

Biotic Resources Group

Biotic Assessments ♦ Resource Management ♦ Permitting

Arroyo Grande Creek Flood Control Project

Biotic Assessment - Final

Prepared for:

San Luis Obispo County

Prepared by:

Biotic Resources Group
Kathleen Lyons, Plant Ecologist

With

Dana Bland & Associates
Dana Bland, Wildlife Biologist

And

Swanson Hydrology + Geomorphology
John Dvorsky, Fisheries Biologist

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**ARROYO GRANDE CREEK FLOOD CONTROL PROJECT
SAN LUIS OBISPO COUNTY**

BIOTIC ASSESSMENT

EXECUTIVE SUMMARY

The flood control channel along the lower portion of Arroyo Grande Creek and Los Berros Creek has been in place since levees were built over 40 years ago. Development upstream in the watershed over the past several decades has increased runoff during rain events, and the levees are no longer adequate to contain flood waters along the lower watershed. After studying various alternatives to controlling flooding within the lower watershed, the Task Force for the Flood Zone 1/1A Advisory Committee, including representatives from local agencies and the landowner community, has recommended as a preferred course of action, given funding limitations, implementation of a multi-tiered project to eventually attain flood control to at least the 20 year event. The project consists of regular vegetation maintenance, sediment excavation to create secondary high flow channels, and levee maintenance. The project will be phased in as funding becomes available to implement each component. If additional funding becomes available, the project may be expanded to include raising levees and raising the Union Pacific Railroad (UPRR) Bridge crossing of Arroyo Grande Creek to accommodate the 20-year flow event.

This Biological Assessment studied the existing conditions along the lower Arroyo Grande and Los Berros Creeks, sensitive biological resources that occur there, and measures to avoid and minimize impacts to sensitive resources. The project has the potential to impact three federally listed species that are known to occur within or adjacent to the project area: tidewater goby, steelhead trout, and California red-legged frog. Other sensitive biological resources within the project area include in-stream wetlands, open water of the low flow channel, nesting birds, and possibly pond turtles. The project description includes several components to avoid and minimize impacts to these sensitive biological resources, including retaining a 15-foot wide vegetated buffer on each side of the low flow channel, conducting vegetation trimming only from August 1 to November 15 of any year, monitoring the created secondary channel to ensure they retain their capacity for high flows, and monitoring the lagoon to ensure sediment does not accumulate there. Additional measures to reduce short-term impacts to sensitive resources are also recommended, including surveys for protected plant species prior to excavation, surveys for and relocation of California red-legged frog during certain construction phases, and excluding 0.78 acres of willow riparian below station 1918.45 from vegetation management activities. With the implementation of the project measures and mitigation measures, the potential impacts of this project can be reduced to a level of non-significance.

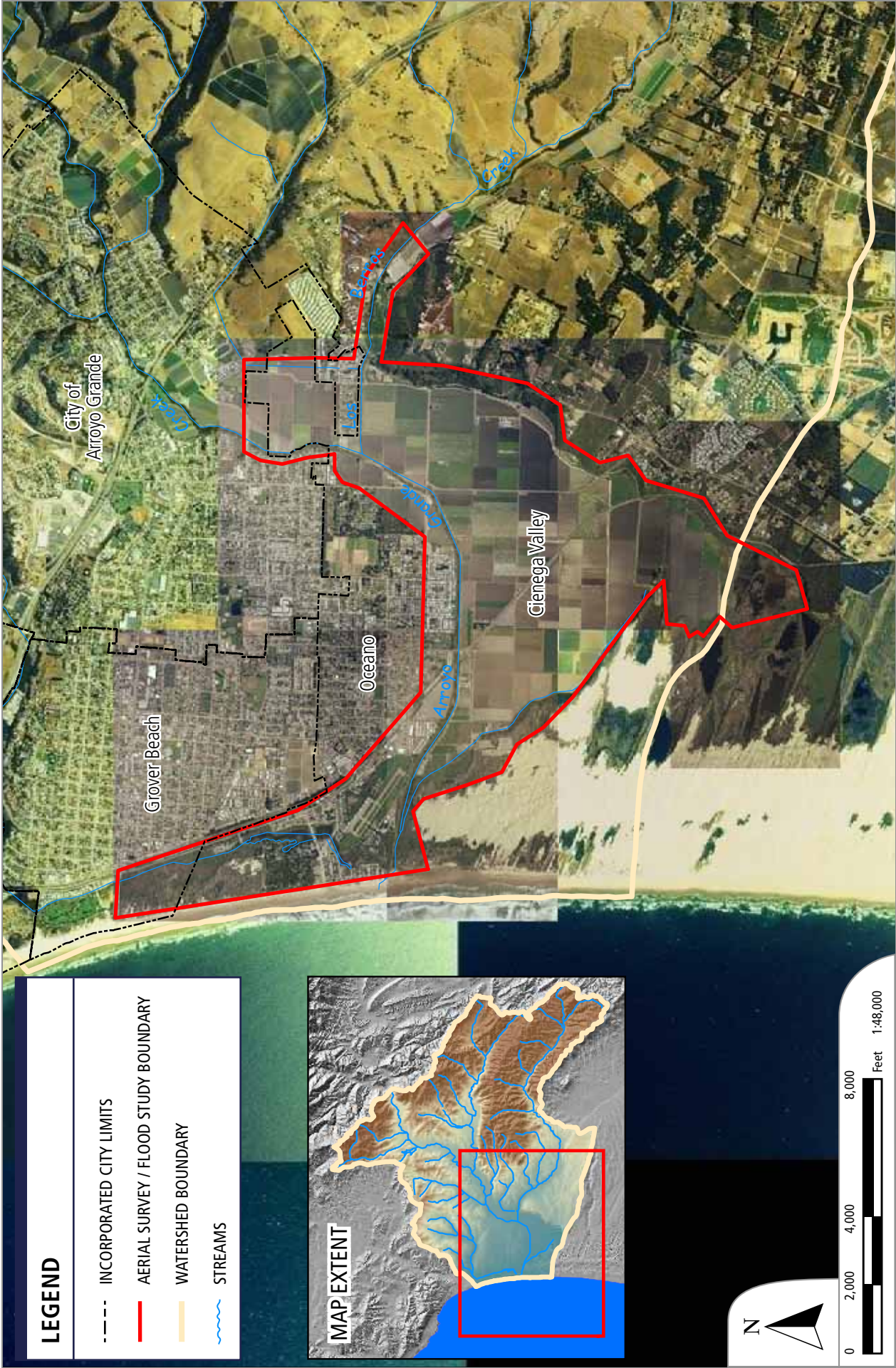


FIGURE 1: Location map for the Biotic Assessment/otic Assessment. The flood control reach consists of all portions of lower Arroyo Grande Creek and lower Los Berros Creek within the Zone 1/1A Flood Control District.

INTRODUCTION

The proposed Arroyo Grande Creek Flood Control Project site is located within San Luis Obispo County, California. The project area is a linear corridor with two segments: (1) beginning on Arroyo Grande Creek 0.14 mile upstream of the confluence of Los Berros Creek and continuing downstream to the upper edge of the Arroyo Grande lagoon at Pacific Ocean, and (2) beginning at the Valley Road Bridge on Los Berros Creek and continuing downstream to the confluence with Arroyo Grande Creek (Figure 1). The proposed Arroyo Grande Creek Flood Control Project is located along a portion of the creeks with existing levees, for a distance of approximately 3.5 miles.

The lower Arroyo Grande, or Cienega Valley, has a long history of flooding and severe damage to agricultural and residential lands. Lopez Reservoir provides flood storage for the uppermost portion of Arroyo Grande Creek. Levees were built along lower Arroyo Grande Creek and the lower portion of Los Berros Creek was diverted in 1961 to provide flood control for the adjacent Cienega Valley. However, development in the watershed has reduced the original capacity of the levees, and in 2001 a portion of the levee failed and inundated Cienega Valley. In 2004, the Coastal San Luis Resource Conservation District (CSLRCD), with funding provided by the San Luis Obispo County Flood Control and Water Conservation District (SLOCFCWCD) and the State Coastal Conservancy, commissioned a study of alternatives to control erosion, sedimentation and flooding along lower Arroyo Grande Creek and Los Berros Creek. The study was completed in 2005 (Swanson Hydrology and Geomorphology 2005), and a preferred alternative was selected by a Task Force with representatives from local agencies and the landowner community which was considered feasible within anticipated funding limits.

The selected approach by the Task Force was to pursue a phased implementation of Alternative 3a, at a minimum, as funding within the local flood control district became available. Alternative 3a, once completely implemented, would provide flood protection up to the 10-year return period. Given a limited annual revenue stream, Alternative 3a would most likely be implemented in several phases over a period of 9-13 years to eventually provide the expected level of flood protection. If additional funding becomes available, implementation of Alternative 3c may be pursued. Alternative 3c includes all elements of Alternative 3a, and additionally raises the levees and UPRR Bridge to provide flood protection up to the 20-year return period. This Biotic Assessment documents existing conditions along lower Arroyo Grande and Los Berros creeks, and analyzes the potential impacts and mitigation measures to biological resources that would result from implementation of all elements of Alternative 3.

Project Description

The erosion, sedimentation, and flood control alternative selected by SLOCFCWCD is referred to in the Swanson 2005 report as Alternative 3. This alternative consists of the following components:

- Vegetation management;
- Sediment removal with maintenance in subsequent years;
- Raising existing levees; and,
- Raising and/or retrofitting the Union Pacific Railroad Bridge that crosses Arroyo Grande Creek.

Vegetation Management: The vegetation management program would consist of maintaining a 15-foot riparian buffer on both sides of the low-flow channel to provide riparian habitat and streamside cover to protect aquatic habitat. The riparian buffer would also act to maintain a bankfull channel that has

developed over the last several years by providing root strength along the low flow channel margins. Vegetation outside of the buffer would be removed completely to allow for high flows to access secondary channels and provide for increased conveyance and flood capacity. Willows present within the buffer would be limbed up to reduce cross-sectional roughness but still provide adequate stream shading and riparian habitat. Cottonwood and sycamore present within the buffer would not be limbed up. Existing gaps in the riparian buffer would be revegetated with native riparian species including cottonwood, sycamore, and willow. In addition, cottonwood and sycamore will be planted at random along the length of the flood control channel to encourage long-term diversity in the riparian canopy. Vegetation management would be conducted as often as necessary to maintain a roughness of 0.04 through an adaptive management approach that would include a reconnaissance survey and site visits with regulatory agency staff. Based on past experience, vegetation management would be repeated approximately every 1-3 years depending on the amount of re-growth. Vegetation management would occur as late as possible in the summer and fall of each year to maximize stream shading during the warmer summer months and would only occur between August 1 and November 15 of any given year to avoid impacts to steelhead. Vigorous regrowth of willow is expected in late winter and spring providing low, overhanging vegetation during critical months for steelhead rearing.

Selective vegetation trimming along Arroyo Grande Creek within the study area was conducted in 2005. Willows less than four inches in diameter and various other understory vegetation was trimmed by hand crews to within five inches of the ground. Removal of material from the channel edge was conducted by hand crews, and in some spots a backhoe operated from the top of levee assisted in removal of debris. No debris was allowed to enter the stream channel, and debris from invasive species was separately bagged and disposed of at a designated landfill. Root masses were not disturbed and branches providing important canopy cover for the stream were not cut. The 2005 vegetation trimming varies from the proposed long-term vegetation management program in that some willows within the buffer area along the low flow channel were thinned, as opposed to just limbed up to six feet. Methods are recommended below under Mitigation Measures to ensure consistent vegetation management methods are implemented as described.

Sediment Removal: The first year of the sediment removal program includes removal of sediment on the levee side of the 15 foot riparian buffers. Sediment would be removed to depths of 1.5-foot above the bed of the Arroyo Grande Creek channel and 1-foot above the Los Berros Creek channel, as measured at a riffle. These depths were estimated as the appropriate bankfull depth for the channel. The overflow channels will be excavated so as to mimic conditions found in natural river systems characterized by primary and secondary channels. In natural systems, the primary channel contains low flows, whereas the secondary channel becomes activated during higher flows that, on average, occur once a year. The Arroyo Grande Creek flood control channel currently lacks the secondary channels that are found in more natural, low gradient stream environments. The secondary, or overflow channels, will be excavated into areas in the channel that have accumulated excess sediment in bars and terraces and reduced flood capacity through the flood control reach. At strategic locations along the flood control reach, the excavated secondary channels will be connected with the primary channels to allow for complex flow conditions that will encourage scour and sediment transport, and reduce the need for future sediment removal. No sediment in the primary channel will be excavated, and the excavation equipment will be operated from the top of the levee. Sediment will be removed by trucks to an approved disposal site. Additionally, large woody debris (LWD) will be placed at strategic locations to protect the head of channel bars, promote pool scour, encourage sediment sorting, and provide deep pools and cover habitat for steelhead and red-legged frog.

Some maintenance of the secondary channels is expected over the long-term. Annual cross-section monitoring will assess the performance of the channel in moving supplied sediment. Modeling presented in Chapter 4 of the Alternatives Study (Swanson, 2005) suggests that increased sediment transport conditions through the flood control reach will not negatively impact the Arroyo Grande lagoon. To ensure that the depth of the lagoon is not impacted, additional cross-sections will be established at the lagoon and monitored following significant runoff events. Cross-section will also be established along the flood control reach to provide information on the need to do spot removal of accumulated sediment to ensure that the project passes target flood flows. Annual maintenance will also be a component of the overall vegetation and sediment management program. Maintenance of the overflow channel will consist of “bar ripping”, which breaks up roots and other debris to promote sediment transport to flush the channel. A similar program has been successful on the San Lorenzo River in Santa Cruz County despite concerns about steelhead, Coho salmon, and red-legged frogs (SH+G et al, 2002). In the case of the San Lorenzo River, secondary channels have developed a gravel/cobble surface due to scouring action and lack of fine sediment deposition. The objective of the annual maintenance program is to keep the secondary channels open for flood flows.

Sediment was removed from several sites along this portion of Arroyo Grande Creek in 2001, 2002 and 2003. An excavator was located on the top of the levee, and a long-reach bucket was used to scoop up sediment from designated areas and deposit it in a dump truck to take the sediment off-site to a County approved area. This is an example of how sediment management will be conducted for the long-term management plan.

Raise Existing Levees: The levees would be raised along most of lower Los Berros Creek and along Arroyo Grande Creek from the Los Berros confluence to the lagoon. The levees would be raised to 2 feet above the 20-year water surface, requiring approximately 76,000 cubic yards of fill. Raising of the levees would most likely be conducted in phases as funding becomes available. The first phase may raise the levees to an elevation that would provide 10-year flood protection. The next phase of levee raising would provide 15-year flood protection. The last levee raising phase would achieve 20-year flood protection. The existing levees will be raised while maintaining a 2h:1v slope on the levee sides and providing a minimum top width of 15-feet. All levee raising work would take place outside the low flow channel and the 15-foot vegetation buffer.

Raise Railroad Bridge: The Union Pacific Railroad (UPRR) Bridge crossing of Arroyo Grande Creek would be raised by up to 5 feet to raise it 0.5 feet above the 50-year water surface elevation. Raising the UPRR Bridge would occur in conjunction with subsequent levee raising phases that provide 15-year and 20-year flood protection.

Biological Assessment Tasks

An assessment of the biotic resources of the proposed flood control project area was conducted during a field visit in October 2005. The focus of the field assessment was to identify existing conditions and sensitive biotic resources within the project area that may be affected by the flood control project.

Specific tasks conducted for this study include:

- Characterize the major plant communities within the project area;
- Identify potential sensitive biotic resources, including plant and wildlife species of concern and ordinance-sized trees, within the project area;
- Evaluate the potential effects of the proposed project on sensitive biotic resources and recommend measures to avoid or reduce such impacts.

EXISTING BIOTIC RESOURCES

METHODOLOGY

The biotic resources of the proposed Arroyo Grande Creek Flood Control Project area were assessed through field observations conducted on October 27, 2005. Kathleen Lyons, plant ecologist, Dana Bland, wildlife biologist, and John Dvorsky, Fisheries Biologist, walked the proposed flood control route. During the field survey, the plant communities on the site were identified.

To assess the potential occurrence of special status biotic resources, two electronic databases were accessed to determine recorded occurrences of sensitive plant communities and sensitive species. Information was obtained from the California Native Plant Society's (CNPS) Electronic Inventory (2004) and California Department of Fish & Game's (CDFG) Natural Diversity DataBase "RareFind 3" (CNDDDB) (CDFG 2005) for the Arroyo Grande NE and Oceano U.S.G.S. quadrangles and the surrounding quadrangles of San Luis Obispo, Lopez Mountain, Tar Springs Ridge, Nipomo, Santa Margarita Lake and Pismo Beach. Previous reports on the riparian resources of Arroyo Grande Creek were also reviewed (Essex Environmental 2002, County of San Luis Obispo 2000, Essex Environmental 2000, California Coastal Commission 2003).

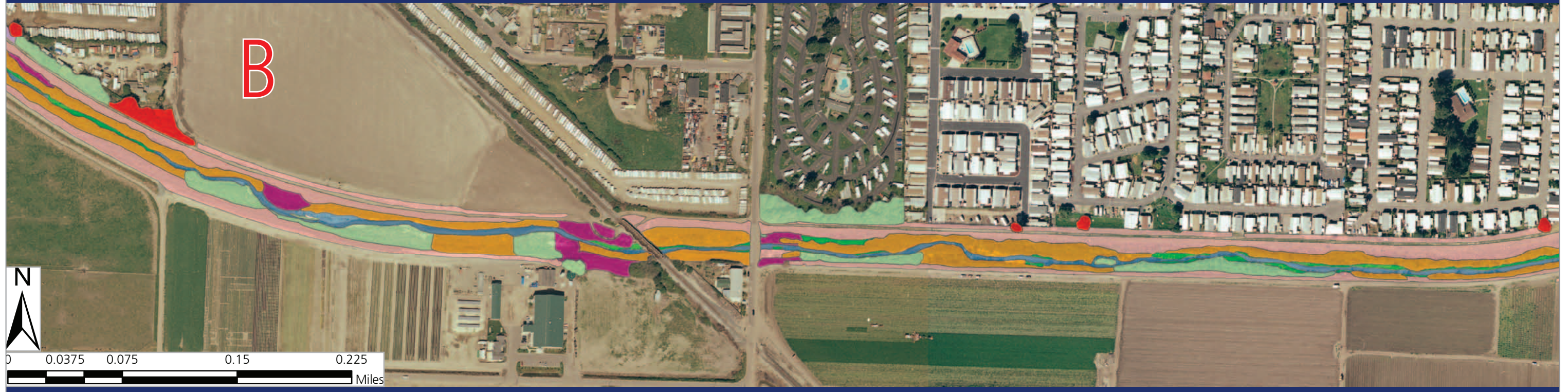
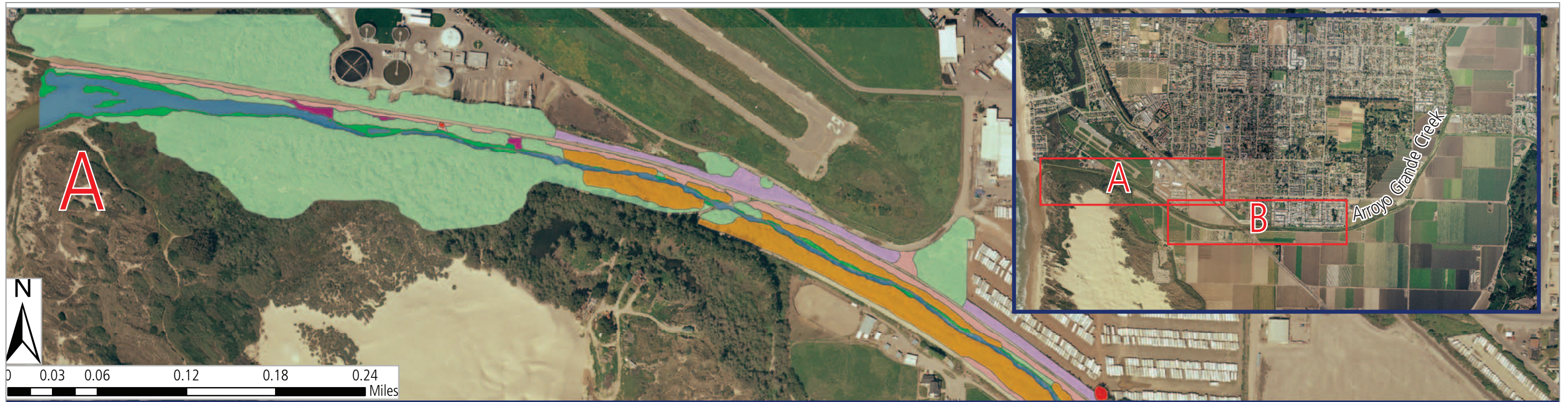
This report summarizes the findings of the biotic assessment. The potential impacts of the proposed flood control work on sensitive biological resources are discussed below. Measures to reduce significant impacts to a level of less-than-significant are recommended, as applicable.

SETTING

The flood control study area encompasses 3.5 miles of lower Los Berros Creek and lower Arroyo Grande Creek in San Luis Obispo County (Figure 1). The study area is located just south of the cities of Arroyo Grande and Oceano, on the Oceano 7.5' USGS quadrangle (see Figure 1). The study area was historically part of a large alluvial valley where sediment from the upper watershed was transported and deposited onto the broad floodplains. Since the early 1800s the valleys have been farmed, and the creek and its riparian forests altered by humans to create more farmland on the rich alluvial deposits. Today, the areas north of lower Arroyo Grande Creek are urbanized with a mix of residential, commercial and utility services; areas south of the creek are still largely agricultural lands of the Cienega Valley and recreational lands such as the Pismo Dunes Natural Preserve. The topography within the study area is relatively flat.

EXISTING BIOTIC RESOURCES

Six plant community types were observed within the Arroyo Grande Creek Flood Control Project area: willow riparian woodland, riparian scrub, coyote brush scrub, ruderal (weedy) grassland, in-stream wetlands, and landscape tree groves. The willow riparian woodland habitat type comprises the majority of the proposed flood control area; due to previous flood control measures, many riparian woodland areas had been thinned or browsed by goats. The distribution of the plant communities within the project area is depicted on Figures 2, 3, and 4 and listed in Table 1.



LEGEND

VEGETATION COMMUNITIES

B - BARE LAND	LT - LANDSCAPED TREES	OWD - OPEN WATER/DRY CHANNEL	RS - RIPARIAN SCRUB	WR - WILLOW RIPARIAN WOODLAND	WRT - WILLOW RIPARIAN WOODLAND/THINNED
CBS- COYOTE BASIN SCRUB	OW - OPEN WATER	RUD - RUDERAL GRASSLAND	W - IN-STREAM WETLAND	WRB - WR/BROUSED BY GOATS	

SWANSON HYDROLOGY+GEOMORPHOLOGY
 500 Seabright Ave, Suite 202 Santa Cruz, CA 95062
 PH 831.427.0288 FX 831.427.0472

FIGURE 1: Map indicating



LEGEND

VEGETATION COMMUNITIES

- | | | | | | |
|-------------------------|-----------------------|------------------------------|-----------------------|-------------------------------|--|
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FIGURE 1: Map indicating

Table 1. Vegetation Types within Arroyo Grande Flood Control Project Area

CNDDDB Code	Vegetation Alliance	Plant Association	General Location	Acreage
61.201.01	Willow Riparian Woodland	Arroyo Willow – Red Willow	Along Arroyo Grande Creek	37 ¹
63.902.00	Riparian Scrub	Young Willow - Mugwort	Along Arroyo Grande Creek	1
32.060.00	Coyote Brush Scrub	Coyote Brush – Himalaya Berry - Fennel	Outer levee slopes along lower reaches of Arroyo Grande Creek	1
42.000.00	Non-native (Ruderal) Grassland	Wild Radish – Fennel – Wild Mustard – Italian ryegrass	Creek slopes along Arroyo Grande Creek and Los Berros Creek	21
52.000.00	In-Stream Wetlands	Watercress – Cattail - Scirpus	Within channel of Arroyo Grande Creek	3
None *	Landscape Tree Groves	Various planted trees and shrubs	Adjacent to Residences	1
None	Open Water	None	None	5
TOTAL				69

* Not in CDFG classification system

1 – includes 1 acre browsed by goats and 12 acres recently thinned

Willow Riparian Woodland

The riparian woodland within the project area occurs along the creek banks of Arroyo Grande Creek. The vegetation is dominated by arroyo willow (*Salix lasiolepis*) and red willow (*S. laevigata*), with scattered occurrences of black cottonwood (*Populus balsamifera ssp. trichocarpa*), dogwood (*Cornus sp.*), box elder (*Acer negundo*), blue elderberry (*Sambucus mexicana*), and western sycamore (*Platanus racemosa*). Throughout the project area, previous flood control measures have been implemented, with the stands of willows thinned to select for small, widely spaced individuals. Of the 37 acres of riparian woodland within the project area, approximately 13 acres had been previously thinned, when viewed in October 2005. Areas where vegetation had been thinned are depicted in Figures 4 and 5. In some locations, goats were used to browse the understory plants (Figure 5). The riparian vegetation on the north and south banks ranges in width between 40 and 60 feet, as measured outward from the edge of the creek channel. The understory is limited to shrubs and herbaceous species, most of which are non-native species. Typical species observed during the fall 2005 survey include curly dock (*Rumex crispus*), fennel (*Foeniculum vulgare*), wild radish (*Raphanus sativa*), wild mustard (*Brassica sp.*), mallow (*Malva neglecta*), witch grass (*Panicum sp.*), castor bean (*Ricinus communis*), and nasturtium (*Tropaeolum majus*). Native species include coyote brush (*Baccharis pilularis*), creek clematis (*Clematis sp.*), toyon (*Heteromeles arbutifolia*), and western raspberry (*Rubus leucodermis*). Occurrences of invasive, non-native plant species were also observed along Arroyo Grande Creek; stands of giant reed (*Arundo donax*) and pampas grass (*Cortaderia jubata*) occur amid the willow-dominated woodland.

The riparian vegetation along Los Berros Creek is limited to isolated patches of willow and blue elderberry.

Riparian Scrub

A few areas along the banks of Arroyo Grande Creek are dominated by riparian scrub. The dominant plant species are young willows, intermixed with common California aster (*Aster chilensis*), coyote brush, Italian ryegrass and Himalaya berry (*Rubus procerus*).

Wildlife Resources of Willow Riparian Woodland and Riparian Scrub

Willow riparian woodlands and the adjacent scrub are home to numerous birds that use the foliage to camouflage their nests. Some of the more common birds expected to nest in this riparian areas include Pacific-slope flycatcher (*Empidonax difficilis*), warbling vireo (*Vireo gilvus*), western scrub jay (*Aphelocoma californica*), Bewick's wren (*Thryomanes bewickii*), American robin (*Turdus migratorius*), Wilson's warbler (*Wilsonia pusilla*), and black-headed grosbeak (*Pheucticus melanocephalus*). Many other birds that are not expected to nest in these habitats, can be abundant on a seasonal basis, for example flocks of wintering yellow-rumped warbler (*Dendroica coronata*).



Figure 5. View of riparian woodland vegetation along Arroyo Grande Creek downstream of 22nd Street, showing vegetation thinning, October 2005.



Figure 6. View of riparian woodland vegetation along Arroyo Grande Creek between Highway 1 and 22nd Street, showing vegetation thinning, October 2005.

Instream Wetlands and Open Water

Portions of the Arroyo Grande Creek channel support in-stream wetlands characterized by the presence of freshwater marsh plant species. During the fall 2005 survey, large expanses of vegetation covered the creek channel. The vegetation was dominated by watercress (*Rorippa nasturtium-aquaticum*) and water smartweed (*Polygonum sp.*), yet stands of cattail (*Typha sp.*) and nutgrass (*Cyperus sp.*) were also observed. Along the edges of the creek bank, plants of cocklebur (*Xanthium strumarium*), bristly ox-tongue (*Picris echioides*), curly dock, Pacific silverweed (*Potentilla anserina ssp. pacifica*), burreed (*Sparangium eurycarpum*), and water parsley (*Oenanthe sarmentosa*). The in-stream wetlands range from bands approximately 2 feet wide along the edge of the channel bank to bands that encompass the entire channel bed and are over 10 feet wide. In-stream wetland vegetation downstream of 22nd Street is depicted in Figure 6.



Figure 7. In-stream wetlands within Arroyo Grande Creek downstream of the UPRR Bridge, October 2005.

Instream Wetlands and Open Water

The lower reaches of the creek (near the creek's outlet to the ocean) support wetlands adapted to the brackish condition of this portion of the creek; stands of bulrush (*Scirpus sp.*) and cattail occur along the creek edges as well as in large masses mid-stream.

Wildlife Resources of Instream Wetlands and Open Water

The aquatic habitats provide a diversified aquatic invertebrate fauna, which forms a link in many food webs. Native wildlife associated with aquatic habitats that feed primarily on invertebrates include fishes such as steelhead trout (*Oncorhynchus mykiss*), Pacific tree frog (*Hyla regilla*), black phoebe (*Sayornis nigricans*), violet-green swallow (*Tachycineta thalassina*), and little brown myotis (*Myotis lucifugus*).

The presence of wetland plants such as rushes, cattails, tules and willows in the creek low-flow channel and along creek edges provide cover, food and breeding sites for wildlife. Southwestern pond turtle (*Clemmys marmorata pallida*) will retreat into deep water or dense patches of cattails to escape danger, and western aquatic garter snake (*Thamnophis couchii*) will use the cover of dense emergent vegetation to stalk one of its favorite prey items, frogs. Larger willow branches that extend over or into the water also make favorite basking sites for pond turtles which is important in their ability to thermoregulate. Mallards (*Anas platyrhynchos*) and red-winged blackbirds (*Agelaius phoeniceus*) are two common birds observed along the creek that feed primarily on the seeds of wetland plants, and red-winged blackbirds use the plant leaves to weave their cup-like nests among the dense stands of tules or cattails. Several beaver (*Castor canadensis*) dams were observed along Arroyo Grande Creek during the October 2005 survey, the dams were built of willow branches and saplings harvested by the beavers from the adjacent banks.

The presence of surface water and abundant prey also attracts other wildlife to aquatic areas for drinking, foraging and seasonal roosts, although they may not reside in these areas year round. Black-tailed deer (*Odocoileus hemionus*) may be seen drinking water from the creek. The presence of fish, amphibians, and small birds in creeks and ponds attracts larger predators. Cooper's hawk (*Accipiter cooperii*) and sharp-shinned hawk (*Accipiter striatus*) forage on smaller birds along riparian corridors such as Arroyo Grande Creek, and raccoons (*Procyon lotor*) commonly hunt at creeks for crayfish and frogs.

Fisheries Resources of Instream Wetlands and Open Water

The instream wetlands and open water habitat present along the project reach can be divided into two primary habitat types. The first habitat type occurs in the lower 1,000 feet of channel and can be characterized as lagoon habitat. Lagoon conditions vary based on the degree of freshwater inflow, the presence of a beach berm, and tidal conditions. The highly productive lagoon environment can often support a variety of fish species including steelhead (*Oncorhynchus mykiss*), tidewater goby (*Eucyclogobius newberryi*), topsmelt (*Atherinops affinis*), and starry flounder (*Platichthys stellatus*). Lagoon fish feed on a variety of plant and animal organisms including small crustaceans, diatoms, filamentous algae, detritus, macroinvertebrate drift, and amphipods.

Upstream of the lagoon, the instream wetland and open water habitat consists of a low gradient, freshwater, riverine habitat that supports a variety of native and non-native fish species that may include

steelhead (*Onchorynchus mykiss*), speckled dace (*Rhinichthys osculus*), prickly sculpin (*Cottus asper*), stickleback (*Gasterosteus aculeatus*), California roach (*Hesperoleucus symmetricus*), brown bullhead (*Ictalurus nebulosus*), largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), and Pacific lamprey (*Lampetra tridentate*). This reach of the Arroyo Grande is currently marginal for steelhead due to low flows and high water temperatures in the summer but it does provide limited spawning and rearing habitat. The Los Berros Creek portion of the study area would only act as a migratory corridor for steelhead due to the lack of cover habitat and dry summer conditions.

Landscape Tree Groves

The project area supports some groves of planted landscape trees. These are located adjacent to residential areas and include Monterey pine (*Pinus radiata*), myoporum (*Myoporum laetum*), blue gum eucalyptus (*Eucalyptus globulus*), and weeping willow (*Salix babylonica*). Other landscape plants include mallow (*Sidalcea sp.*), geranium (*Geranium sp.*) and English ivy (*Hedera helix*).

Wildlife Resources of Landscape Tree Groves

Wildlife use of the landscaping plants is expected to be low because many are non-native plants not frequented by native wildlife species, and most are only single shrubs or trees interspersed among an otherwise urbanized and developed area providing little vegetative cover for wildlife. Urban adapted species such as scrub jay (*Aphelocoma coerulescens*) and European starling (*Sturnus vulgaris*) may use the landscaped areas as perches, and these as well as other birds may occasionally forage on berries or nectar of some plants. Common wildlife species that utilize eucalyptus groves include alligator lizard (*Gerrhonotus multicarinatus*), Anna's hummingbird (*Calypte anna*) and woodrat (*Neotoma sp.*). Eucalyptus trees are locally important as they provide potential wintering or autumnal roosting habitat for monarch butterflies (*Danaus plexippus*). The large eucalyptus trees in the study area also provide potential roosting and nesting habitat for raptors such as red-tailed hawk, red-shouldered hawk (*Buteo lineatus*) and great horned owl (*Bubo virginianus*).

Non-Native (Ruderal) Grassland

The side slopes along Arroyo Grande Creek and Los Berros Creek are dominated by a ruderal (weedy) grassland. Plant species are typical of previously disturbed areas and are dominated by non-native plant species. Typical species within the project area are wild radish, telegraph weed (*Heterotheca grandiflora*), fennel, wild mustard, Kikuyu grass (*Pennisetum clandestinum*), Italian ryegrass (*Lolium multiflorum*), bull mallow, Himalaya berry (*Rubus procerus*), and witch grass. Native plant species are scattered within the grassland and include common California aster, golden fleece (*Ericameria arborescens*), coyote brush, California poppy (*Eschscholtzia californica*) and mugwort (*Artemisia douglasiana*). The project area also supports scattered plants of mission cactus (*Opuntia ficus-indica*). Figure 7 depicts the non-native ruderal habitat along the upper reach of Arroyo Grande Creek.



Figure 8. View of ruderal vegetation along banks of Arroyo Grande Creek upstream of Highway 1 Bridge, October 2005.

Wildlife Resources of Ruderal Habitat

Many of the plants in the ruderal habitat in the study area are non-natives and are not of high value to most native wildlife, although the berries and seeds of some plants do provide forage for common wildlife species similar to described below for the scrub habitats.

Coyote Brush Scrub

Some outer slopes of levees along the lower reaches of Arroyo Grande Creek are dominated by coyote brush scrub. The dominant plant species is coyote brush, yet also includes fennel, wild mustard, Kikuyu grass (*Pennisetum clandestinum*), and Himalaya berry.

Wildlife Resources of Scrub Habitat

The berries of shrubs and the seeds of herbaceous plants in the scrub habitats provide forage for wildlife. California quail (*Callipepla californica*), California towhee (*Pipilo crissalis*), savannah sparrow (*Passerculus sandwichensis*), white-crowned sparrow (*Zonotrichia leucophrys*), and brush mouse (*Peromyscus boylii*) are common seed-eating wildlife species found in scrub habitats. The abundance of invertebrates makes scrub habitats suitable for species such as western fence lizard (*Sceloporus occidentalis*), southern alligator lizard (*Gerrhonotus multicarinatus*), and California thrasher (*Toxostoma redivivum*). Brush rabbits (*Sylvilagus bachmani*) commonly forage on the herbaceous parts of shrub plants. The abundance of prey in scrub habitats attracts larger predators such as gopher snake (*Pituophis melanoleucus*) and striped skunk (*Mephitis mephitis*).

SENSITIVE BIOTIC RESOURCES

Sensitive Habitats

Sensitive habitats are defined by local, State, or Federal agencies as those habitats that support special status species, provide important habitat values for wildlife, represent areas of unusual or regionally restricted habitat types, and/or provide high biological diversity.

The riparian woodland, riparian scrub and instream wetlands within the project area are all considered sensitive habitats according to the CDFG and USFWS. This status is due to the value of these habitats to wildlife and the relatively limited (and declining) distribution of this habitat at the local and statewide level. These habitat types are considered to be areas of high biological quality, warranting preservation and management.

The riparian woodland in the project area is considered sensitive due to its importance to wildlife species and is recognized as such by state resource agencies, federal agencies and the County of San Luis Obispo.

Ordinance Trees

Ordinance-sized trees are considered sensitive resources. The County of San Luis Obispo Tree Removal Controls (County of San Luis Obispo Code, sections 22.56.020 and 22.56.030) serve to protect all trees having a trunk measuring 8 inches or more in diameter at a height of 4 feet above the natural grade of slope. The County's tree ordinance applies to both native and non-native species. A tree removal permit is usually required from the County for removal of trees exceeding this size; however, such a permit is typically not required for public utility projects (Section 22.56.020).

Special Status Plant Species

Plant species of concern include those listed by either the Federal or State resource agencies as well as those identified as rare by CNPS. Based on a search of the CNPS and CNDDDB inventories for the Arroyo Grande NE and Oceano 7.5' quadrangles, and surrounding quadrangles, and a review of pertinent literature, special status plant species were evaluated for their potential to occur in the project vicinity. The species evaluated are listed on Table 2. Based on a search of the CNPS and CNDDDB inventories and visual observations of the project site, there is a potential for four plant species of concern to occur within the lower reaches of Arroyo Grande Creek. The species with potential to occur are sand marshwort, La Graciosa thistle, Gambels watercress, and San Bernardino aster, as listed on Table 2, below. This evaluation is based on presence of suitable habitat for certain sensitive plant species. No special status species were observed on the project area during the October 2005 reconnaissance survey; however, this survey was conducted during the non-blooming period for many plant species.

Table 2. List of Special Status Plant Species Evaluated for Occurrence within the Arroyo Grande Flood Control Project Area

Species	Status	Habitat	Known Occurrence on Site/Vicinity Potential Habitat within Project Area?
Hoover's bentgrass (<i>Agrostis hooveri</i>)	CNPS: List 1B State: None Federal: None	Chaparral woodland and foothill grassland	Recorded from Arroyo Grande at Highway 101, Black Lake Canyon Low potential on site due of lack of suitable habitat.
Santa Lucia manzanita (<i>Arctostaphylos luciana</i>)	CNPS: List 1B State: None Federal: None	Chaparral on shale outcrops	Recorded NNE of Slide Hill in Bald Mountain Area Low potential on site due of lack of suitable habitat.
Sand mesa manzanita (<i>Arctostaphylos rudis</i>)	CNPS: List 1B State: None Federal: None	Chaparral and coastal scrub in sandy soils	Recorded south of Berros along Black Lake Canyon, Nipomo Mesa Low potential on site due of lack of suitable habitat.
Well's manzanita (<i>Arctostaphylos wellsii</i>)	CNPS: List 1B State: None Federal: None	Chaparral, pine woodlands, coastal scrub	Recorded N of Arroyo Grande, Noyes Road, Edna, Grover City Low potential on site due of lack of suitable habitat.
Sand marshwort (<i>Arenaria paludicola</i>)	CNPS: List 1B State: Endangered Federal: Endangered	Marshes, growing amid cattail and bulrush, peat marshes	Recorded from Pismo Beach, Oso Flaco Lake, Black Lake, Jack Lake, Potential along lower reaches of Arroyo Grande Creek within wetlands patches
San Luis mariposa lily (<i>Calochortus obispoensis</i>)	CNPS: List 1B State: None Federal: None	Chaparral, coastal scrub and grassland, often in serpentine	Recorded from head of Carpenter Canyon and near Grover City Low potential on site due of lack of suitable habitat.
Obispo Indian paintbrush (<i>Castilleja densiflora ssp. obispoensis</i>)	CNPS: List 1B State: None Federal: None	Valley and foothill grassland	Recorded from Pismo Creek, Poorman Canyon area, Carpenter Canyon, Noyes Road, Edna, Orcutt Road Low potential on site due of lack of suitable habitat.
Brewer's spineflower (<i>Chorizanthe breweri</i>)	CNPS: List 1B State: None Federal: None	Chaparral woodland and coastal scrub, rocky serpentine	Recorded from Orcutt Road, Price Canyon, Low potential on site due of lack of suitable habitat.
Surf thistle (<i>Cirsium rhotophilum</i>)	CNPS: List 1B State: Threatened Federal: None	Coastal dunes, coastal bluff scrub	Recorded from Pismo Beach, Oso Flaco Lake, Low potential on site due of lack of suitable habitat.
La Graciosa thistle (<i>Cirsium loncholepis</i>)	CNPS: List 1B State: Threatened Federal: Endangered	Coastal Dunes, brackish marshes, riparian scrub	Recorded from Callendar Dunes, Jack Lake, Mud Lake, Dune Lake, Surprise Lake, Oso Flaco Lake Potential along lower reaches of Arroyo Grande Creek.
Pismo clarkia	CNPS: List 1B	Chaparral	Recorded from Tiber Canyon, Price Canyon,

Species	Status	Habitat	Known Occurrence on Site/Vicinity Potential Habitat within Project Area?
<i>(Clarkia speciosa ssp. immaculata)</i>	State: Rare Federal: Endangered	woodland and foothill grassland on ancient sand dunes	Carpenter Canyon, Grover City, Oak Park Blvd., Noyes Road area, Corbit Canyon, Nipomo Mesa Low potential on site due of lack of suitable habitat.
Leafy tarplant <i>(Deinandra increscens ssp. foliosa)</i>	CNPS: List 1B State: None Federal: None	Valley and foothill grassland	Recorded from Lopez Reservoir Low potential on site due of lack of suitable habitat.
Dune Larkspur <i>(Delphinium parryi ssp. blchmaniae)</i>	CNPS: List 1B State: None Federal: None	Chaparral and coastal dunes; rocky areas and dunes	Recorded from Nipomo Mesa, Jack Lake, Callendar Dunes Low potential on site due of lack of suitable habitat.
Beach spectaclepod <i>(Dithyrea maritima)</i>	CNPS: List 1B State: Threatened Federal: None	Coastal dunes, coastal scrub on sand dunes and sandy areas	Recorded from Pismo State Beach, Oso Flaco Lake, Guadalupe Dunes Low potential on site due of lack of suitable habitat.
San Luis Obispo dudleya <i>(Dudleya abramsii ssp. murina)</i>	CNPS: List 1B State: None Federal: None	Chaparral and woodland on serpentine outcrops	Recorded from Corral de Peidra Creeks Low potential on site due of lack of suitable habitat.
Blochman's leafy daisy <i>(Erigeron blochmaniae)</i>	CNPS: List 1B State: None Federal: None	Coastal dunes	Recorded from Oso Flaco Lake, dunes west of Santa Maria Valley, Guadalupe Dunes, Nipomo Mesa Low potential on site due of lack of suitable habitat.
Mesa horkelia <i>(Horkelia cuneata ssp. puberula)</i>	CNPS: List 1B State: None Federal: None	Chaparral woodland and coastal scrub, sandy or gravelly sites	Recorded from NE of Pismo Beach (1936) Low potential on site due of lack of suitable habitat.
Kellogg's horkelia <i>(Horkelia cuneata ssp. sericea)</i>	CNPS: List 1B State: None Federal: None	Chaparral, pine forest, coastal scrub, old dunes and sandhills	Recorded from Callendar Dunes, Nipomo Mesa, Jack Lake Low potential on site due of lack of suitable habitat.
San Luis Obispo County lupine <i>(Lupinus ludovicianus)</i>	CNPS: List 1B State: None Federal: None	Chaparral and woodland in sandy soil	Recorded from Tiber Siding on SPRR, near Edna Low potential on site due of lack of suitable habitat.
Nipomo Mesa lupine <i>(Lupinus nipomensis)</i>	CNPS: List 1B State: Endangered Federal: Endangered	Coastal dunes	Recorded from Jack Lake, Callendar Dunes, Black Lake, E of Santa Maria Oil Refinery Low potential on site due of lack of suitable habitat.
Crisp monardella <i>(Monardella crispera)</i>	CNPS: List 1B State: None	Coastal dunes, coastal scrub	Recorded from Nipomo Dunes, Black Lake, Guadalupe Dunes, Arroyo Grande at Highway Low potential on site due of lack of suitable

Species	Status	Habitat	Known Occurrence on Site/Vicinity Potential Habitat within Project Area?
	Federal: None		habitat.
San Luis Obispo monardella (<i>Monardella frutedcens</i>)	CNPS: List 1B State: None Federal: None	Coastal dunes, coastal scrub	Recorded from Black Lake, Coreopsis Hill, Oso Flaco Lake area, Pismo State Beach, Callendar Dunes Low potential on site due of lack of suitable habitat.
Gambel's watercress (<i>Rorippa gambelii</i>)	CNPS: List 1B State: Threatened Federal: Endangered	Freshwater and brackish water marshes along lakes and streams	Recorded from Oso Flaco Lake, Twin Lake, Little Oso Flaco Lake, Black Lake Canyon, Potential within lower reaches of Arroyo Grande Creek.
San Bernardino aster (<i>Symphyotrichum defolioatum</i>)	CNPS: List 1B State: None Federal: None	Meadows and seeps, coastal scrub, woodland, mesic areas near ditches and streams	Recorded from Mountain View Road, near Halcyon Road and SPRR Overpass Potential along lower Arroyo Grande Creek levees.

CNPS Status:

List 1B: These plants (predominately endemic) are rare through their range and are currently vulnerable or have a high potential for vulnerability due to limited or threatened habitat, few individuals per population, or a limited number of populations. List 1B plants meet the definitions of Section 1901, Chapter 10 of the CDFG Code.

List 3: This is a review list of plants that lack sufficient data to assign them to another list.

List 4: List 4 is a watch list of plants with limited distribution in the state that have low vulnerability and threat at this time. These plants are uncommon, often significant locally, and should be monitored.

Federal and State Status:

T: Designated as a threatened species by the federal government or the California Fish and Game Commission

E: Designated as an endangered species by the federal government or the California Fish and Game Commission

SSC: Species of Special Concern

Special Status Wildlife Species

Special status wildlife species include those proposed for listing, candidates for listing, or those listed by either the Federal or State resource agencies as threatened or endangered. Special status wildlife species also includes State species of special concern. In addition, all raptor nests are protected by Fish and Game Code, and all migratory birds are protected by the Federal Migratory Bird Treaty Act. Special status wildlife species were evaluated for their known and/or potential presence in the project area as described in Table 3. Special status wildlife species that are known or likely to inhabit the project area are described briefly below.

In addition to the wildlife species listed below in Table 3, several other special status wildlife species are known to occur within 10 miles of the general study area vicinity, but are not expected to occur on site because the site lacks suitable habitat. For example, several vernal pool crustaceans that are federally or state listed occur only in vernal pools, which do not occur on or adjacent to the study area. Other species are associated with the extensive dune habitats located south and west of the study area and the coastal strand habitats (e.g., western snowy plover and brown pelican), but are not associated with the riparian habitats present in the study area. Wide ranging species such as bald eagle and condor do not occur in areas of dense urban development that exists on the north side of Arroyo Grande Creek, and are not expected to occur in the study area.

Previous sediment removal and vegetation trimming also limits the habitat value for wildlife species that are less sensitive to adjacent human uses, but still need dense vegetative cover for nesting, e.g., Cooper's hawk, yellow warbler, and the study area is not expected to support these species.

The Steelhead Trout, South Central California Coast ESU, (*Onchorynchus mykiss*) is federally listed as a threatened species, and is a State Species of Special Concern. Steelhead trout are genetically indistinct from rainbow trout and differ only in their behavior. They prefer cool, clear, coastal streams and rivers with a gradient less than 5 percent. Steelhead exhibit a life cycle strategy similar to other salmonids, known as anadromy. Steelhead trout enter streams and rivers to prepare for migration to spawning grounds as soon as streamflow is adequate and the summer sand bar present at the mouths of many coastal lagoons have breached. Spawning occurs within gravel deposits (in the range of 5 to 90 mm) situated at the end or tail of pools and head of riffles. When females dig a nest, or redd, in the gravel, significant clearing of fine sediment in the gravel deposit occurs (Cordone and Kelley, 1961). Excessive fine sediment (sand and silt) in spawning beds can be detrimental and has been shown to diminish the reproductive success of salmonids by reducing the permeability of gravels, intragravel water flow, and availability of dissolved oxygen for developing embryos (Terhune, 1958; McNeil and Ahnell, 1964; Vaux, 1962; Cooper, 1965; Daykin, 1965).

Once hatched, the fish remain in the gravel as sac fry or alevins and have very limited mobility within the gravel deposits. After emerging from the gravel the juvenile fish become very active in swimming to avoid being swept downstream, to seek refuge from predators, and to find food for growth. Young steelhead spend 1 to 2 years in freshwater streams before heading to the ocean as smolts. The amount of time spent in freshwater depends primarily on food availability and metabolic rates. Each of these factors is highly dependent upon water temperature. As water temperature increases, fish become more active and require more food to support higher metabolic rates. In addition to requiring adequate food for growth, juvenile steelhead have specific habitat requirements, essential to their survival. These include fast-water feeding areas to take advantage of drifting aquatic insects or terrestrial insects that have fallen into the water. They also prefer refuge locations to hide from predators and high winter flows, referred to

as escape cover. Escape cover can include deep pools, undercut banks, side channels, large unembedded cobbles and boulders, rootwads, large woody material, and overhanging vegetation. Streams that lack adequate escape cover will often have low fish densities, regardless of the amount of food available.

Central coast steelhead populations have experienced a significant decline in numbers over the last 50 years due to water supply projects, barriers to migration, loss of habitat, reduced water quality, increased fine sediment production, and introduction of non-native predatory fish. The decline in steelhead numbers can often be directly correlated to the level of development within individual watersheds. The most significant impact to steelhead on Arroyo Grande Creek was the building of Lopez Dam, which was completed in 1969. The dam blocked much of the steelhead's historic spawning and rearing habitat located in the primary tributaries such as Lopez Creek. Without access to these areas, steelhead were forced to utilize lower quality habitat on the mainstem that was being impacted by agriculture and urban development. Habitat surveys in 1997 and 2004 suggest that the Arroyo Grande lacks deep pools, has high water temperatures during the summer, and contains non-native fish species that prey on juvenile steelhead. Though populations of adult spawners have not been estimated for Arroyo Grande Creek, electrofishing surveys from 1996 estimate steelhead densities between 0 and 6.8 fish per 100 feet of channel through the project reach.

The study area is within currently designated critical habitat for steelhead (NMFS 2005).

The tidewater goby is federally listed as an endangered species and is a State Species of Special Concern. The tidewater goby (*Eucyclogobius newberryi*) was recognized as a distinct species by Gill in 1862, and is still the only fish in this genus. Tidewater goby was listed as endangered by the USFWS in 1994. Recently the USFWS recognized that the gobies in Orange and San Diego counties are a genetically distinct population segment of this species (USFWS 1999). As a result of recent genetic analysis on tidewater goby, discovery of additional populations, and more information on ability of the goby to recolonize habitats, the USFWS has proposed that the northern populations of this species north of Orange County be removed from the endangered species list (USFWS 1999). This proposal is still currently under consideration.

The tidewater goby is a small (<2 inches) grey-brown fish that inhabits coastal brackish water lagoons and estuaries along the California coast. This fish can tolerate a wide range of salinities, regularly ranging from fresh water to 28 ppt salinity, and some specimens have been collected from salinities as high as 42 ppt (in USFWS 1999). It is thought that this fish's tolerance for variable salinities is responsible for its ability to recolonize habitats after floods (in USFWS 1999). Tidewater gobies regularly migrate to 1 mile upstream in creeks, and have been recorded as far as 5 miles upstream of their tidal lagoons.

Male gobies dig a nest in bottom sediments beginning in April or May, the females lay eggs in the nest, and the males remain in the burrow to guard the eggs. If temperature and salinity are optimal (e.g., 60-65°F, 0-25 ppt), gobies may continue to reproduce into winter months, but usually winter rains and cold temperatures trigger the cessation of spawning. The eggs hatch in 7-10 days. The larvae are planktonic for a few days, then settle to orient to the bottom substrate as they grow larger. Tidewater gobies feed on small invertebrates, and this goby is an annual species living one year or less.

Threats to the continued existence of the northern population of tidewater goby include coastal development, upstream water diversion, groundwater overdaft, agricultural and sewage runoff,

channelization, cattle grazing, feral pig rooting, predation by and competition with introduced species, drought, floods, and inadequacy of existing regulatory mechanisms (USFWS 1999).

Tidewater gobies have recently been found in the coastal lagoon portion of Arroyo Grande Creek (Rischbieter 2005). No critical habitat is currently proposed or designated for the tidewater goby.

The California red-legged frog is a State Species of Special Concern and Federally listed as threatened. This species is found in quiet pools along streams, in marshes, and ponds. Red-legged frogs are closely tied to aquatic environments, and favor intermittent streams which include some areas with water at least 0.7 meters deep, a largely intact emergent or shoreline vegetation, and a lack of introduced bullfrogs and non-native fishes. This species' breeding season spans January to April (Stebbins 1985). Females deposit large egg masses on submerged vegetation at or near the surface. Embryonic stages require a salinity of ≤ 4.5 parts per thousand (Jennings and Hayes 1994). They are generally found on streams having a small drainage area and low gradient (Hayes and Jennings 1988). Recent studies have shown that although only a small percentage of red-legged frogs from a pond population disperse, they are capable of moving distances of up to 2 miles (Bulger 1999). The red-legged frog occurs west of the Sierra Nevada-Cascade crest and in the Coast Ranges along the entire length of the state. Much of its habitat has undergone significant alterations in recent years, leading to extirpation of many populations. Other factors contributing to its decline include its former exploitation as food, water pollution, and predation and competition by the introduced bullfrog and green sunfish (Moyle 1973, Hayes and Jennings 1988).

California red-legged frogs have been observed within Arroyo Grande Creek portion of the study area (Essex Environmental 2002, RCD 2005). The Arroyo Grande Creek portion of the study area is expected to provide summer foraging habitat for this frog; however, due to swift winter flows through the study area, it does not provide suitable frog breeding habitat. The lack of vegetation and dry summer conditions in the Los Berros Creek portion of the study area make it unsuitable for California red-legged frogs.

The study area is not within the currently designated critical habitat for California red-legged frog (USFWS 2005).

The southwestern pond turtle is a Federal and State Species of Special Concern. This aquatic turtle inhabits ponds, lakes, streams, marshes, and other permanent waters located in woodland, grassland, and open forests below 6,000 ft (Stebbins 1985). Pond turtles can often be seen basking in the sun on partially submerged logs, rocks, mats of floating vegetation or mud banks. During cold weather, they hibernate in bottom mud. The diet of these turtles consists of aquatic vegetation, insects, fish, worms, and carrion. Females dig soil nests in or near stream banks (Rathbun *et al.* 1992). Eggs are deposited between April and August. One factor in the decline of this species is the introduction of non-native fish which prey on hatchlings and juveniles.

The CNDDDB lists no records of pond turtles in the study area (CDFG 2005); however the Arroyo Grande Creek portion of the study area provides suitable foraging habitat for turtles. Los Berros Creek portion of the study area provides no habitat for turtles. It is unlikely that this portion of Arroyo Grande Creek provides suitable nesting habitat for turtles, the compacted fill of the levees and the discing of fields for agriculture are not favorable for turtles to dig nests in the soil.

Table 3. Special status wildlife species and their potential occurrence in the Arroyo Grande Creek Flood Control Project study area vicinity. November 2005.

SPECIES	STATUS ¹	HABITAT	POTENTIAL OCCURRENCE ON SITE
Fish			
Steelhead <i>Oncorhynchus mykiss</i>	FT	Perennial creeks and rivers with gravels for spawning.	Known to occur in Arroyo Grande Creek
Tidewater goby <i>Eucyclogobius newberryi</i>	FE, CSC	Coastal lagoons and up to 1 mile upstream in creeks and rivers	Known to occur in Arroyo Grande Creek lagoon.
Amphibians			
California tiger salamander <i>Ambystoma californiense</i>	FT, CSC	Ponds, vernal pools for breeding, grasslands with burrows for upland habitat	None, no suitable habitat.
Arroyo toad <i>Bufo californicus</i>	FE, CSC	Rivers and creeks with shallow, calm water pools in secondary channels or overflow pools, with sandy banks for burrowing	None, no suitable habitat.
California red-legged frog <i>Rana aurora draytonii</i>	FT, CSC	Creeks, rivers, marshes, estuaries and ponds for foraging and dispersal; still water at least into June for breeding.	Summer foraging habitat known to occur in Arroyo Grande Creek; no breeding habitat present.
Foothill yellow-legged frog <i>Rana boylei</i>	CSC	Perennial creeks with cobble substrate for egg attachment.	None. No suitable habitat.
Reptiles			
Southwestern pond turtle <i>Emys (= Clemmys) marmorata pallida</i>	CSC	Creeks and ponds with water of sufficient depth for escape cover, and structure for basking; grasslands or bare areas for nesting.	Possible; suitable habitat in Arroyo Grande Creek
Coast horned lizard <i>Phrynosoma coronatum frontale</i>	CSC	Sandy washes and open loose soils with scattered bushes	None. No suitable habitat.
Two-striped garter snake <i>Thamnophis hammondi</i>	CSC	Creeks and rivers with dense willow or other vegetation, rocky or sandy beds, small mammal burrows along banks or adjacent for overwintering habitat	Unlikely, flood control management has reduced suitable riparian habitat and compacted soils of levees provide few burrows
Birds			
Cooper's hawk <i>Accipiter cooperii</i>	CSC	Nests in riparian and dense oak woodlands; winters in wide variety of habitats	Unlikely, habitat only very marginal for nesting; may occur during winter
Sharp-shinned hawk <i>Accipiter striatus</i>	CSC	Nests in extensive woodlands, usually in coniferous trees; occasionally in riparian forest	Unlikely to nest on site, lacks extensive riparian forest habitat, lacks coniferous trees. May occur during spring and fall migrations.
Western snowy plover <i>Charadrius alexandrinus nivosus</i>	FT, CSC	Nests on sandy beaches, salt pond levees, alkali lakeshores	None. No suitable habitat on site.
California least tern <i>Sterna antillarum browni</i>	SE, FE	Nests along coast on bare, flat substrates, sandy beaches, alkali flats, land fills	None. No suitable habitat on site.

SPECIES	STATUS¹	HABITAT	POTENTIAL OCCURRENCE ON SITE
Western burrowing owl <i>Athene cunicularia hypugea</i>	CSC	Nests and winters in grasslands with burrows and short vegetation	None. No suitable habitat on site.
Loggerhead shrike <i>Lanius ludovicianus</i>	CSC	Nests in dense shrub adjacent to open foraging areas	Unlikely, shrubs only sparse, adjacent developments unfavorable to nesting by this species
Least Bell's vireo <i>Vireo bellii pusillus</i>	SE, FE	Riparian with well developed overstory and understory, and low density of aquatic and herbaceous vegetation, with low human disturbance	None. No suitable habitat, site lacks overstory canopy and is surrounded by agriculture and development.
Yellow warbler <i>Dendroica petechia brewsteri</i>	CSC	Riparian forests with dense understory vegetation	Unlikely to nest in study area; may occur as migrant
Tricolored blackbird <i>(Agelaius tricolor)</i>	CSC	Dense bulrush and/or cattail vegetation adjacent to freshwater marshes	None. No suitable habitat on site.
Mammals			
American badger <i>Taxidea taxus</i>	CSC	Digs burrows in friable soils in open, dry habitats	None. No suitable habitat.
San Joaquin kit fox <i>Vulpes macrotis mutica</i>	FE, ST	Grasslands, alkaline scrub, dry washes	None, no suitable habitat.

¹ Key to status:

- FE = Federally listed as endangered species
- FT = Federally listed as threatened species
- SE = State listed as endangered species
- CSC = California species of special concern

IMPACT AND MITIGATION DISCUSSION

IMPACT CRITERIA

The thresholds of significance presented in the California Environmental Quality Act (CEQA) were used to evaluate project impacts and to determine if the proposed flood control project poses significant impacts to biological resources.

For this analysis, significant impacts are those that substantially affect either:

- A species (or its habitat) listed or proposed for listing by State or Federal governments as rare or endangered (e.g., steelhead, tidewater goby, California red-legged frog, potential for sand marshwort, La Graciosa thistle and Gambels watercress);
- Breeding/nesting habitat for a State species of special concern (i.e., none identified);
- A plant considered rare (i.e., potential for San Bernardino aster) by CNPS;
- A habitat regulated by State or Federal law (i.e., riparian woodland, riparian scrub, in-stream wetlands),
- Nesting birds regulated under the Federal Migratory Bird Treaty Act or Section 3503.5 of CDFG Code (i.e., nesting raptors), or
- A habitat or resource recognized as sensitive by the County of San Luis Obispo (i.e., riparian habitat, wetlands, ordinance-sized trees).

POTENTIAL IMPACTS AND MITIGATION MEASURES

The proposed project involves periodic removal of vegetation from the banks of Arroyo Grande Creek and Los Berros Creek. Vegetation removal will occur every 1-3 years, depending upon plant growth. A 15-foot wide buffer strip of vegetation will be retained adjacent to each side of the low-flow channel within Arroyo Grande Creek¹. Within this buffer area, only willows will be limbed up² (i.e., removal of side branches up to a height of approximately 6 feet); all tree trunks will be retained within this buffer area. Vegetation removal will be accomplished by hand labor, wherein trees and brush outside the 15-foot wide buffer area will be cut to approximately 5 inches above the ground surface. Between vegetation management activities, the cut stumps will be allowed to naturally re-grow. The project also includes sediment removal in designated areas. Any vegetation occurring within these areas will also be removed.

Vegetation and sediment removal will only occur during the period August 1 to November 15 of any given year. This maintenance schedule would not result in significant direct impacts to nesting birds since it is outside the usual bird nesting season, and would minimize temporary effects of loss of shade and cover to steelhead and red-legged frogs during the summer months when these species are normally present. The project is designed to allow shade from streamside vegetation to persist, and thus would not result in significant impacts to steelhead from increased water temperature. In-stream vegetation in the low flow channel would not be removed or disturbed, and would continue to provide California red-legged frogs with adequate cover and escape during their use of the Arroyo Grande Creek as summer foraging area.

¹ A 5-foot wide buffer strip was assumed for Los Berros Creek.

² Limbing up of vegetation will be conducted within the 15-foot buffer strip to maintain a target Manning's roughness coefficient of 0.055 and a composite roughness in the channel of 0.04.

No impacts to tidewater goby in the Arroyo Grande Creek lagoon are expected to occur as a result of this project. Similar projects on the San Lorenzo River in Santa Cruz County have shown that bar ripping and creation of secondary overflow channels has not resulted in significant sedimentation to downstream lagoon habitat (HES, personal communication).

Temporary impacts to California red-legged frog, if they are present, may occur during construction of the inlets and outlets that connect the primary low flow channel to the secondary channels and during the placement of LWD. The long-term impacts of this phase of the project are expected to benefit both red-legged frogs and steelhead. This portion of the project is not expected to necessitate creek diversions because LWD will be lowered into place by equipment located on top of the levee, and the work on the connections will occur in areas approximately 1 to 2 feet above the level of the low flow channel.

No heavy equipment will be operated within the low flow channel, and all debris from sediment excavation and vegetation trimming will be removed to a designated disposal area off site.

The project also includes planting of native vegetation to create a 15-foot wide buffer along the low-flow channel of Arroyo Grande Creek and a 5-foot wide buffer along Los Berros Creek where there are gaps in vegetation, such that a continuous riparian corridor can be established and maintained. As depicted in Figures 2 and 3, many areas along Arroyo Grande Creek and the entire length of Los Berros Creek upstream of the Highway 1 Bridge are devoid of riparian vegetation; in these areas, a 15-foot or 5-foot wide riparian buffer area would be established (the riparian buffer on Los Berros Creek would be narrower due to the smaller width of the channel). This will also have a long-term beneficial effect to steelhead and California red-legged frog by providing more streamside shade and cover habitat for these species. The project also includes measures to plant sycamores and cottonwoods within the riparian buffer area to increase habitat diversity.

Impact BIO-1. Removal of Riparian Vegetation Outside of 15-foot Wide Buffer Area. Implementation of the vegetation management actions will result in the removal of approximately 15 acres of riparian vegetation that currently grows outside the 15-foot wide buffer area, based on habitat conditions documented in October 2005. In Year 1 of the vegetation management program, approximately 15 acres of riparian woodland and riparian scrub vegetation will be removed from the banks of Arroyo Grande Creek. In subsequent years, re-growth from these plants will be periodically re-cut (once every 1-3 years) or mechanically removed if they are located in the designated sediment removal areas. This management regime will result in these areas supporting herbaceous vegetation immediately after vegetation removal or young riparian scrub vegetation in late spring and summer. Depending upon the re-growth pattern, the vegetation may or may not be continuous along the creek. Due to the value of riparian woodland vegetation and its status as a sensitive habitat by State and local agencies, the removal of riparian woodland for flood control management actions is a significant impact to biological resources.

Mitigation Measure BIO-1a. As partial compensation for the removal of approximately 15 acres of riparian woodland along Arroyo Grande Creek (outside the 15-foot wide buffer area), areas lacking a 15-foot wide buffer shall be planted prior to and/or concurrent with Year 1 vegetation management activities. Based on habitat conditions documented in October 2005, approximately 1.33 acres of creek bank within the levees are devoid of riparian vegetation and would be suitable for revegetation. This acreage occurs along approximately 6,934 linear feet of creek channel along Arroyo Grande Creek and Los Berros Creek (both sides of the creek). The majority of the potential revegetation areas are located upstream of the Highway 1 bridge. Establishment of a 15-

foot wide buffer for Arroyo Grande Creek and a 5-foot wide buffer for Los Berros Creek in these areas would create approximately 1.33 acres of riparian woodland vegetation.

Mitigation Measure BIO-1b. As partial compensation for the removal of approximately 15 acres of riparian woodland along Arroyo Grande Creek (outside the 15-foot wide buffer area), the riparian vegetation downstream of Station 1918.45 should not be subject to vegetation management. Vegetation management would provide little flood control benefit and the area provides valuable wildlife habitat. Approximately 0.78 acre of riparian woodland would be excluded from management actions.

Mitigation Measure BIO-1c. As partial compensation for the removal of approximately 15 acres of riparian woodland along Arroyo Grande Creek (outside the 15-foot wide buffer area), the County shall identify other portions of the watershed where riparian revegetation is needed, and implement a revegetation plan such that a 1:1 ratio of riparian vegetation removal to revegetation is attained. Our calculations show that approximately 12.9 additional acres of riparian revegetation would be required to attain a 1:1 ratio.

Impact BIO-2. Removal of Riparian Vegetation Within 15-foot Wide Buffer Area. Implementation of the vegetation management actions will result in the removal of some riparian vegetation that grows within the 15-foot wide buffer areas, as well as within new buffer areas created in Mitigation Measure BIO-1, above. As proposed, vegetation removal within this zone is to be limited to the periodic limbing-up of willows (i.e., removal of side branches to a six-foot height). Based on observations of the recent vegetation management actions in October 2005, the buffer area was thinned (i.e., removal of tree trunks) as well as limbed (i.e., removal of branches from trunks, extending to 6 feet above grade), as authorized by appropriate permitting agencies. The extent of thinning varied throughout the work area. Due to the value of riparian woodland vegetation and its status as a sensitive habitat by State and local agencies, any removal of riparian woodland exceeding that proscribed for flood control management actions is a significant impact to biological resources.

Mitigation Measure BIO-2. Prior to yearly vegetation removal operations, each work crew shall be instructed as to the techniques and objectives of the vegetation removal work. Workers shall be instructed that vegetation limbing within the 15-foot wide buffer area is limited to the removal of side branches on willows and limbing-up shall occur only to a height of six feet. All other vegetation within the buffer area shall be retained. Tree groupings (i.e., areas comprised of several tree trunks) shall not be thinned.

Impact BIO-3. Impact to Special Status Plant Species. Potential habitat for four special status plant species (sand marshwort, La Graciosa thistle, Gambel's watercress, and San Bernardino aster) is present within the lower reaches of Arroyo Grande Creek. The species may occur within the in-stream wetlands (Gamble's watercress, sand marshwort) or in adjacent riparian scrub and riparian woodland (La Graciosa thistle, San Bernardino aster). The removal of these species, and/or their habitat, would be a significant impact.

Mitigation Measures BIO-3. Prior to vegetation management activities downstream of the UPRR Bridge, a botanist shall conduct a spring-season survey of the project area to determine presence/absence of the four special status plant species. If none of the species are found within the work area or within 50 feet of the work area, no additional actions are required. If one or more of the species is found within the work area or within 50 feet of the work area, the County shall postpone vegetation management actions within the area and implement a rare plant impact avoidance

program. The program shall include: a) consultation with CDFG and USFWS to alert them to the plant(s) occurrence, b) demarcation of a no-work area, measured a minimum of 50-feet around the rare plant occurrence, with the area marked with temporary plastic construction-type fencing, c) post-vegetation management monitoring of the area to document the continued presence of the species on the site and to document that the species and its surrounding habitat were not adversely affected by the vegetation management actions, and d) submittal of monitoring reports to CDFG and USFWS. If impacts were noted, remedial measures shall be identified in the monitoring report and such measures implemented during the next vegetation management session.

Impact BIO-4. Placement of Fill within Waters of the U.S. The construction of the secondary channels will result in the placement of fill within Waters of the U.S., including wetlands.³ This will occur where the channel crossovers are created. As the design of the secondary channels has not been completed, the extent of disturbance and volume of fill cannot be determined.

Mitigation Measure BIO-4. The County shall obtain all necessary permits from the U.S. Army Corps of Engineers for the placement of fill within the Waters of the U.S. and from California Department of Fish and Game for work within a stream channel. Pursuant to requirements of applicable regulatory agency requirements, the County shall obtain a Nationwide Permit (under Section 404) from U.S. Army Corps of Engineers, a 1602 Streambed Alteration Agreement (SAA) with CDFG, and a Section 401 water quality certification from the Regional Water Quality Control Board for construction of the secondary channels.

Impact BIO-5. Impacts to Special Status Wildlife Species. The project has the potential to cause temporary impacts during sediment removal and vegetation trimming to California red-legged frog and pond turtle, if they are present within the work areas. There is no breeding habitat for these species along the project corridor, but they are known or expected to utilize the area during the summer months for foraging. Noise and human presence during project activities has the potential to cause the temporary disturbance to individuals of these species if they are present within the work area, resulting in less foraging time for the individual and potentially exposing it to greater predation threat if they must move to less favorable habitats. Because red-legged frogs may also utilize the denser portions of willow riparian habitats above the low flow channel for foraging and cover, the project activities also have the potential to cause injury or kill individuals if they are present in the work area. Pond turtles do not forage away from their stream habitat, and it is unlikely that the project activities would cause direct impacts to individuals.

Mitigation Measures BIO-5. The following measures shall be implemented to avoid and minimize impacts to California red-legged frogs and pond turtles within the project area.

1. Only U.S. Fish and Wildlife Service-approved biologists will participate in activities associated with the capture, handling, and monitoring of California red-legged frogs.
2. Ground disturbance will not begin until written approval is received from the Service that the biologist is qualified to conduct the work.
3. A Service-approved biologist will survey the project site no more than 48 hours before the onset of work activities. If any life stage of the California red-legged frog is found and these individuals are likely to be killed or injured by work activities, the approved biologist will be

³ Placement of engineered large woody debris structures within the channel will require the placement of large boulders to act as ballast for the logs. This action constitutes "fill" as defined by the U.S. Army Corps of Engineers.

- allowed sufficient time to move them from the site before work activities begin. The Service-approved biologist will relocate the California red-legged frogs the shortest distance possible to a location that contains suitable habitat and will not be affected by activities associated with the proposed project. The Service-approved biologist will maintain detailed records of any individuals that are moved (e.g., size, coloration, any distinguishing features, photographs (digital preferred) to assist him or her in determining whether translocated animals are returning to the original point of capture.
4. Before any activities begin on a project, a Service-approved biologist will conduct a “worker awareness” training session on the first morning prior to commencement of construction activities to inform all construction personnel. At a minimum, the training will include a description of the ecology of the California red-legged frog and its habitat, its protected status, and the specific measures being implemented for this project to avoid harm to and conserve the California red-legged frog for the current project, and the boundaries within which the project may be accomplished. Brochures, books and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions.
 5. A Service-approved biologist will be present at the work site until all California red-legged frogs have been removed, workers have been instructed, and disturbance of habitat has been completed. After this time, the state or local sponsoring agency will designate a person to monitor on-site compliance with all minimization measures. The Service-approved biologist will ensure that this monitor receives the training outlined in measure 4 above and in the identification of California red-legged frogs. If the monitor or the Service-approved biologist recommends that work be stopped because California red-legged frogs would be affected to a degree that exceeds the levels anticipated by the Service during review of the proposed action, they will notify the resident engineer immediately (the engineer that is directly overseeing and in command of construction activities). The resident engineer will either resolve the situation by eliminating the effect immediately or require that all actions which are causing these effects be halted. If work is stopped, the Service will be notified as soon as is reasonably possible.
 6. During project activities, all trash that may attract predators will be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris will be removed from work areas.
 7. All refueling, maintenance, and staging of equipment and vehicles will occur at least 60 feet from riparian habitat or water bodies and not in a location from where a spill would drain directly toward aquatic habitat. The monitor will ensure contamination of habitat does not occur during such operations. Prior to the onset of work, the Federal Highway Administration will ensure that a plan is in place for prompt and effective response to any accidental spills. All workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.
 8. Where project sites are designated for revegetation, an assemblage of native riparian, wetland, and upland vegetation suitable for the area will be used. Locally collected plant materials will be used to the extent practicable. Invasive, exotic plants will be controlled to the maximum extent practicable.
 9. The number of access routes, size of staging areas, and the total area of the activity will be limited to the minimum necessary to achieve the project goal. Environmentally Sensitive Areas will be established to confine access routes and construction areas to the minimum area necessary to complete construction, and minimize the impact to California red-legged frog

- habitat; this goal includes locating access routes and construction areas outside of wetlands and riparian areas to the maximum extent practicable.
10. Work activities will be scheduled for times of the year when impacts to the California red-legged frog would be minimal, from August 1 to November 15 of any given year.
 11. To control sedimentation during and after project implementation, the sponsoring agency will implement best management practices outlined in any authorizations or permits, issued under the authorities of the Clean Water Act that it receives for the specific project. If best management practices are ineffective, the sponsoring agency will attempt to remedy the situation immediately, in consultation with the Service.
 12. If a work site is to be temporarily dewatered by pumping, intakes will be completely screened with wire mesh not larger than 0.2 inch to prevent California red-legged frogs and steelhead from entering the pump system. Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. Upon completion of construction activities, any diversions or barriers to flow will be removed in a manner that would allow flow to resume with the least disturbance to the substrate.
 13. Unless approved by the Service, water will not be impounded in a manner that may attract California red-legged frogs or steelhead.
 14. A Service-approved biologist will permanently remove any individuals of exotic species, such as bullfrogs (*Rana catesbeiana*), crayfish, and centrarchid fishes from the project area, to the maximum extent possible. The Service-approved biologist will be responsible for ensuring his or her activities are in compliance with the California Fish and Game Code.
 15. To ensure that diseases are not conveyed between work sites by the Service-approved biologist, the fieldwork code of practice developed by the Declining Amphibian Populations Task Force will be followed at all times.
 16. A monitoring report and project completion form will be prepared by the qualified biologist and sent to the Ventura Fish and Wildlife Office each year of monitoring activities.

Mitigation Measures BIO-6. The UPRR Bridge construction may require temporary dewatering of the Arroyo Grande channel. Specific distances and length of dewatering are unknown at this time. If dewatering is necessary and steelhead will be removed and relocated using seining and/or electrofishing techniques, the following measures will be adhered to in order to minimize potential loss of steelhead during these activities:

1. Block nets will be placed at the upper and lower extent of the diversions to ensure that salmonids upstream and downstream do not enter the areas proposed for dewatering. Block nets will extend across the entire wetted channel. Block nets will not be removed until installation of all cofferdams, bypass pipes or channels, diversion dams or other facilities designed to dewater or divert flow are completed.
2. If electrofishing techniques are utilized during fish relocation activities, at least one member of the field crew will be familiar with NOAA Fisheries' electrofishing guidelines and have a minimum of 100 hours of field experience with electrofishing techniques.
3. Electrofishing may not be performed if water temperatures exceed 18° Celsius, or could reasonably be expected to rise above this temperature during the activities.
4. Electrofishing shall not be utilized in areas where water conductivity is greater than 350 uS/cm. Only direct current (DC) shall be used. At least one assistant shall aid the biologist during electrofishing by netting stunned fish and other aquatic vertebrates.

5. Each electrofishing session must start with all equipment settings (voltage, pulse width, and pulse rate) set to the minimums needed to capture fish. These settings should be gradually increased only to the point where fish are immobilized and captured, and not allowed to exceed the specified maxima: Voltage = 100V (Initial) – 400V (Max); Pulse width= 500 uS (Initial) – 5 uS (Max); Pulse rate = 30 Hz (Initial) – 70 Hz (Max).
6. A minimum of three passes with the electrofisher will be utilized to ensure maximum capture probability of steelhead within the area proposed for dewatering, unless the number of fish captured in the second pass is less than 10 percent of the first pass. In that case, two passes are adequate. If steelhead are present on any pass, a minimum of 20 minutes will separate the beginning of each pass through the Project reach to allow time for fish that are not captured to become susceptible to electrofishing again.
7. All captured fish will be held in water with temperatures not greater than ambient in-stream temperatures. If cooling is used, water temperatures will be maintained not more than three degrees Celsius less than ambient in-stream temperatures. All captured fish will be held in well oxygenated water, with a dissolved oxygen level of not less than seven parts per million. Prior to release, the following information shall be recorded: 1) Enumerate fish by species, 2) Visual determination of age of steelhead, 3) Enumerate steelhead injuries and fatalities by age class, 4) Enumerate successfully relocated steelhead by age class for each relocation site, and 5) Date and time of release of steelhead to each relocation site. Steelhead shall be subject to the minimum handling and holding times required. All captured fish will be allowed to recover from electrofishing and other capture gear before being returned to the stream. All captured fish will be processed and released prior to any subsequent electrofishing pass or netting effort.
8. All captured fish will be released upstream of the block nets to facilitate redistribution into dewatered areas following construction activities.

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