Chapter 3.3

BIOLOGICAL RESOURCES

3.3 Biological Resources

3.3.1 Introduction

This section presents the regulatory setting, environmental setting, and potential impacts of the Proposed Project related to biological resources. The section describes existing biological conditions in the Project Area and changes to the SMP and biological resources since 2002.

To identify biological resources, a number of documents were collected and reviewed including: the Final Environmental Impact Report for the Multi-Year Stream Maintenance Program (SCVWD 2002a), the 2002 Stream Maintenance Program (SCVWD 2002b), the 2012 Stream Maintenance Project Description (SCVWD 2010), SMP post-construction reports (SCVWD 2002d, 2003b, 2004b, 2005b, 2006b, 2007c, 2008b, and 2009b), and the 2002–2009 SMP fish relocation reports (SCVWD 2002c, 2003a, 2004a, 2005a, 2006a, 2007a, 2007b, 2008a, and 2009a). Data on special-status species occurrences compiled by SCVWD since 2001 were collected and reviewed: Rarefind data (CNDDB 2011); California wildlife habitat relationships information (CDFG 2008a); the Breeding Bird Atlas of Santa Clara County (Bousman 2007h); California Bird Species of Special Concern (Shuford and Gardali 2008); information available through the USFWS, including a list of special-status species potentially occurring in Santa Clara County; and other technical publications and previous reports.

All California Native Plant Society (CNPS) lists (CNPS 2011) and applicable records were reviewed to determine the potential for occurrence of special-status plant species in the Project Area. The Jepson Manual (Hickman 1993) supplied information regarding the distribution and habitats of vascular plants in Santa Clara County. In addition, the habitat-level ("land cover") and vegetation association descriptions in the working draft of the Santa Clara Valley Habitat Conservation Plan/Natural Communities Conservation Plan (Habitat Plan; ICF Jones & Stokes 2010) provided some indication of the potential locations of special-status plants.

SCVWD routinely conducts a variety of surveys and monitoring efforts that provide information on the presence and distribution of sensitive communities and plant and animal species, including special-status species and their habitats in SCVWD's service area. The following discussion summarizes information collected during the review, used to determine the environmental setting for the Proposed Project. A number of the studies used to compile the baseline biological conditions were performed prior to the publication of the Notice of Preparation (31 August 2010); such studies were used to inform the description of baseline conditions if they contributed relevant information regarding baseline biological conditions.

Vegetation Mapping

Aerial Information Systems, Inc. (AIS) conducted vegetation mapping of streams and canals in the Project Area in 2010. Vegetation units were mapped using aerial photo interpretation and interactive computer digitization methods. The vegetation classification system was based on *A Manual of California Vegetation* (Sawyer et al. 2009). Each vegetation unit was coded to the group level (alliance level where possible) and assigned a cover class density for the vegetation type mapped. This mapping involved a reconnaissance-level field visit to match preliminary aerial photo signatures with vegetation types on the ground before photo interpretation, as well as spot-checking of selected areas in the field after preliminary photo interpretation to verify the accuracy of mapping of certain vegetation types. In addition, in 2004 and 2008, SCVWD botanist J. Hillman surveyed SMP-maintained creeks and canals within serpentine communities and mapped high-quality examples of these communities.

Special-Status Plant Surveys

In 2004 and 2008 as part of the Biodiversity Monitoring Program, SCVWD conducted mapping of comprehensive botanical surveys for serpentine soils on all its creeks and canals, determined by overlaying U.S. Soil Conservation Service (USSCS, now the Natural Resources Conservation Service) and U.S. Geologic Survey (USGS) maps of serpentine soils on the Project Area map. That overlay indicated that 15.3 miles of canals were found to traverse serpentine soils and associated bedrock, as evidenced by associated plant species, vegetation types, and soil analysis (SCVWD unpublished data). During the 2004 and 2008 botanical surveys, 44 populations or partial populations of six special-status plant species were mapped by SCVWD botanist J. Hillman along the Almaden Calero Canal, Coyote Alamitos Canal, Coyote Canal, and Coyote Canal Extension. In contrast, no special-status plants were documented along any natural creeks in serpentine-dominated areas.

Fisheries Surveys

SCVWD has collected fish species distribution, occurrence, and abundance data for a variety of projects and conducted several types of fisheries surveys to meet specific information needs. Such surveys have included conducting habitat typing of fish assemblages at index reaches, and collecting data on species presence, disposition, and abundance at relocation sites. Fish relocations have been performed at various SMP work sites (see Table 3.3-1) throughout the past 9 years of the SMP (SCVWD 2002c, 2003, 2004, 2005, 2006, 2007a, 2007b, 2008, and 2009). Fish species, disposition, and abundance data were collected at each of these sites, and summaries of the fish captured and released (natives) or sacrificed (non-natives) were prepared for each year. Other general surveys related to habitat quality for salmonids have included the collection of hourly stream temperatures and bi-monthly reservoir profiles at certain locations, evaluating creeks to determine if they are ephemeral, and mapping passage impediments on some creeks. Examples of studies conducted by SCVWD that provide information on fish use of SMP creeks are listed in Table 3.3-2.

Table 3.3-1. Fish Relocation Creeks

Adobe Creek	Guadalupe River	Permanente Creek
Alamitos Creek	Hale Creek	Ross Creek
Berryessa Creek	Llagas Creek	San Tomas Aquino Creek
Calabazas Creek	Los Coches Creek	Saratoga Creek
Calero Creek	Lower Penitencia Creek	Stevens Creek
Coyote Creek	Lower Silver Creek	Sunnyvale East Channel
Greystone Creek	Matadero Creek	Upper Penitencia Creek
Guadalupe Creek	Mistletoe Creek	Wildcat Creek

Source: Compiled by Horizon Water and Environment in 2011

Table 3.3-2. Selected Recent SCVWD Fisheries Studies

Title	Year
Santa Clara Valley Water District Upmigrant and Outmigrant Trapping Operations for the Guadalupe River, Coyote Creek, and Stevens Creek	1998–2005
Santa Clara Valley Water District Guadalupe River Project Mitigation Monitoring Report	2000–2010
Fish Relocations for Stream Maintenance Program	2002–2009
Provenance Analysis of Chinook Salmon (*Oncorhynchus tshawytscha*) in the Santa Clara Valley Watershed	2002
Chinook Radio Tracking Report, Guadalupe River Watershed, 2003-2004	2004
Mid-Coyote Flood Protection Project Baseline Fisheries Monitoring Report Year 1 (2007)	2007
Population Genetics of *Oncorhynchus mykiss* in the Santa Clara Valley Region	2008
Mid-Coyote Creek Flood Protection Project Baseline Fisheries Monitoring Report Year 2 (2008)	2009
Lenihan Dam Outlet Modifications Project Fisheries Sampling Update, Project No. 91904005	2009

Source: Compiled by Horizon Water and Environment in 2011

California Red-legged Frog Surveys

Between 1996 and 2001, SCVWD surveyed portions of the Project Area for California red-legged frogs (*Rana draytonii*), following the 1997 USFWS protocol (USFWS 1997). Approximately 80 percent of the streams in the Project Area with suitable habitat and accessible to SCVWD were surveyed. Areas in the foothills and mountain ranges were less thoroughly surveyed because of difficulty accessing private land. SCVWD concluded that most of the County's ephemeral creeks do not support red-legged frog breeding habitat because of the absence of surface water during the tadpole-rearing season. Since 2001, SCVWD has conducted surveys for red-legged frogs in the context of pre-activity surveys for SMP activities. Furthermore, since 2004, annual surveys for the presence or absence of special-status amphibians have been conducted in numerous locations before the application of instream herbicides (see Table 3.3-3); no special-status amphibians were found at any of the locations listed in Table 3.3-3. These data sets were reviewed as part of the preparation of this document.

Table 3.3-3. Locations of Pre-Construction Presence/Absence Surveys for Special-Status Amphibians, 2004–2010

Creek Name	Creek Stationing		Creek Name	Creek Stationing	
	To	From		To	From
Adobe Creek	132+00	250+00	North Babb Creek	42+00	55+00
Alamitos Creek	21+55	232+00	Norwood Creek	0+00	32+00
Barron Creek	0+00	105+00	Penitencia East channel	0+00	36+00
Berryessa Creek	0+00	297+00	Permanente Creek	70+00	383+00
Calabazas Creek	20+00	447+30	Permanente diversion	0+00	71+00
Calera Creek	9+00	60+00	Piedmont Creek	0+00	26+00
Canoas Creek	0+00	390+00	Prospect Creek	0+00	20+00
Coyote Creek	480+00	776+00	Quimby Creek	0+00	38+00
Daves Creek	12+00	14+00	Randol Creek	0+00	89+00
Deer Creek	0+00	17+00	Regnart Creek	0+00	66+00
Deer Creek	74+00	91+00	Rodeo Creek	0+00	100+00
El Camino storm drain	0+00	20+00	Ross Creek	3+00	236+00
Flint Creek	0+00	20+00	Ruby Creek	0+00	20+00
Golf Creek	0+00	70+00	South Babb Creek	0+00	45+00
Greystone Creek	0+00	70+00	San Tomas Aquino Creek	26+00	224+00
Guadalupe Creek	1050+00	1130+00	San Tomas Aquino Creek	430+00	670+00
Guadalupe River	220+00	1044+00	Saratoga Creek	0+00	280+00
Hale Creek	0+00	60+00	Sierra Creek	0+00	63+00
Heney Creek	0+00	52+00	Smith Creek	0+00	92+00
Junipero Serra channel	0+00	132+00	Stevens Creek	88+00	410+00
Lone Hill Creek	0+00	20+00	Summerhill Creek	0+00	5+00
Los Coches Creek	0+00	62+00	Sunnyvale east channel	22+00	315+00
Los Gatos Creek	0+00	420+00	Sunnyvale west channel	44+00	140+00
Lower Silver Creek	0+00	318+00	Thompson Creek	0+00	65+00
Lower Silver Creek	370+00	380+68	Tularcitos Creek	1+00	36+00
Lower Penitencia Creek	0+00	216+00	Upper Penitencia Creek	35+00	65+00
Matadero Creek	95+00	200+00	Upper Penitencia Creek	72+00	115+00
Miguelita Creek	12+00	44+00	Upper Silver Creek	0+00	63+00
North Babb Creek	0+00	15+00			

Source: Compiled by Horizon Water and Environment in 2011

Bird Surveys

SCVWD has conducted surveys for the California clapper rail (*Rallus longirostris obsoletus*), least Bell's vireo (*Vireo bellii pusillus*), western snowy plover (*Charadrius alexandrinus nivosus*), and burrowing owl (*Athene cunicularia*) in various parts of the county since the mid-1990s. California clapper rail surveys have been conducted before maintenance activities in suitable habitat since 1996. Beginning in 1997, least Bell's vireo surveys were conducted annually (except in 2005, 2007, and 2008) during the breeding season along lower Llagas Creek, and occasionally along sections of Uvas Creek (Padley 2010, H. T. Harvey & Associates 2010b). Surveys for western snowy plovers have been conducted at potential work sites that contain suitable habitat, including ponds A4, A5, and A8 (Ryan 2000).

In 2007 and 2008, EDAW conducted a habitat assessment, burrow mapping study, and standardized protocol surveys for the burrowing owl along sections of multiple SCVWD-managed waterways in Palo Alto, Mountain View, Sunnyvale, Santa Clara, San Jose, Alviso, Milpitas, and Gilroy (EDAW 2008). In these areas, 236,214 linear feet of potential burrowing owl habitat along SCVWD waterways were assessed. The study was performed under SCVWD's Biodiversity Monitoring Program and was designed to monitor burrowing owl distribution, abundance, and trends in the Project Area.

Numerous surveys for nesting birds have been conducted for SCVWD compliance with the Migratory Bird Treaty Act. Surveys have occurred throughout Santa Clara County, but generally below the 1,000-foot elevation where SCVWD activities routinely occur. These surveys have investigated potential habitat for all special-status bird species.

3.3.2 Regulatory Setting

A number of federal, state, and local laws and ordinances regulate biological resources. Described next are the pertinent statutes and regulations.

Federal Plans, Policies, Regulations, and Laws

Clean Water Act

Areas meeting the regulatory definition of "waters of the U.S." (jurisdictional waters) are subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE) under provisions of Section 404 of the 1972 Clean Water Act (federal Water Pollution Control Act) and/or Section 10 of the 1899 Rivers and Harbors Act (described below). These waters may include all waters used, or potentially used, for interstate commerce, including all waters subject to the ebb and flow of the tide, all interstate waters, all other waters (intrastate lakes, rivers, streams, mudflats, sandflats, playa lakes, natural ponds), all impoundments of waters otherwise defined as "waters of the U.S.," tributaries of waters otherwise defined as "waters of the U. S.," territorial seas, and wetlands (termed Special Aquatic Sites) adjacent to "waters of the U.S." (33 Code of Federal Regulations [CFR], Part 328, Section 328.3). Wetlands on non-agricultural lands are identified using the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987).

Areas typically not considered jurisdictional waters include non-tidal drainage and irrigation ditches excavated on dry land, artificially irrigated areas, artificial lakes or ponds used for irrigation or stock watering, small artificial water bodies such as swimming pools, and water-filled depressions (33 CFR, Part 328). Canals subject to SMP activities are not expected to be jurisdictional because they were excavated in uplands and do not function as navigable waters or tributaries to navigable waters). Furthermore, the canals that are currently not in operation (Coyote, Coyote Extension, and Coyote Alamitos) do not carry water at all, other than runoff that is intercepted from upslope upland areas. However, whether or not the canals subject to SMP Update activities are jurisdictional waters of the U.S. is to be determined by the USACE.

Construction activities within jurisdictional waters are regulated by the USACE, and placement of fill into such waters must comply with USACE permit requirements. To comply with state and federal policy that no net loss of wetlands occurs, discharge into wetlands must be avoided and minimized to the extent practicable. For unavoidable impacts, compensatory mitigation is required to replace the loss of wetlands.

No USACE permit will be effective in the absence of state water quality certification, pursuant to Section 401 of the Clean Water Act. The State Water Resources Control Board (SWRCB) is the state agency (together with the Regional Water Quality Control Boards [RWQCBs]) charged with implementing water quality certification in California.

Project Applicability. SCVWD will apply for a Section 404 permit for the SMP Update. Any work within waters of the U.S. (i.e., wetlands and other waters), including relatively large waterways, small perennial and intermittent drainages, and wetlands maymay require a Section 404 fill discharge permit from the USACE and Section 401 Water Quality Certification from the RWQCB. Tidal salt marsh, tidal brackish marsh, most freshwater wetlands, and open water habitats (as described above) generally are considered waters of the U.S., subject to the jurisdiction of the USACE and RWQCB. As discussed above, the canals subject to SMP Update activities are not expected to be considered waters of the U.S.; however, this determination will be made by the USACE.

Rivers and Harbors Act

Section 10 of the Rivers and Harbors Act (1899) 33 U.S. Code (USC) 403 regulates the construction of structures, placement of fill, and introduction of other potential obstructions to navigation in navigable waters. Under Section 10 of the Act, the building of any wharfs, piers, jetties, and other structures is prohibited without congressional approval, and excavation or fill within navigable or tidal waters requires the approval of the chief of engineers.

The USACE has the authority to issue permits for the discharge of refuse into, or affecting, navigable waters under section 13 of the 1899 Act (33 USC 407; 30 Statute 1152). The Act was modified by Title IV of Public Law 92-500, October 18, 1972; the federal Water Pollution Control Act Amendments of 1972 (33 USC 1341–1345; 86 Statute 877), as amended, established the National Pollutant Discharge Elimination System (NPDES) permits.

Project Applicability. Any maintenance activities conducted within or over the tidally influenced portions of Guadalupe, Coyote, and Alviso sloughs and the lower reaches of Permanente, Stevens, San Tomas Aquino, Calabazas, San Francisquito, Coyote, and Lower Penitencia creeks, Sunnyvale East and West Channels, and Guadalupe River, potentially could require a Section 10 Letter of Permission.

Federal Endangered Species Act

The federal Endangered Species Act (FESA) identifies species at risk of extinction and protects them and their habitats from unauthorized take. Take is broadly defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Take also can include habitat modification or degradation that directly results in death or injury of a listed wildlife species. An activity can be defined as "take" even if it is unintentional or accidental. Listed plant species are legally protected from take under the FESA only if they occur on federal lands or if the project requires a federal action, such as a Clean Water Act Section 404 fill permit from the USACE.

The USFWS has jurisdiction over federally listed threatened and endangered plants, wildlife, and freshwater fish species under FESA, while the National Marine Fisheries Service (NMFS) has jurisdiction over federally listed, threatened, and endangered marine and anadromous fish. Authorized take can be obtained through Section 7 and/or Section 10 of the ESA. Federal agencies, such as the USACE, are required to consult with the USFWS or NMFS if their actions "may affect" a listed species. The USFWS and/or NMFS may issue an incidental take statement and Biological Opinion (BO) before the federal consulting agency issues a permit. The federal consulting agency then incorporates the incidental take statement and BO into any authorization or permits. Alternatively, in the absence of federal involvement, incidental take can be authorized through the development and implementation of a Habitat Conservation Plan.

Project Applicability. FESA compliance for the SMP Update will be achieved through Section 7 consultation implemented by the USACE, which will issue a Section 404 permit for the SMP Update (see above). Proposed Project maintenance activities maymay affect a number of federally listed species. Federally listed fish and wildlife species that occur, or could potentially occur, in the Project Area include the Bay checkerspot butterfly (*Euphydryas editha bayensis*), southern green sturgeon (*Acipenser medirostris*), Central California Coast steelhead (*Oncorhynchus mykiss*), South-Central California Coast steelhead, California tiger salamander (*Ambystoma californiense*), California red-legged frog, California condor (*Gymnogyps californianus*), California least tern (*Sterna antillarum browni*), least Bell's vireo, California clapper rail, western snowy plover, salt marsh harvest mouse (*Reithrodontomys raviventris*), and San Joaquin kit fox (*Vulpes macrotis mutica*). Federally listed plant species known to occur (or that have occurred historically) in the Project Area are the federally endangered Santa Clara Valley dudleya (*Dudleya setchellii*), Tiburon paintbrush (*Castilleja affinis* ssp. *neglecta*), Coyote ceanothus (*Ceanothus ferrisiae*), robust spineflower (*Chorizanthe robusta* var. *robusta*), Contra Costa goldfields (*Lasthenia conjugens*), and Metcalf Canyon jewel-flower (*Streptanthus albidus* ssp. *albidus*). Section 7 Consultation between the USACE, USFWS, and NMFS would be required to authorize incidental take of listed species.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act governs all fishery management activities that occur in federal waters within the United States' 200-nautical-mile limit. The Act establishes eight Regional Fishery Management Councils responsible for the preparation of fishery management plans to achieve the optimum yield from U.S. fisheries in their regions. These councils, with assistance from the NMFS, establish essential fish habitat (EFH) in fishery management plans for all managed species. Federal agencies that fund, permit, or implement activities that may adversely affect EFH are required to consult with the NMFS regarding potential adverse effects of their actions on EFH, and respond in writing to recommendations by the NMFS.

Project Applicability. Proposed Project maintenance activities in tidal waters and in Coyote Creek maymay affect EFH. The only fish species subject to a fisheries management plan that occurs in the Project Area with any regularity is the Chinook salmon (*Oncorhynchus tshawytscha*), which is regulated by the Pacific Fishery Management Council's Salmon Fishery Management Plan. Both Coyote Creek and the San Francisco Bay are officially listed as EFH for this species (Pacific Fishery Management Council 1999), and Chinook salmon also occur in Los Gatos Creek and the Guadalupe River. Although the Chinook salmon in the Project Area have been recognized as strays from hatchery releases (NMFS 1999, Hedgecock 2002), NMFS still considers habitat used by Chinook salmon in the South Bay as EFH.

A number of fish species regulated by the Coastal Pelagics and Pacific Groundfish Fisheries Management Plans, such as the leopard shark (*Triakis semifasciata)*, English sole (*Parophrys vetulus)*, starry flounder (*Platichthys stellatus*), and big skate (*Raja binoculata*), occur in the tidal habitats of South San Francisco Bay and occasionally disperse upstream into the reaches of Alviso Slough, Coyote Slough, San Francisquito Creek, San Tomas Aquino Creek, and other tidal creeks in the Project Area. Species such as the northern anchovy (*Engraulis mordax*), Pacific sardine (*Sardinops sagax*), and jack mackerel (*Trachurus symmetricus*) also occur in the South Bay; these species are less likely to occur in the uppermost tidal reaches of sloughs where Proposed Project activities would occur, but small numbers could potentially occur there. Thus, the NMFS maymay consider these tidal waters to be EFH as well.

Federal Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA; 16 USC, Section 703, Supplement I, 1989) prohibits killing, possessing, or trading of migratory birds except in accordance with regulations prescribed by the Secretary of the Interior. The trustee agency that addresses issues related to the MBTA is the USFWS. Migratory birds protected under this law include most native birds (USFWS 2010a). This act encompasses whole birds, parts of birds, and bird nests and eggs. The MBTA protects active nests from destruction and nests, whether active or not, cannot be possessed. An active nest under the MBTA, as described by the Department of the Interior in its April 16, 2003 Migratory Bird Permit Memorandum, is one having eggs or young. Nest starts, before egg laying, are not protected from destruction.

Project Applicability. Almost all native bird species occurring in the Project Area would be protected by the MBTA.

State Plans, Policies, Regulations, and Laws

Section 401 Water Quality Certification

The RWQCB is responsible for protecting surface, ground, and coastal waters in its jurisdiction. It requires that a project proponent apply for and obtain a CWA Section 401 Water Quality Certification for any project that requires a CWA Section 404 permit from the USACE.

Project Applicability. As described under Clean Water Act above, any work within waters of the U.S. (i.e., wetlands and other waters), including relatively large waterways, small perennial and intermittent drainages, and wetlands, maymay require a Section 404 fill discharge permit from the USACE and Section 401 Water Quality Certification from the RWQCB. Tidal salt marsh, tidal brackish marsh, most freshwater wetlands, and open water habitats (as described above) generally are considered waters of the U.S., subject to the jurisdiction of the USACE and RWQCB.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act (Porter-Cologne Act) protects water quality and waters of the state of California. Activities that result in the discharge of fill material into "State Waters" that are not otherwise under the jurisdiction of the USACE (e.g., "isolated" wetlands without an interstate commerce connection or significant nexus to navigable waters of the U.S.) may require issuance of a Waste Discharge Requirements (WDRs) permit by the RWQCB pursuant to the Porter-Cologne Act and in compliance with the California Wetlands Conservation Policy.

The Porter-Cologne Act authorizes the RWQCB to issue permits to control pollution (i.e., WDRs and NPDES permits) in compliance with implementation of water quality standards as outlined in the region's Basin Plan and taking into consideration beneficial uses to be protected. These regulations limit impacts to aquatic and riparian habitats from a variety of water pollution sources.

Project Applicability. Any maintenance activities that would impact waters of the U.S. and/or State would require 401 certification and/or a WDR permit from the RWQCB.

McAteer-Petris Act

The McAteer-Petris Act was enacted in 1965 to promote responsible planning and regulation of San Francisco Bay. This law created the San Francisco Bay Conservation and Development Commission (BCDC), which is responsible for enforcing the McAteer-Petris Act, requiring that "maximum feasible public access, consistent with a project be included as part of each project to be approved by the BCDC." BCDC jurisdiction in the San Francisco Bay Area extends over the Bay, up to mean high tide and to 5 feet above mean sea level in marshes; and over a 100-foot shoreline band inland from the line of mean high tide or the line 5 feet above mean sea level adjacent to marshes. The Commission also has certain waterway jurisdiction in the vicinity of the Project area, along Coyote Creek and the Guadalupe River. The Commission does not have 100-foot shoreline band jurisdiction adjacent to its certain waterway jurisdiction. The Commission also has salt pond

jurisdiction consisting of all areas diked off from the bay and used between August 1966 and August 1969 for the solar evaporation of bay water in the course of salt production.

Project Applicability. Any maintenance activities that are conducted within tidal waters of the South San Francisco Bay or areas determined to be within the Shoreline Band may require a permit from the BCDC.

California Endangered Species Act

The California Endangered Species Act (CESA) (Fish and Game Code of California, Chapter 1.5, Sections 2050-2116) prohibits the take of any plant or animal listed or proposed for listing as rare (plants only), threatened, or endangered. In accordance with the CESA, the California Department of Fish and Game (CDFG) has jurisdiction over state-listed species. The CDFG regulates activities that may result in "take" of individuals listed under the Act (i.e., "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill"). Habitat degradation or modification is not expressly included in the definition of "take" under the Fish and Game Code. The CDFG, however, has interpreted "take" to include the "killing of a member of a species which is the proximate result of habitat modification."

Project Applicability. ~~Maintenance activities may result in the take of a number of state-listed species. A CESA take permit or other form of authorization may be required for State-listed wildlife species occurring (or potentially occurring) in the Project Area.~~ State-listed species potentially occurring in the Project Area include the longfin smelt (*Spirinchus thaleichthys*), California tiger salamander, bank swallow (*Riparia riparia*), California condor, bald eagle (*Haliaeetus leucocephalus*), Swainson's hawk (*Buteo swainsoni*), California clapper rail, California black rail (*Laterallus jamaicensis coturniculus*), California least tern, least Bell's vireo, salt marsh harvest mouse, and San Joaquin kit fox. ~~The only state-listed plant species known to occur in the Project Area is the state-threatened Tiburon paintbrush.~~ Of these, the California clapper rail, California black rail, California condor, bald eagle, and salt marsh harvest mouse are also listed as fully protected species; take of such species must be avoided. Maintenance activities may result in the take of other state-listed species, including the California tiger salamander and longfin smelt; a CESA Incidental Take Permit would be required for take of these species.

Native Plant Protection Act

The Native Plant Protection Act (California Fish and Game Code Sections 1900–1913) requires permits for collecting, transporting, or selling plant species designated rare, or endangered by the Fish and Game Commission.

Project Applicability. The CNPS has developed a set of lists of native plants in California according to rarity. Plants on List 1A, List 1B, and List 2 meet the definitions of Section 1901, Chapter 10 (Native Plant Protection Act) or Sections 2060 and 2067 (California Endangered Species Act) of the California Department of Fish and Game Code (Section 1900–1913) as rare or endangered species. These species were fully considered during CEQA review of the Proposed Project in the context of this document.

California Environmental Quality Act

The California Environmental Quality Act (CEQA) is a state law that requires state and local agencies, such as SCVWD, to document and consider the environmental implications of their actions and to refrain from approving projects with significant environmental effects if feasible alternatives or mitigation measures exist that can substantially lessen or avoid those effects. CEQA requires the full disclosure of the environmental effects of agency actions, such as approval of a general plan update or the projects covered by that plan, on resources such as air quality, water quality, cultural resources, and biological resources. The State Resources Agency-promulgated guidelines for implementing CEQA are known as the State CEQA Guidelines.

CEQA and the State CEQA Guidelines provide guidance in evaluating impacts of projects to biological resources and determining which impacts will be significant. CEQA defines "significant effect on the environment" as "a substantial adverse change in the physical conditions which exist in the area affected by the proposed project." Under State CEQA Guidelines Section 15065, a project's effects on biotic resources are deemed significant where the project would:

- substantially reduce the habitat of a fish or wildlife species;
- cause a fish or wildlife population to drop below self-sustaining levels;
- threaten to eliminate a plant or animal community; or
- "substantially reduce the number or restrict the range of an endangered, rare or threatened species"

In addition to the Section 15065 criteria that trigger mandatory findings of significance, Appendix G of the State CEQA Guidelines provides a checklist of other potential impacts to consider when analyzing the significance of project effects. For biological resources, these impacts include whether the project would:

- have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service;
- have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service;
- have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act;
- interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native

resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

- conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Section 15380(b) of the State CEQA Guidelines provides that a species not listed as rare, threatened, or endangered under CESA or FESA (except insects that are considered pests) may be considered rare, threatened, or endangered if the species meet the stated definitions. This section deals with situations in which the USFWS or Fish and Game Commission have not acted to list a species as rare, threatened, or endangered but in which the species is locally or regionally rare.

The CDFG has produced three lists (amphibians and reptiles, birds, and mammals) of "species of special concern" that serve as "watch lists". Species on these lists are of limited distribution or the extent of their habitats has been reduced substantially, such that threat to their populations may be imminent. Thus, their populations should be monitored. They may receive special attention during environmental review as potential rare species but do not have specific statutory protection.

The CNPS, a non-governmental conservation organization, has developed lists of plant species of concern in California. Vascular plants included on these lists are defined as follows:

List 1A Plants considered extinct

List 1B Plants rare, threatened, or endangered in California and elsewhere

List 2 Plants rare, threatened, or endangered in California but more common elsewhere

List 3 Plants about which more information is needed—review list

List 4 Plants of limited distribution—watch list

These CNPS listings are further described by the following threat code extensions:

.1—seriously endangered in California

.2—fairly endangered in California

.3—not very endangered in California

Although the CNPS is not a regulatory agency and plants appearing on List 1B or List 2 are, in general, considered to meet CEQA's Section 15380 criteria, adverse effects to these

species may be considered significant. Impacts to plants that are listed by the CNPS on List 3 or 4 also are considered during CEQA review, although because these species are typically not as rare as those on List 1B or List 2, impacts to them are less frequently considered significant.

Project Applicability. All impacts to biological resources, including species not formally listed as rare, threatened, or endangered by the USFWS and CDFG, were considered during CEQA review of the Proposed Project. The significance guidance discussed above was considered in the determination of significance criteria for the evaluation of the Proposed Project.

California Fish and Game Code

The California Fish and Game Code Section 1601–1603 requires a Streambed Alteration Agreement for the fill or removal of material within the bed and banks of a watercourse or waterbody and for the removal of riparian vegetation.

Fish and Game Code Sections 3503, 3503.5, 3513, and 3800 (and other sections and subsections) protect native birds, including their nests and eggs, from all forms of take. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "take" by the CDFG. Non-game mammals are protected by Fish and Game Code Section 4150, and Fully Protected Species are protected by Sections 3505, 3511, 4700, 5050, and 5515.

The CDFG also maintains the California Natural Diversity Database (CNDDB) and the California Wildlife Habitat Relationships (CWHR) System. The CNDDB consists of historical observations of special-status plants, wildlife, and natural communities. Because the CNDDB is limited to reported sightings, it is not a comprehensive list of species that may occur in a particular area. However, it is useful in refining the list of special-status species that have the potential to occur on a particular site.

The CWHR is a comprehensive information system for terrestrial vertebrates and their habitats in California. It includes (1) a complete species list of California's terrestrial vertebrate species, (2) life history information and geographic range data on terrestrial species regularly occurring in California, (3) a standardized habitat classification scheme for California, and (4) a community-level matrix model associating the regularly occurring wildlife species with the standardized habitats. Under Section 1802 of the Fish and Game Code, the Department of Fish and Game is the trustee agency for fish and wildlife resources and shall review and comment on environmental documents.

Project Applicability. SCVWD will apply for a Section 1602 Streambed Alteration Agreement for the SMP Update. Maintenance activities would occur within the jurisdiction of the CDFG and would require a Streambed Alteration Agreement with CDFG. Maintenance activities may be required to take measures to avoid impacts to native mammals and nesting birds.

3.3.3 Environmental Setting

Climate and Soils

Santa Clara County has a Mediterranean climate characterized by mild, wet winters, and warm, dry summers. The county has unique natural biological communities, adapted to this precipitation regime. The unique natural communities and temperature regimes have resulted in endemic plant species that are adapted to long periods of drought and frequent fire events. Soil types ultimately play a large role in influencing distributions of habitats and wildlife. As detailed in Section 3.7, *Hydrology and Geomorphology*, soils vary considerably in the Project Area. Soils in and immediately surrounding San Francisco Bay tend to be fine-textured, clayey soils that were deposited by tidal events. Soils in the valley lowlands and farther inland are very deep, medium to fine-textured soils, ranging from poorly to excessively drained. Soils higher in the valley and in the foothills may be derived from sedimentary, basic igneous, or sometimes serpentine, rock with clayey, loamy textured soils (USSCS 1968).

Serpentine soils and bedrock support a unique assemblage of endemic plant and animal species in California. These soils form from weathered ultramafic rocks that provide relatively inhospitable conditions for plant growth, including: 1) a low calcium to magnesium ratio; 2) a lack of essential nutrients such as nitrogen, potassium, and phosphorus; and 3) high concentrations of heavy metals such as nickel and chromium that may be toxic to most plant species (Kruckeberg 1984). Plant species found on serpentine soils are adapted to or are able to tolerate these harsh soil conditions in areas where other plant species cannot grow as easily. Therefore, many special-status plants are endemics that are restricted to the range of serpentine soils. Serpentine in the Project Area is present as exposed bedrock outcrops, serpentine-derived soils, alluvially deposited serpentine soils at the edge of the valley floor and foothills, or a combination of these. The major concentrations of serpentine soils have been mapped for the county by the USSCS (1968). These include Coyote Ridge and other smaller serpentine outcrops on the east side of Coyote Valley south to the San Martin area; areas on the west side of Coyote Valley from the Santa Teresa Hills south to San Martin; small outcrops near Lexington, Calero and Coyote reservoirs; and inclusions within the valley, such as Communications Hill and Tulare Hill.

Existing Land Uses, Natural Communities, and Habitats

The Santa Clara Valley, which is dominated by agricultural and developed land uses, runs the length of the Project Area and is ringed by rolling hills. Plant communities in the Diablo Range to the east include grasslands, chaparral, and oak savannah (County of Santa Clara 2011b). Communities to the west in the Santa Cruz Mountains include rolling grasslands, oak woodlands, and mixed hardwood and evergreen forests (County of Santa Clara 2011b). The Baylands occupy the northern portion of the Project Area and consist mostly of former salt evaporation ponds and remnant marshes and wetlands. As the Project Area is so vast and contains some terrestrial communities and habitats that may not be subject to disturbance by the SMP Update, for purposes of this document, only the communities and habitat types that have the potential of being directly affected by the Proposed Project or occur adjacent to work areas are described. Based on dominant plant species in the Project Area as determined using the AIS vegetation mapping described previously, the Proposed

Project may affect the following natural communities/wildlife habitats: tidal salt marsh, tidal brackish marsh, freshwater wetlands (tidal and non-tidal), riparian forest and woodland, ruderal grasslands, serpentine grassland, serpentine seeps, serpentine rock outcrops, chaparral, oak woodland, and open water. The dominant and characteristic plant and animal species for each of these communities/habitats are described below, and a crosswalk between the vegetation units mapped by AIS and the natural communities/wildlife habitats described is provided in Table 3.3-4. Scientific names for plant species follow the nomenclature used in *The Jepson Manual Higher Plants of California* (Hickman 1993). An updated, second edition of *The Jepson Manual* is expected to be published in the later part of 2011. Appendix F provides a taxonomic crosswalk transcribing the species' scientific names from the 1993 edition of *The Jepson Manual* to the unpublished second edition that is provided on the Jepson Herbarium Web site (The Jepson Herbarium 2011, Baldwin et al. 2011). Figure 3.3-1 depicts an example of the vegetation mapping data prepared by AIS and used for the current analysis; inclusion of maps depicting vegetation-mapping units throughout the entire Project Area at a scale that allows interpretation in this document is infeasible because of the extent of the Project Area and the fine scale of the mapping units. In addition to the natural communities discussed below, the Proposed Project also may impact small areas of developed habitat (including roads) and non-native trees.

Table 3.3-4. Crosswalk between Natural Community/Wildlife Habitat Types and Vegetation Mapping Units

Natural Community/ Wildlife Habitat	Vegetation Mapping Units
Tidal Salt Marsh	Cordgrass *Salicornia* *Salicornia* – Salt Grass - *Jaumea*
Tidal Brackish Marsh	Bulrush – Cattail *Lepidium latifolium* Fresh or brackish bulrush spp.
Freshwater Wetlands	Arid freshwater emergent marsh group Bulrush-cattail *Typha* Western North American freshwater aquatic vegetation group *Eleocharis macrostachya*, *Downingia*, *Trifolium variegatum*, *Eryngium* Freshwater wet meadow
Riparian Forests and Woodlands	*Salix exigua* *Salix laevigata* *Toxicodendron diversilobum* *Sambucus nigra* *Rubus discolor* *Acer macrophyllum* *Acer negundo* Agriculture group *Aesculus californica* *Arundo donax* *Alnus rhombifolia* *Populus fremontii*
Riparian Forests and Woodlands cont.	*Quercus agrifolia* *Quercus lobata* *Juglans hindsii* *Umbellularia californica* Southwestern North American riparian evergreen and deciduous woodlands group *Baccharis salicifolia* Eucalyptus Southwestern North American riparian/wash scrub group *Platanus racemosa*
Ruderal/Non-native Grasslands	Mediterranean California naturalized annual and perennial grassland group *Baccharis pilularis* California perennial and annual grasslands group *Conium-Foeniculum* patches Cliffs and rock outcropping
Serpentine	Serpentine component mapping unit

Table 3.3-4. Crosswalk between Natural Community/Wildlife Habitat Types and Vegetation Mapping Units

Natural Community/ Wildlife Habitat	Vegetation Mapping Units
Chaparral and Coastal Scrub	*Adenostoma fasciculatum* *Arctostaphylos glauca* California xeric chaparral group
Oak Woodland	*Quercus agrifolia* *Quercus douglasii* *Quercus lobata*
Open Water	Reservoirs Water group Small earthen dam ponds and natural lakes River and lacustrine flats and streambeds Perennial Stream Channel Concrete Lined Channels Earth Lined Channels

Source: Mapped by AIS using units from Sawyer et al. 2009

Land Use

The northern half of Santa Clara County is extensively urbanized, by thirteen of the county's fifteen cities and 90 percent of its nearly 1.7 million residents (County of Santa Clara 2011a). It is a major employment center, providing more than 25 percent of all jobs in the Bay Area (County of Santa Clara 2011b). The southern half of the county is mostly rural, with the exception of Gilroy, Morgan Hill, San Martin, and scattered low-density residential developments. It contains most of the county's agricultural land. In addition to livestock and poultry, agricultural land uses include approximately 231,000 acres of field crops (e.g., alfalfa, grain, pasture), bushberries, strawberries, floral crops, forest products, fruits and nuts, vegetable crops, seed crops, and nursery crops (e.g., bedding plants, ornamental trees and shrubs, Christmas trees) (Santa Clara County Department of Agriculture 2009).

Tidal Salt Marsh

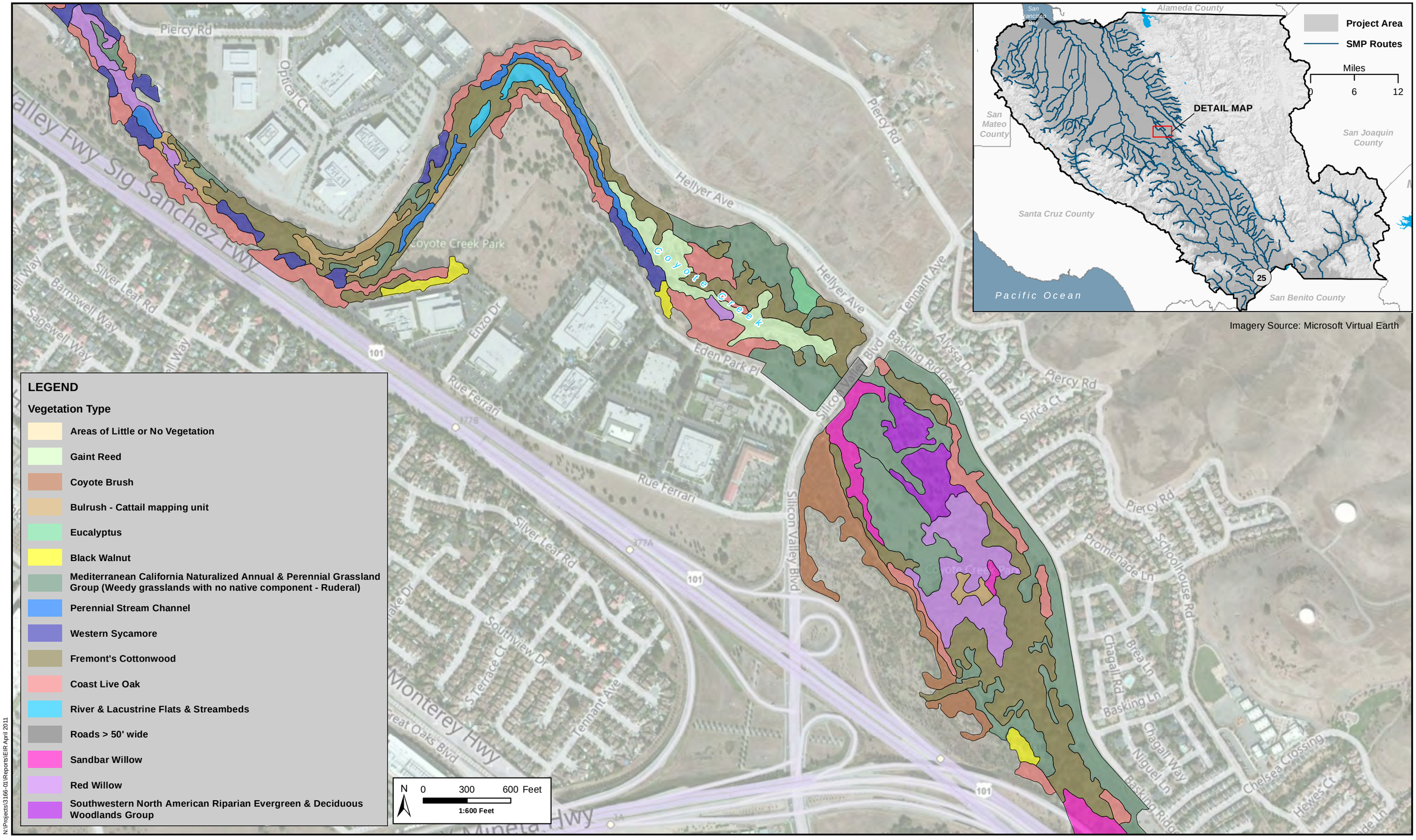
Tidal salt marsh is located in the lower reaches of creeks surrounding the San Francisco Bay and is influenced by fluctuations in the tide and salinity. Salt marshes in the Bay typically consist of three zones: low marsh dominated by cordgrass (*Spartina* spp.) occurring below the mean high water (MHW) mark; middle marsh dominated by pickleweed and occurring above MHW; and above this, a transitional high marsh zone with a mixture of pickleweed (*Salicornia* spp.) and other moderately halophytic species that can tolerate occasional high tides. Other halophytic plant species commonly found in salt marsh habitat located in the South Bay include alkali heath (*Frankenia salina*), saltgrass (*Distichlis spicata*), saltmarsh dodder (*Cuscuta salina*), spearscale (*Atriplex triangularis*), and marsh gumplant (*Grindelia stricta* var. *angustifolia*). These species typically occur above the MHW mark in the middle marsh and less disturbed areas of the high transitional marsh zone.

High marsh habitat often extends up levee banks in a disturbed ecotone that contains native marsh species as well as ruderal (disturbance-loving), non-native, salt-tolerant species such as iceplant (*Mesembryanthemum nodiflorum*), New Zealand spinach (*Tetragonia tetragonioides*), Russian thistle (*Salsola soda*), and Australian saltbush (*Atriplex semibaccata*), as well as perennial pepperweed (*Lepidium latifolium*). Differences in transitional, pickleweed, and cordgrass salt marsh habitat types affect wildlife use and sedimentation in the sloughs and channels draining into the Bay.

Two species of cordgrass are found in the South Bay, the native Pacific cordgrass (*Spartina foliosa*) and smooth cordgrass (*S. alterniflora*), which is native to the east coast of North America. Smooth cordgrass easily hybridizes with Pacific cordgrass, which can quickly lead to widespread distribution of the hybridized species. Smooth cordgrass (and its hybrids) and perennial pepperweed are the predominant invasive plant species found in the tidal salt marshes in the Project Area. Such invasions not only affect the food web, but also grow lower into channels than the native cordgrass. This can result in the loss of channels to vegetation encroachment and subsequent sedimentation (PWA and H.T. Harvey & Associates 2006), as well as loss of mudflats that are valuable to wildlife and native estuarine aquatic organisms. The Bay-wide Invasive Spartina Program (ISP; funded by the California Coastal Conservancy) along with the District's Spartina Control Program (part of the 2002–2012 SMP FEIR mitigation package) has been successful at minimizing the extent of hybrid *Spartina* in South Bay marshes. Small populations of hybrid *Spartina* still exist in the South Bay, however, the ISP is continuing to monitor and control this plant Bay-wide with the ultimate goal of eradication.

Tidal marshes in the Project Area are remnants of formerly much larger marshes. Tidal marshes support high densities of many wildlife species, including several species that are endemic to the San Francisco Bay. Based on trapping studies that have been conducted in a number of areas in the South Bay, the California vole (*Microtus californicus*) is often the most common small mammal species found in these tidal marshes, but the state and federally endangered salt marsh harvest mouse has been recorded in pickleweed-dominated marshes such as New Chicago, Nine-Par Marsh, and the Coyote Creek Salt Marsh Harvest Mouse Management Area. The salt marsh wandering shrew (*Sorex vagrans halicoetes*) has been recorded in New Chicago Marsh and other areas as well.

The state and federally endangered California clapper rail nests in cordgrass, dense stands of pickleweed, and marsh gumplant in tidal marsh habitats in the South Bay (e.g., Palo Alto Baylands, Alviso Slough, Guadalupe Slough, and Coyote Slough); this species is found in the lower marsh zone where numerous small tidal channels are present. Alameda song sparrows (*Melospiza melodia pusillula*) and Bryant's savannah sparrows (*Passerculus sandwichensis alaudinus*) also nest in tidal marshes. Alameda song sparrows prefer dense herbaceous vegetation wherever it occurs throughout the tidal marsh, while savannah sparrows nest in shorter vegetation such as pickleweed and high transitional marshes in upland ecotones. Other avian species that nest in tidal marshes in the South Bay include several species of ducks, herons, and egrets (Gill 1977). California black rails winter in small numbers in tidal marshes in the South Bay. Shorebirds, swallows, blackbirds, and other avian species roost and forage, often in large numbers, in tidal marsh habitats in the South Bay, but most do not breed in these areas.



LEGEND

Vegetation Type

- Areas of Little or No Vegetation
- Gaint Reed
- Coyote Brush
- Bulrush - Cattail mapping unit
- Eucalyptus
- Black Walnut
- Mediterranean California Naturalized Annual & Perennial Grassland Group (Weedy grasslands with no native component - Ruderal)
- Perennial Stream Channel
- Western Sycamore
- Fremont's Cottonwood
- Coast Live Oak
- River & Lacustrine Flats & Streambeds
- Roads > 50' wide
- Sandbar Willow
- Red Willow
- Southwestern North American Riparian Evergreen & Deciduous Woodlands Group

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H. T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS

Figure 3.3-1: Sample of Vegetation Mapping Performed for the SMP

Santa Clara Valley Water District Stream Maintenance Program EIR (3166-01)

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Tidal Brackish Marsh

Tidal brackish marsh habitat occurs in the upper intertidal reaches of sloughs and creeks draining into the Bay, where vegetation is subject to tidal inundation diluted by freshwater flows from upstream. This habitat type is dominated by emergent, vascular plant species adapted to intermediate (brackish) soil water salinities and consists of brackish marsh species including short bulrushes such as alkali bulrush (*Scirpus robustus*) and saltmarsh bulrush (*Scirpus maritimus*).

Wildlife communities are largely similar to those that occur in tidal salt marshes, with the potential for additional species to occur that prefer freshwater marshes. Marsh wrens (*Cistothorus palustris*), red-winged blackbirds (*Agelaius phoeniceus*), song sparrows (*Melospiza melodia*), and San Francisco common yellowthroats (*Geothlypis trichas sinuosa*) are common breeders in brackish marshes. Salt marsh species, such as the federally endangered salt marsh harvest mouse and California clapper rail, occur rarely in the brackish marsh habitat. Many additional tidal salt marsh and freshwater marsh species may forage in these areas, including ducks, herons, egrets, sparrows, larger shorebirds, and swallows.

Freshwater Wetlands

Freshwater wetlands in the Project Area can be divided into two distinct biotic sub-communities. These are freshwater marsh and seasonal wetlands. Water availability and microhabitat conditions, such as shading and soils, can determine the composition of wetland species. In the Project Area, freshwater marsh communities tend to occur in relatively long, linear patches, such as those along the lower freshwater reaches of streams that feed into the Bay (e.g., Saratoga Creek, Calabazas Creek, Permanente Creek, Guadalupe River); along Guadalupe Creek near the Los Capitancillos Percolation Ponds; and along Coyote Creek in the region of the Coyote Creek Park Chain. Seasonal wetlands in the Project Area typically occupy smaller, more discrete areas than freshwater marshes. They are found intermixed with freshwater marsh communities along Coyote Creek in the Coyote Creek Park Chain area and in the southern portion of the Project Area along Tar Creek, Tick Creek, and Uvas Creek.

In many parts of the Project Area, freshwater wetlands have been disturbed or lost because of urban development or agriculture. For example, Grossinger et al. (2007) estimated that the area of freshwater marsh on the valley floor portion of the Coyote Creek watershed has declined by 85-91 percent since the late 1700s.

Freshwater Marsh

Freshwater marshes are present primarily where perennial or near-perennial inundation by shallow, fresh water occurs in an open (i.e., not wooded) environment. These marshes typically are densely vegetated and dominated by bulrush (*Scirpus* spp.), rushes (*Juncus* spp.), sedges (*Cyperus* spp.), bur reed (*Sparganium* spp.) and cattails (*Typha* spp.). Other common freshwater marsh herbs in Santa Clara County are native and non-native smartweeds (*Polygonum* or *Persicaria* spp.) and primrose (*Ludwigia* spp.).

Freshwater marshes provide habitat for numerous bird species including ducks, gulls, terns, herons, egrets, and other waterbirds. The sora (*Porzana carolina*) and Virginia rail (*Rallus limicola*) forage in freshwater marshes in the Project Area during migration and in winter. American coots (*Fulica americana*), common moorhens (*Gallinula chloropus*), pied-billed grebes (*Podilymbus podiceps*), and several species of ducks breed in freshwater wetlands, channels, and ponds in and around emergent vegetation in the Project Area. Passerine species that breed in freshwater marshes include the marsh wren, song sparrow, common yellowthroat (*Geothlypis trichas*), and red-winged blackbird. Amphibians such as the native Pacific chorus frog (*Pseudacris regilla*) and western toad (*Anaxyrus boreas*), as well as the non-native American bullfrog (*Lithobates catesbeianus*), also are present in this habitat. However, special-status amphibians such as the California tiger salamander and California red-legged frog are not known to breed in the small patches that have been mapped as freshwater marsh habitat in the Project Area, although they have been observed in freshwater marshes in the surrounding mountains.

Seasonal Wetland

Seasonal wetlands form during the rainy season, typically in topographic low areas with underlying confining soil layers (generally clays and silts) that prevent water from percolating into the ground. Seasonal wetlands also may form on areas with seasonally high groundwater tables. Dominant plant species include those noted above for the freshwater marsh, including rushes and sedges such as tall umbrella sedge (*Cyperus eragrostis*), but they are more commonly dominated by non-native annual hydrophytic species such as rabbitsfoot grass (*Polypogon monspeliensis*), hyssop loosestrife (*Lythrum hyssopifolium*), white sweetclover (*Melilotus albus*), and bristly ox-tongue (*Picris echioides*).

Wildlife use of seasonal wetlands in the Project Area depends largely on the duration and depth of ponding, the extent of open water, and the structure and type of emergent vegetation. Most of the seasonal wetlands in the Project Area provide little open water, and they generally do not provide deep water. As a result, they are used primarily for winter and spring foraging by waterbirds, such as shorebirds, ducks, and geese. Song sparrows and red-winged blackbirds nest in vegetation in those seasonal wetlands that support taller, denser vegetation, and a variety of finches, sparrows, and other birds use this vegetation for cover and foraging habitat. Seasonal wetlands that provide standing water for at least several months support successful breeding by western toads and Pacific chorus frogs, while seasonal wetland swales that do not provide sufficient ponding provide only foraging habitat and moist refugia for these amphibians. In some areas, seasonal wetlands provide suitable breeding conditions for California tiger salamanders, if they hold water through May, and for California red-legged frogs, if they hold water into July. Common garter snakes (*Thamnophis sirtalis*) and western terrestrial garter snakes (*Thamnophis elegans*) forage in these wetlands for amphibian larvae.

Riparian Forests and Woodlands

As a result of the long history of human disturbance, isolation, and other urban-associated pressures that began in the late 1700s, many riparian habitats in the Project Area have undergone a shift in composition. For example, Grossinger et al. (2007) documented a substantial shift in land cover along much of Coyote Creek, from relatively open sycamore alluvial woodland, riparian scrub, and unvegetated gravel bars to more dense and

homogeneous riparian forest. In addition, riparian forests and woodlands in the Project Area are predominately restricted to narrow corridors along streams, and many reaches of streams support little or no woody vegetation. In some areas, channels are lined with concrete, riprap, or gabions (e.g., Guadalupe River near Hillsdale Avenue). Although native trees dominate most riparian woodlands and forests in the Project Area, non-natives abound as well, and exotic species, such as eucalyptus (*Eucalyptus* spp.), giant reed (*Arundo donax*), tree-of-heaven (*Ailanthus altissima*), elms (*Ulmus* spp.), and others occur frequently along these riparian systems.

In some areas, riparian forests and woodlands have been protected, and in some cases restored (particularly along the larger streams such as Coyote Creek and the Guadalupe River), by SCVWD and others. Even though riparian land cover is limited, these habitats contribute a disproportionately high amount to landscape-level wildlife species diversity. The presence of water and abundant invertebrate fauna provide foraging opportunities for many species. The diverse habitat structure provides cover, nesting opportunities, and migratory corridors for many wildlife species in the region, supporting the most diverse bird communities in the Project Area (Rottenborn 1997).

Three major types of riparian forest and scrub communities occur in the Project Area: willow riparian forests, woodlands, and scrub; mixed riparian forest and woodland; and central California sycamore alluvial woodland (ICF Jones & Stokes 2010). Central California sycamore alluvial woodland is considered a sensitive natural vegetation community by the CDFG (2007).

Willow Riparian Forests, Woodlands, and Scrub

Willow riparian forests, woodlands, and scrub comprise the most common riparian habitat type in the Project Area. These woodlands occur in the majority of drainages in the Santa Clara Valley.

Willow species, such as the yellow willow (*Salix lucida ssp. lasiandra*), red willow (*Salix laevigata*), arroyo willow (*Salix lasiolepis*), sandbar willow (*Salix exigua*), and mulefat (*Baccharis salicifolia*) dominate willow riparian forests, woodlands, and scrub habitat in the Project Area. Most willow riparian habitat in the Project Area supports invasive trees such as black locust (*Robinia pseudoacacia*), holly oak (*Quercus ilex*), eucalyptus, tree-of-heaven, and elms, as well as invasive herbaceous plants such as periwinkle (*Vinca major*) and English ivy (*Hedera helix*) that dominate the understory. Other areas contain native understory species, such as California blackberry, poison oak (*Toxicodendron diversilobum*), toyon (*Heteromeles arbutifolia*), and Mexican elderberry (*Sambucus mexicana*).

Willow riparian habitats that include large, mature riparian trees occur along select portions of Coyote Creek and the Guadalupe River, with smaller areas dominated by mature trees present along other SMP-maintained streams as well. Dominant native canopy species in these areas include willows and Fremont cottonwood (*Populus fremontii* spp. *fremontii*), along with native understory species such as elderberry and wild rose (*Rosa californica*).

Dense, native willow riparian forests provide habitat for relatively high densities of native nesting songbirds, such as song sparrows, black-headed grosbeaks, and warbling vireos.

This habitat also is more likely to support native bird and mammal species, such as Swainson's thrushes (*Catharus ustulatus*), yellow warblers, yellow-breasted chats (*Icteria virens*), and San Francisco dusky-footed woodrats.

The wider, more mature willow riparian corridors contain suitable foraging and breeding habitat for several functional groups of birds including insectivores (e.g., warblers, flycatchers), seed-eaters (e.g., finches), raptors, and cavity-nesters (e.g., swallows and woodpeckers). Among the numerous species of birds that use the riparian habitats in the Project Area for breeding are the Pacific-slope flycatcher (*Empidonax difficilis*), black-headed grosbeak (*Pheucticus melanocephalus*), warbling vireo (*Vireo gilvus*), yellow warbler (*Dendroica petechia*), belted kingfisher (*Ceryle alcyon*), and black-chinned hummingbird (*Archilochus alexandri*).

Several species of reptiles and amphibians occur in these riparian corridors in the Project Area. Leaf litter, downed tree branches, and fallen logs provide cover for the arboreal salamander (*Aneides lugubris*), western toad, and Pacific chorus frog. Several lizards may also occur here, including the western fence lizard (*Sceloporus occidentalis*), western skink (*Eumeces skiltonianus*), and southern alligator lizard (*Elgaria multicarinata*). Western pond turtles (*Actinemys marmorata*) and the non-native red-eared sliders (*Trachemys scripta*) use riparian habitat, particularly for breeding and winter aestivation. Bats and small mammals, such as the ornate shrew (*Sorex ornatus*), California vole, and Audubon's cottontail (*Sylvilagus audubonii*) use these riparian habitats as well. San Francisco dusky-footed woodrats (*Neotoma fuscipes annectens*) occur, often at high densities, in riparian habitats in less developed areas, such as in Coyote Valley, but they are often absent from heavily urbanized streams. Medium-sized mammals, such as the raccoon (*Procyon lotor*) and striped skunk (*Mephitis mephitis*), also are common in this habitat. Non-natives such as the opossum (*Didelphis virginiana*), eastern fox squirrel (*Sciurus niger*), Norway rat (*Rattus norvegicus*), red fox (*Vulpes vulpes*), and feral cat (*Felis catus*) may harass, compete with, or depredate eggs and young of native birds and small mammals, reducing the quality of this habitat for native riparian wildlife species.

Mixed Riparian Forest and Woodland

Mixed riparian forest and woodland habitat occurs in several drainages and persists in the foothills of the Project Area, along Thompson Creek, Uvas Creek, upstream reaches of Coyote Creek, Llagas Creek (above Chesbro Reservoir), Alamitos Creek, Calero Creek, and drainages east of Anderson Reservoir. White alder, big leaf maple, and western creek dogwood occur in lower densities in the Project Area.

Mixed riparian forest and woodland habitat is composed of white alder (*Alnus rhombifolia*), Fremont cottonwood, California sycamore (*Platanus racemosa*), coast live oak (*Quercus agrifolia*), valley oak (*Quercus lobata*), California bay (*Umbellularia californica*), and box elder (*Acer negundo*). Understory trees and shrubs include willows (*Salix* spp.), California buckeye (*Aesculus californica*), native and introduced blackberry (*Rubus* spp.), and poison oak.

The structural diversity of mixed riparian forests in the Project Area supports high diversities of riparian-breeding species, and many of the same species found in willow

riparian forests also are present in mixed riparian habitats, but the lower vegetation volume of mixed riparian forests results in lower bird densities. Additional species that prefer low-density riparian habitats and higher structural diversity are likely to be present throughout this habitat type, including chestnut-backed chickadees (*Poecile rufescens*), oak titmice (*Baeolophus inornatus*), bushtits (*Psaltriparus minimus*), finches, black phoebes (*Sayornis nigricans*), western scrub-jays (*Aphelocoma californica*), house wrens (*Troglodytes aedon*), American robins (*Turdus migratorius*), and dark-eyed juncos (*Junco hyemalis*). Raptors, such as red-shouldered hawks (*Buteo lineatus*) and Cooper's hawks (*Accipiter cooperii*), nest within these riparian corridors and forage in adjacent habitats. Oak, cottonwood, and sycamore trees also support cavity-nesting bird species such as woodpeckers, American kestrels (*Falco sparverius*), barn owls (*Tyto alba*), and bat colonies.

Central California Sycamore Alluvial Woodland

Central California sycamore alluvial woodland, a CDFG sensitive natural vegetation community (CDFG 2007), occurs primarily in the upper watersheds above the Project Area, such as along Llagas, Uvas, Alamitos, Guadalupe and Stevens creeks, and the upstream reaches of Coyote and Upper Penitencia creeks. It occurs on broad valley floors along low, braided riparian channels. This land cover type usually forms only where floodplains are broad, along low gradient streams flowing over deep alluvial deposits. Sycamore alluvial woodland stands have an open canopy dominated by California sycamore, often interspersed with white alder and willows. Other associated species may include valley oak, coast live oak, and California bay. Winter flows typically scour the understory vegetation each season, and as such, herbaceous vegetation is spare and patchy. Riparian species such as willows, coyote brush (*Baccharis pilularis*), mulefat, California buckeye, blackberry, Italian thistle (*Carduus pycnocephalus*), poison oak, common chickweed (*Stellaria media*), and bedstraw (*Galium aparine*) may occur along the outer stream banks.

Sycamore woodlands provide habitat for many species of bats, including the pallid bat (*Antrozous pallidus*), Brazilian free-tailed bat (*Tadarida brasiliensis*), Yuma myotis, California myotis (*Myotis californicus*), and big brown bat (*Eptesicus fuscus*). Cavity-nesting bird species, such as woodpeckers and American kestrels, are also likely to be found breeding in this habitat. Red-tailed hawks (*Buteo jamaicensis*), red-shouldered hawks, great-horned owls (*Bubo virginianus*), and other raptors nest in the larger trees in this habitat and forage in adjacent habitats. Species that prefer thick understory cover, such as towhees and sparrows, are less abundant in sycamore woodlands compared with other riparian habitats.

Ruderal/Non-Native Grasslands

California annual grassland habitat occurs commonly on undeveloped parcels and constructed levees throughout the Project Area. The largest expanses of this habitat are present on hills surrounding Coyote Valley, in the northern portion of the Santa Teresa Hills, to the east of Anderson Reservoir, and elsewhere along the hilly eastern margin of the Project Area. This habitat type also extends into Alviso, and along the valley floor on both sides of upper Coyote Creek north of the Morgan Hill city limits.

Grassland communities are characterized by a dominance of grass and herb species, with less than 10 percent cover by trees and shrubs. Dominant plant species are non-native

annual grasses, such as ripgut brome (*Bromus diandrus*), Italian ryegrass (*Lolium multiflorum*), and wild oats (*Avena* sp.). Associated species include many native and non-native forbs, such as California poppy (*Eschscholzia californica*), lupine (*Lupinus* spp.), and filaree (*Erodium* spp.).

Native grassland habitat (non-serpentine) is distributed in small patches throughout portions of the California annual grassland habitat and typically includes a component of native purple needlegrass (*Nassella pulchra*) growing in association with wild oats and ripgut brome. It is relatively rare to find native grasslands dominated (i.e., greater than 50 percent by relative percent cover) by purple needlegrass in the Santa Clara Valley.

A small area of rock outcrops consisting of exposed non-serpentine bedrock occurs in the Project Area within California annual grassland habitat north of Alamitos Creek in the Santa Teresa Hills. These rock outcrops are devoid of soil and typically do not support vascular plants except within crevices that have accumulated soil. One exception is that several species of non-special-status dudleya (*Dudleya* spp.) are able to grow in cracks and fractures of the outcrops. In addition, mosses and other epiphytes may grow in some crevices that can retain water for a short duration.

Wildlife use of grasslands in much of the Project Area is limited by human disturbance, extent of the habitat in a specific area, abundance of non-native and invasive species, and isolation of grassland habitat remnants from more extensive grasslands. As a result, some of the wildlife species associated with extensive grasslands, such as grasshopper sparrows (*Ammodramus savannarum*), breeding Bryant's savannah sparrows, and western meadowlarks (*Sturnella neglecta*) are absent from small patches of grassland within the urban matrix that occupies most of the Project Area. However, much of the grassland around the periphery of the Project Area is contiguous with larger expanses of grassy open space, and thus provides higher-quality habitat for grassland-associated wildlife species.

California ground squirrels (*Spermophilus beecheyi*), where they are present, are an important component of these grassland communities, providing a prey base for diurnal raptors and terrestrial predators. The burrows of California ground squirrels also provide refugia for several special-status wildlife species, such as the burrowing owl and the California tiger salamander. Other rodent species that are likely present in grassland habitats include the California vole, valley pocket gopher (*Thomomys bottae*), and deer mouse (*Peromyscus maniculatus*). Diurnal raptors such as red-tailed hawks, northern harriers (*Circus cyaneus*), white-tailed kites (*Elanus leucurus*), and American kestrels forage for these small mammals over grasslands during the day, and at night nocturnal raptors, such as barn owls, forage for nocturnal rodents, such as deer mice. Loggerhead shrikes (*Lanius ludovicianus*) forage in grassland habitats for insects and other prey.

Open grassland habitat with bare ground is important foraging habitat for the pallid bat and Brazilian free-tailed bat. Mammals such as the coyote (*Canis latrans*), American badger (*Taxidea taxus*), black-tailed jackrabbit (*Lepus californicus*), and striped skunk utilize grassland habitats in the Project Area for foraging. Reptiles such as western fence lizards, southern alligator lizards, western skinks, western terrestrial garter snakes, gopher snakes (*Pituophis catenifer*), racers (*Coluber constrictor*), western rattlesnakes (*Crotalus viridis*), and common kingsnakes (*Lampropeltis getula*) also frequent these habitats.

Serpentine

Serpentine bunchgrass grasslands, rock outcrops/barrens, seeps, and chaparral are considered sensitive communities by virtue of their importance to special-status plants and animals and their relatively limited extent (CDFG 2007, ICF Jones & Stokes 2010).

Serpentine Bunchgrass Grassland

Serpentine bunchgrass communities have been documented in the Project Area primarily on either side of the Santa Clara Valley, from Coyote Ridge on the east and the Santa Teresa Hills on the west, south to the San Martin area. Smaller patches of serpentine grassland occur elsewhere, such as on Communications Hill, Tulare Hill, and north of Alum Rock in San Jose.

Serpentine bunchgrass grasslands occur on soils derived from serpentine rock substrates. Most serpentine soils support a diverse grassland assemblage dominated by California dwarf plantain (*Plantago erecta*), Italian ryegrass, and spring and summer wildflowers, including goldfields (*Lasthenia* spp.), buttercup (*Ranunculus californicus*), purple owl's clover (*Castilleja exserta*), and tidy-tips (*Layia platyglossa*, *L. chrysanthemoides*), among many others. Native grasses, such as purple needlegrass, junegrass (*Koeleria macrantha*), big squirreltail (*Elymus multisetus*), creeping wildrye (*Leymus triticoides*), and other perennial bunchgrasses are common throughout this community.

Serpentine grasslands are highly infertile because of their extremely high levels of magnesium, chromium, and nickel; low concentrations of nutrients such as calcium and nitrogen; and low water-holding capacity. A unique group of vascular plant species, which can tolerate the relatively high magnesium to calcium ratio, has evolved in response to these conditions. As a result, serpentine grasslands generally support native plant communities, including rare plants, such as the federally listed Santa Clara Valley dudleya and Metcalf Canyon jewel-flower, as well as most beautiful jewel-flower and smooth lessingia (see also Special-Status Plant Species below). In turn, several invertebrate species, including the federally threatened Bay checkerspot butterfly, depend on serpentine grasslands because their host food plants are found primarily in these habitats.

The Bay checkerspot butterfly occurs in native serpentine grassland communities that support dense stands of its primary larval food plant, dwarf plantain. Larvae also utilize secondary larval food plants such as owl's clover (*Orthocarpus* spp.), and adult butterflies use nectar from plants such as goldfields, onion (*Allium* spp.), tidy-tips, cream cups (*Platystemon californicus*), and lomatium (*Lomatium* spp.). This species is associated primarily with large expanses of serpentine grassland, characterized by a diversity of slope exposures and moderate-to-high grazing intensity.

Bird species that occur most abundantly in serpentine grassland habitats in the Project Area include the grasshopper sparrow, horned lark (*Eremophila alpestris*), rufous-crowned sparrow (*Aimophila ruficeps*), and rock wren (*Salpinctes obsoletus*). These species are well adapted to the patchy distribution of bunchgrass vegetation in serpentine habitats.

Serpentine Rock Outcrops/Barrens

Serpentine rock outcrops/barrens lack soil entirely and are typically devoid of vegetation, with visible rock outcrops usually covered in crustose (forming a crusty, fixed mass that covers the surface on which it grows) lichen species. Serpentine rock outcrops/barrens are found in a patchwork of low-growing serpentine plant communities in the grasslands on either side of Coyote Valley (including extensive areas on Coyote Ridge), Communications Hill, Tulare Hill, the Santa Teresa Hills, and in the San Vicente area west of Calero Reservoir and in the field south of Suncrest Avenue in the Alum Rock area, interspersed with intact, undisturbed patches of sagebrush chaparral communities. This habitat tends to exclude most special-status plant species as no soil accumulation exists in these areas; however, the federally endangered Santa Clara Valley dudleya occurs primarily in this habitat type. Crevices in these outcrops provide refugia for western fence lizards, common kingsnakes, and western rattlesnakes. Rock wrens hide their nests in these outcrops.

Serpentine Seep

Several serpentine seeps, small wetlands that typically lack woody vegetation and are fed by small springs or creeks supported by groundwater, occur in the Santa Teresa Hills and all along Coyote Ridge. These seeps are distinguished from other wetlands because they occur on serpentine soils within serpentine grassland habitat. Many of the serpentine seeps in the Project Area support the special-status Mt. Hamilton thistle (*Cirsium fontinale var. campylon*); this is the only habitat type in which this species occurs. Serpentine seeps are wetland habitats that provide moist refugia for Pacific chorus frogs, western toads, and other amphibians, but typically do not pond water deep enough to provide suitable breeding habitat for these species. They also are so limited in extent that they are infrequently used by other aquatic/wetland-associated wildlife species, such as shorebirds or waterfowl.

Mixed Serpentine Chaparral

Mixed serpentine chaparral is an uncommon chaparral-type that is generally composed of chaparral species tolerant of a broad range of soil conditions such as those listed above, as well as species that are limited to serpentine soils such as leather oak (*Quercus durata*), Coyote ceanothus, and chaparral silktassel (*Garrya congdonii*). The dominant shrubs in mixed serpentine chaparral are often dwarfed and spaced more widely than is typically seen in non-serpentine stands (Holland and Keil 1995). Grass and herbaceous vegetation may or may not be present in the spaces between the shrubs. This unique community supports many special-status plants such as Coyote ceanothus, Santa Clara thornmint (*Acanthomintha lanceolata*) and Sharsmith's harebell (*Campanula sharsmithiae*). Wildlife species typical of this community are similar to those described for chaparral and coastal scrub below.

Chaparral and Coastal Scrub

In the Project Area, chaparral and coastal scrub communities were mapped primarily in the area between Calero Reservoir and Almaden Quicksilver Park and along the Coyote Creek Park Chain. These are characterized by drought-tolerant, shrub-dominated landscapes that are exposed to intense sunlight. These habitat types form dense stands of shrubs with little understory and are prone to intense and regular fire cycles in natural settings. After a fire event, these habitat types recover quickly and support extraordinary blooms of annual

forbs adapted to fire during the first few years as the shrub canopy develops. Typical dominant species found in chaparral communities are chamise (*Adenostoma fasciculatum*), bigberry manzanita (*Arctostaphylos glauca*), ceanothus (*Ceanothus* spp.), and scrub oak (*Quercus* spp.). Typical dominant species found in coastal scrub communities are black sage (*Salvia mellifera*), coyote brush, and California sagebrush (*Artemisia californica*). Coastal scrub communities generally occur on exposed sites with shallow, rocky soils. Overall, the shrub species comprising coastal scrub communities are lower in stature than chaparral and appear more open. In contrast, once the manzanita and ceanothus shrubs that dominate chaparral reach maturity these plants form a dense, impenetrable thicket of broad-leaved sclerophylous shrubs.

Chaparral and coastal scrub habitats typically are dry and provide relatively low and homogeneous structure. In addition, the areas where these habitats occur in the Project Area are small and often surrounded by other habitat types, such as annual grassland and oak woodland. Therefore, wildlife utilization of these areas is largely determined by adjacent habitats. Nevertheless, a number of animal species occur in these habitats.

Amphibians are usually absent or scarce in chaparral habitats because of their very dry conditions, and many other wildlife species occurring here either derive moisture directly from food or synthesize their water metabolically from seeds (e.g., the California pocket mouse [*Chaetodipus californicus*]). Mammals that use chaparral and coastal scrub habitats for cover include the coyote, bobcat (*Lynx rufus*), and brush rabbit (*Sylvilagus bachmani*), among others. Nests of San Francisco dusky-footed woodrats often are present where oaks and/or poison oak are mixed with coyote brush scrub. California mice (*Peromyscus californicus*), which occupy woodrat nests, also are present. Bird species that nest in chaparral habitats include the California thrasher (*Toxostoma redivivum*), California towhee (*Pipilo crissalis*), spotted towhee (*Pipilo maculatus*), California quail (*Callipepla californica*), wrentit (*Chamaea fasciata*), loggerhead shrike, lesser goldfinch (*Carduelis psaltria*), and Anna's hummingbird (*Calypte anna*). Rufous-crowned sparrows often nest where these habitats are dominated by California sagebrush. Reptiles that occur in these habitats include the gopher snake, western rattlesnake, southern alligator lizard, striped racer (*Masticophis lateralis*), California horned lizard (*Phrynosoma coronatum frontale*), and western fence lizard.

Oak Woodland

Oak woodland communities in the Project Area typically occur at elevations above 300 feet and are characterized by native California oaks (e.g., coast live oak, valley oak, and blue oak [*Quercus douglasii*]). Representative understory plants are weedy annual grasses, some native and introduced forbs, and occasional shrubs, such as toyon, poison oak, California coffeeberry (*Rhamnus californica*), and common snowberry (*Symphoricarpos albus var. laevigatus*). The special-status species big-scale balsamroot (*Balsamorhiza macrolepis var. macrolepis*) and robust monardella (*Monardella villosa ssp. globosa*) occur in oak woodland habitats.

Many of the oak woodland habitats in the Project Area have been fragmented by urban and suburban land uses. Nevertheless, they still support a number of the common oak-associated wildlife species in the region. The western scrub-jay, acorn woodpecker

(*Melanerpes formicivorus*), oak titmouse, Nuttall's woodpecker (*Picoides nuttallii*), chestnut-backed chickadee, spotted towhee, and white-breasted nuthatch (*Sitta carolinensis*) are year-round residents. Dusky-footed woodrats also are frequently found in oak woodlands. The deer mouse, California mouse, and the introduced eastern gray squirrel (*Sciurus carolinensis*) nest and forage in this habitat as well. Reptiles found in adjacent grassland and scrub habitats also occur regularly in oak woodland habitats. Bats, such as the pallid bat, may use hollows of larger, older oak trees for roosting in open-canopy oak woodland. The California myotis and long-eared myotis (*Myotis evotis*) may occur in areas of oak woodland with a closed canopy.

Open Water

Aquatic or open water habitats are permanently or semi-permanently flooded, and support less than 5 percent vegetation in emergent or submerged states. Isolated ponds, reservoirs, percolation ponds (off-stream groundwater recharge ponds), rivers, streams, canals, and ditches, and tidal/intertidal habitats represent the open water surfaces mapped in the Project Area. Such areas are described below in terms of the hydrologic regimes and the salinity of the water.

Ponds and Reservoirs

Very few naturally occurring ponds exist in the Project Area. Many human-made ponds, including old gravel excavation sites, stock ponds, or ornamental ponds associated with golf courses and parks, occur. Other water bodies in the Project Area include the Parkway Lakes, Lake Cunningham, Lake Almaden, and percolation ponds along Los Gatos, Llagas, Coyote, Upper Penitencia, Stevens, and Guadalupe creeks, the Guadalupe River, and Madrone Channel.

There are 10 reservoirs in the Project Area: Anderson, Calero, Chesbro, Coyote, Guadalupe, Lexington, Stevens Creek, Uvas, Vasona, and Almaden. These reservoirs were built to provide water supply and storage uses for county residents. Reservoirs have altered downstream hydrology by reducing spring runoff events, dampening flood peaks and frequency, and supplying water to creeks that would normally be dry during summer months. They also retain sediment, preventing natural sediment dispersal throughout the watershed. Although no Proposed Project activities would occur in the reservoirs, these reservoirs influence the biological resources present in reaches both above and below them.

Cormorants, gulls, and pelicans exhibit movements between foraging areas at inland reservoirs and the South Bay, and ospreys (*Pandion haliaetus*), Forster's terns (*Sterna forsteri*), and Caspian terns (*Sterna caspia*) forage for fish in a number of ponds and reservoirs in the Project Area. Since the late 1990s, small heron rookeries have become established on islands in inland reservoirs in the South Bay; these herons and egrets forage largely on fish in these waterbodies.

Amphibian species that breed in ponds and reservoirs throughout the Project Area include the Pacific chorus frog, bullfrog, and western toad. Western pond turtles are known to occur in a number of creeks including Coyote Creek, Guadalupe River, Alamitos Creek; ponds on the Santa Teresa Golf Course; several SCVWD reservoirs (Almaden, Calero, Chesbro, Anderson, Uvas, Stevens Creek, Lexington, etc.); and other small ponds throughout the

Project Area (H. T. Harvey & Associates 1999a, CNDDB 2011). This species may occur in creek, pond, and reservoir habitats throughout the Project Area, though in urban areas, nesting habitat is limited or absent. Several non-native turtle species have been introduced into the Project Area as well. California tiger salamanders are known to breed in several ponds at the periphery of the Project Area, and near Communications Hill, where non-instream aestivation habitat is available and non-native aquatic predators, such as bullfrogs, green sunfish (*Lepomis cyanellus*), mosquitofish (*Gambusia affinis*), and Louisiana red crayfish (*Procambarus clarkii*), are absent. California red-legged frogs are known from ponds and streams in a few areas at the periphery of the Project Area; however, this species is largely absent from the portions of the Project Area on the Santa Clara Valley floor that have been heavily impacted by urban development and agricultural activities (H. T. Harvey & Associates 1997).

Common resident birds that occur in ponds, lakes, and reservoirs throughout the Project Area include the pied-billed grebe (*Podilymbus podiceps*), double-crested cormorant (*Phalacrocorax auritus*), great egret, snowy egret (*Egretta thula*), Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), common merganser (*Mergus merganser*), American coot, and killdeer (*Charadrius vociferus*), among others. Numerous species of wintering ducks, such as the northern shoveler (*Anas clypeata*), lesser scaup (*Aythya affinis*), and bufflehead (*Bucephala clangula*) occur in these habitats during fall and winter. Shorebirds, such as the greater yellowlegs (*Tringa melanoleuca*), spotted sandpiper (*Actitis macularius*), and others, forage and roost at the edges of these habitats during migration and winter. Additionally, a variety of mammals come to ponds and reservoirs to drink.

The Coyote Creek Reach 1A pond along lower Coyote Creek was created and is managed specifically for waterbird use and provides habitat for numerous shorebirds, waterfowl, gulls, terns, and larger waders. Regular monitoring by the San Francisco Bay Bird Observatory of this 16-acre pond has recorded more than 57 species of waterbirds, the most common of which were dowitchers (*Limnodromus spp*.), American avocets (*Recurvirostra americana*), northern shovelers, and California gulls (Strong 2003). Additional birds using this pond include pectoral sandpipers (*Calidris melanotos*), western sandpipers (*Calidris mauri*), and Wilson's phalaropes (*Phalaropus lobatus*), as well as large numbers of nesting American avocets, black-necked stilts (*Himantopus mexicanus*), and ducks (Strong 2003).

Creek and Stream Channels

Creek and stream channels have been divided into three types for the purposes of the existing SMP: natural, mixed, and concrete. Natural channels are streams that have an unmodified bed and banks. Mixed channels have modified channels but have earthen stream-bottoms. The banks of mixed channels are often lined with excavated earth, rock rip-rap, gabions, concrete, or flood walls. Concrete-type channels are defined by concrete lining in the channel bed. Creek and stream channels may be vegetated with wetland vegetation, riparian vegetation, or open water, depending on the extent and type of modification applied.

Amphibians such as the western toad, Pacific chorus frog, and the non-native bullfrog also are present in creeks and stream channels in the Project Area. The native western pond

turtle is present in low numbers in some reaches of these streams, as are several species of non-native turtles that have been released locally from captivity, such as red-eared sliders and painted turtles (*Chrysemys picta*). Waterbirds, such as the mallard, green heron (*Butorides virescens*), great egret (*Ardea alba*), and belted kingfisher, forage in these waters. Bats, including the Yuma myotis (*Myotis yumanensis*) and big brown bat, forage aerially on insects over these streams.

A number of fish also use the creek and stream channels in the Project Area, including several species of native fishes. The rivers and creeks of Santa Clara County are home to 12 native and 24 non-native species of fish (SCVWD 1995, Leidy 2007). The most species-rich creek in terms of the number of fish species supported is Coyote Creek, with 12 native species (SCVWD 1995, Leidy 2007).

According to SCVWD fish sampling and relocation data (2002-2009) and Leidy (2007), the most common native fish in the Project Area streams draining to San Francisco Bay include the California roach (*Lavinia symmetricus*), hitch (*Lavinia exilicauda*), Sacramento sucker (*Catostomus occidentalis*), and threespine stickleback (*Gasterosteus aculeatus*), which occur in most watersheds and sub-watersheds in the Project Area. The federally threatened Central California Coast steelhead and the fall-run Chinook salmon are anadromous fish that spawn in several of these streams, such as Coyote Creek, Upper Penitencia Creek, the Guadalupe River, and Los Gatos Creek (SCVWD 2007a). The native Pacific lamprey (*Lampetra tridentata*) occurs in several streams in the Project Area. The creeks in the Pajaro River basin, which drain to Monterey Bay, support many of the same species as the creeks draining into San Francisco Bay. Dominant native fish species occurring in these creeks include species such as the Pacific lamprey, Monterey roach (*Lavinia symmetricus subditus*), hitch, pikeminnow (*Ptychocheilus grandis*), threespine stickleback, and riffle sculpin (*Cottus gulosus*), as well as the South-Central California Coast steelhead (Smith 1982).

A number of non-native fishes have been introduced to the Project Area, including the mosquitofish, largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), pumpkinseed (*Lepomis gibbosus*), green sunfish, common carp (*Cyprinus carpio*), goldfish (*Carassius auratus*), fathead minnow (*Pimephales promelas*), bigscale logperch (*Percina macrolepida*), inland silverside (*Menidia beryllina*), golden shiner (*Notemigonus crysoleucas*), and threadfin shad (*Dorosoma petenense*). Although fish in the Project Area's creeks consist of a mix of native and non-native species, most of the fish occurring in off-channel ponds and lakes are non-natives.

Canals

SCVWD-maintained canals (such as the Almaden Calero, Vasona, and Penitencia Canals) are used to divert water between streams or around certain stream reaches, or from one reservoir to another; canals also provide a flood protection benefit by intercepting hillside runoff. Some canals, such as the Coyote Alamitos Canal, Almaden Calero Canal, and portions of the Coyote Canal and Coyote Canal Extension, are concrete-lined and as a result support little riparian or wetland vegetation, other than vegetation that establishes on sediment that accumulates in the canals. As a result, dominant vegetation along these canals is determined primarily by the type of habitat (e.g., grassland or woodland) in which the canals have been constructed. Portions of the Coyote Canal and Coyote Canal Extension have natural earth

beds and banks, although little or no wetland or riparian vegetation (i.e., vegetation supported by groundwater associated with the canals) is present along these canals except where serpentine seeps drain into the canals. Among the canals in the Project Area, currently the Almaden Calero Canal, Vasona Canal, and Kirk and Page Distribution Systems are operable, whereas the Coyote, Coyote Extension, and Coyote Alamitos Canals are inoperable and are not used for water transfers or diversions, though these canals provide some flood protection benefit by intercepting runoff.

Fish from upstream areas may occur in perennially wet sections of the canals, and amphibians such as Pacific chorus frogs and western toads use portions of these canals for refuge and as breeding habitat. Ducks such as mallards forage in canals in low numbers, but waterbird use of these facilities is generally low.

Intertidal Areas

Mudflat habitat occurs in intertidal areas from below mean lower low water to mean tide level. Such intertidal areas are expanses of unvegetated mud just beyond the lower edge of tidal wetlands and between the low-flow channel and edge of wetlands within the tidal reaches of slough and creek channels that drain to San Francisco Bay. Mudflats generally are covered by shallow water during high tide, and are exposed during low tides. These are dynamic depositional features, changing in extent and location depending on erosion and deposition of sediments. Narrow mudflats occur along the edges of the upper reaches of tidal sloughs while much more extensive flats are present at the mouths of the major sloughs. For example, a large expanse of newly formed mudflat habitat exists at the mouths of Alviso Slough and Guadalupe Slough, while small areas of mudflat are surrounded by freshwater marsh at the upper end of Coyote Slough. This habitat often supports less than 10 percent cover of emergent vegetation, typically in the form of cordgrass and annual pickleweed (*Salicornia europaea*) that is too sparse to map as distinct salt marsh habitat.

Aquatic intertidal habitat is present in the Project Area in the lower, tidal reaches of streams entering the Bay. Such areas have tidal estuarine influence and are too deep to support low tidal salt marsh and cordgrass species. Depending on tidal action, such areas can range from relatively clear to extremely turbid. These habitats are more benthic in nature than mudflats and are not exposed, even during very low tides.

Detritus from tidal marshes, phytoplankton that settles in the water column, and algae and diatoms growing on the intertidal mudflats are responsible for the high productivity of benthic invertebrates on mudflats (Warwick and Price 1975, Life Science 2003). Crustaceans, polychaete worms, gastropod and bivalve mollusks, and other invertebrates live on or just below the surface of the mud. During the daily high tides, fish school over the mudflats to feed on these invertebrates. As the tide recedes and the flats emerge, the fish retreat to subtidal areas while considerable numbers of birds, primarily shorebirds, leave their high-tide roosts and feed on the flats. These mudflats are primarily responsible for the importance of the San Francisco Bay area to West Coast shorebird populations. Gulls and some dabbling ducks forage on the exposed mudflats as well. Because benthic invertebrates often recede deeper into the mud as the tidal elevation drops, especially large concentrations of foraging birds usually occur right at the edge of the receding or rising tideline. Although the largest numbers of shorebirds forage on the broad flats along the

edge of the Bay at low tide, some shorebirds, gulls, and large waders (e.g., herons and egrets) feed on the exposed flats along sloughs and channels, and the smaller channels in the brackish and salt marshes are the favored foraging areas for the state and federally endangered California clapper rail. Shorebirds, gulls, terns, American white pelicans (*Pelecanus erythrorhynchos*), and ducks often use exposed mudflats as roosting or loafing areas when they are available, as do Pacific harbor seals (*Phoca vitulina richardii*). When the tides rise, most of these birds return to roosting areas in salt ponds or other alternate habitats.

Invasive Species

For over two centuries, people have brought non-native plants and animals into the Project Area, either accidentally (e.g., as stowaways in cargo shipments) or intentionally (e.g., imported for food, ornament, sport, or as pets), and many of these species have now been introduced into the wild. Such species that cause harm and, once established, spread quickly from their point of introduction are often called "invasive" species.

Invasive species can threaten the diversity and abundance of native species through predation, competition for resources, transmission of disease, parasitism, and physical or chemical alteration of the habitat. Their effects on natural communities also may lead to direct effects on human activities, such as clogging waterways and water delivery systems, weakening flood protection structures, damaging crops, and diminishing sport fish populations (CDFG 2008c).

As described previously, invasive plant species, such as smooth cordgrass, perennial pepperweed, and giant reed, are common in the Project Area. Introduced animal species are also common in the Project Area. A few of the more common introduced/invasive wildlife and fish species present, or with a high potential to be introduced, are discussed next.

Mosquitofish have been introduced throughout the world, including Santa Clara County, to control mosquito populations. Such introductions have been shown to have negative effects on amphibians in experimental studies, including decreased survival of larval Pacific treefrogs (Goodsell and Kats 1999) and California newts (Gamradt and Kats 1996), as well as tail injury, reduced metamorph size, and altered activity patterns of larval California red-legged frogs (Lawler et al. 1999).

New Zealand mud snails (*Potamopyrgus antipodarum*), which reproduce rapidly and can crowd out the native insects that aquatic wildlife depend on for survival, were first discovered in California in 2000 in the Owens River in Mono County (CDFG 2008d). In New Zealand, populations likely are kept in check naturally by a native parasite that is not present in North America. In the absence of such natural predators or parasites, population densities can reach nearly 1 million snails per square meter, and the species is parthenogenic (i.e., able to start a new population from only one snail) (CDFG 2008d). Biologists do not believe that the species can be eradicated once established (CDFG 2008d). Although this species has not yet been recorded in the Project Area, it has been located to the north in Alameda County on Alameda Creek and to the south in Santa Cruz County on the San Lorenzo River (Benson 2011).

The American bullfrog has been accidentally and intentionally introduced (e.g., for food in the 1920s by commercial frog farmers) throughout the world and is now established throughout most of the western United States, including the Project Area (California Herps 2011). Their large size, mobility, generalized eating habits (their prey includes native amphibians as well as other aquatic and riparian vertebrates [Graber 1996]), and aggressive behavior have made bullfrogs extremely successful invaders and a threat to biodiversity (AmphibiaWeb 2008).

Non-native species such as feral house cats (*Felis felis*), red foxes, Norway rats, and muskrats are known to occur in the Project Area and are significant predators of native birds. For example, non-native Norway rats (*Rattus norvegicus*) have long been known to be effective predators of clapper rail nests (DeGroot 1927, Harvey 1980, Foerster et al. 1990), and according to Harvey and Foerster et al., predators, especially rats, has accounted for clapper rail nest losses of 24 to 29 percent in certain South Bay marshes.

Special-Status Plant and Animal Species

CEQA requires assessment of the effects of a project on species that are "threatened, rare, or endangered"; such species are typically described as "special-status species." For planning purposes during the SMP Update and for assessment of impacts of the Proposed Project, special-status species have been defined as described below. Impacts to these species are regulated by some of the federal and state laws and ordinances described under Section 3.3.2, *Regulatory Setting*.

Special-Status Plants

For the purposes of this document, "special-status" plants are considered plant species that are:

1. Listed under the FESA as threatened, endangered, proposed threatened, proposed endangered, or a candidate species.
2. Listed under the CESA as threatened, endangered, rare, or a candidate species.
3. Listed by the CNPS as rare or endangered on List 1A, 1B, or 2.
4. Listed by the CNPS on List 3 or 4.

For the purpose of this study, all special-status plants were analyzed for their potential to occur in the Project Area, and all those with the potential to occur were carried forward for additional analysis, except CNPS List 4 species were only carried forward if: 1) the only known populations occur in the vicinity of Santa Clara County; 2) it has been recorded by the CNPS (2011) as occurring in no more than two counties in California (i.e., very limited distribution); 3) populations in the Project Area are at the periphery of the species' range or in areas where the taxon is especially uncommon or has sustained heavy losses; 4) the type locality occurs in the Project Area; or 5) populations exhibit unusual morphology or occur on unusual substrates. Two CNPS List 4 species meet the above criteria because of their restricted range: Santa Clara red ribbons (*Clarkia concinna* ssp. *automixa*) and Satan's goldenbush (*Isocoma menziesii* var. *diabolica*).

Based on information from the CNPS and CNDDB (2011), a list of 94 special-status plants potentially occurring in Santa Clara County was compiled. After an analysis of documented habitat requirements and occurrence records for these species, 60 were determined to be absent from the Project Area. (A list of all species considered but rejected, and the reason for rejection is provided in Appendix G.) An additional two species were eliminated from consideration for species-specific reasons shown in Table 3.3-~~20~~21, located at the end of this section. The remaining 32 species are considered to occur potentially in the Project Area, based on their general habitat descriptions, also described in Table 3.3-~~20~~21. Detailed descriptions of each species potentially occurring in the Project Area and a discussion of known occurrences are provided in Appendix H and Table 3.3-~~20~~21.

Special-Status Animals

For purposes of this report, "special-status" animals are considered animal species that are:

- listed under the FESA as threatened, endangered, proposed threatened, proposed endangered, or a candidate species;
- listed under the CESA as threatened, endangered, or a candidate species;
- designated by the CDFG as a California species of special concern;
- listed in the California Fish and Game Code as a fully protected species (birds at Section 3511, mammals at Section 4700, reptiles and amphibians at Section 5050, and fish at Section 5515);
- protected by the Marine Mammal Protection Act;
- invertebrates that are on the CDFG's list of Special Animals (CDFG 2011) (although other taxa on that list are not included as special-status species in this analysis, if they do not meet one of the other criteria above, the invertebrates on the Special Animals list are considered special-status species here because no official list of invertebrate species of special concern exists); or
- Pacific lamprey, which could potentially be subject to listing under the state and/or federal Endangered Species Act during the period covered by this SMP update.

The legal status and potential for occurrence of special-status animal species known to occur or potentially occurring in the general vicinity of the Project Area are shown in Table 3.3-~~21~~22, located at the end of this section. Expanded descriptions are included in Appendix I for those species 1) known to occur in the Project Area, 2) for which potentially suitable habitat occurs within or in the general vicinity of the Project Area, 3) for which the site is accessible to animals from known populations, and/or 4) for which resource agencies and/or the Habitat Plan have expressed particular concern such that an expanded discussion is required.

Several special-status wildlife species that historically have occurred in the Project Area, or that have been recorded in Santa Clara County but not in the Project Area itself, are not expected to be present in the Project Area currently, at least not as special-status species. (Note: Several birds in this group are considered California species of special concern only when breeding [Shuford and Gardali 2008]. Thus, if they occur in the Project Area only as non-breeders [e.g., as migrants or winter visitors], they are not special-status species when they occur in the Project Area.) They include the following:

- The Central California Coast coho salmon (Oncorhynchus kisutch) was anecdotally reported to occur in Coyote Creek, and possibly in the Guadalupe River and Los Gatos Creek. However, it is unclear whether the species was ever actually present, as the life history of coho salmon is not conducive to its existence in South San Francisco Bay streams under either historical or current conditions. If it was ever present, it has been extirpated from these areas (Leidy et al. 2005, Spence et al. 2005).
- The silvery legless lizard (Anniella pulchra pulchra) was historically recorded in the northern San Jose portion of the Project Area, but no recent records exist. This species has been displaced by development or disturbed by agriculture in much of the Project Area, and a suite of other factors (e.g., off-road vehicle activity, erosion, livestock grazing, and the introduction of exotic plant species) has altered remaining habitat to the extent that the species is unlikely to occur in the Project Area.
- The willow flycatcher (Empidonax traillii) formerly nested commonly in riparian habitats on the Santa Clara Valley floor, but local populations were extirpated by the late 1960s. This species still occurs as an uncommon migrant in the Project Area, moving between wintering areas in Mexico and breeding areas to the north (Unitt 1987, Hunter et al. 2005). However, migrant willow flycatchers occurring in the Project Area are likely from breeding populations outside the state, and, thus, would not be individuals from the state-listed California population or the federally listed subspecies extimus that resides in riparian habitat of southern California (Unitt 1987).
- Yellow-headed blackbirds (Xanthocephalus xanthocephalus) historically nested in marshes on the Santa Clara Valley floor, but breeding has not been noted anywhere in Santa Clara County since 1925 (Bousman 2007a). This species currently occurs in the Project Area in small numbers, but only during migration. Because it is only considered a California species of special concern when nesting, it is not a special-status species when it occurs as a non-breeder in the Project Area.

Seven other bird species that are California species of special concern occur in the Project Area as non-breeding transients, foragers, or migrants, but they have never been recorded

breeding in or very close to the Project Area. These include the Barrow's goldeneye (*Bucephala islandica*), common loon (*Gavia immer*), American white pelican, western least bittern (*Ixobrychus exilis hesperis*), purple martin (*Progne subis*), black swift (*Cypseloides niger*), and black tern (*Chlidonias niger*). Because they are only considered species of special concern when nesting, they are not special-status species when they occur as non-breeding visitors to the Project Area.

Several bird species that are state or federally listed and consequently special-status species year-round also occasionally occur in the Project Area as non-breeding migrants, transients, or foragers, but they are not known or expected to breed, to occur regularly, or to occur in large numbers in the Project Area. These include the California condor, Swainson's hawk, California black rail, California least tern, least Bell's vireo, and bank swallow. These species are listed as threatened or endangered under the CESA and/or the FESA. Thus, they are considered special-status species even though they do not breed in the Project Area. Therefore, although these species occur in the Project Area only infrequently and/or in small numbers, they are discussed in further detail below. The willow flycatcher would be treated similarly to these species if the individuals that occur as migrants in the Project Area were from California breeding populations; however, because of the rarity of the species as a breeder in the state and the paucity of breeding pairs to the north of the Project Area, the probability that any California-breeding willow flycatchers migrate through the Project Area is extremely low.

A number of other special-status animal species are addressed in greater detail below because they 1) are known to breed or could potentially breed in the Project Area, 2) occur fairly commonly as non-breeders in the Project Area (and thus could potentially be substantially affected by activities that occur under the Proposed Project), 3) are described in the Habitat Plan as potentially occurring in the Project Area, 4) and/or are of particular concern to regulatory agencies. These include the Bay checkerspot butterfly, Pacific lamprey, green sturgeon, Central Valley fall-run Chinook salmon, Central California coast steelhead, longfin smelt, California tiger salamander, California horned lizard, California red-legged frog, foothill yellow-legged frog (*Rana boylii*), western pond turtle, black skimmer, California clapper rail, western snowy plover, northern harrier, white-tailed kite, golden eagle (*Aquila chrysaetos*), bald eagle, American peregrine falcon (*Falco peregrinus anatum*), long-eared owl (*Asio otus*), burrowing owl, Vaux's swift (*Chaetura vauxi*), olive-sided flycatcher (*Contopus cooperi*), loggerhead shrike, yellow warbler, San Francisco common yellowthroat, yellow-breasted chat, Alameda song sparrow, grasshopper sparrow, Bryant's savannah sparrow, tricolored blackbird (*Agelaius tricolor*), salt marsh wandering shrew, salt marsh harvest mouse, San Francisco dusky-footed woodrat, pallid bat, Townsend's big-eared bat (*Corynorhinus townsendii*), western red bat (*Lasiurus blossevillii*), ringtail (*Bassariscus astutus*), San Joaquin kit fox, American badger, and Pacific harbor seal.

Regulated and Sensitive Natural Communities

Waters, Streams, Lakes, and Other Waters of the U.S./Waters of the State

As described above under tidal salt marsh, tidal brackish marsh, freshwater wetlands, and open water, these habitats are extremely important in supporting numerous plant and wildlife species in the Project Area. Throughout California, the quality and quantity of aquatic and wetland habitat types has dramatically declined because of the construction of

dams, dikes, and levees as well as water diversions, the filling of aquatic and wetland habitat for development, and the overall degradation of general water quality caused by inputs of runoff from agricultural and urban development and other sources. As a result of their importance and the declines in these habitats that have occurred, aquatic and wetland habitat types are considered sensitive.

As described in Section 3.3.2, *Regulatory Setting*, many streams, lakes, and wetlands in the Project Area are regulated by the USACE as "waters of the U.S." and/or by the RWQCB as "waters of the state". The BCDC regulates impacts to wetlands and other waters within 100 feet of the BCDC-regulated shoreline band as well.

Riparian Habitats Regulated Under California Fish and Game Code

As discussed above, riparian plant and animal communities are extremely important to biodiversity and to the maintenance of biological and physical processes in the Project Area. However, these habitats have been degraded by a variety of factors, including the construction and operation of dams, realignment of streams and conversion to concrete-lined culverts, grazing and mowing, and population growth. In addition, historic groundwater overdraft has caused wetland and riparian loss throughout the region.

As described in Section 3.3.2, *Regulatory Setting*, the California Fish and Game Code includes regulations governing the use of, or impacts to, many of the state's fish, wildlife, and sensitive habitats, including the bed and banks of rivers, lakes, and streams.

Oak Woodlands

Oak woodlands are considered one of California's most productive and important natural communities. They support a rich plant and wildlife community; at least 60 of California's 169 terrestrial mammal species and approximately 60 species of birds are associated with oak woodlands (County of Santa Clara 2005). In addition, oaks play an important role in helping to maintain water quality in streams and rivers by reducing erosion. Yet more than a million acres of oak savannah and oak woodlands in California are estimated to have been lost since 1945 (County of Santa Clara 2005). Major factors contributing to the loss of oak woodlands include urban growth, conversion to agriculture, lack of regeneration of oak trees, and habitat fragmentation. As a result, numerous state and local agencies have established guidelines, regulations, and ordinances regarding the conservation of oak woodlands (e.g., Oak Woodlands Conservation Act [Fish and Game Code Section 1360-1372], Senate Bill 1334, and the Santa Clara County Oak Woodlands Management Plan [2005]).

CDFG Natural Communities of Special Concern

CDFG natural communities of special concern are those that are of limited distribution statewide or within a county or region. These communities may or may not contain special-status species or their habitat. Most types of wetlands and riparian communities are considered special-status natural communities because of their limited distribution in California. CDFG natural communities of special concern mapped within the Project Area include Northern Coastal Salt Marsh, Serpentine Bunchgrass, and Sycamore Alluvial Woodland (CDFG 2007).

Northern coastal salt marsh once occurred extensively in the tidally influenced lowlands surrounding San Francisco Bay. However, in the South Bay much of this habitat has been lost because of filling for development, landfills, and other uses; installation of flood protection structures which remove or mute tidal influence; and construction of levees to create managed ponds in areas that used to be extensive marshes. This community, which is located in tidal saline habitats at the extreme northern edge of the Project Area, supports a wide variety of plant and animal species specifically adapted to the dynamic hydrologic conditions and high salinity that occur within tidally influenced areas, including federally endangered species such as the salt marsh harvest mouse.

As described previously, serpentine bunchgrass generally supports native plant communities including rare plants, such as the federally listed Santa Clara Valley dudleya and Metcalf Canyon jewel-flower as well as most beautiful jewel-flower and smooth lessingia. Several invertebrate species, including the federally threatened Bay checkerspot butterfly, depend on serpentine grasslands because their host food plants are found primarily in these habitats. Likewise, serpentine outcrops/barrens, serpentine chaparral, and serpentine seeps are considered sensitive communities (ICF Jones & Stokes 2010) because of their importance to serpentine-endemic plants and invertebrates and their limited regional distribution. In the Project Area, serpentine communities occur primarily on either side of the Santa Clara Valley, from Coyote Ridge on the east and the Santa Teresa Hills on the west, south to the San Martin area. Smaller patches of serpentine grassland occur elsewhere, such as on Communications Hill, Tulare Hill, and north of Alum Rock in San Jose.

Central California sycamore alluvial woodland occurs along low, braided channels in areas with wide floodplains. The vegetation is dominated by California sycamore and the substrate tends to be cobbly or gravelly, scoured frequently by spring run-off events, and it supports a very sparse understory. Although sycamore alluvial woodlands were once more broadly distributed in California, they have experienced severe declines resulting from development of valley floors and changes in hydrology in suitable sites, typically caused by flood protection improvements along the drainages supporting sycamore stands. One study documented only 17 occurrences (comprising 2,032 acres) in the entire state (Keeler-Wolf et al. 1996). Sycamore alluvial woodland occurs sparsely in the Project Area, with the best examples of this community type occurring along Coyote Creek between U.S. Highway 101 and the Ogier Ponds and along Pacheco Creek.

3.3.4 Impact Analysis

Methodology

Impact Assessment. This impact analysis focused on potential effects of Proposed Project activities that may occur during 2012–2022. This evaluation does not assess the biological effects of the original construction of SCVWD's capital projects or prior (pre-2012) SMP activities. Rather, it evaluates the effects of proposed maintenance activities that are expected to occur over the next 10 years, compared to existing baseline conditions.

In general, the primary adverse effects of Proposed Project activities would occur during maintenance activities and the period immediately following maintenance activities.

Potential impacts are expected to include adverse effects on riparian, wetland, and instream habitats that would eventually restore themselves, impacts to associated plant communities and habitat of associated species, and potential degradation of water quality caused by herbicide use and releases of sediment. In some cases stream maintenance activities would result in long-term effects. Also, many shorter-term impacts would be repetitive, occurring a number of times during the 10-year period covered by the SMP Update.

Several characteristics of the Project and Project Area complicate the quantification of impacts to biological resources that would occur during 2012–2022. First, a specific reach of creek or canal may be subject to several types of activities, either simultaneously or in succession. For example, a reach may undergo sediment removal one year, followed by herbicide application the next year. Vegetation management activities also may target only instream areas, only non-instream areas (such as levees), or some combination of instream, bank/bench, and levee areas. The different combinations of Proposed Project activities that may occur along a specific reach of creek or canal complicate the quantification of impacts.

Further complicating the detailed quantification of impacts to biological resources in this analysis is the fact that maintenance activities may not occur exactly where they are projected. Experience from the 2002–2012 SMP indicates that some maintenance activities would be required in areas where they were not originally projected, and some reaches where activities were projected would not actually be subjected to maintenance. Furthermore, the total area in which SMP activities have occurred since 2002 has been substantially less than the projected impacts. Because of the impact avoidance and minimization that SCVWD employs through its BMPs, it is expected that actual impacts from 2012–2022 Proposed Project activities would be less than projected.

In addition, the projections for sediment removal and vegetation management activities do not specify precisely where within the projected reach maintenance activities would occur. Rather, these projections identify reaches of creek within which such activities are expected, as well as an estimated "work area percentage" indicating the percentage of that reach that would be affected by the specific activity. Because habitat conditions often vary within a reach, the precise effects of a specific activity within that reach can only be estimated at this time. The magnitude and location of impacts would be identified on an activity-by-activity basis as work was conducted, and the quantification those impacts would be refined and reported on an annual basis.

Finally, there are some areas where work activities were projected in 2001 for the period 2002–2012, and where activities are also projected for the period 2012–2022, but where the type and extent of activities may differ somewhat. For example, a reach subjected to manual vegetation management during the period 2002–2012 may undergo herbicide treatment during the period 2012–2022. In general, herbicide has less impact on vegetation than hand removal because ~~hand removal~~ herbicide application is targeted to specific individual plants. However, careful application of herbicide also is targeted and can reduce the effects on surrounding vegetation. Furthermore, hand removal makes it possible to remove larger diameter vegetation that fills a somewhat different ecological niche than herbicide application. To compound the difficulty of estimating the relative increase or decrease in the magnitude of the impacts resulting from these SMP Update activities, the projections in 2002 were based on linear extents and approximate widths while the 2012

projections were based on actually located polygons. Thus, a detailed comparison of the relative effects of these activities is infeasible.

As a result of these constraints, the approach taken to evaluate impacts to biological resources in this analysis and the approaches to be followed by SCVWD as its maintenance proceeds during 2012–2022 are as follows:

- This analysis describes qualitatively the types of impacts to biological resources that could occur as a result of 2012–2022 Proposed Project activities.
- This analysis broadly estimates the expected locations and potential magnitude of potential impacts, based on projections of sediment removal and vegetation management activities during 2012–2022, and based on experience from the 2002–2012 SMP. While the extent of work that is performed would likely be lower than the projections, based on experience during 2002–2012, it is also possible that the extent of work will be higher than projected. Significance determinations were based on these projections and estimates, and the type of and need for compensatory mitigation has been determined accordingly.
- Although the biological resources present in areas subject to SMP activities during the period 2002–2012 are often of lower quality than in areas where no recent maintenance has occurred, the discussion of the types of impacts that could result from proposed SMP activities during the period 2012–2022 applies to biological resources in all impact areas, regardless of whether or not work was performed in a given reach during the period 2002–2012. For example, if a given reach underwent manual vegetation management during the period 2002–2012, but would undergo both manual and herbicide vegetation management during the period 2012–2022, the discussions of potential impacts from both manual and herbicide treatment provided below would apply to the 2012–2022 activities. However, if any type of vegetation management was previously projected in that reach during the period 2002–2012, and thus in-perpetuity mitigation was already provided for impacts to that reach, no additional mitigation would be required for 2012–2022 vegetation management activities even though such activities may differ from those performed during the prior decade.
- During implementation of Proposed Project activities, SCVWD would refine the quantification of impacts to biological resources, such as the acreage of impacts to wetlands and riparian habitats, sensitive communities, or sensitive species' habitats. SCVWD would track these impacts annually, tallying the effects of Proposed Project activities for a specific year at the end

of the year. These refined impact calculations then would be used as the basis for determining mitigation that was to be provided at either that year's end or the following year. This annual mitigation analysis will clearly distinguish mitigation requirements for new work areas from areas where work was projected, and for which mitigation was already provided, during the period 2002–2012. Annual reports summarizing the impacts and associated mitigation needs would be submitted to the USFWS, NMFS, CDFG, USACE, and RWQCB.

Potential impacts on biotic resources from the Proposed Project were systematically evaluated at both the project level and cumulatively. These impacts were first evaluated without considering implementation of BMPs to describe qualitatively how Proposed Project activities could impact biotic resources. Then, the impacts were evaluated with application of the program BMPs. For those impacts that remained potentially significant even with BMP implementation, feasible mitigation measures were identified, and the significance of the impacts were then re-evaluated to determine if compensatory mitigation would reduce impacts to a less-than-significant level. Impacts that remained significant with implementation of compensatory mitigation are described as significant and unavoidable.

Biological resources would be affected not only by specific Proposed Project activities but also, in a few cases, by mitigation measures and BMPs. The net effect of these mitigation measures and BMPs would be beneficial. However, in a few cases, adverse effects may occur during implementation of these measures. For example, although relocation of steelhead and special-status reptiles and amphibians from work areas may be necessary to avoid mortality of those individuals, some injury or mortality may occur during relocation. As a result, the effects of the BMPs and the mitigation program also were analyzed where appropriate.

Mitigation Assessment. Many of the areas where activities are projected for 2012–2022 were similarly impacted during 2002–2012. In the impact assessments below, impacts that would be caused by continuing to conduct 2002–2012 maintenance activities over an additional period of 10 years (2012–2022) are distinguished from those caused by new activities, or activities in new areas where routine maintenance has not occurred in the past 10 years.

Compensatory mitigation, such as habitat restoration or preservation, has already been provided for impacts to areas where maintenance activities were projected for 2002–2012 period. For the 2002–2012 SMP, impacts from projected sediment removal and vegetation management activities on instream wetlands and riparian vegetation were mitigated through an "up front" or defined mitigation package based on the maximum work projections estimated in 2001. However, the actual amount of maintenance work conducted during 2002–2012, and the associated impacts, have been less than projected. For example, to date the actual sediment removed (371,292 cubic yards) is only about 47 percent of the originally projected sediment removal volume of 795, 600 cubic yards. As a result, mitigation provided for the 2002–2012 SMP has exceeded, or will exceed once the mitigation has been completed, proposed 2002–2012 activities.

Impacts from non-projected maintenance activities, such as bank stabilization activities, during 2002–2012 have been mitigated on an "as-needed" basis, using defined mitigation ratios as maintenance activities occurred.

Because the 2002–2012 SMP will have mitigated potential impacts from projected sediment removal and vegetation management, whether they actually occurred or not, this analysis does not propose any additional compensatory mitigation for 2012–2022 activities that would occur in areas where previous maintenance activities were projected in 2002. The 2012–2022 SMP Update identifies projected activities in channel reaches that were not previously identified or projected in 2002. These "new" work areas were not accounted in the 2002 SMP FEIR mitigation. After implementation of the SCVWD's BMPs, if residual impacts from maintenance activities in new work areas remained potentially significant, compensatory mitigation is prescribed that would reduce impacts to less-than-significant levels where feasible. This analysis describes the type(s) of compensatory mitigation that would be required and discusses how the amount of required mitigation would be determined. As described previously, SCVWD would refine the quantification of impacts and mitigation requirements on an annual basis, for annual review by resource agencies.

The mitigation package, described in Appendix C, is designed to compensate for many of the residual impacts of the Proposed Project. The residual impacts associated with vegetation management and sediment removal activities would be temporary in nature—vegetation that was managed and wetlands and other waters affected by sediment removal would restore naturally if management were to cease. However, the repetitive nature of many SMP Update activities, which would not allow for regeneration of these resources if management occurred frequently, would result in longer-term effects. Permanent impacts associated with the SMP Update would occur with streambank stabilization activities when bank-hardening treatments were applied, as vegetation and habitats would not naturally restore themselves following the cessation of bank stabilization activities. As described in Appendix C, the mitigation for bank stabilization would occur on an as-needed basis.

General Discussion of Impacts of Proposed Activities on Biological Resources

The following sections describe generally how bank stabilization, sediment removal, vegetation management, and management of animal conflicts may impact different types of biological resources. These discussions are detailed here, rather than in the individual (e.g., species-specific) impact discussions that appear later in this document, to avoid redundancy. For example, the general discussions of how SMP Update activities may affect birds would apply to the more species-specific impact sections on the least Bell's vireo, yellow warbler, yellow-breasted chat, burrowing owl, golden eagle, bald eagle, and other birds. Thus, the species-specific impact sections reference the general discussions included below, then go into more detail regarding species-specific impacts, as appropriate.

Minor maintenance activities, which are described in Section 2.2.4, may occur throughout the Project Area, and 100–200 minor maintenance activities currently occur each year. Any minor maintenance activity typically would affect only a very limited area and, therefore, impacts to biological resources likewise typically would be limited in extent. Nevertheless, minor maintenance activities may have impacts similar to those that would result from bank stabilization, sediment removal, vegetation management, and management of animal

conflicts. Therefore, the discussions of how bank stabilization, sediment removal, vegetation management, and management of animal conflicts would affect biological resources pertain to similar minor maintenance activities, and the effects of minor maintenance activities on these resources would be tracked by SCVWD for mitigation purposes, just as would occur for the other activities. Minor maintenance also would include limited road repair and grading, which could occur at any location in the Project Area.

Bank stabilization, sediment removal, vegetation management, management of animal conflicts, and minor maintenance could each occur, and some are projected to occur, along canals. Therefore, the effects of bank stabilization, sediment removal, vegetation management, and management of animal conflicts discussed below would apply to areas where those activities may occur along natural channels or canals. More detailed discussion of impacts from SMP Update activities along canals is provided where impacts to a certain biological resource are expected to occur disproportionately along canals.

Determination of Impacts to Aquatic and Wetland Communities

This section describes the general approach used to determine impacts on aquatic and wetland communities, including areas that are considered jurisdictional waters of the U.S. or waters of the state.

Types of Impact

Proposed Project activities may affect aquatic and wetland communities through direct or indirect disturbance of vegetation and disturbance, modification, or destruction of habitat. The types of potential impacts that were considered in this evaluation, grouped by maintenance activity type, are described below.

Bank Stabilization

Bank stabilization activities (e.g., grading to remove undercut banks and installation of bank armoring) and subsequent changes in hydrology may result in changes to the extent of wetland and aquatic communities present in a work site. Wetland vegetation may be lost as a result of mechanical or physical clearing in the work site (including access areas) and damage to vegetation may occur as a result of crushing by equipment; trampling by personnel; and compaction of soil, which could result in damage to plant roots. Some bank stabilization activities would require temporary water diversions or dewatering. This activity would result in the temporary loss of aquatic and wetland communities and may result in increased turbidity within and downstream from the footprint of the activities caused by mobilization of fine sediments. In addition, because barren slopes are more susceptible to erosion from incident rainfall, the loss of wetland vegetation and non-instream vegetation along stream banks following bank stabilization activities may result in an increase in erosion and sedimentation. Increased erosion and sedimentation may lead to the filling in of pools and damage to wetland vegetation. Bank stabilization also may affect downstream areas by altering flow patterns.

Sediment Removal

As sediment is removed, so is any vegetation that is growing on it, including freshwater and tidal wetland vegetation. Removal of wetland vegetation may result in the loss of

propagules for colonization of downstream areas. Additionally, similar to bank stabilization, some sediment removal activities would require temporary water diversions or dewatering. This activity would result in the temporary loss of aquatic and wetland communities and may result in increased turbidity caused by mobilization of fine sediments. Wetland vegetation also may be damaged by equipment accessing sediment removal sites.

Vegetation Management

In-channel vegetation management involves the foliar application of herbicide to targeted vegetation (e.g., plants with stems 2 inches diameter at breast height [dbh] or less) or the hand removal, mowing, or pruning of such vegetation (along with follow-up herbicide treatment of cut stumps). Target vegetation primarily consists of herbaceous annual and perennial emergent wetland vegetation, such as cattails and bulrush, or woody vegetation consisting of native riparian species, such as willow and box elder, and non-native species, such as eucalyptus. "Limbing up," which entails removal of woody understory vegetation and the lower branches of taller trees, occurs along the slopes of levees that must be maintained to USACE-mandated standards. Vegetation management includes large woody debris relocation or removal, non-native invasive plant removal, and removal of trees up to 12 inches dbh. Removal of trees larger than 12 inches dbh is not included in the SMP Update. Vegetation removal could result in increased scour caused by the loosening of sediment deposits, not only as a result of the removal of vegetation but also from accelerated flows.

Management of Animal Conflicts

Discharge of sediments into the channel as a result of ground-disturbing activities on levee surfaces (e.g., filling or compacting of crevices/holes) may result in the filling of pools as well as adverse effects on wetland vegetation. Regrading and recompacting the levee surface, as well as the installation of surface barriers, may require the removal of vegetation or may limit new vegetation growth caused by soil compaction and loss of accessible surface growing space.

Quantification of Impacts

Direct impacts on aquatic and wetland communities were evaluated by determining the quantity (e.g., in acreage or linear miles, as projections data was available) of projected sediment removal and vegetation management impacts to creek reaches potentially supporting these communities.

Determination of Impacts to Non-Instream Sensitive Plant Communities

This section describes the approach used to determine impacts on non-instream sensitive plant communities as defined under the Regulated and Sensitive Natural Communities discussion above.

Types of Impact

Proposed Project activities may affect non-instream sensitive plant communities through direct or indirect disturbance of vegetation and disturbance, modification, or destruction.

The types of potential impacts that were considered in this evaluation, grouped by maintenance activity type, are described next.

Bank Stabilization

Bank stabilization activities may impact non-instream sensitive plant communities through temporary loss and degradation of the community (e.g., soft armoring of the bank, creation of temporary staging areas and access routes, alteration of hydrology on levee tops and upper side slopes through compaction, alteration of surface drainage patterns caused by movement of heavy equipment or soil disturbance, and introduction of non-native species) or permanent loss of the community (e.g., hard armoring of the bank). Vegetation may be lost as a result of mechanical or physical clearing in the work site (including staging and access areas), and damage to vegetation may occur as a result of equipment use, trampling by personnel, and compaction of soil, which could result in damage to plant roots or stems. Such impacts may lead to the alteration of the communities' species composition, structure, and function.

Furthermore, maintenance activities (including bank stabilization) often include the refueling of equipment on-site. Minor fuel and oil spills may occur during refueling, with a risk of larger releases. Without rapid containment and clean up, these materials may kill or impair the health of plants.

Sediment Removal

Because sediment removal would be limited to the stream channel, direct disturbance to upland plant communities would occur primarily through the establishment of staging and access areas in such communities. The concomitant operation of equipment in non-instream areas during sediment removal activities also may result in impacts to sensitive upland plant communities, similar to those described for bank stabilization activities.

Vegetation Management

The Proposed Project would include several methods of vegetation management activities, including mowing, hand removal, and herbicide application. Such activities may impact sensitive upland plant communities as a result of mechanical, physical, or chemical (i.e., herbicide) removal of vegetation, which could result in the alteration of the communities' species composition, structure, and function. In addition, the creation of temporary access routes and staging areas may result in direct impacts on sensitive upland plant communities caused by mechanical or physical removal of vegetation, crushing by equipment trampling by personnel, compaction of soil, and alteration of hydrology through compaction or alteration of surface drainage patterns resulting from movement of heavy equipment or soil disturbance.

Management of Animal Conflicts

Animal conflict management activities may impact sensitive upland plant communities as a result of the disturbance of the soil surface, collapsing and filling of burrows, installation of surface treatments to inhibit burrowing, and control of burrowing mammal populations that are a component of some sensitive upland communities, such as serpentine grasslands. Impacts may include direct removal or damage of vegetation; compaction of soil, which

could result in damage to plant roots; trampling by personnel; alteration of hydrology through compaction or alteration of surface drainage patterns; and exposure to toxic chemicals (e.g., petroleum products).

Quantification of Impacts

Direct impacts on sensitive upland plant communities were evaluated by comparing the quantity and quality of communities present in the Project Area under baseline conditions to anticipated conditions after implementation of the proposed stream maintenance activities. For this evaluation, direct impacts on sensitive upland plant communities were assessed based on the potential for disturbance, degradation, or loss of communities as a result of projected activities.

Determination of Impacts to Special-Status Plants

The impact assessment for special-status plants was developed using general life history and habitat requirements. The impact analysis considered how each of the Proposed Project activities (i.e., sediment removal, vegetation management, bank protection, management of animal conflicts, minor maintenance, and canal maintenance) could affect each of the special-status plants identified as potentially occurring in the Project Area. The significance of impacts then was determined, based on the criteria discussed next.

Types of Impact

Proposed Project activities may affect special-status plants through direct or indirect disturbance of populations and disturbance, modification, or destruction of suitable habitat. The types of potential impacts that were considered in this evaluation, grouped by maintenance activity type, are described as follows.

Bank Stabilization

Bank stabilization activities may impact special-status plants through temporary loss and degradation of suitable habitat (e.g., soft armoring of the bank, creation of access routes, alteration of hydrology through soil compaction, alteration of surface drainage patterns resulting from movement of heavy equipment or soil disturbance; and introduction of non-native species) or permanent loss of habitat (e.g., hard armoring of the bank). In addition, individual plants and populations may be lost as a result of mechanical or physical removal of vegetation in the work site (including staging and access areas), and damage to special-status plants may occur as a result of crushing by equipment; trampling by personnel; and compaction of soil, which could result in damage to plant roots. These activities could result in death, altered growth, or reduced seed set through physically breaking, crushing, wilting, or uprooting plants.

Furthermore, maintenance activities (including bank stabilization) often include the refueling of equipment on location. Minor fuel and oil spills may occur during refueling, with a risk of larger releases. Without rapid containment and clean up, these materials may kill or impair the health of special-status plants.

Sediment Removal

As sediment is removed, so is any vegetation that is growing on it, including special-status plant species. Because suitable habitat for only a single special-status plant species (Mt. Hamilton thistle) occurs within the stream channels, sediment removal is expected to result in the removal of few special-status plants. However, the operation of equipment in non-instream areas during sediment removal activities may result in damage to special-status plants by personnel and equipment; compaction of soil; alteration of hydrology through compaction or alteration of surface drainage patterns; removal of propagules for colonization of other areas; and exposure to toxic chemicals (e.g., petroleum products).

Vegetation Management

Vegetation management activities may result in the alteration of habitat (including the introduction of non-native species) and/or direct damage and mortality of special-status plant individuals or populations as a result of mechanical or physical removal of vegetation or off target herbicide contact via drift. In addition, the creation of temporary access routes and staging areas may result in direct impacts on special-status plant species as a result of mechanical or physical removal of vegetation; trampling by personnel and equipment; compaction of soil caused by movement of heavy equipment or soil disturbance; removal of propagules for colonization of other areas; and exposure to toxic chemicals (e.g. petroleum products).

Management of Animal Conflicts

Animal conflict management activities would include the destruction of rodent burrows on levees and slopes. Special-status plants may be directly impacted by burrow filling and compaction activities, which would involve disturbance of the soil surface, collapsing and filling of burrows, and subsequent soil compaction. Installation of surface treatments to inhibit burrowing by mammals also may affect special-status plants in the treated area, and control of populations of burrowing mammals may adversely affect the disturbance regimes of plant communities that support special-status plants. Impacts may include direct removal of vegetation to access and remove the burrows, compaction of soil, trampling by personnel, alteration of hydrology through compaction or alteration of surface drainage patterns, and exposure to toxic chemicals (e.g. petroleum products).

Quantification of Impacts

For this evaluation, impacts on special-status plants were assessed based on the potential for the species or their habitat to be disturbed during stream maintenance activities. Impacts on special-status plants were evaluated by comparing the quantity and quality of habitat present in the Project Area under baseline conditions to anticipated conditions after implementation of Proposed Project maintenance activities, and by considering the potential for individual activities to affect known and potentially occurring populations of these species.

Determination of Impacts to Wildlife and Fisheries

The impact assessment for wildlife and fisheries was developed using general life history and habitat requirements for each of the five vertebrate classes (i.e., fish, amphibians, reptiles, birds, and mammals) and invertebrate groups (e.g., insects). The impact analysis looked at each of the project components (i.e., sediment removal, vegetation management,

bank protection, management of animal conflicts, and minor maintenance), broken down by location and stream conditions, and evaluated how each of the major taxa would be affected by these work components. The significance of impacts then was determined based on the criteria discussed next. The following discussion applies to all fish and wildlife species and communities, including common and special-status species.

Types of Impact

Proposed Project activities may affect animals through direct or indirect disturbance of individuals and populations and disturbance, modification, or destruction of habitat. The types of potential impacts that were considered in this evaluation, grouped by maintenance activity type, are described next.

Bank Stabilization

Fish. The effects of bank stabilization on fish depend on the community supported in the reach where the activity occurs, the habitat present at the site, and the type of bank stabilization installed. Important habitat values for fish that may be affected by proposed bank stabilization activities would include effects on riparian shrubs and trees, instream and overhanging escape cover, and sedimentation.

Riparian vegetation is important in determining the structure and function of instream habitat. For example, overhanging riparian vegetation provides shade that moderates stream temperatures. Unusual stream temperatures can lead to disease outbreaks and altered timing of migration (USDA Forest Service 1979), and excessive summer temperatures can be lethal to salmonids and their invertebrate prey species. Furthermore, terrestrial insects that occur in riparian vegetation are an important food item for salmonids, entering stream channels as a result of being blown or washed off riparian vegetation. In addition, plant material that falls into streams is an important food source for aquatic insects, which in turn are fed on by fish (USDA Forest Service 1979; Knight and Bottorff 1984).

Repeated removal of smaller trees would prevent them from growing into larger trees, and thus over the long term, Proposed Project activities could reduce the input of large woody debris into streams and reduce the development of extensive root systems that would provide additional instream complexity. Over the course of the 10-year SMP Update (2012–2022), such impacts would be limited by the extent to which 10 years' growth could substantially change habitat conditions or the contribution that individual trees could make to fish habitat. However, vegetation management would reduce the number of trees that grew tall enough to provide such habitat complexity resources to streams. Such complexity would be important to fish by encouraging the development of riffle/pool complexes, which would be important to steelhead spawning and feeding, and would provide refugia from predators and high flow velocities. Thus, bank stabilization activities that resulted in the loss of riparian vegetation (e.g., grading to remove undercut banks and clearing of vegetation before the installation of bank armoring) may adversely affect fish as a result of increased water temperatures and reduced food availability. The grading and armoring of undercut banks and the removal of overhanging vegetation and associated roots protruding from eroding banks also may adversely affect fish habitat by reducing the availability of instream escape cover.

Although the loss of organic matter associated with vegetation that was removed could affect the aquatic food web, a benefit would occur to thinning of vegetation in areas that were formerly densely shaded. The presence of dams along most SMP-maintained streams likely has resulted in significant shifts in vegetation type and density over time along the stream reaches below the dams. Without heavy flushing flows during winter storms, vegetation has encroached on the channel, reducing channel width and, in many areas, densely shading the channel. In Uvas Creek, a study by Casagrande (2010) found that steelhead grew much more quickly, and thus were much larger by their first winter, at less shaded, somewhat warmer sites, which had higher prey abundance, than at densely shaded, cooler sites. Casagrande (2010) verified that invertebrate biomass was considerably higher at less heavily shaded sites than under a dense forest canopy. His findings confirm those of other studies, demonstrating greater stream productivity (Murphy et al. 1981, Bilby and Bisson 1992, Quinn et al. 1997, Ambrose et al. 2004) and greater salmonid production (Wilzbach et al. 1986, 2005; Nislow and Lowe 2006) along reaches with lower canopy closure and higher light levels. Fish sampling by SCVWD in reaches below dense canopy has found very low densities of fish (of any species), apparently as a result of very low food densities (M. Moore, unpublished data). Therefore, thinning of vegetation as a result of the SMP Update's vegetation management component may have considerable benefits to steelhead and other fish by increasing prey abundance in areas that are currently heavily shaded.

The loss of riparian vegetation on channel banks following bank stabilization activities also may result in an increase in erosion and sedimentation. Stream bank erosion is a natural process that can be beneficial to fish by providing a source of the boulders, cobble, and gravel necessary for high quality salmonid spawning, rearing, and overwintering habitat. However, when natural levels of erosion are exceeded, sedimentation may have adverse effects on salmonid habitat by filling in spaces between gravels and cobbles. This embedding of gravels can impede intragravel flow, which is important for delivering oxygen to incubating eggs; create an impenetrable barrier that prevents the emergence of fry from their gravel nest; and decrease the amount of available habitat for overwintering steelhead, which use interstitial spaces in cobble or boulder substrate during winter periods of inactivity to reduce their exposure to predation and as refuge from downstream displacement during high velocity flows (Bustard and Narver 1975, Stillwater Sciences 2006). Increases in turbidity and sediment input also may cause stress to fish because of feeding difficulties or displacement. Minor spills of petrochemicals, hydraulic fluids, and solvents may occur during vehicle and equipment refueling or as a result of leaks, adversely affecting water quality and potentially killing or injuring fish. Similarly, contact by uncured concrete with water could release chemicals that could impair the health of fish.

In accordance with its BMPs, SCVWD would capture and relocate steelhead before the initiation of bank stabilization activities that would require temporary water diversions or dewatering. During relocation operations, steelhead would be subject to harassment, pursuit, capture, mortality, and related stresses associated with netting and electrofishing. In addition to direct injury and mortality, the effects of electrofishing may include reduced growth rates of injured fish for at least a year following the electrofishing event (Dalby et al. 1996; Ainslie et al. 1998). Fish that were not relocated and that remained within the work site may be subjected to degraded water quality, temporary blockage of migration, stranding in isolated pools, and mortality as a result of maintenance activities.

Soil and groundwater in the Guadalupe River watershed contain potentially hazardous levels of mercury contamination (see Section 3.6, *Hazards and Hazardous Materials*). Maintenance activities involving ground disturbance, such as sediment removal and bank stabilization, may expose the mercury and potentially release it into the environment. Mercury is a toxic constituent that bioaccumulates in the food chain of aquatic organisms and terrestrial wildlife. Effects of methylmercury exposure on wildlife can include mortality, reduced fertility, slower growth and development and abnormal behavior that affects survival, depending on the level of exposure (Scheuhammer et al. 2007, USEPA 2010).

Certain activities proposed under the SMP Update (e.g., bank stabilization and sediment removal) may require the construction of coffer dams to temporarily dewater the affected channel and minimize impacts on water quality. Coffer dams may be constructed of inflatable dams, sand bags, or possibly fiberglass sheet piles that could be pushed into place (rather than hammered into place).

Bank stabilization activities often necessitate the operation of heavy equipment within the stream bed (after dewatering). Movement of heavy equipment may compact the substrate, potentially killing benthic invertebrates (which may serve as prey for fish), embedding gravel within finer sediments, and otherwise altering habitat for fish and their prey.

Amphibians and Reptiles. Potential direct effects on amphibians and reptiles as a result of bank stabilization activities could include injury or mortality of individuals by equipment, vehicle traffic, and worker foot traffic and disturbance of emergent vegetation, boulders, or cobbles that would support egg masses. In addition, because most reptiles and amphibians are oviparous (egg-laying), destruction of eggs/nests also could occur during maintenance activities. Furthermore, petrochemicals, hydraulic fluids, and solvents that were spilled or leaked from vehicles or equipment may kill individuals at any life stage, and increased sediment deposition may suffocate embryos and tadpoles. Special-status amphibians and reptiles that were found during pre-construction surveys and relocated to suitable habitat outside of the work site may be subjected to physiological stress and greater risk of predation.

Fossorial (burrowing) species and species that use existing animal burrows as refugia (e.g., Pacific tree frogs, western toads, western fence lizards, California newts [*Taricha torosa*], ensatina [*Ensatina eschscholtzii*], California tiger salamanders, California red-legged frogs, western skinks, gopher snakes) may be crushed in their burrows by the passage of heavy equipment or trapped and suffocated. Furthermore, loss of subterranean habitat (i.e., burrows) as a result of grading and bank armoring may result in the displacement of small mammals and invertebrates that would serve as a food source for some species of amphibians and reptiles. Additionally, where "hard" bank stabilization methods were used, bank protection could result in the loss of foraging, nesting, and overwintering habitat by precluding the re-establishment of riparian vegetation.

Daily movements throughout their home range may be temporarily affected during maintenance activities as a result of dewatering or disturbance of non-instream habitat. Seasonal movements (i.e., breeding, aestivation) also may be affected, depending on the timing and duration of activities.

Substrate vibrations or sounds may cause individuals to move out of refugia, exposing them to a greater risk of predation or desiccation, and may interfere with predator detection, causing a decrease in time spent foraging. Additionally, increases in human concentration and activity in the vicinity of suitable habitat may result in an increase in native and non-native predators that would be attracted to trash left in the work site. For example, raccoons, American crows (*Corvus brachyrhynchos*), and ravens (*Corvus corax*) would be attracted to trash and also would prey opportunistically on amphibians.

As discussed above, bank stabilization activities in the Guadalupe River watershed may expose soils contaminated with mercury. Effects of methylmercury exposure on wildlife could include mortality (death), reduced fertility, slower growth and development, and abnormal behavior that affects survival, depending on the level of exposure (Scheuhammer et al. 2007, USEPA 2010).

Birds. Birds that foraged or roosted in the work site would be affected while heavy ground disturbance, noise, and vibration caused by the work activity proceeded. Individuals of these species (especially eggs or young in nests) could be killed or injured during maintenance activities by personnel or equipment. Maintenance activities causing a substantial increase in noise, movement of equipment, or human presence near active nests could result in the abandonment of nests, and possibly the loss of eggs or young as a result. In addition, increased human activity may affect the behavior of birds, causing them to avoid work sites and possibly exposing them to increased competition with other birds in the areas to which they dispersed and increased levels of predation caused by unfamiliarity with the new area. Increases in human concentration and activity associated with maintenance in the vicinity of suitable habitat also may result in an increase in native and non-native predators that would be attracted to trash left in the work site and a reduction in the quality of breeding or foraging habitat caused by the introduction of non-native vegetation.

Clearing and grading may result in the temporary or permanent loss of breeding and/or foraging habitat. In addition, increased sedimentation or hazardous material spills from maintenance activities may result in the temporary or permanent degradation of water quality and, hence, habitat quality in marsh or aquatic habitats downstream from work sites and could impact aquatic and riparian bird species.

As discussed above, bank stabilization activities in the Guadalupe River watershed may expose soils contaminated with mercury. Birds fed inorganic mercury show a reduction in food intake and consequent poor growth, with other reported effects including increased enzyme production, decreased cardiovascular function, blood parameter changes, immune response, changes in kidney function and structure, and behavioral changes) (Boening 2000, Scheuhammer et al. 2007, USEPA 2010).

Mammals. During bank stabilization activities, smaller mammals may be crushed or injured by personnel or equipment. Furthermore, species that seek safety in burrows (mice, skunks, squirrels) could be killed or entombed in collapsed burrows. Larger, more mobile mammal species, such as deer, canids, and bobcats, and some smaller mammals would vacate the area, potentially exposing them to increased competition from conspecifics already

occupying the area to which they were displaced and increased levels of predation because of unfamiliarity with the new area or lack of sufficient refugia.

As discussed above, bank stabilization activities in the Guadalupe River watershed may expose soils contaminated with mercury. Effects of methylmercury exposure on wildlife can include mortality (death), reduced fertility, slower growth and development, and abnormal behavior that affect survival, depending on the level of exposure (Scheuhammer et al. 2007, USEPA 2010).

Invertebrates. Invertebrates occur in and adjacent to channels where bank stabilization activities are planned. In these areas, invertebrates could be either killed directly (e.g., by crushing) or adversely affected by the loss of host plants or disturbance of refugia. For species such as moths and butterflies, host plants may be damaged or killed as a result of work site clearing (e.g., before the installation of bank armoring or during the creation of access roads or staging areas), crushing by equipment, trampling by personnel, and soil compaction by heavy equipment. In addition, these species may be adversely affected by habitat conversion, which could result from the unintentional introduction of non-native grasses and forbs to work sites. Bank stabilization activities often necessitate the operation of heavy equipment within the stream bed (after dewatering). Movement of heavy equipment may compact the substrate, potentially killing benthic invertebrates, embedding gravel within finer sediments, and otherwise altering habitat conditions.

Sediment Removal

Fish. Sediment removal activities (e.g., sediment removal, access road construction, and staging area construction) may result in the removal of instream emergent vegetation and riparian vegetation along the channel banks, resulting in impacts similar to those described for loss of riparian vegetation as a result of bank stabilization activities. The removal of instream vegetation and riparian habitat may adversely affect fish as a result of increased water temperatures and reduced food availability. Additionally, the loss of instream cover, such as rocks, vegetation, and large woody debris, may adversely affect fish as a result of increased predation caused by a decrease in the availability of escape cover and the alteration of local hydraulics (e.g., increasing water velocity), which could reduce the frequency of riffle and pool habitat (Stillwater Sciences 2006), and the loss of refugia during high flows. Sediment removal also would result in the loss of substrate used by various fish for foraging or spawning, most notably the removal of spawning gravel for salmonids.

As discussed under bank stabilization above, increased sedimentation may have adverse effects on salmonid spawning and overwintering habitat by filling in spaces between gravels and cobbles. Increases in turbidity and sediment input also may cause stress to fish because of feeding difficulties or displacement. Furthermore, settling of silt disturbed by sediment removal activities and contouring and grading of the channel following sediment removal may degrade spawning or rearing habitat in or downstream from work sites.

As discussed for bank stabilization activities, SCVWD would capture and relocate native fish in accordance with its BMPs before the initiation of sediment removal activities that require temporary water diversions or dewatering along steelhead streams. During relocation operations, steelhead would be subject to harassment, pursuit, capture, mortality, and

related stresses associated with netting and electrofishing. Furthermore, fish that were not relocated and that remained within the work site may be subjected to degraded water quality, temporary blockage of migration, stranding in isolated pools, and mortality as a result of maintenance activities.

Other effects of sediment removal on fish would be similar to those described above for bank stabilization. These would include the potential for fish injury or mortality during relocation efforts and adverse effects of fuel or chemical spills and mercury mobilization.

However, the removal of sediment also may result in beneficial impacts on the ability of fish to move along streams, particularly for salmonids to migrate between estuarine areas and upstream spawning and rearing habitats, by improving upstream and downstream access.

Amphibians and Reptiles. Similar to the potential direct effects of bank stabilization activities described above, potential impacts of sediment removal activities on amphibians and reptiles would include injury or mortality of individuals by equipment, vehicle traffic, and worker foot traffic; disturbance of boulders or cobbles that support egg masses; destruction of eggs/nests; silting over of eggs or tadpoles; exposure to petrochemicals, hydraulic fluids, and solvents; disruption of daily or seasonal movements; loss of basking sites and vegetative cover; exposure to mercury; disruption of foraging as a result of vibrations or seismic sounds; and exposure to increased numbers of predators. Furthermore, special-status amphibians and reptiles that were found during pre-construction surveys and relocated to suitable habitat outside of the work site may be subjected to physiological stress and be at greater risk of predation, and dewatering activities may result in a temporary loss of habitat, blockage of movement, and stranding or death of frog eggs and tadpoles.

Birds. Similar to the potential effects of bank stabilization activities described above, potential impacts of sediment removal activities on birds would include mortality or injury of adults or eggs/young in nests as a result of crushing by equipment; nest abandonment because of increased noise and disturbance; exposure to increased competition as a result of displacement; exposure to increased numbers of predators; and increased exposure to mercury.

The removal of instream vegetation associated with sediment removal activities may result in the temporary loss of habitats that served as breeding and/or foraging habitat, both in the sediment removal area and in access and staging areas. In addition, increased sedimentation or hazardous material spills from maintenance activities may result in the temporary or permanent degradation of water quality and, hence, habitat quality in marsh or aquatic habitats downstream from work sites and could impact habitat used by aquatic and riparian species.

Mammals. Similar to the potential direct effects of *Bank Stabilization* activities described above, potential impacts of sediment removal activities on mammals would include mortality or injury by personnel or equipment; exposure to increased competition from conspecifics as a result of displacement; exposure to increased levels of predation because of unfamiliarity with the new area, lack of sufficient refugia, or increased numbers of predators; and exposure to increased levels of mercury. These effects would occur primarily

in non-instream staging and access areas and would be limited in the sediment removal area itself, as most mammals in the Project Area would be terrestrial.

Invertebrates. Impacts to invertebrates from sediment removal would be similar to those described above for bank stabilization activities, although impacts to common aquatic invertebrates would be greater because of the greater area of sediment removal. Because sediment removal would be limited to the stream channel, direct impacts on terrestrial invertebrates would occur primarily because of the operation of equipment in non-instream areas during sediment removal activities (and in staging and access areas).

Vegetation Management

Fish. As discussed under *Bank Stabilization* and *Sediment Removal* above, removal of instream and riparian vegetation may adversely affect steelhead as a result of increased water temperatures, reduced food availability, reduced escape cover, and the alteration of local hydraulics. In addition, decaying vegetation left in the channel following vegetation management activities may cause deterioration of water quality due to the depletion of oxygen.

Settling of silt disturbed by vegetation removal activities may result in adverse effects as discussed under *Bank Stabilization* and *Sediment Removal* above, including potential impacts on salmonid spawning and overwintering habitat and stressing of fish caused by feeding difficulties or displacement.

Proposed vegetation management activities would include the application of herbicides. the U.S. Environmental Protection Agency (USEPA) has conducted ecological risk assessments to determine the potential risks of labeled uses of several herbicides, including three proposed for use by SCVWD (glyphosate, pendimethalin, and triclopyr), on Pacific salmonids. These assessments are useful in evaluating potential effects of herbicide use on fish species in general for the Project Area. Evaluated herbicides proposed for use by SCVWD are as follows, with a summary of USEPA's effects determination:

- Glyphosate: use of the aquatically approved formulation at labeled rates would result in no effect on steelhead.
- Pendamethaline: no effect on steelhead.
- Triclopyr: used as per the label with no exposure to the watercourse, use results in no impact to steelhead. If the material enters the watercourse, it is toxic to fish and results in mortality to steelhead.

Thus, use of these pesticides according to current label directions and the voluntary guidelines provided in the 2000 USEPA bulletin, *Protecting Endangered Species, Interim Measures for Use of Pesticides in Santa Clara County,* is not expected to result in direct adverse effects on fish. Nevertheless, herbicides may affect fish indirectly as a result of reduction in the availability of food items (e.g., invertebrates) and in the suitability of habitat (e.g., reduction in abundance of aquatic and terrestrial plants).

SCVWD would continue to use a surfactant to enhance the performance of herbicides. Surfactants aid the ability of an herbicide to penetrate the surface of vegetation by

increasing its ability to spread over vegetation, stick to foliage, and penetrate thick cuticles. For aquatic herbicides, the use of a surfactant is typically necessary to achieve reasonable levels of control. In instances where surfactants are absent from the tank mix, the level of control is often reduced. A reduction in control results in the need for a greater return frequency, which translates to more herbicide being used in the system and more frequent disturbance to the site.

In general, aquatic species (e.g., fish and amphibians) are more susceptible to adverse effects than terrestrial wildlife because of the potential for surfactants to alter cell permeability, thus increasing the potential for absorption of chemicals through their thin, moist skin. Some surfactants, particularly those that are nonylphenol-based, have been documented to result in chemical-induced lethargy and unconsciousness in fish, which can result in an increased risk of predation, as well as estrogenic effects (Smith et al. 2004, USFS 2007). However, as described in the SMP Manual (Appendix A), SCVWD proposes to limit surfactant use to the products that are documented to have the least toxic effect to aquatic life, Agri-dex and Competitor. Both of these surfactants are oil-based (Competitor is vegetable oil based while the primary ingredient in Agri-dex is a paraffin-based oil) and function by increasing the absorption of herbicides through plant tissues. They are especially useful in increasing the penetration of herbicides through the bark of woody brush or tree stems (Bakke 2007). A study on the toxicity of surfactants to juvenile rainbow trout concluded that Agri-dex was less toxic to rainbow trout than two other commonly used surfactants, R-11 and LI 700 (Smith et al. 2004), and the 2006 Supplemental Environmental Assessment of the National Oceanic and Atmospheric Administration (NOAA) *Fisheries Implementation Plan for the Community Based Restoration Program* (NOAA 2006) concluded that Agri-dex was among the surfactants least toxic to marine and aquatic organisms (it is unknown whether Competitor was assessed).

During the course of the Proposed Project, new surfactants or improved chemistries may be proposed to improve the efficacy of the program or improve protection to biological resources. The proposal of any new materials would include toxicological data for review by stakeholders. This would provide a process for review and approval before inclusion in the program.

Proposed vegetation management activities also may have beneficial impacts on fish. A recent study on the distribution, abundance, growth, and habitat use of steelhead in Uvas Creek (Casagrande 2010) determined that juvenile steelhead survival and growth in Uvas Creek from Uvas Road downstream to Highway 152 is currently limited, in part, because of the high shading and low light levels caused by the dense riparian forest. The author concludes that selective removal of trees within this reach to reduce shading and increase light levels would improve the feeding efficiency of juvenile steelhead and lead to more abundant algal growth. In turn, more abundant algal growth would not only lead to an increase in the invertebrate population (a steelhead food source) but also would filter turbid waters released from upstream reservoirs. Thus, vegetation management activities in at least some portions of the Project Area may benefit steelhead by reducing the density of the riparian canopy.

Amphibians and Reptiles. Similar to the potential direct effects of bank stabilization activities described above, potential impacts of vegetation management activities on

amphibians and reptiles would include mortality of individuals crushed by equipment, vehicle traffic and worker foot traffic; disturbance of boulders or cobbles that supported egg masses; destruction of eggs/nests; silting over of eggs or tadpoles; exposure to petrochemicals, hydraulic fluids, and solvents; disruption of daily or seasonal movements; loss of basking sites; disruption of foraging as a result of vibrations or seismic sounds; and exposure to increased numbers of predators. Furthermore, special-status amphibians and reptiles that were found during pre-construction surveys and relocated to suitable habitat outside of the work site may be subjected to physiological stress and greater risk of predation.

Proposed vegetation management activities would include the application of herbicides. Amphibians in particular could potentially be impacted via absorption of chemicals through their thin, moist skin. USEPA has conducted ecological risk assessments to determine the potential risks of labeled uses of several herbicides, including four proposed for use by SCVWD (glyphosate, imazapyr, pendimethalin, and triclopyr), on the federally listed California red-legged frog. These assessments are useful in evaluating potential effects of herbicide use on other amphibian species in the Project Area. Evaluated herbicides proposed for use by SCVWD are as follows, with a summary of USEPA's effects determination.

- Glyphosate: Likely to affect adversely aquatic-phase California red-legged frog via indirect effects through reduction in prey (non-vascular plants) and habitat (aquatic and terrestrial plants). No direct effects would occur on the aquatic-phase California red-legged frog for any of the terrestrial or aquatic uses. Likely to adversely affect the terrestrial-phase California red-legged frogs via both direct effects and indirect effects following reduction in prey (terrestrial invertebrates, terrestrial-phase amphibians and mammals) and habitat (terrestrial plants).
- Imazapyr: Likely to affect adversely the California red-legged frog via indirect effects on habitat and/or primary productivity (i.e., ecosystem structure and function for both the aquatic plant community and riparian vegetation). No direct effects are anticipated.
- Pendimethalin: Likely to affect adversely the California red-legged frog via both direct and indirect effects on both terrestrial and aquatic phases of the frog.
- Triclopyr: Likely to affect adversely the California red-legged frog via both direct and indirect effects on both terrestrial and aquatic phases of the frog.

As a result, the use of herbicides for vegetation management could adversely affect the health of amphibians; though BMPs would be implemented to reduce these effects, as described below. SCVWD would continue to use herbicides in compliance with the current applicable state and federal laws and in accordance with the PRESCRIBE (Pesticide Regulation's Endangered Species Realtime Internet Bulletin Engine) database that is managed by the California Department of Pesticide Regulation. Herbicides also may affect amphibians indirectly as a result of reduction in the availability of food items (e.g., invertebrates) and in the suitability of habitat (e.g., reduction in abundance of aquatic and terrestrial plants).

As noted for fish above, SCVWD also proposes to use surfactants designed for aquatic applications as part of its herbicide program. Although the potential exists for absorption of chemicals through the thin, moist skin of amphibians, SCVWD purposes to limit surfactant use to the products that are documented to have the least toxic affect to aquatic life, Agri-dex and Competitor.

Birds. Similar to the potential effects of bank stabilization activities described above, potential impacts of vegetation management activities on birds would include mortality or injury of adults or eggs/young in nests crushed by equipment; nest abandonment resulting from increased noise and disturbance; exposure to increased competition because of displacement; exposure to increased numbers of predators; and increased exposure to mercury.

Most importantly, the removal of vegetation would result in a loss of nesting, foraging, and roosting habitat in the form of riparian and wetland vegetation. Riparian habitats in Santa Clara County support very high densities and diversity of birds (Rottenborn 1997). Vegetation management effects would be largely temporary in any specific area, although the repeated nature of these impacts would limit the regeneration of woody riparian vegetation. Bird diversity generally increases with increasing foliage height diversity, or stratification of the vegetation (MacArthur and MacArthur 1961). As a result, inhibiting the development or maintenance of a multi-layered riparian forest through vegetation management is expected to reduce bird diversity. Furthermore, because the densities of native riparian birds tend to increase with increasing vegetation volume (Mills et al. 1991), vegetation management activities that reduced the volume of vegetation (i.e., how dense the vegetation was) could reduce bird abundance. As a result, vegetation management would adversely affect some aspects of the riparian bird community. For species that occurred primarily in early successional habitats, the vegetation management component would help to maintain such habitat over the long term. For species associated with more mature forests, the repeated management of younger vegetation, which would prevent it from becoming mature, may result in the long-term decline in mature riparian forests. Hazard tree removal may result in the loss of snags or other larger trees that otherwise would provide habitat for a variety of birds.

Loss of understory vegetation resulting from pruning, mowing, and limbing up would reduce habitat for understory birds and could reduce dispersal ability of bird species associated with dense vegetation, as such species may be reluctant to move through areas without suitably dense cover. Limbing up would occur primarily along the slopes of levees as mandated by USACE standards, while pruning could occur in a number of areas, particularly along access roads. Hand pruning could occur in up to 40 acres of new work areas during the period 2012–2022. Pruning will occur on woody vegetation in order to restore conveyance capacity of a creek reach, provide visual inspection of District facilities, and to provide access clearance on roadways (not projected in 2002) and for bank stabilization projects. Hand pruning may also be performed for ecological/stewardship purposes.

General work activity would cause most local species to avoid the area until the activity was finished. In the post-construction phase, birds would return to the area as it re-vegetated. Loss of vegetation during maintenance activities could reduce the amount of prey available

for birds that foraged in the work site. However, some birds would take advantage of prey that was flushed out of the area and into the open during construction.

Mammals. Similar to the potential effects of bank stabilization activities described above, potential impacts of vegetation management activities on mammals would include mortality or injury by personnel or equipment; exposure to increased competition from conspecifics as a result of displacement; and exposure to increased levels of predation caused by unfamiliarity with the new area, lack of sufficient refugia, or increased numbers of predators. Removal of riparian and wetland vegetation also would remove habitat and cover for mammals, and loss of understory vegetation resulting from pruning or mowing could reduce dispersal ability of species associated with dense vegetation. As such, species may be reluctant to move through areas without suitably dense cover. For species associated with more mature forests, the repeated management of younger vegetation, which would prevent it from becoming mature, may result in the long-term decline in mature riparian forests. Hazard tree removal may result in the loss of snags or other larger trees that could provide roost sites for bats.

Invertebrates. Similar to the potential effects of bank stabilization activities described above, potential impacts of vegetation management activities on invertebrates would include mortality or injury from crushing by personnel or equipment. In addition, these species could be adversely affected by the loss of host plants as a result of mechanical, physical, or chemical (i.e., herbicide) clearing in the work site; soil compaction; and damage to host plants. Furthermore, these species may be adversely affected by the conversion of habitat, which could occur after the unintentional introduction of non-native grasses and forbs to areas on or near serpentine soils.

Management of Animal Conflicts

Fish. Surface application of erosion control blankets, pyramat, and chain link for the purpose of animal conflicts management may result in a loss of vegetation that was overhanging and shading the active channel. As discussed above, riparian vegetation plays an important role in determining the structure and function of fish habitat, and the loss of such vegetation could result in increased stream temperatures and a loss of escape cover for fish.

Discharge of sediments into the channel as a result of ground-disturbing activities on levee surfaces (e.g., filling or compacting of crevices/holes), or spills/leaks of fuels and other chemicals, may result in adverse effects as discussed under *Bank Stabilization* and *Sediment Removal* above, including potential impacts on salmonid spawning and overwintering habitat and stressing of fish because of feeding difficulties or displacement. The use of certain rodenticides, such as strychnine and zinc phosphide, to control burrowing mammals on levees would be unlikely to result in adverse water quality effects, as these rodenticides would be applied directly in burrows rather than being broadcast over the surface.

Amphibians and Reptiles. Similar to the potential direct effects of bank stabilization and sediment removal activities described above, potential impacts on amphibians and reptiles resulting from the management of animal conflicts would include mortality of individuals crushed by equipment, vehicle traffic, and worker foot traffic; disturbance of boulders or

cobbles that supported egg masses; destruction of eggs/nests; silting over of eggs or tadpoles; exposure to petrochemicals, hydraulic fluids, solvents and lethal baits; disruption of daily or seasonal movements; loss of basking sites; disruption of foraging; and exposure to increased numbers of predators. Furthermore, special-status amphibians and reptiles that were found during pre-construction surveys and relocated to suitable habitat outside of the work site may be subjected to physiological stress and greater risk of predation.

Direct mortality and a loss of subterranean habitat for amphibians and reptiles may occur because of filling or compacting of crevices/holes on levee surfaces or slopes. In addition, control of small mammal populations would result in a reduction in the availability of refugia for amphibians and reptiles. Species that may be adversely affected would include fossorial species and species that sought refuge in small mammal burrows to prevent dehydration during arid conditions or as an escape mechanism for predators. Loss of subterranean habitat may result in the displacement of small mammals and invertebrates that served as a food source for some species of amphibians and reptiles.

In addition to direct loss of subterranean habitat, a reduction in the quantity of subterranean habitat available for amphibians and reptiles would occur from surface application control methods aimed at preventing rodent activity. The use of certain rodenticides (e.g., strychnine and zinc phosphide) to prevent animal conflicts on levees may result in the secondary poisoning of amphibians (e.g., California red-legged frog and California tiger salamander) resulting from dermal exposure (amphibians have thin, permeable skin) to bait placed in burrows or consumption of invertebrates that had consumed the poison bait (USEPA 2009). Furthermore, application of pyramat or other blanket-like surface barriers used to prevent rodent burrowing may result in the entrapment of amphibians and reptiles, leading to death by predation, starvation, or desiccation.

Birds. As discussed above, birds that foraged or roosted in the work site would be impacted while heavy ground disturbance, noise, and vibration caused by the work activity (e.g., filling or compacting of crevices/holes on levee surfaces or slopes) proceeded. Individuals (especially young in nests) could be killed or injured during maintenance activities; the accompanying increase in noise and human presence near active nests could result in the abandonment of nests, and possibly the loss of eggs or young as a result; and the increased activity associated with maintenance activities may affect the behavior of birds, causing them to avoid work sites and possibly exposing them to increased competition and predation.

Increases in human concentration and activity associated with maintenance activities in the vicinity of suitable habitat also may result in an increase in native and non-native predators that were attracted to trash left in the work site and a reduction in the quality of breeding, foraging, or upland refuge habitat from the introduction of non-native vegetation. In addition, surface application of erosion control blankets, pyramat, and chain link for the purpose of animal conflicts management may affect the character of the vegetation on the levee and, thus, the composition of bird species that would use the treated levee slopes.

Filling or compacting of crevices/holes on levee surfaces or slopes may kill or injure burrowing owls (especially young or adults in burrows) crushed by maintenance personnel

or equipment because they nested underground. In addition, the filling of burrows, compaction of soils, or placement of armor material to secure levee surfaces and prevent rodent activity would result in a loss of suitable habitat for the burrowing owl (see Impact Bio-23 for additional detail). Furthermore, small mammal control may reduce the suitability of habitat for birds that foraged in the work site by reducing the availability of prey (e.g., small burrow-dwelling rodents). The use of certain rodenticides (e.g., strychnine, anticoagulants such as chlorophacinone and diphacinone) to prevent animal conflicts on levees may result in the secondary poisoning of birds that consumed rodents or invertebrates that had consumed the poison bait (USEPA 2009).

Mammals. Because burrowing mammals are the primary target of animal conflicts management, obvious direct impacts on target mammals would result from the poisoning and trapping of small mammals, particularly California ground squirrels and valley pocket gophers, and the removal of their burrows. Individuals could be crushed or entombed within their burrows, and some species, particularly ground squirrels, cottontails, and deer mice would have to expend energy to find or dig new underground refuge sites. Carnivorous and omnivorous species would lose some food resources with the loss of underground prey species.

Surface application of erosion control blankets, pyramat, and chain link for the purpose of animal conflicts management may result in direct and indirect impacts on mammal species. Similar to the impacts discussed for birds, the potential impacts on mammals would depend on the material used. Blanket-like materials could trap small mammals and cause mortality. Alternatively, blanket materials could act as cover for species like the California vole, which may be attracted to food resources beneath the barrier but also would be protected from larger predators above the barrier. The chain link barrier would have no impact on small mammals that could access the surface through the open pattern. Medium to large sized mammals, like skunks, ground squirrels, and coyotes would lose refuge sites because burrowing by larger mammals would be prevented by any of the surface barriers.

The use of certain rodenticides (e.g., strychnine and anticoagulants such as chlorophacinone and diphacinone) to prevent animal conflicts on levees may result in the secondary poisoning of larger mammals that consumed rodents or invertebrates that had consumed the poison bait (USEPA 2009). Other impacts would be similar to the potential direct effects of bank stabilization activities described above, including mortality or injury by personnel or equipment; exposure to increased competition from conspecifics as a result of displacement; and exposure to increased levels of predation because of unfamiliarity with the new area, lack of sufficient refugia, or increased numbers of predators.

Invertebrates. Similar to the impacts on invertebrates described above for bank stabilization activities, management of animal conflicts may result in the mortality or injury of invertebrates crushed by personnel or equipment and alteration of habitat. Removal of burrows that provided refugia for invertebrates would reduce habitat for these species. In addition, individuals could be adversely affected because of the loss of host plants. Host plants may be damaged or killed by soil compaction, creation of access roads or staging areas, and surface application of erosion control materials. Furthermore, these species may be adversely affected by the conversion of habitat, which could occur by the unintentional introduction of non-native grasses and forbs to work areas.

Quantification of Impacts

For this evaluation, impacts on both common and special-status animals were assessed based on the potential for individuals or populations of animal species, or their habitat, to be disturbed, degraded, or lost during stream maintenance activities. Impacts on animal populations and communities were evaluated by comparing the quantity and quality of habitat present in the Project Area under baseline conditions to anticipated conditions after implementation of the maintenance activities, and by considering the potential for individual activities to affect populations of these species.

Criteria for Determining Significance

For the purposes of this analysis, the Proposed Project would result in a significant impact on biological resources if it would:

A. have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal;
B. have a substantial adverse effect, either directly or through habitat modification, on an identified candidate, sensitive, listed, or special status species in any local, regional, state, or federal plan, policy, or regulation;
C. have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to, marsh, vernal pool, coastal) through direct removal, filling, hydrological interruption, or other means;
D. have a substantial adverse effect on any other sensitive natural community identified in local, region, state, or federal plans, policies, or regulations (such as riparian habitat, oak woodlands, etc.);
E. interfere substantially with the movement of any native resident or migratory species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites; or
F. conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Environmental Impacts

Tables 3.3-5 and 3.3-6 summarize the acreages of impacts to certain habitats in non-tidal and tidal reaches that would result from sediment removal activities and each type of vegetation management activity that are projected for 2012–2022. These tables include all of these projected activities, including "new" impact areas and areas that have also been impacted by 2002–2012 SMP activities. These acreages include overlap in areas that may be affected by multiple activities; for example, if a specific acre were subjected to herbicide, hand removal, and hand pruning, then those impacts would be represented in the table by an acre of impact in each of those three categories in the table, totaling to 3 acres of impact even though only one acre was involved. As a result, this table over-estimates the actual total acreage of each habitat that would be impacted. Habitat types are based on AIS's 2010 habitat mapping, described previously.

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Table 3.3-5. Projected Impact Acreages by Habitat Type and Activity, Non-tidal Reaches

		Habitat Type (acres)						
Watershed	**Activity Type**	**Woodlands**	**Herbaceous (non-wetland)**	**Sediment Wetland**	**Aquatic (wetland)**	**Herbaceous (wetland)**	**Shrub**	**Misc.**
Lower Peninsula	Sediment Removal	3.587	0.51	2.200	0.000	0.625	0.000	4.084
	Herbicide	6.52	3.253	N/A	0.000	0.209	0.262	7.765
	Hand Removal	0.064	0.000	N/A	0.000	0.000	0.000	0.002
	Discing	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	Mowing	0.967	2.659	N/A	0.000	0.008	0.025	0.604
	Hand Pruning	0.139	0.011	N/A	0.000	0.000	0.000	0.084
	Lower Peninsula Subtotal	***11.277***	***6.433***	***2.200***	***0.000***	***0.842***	***0.287***	***12.539***
West Valley	Sediment Removal	2.065	3.227	8.530	0.000	0.798	0.059	1.426
	Herbicide	22.639	31.329	N/A	0.000	2.066	0.321	25.161
	Hand Removal	0.076	0.01	N/A	0.000	0.000	0.005	0.005
	Discing	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	Mowing	1.816	7.644	N/A	0.000	0.314	0.000	0.358
	Hand Pruning	0.225	0.056	N/A	0.000	0	0.001	0.102
	West Valley Subtotal	***26.821***	***42.266***	***8.530***	***0.000***	***3.178***	***0.386***	***27.052***
Guadalupe	Sediment Removal	31.89	5.199	14.640	0.000	1.091	2.405	13.654
	Herbicide	42.051	65.511	N/A	0.000	1.916	1.782	19.619
	Hand Removal	0.237	0.052	N/A	0.000	0.001	0.015	0.004
	Discing	0.071	1.15	N/A	0.000	0.000	0.000	0.000
	Mowing	25.006	20.909	N/A	0.000	1.242	2.914	15.517
	Hand Pruning	0.221	0.046	N/A	0.000	0.001	0.000	0.003
	Guadalupe Subtotal	***99.476***	***92.867***	***14.640***	***0.000***	***4.251***	***7.116***	***48.797***
Coyote	Sediment Removal	45.564	9.472	28.090	0.009	0.786	2.031	4.702
	Herbicide	30.24	137.874	N/A	0.001	34.432	1.299	33.286
	Hand Removal	3.175	0.993	N/A	0.000	0.036	0.069	0.262
	Discing	1.287	5.199	N/A	0.000	0.635	0	0.226
	Mowing	8.151	20.502	N/A	0.000	0.000	0.567	1.776
	Hand Pruning	11.27	3.138	N/A	0.000	0.045	0.188	0.586
	Coyote Subtotal	***99.687***	***177.178***	***28.090***	***0.010***	***35.934***	***4.154***	***40.838***

Table 3.3-5. Projected Impact Acreages by Habitat Type and Activity, Non-tidal Reaches

Watershed	Activity Type	Habitat Type (acres)						
		Woodlands	Herbaceous (non-wetland)	Sediment Wetland	Aquatic (wetland)	Herbaceous (wetland)	Shrub	Misc.
SF Basin Total	Sediment Removal	83.106	18.408	53.460	0.009	3.300	4.495	23.866
	Herbicide	101.450	237.967	N/A	0.001	38.623	3.664	85.831
	Hand Removal	3.552	1.055	N/A	0.000	0.037	0.089	0.273
	Discing	1.358	6.349	N/A	0.000	0.635	0.000	0.226
	Mowing	35.940	51.714	N/A	0.000	1.564	3.506	18.255
	Hand Pruning	11.855	3.251	N/A	0.000	0.046	0.189	0.775
	SF Basin Total	**237.261**	**318.744**	**53.460**	**0.010**	**44.205**	**11.943**	**129.226**
Pajaro Basin Total	Sediment Removal	5.99	10.763	9.810	0.000	0.022	0.038	3.743
	Herbicide	49.097	86.642	N/A	0.268	1.083	0.579	10.719
	Hand Removal	4.173	2.239	N/A	0.047	0.276	0.037	0.442
	Discing	1.731	8.584	N/A	0.000	0.000	0.000	10.596
	Mowing	12.865	36.979	N/A		0.286	0.000	6.494
	Hand Pruning	2.334	4.007	N/A		0.005	0.037	0.111
	Pajaro Basin Total	**76.190**	**149.214**	**9.810**	**0.315**	**1.672**	**0.691**	**32.105**

Notes:

1. Includes areas that also were projected for maintenance (and/or maintenance was conducted) from 2002–2012.
2. Acreages are shown for the total of each type, but overlaps between work types are not eliminated.
3. Acreages incorporate the work area percentage to account for various intensities of work within a specific reach and includes areas that also were projected for maintenance (and/or maintenance was conducted) from 2002–2009.
4. "Misc." habitats include cultivated lands, row crops, vineyards, orchards, developed/urban areas, roads, reservoirs, open water, and similar areas.
5. "Sediment wetland" refers to wetland and aquatic havitats (combined) projected to be impacted by sediment removal, based on calculations performed by SCVWD, taking into account the length of reaches where sediment removal is projected and the approximate widths of the wetland/aquatic habitat within those reaches. SCVWD then identified additional areas (i.e., outside the "sediment wetland" polygons) where the various SMP Update activities were projected in areas mapped by AIS as aquatic habitats (summarized in those tables as "acquatic [wetland]" impacts and vegetation types that are considered herbaceous wetlands (summarized in those tables as "herbaceous [wetland]" impacts).

Source: Data compiled by Horizon Water and Environment in 2011 based on information from SCVWD

Table 3.3-6. Projected Impact Acreages by Habitat Type and Activity, Tidal Reaches.

Watershed	Activity Type	Habitat Type (ac)						
		Woodlands	Herbaceous (non-wetland)	Sediment Wetland	Aquatic (wetland)	Herbaceous (wetland)	Shrub	Misc
Lower Peninsula	Sediment Removal	3.704	0.971	0.370	0.000	0.316	0.069	2.539
	Herbicide	0.000	0.001	N/A	0.000	0.000	0.000	0.001
	Hand Removal	0.139	0.000	N/A	0.000	0.000	0.000	0.000
	Discing	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	Mowing	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	Hand Pruning	0.000	0.000	N/A	0.000	0.000	0.000	0.000
Lower Peninsula Subtotal		***3.843***	***0.972***	***0.370***	***0.000***	***0.316***	***0.069***	***2.540***
West Valley	Sediment Removal	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Herbicide	0.048	0.294	N/A	0.000	0.337	0.000	0.57
	Hand Removal	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	Discing	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	Mowing	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	Hand Pruning	0.000	0.000	N/A	0.000	0.000	0.000	0.000
West Valley Subtotal		***0.048***	***0.294***	***0.000***	***0.000***	***0.337***	***0.000***	***0.570***
Guadalupe	Sediment Removal	2.82	17.302	18.080	0.000	1.611	0.069	1.892
	Herbicide	0.000	0.000	N/A	0.000	0.021	0.000	0.000
	Hand Removal	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	Discing	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	Mowing	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	Hand Pruning	0.000	0.000	N/A	0.000	0.000	0.000	0.000
Guadalupe Subtotal		***2.820***	***17.302***	***18.080***	***0.000***	***1.632***	***0.069***	***1.892***
Coyote	Sediment Removal	0.127	1.231	3.050	0.000	0.541	0.000	2.053
	Herbicide	0.000	0.014	N/A	0.000	0.18	0.000	0.098
	Hand Removal	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	Discing	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	Mowing	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	Hand Pruning	0.000	0.000	N/A	0.000	0.000	0.000	0.000

Table 3.3-6. Projected Impact Acreages by Habitat Type and Activity, Tidal Reaches.

Watershed	Activity Type	Habitat Type (ac)						
		Woodlands	Herbaceous (non-wetland)	Sediment Wetland	Aquatic (wetland)	Herbaceous (wetland)	Shrub	Misc
	Coyote Subtotal	***0.127***	***1.245***	***3.050***	***0.000***	***0.721***	***0.000***	***2.151***
SF Basin	Sediment Removal	6.651	19.504	21.500	0.000	2.468	0.138	6.484
	Herbicide	0.048	0.309	N/A	0.000	0.538	0.000	0.669
	Hand Removal	0.139	0.000	N/A	0.000	0.000	0.000	0.000
	Discing	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	Mowing	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	Hand Pruning	0.000	0.000	N/A	0.000	0.000	0.000	0.000
	SF Basin Total	**6.838**	**19.813**	**21.500**	**0.000**	**3.006**	**0.138**	**7.153**

Notes:

1. Includes areas that also were projected for maintenance (and/or maintenance was conducted) from 2002–2012.
2. Acreages are shown for the total of each type, but overlaps between work types are not eliminated.
3. Acreages incorporate the work area percentage to account for various intensities of work within a specific reach and includes areas that also were projected for maintenance (and/or maintenance was conducted) from 2002–2009.
4. "Misc." habitats include cultivated lands, row crops, vineyards, orchards, developed/urban areas, roads, reservoirs, open water, and similar areas.
5. "Sediment wetland" refers to wetland and aquatic havitats (combined) projected to be impacted by sediment removal, based on calculations performed by SCVWD, taking into account the length of reaches where sediment removal is projected and the approximate widths of the wetland/aquatic habitat within those reaches. SCVWD then identified additional areas (i.e., outside the "sediment wetland" polygons) where the various SMP Update activities were projected in areas mapped by AIS as aquatic habitats (summarized in those tables as "acquatic [wetland]" impacts and vegetation types that are considered herbaceous wetlands (summarized in those tables as "herbaceous [wetland]" impacts).

Source: Data compiled by Horizon Water and Environment in 2011 based on information from SCVWD

Impact BIO-1: Loss or Disturbance of Wetlands and Other Waters (Significance Criteria C and D; Less than Significant with Mitigation)

Maintenance activities associated with the Proposed Project would result in the short-term, but repetitive, disturbance of wetland and aquatic communities, including both jurisdictional and non-jurisdictional wetlands and other waters, which provide valuable habitat for fish and wildlife. As described above under *Determination of Impacts to Aquatic and Wetland Communities*, these activities could result in the placement of fill, hydrological interruption (e.g., dewatering or diversion), alteration of bed and bank, degradation of water quality (e.g., increased sedimentation and turbidity, herbicide contamination), and other direct impacts. The activities would primarily result in the short-term loss and disturbance of wetlands and aquatic habitats; however, small permanent losses could occur because of the use of hardscape for bank stabilization activities.

Over the next 10 years, sediment removal activities may occur in up to 42.8 miles of creeks and canals, including approximately 35.4 miles in the Santa Clara Basin and 7.4 miles in the Pajaro River Basin. Table 3.3-7 includes the total sediment removal work projected for 2012–2022 and identifies how much of this work is estimated for new channel areas ("Projected Sediment Removal, 2012–2022 but not 2002–2012") and how much would occur in channels that were also forecast under the original 2002 program projections ("Projected Sediment Removal, both 2002–2012 and 2012–2022"). The values in Table 3.3-7 indicate the number of miles in which some level of sediment removal would occur. However, because a "work area percentage" would be applied to these sediment removal activities (i.e., only a certain percentage of each reach would undergo sediment removal), the actual extent of creeks subject to sediment removal is expected to be less than what is reported in this table.

Table 3.3-7. Projected Sediment Removal, 2012–2022

Watershed	2012–2022 Total Projected Length (miles)	Projected Sediment Removal, 2012–2022 but not 2002–2012 (miles)	Projected Sediment Removal, both 2002–2012 and 2012–2022 (miles)
Santa Clara Basin			
Lower Peninsula	3.9	0.7	3.2
West Valley	3.8	0.9	2.8
Guadalupe	11	8.7	2.3
Coyote	16.7	5.9	10.8
Pajaro Basin			
Pajaro	7.4	3.1	4.5
Total	**42.8**	**19.3**	**23.5**

Note:

Values have not been adjusted for "work area percentage"; thus, the actual extent of impacts would be lower than reported here.

Source: Data compiled by Horizon Water and Environment in 2011 based on information from SCVWD

Certain types of vegetation management work (hand removal, herbicide, pruning, mowing, and discing) also are projected activities, as shown in Table 3.3-8. This table does not account for overlap in vegetation management activities along the same stream reaches or between different types of vegetation management. For example, if herbicide use were to occur in instream, bank/bench, levee slope, and levee top areas along a specific mile of creek, the herbicide use along that reach would be reflected as 4 miles of impacted creek rather than one mile. In addition, if pruning and mowing were to occur in that one-mile reach, the columns for those activities would reflect that one-mile impact as well. Therefore, Table 3.3-8 does not include a summary of the total stream miles that are projected to be subject to vegetation management activities from 2012–2022. Rather, this table is provided primarily to quantify the number of miles in which the various types of vegetation management are projected to occur during the period 2012–2022.

Table 3.3-8. Projected Vegetation Management 2012–2022

Watershed	Hand Removal (miles)	Herbicide (miles)	Pruning (miles)	Mowing (miles)	Discing (miles)
Santa Clara Basin					
Lower Peninsula	2.5	47.8	22.7	3.8	0
West Valley	3.2	146	61.7	32.6	0
Guadalupe	6.9	277.7	211.6	146.8	0.4
Coyote	88.6	213.4	159.5	58.3	0.5
Pajaro Basin					
Pajaro	49.7	162	156.6	45.9	0.9

Note:
Values do not account for overlapping work areas.
Source: Data compiled by Horizon Water and Environment in 2011 based on information from SCVWD

Wetlands serve a variety of important functions, such as sediment stabilization, sediment/toxicant retention, nutrient removal/transformation, and aquatic and terrestrial wildlife species habitat. These functions may be adversely affected as a result of sediment removal, vegetation management, bank stabilization, and other Proposed Project activities.

The vast majority of wetlands and aquatic habitats providing important ecological functions and values are considered jurisdictional waters of the U.S. by the USACE. However, the canals subject to SMP activities are not expected to be considered waters of the U.S., although this determination ultimately will be made by the USACE. Impacts to unvegetated segments of these canals would not result in substantial adverse effects on wetland or aquatic functions and values, as they would simply result in minor modification (e.g., through sediment removal) of unvegetated areas. However, some pockets of vegetated wetland that are not expected to be considered jurisdictional wetlands are present within the canals. These wetlands do provide important ecological functions and values, serving as habitat for wildlife and, in some areas, supporting the Mt. Hamilton thistle, a special-status plant. Loss of these wetlands would result in a substantial impact even though they are likely non-jurisdictional.

As reported in the 2002 SMP FEIR, SCVWD studies have found that wetland vegetation in some areas often quickly re-establishes following sediment removal activities. The *Instream Wetland Vegetation Regrowth Study* (Rankin and Hillman 2000) found 65 percent and 98 percent average regrowth within 1 and 2 years, respectively, after 1997 sediment removal at six non-tidal freshwater study sites. Average regrowth on two tidal study sites was less, at 21 percent and 29 percent after one and two years, respectively. The pattern of rapid re-establishment, with greater rates in non-tidal than in tidal areas, was supported by regrowth study results on four additional 1998 sediment removal sites. After one year, those sites supported more non-tidal wetland than was present before sediment removal and almost 70 percent of the tidal wetland that was present before sediment removal.

Vegetation dominance and quality (as represented by vegetation type, total percent cover of vegetation, and relative percent cover of native and non-native species) were similar between pre- and post-project years on both sediment removal work sites and reference sites on which sediment removal had not been conducted for several years. At most sites, however, some vegetation shifts did occur. Most shifts were neutral or positive, from the perspective of long-term effects on native communities, including full or partial transition from one native-dominated vegetation type to another, disappearance of a non-native vegetation type, or increased total percent cover. Potentially negative changes occurred less frequently, including slightly increased invasive species cover, appearance or increase in amount of a non-native vegetation type, and decrease in total percent cover.

The *Instream Wetland Vegetation Regrowth Study* (Rankin and Hillman 2000), as well as anecdotal observations by SCVWD biological and vegetation management staff, indicate that wetland extent and species composition are affected by vegetation management. Herbicide spraying likely reduces the amount of the target vegetation present (mostly cattails) in freshwater and tidal wetlands in years following the treatment. By targeting perennial emergent vegetation with herbicides, which kill the entire plant, other wetland vegetation types, such as other herbaceous wetland species and non-native annuals, appear to be favored. In contrast, cattails that are removed by manual methods such as cutting re-sprout each year. Therefore, hand removal does not result in a reduction in abundance of erect emergent vegetation as occurs with herbicide use. On the other hand, herbaceous wetland vegetation benefits from the targeted removal of woody riparian saplings, either by herbicide or hand removal, which would otherwise shade out wetland plants.

The Project Area for the *Instream Wetland Vegetation Regrowth Study* mostly included leveed and excavated channels in lower valley sites where work had been done previously. Therefore, the results of that study are not necessarily applicable to the new work areas, especially higher-elevation areas where sediment removal has not previously been performed. Notably, species composition in these higher-elevation areas is different, and these species are likely much less adapted to disturbance from typical SCVWD maintenance activities. Furthermore, these studies occurred during wet years, and their applicability during drought years is unknown.

SCVWD would implement a number of measures to address the impacts of Proposed Project activities on wetlands and other waters. First, implementation of BMPs would reduce impacts on these habitats by minimizing the spatial extent of maintenance activities, scheduling activities to avoid high-water periods, and designing maintenance

activities to result in the least impact to the stream channel, while still meeting flood conveyance objectives. In addition, SCVWD would implement the relevant project and post-project BMPs during maintenance activities to minimize impacts to water quality (e.g., resulting from erosion and sedimentation; contamination by fuels, herbicides, etc.). These BMPs are listed below; descriptions of each are provided in Table 2-12.

Applicable Best Management Practices

BMP GEN-1: In-Channel Work Windows
BMP GEN-2: Instream Herbicide Application Work Window
BMP GEN-4: Minimize the Area of Disturbance
BMP GEN-16: In-Channel Minor Activities
BMP GEN-20: Erosion and Sediment Control Measures
BMP GEN-21: Staging and Stockpiling of Materials
BMP GEN-23: Stream Access
BMP GEN-26: Spill Prevention and Response
BMP GEN-30: Vehicle and Equipment Maintenance
BMP GEN-32: Vehicle and Equipment Fueling
BMP GEN-35: Pump/Generator Operations and Maintenance
BMP SED-2: Prevent Scour Downstream of Sediment Removal
BMP VEG-1: Minimize Local Erosion Increase from In-Channel Vegetation Removal
BMP VEG-3: Use Appropriate Equipment for Instream Removal
BMP VEG-6: Standard Grazing Procedures
BMP BANK-1: Bank Stabilization Design to Prevent Erosion Downstream
BMP BANK-2: Concrete Use near Waterways
BMP REVEG-1: Seeding

Conclusion

Implementation of these BMPs would minimize disturbance of wetlands and other waters.

The vast majority of impacts to acreage of wetlands and other waters would be short-term, because aquatic habitats would be maintained despite Proposed Project activities (e.g., no loss of aquatic habitat would occur because of any maintenance activity other than, perhaps, bank stabilization). In addition, at least along valley-floor channels, many vegetated wetland areas would restore themselves within 1-2 years following sediment removal or vegetation management, as described previously. Nevertheless, the Proposed Project would result in temporal losses of wetland and aquatic habitat functions and values, possible type conversion of wetlands (e.g., from wetlands dominated by certain plant species to wetlands dominated by others), and potentially permanent losses of wetlands and other waters. Even with BMPs, complete avoidance of fill and water quality degradation could not be accomplished while still meeting the projected goals and public health and safety directives.

Thus, in the absence of any mitigation measures, this impact is considered significant because it would result in short-term degradation and temporary and permanent losses of ecologically valuable wetlands and aquatic habitats, including jurisdictional wetlands and other waters (Significance Criteria C and D), and temporary disruption of stream continuity during sediment removal activities within the channel. Impacts on special-status wildlife species resulting from disturbance or loss of wetland and aquatic habitat

are addressed in separate impact discussions below. Mitigation Measure BIO-1 would be implemented to reduce residual impacts to wetlands and other waters to a less-than-significant level.

Mitigation Measure BIO-1: Implement Compensatory Mitigation for Wetlands and Other Waters

The compensatory mitigation package, which is detailed in Appendix C, 2012–2022 SMP Update Mitigation Approach Memorandum, shall be implemented to compensate for new impacts (i.e., work areas not included in the 2002–2012 work projections) on wetlands (both jurisdictional and non-jurisdictional) and on jurisdictional "other waters"; no mitigation is necessary for impacts to non-jurisdictional "other waters", which are limited to unvegetated areas of inoperable canals. For work areas included in the 2002–2012 work projections, previously provided mitigation would continue to serve as mitigation in perpetuity, as no new significant environmental effects or a substantial increase in the severity of previously identified significant effects are anticipated under the SMP Update.

Following the procedure described in Appendix C, the SCVWD would refine the quantification of impacts to wetlands and other waters that occur during a specific year, tallying the impact totals at the end of the year, and compensatory mitigation will be implemented the following year, in many cases. Exceptions will occur in cases in which compensatory mitigation is incorporated directly into Proposed Project work areas; in those cases, compensatory mitigation may be implemented during the same year in which impacts occur. Details regarding performance criteria for mitigation, as well as for monitoring and reporting, are described in Appendix C.

According to the mitigation package, SCVWD will have several options for satisfying mitigation requirements for impacts to wetlands and other waters by the SMP. The two main types of mitigation that can be applied for impacts to non-tidal wetlands and other waters resulting from sediment removal, vegetation management, canal maintenance, and minor maintenance are "in perpetuity" mitigation and "pay as you go" mitigation.

In perpetuity mitigation. For permanent impacts and, at the discretion of SCVWD, repetitive impacts to wetlands or other waters in a specific area, SCVWD will provide mitigation in perpetuity via one or more of the following methods:

- *In-kind restoration/creation*: SCVWD will restore, preserve, and manage wetlands and aquatic habitats, or substantially improve the quality of highly degraded wetlands and aquatic habitats at a ratio of 1.5:1, meaning 1.5 acres of wetlands or other waters shall be restored/created for every 1 acre of wetlands and other waters impacted by Proposed Project activities.

- *In-kind preservation and enhancement*: SCVWD will acquire, preserve, enhance, and manage lands that provide similar ecologic functions and values to the wetlands and other waters impacted by SMP maintenance activities. The acquisition and preservation/enhancement of these higher quality lands will occur at a ratio of 3:1, meaning 3 acres of wetlands or other waters shall be acquired, preserved, and enhanced for every 1 acre of wetlands and other waters impacted by Proposed Project activities. Enhancement may include modification of existing management, limited

planting, or invasive plant removal, or other activities to enhance wetland/aquatic habitat functions and values.

- *Out-of-kind preservation of watershed lands:* SCVWD will acquire, preserve, enhance, and manage watershed lands. These lands provide more general conservation, open space, and habitat values. Although acquired lands would not be specifically tied or matched in-kind to wetland impacts, as they can include a variety of non-wetland/aquatic habitats, their preservation and management will help to maintain the quality or wetlands and aquatic habitats through management focused on benefits to the aquatic environment, such as management to reduce erosion and sedimentation. The acquisition of more general watershed conservation lands will occur at a ratio of 8:1, meaning 8 acres of land shall be acquired and restored for every 1 acre of impacted habitats resulting from Proposed Project activities.

- *Enhancement or management of land that is owned by other agencies*: SCVWD may collaborate with owners of land that is currently managed for open space or passive recreation. In such cases, SCVWD would not acquire the mitigation lands but would enter into an agreement with the landowners to provide management and financial support toward preserving or improving the lands toward beneficial outcomes, including improved habitats. In these cases, a detailed management plan for species or habitats would be SCVWD's responsibility and would not necessarily be managed by the landowner. The mitigation accounting for such "partnership projects" and how much mitigation would be provided to account for SMP Update activities would be reviewed and developed with regulatory staff on a case-by-case basis.

For any of the three mitigation options above, the mitigation areas will be preserved and managed in perpetuity by SCVWD. Mitigation could occur on lands acquired or owned by SCVWD, or on permanently protected lands not owned by SCVWD but by another entity (e.g., an open space district or park lands). These options would reduce impacts to wetlands and aquatic habitats to less-than significant levels by directly replacing wetlands (in-kind restoration/creation); directly improving the functions and values of existing wetlands and maintaining those resources through long-term management (in-kind preservation and enhancement); or indirectly enhancing and/or protecting wetland and aquatic functions and values by protecting watershed lands that contribute to wetland and aquatic habitat ecology and integrity (out-of-kind preservation of watershed lands). The mitigation ratios for these three options were selected to reflect the relative value of each type of mitigation, with in-kind restoration/creation having the lowest mitigation ratio to reflect its direct compensation for lost wetlands, and out-of-kind preservation of watershed lands having the highest mitigation ratio to reflect its more indirect value in protecting and enhancing wetlands and aquatic habitats. Because acquisition lands will be conserved in perpetuity, the mitigation they provide will also serve the SMP in perpetuity. As a result, if in-perpetuity mitigation were applied to impacts to wetlands and other waters in a certain area, no further mitigation would be needed if repetitive impacts to that area were to occur, in perpetuity.

Pay as you go mitigation. Unless it specifically decides to use in perpetuity mitigation to compensate for impacts to wetlands and aquatic habitats in a certain area (e.g., an area where sediment removal or vegetation management will have frequent, repetitive impacts), SCVWD will use two programs (invasive plant management and riparian

planting) to provide incremental "pay as you go" habitat mitigation to compensate for annual impacts to wetlands and aquatic habitats from sediment removal and vegetation management activities. A mitigation ratio of 1.2:1 (area mitigated to area impacted) shall be applied for habitat impacts from sediment removal and vegetation management activities. SCVWD can use either the invasive plant management program or the riparian planting program (or a combination of the programs) to achieve this net mitigation target for annual activities.

Invasive plant management. The primary goal of the invasive plant management program (IPMP) element of the SMP's compensatory mitigation package is to preserve and improve habitat within Santa Clara County streams and riparian corridors by reducing the population of invasive plant species. The IPMP will have a two-pronged approach:

- a systematic program with the longer-term objective of identifying, prioritizing, and controlling invasive plants throughout the Project Area; and
- an opportunistic, site-specific approach with the objective to remove invasive plants from individual SMP work sites. (As mitigation for vegetation management activities, each of the SMP maintenance sites will be evaluated for on-site invasive plant removal and control. Invasive plant management will focus on controlling species that are invasive at individual SMP work sites.)

Riparian planting. The primary goal of the riparian planting component of the SMP mitigation package is to compensate for the loss of quality and quantity of native-dominated riparian habitat because of maintenance activities. Riparian planting will enhance habitat for birds, amphibians, and other wildlife using terrestrial riparian areas while providing shading, sources of organic matter and coarse woody debris, and water quality benefits to aquatic species.

Opportunities for riparian planting and restoration will be evaluated at all vegetation management maintenance locations. SCVWD's preference will be to first prioritize riparian planting at maintenance sites, and in this way provide direct on-site mitigation for maintenance activities. Riparian planting and restoration will provide mitigation that directly addresses impacts associated with vegetation management activities. Where opportunities for onsite riparian planting and restoration are unavailable or highly constrained, SCVWD will identify offsite locations that can provide suitable mitigation opportunities. Off-site riparian planting restoration sites will be prioritized to:

- stream reaches with riparian restoration opportunities for sensitive fish and/or wildlife species;
- stream reaches where riparian restoration of existing riparian canopy gaps will improve connectivity between existing patches of high-quality riparian habitat; and
- stream reaches with riparian habitat gaps where invasive plant species have been treated to accelerate native riparian plant establishment and inhibit re-colonization by invasive plant species.

Although invasive species management and riparian planting do not result in the direct replacement of lost or degraded wetland habitat, they do contribute substantially to the protection and enhancement of aquatic functions. As a result, riparian buffer plantings have been recognized as an appropriate component of programs to mitigate impacts to jurisdictional wetlands and other waters of the U.S. by the USACE (2002).

The "pay as you go" mitigation areas will not be preserved and managed in perpetuity. However, several factors were considered in determining that these components of the mitigation plan will reduce residual impacts to wetlands and aquatic habitats to less-than-significant levels:

- These "pay as you go" mitigation options will benefit wetlands and aquatic habitats indirectly, by increasing the functions and values of existing wetland and aquatic habitats.
- Any riparian planting area used as pay as you go mitigation for impacts to wetlands or aquatic habitats will remain unimpacted for at least 10 years; or, if the mitigation area is impacted within 10 years, it will then be replaced elsewhere.
- Pay as you go mitigation will be provided each time a specific area of wetlands or other waters is impacted. For example, if the same 1-acre area were impacted three times during the 10-year SMP Update period, then 3.6 acres of pay as you go mitigation will be provided for impacts to that area during the 10-year period.
- Impacts to any specific area will degrade, but will not entirely remove, wetland and aquatic functions and values within the impact area.

Mitigation for Bank Stabilization Impacts. Impacts to non-tidal wetlands and aquatic habitats resulting from bank stabilization will be provided via the methods described in Appendix C and using the mitigation ratios identified in Table 2-4. ~~Softscape repairs will be self-mitigating because they will not result in long-term adverse effects.~~ Mitigation may occur through a combination of replacement of "hard" stabilization measures with soft, biotechnical measures (either on the stabilization site or off-site) or out-of-kind via riparian revegetation as determined by a Mitigation Feasibility Assessment, as described in Appendix C. These measures will reduce impacts to wetlands and aquatic habitats resulting from bank stabilization by increasing the functions and values of existing wetland and aquatic habitats.

Mitigation for Impacts to Tidal Wetlands and Other Waters. <u>SCVWD will continue to implement mitigation measures adopted to reduce impacts for the SMP. Although the 2012 project description has changed, this FSEIR has examined the Proposed Project changes and determined that the existing tidal marsh restoration mitigation measures will continue to reduce the Proposed Project impacts to less than significant. The 2012 SMP Update will be a continuation from the 2002 SMP, with some program modifications; although the work activities are updated, the original mitigation remains, along with the resulting benefits.</u>

As mitigation for impacts to tidal habitats and tidal marsh species predicted to result from the 2002–2012 SMP work activities, SCVWD restored the "Island Ponds" (Ponds A19, A20, and A21), located between Coyote Slough and Mud Slough near Alviso, to tidal action. Restoring these ponds provided 30 acres of tidal habitat that is used by a variety of tidal marsh species. Monitoring has documented achievement of all performance criteria appropriate for the development of both vegetated tidal salt/brackish marsh and tidal aquatic habitat, ~~including~~with the formation of nascent tidal marsh habitat, including extensive channel networks, within these ponds.

The 2002 SMP work projections provided the basis for determining the SMP's initial, upfront compensatory mitigation. As a result of those projections, impacts to tidal habitats for the 2002-2012 SMP Update were calculated with a mitigation requirement of 30 acres of tidal restoration. SCVWD already has met this obligation by restoring 30 acres of tidal habitat with the "Island Ponds." ~~Thirty acres of tidal restoration within the Island Ponds was intended to serve as mitigation for impacts to tidal habitats for the 2002–2012 SMP.~~ However, not all of the 2002 projected work has actually been performed. Thus, the 2002 mitigation of 30 acres of restored tidal habitat paid for more work than was conducted. Based on the actual impacts from activities conducted between 2002–2012~~ Proposed Project activities~~, only 9 acres of tidal mitigation ~~will be~~is needed to compensate for those impacts.

The 2002–2012 SMP created an upfront compensatory mitigation package to account for SMP impacts in perpetuity. The 2012–2022 SMP Update has modified the project description to refine maintenance work activity needs. The updated project description in this FSEIR is a continuation, with modifications, of the 2002–2012 SMP.

SCVWD will remove the 2002 work activity projections that would have resulted in the need for 21 tidal habitat mitigation acres. The removal of these projections, therefore, will equate to having 21 acres of tidal habitat mitigation that is not attributed to ongoing SMP impacts. ~~Therefore, SCVWD created 21 acres of excess tidal habitats.~~ SCVWD will use the 21 acres of ~~excess~~ tidal ~~marsh~~habitat restoration as available mitigation for impacts to tidal wetlands and aquatic habitats, as well as tidal marsh species, that may occur under the 2012–2022 SMP Update. ~~Physical breaching of the Island Pond levees and other physical work required for this tidal restoration has already occurred, and no further activities (other than continued monitoring of marsh development per the 2002–2012 SMP monitoring requirements) are proposed by SCVWD.~~

It is possible that these mitigation measures may be refined during permitting with the USACE, RWQCB, and CDFG, in which case the refinements required by these resource agencies would be implemented.

MM BIO-1 will mitigate impacts to wetlands and other waters, including jurisdictional waters of the U.S./state, to less-than-significant levels by replacing lost wetlands and aquatic habitats through restoration or by replacing the lost functions and values provided by these habitats through other means, such as non-native plant removal and watershed protection. Thus, MM BIO-1 will assure that the SMP does not result in a substantial adverse effect on federally protected wetlands or on sensitive wetland and aquatic communities.

Impact BIO-2: Loss or Disturbance of Woody Riparian Vegetation (Significance Criterion D; Less than Significant with Mitigation)

Bank stabilization, sediment removal, and vegetation management activities would result in the loss and disturbance of woody riparian vegetation that occurred along the stream banks above the ordinary high water mark. As described above under *Determination of Impacts to Non-Instream Sensitive Plant Communities*, these activities could result in the loss of vegetation through directly removal, herbicide use, trampling, and other impacts.

Although the effects of bank stabilization on riparian vegetation are difficult to quantify precisely, based on past work records, SCVWD stabilizes nearly one mile of stream bank per year (approximately 0.75 miles in the Santa Clara Basin and 0.25 miles in the Pajaro Basin). Impacts to riparian vegetation could occur during sediment removal activities as well (e.g., during access to sediment removal areas and movement of equipment for sediment removal), although predicting the impacts to riparian habitat quantitatively would not be possible beyond the linear miles of creek subject to sediment removal (summarized in Table 3.3-7) because sediment removal would target instream sediment.

Impacts of projected vegetation management activities on woody riparian vegetation were summarized by SCVWD using AIS's vegetation mapping (to determine where instream woodland, forest, and scrub-shrub vegetation was located) and the 2012–2022 projections. Table 3.3-9 summarizes these estimated impacts by watershed for riparian woodland/forest and scrub-shrub habitats. Because of overlap between certain types of vegetation removal activities (i.e., with multiple activities occurring in the same general area), the total number of acres that would be subject to impact by projected vegetation management activities would be lower than the totals in this table.

Table 3.3-9. Estimated Impacts to Riparian Woodland, Forest, and Scrub-Shrub from Projected Vegetation Management, 2012–2022

Watershed	Hand Removal (acres)	Herbicide (acres)	Pruning (acres)	Mowing (acres)	Discing (acres)	Total (acres)
Lower Peninsula	0.2	3.7	0.1	0.8	0	4.8
West Valley	0.1	18.5	0.2	1.8	0	20.6
Guadalupe	0.2	31.4	0.2	27.9	0.1	59.8
Coyote	3.3	26.5	11.4	8.7	1.3	51.2
Pajaro	4.2	40.7	1.5	9.3	1.7	57.4
Total	**8.0**	**120.8**	**13.4**	**48.5**	**3.1**	**193.8**

Note:
Some of the activities in this table overlap within a specific area. Also, SCVWD may perform additional pruning that could affect up to 40 acres during the period 2012–2022.

Source: Data compiled by Horizon Water and Environment in 2011 based on information from SCVWD

~~Hand pruning has been projected in 40 acres of new work areas. Pruning will occur on woody vegetation in order to restore conveyance capacity of a creek reach, provide visual inspection of District facilities, and to provide access clearance on roadways (not projected in 2002) and for bank stabilization projects. Hand pruning may also be performed for ecological/stewardship purposes.~~ The pruning projections in Table 3.3-9, totaling 13.4 acres, were derived from SCVWD's database of reach-by-reach projected activities. In addition, additional pruning are expected to be necessary in areas that are not yet completely defined, to restore conveyance capacity of a creek reach, provide visual inspection of SCVWD facilities, and provide access clearance on roadways, for bank stabilization projects and for ecological/stewardship purposes. As a result, SCVWD has allowed for the possibility that pruning may affect considerably more acreage than has been indicated in Table 3.3-9 and has set a cap of 40 acres of pruning for the entire 10-year 2012–2022 program.

In addition, unprojected activities (e.g., management of animal conflicts and minor maintenance) could potentially result in the loss or disturbance of woody riparian vegetation.

Vegetation that is removed by Proposed Project activities is expected to regrow, except in areas where bank stabilization would result in the permanent loss of natural streambank, or where capacity or other maintenance activities would require the permanent exclusion of vegetation. Thus, most Proposed Project impacts to riparian habitats would be temporary in that they would not preclude the potential for woody riparian vegetation to regrow. However, repetitive impacts to woody riparian vegetation would prevent regrowth, at least during the 10-year duration of the SMP Update. Proposed Project activities also may contribute towards the long-term modification of riparian plant communities if certain plant species were targeted. For example, young cottonwoods often are removed by vegetation management activities, which prevents these trees from maturing into the large trees that provide habitat for a number of wildlife species. Cottonwoods already suffer the effects of stream modification, including restrictions on the ability of streams in urban areas to meander, and thus regeneration of cottonwood-

dominated forests in urban Santa Clara County is poor. Proposed Project activities that would prevent the maturation of cottonwoods could contribute to the long-term decline in multi-aged cottonwood-dominated riparian forests in the county.

Riparian communities are considered sensitive habitats in and of themselves. In addition, riparian habitats include two plant communities, sycamore alluvial woodland and oak woodlands, that also are considered sensitive. Impacts to sycamore alluvial woodland and oak woodlands are addressed in greater detail under Impact BIO-3.

As discussed above, woody riparian habitats in the Project Area provide a wide range of biological functions for fish and wildlife, ranging from providing habitat for fish and other aquatic species to foraging and nesting habitat for birds, to movement corridors for numerous terrestrial species. As a result, impacts to riparian habitats would affect a variety of fish and wildlife species as well. Impacts on special-status plant and wildlife species resulting from disturbance or loss of riparian habitat are addressed in separate impact descriptions below.

Riparian vegetation in some work sites would include herbaceous vegetation rather than woody vegetation. Herbaceous vegetation, which often includes species such as black mustard (*Brassica nigra*), poison hemlock (*Conium maculatum*), perennial ryegrass (*Lolium perenne*), Italian thistle, bristly ox-tongue, sweet fennel (*Foeniculum vulgare*), and smilograss (*Piptatherum miliaceum*), typically dominates the banks of reaches that would be frequently disturbed (including disturbance from ongoing maintenance activities). Such vegetation regenerates quickly and, compared to woody riparian vegetation dominated by trees and shrubs, would provide relatively low functions and values for wildlife. As a result, impacts of Proposed Project activities on non-wetland, herbaceous riparian vegetation would not have substantial ecological effects.

SCVWD would implement a number of measures to address the impact of Proposed Project activities on woody riparian vegetation, including limiting impacts to the minimum area required and conducting pruning according to the National ANSI A300 standards. These BMPs are listed below, and descriptions of each are provided in Table 2-12.

Applicable Best Management Practices

BMP GEN-4: Minimize the Area of Disturbance
BMP GEN-21: Staging and Stockpiling of Materials
BMP GEN-23: Stream Access
BMP GEN-28: Fire Prevention
BMP REVEG-1: Seeding
BMP REVEG-2: Planting Material

Conclusion

Implementation of these BMPs would minimize disturbance of woody riparian vegetation. Nevertheless, the Proposed Project would result in temporal losses of woody riparian functions and values and some permanent losses of woody riparian habitat because complete avoidance could not be accomplished while still meeting the project goals for public health and safety directives. Thus, significant residual impacts would remain. The impact of Proposed Project activities on woody riparian vegetation is considered

significant because it would result in short-term degradation of riparian habitat (Significance Criterion D) and temporary and permanent loss of riparian vegetation (Significance Criterion D). Mitigation Measure BIO-2 would be implemented to reduce this residual impact to a less-than-significant level.

As discussed above, riparian vegetation in some work sites would include herbaceous vegetation rather than woody vegetation. Compared to woody riparian vegetation dominated by trees and shrubs, such vegetation regenerates quickly and generally provides relatively low functions and values for wildlife. As a result, impacts of Proposed Project activities on non-wetland, herbaceous riparian vegetation are less-than-significant, and no mitigation for such impacts is required (although impacts to herbaceous wetland vegetation, which may extend up into riparian areas from the creek channel, would be significant as discussed under Impact BIO-1).

Mitigation Measure BIO-2: Implement Compensatory Mitigation for Woody Riparian Vegetation

The compensatory mitigation package, which is incorporated into the Proposed Project and detailed in Appendix C, shall be implemented to compensate for new impacts (i.e., work areas not included in the 2002–2012 work projections) on woody riparian vegetation. For work areas included in the 2002–2012 work projections, previously provided mitigation would continue to serve as mitigation in perpetuity, as no new significant environmental effects or a substantial increase in the severity of previously identified significant effects are anticipated under the updated program.

Following the procedure described in Appendix C, the SCVWD would refine the quantification of impacts to riparian vegetation that occur during a specific year, tallying the impact totals at the end of the year, and compensatory mitigation will be implemented the following year, in many cases. Exceptions will occur in cases in which compensatory mitigation is incorporated directly into the SMP work areas; in those cases, compensatory mitigation may be implemented during the same year in which impacts occur. Details regarding performance criteria for mitigation, as well as for monitoring and reporting, are described in Appendices C and Appendix L.

According to the mitigation package, SCVWD will have several options for satisfying mitigation requirements for impacts to riparian vegetation by the SMP. The two main types of mitigation that can be applied for impacts to riparian vegetation resulting from sediment removal, vegetation management, canal maintenance, and minor maintenance are “in perpetuity” mitigation and “pay as you go” mitigation. These mitigation options would be applied to riparian vegetation as described in Mitigation Measure BIO-1 for wetlands and other waters.

For any of the three “in perpetuity” mitigation options, the mitigation areas will be preserved and managed in perpetuity by SCVWD or a land management agency. These options will reduce impacts to riparian vegetation to less-than significant levels by directly replacing such vegetation (in-kind restoration/creation); directly improving the functions and values of existing riparian vegetation and maintaining those resources through long-term management (in-kind preservation and enhancement); or indirectly enhancing and/or protecting riparian functions and values by protecting watershed lands that

contribute to riparian habitat ecology and integrity (out-of-kind preservation of watershed lands). The mitigation ratios for these three options were selected to reflect the relative value of each type of mitigation, with in-kind restoration/creation having the lowest mitigation ratio to reflect its direct compensation for lost riparian vegetation, and out-of-kind preservation of watershed lands having the highest mitigation ratio to reflect its more indirect value in protecting and enhancing riparian vegetation. Because acquisition lands will be conserved in perpetuity, the mitigation they provide also will serve the SMP in perpetuity. As a result, if in-perpetuity mitigation is applied to impacts to riparian vegetation in a certain area, no further mitigation will be needed if repetitive impacts to that area occurs, in perpetuity.

"Pay as you go" mitigation via invasive plant management and riparian planting will directly compensate for impacts to riparian vegetation. In many areas, invasive plant management will remove invasive species that occupy areas that otherwise can support riparian vegetation, and that threaten further to invade riparian areas. Riparian planting obviously will provide in-kind mitigation for impacts to riparian vegetation.

Mitigation for bank stabilization impacts also will be provided, as described in Mitigation Measure BIO-1 for wetlands and other waters.

Two components of the mitigation package that are directly applicable to the compensation for impacts to riparian vegetation, but that were not applicable to (and thus not discussed in) Mitigation Measure BIO-1, are mitigation for pruning and mitigation for removal of trees 6-12 inches dbh (removal of trees greater than 12 inches dbh is not included in the SMP).

The mitigation requirement for pruning is the same as the riparian replanting mitigation ratio of 1.2:1. Based on the International Society of Arboriculture pruning standards, and the SMP Manual (Appendix A), no more than 25 percent of a tree would be pruned, unless greater pruning is necessary for safety or specific ecological purposes (e.g., codominant stem species). Applying the degree of impact (25 percent of any given tree) to the mitigation ratio of 1.2:1, the resulting mitigation factor is 0.3. Up to 40 acres of pruning may occur, and thus the resulting mitigation acreage necessary is 12 acres (40 acres x 0.3). Whereas other mitigation will be calculated on an annual basis, these 12 acres of mitigation will be provided for the entire program, and a maximum (or "cap") of 40 acres of hand pruning will be established for the entire program for the period 2012–2022.

Removal of trees up to 6 inches dbh will not require mitigation on a tree-by-tree basis; rather, impacts to woody riparian vegetation comprised of trees or shrubs less than 6 inches dbh will be mitigated (as described above) via in perpetuity or pay as you go mitigation. However, removal of trees sized 6-12 inches dbh will be mitigated through the individual planting of replacement trees. Appendix B in the 2012–2022 SMP Update Mitigation Approach Memorandum (Appendix C), *Tree Scoring for Removal of Trees and Shrubs ≤ 12"DBH* provides a specific tree appraisal and evaluation protocol to determine how replacement planting occurs. The protocol involves carefully assessing targeted tree removals for their existing conditions and functions, including their canopy cover, local area value, ecosystem benefits, and ecosystem detriments. Using a cumulative ranking method, tree replacement mitigation ratios for removed trees (6-12 inches dbh) occurs at

either 1:1, 2:1, or 3:1 (replacement tree to removed tree), depending on the overall quality and function of the removed tree.

Impacts to riparian vegetation containing trees 6-12 inches dbh are, therefore, mitigated in two ways—mitigation on an acreage basis via in perpetuity or pay as you go mitigation, plus mitigation via replacement of trees 6-12 inches dbh. The two mitigation areas will be non-overlapping. As a result, the extent of mitigation for impacts to more mature woody riparian vegetation will be greater, as is appropriate based on the greater functions and values to wildlife, than impacts to less mature riparian vegetation.

As part of the riparian mitigation component, SCVWD will mitigate impacts to sensitive riparian communities, including sycamore alluvial woodland and oak woodland, in-kind. For a specific extent of impact to sycamore alluvial woodland or oak woodland, the in perpetuity or pay as you go mitigation that is applied to that impact will focus on enhancement, preservation, and/or restoration of that sensitive community type; removal of invasives will not be considered appropriate mitigation for these sensitive community types unless accompanied by restoration that targets that community type. Similarly, when impacts to high-quality occurrences of cottonwood-dominated forest occur, SCVWD will mitigate by providing cottonwood-dominated mitigation sites. "High-quality" occurrences will be determined by a qualified botanist based on criteria such as evidence of natural regeneration and the presence of multi-layered and multi-aged stands.

It is possible that these mitigation measures may be refined during permitting with the USACE, RWQCB, and CDFG, in which case the refinements required by these resource agencies would be implemented.

MM BIO-2 will mitigate impacts to riparian habitats to less-than-significant levels by replacing lost riparian vegetation through restoration or by replacing the lost functions and values provided by these habitats through other means, such as non-native plant removal and watershed protection. Thus, MM BIO-2 will assure that the SMP does not result in a substantial adverse effect on sensitive riparian communities.

Impact BIO-3: Disturbance of Sensitive Plant Communities (Significance Criteria A and D; Less than Significant with Mitigation)

Sensitive plant communities (see *Regulated and Sensitive Natural Communities* above) often are of limited distribution within a region and frequently support special-status species or high numbers of common species. Thus, the conservation of these natural communities is integral to maintaining biological diversity. However, as described above under *Determination of Impacts on Aquatic and Wetland Communities* and *Determination of Impacts on Non-instream Sensitive Plant Communities*, Proposed Project activities may affect sensitive plant communities through direct disturbance of vegetation and disturbance, modification, or destruction of habitat. Impacts to wetlands and aquatic habitats in general, which are considered sensitive communities, are described under Impact BIO-1, and impacts to riparian habitats (also sensitive communities) are described under Impact BIO-2. Impact BIO-3 focuses on specific sensitive communities, such as northern coastal salt marsh, sycamore alluvial woodland, and serpentine communities. Table 3.3-10 summarizes estimated impacts of projected SMP Update activities on these

latter communities, based on mapping by AIS and SCVWD projections for maintenance activities during the period 2012–2022.

Table 3.3-10. Estimated Impacts to Northern Coastal Salt Marsh, Sycamore Alluvial Woodland, and Serpentine Communities from Projected SMP Update Activities, 2012–2022

Community	Projected Impact (acres)
Northern Coastal Salt Marsh	8.3
Sycamore Alluvial Woodland	17.6
Coast Live Oak	27.3
Valley Oak	7.2
Serpentine	24.4

Note:
Source: Data compiled by Horizon Water and Environment in 2011 based on information from SCVWD and AIS.

Northern coastal salt marsh would not be directly impacted by sediment removal, but vegetation management in 8.3 acres of salt and brackish marsh habitats would affect these habitats. Some vegetation management would result in temporary degradation of northern coastal salt marsh communities via mowing or removal of plants, which would affect the structure of this community and the services it would provide to wildlife. Impacts to this community would be as described under Impact BIO-1 for wetland and aquatic habitats. However, the majority of such impacts (6.8 acres) would occur as a result of herbicide application in perennial pepperweed-dominated areas near Coyote Slough and Coyote Bypass. This activity, which occurs in part as mitigation for impacts resulting from the Lower Coyote Creek capital project, would enhance habitat conditions by reducing the infestation of salt marsh by the invasive perennial pepperweed.

No activities are projected within the highest-quality occurrences of sycamore alluvial woodland, such as those along Coyote Creek from U.S. Highway 101 downstream to the Ogier Ponds, or along Pacheco Creek. However, vegetation management activities are projected in 17.6 acres mapped as sycamore-dominated by AIS. More than half of this impact would occur in the Guadalupe River watershed. Impacts to this community would occur in the same ways as described under Impact BIO-2 for impacts to woody riparian vegetation.

Impacts to oak woodland communities would occur in a number of locations where the streamside vegetation is dominated by oaks. Approximately 23.4 acres dominated by coast live oak and 3.1 acres dominated by valley oak would be impacted by projected vegetation management activities in the Santa Clara Basin, while 3.9 acres dominated by coast live oak and 4.1 acres dominated by valley oak would be impacted by projected vegetation management activities in the Pajaro Basin. Impacts to this community would occur in the same ways as described under Impact BIO-2 for impacts to woody riparian vegetation.

Projected activities would occur in or very close to serpentine communities, primarily along portions of the Coyote Canal, Coyote Canal Extension, Coyote Alamitos Canal, and

Almaden Calero Canal, where high-quality serpentine communities were mapped by SCVWD botanist J. Hillman based on surveys in 2004 and 2008 (Figure 3.3-2). Although serpentine communities likely would occur near work sites elsewhere, such as along Upper Silver Creek, no high-quality serpentine communities were identified in these areas during SCVWD's surveys. As described under *Determination of Impacts to Non-instream Sensitive Plant Communities* above, proposed maintenance activities could result in a variety of impacts on serpentine communities. For example, during any bank stabilization, sediment removal, vegetation management, and animal conflict management activity that would occur in or adjacent to serpentine, equipment use, vehicle traffic, and worker foot traffic may result in the injury or mortality of individual plants. These activities could result in death, altered growth, or reduced seed set through physically breaking, crushing, wilting, or uprooting plants, and the compaction of soil by heavy equipment could damage plant roots. In addition, vegetation management activities and the creation of access routes and staging areas may result in the mechanical or physical removal of vegetation as a result of off-target herbicide contact via drift. Although such impacts would be temporary in that they would not preclude the regeneration of serpentine vegetation, the repetitive nature of impacts in at least some areas would result in longer-term effects over the 10-year duration of the SMP Update. Permanent impacts to serpentine communities may occur if bank stabilization activities were necessary in such areas. Unprojected activities (e.g., bank stabilization, management of animal conflicts, and minor maintenance) also could result in the loss or disturbance of serpentine communities.

For the sake of estimating the extent of potential impacts to serpentine plant communities, all projected activities along canals that were determined to provide high-quality serpentine communities, as depicted in Figure 3.3-2, were evaluated. These activities are projected to impact up to 5.04 linear miles of Coyote, Coyote Extension, Coyote Alamitos, and Almaden Calero Canals within high-quality serpentine communities. Assuming (conservatively) that areas up to 20 feet on either side of the canal could be impacted, projected activities could impact up to 24.43 acres of high-quality serpentine communities.

SCVWD would implement several measures to address the impacts of Proposed Project activities on sensitive plant communities, including pre-project planning BMPs to minimize the area of disturbance and pre-activity surveys to identify and avoid sensitive plant communities. These BMPs are listed below, and descriptions of each are provided in Table 2-12.

Applicable Best Management Practices

BMP GEN-4: Minimize the Area of Disturbance
BMP GEN-9: Avoid Impacts to Special-Status Plant Species and Sensitive Natural Vegetation Communities
BMP GEN-21: Staging and Stockpiling of Materials

Conclusion

Implementation of these BMPs would minimize disturbance of sensitive plant communities. Nevertheless, the Proposed Project would result in temporal losses of functions and values, and possibly some permanent losses of sensitive plant communities because complete avoidance could not be accomplished while still meeting the project goals for public health and safety directives. Thus, residual impacts would remain. Although most of the impacts to northern coastal salt marsh would result from beneficial activities (invasive species management), and impacts to sycamore-dominated habitat would not strictly be to typical sycamore alluvial woodland communities, both impacts would be significant because of the value of these communities to wildlife (Significance Criteria A and D). Impacts to serpentine communities, because of the importance of these communities to special-status species and their regional rarity, and to oak woodlands, because of their ecological importance to a diversity of riparian and upland wildlife species, would be significant (Significance Criteria A and D).

No mitigation would be required for vegetation management that was specifically performed for ecologically beneficial purposes; for example, management of the invasive perennial pepperweed in the Coyote Creek Bypass area would benefit the northern coastal salt marsh community, and thus it would not require mitigation. As noted under Mitigation Measure BIO-1, ~~excess~~ mitigation provided by restoration of tidal habitats at the Island Ponds under the 2002–2012 SMP also would compensate for impacts of 2012–2022 Proposed Project activities on tidal wetlands, such as northern coastal salt marsh. Therefore, implementation of Mitigation Measure BIO-1 would reduce Proposed Project impacts to northern coastal salt marsh communities to less-than-significant levels.

Implementation of Mitigation Measure BIO-2 would reduce residual impacts to sycamore alluvial woodland/oak woodland and serpentine communities, respectively, to a less-than-significant level by implementing applicable components of the mitigation package with a direct focus on mitigation specific to these two community types whenever impacts to these communities occurred.

Mitigation Measure BIO-3 would be implemented to reduce impacts to sensitive plant communities to a less-than-significant level.

Mitigation Measure BIO-3: Implement Compensatory Mitigation for Serpentine Communities

SCVWD will provide mitigation for unavoidable impacts to high-quality serpentine communities, including grassland, rock outcrops, seeps, and chaparral. SCVWD would refine the quantification of impacts to high-quality serpentine habitat on an annual basis. Along SCVWD's canals, where most or all SMP impacts to serpentine species and communities are expected to occur, high-quality serpentine communities were mapped by SCVWD using data gathered during surveys in 2004 and 2008. Serpentine communities are considered to be of "high quality" if they are in a semi-natural or natural/undisturbed state and meet one or both of the following criteria:

- Presence of multiple special-status plant occurrences
- Relatively high abundance of natives or serpentine obligates vs. non-natives

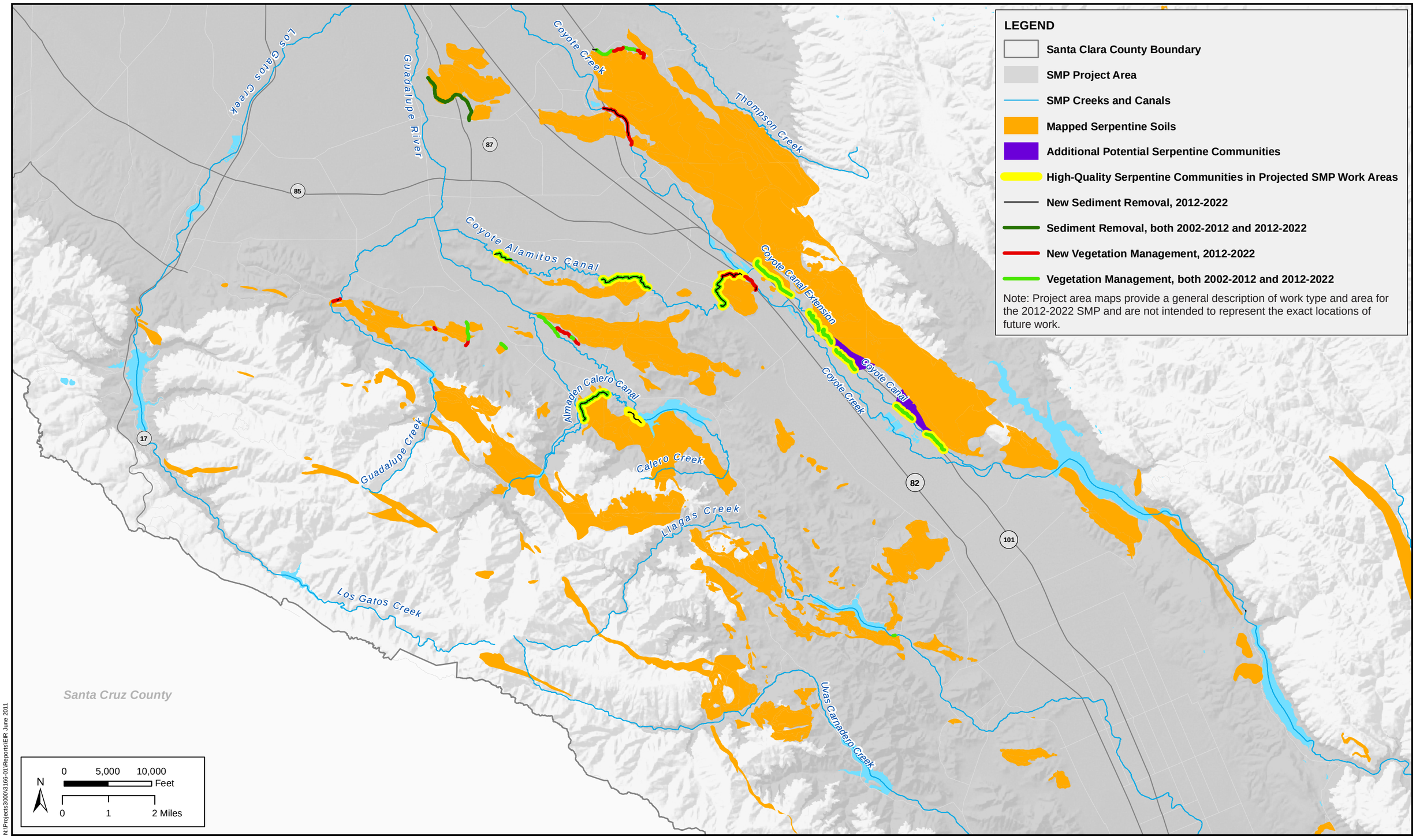

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Figure 3.3-2: Projected SMP Update Activities in Serpentine Communities

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Before Proposed Project activities that can impact serpentine communities and species, an SCVWD botanist will conduct a review of potential serpentine impact areas using existing data, such as SCVWD's mapping, and field verification as needed, to identify high-quality serpentine communities. At the end of that year's maintenance period, SCVWD will determine the extent of impacts to high-quality serpentine communities that have occurred during the year.

Compensation for unavoidable effects to high-quality serpentine communities will be provided via the protection, enhancement, and management of serpentine communities outside SMP work sites at a 2:1 (mitigation:impact~~:mitigation~~) ratio, on an acreage basis. SCVWD will acquire land supporting serpentine communities via fee title or purchase of a conservation easement. Compensatory mitigation may be carried out through one or both of the following methods, in order of preference:

- The preservation and management of existing serpentine communities
- The restoration or enhancement of previously existing or degraded serpentine communities

SCVWD will develop a Habitat Mitigation and Management Plan (HMMP), describing the measures that will be taken to enhance and manage the mitigation lands and to monitor the effects of management on serpentine communities. That plan will include, at a minimum, the following:

- A summary of impacts to high-quality serpentine communities and the proposed mitigation
- A description of the location and boundaries of the mitigation site and description of existing site conditions
- A description of measures to be undertaken if necessary to enhance (e.g., through focused management) the mitigation site for serpentine communities
- Proposed management activities, such as managed grazing and management of invasive plants, to maintain high-quality serpentine communities
- A description of community monitoring measures on the mitigation site, including specific, objective goals and objectives (including maintaining or increasing native plant species diversity), performance indicators and success criteria (including maintaining or increasing the relative abundance of native vs. non-native species), monitoring methods (including vegetation sampling for plant species composition), data analysis, reporting requirements, and monitoring schedule

  (Determining other specific performance/success criteria requires information regarding the specific mitigation site, its conditions, the biological resources present on the site, and the specific enhancement and management measures tailored to that site and its conditions. As a result, additional~~those~~ specific criteria will be defined in the HMMP rather than in this SEIR. Nevertheless, the performance/success criteria described in the HMMP will guide the mitigation for management and protection of high-

quality serpentine communities to adequately compensate for the functions and values of the impacted communities.)

- A description of the management plan's adaptive component, including potential contingency measures for mitigation elements that do not meet performance criteria
- A description of the funding mechanism for the long-term maintenance and monitoring of the mitigation lands

After mitigation has been provided for impacts to a specific area supporting high-quality serpentine communities and/or special-status species from a specific year's activities, future (i.e., repetitive) impacts to that area will not require additional mitigation.

The HMMP will be provided to the USFWS for review because some of the serpentine-associated special-status species that would benefit from this mitigation are federally listed species regulated by the USFWS. It is possible that this mitigation measure may be refined during the Section 7 consultation process with the USFWS (e.g., in the Biological Opinion covering Project effects on federally listed, serpentine-associated species), in which case the refinements required by the USFWS would be implemented.

MM BIO-3 will mitigate impacts to sensitive serpentine communities to less-than-significant levels by replacing the functions and values provided by such communities through the enhancement, management, and protection of serpentine communities. Thus, MM BIO-3 will assure that the SMP does not result in a substantial adverse effect on sensitive serpentine communities or threaten to eliminate this plant community.

Impact BIO-4: Impacts to Serpentine-Associated Special-Status Plant Species (Significance Criteria A and B; Less than Significant with Mitigation)

Serpentine plant communities in the Project Area support a unique assemblage of plant species, including the following special-status species (see Figure 3.3-3 and Table 3.3-~~20~~21):

- Tiburon paintbrush
- Coyote ceanothus
- Santa Clara Valley dudleya
- Metcalf Canyon jewel-flower
- Big-scale balsamroot
- Pink creamsacs
- Mt. Hamilton thistle
- Fragrant fritillary (*Fritillaria falcata*)
- Woolly-headed lessingia (*Lessingia hololeuca*)
- Smooth lessingia (*Lessingia micradenia* var. *glabrata*)
- Most beautiful jewel-flower (*Streptanthus albidus* ssp. *peramoenus*)

Neither the Tiburon paintbrush nor Coyote ceanothus are known to occur in or very close to areas where activities are either projected or expected to occur, and because of the intensity of survey effort for these species over the years, both on SCVWD facilities and in general, a previously unknown occurrence is not expected to be located in an area where it could be affected by Proposed Project activities. However, the possibility of colonization of serpentine habitat in or near the Coyote, Coyote Extension, Coyote Alamitos, or Almaden

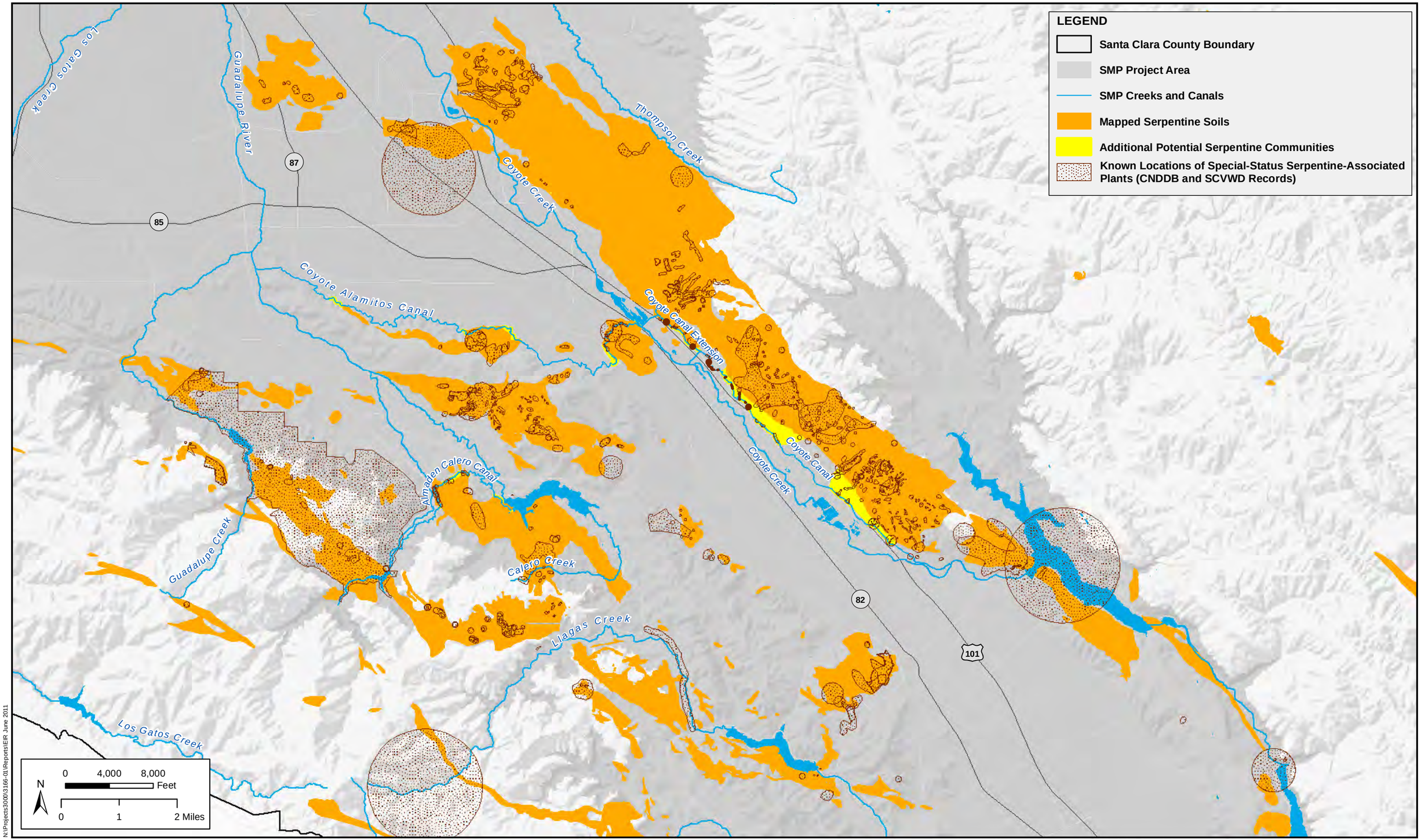

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Figure 3.3-3: Mapped Serpentine Soils and Known Locations of Special-Status Serpentine-Associated Plants

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Calero canals cannot be eliminated. Thus, because Tiburon paintbrush and Coyote ceanothus are so rare that any new occurrence would be significant to the population, and any loss of individuals or degradation of the health of the population would result in a substantial adverse effect on the species, SCVWD would implement BMP GEN-9 (*Avoid Impacts to Special-Status Plant Species and Sensitive Natural Vegetation Communities*) to prevent all direct and indirect effects on these species. Individuals of these species would be sought during pre-activity surveys along the segments of the aforementioned canals that are located within serpentine communities and, if any individuals were found, Proposed Project activities would be modified to prevent adverse effects on them. Thus, with implementation of BMPs, no short- or long-term effects on the Tiburon paintbrush and Coyote ceanothus are expected to occur.

Several of the special-status plants listed above are known to occur in or near proposed work sites. During SCVWD's 2004 and 2008 surveys of SMP channels within serpentine communities, both the federally listed Santa Clara Valley dudleya and Metcalf Canyon jewel-flower were documented within SCVWD canal easement (Figure 3.3-3). Santa Clara Valley dudleya was documented along the Coyote Alamitos Canal, the Coyote Canal Extension, and the Almaden Calero Canal. One population of Metcalf Canyon jewel-flower was documented along the Coyote Canal Extension. Other special-status serpentine-associated plant species located in SMP work sites during SCVWD's 2004 and 2008 surveys included Mt. Hamilton thistle, smooth lessingia, Hall's bush-mallow, and most beautiful jewel-flower. Although none of the remaining serpentine-associated species listed above were detected during these surveys, serpentine soils similar to those that support known populations occur in the Project Area throughout much of Coyote Ridge, on Tulare Hill, and in the Santa Teresa Hills. Thus, some potential would exist to find serpentine bunchgrass grassland, rock outcrops, seeps, and mixed serpentine chaparral habitat virtually anywhere in the Project Area that may support these species.

As was discussed for serpentine communities under Impact BIO-3, projected activities would occur in or very close to serpentine communities primarily along portions of the Coyote Canal, Coyote Canal Extension, Coyote Alamitos Canal, and Almaden Calero Canal where high-quality serpentine communities were mapped by SCVWD botanist J. Hillman, based on surveys in 2004 and 2008 (Figure 3.3-2).

Although serpentine communities occurred near SMP work sites elsewhere, such as along Upper Silver Creek, no high-quality serpentine communities were identified in these areas during SCVWD's surveys. As described under *Determination of Impacts to Special-Status Plants*, proposed maintenance activities could result in a variety of short-term impacts on serpentine-associated special-status plants. For example, during any bank stabilization, sediment removal, vegetation management, and animal conflict management activity that occurred in or adjacent to serpentine communities, equipment use, vehicle traffic, and worker foot traffic may result in the injury or mortality of individual plants. These activities could result in death, altered growth, or reduced seed set by the physical breaking, crushing, wilting, or uprooting of plants, and soil compaction by heavy equipment could damage plant roots. In addition, vegetation management activities and the creation of access routes and staging areas may result in the mechanical or physical removal of special-status plants and the damage or mortality of individuals as a result of off-target herbicide contact via drift. Although such impacts to habitat of these species would be temporary in that they would not preclude the regeneration of serpentine

vegetation and the recolonization of these areas by special-status plants, the repetitive nature of impacts in at least some would result in longer-term effects over the 10-year duration of the SMP Update. Permanent impacts to serpentine-associated special-status plants may occur if bank stabilization activities were necessary in occupied habitat. Unprojected activities (e.g., bank stabilization, management of animal conflicts, and minor maintenance) also could result in the loss or disturbance of serpentine-associated special-status plant populations.

As discussed for serpentine communities under Impact BIO-3, SMP Update activities are projected to impact up to 5.04 linear miles of canal within high-quality serpentine communities. Assuming (conservatively) that areas up to 20 ft on either side of the canal could be impacted, projected activities could impact up to 24.43 ac of high-quality serpentine communities. Although special-status serpentine-associated plants occur in only a subset of this area, there is some potential for impacts to populations of these species throughout that area.

SCVWD would implement several measures to address the impact of Proposed Project activities, including pre-project planning BMPs to minimize the area of disturbance. Implementation of the BMP specifically designed to protect special-status plants (BMP GEN-9) would avoid or minimize impacts to these species through the identification and avoidance of serpentine and serpentine-associated special-status species. These BMPs are as follows, and a description of each is provided in Table 2-12.

Applicable Best Management Practices

BMP GEN-4: Minimize the Area of Disturbance
BMP GEN-9: Avoid Impacts to Special-Status Plant Species and Sensitive Natural Vegetation Communities
BMP GEN-21: Staging and Stockpiling of Materials

Conclusion

By implementing these BMPs, SCVWD would reduce impacts to serpentine-associated special-status plant species. However, complete avoidance of special-status serpentine-associated plant species would be infeasible. Impacts would most likely occur if special-status serpentine plants were located within a levee road or on a canal bank between the access road and the canal, if sediment on which Mt. Hamilton thistle was growing needed to be removed, or if unprojected maintenance activities occurred in areas where avoidance of serpentine habitats and species was not feasible. If impacts to special-status serpentine plants was unavoidable, such impacts would be significant because of their regional rarity (Significance Criteria A and B). Mitigation Measure BIO-4 would be implemented to provide compensation for these impacts, reducing the impact on serpentine-associated special-status plant species to a less-than-significant level.

Implementation of Mitigation Measure BIO-3 for serpentine plant communities would help to reduce impacts to special-status serpentine-associated plants by providing compensation for impacts to high-quality occurrences of communities in which these special-status species occurred. However, Mitigation Measure BIO-4 still would be necessary so that mitigation specific to the impacted species was provided. Mitigation

Measure BIO-4 would be implemented to reduce the impact to serpentine-associated special-status plant species to a less-than-significant level.

Mitigation Measure BIO-4: Implement Compensatory Mitigation for Serpentine-Associated Special-Status Plant Species

SCVWD will provide mitigation for unavoidable impacts to serpentine-associated special-status plant populations. Before Proposed Project activities that can impact serpentine communities and species, an SCVWD botanist will conduct a review of potential serpentine impact areas using existing data, such as SCVWD's mapping, and field verification as needed, to identify high-quality serpentine communities. The botanist also will conduct a pre-activity survey for special-status plants. At the end of that year's maintenance period, SCVWD would refine the quantification of impacts to populations of special-status serpentine-associated plants.

Compensation for unavoidable impacts to populations of special-status serpentine-associated plants will be provided by a combination of preservation and enhancement of those species' populations outside SMP work sites. For impacts to populations (including partial populations) of a specific special-status serpentine plant species, compensatory mitigation will include preservation, enhancement, and management of lands that (a) already support equal or greater numbers (and health) of individuals of that species and (b) contain sufficient unoccupied habitat to allow for an increase in populations, the increase being at least equivalent to the number impacted, through habitat enhancement and management. For determining the number of individuals impacted, the highest number of individuals known to be present within the impact area (if the impact area has undergone multiple surveys) will be used to determine the magnitude of the impact.

Compensatory mitigation for impacts to high-quality serpentine communities (as discussed in Mitigation Measure BIO-3) and special-status serpentine-associated plants may occur on the same lands, provided that the conditions pertaining to special-status plant species are satisfied for each species for which mitigation is required. The HMMP that will be prepared by SCVWD to describe the measures that will be taken to enhance, manage, and monitor the mitigation lands (as discussed in Mitigation Measure BIO-3) also will include consideration of focal special-status species. For example, in addition to the measures described in Mitigation Measure BIO-3, the HMMP also will include the following:

- A summary of impacts to special-status plant populations and the proposed mitigation
- A description of measures to be undertaken if necessary to enhance (e.g., through focused management) the mitigation site for special-status species
- A description of measures to transplant individual plants or seeds from the impact area to the mitigation site, if determined by a qualified botanist to be appropriate and to have a high likelihood of success
- Proposed management activities, such as managed grazing and management of invasive plants, to maintain high-quality habitat conditions for the focal species

- A description of species monitoring measures on the mitigation site, including specific, objective goals and objectives (including enhancement of populations of focal special-status species on the mitigation site), performance indicators and success criteria (including increasing the abundance of the focal species by at least as many individuals as were impacted), monitoring methods (including sampling for the focal species), data analysis, reporting requirements, and monitoring schedule. Determining other specific performance/success criteria requires information regarding the specific mitigation site, its conditions, the biological resources present on the site, the specific plant species for which mitigation is being provided, and the specific enhancement and management measures tailored to the mitigation site and its conditions. As a result, additional specific criteria will be defined in the HMMP rather than in this SEIR. Nevertheless, the performance/success criteria described in the HMMP will guide mitigation to manage and protect high-quality serpentine habitat for, and populations of, the impacted species. The HMMP will include monitoring for non-native plant species and remediation measures in the event that such species are detected on the site.

After mitigation has been provided for impacts to special-status plant populations in a specific area from a specific year's activities, future (i.e., repetitive) impacts to that area will not require additional mitigation.

The HMMP will be provided to the USFWS for review because some of the serpentine-associated special-status species for which the HMMP will be prepared are federally listed species regulated by the USFWS. It is possible that this mitigation measure may be refined during the Section 7 consultation process with the USFWS (e.g., in the Biological Opinion covering Project effects on federally listed, serpentine-associated species), in which case the refinements required by the USFWS would be implemented.

MM BIO-4 will mitigate impacts to special-status serpentine-associated plants to less-than-significant levels by enhancing, managing, and protecting populations of these species so that the SMP does not substantially reduce the number or restrict the range of rare or endangered serpentine-associated plants or have a substantial adverse effect on special-status serpentine-associated plants.

Impact BIO-5: Impacts to Non-Serpentine Special-Status Plant Species (Significance Criteria A and B; Less than Significant with Mitigation)

Special-status plants, typically not strongly associated with serpentine communities and instead typically occurring in communities such as valley and foothill grassland and riparian woodland, are present in the Project Area (see Figure 3.3-4 and Table 3.3-~~20~~21). Thus, maintenance activities involving the removal of upland vegetation or ground disturbance could have impacts on the following special-status plant species:

- Franciscan onion (*Allium peninsulare* var. *franciscanum*)
- Bent-flowered fiddleneck (*Amsinckia lunaris*)
- Anderson's manzanita (*Arctostaphylos andersonii*)
- Brittlescale (*Atriplex depressa*)

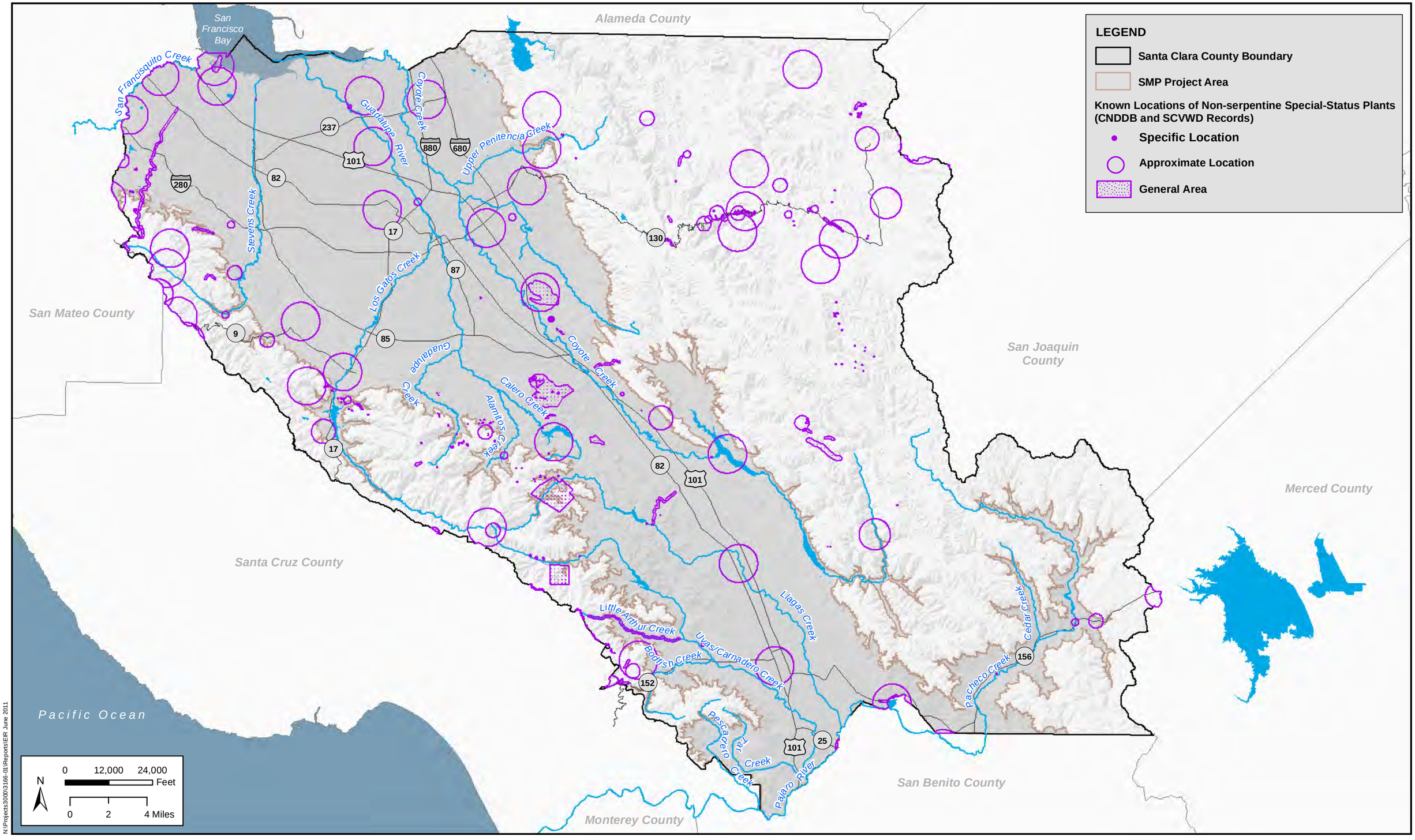

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Figure 3.3-4: Known Locations of Non-serpentine Special-Status Plants

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- Round-leaved filaree (*Erodium macrophyllum*)
- Congdon's tarplant (*Hemizonia parryi* ssp. *congdonii*)
- Santa Clara red ribbons (*Clarkia concinna* ssp. *automixa***)**
- Hospital Canyon larkspur (*Delphinium californicum* ssp. *interius*)
- Western leatherwood (*Dirca occidentalis*)
- Hoover's button-celery (*Eryngium aristulatum* var. *hooveri*)
- Satan's goldenbush (*Isocoma menziesii* var. *diabolica*)
- Showy golden madia (*Madia radiata*)
- Davidson's bush-mallow (*Malacothamnus davidsonii*)
- Hall's bush-mallow (*Malacothamnus hallii*)
- Loma Prieta hoita (*Hoita strobilina*)
- San Francisco collinsia (*Collinsia multicolor*)
- Oregon meconella (*Meconella oregana*)
- Mt. Diablo cottonweed (*Micropus amphibolus*)
- Robust monardella (*Monardella villosa* ssp. *globosa*)
- Hooked popcorn-flower (*Plagiobothrys uncinatus*)
- Saline clover (*Trifolium depauperatum* var. *hydrophilum*)

As discussed under Determination of Impacts to Special-Status Plants, proposed maintenance activities may result in direct and indirect impacts on these species as a result of trampling by personnel and equipment; soil compaction leading to damage of roots; or alteration of hydrology and mechanical, physical, or chemical removal of vegetation. Because these species generally are not associated with a single vegetation or soil type, as is the case with the serpentine-associated special-status species considered under Impact BIO-4, site-specific impacts to these species resulting from Proposed Project activities are difficult to predict. However, each of the species listed above has some potential to occur in areas where they could be adversely affected by Proposed Project activities.

Santa Clara red ribbons, Hospital Canyon larkspur, and robust monardella are each known from numerous reported occurrences in the Project Area. However, these upland species are expected to occur infrequently and in low numbers in riparian areas where Proposed Project activities would be focused. Thus, the Proposed Project likely would have an adverse affect on only a very small proportion of the regional populations of these species, and possibly most of these species would not be affected at all. Because the effects of maintenance activities are not expected to rise to the threshold of a *substantial* adverse effect on regional populations, Proposed Project impacts to these species will be less than significant.

Round-leaved filaree, Congdon's tarplant, Hoover's button-celery, Satan's goldenbush, showy golden madia, San Francisco collinsia, western leatherwood, and Mt. Diablo cottonweed are each known from only a few locations in the Project Area. As a result, little potential would exist for impacts to these species. However, any impacts on these species as a result of the Proposed Project may result in a substantial effect on the species' regional populations because of their greater rarity in the region, compared to the species discussed in the previous paragraph. Thus, this impact would be significant (Significance Criterion B). In addition, Hall's bush mallow is known to occur on the Coyote Canal Extension within an SMP work site. During surveys by SCVWD botanists in 2004 and 2008, four occurrences totaling up to 55 individuals were recorded. Canal maintenance,

particularly vegetation management, could result in the loss of these individuals. Because of the regional rarity and relatively low number of regional occurrences of Hall's bush mallow, this impact would be significant.

Occurrences of Franciscan onion, bent-flowered fiddleneck, Anderson's manzanita, brittlescale, hooked popcorn flower, Oregon meconella, and saline clover are unknown in the Project Area. However, suitable habitat for these species is present and, because of the lack of comprehensive surveys of all SMP work sites (which would be infeasible because of the extent of the Project), the possibility of occurrence of these species within a work site could not be dismissed. Because these species have not been recorded in the Project Area, possibly they would not be impacted at all. Nevertheless, any impacts to newly discovered populations of these species in the Project Area would be considered significant, as the population would represent an extension of the species' known distribution (Significance Criteria A and B). Similarly, Davidson's bush-mallow is known from the Project Area only, from three historical records dating back to 1936. Thus, any impacts to newly discovered populations of this species in the Project Area would be considered significant (Significance Criteria A and B).

SCVWD would implement pre-project planning BMPs, including limiting impacts to the minimum area required, to address the impact of Proposed Project activities on non-serpentine special-status plant species. In addition, implementation of the BMP specifically designed to protect special-status plants and sensitive communities would avoid impacts to these species through the identification and avoidance of occupied habitat. These BMPs are as follows, and a description of each is provided in Table 2-12.

Applicable Best Management Practices

BMP GEN-4: Minimize the Area of Disturbance
BMP GEN-9: Avoid Impacts to Special-Status Plant Species and Sensitive Natural Vegetation Communities

Conclusion

By implementing these BMPs, SCVWD would reduce impacts to non-serpentine special-status plants by avoiding both direct and indirect impacts to these species. However, circumstances may arise in which complete avoidance of special-status plants was infeasible. For example, unprojected maintenance activities may need to occur in areas where avoidance of occurrences was infeasible because complete avoidance could not be accomplished while still meeting the project goals for public health and safety directives. If impacts to populations or partial populations of the round-leaved filaree, Congdon's tarplant, Hoover's button-celery, Satan's goldenbush, showy golden madia, Davidson's bush-mallow, Mt. Diablo cottonweed, Franciscan onion, bent-flowered fiddleneck, Anderson's manzanita, brittlescale, hooked popcorn flower, Hall's bush mallow, Oregon meconella, or saline clover were unavoidable, such impacts would be significant (Significance Criteria A and B).

Mitigation Measure BIO-5 would be implemented to reduce impacts to non-serpentine special-status plant species to a less-than-significant level.

Mitigation Measure BIO-5: Implement Compensatory Mitigation for Impacts to Non-Serpentine Special-Status Plant Species

If Proposed Project activities result in the loss of individual non-serpentine special-status plants, other than the Santa Clara red ribbons, Hospital Canyon larkspur, western leatherwood, Hall's bush-mallow, and robust Monardella, compensatory mitigation will be provided. Before Proposed Project activities that can impact these special-status species, an SCVWD botanist will conduct a review of potential impact areas using existing data, and field verification as needed, to identify areas of potential occurrence of these species. The botanist also will conduct a pre-activity survey for special-status plants in areas where occurrence is possible. At the end of that year's maintenance period, SCVWD will determine the extent of impacts to populations of these special-status plants.

Compensation for unavoidable impacts to populations of special-status non-serpentine plants will be provided by a combination of preservation and enhancement of those species' populations outside SMP work sites. For impacts to populations (including partial populations) of a specific special-status plant species, compensatory mitigation will include preservation, enhancement, and management of lands that (a) already support equal or greater numbers (and health) of individuals of that species and (b) contain sufficient unoccupied habitat to allow for an increase in populations, the increase being at least equivalent to the number impacted, through habitat enhancement and management. For determining the number of individuals impacted, the highest number of individuals known to be present within the impact area (if the impact area has undergone multiple surveys) will be used to determine the magnitude of the impact.

SCVWD will develop an HMMP describing the measures that will be taken to enhance and manage the mitigation lands and to monitor the effects of management on the focal special-status plant species. That plan will include, at a minimum, the following:

- A summary of impacts to special-status plant populations, and the proposed mitigation
- A description of the location and boundaries of the mitigation site and description of existing site conditions
- A description of measures to be undertaken if necessary to enhance (e.g., through focused management) the mitigation site for special-status species
- A description of measures to transplant individual plants or seeds from the impact area to the mitigation site, if determined by a qualified botanist to be appropriate and to have a high likelihood of success
- Proposed management activities to maintain high-quality habitat conditions for the focal species
- A description of species monitoring measures on the mitigation site, including specific, objective goals and objectives (including enhancement of populations of focal special-status species on the mitigation site), performance indicators and success criteria (including increasing the abundance of the focal species by at least as many individuals as were impacted), monitoring methods (including sampling for the focal species),

data analysis, reporting requirements, and monitoring schedule. Determining other specific performance/success criteria requires information regarding the specific mitigation site, its conditions, the biological resources present on the site, the specific plant species for which mitigation is being provided, and the specific enhancement and management measures tailored to the mitigation site and its conditions. As a result, additional~~those~~ specific criteria will be defined in the HMMP rather than in this SEIR. Nevertheless, the performance/success criteria described in the HMMP will guide the mitigation to manage and protect high-quality habitat for, and populations of, the impacted species. The HMMP will include monitoring for non-native plant species and remediation measures in the event that such species are detected on the site.

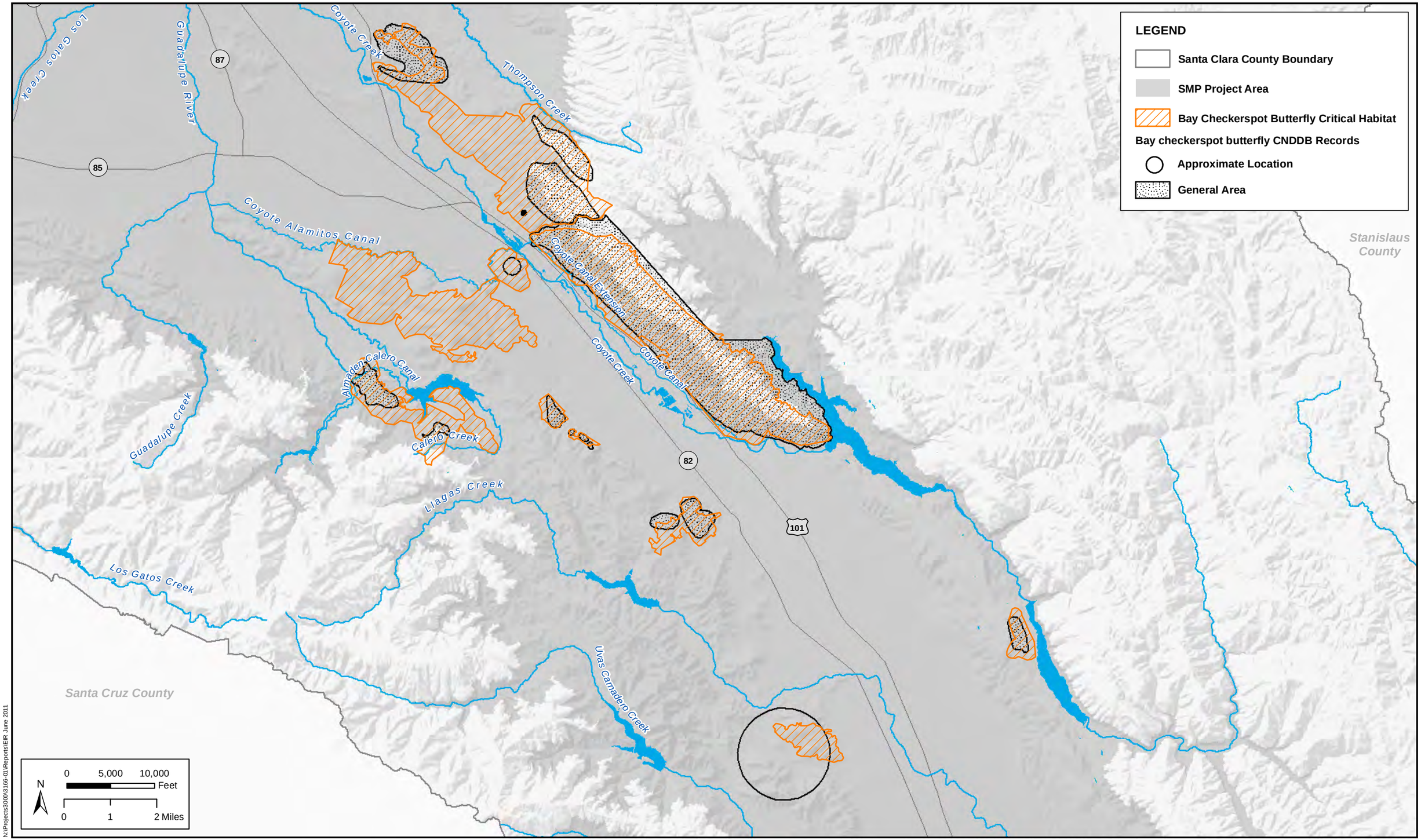
- A description of the management plan's adaptive component, including potential contingency measures for mitigation elements that do not meet performance criteria
- A description of the funding mechanism for the long-term maintenance and monitoring of the mitigation lands

After mitigation has been provided for impacts to a specific area supporting special-status species from a specific year's activities, future (i.e., repetitive) impacts to that area will not require additional mitigation.

MM BIO-5 will mitigate impacts to special-status non-serpentine plants to less-than-significant levels by enhancing, managing, and protecting populations of these species so that the SMP does not substantially reduce the number or restrict the range of rare or endangered non-serpentine plants or have a substantial adverse effect on special-status non-serpentine plants.

Impact BIO-6: Impacts to Serpentine-Associated Special-Status Invertebrates (Significance Criteria A and B; Less than Significant with Mitigation)

Serpentine-associated invertebrate species including the Bay checkerspot butterfly, Hom's micro-blind harvestman (*Microcina homi*), Jung's micro-blind harvestman (*Microcina jungi*), and Opler's longhorn moth (*Adela oplerella*) may be affected by projected activities that occurred along canals running through serpentine habitats. As was discussed for serpentine communities under Impact BIO-3, projected activities would occur in or very close to serpentine communities, primarily along portions of the Coyote Canal, Coyote Canal Extension, Coyote Alamitos Canal, and Almaden Calero Canal where high-quality serpentine communities were mapped by SCVWD botanist J. Hillman during surveys in 2004 and 2008 (Figure 3.3-2). Projected activities along Upper Silver Creek, Coyote Creek, Coyote Canal Extension, Coyote Canal, Coyote Alamitos Canal, and Almaden Calero Canal (totaling 7.58 acres) would occur within designated critical habitat for the Bay checkerspot butterfly. Because the Bay checkerspot butterfly typically occurs high on hillsides in the Project Area rather than the lower locations of these canals, impacts to occupied Bay checkerspot butterfly habitat (and individuals) in work sites would be very limited, if in fact any such impacts were to occur at all. Figure 3.3-5 indicates the distribution of the Bay checkerspot butterfly and its designated critical habitat in the Project Area.



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ECOLOGICAL CONSULTANTS

Figure 3.3-5: Bay Checkerspot Butterfly Distribution in Santa Clara County

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Furthermore, some projected activities would occur in or very close to serpentine habitats along portions of Upper Silver Creek and Coyote Creek (Figure 3.3-2). No high-quality serpentine communities were identified in work sites during SCVWD's surveys. As a result, the Bay checkerspot butterfly would be unlikely to occur in such areas, and a low probability exists that the other serpentine-associated invertebrate species (i.e., Hom's micro-blind harvestman, Jung's micro-blind harvestman, and Opler's longhorn moth) would be present in these areas.

Proposed Project activities in serpentine habitat may include spot-removal of sediment plugs from the canals themselves, vegetation management along the tops and inboard sides of the levees/roads immediately adjacent to canals, vegetation management activities within the canal, and animal conflict management. As described under *Determination of Impacts to Wildlife and Fisheries*, these activities could result in the direct mortality or injury of special-status invertebrates associated with serpentine communities.

Suitable habitat for the Bay checkerspot's larval and adult food plants (i.e., dwarf plantain, purple owl's-clover, and exserted paintbrush) occurs in upland areas along the edges of the canals, and in and along the canal-side levee roads. In particular, dwarf plantain can be locally abundant in disturbed areas such as levees. Thus, these species may be impacted by people or equipment moving along the sides of the canals during access to canal work sites, or by activities that focused on the maintenance of the canal-side roads and levees, such as mowing, herbicide application, and animal conflict management.

Equipment use, vehicle traffic, and worker foot traffic along canals may result in the injury or mortality of serpentine dependent invertebrates including the Bay checkerspot butterfly (larvae and pupae) and its host plants (e.g., physically breaking, crushing, wilting, or uprooting plants and damaging their roots as a result of soil disturbance by heavy equipment). Additionally, butterflies and their host plants may suffer injury or mortality as a result of vegetation clearing for access roads and staging areas. Impacts to Opler's longhorn moth would be similar, although because the two harvestman species typically occur in or under rocks, Proposed Project activities likely would have little effect on these species.

As discussed for serpentine communities under Impact BIO-3, SMP Update activities are projected to impact up to 5.04 linear miles of canal within high-quality serpentine communities. Assuming (conservatively) that areas up to 20 feet on either side of the canal could be impacted, projected activities could impact up to 24.43 acres of high-quality serpentine communities. Although special-status, serpentine-associated invertebrates may occur in only a subset of this area, some potential would exist for impacts to populations of these species throughout that area.

SCVWD would implement several measures to address the impact of Proposed Project activities on serpentine-dependent special-status animal species, including pre-project planning BMPs to minimize the area of disturbance. Implementation of the BMPs specifically designed to protect sensitive natural communities and to avoid impacts to the Bay checkerspot butterfly and its critical habitat would avoid or minimize impacts to these species by the identification and avoidance of serpentine habitat and serpentine-dependent special-status species. These BMPs are as follows, and a description of each is provided in Table 2-12.

Applicable Best Management Practices

BMP GEN-4: Minimize the Area of Disturbance
BMP GEN-9: Avoid Impacts to Special-Status Plant Species and Sensitive Natural Vegetation Communities
BMP GEN-10: Avoid Impacts to Bay Checkerspot Butterfly and Associated Critical Habitat
BMP GEN-21: Staging and Stockpiling of Materials

Conclusion

By implementing these BMPs, SCVWD is expected to be able to reduce impacts to serpentine-associated special-status species. Nevertheless, the Proposed Project may result in residual impacts to special-status serpentine-associated invertebrates and their habitats because complete avoidance could not be accomplished while still meeting the project goals for public health and safety directives. This impact would be significant because of the regional rarity of these species (Significance Criteria A and B). Implementation of Mitigation Measure BIO-6 would reduce this residual impact to a less-than-significant level. Implementation of Mitigation Measure BIO-3 for serpentine plant communities and Mitigation Measure BIO-4 for serpentine-associated special-status plant populations would help to reduce impacts to special-status serpentine-associated invertebrates by providing compensation for impacts to high-quality occurrences of the communities in which these special-status species typically occur. However, Mitigation Measure BIO-6 still would be necessary to assure mitigation specific to the special-status invertebrate species that were impacted was provided. Mitigation Measure BIO-6 would be implemented to reduce the impact to serpentine-associated special-status invertebrates to a less-than-significant level.

Mitigation Measure BIO-6: Implement Compensatory Mitigation for Impacts to Serpentine-Associated Special-Status Invertebrates

SCVWD will compensate for its impacts to populations and habitat of serpentine-associated special-status invertebrates through the preservation and management of serpentine communities as described for Mitigation Measure BIO-3. The procedures for identifying impacts to potential habitat of these species will occur as described for serpentine communities under Mitigation Measure BIO-3. Mitigation lands will be preserved and managed as described for Mitigation Measure BIO-3 as well, with the qualification that for any impacts to high-quality serpentine communities within Bay checkerspot butterfly critical habitat, the compensatory mitigation lands also must be in Bay checkerspot critical habitat. The management and monitoring of mitigation lands, as described in the HMMP, will include measures specifically targeting the Bay checkerspot butterfly, which will serve as a proxy for the other special-status invertebrates.

The HMMP will be provided to the USFWS for review because one of the serpentine-associated special-status species (Bay checkerspot butterfly) for which this HMMP will be prepared is a federally listed species regulated by the USFWS. It is possible that this mitigation measure may be refined during the Section 7 consultation process with the USFWS (e.g., in the Biological Opinion covering Project effects on the Bay checkerspot butterfly), in which case the refinements required by the USFWS would be implemented.

MM BIO-6 will mitigate impacts to serpentine-associated special-status invertebrates to less-than-significant levels by enhancing, managing, and protecting populations of these species so that the SMP does not substantially reduce the number or restrict the range of rare or endangered serpentine-associated invertebrates or have a substantial adverse effect on special-status serpentine-associated invertebrates.

Impact BIO-7: Loss of Ordinance Trees (Significance Criterion F; Less than Significant with Mitigation)

For the purposes of the SMP Update, unless an agreement between SCVWD and a municipality states otherwise, ordinance trees are defined based on the applicable local ordinance. Often, ordinance trees must meet a minimum size requirement. However, some ordinances are not size-based but species based (e.g., all oaks) and, in some cases, no distinction is made between native and non-native species. Ordinance-sized trees are common in many of the riparian habitats along the creeks that are maintained by SCVWD, and they are present in some non-instream areas as well. In addition to providing riparian functions and values, as described in the habitats section above, larger trees are particularly valuable because they provide the highest-quality nesting sites for raptors, they may contain cavities that serve as roost sites for bats or nesting/denning sites for other animals, they provide large amounts of coarse woody debris to the stream ecosystem, and they promote high foliage height diversity, which in turn increases the local diversity of birds. They also provide important shading and aesthetic values. As a result of their high value, such trees are protected by local ordinances of Santa Clara County and a number of municipalities within SCVWD's jurisdictional area. Thus, these trees merit special consideration in assessing impacts of the Proposed Project.

Removal of all hazard trees and trees greater than 12 inches dbh is not included in the SMP Update. As a result, few ordinance trees are likely to be impacted by Proposed Project activities. Nevertheless, vegetation management and bank stabilization activities associated with the Proposed Project may result in the removal of ordinance trees, and some potential would exist for all Proposed Project activities indirectly to affect the health of ordinance trees through herbicide application or damage to roots resulting from the movement of heavy equipment.

SCVWD would implement a pre-project planning BMP, limiting impacts to the minimum area required, to address the impact of Proposed Project activities on ordinance trees. This BMP is as follows; a description of this BMP is provided in Table 2-12.

Applicable Best Management Practices

BMP GEN-4: Minimize the Area of Disturbance

Conclusion

Implementation of BMP GEN-4 would minimize the loss of ordinance trees, but complete avoidance of these trees may not be practicable. In the absence of mitigation measures, this impact would be significant in accordance with Significance Criterion F. When direct removal of ordinance trees by SCVWD could not be avoided, Mitigation Measure BIO-7 would be implemented to reduce residual impacts to a less-than-significant level.

Mitigation Measure BIO-7: Tree Replacement

The SCVWD will replace ordinance trees as follows. As discussed under Mitigation Measure BIO-2, removal of trees sized 6-12 inches dbh will be mitigated through the individual planting of replacement trees. Section 5.5 in Appendix C (*Mitigation for Tree and Shrub Removals 6–12 inches dbh*) provides a specific tree appraisal and evaluation protocol to determine how replacement planting should occur. The protocol in Section 5.5 of Appendix C will involve carefully assessing targeted tree removals for their existing conditions and functions, including their canopy cover, local area value, ecosystem benefits, and ecosystem detriments. Using a cumulative ranking method, tree replacement mitigation ratios for removed trees (6-12 inches dbh) will occur at either 1:1, 2:1, or 3:1 (replacement tree to removed tree), depending on the overall quality and function of the removed tree. Therefore, if any trees 6-12 inches dbh that are removed are ordinance trees (depending on the locality in which tree removal occurs), then mitigation will be provided as described in Section 5.5 of Appendix C.

It is possible that this mitigation measure may be refined during the permitting process by the USACE, CDFG, or RWQCB, in which case the refinements required by these agencies would be implemented.

MM BIO-7 will mitigate impacts to ordinance trees to less-than-significant levels by replacing trees that are removed so that the SMP does not conflict with the provisions of local tree ordinances.

Impact BIO-8: Impacts on Steelhead (Significance Criteria A, B, and E; Less than Significant with Mitigation)

The federally listed steelhead, including both the Central California Coast (CCC) steelhead and the South-Central California Coast (SCCC) steelhead, rely on adequate flows, water temperatures, water depths, and velocities; appropriate spawning and rearing substrates (e.g., riverbed gravels); and availability of instream cover and food for survival and reproduction in the creeks of the Project Area. Proposed maintenance activities may significantly alter these conditions and result in the direct injury or mortality of these fish as generally described under *Determination of Impacts to Wildlife and Fisheries*.

Effects of bank stabilization on steelhead would depend largely on their use of the affected reach, the existing (pre-stabilization) condition of the bank, and the stabilization methods that were employed. For example, along reaches used solely for fish passage between spawning/rearing locations and San Francisco Bay, bank stabilization activities would be unlikely to have a substantial impact regardless of the stabilization methods employed. Conversely, bank stabilization activities within spawning or rearing habitat, or upstream from such habitats, may have more substantial effects on steelhead and their habitats. Replacement of a natural or "soft" bank, especially one supporting riparian vegetation, with "hard" substrate such as concrete or riprap that was not conducive to riparian revegetation would be likely to result in an adverse effect on steelhead habitat. In contrast, replacement of a hardened bank with softer stabilization methods, especially those that enhanced instream complexity, would result in a considerable net benefit to steelhead by increasing habitat complexity and enhancing refugia, pool-riffle complexes, and rearing habitat. SCVWD would prioritize the use of soft stabilization methods that provided these

benefits. Bank stabilization also could lead to degradation of habitat through the loss of undercut banks.

The extent of potential impacts to steelhead and their habitat resulting from bank stabilization activities is difficult to quantify, because stabilization activities cannot be projected and because the magnitude of the impact of stabilization would depend on the type of repair method used and the location of the repair project. However, the extent of bank stabilization work that is expected to occur in steelhead habitat would be relatively low, based on SMP activities conducted since 2002. Between 2002 and 2010, ~~(approximately~~ less than 1 mile of bank stabilization work per year has occurred throughout the Project Area, including non-steelhead streams~~)~~. SCVWD's records indicate that less than 20 percent of this bank stabilization work occurred in unmodified channels, which likely provide the highest-quality habitat for steelhead. Furthermore, SCVWD expects that no more than half of the bank repairs during the period 2012–2022 to consist of impervious hardscape bank stabilization work. As a result, and because of the potential long-term benefits of bank stabilization to steelhead habitat described above, little long-term adverse impact to steelhead habitat is expected to occur as a result of 2012–2022 bank stabilization activities.

Before work within an active channel that contains water, the reach would be dewatered. By implementing BMP GEN-15, fish would be relocated from streams supporting steelhead to minimize mortality and implementing BMP GEN-1 would limit in-channel activities to the period when steelhead would be least likely to be present. As a result, no adult steelhead are expected to be present in work sites when dewatering and fish relocation occur; and thus, no adults would be impacted by the maintenance activity or relocation. However, fry and juveniles may be present, especially if maintenance activities occurred near spawning or rearing habitat. During capture and relocation, fry and juveniles may be subjected to stress, injury, or mortality associated with netting, electrofishing, temporary captivity, and release into the relocation site. SCVWD fish relocation activities for the SMP from 2002–2009 resulted in a steelhead mortality rate of 0.9 percent (SCVWD 2002–2004, 2006–2009). Although the relocation sites would be carefully selected by SCVWD fisheries biologists based on criteria specified in the *Fish Relocation Guidelines*, some potential would exist for changes in temperature or water chemistry between the capture and release site, or densities of predators or competitors at the release site, to result in increased stress, injury, or mortality as well. Although the benefits of steelhead relocation would far outweigh the complete loss of individuals that would occur if fish were not relocated before dewatering took place, relocation could still result in adverse effects.

The main impact to steelhead resulting from sediment removal would be the removal of spawning gravel. Because projected 2012–2022 sediment removal activities would include some higher-elevation reaches where steelhead would be likely to spawn, such as in the Guadalupe River watershed, adverse effect of sediment removal on steelhead may occur because of the removal of gravel. Gravel removal would reduce the extent and availability of potential spawning habitat, and possibly rearing habitat, in the short term by removing existing spawning habitat and in the long term by reducing gravel supply within a creek.

Bank stabilization and sediment removal activities often necessitate the operation of heavy equipment within the stream bed (after dewatering). Movement of heavy equipment may compact the substrate, potentially killing benthic invertebrates (which may serve as prey

for steelhead), embedding gravel within finer sediments, and otherwise altering habitat for fish and their prey.

The locations where projected sediment removal would overlap steelhead habitat can be predicted and are shown in Figure 3.3-6. Sediment removal is projected to occur along approximately 12.61 miles of steelhead bearing streams from 2012–2022, with 11.34 miles in the Santa Clara Basin (thus affecting CCC steelhead) and 1.27 miles in the Pajaro Basin (thus affecting SCCC steelhead). Table 3.3-~~10~~11 summarizes the length of each steelhead-accessible creek in which sediment removal has been projected from 2012–2022. Although Figure 3.3-6 depicts the stream reaches in which sediment removal is projected, not every linear mile indicated as "projected" would actually undergo sediment removal. As explained in Chapter 2, *Project Description*, a "work area percentage" has been applied to some reaches in which only a certain percentage of the reach would undergo sediment removal. Table 3.3-~~10~~11 takes the "work area percentage" into account. As a result, the linear miles of sediment removal in Table 3.3-~~10~~11 represent only a certain percentage (the "work area percentage") of the projected work areas shown in Figure 3.3-6.

Table 3.3-~~10~~11. Projected Sediment Removal Work on Streams Supporting Steelhead, 2012–2022

Creek/River	Work Areas from 2002–2012, also projected for 2012–2022 (miles)	New Work Areas for 2012–2022 (miles)	Total Work Areas for 2012–2022 (miles)
Central California Coast Steelhead			
San Francisquito Creek	0.00	0.01	0.01
Stevens Creek	0.80	0.04	0.84
Guadalupe River/Creek	1.15	5.83	6.98
Alamitos Creek	0.01	0.31	0.32
Coyote Creek	0.00	2.64	2.64
Upper Penitencia Creek	0.01	0.42	0.43
Los Gatos Creek	0.00	0.08	0.08
Calero Creek	0.00	0.04	0.04
Subtotal	1.97	9.37	11.34
South-Central California Coast Steelhead			
Uvas/Carnadero Creek	0.00	0.04	0.04
Llagas Creek	0.38	0.84	1.22
Bodfish Creek	0.00	0.01	0.01
Subtotal	0.38	0.89	1.27
Total	2.35	10.26	12.61

Source: Data compiled by Horizon Water and Environment in 2011 based on information from SCVWD

Riparian vegetation serves a number of important roles for steelhead that would be altered by projected vegetation management activities, as discussed previously. However, Casagrande (2010), studying steelhead in Uvas Creek, found that steelhead grew much more quickly, and thus were much larger by their first winter, at less shaded, somewhat warmer sites, which had higher prey abundance compared to densely shaded, cooler sites. Casagrande verified that invertebrate biomass was considerably higher at less heavily shaded sites than under a dense forest canopy. His findings confirm those of other studies that demonstrate greater stream productivity (Murphy et al. 1981, Bilby and Bisson 1992, Quinn et al. 1997, Ambrose et al. 2004) and greater salmonid production (Wilzbach et al. 1986, 2005, Nislow and Lowe 2006) along reaches with lower canopy closure and higher light levels. Fish sampling by SCVWD in reaches below dense canopy has found very low densities of fish (of any species), apparently as a result of very low food densities (M. Moore, unpublished data). Therefore, thinning of vegetation as a result of the Proposed Project's vegetation management component may have benefits to steelhead, by increasing prey abundance in areas that are currently heavily shaded. In addition, larger steelhead tend to have higher winter survival, and thus the availability of conditions that would contribute to rapid growth, especially in the first year, could benefit steelhead populations considerably.

Vegetation management activities also would include the application of herbicides, as discussed above. Herbicides have the potential to result in impacts on steelhead as a direct effect on the survival, reproduction, and growth of individual steelhead, as well as indirect effects, such as reduction of the prey base or modification of their habitat. However, such effects would be minimized by SCVWD, using herbicide formulations approved for aquatic environments and adhering to state and federal regulations concerning herbicide use, as well as implementing SCVWD's BMPs.

USEPA has conducted ecological risk assessments to determine the potential risks of labeled uses of several herbicides, including three proposed for use by SCVWD (glyphosate, pendimethalin, and triclopyr) on Pacific salmonids. Evaluated herbicides proposed for use by SCVWD are as follows, with a summary of USEPA's effects determination:

- Glyphosate: for all uses with application rates of 5 pounds of active ingredient/acre or less, use results in no effect on the Central California Coast or South-Central California Coast steelhead. For application rates above 5 pounds active ingredient/acre, the pesticide may affect but is not likely to adversely affect these ESUs.
- Pendimethalin: no effect on the Central California Coast or South-Central California Coast steelhead.
- Triclopyr: may affect but is not likely to adversely affect the Central California Coast or South-Central California Coast steelhead.

SCVWD would use a surfactant to enhance the performance of herbicides. Surfactants aid the ability of a herbicide to penetrate the surface of vegetation, by increasing its ability to spread over vegetation, stick to foliage, and penetrate thick cuticles. Most aquatic herbicides either require or highly recommend the use of a surfactant to achieve reasonable levels of control. In instances where surfactants are absent from the tank mix, the level of control often is reduced. A reduction in control causes a greater return

frequency, which translates to more herbicide being used in the system and more frequent disturbance to the site.

In general, aquatic species (e.g., fish and amphibians) are more susceptible to adverse effects than terrestrial wildlife because of the potential for surfactants to alter cell permeability, thus increasing the potential for absorption of chemicals through their thin, moist skin. Some surfactants, particularly those that are nonylphenol-based, have been documented to result in chemical-induced lethargy and unconsciousness in fish, which can result in an increased risk of predation as well as cause estrogenic effects (Smith et al. 2004, USFS 2007). However, SCVWD proposes to limit surfactant use to the products that are documented to have the least toxic effect on aquatic life, Agri-dex and Competitor. Both of these surfactants are oil-based (Competitor is vegetable oil-based while the primary ingredient in Agri-dex is a paraffin-based oil) and function by increasing the absorption of herbicides through plant tissues. They are especially useful in increasing the penetration of herbicides through the bark of woody brush or tree stems (Bakke 2007). A study on the toxicity of surfactants to juvenile rainbow trout concluded that Agri-dex was less toxic to rainbow trout than two other commonly used surfactants, R-11 and LI 700 (Smith et al. 2004), and the *2006 Supplemental Environmental Assessment of NOAA Fisheries Implementation Plan for the Community Based Restoration Program* (NOAA 2006) concluded that was among the surfactants least toxic to marine and aquatic organisms (it is unknown whether Competitor was assessed).

The use of these pesticides and surfactants according to existing label directions and the California Department of Pesticide Regulation PRESCRIBE database, which provides information consistent with USEPA's Interim Measures Bulletins for Protection of Endangered Species for user-selected sites and pesticides, would minimize direct adverse effects on steelhead. However, herbicide use still could result in type conversion of riparian and wetland vegetation types, reduction in cover associated with vegetation, and modification of prey base for steelhead.

Vegetation management also is projected in the SMP Update. Therefore, the locations where projected vegetation management would overlap steelhead habitat can be predicted; these locations are shown in Figure 3.3-7 for instream herbicide application, Figure 3.3-8 for non-instream herbicide application, and Figure 3.3-9 for other vegetation management methods, such as hand removal, pruning, and mowing. Tables 3.3-~~11~~12, 3.3-~~12~~13, and 3.3-~~13~~14 summarize the length of each steelhead-accessible creek in which instream herbicide application, non-instream herbicide application, and manual vegetation management, respectively, are projected from 2012–2022.

Although Figures 3.3-7, 3.3-8, and 3.3-9 depict the stream reaches in which vegetation management activities are projected, not every linear mile indicated as "projected" in these figures would actually be subject to vegetation management. As explained previously, a "work area percentage" has been applied to some reaches in which only a certain percentage of the reach would undergo certain management activities. Tables 3.3-~~11~~12, 3.3-~~12~~13, and 3.3-~~13~~14 take the "work area percentage" into account, and thus the linear miles of sediment removal in these tables represent a subset of the projected work areas shown in the corresponding figures.

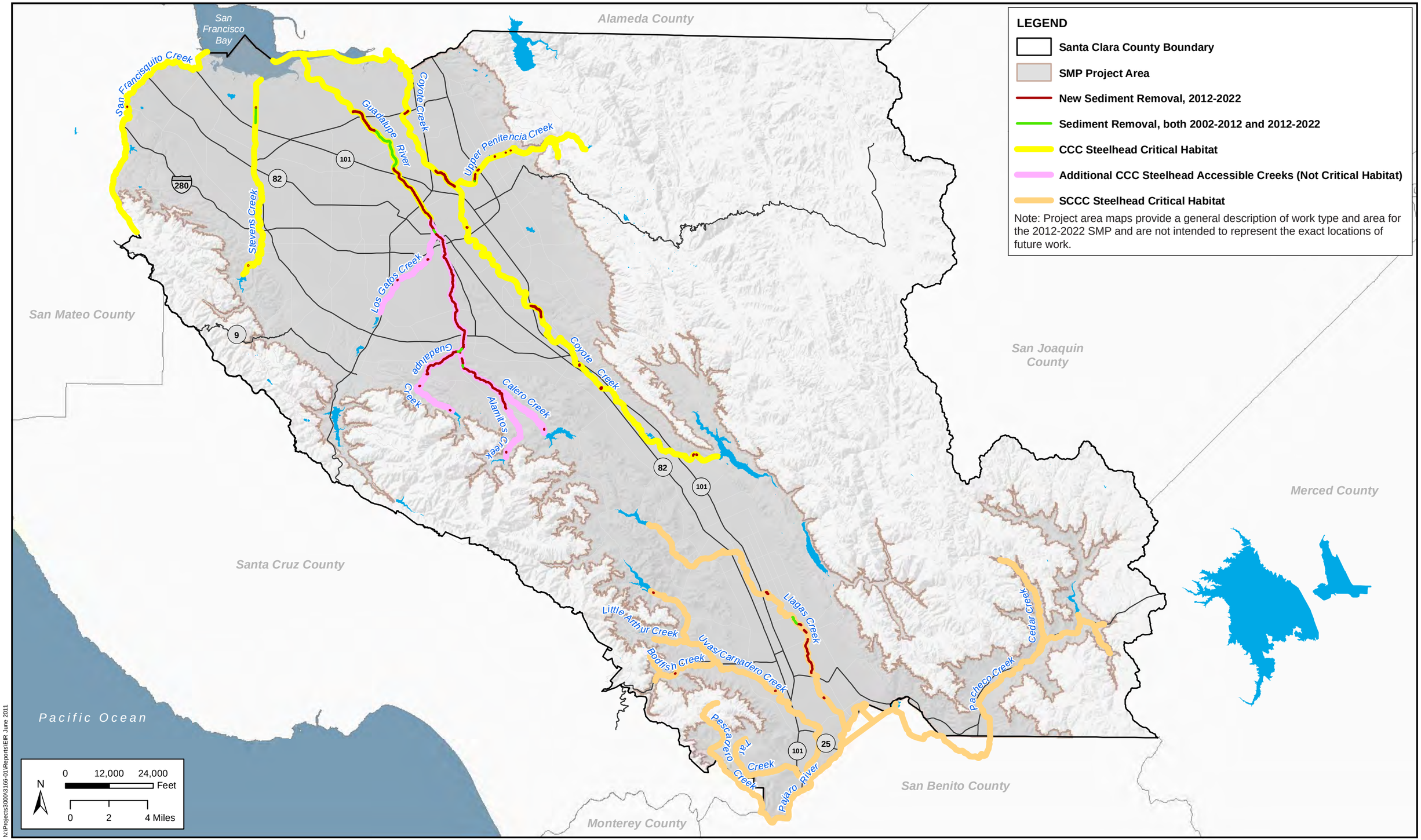

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Figure 3.3-6: Projected Sediment Removal, 2012-2022, along Steelhead Streams

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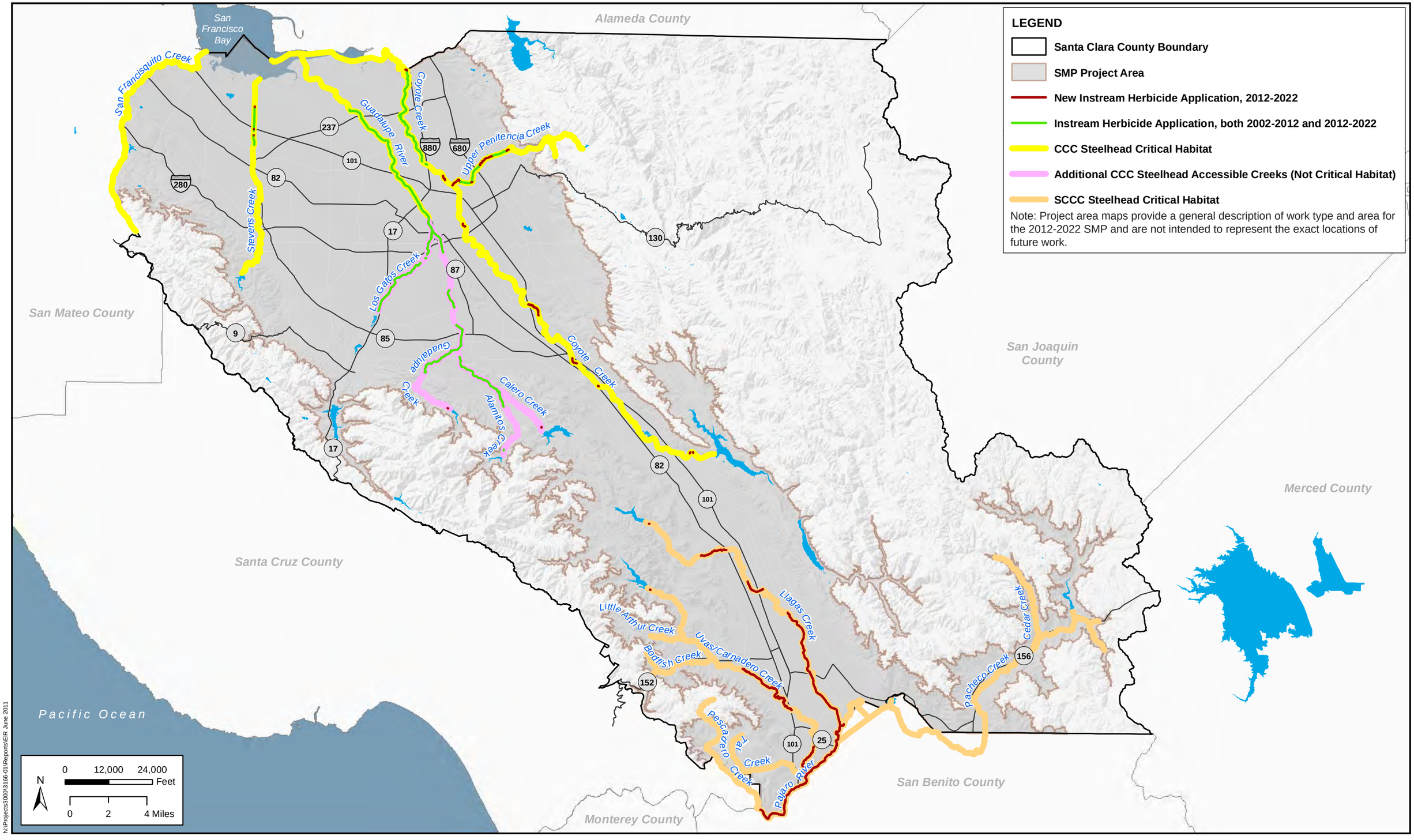

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Figure 3.3-7: Projected Instream Herbicide Application, 2012-2022, along Steelhead Streams

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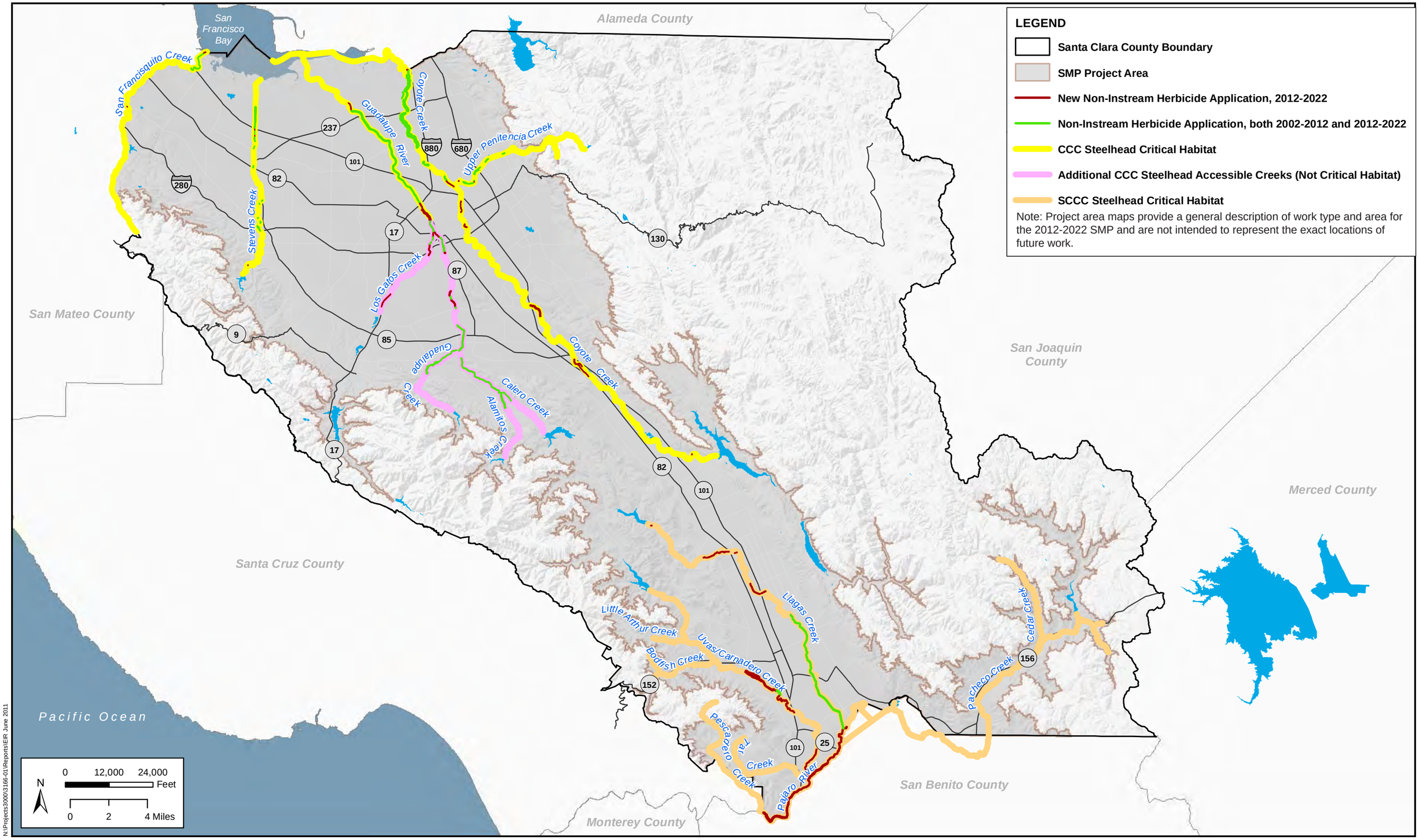

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Figure 3.3-8: Projected Non-Instream Herbicide Application, 2012-2022, along Steelhead Streams

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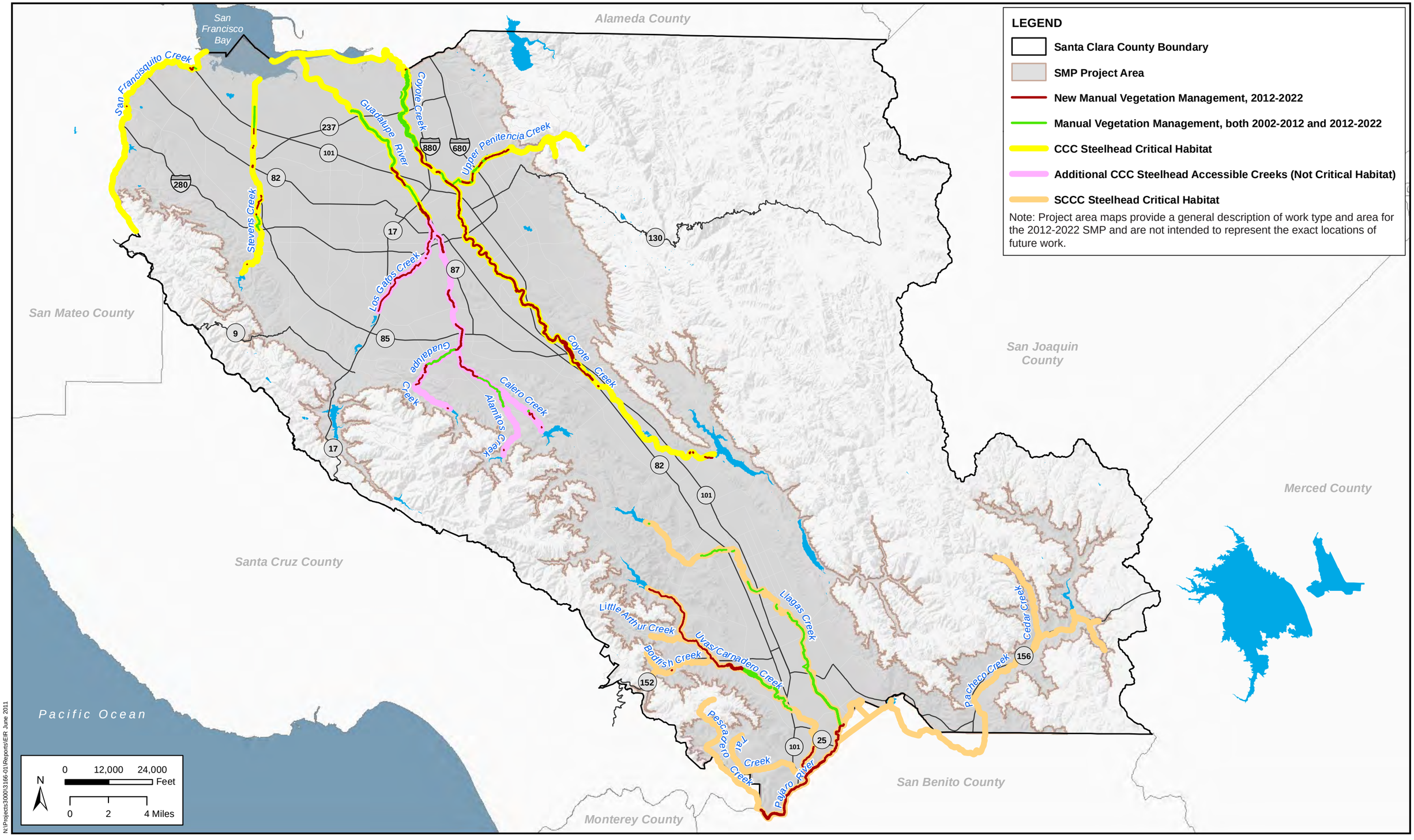

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Figure 3.3-9: Projected Manual Vegetation Management, 2012-2022, along Steelhead Streams

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The Project Area contains designated critical habitat for both the CCC and SCCC steelhead (Figure 3.3-6). Stream maintenance activities would result in both adverse and beneficial effects on designated critical habitat, as described above for steelhead habitat in general. Specifically, Proposed Project activities would impact the primary constituent elements (PCEs) of critical habitat involving freshwater spawning, rearing, and migration habitat for both populations, as well as estuarine habitats of the Central California Coast steelhead.

SCVWD would implement a variety of BMPs to avoid and minimize impacts to steelhead and their habitats. These BMPs are listed below and described in Table 2-12.

Table 3.3-~~11~~12. Projected Instream Herbicide Application Work on Streams Supporting Steelhead, 2012–2022

Creek/River	Work Areas from 2002–2012 Period Also Projected for 2012–2022 (miles)	New Work Areas for 2012–2022 (miles)	Total Work Areas for 2012–2022 (miles)
Central California Coast Steelhead			
Stevens Creek	0.08	<0.01	0.08
Guadalupe River	0.34	0.00	0.34
Los Gatos Creek	0.29	0.00	0.29
Guadalupe Creek	0.12	0.04	0.16
Alamitos Creek	0.24	0.00	0.24
Coyote Creek	0.17	0.19	0.36
Upper Penitencia Creek	0.24	0.18	0.42
Calero Creek	0.00	0.04	0.04
Subtotal	1.48	0.45	1.93
South-Central California Coast Steelhead			
Pajaro River	0.00	0.42	0.42
Uvas/Carnadero Creek	0.00	0.33	0.33
Llagas Creek	0.00	1.80	1.80
Subtotal	0.00	2.55	2.55
Total	1.48	3.00	4.48

Source: Data compiled by Horizon Water and Environment in 2011 based on information from SCVWD

Table 3.3-~~12~~13. Projected Non-Instream Herbicide Application Work on Streams Supporting Steelhead, 2012–2022

Creek/River	Work Areas from 2002–2012 Period Also Projected for 2012–2022 (miles)	New Work Areas for 2012–2022 (miles)	Total Work Areas for 2012–2022 (miles)
Central California Coast Steelhead			
San Francisquito Creek	1.31	0.13	1.43
Stevens Creek	1.44	0.06	1.50
Guadalupe River	8.96	1.99	10.95
Los Gatos Creek	0.01	0.23	0.24
Guadalupe Creek	2.36	0.00	2.36
Alamitos Creek	3.35	0.00	3.35
Coyote Creek	5.42	1.94	7.36
Upper Penitencia Creek	1.49	0.02	1.51
Calero Creek	0.64	0.01	0.65
Subtotal	24.98	4.38	29.35
South-Central California Coast Steelhead			
Pajaro River	0.00	0.17	0.17
Uvas/Carnadero Creek	0.32	1.77	2.09
Llagas Creek	7.14	1.15	8.29
Subtotal	7.46	3.09	10.55
Total	32.44	7.47	39.90

Source: Data compiled by Horizon Water and Environment in 2011 based on information from SCVWD

Table 3.3-~~13~~14. Projected Manual Vegetation Management Work on Streams Supporting Steelhead, 2012–2022

Creek/River	Work Areas from 2002–2012 Period Also Projected for 2012–2022 (miles)	New Work Areas for 2012–2022 (miles)	Total Work Areas for 2012–2022 (miles)
Central California Coast Steelhead			
San Francisquito Creek	0.19	0.04	0.23
Stevens Creek	1.15	0.02	1.17
Guadalupe River	5.30	5.01	10.31
Los Gatos Creek	0.00	1.43	1.43
Guadalupe Creek	1.90	0.89	2.79
Alamitos Creek	1.52	1.72	3.24
Coyote Creek	4.99	3.27	8.26
Upper Penitencia Creek	0.56	0.23	0.79
Calero Creek	0.05	0.07	0.12
Subtotal	15.66	12.68	28.34
South-Central California Coast Steelhead			
Pajaro River	0.00	0.42	0.42
Uvas/Carnadero Creek	2.12	0.27	2.39
Llagas Creek	7.43	0.00	7.43
Bodfish Creek	0.00	0.01	0.01
Subtotal	9.55	0.70	10.25
Total	25.21	13.38	38.59

Source: Data compiled by Horizon Water and Environment in 2011 based on information from SCVWD