2014-2023 Stream Maintenance Program Manual

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SCVWD
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2014 – 2023 STREAM MAINTENANCE PROGRAM MANUAL

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ACB	Articulated Concrete Blocks
ACHP	Advisory Council on Historic Preservation
AIS	Aerial Information Systems
ANI	Management of Animal Conflicts Best Management Practice
ANSI	American National Standards Institute
ASR	Annual Summary Report
BA	Biological Assessment
BANK/BANK_X	Bank Protection Best Management Practice
BCDC	Bay Conservation and Development Commission
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
BMP	Best Management Practice
BO	Biological Opinion
CAS#	Chemical Abstracts Service
CC /CCC	Central Coast/Central California Coast
CCM	Cellular Concrete Mats
CCR	California Clapper Rail
CCR	California Code of Regulations
CDFA	California Department of Food and Agriculture
CDFW	California Department of Fish and Wildlife
CDPR	California Department of Pesticide Regulation
CEO	Chief Executive Officer
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CIP	Capital Improvement Project
Cm	centimeter
CNDDB	California Natural Diversity Data Base
CNPS	California Native Plant Society
CSSC	California Species of Special Concern
CWA	Clean Water Act
DBH	Diameter at Breast Height

DFW	Department of Fish and Wildlife
EA	Environmental Assessment
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
ESA	Endangered Species Act
F&G	Fish and Game
FE	Federal Endangered
FEIR	Final Environmental Impact Report
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FMP	Fisheries Management Plan
FONSI	Finding of No Significant Impact
FP	Fully Protected
Fps	Feet per second
FSEIR	Final Subsequent Environmental Impact Report
FT	Federal Threatened
FWCA	Fish and Wildlife Coordination Act
GEN	Pre-project Planning and General Best Management Practice
GIS	Geographic Information System
HM-X	Pesticide Best Management Practice
HWY	Highway
IAWG	Interagency Working Group
IECA	International Erosion Control Association
IPMP	Invasive Plant Management Program
ISA	International Society of Aboriculture
ITP	Incidental Take Permit
Lbs	Pounds
LOS	Level of Service
LTMS	Long-Term Management Strategy
LWD	Large Woody Debris
MBTA	Migratory Bird Treaty Act
MG	Maintenance Guideline
MMPA	Marine Mammal Protection Act
MOA	Memorandum of Agreement
MRP	Municipal Regional NPDES Permit
MSA	Magnuson-Stevens Fishery Conservation and Management Act
N/A	Not Applicable
NEPA	National Environmental Policy Act
NGO	Non-Governmental Organization
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration

NPDES	National Pollution Discharge Elimination System
NPW	Notice of Proposed Work
NRHP	National Record of Historic Places
OHG	Overhanging Growth
OHW	Ordinary High Water
OHWM	Ordinary High Water Mark
PBO	Programmatic Biological Opinion
pH	Hydrogen Concentration
PMA	Previously Mitigated Area
QEMS	Quality Environmental Management System
RCD	Resource Conservation District
RD	Road
REVEG-X	Revegetation Best Management Practice
RGP	Regional General Permit
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SC	State Candidate
SCCC	South Central California Coast
SCV	Santa Clara Valley
SCVWD	Santa Clara Valley Water District
SCWA	Sonoma County Water Agency
SDR	Sediment Deposition Reaches
SE	State Endangered
SED / SED-X	Sediment Removal Best Management Practice
SF	San Francisco
SFEIR	Subsequent Final Environmental Impact Report
SMHM	Salt Marsh Harvest Mouse
SMP	Stream Maintenance Program
SMP-1	Stream Maintenance Program 2002-2013
SMP-2	Stream Maintenance Program 2014-2023
SP	State Protected
SPD	Standard Operating Procedures for Determination (of Mitigation Ratios, ACOE)
Sq ft	Square feet
SR	State Rare
SRA	Shaded Riverine Aquatic
Ssp	Subspecies
ST	State Threatened
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load
UC	University of California
UPRR	Union Pacific Railroad
US	United States
USACE/ACOE	U.S. Army Corps of Engineers

USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Fish and Wildlife Service
USFWS	United States Fish and Wildlife Service
UTC	United Technologies
Var	variety
VEG-X	Vegetation Best Management Practice
VHP	Valley Habitat Plan
WDR	Waste Discharge Requirements
WPCP	Water Pollution Control Plant

GLOSSARY OF SIGNIFICANT TERMS

100-Year Flood	Flood of a magnitude with an expected recurrence of once in 100 years. Synonymous with 1 percent flood.
Adaptive Management	A dynamic process that recognizes that the future cannot be perfectly predicted. In response to imperfect predictions, planning and management strategies are modified as better information becomes available. It is a continuous improvement process whereby monitoring and analysis of the results of past actions are fed back into the current decision-making process.
Anadromous	A term used to describe the life history characteristics where fishes move from saltwater to freshwater to lay eggs. The juvenile fish then move from freshwater to saltwater to grow and mature.
Annual Work Plan	The stream maintenance work indentified through field inspections. Specific information, such as location, size, and type of work activity is provided in the Annual Work Plan.
Appurtenant Structures	Structures, such as storm outfalls, stream gages, trash racks, flap gates, tide gates, vaults, bridges, wing walls, and headwalls that are associated with channels
Aquatic Vegetation	Plants growing in water.
Avoidance	Strategies for the planning, design, maintenance, and operation of District facilities which avert environmental impacts.
Bank Stabilization	Bank stabilization involves any action by the District to repair and prevent erosion of stream banks.
Bank Repair	Maintenance of banks that are eroding or are unstable.
Bankfull	The river elevation (stage) at which time the most effective geomorphic work occurs. This is also referred to as the dominant discharge and is the stage that generally corresponds to a flow event with a 1-2 year recurrence interval.
Bankfull Elevation	The point where the normal channel meets the floodplain, the elevation at the top of the channel banks.

Bed	The bottom of a body of water, such as a stream.
Bench	A flat or sloped area adjacent to a stream channel (also known as a terrace).
Berm	A raised area of earth acting as a temporary or permanent levee.
Best Management Practice (BMP)	An activity, procedure, or other standard management and work practice that provides the most effective means of preventing or reducing pollution or other negative environmental consequences. BMPs are incorporated into project activities to avoid and minimize environmental impacts.
Biotechnical	A method of bank stabilization emphasizing the incorporation of soft structures (e.g., vegetation). See "Soft Structures."
Box Culvert	A water channel in the shape of a rectangular concrete box.
Bypass Structures	On construction sites, a generic term for any type of structure(s) used to pond water and convey it around a work site (e.g., cofferdams, bypass pipes, channels).
California Environmental Quality Act (CEQA)	The California Environmental Quality Act is California Public Resources Code Sections 21000 et seq. CEQA establishes a duty for public agencies to avoid or minimize environmental damage where feasible, recognizing that a public agency has an obligation to balance a variety of public objectives, including economic, environmental, and social factors. CEQA is intended to facilitate the disclosure of the significant environmental effects of proposed activities to decision-makers and the public, the identification of ways to avoid or reduce environmental damage, and the prevention of environmental damage by requiring the implementation of feasible alternatives or mitigation measures.
Capital Improvement Project CIP)	For the purposes of the Stream Maintenance Program, a large flood control construction project that affects the flood conveyance capacity of the stream. These projects are not considered routine stream maintenance.
Channel	Creeks and canals. A natural stream that conveys water; a ditch or channel excavated for the flow of water. The area where water is concentrated to flows across the landscape. Channels include creeks, ditches, and

	canals, but does not include culverts, pipes, and other closed structures.
Channel Stabilization	Any action by the District to repair and prevent scouring or downcutting of stream beds..
Clean Water Act	Federal Water Pollution Control Act of 1973.
Co-dominant	Equal in size and relative importance, usually associated with either the trunk/stems or scaffold limbs/branches in the crown (Matheny and Clark 1994).
Compensatory Mitigation	The restoration, creation, enhancement, or preservation of resources to replace those resources impacted by maintenance activities.
Culvert	Any covered structure not classified as a bridge, which conveys a waterway under a road or other area.
Cut-Stump Treatment	Elimination of woody vegetation by cutting at ground level and treating the cambium, or outer most plant tissue, with a concentrated, systemic herbicide.
Debris Basin	A depression formed by the construction of a barrier or dam built at a suitable location to retain rock, sediment, plant material, and the like, which can be conveyed along steep hillside streams during high flows. Usually placed in hillside areas where access is better for removing sediment, generally prior to entering urbanized reaches (see also “Sediment Basin”).
Degradation	Process of a channel lowering its elevation through increased erosion, channel bed scour, or down-cutting. A type of fluvial geomorphic instability.
Design Capacity	The amount of water a channel was planned to carry.
Design Flood	The maximum calculated discharge intended to be conveyed in the design of a capacity-constructed channel. The maximum level of flood protection used as a design criterion in the design of a constructed or improved channel or waterway.
Diameter at Breast Height (dbh)	A tree trunk diameter is measured by the standard diameter at breast height (dbh) or approximately 4.5 feet above ground level.
Drop Structure	A structure designed to convey flows over a vertical distance from a higher to a lower elevation.

Emergency A situation is considered an “emergency” if it is a sudden, unexpected occurrence involving a clear and imminent danger that demands immediate action to prevent or mitigate loss of or damage to life, health, property, or essential public services (Public Resource Code Section 21060.3).

Enhancement The manipulation of a site or feature to heighten, intensify, or improve the resource. Enhancement results in a selective gain in function and or value. Enhancement does not result in a gain in resource area.

Environmental Impact Report (EIR) A document prepared under CEQA to describe a project that has impacts on the environment which requires a public agency to make findings and if feasible to mitigate those impacts.

Ephemeral Creek that only flows for short periods of time during or immediately following a rain event.

Erosion The detachment and movement of soil and rock fragments by water and other geological agents, which results in the wearing away of the land. When water is the eroding agent, erosional processes include sheet and rill erosion, gully erosion, and channel erosion.

Establishment Creation. The manipulation of a site to develop resource functions and values that did not previously exist at a site. Establishment results in a gain in resource area.

Fish Ladders A structure to enable fish traveling upstream, against the flow of water, to span a large vertical distance in a series of gradual steps. Used at dams or other in-stream barriers.

Flood Capacity The flow or volume of water a channel can carry. Capacity is dependent on cross-sectional area and frictional components (e.g., channel vegetation).

Flood Control Facility For the purposes of the Stream Maintenance Program, any watercourse, whether natural or man-made, in which water does or may flow and which is under ownership or controlled by the District for flood control purposes.

Floodplain The relatively flat area extending from the top of a creek bank away from a creek which may be inundated occasionally during high water events.

Fluvial Pertaining to rivers.

Habitat The area with a combination of resources and environmental conditions that promotes occupancy of a

	given species and allows those individuals to survive and reproduce.
Habitat Conservation Plan (HCP)	Plans under the Endangered Species Act (ESA) negotiated between the federal government and private landowners or state and local governments. These plans are designed to allow landowners to receive a federal permit to unintentionally harm listed species in the course of completing projects. In exchange for a permit, landowners agree to pursue specific management protections for threatened and endangered species.
Hard Structures	A type of bank stabilization structure incorporating rock, rip rap, sack concrete, mattresses, or concrete.
Hardscape	Concrete, rock, gabions, or other permanent, hard surface channel or bank treatment. Refers to designs that utilize predominantly hard structures and are generally incapable of supporting vegetation (see “Softscape,” “Hybrid” and bank stabilization table).
Hazard Tree	The combination of a failure of a tree or part of a tree with the presence of an adjacent target. A hazard does not exist if there will not be an impacted target. Excluded from SMP coverage.
Herbaceous Vegetation	Non-woody vegetation which includes grasses, broadleaf weeds, cattails, bulrushes, annuals, biennials, and perennials.
Herbicide	A chemical agent used to kill plants or inhibit plant growth.
Hybrid	For purposes of the SMP Update, refers to bank stabilization projects that consist of a combination of hard and softscape (see “Hardscape,” “Softscape,” and bank stabilization table).
Hydraulic	Of or pertaining to the scientific or technical study of the static and dynamic behavior of fluids. Fluvial hydraulics is an engineering discipline geared toward the physics of water flow in channels—its volume, velocity, and elevation, in space and time. Hydraulic analysis is typically used to determine discharge capacity and to assess the effects of channel vegetation on channel capacity.
Hydrology	Hydrology is the science (or study) of water in the environment with a focus on the circulation and distribution of water as expressed in the hydrologic cycle or water balance.

Hydroseed	A process for revegetation of areas with plant seeds. Often mixed with fertilizer, straw mulch, a binding agent, and green dye.
Impact	See “Significant Environmental Impact.” A strong effect of an action that leads to a change of condition.
Impervious Hardscape	Paved areas such as streets and sidewalks, other developed areas, or bank stabilization methods which are impenetrable to water.
In-channel	For the purposes of SMP-2, in-channel is the: inboard levee toe to the opposite inboard levee toe; where there is not a levee, inboard toe of the stream, ordinarily associated with “channel bottom”; or below bankfull. See Glossary cross-section diagram.
Invasive Plant	A plant species that may reproduce rapidly and has the ability to spread aggressively outside its natural range.
Invasive Species	A plant or animal that aggressively spreads outside its native range.
Invert	The lowest point of the internal cross section of a pipe, culvert, or channel; the elevation of the bottom of the channel (see “instream”).
Lateral Branch	A limb or secondary trunk of a tree or shrub arising from a larger limb or trunk.
Levee	An embankment constructed to prevent a river or stream from flowing across adjacent lands.
Listed Species	A species that is formally designated as endangered or threatened or rare by the state or federal Endangered Species Acts.
Low-Flow Channel	A section of stream that carries the more frequent, periodic streamflows.
Maintenance Guidelines	Engineering standards developed for each District flood control facility that will give guidance on maintenance requirements for flood control capacity. The guidelines may include design information, historical information, or special requirements for a reach of channel.
Mean High Water (MHW)	In San Francisco Bay, there are two high tides each day, usually with different elevations. Mean High Water is defined as the average height of both of these two tides.

Mitigation	Action taken by the District to fulfill CEQA/NEPA permit requirements and court-mandated mitigation to avoid, minimize, rectify, or reduce adverse environmental impacts, or to compensate for the impact(s) by replacing or providing substitute resources or environments.
Modified Channel	A waterway in which channels have been substantially altered from historical conditions.
Modified Channel With Ecological Value	A Modified Channels with Ecological Values type includes channels significantly altered from historical conditions but also having features such as closed canopy riparian woodland, and/or being known to support special-status species.
Multi-Stem	A tree or shrub with a root ball and multiple trunks or stems. This may occur at ground level or several feet above ground.
Natural Flood Protection	A multiple-objective approach to providing environmental quality, community benefit and protection from creek flooding in a cost effective manner through integrated planning and management that considers the physical, hydrologic, and ecologic functions and processes of streams within the community setting.
Non-Native Vegetation	Any vegetation that, under natural conditions, does not originate within the ecosystem in which it is found
Non-Jurisdictional	Areas outside permitting authority of a resources agency.
Obstruction	Material or objects which impede a facility from operating appropriately.
Ordinary High Water (OHW)	In non-tidal area, the highest level of water in a channel reached by commonly experienced flows. Defines the limit of the U.S. Army Corps of Engineers jurisdiction.
Outfall	The end of a pipe or culvert that delivers local drainage into a creek. Features associated with an outfall structure may include erosion control materials, such as rip rap t or an energy dissipater below the culvert. A flap gate, may also be part of the outfall structure.
Policy	Statement by the Board of Directors describing a condition or course of action.
Post-Emergent Herbicide	A herbicide designed to control target plant material after it has sprouted or following a dormant period. Post-emergents control plants by disrupting various growth mechanisms.

Pre-Emergent Herbicide	A herbicide designed to control target plant material prior to germination. Pre-emergents are applied to the soil surface to prevent germination and growth of seeds in the upper soil strata.
Preservation	The setting aside of existing site to protect or prevent a decline of a resource through legal or physical mechanisms. Preservation does not result in a gain of resource area or function.
Preventive Maintenance (PM)	Work conducted before conditions change to avoid facility degradation.
Program	A program is a series of actions that can be described at a general level of detail. Programs include agency plans, policies, or regulatory programs.
Project Area	The area within the District that is subject to routine maintenance. The SMP area contains the creeks and channels below the 1000 foot elevation contour.
Protocols	An established set of ground rules or procedures governing routine stream maintenance activities.
Reach	A subdivision of a drainage system consisting of a discrete portion of a channel.
Re-establishment	Manipulation of a site with the goal of returning natural/historic functions. Re-establishement results in rebuilding former resources and results in a gain in resource area and function.
Regrowth	The growth of vegetation following the trimming or removal.
Rehabilitation	Manipulation of a site with the goal of repairing natural/historic functions. Rehabilitation results in a gain in resource function, but does not result in a gain in resource area.
Repair	For the purposes of the Stream Maintenance Program, repair refers to maintenance of bank stabilization structure with in-kind and/or in-place materials.
Restoration	The returning of the natural/historic functions and values to a former or degraded site. Restoration includes both re-establishment and rehabilitation.
Revetment	A term used to describe any number of hard structures used in bank stabilization.

Riprap	Loose rock or concrete of varying size, typically brought to a site. Used to protect channel banks from scouring forces.
Riparian	Located along the edge of a channel, generally on the floodplain. Characterized by access to and influence of the channel, but not in it. A riparian zone or riparian area is the interface between land and a river or stream
Riparian Corridors	Refers to a biological zone dominated by riparian vegetation immediately next to a channel.
Riparian Vegetation (or Habitat)	Riparian habitat is composed of the trees and other vegetation and physical features normally found on the stream banks and flood plains associated with streams, lakes, or other bodies of water. (http://www.wcb.ca.gov/Riparian/)
Rootwad	A tree stump (dead or alive) with attached roots.
Routine Stream Maintenance	Routine stream maintenance includes four major activities, as follows: (1) sediment removal activities that are designed to restore the flood capacity of existing District channels or associated features (e.g., tide gates), (2) vegetation management in and around the District's channels, including removal of vegetation for access and fire control, (3) bank stabilization activities necessary to protect District or other facilities, and (4) management of animal conflicts. Routine stream maintenance also includes more minor maintenance activities, such as trash removal; fence work; access road maintenance; repair of structures with in-kind materials within the same footprint (such as replacement of concrete linings, culverts, pipes, valves, or similar structures); cleaning and minor sediment removal at stream gages, outfalls, flap gates, tide gates, fish ladders; and graffiti removal.
Ruderal	Vegetation containing mostly introduced, weedy herbaceous species; "disturbance loving" species. Common in disturbed areas, along roadsides or vacant lots.
Runoff (Surface)	The flow of water across the land surface and in stream channels. Occurs only after the local storage capacity or infiltration rate of the landscape has been exceeded and includes both overland flow and streamflow.
Salmonid	Any member of the fish family Salmonidae.
Scour	The clearing and digging action of flowing air or water, especially the downward erosion caused by steam water in

removing material (e.g., soil, rocks) from a channel bed or bank or around in-channel structures.

Secondary Channel For purposes of the SMP, secondary channels are constructed features of a main channel that are designed with flood conveyance or maintenance purposes. These channels often have maintenance requirements that are different than the main channel and are therefore specifically managed and reported separate from the main channel.

Section 404 Refers to a section of the Clean Water Act establishing a permit program for the discharge of dredged or fill materials into Waters of the United States.

Sediment Particles derived from rocks or biological materials that have been transported by a fluid, or solid material suspended in or settled from water.

Sediment Basin A depression formed by the construction of a barrier or dam built at a suitable location to retain rock, sand, gravel, silt, or other material. In SCVWD, these basins also are commonly called “Debris Basins.”

Sediment Load The sediment that is in transport. Load is a general term that refers to material in suspension and/or transport. It is not synonymous with discharge.

Sediment Removal The act of removing sediment deposited within a stream.

Sensitive Habitat A general term used to characterize habitats that either support sensitive species (listed species, species proposed for listing, and species of special concern) or are designated as a sensitive natural community in local or regional plans, policies, regulations, or by the CDFG or the U.S. Fish and Wildlife Service.

Sensitive Species A general term for plants or animals on a state or federal threatened, endangered or rare species lists , species proposed for listing, and species of special concern.

Shaded Riverine Aquatic Habitat (SRA) The aquatic area occurring along the edge of a channel where the adjacent bank is composed of natural materials and supports riparian vegetation that overhangs or protrudes into the water and filters or blocks direct sunlight into the water.

Shear Stress The force tending to cause deformation of a material by slippage along a plane or planes parallel to the imposed stress.

Shrub	Woody plant smaller in height than a tree (less than approximately 16 feet [5 meters] at maturity.
Significant Rainfall	Local rainfall 0.5 inches or greater within a 24-hour period in the subject watershed.
Soft Structures	A type of bank stabilization structure incorporating biological materials, such as seeds, plants, plant parts (e.g., root wads), or a combination of vegetation and inert materials (e.g., brush mats/sills, wattles, fascines, or branch packing/layering).
Softscape	Earth channel or levees, either natural or modified. Also refers to “soft forms of bank stabilization” such as root wads, log structures, etc. (see “hardscape,” “hybrid,” and bank stabilization table.
Spawning Gravel	Rocks and pebbles deposited in stream beds that are just the right size for anadromous fish to move about as they lay their eggs.
Station	Station is a standard channel location system. Distances are measured from the mouth of creeks or from the confluence of a tributary heading upstream. Distance is measured in feet,. For example, station 43+56 would be a point 4,356 feet upstream from the mouth of the channel.
Stewardship	To entrust the careful and responsible management of the environment and natural resources to one’s care for the benefit of the greater community.
Stream	For the purposes of the Stream Maintenance Program, “streams” are defined as the natural watercourses and modified channels within the District’s jurisdiction. In this Program, streams include both the waterway and its immediate geographical corridor, including riparian corridors.
Stream Maintenance Program	The policies, methods, processes, documents and activities associated with routine management and repair of streams reaches under the jurisdiction of the Santa Clara Valley Water District and below 1000 ft.
Stream Maintenance Project	For the purposes of the Stream Maintenance Program, a project is the whole of a set of routine stream maintenance actions that are along the same channel reach. A project has a specific location, duration, and purpose.
Streambed	The part of a stream over which a column of water moves.

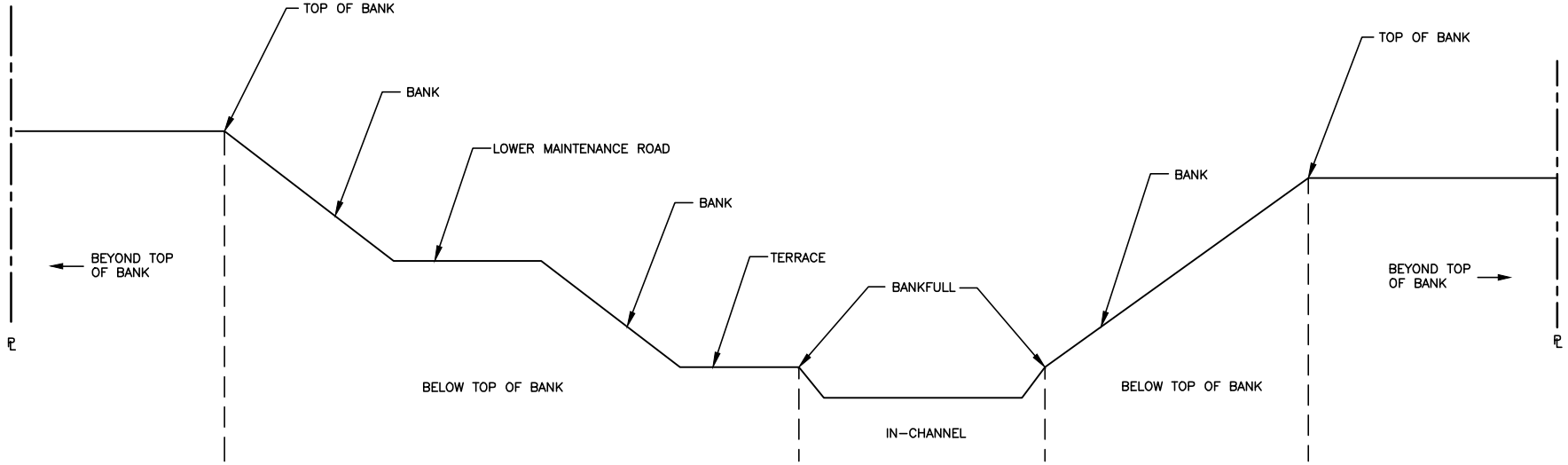
Sudden Oak Death	Sudden Oak Death is the common name of a disease caused by *Phytophthora ramorum*. The disease kills oak and other species of tree.
Surfactants	A shorthand term for surface-active agent, which are chemicals that modify surfaces of two liquids or a liquid and a solid. In the context of the Stream Maintenance Program, surfactants are used in combination with herbicides to increase the retention and penetration of herbicides on and into plants.
Take (of a Listed Species)	To harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect a listed species or its habitat, or to attempt to engage in any such activity.
Terrace	A flat or slightly sloped area adjacent to a stream channel
Thalweg	Main channel in the creek.
Toe	The base of a slope.
Tree	A woody plant that typically has one dominant vertical trunk and a height greater than approximately 16 feet (5 meters) in its natural form.
Trimming	The removal of branches of a plant, usually a woody perennial.
Turbidity	The cloudiness of water, caused by suspended sediment. Turbidity is measured by the degree to which light penetration is blocked because the water is muddy or cloudy.
Unavoidable Impact	An unavoidable impact would occur if specific economic, social, legal, technical, or other considerations make mitigation measures or alternatives for the impact of a project infeasible. When such impacts are considered "significant," to support its decision on a project for which an EIR was prepared, a Lead Agency must prepare written findings the identify that either: (1) changes to the project are within another agency's jurisdiction and have been or should be adopted, (2) specific economic, social, legal, technical, or other considerations make mitigation measures or alternatives infeasible (State CEQA Guidelines Section 15091). In addition, the Lead Agency must adopt a Statement of Overriding Considerations which describes how the benefits of the project outweigh the unavoidable adverse environmental effects (State CEQA Guidelines Section 15092, 15096(h)).

Unmodified Channel	Channels that generally are unchanged from historic conditions. Unmodified channels may have small areas of modification, including bridges, outfalls, culverts, gauges, or other appurtenant structures.
Unvegetated	Areas containing either no, or only ruderal, vegetation.
Upland	Areas above the normal reach of streams or rivers and characterized by non-wetland vegetation.
Upper Watershed	Generally, the steeper portion of a watershed, above reservoirs and above urban areas.
Velocity	Speed with which water flows in a channel.
Vegetation Management/Removal	Removal of vegetation in and adjacent to creeks to maintain the ability of channels to function as flood control facilities. In addition, vegetation is removed to meet local fire code requirements and to reduce combustible weeds and grasses on property adjacent to the streams within the District's jurisdiction. The control of invasive non-native vegetation is another purpose for which the District undertakes vegetation control. Vegetation management can be accomplished through mowing, hand pruning, hand removal, or herbicide applications (depending on the environmental conditions of the site).
Waste Discharge Requirement	A legal mechanism of the state and regional Water Quality Control Boards to regulate discharges of dredge or fill materials.
Waters of the United States	Tidal waters, all interstate waters, including wetlands, and all other waters including tributaries to streams and rivers which could involve interstate or foreign commerce.
Watershed	Entire area that drains to a common stream, synonymous with drainage area
Weir	A dam, wall, screen, or other structure in a waterway for the purpose, diverting, screening, or measuring water.
Wetlands	Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetland is characterized by having the appropriate plant species (dependant on or capable of surviving root saturation), the appropriate hydrology (predictable saturation), and soils reflecting saturation and periodic anaerobic conditions.

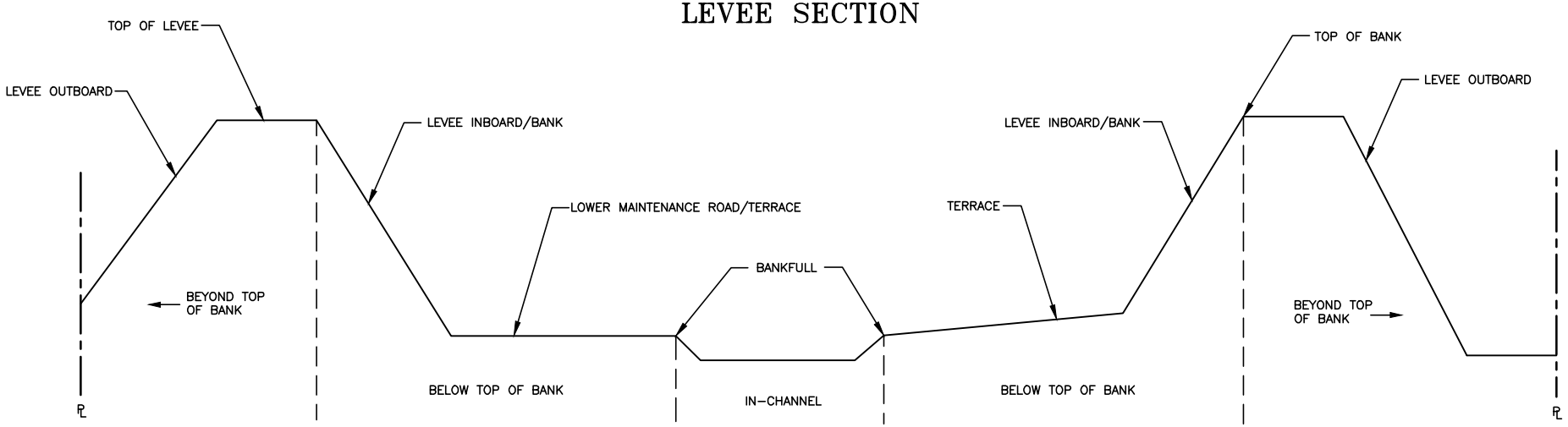
Winterization	Winterization is the process to temporarily or permanently close a work site and prepare it for winter storm flows.
Woody Vegetation	Live vegetation having a stiff trunk or branch structure that is inflexible and does not bend over in flows. Typical vegetation types include trees and large shrubs.
Work Sites	The locations where maintenance activities occur.

LATERAL CROSS-SECTIONS FOR SMP-2
(NOTE: CHANNELS WILL NOT ALWAYS DISPLAY ALL CHARACTERISTICS)

NO LEVEE SECTION



LEVEE SECTION



CHAPTER 1: INTRODUCTION

The Santa Clara Valley Water District (District or SCVWD) is the largest multi-purpose water supply, watershed stewardship and flood management special district in California. The SCVWD serves nearly two million people in Santa Clara County by providing a reliable and safe supply of water; enhancing streams and watersheds through creek restoration and habitat protection; providing flood protection for homes, schools and businesses; and partnering with other agencies to provide trails, parks and open space for community recreation.

As the primary water resources agency for Santa Clara County, the SCVWD encompasses all of the county's 1,300 square miles, providing services to the cities of Campbell, Cupertino, Gilroy, Los Altos, Los Altos Hills, Los Gatos, Milpitas, Monte Sereno, Morgan Hill, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga and Sunnyvale as well as the unincorporated areas of the county.

The SCVWD's multiple purposes enable it to use a comprehensive regional approach to water resources management and environmental protection that would not be possible if its services were fragmented among several agencies. The SCVWD's Board of Directors (Board) has developed policies that establish the SCVWD's mission as well as goals and outcomes to be achieved for the good of the public. The mission of the SCVWD is to:

Provide Silicon Valley with safe, clean water
for a healthy life, environment, and economy.

The SCVWD's Ends Policies describe the accomplishments that the Board wants to achieve for its customers. These include projects that will continue to provide a safe, reliable source of water; flood control management; and environmental stewardship. The Chief Executive Officer (CEO) directs SCVWD staff in interpreting these policies and aligns resources to carry them out.

The Stream Maintenance Program (SMP or Program) provides the framework that balances effective and efficient maintenance of SCVWD's waterways with anticipated impacts on the environment. This balanced approach enables the SCVWD to fulfill its mission within the SMP's environmental parameters.

The SMP is a long-term and ongoing SCVWD program, initially developed in 2001 to define and improve the management and maintenance of flood control channels and streams under the SCVWD's authority. The SMP establishes programmatic guidance for the SCVWD's routine facility maintenance activities to facilitate avoidance and minimization of environmental impacts. The SMP also provides the organizational framework to oversee routine maintenance activities, keeping the Program compliant with the terms and conditions of its permits.

The SMP Manual is updated periodically by the SCVWD, in collaboration with the permitting agencies, to address permitting renewals, environmental conditions, or changing maintenance needs. The SMP Manual defines the overall maintenance program and describes the authorized maintenance activities, regulatory framework, annual maintenance planning process, impact avoidance measures, best management practices (BMPs), mitigation activities, and program management actions. This updated 2014 SMP Manual provides current information about maintenance activities, work locations, impact avoidance measures, and mitigation approaches. Agency-specific terms and conditions for SMP implementation are described in the Program

permits. The SMP permits should be consulted for additional information regarding agency-specific requirements, particularly those pertaining to notification and compensatory mitigation requirements, including mitigation monitoring, success criteria, and reporting.

The SMP Manual is intended for use by SCVWD maintenance staff, engineers, and resource managers, as well as by environmental regulatory agency staff and other watershed stakeholders. The SMP Manual provides a description of the activities that will be conducted as part of the Program, as permitted by the relevant regulatory agencies.

The SMP and Final Environmental Impact Report that were adopted in 2001 (2001 FEIR) used a 20-year planning horizon to evaluate cumulative impacts. This 2013 SMP Manual addresses the second 10-year period of the Program (from 2014 through 2023) and wholly replaces the previous Program Summary Requirements and supporting documents. The evaluation of SMP environmental impacts for the second 10-year period was addressed through a Final Subsequent Environmental Impact Report (FSEIR), developed in compliance with the California Environmental Quality Act (CEQA) and certified by the SCVWD's Board in 2012.

The SMP is envisioned to be flexible, subject to periodic revisions that reflect improved understanding of resource conditions, maintenance technologies, and management practices over time.

This introductory chapter describes the Program's goals, objectives, and principles, general activities, work history, and work area.

1.1 Goals and Objectives

1.1.1 Program Goals

The SMP activities are designed to meet two primary Program goals.

1. Maintain the flow conveyance capacity of SCVWD channels and facilities, and

2. Maintain the structural and functional integrity of SCVWD facilities.

The SCVWD aims to maintain the flow conveyance capacity of a channel, creek, or other flood management facility to the designed conveyance capacity. In the event that a facility does not have a designed capacity or the designed capacity is unknown or uncertain, then the SCVWD maintains the channel, creek, or facility to an appropriate capacity to reduce the risk of flooding. Section 3.6, Maintenance Guidelines, provides additional information about the criteria and thresholds that the SCVWD will use to determine when maintenance is necessary.

1.1.2 Program Objectives

The following objectives will be used to meet the Program goals:

1. Remove sediment for flow conveyance and safety while maintaining the habitat functions of creek systems;

2. Manage vegetation for flow conveyance and safety while maintaining the habitat functions of the creeks, channels, and other SCVWD facilities, and to allow levee inspections and maintenance access;

3. Stabilize stream and channel beds and banks to protect existing infrastructure, maintain public safety, reduce sediment loading, protect water quality, and protect habitat values; and

4. Avoid, minimize, or mitigate impacts on the environment by identifying when maintenance work is necessary and incorporating stream stewardship measures to further reduce potential impacts and enhance conditions where possible.

1.2 Program Principles

SMP principles are to be followed so that natural resources are protected to the maximum extent feasible during all work conducted under the SMP. Program-specific BMPs have been developed to implement these principles. A list of the BMPs is provided in Attachment F. The SMP principles also are to be used to identify and prioritize work activities and guide maintenance work decision-making. The SMP principles are framed to address Program objectives and comply with the SCVWD's Ends Policies (Section 1.3).

Principle 1: The District will implement all SMP activities according to the methods and protocols described in the 2013 Program Manual, 2012 FSEIR, the SMP-2 permits, and other Program supporting documentation.

Principle 2: The District's decisions regarding the necessity of sediment removal and vegetation management activities will be made to restore established or calculated channel flow capacities. Maintenance Guidelines (Section 3.6) will be used to direct sediment removal and vegetation management activities according to specific thresholds and criteria. Where Maintenance Guidelines have not yet been updated or developed, sediment and vegetation management activities will follow the criteria and thresholds identified in Chapter 3, Maintenance Planning and Impact Avoidance.

Principle 3: The District will implement measures to avoid or minimize impacts on natural resources, including native species and their habitats.

Principle 4: The District will perform all maintenance activities in a manner that lessens impacts on the natural flora, fauna, and aquatic resources while meeting Program objectives.

1.3 Ends Policies (Board of Directors Established)

E-1 Mission and General Principles

The mission of the District is to provide Silicon Valley safe, clean water for a healthy life, environment, and economy.

Maintenance of the creeks under the SMP is an integral part of the mission, which combines work needed for comprehensive and efficient management within the context of environmental requirements.

E-2 Water Supply: There is a reliable, clean water supply for current and future generations.

Goal 2.1 Current and future water supply for municipalities, industries, agriculture and the environment is reliable.

Objective 2.1.1 Aggressively protect groundwater basins from the threat of contamination and maintain the groundwater basins for reliability.

Objective 2.1.2 Protect, maintain, and develop local water.

E-3 Natural Flood Protection: There is a healthy and safe environment for residents, businesses, and visitors, as well as for future generations.

Goal 3.1 Natural flood protection for residents, businesses and visitors.

Objective 3.1.1 Balance environmental quality and protection from flooding in a cost effective manner.

Objective 3.1.2 Preserve flood conveyance capacity.

E-4 Water Resources Stewardship: There is water resources stewardship to protect and enhance watersheds and natural resources and to improve the quality of life in Santa Clara County.

Goal 4.1 Healthy creek and bay ecosystems.

Objective 4.1.1 Balance water supply, flood protection and environmental stewardship functions.

Objective 4.1.2 Improve watersheds, streams, and natural resources.

Objective 4.1.3 Promote awareness of creek and bay ecosystem functions.

Goal 4.2 Clean, safe water in creeks and bay.

Objective 4.2.1 Preserve or improve surface and ground water quality for beneficial uses.

Objective 4.2.2 Promote awareness of water quality and stream stewardship.

Goal 4.3 Improved quality of life in Santa Clara County through trails, open space and water resources management.

Objective 4.3.1 Support additional trails, parks and open space along creeks and in the watersheds when reasonable and appropriate.

Objective 4.3.2 Reduce greenhouse gas emissions when reasonable and appropriate.

The SMP is intended to authorize routine work needed to preserve flood conveyance capacity. The SMP integrates the guiding principal of protective resource management directly into its activities. Program elements are designed to avoid, minimize, or mitigate potential impacts in balance with the need to conduct work in streams to carry out the District's mission.

1.4 Program Overview

1.4.1 General Applicability

The SMP applies to all of the SCVWD's routine stream maintenance activities. These activities are grouped into five categories: vegetation management, sediment removal, bank stabilization, management of animal conflicts, and minor maintenance.

Routine stream maintenance is defined as the SCVWD's generally anticipated and expected annual work activities, as described in this Manual and the 2012 FSEIR. As further described in Chapter 3, Maintenance Planning and Impact Avoidance, routine stream maintenance includes activities and procedures that are conducted to the SCVWD's standards, performed regularly and often repeatedly. Routine maintenance activities occur within the SMP Program area (Figure 1-1) below the 1,000-foot elevation contour and along approximately 800 miles of creek and related facilities. Routine activities may include a wide variety of levels of work, based on annual rainfall, stream flow, and growth of vegetation. Infrequently, maintenance activities may occur on sites other than those owned by the SCVWD; such work would be authorized by the SCVWD's Board to achieve the goals of this Program.

The SCVWD developed maintenance activity projections for the 2002–2012 and 2014–2023 Program periods to estimate activity types, work site locations, work site sizes, and the frequency for anticipated maintenance activities. The activity projections were developed by an interdisciplinary SCVWD team who were familiar with and responsible for conveyance requirements of the creeks. The 2014–2023 maintenance activity projections were used as a basis to evaluate potential environmental impacts for the 2014 SMP activities that are permitted within the Program area, as long as they do not result in significant environmental effects substantially different than those evaluated for the Program as a whole, described in the 2012 FSEIR. Chapter 2, Environmental Agencies and Regulatory Framework, describes the Program's regulatory framework and permitting requirements in detail.

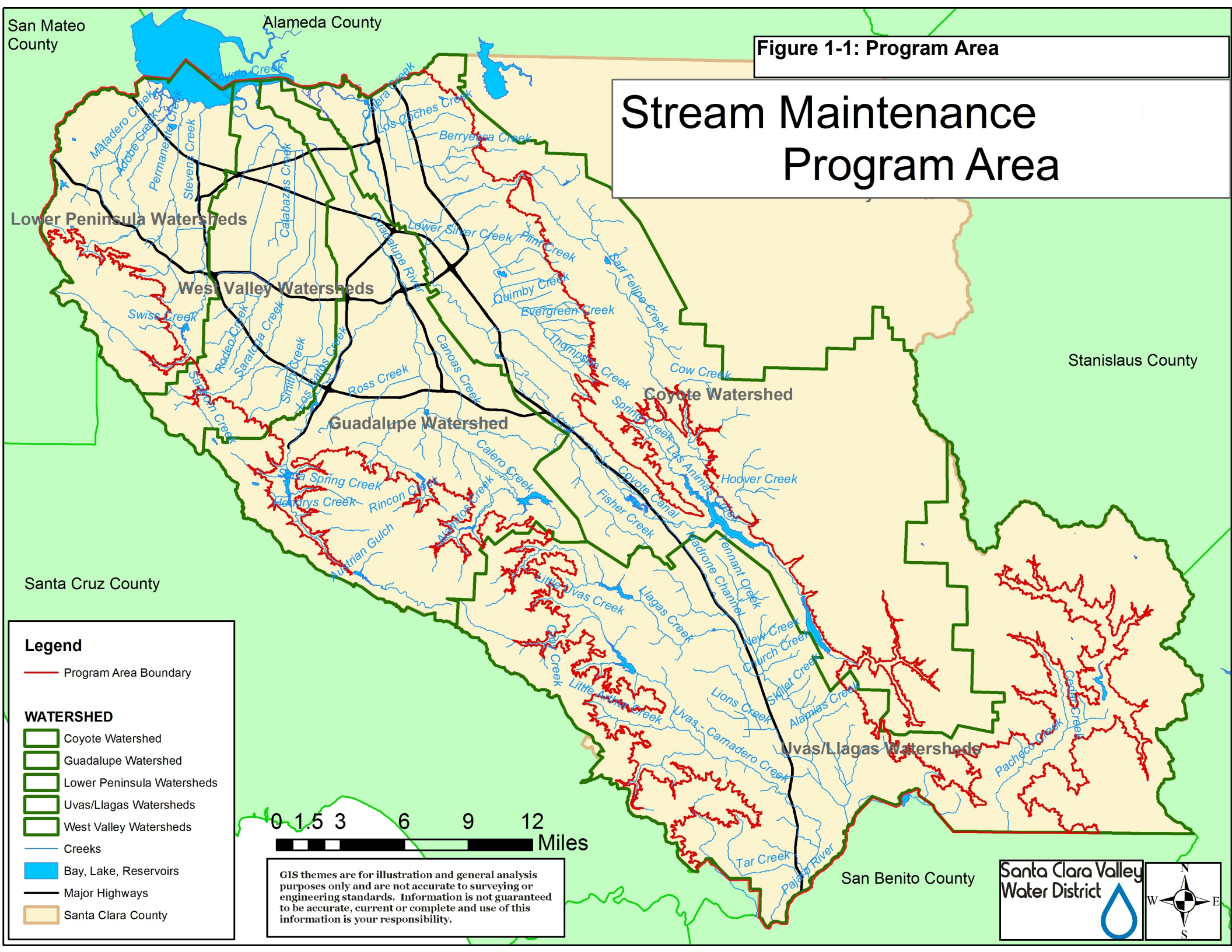


Figure 1-1: Program Area
Stream Maintenance Program Area
San Mateo County
Alameda County
Santa Cruz County
Stanislaus County
San Benito County
Lower Peninsula Watersheds
West Valley Watersheds
Guadalupe Watershed
Coyote Watershed
Uvas/Llagas Watersheds
Coyote Creek
Guadalupe River
Los Gatos Creek
Canoas Creek
Ross Creek
Calero Creek
Berryessa Creek
Lower Silver Creek
Penitencia Creek
Upper Silver Creek
Quimby Creek
Evergreen Creek
Thompson Creek
Cow Creek
Hoover Creek
Los Animas Creek
Fisher Creek
Coyote Canal
Fennant Creek
Church Creek
New Creek
Skyline Creek
Alamitos Creek
Lions Creek
Uvas - Camadero Creek
Little Uvas Creek
Llagas Creek
Pacheco Creek
Cedar Creek
Tar Creek
Pajaro River
Rincon Creek
Hendrys Creek
Austrian Gulch
Swiss Creek
Rodeo Creek
Saratoga Creek
Smith Creek
Matadero Creek
Adobe Creek
Permanente Creek
Stevens Creek
Calabazas Creek
Legend
Program Area Boundary
WATERSHED
Coyote Watershed
Guadalupe Watershed
Lower Peninsula Watersheds
Uvas/Llagas Watersheds
West Valley Watersheds
Creeks
Bay, Lake, Reservoirs
Major Highways
Santa Clara County
0 1.5 3 6 9 12
Miles
GIS themes are for illustration and general analysis purposes only and are not accurate to surveying or engineering standards. Information is not guaranteed to be accurate, current or complete and use of this information is your responsibility.
Santa Clara Valley Water District
N
W
E
S

1.4.2 General Exclusions

The SMP does not include the following stream maintenance activities:

1. Emergency repair work;
2. Maintenance work that would increase the flow conveyance or water supply capacity of a facility beyond the designed conveyance channel capacity (as-built design);
3. Maintenance work in stream reaches that are above the 1,000-foot elevation contour (areas typically above reservoirs);
4. Maintenance work for dams, reservoirs, and other water supply facilities, such as canals, pipelines outside of stream corridors, groundwater percolation ponds, and instream summer dams;
5. Installation of new or major modification of fish ladders;
6. Maintenance work conducted on private property by owners or other agencies;
7. Maintenance work performed by other agencies;
8. Maintenance work for large construction projects or Capital Improvement Projects (CIPs); and
9. Area-wide, intensive maintenance, or rehabilitation of large (greater than 0.05 acre) areas, implemented as part of CIPs that have persisted beyond the Establishment Period (period of time until the plant is self-sustaining).

1.4.3 Stream Maintenance Activity Descriptions

Vegetation Management

Vegetation management is intended to maintain the flow conveyance, flood management, and fire safety of SCVWD's channels and lands. Vegetation management includes trimming, thinning, or removing vegetation that causes flow blockages, traps debris, or significantly increases hydraulic roughness, thereby reducing channel conveyance capacity. Vegetation management also reduces fuel loads to achieve fire safety, preserves levee integrity, and provides access to SCVWD facilities. Vegetation management methods include pruning, hand or mechanical removal, herbicide application, mowing, flaming, and grazing. Vegetation management activities occur along creeks or at stream gauges.

Sediment Removal

Sediment removal is the act of mechanically removing sediment that has deposited within a channel. Sediment removal is required when accumulated sediment reduces a channel's flow conveyance capacity, prevents facilities or appurtenant structures from functioning as intended, or impedes fish passage and access to fish ladders. Sediment is removed to assist a channel to convey flow and minimize the flood hazard according to the existing channel design (where available). Sediment removal under the SMP does not include increasing a channel's flow conveyance capacity beyond the maintenance baseline, as defined in section 3.2.2.. Sediment removal may occur along creeks or at stream gauges. In unmodified channels, sediment removal will not enlarge the channel capacity beyond the maintenance baseline.

Bank Stabilization

Stabilizing and repairing eroding stream channel banks and levees is a routine SMP activity. Although bank stabilization is routine and expected, specific work locations are never predictable. As a result, this type of maintenance is not a projected work activity, like sediment removal or vegetation management. Rather, bank stabilization maintenance needs are assessed annually on an as-needed basis. Bank stabilization can be performed in any creek where the SCVWD owns a fee title or easement, or where directed by the Board of Directors, unless specifically excluded by the Program. The SCVWD has made a commitment to avoid impervious hardscape materials where technically feasible, and that no more than half the number of bank repair activities will consist of impervious hardscape materials (in all watersheds combined) each year.

Management of Animal Conflicts

The SCVWD manages animal damage and conflicts in SCVWD channels. Animals may damage SCVWD facilities by burrowing into levees or channel banks, foraging at mitigation sites, and/or interfering with work activities. To avoid compromising SCVWD facilities and reduce conflicts with species living in or present within sites where work is necessary, management of animal conflicts may be undertaken.

Minor Maintenance

Minor maintenance includes fence repairs, access road maintenance, sediment removal of 25 cubic yards or less, and other minor maintenance activities that are necessary to maintain SCVWD facilities. Minor maintenance is not projected and may occur anywhere in the SMP Program area. A minor maintenance activity cannot result in removal of more than 0.08 acres (3485 square feet) of wetland or riparian vegetation annually, in all watersheds combined.

1.4.4 Work Windows

Specific work activities have timing or seasonal restrictions. In general, the available work window for in-channel vegetation, herbicide application, sediment removal, bank stabilization occur between June 15 and October 15 each year. Under certain conditions, and depending on the activity type, the SCVWD may extend the maintenance period past October 15. Section 3.4, Work Windows, provides a more complete description of maintenance work windows and allowable extensions.

1.4.5 SMP 2002–2012 Conducted Work

The 2014–2023 SMP Update is a continuation of the 2002–2012 Program. Tables 1-1 through 1-4 summarize stream maintenance activities conducted during the first decade of the Program. This work summary provides a good basis to understand the amount of anticipated maintenance activity needed during the upcoming 10-year period.

Tables 1-1 and 1-2 summarize sediment removal for the total 10-year period and by individual years. Table 1-2 includes precipitation data. The extent of sediment removal activities often are related to the magnitude of storm events in the previous season (or seasons). Table 1-3 and 1-4 summarize vegetation management and bank stabilization activities conducted in 2002–2012. These tables are intended to demonstrate the range in frequency and magnitude of the SCVWD's steam maintenance activities. Maps and lists of high frequency stream maintenance work sites are provided in Appendix J.

Table 1-1. Sediment Removal Summary, 2002–2012

Basin	Length (feet)			Volume Removed (cubic yards)		
	Average Annual	Minimum Annual Length	Maximum Annual Length	Average Annual Volume	Minimum Annual Volume	Maximum Annual Volume
Santa Clara Basin	39,138	11,056	59,763	40,592	8,555	95,379
Pajaro Basin	3,546	0	13,160	1,212	0	2,664
Single Year		**11,959**	**68,202**		**9,195**	**96,239**
Program Average	**42,684**			**41,804**		

Source: Data compiled by SCVWD in 2013

Table 1-2. Sediment Removal by Year, 2002–2012

Year	Santa Clara Basin		Pajaro Basin	
	Sediment Removed (cubic yards)	Annual[1] Precipitation (inches)	Sediment Removed (cubic yards)	Annual[2] Precipitation (inches)
2002	49,648	12.98	751	17.36
2003	82,974	13.62	0	15.93
2004	35,899	15.10	1,765	19.66
2005	39,420	22.80	2,664	24.95
2006	95,379	20.42	860	18.45
2007	33,523	8.38	0	5.84
2008	8,555	10.71	640	14.62
2009	15,465	13.83	594	20.31
2010	19,084	17.15	2,360	23.51
2011	31,602	12.09	2,405	gauge out of order
2012	34,966	12.55	1,300	20.84
Total	**446,515**		**13,339**	

Notes:
[1] Annual precipitation amounts taken from the San Jose rainfall gauge (water year October 1 – September 30).[2] Annual precipitation amounts taken from the Gilroy rainfall gauge (water year October 1 – September 30).

Source: Data compiled by SCVWD in 2013

Table 1-3. Cumulative Length of Vegetation Management, 2002–2012

Watershed	Channel Hand Removal Work Length Completed (miles)	Herbicide Application Work Length Completed (miles)
Santa Clara Basin	18.0	165.1
Pajaro Basin	31.4	0.0
Program Total	**49.4**	**165.1**
Source: SCVWD 2012:Table 3.1, Post Construction Report		

Table 1-4. Cumulative Bank Stabilization, 2002–2012

Watershed	Length (feet)		
	Hardscape	Softscape	In-Kind Repair
Santa Clara Basin	8,951	28,846	7,325
Pajaro Basin	36	1,063	1
Program Total	**8,987**	**29,909**	**7,326**
Source: SCVWD 2012: Table 4.1, Post Construction Report			

1.4.6 Program Mitigation

The SMP has an ongoing compensatory mitigation program to address environmental impacts. Chapter 3, Maintenance Planning and Impact Avoidance describes the Program's impact avoidance and minimization approaches. Chapter 10, Program Mitigation, describes the Program's compensatory mitigation. During the SMP's first decade (2002–2012), the SCVWD undertook a number of land acquisition and restoration projects to provide mitigation for several projected SMP activities. Mitigation has been provided for sediment removal and vegetation management activities that were projected in the 2001 SMP and were evaluated in the 2001 FEIR. Chapter 10 describes the SMP's mitigation measures, including mitigation requirements for the first decade 2002-2012 and how those mitigation requirements were addressed. Chapter 10 also describes the SCVWD's overall mitigation approach, regulatory guidance, and current updates to the mitigation measures. Agency-specific mitigation requirements are described in the Program permits. The SMP permits should be consulted for additional information regarding agency-specific requirements pertaining to compensatory mitigation requirements, including mitigation monitoring, success criteria, and reporting.

1.4.7 On-going Maintenance of Capital Improvement Projects

Large construction projects and CIPs are not considered routine stream maintenance activities and are not addressed by the SMP. Future CIPs will analyze and account for long-term maintenance impacts under their own environmental review process. The analysis of long-term maintenance for a CIP is expected to follow a systematic process, including evaluating maintenance requirements and determining whether the needed maintenance may be provided by the SMP. Chapter 10, Program Mitigation, includes a discussion of how mitigation for CIP maintenance needs, where appropriate, may be integrated into the SMP.

1.5 Program Area

1.5.1 Geographic Scope

The Program area includes the portions of Santa Clara County below the 1,000-foot elevation contour, as shown in Figure 1-1. The Program area includes streams within the Santa Clara and Pajaro basins. Municipalities within the area that contain SCVWD-owned or maintained channels include the cities of Campbell, Cupertino, Gilroy, Los Altos, Milpitas, Morgan Hill, Monte Sereno, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, and Sunnyvale, and the towns of Los Altos Hills and Los Gatos. The SCVWD generally does not provide maintenance on private property where no easement exists, unless expressly authorized by the SCVWD's Board of Directors.

1.5.2 Channel Types and Ownership

Channel Types

The SCVWD manages approximately 800 miles of channels and creeks below the 1,000-foot elevation contour in Santa Clara County. Channels within the Program area are classified according to three general types, including assessing their forms and channel material types. General channel types include: (1) Modified Channel, (2) Modified Channel with Ecological Value, and (3) Unmodified Channel. The location of these channel types within each major watershed is shown in Figures 1-2 through 1-6. Photos showing examples of the channels types are seen in Figures 1-7 through 1-9. Definitions are provided as follows:

Modified Channel: In general, a Modified Channel type includes channels that have been substantially altered from historical conditions. Some modified channels have had recent CIPs, while others were constructed as a condition of land development approvals or to maximize developable land adjacent to the creek. Some modified channels have established flood flow conveyance criteria and will be maintained to those criteria. However, other channels clearly have been modified over time but not necessarily to an engineered design with established flood flow conveyance criteria. Modified channels typically include realigned, straightened, improved, or hardened reaches that have been designed to maximize efficient flow of water to minimize erosion. These channels generally are grass-lined, concrete-lined (bed or bank), and may include a high flow channel. These channels may have the potential for some environmental enhancement but are differentiated from the Modified Channel with Ecological Values type that have existing and often diverse ecological values.

Note: A concrete channel bed in a steelhead, fall-run Chinook, or green sturgeon (the latter in San Francisco Bay tidal areas only) creek would be considered a Modified Channel (not a Modified Channel with Ecological Value) due to the disconnection for fish from a natural channel bed. Channels with concrete banks are discussed next.

Modified Channel with Ecological Values: A Modified Channels with Ecological Values type includes channels significantly altered from historical conditions but also having features such as closed canopy riparian woodland, and/or being known to support special-status species. Some of these channels have had recently completed CIPs, while others have had some level of construction that did not eliminate all of the ecological value areas, or the reconfigured channel was allowed to return to a natural state. Some of these channels have established flood flow conveyance criteria and are maintained to that criteria. These channels include realigned, straightened, improved, or hardened reaches, designed to move flood flows with minimal erosion. Modified channels with ecological value include creeks identified as creeks supporting steelhead, fall-run Chinook, and green sturgeon (the latter in San Francisco Bay tidal areas only; of which 14 are present), have earthen beds, or provide features such as closed riparian woodland canopy, and/or they are known to support special-status species. Modified channels with ecological values may or may not have concrete banks, but may not have concrete beds.

Unmodified Channel: An Unmodified Channel type is defined as creeks that generally are unchanged from historic conditions. Unmodified channels may have small areas of modification, including bridges, outfalls, culverts, gauges, or other appurtenant structures. Unmodified channels usually are located in areas without other types of flood protection measures and generally occur in the foothills or higher elevations of the Program area.

Channel Ownership

The SCVWD generally performs work where it owns property in-fee title or has an easement. The Board of Directors also may approve maintenance work on private property, if it is determined that the erosion, scour, or other maintenance needs are negatively affecting the flow conveyance and bank stability of the overall creek system. Because of the skill and knowledge necessary to maintain the function of the creek system, it is necessary for the SCVWD to work on private property on occasion, for general public safety. For the 2014 SMP Update, the SCVWD also has projected stream maintenance activities at sites where no in-fee title or easement property rights exist, but where it is determined that maintenance needs may occur over the life of the Program. The SCVWD may acquire new property rights through purchase of in-fee title or easements, to provide creek access, prevent encroachment of development into flood plains, and meet the goals and objectives of the Program.

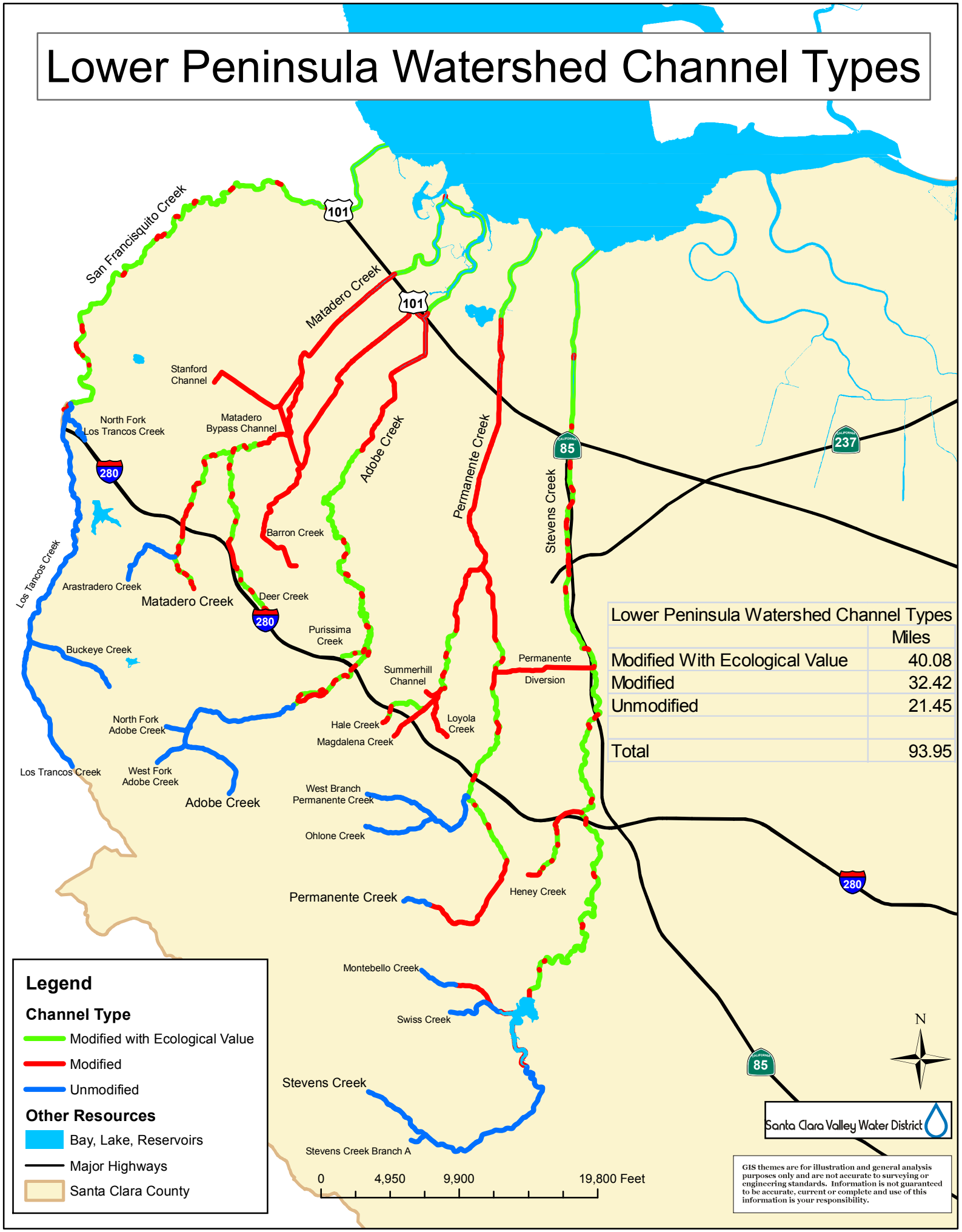


Figure 1-2. Lower Peninsula Watershed Channel Types

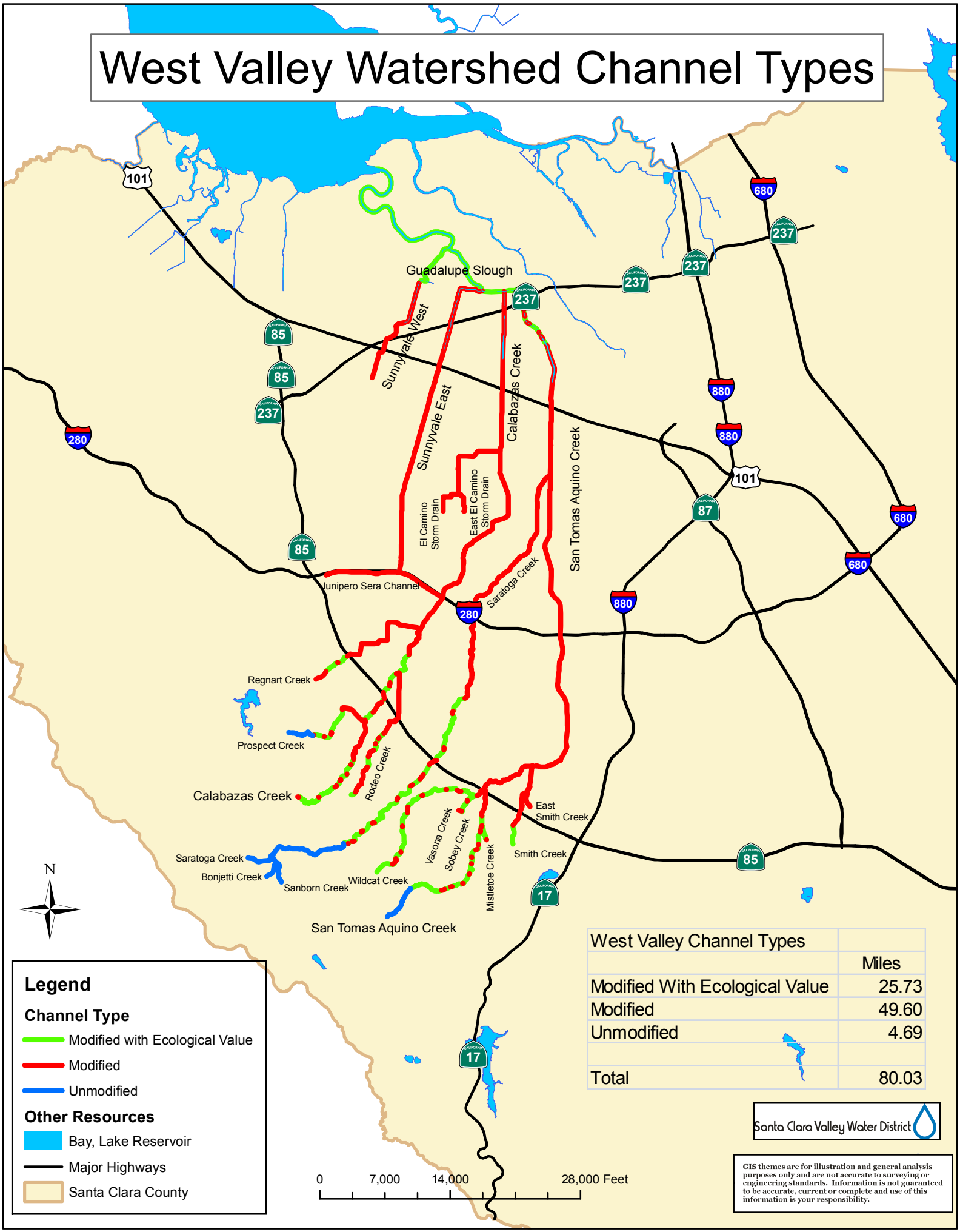


Figure 1-3. West Valley Watershed Channel Types

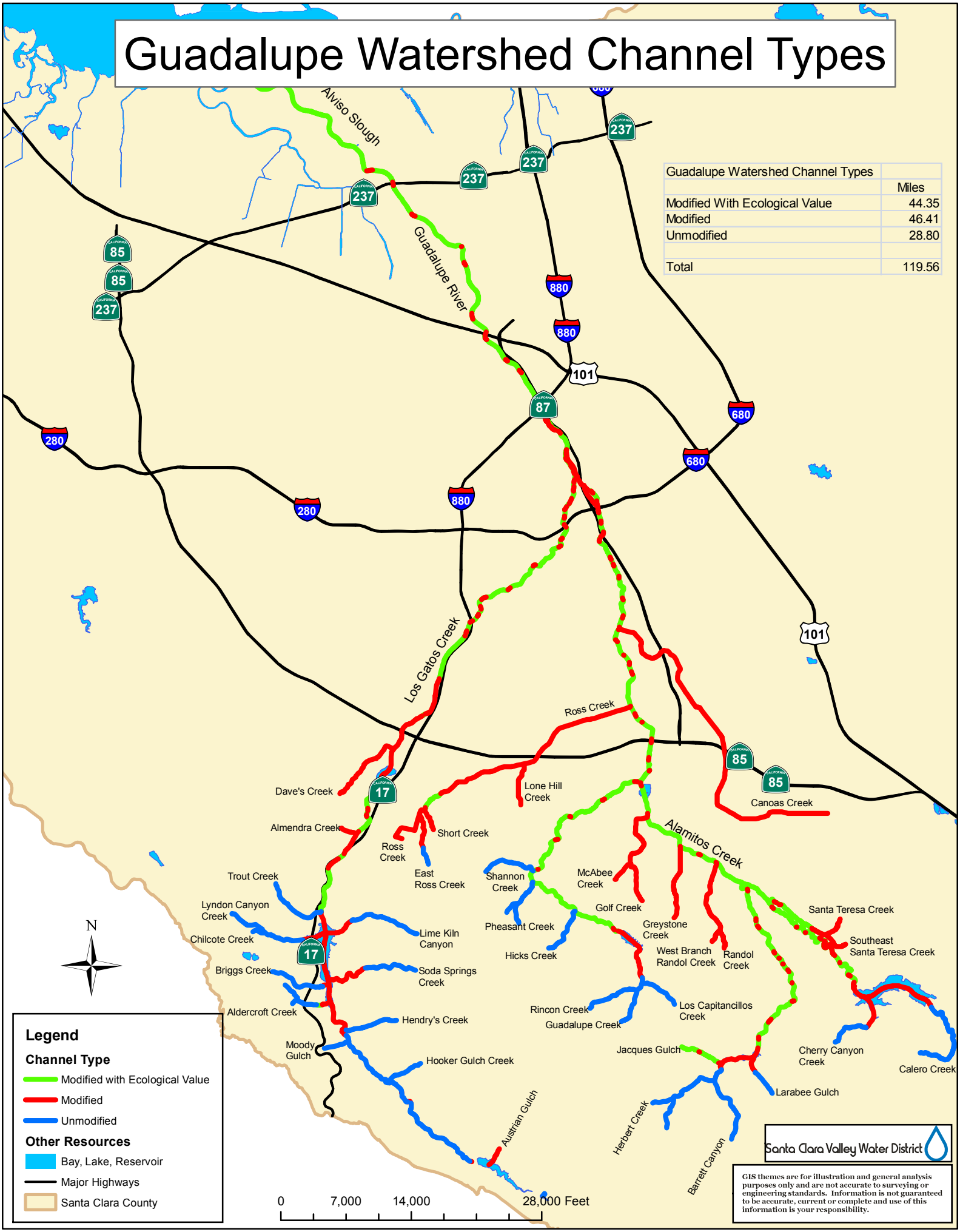
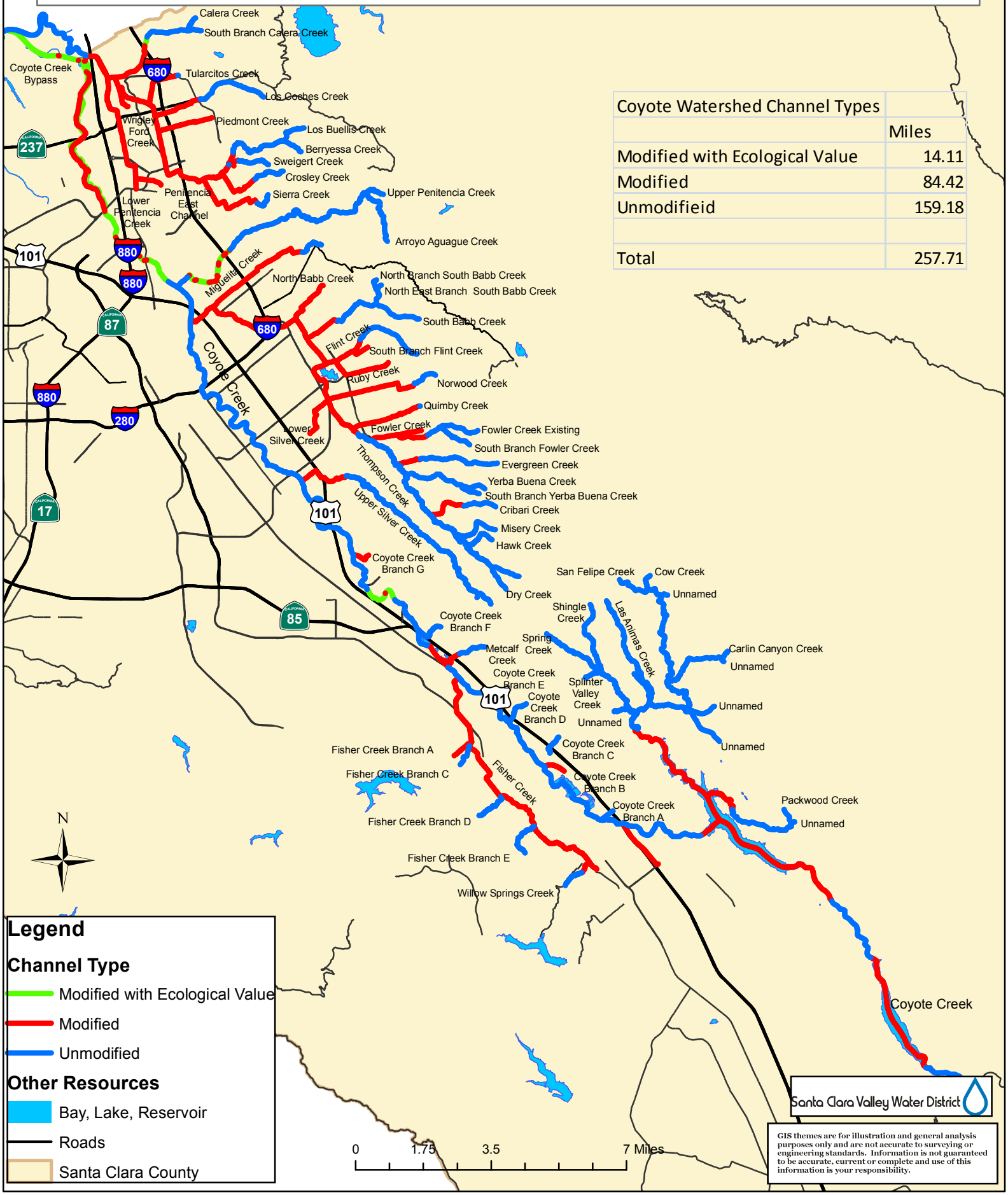


Figure 1-4. Guadalupe Watershed Channel Types

Coyote Watershed Channel Types



Coyote Watershed Channel Types	
	Miles
Modified with Ecological Value	14.11
Modified	84.42
Unmodifieid	159.18
Total	257.71

Figure 1-5. Coyote Watershed Channel Types

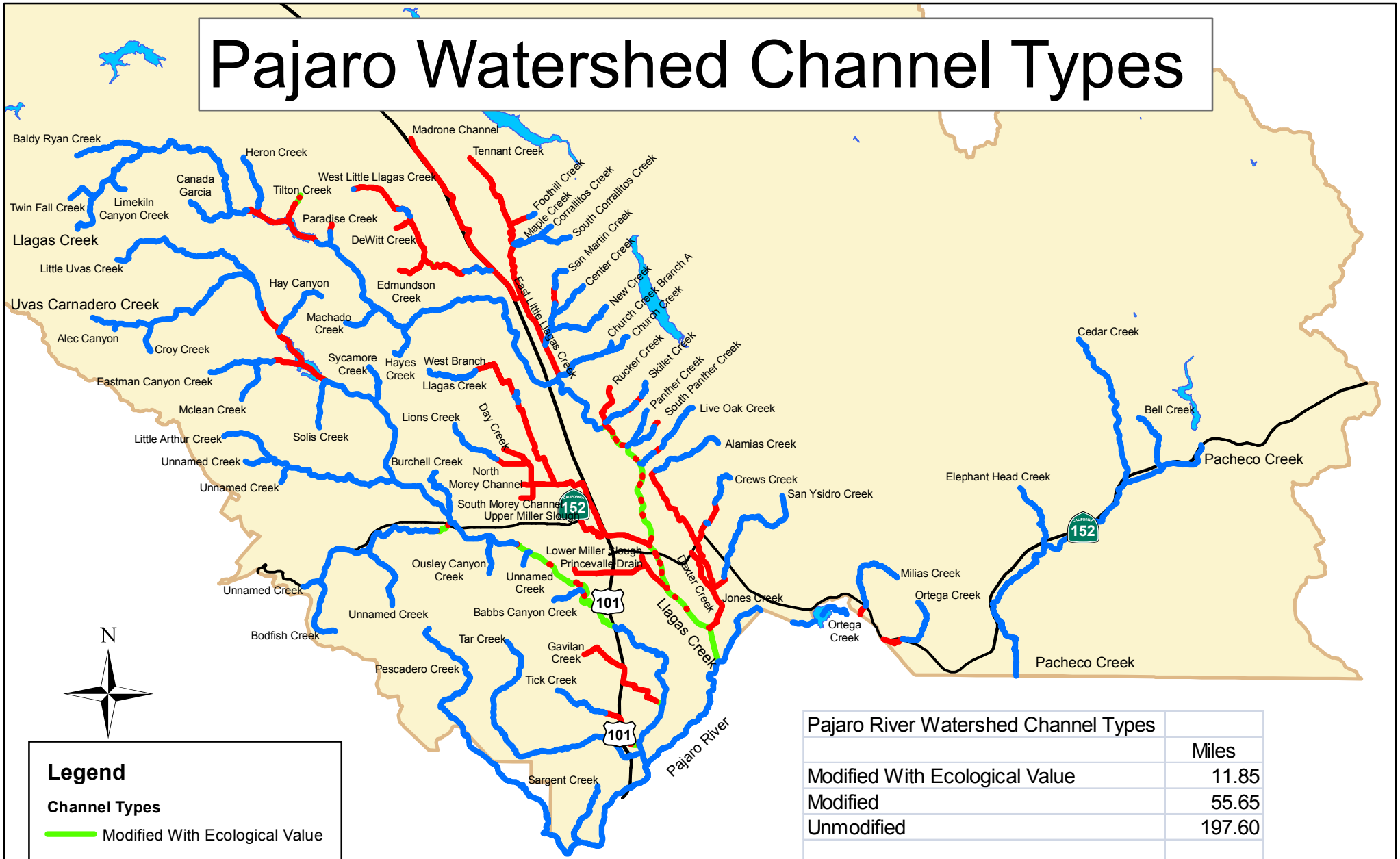


Figure 1-6. Pajaro Watershed Channel Types

Photo 1. Adobe Creek at Station 219+16.

Photo 2. Lions Creek at Station 10+50.

Photo 3. Matadero Creek at Station 121+08.

Photo 4. Ross Creek at Station 205+46.

Photo 5. San Tomas Creek at Station 174+17.

Photo 6. Sunnyvale East Channel at Station 156+28.

Figure 1-7
Representative Modified Channels

Photo 1. Adobe Creek at Station 257+05.

Photo 2. Coyote Creek at Station 1525+50.

Photo 3. Guadalupe River at Station 390+97.

Photo 4. San Francisquito Creek at Station 31+02.

Photo 5. Smith Creek at Station 71+25.

Photo 6. Uvas Creek at Station 461+40.

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Figure 1-8
Representative Modified Channels with Ecological Value

Photo 1. San Tomas Creek at Station 820+00.

Photo 2. San Tomas Creek at Station 823+00.

Photo 3. Stevens Creek at Station 931+46.

Photo 4. Stevens Creek at Station 943+62.

Photo 5. Uvas Creek at Station 327+00.

Photo 6. Llagas Creek at Station 521+75.

Figure 1-9
Representative Unmodified Channels

CHAPTER 2: ENVIRONMENTAL AGENCIES AND REGULATORY FRAMEWORK

This chapter describes the relevant regulations and permit processes that will be used by SCVWD to obtain SMP authorization from various federal, State, and regional environmental agencies. Agencies with regulatory authority over the SMP include the U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), U.S. Environmental Protection Agency (USEPA), California Regional Water Quality Control Boards (RWQCBs: Region 2–San Francisco Bay and Region 3–Central Coast), California Department of Fish and Wildlife (CDFW), and the San Francisco Bay Conservation and Development Commission (BCDC). This chapter also describes SMP compliance with the National Environmental Policy Act (NEPA), and CEQA. The subsections herein address each agency, their regulatory authority, and their permitting processes for the SMP.

Table 2-1 is a summary showing the work activities regulated by each regulatory agency.

Table 2-1. Agency Jurisdiction by SMP Work Activity

Maintenance Activity	USACE[1]	CDFW[2]	RWQCBs[3]	NMFS[4]	USFWS[5]	BCDC[6]
Bank Stabilization	X	X	X	X	X	X
Sediment Removal	X	X	X	X	X	X
Dewatering and Temporary Access Road Construction	X	X	X	X	X	X
In-Channel Vegetation Management						
Large Woody Debris	X	X	X	X	X	
Hand Removal		X	X	X	X	
Pruning		X	X	X	X	
Mowing		X	X	X	X	
Herbicide		X	X	X		
Non-In-Channel and Below Top of Bank Vegetation Management						
Hand Removal		X	X	X	X	
Routine Pruning		X	X	X	X	
Corrective Pruning		X	X	X	X	
Coppicing		X	X	X	X	
Herbicide		X	X	X		
Mowing		X			X	
Grazing		X	X		X	
Management of Animal Conflicts						
Physical Alteration of the Facility	X	X	X		X	X
Habitat Modification		X	X		X	X
Non-lethal Trapping and Relocation		X				
Lethal Control						
Fumigants		X	X		X	
Chemical Baits		X	X		X	
Trapping		X			X	
Minor Maintenance						
Vegetation Removal		X	X	X	X	
Sediment Removal	X	X	X	X	X	X
Road Maintenance – Below Top of Bank		X	X		X	X

Maintenance Activity	USACE[1]	CDFW[2]	RWQCBs[3]	NMFS[4]	USFWS[5]	BCDC[6]
Grading for Improved Drainage and Reduced Erosion	X	X	X		X	X
Trash and Debris Removal		X	X	X	X	
Repair/Installation of Fences and Gates		X				
Stream Gauge Maintenance	X	X	X	X	X	
Repair of Existing Structures	X	X	X	X	X	X
Mitigation Sites/Landscape Maintenance		X	X			
Minor Erosion Repair Above OHWM		X		X	X	X
Fish Ladder/Fish Screen Maintenance	X	X	X	X	X	

Notes:
"X" denotes the regulatory authorization needed for the work activity.

1. Generally applies to work within Waters of the U.S. (including tidal areas) – generally below the Ordinary High Water Mark. NOTE: All SMP activities below the Mean High Water Line in tidal areas may require Corps authorization.
2. Includes all areas and species within CDFW jurisdiction (F&G Code Section 1600 et seq.). Notification will be made to CDFW for any work that could potentially affect a state listed species, even if it is outside of CDFW jurisdictional area.
3. Only applies to work within Waters of the State, which includes the area below top-of-bank of the outermost bank or levee, and the riparian corridor to the upland dripline of riparian vegetation.
4. Only applies to anadromous/sturgeon streams
5. Only applies in federal species-specific areas.
6. Within the Program area, 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.

2.1 U.S. Army Corps of Engineers

2.1.1 Clean Water Act Section 404

Section 404 of the Clean Water Act (CWA) prohibits the discharge of dredged and fill materials into waters of the United States, including wetlands, without prior USACE authorization. "Discharge of dredged material" and "discharge of fill material" are defined in Title 33, Section 323.2 of the Code of Federal Regulations (33 CFR Section 323.2). "Waters of the United States," including "wetlands," are defined in 33 CFR Section 328.3. USACE jurisdiction in wetlands and other waters of the United States is briefly summarized next.

Wetlands. USACE regulates wetlands, defined as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. USACE jurisdiction extends to the limits of wetlands, which are delineated following the methodologies outlined in USACE's 1987 Wetland Delineation Manual and its 2008 Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region. In the Program area, wetlands (including both tidal and non-tidal wetlands) are present in many areas where SMP activities may occur.

Non-Wetland Waters of the United States. In non-tidal waters without wetlands present, USACE jurisdiction extends to the ordinary high water mark; when non-isolated wetlands are

present, the jurisdiction extends beyond the ordinary high water mark to the boundary of those wetlands. In tidal waters, USACE's limits of jurisdiction extend landward to the high tide line. In the Program area, non-tidal, non-wetland waters include rivers, creeks, some ditches, ponds, and lakes; tidal non-wetland waters include tidal portions of creeks as well as sloughs and tidal ponds.

Non-Regulable Discharges of Dredge Material. Incidental fallback is defined as the redeposit of small volumes of dredged material that is incidental to excavation activity in waters of the U.S. when such material falls back to substantially the same place as the initial removal. Examples of incidental fallback include soil that is disturbed when dirt is shoveled and the back-spill that comes off a bucket when such small volume of soil or dirt falls into substantially the same place from which it was initially removed (66 FR 4575) (amending 33 CFR 323.2(d)(2)(ii), and 40 CFR 232.2(2)(ii)). For instance, when using a clamshell dredge, some small portion of the sediment collected by the clamshell falls out of the clamshell and becomes deposited within Waters of the U.S. "Incidental fallback" is not considered a regulated discharge of dredge material under the CWA.

As a result, the incidental fallback associated with excavating sediment from the channel using long-reach excavators or other similar equipment located from a top-of-bank location or within the channel would not be regulated by USACE under CWA Section 404. Projects that involve stockpiling of excavated sediments within waters of the U.S., or use of equipment which moves dredge material from one place to another within Waters of the U.S. prior to removal of the dredge material (for instance, a bulldozer), would be subject to regulation under CWA Section 404. Dewatering activities and temporary access road construction activities associated with sediment removal would also require authorization.

2.1.2 Rivers and Harbors Act Section 10

Section 10 of the Rivers and Harbors Act of 1899 prohibits obstruction or alteration of navigable waters of the United States without prior USACE authorization. Within the Program area, Section 10 jurisdictional waters include all tidally influenced portions (up to the mean high water line) 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 the Guadalupe River.

2.1.3 Regional General Permit

USACE will develop a Regional General Permit (RGP) for the SMP, under the authority of CWA Section 404 (33 U.S. Code [USC] Section 1344) and the Rivers and Harbors Act of 1899 Section 10 (33 USC Section 403), in accordance with provisions of "Regulatory Programs of the Corps of Engineers," 33 CFR Section 323.2(h) for activities that are substantially similar in nature and cause only minimal individual and cumulative environmental impacts. The RGP will be valid for 5 years from the date of issuance and may be renewed at USACE's discretion. Because the current SMP 2013 Manual Update is written for a 10-year period through 2024, pending the SCVWD's compliance during the 5-year permit term, USACE is expected to renew the RGP for a second 5-year term.

Compliance with additional regulations, including but not limited to the following, will be required by USACE before its issuance of the RGP:

- Endangered Species Act (ESA)
- Fish and Wildlife Coordination Act (FWCA)
- Migratory Bird Treaty Act (MBTA)
- Bald and Golden Eagle Protection Act (BGEPA)
- Magnuson–Stevens Fishery Conservation and Management Act (MSA) for Essential Fish Habitat (EFH)
- Section 106 of the National Historic Preservation Act (NHPA)
- Section 401 of the CWA
- National Environmental Policy Act (NEPA)

USACE will initiate the ESA and MSA consultations as part of the RGP permit process. ESA compliance will be achieved through Section 7 consultations requested by USACE, with USFWS and NMFS (as described in Section 2.1.5, Federal Endangered Species Act –Section 7 Consultation). FWCA compliance will be achieved through a FWCA report prepared by USFWS. MSA compliance will be achieved through an EFH consultation requested by USACE which is typically conducted concurrently with the ESA Section 7 consultation. EFH conservation recommendations may be incorporated by USACE as RGP special conditions that will be provided in NMFS's EFH consultation response. NHPA compliance will be achieved through adherence to BMPs GEN-40 and -41 (as described in Section 2.1.4, National Historic Preservation Act Section 106). CWA Section 401 compliance will be through programmatic 401 Water Quality Certifications from the RWQCBs (as described in Section 2.5.2, Clean Water Act Section 401). NEPA compliance will be achieved by USACE's preparation of an Environmental Assessment (EA) as part of the RGP process; a finding of no significant impact (FONSI) is anticipated.

In April 2008, USEPA and USACE issued regulations governing compensatory mitigation for activities authorized by USACE permits (40 CFR Part 230, 33 CFR Parts 325 and 332). The 2008 "Mitigation Rule" adopted standards to improve the planning, implementation, and management of compensatory mitigation projects by emphasizing a watershed approach in selecting compensatory mitigation project locations; requiring measurable, enforceable ecological performance standards and regular monitoring; stipulating timing requirements for mitigation project implementation; and specifying the components of a complete compensatory mitigation plan (including assurances of long-term protection of compensation sites, financial assurances, and identification of the parties responsible for specific project tasks). The Mitigation Rule advised that compensatory mitigation projects (i.e., permittee-responsible compensatory mitigation, mitigation banks, and in-lieu fee mitigation) require written mitigation plans with the following components: objectives, site selection criteria, site protection instruments (e.g., conservation easements), baseline information (for impact and compensation sites), credit determination methodology, a mitigation work plan, a maintenance plan, ecological performance standards, monitoring requirements, a long-term management plan, an adaptive management plan, and financial assurances. The SCVWD will provide compensatory mitigation for impacts to waters of the U.S. in accordance with the Mitigation Rule, as described in Chapter 10, Program Mitigation. Corps-specific mitigation requirements will be described in the RGP special conditions. The RGP should be consulted for additional information regarding Corps-specific requirements pertaining to compensatory mitigation, including mitigation monitoring, success criteria, and reporting.

2.1.4 National Historic Preservation Act Section 106

Section 106 of the NHPA of 1966, as amended, requires federal agencies to take into account the effects of their undertakings on cultural resources, including historic properties and historic and prehistoric archaeological sites. The NHPA authorizes the Secretary of the Interior to expand and maintain a National Record of Historic Places (NRHP), and the Secretary has established an Advisory Council on Historic Preservation (ACHP) as an independent federal entity. Section 106 of the NHPA requires federal agencies to afford the ACHP a reasonable opportunity to comment on an undertaking before licensing or approving the expenditure of funds on any undertaking that may affect properties listed, or eligible for listing, in the NRHP, and it requires federal agencies to coordinate with the State Historic Preservation Officer in the state where the proposed action will take place.

When issuing an RGP to the SCVWD to discharge fill into waters of the U.S. under authority of CWA 404, USACE must comply with Section 106 of the NHPA because an RGP would be an undertaking by USACE as defined under Interim Guidance for Implementing Title 33, CFR Part 325, Appendix C, and under Title 36, CFR Part 800.16(y). Title 33, CFR Part 325, Appendix C establishes the procedures to be followed by USACE to fulfill NHPA requirements.

All earth-disturbing activities, such as bank stabilization and sediment removal activities that are conducted under the SMP within USACE jurisdiction will require compliance with Section 106 of the NHPA. USACE will ensure that the SCVWD meets its compliance requirements by conditioning the RGP to require the implementation of the relevant cultural resource avoidance measures and BMPs listed in Appendix F, Stream Maintenance Program Best Management Practices. BMPs GEN-40 Discovery of Cultural Remains or Historic or Paleontological Artifacts and GEN-41 Review of Projects with Native Soil include several measures to avoid and minimize potential impacts to cultural and paleontological resources. These BMPs describe the protocol for notification and response actions if cultural resources are encountered.

2.1.5 Federal Endangered Species Act – Section 7 Consultation

The federal ESA was enacted in 1973, to protect plant and wildlife species as determined by USFWS or NMFS to be at risk of extinction. Species are protected through listing under the ESA as either threatened or endangered. An endangered species is at risk of extinction throughout all or a significant portion of its range (ESA Section 3[6]). A threatened species is likely to become endangered within the foreseeable future (ESA Section 3[19]). NMFS is responsible for protection of ESA-listed marine species and anadromous fishes; USFWS is responsible for all other ESA-listed species and critical habitat.

Table 2-2 (at the end of this chapter) lists special-status plants, and Table 2-3 identifies special-status fish and wildlife that may occur in the Program area, including those that are recognized by federal and state agencies as threatened or endangered.

ESA Section 9 prohibits the take of any fish or wildlife species listed under the ESA as endangered. Take of threatened species also is prohibited under ESA Section 9, unless otherwise authorized by federal regulations. Take, as defined by the ESA, means “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.” Harm is defined as “any act that kills or injures the species, including significant habitat modification.” In addition, ESA Section 9 prohibits the “removal or reduction to possession” of any listed plant species “under federal jurisdiction” (i.e., on federal land).

The ESA includes three mechanisms that provide exceptions to the ESA Section 9 take prohibitions: ESA Section 7 consultation, ESA Section 10, and issuing ESA Section 4(d) rules. ESA Section 7 consultation is most relevant to SMP activities because it allows for take coverage of federal actions. This will be the mechanism by which incidental take coverage is obtained to conduct SMP activities. ESA Section 7 provides a means for authorizing take of threatened and endangered species by federal agencies under certain circumstances. It applies to actions that are conducted, permitted, or funded by a federal agency.

Under ESA Section 7, USACE will consult with USFWS and NMFS to ensure that the proposed federal action (which in the case of the SMP is USACE's issuance of the RGP) will not jeopardize the continued existence of endangered or threatened species or result in adverse modification of designated critical habitat. Because the SMP "may affect" listed species and designated critical habitat, the SCVWD will prepare Biological Assessments (BAs) for USFWS and NMFS, for distribution to those agencies by USACE, evaluating the nature and magnitude of the expected effects. In response, USFWS and NMFS are expected to issue a Programmatic Biological Opinion and Biological Opinion (PBO/BO), respectively, with a determination that the proposed action either:

- may jeopardize the continued existence of one or more listed species (jeopardy finding) or result in the destruction or adverse modification of critical habitat (adverse modification finding), or
- will not jeopardize the continued existence of any listed species (no jeopardy finding) or result in adverse modification of critical habitat (no adverse modification finding).

If the project will not jeopardize a listed species, USFWS and NMFS will issue incidental take statements to authorize take by SMP activities. The incidental take statements attached/appended to the BOs issued by USFWS and NMFS may stipulate "reasonable and prudent" measures that are necessary and appropriate to minimize take of listed species. The BO from NMFS and the PBO from the USFWS are anticipated to cover a 10 year period. Under the PBO, USFWS will issue appendage letters and associated Incidental Take Statements for the projects proposed annually.

2.2 U.S. Fish and Wildlife Service

2.2.1 Migratory Bird Treaty Act

The MBTA (16 USC 703-712), administered by USFWS, implements four treaties between the United States and Canada, Mexico, Japan and Russia, respectively, to manage and conserve migratory birds that cross national borders. The MBTA makes it unlawful in any manner, unless expressly authorized by permit pursuant to federal regulations, to pursue, hunt, take, capture, kill, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export at any time, or in any manner, any migratory bird, or any part, nest, or egg of any such bird. The definition of "take" is defined as any act to "pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture or collect." This includes most actions, direct and indirect, that can result in "take" or possession, whether it is temporary or permanent, of any protected species. Although harassment and habitat modification do not themselves constitute take under the MBTA or the California Fish and Game Code (F&G Code), such actions that result in direct loss of birds, nests, or eggs, including nest abandonment or failure, are considered take under such regulations. A list of migratory birds

protected under the MBTA is available in 50 CFR Section 10.13. On December 8, 2004, the U.S. Congress passed the Migratory Bird Treaty Reform Act (Division E, Title I, Section 143 of the Consolidated Appropriations Act, 2005, PL 108–447), which excludes all migratory birds that are non-native or have been human-introduced to the U.S. or its territories. It defines a native migratory bird as a species present within the U.S. and its territories as a result of natural biological or ecological processes. USFWS published a list of the bird species excluded from the MBTA on March 15, 2005 (70 Federal Register 12710).

All native bird species occurring in the Program area are protected by the MBTA. SMP activities, such as vegetation management, may require the removal of vegetation at work sites where migratory birds are nesting. Compliance with the MBTA will be met through the implementation of BMPs requiring pre-activity surveys before any breeding-season maintenance activities, implemented during SMP activities so that take of migratory birds is avoided.

2.2.2 Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act of 1940 protects eagles from commercial exploitation and safeguards their continued survival in the United States. This law provides for the protection of the bald eagle (the national emblem) and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds. USFWS, which enforces the Bald and Golden Eagle Protection Act, can issue permits for the take of eagles under limited circumstances. However, no such permit will be needed for SMP activities, which will avoid any such impacts through implementation of BMPs involving pre-construction surveys for nesting birds (including eagles) and implementation of measures to protect any nesting eagles from disturbance.

2.2.3 Federal Endangered Species Act

As described in Section 2.1.5, Federal Endangered Species Act – Section 7 Consultation, the FESA protects plant and wildlife species determined by USFWS or NMFS to be at risk of extinction. USFWS is responsible for protection of listed plants and wildlife other than marine species and anadromous fishes, which are protected by NMFS.

Listed Species: The following federally threatened, endangered, proposed, and candidate species that are protected by USFWS have been determined to occur or potentially occur in the Program area:

- Coyote ceanothus (*Ceanothus ferrisiae*), listed as Endangered
- Metcalf Canyon jewel-flower (*Streptanthus albidus* ssp. *albidus*), listed as Endangered
- Santa Clara Valley dudleya (*Dudleya setchellii*), listed as Endangered
- Tiburon paintbrush (*Castilleja affinis* ssp. *neglecta*), listed as Endangered
- Bay checkerspot butterfly (*Euphydryas editha bayensis*), listed as Threatened
- California red-legged frog (*Rana draytonii*), listed as Threatened
- California tiger salamander (*Ambystoma californiense*), listed as Threatened
- California clapper rail (*Rallus longirostris obsoletus*), listed as Endangered
- California condor (*Gymnogyps californianus*), listed as Endangered

- California least tern (*Sterna antillarum browni*), listed as Endangered
- Least Bell's vireo (*Vireo bellii pusillus*), listed as Endangered
- Western snowy plover (*Charadrius alexandrinus nivosus*), listed as Threatened
- Salt marsh harvest mouse (*Reithrodontomys raviventris*), listed as Endangered
- San Joaquin kit fox (*Vulpes macrotis mutica*), listed as Endangered

These species are described in greater detail in Tables 2-2 and 2-3.

Critical Habitat: USFWS has designated critical habitat within the Program area for three species: the Bay checkerspot butterfly, California red-legged frog and California tiger salamander.

As described in Section 2.1.5, Federal Endangered Species Act – Section 7 Consultation, USACE will consult with USFWS concerning potential effects of SMP activities on the listed species and designated critical habitat listed above, including preparation of a BA describing these effects. USFWS is expected then to issue a PBO for the SMP. Under the PBO, USFWS will issue appendage letters and associated Incidental Take Statements for the projects proposed annually.

2.3 National Marine Fisheries Service

2.3.1 Federal Endangered Species Act

As described in Section 2.1.5, Federal Endangered Species Act – Section 7 Consultation, the FESA protects plant and wildlife species determined by USFWS or NMFS to be at risk of extinction. NMFS is responsible for protection of federally listed marine species and anadromous fishes.

Listed Species: The following federally threatened, endangered, proposed, and candidate species that are protected by NMFS have been determined to occur or potentially occur in the Program area:

- Steelhead (*Oncorhynchus mykiss*), Central California Coast distinct population segment (CCC steelhead), listed as Threatened
- Steelhead, South-Central California Coast distinct population segment (SCCC steelhead), listed as Threatened
- Green sturgeon (*Acipenser medirostris*) southern distinct population segment (southern green sturgeon), listed as Threatened

These species are described in greater detail in Table 2-3.

Critical Habitat: NMFS has designated critical habitat within the Program area for CCC steelhead, SCCC steelhead, and southern green sturgeon.

As described in Section 2.1.5, Federal Endangered Species Act – Section 7 Consultation, USACE will consult with NMFS concerning potential effects of SMP activities on the listed species and designated critical habitat listed above, including preparation of a BA describing

these effects. NMFS is expected then to issue a BO that includes a statement allowing incidental take of these listed species during SMP activities.

2.3.2 The Magnuson-Stevens Fishery Conservation and Management Act

The MSA establishes a national program to manage and conserve the fisheries of the United States through the development of federal Fishery Management Plans (FMPs), and the federal regulation of domestic fisheries under those FMPs, within the 200-mile U.S. Exclusive Economic Zone (16 USC Section 1801 et seq.). To ensure that habitat considerations receive increased attention for the conservation and management of fishery resources, the amended MSA requires each existing, and any new, FMP to "describe and identify essential fish habitat for the fishery based on the guidelines established by the Secretary under Section 1855(b)(1)(A) of this title, minimize to the extent practicable adverse effects on such habitat caused by fishing, and identify other actions to encourage the conservation and enhancement of such habitat." (16 USC Section 1853[a][7]).

Essential Fish Habitat (EFH) is defined in the MSA as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 USC Section 1802[10]). The components of this definition are interpreted in 50 CFR Section 600.10 as follows: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle.

Pursuant to the MSA, each federal agency is mandated to consult with NMFS with respect to any action authorized, funded, or undertaken, or proposed to be, by such agency that may adversely affect any EFH under this Act (16 USC Section 1855[b][2]). Furthermore, when NMFS receives information from a Fishery Management Council, or federal or state agency or determines from other sources that an action authorized, funded, or undertaken, or proposed to be, by any federal or state agency will adversely affect any EFH identified under the MSA, NMFS has an obligation to recommend to such agency measures that can be taken to conserve EFH.

Regarding EFH in the Program area, maintenance activities in tidal waters, and in non-tidal waters where Chinook salmon (*Oncorhynchus tshawytscha*) occurs, may affect EFH. The only fish species subject to an FMP that occurs in non-tidal waters of the Program area with any regularity is Chinook salmon, which is regulated by the Pacific Fishery Management Council's Salmon FMP. 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 occurs in the Guadalupe watershed. Within the Guadalupe watershed, Chinook salmon spawning has been observed in Los Gatos Creek, Alamitos Creek, and the mainstem Guadalupe River. NMFS considers any habitat used by Chinook salmon in the South Bay (i.e., tidal waters and non-tidal waters in the Coyote Creek and Guadalupe River watersheds that are accessible to Chinook salmon) as EFH.

A number of fish species regulated by the Coastal Pelagic Species 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 the 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 Program 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 SMP activities will take place, but small numbers potentially can occur there. Thus, NMFS considers these tidal waters to be EFH for these FMPs as well.

Under the MSA, USACE will consult with NMFS regarding the effects of the proposed federal action (which in the case of the SMP is USACE's issuance of the RGP) on the EFH of these FMP-managed species. NMFS will then provide recommendations for conservation of EFH during SMP activities.

2.4 U.S. Environmental Protection Agency

USEPA is the overall administering agency for the CWA, and jointly administers CWA Section 404 together with USACE. Under a Memorandum of Agreement (MOA) between USEPA and the Department of Defense, USACE was given sole responsibility for making final permit decisions pursuant to Section 404 and, "conducts jurisdictional delineations associated with the day-to-day administration of the Section 404 program" (USDA 1996). USEPA retains the authority to enforce compliance with Section 404 and maintains the power to overrule USACE decisions on the issuance or denial of permits (USEPA 1995). If a dispute occurs about whether an area can be regulated, USEPA has the ultimate authority to determine the actual geographic scope of waters of the United States subject to jurisdiction under all sections of the CWA, including the Section 404 regulatory program (USDA 1996).

USEPA will not be issuing permits for the SMP, but it will have a coordination and oversight role with the applicable federal agencies and also will provide the SCVWD with guidance on implementing the SMP.

2.5 Regional Water Quality Control Boards

2.5.1 The Porter-Cologne Water Quality Control Act

California's Porter-Cologne Water Quality Control Act (Porter-Cologne Act) was enacted in 1969, and, together with the federal CWA, provides regulatory guidance to protect water quality and water resources. The Porter-Cologne Act established the State Water Resources Control Board (SWRCB) and divided California into nine regions, each overseen by an RWQCB. The Porter-Cologne Act established regulatory authority over "waters of the State," which are defined as "any surface water or groundwater, including saline waters, within the boundaries of the State" (California Water Code, Division 7, Section 13050). More specifically, the SWRCB and its nine RWQCBs have jurisdiction over the bed and banks of a stream channel, its riparian corridor, and its beneficial uses.

The Porter-Cologne Act also assigns responsibility for implementing CWA Sections 303, 401, and 402 to the SWRCB and RWQCBs. Under Section 303, the RWQCBs, in conjunction with USEPA, are responsible for developing and implementing Total Maximum Daily Loads (TMDLs) to address water quality impairments.

The Porter-Cologne Act requires the development and periodic review of water quality control plans (basin plans) for the protection of water quality in each of California's nine regions. A basin plan is unique to each region and must identify beneficial uses, establish water quality objectives for the reasonable protection of the beneficial uses, and establish a program of implementation for achieving the water quality objectives. To provide currency, basin plans must be updated every 3 years. The basin plans also must comply with Section 303 of the federal CWA, which requires states to establish their own water quality standards. Basin plans provide the technical basis for the RWQCBs to determine waste discharge requirements (WDRs), take enforcement actions, and evaluate grant proposals.

As described in Section 2.5.2, CWA Section 401, regulatory compliance for projects occurring within waters of the U.S. is met through Water Quality Certification, granted by the RWQCBs. For projects occurring within Porter-Cologne Act jurisdiction (i.e., State jurisdiction) but outside waters of the U.S. (in streams this is the area above the ordinary high water mark, or "isolated" waters such as wetlands), WDRs or Waiver of WDRs are required. WDRs are issued by the RWQCB that has jurisdiction over the region in which the project will occur.

The San Francisco Bay and Central Coast RWQCBs (Regions 2 and 3, respectively) have jurisdictional authority to implement the Porter-Cologne Act in Santa Clara County; the San Francisco Bay RWQCB oversees watersheds draining to the San Francisco Bay, and the Central Coast RWQCB oversees watersheds draining to the Pajaro River and thence to Monterey Bay. All waters of the U.S. in the Program area also are considered waters of the State and thus are subject to RWQCB jurisdiction under the Porter-Cologne Act. SMP compliance with the Porter-Cologne Act will occur via WDRs and will be combined with CWA Section 401 Water Quality Certification, as described next.

2.5.2 Clean Water Act Section 401

Under CWA Section 401, applicants for a federal license or permit to conduct activities that may result in the discharge of dredged and fill materials into surface waters of the United States (including wetlands) must obtain Section 401 Water Quality Certification so that any such discharge will comply with the applicable provisions of the CWA, including Sections 301, 302, 303, 306, and 307, and State water quality standards. Section 401 Water Quality Certification is issued by the State in which the discharge will originate; or, if appropriate, from the interstate water pollution control agency with jurisdiction over affected waters at the point where the discharge will originate. Therefore, all projects that have a federal component and may affect State water quality (including projects that require federal agency approval, such as issuance of a CWA Section 404 permit) also must comply with CWA Section 401. The goal of CWA Section 401 is to include evaluation of water quality when considering activities associated with dredging or placement of fill materials into waters of the United States.

The SCVWD has worked with representatives from the San Francisco Bay and Central Coast RWQCBs to develop a compliance approach for CWA Section 401, and will apply for Section 401 Water Quality Certification for SMP activities affecting waters of the U.S. within the jurisdiction of each of these RWQCBs.

2.5.3 Clean Water Act Section 402

CWA Section 402 regulates point and non-point source discharges to surface waters (other than dredge or fill material) through the National Pollutant Discharge Elimination System (NPDES),

administered by the USEPA. The NPDES program provides for both general permits (those that cover a number of similar or related activities) and individual permits (for discharges to waters of the U.S.). This regulation is implemented at the state level and generally applies to construction, industrial, and municipal stormwater discharges, and residual discharges from pesticide application.

2.5.4 Municipal Regional Stormwater NPDES Permit

As part of the NPDES, municipalities are required to maintain NPDES permits for their stormwater discharges. The municipalities, in turn, require that individual projects within their jurisdiction comply with the requirements of these permits. The Municipal Regional Stormwater NPDES permit (Order R2-2009-0074, NPDES Permit No. CAS612008) covers municipal stormwater discharges from the majority of Bay Area counties and cities. The permit is applicable to Santa Clara County and the following cities and agencies within the county which have joined together to form the Santa Clara Valley Urban Runoff Pollution Prevention Program: the cities of Campbell, Cupertino, Los Altos, Milpitas, Monte Sereno, Mountain View, Palo Alto, San Jose, Santa Clara, Saratoga, and Sunnyvale; the towns of Los Altos Hills and Los Gatos; and SCVWD.

The SMP will continue to comply with the requirements detailed in this NPDES permit, including water quality monitoring and pesticide toxicity control.

2.5.5 General NPDES Aquatic Pesticide Use Permit

The SWRCB recently renewed a General NPDES permit for the regulation of residual aquatic pesticide discharges to waters of the U.S. from algae and aquatic weed control applications. This General NPDES permit only authorizes the discharge of the following aquatic pesticides: 2,4-D, acrolein, copper, diquat, endothall, fluridone, glyphosate, imazamox, imazapyr, nonyphenol, penoxsulam, sodium carbonate peroxyhydrate, and triclopyr-based algaecides and aquatic herbicides. Aquatic pesticides that are applied to waters of the U.S. in accordance with Federal Insecticide, Fungicide, and Rodenticide Act label requirements are not considered pollutants. However, pesticides or by-products that persist in or leave the treatment area after a specified treatment period are considered pollutants and require coverage under this General Permit.

Key requirements of the General Permit include the following.

- compliance with the requirements of California Toxics Rule (40 CFR Part 131) and the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (SWRCB 2005);
- compliance with other applicable receiving water limitations and with effluent limitations;
- issuance of a license to the permittee by the California Department of Pesticide Regulation, or the permittee must work under the supervision of someone who is licensed if the aquatic pesticide is considered a restricted material;
- preparation of, and adherence to, an Aquatic Pesticide Application Plan;
- compliance with specific monitoring and reporting requirements of the permit;
- adherence to all label instructions and terms of any applicable use permits;

- maintenance of a Pesticide Application Log; and
- compliance with Public Notice Requirements.

To obtain coverage under this General Permit, a discharger must submit a completed notice of intent, a vicinity map, and the first annual fee to the appropriate RWQCB. These items constitute a complete application package, the submittal of which authorizes the discharge of pollutants associated with the application of aquatic pesticides in compliance with the General Permit.

All aquatic pesticides applied by the SCVWD under the General NPDES permit are done in accordance with the permit requirements.

2.5.6 Clean Water Act Section 303 and the Total Maximum Daily Load Program

Under CWA Section 303(d), states are required to identify "impaired water bodies" (those that do not meet established water quality standards), identify the pollutants causing impairment; establish priority rankings for waters on the list; and develop a schedule for development of control plans to improve water quality. Each RWQCB must update the Section 303(d) list every 2 years. Water bodies on the list have no further assimilative capacity for the identified pollutant, and the Section 303(d) list identifies priorities to develop pollution control plans for each listed water body and pollutant. The pollution control plans triggered by the CWA Section 303(d) List are TMDLs.

CWA Section 303 is overseen by USEPA and is administered by the SWRCB and its nine RWQCBs. Once a TMDL is developed and approved by USEPA, the SWRCB, and the relevant RWQCB, the implementation plan (if included in the TMDL) can be enacted. The San Francisco Bay and Central Coast RWQCBs have prepared, or are in the process of preparing, TMDLs applicable to water bodies in Santa Clara County. USEPA has approved the following TMDLs that currently are implemented by the San Francisco Bay RWQCB: Guadalupe River Watershed Mercury, San Francisco Bay Mercury, San Francisco Bay Polychlorinated Biphenyls, and Urban Creeks Pesticide Toxicity. Additionally, the San Francisco Bay RWQCB is currently developing a TMDL for sediment impairment in San Francisquito Creek. USEPA-approved TMDLs within those portions of Santa Clara County under the jurisdiction of the Central Coast RWQCB include: Pajaro River Fecal Coliform (including Pajaro River, San Benito River, Llagas Creek, and Tequisquita Slough); Pajaro River Sediment (including San Benito River, Llagas Creek, and Rider Creek); and Pajaro River Nitrate (including Llagas Creek).

The SMP will continue to comply with the requirements detailed in adopted TMDLs, including water quality monitoring and pollutant control.

2.6 California Department of Fish and Wildlife

2.6.1 California Endangered Species Act

The California Endangered Species Act (CESA) is defined in Section 2080 et seq. of the F&G Code. CESA was originally enacted in 1970, to designate wildlife, fish, and plants as "endangered" or "rare." In 1984, CESA was amended and species were reclassified as "endangered" or "threatened." As of January 1985, all "rare" wildlife species were reclassified as "threatened" and the term rare was dropped from the code. For plants however, the classification of "rare" was maintained for those listed under the California Native Plant

Protection Act (Sections 1900-1913), but those plants are subject only to the protections of that Act and not CESA.

The CESA states that all native species of fishes, amphibians, reptiles, birds, mammals, invertebrates, and plants, and their habitats that are threatened with extinction and those experiencing a significant decline which, if not halted, will lead to a threatened or endangered designation, will be protected or preserved. The CESA sets forth procedures by which individuals, organizations, or CDFW can submit petitions to the Fish and Game Commission, requesting that a species, subspecies, or variety of plant or wildlife be added to, deleted from, or changed in status on the State lists of threatened or endangered species.

Like the federal ESA, CESA also allows for incidental take of listed species. Take is defined under the F&G Code Section 86 as to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." The incidental take permit process is outlined in CESA (F&G Code Section 2081). CESA (F&G Code Section 2081[b]) provides a means by which agencies or individuals may obtain authorization for incidental take of State-listed species. Take must be incidental to, and not the purpose of, an otherwise lawful activity. Requirements for an F&G Code Section 2081(b) permit include: the identification of impacts on listed species; development of mitigation measures that minimize and fully mitigate impacts; development of a monitoring plan; and assurance of funding to implement mitigation and monitoring.

State-listed and candidate species potentially occurring in the Program 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, Townsend's big-eared bat (Corynorhinus townsendii, and San Joaquin kit fox. Take of most of these species will be avoided, either because SMP activities will not occur in locations or in ways in which take can occur, or in the case of fully protected species such as the California clapper rail, California black rail, California condor, bald eagle, and salt marsh harvest mouse, because of implementation of BMPs to avoid take. However, SMP activities may result in take of one State-listed species, California tiger salamander. The SCVWD has submitted a CESA Incidental Take Permit application to CDFW, requesting incidental take of this species, describing the measures that will be implemented to avoid, minimize, and fully mitigate take (including compensatory habitat mitigation). CDFW is expected then to issue an incidental take permit for SMP activities.

2.6.2 Lake and Streambed Alteration Program

California's Lake and Streambed Alteration Program is regulated under Section 1600 et seq. of the F&G Code. Under the F&G Code Section 1602, CDFW regulates projects that affect the flow, channel, or banks of rivers, streams, and lakes. F&G Code Section 1602 requires State or local governmental agencies, public utilities, and private individuals to notify and enter into a streambed or lakebed alteration agreement with CDFW before construction of a project that will:

- substantially divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake;
- substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake; or

- result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake.

F&G Code Section 1602 generally applies to any work undertaken in-channel and within and/or associated riparian habitat of a river, stream, or lake. F&G Code Section 1602 typically does not apply to drainages that lack a defined bed and banks, such as swales, or to wetlands, such as vernal pools.

CDFW has regulatory jurisdiction over the bed, bank, or channel of a stream, lake, or pond, as stated in F&G Code Sections 1600-1616. Under F&G Code Section 1602, the CDFW administers the Lake and Streambed Alteration Program and may issue a Streambed Alteration Agreement (SAA) for projects within their jurisdiction. SAAs typically are issued through an application process (submittal of a notification package) and include restrictions on construction periods and locations, and avoidance, minimization, and mitigation measures for potential impacts on habitat associated with waters of the State. Because CDFW has discretionary approval authority, it is a responsible agency under CEQA (see further discussion in Section 2.9, CEQA). As such, projects must fully comply with CEQA before CDFW can finalize an SAA. Note that such CEQA compliance has been completed for the SMP through the SMP 2012 FSEIR.

All creeks, lakes, and ponds in the Program area, as well as associated riparian vegetation, are subject to CDFW jurisdiction under F&G Code Sections 1600-1616. Because SMP activities will affect these areas, the SCVWD will submit an application to CDFW for, and CDFW is expected then to issue, an SAA.

2.6.3 Protection of Birds

F&G Code Section 3503 prohibits the take, possession, or needless destruction of the nests or eggs of any bird . F&G Code Section 3503.5 makes it unlawful to take, possess, or destroy any bird, nests or eggs of birds of prey (new world vultures, hawks, eagles, ospreys and falcons, and owl). Species protected by the MBTA may not be taken or possessed except as provided by rules an regulations adopted by the Secretary of the Interior in compliance with the MBTA (CDFW Code Section 3513). Disturbance that causes nest abandonment and/or loss of reproductive effort is considered “take” by CDFW.

Nearly all native bird species occurring in the Program area are protected by the F&G Code. SMP activities, such as vegetation management, may require the removal of vegetation where migratory birds are nesting. Compliance with the F&G Code will be met through implementation of the BMPs requiring pre-activity surveys before any breeding-season maintenance activities, implemented before SMP activities so that take of migratory birds is avoided.

2.6.4 Native Plant Protection Act

The Native Plant Protection Act (Fish and Game Code Section 1900 et seq), enacted in 1977, is a state law that prohibits take of endangered or rare native plants (with some exceptions).

CDFW works in collaboration with the California Native Plant Society and with botanical experts throughout the state to maintain an Inventory of Rare and Endangered Plants, and the similar Special Vascular Plants, Bryophytes, and Lichens List. Species on these lists may meet the CEQA definition of rare or endangered. As the trustee agency for the wildlife of California, which

includes plants, ecological communities and the habitat upon which they depend, CDFW advises public agencies during the CEQA process to help ensure that the actions they approve do not significantly impact such resources. CDFW often advises that plant species with an appropriate California Rare Plant Rank in the Inventory be properly analyzed by the lead agency during project review to ensure compliance with CEQA.

Table 2-2 lists native, special-status plant species occurring or potentially occurring in the Program area. These species were fully considered during CEQA review of the SMP 2013 Manual Update, and measures to avoid, minimize, and mitigate impacts to these species were included in the SMP 2012 FSEIR.

2.6.5 Fully Protected Species

The California Fish and Game Code sections 3511, 4700, 5050 and 5515 prohibit the take of species listed within these sections of the code except under provisions of an approved Natural Communities Conservation Plan or for necessary scientific research including actions to recover the species. Take may be authorized for scientific research only after a notice has been published in the California Regulatory Notice Register. Scientific research does not include actions taken as part of a mitigation project as defined by the California Environmental Quality Act.

Fully Protected Species within the Stream Maintenance Program Project Area are: American Peregrine Falcon, Brown Pelican, California Black Rail, California Clapper Rail, California Condor, California Least Tern, Golden Eagle, Southern Bald Eagle, White Tailed Kite, Trumpeter Swan, Greater Sandhill Crane, Ring-tailed Cat, and the Salt Marsh Harvest Mouse.

2.7 San Francisco Bay Conservation and Development Commission

BCDC has regulatory responsibility over development in the San Francisco Bay and along the Bay's nine-county shoreline. BCDC works with its federal, State and local partners in the Long-Term Management Strategy (LTMS) for the Placement of Dredged Material in the San Francisco Bay Region, to manage dredging and disposal activities in the Bay Area. Formed in 1990, the LTMS Program is a collaborative partnership, involving regulatory agencies, resource agencies, and stakeholders who work together to maximize beneficial re-use of dredged material and minimize disposal in the Bay. (BCDC 2007)

2.7.1 McAteer-Petris Act

The McAteer-Petris Act was enacted in 1965, to promote responsible planning and regulation of the San Francisco Bay. This law created 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. BCDC 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.

Within the Program area, 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.

The SCVWD is authorized to perform stream maintenance activities under BCDC Permit No. M77-113, Amendment 4, which expires on May 5, 2015. The SCVWD will be requesting an extension of 4 years from BCDC (through Amendment 5), to May 1, 2019. The purpose of this 4-year extension will be to align with the timelines of SMP permits issued by other State and federal agencies. Having the same permit coverage timeline for the SMP will assist with interagency collaboration and SCVWD reporting. The SCVWD is in compliance with conditions of the BCDC Permit. All currently authorized maintenance activities will be conducted under the same protocols and locations for Amendment 5. Similarly, the SCVWD will continue to comply with all mitigation, monitoring, and reporting requirements included in the existing permit.

2.8 National Environmental Policy Act

NEPA requires federal agencies to include in their decision-making process appropriate and careful consideration of all environmental effects of a proposed action and of possible alternatives. Documentation of the environmental impact analysis and efforts to avoid or minimize the adverse effects of proposed actions must be made available for public notice and review. This analysis is documented in either an EA with a FONSI or an EA with a finding that preparation of an EIS is required. NEPA compliance will be achieved for the SMP by USACE through preparation of an EA as part of the RGP process. Issuance of a FONSI is anticipated.

2.9 California Environmental Quality Act

CEQA (Public Resource Code Section 21000 et seq.) is the cornerstone of environmental law and policy in California. CEQA requires public agencies to assess and publicly disclose the environmental implications of proposed actions through the preparation of appropriate documents. The primary objectives of CEQA include:

- ensuring that the potential environmental impacts of SMPs are disclosed to decision makers and the public;
- ensuring that environmental damage is avoided, reduced, or compensated for by the implementation of carefully designed mitigation measures;
- making the public aware of the reasons for an agency's approval of a project with significant, unavoidable, and unmitigable environmental impacts;
- fostering cooperation between agencies in the review of projects; and
- enhancing public involvement in the planning and review of projects that may impact local communities and their natural environment.

CEQA applies to discretionary activities proposed, implemented, or approved by California public agencies, including state, regional, county, and local agencies. The public agency that has the principal responsibility for carrying out or approving a project which may have a significant effect on the environment is the lead agency for CEQA compliance, and this agency is responsible for preparing the environmental documentation for the SMP.

For the SMP, the SCVWD served as lead agency for the preparation of the FSEIR (certified by the SCVWD in January 2012) that evaluated the environmental impacts of SMP activities.

Table 2-2. Special-Status Plant Species with Potential to Occur in the Program Area

Common Name (*Scientific Name*)	Status [1, 2]	Habitat Association	Potential to Occur in the Program Area
Federal or State Endangered and Threatened Plant Species			
Tiburon paintbrush (*Castilleja affinis* ssp. *Neglecta*)	FE, ST, CNPS List 1B.2, VHP	Valley and foothill grassland (serpentinite)/ serpentine bunchgrass grassland	**Unlikely to Occur.** Documented occurrences in the Program Area on Coyote Ridge between Anderson Reservoir and U.S. Highway 101. Potential habitat includes serpentine bunchgrass grasslands located on the northern portion of Coyote Ridge and portions of the Santa Teresa Hills. However, SCVWD **s**urveys for special-status plants along all creeks mapped on serpentine soils in the Program area in 2004 and 2008 did not detect any occurrences of Tiburon paintbrush. Therefore, a low probability exists for it to occur in close proximity to any SMP activities.
Coyote ceanothus (*Ceanothus ferrisiae*)	FE, CNPS List 1B.1, VHP	Chaparral, coastal scrub, valley and foothill grassland on serpentinite/ serpentine bunchgrass grassland and mixed serpentine chaparral	**Unlikely to Occur.** Three populations are recorded in the Anderson Reservoir area, within the south-central portion of the Program area. A fourth population is located near Morgan Hill off Llagas Road and Old Monterey Road. The species also may occur on serpentine soils on northern Coyote Ridge and portions of the Santa Teresa Hills. However, SCVWD surveys for special-status plants along all creeks mapped on serpentine soils in the Program area in 2004 and 2008 did not detect any occurrences of coyote ceanothus away from known locations. Therefore, this species is not expected to occur in or very near any SMP work sites.
Santa Clara Valley dudleya (*Dudleya setchellii*)	FE, CNPS List 1B.1, VHP	Cismontane woodland, valley and foothill grassland on serpentinite, rocky/ serpentine rock outcrop	**May be Present.** This species occurs in numerous locations in the Program area, on serpentine rock outcrops, including the Santa Teresa Hills, Communications Hill, near Monterey Road/Senter Road, Coyote Ridge, near Anderson Reservoir, and in the upper Llagas Creek watershed. Although many populations have been documented in the Program area, much of the suitable habitat has not been surveyed as it occurs on private lands. Potential habitat occurs elsewhere on serpentine soils in the lower foothills of the Santa Cruz Mountains and the Diablo Range. SCVWD surveys in 2004 and 2008 documented the Santa Clara Valley dudleya on SCVWD lands only along canals, which are not included in the SMP 2013 Manual Update. A possibility (albeit low) exists that the species occurs on serpentine substrates along creeks near SMP work sites.

Common Name (*Scientific Name*)	Status [1, 2]	Habitat Association	Potential to Occur in the Program Area
Metcalf Canyon jewel-flower (*Streptanthus albidus* ssp. *Albidus*)	FE, CNPS List 1B.1, VHP	Valley and foothill grassland (serpentinite)/ serpentine bunchgrass grassland	**May be Present.** The majority of the Metcalf Canyon jewel-flower's range is considered to occur in the Program area. The species occurs on serpentine soils on Coyote Ridge and near Anderson Reservoir in the Program area, on Communication Hill, and off Llagas Rd, in Morgan Hill. Some uncertainty exists around the taxonomic treatment of this species and most beautiful jewel-flower, but potentially suitable habitat is present north of Alum Rock, in the Santa Teresa Hills, west of Coyote Valley, along Coyote Ridge, on Communications Hill, and perhaps in a serpentine outcrop near Monterey Road and Senter Road. SCVWD surveys in 2004 and 2008 documented the Metcalf Canyon jewel-flower on SCVWD lands only along canals, which are not included in the SMP 2013 Manual Update. There is a possibility (albeit low) that the species occurs on serpentine substrates along creeks near SMP work sites.
CNPS-Listed Plant Species			
Franciscan onion (*Allium peninsulare* var. *franciscanum*)	CNPS List 1B.2	Cismontane woodland, valley and foothill grassland on clay, volcanic soils, often serpentinite/oak woodland	**May be Present.** No known occurrences exist in the Program area, but suitable habitat may be present. The closest known population occurs off Page Mill Road in Palo Alto, but suitable habitat exists in the Program area in oak woodland habitats, such as those in the Santa Teresa and Almaden Hills.
Bent-flowered fiddleneck (*Amsinckia lunaris*)	CNPS List 1B.2	Coastal bluff scrub, cismontane woodland, valley and foothill grassland/oak woodland and chaparral	**May be Present.** No known occurrences exist in the Program area, but suitable habitat may be present. One population has been described from Santa Clara County on Kinkaid Road, 1.1 miles north of Mt. Hamilton Road, outside of the Program area. However, suitable habitat is present at similar elevations in the Program area in chaparral and oak woodland habitats, particularly in the western portion of the Program area near the Almaden Hills and near Llagas Creek.
Anderson's manzanita (*Arctostaphylos andersonii*)	CNPS List 1B.2	Broadleafed upland forest, chaparral, and North Coast coniferous forest habitats (openings) at elevations of 197 to 2,395 feet	**May be Present.** No known occurrences in the Program area, but suitable habitat may be present. Eight documented populations occur above 1,000 feet elevation in the Santa Cruz mountains, outside of the Program area. However, potential habitat is present in the foothills toward the eastern and western edges of the Program area.
Brittlescale (*Atriplex depressa*)	CNPS List 1B.2	Chenopod scrub, meadows and seeps, playas, valley and foothill grasslands, and vernal pools on alkaline, clay soils/California annual grassland habitat on alkaline soil, seasonal wetlands	**May be Present.** No known occurrences exist in the Program area, but suitable habitat may be present. The closest known occurrence is in the baylands north of Mud Slough, in similar habitat to that occurring south and southwest of the Water Pollution Control Plant (WPCP) in the Program area. Although no occurrences are in the Program area, suitable habitat is present on low-lying moist, alkaline, clay soils near the Bay, where the species may be present.

Common Name (*Scientific Name*)	Status [1, 2]	Habitat Association	Potential to Occur in the Program Area
Big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*)	CNPS List 1B.2, VHP	Chaparral, cismontane woodland, valley and foothill grassland sometimes in serpentinite/serpentine bunchgrass grassland, mixed serpentine chaparral, and oak woodland	**Unlikely to Occur.** One extirpated historical occurrence exists from east of Coyote Creek in the Program area, and one extant occurrence has been recorded near the northern portion of Coyote Ridge. Additional suitable habitat in the Program area includes serpentine soils, such as those on Coyote Ridge and the Santa Teresa Hills, along the foothills. However, SCVWD surveys for special-status plants along all creeks mapped on serpentine soils in the Program area in 2004 and 2008 did not detect any occurrences of big-scale balsamroot. Therefore, this species is not expected to occur in or very near any SMP work sites.
Round-leaved filaree (*Erodium macrophyllum*)	CNPS List 1B.1	Cismontane woodland, valley and foothill grassland/in California annual grassland and oak woodland habitat on clay soils	**May be Present.** Suitable habitat may be present in the Program area. Nine records for round-leaved filaree have been made in the Program area. Suitable habitat occurs on clay soils in the foothills of the Santa Cruz Mountains and the Diablo Range.
Pink creamsacs (*Castilleja rubicundula* ssp. *Rubicundula*)	CNPS List 1B.2 , VHP No Take	Chaparral (openings), cismontane woodland, meadows and seeps, valley and foothill grassland on serpentinite/oak woodland, serpentine bunchgrass grassland	**Unlikely to Occur.** The species has been recorded approximately 4.5 miles south of Gilroy in the Program area. Suitable habitat also is present on serpentine soils such as those along Coyote Ridge, within the Santa Teresa Hills, near Anderson Reservoir, west of Coyote Valley, within Communications Hill (although it has not been found there in surveys), and within the area of serpentine north of Alum Rock. However, SCVWD surveys for special-status plants along all creeks mapped on serpentine soils in the Program area in 2004 and 2008 did not detect any occurrences of pink creamsacs. Therefore, this species is not expected to occur in or very near any SMP work sites.
Congdon's tarplant (*Hemizonia parryi* ssp. *congdonii*)	CNPS List 1B.2	Valley and foothill grassland (alkaline)/ California annual grassland habitat on alkaline soils	**May be Present.** Suitable habitat may be present in the Program area. Five populations have been recorded in the Program area, in the Warm Springs region of Fremont and in Alviso. The species may occur in disturbed areas on alkaline soils and may occur in disturbed California annual grassland habitat near seasonally wet habitat, specifically in the northern reaches of the Program area near Alviso.

Common Name (*Scientific Name*)	Status [1, 2]	Habitat Association	Potential to Occur in the Program Area
Mt. Hamilton thistle (*Cirsium fontinale* var. *campylon*)	CNPS List 1B.2, VHP	Chaparral, cismontane woodland, valley and foothill grassland in serpentinite seeps/ serpentine seeps	**May be Present.** Numerous recorded populations exist in the Program area. It is found near the Almaden Calero Canal, Coyote Canal, Coyote Canal Extension, Silver Creek, Metcalf Canyon, Anderson Dam spillway, Coyote Creek tributaries, springs east of Coyote Creek, drainages between Kirby Canyon landfill, and Coyote Creek golf course, drainage near Almaden Research Center, north of Calero Reservoir in a tributary to Arroyo Creek, and other locations. Suitable habitat is present elsewhere on mesic serpentine habitat, such as seeps and swales throughout the foothills in the central portion of the Program area. SCVWD surveys in 2004 and 2008 documented the Mt. Hamilton thistle on SCVWD lands only along canals, which are not included in the SMP 2013 Manual Update. A possibility exists that the species occurs on serpentine substrates along creeks near SMP work sites.
Santa Clara red ribbons (*Clarkia concinna* ssp. *automixa*)	CNPS List 4.3	Chaparral, cismontane woodland/ chaparral, oak woodland; slopes near drainages	**May be Present.** Suitable habitat may be present in the Program area. This CNPS list 4.3 species has a narrow endemic range that has been reduced to Santa Clara and Alameda counties. Three of 17 records in Santa Clara County are below 1,000 feet elevation and are within the Program area. Suitable habitat exists in chaparral and oak woodland habitats in the upper limits of the Program area, in the foothills of the Santa Cruz Mountains and the Diablo Range.
San Francisco collinsia (*Collinsia multicolor*)	CNPS List 1B.2, VHP	Closed-cone coniferous forest, coastal scrub, sometimes serpentinite	**May be Present.** One population has been documented near Stanford University, but was last reported in 1903. A second occurrence, listed in Edenvale, is located in the Program area. However, this population was recorded in an area that has since been developed, and the species was last observed there in 1961. A new occurrence was observed by SCVWD botanist J. Hillman (pers. comm.) in 2009, on the shoreline of Anderson Reservoir, and another occurrence was reported in Almaden/Quicksilver Park (outside of the Program area) in 2001 (although this occurrence has not been relocated). SCVWD surveys for special-status plants along all creeks mapped on serpentine soils in the Program area in 2004 and 2008 did not detect any occurrences of San Francisco collinsia. However, SCVWD did document an occurrence along the shoreline of Anderson Reservoir in 2009, and the majority of occurrences are not located on serpentine soils. Thus, some potential exists for the species to occur in or near SMP work sites.
Hospital Canyon larkspur (*Delphinium californicum ssp. interius*)	CNPS List 1B.2	Found in chaparral and cismontane woodland habitats at elevations of approximately 760–3,615 feet	**May be Present.** Suitable habitat may be present in the Program area. The species inhabits a small endemic range that covers the mid- and upper elevations of the inner Coast Ranges in the San Francisco Bay Area and south towards Mount Hamilton. Potential habitat occurs toward the upper elevations of the Program area in the Diablo Range, in wet, boggy meadows, canyons, and chaparral openings.

Common Name (*Scientific Name*)	Status [1, 2]	Habitat Association	Potential to Occur in the Program Area
Western leatherwood (*Dirca occidentalis*)	CNPS List 1B.2	Mesic broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, North Coast coniferous forest, riparian forest, and riparian woodland habitats at elevations of approximately 164–1,296 feet	**May be Present.** Suitable habitat may be present in the Program area. Four occurrences have been documented in the northeastern portion of the Program area, and these are presumed extant. Potential habitat occurs in the Santa Cruz mountains, in the foothills along the northeastern edge of the Program area.
Hoover's button-celery (*Eryngium aristulatum* var. *hooveri*)	CNPS List 1B.1	Vernal pools/California annual grassland habitat on alkaline soil, seasonal wetland	**May be Present.** Suitable habitat may be present in the Program area. Several historical occurrences of the species have been reported in the Program area. However, all occurrences in Santa Clara County have been extirpated by development, except one located in the vicinity of San Felipe Lake on the southern border of the county. Habitat of a suitable quality may be present in alkaline depressions, vernal pools, or roadside ditches along South San Francisco Bay, near Alviso.
Talus fritillary (*Fritillaria falcate*)	CNPS List 1B.2	Serpentinite, often talus-based soils in chaparral, cismontane woodland, and lower montane coniferous forest habitats at elevations of approximately 984–5,003 feet	**Absent.** Out of range; no suitable habitat occurs for this species. No documented occurrences occur in the Program area. The last documented observation was in Blackbird Valley, a tributary to Arroyo Colorado Creek, in 1995. This was at a 3,000-foot elevation, outside the Program area. The species is presumed to be absent.
Fragrant fritillary (*Fritillaria liliacea*)	CNPS List 1B.2, VHP	Cismontane woodland, coastal prairie, coastal scrub, valley and foothill grassland, often in serpentinite/oak woodland, serpentine bunchgrass grassland	**Unlikely to Occur.** Six populations have been documented in various locations in the Program area. Additional suitable habitat occurs on serpentine soils in the Program area, such as Coyote Ridge, Anderson and Calero Reservoirs, west of Coyote Valley, the Santa Teresa Hills, Communications Hill, and serpentine north of Alum Rock. SCVWD surveys for special-status plants along all creeks mapped on serpentine soils in the Program area in 2004 and 2008 did not detect any occurrences of fragrant fritillary. Therefore, this species is not expected to occur in or very near any SMP work sites.
Loma Prieta hoita (*Hoita strobilina*)	CNPS List 1B.1, VHP	Chaparral, cismontane woodland, riparian woodland, usually serpentinite/mesic mixed serpentine chaparral, serpentine seeps	**May be Present.** Known occurrences of the species have been recorded on several creeks in the Program area, suggesting the possibility that the species may occur in SMP work sites. Numerous records exist in the Program area, from serpentine soils predominantly in the Santa Cruz mountains from Saratoga to Gilroy, to the Diablo range near Coyote Ridge. Suitable habitat is present in the Program area in riparian areas, particularly in mesic-serpentine influenced soils of the Santa Cruz Mountains.

Common Name (*Scientific Name*)	Status [1, 2]	Habitat Association	Potential to Occur in the Program Area
Satan's goldenbush (*Isocoma menziesii* var. *diabolica*)	CNPS List 4.2	Cismontane woodland/oak woodland	**May be Present.** Suitable habitat may be present in the Program area. The species only has been documented in Santa Clara and San Benito counties. It occurs in the Program area in the foothills near the Almaden Hills. Suitable habitat is present in the foothills where oak woodland habitat occurs in the Santa Teresa Hills, the Almaden Hills, near Anderson Reservoir, and along Coyote Ridge.
Woolly-headed lessingia (*Lessingia hololeuca*)	CNPS List 3	Clay and serpentinite soils in broadleafed upland forest, coastal scrub, lower montane coniferous forest, and valley and foothill grassland habitats at elevations of approximately 49–1,000 feet	**Unlikely to Occur.** Two records exist in the Program area, one in the foothills west of Los Gatos and one in an area north of Gilroy. Potential habitat exists in the Program area, on serpentine soils in the foothills of the Santa Cruz Mountains. SCVWD surveys for special-status plants along all creeks mapped on serpentine soils in the Program area in 2004 and 2008 did not detect any occurrences of wooly-headed lessingia. Therefore, this species is not expected to occur in or very near any SMP work sites.
Smooth lessingia (*Lessingia micradenia* var. *glabrata*)	CNPS List 1B.2, VHP	Chaparral, cismontane woodland- on serpentinite, often roadsides/mixed serpentine chaparral and oak woodland	**May be Present.** In the Program area, 27 records have been made throughout the foothills in the central and southern portions of the county, in both the Santa Cruz Mountains and the Diablo Range. Suitable habitat is present on rocky slopes and along roadsides in serpentine-derived soils throughout the central and southern foothills of Santa Clara County. SCVWD surveys in 2004 and 2008 documented the smooth lessingia on SCVWD lands only along canals, which are not included in the SMP 2013 Manual Update. The possibility exists that the species occurs on serpentine substrates along creeks near SMP work sites.
Showy golden madia (*Madia radiata*)	CNPS List 1B.1	Cismontane woodland and valley and foothill grassland habitats from 82–2,953 feet in elevation	**May be Present.** Suitable habitat may be present in the Program area. The only documented occurrence in Santa Clara County is from an elevation of 2,200 feet, outside the Program area. Potential habitat exists within the Program area, in the foothills on clay soils.
Davidson's bush-mallow (*Malacothamnus davidsonii*)	CNPS List 1B.2	Chaparral, cismontane woodland, coastal scrub, riparian woodland/ chaparral, oak woodland, mixed riparian forest and woodland	**May be Present.** No extant records are found in the Program area; however, suitable habitat is present. Three historical records exist near Stanford and Los Altos, dating from 1936. Suitable habitat is present in the woodland and riparian habitats of the foothills of the Santa Cruz Mountains, on sandy substrates.
Hall's bush-mallow (*Malacothamnus hallii*)	CNPS List 1B.2, VHP	Chaparral, coastal scrub/chaparral	**May be Present.** SCVWD surveys in 2004 and 2008 documented the Hall's bush-mallow only along canals, which are not included in the SMP 2013 Manual Update. A possibility exists that the species occurs along creeks near SMP work sites. Numerous records of the species exist in the Program area, in the Santa Teresa Hills and along Coyote Ridge. Additional suitable habitat is present in the foothills of the Santa Cruz Mountains and the Diablo Range.

Common Name (*Scientific Name*)	Status [1, 2]	Habitat Association	Potential to Occur in the Program Area
Oregon meconella (*Meconella oregano*)	CNPS List 1B.1	Coastal prairie and coastal scrub communities, at elevations from 820–2,034 feet	**May be Present.** No known occurrences exist in the Program area, but suitable habitat may be present. Three occurrences were recorded in Santa Clara County as recently as 2005. All were in the same location near the summit of Mt. Hamilton. Potential habitat may occur in the upper reaches of the Program area (above 820 feet elevation) in the Diablo Range.
Mt. Diablo cottonweed (*Micropus amphiboles*)	CNPS List 3.2	Broad-leafed upland forest, chaparral, cismontane woodland, valley and foothill grassland in rocky habitat/oak woodland, chaparral, California annual grassland	**May be present.** Suitable habitat may be present in the Program area. One record of the species exists in the Program area from a location west of Campbell. Suitable habitat occurs within rocky oak woodland habitat in the Santa Cruz Mountains and the Diablo Range.
Robust monardella (*Monardella villosa* ssp. *globosa*)	CNPS List 1B.2, VHP	Broad-leafed upland forest (openings), chaparral (openings), cismontane woodland, coastal scrub, valley and foothill grassland/chaparral, oak woodland, and California annual grassland	**May be Present.** Five records exist for the species in the Program area. These predominantly occur in Almaden Quicksilver County Park, Rancho San Antonio Open Space Preserve, and Lexington Reservoir County Park. Suitable habitat is present in the Program area, particularly in the foothills of the Santa Cruz Mountains and the Diablo Range.
Hooked popcorn-flower (*Plagiobothrys uncinatus*)	CNPS List 1B.2	Valley and foothill grasslands, cismontane woodlands, and chaparral habitats (sandy soils) at elevations of approximately 990–2,510 feet; across all habitat types often associated with canyon slopes	**May be Present.** No known occurrences exist in the Program area, but suitable habitat may be present. Potential habitat exists in sandy soils at higher elevations in the foothills bordering the Program area.
Most beautiful jewel-flower (*Streptanthus albidus* ssp. *peramoenus*)	CNPS List 1B.2, VHP	Chaparral, cismontane woodland, valley and foothill grassland in serpentinite/ serpentine bunchgrass grassland, mixed serpentine chaparral	**May be Present.** Numerous populations have been recorded in the Program area along Coyote Ridge, near Anderson and Calero reservoirs, and in the Santa Teresa Hills. In addition, suitable habitat is present in the Program area on serpentine soils, such as those on Communications Hill and the serpentine habitat area near Alum Rock. SCVWD surveys in 2004 and 2008 documented the most beautiful jewel-flower only along canals, which are not included in the SMP 2013 Manual Update. A possibility exists that the species occurs on serpentine substrates along creeks near SMP work sites.

Common Name (*Scientific Name*)	Status [1], [2]	Habitat Association	Potential to Occur in the Program Area
Saline clover (*Trifolium depauperatum* var. *hydrophilum*)	CNPS List 1B.2	Mesic, alkaline, or saline sites in valley and foothill grassland habitat, in vernal pool habitat, or in marshes and swamps at elevations from 0–984 feet; occurs in both coastal and inland marshes (Hickman 1993)	**May be Present.** No known occurrences in the Program area, but suitable habitat may be present. The nearest documented occurrences are between Millers Canal and the Pajaro River off Highway 125 near the San Benito and Santa Clara county line. Suitable habitat in the Program area would be mesic-alkaline soils in vernal pools, marshes, and swamps, and grasslands, such as those near Alviso and the Pajaro River.

[1] Federal and State Endangered and Threatened Status Definitions:
[2] California Native Plant Society (CNPS)
– = None

List Status Definitions:

Federal
BLM Designated as Sensitive by the Bureau of Land Management (BLM)
FE Endangered under the Endangered Species Act (ESA)
FT Threatened under the ESA

State
SE Endangered under the California Endangered Species Act
SR Rare under the Native Plant Protection Act
1B California Rare Plant Rank of rare, threatened, or endangered in California and elsewhere
Source: Data compiled by H.T. Harvey & Associates in 2013

Table 2-3. Special-Status Wildlife Species with Potential to Occur in the Program Area

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Federal or State Endangered, Threatened, or Candidate Species			
Bay checkerspot butterfly (Euphydryas editha bayensis)	FT	Native grasslands on serpentine soils; larval host plants are Plantago erecta and/or Castilleja sp.	Present. Occurs within the Program area in serpentine bunchgrass grasslands and serpentine rock outcrop/barrens on the east side of the Santa Clara Valley, from Coyote Ridge south to Harvey Bear Ranch and on the west side of the valley from the Santa Teresa Hills south to San Martin.
Green sturgeon (Acipenser medirostris)	FT, CSSC	Spawns in large river systems such as the Sacramento River; forages in nearshore oceanic waters, bays, and estuaries	May be Present. Known to occur in San Francisco Bay; apparently occurs in the South Bay very rarely as a non-breeding visitor. May occur in the tidal reaches of sloughs in the Alviso area within the Program area, albeit infrequently and in low numbers, if at all. Does not spawn in the South Bay. Likely occurs only irregularly and in low numbers in the Program area. The species is not expected to be a concern because of the very limited abundance of the species in the Program vicinity and the limited extent of SMP activities to occur in tidal habitats.
Longfin smelt (Spirinchus thaleichthys)	ST	Spawns in fresh water in the upper end of the San Francisco Bay; occurs year-round in the South Bay	May be Present. Occurs in the South Bay year-round (Wernette 2000), and has been collected in Alviso Slough (EDAW 2007) and in the Island Ponds between Coyote Slough and Mud Slough (Hobbs 2011). May be present in the tidal reaches of other sloughs in the South Bay as a rare non-breeding visitor, but in very low numbers. Does not spawn in the Program area, and the species is likely to occur only in low numbers in the Program area because of the very limited abundance of the species in the vicinity and limited extent of SMP activities in tidal habitats.
Central California coast steelhead (Oncorhynchus mykiss)	FT	Cool streams with suitable spawning habitat and conditions allowing migration between spawning and marine habitats	Present. Known to occur in the Program area in a number of streams flowing into the San Francisco Bay, including Coyote Creek, Upper Penitencia Creek, Arroyo Aguague, Los Gatos Creek, Alamitos Creek, Arroyo Calero, Los Trancos Creek, Guadalupe Creek, the Guadalupe River, Stevens Creek, and San Francisquito Creek. Likely present in all accessible reaches of these streams in the Program area during migration. Juveniles present year-round in upper reaches of these streams. Also present in the lower, tidal reaches of Alviso Slough, Coyote Slough, Stevens Creek, and San Francisquito Creek, and in estuarine habitats of the South Bay during migration.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
South-Central California coast steelhead (Oncorhynchus mykiss)	FT	Cool streams with suitable spawning habitat and conditions allowing migration between spawning and marine habitats	Present. Known to occur in the Program area in the Pajaro River and its tributaries, including Llagas Creek, Uvas/Carnadero Creek, Little Arthur Creek, Bodfish Creek, Tar Creek, and Pacheco Creek. Likely present in all accessible reaches of these streams in the Program area during migration.
California tiger salamander (Ambystoma californiense)	FT, SE/ CSSC	Vernal or temporary pools in annual grasslands or open woodlands	Present. Historically may have occurred throughout the Program area; however, several populations located along the valley floor have been extirpated because of habitat loss, and the species is absent from most of the valley floor. Recent occurrences are scattered throughout the Program area on both sides of the Santa Clara Valley.
California red-legged frog (Rana draytonii)	FT, CSSC	Streams, freshwater pools, and ponds with emergent or overhanging vegetation	Present. This species apparently has been extirpated from much of the valley floor, as well as the brackish marshes bordering the South Bay, and red-legged frogs are not expected to occur throughout most of the developed portions of the Program area, even in streams and ponds. However, red-legged frogs are known or expected to occur in a number of locations at the periphery of the Program area (i.e., in or near the upper, less developed reaches of streams in the Program area).
San Francisco garter snake (Thamnophis sirtalis tetrataenia)	FE, SE	Freshwater marshes, ponds, and slow-moving streams along the coast	Absent. Garter snakes in the northwestern part of the Program area (i.e., in the Palo Alto/Stanford area) fall within the intergrade zone between the San Francisco garter snake and the red-sided garter snake (Thamnophis sirtalis infernalis) (Barry 1994). The intergrade populations do not belong exclusively to either subspecies; thus, true San Francisco garter snakes do not occur in the Program area.
Bank swallow (Riparia riparia)	ST	Colonial nester on vertical banks or cliffs with fine-textured soils near water	Absent as Breeder. No recent breeding records from Santa Clara County. Occurs only as a rare migrant.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
California condor (Gymnogyps californianus)	FE, SE	Nests in caves in steep, isolated cliffs or cavities in mature redwood trees. Forages over grasslands, open woodlands, and along coastal beaches	May be Present. Historically present as a non-breeder but not currently known to occur in the Program area. No breeding habitat for this species is present in the Program area. Reintroduced individuals from Pinnacles National Monument in San Benito County occasionally range as far north as the Program area (and may do so increasingly in the future, if the reintroduced population expands), because five were sighted at the summit of Mt. Hamilton in June 2011. However, such individuals are unlikely to occur in the low-elevation areas where the SMP activities are expected to occur.
Bald eagle (Haliaeetus leucocephalus)	SE, SP	Occurs mainly along seacoasts, rivers, and lakes; nests in tall trees or in cliffs, occasionally on electrical towers; feeds mostly on fish	Present. Has been recorded nesting in the Program area (i.e., below 1,000 feet elevation) at Coyote Reservoir, where a pair nested in 2010; at Anderson Reservoir, where a nesting pair was present in 2010 and possibly in several prior years; and at San Felipe Lake, where a pair was nesting in 2011. However, no SMP activities are projected to be performed near any of these nest sites. Elsewhere in Santa Clara County, it has nested only at Calaveras Reservoir, which is outside the Program area. Small numbers forage in the Program area at all the large reservoirs, and in Coyote Valley, primarily during the non-breeding season.
Swainson's hawk (Buteo swainsoni)	ST	Nests in trees surrounded by extensive marshland or agricultural foraging habitat	Absent as Breeder. Apparently nested in small numbers in Santa Clara County historically, and an 1894 nest record exists for the Berryessa area (in eastern San Jose) (Bousman 2007). Currently, the species is known to occur in the Program area only as a very infrequent transient during migration. Although young not long out of the nest have been recorded on several occasions in the Santa Clara Valley in recent years, more concrete evidence of nesting has not been documented, so this species currently is not known to breed in the Program area.
California clapper rail (Rallus longirostris obsoletus)	FE, SE, SP	Salt marsh habitat dominated by pickleweed and cordgrass	Present. Suitable breeding habitat is present in the Program area in saltmarsh habitat along the lowermost tidal reaches of creeks that flow into the San Francisco Bay (Liu et al. 2009). On very rare occasions, non-breeding individuals wander up tidal sloughs (e.g., in tidal brackish/freshwater marsh habitats along Alviso Slough); however, all suitable breeding habitat for clapper rails is present in saline and brackish tidal marshes.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
California black rail (Laterallus jamaicensis coturniculus)	ST, SP	Breeds in fresh, brackish, and tidal salt marsh	May be Present. Not known to breed in the South Bay; occurs only as a very infrequent winter visitor to tidal salt marshes along the edge of the Bay.
Western snowy plover (Charadrius alexandrinus nivosus)	FT, CSSC	Sandy beaches on marine and estuarine shores and salt pannes in the San Francisco Bay saline managed ponds	Present. Nests on levees, islands, and salt flats in some of the South Bay saline-managed ponds in the Mountain View/Sunnyvale/Alviso area, and in New Chicago Marsh in Alviso. Forges in these same areas and on levees and managed pond bottoms in other ponds along the Bay edge.
California least tern (Sterna antillarum browni)	FE, SE, SP	Nests along the coast on bare or sparsely vegetated, flat substrates; in the South Bay, nests in salt pannes and on an old airport runway; forages for fish in open waters	Present. Does not breed in the Program area. The South Bay is an important post-breeding staging area for least terns. Most such staging has occurred in managed ponds along the Bay in the Mountain View/Sunnyvale area (occasionally in the Alviso area).
Least Bell's vireo (Vireo bellii pusillus)	FE, SE	Nests in heterogeneous riparian habitat, often dominated by cottonwoods and willows	May be Present. The only breeding records in Santa Clara County are from Llagas Creek southeast of Gilroy in 1997 and the Pajaro River south of Gilroy in 1932. Otherwise, records include one or two singing males along lower Llagas Creek in May 2001, and a singing male in June 2006 along Coyote Creek near the Coyote Creek Golf Club. Although this species may increase in number and distribution as core populations increase, it is unlikely to be more than a rare and very locally occurring breeder along south county streams.
Townsend's big-eared bat (Corynorhinus townsendii)	SC	Roosts in caves and mine tunnels, and occasionally in deep crevices in trees such as redwoods or in abandoned buildings, in a variety of habitats	May be Present. No known extant populations on the Santa Clara Valley floor, and no breeding sites known from the Program area. Occasionally individual Townsend's big-eared bats may roost and forage in habitats nearly anywhere in the Program area, but such individuals are expected to occur very infrequently and in small numbers. Roosting colonies are known from UTC property east of Coyote Ridge near Metcalf Road and at Almaden-Quicksilver County Park. Although both locations are outside the Program area, these records indicate the potential for this species to occur in suitable habitat in the Program area, possibly near southern Coyote Ridge and northern Anderson Reservoir or in the Guadalupe Mines area.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Salt marsh harvest mouse (Reithrodontomys raviventris)	FE, SE, SP	Salt marsh habitat dominated by common pickleweed	Present. Known to occur in the Program area in saline and brackish marshes, particularly those dominated by pickleweed or dense mature tri-corner bulrush (Schoenoplectus americanus) habitat around the Bay edge, including both fully tidal and diked/muted tidal marshes (H.T. Harvey & Associates 2010).
San Joaquin kit fox (Vulpes macrotis mutica)	FE, ST	Flat or gently sloping grasslands, mostly on the margins of the San Joaquin Valley and adjacent valleys	May be Present. Expected to occur only in the southeastern portion of the Program area, in the vicinity of Pacheco Creek and the uppermost reaches of the Pajaro River. If it occurs here at all, likely to occur in low numbers, and infrequently, during dispersal between areas of known breeding activity outside the Program area. No SMP activities are projected in areas where the kit fox can occur.
California Species of Special Concern			
Central Valley fall-run Chinook salmon (Oncorhynchus tshawytscha)	CSSC	Cool rivers and large streams that reach the ocean and that have shallow, partly shaded pools, riffles, and runs	Present. Known to occur in the Program area in Coyote Creek, Los Gatos Creek, Alamitos Creek, and the Guadalupe River in very small numbers (Leidy et al. 2003). Uses the lower reaches of Coyote Creek and Alviso Slough as migration corridors between estuarine habitats and upstream spawning and rearing habitats. However, genetic analysis has confirmed that Chinook in South Bay streams are all derived from hatchery stock, and conditions for successful spawning in the Program area are marginal.
Monterey roach (Lavinia symmetricus subditus)	CSSC	Fairly warm streams and rivers flowing into Monterey Bay	Present. Restricted to the tributaries of the Monterey Bay. It is considered plentiful in the Pajaro watershed and is known to occur in Llagas Creek, Uvas Creek, and the Pajaro River.
Foothill yellow-legged frog (Rana boylii)	CSSC	Partially shaded shallow streams and riffles with a rocky substrate. Occurs in a variety of habitats in coast ranges	Present. This species has disappeared from the farmed and urbanized areas of Santa Clara County as well as many of the perennial streams below major reservoirs. Foothill yellow-legged frogs may still be present along the eastern and western margins of the Program area, along the upper reaches of cobbly streams (H. T. Harvey & Associates 1999).

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Western pond turtle (Actinemys marmorata)	CSSC	Permanent or nearly permanent water in a variety of habitats	Present. Occurs in a number of aquatic habitats in the Program area, including a number of creeks, rivers, lakes, and ponds (H. T. Harvey & Associates 1999, CNDDB 2011). The majority of recent occurrences in the Program area have been from southern areas or from the margins of the Program area, as breeding populations have been extirpated from most agricultural and urbanized areas. However, individuals of this long-lived species still occur in urban streams and ponds as well.
California horned lizard (Phrynosoma coronatum frontale)	CSSC	Open habitats with sandy, loosely textured soils, such as chaparral, coastal scrub, annual grassland, and clearings in riparian woodlands with the presence of native harvester ants (Pogonomyrmex barbatus)	Present. Recorded recently in the Program area only near Calero Reservoir. Probably restricted to a few locations at the margins of the Program area.
Silvery legless lizard (Anniella pulchra pulchra)	CSSC	Areas with sandy or loose loamy soils under the sparse vegetation of beaches, chaparral, or pine-oak woodland; or sycamores, cottonwoods, or oaks that grow on stream terraces	Absent. Historically recorded in Program area in the Alviso area, but no recent records. Silvery legless lizards have been displaced by development or disturbed by agriculture in much of the Program 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 Program area.
Redhead (Aythya americana)	CSSC (nesting)	Nests in marshes and at pond margins	Absent as Breeder. Recorded nesting in the Program area only on a few occasions, in the 1970s and 1980s, at the Palo Alto Flood Control Basin. Low probability of nesting elsewhere.
Western least bittern (Ixobrychus exilis hesperis)	CSSC (nesting)	Nests and forages in freshwater marshes	Absent as Breeder. Although the species has been recorded occasionally in the Program area, no breeding confirmations exist for the Program area, and this species likely occurs only as an occasional migrant.
Black skimmer (Rynchops niger)	CSSC (nesting)	Nests on abandoned levees and islands in saline managed ponds and marshes	Present. Uncommon resident. Black skimmers have nested in the South Bay since 1994. Near the Program area, the species has nested on islands in saline managed ponds in the Alviso area (e.g., on ponds AB1, AB2, A1, A2W, A7, A8 and A16, and Pond A12 (Bousman 2007). May forage in tidal sloughs, but is not expected to occur away from tidal/bayland areas.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Northern harrier (Circus cyaneus)	CSSC (nesting)	Nests in marshes and moist fields, forages over open areas	Present. Within the Program area, potential nesting habitat is present primarily in tidal marshes along sloughs, in diked/muted tidal salt marshes near the Bay, in fallow fields and pastures in Coyote Valley, and in fallow fields and wetlands along lower Llagas Creek, Carnadero Creek, and the Pajaro River. The accessibility of these areas to predators, particularly away from Bay marshes, limits the abundance of nesting pairs in the Program area. Non-breeders are known to forage regularly in grassland, agricultural, and wetland habitats in the Program area, occasionally (e.g., during vole outbreaks) in high densities.
Long-eared owl (Asio otus)	CSSC (nesting)	Riparian bottomlands with tall, dense willows and cottonwood stands (also dense live oak and the California Bay along upland streams); forages primarily in adjacent open areas	May be Present. Rare resident and occasional winter visitor in Santa Clara County (Bousman 2007). Historical breeding records exist for the Santa Clara Valley floor and one recent nest was recorded at Ed Levin County Park west of Calaveras Reservoir (Noble 2007). Could potentially breed in oak woodlands, riparian habitats, and other wooded habitats in the Program area, although likely only in very low numbers.
Short-eared owl (Asio flammeus)	CSSC (nesting)	Nests in marshes and moist fields, forages over open areas	May be Present. Has been recorded nesting in the Program area only in the Palo Alto Flood Control Basin, although it has not been confirmed nesting there since the 1970s. Low probability of nesting elsewhere.
Burrowing owl (Athene cunicularia)	CSSC	Open grasslands and ruderal habitats with suitable burrows, usually those made by California ground squirrels	Present. Present year-round in the Program area in open, agricultural, and grassland areas, where active ground squirrel burrows are present. However, the species has undergone a decline in Santa Clara County. Core populations of breeding and overwintering burrowing owls occur at the San Jose International Airport, in the North San Jose/Alviso area, and in the northern Mountain View area.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Vaux's swift (Chaetura vauxi)	CSSC (nesting)	Nests in snags in coastal coniferous forests or, occasionally, in chimneys; forages aerially	May be Present. In the South Bay, breeds primarily in snags within Santa Cruz Mountain forests, outside of the Program area. However, it also breeds in residential chimneys in the foothills of the Santa Cruz Mountains. Swifts have been observed foraging widely over various habitats, but most commonly in suburban areas having chimneys suitable for nesting, such as Los Gatos, Los Altos, Los Altos Hills, Cupertino, and Campbell (Rottenborn 2007). Thus, it likely breeds more commonly than currently recorded (though still in small numbers) in residential areas in the northwestern part of the Program area. The species forages aerially over these areas during the breeding season, and anywhere over the larger Program area during migration.
Olive-sided flycatcher (Contopus cooperi)	CSSC (nesting)	Breeds in mature forests with open canopies, along forest edges in more densely vegetated areas, in recently burned forest habitats, and in selectively harvested landscapes	Present. Common summer resident in western Santa Clara County (Bousman 2007). This species breeds widely in the Santa Cruz Mountains, and more sparingly in the Diablo Range, but it does not breed on the Santa Clara Valley floor. Likely, few pairs nest at sites below 1,000 feet elevation, but confirmed breeding has occurred at elevations as low as 400 feet (Bousman 2007).
Loggerhead shrike (Lanius ludovicianus)	CSSC (nesting)	Nests in tall shrubs and dense trees; forages in grasslands, marshes, and ruderal habitats	Present. Breeds in a number of locations in the Program area where open grassland, ruderal, or agricultural habitat with scattered brush, chaparral, or trees provides perches and nesting sites (Bousman 2007), although populations seem to have declined in recent years as suitable habitat dwindles with increasingly development. Occurs slightly more widely (i.e., in smaller patches of open areas providing foraging habitat) during the non-breeding season.
Yellow warbler (Dendroica petechia)	CSSC (nesting)	Nests in riparian woodlands	Present. Uncommon breeder in wooded riparian habitats in the Program area. Prefers riparian corridors with an overstory of mature cottonwoods and sycamores, a midstory of box elder and willow, and a substantial shrub understory (Bousman 2007), particularly in areas with more open space adjacent to the riparian habitat (rather than in heavily developed areas). The species is an abundant migrant throughout the Program area during the spring and fall.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
San Francisco common yellowthroat (Geothlypis trichas sinuosa)	CSSC	Nests in herbaceous vegetation, usually in wetlands or moist terraces	Present. In the Program area, the greatest proportion of breeding records are from brackish and freshwater marshes near the edge of the Bay, and in early-successional riparian habitat in broader floodplains along lower Coyote Creek and the Guadalupe River (Bousman 2007). Nests typically are located in extensive stands of bulrushes in brackish marshes and dense cattail beds in freshwater marsh habitat, but also are found in forbs in riparian habitats. Yellowthroats nesting from the northern San Jose/Milpitas/Santa Clara/Los Gatos area northward, both along the edge of the Bay and in riparian and wetland habitats inland, are likely of this subspecies, whereas those in areas to the south are likely of the more widespread subspecies arizela.
Yellow-breasted chat (Icteria virens)	CSSC (nesting)	Nests in dense stands of willow and other riparian habitat	Present. Rare breeder, and only slightly more regular transient, in willow-dominated riparian habitats in the Program area. Historically, it likely bred more widely in Santa Clara County, but it is now rare because of the loss of suitable breeding habitat and brood parasitism in brown-headed cowbirds. In the Program area, the species is most numerous and occurs most regularly on lower Llagas Creek, but it has been recorded along Coyote Creek in the vicinity of Hellyer Park upstream, and it likely occurs in low numbers on other streams south of the more urbanized San Jose area.
Alameda song sparrow (Melospiza melodia pusillula)	CSSC	Nests in salt marsh, primarily in marsh gumplant and cordgrass along channels	Present. Endemic to Central and South San Francisco Bay. In the Program area, it occurs in the taller vegetation found along tidal sloughs, including salt marsh cordgrass and marsh gumplant, near the South Bay. The location of the interface between populations of the Alameda song sparrow and those of the race breeding in freshwater riparian habitats (gouldii) along most creeks is not known because of difficulties in distinguishing individuals of these two races in the field.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Grasshopper sparrow (Ammodramus savannarum)	CSSC (nesting)	Breeds and forages in grasslands, meadows, fallow fields, and pastures	Present. Nests in extensive grasslands with some heterogeneity, including serpentine grasslands. In the Program area, breeding birds occur in the foothills of the Santa Cruz Mountains, and from Calaveras Reservoir southeast to the hills above Pacheco Creek (Heller 2007). Breeding birds also occur in the southeast portion of the Program area, where the hills drop down to the Pajaro River Valley (Heller 2007). It may occur somewhat more widely during migration, but it is seldom detected in the Program area outside the breeding season.
Bryant's savannah sparrow (Passerculus sandwichensis alaudinus)	CSSC	Nests in pickleweed dominated salt marsh and adjacent ruderal habitat	Present. Breeds in the Program area primarily in short pickleweed-dominated portions of diked/muted tidal salt marsh habitat, and in adjacent ruderal habitat, in the South San Francisco Bay (Rottenborn 2007). Breeding also has been confirmed in expanses of short grassland in inland/non-instream areas on the west side of the Coyote Valley and in the Santa Cruz Mountain foothills just north of the Pajaro River Valley (Rottenborn 2007). During the non-breeding season, alaudinus and other savannah sparrow subspecies may forage in open areas throughout the Program area.
Tricolored blackbird (Agelaius tricolor)	CSSC (nesting colony)	Nests near fresh water in dense emergent vegetation	Present. Typically nests in extensive stands of tall emergent herbaceous vegetation in freshwater marshes and ponds. In the Program area, the species is patchily distributed in the Santa Clara Valley, its distribution reflecting the patchy nature of its breeding habitat (Rottenborn 2007). The species occurs as an uncommon non-breeding forager throughout most of the Program area.
Salt marsh wandering shrew (Sorex vagrans halicoetes)	CSSC	Medium-high marsh 6 to 8 feet above sea level with abundant driftwood and common pickleweed	May be Present. Formerly more widely distributed in the Bay Area. This small insectivorous mammal is now confined to salt marshes of the South Bay (Findley 1955). Salt marsh wandering shrews occur most often in medium-high wet tidal marsh (6 to 8 feet above sea level), with abundant driftwood and other debris for cover (Shellhammer 2000). They also have been recorded occasionally in diked marsh. This species typically is found in fairly tall pickleweed, in which these shrews build nests.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Pallid bat (Antrozous pallidus)	CSSC	Forages over many habitats; roosts in caves, rock outcrops, buildings, and hollow trees	Present. Historically, likely present in a number of locations throughout the Program area, but this species has declined in recent decades. Known maternity colonies in the Program area occur at several locations, such as on Cochrane Road near Anderson Dam; south of Berryessa Creek and close to Old Piedmont Road, and on Chaboya Court at the end of Quimby Road in eastern San Jose; and on the Highway 152 bridge over Uvas Creek. Suitable roosting sites are present in a number of other areas, particularly in or near open space or less developed areas around the periphery of the Program area, and the species may be more widespread than is known. Individuals potentially could forage in the Program area in open areas located within several miles of colonies.
Western red bat (Lasiurus blossevillii)	CSSC	Roosts in foliage in forest or woodlands, especially in or near riparian habitat	Present. Occurs as a migrant and winter resident, but does not breed in the Program area. May roost in foliage in trees virtually anywhere in the Program area, but is expected to roost primarily in riparian areas.
San Francisco dusky-footed woodrat (Neotoma fuscipes annectens)	CSSC	Nests in a variety of habitats including riparian areas, oak woodlands, and scrub	Present. Currently, with the exception of records along Coyote Creek and along the edges of the valley, San Francisco dusky-footed woodrats are not known to occur on the urban Santa Clara Valley floor (H. T. Harvey & Associates 2010). They also have likely been extirpated in the southern portion of the county, in the Gilroy and Morgan Hill areas where the valley floor is developed (H. T. Harvey & Associates 2010). In the Program area, Coyote Creek likely supports extant populations of the San Francisco dusky-footed woodrat. Where low open valleys are less developed, woodrat populations appear to remain intact.
American badger (Taxidea taxus)	CSSC	Burrows in grasslands and occasionally in infrequently disked agricultural areas	Present. Known to occur in the Program area primarily in grasslands and less frequently disturbed agricultural habitats, mostly in the foothills but sometimes on the valley floor.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
State Fully Protected Species			
American peregrine falcon (Falco peregrinus anatum)	SP	Forages in many habitats; nests on cliffs and tall bridges and buildings	Present. Peregrine falcons are uncommon breeders in the Program area, but non-breeders are present in small numbers in fall and winter. They may occur anywhere throughout the Program area as a forager or migrant, although always at low densities. In the Program area, peregrine falcons are known to nest at San Jose City Hall and on electrical towers in Mountain View and Alviso managed ponds. The may breed more widely in the Program area from 2012 through 2022.
Golden eagle (Aquila chrysaetos)	SP	Breeds on cliffs or in large trees (rarely on electrical towers), forages in open areas	Present. Breeds widely in the Diablo Range and less commonly in the Santa Cruz Mountains, mostly above the elevation of the Program area, but a few pairs breed at the edges of the Santa Clara Valley at elevations within the Program area (Bousman 2007). Forages somewhat more widely in agricultural/open space areas on the valley floor, such as in the Alviso area, in Coyote Valley, and in the Pajaro River watershed.
White-tailed kite (Elanus leucurus)	SP	Nests in tall shrubs and trees, forages in grasslands, marshes, and ruderal habitats	Present. Breeds across the northern edge of Santa Clara County, from the foothills of the Santa Cruz Mountains near Palo Alto through the open areas edging the South Bay, and into the foothills of the Diablo Range east of Milpitas (Mammoser 2007). Also occurs at scattered locations southward along the Santa Clara Valley floor and the foothills on either side of the valley. Also fairly common along Llagas and Uvas/Carnadero creeks and the Pajaro River.
Ringtail (Bassariscus astutus)	SP	Cavities in rock outcrops and talus slopes, as well as hollows in trees, logs, and snags that occur in riparian habitats and dense woodlands, usually in close proximity to water	May be Present. Ostensibly, suitable habitat is present in forested areas at the upper margins of the Program area, but few confirmed records exist. The species has been observed near Lexington Reservoir, near Highway 152 just west of Gilroy, and near the confluence of Carnadero Creek and the Pajaro River, and it may be present in other areas removed from urbanization.
Other Special-Status Species			
Mimic tryonia (Tryonia imitator)		Coastal lagoons, estuaries, and salt marshes with permanent water	Present. The CNDDB has two records of this species in Santa Clara County, both within the Program area in the Alviso area (CNDDB 2011).

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
Hom's micro-blind harvestman (Microcina homi)		Endemic to serpentine soils in California; found under moist rocks in open hillside-grassland habitat	May be Present. The species has been observed or collected at eight sites, all within Santa Clara County (USFWS 1998). In the Program area, it has been observed in the Santa Teresa Hills, the Morgan Hill area, north of U.S. Highway 101 on Metcalf Road, and near Silver Creek Road (CNDDB 2011).
Jung's micro-blind harvestman (Microcina jungi)		Endemic to serpentine soils in California	May be Present. Known only from one rocky serpentine grassland location 0.9 mile south of the junction of Silver Creek and San Felipe roads near San Jose (USFWS 1998, CNDDB 2011).
Opler's longhorn moth (Adela oplerella)		Serpentine-derived or similar soils that support the moth's host plant, California cream cups	May be Present. Known from nine serpentine habitat locations in Santa Clara County, all within the Program area (USFWS 1998). Occurs on both sides of U.S. Highway 101 from Upper Hellyer Canyon to just south of Gilroy.
Unsilvered fritillary (Speyeria adiaste adiaste)		Openings in conifer and redwood forests, as well as oak woodlands, chaparral, and grassy slopes in the central coast region of California. Require violets (Viola spp.) as larval host plants	Absent. This subspecies is known from the Santa Cruz Mountains in San Mateo, Santa Cruz, and Santa Clara counties. It is not expected to occur at elevations below 1,000 feet in Santa Clara County. It has been determined to be absent from the Program area.
Pacific lamprey (Lampetra tridentata)		Spawns in gravel-bottomed streams or rivers upstream of riffle habitat. Adults forage in marine areas	Present. Historically, this species may have been present in streams throughout the Program area. It currently is known from the Guadalupe River San Francisquito, Coyote, Upper Penitencia, Lower Silver, Guadalupe, Alamitos, Stevens, and Uvas creeks, and may be locally common in these areas (Leidy 2007, SCVWD 2002–2009). The species' status is poorly documented, and abundance in other streams throughout the Program area is poorly understood. It may be present in all accessible portions of streams in the Program area during migration between spawning areas and marine foraging habitat.
Pacific harbor seal (Phoca vitulina richardsi)	MMPA	Found throughout the northern Atlantic and Pacific Oceans along coastal waters, river mouths, and bays	May be Present. Permanent resident of San Francisco Bay. Primary haul-out sites in the San Francisco Bay include Mowry Slough (243 seals in 1999), northeast of the Program area. Suitable haul-out sites for harbor seals are present in the Program area in the tidal reaches of sloughs in the South Bay area and use of haul-out sites varies over time. No pupping sites are currently known within the Program area, although potentially suitable pupping habitat is present.

Name (Scientific Name)	Status	Habitat Association	Potential to Occur in the Program Area
List Status Definitions: Federal FE Endangered under the Endangered Species Act (ESA) FT Threatened under ESA State SE Endangered under the California Endangered Species Act (CESA) ST Threatened under CESA SC Candidate for Listing under CESA SP State Protected CSSC California Species of Special Concern MMPA Species Protected by the Marine Mammal Protection Act Source: Data compiled by H.T. Harvey & Associates in 2013			

CHAPTER 3: MAINTENANCE PLANNING AND IMPACT AVOIDANCE

3.1 Program Environmental Principles

This chapter describes how measures to avoid and reduce impacts are incorporated into SCVWD practices prior to the start of any maintenance work. Proper planning requires a clear understanding of the location, extent, and specifics of maintenance activities; it also requires an understanding of the stream system's natural and aquatic resources. Understanding these resources, their locations and how they interact informs an approach to avoid, minimize, and mitigate environmental impacts when routine maintenance activities need to occur.

The SCVWD's Board of Directors has established Ends Policies that describe the accomplishments that the Board wants to achieve for its customers, the citizens of Santa Clara County. The following policy specifically addresses the need to minimize environmental impacts: "*A net positive impact on the environment is important in support of the District mission and is reflected in all that we do*." Two other policies stress the importance of preserving flood conveyance capacity and maintaining stream bank integrity.

The following maintenance principles have been developed as guidelines to reflect those policies:

1. Avoid unnecessary intervention. Maintenance should only be done when it is determined to be necessary and appropriate to maintain conveyance, structural integrity of stream banks, and/or improve watersheds, streams, and natural resources.

2. Consider the ecological system and its processes, including adjacent land uses, when determining maintenance necessity. If maintenance is necessary, then prior to selecting sediment, vegetation, or bank stabilization treatments, the channel system and its formative processes must be understood to know why the reach is functioning as it is. Established maintenance guidelines (MGs) are a method to document and centralize applicable information to be used to guide appropriate maintenance activities. Where channels are bordered by developed land uses, flood protection requirements may limit stream management options. Maintenance activities will not increase the level of flood protection provided to surrounding lands as defined by as-built information for the reach, or increase the dimensions of an unmodified channel.

3. Seek maintenance solutions which minimize the impacts on the environment. Implementing BMPs, work windows, work activity program requirements, and project and program limits are all methods in which maintenance objectives can be achieved while minimizing impacts.

4. Integrate maintenance activities towards sustainability to reduce frequency of maintenance. The approach for channel maintenance should integrate effective activities that, in time, will reduce the overall need for continued maintenance support.

These maintenance principles collectively guide the SMP's integrated maintenance approach, while taking into consideration a variety of parameters including existing conditions, natural processes, and ecological health.

3.2 Maintenance Triggers and Assessment Process Prior to Conducting Work

SCVWD staff annually inspect channels to identify bank erosion, levee erosion, levee damage from animals, in-channel blockages (debris, large woody debris [LWD], downed trees), sediment deposition, excessive bed scour, and in-channel vegetation growth that may impede flow conveyance. Staff conducting the inspections use MGs, where available, as the basis for identifying deficiencies.

MGs do not exist for all channels, and for those channels where there are no MGs, staff rely on data from the as-built plans and associated flow data including the cross sections. In addition, data from existing SCVWD hydraulic models and the corresponding information from the Maps of Flood Control Facilities and Limits of 1% Flooding prepared by the SCVWD in 1993 will be used. This document provides channel dimensions and type (e.g. natural, concrete, levee) on a reach by reach basis for channels, as well as dimensions and types for other in-channel features such as culverts and bridges.

Inspection staff conduct a visual assessment of the channels. Potential deficiencies are documented on inspection forms and photos are taken of the sites. Information gathered during the inspections is forwarded to technical staff for quantitative analysis and assessment, which may include the collection of survey data and hydraulic modeling. A multidisciplinary team consisting of engineers, biologists, inspection staff, and construction staff meet to review each site, prioritize the site for maintenance, and determine the appropriate course of actions to remedy the deficiency.

3.2.1 Vegetation Management

In-channel Vegetation Management

In-channel vegetation management is performed to maintain channel capacity. This type of work involves activities that result in reduction or removal of vegetation by using herbicide treatments, mechanical mowing or hand removal.

Triggers: Vegetation management activities are triggered after inspection of a facility indicates a deficiency as defined by any of the following:

1. Visual observation (verified by field measurement) indicating that vegetation exceeds allowable tolerances identified in the MGs.
2. Visual observation (verified by field measurement), compared with the design or as-built channel roughness condition, indicating the need to remove vegetation.
3. Visual observation (verified by quantitative estimate of roughness conditions), compared with the vegetation condition that provides a balance between flow capacity and habitat function and value in the channel, indicating that vegetation must be removed to restore that balance
4. Vegetation poses a threat to proper function or integrity of facilities (including channel bed and banks, for instance if vegetation growth is directing flows into a channel bank, leading to bank erosion).
5. Essential maintenance or emergency access is prohibited or public safety is threatened.

Assessment and Prioritization Process: Assessment of annual inspection records and field data may identify potential locations in need of vegetation management. Technical staff

evaluate these locations to determine if conditions meet any of the triggers. The following is the assessment process for evaluating these potential locations:

Inspections: SCVWD staff annually inspects channels as described in Section 3.2. Annual inspection results that identify potentially problematic vegetation growth are forwarded to technical staff for further evaluation.

Assessment and Analysis of Inspection Results: Analysis of the inspection results is conducted by technical staff to ensure an accurate assessment of the current channel capacity and conveyance at those locations. Staff analyzing the inspection results may collect additional measurements and information about the site including but not limited to, cross-section surveys, photo documentation, and vegetation inventories. The measurements and information acquired are compiled to develop a clear understanding of the current condition, particularly the current channel roughness (Manning's N value). The current condition is then compared to available MGs. If MGs are not available for a location, staff follows the process described in section 3.6.2. Hydraulic modeling may be used to determine the effects of the current channel roughness on flow conveyance and capacity where the allowable channel roughness is not defined by a maintenance guideline. This information is then compared against the defined maintenance triggers to determine if the site requires vegetation management.

SCVWD maintenance crews will inspect and treat, as necessary, all required crossings to maintain flow conveyance. Each crossing is distinct and will be evaluated per site specific condtions. Therefore, the amount and type of work will be different for each crossing. Vegetation will not be removed beyond that which is described in the maintenance guideline or beyond that which is consistent with the vegetation objectives for a specific creek reach. Inspections may also identify the presence of undesirable non-native vegetation. These results are forwarded to technical staff for review and may result in the collection of additional field data to document the extent of the non-native vegetation. The SCVWD will use a multi-disciplinary team consisting of biologists, vegetation management staff, and engineers to evaluate the identified locations.

Invasive vegetation that is removed for the purposes of flow conveyance is considered an impact neutral activity and no mitigation will be required.

Non-In-channel Vegetation Management

Vegetation management outside of the stream is performed for several reasons. Reasons to perform vegetation management work in these areas include:

1. To provide maintenance access for in-channel activities.
2. To address public safety issues.
3. To maintain the structural integrity of facilities.
4. To maintain habitat integrity.

Each of these activity types is described separately below. Avoidance and minimization approaches for all non-in-channel vegetation work activities are addressed in section 3.5. Maintenance will be performed when applicable triggers are met and are not conditioned by MGs or section 3.6.2, except where otherwise noted below.

1. Maintenance Access

Maintenance access activities include pruning of obstructive vegetation and herbicide applications on maintenance roads. This is an annual preventative maintenance activity to ensure continual access to facilities for maintenance purposes**.**

Triggers: Pruning work is triggered when vegetation along existing maintenance roads, maintenance footpaths and along fence lines overhanging the roadway or path such that visibility to the roadway has become impaired, damage to vehicles or equipment traveling along the roadway is possible, or the growth restricts access.

Herbicide work on maintenance roads is an annual activity that is planned and scheduled for dry periods during the mid-Fall through late Spring season, before weeds or other undesirable vegetation are able to establish. This activity is conducted pre-emptively and therefore does not have a specific trigger mechanism.

Assessment and Prioritization Process: Pruning work is prioritized based on the impacts to vehicle traffic or the length of time since the last pruning event. Various facilities require pruning on varying intervals; some are scheduled annually, while others are scheduled for pruning every 2 to 3 years. Vegetation management staff inspects all maintenance roads and access ramps twice annually and apply herbicide as necessary. Vegetation management staff apply pre-emergent herbicide to all SCVWD maintenance roads to prevent vegetative growth that could impede access and along property lines to provide fire breaks. Follow up treatments of post-emergent herbicide are applied to all maintenance roads and along property lines as needed. Post-emergent is applied via spot spraying, which limits the amount of herbicide used.

Inspections: Pruning work is performed after an inspection of the facility has identified that overhanging vegetation will impact vehicle traffic, maintenance footpaths, or impedes visual inspection of the facility. Upon this determination, a work order request is generated and appropriate staff is dispatched to perform the pruning work as required to provide necessary SCVWD access. Pruning work is generally performed in a manner that trims back vegetation beyond the edge of roadway so that re-occurring pruning work is not required for two years. Pruning techniques are discussed further in Chapter 4.

Herbicide work is performed twice annually, as previously described, by licensed applicators under the written direction of a licensed Pest Control Advisor after an assessment of conditions is performed. An herbicide work assessment is performed for each site prior to scheduling application. This assessment includes recommendations and methods of application that are then documented in individual work orders and pesticide recommendations for each site. Worker qualifications and herbicide application techniques are discussed further in Chapter 4.

2. Public Safety

Maintenance activities to address public safety issues include mechanical mowing, hand mowing/weed whacking, pruning, and herbicide applications above ordinary high water. This is an annual preventative maintenance activity to abate combustible vegetative fuels and meet local fire codes and civil ordinances.

Triggers*:* Work to address public safety issues is triggered when vegetation on SCVWD facilities, including maintenance roads, could be considered a fire hazard by fire officials.

Herbicide work on maintenance roads has a dual purpose of providing maintenance access and establishing firebreaks adjacent to neighboring properties. Mechanical mowing and hand work is performed on slopes and large areas such as floodplains where herbicide use is not practical or would be more impactful.

Assessment and Prioritization Process: Mowing activities in this category are prioritized based on the type of adjacent property, historical records of where fires have occurred, and the effects of local micro-climates (temperature, wind, etc.). Inspection and herbicide application is performed twice annually to prevent vegetative growth that could present a fire hazard during summer months.

Inspections: These work activities are performed after an inspection of the facility has identified vegetation that could be considered a fire hazard. Work assessments are performed on a site-by-site basis. Typically, skilled staff performs an assessment at each location to determine the appropriate method to abate the fire hazard. A work order is generated and appropriate staff or contractors are dispatched to perform the work. For all activities, work is generally performed in a manner that reduces potential fuel load to a level acceptable to local fire authorities. Worker qualifications and work techniques are discussed in Chapter 4.

3. Structural Integrity of Facilities

Structural integrity of facilities is preserved through control of woody volunteer establishment on engineered structures. Such structures include concrete wing walls and appurtenances and levees whose integral strength may become damaged by woody vegetation. This is a corrective maintenance activity performed after deficiencies are identified in annual facility inspections.

Triggers: Work to address structural integrity of facilities is triggered after an annual inspection has determined that conditions are present that could degrade the structural strength of facilities. Vegetation growing in concrete weep holes and expansion joints are examples of the conditions that trigger work to be performed. Work activities include mowing, pruning, and spot herbicide applications, and would not involve ground disturbance. While woody vegetation on levees would trigger an assessment for needed work, justification for work would be provided via MGs or section 3.6.2.

Assessment and Prioritization Process: Activities in this category are performed annually as needed, usually during the winter months. Prioritization is based on the potential consequences resulting from the failure of the facility.

Inspections: Once an inspection of the facility has identified that vegetation either represents or could represent a structural deficiency in the facility, a work order request is generated and appropriate staff or contractors are dispatched to perform the work. For all activities, work is performed in a manner that alleviates the potential for structural deficiency.

4. Maintenance of Habitat Integrity

Maintenance activities to support habitat integrity focus on management of invasive plants to support the success of local native plants and habitats. Other issues, such as diseased trees or instances of Sudden Oak Death will also be considered. Specific activities include pruning, hand removal, and herbicide applications to invasive plants. The extent of this activity is balanced with the potential for excessive vegetation removal to degrade habitat and beneficial uses.

Removal of invasive vegetation up to that necessary to maximize ecological functions and values will be considered mitigation under the IPMP; removal of greater amounts of vegetation to address other objectives, such as flow conveyance capacity, will be subject to mitigation requirements.

Triggers: Work to maintain habitat integrity is triggered after an annual inspection has determined that the establishment or continued growth of non-native vegetation poses a threat to the continued growth, natural recruitment or survival of native species. Non-native and invasive vegetation can establish, outcompete and overwhelm native vegetation, degrading habitat value.

Assessment and Prioritization Process: Activities in this category that are not performed as part of the IPMP mitigation methodology will be prioritized based on protecting the existing functions and values of the habitat.

Inspections: These work activities are performed after an inspection of the facility has identified that undesirable vegetation could degrade or has degraded native habitat and the benefits provided to a variety of species. Upon this determination, a work order is generated and appropriate staff or contractors are dispatched to perform the work. For all activities, work is generally performed in a manner that minimizes the presence of undesirable species. Undesirable species may be left in place where they are helping support the native habitat (e.g., a mature non-native tree which provides shade in a reach where no other mature trees exist).

3.2.2 Sediment Removal

Sediment removal operations consist of mechanical removal of sediment deposited within a creek that reduces design flow capacity, prevents appurtenant facilities from functioning as designed, or impedes fish passage and access to fish ladders.

Triggers: The need for sediment removal is triggered when conditions in the channel meet any of the following:

1. Visual observation (verified by field measurement) indicating that sediment exceeds allowable tolerances identified in the MGs.
2. Visual observation (verified by field measurement), compared with the design or as-built dimensions of the channel, indicating the need to remove sediment.
3. Sediment deposition poses a threat to proper function or integrity of facilities (including channel bed and banks, for instance is sediment deposition is directing flows into a bank, causing bank erosion).
4. Sediment deposition blocks access to maintenance roads and/or public trails (bridge under-crossings).
5. Sediment deposition within the footprint (i.e. below/above/within) fish ladders impedes access during migration seasons for anadromous fish. Sediment impediments vary depending upon the size of the ladder, flow regimes during migration seasons, and depth of sediment. Each ladder/fish screen will be assessed based on its functionality. (See section 11.8 for more information.)

Assessment and Prioritization Process: Sites are individually evaluated and prioritized based on the risk to public safety based on reduced flow conveyance capacity and potential for flooding.

Inspections: Staff conduct annual inspections of channel facilities to monitor stream functions and to identify specific areas that require additional evaluation. Initial evaluations of sediment deposition areas are made visually in addition to the collection of photo documentation, field measurements (length and depth of sediment deposition), and other site specific information. Locations identified as needing additional evaluation are forwarded to technical staff for evaluation (see Assessment and Analysis of Inspection Results, below).

Assessment and Analysis of Inspection Results*:* If needed, hydraulic modeling will be performed using field survey data to ensure an accurate assessment of the current channel capacity and conveyance at those locations. Staff analyzing the inspection results may collect additional measurements and information about the site including but not limited to, cross-section surveys, photo documentation, and identification of potential causes such as constrictions or blockages. The measurements and information acquired are compiled to develop a clear understanding of the current condition which may include hydraulic modeling. The current condition is then compared to the available MGs, as-builts, and the established maintenance baseline[1], when available. If documentation is not available for a location, staff will follow the process described in section 3.6.2. This information is then compared against the defined maintenance triggers to determine if the site requires sediment removal. The process also includes an assessment of the presence and possible effects on sensitive habitats, using the methods described below in section 3.3.

[1] "The maintenance baseline", as developed/established by the MGs, is a description of the physical characteristics (e.g., depth, width, length, location, configuration, or design flood capacity, etc.) of a channel or channel reach that defines the limits of maintenance activities authorized under the SMP, subject to any case-specific conditions. Where no maintenance baseline has been established by an approved MG, maintenance shall be conducted in accordance with Section 3.6.2 of the SMP Manual.

The agencies will approve the maintenance baseline via the MGs based on the approved or constructed capacity of the channel or channel reach. The District will determine the maintenance baseline through development of MGs for the channel or channel reach as specified in Chapter 3.6.4 of the SMP Manual. In addition to the MGs, the SMP Manual includes best management practices to ensure that the impacts to the aquatic environment are minimal, especially in modified channels with ecological values and unmodified channels. (The permitting agencies may request maintenance records in areas where there has not been recent maintenance). Revocation or modification of the of the maintenance baseline established through the MG development process can only be done by written mutual agreement between the District and permitting agencies. The SMP authorizations cannot be used until the permitting agencies approve the maintenance baseline, either by approving the relevant MG, or following review of the supplemental information specified in Chapter 3.6.2 (for channels without approved MGs). The annual NPW shall include all information required to demonstrate that proposed maintenance activities will be implemented consistent with the maintenance baseline as defined above, and shall determine the need for mitigation and any channel or activity-specific conditions. Once determined through the MG development process, the maintenance baseline will remain valid for any subsequent reissuance of the SMP authorizations.

3.2.3 Bank Stabilization

Bank stabilization activities are actions by the SCVWD to repair creek banks, levees and beds that are eroding or are in need of erosion protection. Bank and bed erosion can compromise the structural and habitat integrity of channels, as well as creating water quality and public safety concerns. Extensive bank erosion can impact adjacent public infrastructure or private property and adverse impacts to water quality, requiring action to prevent unacceptable loss.

Triggers: The SCVWD may implement bank stabilization when the problem:

1. Causes or could cause significant damage to SCVWD and/or adjacent property;
2. Is a public safety concern; and/or
3. Is causing in-channel sedimentation, and/or affecting water quality and other beneficial uses such as riparian habitat and recreation.

Assessment and Prioritization Process: The annual field inspection process and subsequent desk assessment process results in the identification of multiple erosion sites determined to be moderate to high risk to public safety, water quality, habitat values and/or other infrastructure. Site with the highest priority are submitted for approval in the Notice of Proposed Work (NPW).

Inspections: SCVWD staff conducts annual inspection of channel facilities to identify specific areas requiring additional evaluation. Initial evaluations of bank and bed erosion areas are made visually. Inspectors collect photo documentation, identify possible causes, record proximity to infrastructure or private property and any other site specific information that may be relevant. Data collected during the annual inspection process is provided to technical staff for further evaluation.

Assessment and Analysis of Inspection Results: Inspection results forwarded to technical staff are reviewed to determine which sites require additional investigation or the collection of field data including, but not limited to field surveys to assess vicinity of failure to adjacent private and public structures, is failure compromising critical maintenance access, scour characteristics for potential to have a massive failure (slope of bank, depth of scour), and potential for substantial change to the site (i.e. how stable is the site or is it experiencing rapid change/erosion).When further analysis determines that conditions at a specific erosion site meet one or more of the maintenance triggers and requires action, a plan is developed to stabilize the site. The plan for stabilizing the channel is based on the parameters and considerations described in Chapter 6, Section 6.2, and the descriptions of the bank stabilization techniques contained in Attachment A. Evaluation of the site and selection of the repair method includes the collaborative work of engineers, biologists and construction staff to ensure impacts are minimized and stream functions are maximized.

3.2.4 Management of Animal Conflicts

Management of Animal Conflicts consists of actions taken by the SCVWD to prevent animal damage to SCVWD facilities or assets, and actions to prevent animal conflicts with SCVWD work activities. Animals can damage SCVWD facilities by burrowing into levees and creek banks. Animal burrows in levees and creek banks may threaten their structural integrity which can lead to failure, sloughing, and slumping. Animals foraging on revegetated mitigation sites

can reduce the health and vigor of plants and lead to failure of the revegetation site. The presence of some animals in work areas could lead to injuries for workers.

Triggers: The SCVWD may implement animal conflict management activities when:

1. Visual observations indicating damage from animals burrowing into levees, creek banks or undermining other SCVWD facilities and or assets.
2. Visual observations of excessive animal forage on mitigation sites.
3. Visual observations of animals in an area where a work activity will occur that may pose a safety concern for workers, such as bees or wasps.
4. Knowledge for the potential to have animal conflicts (burrowing) where vegetation management or biological controls could be effective but take time to implement.

Maintenance will be performed when these triggers are met and are not conditioned by MGs or section 3.6.2.

Assessment and Prioritization Process: There are two main processes that identify the triggers for animal conflict management work. The first process is the field inspections that are conducted by watershed staff. In this process, the watershed staff logs animal conflict activities, mainly burrowing rodent activities, during their annual/quarterly inspections. Staff identifies the areas where animal damage has caused or has a high potential of causing a failure of a bank or levee. Field inspections of work areas prior to starting projects may identify the presence of potentially harmful species that pose a health risk to the general public and/or SCVWD staff. Field inspections of mitigation sites may identify excessive animal foraging on revegetation and the need for preventative measures such as fencing or caging of revegetation areas. Knowledge of previous nesting activity in a proposed work area that would prevent a project from being constructed may trigger a request for an evaluation of the use of preventative nesting measures such as the use of bird netting.

Another avenue that identifies this work is requests for services that are generated by internal staff or external entities. These requests are sent to the individual watershed staff and are followed up with a field inspection to determine the actual need and allowable activity.

Prioritization of these activities is made at the watershed level, based on the critical nature of the facility. Rodent activity on levees receive immediate and on-going attention until burrow activities are not evident. For stream banks or other infrastructure, priority is given to areas displaying damage or evidence of multiple rodents. All of the inspections/evaluations for these types of activities are placed into a work request and are routed through the watershed for an engineering, environmental, and biological evaluation.

3.2.5 Minor Maintenance

Minor maintenance work addresses small scale erosion or sediment deposition less than or equal to 25 cubic yards. Minor maintenance also allows for removal of trash and other minor debris located within the channel. Some stream gage maintenance and the maintenance of mitigation or landscape sites are also minor maintenance activities. See Chapter 8 for a full description of these activities.

Triggers: Any of the following on-the-ground conditions may trigger the need for minor maintenance:

1. Minor erosion repair above OHW, consistent with the activity as described in Chapter 8 (this does not include bank stabilization activities).
2. Minor sediment deposition (less than or equal to 25 cubic yards) that is compromising channel function and/or public infrastructure.
3. Trash or debris compromising public safety, structural integrity of a facility, water quality, or habitat values.
4. Damage to fences, gates, and other structures.
5. Damage to existing maintenance roads.
6. Stream gage maintenance.
7. Mitigation and landscape sites requiring maintenance.

There are a number of more specific triggers for when these activities are required. The majority of these triggers come in the means of inspection and analysis where it is recognized that there could be or has been damage that has caused or has a high potential of causing detrimental effects to the surrounding environment and/or SCVWD facilities.

Assessment and Prioritization Process: There are two main processes that identify this maintenance work. The first process is the field inspections that are conducted by watershed staff. In this process, watershed staff logs the type of issue to be addressed during their annual/quarterly inspections. Another avenue that identifies potential issues is requests for services that are generated by internal staff or external entities through the SCVWD's tracking system. These requests are sent to individual watershed staff and are followed up with a field inspection to determine the actual need and allowable activity for the described issue.

Prioritization methods vary based on the specific minor maintenance activity in question. Minor sediment depositions are prioritized based on level of impact to channel or infrastructure. If infrastructure is inoperable, nearly inoperable, or at risk of failure, action will be proposed. For trash and debris removal, priorities are set based on (1) the level of impact to habitat values, (2) the amount of public or political outcry for action, (3) a pre-determined list of routine sites scheduled for regular clean up as required by voter initiative. All of the inspections/evaluations for these types of activities are placed into a work request and are routed through watershed staff for an engineering, environmental, and biological evaluation. Further field evaluation is conducted if the desktop evaluation of the issue determines it is necessary.

3.3 Work Approach in Sensitive Habitats

While the SCVWD manages streams throughout Santa Clara County to provide flood protection, sensitivity to the ecological values in these channels/facilities is required in the manner that the SCVWD conducts its work. Some channels support resources which are considered particularly sensitive.

"Sensitive habitats," for the purposes of this document, are defined as channels supporting federally or state listed threatened or endangered species, State species of special concern and their habitats, are designated as Critical Habitat, are designated as special status natural communities, and/or are special aquatic sites as defined by USACE (e.g., wetlands, riffle and pool complexes, etc.). Special status natural communities are communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental effects of projects. These communities may or may not contain special status species or their

habitat. The most current version of DFW's *List of California Terrestrial Natural Communities* indicates which natural communities are of special status given the current state of the California classification.
(**http://www.dfg.ca.gov/biogeodata/vegcamp/natural_communities.asp**)

The SCVWD uses a comprehensive approach to identify and manage work in sensitive habitats. This approach may include the following activities:

- Training maintenance staff
  - Annual BMP training
  - On-going sensitive resources training focusing on new data
  - SCVWD Policies
- Use of avoidance and minimization measures
- Implementation of BMPs
- Project review by trained biological staff to identify sensitive habitats
- Implementation of biologist's recommendations

Each year the SCVWD conducts training for the Field Operations Unit staff regarding the SCVWD's BMPs and on resource protection requirements. The Field Operations Units conduct tailgate safety training where new information on sensitive resources may be discussed. Where sensitive resources are present on or adjacent to a work site the maintenance crews are trained on the site specific requirements. This on-site training may include species identification, identification of protected resources, creation and implementation of buffer zone locations and sizes, and what to do when work may need to proceed within the buffer zones.

As part of the work order development and implementation process, each work order is submitted to biological staff for review and assessment of sensitive biological resources. The work order is assigned to one or more biologists trained in the resources that are likely to be found on site. The biologist then conducts an initial assessment to determine if the work will affect known sensitive habitats. If the work will affect known sensitive habitats the biologist will identify the BMPs to be employed and may recommend additional field surveys.

The SCVWD employs procedures to determine how and when maintenance will occur in such sensitive habitats, both to identify the BMPs appropriate for avoiding and minimizing impacts to such habitats and the species that use them, and to determine mitigation requirements. The procedures used to approach work in sensitive areas are as follows:

1. The SCVWD identifies maintenance needs, activities, and locations for the upcoming maintenance year that may occur in sensitive habitat.

2. Prior to initiation of any work activity identified within a sensitive habitat, a SCVWD biologist familiar with the life history requirements of the listed species will conduct an evaluation. The assessment may include review of aerial photography, GIS based review of habitat mapping or species distribution, specific field surveys, or other agency information pertinent to the site or species information.

3. Where sensitive resources are identified in the work area by a SCVWD biologist, the limits of the affected resources may be mapped or delineated in the field. For each activity, the SCVWD biologist identifies the BMPs or other recommendations that must be implemented to avoid and minimize impacts, based on the sensitive habitats/species

that may be present. The maintenance supervisor then ensures that the recommendation or BMPs are implemented before and during the maintenance activity.

3.4 Work Windows

Work windows are used to minimize and avoid potential impacts to protected species and habitat. Additional Program parameters are included in the specific work activity chapters. The following series of tables presents the work windows for various locations and maintenance activities. Figures 3-1 and 3-2 provide maps of creeks supporting the fish identified in the tables below.

Table 3-1. In-channel Work Window for Creeks supporting Sensitive Species (creeks supporting anadromous salmonids, and in San Francisco Bay tidal areas, green sturgeon and longfin smelt)

Work Activity	June 15 – Oct 15	Oct 15 – Oct 31 No work once significant rainfall occurs (0.5" within 24-hr within watershed)[3]	Nov 1 – Dec 31 No work once significant rainfall occurs (0.5" within 24-hr within watershed)
In-channel hand pruning	X	X	X
In-channel hand removal	X	X	X
Herbicide	X[1,2]	X	X[1,2]
Sediment Removal	X	X	
Bank Stabilization	X	X, if at least 50% complete on October 15	

X = work is allowed

[1] Surfactant use on the 14 creeks supporting anadromous salmonids is permitted when the stream is dry in the immediate work location and no rain is forecast for the next 24 hours.
[2] Aquatic herbicide can only be used in California red-legged frog and California tiger salamander SMP mapped areas when the creek is dry and no rain is forecast for the next 48 hours.
[3] After October 1st, seventy-two-hour look-ahead weather forecasts from the National Weather Service (or local vendor such as the Western Weather Group) are consulted to prepare for possible winterization measures. If a significant rainfall is forecast within the coming 72-hr forecast window, then maintenance work that may result in sediment runoff to the stream shall be stopped, to allow adequate time to complete erosion control measures. Winterization materials will be available and installed prior to significant rainfall. If after a storm event occurs and there was not significant rainfall, the project will continue until next significant rainfall or October 31st.

Table 3-2. In-channel Work Window for Creeks that Do Not Support Sensitive Species (creeks NOT supporting anadromous salmonids, and in San Francisco Bay tidal areas, green sturgeon and longfin smelt)

Work Activity	June 15 – Oct 15	Oct 15 – Nov 30 No work once significant rainfall (0.5" within 24-hr within watershed)[1]	Dec 1 – Dec 31 No work once significant rainfall (0.5" within 24-hr within watershed)[1]	June 15 – Dec 31 Work even after significant rainfall (0.5" within 24-hr within watershed)[1]	Year Round, except where mechanized equipment crosses a creek or otherwise affects water quality[2]
In-channel hand pruning					X
In-channel hand removal					X
Herbicide	X	X	X		
Sediment Removal	X	X		X, specific reaches of Berryessa, Lower Silver, Thompson, Canoas, Ross, Calabazas, San Tomas Aquino	
Bank Stabilization	X	X, if at least 50% complete on October 15 or is a new project that will be completed in five (5) days or less			

X = work is allowed

[1] Seventy-two-hour look-ahead weather forecasts from the National Weather Service (or local vendor such as the Western Weather Group) are consulted to prepare for possible winterization measures. If a significant rainfall is forecast within the coming 72-hr forecast window, then maintenance work that may result in sediment runoff to the stream shall be stopped, to allow adequate time to complete erosion control measures. Winterization materials will be available and installed prior to significant rainfall. If after a storm event occurs and there was not significant rainfall, the project will continue until next significant rainfall or October 31st.

[2] If heavy equipment would be required for in-channel work, the work would be included in the NPW for the in-channel work window.

Table 3-3. Non-in-channel Work Window

Work Activity	Year-Round, except where mechanized equipment crosses a creek or otherwise affects water quality	Date Specific Work Period
Vegetation Management	X	
Herbicide	X Per Material Safety Data Sheet and Product label limitations	1
Large Woody Debris	X See Management of LWD guidelines	
Mowing		Feb 1 – Nov 30
Flaming	X	
Grazing	X	
Management of Animal Conflicts	X Per special status species and pesticide requirements	
Minor Maintenance	X In-channel work follows activity specific work windows	

X = work is allowed

1. Herbicide application can only occur in California red-legged frog and California tiger salamander SMP mapped areas when the creek or area is dry and no rain is forecast for the next 48 hours.

Protected Fish Species in North Santa Clara County

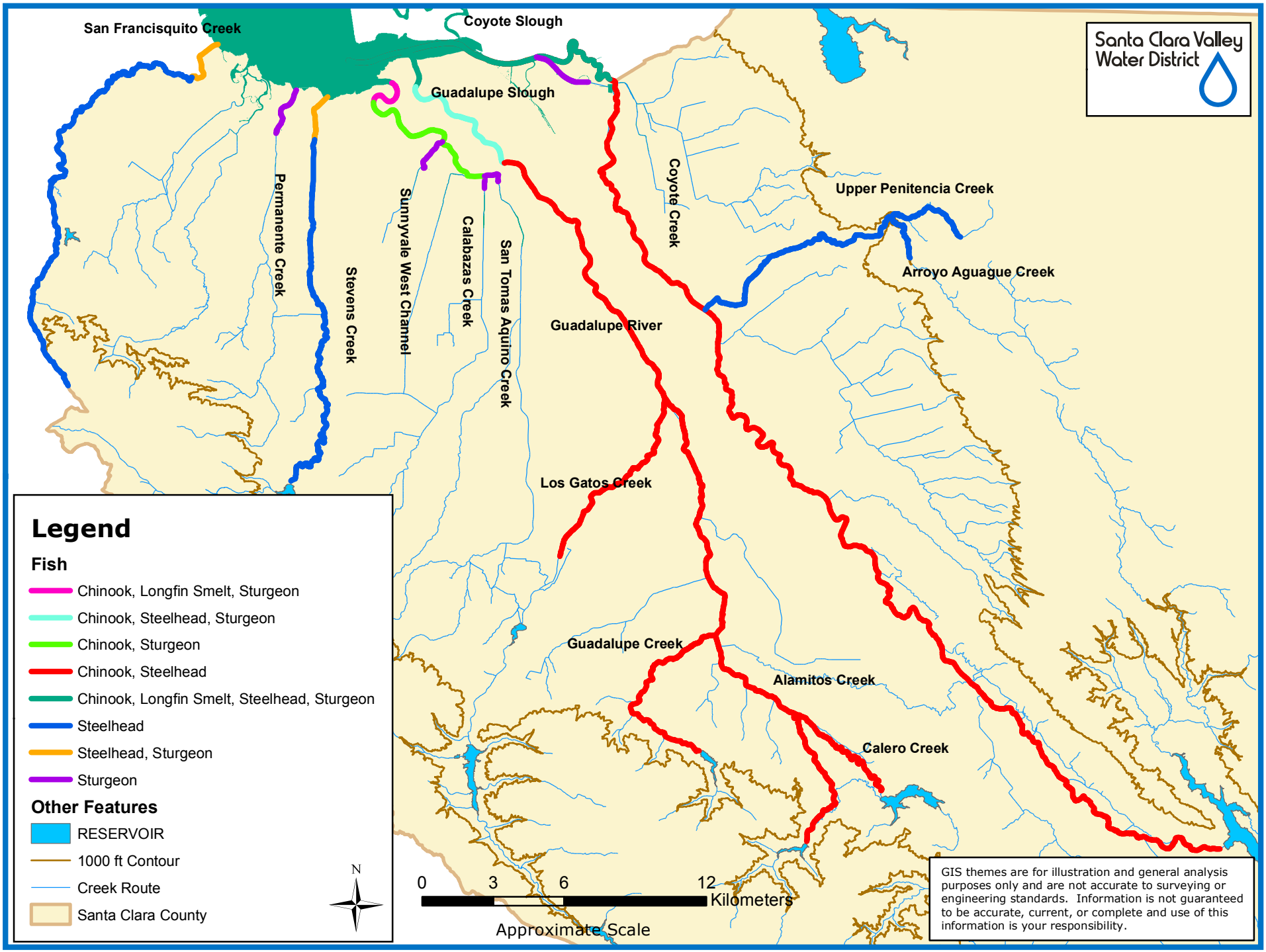


Figure 3-1. Protected Fish Species Distribution in the Northern Portion of Santa Clara County.

Protected Fish Species in South Santa Clara County

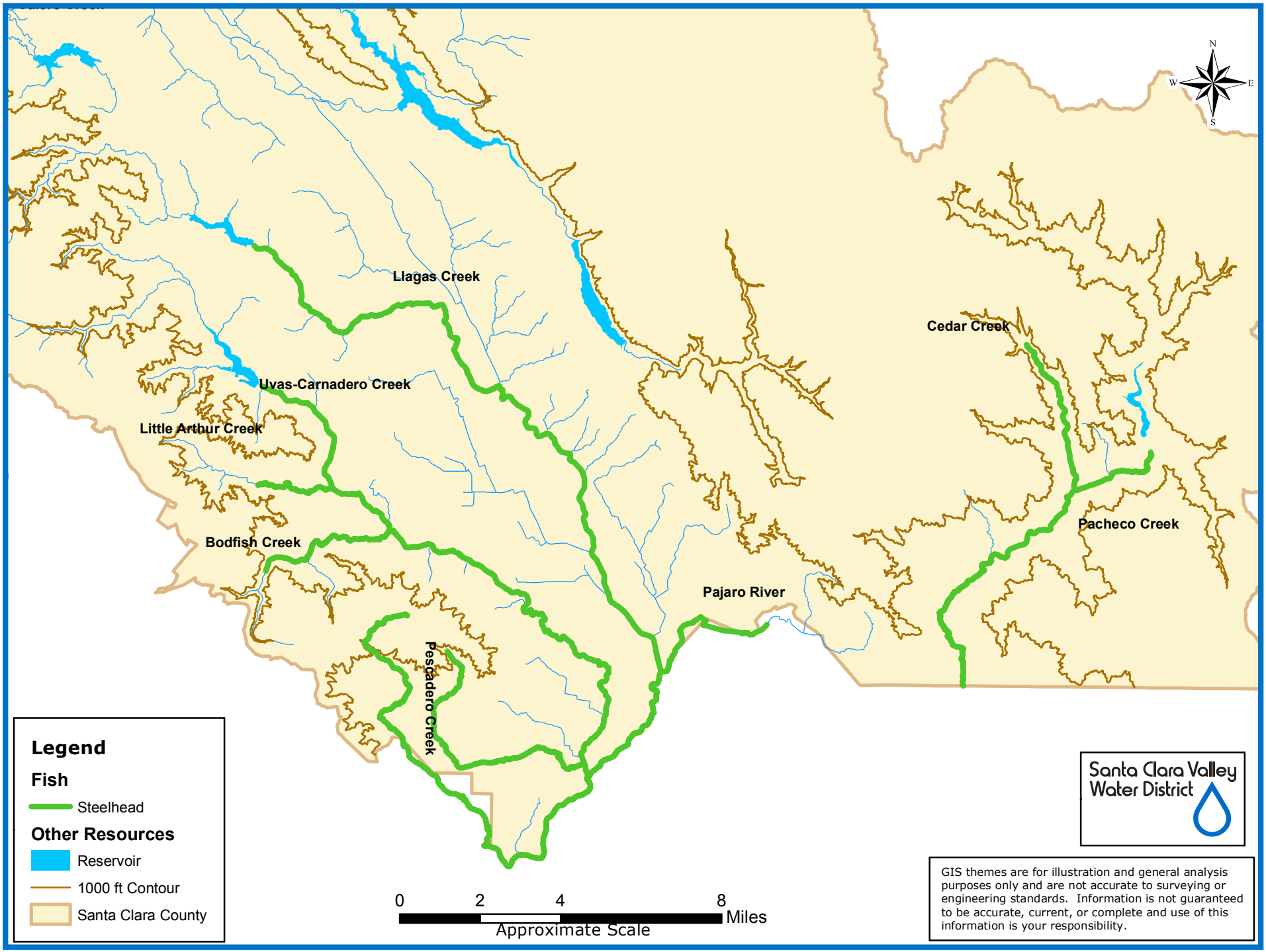


Figure 3-2. Protected Fish Species in the South County

3.5 Best Management Practices (BMPs)

Best Management Practices are operational and procedural practices developed to protect natural resources, and to protect the health and safety of maintenance workers and the general public. These measures are designed to avoid or minimize impacts associated with stream maintenance activities. Individual BMPs may be applied program-wide or on a site-by-site basis to protect the site and the surrounding area. As discussed in Section 3.1, SMP environmental principles guide the use and implementation of BMPs at maintenance projects. BMPs enable the SCVWD to implement maintenance solutions that avoid and minimize impacts on the environment, consider the ecological system around the project, and integrate maintenance activities towards sustainability.

BMPs are evaluated annually and revised as needed to ensure adequate and appropriate protection of natural resources, and the health and safety of maintenance workers and the general public. District staff and contractors are trained annually on the BMPs, including any revisions that have been agreed to by the regulatory agencies. The table of BMPs is located in Attachment F. This table is organized into groups corresponding to program activities and specific environmental resources. A description of each BMP group is provided below. When BMPs are revised, they are submitted to the agencies for review and approval prior to implementation.

Pre-Project Planning and General BMPs (GEN-X)

Pre-project planning BMPs are implemented when developing the annual work plan. These BMPs are employed prior to on-site maintenance work. Pre-project planning BMPs are used to identify site requirements for dust control, hazardous materials management, sediment stockpiling, water quality protection, dewatering planning, vehicle maintenance, and fire protection. Pre-project BMPs also include protection of sensitive biological and cultural resources. Site design constraints for sediment and bank stabilization activities, in particular, are also identified as part of the pre-project planning process. Public safety BMPs describe public outreach and protection measures. General BMPs are applicable program-wide and include standard construction practices, worker safety, and impact avoidance measures.

Vegetation Management (VEG-X)

Vegetation management BMPs provide guidance on minimizing erosion from in-channel and non-native vegetation removal, equipment selection, flaming, and grazing.

Minimization and Avoidance. Non-channel vegetation management activities are performed through work orders and use of applicable BMPs, thus avoiding and minimizing impacts to the environment. Field staff conduct field surveys at the start of every job and periodically as the job progresses to ensure that no changes in conditions have occurred since the pre-construction biological surveys were performed. Any change in conditions is reported to biological staff and if necessary, adjustments are made prior to commencing or continuing work. If adjustments cannot be made to adequately avoid or minimize impacts, work may be deferred completely, or specific areas may be deferred.

In the case of herbicide applications, products with the lowest toxicity are used. Testing of the effectiveness of various herbicide rates is conducted to ensure that the lowest effective rate is used. Application methods are adjusted near the upper hinge point of the channel at top of bank to prevent the herbicide from entering the channel cross section. Spot spraying and direct stump

application reduce the amount of herbicide used versus broadcast spraying and avoids or minimizes impacts to non-target vegetation and other resources.

Finally, minimization is further achieved by specifically targeting emergent vegetation during the post-emergent work conducted in the late winter and spring. This establishes an annual approach involving less intensive treatments and reduced impacts, compared to a less frequent approach with more intensive treatments that would have substantially higher impacts. Vegetation is managed to encourage growth of native vegetation in an effort to reduce non-native or undesirable vegetation through shading, where feasible.

Sediment Removal (SED-X)

Sediment removal BMPs provide guidance specific to sediment removal activities and to site-specific conditions. The sediment removal BMPs include management of groundwater resources, prevention of downstream scouring, restoration of channel features, and berm bypasses.

Minimization and Avoidance: Prior to the initiation of sediment removal operations, a series of field meetings with technical, engineering, biological and construction staff are conducted to strategize sediment removal efforts. Access, staging, travel, water diversion, exact areas of work, and habitat values are some of the issues discussed in detail. When habitat values may be impacted by the need to access the channel, staff works collaboratively to identify methods to minimize vegetation removal, minimize impacts to aquatic habitat, and to reduce the amount of temporary grading work needed to construct access paths or ramps. Stream flow diversions are common for sediment removal operations, but staff also discusses opportunities to remove sediment without disrupting stream flows, by selectively removing pockets of sediment outside the low flow channel. This option leaves stream functions in the low flow channel unchanged during sediment removal operations. For sites where installation of stream flow diversions cannot be avoided, staff install diversion dams and energy dissipation tools to minimize water quality impacts that can occur at the pump and bypass discharge point. Fish residing at the project site are collected and re-located during the de-watering process. In general, multiple factors are considered to reduce the overall impact of a sediment removal operation.

Limited sediment removal work is conducted in the low flow channel of facilities identified as anadromous salmonid habitat. Maximum creek lengths for sediment removal are included at the end of this chapter and in Chapter 5. Sediment removal in channels that support anadromous salmonids and have MGs will be performed only when the deposition is at or beyond the allowable threshold established in the maintenance guideline for the facility. Sediment removal in channels that support anadromous salmonids and do have MGs will be performed only when the deposition is reducing design flow conveyance to less than acceptable levels as confirmed by measurements taken in the field and verified by hydraulic modeling. Sediment removal is performed during the summer construction season to avoid impacts to spawning and migrating anadromous salmonids. Dewatering and fish relocation BMPs and Guidelines (See Attachment B) ensure that impacts from the sediment removal activity are reduced.

The SCVWD seeks to restore design flow conveyance by removing sediments from areas outside of the summer low flow channel, such as from natural benches and floodplains, whenever possible, to reduce potential impacts to anadromous salmonids and salmonid habitat. Sediment removal within the Lower Guadalupe River Flood Protection Project reaches are limited to the sediment deposition reaches – SDRs)(Figure 3-3). The sediment removal

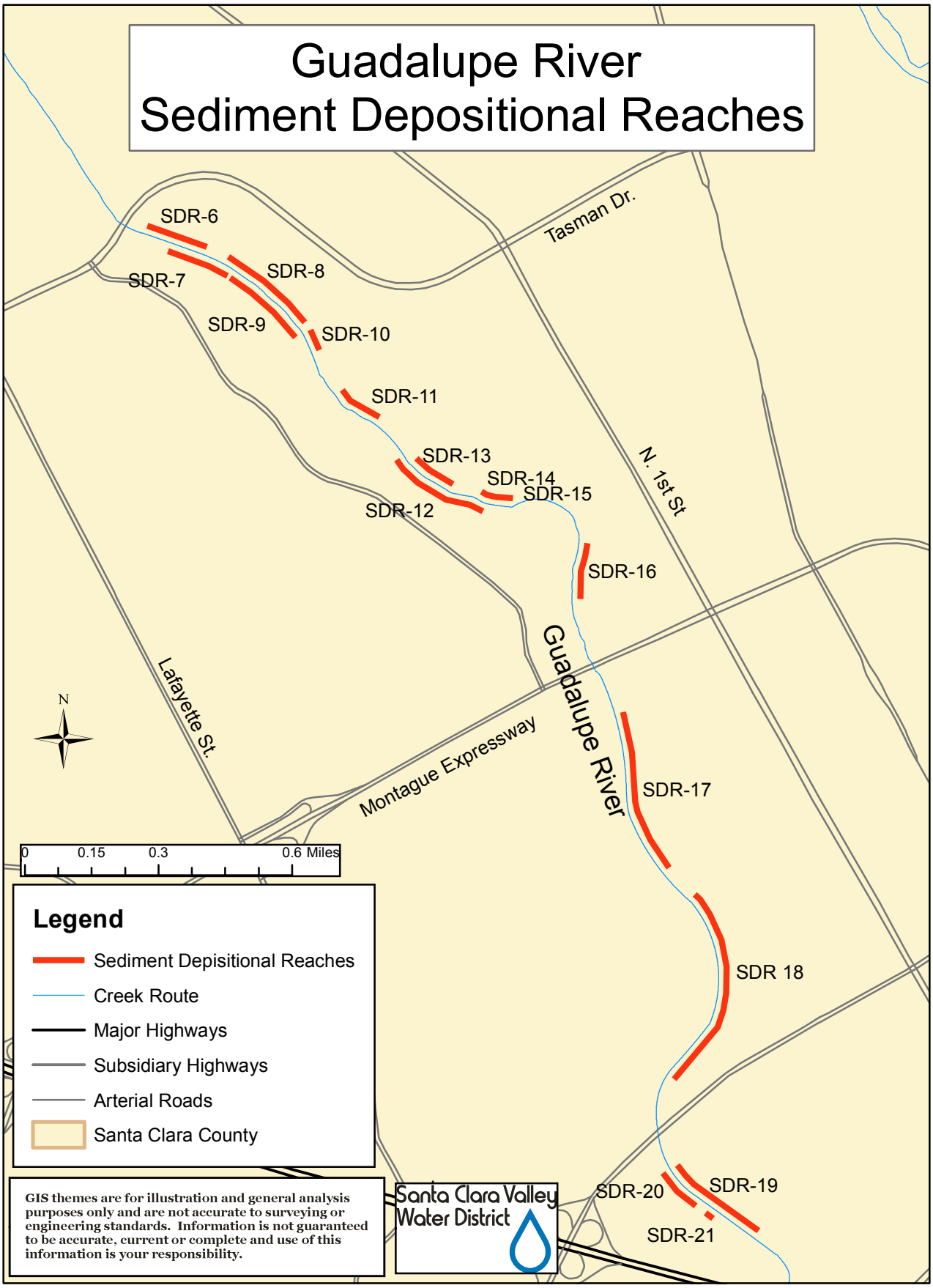


Figure 3-3. Guadalupe River Sediment Depositional Reaches

channels were designed to capture sediment when flows exceed the capacity of the main channel and allow for sediment removal without impacting salmonid habitat.

Bank Stabilization (BANK-X)

Bank stabilization BMPs include measures to prevent downstream erosion, protect water quality, and prioritizing the repair of past bank stabilization projects up to 2 years post construction.

Minimization and Avoidance: During the planning and design process, engineers, biologists, and construction staff meet to consider site specific parameters to determine which repair method(s) can be considered. Staff also evaluate habitat values within the stream bed and bank to inform the maintenance approach in restoring the design capacity of the channel and to return the channel to its current condition or better, to the greatest extent feasible. Prior to the construction of a bank stabilization project, a series of field meetings with technical, engineering, biological and construction staff are conducted to strategize on the construction efforts. Access, staging, travel, water diversion, exact areas of work, habitat values, and locations of sensitive habitat are some of the issues discussed in detail. When habitat values might be impacted by the need to access the channel, staff work collaboratively to identify alternative access points and methods to minimize vegetation removal and to reduce the amount of temporary grading work (access path or ramps). When stream flow diversions are required to implement the construction of erosion projects, staff discuss opportunities to minimize the impact area to avoid disrupting stream flows over a larger area. For sites that cannot avoid the installation of stream flow diversions, staff use a variety of innovative solutions to install diversion dams and energy dissipation tools to minimize water quality impacts that can occur at the pump and bypass discharge point.

In selecting a bank stabilization technique, the SCVWD undertakes a multiple-step process to determine the least environmentally damaging practicable alternative, as shown on Figure 6-1. This begins with an evaluation of whether the site needs to be repaired to prevent further erosion or destabilization of the stream bank, or whether other conditions exist which could compromise the integrity, safety and/or functionality of SCVWD facilities. If a repair is indicated based on these factors, the SCVWD conducts a field assessment to evaluate a variety of relevant factors for the repair, including the benefits of the repair, site opportunities and constraints, geomorphic conditions, fish and wildlife data, potential presence of endangered species, etc. Engineering calculations are also conducted and may include hydrology, hydraulics, hydraulic geometry and geotechnical constraints. On this basis, the SCVWD evaluates the repair alternatives presented in Table 6-1. Those bank stabilization methods that would not address the erosion/risk hazard, or which are not technically feasible at the proposed location, are not considered further. Of the remaining alternatives, the alternative which has the optimal combination of low cost, meeting the repair objective(s), and having the least environmental impact is then selected.

Bank stabilization activities that involve either the sole use of native vegetation or other bioengineered design techniques, or a combination of hard armoring and native vegetation or bioengineered design techniques, are evaluated for their suitability for use at the site. Soft or hybrid methods are utilized whenever they are determined to be practicable. Table 6-1 shows the parameters considered in selecting the appropriate repair methods. In designing and implementing bank repair projects, the SCVWD uses the standard designs shown in Attachment A. These designs are based on industry standards for soft, hybrid and hard bank stabilization techniques.

In addition, it is necessary to consider the scour depth and the rock size for the key. The scour depth varies depending on the velocity and the soil type at that location. In determining the appropriate rock size, when flow data is available, hydraulic modeling is conducted to determine the velocity that needs to be sustained in that reach, allowing for calculation of the minimum appropriate rock sizing that can sustain the shear stress. Based on additional localized site constraints, a factor of safety may be applied to the sizing calculation. In this manner, the potential for natural reestablishment of riparian and other vegetation is incorporated into each bank design and method selection. In general, multiple factors are considered to avoid and minimize the potential impacts of a bank stabilization operation. To further minimize potential impacts, numerous BMPs are implemented.

Post-Project Restoration (REVEG-X)

These measures provide guidance on planting vegetation on work sites where ground disturbing activities have occurred.

Management of Animal Conflicts (ANI-X)

The animal conflict management BMPs provide guidance on avoiding the redistribution of rodenticides, protection of sensitive species, and protection of water quality when slurry mixtures are used adjacent to streams.

Use of Pesticides (HM-X)

The pesticide BMPs includes guidance on posting notices of pesticide use at work sites according to label requirements and use of products with the lowest toxicity at the lowest practical rates. These practices minimize exposure to humans, domestic animals, wildlife, non-target vegetation, and water quality.

3.6 Maintenance Guidelines

3.6.1 Purpose and Objectives

The purpose of MGs is to provide a quantitative approach to identifying deficiencies that would trigger maintenance actions on SCVWD facilities as described in previous sections of this document. The SCVWD maintains its facilities to convey flows draining from the upper watershed and from storm water outfalls. When properly maintained these facilities convey flows at either the level for which they were designed (reaches where flood control projects have been constructed) or at historic levels (non-engineered channels that have been modified historically, or unmodified channels). The design flow conveyance, established by as-builts, establishes an expected Level of Service (LOS) for channels designated as Modified or Modified with Ecological Value. Historic flow conveyance or FEMA's flow capacity of a channel establishes an expected Level of Service (LOS) for non-engineered Modified and Unmodified channels. Historic flow conveyance or channel capacity is established by defining the channel dimensions used in the hydraulic model for FEMA's mapping, where applicable. Where FEMA's Flood Insurance Study report or hydraulic model is not available for a non-engineered Modified or Unmodified channel, or where FEMA's conveyance values are not based on actual historic channel dimensions, the SCVWD will apply the process described in section 3.6.2.

MGs establish quantifiable objectives that define the corrective, routine maintenance necessary to provide the established LOS on SCVWD facilities while minimizing impacts to channels and

natural resources. SCVWD facilities, for the purposes of the SMP, are categorized as Modified with Ecological Value, Modified, or Unmodified. The LOS of a SCVWD facility is based on Planning documents, Engineer's reports and Board accepted projects with As-built Plans and Specifications. The process for defining LOS for a SCVWD facility without the aforementioned documentation is described section 3.6.2.

MGs will be developed for channels designated as Modified or Modified with Ecological Value only. When work is proposed in unmodified channels, the SCVWD will follow the methodology described in section 3.6.2. If an unmodified channel has the same work performed on it in the same area more than 2 times in a 5-year period, then that reach of creek would be prioritized for development of MGs as well.

3.6.2 Evaluation Procedure where Maintenance Guidelines Do Not Exist

The first goal of the SMP is to maintain the design flow conveyance of SCVWD facilities. MGs will be used to guide sediment removal and vegetation management activities according to established, quantifiable thresholds and criteria such as design flood return period, design flow, roughness coefficient, sediment accumulation, vegetation growth, and other types of channel characterizations. Where vegetation management and/or sediment removal is necessary but MGs do not exist, the SCVWD will develop and submit the following information in the NPW, consistent with Condition 66 of the San Francisco Regional Board's order:

i. Classification of the channel reach as Modified, Modified with Ecological Value, or Unmodified;

ii. Statement as to whether the channel reach is part of a Previously Mitigated Area (PMA), and if so, maintenance activities covered under the PMA;

iii. For modified and modified with ecological value channel reaches, the design flood return period for each reach (e.g., the one-hundred-year flood) and the design flow rate;

iv. For unmodified channel reaches, a description of the SCVWD's best estimate of the natural condition of the reach, and the assumptions to develop it.

v. Roughness and sediment objectives for the proposed maintenance, including the assumptions and rationale used to develop the objectives;

vi. Vegetation objectives for the proposed maintenance shall describe the desired vegetation condition (e.g., vegetation type, density, etc.) that optimizes environmental values while still providing the design flood flow conveyance.

vii. Determination of any increase in water surface elevation compared to the as-built condition and the cause of this increase, including whether the work site is a hydraulic constriction, or is subject to backwater effects caused by a downstream constriction, using available field data and/or a hydraulic model, if available;

viii. Evaluation of alternative approaches that could achieve the same result (e.g., removing a hydraulic constriction, removing sediment instead of in-channel vegetation, etc.);

ix. General channel reach dimensions;

x. Anticipated frequency of maintenance; and

xi. For all sediment removal and bank stabilization activities proposed in anadromous streams, regardless of channel type and whether MGs exist or not, provide an evaluation of alternative approaches (e.g. removing a hydraulic constriction, removing vegetation instead of sediment, considering an alternative bank stabilization method, etc.) that could achieve the same result while further minimizing or avoiding impacts to the sensitive habitat.

3.6.3 Workplan for Development of Maintenance Guidelines

The SCVWD has already developed MGs for a number of facilities that guide maintenance activities. These MGs vary in age and in some cases need to be updated to reflect current conditions and maintenance approaches. Where MGs do not exist, the SCVWD relies on as-builts, where they exist, or by using cross section data in the hydraulic model that was used for the FEMA mapping, and by applying the process described in section 3.6.2.

Updating and developing MGs is essential to maintaining SCVWD facilities to the established or historic LOS. The SCVWD will update existing or develop new MGs for 40 facilities over the ten year period for the SMP. MGs will be updated or developed as follows:

1. All existing MGs will be updated using the information described in section 3.6.4. Prioritization of MG development will be based on the type of maintenance, associated impacts, and the volume and frequency of work.

2. New guidelines will be developed using the information developed as described in section 3.6.4 for those facilities without existing guidelines, prioritizing facilities based on the type of maintenance, the volume and frequency of work, and anticipated impacts considering the sensitivity of the resources found in the reach (e.g., Modified with Ecological Value channels).

The facilities targeted for development of MGs over the next 10 years is shown on Table 3-4 and Figures 3-4 and 3-5. Facilities are listed alphabetically per watershed; they are not prioritized in the table. MGs for any new capital facilities will also be developed.

Table 3-4. List of Facilities for MG Development (2014-2023)

Facility Name	From Station	To Station	Channel Type	Does Channel Support Anadromous Salmonids?
Coyote Watershed				
Berryessa Creek	20500	30000		N
	20500	29932	modified	
	29932	30000	unmodified	
Calera Creek	2280	6300	modified	N
Coyote Creek	0	72280		Y
	0	46017	unmodified	
	46017	46095	modified with ecological value	
	46095	46367	modified	

Facility Name	From Station	To Station	Channel Type	Does Channel Support Anadromous Salmonids?
	46367	58067	modified with ecological value	
	58067	59128	modified	
	59128	64943	modified with ecological value	
	64943	65304	modified	
	65304	72119	modified with ecological value	
	72119	72280	modified	
Los Coches Creek	0	6300	modified	N
Lower Penitencia Creek	4700	16670	modified	N
Lower Penitencia Creek	16670	21694	modified	N
Lower Silver Creek	0	12650	modified	N
Thompson Creek	0	7260		N
	0	7063	modified	
	7063	7260	unmodified	
Upper Penitencia Creek	3630	20550		Y
	3630	3756	modified	
	3756	5574	modified with ecological value	
	5574	6002	modified	
	6002	6410	modified with ecological value	
	6410	6667	modified	
	6667	7214	modified with ecological value	
	7214	7509	modified	
	7509	8934	modified with ecological value	
	8934	9265	modified	
	9265	10544	modified with ecological value	
	10544	10902	modified	
	10902	11634	modified with ecological value	
	11634	11734	modified	
	11735	17025	unmodified	
	17026	17403	modified	
	17403	19940	unmodified	
	19940	20167	modified	
	20167	20550	unmodified	
Upper Silver Creek	0	10700		N
	0	7539	modified	
	7540	10700	unmodified	
Guadalupe Watershed				
Alamitos Creek	0	40335		Y
	0	188	modified with ecological value	
	188	507	modified	
	507	2143	modified with ecological value	
	2143	2153	modified	
	2153	3630	modified with ecological value	

Facility Name	From Station	To Station	Channel Type	Does Channel Support Anadromous Salmonids?
	3630	3879	modified	
	3879	10945	modified with ecological value	
	10945	10955	modified	
	10955	11657	modified with ecological value	
	11657	11901	modified	
	11901	18779	modified with ecological value	
	18779	19021	modified	
	19021	22261	modified with ecological value	
	22261	22513	modified	
	22513	23105	modified with ecological value	
	23105	23371	modified	
	23371	26677	modified with ecological value	
	26677	26893	modified	
	26893	27601	modified with ecological value	
	27601	27619	modified	
	27619	28434	modified with ecological value	
	28434	28443	modified	
	28443	29308	modified with ecological value	
	29308	29534	modified	
	29534	30911	modified with ecological value	
	30911	30922	modified	
	30922	33108	modified with ecological value	
	33108	33331	modified	
	33331	36569	modified with ecological value	
	36569	37007	modified	
	37007	39094	modified with ecological value	
	39094	39326	modified	
	39326	40281	modified with ecological value	
	40281	40335	modified	
Canoas Creek	0	39032	modified	N
Greystone Creek	0	8189	modified	N
Guadalupe River	74300	75500		Y
	74300	74376	modified	
	74376	75291	modified with ecological value	
	75291	75500	modified	
Guadalupe River	104550	107415		Y
	104550	104765	modified	
	104765	105926	modified with ecological value	

Facility Name	From Station	To Station	Channel Type	Does Channel Support Anadromous Salmonids?
	105926	106012	modified	
	106012	107415	modified with ecological value	
Golf Creek	0	9052	modified	N
Ross Creek	0	27126		N
	0	23510	modified	
	23510	25912	modified with ecological value	
	25912	25952	modified	
	25952	25963	modified with ecological value	
	25963	27126	modified	
Lower Peninsula Watershed				
Adobe Creek	12720	58000		N
	12720	24961	modified	
	24961	34664	modified with ecological value	
	34664	34903	modified	
	34903	35845	modified with ecological value	
	35845	36135	modified	
	36135	38090	modified with ecological value	
	38090	38342	modified	
	38342	40474	modified with ecological value	
	40474	40704	modified	
	40704	44584	modified with ecological value	
	44584	44819	modified	
	44819	48198	modified with ecological value	
	48198	48434	modified	
	48434	49695	modified with ecological value	
	49695	50179	modified	
	50179	50804	modified with ecological value	
	50804	51126	modified	
	51126	51744	modified with ecological value	
	51744	52139	modified	
	52139	53202	modified with ecological value	
	53202	53452	modified	
	53452	54994	modified with ecological value	
	54994	55233	modified	
	55233	55958	modified with ecological value	
	55959	58000	unmodified	
Matadero Creek	9000	25200		N
	9000	9315	modified with ecological value	
	9315	25200	modified	
Permanente Creek	10500	45000		N
	10500	31783	modified	
	31783	33239	modified with ecological value	
	33239	33494	modified	

Facility Name	From Station	To Station	Channel Type	Does Channel Support Anadromous Salmonids?
	33494	34236	modified with ecological value	
	34236	35728	modified	
	35728	38447	modified with ecological value	
	38447	38697	modified	
	38697	38929	modified with ecological value	
	38929	39317	modified	
	39317	43263	modified with ecological value	
	43263	43630	modified	
	43630	45000	modified with ecological value	
San Francisquito Creek	2000	8000		Y
	2000	7819	modified with ecological value	
	7819	8000	modified	
San Francisquito Creek	8000	17000		Y
	8000	8261	modified	
	8261	8646	modified with ecological value	
	8646	9183	modified	
	9183	13375	modified with ecological value	
	13375	13684	modified	
	13684	17000	modified with ecological value	
Stevens Creek	8850	58000		Y
	8850	8955	modified	
	8955	13813	modified with ecological value	
	13813	13924	modified	
	13924	14632	modified with ecological value	
	14632	15516	modified	
	15516	16509	modified with ecological value	
	16409	16811	modified	
	16811	17566	modified with ecological value	
	17566	17580	modified	
	17580	18248	modified with ecological value	
	18248	18531	modified	
	18531	19316	modified with ecological value	
	19316	19809	modified	
	19809	20739	modified with ecological value	
	20739	21359	modified	
	21359	22234	modified with ecological value	
	22234	22491	modified	
	22491	23283	modified with ecological value	
	23283	24189	modified	
	24189	24476	modified with ecological value	
	24476	24722	modified	
	24722	25685	modified with ecological value	
	25685	26018	modified	

Facility Name	From Station	To Station	Channel Type	Does Channel Support Anadromous Salmonids?
	26018	30654	modified with ecological value	
	30654	31024	mod	
	31024	36566	modified with ecological value	
	36566	36959	modified	
	36959	37655	modified with ecological value	
	37655	37945	modified	
	37945	44073	modified with ecological value	
	44073	44351	modified	
	44351	46378	modified with ecological value	
	46378	46790	modified	
	46790	51348	modified with ecological value	
	51348	51616	modified	
	51616	57302	modified with ecological value	
	57302	57566	modified	
	57566	58000	modified with ecological value	
Uvas/Llagas Watershed				
Edmundson Creek	0	4340	modified	N
Jones Creek	0	13560	modified	N
Lions Creek	0	10460		N
	0	10423	modified	
	10423	10460	unmodified	
Llagas Creek	5900	37800		Y
	5900	8728	modified with ecological value	
	8728	8866	modified	
	8866	10908	modified with ecological value	
	10908	11055	modified	
	11055	12601	modified with ecological value	
	12601	12819	modified	
	12819	14820	modified with ecological value	
	14820	15040	modified	
	15040	16154	modified with ecological value	
	16154	16393	modified	
	16393	17203	modified with ecological value	
	17203	17422	modified	
	17422	17551	modified with ecological value	
	17551	17700	modified	
	17833	19372	modified with ecological value	
	19372	20093	modified	
	20093	23411	modified with ecological value	
	23411	23652	modified	
	23652	25570	modified with ecological value	
	25570	25831	modified	
	25831	27851	modified with ecological value	

Facility Name	From Station	To Station	Channel Type	Does Channel Support Anadromous Salmonids?
	27851	28123	modified	
	28123	29041	modified with ecological value	
	29041	29297	modified	
	29297	31612	modified with ecological value	
	31612	31868	modified	
	31868	34318	modified with ecological value	
	34318	34753	modified	
	34753	35737	modified with ecological value	
	35737	36053	modified	
	36053	36975	modified with ecological value	
	36975	37238	modified	
	37238	37688	modified with ecological value	
	37688	37928	modified	
	37928	38700	modified with ecological value	
Madrone Channel	0	21840	modified	N
North Morey Channel	0	1350	modified	N
Princevalle Drain	0	9560	modified	N
South Morey Channel	0	3310	modified	N
Uvas-Carnadero Creek	27000	49400		Y
	27000	38355	modified with ecological value	
	38355	39196	modified	
	39196	39230	modified with ecological value	
	39230	39270	modified	
	39270	43703	modified with ecological value	
	43703	43968	modified	
	43968	49321	modified with ecological value	
	49321	49400	modified	
West Branch Llagas Creek	0	22400	modified	N
West Valley Watershed				
Calabazas Creek	0	68000		N
	0	44792	modified	
	44792	47756	modified with ecological value	
	47756	48022	modified	
	48022	49288	modified with ecological value	
	49288	49592	modified	
	49592	50676	modified with ecological value	
	50676	51385	modified	
	51385	51824	modified with ecological value	
	51824	53366	modified	
	53366	54928	modified with ecological value	

Facility Name	From Station	To Station	Channel Type	Does Channel Support Anadromous Salmonids?
	54928	54998	modified	
	54998	59662	modified	
	59662	60369	modified with ecological value	
	60369	60389	modified	
	60389	61653	modified with ecological value	
	61653	61684	modified	
	61684	62782	modified with ecological value	
	62782	63004	modified	
	63004	63679	modified with ecological value	
	63679	63924	modified	
	63924	66183	modified with ecological value	
	66183	66238	modified	
	66238	68000	modified with ecological value	
Regnart Creek	0	14000		N
	0	11147	modified	
	11147	12444	modified with ecological value	
	12444	12500	modified	
	12500	14000	modified with ecological value	
San Tomas Aquino Creek	0	24000		N
	0	2850	modified with ecological value	
	2850	3425	modified	
	3425	4107	modified with ecological value	
	4107	4122	modified	
	4122	4613	modified with ecological value	
	4613	4876	modified	
	4876	5560	modified with ecological value	
	5560	5886	modified	
	5886	7288	modified with ecological value	
	7288	7307	modified	
	7307	7814	modified with ecological value	
	7814	8128	modified	
	8128	8910	modified with ecological value	
	8910	9162	modified	
	9162	9634	modified with ecological value	
	9634	9858	modified	
	9858	24000	modified	
San Tomas Aquino Creek	43800	80000		N
	43800	67540	modified	
	67540	68576	modified with ecological value	
	68576	68834	modified	
	68834	69147	modified with ecological value	
	69147	69371	modified	

Facility Name	From Station	To Station	Channel Type	Does Channel Support Anadromous Salmonids?
	69371	70785	modified with ecological value	
	70785	70850	modified	
	70850	71390	modified with ecological value	
	71390	71545	modified	
	71545	72389	modified with ecological value	
	72389	72405	modified	
	72405	72525	modified with ecological value	
	72525	72600	modified	
	72600	73285	modified with ecological value	
	73285	73330	modified	
	73330	74657	modified with ecological value	
	74657	74740	modified	
	74740	75935	modified with ecological value	
	75935	76008	modified	
	76008	77236	modified with ecological value	
	77236	77440	modified	
	77440	78126	modified with ecological value	
	78126	78496	modified	
	78496	80000	modified with ecological value	
Saratoga Creek	0	51800		N
	0	28651	modified	
	28651	30706	modified with ecological value	
	30706	31041	modified	
	31041	35229	modified with ecological value	
	35229	35476	modified	
	35476	37004	modified with ecological value	
	37004	37915	modified	
	37915	39176	modified with ecological value	
	39176	39428	modified	
	39428	39528	modified with ecological value	
	39528	39778	modified	
	39778	40811	modified with ecological value	
	40811	41064	modified	
	41064	43431	modified with ecological value	
	43431	43679	modified	
	43679	48103	modified with ecological value	
	48103	48387	modified	
	48387	49841	modified with ecological value	
	49841	50087	modified	
	50087	51580	modified with ecological value	
	51580	51800	modified	
Sunnyvale East Channel	0	31300	modified	N

Facility Name	From Station	To Station	Channel Type	Does Channel Support Anadromous Salmonids?
Wildcat Creek	0	14000		N
	0	1290	modified	
	1290	3332	modified with ecological value	
	3332	3791	modified	
	3791	5008	modified with ecological value	
	5008	5092	modified	
	5092	7961	modified with ecological value	
	7961	8079	modified	
	8079	10215	modified with ecological value	
	10215	10848	modified	
	10848	12564	modified with ecological value	
	12564	12637	modified	
	12637	14000	modified with ecological value	

Note: List may be revised annually based on field conditions.

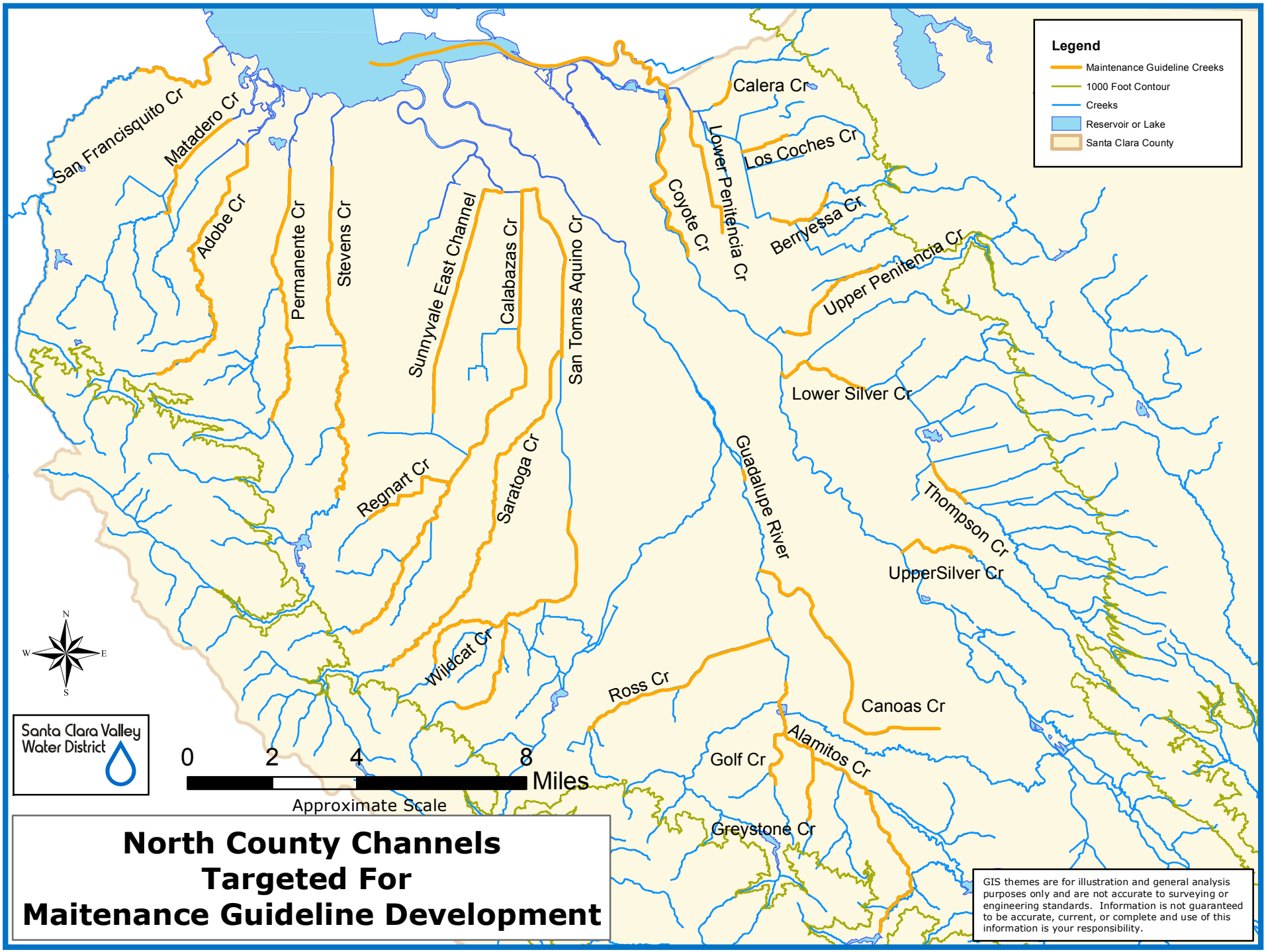


Figure 3-4. North County Channels Targeted for Maintenance Guidelines Development.

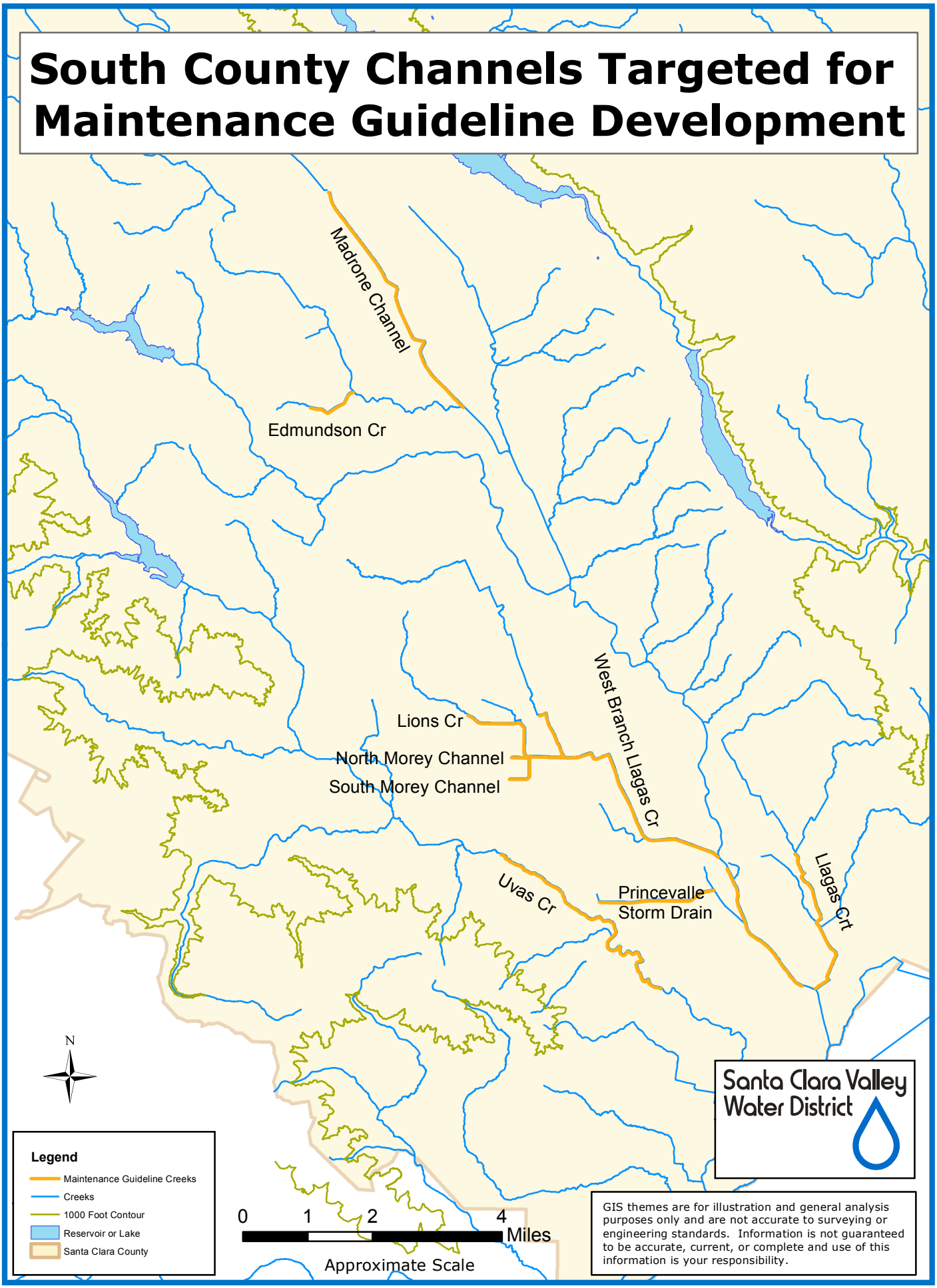


Figure 3-5. South County Channels Targeted for Maintenance Guideline Development

3.6.4 Scope and Content of the Developed Maintenance Guidelines

MGs developed by the SCVWD will provide comprehensive, quantifiable parameters that will clearly define the optimum channel condition. The optimum channel condition can include multiple individual objectives, that when taken as a whole, drive maintenance activities toward providing design flow conveyance while protecting habitat values to the maximum extent practicable.

MGs will consist of the following information:

1. Channel type, location of channel reach, length of the channel reach and the percentage of the total channel length.
2. In support of developing MGs, baseline hydraulic conditions will be established for the channels under relevant flow conditions.
3. For channels which may be subject to sediment removal, estimate active (bankful) channel dimensions or dimensions which can best establish quasi-stable hydrogeomorphic conditions that do not cause nuisance or excessive erosion or deposition. These dimensions shall be developed using a combination of information from regional stream restoration curves, reference reach data, computation of effective discharges, shear stresses and other assessments, as well as addressing different reach conditions and constraints. These active channel dimensions shall guide the management approaches contained in the MGs and inform how to finish grading in reaches undergoing sediment removal.
4. For sediment and vegetation removal at bridges and crossings, the design flow rate will be documented; based on this, a reasonable allowance for head loss will be established for each bridge/crossing, and maintenance approaches will be based on analysis that identifies the minimum maintenance necessary to maintain conveyance objectives.
5. Sediment objectives for each channel reach will be developed to establish how much deposition can occur before the tolerance for loss of flood flow capacity is exceeded. Sediment objectives will include consideration for vegetation objectives while still providing the necessary flood flow conveyance.
6. Roughness objectives for each channel reach will be developed to define Manning's N thresholds. Roughness objectives will incorporate both sediment deposition and vegetation objectives to provide the design flow conveyance as well as protection of habitat functions and values, and beneficial uses, to the maximum extent practicable.
7. Vegetation management objectives for each channel reach will be developed. Vegetation objectives shall be derived from identified roughness objectives and shall describe the desired vegetation condition (e.g., vegetation type, density, etc.) for the given roughness that optimizes environmental values, including beneficial uses, for the reach (e.g., habitat, complexity, shade, etc.), while still providing the design flood flow conveyance.
8. Estimates of stage-discharge relationships will be developed. These estimates should be based on actual field measurements and/or observations.
9. For channels which may be subject to sediment removal, channel dimensions such as invert width, bank slope, and channel depth, will be specified for each segment of the

channel, based on as-built plans for channels categorized as Modified or Modified with Ecological Value.

10. A map that shows all Modified and Unmodified channel types, including channels with ecological values, channels supporting anadromous salmonids, and those channels with maintenance requirements specified by the U.S. Army Corps of Engineers.

11. The following shall be notated in the MG and updated as new information and when observations are made. Suggested corrective actions may be included as notations to inform potential future actions and will be proposed to SCVWD design and construction group for assessment as a potential future capitol project.

    a. Channel reaches with hydraulic constrictions (e.g., under-sized culverts, bridge abutments, railroad trestles, utility crossings, and other natural or human caused obstructions) potentially causing backwater conditions, increased water surface elevations, bank instabilities, or fish passage barriers;

    b. Channel reaches that are a priority for maintenance based on chronic problems, such as sediment accumulation, flooding, or excessive erosion and an assessment the chronic problem causes;

    c. A map that shows anadromous salmonid channels, along with information related to the mapping, notation and listing; and

    d. Description of important maintenance elements, such as sediment deposition zones from topographic changes.

12. MGs will include information about the design capacity/Q/LOS, and the engineering basis for this information based on a previously approved design.

3.7 Projections

Work projections were used to conduct the environmental impact analysis in the 2012 SMP Final Subsequent Environmental Impact Report (FSEIR) and thereby determine potential impacts and necessary BMPs and mitigation measures. Maintenance activities are permitted throughout the program area as long as they do not result in significant environmental effects substantially different than those evaluated for the Program as a whole (as informed by the projections that were used for the analysis), or per the work limits identified in regulatory permits.

Since the certification of the FSEIR, the SCVWD has decided to remove work activities along canals from the SMP.

3.8 Program Limits

Because the SMP is managed programmatically, each work activity has a range of project specific limitations. The SMP protects natural resources by adhering to the program and project limits. Work areas are managed for the entire Program area to ensure that the maximum work covered by the Program, FEIR and regulatory permits, is not exceeded.

The program limits include the following types of limits:

- overall (10-year) acreage limitations on various types of maintenance
- annual acreage limitations on various types of maintenance
- limits on the extent of work in a particular area (e.g., extent of canopy removal, linear feet subject to maintenance based on channel type)
- numbers of trees over 6" DBH that can be removed (annually and over the 10-year lifetime of the Program)
- average annual and 10-year limits on the amount of herbicides and pesticides that can be used
- limits on the proportion of bank repairs using hardscape

The specific program limits for each work activity are described in the work activity-specific chapters (Chapters 4.4, 5.4, 6.5, 7.4, and 8.4).

CHAPTER 4: VEGETATION MANAGEMENT

The Vegetation Management Program is designed to manage vegetation within channel corridors, from edge of right-of-way to edge of right-of-way. The SCVWD uses an integrated approach for vegetation management to ensure the most effective technique is used in a manner that minimizes impacts to the environment while meeting flood protection, fire safety, and other legal requirements (including mitigation requirements).

Properly managed vegetation facilitates flood management and flow conveyance in channels, and allows access to the creek corridors by the SCVWD and the public. Maintaining vegetation has environmental benefits as well, including maintenance or improvement of water quality, improvement of habitat quality and species composition (including reduced impacts on the riparian system associated with corrective pruning in the vicinity of homeless encampments), and the removal of competitive invasive species. Public safety benefits include reduction in fuel loads and the reduction of nuisance animal populations next to highly urbanized areas. Environmental and safety activities are part of a holistic vegetation management approach for maintenance of the channels for multiple purposes.

A variety of vegetation management activities are anticipated during the program period 2014-2023. Multiple vegetation management activities may be used in combination to achieve program objectives depending upon the location, season, and resource conditions at the channel site.

This Vegetation Management chapter has the following sub-sections:

Definitions:

1. Diameter at breast height (dbh): the diameter of the stem(s) of a tree or shrub at 4.5' above ground.
2. Pruning: the cutting of a branch ≤ 4" in diameter (the cutting of a branch > 4" in diameter is referred to as tree removal).
3. Herbaceous: non-woody vegetation, including grasses, broadleaf weeds, cattails, and bulrush; includes annuals, biennials, and perennials.
4. Shrub: a woody plant smaller in height than a tree (< 15 feet at maturity), often formed by a number of vertical or semi-upright branches arising close to the ground. For simplicity, the term "tree" or "trees" will refer to both trees and shrubs.

5. Tree: a woody perennial that typically has one dominant vertical trunk and a height greater than 15 feet in its natural, mature form. Several exceptions to this definition exist; willows and elderberries are two examples found in the SMP area which are considered trees for the purposes of the Program, but may not have a single dominant trunk.
6. Multi-stem: a tree or shrub with a root ball and multiple trunks or stems. This may occur at ground level or a few feet above ground. The dbh of trees with multiple stems will be calculated by adding the dbh of the individual stems. Individuals with greater than seven (7) stems at dbh will be assessed by their canopy cover, per the Tree Scoring for Removal of Trees and Shrubs 6 - 12" dbh (Attachment C), except for willows or other similarly fast growing sprouters. The dbh of these fast growing trees will be calculated by the summation of all stems divided by 2 to equal dbh.
7. Inboard/Outboard: this refers to which side of a levee or streambank is being referenced. The inboard side of a levee is the side sloping toward the channel. The outboard side of a levee is the side sloping away, and outside of the channel.
8. Ordinary High Water Mark: is defined by the USACE as the line on the bank established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.
9. Bankfull – is the river elevation (stage) at which time the most effective geomorphic work occurs. This is also referred to as the dominant discharge and is the stage that generally corresponds to a flow event with a 1-2 year recurrence interval.

4.1 Woody Vegetation Management

4.1.1 Routine Pruning

A. Purpose

Pruning of trees and shrubs is a routine activity necessary to provide access to SCVWD facilities, improve visibility to inspect SCVWD facilities, protect SCVWD infrastructure, and maintain the designed hydraulic capacity of the channel systems, as determined through Maintenance Guidelines or the quantitative process described in Chapter 3.2.

The SCVWD may thin vegetation to reduce or prevent fire hazards, in compliance with local fire codes. Tree pruning may include thinning the canopy of an individual tree or shrub.

B. Work Activity

Pruning is the partial removal of any individual tree and includes cutting of tree branches. Pruning may be conducted with mechanized and non-mechanized hand tools. Pruning typically takes place along maintenance roads, fences, and levee slopes, though it may occur anywhere along terrace areas or in-stream.

C. Requirements

Pruning requirements have been incorporated into the SMP to provide a consistent approach to this work activity. Pruning can stimulate new growth, so improperly pruning a tree or shrub can create more work the following year(s), such as when multiple, weakly attached stems sprout from a stub cut.

The following pruning standards will be used, with the exception of cases where these standards would create unsafe conditions for workers, in which case the standards will be adjusted as needed to ensure worker safety:

1. Pruning will be done by qualified staff in a manner that will achieve the maintenance goals of the facility while preserving the short and long term health of the vegetation.
2. Pruning will be performed according to national American National Standards Institute (ANSI) A300 (Part 1) 2008 Pruning, ANSI Z133.1 – 2000 Safety Requirements and International Society of Arboriculture (ISA) Best Management Practices Tree Pruning (revised 2008) or the most current updates.
3. Pruning will remove no more than 25% of the structure of an individual tree in one season; if more than 25% of the structure of a tree is to be removed, this is considered hand removal and is addressed in Section 4.1.4.

4.1.2 Corrective Pruning

A. Purpose

Corrective pruning is performed to promote long-term tree health. Corrective pruning may address defects that would eventually result in whole tree failure such as co-dominant leaders; decayed or diseased limbs; extensive branch dieback; incorrect past pruning; or injury due to storm or mechanical damage. Corrective pruning may occur where a potential hazard exists yet complete removal of a tree is unwarranted. It may also be used to adhere to proper pruning standards. For example, in order to avoid leaving a large stub and promoting unwanted re-sprouting, pruning a lateral branch away from a maintenance road may be extended to the trunk of the tree. Corrective pruning of lateral branches is also important to reduce the risk of debris trapping in the channel, particularly near the active bankfull channel.

Corrective pruning will not be used as justification to do more work than is necessary or would otherwise be permitted. For example, in some cases, cutting a lateral branch mid-way (beyond the minimum necessary) may be an appropriate place to support or regenerate growth upward.

B. Work Activity

Corrective pruning involves the partial removal of any individual plant and includes cutting of tree branches, and is conducted with mechanized and non-mechanized hand tools. Unlike routine pruning, the goal of corrective pruning is to correct an injury, reduce the effects of disease, manage past damage, or to address one or more of the circumstances described in Section A above. Corrective pruning may occur in-stream and along terrace areas.

C. Requirements

1. All corrective pruning is performed according to national ANSI A300 (Part 1) 2008 Pruning, ANSI Z133.1 – 2000 Safety Requirements and International Society of Arboriculture (ISA) Best Management Practices Tree Pruning (revised 2008) or the most current updates.
2. Corrective pruning will be prescribed and marked by an ISA Certified Arborist or those experienced and knowledgeable in ISA pruning standards and successful corrective pruning.
3. No more than 25% of the structure of an individual tree would be removed in one season. Rare cases may occur, however, such as the removal of a co-dominant leader,

which can result in removal of more than 25% of the structure of the tree. Such cases are still considered corrective pruning.

4. Removal of limbs greater than 4" diameter may be necessary for the health of the tree or for other reasons, and is still considered corrective pruning; an arboricultural justification will be provided in these cases. Removal of limbs greater than 4" diameter will be tracked in the hand removal section (4.1.4) and appropriate mitigation provided.

4.1.3 Coppicing

A. Purpose

Coppicing is the cutting of a tree to the ground level, creating annual "sucker" growth that may be used as cutting material for direct installation in mitigation projects. The trees that are chosen are trees that would normally be targeted for complete removal. Willow species, mulefat, and coyote brush are typically chosen for coppicing. After cutting the tree back to the ground, rather than treating the remaining stump with herbicide, the tree is instead left to re-sprout and provide an ongoing cutting source for the individual watershed in which the tree is located. Select trees within each of the major watersheds may be dedicated to this activity.

B. Work Activity

Coppicing of trees entails severely pruning the entire plant near the ground to promote multi-stemmed re-growth. This action may change the plant form from a tree to a shrub, thus increasing variability of canopy architecture and age. Hand-held and small mechanical tools are typically used for coppicing. Larger equipment may be necessary to remove the vegetation from the channel, after which it would be hauled away.

C. Requirements

Trees that would otherwise need to be removed may be good candidates for coppicing. All work is done after appropriate pre-construction biological surveys have been performed and appropriate biological clearances obtained.

4.1.4 Hand Removal

A. Purpose

Hand removal is a routine work occurrence and is necessary to maintain the proper function of SCVWD facilities, maintain conveyance capacity, remove debris accumulation and improve the riparian system. Different criteria for hand removal apply, based on species type and location within the channel system. Trees greater than 12" dbh are not included in this Program.

Tree removal is the complete removal of above-ground portions of any tree using mechanized or non-mechanized hand tools. Stump treatment of removed trees is implemented, and for the purposes of this manual, such use of herbicide is considered part of the tree removal, and is not part of the herbicide work described in Section 4.2.1. Stump treatment with herbicide is assumed for all tree removal, unless otherwise noted in this manual. In particular, biological clearances will assume herbicide treatment unless otherwise noted on the Work Order, and take this into consideration when conducting these clearances.

Tree removal also includes the removal of limbs >4" in diameter that may need to be removed for bank stabilization or sediment removal projects, or for other reasons (e.g., to protect SCVWD facilities). In lieu of the entire tree being removed for specific projects, removing a larger limb may be sufficient.

Live or dead standing trees may be removed from SCVWD facilities to meet one of the following program objectives: to maintain design flow conveyance capacity, provide facility inspection and access, maintain the structural integrity of SCVWD facilities, and promote overall ecological health.

Hand removals may occur anywhere in the channel cross section, including but not limited to streams and their immediate overstory, stream banks, levees, access roads and pedestrian paths, outboard areas and at bridges and culverts.

The three primary reasons for hand removal are to provide flow conveyance capacity, to support or enhance a bank stabilization project, or to provide ecological health/stewardship. Each of these is described below.

1. Hand Removal for Flow Conveyance

Hand removal may be necessary to retain design flow conveyance capacity and to maintain channels. These conditions usually occur when a tree (or trees) on the bank has fallen into the stream or moved in such a way that the tree's new orientation impedes flows or causes debris blockages, resulting in an increased flood risk. Fallen trees also can divert stream flows into the opposite stream bank, increasing the erosion and flood risk. Although specific locations of downed trees are not always predictable, this work is considered "anticipated" due to its natural and regular occurrence.

Trees also exist in locations where their roots or branches may interfere with or undermine the integrity of SCVWD facilities. These facilities include, but are not limited to, concrete linings, concrete wing walls, gabions, sacked concrete walls, stream flow gauges, storm drain outfalls, culverts, and pipes. Trees removed in these areas would likely be stump-treated with herbicide to prevent recovery and re-establishment.

Hand removal < 6" dbh may be routinely removed from channels to reduce the accumulation of debris and potential flooding and include both woody and herbaceous vegetation. Trees and vegetation immediately upstream and downstream of bridges may be removed to prevent debris accumulation at the bridges. Each crossing is distinct and will be evaluated based on site specific conditions. Therefore, the amount and type of work will be different for each crossing. Where maintenance guidelines exist the vegetation will not be removed beyond that which is described in the maintenance guideline or beyond that which is consistent with the vegetation objectives for a specific creek reach.

2. Hand Removal for Bank Stabilization and Access

Bank stabilization projects often require the installation of temporary roads and ramps to access the work area. Tree removal may be required under these circumstances when pruning will not suffice to provide clearance for maintenance vehicles and heavy equipment. Hand removal may also be required to provide for facility inspection and access; though pruning will be considered prior to complete removal. Where tree removal is needed, an effort is made to target non-native trees where tree removal for vehicle access is required, and to select an access route that avoids mature, native trees. Removal of large branches

(> 4" diameter) from mature trees for equipment access is evaluated carefully and avoided whenever possible.

3. Hand Removal for Ecological Health/Stewardship

In the interest of stream and land stewardship, where possible, the SCVWD will make efforts to improve the health and vigor of trees on SCVWD properties through proper arboricultural and vegetation management techniques. Early detection of plant diseases and pathogens such as Sudden Oak Death and western bark beetles will be implemented through this Program, as supported by relevant BMPs (e.g., GEN-31 and VEG-2) that prevent movement of infected materials to additional locations. Removal of infected trees may be necessary to guarantee the ecological health of the greater area. SCVWD staff conducting tree health assessments shall be qualified arborists, botanists, or other specialists qualified to make such decisions.

Trees may be removed or pruned (see Section 4.1.2, Corrective Pruning) to improve both aquatic and terrestrial habitat quality. To promote water resources stewardship, efforts will be made to improve the ecological health of riparian and upland woodlands on SCVWD facilities. Trees with structural defects, insect infestation, or pathogens that threaten the ecological health of the tree or woodland may be removed. Woodlands with stunted growth as a result of competition for resources may be thinned to facilitate normal growth. Non-native and invasive vegetation can establish, outcompete and overwhelm native vegetation, degrading habitat value. Prior to removal or stand thinning of trees, an assessment of the ecological health of the riparian and/or upland woodlands will be conducted and documented with written recommendations by qualified staff for consideration by management in planning the tree removal or pruning activity.

B. Work Activity

Tree removal is defined as the complete removal of above-ground portions of any individual tree. The removal is followed by herbicide stump treatment, called a "cut stump" treatment. Cut stump treatment is a paired activity with tree removal, and assumed to occur unless noted otherwise on the Work Order.

Tree removal also includes the removal of limbs >4" dbh, whereby the pruning of these limbs is conducted in lieu of complete tree removal, thereby minimizing impacts to vegetation. Such removal of limbs is typically not conducted in combination with a cut stump treatment.

Hand removal is performed using small hand tools or mechanized tools such as chainsaws to cut vegetation. Cut vegetation is transported from the channel bed to the access road by hand or by mechanical equipment such as an excavator or loader. Vegetation is chipped on site or may be hauled away in dump trucks/compactors. The herbicide application portion of this work activity is performed using tools such as drip cans, a spray bottle, or a paintbrush to do a topical treatment.

C. Removal Criteria

Hand removal is performed as described above for the purposes of maintenance, bank stabilization, and ecological health/stewardship. Both native and non-native trees located within a channel, channel bank, or levee may require removal if flow conveyance capacity is reduced, the structural integrity is compromised, and where needed for visual inspection of levees. Though the Invasive Plant Management Plan (IPMP) is designed to serve a positive ecological purpose, not all non-native trees may be appropriate candidates for removal.

Nevertheless, native trees are given a higher level of consideration for preservation than non-native trees. Native tree species are more desirable and their presence is encouraged over non-native species. Non-native species and in particular, invasive non-natives, are less desirable. However, non-native trees, including invasives, may also provide valuable habitat functions in the absence of more desirable native vegetation. Removal of any tree would be evaluated per the Requirements section below.

The following criteria are used in assessing the need for hand removal.

1. Presence or absence of adjacent vegetation of similar stature providing equivalent habitat functions such as roosting, nesting, or perching sites, shaded riverine aquatic (SRA) habitat, or other valuable habitat attributes. Retention of non-natives (invasive or not) will be given a higher priority if other vegetation is not available to provide alternative habitat.
2. Current or documentable use by wildlife that would be difficult to replace locally (i.e., near the tree removal location) if the vegetation is removed. Such use would include raptor nests, evidence of use by cavity nesting species, evidence of a rookery, and similar wildlife uses.
3. Instances where the tree is providing vegetative structure (root system) to a stream bank that is likely to erode if the tree is removed will be considered for pruning or thinning instead of removal to retain the soil stability function.

D. Requirements

1. Attachment C, Tree Scoring for Removal of Trees and Shrubs 6 - 12" DBH, provides a specific tree appraisal and evaluation protocol to determine how replacement planting occurs. The protocol in Attachment C involves carefully assessing targeted tree removals for their existing conditions and functions, including their canopy cover, local area value, ecosystem benefits, and ecosystem detriments.
2. Removal of limbs >4" is prescribed and marked by an ISA Certified Arborist or those experienced and knowledgeable in ISA pruning standards.
3. All tree removals require a biological survey and must be verified for compliance by the watershed environmental planner. In certain circumstances, the work may need to be supervised by a qualified horticultural specialist or Certified Arborist.
4. Hand removals must meet one of the purposes stated in A. Purpose, above.

4.1.5 Large Woody Debris (LWD)

Large woody debris features provide ecologic functions to SCVWD channels by creating more instream complexity and also providing some refugial habitat in the eddy and calm water zones behind the wood. However, LWD also requires evaluation and maintenance when located in a flood control channel. LWD features can increase the flood or erosion risk if they are trapping excessive debris; are caught at a bridge, culvert, or other facility where they may raise the water surface elevation; or direct erosive flows toward a bank. Under the SMP, LWD is defined as having a minimum diameter of 12 inches (30.5 cm) with a minimum length of 6 feet (1.82 meters).

While LWD maintenance activities apply to woody debris greater than 12" diameter for the SMP, wood smaller than 12" diameter may also provide ecologic functions to the channel. To support

healthy stream functions, and as described in Chapter 6, bank stabilization projects will be evaluated for the inclusion of additional wood features beyond those in the chosen bank design. Where possible and feasible, additional wood features will be included into bank stabilization projects and thereby provide an off-set to the loss of functions occurring from maintenance activities which may remove wood pieces smaller than 12" in diameter.

Large woody debris is recruited to the stream channel throughout the year by a variety of natural processes, including bank erosion, landslides, windstorms, and tree mortality. The LWD evaluation and implementation program (see Attachment E) includes an assessment of the ecological, geomorphic, and hydraulic effects (creek and stream gauge functions) of LWD in program channels. The evaluation and implementation program will balance flood protection and ecological objectives. Due to these natural processes, Tier 4 LWD projects will be submitted in the NPW and may be submitted to the resource agencies during the in-channel work season.

The LWD program only pertains to the in-channel area on anadromous salmonid channels, which is defined as the stream channel below bankfull discharge demarcations. The term bankfull is defined as the river elevation (stage) at which time the most effective geomorphic work occurs. This is also referred to as the dominant discharge and is the stage that generally corresponds to a flow event with a 1-2 year recurrence interval.

LWD will be removed from the immediate vicinity of all bridges and culverts. Maintenance guidelines will establish areas where LWD is allowed to remain and areas where LWD is not allowed to remain. Where maintenance guidelines do not exist, each crossing will be considered distinct and will be evaluated based on site specific conditions. Therefore, the amount and type of LWD may be different for each crossing and the location and amount may be different upstream and downstream of any given bridge or culvert.

A. Purpose

LWD provides an important ecological role in Santa Clara County channels. The objective of the LWD program (See Attachment E) is to retain woody debris, where possible, in Program channels to preserve the physical and biological processes associated with the natural recruitment of wood to waterways. Retention of woody debris will be considered in locations where such features will not increase the flood risk by way of sedimentation, debris capture, or flow deflection.

B. Work Activity

The SCVWD uses a four-tiered evaluation process to manage LWD in its channels. The four tiers are considered in the following order of priority: Tier 1) retain the LWD feature as-is in the channel, Tier 2) retain but modify the LWD feature, Tier 3) remove the LWD feature and replace it on-site, or Tier 4) remove the LWD feature entirely. LWD management may use an excavator, material handler, and/or crane to modify placement.

C. Requirements

The full requirements for LWD management are described in the LWD Program document (Attachment E), and Chapter 10.8.4, *Large Woody Debris*. Once a determination regarding

the LWD feature is made and implemented, the LWD will be tagged and monitored. This information will be entered and tracked in the SCVWD database.

4.2 Herbicide and Mechanical Vegetation Management

The SCVWD Vegetation Management Program uses an integrated approach of chemical, mechanical, cultural, and some limited biological methods to manage vegetation on its facilities. Herbicides are used in conjunction with mechanical and hand vegetation suppression to support hydraulic, fire safety, and ecosystem functions. Herbicides are used in a manner that is least disruptive to biological resources. New crews are trained in BMPs relative to pesticide use. This training and review is conducted annually for internal staff, as part of the employee orientation for new staff, and as a condition of work for contract staff performing herbicide applications. All contractors are trained in proper herbicide protocols prior to any work activities. Daily checklists are used to monitor herbicide application activities. Staff applying herbicide are also periodically monitored for compliance with additional internal SCVWD protocols.

Control of herbaceous vegetation in the SMP area is done for many of the same reasons as management of woody species. For the purposes of the SMP, herbaceous vegetation is non-woody vegetation which includes grasses, broadleaf weeds, cattails, and bulrush. Herbaceous vegetation includes annual, biennial, and perennial plant types. Herbaceous vegetation has the ability to impede flow conveyance and create fire hazards. Herbaceous vegetation may also have negative ecological impacts as it can out-compete more desirable native species, resulting in habitat degradation.

Herbaceous vegetation control is performed to limit weed growth, seeding, and expansion into new areas to reduce weeds in areas of special management (mitigation sites), maintain road right-of-ways and firebreaks along the top of bank, prevent vegetation encroachment into SCVWD facilities, mitigation sites, etc. by herbaceous plants, maintain vegetation-free areas as buffers, and provide localized treatments needed to protect facilities and resources.

Guiding Principles. The goal of SMP vegetation management is to achieve the desired control while balancing environmental and economic considerations. Herbicides, while often the most effective management tool economically, are routinely dismissed for some applications due to other factors that make their use in a given situation inappropriate (such as presence of special-status plants). However, herbicides used appropriately are, in many cases, the most environmentally desirable method for achieving the desired level of vegetation control. The selection of an approved herbicide, coupled with the use of an appropriate surfactant per label recommendations, can provide a higher level of control, which may reduce the frequency with which an area needs to be maintained and minimize physical impacts to the site. Specifically, targeted use of herbicides may eliminate the need to bring in heavy mowing equipment or large hand crews that can be more disruptive to on-site biological resources. For example, rather than conducting annual maintenance to control vegetation growth a specific area, the SCVWD may be able to reduce the maintenance interval to once every two years.

The SCVWD complies with the Integrated Pest Management Plan (IPMP) of the Municipal Regional NPDES Permit (MRP). The pesticide policy mandates that pesticides (in this case specifically herbicides) are used only when other methods have proven impracticable. When pesticides are used, the least toxic products that will meet the need are used at the lowest practical rate. The SCVWD continually works to minimize pesticide use as much as practical. The SCVWD's pesticide use is reviewed regularly as part of the compliance effort

with the MRP. The SCVWD's pesticide use is consistent with California Department of Pesticide Regulation requirements and court orders for threatened and endangered species. See http://www.cdpr.ca.gov/docs/endspec/salmonid.htm for further information as stipulated by a 2004 United States District court order, for certain pesticides applied near salmon-supporting waters. A 2006 Environmental Protection Agency injunction and order for no-use buffer zones surrounding California red-legged frog upland and aquatic habitats for certain pesticides can be viewed at http://www.cdpr.ca.gov/docs/endspec/rl_frog/index.htm.

4.2.1. Herbicide

A. Purpose

Herbicides are applied where the presence of herbaceous or small woody vegetation is in conflict with the maintenance guidelines and standards for the facility. In the case of woody vegetation, treatment is limited to saplings <2" dbh and generally not exceeding 8' in height. Post-emergent herbicides are applied to manage firebreaks and roadways along the terraces up to the inboard hinge and into the outboard cross-section. Pre-emergent and Post-emergent herbicides are used on roadways and in some out-board areas. Cut stump treatments are addressed in Section 4.1.4, Hand Removal.

B. Work Activity

The application of herbicide occurs in-stream and on terrace areas as well as on maintenance roads, outboard levee slopes, and similar non-in-channel areas. Various herbicide formulations may be used. Under this activity, herbicide use is the primary abatement tool to manage vegetation.

All herbicide applications are performed using equipment appropriate to the specific application type. In-channel herbicide application may use a hose and hand gun sprayer, or a backpack unit for smaller areas.

On unpaved access roads, herbicide is applied from a truck-mounted boom or hand gun (used around gates, curves, etc.), as needed, to control weeds in order to allow maintenance access and provide firebreaks. The booms have multiple nozzles that are specifically calibrated to provide the dosage and spray pattern appropriate to the area. The application is managed from an on-board computer mounted in each spray rig. During the application, notifications are posted near treated roads to notify the public of the application, and remain in place until the application dries, to reduce the risk of incidental exposure.

Herbicide use to treat cut stumps after tree removal activities is considered part of tree removal and is addressed under that activity description.

C. Requirements

Requirements 1-8 below apply to all work channels. Requirement 9 below applies to unmodified channels.

1. All herbicide use must be preceded by the appropriate biological surveys and clearances.

2. All herbicide applications must be preceded by a Pest Control Recommendation provided by a California licensed Pest Control Advisor. A recommendation is provided after each site is surveyed and the most appropriate control methods for the site are determined.

3. Foliar applications to woody vegetation are limited to plants <2" dbh and typically less than 8' in height.

4. Herbicide use is permitted in non-in-channel (terrace) areas.

5. Herbicide application can only occur in California red-legged frog and California tiger salamander SMP mapped areas when the creek or area is dry and no rain is forecast for the next 48 hours.

6. Use of surfactants on streams identified as supporting anadromous salmonids is permitted when:
   a. The stream is dry in the immediate work location and no rain is forecast for the next 48 hours.
   b. Spot spraying is necessary to control undesirable vegetation (e.g., invasive non-native vegetation or vegetation that falls outside the acceptable maintenance design of the facility).
   c. Foliar spraying is necessary to maintain channel capacity per the engineering standards for the following facilities and locations:
      1) Stevens Creek from Highway 101 to L'Avenida Avenue
      2) Guadalupe River:
         i. Reach G thru B (500' downstream UPRR bridge to Highway 101)
         ii. Branham Lane to Guadalupe Creek/Alamitos Creek confluence
      3) Alamitos Creek (Guadalupe River confluence to Coleman Road)
      4) Los Gatos Creek (South Bascom Avenue upstream to Camden; and Hwy 85 to Lark Avenue)
      5) Uvas Creek (Bloomfield Rd upstream to Santa Teresa Boulevard)
      6) Llagas Creek (confluence with the Pajaro River upstream to Santa Teresa Boulevard).

7. Surfactants are permitted adjacent to streams identified as supporting anadromous salmonid, or green sturgeon/longfin smelt (the latter in SF Bay tidal areas only) when a 20' buffer is established between the treatment area and the wetted flow channel.

8. The SCVWD also has coverage under the Statewide General NPDES Permit for the Discharge of Aquatic Pesticides for Aquatic Weed Control in Waters of the United States General Permit No. CAG990005, and fully complies with all provisions of that permit.

9. Unmodified channels may involve the following additional work activities:
   a. Pre-emergent herbicide application in non-in-channel (terrace) areas outside of the channel banks.
   b. Registered aquatic post-emergent herbicide application in aquatic habitats to control non-native and invasive plant species.
   c. Post-emergent herbicide application outside the wetted channel (inboard slope, terraces, and outboard slope) to control vegetation for fuel management, maintenance access and ecological requirements.

d. Implementation of additional biological and pest control recommendations as required to protect sensitive species and their habitats.

D. Aquatic Herbicides and Surfactants

Only herbicides and surfactants that have been approved for aquatic use by the EPA and are registered for use by the California Department of Pesticide Regulation (CDPR) will be used for SMP aquatic vegetation control. The lowest recommended rate of both herbicides and surfactants to achieve project objectives will be utilized to achieve desired control. An indicator dye may be added to the tank mix to help the applicator identify areas that have been treated and better monitor the overall application.

As new herbicide and surfactant formulations are developed and registered in California, the SCVWD may propose incorporating them into the Program. Such a proposal would be accompanied by data regarding efficacy and environmental impact. The SCVWD recognizes the dynamic nature of vegetation management and the routine introduction of new technologies. It is the intent of the SCVWD that such newly added formulations of both herbicides and surfactants will neither increase the level of toxicity to non-target receptors, or the quantity of product used relative to the formulation(s) being replaced.

Surfactants. Surfactants are materials that are added to herbicide mixtures to enhance their performance. The surfactant may assist with spreading over the vegetation, sticking to the foliage, penetrating thick cuticles, or other mechanisms to increase the efficacy of the application. 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 is often 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.

Surfactant use is limited to the products which are documented to have the least toxic affect to aquatic life. Currently, Agridex and Hasten (also known as Competitor) are documented as the least toxic in the NOAA 2006 Supplemental Environmental Assessment of NOAA Fisheries Implementation Plan for the Community Based Restoration Program. (NOAA Restoration Center, Silver Springs, MD). As new technologies and formulations become available, the SCVWD will evaluate its Program and adopt materials that achieve optimum control while affording the best protection to environmental resources. Other products may be substituted for the currently used products as new formulations emerge, provided the new products do not exceed the toxicity or usage limits of the products they replace.

4.2.2 Mowing

A. Purpose

Mowing is conducted to provide visual access for facility inspections, for flow conveyance capacity, and/or to meet local fire codes. Current (as of September 2013) local fire codes call for all weeds and grasses to be maintained below 6” in height for 10’ laterally on both sides of access routes. Vegetation must be cut back 30’ around any structures and this 30’ firebreak must be maintained. Parcels up to one acre in size must be completely mowed. All work is performed to conform to local fire code requirements.

B. Work Activity

Mowing is the area-wide cutting of above-ground plant material by mechanized or hand-held equipment. Work primarily occurs on the terraces/outboard areas, though it may also be

conducted in tidally-influenced areas near SF Bay or in smaller streams as required by fire codes.

C. Requirements

All standard procedures for biological clearances apply (per applicable BMPs as described in Attachment F). Because much of this work is performed by contractors, annual BMP training is required, and BMP checklists are completed daily by the contractor.

4.2.3 Flaming

A. Purpose

A hand-held propane gas-powered flamer may be used to control weed seedlings. Operation of a flamer is a useful alternative when non-target plants have known sensitivity to herbicide drift.

B. Work Activity

A flamer is a gas-powered hand-held wand that delivers a directed torch flame fueled by a propane canister. An individual walks the work site carrying the flamer and applying flame to target vegetation. Cell contents of the weed expand with the heat in a few seconds, bursting cell walls, leaving the plant wilted. Steam, not smoke, is the by-product. Upright, broad-leaved weeds from ½ to 1 inch tall are most effectively controlled by this method; grasses or rosettes are more difficult. If the ground substrate is flammable (e.g. wood mulch, leaf litter), flaming should be conducted when the substrate is wet or moist. Non-flammable substrates such as rocked maintenance roads, cellular concrete mats (CCM), driveways, sidewalks, concrete floodwall seams, gabions (subject to the wire tolerance), gravel bars, marshes, weepholes, and expansion joints in concrete-lined channels, spillways, etc. are ideal settings for this maintenance approach. Smooth substrates allow even application of heat; weeds in areas with rough surfaces may evade the torch effects.

C. Requirements

All standard procedures for biological clearances apply (per applicable BMPs as described in Attachment F). Flamers are used only by trained qualified staff in strict compliance with all applicable regulations. Flamers will not be used within the mapped range of the SMHM. Flamers are not used during periods of high fire danger or in areas where fuel or climate conditions could cause an accidental fire. Local fire districts may request notification prior to use.

4.2.4 Grazing

A. Purpose

Grazing is used in limited circumstances for herbaceous weed control on SCVWD facilities. Grazing involves the use of various species of domestic animals to provide non-targeted weed control. Animals include goats, sheep and other appropriate animals.

B. Work Activity

A small herd is put on a parcel after evaluation by biological staff to confirm the absence (or protection) of sensitive resources that could be adversely affected by the herd. Vegetation to be preserved is fenced off as a protective measure. Grazing is excluded from channels

and other water resources. If a sensitive waterbody is within the grazing area, it will be excluded with fencing.

C. Requirements

All standard procedures for biological clearances apply (per applicable BMPs as described in Attachment F).

4.3 Impact Avoidance and Activity Specific BMPs

The following BMPs provide specific and detailed guidance for the variety of vegetation management procedures implemented by the SCVWD. BMPs for the following maintenance techniques are included: pruning, tree removal, woody debris management, herbicide application, mowing, flaming, and grazing. Practices are implemented by fully trained and qualified field crews. Pre-planning "GEN" BMPs are also implemented as applicable to the specific site conditions and resources.

BMP Number	BMP Title	BMP Description
VEG-1	Minimize Local Erosion Increase from In-channel Vegetation Removal	To minimize the potential effect of localized erosion, the toe of the bank will be protected by leaving vegetation to the maximum extent possible and consistent with the maintenance guidelines or original design requirements.
VEG-2	Non-native Invasive Plant Removal	Invasive species (e.g. cape ivy [*Delairea odorata/Senecio mikanoides]*, arundo [*Arundo donax*]) will be disposed of in a manner that will not contribute to the further spread of the species. Cape ivy removed during a project shall be bagged and disposed of in a landfill. Arundo canes will be prevented from floating downstream or otherwise entering the creek or waterway.
VEG-3	Use Appropriate Equipment for In-channel Removal	When using heavy equipment to cut or remove in-channel vegetation, low ground pressure equipment, such as tracked wheels will be utilized to reduce impacts to the streambed.
VEG-4	Use Flamers with Caution	1. A fire extinguisher, water supply and other appropriate fire suppression equipment will always be kept close to the work site in case of an emergency. 2. Propane tanks will be checked for leaks and proper functioning prior to and proceeding use of flaming equipment. The propane tank will be treated as a hazardous material.
VEG-5	Conduct Flaming During Appropriate Weather and Seasonal Conditions	Flamers will not be used during periods of high fire danger or in areas where fuel or climate conditions could accidentally ignite a fire.
VEG-6	Standard Grazing Procedures	1. Vegetation and areas to be preserved will be fenced off to exclude grazing animals. 2. Grazing animals will be excluded from stream channels, using fencing or other barriers.

BMP Number	BMP Title	BMP Description
HM-4	Posting and Notification for Pesticide Use	Posting of areas where pesticides are used will be performed in compliance with QEMS Document Q751D02 Control and Oversight of Pesticide Use 1. Posting will be performed in compliance with the label requirements of the product being applied. 2. In addition, posting will be provided for any products applied in areas used by the public for recreational purposes, or those areas readily accessible to the public, regardless of whether the label requires such notification. In doing this, the SCVWD ensures that exposure risk is minimized further by adopting practices that go beyond the product label requirements. (The posting method may be modified to avoid destruction of bait stations or scattering of rodenticide.) 3. These postings will notify staff and the general public of the date and time of application, the product's active ingredients, and common name, and the time of allowable re-entry into the treated area. 4. Signs will not be removed until after the end of the specified re-entry interval. 5. Right-to-know literature on the product will be made available to anyone in the area during the re-entry period. 6. A SCVWD staff contact phone number will be posted on the sign, including a cellular phone number. 7. Notification of pesticide activities will be made as required by law. Also, the SCVWD will maintain records of neighbors with specific needs relative to notification before treatment of an adjacent area so that such needs are met.

4.4 Program Limits for Vegetation Management

4.4.1 Woody Vegetation Management

The woody vegetation limits described below apply to channels that do not have Maintenance Guidelines established. These limits are provided to guide maximum project, annual, and program maintenance activities until such time as Maintenance Guidelines are established.

Where Maintenance Guidelines exist, projects will comply with the quantitative objectives established by the Maintenance Guidelines as identified in Section 3.2. In the event that conformance with Maintenance Guidelines results in exceedance of the limits described below, the requirements of the Maintenance Guidelines shall be followed.

A. Pruning

Routine pruning activities include removal of overhanging growth (OHG) from maintenance roads and fence lines that were previously authorized under SMP-1 and are being reauthorized for the SMP-2 period (2014-2023). (See Table 10-3 for a list of channel locations.) Areas not included in the OHG for SMP-1 are considered "new" work areas and

will be subject to the pruning limits described below, if they impact more than 0.01 ac of riparian or wetland vegetation.

New Pruning (outside of 2002 OHG lengths per Table 10-3). The following limits will apply, if they impact more than 0.01 ac of riparian or wetland vegetation:

10-year Program Limit:	40 acres
Annual Limit:	20% of 10-year limit
Per-Project Limit:	No more than 20% canopy removal within the reach.

B. Coppicing

Coppicing will not have limits on its geographic extent because the activity is not widespread and serves to provide an ecological benefit. No more than 20% canopy removal will be allowed in any reach. Assessment of canopy removal is made visually based on the pre-maintenance condition.

C. Tree Removal

Removal of Trees 6-12" dbh. The following limits will apply:

10-year Program Limit:	2000 live trees
Annual Limit:	20% of 10-year limit
Per-Project Limit:	No more than 20% canopy removal in any reach
Other:	Tree removal that is determined to be needed based on MG's or triggers, may exceed the annual and Program tree limits and will be subject to agency approval.

Removal of Trees <6" dbh. Maintenance Guidelines and the Chapter 3.2 interim process will dictate when, where, and what work is needed on a project-by-project basis.

D. Large Woody Debris (LWD)

LWD maintenance activities are described in Section 4.1.5 and Attachment E of the SMP Manual. LWD maintenance activities apply to woody debris greater than 12" diameter and 6' in length in anadromous salmonid channels. In consideration that LWD features often involve wood smaller than 12" diameter, and such features provide ecologic functions to the channel; the inclusion of additional wood features beyond the chosen bank design, will be considered for each bank stabilization maintenance project. Where possible and feasible, the addition of such wood features into bank stabilization projects will thereby provide an off-set to the loss of functions occurring from maintenance activities which may remove wood pieces smaller than 12" in diameter.

The following limits will apply in Tier 4 of the LWD Program within anadromous salmonid channels (as defined in Attachment E):

Per-Project Limit:	n/a
Other:	No limits on LWD removal within bridge and culvert zones. No limits on LWD removal which is cut and left in place due to ecological values provided.

4.4.2 Herbicide and Mechanical Vegetation Management

A. Herbicide Use

Annual and 10-year program limits are based on gallons/pounds/ounces of product, and summarized in the tables below. The per-project limit will correspond to label restrictions per application, using units (gallons/pounds/ounces) per acre based on the size of the job.

Table 4-1. In-channel Herbicide Use Limits, 2014–2023

Product	Active Ingredient	CAS#	In-channel Use	
			Estimated Average Annual	10-Year Program Limits
Rodeo Herbicide/ Aquamaster Herbicide	Glyphosate, Isopropylamine salt of glyphosate 54%	38641-94-0	932 gallons	9,320 gallons
Competitor	Ethyl Oleate, 98% (modified vegetable oil)	111-62-6	310 gallons	3,100 gallons

Notes:

1. In-channel program limits will be greater than previous annual average usage due to the addition of South County (Pajaro Basin) in-channel vegetation management.

2. The in-channel herbicide program has a goal to reduce annual herbicide usage in the North County area (Santa Clara Basin) by 25% within the first five years of the program with a target program limit reduction of 20% by the end of the 10-year period. Because herbicide maintenance has not previously been applied in the South County (Pajaro Basin), there is no basis yet for targeting a reduction target in that area. It is expected that during the first few years of SMP-2 herbicide usage in South County areas will be a bit higher than its expected longer-term average to reduce the overgrowth that has accumulated. Once that overgrowth is controlled, then herbicide usage in South County will also be reduced accordingly.

3. Other products may be substituted for the products listed here as new formulations emerge if these products do not exceed the toxicity or usage limits of the products they replace

Table 4-2. Non-In-channel Herbicide Program Limits, 2014-2023

Product	Active Ingredient	CAS#	Non-In-channel Use	
			Estimated Average Annual	10-Year Program Limits
Roundup Pro Concentrate Herbicide	Glyphosate, Isopropylamine salt of glyphosate 50%	38641-94-0	1,310 gallons	13,100 gallons
Garlon 4 Herbicide	Triclopyr, 62%	64700-56-7	6 gallons	60 gallons
Pendulum AquaCap Herbicide	Pendimethalin, 39%	40487-42-1	1,370 gallons	13,700 gallons
Gallery 75 Dry Flowable Herbicide	Isoxaben, 75%	82558-50-7	1,695 pounds	16,950 pounds
Competitor	Ethyl Oleate, 98%	111-62-6	278 gallons	2,780 gallons

Used only on in-channel program - moved to that table	(modified vegetable oil)			

Notes:

1. The non-In-channel herbicide program has a goal to reduce annual usage of Roundup Pro, Pendulum, Gallery and Competitor in the North County area (Santa Clara Basin) by 30 to 40% within the first five years of the program, with a target program limit reduction of 25% by the end of the 10-year period. Similar to the situation described above for in-channel herbicide usage, there is not yet a basis to target herbicide reduction in the South County area (Pajaro Basin).

2. Other products may be substituted for the products listed here as new formulations emerge if these products do not exceed the toxicity or limits of the usage of the products they replace.

B. Mowing, Flaming and Grazing

There are no limits on these activities for the following reasons:

1. Activities are generally conducted in areas of ruderal vegetation, dominated by non-native annuals, and as such have little ecological impact.
2. Activities are likely to benefit native plant species.
3. Activities are necessary in order to meet fire standards (non-discretionary).
4. On USACE levees, activities are necessary to meet USACE requirements (non-discretionary).

CHAPTER 5: SEDIMENT REMOVAL

5.1 Purpose

Sediment removal is the act of mechanically removing sediment deposited within a channel. Sediment removal is necessary when an accumulation of sediment: (1) reduces flow conveyance capacity below acceptable levels; (2) prevents facilities or appurtenant structures from functioning as intended; or (3) impedes fish passage and access to fish ladders. Sediment removal activities occur per the triggers and maintenance guidelines approach described in Chapter 3.

5.2 Work Activities

Sediment may be removed from channel beds using various equipment, including but not limited to excavators, long-reach excavators, bulldozers, scrapers, and front-end loaders. Sediment removal is usually conducted from the top-of-bank using one or more excavators, once the area is dry or isolated from the live stream flow. Where practical and necessary, smaller compact tractors, such as Bobcats, are lowered directly into the channel from a nearby crossing; in certain scenarios, this approach can minimize the impacts associated with sediment removal using larger equipment in the channel. Small compact loaders may also be used to remove sediment from within a culvert where larger equipment will not fit. Excavated sediment is either placed directly into dump trucks parked on the access road, or stockpiled into central locations along the channel for subsequent removal. Stockpiling of materials occurs as described in BMP GEN-21.

Where practicable, sediment removal activities will be conducted by 'pure excavation' such that the discharge of fill material will be limited to incidental fallback of material from the excavation equipment. As described in Chapter 2, when this approach is used, the sediment removal activities are not regulated by the USACE, though they may still regulated by other agencies as applicable. To accomplish sediment removal via pure excavation, sediment will be directly excavated from the channel using long-reach excavators operating from the top-of-bank or excavated from within the channel using a backhoe or similar "scoop and lift" type of equipment. Excavated sediment will be deposited above the top of bank or other non-jurisdictional area. Sediment will not be stockpiled in the channel or within jurisdictional Waters of the U.S., and temporary access roads and dewatering activities will not be constructed in association with projects qualifying as 'pure excavation."

5.2.1 Channel Access and Staging

Access to work sites occurs via existing, adjacent access roads where present. Most SCVWD-maintained channels have at least one existing access road running along the top-of-bank on one side of the channel. Some channels have an access road on both sides of the channel, while others may have a lower maintenance road along the lower level channel banks. Other channels do not have access roads on either side. When the channel shape, bank height, or presence of mature vegetation prevents the use of the top-of-bank access roads, equipment can be located along interior channel access roads or terrace locations via existing access ramps, as available. Where there is not existing access into the channel, the construction of a temporary access ramp may be required. Temporary access ramps are removed upon completion of the project, as described in BMP GEN-23. Selective clearing of shrubs or trees on the banks may be necessary to provide equipment access to the channel bed. Removal of vegetation follows Program requirements as described in Chapter 4, Vegetation Management.

In the event that work is to be performed within the channel bottom, all work is performed in dry conditions or within an area dewatered by a stream flow bypass system.

5.2.2 Requirements

1. Pre- and post-project assessments will be performed on anadromous salmonid channels to assess impacts to gravels and instream habitat complexity features and develop a suitable mitigation approach (see Chapter 10, Section 10.8.3 *Mitigation for Impacts to Anadromous Salmonids*).
2. Water quality sampling is performed for any site with active diversions. See the Water Quality Monitoring Plan (Attachment H) for information on: (1) additional monitoring efforts and regulatory agency notification in case of exceedance of receiving water limitations; (2) monitoring procedure; and (3) details on type of records and field documentation kept by SCVWD staff.
3. Sediment characterization is performed to determine the appropriate reuse or disposal option for the removed sediment. The Sediment Characterization Plan (Attachment G) provides additional information on: (1) how sediment sampling locations are selected; (2) sampling and analytical procedures; and (3) details on the type of records and field documentation kept by SCVWD staff.

5.3 Impact Avoidance and Activity-Specific BMPs

This group of BMPs is implemented specifically during sediment removal activities to avoid potential impacts on biological resources. Pre-planning "GEN" BMPs are also implemented as applicable to the specific site conditions and resources.

BMP Number	BMP Title	BMP Description
SED-1	Groundwater Management	If high levels of groundwater (i.e., visible water) are encountered during excavations in a work area, the water will be pumped out of the work site or left within the work area if the work activity is not causing water quality degradation in a live stream. Water Quality monitoring would need to occur. If necessary to protect water quality, the extracted water will be discharged into specifically constructed infiltration basins, holding ponds, or areas with vegetation to remove sediment prior to the water re-entering a creek. Water discharged into vegetated areas or swales will be pumped in a manner that will not create erosion around vegetation.
SED-2	Prevent Scour Downstream of Sediment Removal	Sediment removal sites in the transport zone on alluvial fans may cause increased scour downstream if they experience scouring flows or rapid sediment accumulation after maintenance. After sediment removal, the channel will be graded so that the transition between the existing channel both upstream and downstream of the maintenance area is smooth and continuous between the maintained and non-maintained areas and does not

BMP Number	BMP Title	BMP Description
		present a sudden vertical transition (wall of sediment) or other blockage that could erode once flows are restored to the channel.
SED-3	Restore Channel Features	Low-flow channels within non-tidal streams will be contoured to facilitate fish passage and will emulate the pre-construction conditions as closely as possible, within the finished channel topography.
SED-4	Berm Bypass	Where sediment removal is accomplished without a bypass by removing alternating cells, the berm between the work and the live channel will be wide enough to prevent introduction of turbid water from the cell into the live channel.
SED-5	Sediment Characterization	Projects involving sediment removal at stream gauges, outfalls, culverts, flap gates, tide gates, grade control structures, bridges, fish ladders, and fish screens in excess of 25 cubic yards shall be characterized in accordance with the SCVWD's Sediment Characterization Plans for SMP-2. These projects shall be reported in the annual summary report. Sediment removed will not be re-used without pre-approval from appropriate regulatory agencies. See section 5.4 for information on the waiver process.

5.4 Program Limits for Sediment Removal Activities

For channel reaches classified as modified channels, sediment removal projects must comply with the quantitative objectives established by the Maintenance Guidelines (where MGs exist), as identified in Section 3.6. Sediment removal in modified channels will not exceed 5,000 linear feet for individual projects. The amount of sediment removed may not exceed the established maintenance baseline.

For channel reaches classified as either modified with ecological values or unmodified, sediment removal projects must comply with the quantitative objectives as established by the Maintenance Guidelines where Maintenance Guidelines exist. Where maintenance guidelines do not exist the triggers described in section 3.2 will be used to evaluate and justify the work. Sediment removal in modified channels with ecological values will not exceed 300 linear feet for individual projects. When a sediment removal project involves a combination of modified and modified with ecological value channel types, then the individual sediment removal project limits (5000 ft. and 300 ft. for modified and modified channels with ecological value respectively) shall be applied to the combined sections of the project with those channel type designations.

Sediment removal in unmodified channels will not exceed 300 linear feet for individual projects.

Sediment removal from unmodified and modified with ecological values type channels must be associated with a facility or man-made structure (i.e., bridge, outfall, gauge, grade control, etc.). “Associated” is defined as one or more portions of the sediment removal reach are located 100 feet or less from the structure or facility. The amount of sediment removed may not exceed the established maintenance baseline as established by the MGs.

Upon request by the SCVWD, the CDFW, RWQCBs, NMFS, USFWS, and the USACE will review and may waive the Per-Project Limits for sediment removal or the requirements for "association with a man-made structure" by making a written determination concluding that the project will result in minimal adverse effects. Waivers must be obtained from each agency for the SCVWD to proceed. Waivers may be submitted in the NPW or during the in-channel work season. For waivers submitted in the NPW, agencies will provide a response to the waiver during the NPW review period. If the agencies cannot conclude their waiver review by the end of the NPW review period, they will respond to the SCVWD and explain the status of the waiver review and an indication of how much time is needed to complete the review. Agencies will work diligently to respond to in-channel work season waivers promptly.

For waiver requests that may affect federally listed species, the USACE will make an effects call and determine if consultation with the USFWS or NMFS is warranted. The SCVWD will submit waiver requests to the NMFS and USFWS at the same time they submit requests to the other agencies.

All waiver requests must include the following:

a) A narrative description of the stream. This should include known information on: volume and duration of flood flow events; the approximate length, width, and depth of the waterbody and characteristics observed associated with an OHWM (e.g. bed and bank, wrack line or scour marks): a description of the adjacent vegetation community and a statement regarding the wetland status of the adjacent areas (i.e. wetland, non-wetland): surrounding land use; water quality; issues related to cumulative impacts in the watershed, and: any other relevant information;

b) An analysis of the potential impacts associated with sediment removal to the waterbody;

c) An analysis of the potential for special-status plants or animals to be impacted by the sediment removal project;

d) Measures taken to avoid and minimize losses to waters of the State, including other methods of constructing the proposed activity(s); and

e) A compensatory mitigation plan describing how the unavoidable losses are proposed to be offset.

The Maintenance Guidelines, where developed, may provide a basis for the information to be used in sub-sections (a) through (e) above.

Waivers for sediment characterization > 25 cy may be requested to the Regional Water Board Executive Officer. The SCVWD will provide the following information: (1) a narrative discussion explaining the justification for waiving sediment characterization, which may include, but need not be limited to, interpretation of existing historic sediment characterization data for the project reach and/or entire stream channel; (2) project-specific information: location of the sediment removal project, stream length where sediment will be removed, and volume of sediment to be removed; and (3) sediment reuse information: location of reuse, sediment reuse purpose, foundation reuse or surface reuse, and volume of sediment to be reused.

There is no limit to the number of sediment removal projects that may occur in a single year. The Per-Project Limits described above are intended to ensure minimal effects on aquatic and other sensitive biological resources. Consequently, the Annual Limits for sediment removal will

effectively be the cumulative annual acreage, linear footage, and volume of the individual project activities.

To ensure that SMP projects are unconnected, single and complete actions and not part of a larger action that will exceed the SMP's per-project size and placement limits, each project must demonstrate independent utility. A SMP project will be considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility. A separation of 500 feet between sediment removal work sites is required.

CHAPTER 6: BANK STABILIZATION

6.1 Purpose

Bank stabilization involves repairing and stabilizing channel banks and levees that are eroding or are in need of erosion protection. The SCVWD may implement bank stabilization when a destabilized or eroding bank: (1) causes or could cause significant damage to SCVWD property and/or adjacent property; (2) is a public safety concern; and/or (3) is causing instream sedimentation, and/or affecting water quality and other beneficial uses such as riparian habitat and recreation.

Channel bank erosion mostly occurs during, or following, major storm events. Erosion can occur due to a combination of flow velocities and existing soil strength and can be accelerated by adjacent land uses. Bank erosion can weaken or lower the stream bank elevations and thereby increase the flood risk to adjacent properties. Bank erosion and its sediment yield can degrade water quality and can also lead to increased downstream deposition which may further reduce conveyance capacity and increase the flood risk. Bank erosion may also cause vegetation and soil loss, damage private or public property, and impact transportation (e.g., trails and access roads), recreation, and utilities. Erosional conditions can increase turbidity which can be injurious to fish and aquatic life.

For these reasons, stabilizing eroding stream banks or preventing anticipated bank failure provides the benefits of reducing instream sedimentation, protecting water quality, and protecting other beneficial uses such as riparian habitat and recreation.

6.2 Treatment Selection

The SCVWD considers a wide range of potential bank repair treatments depending upon site conditions, maintenance triggers, Maintenance Guidelines and other site assessment processes as discussed in Chapter 3. Table 6-1 summarizes the 12 approved bank stabilization treatments the SMP may use. Attachment A (Bank Stabilization Measures) provides more detailed information for each treatment. Table 10-6 identifies the applicable mitigation ratio for each treatment method and whether regulatory agencies require notification, which may include review of the project design prior to approval.

In general, bank stabilization methods are described as hard, hybrid, or soft depending upon the degree of bank hardening involved. As shown in Table 6-1, “hard” methods may include concrete blocks, sacrete, boulders, or other hardened materials. “Soft” methods may include biotechnical treatments emphasizing vegetation and earthen banks, and “hybrid” methods are typically earthen bank repairs that include some type of rock material in the lower bank zone to provide additional strengthening.

For the SMP, the elevation of the “lower bank zone” or “toe of bank” where rock may be placed will be determined by hydraulic analysis. The bank stabilization measures included in Attachment A that have rock placed in the lower bank zone generally have the rock placed up to the elevation of the Ordinary High Water Mark (OHWM). The OHWM is defined by the USACE as the line on the shore or bank established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or

other appropriate means that consider the characteristics of the surrounding areas. The term "toe of bank" or "bank toe" generally refers to the very bottom location of the bank where it meets the channel bed.

During the bank stabilization assessment process, sites with destabilized banks are evaluated for their soil conditions, channel and bank scour velocities, slope stability, channel form/position, and other active geomorphic conditions. Consideration of the cause of the bank failure (over-land runoff, bank slumping, undersized culvert upstream, etc.) is also critical to determination of the appropriate treatment approach. Where practicable and appropriate, bank stabilization projects will also address the cause of the bank failure.

Based on the site conditions, a SCVWD design engineer, biologist, environmental planner, and other SCVWD staff will collaboratively develop a treatment approach that stabilizes the streambank while trying to avoid and minimize the use of hardscape. The SCVWD staff will consider on-site habitat values, species use, and beneficial uses. Some of the factors considered in the treatment selection process are shown in Figure 6-1.

As described in Chapter 4, bank stabilization projects will be evaluated for the inclusion of additional wood features beyond those in the chosen bank design. Where possible and feasible, additional wood features will be included into bank stabilization projects and thereby provide an off-set to the loss of functions occurring from maintenance activities which may remove wood pieces smaller than 12" in diameter. While LWD maintenance activities apply to woody debris greater than 12" diameter for the SMP, wood smaller than 12" diameter may also provide ecologic functions to the channel. SCVWD staff will collaboratively develop treatment approaches in anadromous salmonid channels that incorporate wood features to enhance on-site beneficial uses.

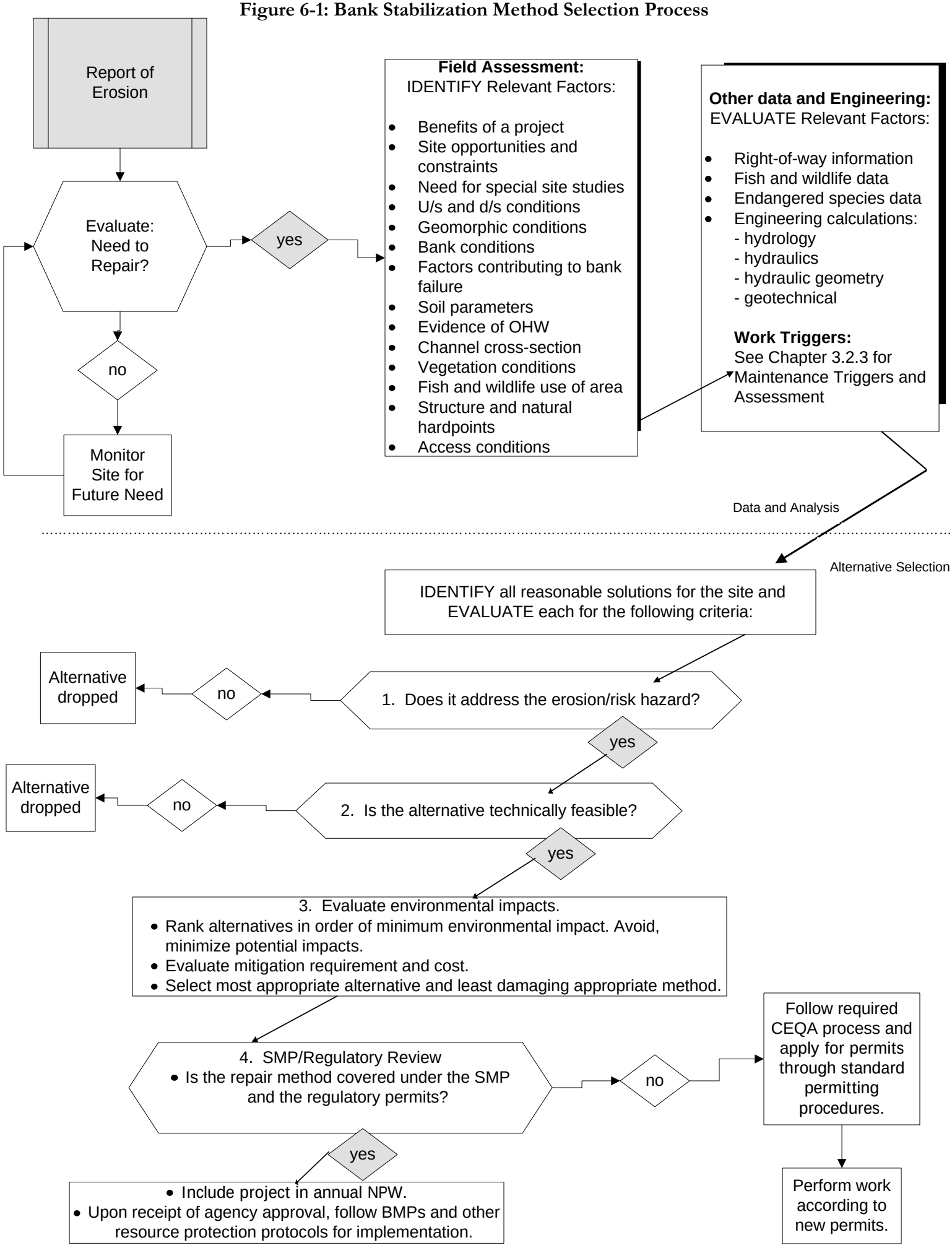
When an existing hardened bank site is evaluated for stabilization activities, an assessment is made as to whether a softer treatment method can be used in place of an in-kind hardened replacement. When the site will support it, hardscape bank treatments will be replaced with hybrid or soft bank measures. As described in Chapter 10, where hardscape treatments are replaced with soft or hybrid approaches, the sites may provide compensatory mitigation within the area of hardscape that is removed. This compensatory mitigation may be applied to other bank stabilization locations where a hard bank treatment requires off-site compensatory mitigation. In these cases, the SCVWD will submit a compensatory mitigation plan, prepared in accordance with the requirements outlined in Chapter 10, to the agencies for review and approval.

6.3 Work Activities

Work activities at bank stabilization sites typically involve four phases: (1) site preparation; (2) recontouring and treatment installation; (3) earth and soil compaction and grading; and (4) vegetation planting and other on-site restoration activities.

During site preparation the eroded or destabilized bank site is cleared of vegetation and loose site soil is stockpiled locally for later use. Materials that will be used for the erosion treatment are staged locally and if necessary, access for in-channel activities is developed.

Figure 6-1: Bank Stabilization Method Selection Process



Access to erosion sites occurs via existing maintenance roads where present. Most SCVWD-maintained channels have at least one existing access road along the top of the bank on one side of the channel. Some channels have an access road on either side of the channel. Some channels may have a lower maintenance road along a terrace.

Selective clearing of shrubs or trees may be necessary on the banks to provide equipment access to the channel bed. Tree removal necessary for bank stabilization activities occurs as described above in Section 4.1.4 Hand Removal.

In the event that bank repair work requires some activities in the channel bottom, all work is performed in dry conditions or within an area dewatered by a stream flow bypass system.

Bank stabilization activities use bioengineering approaches when feasible and appropriate to stabilize eroding streambanks. Softer approaches are typically used in lower velocity, grass lined channels, in more natural creek settings where poor soil conditions exist or where the creek conditions can tolerate higher hydraulic roughness conditions. The most common soft approach at these sites is to reconstruct the slope with earthen materials and revegetate the slope.

Softscape approaches may use a variety of willow plantings, contour wattling, brush mattresses, root wads, log crib walls, and earthen soil banks to provide effective erosion control and resource enhancement. Where feasible, these softscape approaches are combined with additional plantings (see Table 10-9 riparian planting palette) or other instream features to further enhance and restore riparian and channel habitat. For sites with higher tolerances for hydraulic roughness, staff reviews adjacent habitat conditions to determine which soft approach is best suited for those conditions.

Where hydraulic forces exceed the design parameters and guidance for softscape treatments, SCVWD then considers hybrid or hardened approaches for specific locations which require a higher level of resistance for erosive shear forces. For example, the softscape approaches shown in Table 6-1 can be combined with selective rock use (typically in the lower bank zone where erosive forces are greatest) to provide added shear strength. The outer bends of channels where flow velocities and shear stresses are greater are also common locations for using hardscape elements.

Left untreated, eroding streambanks will generally become progressively more unstable leading to increased erosion and flooding risks. Eroding streambanks left untreated also typically result in further impacts to aquatic resources and beneficial uses, including deleterious effects to water quality and streambank habitat. In some cases, site conditions may require rock riprap installed to a higher elevation than just the base area. This determination will be based on hydraulic analysis and field conditions, the Maintenance Guidelines (if applicable and available), maintenance triggers as described in Chapter 3, and the site assessment process described in Section 3.6.2. For installation of hard structures, existing undesirable soil and material from the

failed bank is removed and the bank is reconstructed with back-filled soil and the appropriate hardscape material per the project design.

Equipment used for bank stabilization activities may include excavators, bulldozers, cranes, front-end loaders, dump trucks, water trucks, pumps, generators, compactors, and hand operated thumpers. Staging typically occurs on adjacent access roads or lands, if available, or within the work area. Where possible, soil and riprap are staged in areas that have been previously disturbed (e.g., service roads and turn-outs).

The bank stabilization repair is completed with final earth compaction and grading to the finished slope design specification and planting and/or other on-site restoration practices as planned for the repair. When repairs are made, banks are recontoured to match the adjacent bank slope (i.e., returned to pre-failure configuration) to the extent possible. If healthy riparian vegetation exists adjacent to the bank failure site, care is taken to minimize disturbance of such vegetation, including mature trees. The bank repair site is restored to match pre-failure conditions to the extent possible.

6.3.1 Requirements

1. Pre- and post-project assessments will be performed on anadromous salmonid channels to assess impacts to gravels and instream habitat complexity features and develop a suitable mitigation approach (see Chapter 10, Section 10.8.3 *Mitigation for Impacts to Anadromous Salmonids*).

2. Bank stabilization can be performed in any creek under SCVWD jurisdiction or as approved by the Board of Directors.

3. The notification requirements for bank stabilization projects are outlined in Chapter 12. Results from a hydraulic analysis and a written justification will be provided to support hardscape designs and provide justification for why a softscape or hybrid method was not selected. In-kind repairs on non-anadromous salmonid channels that do not change the character, scope or size of the original structure, that occur in the same project footprint, and are not extending rock any higher than the existing condition are not subject to regulatory review. In-kind rock repairs on anadromous salmonid channels will included in the NPW.

4. Water quality monitoring is performed per the Water Quality Monitoring Plan (Attachment H), and all excavated sediment is tested per the Sediment Characterization Plan (Attachment G).

5. Winterization is the process of preparing and maintaining work sites with adequate BMPs to prevent erosion and sediment transport, and to protect water quality, during the rainy season. Every bank stabilization project is winterized upon completion. The SCVWD relies on weather forecasts to prepare for anticipated significant rainfall and monitors the 72-hour look-ahead weather forecasts from the National Weather Service (or local vendor such as the Western Weather Group) year round to prepare for the timing of winterization measures. If a significant rainfall is forecast within the coming 72-hr forecast window, then maintenance work that may result in sediment runoff to the channel shall be stopped to allow adequate time to complete erosion control measures. Winterization is completed prior to the occurrence of significant rainfall.

Basic guidance for winterization procedures (and Post-Project Restoration Measures) includes the following:

1. Direct runoff away from disturbed areas.
2. Retain existing vegetation as much as possible.
3. Contour grading consistent with the surrounding terrain.
4. Prepare temporary drainages and outlets.
5. Grade/excavate outside of rainy season.
6. Minimize length and steepness of slope.
7. Stabilize disturbed areas by mulching and revegetation (e.g., hydromulching, hydroseeding, hydraulic matrices, and blankets).
8. Use dissipating measures to keep runoff velocities low.
9. Trap sediment on site.
10. Inspect, log, and maintain control measures after each storm.

Proper use of erosion and sediment control BMPs requires training by experienced professionals. Certifications are available through the IECA (International Erosion Control Association).

Table 6-1. Bank Stabilization Methods

I.D. No.	Method	Appropriate Slope Angle For Method	Scour Velocity Supported (feet per second)	Hard-/Soft-scape
1	Earth Repair	2:1 or flatter	≤ 6fps	Soft
1A	Earth Repair with Buried Rock	1.5:1 or flatter	≤ 6fps	Soft
1B	Earth Repair with Rock Base	2:1 or flatter for earth repair section; 1.5:1 or flatter for boulder section	≤ 6fps	Hybrid if rock area is vegetated Hard if rock area is not vegetated
2	Live Construction	2:1 or flatter	≤ 6fps	Soft
2A	Live Construction with Boulder Base	2:1 or flatter for live construction; 1.5:1 or flatter for boulder section	≤ 6fps	Hybrid if rock area is vegetated Hard if rock area is not vegetated
2B	Live Construction with Log Base	2:1 or flatter for live construction; 1:1 or flatter for log toe section	≤ 15 fps	Soft
3	Contour Wattling	2:1 or flatter	≤ 6fps	Soft
3A	Contour Wattling with Boulder Base	2:1 or flatter for contour wattling area; 1.5:1 or flatter for boulder section	≤ 6fps	Hybrid if rock area is vegetated Hard if rock area is not vegetated

I.D. No.	Method	Appropriate Slope Angle For Method	Scour Velocity Supported (feet per second)	Hard-/Soft-scape
3B	Contour Wattling with Log Base	2:1 or flatter for contour wattling area; 1.5:1 or flatter for log toe section	≤ 15 fps	Soft
4	Brush Mattress (Brush Layering)	2:1 or flatter	≤ 6fps	Soft
4A	Brush Mattress (Brush Layering) with Boulder Base	2:1 or flatter for brush mattress; 1.5:1 or flatter for boulder	≤ 6fps	Hybrid if rock area is vegetated Hard if rock area is not vegetated
4B	Brush Mattress (Brush Layering) with Log Base	2:1 or flatter for brush mattress; 1:1 or flatter for log toe	≤ 15 fps	Soft
5	Surface Matting (Erosion Mats)	2:1 or flatter	≤ 12 fps	Soft
5A	Surface Matting (Erosion Mats) with Boulder Base	2:1 or flatter for erosion mat; 1.5:1 or flatter for boulder	≤ 6fps if boulders are planted with live stakes; 12 fps if boulders not planted	Hybrid if rock area is vegetated Hard if rock area is not vegetated
5B	Surface Matting (Erosion Mats) with Log Base	2:1 or flatter for erosion mat section; 1:1 or flatter for boulder	≤ 15 fps	Soft
6	Add Rock to Invert	N/A	For incised channels or scour holes d/s concrete lined areas	Hard
6A	Rock Cross Vanes	N/A	For channels types “B” and “F” in Rosgen’s stream classification	Hard
6B	Root Wads and Boulders	N/A	≤ 10 fps	Hybrid
6C	Live Log Crib Walls	Slopes up to ¼:1	6 – 12 fps	Soft
6D	Log Revetment	Slopes up to ¼:1 or flatter	≤ 15 fps	Hybrid
7	Cellular Confinement System	Slopes up to ½:1	≤ 6 fps	Hard
8	Rock Blanket	Slopes up to 1.5:1, 2:1 preferable	≤ 15 fps	Hard
8A	Boulder Revetment	Slopes up to 1:1, 2:1 preferable	≤ 6 fps if boulder joints planted; ≤ 15 fps if not planted	Hard
8B	Boulder Revetment with Soil and Vegetation	Slopes up to 1:1, 2:1 preferable	≤ 6 fps	Hybrid

I.D. No.	Method	Appropriate Slope Angle For Method	Scour Velocity Supported (feet per second)	Hard-/Soft-scape
9	Articulated Concrete Blocks	0.75:1 up to 3:1	≤ 15 fps	Hard
9A	Articulated Concrete Blocks with Planted Areas	1:1 up to 3:1	≤ 15 fps	Hard
10	Concrete Crib Walls	Up to 1:1	≤ 15 fps for closed ACBs, ≤ 6 fps for open ACBs[3]	Hard
11	Sacked Concrete	Up to 1/2:1	≤ 15 fps	Hard
12	Gunite Slope Protection	Up to 0.1:1	≤ 15 fps	Hard

Notes:
1. Mitigation ratio applies to the hardened area only.
2. Bank methods 1-9 that include hardscape will provide mitigation for those areas on-site, above the OHWM.
3. ACB: Articulated Concrete Blocks

6.4 Impact Avoidance and Activity-Specific BMPs

These BMPs guide the implementation of bank stabilization projects to avoid impacts on biological and cultural resources. The BMPs included in this section are implemented by the field crew and site manager. Pre-planning "GEN" BMPs are also implemented as applicable to the specific site conditions and resources.

BMP Number	BMP Title	BMP Description
BANK-1	Bank Stabilization Design to Prevent Erosion Downstream	To further prevent potential downstream erosion impacts due to bank stabilization, the site design will be adjusted to provide proactive protection of vulnerable areas within the reach of the worksite. Such measures include, but are not limited to, appropriately keyed-in coir logs, riparian planting, strategic placement of rock, and flow deflectors. Bank stabilization will include appropriate transition designs, that contour the repaired site to conform to adjacent areas upstream and downstream of the work site to prevent potential erosion impacts.
BANK-2	Concrete Use Near Waterways	Concrete that has not been cured is alkaline and can increase the pH of the water. Fresh concrete will be isolated until it no longer poses a threat to water quality using the following appropriate measures: 1. Wet sacked concrete will be excluded from the wetted channel for a period of 30 days after installation. During that time, the wet sacked concrete will be kept moist (such as covering with wet carpet) and runoff from the wet sacked concrete will not be allowed to enter a live stream.

BMP Number	BMP Title	BMP Description
		2. Poured concrete will be excluded from the wetted channel for a period of 30 days after it is poured. During that time, the poured concrete will be kept moist, and runoff from the wet concrete will not be allowed to enter a live stream. Commercial sealants (e.g., Deep Seal, Elasto-Deck Reservoir Grade) may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If a sealant is used, water will be excluded from the site until the sealant is dry. 3. Dry sacked concrete will not be used in any channel. 4. An area outside of the channel and floodplain will be designated to clean out concrete transit vehicles.
BANK-3	Bank Stabilization Post-Construction Maintenance	The SCVWD may maintain or repair bank stabilization projects that are less than 2 years old that are damaged by winter flows. The SCVWD will notify the regulatory agencies 24 hours prior to beginning the work and the work will be reported as part of the Post-Construction Report submitted by January 15 of each year or if necessary, the subsequent year. Appropriate BMPs will be applied during maintenance repairs.

6.5 Project and Program Limits

Per-Project Limits:
For individual projects, soft methods may not exceed 500 linear feet. Hard and hybrid methods may not exceed 300 linear feet. All methods may not exceed 0.5 acres below the OHWM for individual projects.

Bank Stabilization Annual Limit:
There is no limit to the total number of bank stabilization projects that may occur in a single year. The annual bank stabilization limit is one (1) linear mile of channel. Hardscape projects may not exceed 20% of the linear footage of total bank stabilization projects in a given year. Hybrid treatments are not included in the hardscape category that is limited to 20% of the annual work length. The Per-Project Limits are intended to ensure minimal effects on aquatic and other sensitive biological resources. Consequently, the annual limits for bank stabilization will effectively be the cumulative annual acreage and linear footage of the individual project activities.

Program Limit:
The total program limit for bank stabilization will effectively be the cumulative acreage and amount of the individual project activities.

Other Bank Stabilization Requirements:
Hardscape projects being replaced in-kind will comply with the Per-Project Limits and will be counted toward the annual limit of 20% of the linear footage of total bank stabilization projects in a given year.. Hybrid projects will not be counted as hardscape projects for the purposes of the 20% hardscape limit. Hardscape areas being replaced with softscape or hybrid methods may

exceed the Per-Project Limits for maximum length and will not be counted toward the annual maximum length of one (1) mile. Per Chapter 10, hardscape areas replaced with softscape or hybrid methods will provide a mitigation credit that can be applied to other projects owing mitigation, however, USACE will need to approve this approach on a project-by-project basis if this approach to compensatory mitigation is proposed for impacts below the OHWM.

To ensure that SMP projects are unconnected, single and complete actions, and not part of a larger action that will exceed the SMP's per-project size and placement limits, each project must demonstrate independent utility. A SMP project will be considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility. A separation of 500 feet is required between bank stabilization projects.

Exceptions:

Upon request by the SCVWD, the CDFW, RWQCBs and the USACE will review and may waive the Per-Project Limits for bank stabilization projects by making a written determination concluding that the project will result in minimal adverse effects. Waivers must be obtained from each agency for the SCVWD to proceed. Waivers may be submitted in the NPW or during the instream work season. For waivers submitted in the NPW, agencies will provide a response to the waiver during the NPW review period. If the agencies cannot conclude their waiver review by the end of the NPW review period, they will respond to the SCVWD and explain the status of the waiver review and an indication of how much time is needed to complete the review. Agencies will work diligently to respond to instream work season waivers promptly.

For waiver requests that may affect federally listed species, the USACE will make an effects call and determine if consultation with the USFWS or NMFS is warranted. The SCVWD will submit waiver requests to the NMFS and USFWS at the same time they submit requests to the other agencies.

All waiver requests must include the following:

a) A narrative description of the stream. This should include known information on: volume and duration of flood flow events; the approximate length, width, and depth of the waterbody and characteristics observed associated with an OHWM (e.g. bed and bank, wrack line or scour marks): a description of the adjacent vegetation community and a statement regarding the wetland status of the adjacent areas (i.e. wetland, non-wetland): surrounding land use; water quality; issues related to cumulative impacts in the watershed, and: any other relevant information;

b) An analysis of the potential impacts of the bank stabilization project to the waterbody;

c) An analysis of the potential for special-status plants or animals to be impacted by the bank stabilization project;

d) Measures taken to avoid and minimize losses to waters of the State, including other methods of constructing the proposed activity(s); and

e) A compensatory mitigation plan describing how the unavoidable losses are proposed to be offset

The Maintenance Guidelines, where developed, may provide a good basis for the information to be used in sub-sections (a) through (e) above.

CHAPTER 7: MANAGEMENT OF ANIMAL CONFLICTS

7.1 Purpose

Animals may damage SCVWD facilities by burrowing into levees and creek banks, damage mitigation sites by eating vegetation, and interfere with work activities. Animal burrows into levees and banks may threaten their structural integrity, which can lead to failure, sloughing, and slumping. Animals feeding on vegetation can reduce the health and vigor of plants, or even denude local areas. Animals can be territorial or defensive of specific resources or locations, thereby interfering with SCVWD facilities. The presence of some animals may require the SCVWD to postpone work activities. To avoid compromising SCVWD facilities and to reduce conflicts with species living in or protecting sites where work is needed, management of animal conflicts may be undertaken.

7.2 Work Activities

Management of animal conflicts may include maintenance of sanitary conditions, avoidance, maintenance of a safe work site environment, biological control, physical alterations, habitat alteration, non-lethal trapping and relocation, and lethal control. Work activities are conducted during the appropriate season, life cycle timing, and location to synergistically manage species at individual sites. Properly sequencing activities effectively manages the area by addressing different life stages and activities of the target animals.

Maintenance of Sanitary Conditions. SCVWD wildlife biologists work with CDFW, as well as local agencies and Non-Governmental Organizations (NGOs), to identify and reduce potential for wildlife disease outbreaks. Where appropriate, maintenance staff removes and disposes of animal carcasses that do not pose a hazard to human health to reduce the spread of animal diseases. This may include the removal of animals that succumb to diseases such as botulism or avian cholera. The Santa Clara County Vector Control District is contacted when animal carcasses are found that could pose a hazard to human health.

Avoidance. SCVWD wildlife biologists conducting pre-construction surveys may recommend avoidance measures to protect individual species or specific resources (e.g., nests), or to reduce conflicts with potentially dangerous species such as mountain lions, bobcats, coyotes, raccoons, skunks, foxes, or rattlesnakes. Where sensitive resources are present within the work site the biologist may establish appropriate buffers. For example, activities near nesting birds may risk causing nest abandonment, and conversely, birds may occasionally become defensive and attack individuals or vehicles near nest sites or food resources. If the ecological resource cannot be physically avoided, the biologist may recommend temporal avoidance by delaying the work activity (e.g., until nesting is completed).

Maintenance of a Safe Work Site Environment. Field conditions and the types of animals encountered vary seasonally, geographically, and by work activity. Swarms of wasps and bees can be located in a tree, and arachnids and nuisance insects may be uncovered around culverts and bridges. Where avoidance and other measures are not sufficient to maintain a safe work site environment, off-the-shelf chemicals and sprays may be used.

Biological Control. Biological control involves the deliberate release of one species into the environment to control a second species. Insects have been used as biological control agents to control other insect pests or to control plant species. Biological control may also include

changing plant species composition to make a site inhospitable to a particular nuisance species. For example, the SCVWD may change plant palettes to reduce the habitat suitability of a site for specific animals. Raptor nest structures and perches may be installed in areas to encourage natural predation on ground squirrels and gophers.

Repellents may be used to deter rodents or other nuisance species, such as rabbits. Repellents may include plant species and extracts intended to target specific species. Placement of peppermint oil or capsaicin, and sprinkling pepper, cinnamon, and cayenne in the areas where rodent activities are frequent, are examples of biological repellents.

Physical Alteration of a Facility. Physical alteration of a facility may include minor alterations that do not change the size or functionality of a facility but do promote the SCVWD's ability to conduct work at the facility. Bird netting on bridges or structures such as stream gauges and culverts may be installed and maintained to prevent birds such as swallows or black phoebes from nesting. Physical alterations may also occur to reduce or eliminate the effects of burrowing animals. Examples of physical alterations include:

1. Surface compaction of levee faces. Surface compaction consists of using heavy equipment to consolidate, re-compact, or harden the levee surface. Compaction is achieved by driving heavy equipment up and down or across the levee slope after the slope has been optimized for this operation. Optimization can include adding moisture (watering) to allow for better compaction rates. The levee will be evaluated for the correct moisture content. Optimization and preparation for compaction also involves mowing the vegetation to improve equipment-to-soil contact, and possibly slurry-filling of identified rodent holes. Heavy equipment used to compact levee surfaces includes crawler tractors, rollers/compactors, and a water truck. Prior to compaction, the levee surface is evaluated to determine how much moisture should be added.

2. Filling burrows with slurry material. Filling burrows with slurry consists of using a truck or trailer-mounted mixing machine to dispense the slurry through a hose to adjacent locations where rodent burrow are filled. This equipment provides mobility and flexibility, as it is relatively small and able to mix less than a few cubic yards at any given time. A typical operation includes a truck or flatbed where bags of slurry mixture can be stored and transported, a trailer-mounted mixing/pumping machine, and a water truck. At the location of rodent burrows to be filled, bags of dry slurry material are hand loaded into the mixing machine and water is added until the appropriate consistency is reached. The material is then pumped through a hose and into the rodent burrow until the burrow is filled. Viscosity of the slurry mixture is critical in properly filling the burrows, and will vary dependent upon the moisture of the soil at the hole location. If the burrow is within the buffer area of a sensitive species, the hole must be inspected with a burrow camera prior to filling. Systematic excavations may be necessary to ensure no impact to sensitive species. Excavations may be performed with a small backhoe or hand tools.

3. Reconstruction of levee side slopes. Reconstructing levee slopes requires first excavating or deconstructing the damaged area to prepare the site for reconstruction. The affected site is rebuilt according to the original construction standard. This type of operation uses heavy equipment such as an excavator, crawler tractor, loader, dump truck, motor grader, roller/compactor, scraper, back hoe, and a water truck.

4. Placement of physical barriers. Materials such as geotextile mats, chain link fencing, and erosion control blankets may be placed on the ground's surface to inhibit burrowing by

mammals. Placement of physical barriers consists of preparing an area for installation of the barrier, installing the barrier, and providing follow-up maintenance as needed. Site preparation includes scraping the barren soil, removing groundcover vegetation (weeds or grasses), or trenching. Equipment used for this operation can include hand tools or a tractor, mower, or trencher. Materials used may be similar to those used on bank stabilization projects to prevent erosion and protect water quality, and for winterization.

Habitat Modification. Modifying habitat through vegetation management is another method used to influence animal behavior. Low-growing herbaceous vegetation may be cleared prior to the avian nesting season to minimize nesting in the area. Likewise, mowing vacant or fallow lands adjacent to flood control levees can decrease the future food source and habitat for burrowing rodents. By limiting available forage areas adjacent to key SCVWD facilities, burrowing rodent populations may be reduced. Habitat modification may include:

1. Managing vegetation growth to prevent individuals from taking up residence, burrowing, or nesting.
2. Maintaining vegetative barriers to reduce animal occupancy at a site.
3. Changing a plant palette to reduce habitat suitability or desirability.

Non-lethal Animal Trapping and Relocation. The SCVWD may employ non-lethal animal trapping and removal when target animals occur in project areas. Animals removed and released out of harm's way most often include reptiles and amphibians, though other animals are relocated as well. Honey bee colonies and swarms may be captured and relocated by local apiarists at the SCVWD's request.

The trapping and removal of birds is only conducted in consultation with and under separate permit from USFWS and authorization from CDFW.

Lethal Control. Lethal control is implemented only when other animal conflict management activities are inadequate to feasibly address a conflict, such as when burrowing mammals require ongoing population control.

A. Management. Lethal control methods are prescribed by a Pest Control Advisor. Compliance with species and habitat protections under the Program is managed by a biologist knowledgeable with the affected species in accordance with applicable BMPs. Lethal control methods comply with County Agriculture Commission requirements.

B. Methodology

a. Fumigants

To be effective, fumigants are used when there is sufficient moisture in the soil to prevent the gases from diffusing out of the burrow. In Santa Clara County, this normally occurs from late January through early May. In areas of active burrows, an initial fumigant treatment is conducted. One to two weeks later, burrows that continue to show signs of activity are retreated. California ground squirrels and gophers are the most targeted species.

i. Gas Cartridges (smoke bombs): Gas cartridges consist of a mixture of sodium nitrate, charcoal, and sawdust compressed in a tube. Cartridges are lit with a fuse and placed directly into the burrow, which is then sealed with soil. The cartridge produces a carbon monoxide gas that spreads through the burrow and asphyxiates

the animals within. If smoke is observed from any other burrows (indicating interconnection of burrows), those burrows are sealed as well.

ii. Aluminum phosphide: Aluminum phosphide is a colorless gas with a pungent odor (University of California [UC] BMPs for California Ground Squirrel Control, 2011). Two to four aluminum phosphide tablets are placed directly into the burrow. The burrow entrance is then plugged with crumpled newspaper to prevent soil from covering the tablets, and then sealed with soil. The moisture in the burrow activates the fumigant, which produces a phosphine gas that spreads through the burrow and is lethal to the enclosed animals.

b. Chemical Baits

i. Acute toxins

A) Zinc phosphide (Zn_3P_2): Zinc phosphide formulations used in rodent control consist of a heavy, finely ground, crystalline gray-black powder that is practically insoluble in water and alcohol. Zinc phosphide is available in pellet or grain baits that have been treated and dyed black (the black dye reduces the risk to birds). It may be used one time per year once the ground and annual vegetation have dried out and burrowing rodent feeding habits transition from forbs to grains and seeds (normally between May and July). When ingested, zinc phosphide reacts with moisture and stomach acids to produce a lethal phosphine gas, causing death by asphyxiation. Treatment areas are pre-baited with untreated non-toxic bait to enhance bait acceptance.

Zinc phosphide is applied by spot baiting (hand baiting). Using a bait spoon, one tablespoon of bait is spread evenly over the grass area near each active ground squirrel burrow.

To reduce the potential for exposure to non-target species the bait is not piled nor applied to bare soil or other surfaces. Zinc phosphide is used prior to application of the anticoagulant baits in order to significantly reduce the number of squirrels. This process results in a lower population needing to be targeted with bait stations as well as reducing the number of squirrel carcasses that contain anticoagulant residue that could cause secondary poisoning of non-target species (Salmon and Newman, UC BMPs for California Ground Squirrel Control, 2010).

B) Strychnine: Strychnine treated bait is the most common rodenticide used for gopher control. Gopher control may occur year round depending on the animals' level of activity. Strychnine is only used underground and only for gopher control. A probe is used to locate main tunnels, and strychnine treated bait is deposited into the tunnel(s) where gophers are most likely to find it. The probe hole is then covered. Gopher tunnels typically occur at a depth of six to eight inches (California Department of Food and Agriculture [CDFA] Vertebrate Pest Control Handbook, 2010).

ii. First generation anticoagulants

First generation anticoagulant baits, such as chlorophacinone and diphacinone, are chronic baits that require several feedings over a period of days to a week to acquire a lethal dose. The anticoagulants cause capillaries to rupture and prevent the

formation of blood clots, which causes the animal to bleed to death over the period of a few days. Anticoagulant treated baits are used when burrows are active and can be strategically timed for use following a zinc phosphide application. The anticoagulants are typically applied in bait stations from May to November, when herbaceous vegetation is dried out so ground squirrels are not feeding on green vegetation during application, but have transitioned from feeding on forbs to grains and seeds.

Restricted Access Bait Station

Bait stations have a 3-inch diameter opening to restrict access from non-target species and a lip to prevent feeding animals from spilling bait outside of the bait stations. The bait stations are secured in place to prevent them from being tipped over. Bait stations can also be removed or damaged by the public who may oppose their use. The application areas are surveyed during active baiting on a weekly basis and carcasses are removed to minimize secondary poisoning (UC BMPs for California Ground Squirrel Control, 2011).

c. Trapping

i. Live traps: Live trapping is typically used when other lethal control methods are not appropriate due to potential non-target effects on special-status species. Live trapping takes place year-round when ground squirrels are present above ground. Wire cage traps are baited with untreated bait. The wire traps have openings no smaller than 2 inches by 1 inch, which is large enough to allow mice and other small species to escape the trap. Live traps are checked daily. Ground squirrels are removed from the site and are humanely euthanized with carbon dioxide gas. Non-target species are released on-site as soon as they are detected.

ii. Kill traps: Box traps are placed in main ground squirrel runways or near a burrow entrance. Tunnel/tube traps are placed in gopher tunnels. A probe is used to locate a main gopher tunnel and then a shovel is used to widen the tunnel enough to insert the trap, and the trap is then covered with soil. A Conibear 110 body gripping trap is placed in the entrance of a burrow. The trap has a 4.5 by 4.5 inch jaw spread. Soil may be used to partially fill the burrow entrance around the outer edges of the trap to prevent the ground squirrel from escaping outside of the trap. The trap is staked down to prevent it from being carried off. Traps are checked daily as required by CCR Title 14, § 465.5.

C. Coordination with Local, State, or Federal Agencies. The SCVWD may contract with or request assistance from local, state, or federal agencies to capture nuisance animals such as feral cats, dogs, red fox, opossum, or skunks, especially on sites where the SCVWD manages habitat for threatened and endangered species.

D. Safety. Label use restrictions are followed for all rodenticides used. Fumigants are not be near dry grasses or other flammable material, or near buildings.

Zinc phosphide persists for approximately two weeks under average conditions (U.S. National Library of Medicine, 1995). Zinc phosphide breaks down when exposed to water and converts to phosphine gas, which is then diluted by air. In areas accessible to the public the SCVWD posts notices that the area has been treated, which are kept in place for two weeks following the

initial application of zinc phosphide. All postings include a staff contact for further information. After two weeks, the SCVWD deactivates any remaining bait with water, converting zinc phosphide into phosphine gas.

Bait stations are secured in place and have a lip inside the opening to prevent any bait from being spilled by a feeding rodent. Any spilled bait is cleaned up immediately and properly disposed of.

7.2.1 Requirements

1. The method of control used is based on the seasonal efficacy of the target animals' life cycles and in compliance with the protection of special-status species.
2. A SCVWD Wildlife Biologist will conduct a desk audit to determine whether suitable special-status species habitat is present in or adjacent to a maintenance activity.
3. If the SCVWD Wildlife Biologist determines that a special-status species could occur in the activity area, avoidance and minimization measures will be inserted into the work order requirements in accordance with the BMPs discussed in Section 7.3 below.

7.3 Impact Avoidance and Activity-Specific BMPs

Of the methods for management of animal conflicts, implementation of lethal controls has the highest potential for environmental and biological impacts. Therefore, animal conflict management BMPs focus on lethal controls. The application area for lethal controls is identified during the annual planning process (see the Biological Resource Planning BMPs) and guided as directed by wildlife biologists. Species habitat areas are defined by the SCVWD's GIS species mapping, updated CNDDB occurrence records, and known local biological information and are included in the SMP Update Subsequent EIR. Pre-planning "GEN" BMPs are also implemented as applicable to the specific site conditions and resources.

BMP Number	BMP Title	BMP Description
ANI-1	Avoid Redistribution of Rodenticides	Carcass surveys will be conducted periodically when acute poisons and first generation anticoagulants are used. The frequency of the carcass surveys will be specific to the type of rodenticide used, to minimize secondary poisoning impacts: • Acute toxins – Daily carcass surveys, beginning the first day after application until the end of the baiting period for acute toxins used above-ground. • Anticoagulants - Within 7 days of installation of first generation anticoagulant bait, and weekly thereafter. Anytime a carcass is found, daily carcass surveys will begin for as long as carcasses are found until no carcasses are found during a daily survey. Once no carcasses are found, carcass surveys will return to the weekly carcass survey timeline maximum from the date of initial installation of an anticoagulant bait station. To verify that the frequency of carcass surveys is adequate, a biologist will conduct daily carcass surveys 2 times per year

BMP Number	BMP Title	BMP Description
		over one baiting cycle. Based on the results of these surveys, the timing of carcass surveys will be adjusted if necessary. Any spilled bait will be cleaned up immediately.
ANI-2	Prevent Harm to the Salt Marsh Harvest Mouse and California Clapper Rail	1. No rodenticides or fumigants will be used within the range of the SMHM or CCR as identified on SCVWD range maps. 2. Methods of rodent control within SMHM or CCR habitat will be limited to live trapping. All live traps shall have openings measuring no smaller than 2 inches by 1 inch to allow any SMHM that inadvertently enter the trap to easily escape. All traps will be placed outside of pickleweed areas and above the high tide line.
ANI-3	Burrowing Owl, Bald Eagle and Golden Eagle Buffer Zone	Per the California Department of Fish and Wildlife's 2008 *Guidance for Burrowing Owl Conservation*, a 656-yard buffer will be established around known burrowing owl locations where no rodenticides or fumigants (including smoke bombs) will be used. A 0.5-mile buffer will be established around known bald eagle and golden eagle nesting locations where no rodenticides will be used.
ANI-4	Animal Control in Sensitive Amphibian Habitat	1. Fumigants will not be used within the habitat areas of special status amphibians. 2. The use of bait stations within the potential habitat areas of California red-legged frog, California tiger salamander, or foothill yellow-legged frog will be limited to bait stations specifically designed to prevent entry by these species. 3. Any live traps will allow California red-legged frogs, California tiger salamanders, or foothill yellow-legged frogs to safely exit (e.g., by having openings measuring no smaller than 2 inches by 1 inch).
ANI-5	Slurry Mixture near Waterways	All slurry type mixes used to fill rodent burrows will be prevented from entering any waterway by using appropriate erosion control methods and according to the manufacturer's specifications. If the creek bed is dry or has been dewatered, any material that has entered the channel will be removed.
ANI-6	Species requiring depredation permit	Animal Conflict Management will not include lethal control of species listed in California F&G Code Section 4181 including beaver and gray squirrel without first obtaining a depredation permit.
HM-4	Posting and Notification for Pesticide Use	Posting of areas where pesticides are used will be performed in compliance with SCVWD Policy Ad-8.2 Pesticide Use as follows: 1. Posting will be performed in compliance with the label requirements of the product being applied. 2. In addition, posting will be provided for any products applied in areas used by the public for recreational purposes, or those areas readily accessible to the public, regardless of whether the

BMP Number	BMP Title	BMP Description
		label requires such notification. In doing this, the SCVWD ensures that exposure risk is minimized further by adopting practices that go beyond the product label requirements. (The posting method may be modified to avoid destruction of bait stations or scattering of rodenticide.) 3. These postings will notify staff and the general public of the date and time of application, the product's active ingredients, and common name, and the time of allowable re-entry into the treated area. 4. Signs will not be removed until after the end of the specified re-entry interval. 5. Right-to-know literature on the product will be made available to anyone in the area during the re-entry period. 6. A SCVWD staff contact phone number will be posted on the sign, including a cellular phone number. 7. Notification of pesticide activities will be made as required by law. Also, the SCVWD will maintain records of neighbors with specific needs relative to notification before treatment of an adjacent area so that such needs are met.

7.4 Project and Program Limits

Annual, five- and 10-year Program limits for rodenticide are based on pounds of product, and summarized on the table below. The per-project limit will correspond to label restrictions per application, using units (gallons/pounds/ounces) per acre based on the size of the job.

No limits have been identified for the other methods, to provide an incentive to use non-chemical methods. In addition, certain activities are necessary to maintain a safe work environment, sanitary conditions, or to comply with other regulatory requirements (e.g., USACE levee inspection requirements).

Table 7-1. Rodenticide Use Limits, 2014-2023

Rodenticide	Annual Limit	10-Year Program Limits	5-Year Program Limits
Zinc Phosphide	12 lbs	120 lbs	60 lbs
Strychnine	4 lbs	40 lbs	20 lbs
First Generation Anticoagulants	1 lb	10 lbs	5 lbs

CHAPTER 8: MINOR MAINTENANCE ACTIVITIES

8.1 Purpose

Minor Maintenance activities are routine small-scale activities performed to make repairs and keep SCVWD facilities operational. Maintenance activities may occur along creeks and at stream gauges. Though they may occur throughout the SMP area, they do not change the footprint of any existing facility. These are minor activities because they are small in size and their potential environmental impact to resources is limited.

8.2 Work Activities

Minor Maintenance activities include:

1. Minor sediment removal – 25 cubic yards or less of material at outfalls, culverts, flap gates, tide gates, inlets, grade control structures, fish ladders, fish screens, bridges, streamflow measuring stations (stream gauges) to maintain functions of such structures. Minor maintenance work at these facilities is limited to 25 cubic yards per facility. Removal of sediment cannot extend farther than 100 feet in any direction from the structure.
2. Trash and debris removal that requires minor ground disturbance.
3. Repair and installation of fences and gates, when such repairs or installations requires minor ground disturbance.
4. Grading and other repairs to restore the original contour of existing maintenance roads.
5. Grading small areas above streambanks to improve drainage and reduce erosion.
6. Repair of structures with similar materials within the same footprint (such as replacement of concrete linings, culverts, pipes, valves or similar structures; or repairing a weir, in-stream orifice, or communication pipe). For purposes of this activity description, similar materials means that materials will be replaced in-kind, such that hardscape and softscape facilities will be replaced with similar materials, respectively (as defined in the Bank Stabilization Methods Table).
7. Installation and on-going maintenance of mitigation and landscape sites, including: irrigation, weed control, replanting of dead or declining individual plants, and other types of ongoing maintenance at mitigation sites until such time when the success criteria are met.
8. Removal of obstructions, other than sediment and large woody debris, at structures such as bridges (not to exceed 100 feet upstream and downstream of a bridge), streamflow measuring stations (stream gauges), box culverts, storm drain outfalls, and drop structures to maintain functions of such structures. See Chapter 4, Vegetation Management, for vegetation removal requirements.
9. Stream gauge maintenance, including stilling well cleaning, painting of gauge house, replacing/adding antenna or solar panels to existing structures, replacing instrumentation, cableway repair, weir cleaning of algae and debris, and unburying staff markers/orifice/communication pipes.
10. Minor erosion repair above OHWM includes the repair of small rills or gullies (less than 5 ft. wide) that may develop in channel banks or upland areas due to localized runoff conditions. These minor erosion repairs differ from bank stabilization activities described in Chapter 6 which address erosion caused by flows in the channel itself, and are larger in extent and

involve engineering design. These minor erosion repairs are typically caused by small local runoff occurring outside of the channel that is drained toward the channel. Typically these minor erosion repairs may involve recompacting earth in a narrow 1-5 ft. wide section of the upper streambank, maintenance road, or other upland location above the OHWM.

8.2.1 Requirements

A minor activity is work that results in the removal of less than 0.08 acre (3485 sq ft) of wetland or riparian vegetation. The minimum reporting size is 0.01 acres (436 sq ft) per project. In addition, all minor activities for a single year have a total wetland or riparian vegetation impact of 0.4 acre and a total of 4 acres for the 10-year program. Any impacts to wetland or riparian vegetation necessary for access or staging are calculated as part of this total. Vegetation work smaller than this size does not require reporting.

8.3 Impact Avoidance and Activity Specific BMPs

There are no specific BMPs for Minor Maintenance activities. Species and work activity-specific BMPs are implemented as applicable depending upon the activity. GEN-20: Erosion and Sediment Control Measures, shall apply if large areas of soil are exposed as a result of minor maintenance activities.

8.4 Project and Program Limits

Per-Project Limit:	0.08 acres (3485 sq ft)
Annual Limit:	0.4 acres
Program Limit:	5-year program limit is 2.0 acres; 10-year program limit is 4.0 acres.

Other: Minor Maintenance activities are limited to actions that result in temporary impacts and may not include any actions that result in permanent impacts (i.e., construction of a new structure). To ensure that Minor Maintenance SMP projects are unconnected, single and complete actions, and not part of a larger action that will exceed the SMP's per-project size and placement limits, each Minor Maintenance project must demonstrate independent utility. An SMP project will be considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility. A separation of 500 feet between consecutive Minor Maintenance projects is required. If a Minor Maintenance project is required in combination with, or in adjacency to, another routine maintenance project, for example during the removal or repair of an existing culvert, then this 500 foot separation limit will not apply.

Exceptions: None

CHAPTER 9: SUMMARY OF SMP-2 IMPACTS REQUIRING MITIGATION

9.1 Aquatic, Wetland, and Riparian Habitat Impacts for Maintenance Areas

SMP-2 activities are expected to impact aquatic, wetland, and riparian habitats. These habitats can be categorized according to the regulations protecting them and the applicable agencies that regulate impacts to them, as described in Chapter 2. In addition, these features can be categorized according to whether or not they are vegetated and the types of vegetation present.

SMP-2 uses a vegetation-based habitat classification mapping system that is a hierarchical system based on *A Manual of California Vegetation* (Sawyer et al. 2009; California Native Plant Society in collaboration with California Department of Fish and Wildlife). Based on this system, general habitat types where SMP activities may occur include: woodland, shrub, herbaceous (non-wetland), and wetland habitats.

Areas such as “earth lined channels” or “concrete lined channels” include waters of the U.S./State which are within the jurisdiction of federal and State agencies, even if such areas do not have vegetated wetlands (e.g., they may be “other waters of the U.S./State”).

Although habitats are categorized according to the definitions above, all areas subject to regulatory jurisdiction are identified on the basis of applicable regulatory guidance. As a result, impacts to waters of the U.S. regulated by the USACE, waters of the State regulated by the RWQCBs, and bed/bank/channel and associated riparian habitats regulated by the CDFW, and therefore associated mitigation requirements, will be determined using applicable regulatory guidance. It is the intent of the SCVWD to mitigate for impacts to all waters of the U.S., waters of the State, and habitats regulated by CDFW, regardless of type or quality.

9.2 Identifying Impacts

As maintenance activities are identified, staff will first evaluate potential direct and indirect impacts to identify biological and other natural resources that may be impacted by the activity or that trigger activity-specific survey requirements. To identify impacts, the following will occur:

1. A biologist will evaluate all available information including site descriptions, photos, aerials, vegetation maps, local site knowledge, etc.., to determine reliability of maps and aerials. If overlays and/or photos are still accurate, the biologist will estimate the impacts to vegetated wetlands, other waters, riparian habitat, oak woodland, high-quality cottonwood stands, species habitat, and their beneficial uses based on the overlays and/or photos. If the information available to the biologist is inconsistent, out of date, or does not facilitate impact assessments, then Step 2. below will be followed.

2. A biologist will visit the proposed work site, walk or drive the reach where an activity is proposed, and obtain a more accurate assessment of the distributions of these resource relative to the impact area and collect whatever data are necessary to allow the impact

to be estimated (e.g., sketch the limits of wetlands on an aerial, take them back to the office, and digitize them).

The GIS overlays used to assess potential project impacts may include, but are not limited to:

- Mapping of the extent of tidal wetlands and other waters (from the South Bay Salt Ponds Restoration Project/USACE Shoreline Study)
- Vegetation mapping performed for the FSEIR
- California tiger salamander distribution maps (VHP and SMP mapping)
- California red-legged frog distribution map (VHP and SMP mapping)
- California clapper rail area map
- Salt marsh harvest mouse area map
- Burrowing owl nest locations
- Freshwater wetlands
- Riparian habitat
- California EcoAtlas

Additional overlays may be developed as the SCVWD (or others) evaluate more data on the location and extent of these natural resources. The existing overlays may need to be updated periodically (i.e., during the current 10-year, 2014-2023 SMP-2 period) as new species distribution data become available.

In some cases, the GIS overlays may be sufficiently detailed and accurate to preclude the need for field verification. In other cases, field verification may be needed to determine the presence/absence or extent of the resource in question. Consideration will be given to what are the potential impacts of the maintenance activity proposed, and whether surveys are required by the FEIR or permit conditions (e.g., for special-status plants).

9.3 Impacts to Special-Status Species

A number of special-status species occur, or potentially occur, in SMP project areas. For the purpose of this Manual, special-status species are defined as all species for which agency approvals may include species-specific conditions and/or for which mitigation is required for CEQA compliance. As a result, such species include those potentially occurring in the SMP area that are listed under the Federal or California Endangered Species Acts as threatened, endangered, proposed threatened, proposed endangered, or a candidate species, as well as all non-listed species (such as certain state species of special concern) covered by the Valley Habitat Plan, identified specifically in the draft Streambed Alteration Agreement, covered by a Fishery Management Plan, or requiring mitigation for CEQA compliance. Special-status animals are listed in Table 9-1. No special-status plants are addressed in agency approvals; special-status plants for which mitigation may be required by CEQA were discussed in the 2011 SMP Update SFEIR.

Owing to differences in the distributions, habitat associations, temporal occurrence (e.g., for migratory species), and mobility of the various special-status species that occur in the SMP area, the potential for, types of, and magnitude of impacts vary considerably among species. In addition, the description of impacts may vary among regulatory agencies; for example, “take” of

the state and federally listed California tiger salamander is defined differently under the Federal and California Endangered Species Acts, so that impacts to this species may be described differently by the USFWS and CDFW.

Impacts on these species that could result from SMP activities were described in detail in the 2011 SMP Update SFEIR. In addition, Program impacts to individual species will be described in regulatory agency permits and associated documents, as follows:

- USFWS Biological Opinion – California tiger salamander, California red-legged frog, California clapper rail, least Bell's vireo, and salt marsh harvest mouse.

- NMFS Biological Opinion and Essential Fish Habitat Recommendations – Central California Coast steelhead, South-Central California Coast steelhead, green sturgeon, and fall-run Chinook salmon.

- CDFW Incidental Take Permit – California tiger salamander. No take of the longfin smelt, Swainson's hawk, or Townsend's big-eared bat is expected to occur as a result of SMP activities. In the event that the SCVWD determines that take may occur, it will apply for an Incidental Take Permit for the species to be affected.

Expected impacts to these special-status species and their habitats will be quantified (e.g., on an acreage basis) annually. Impacts will be assessed based on the geographic locations of proposed SMP activities relative to the distributions of these species and suitability of habitat for them, and in the case of special-status plants, on the basis of presence/absence during pre-activity surveys. Impact assessments will also take into consideration avoidance and minimization achieved through implementation of BMPs (as described in Section 3.5). These impacts will be quantified in the NPW as described in Section 12.2.

Table 9.1: Special-Status Animal Species in the SMP Area

Common Name	Scientific Name	Status*
Green sturgeon	*Acipenser medirostris*	FT, CSSC
Longfin smelt	*Spirinchus thaleichthys*	ST
Central California coast steelhead	*Oncorhynchus mykiss*	FT
South-Central California coast steelhead	*Oncorhynchus mykiss*	FT, CSSC
Central Valley fall-run Chinook salmon	*Oncorhynchus tshawytscha*	FMP, CSSC
California tiger salamander	*Ambystoma californiense*	FT, ST, VHP
California red-legged frog	*Rana draytonii*	FT, CSSC, VHP
Foothill yellow-legged frog	*Rana boylii*	CSSC, VHP
Western pond turtle	*Actinemys marmorata*	CSSC, VHP

California condor	*Gymnogyps californianus*	FE, SE
Bald eagle	*Haliaeetus leucocephalus*	SE, FP
Swainson's hawk	*Buteo swainsoni*	ST
Burrowing owl	*Athene cunicularia*	CSSC, VHP
California clapper rail	*Rallus longirostris obsoletus*	FE, SE, FP
California black rail	*Laterallus jamaicensis coturniculus*	ST, FP
Western snowy plover	*Charadrius alexandrinus nivosus*	CSSC, FT
California least tern	*Sterna antillarum browni*	FE, SE, FP
Least Bell's vireo	*Vireo bellii pusillus*	FE, SE, VHP
Yellow warbler	*Setophaga petechia*	CSSC
Yellow-breasted chat	*Icteria virens*	CSSC
Tricolored blackbird	*Agelaius tricolor*	CSSC, VHP
Salt marsh harvest mouse	*Reithrodontomys raviventris*	FE, SE, FP
San Joaquin kit fox	*Vulpes macrotis mutica*	FE, ST, VHP
Pallid bat	*Antrozous pallidus*	CSSC
Townsend's big-eared bat	*Corynorhinus townsendii*	SC
San Francisco dusky-footed woodrat	*Neotoma fuscipes annectens*	CSSC

***Status:**
Federally Endangered = FE
Federally Threatened = FT
State Endangered = SE
State Threatened = ST
State Candidate = SC
Fully Protected = FP
Valley Habitat Plan-covered species = VHP
Fisheries Management Plan-covered species = FMP
California Species of Special Concern = CSSC

CHAPTER 10: MITIGATION PROGRAM

10.1 Introduction

Compensatory mitigation is one element of a comprehensive impact avoidance, minimization, and compensation approach. As described in Chapter 3, Maintenance Planning and Impact Avoidance, project planning, resource evaluations, maintenance guidelines, and avoidance and minimization measures are used to prioritize work activities, avoid conducting any unnecessary maintenance, and avoid impacts during maintenance activities. When maintenance is required, BMPs are applied on site to avoid and minimize impacts. Residual impacts may require compensatory mitigation, depending upon the nature of the impact and the regulatory authority involved. The SCVWD is committed to providing appropriate and effective mitigation for SMP impacts.

This Chapter is organized as follows:

Section 10.2 Applicable Regulatory Guidance for Mitigation Program

Section 10.3 SMP-1 Background and Mitigation Provided to Date

Section 10.4 Mitigation approach for SMP-2 (2014-2023)

Section 10.5 Ecologic Services Based Mitigation: Mitigation for Impacts to Waters of the U.S. and State, and CDFW 1602-jurisdictional Habitats for SMP-2 Sediment Removal and Vegetation Management Activities

Section 10.6 Bank Stabilization Mitigation

Section 10.7 Land Acquisition Mitigation Process

Section 10.8 Mitigation for Impacts to Special-Status Species and Associated Habitat

Section 10.9 Annual Mitigation Assessment Process

Mitigation monitoring activities, including monitoring methods and success criteria, are described in Chapter 11.

10.2 Applicable Regulatory Guidance for Mitigation Program

The mitigation concepts, objectives, and activities described in this chapter were developed in collaboration with, and using guidance from, the Program's Inter-Agency Working Group (IAWG).

10.2.1 US Army Corps of Engineers (USACE) and Environmental Protection Agency (EPA)

In June 2008, the USACE and EPA issued the Compensatory Mitigation for Losses of Aquatic Resources; Final Rule (2008 USACE 33 CFR, Parts 325 and 332 (2008); and EPA 40 CFR Part 230 (2008)). The mitigation sequence established by CWA Section 404(b)(1) guidelines is to avoid, minimize and compensate for impacts. Compensatory mitigation is required to address residual impacts that are neither avoided nor minimized completely through other measures. Compensatory mitigation may involve the restoration, establishment, enhancement, and/or in certain circumstances, preservation of aquatic resources for the purposes of off-setting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved (Sec. 332.2). The methods of compensation are defined below according to the 2008 Mitigation Rule:

- Preservation: the removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources.
- Enhancement: the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s).
- Restoration: the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource.
- Establishment (creation): the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site.

The 2008 Mitigation Rule identifies a hierarchy of preferred mitigation approaches as follows (Sec 332.3):

- Mitigation bank credits – when using this approach, the highest preference is for established banks already in place that can provide mitigation prior to when the activity is permitted, and prior to foreseeable impacts.

- In-lieu fee program credits – under this approach, the applicant makes a payment to a third-party program that will conduct wetland, stream, or other aquatic resource restoration, creation, enhancement, or preservation activities.

- Permittee-Responsible Mitigation Using a Watershed Approach – where permitted impacts are not in the service area of an approved mitigation bank or in-lieu fee program that has the appropriate type and number of resource credits available, permittee-responsible mitigation is the only option. The watershed approach (Sec 332.(3)(c)) strategically selects compensatory mitigation sites to improve the quality and quantity of aquatic resources within the watershed where impacts occur. The watershed approach considers the importance of resource types, landscape position and functions in the watershed, locational factors such as hydrology and surrounding land use, and historic conditions to provide a suite of functions that are typically provided by the affected aquatic resource.

- Permittee-responsible Mitigation Using On-Site and In-Kind Mitigation – in cases where a watershed approach is not practicable, the USACE district engineer should consider opportunities to off-set anticipated aquatic resource impacts by requiring on-site and in-kind compensatory mitigation.

- Permittee-responsible Mitigation Using Off-Site and/or Out-of-Kind Mitigation – where the above compensatory mitigation opportunities are not practicable, are unlikely to compensate for the permitted impacts, or will be incompatible with the proposed project, and a practicable off-site and/or out-of-kind mitigation opportunity is identified that has a greater likelihood for off-setting the permitted impacts, or is environmentally preferable, the USACE district engineer should require that this alternative compensatory mitigation be provided.

As described in the 2008 Mitigation Rule, the above approaches provide a range of options that can be prioritized based on specific project, resource, and permit conditions. While there is a sequential preference as shown in the order above, the top listed approaches are not requirements. All of these compensatory mitigation options are available.

The 2008 Mitigation Rule was reviewed, considered and applied in developing the SMP-2 mitigation program. The updated SMP mitigation program will include the following approaches: permittee-responsible mitigation using on-site and in-kind mitigation; permittee-responsible off-site and/or out-of-kind mitigation; permittee-responsible mitigation using a watershed approach; and a single-user mitigation bank specifically for the SMP. The general SMP mitigation approach is described in more detail in Section 10.4 below.

Regulatory agency representatives who are providing permit approvals and guidance for the SMP requested that the topics below from the 2008 Mitigation Rule be described for their SMP applicability.

Habitat Mitigation and Monitoring Proposal Guidelines are in CFR 332.4(c) and are summarized below:

- If compensatory mitigation is required, the USACE district engineer may approve a conceptual or detailed compensatory mitigation plan to meet required time frames for general permit verifications. A final mitigation plan incorporating the elements of sections 332.4 (c)(2) – (c)(14) must be approved by the USACE district engineer before the permittee commences work in waters of the U.S. Sections 332.4 (c)(2)-(c)(14) describe the following elements to be included in compensatory mitigation plans, to be described at a level of detail commensurate with the scale and scope of the project impacts: objectives, site selection, site protection instrument, baseline information, determining of mitigation ratios, mitigation work plan, maintenance plan, performance standards, monitoring requirements, long-term management plan, adaptive management plan, financial assurances, and other information. As an alternative, the USACE district engineer may address the mitigation plan components identified in Sections 332.4(c)(2) – (c)(14) as specific permit conditions, instead of components of a compensatory mitigation plan. The USACE San Francisco and Sacramento Districts developed Mitigation and Monitoring Proposal

Guidelines (USACE 2004) which provide additional detail on the content and preparation of compensatory mitigation plans.

The timing of implementation of compensatory mitigation is described in CFR 332.3(m) and is summarized below:

- Mitigation timing – implementation of the compensatory mitigation project shall occur, to the maximum extent practicable, in advance of or concurrent with the activity causing the authorized impacts. This is particularly true when off-site mitigation is pursued. For on-site mitigation, it is recognized that the on-site mitigation activities, by necessity, will likely occur during or following the maintenance activities. It is preferable to reduce the time lag between the loss of aquatic resource functions caused by the permitted impacts and the replacement of such functions as provided by compensatory mitigation. As described in the 2008 Mitigation Rule, mitigation ratios may be required to address the temporal loss of functions. As described below in Section 10.5, the SMP provides an additional 30%, 50%, or 300% mitigation rate (depending upon the channel type affected) to address the temporal loss of aquatic resource functions from routine sediment removal and vegetation management practices. Based on comparisons to other channel maintenance programs in northern California with similar impacts, this additional ratio is higher than other recently permitted maintenance programs.

- Site protection and funding mechanisms – CFR Section 332.7(a) describes site protection, such that the aquatic habitats, riparian areas, buffers, and uplands that comprise the overall compensatory mitigation project will have long-term protection through real estate instruments or other available mechanisms as appropriate.

10.2.2 California Department of Fish and Wildlife

CDFW promulgates mitigation requirements through various sections of the California F&G Code and associated regulations related to lake and streambed habitats and species receiving protection under the California Endangered Species Act (CESA), as follows:

- 1602 Streambed Alteration Agreements - Under Section 1602 of the California Fish and Game Code, CDFW may issue permits allowing impacts to the bed, channel, or bank of rivers, streams, lakes, and the associated riparian habitat. As a condition of these permits, CDFW may require measures to protect fish and wildlife resources, which may include compensatory mitigation.
- California Endangered Species Act
    - California F&G Code Section 2081 - Under Section 2081 of the California F&G Code, CDFW may issue permits authorizing the incidental take of species that are listed as threatened or endangered, or candidates for such listing, under CESA.

- California Code of Regulations Title 14 Section 783 - This section of the California Code of Regulations (CCR) implements Sections 2080 and 2081 of the California F&G Code (i.e., CESA). Thus, Section 783 implements the requirements described in the previous bullet that impacts from the incidental take of CESA-protected species be minimized and fully mitigated.

10.2.3 U.S. Fish and Wildlife Service and National Marine Fisheries Service

The 1973 Endangered Species Act (ESA), as amended, established a broad public and Federal interest in identifying, protecting, and providing for the recovery of threatened or endangered species. The USFWS and NMFS are charged with implementing and enforcing the ESA. Both agencies are involved in stream maintenance through the provisions of the ESA. Section 7 of the ESA directs Federal agencies to use their legal authorities to further the purposes of the ESA carrying out conservation programs for listed species. Section 7 requires these agencies to ensure that any actions (e.g., development projects they fund, have permit authority over, or carry out) do not jeopardize the continued existence of a listed species. If a Federal agency finds that one of its activities may affect a listed species, it is required to consult with the USFWS and/or NMFS regarding the project's effects on any endangered or threatened species or its critical habitat. Because the USACE is a federal agency with permit authority over the SMP, it is required to consult under Section 7 and comply with any conditions that consultation may place on the Federal permit. Conditions of the incidental take approvals provided by the USFWS and NMFS may include compensatory mitigation requirements.

In addition, pursuant to the Magnuson–Stevens Fishery Conservation and Management Act, each Federal agency is mandated to consult with NMFS with respect to any action authorized, funded, or undertaken by the agency that may adversely affect EFH. When NMFS receives information from a Fishery Management Council, a Federal or state agency, or other sources that such an action would adversely affect EFH, NMFS has an obligation to recommend to the agency measures that can be taken to conserve EFH. Such measures may include conservation recommendations, potentially including compensatory mitigation requirements.

10.2.4 Regional Water Quality Control Boards (RWQCBs)

The Regional Water Quality Control Boards have established basin plans for the San Francisco Bay and Monterey Bay Watersheds. These plans identify beneficial uses and water quality standards for the watersheds. In considering mitigation for impacts to wetlands, the RWQCB follows the California Wetlands Conservation Policy (Executive Order W-59-93). The objectives of this policy include:

1. To ensure no overall net loss and long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship, and respect for private property.
2. To reduce procedural complexity in the administration of State and Federal wetlands conservation programs.
3. To encourage partnerships to make restoration, landowner incentive programs, and cooperative planning efforts the primary focus of wetlands conservation.

The RWQCBs (San Francisco Bay and Central Coast) also provided guidance that their preferred mitigation approach for SMP activities is to provide in-kind, on-site, near-site, in-water body, and in-watershed mitigation over out-of-kind, off-site land acquisition, preservation, enhancement approaches.

10.3 SMP-1 Background and Mitigation Provided to Date

SMP-1 refers to the original SMP period 2002-2013. SMP-1 provides for the permanent mitigation of sites where maintenance work occurred under the program. For example, where sediment removal projects occurred and were mitigated during the SMP-1 period, the impacts to vegetation on the sediment removed were also permanently mitigated.

Table 10-1 summarizes the mitigation requirements for SMP-1 activities as identified in the 2001-02 SMP program documents and associated permits. The on-going SMP-1 mitigation program includes land acquisition, habitat protection and enhancement, and wetland restoration/creation activities to mitigate for the potential maintenance impacts identified in 2001-02 (Figure 10-1, Table 10-2). The SCVWD is continueing to locate and negotiate the purchase of mitigation lands to fulfill its commitment to the SMP-1 mitigation requirements.

SMP Wetland & SWPP Mitigation Project Sites

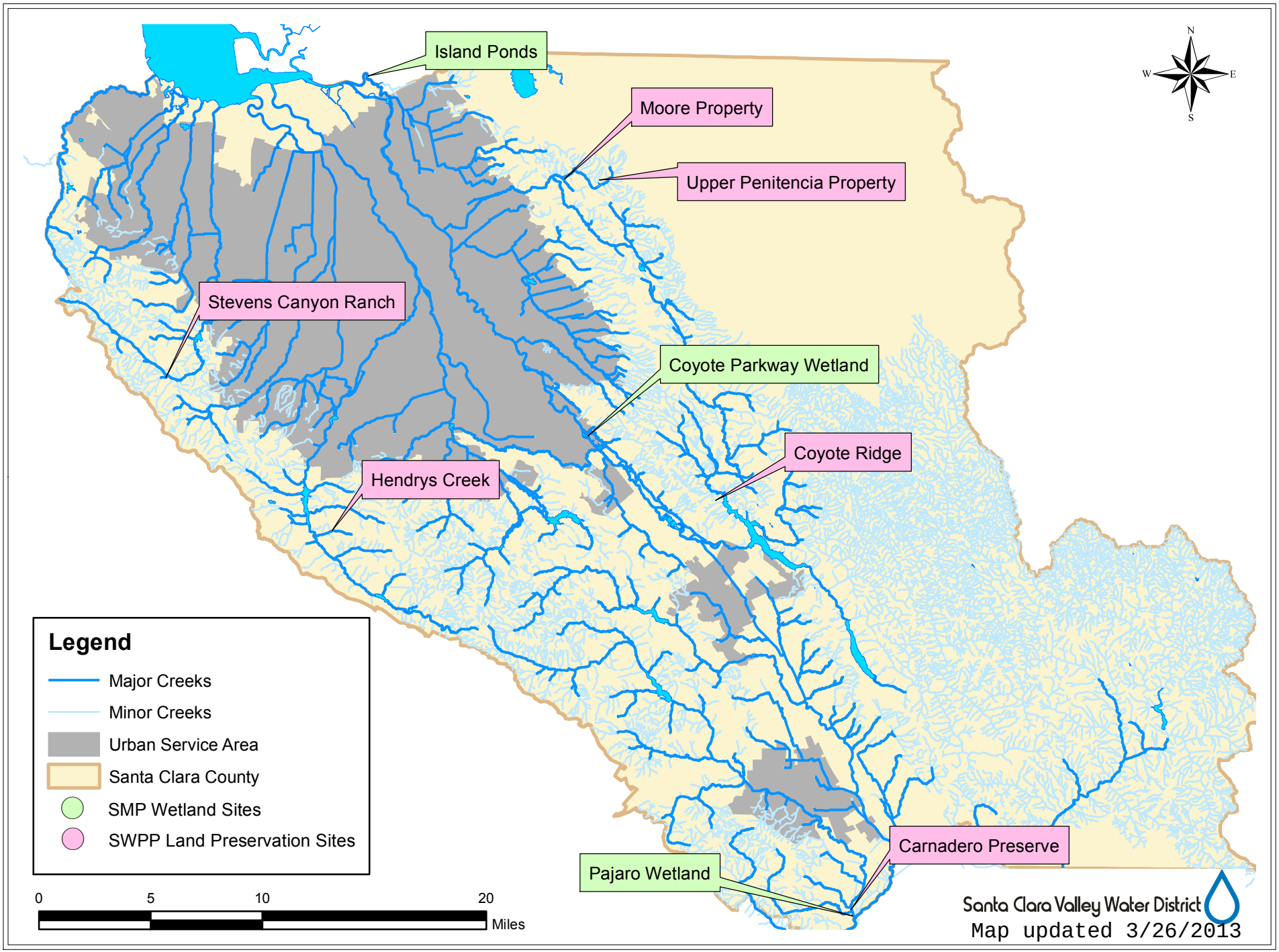


Figure 10-1: SMP Wetland and Stream and Watershed Protection Program

Table 10-1. SMP-1 Mitigation Program Status

		Mitigation Purpose	Mitigation Requirement	Mitigation Completed to Date	Percent of Requirement Completed[1]
1	Tidal Wetland Restoration	Restore salt ponds to tidal marsh conditions. Provides mitigation for tidal wetland/species impacts.	30 acres	30 acres	100%
2	Freshwater Wetland Creation/ Restoration	Convert or restore areas to seasonal or perennial wetlands. Provides mitigation for non-tidal wetland impacts.	10 ac Santa Clara Basin[2] 4 ac Pajaro Basin	7ac Santa Clara Basin[2] 4.65ac Pajaro Basin[3]	70% Santa Clara Basin[2] 100% Pajaro Basin
3	Stream and Watershed Protection	Preserve, protect, and improve streams and associated watersheds.Provides mitigation for non-tidal wetland and CRLF impacts	Freshwater wetland habitat: 820-1080 ac acquired for 81 credits for Santa Clara Basin 11 credits for Pajaro Basin (138 ac) CRLF Habitat - 108 ac credit District wide	Freshwater wetland habitat: 10 ac credit (125 ac total) for Santa Clara Basin (will increase to 69 credits achieved with Coyote Ridge, Hendrys Creek, Upper Penitencia). 15 additional acres will be provided by SCVWD. 10.7 ac credit (138 ac total) for Pajaro Basin[3] CRLF Habitat – 56 ac credit (will increase to 128 acres with Castle & Cooke)[4]	12% Santa Clara Basin (85% with Coyote Ridge, Hendrys and Upper Pentiencia properties) 100% Pajaro Basin 52% CRLF Habitat (100% with Coyote Ridge)
4	Giant reed (*Arundo donax*) Control	Control giant reed outbreaks; map, revegetate, educate, and coordinate reed control efforts in County. Provides mitigation for riparian impacts.	125 ac District wide	126 ac District wide	100%

		Mitigation Purpose	Mitigation Requirement	Mitigation Completed to Date	Percent of Requirement Completed[1]
5	Invasive smooth cordgrass (*Spartina alterniflora*) Control	Control invasive cordgrass along tidal shorelines. Provides mitigation for time lag until tidal wetland mitigation is established.	Up to 10 acres in tidal areas	10 acres	100%

1. Does not include monitoring period and achievement of final success criteria.
2. 3 acres of mitigation requirement rolled into stream and watershed protection requirements. 7 acres of constructed wetlands in Santa Clara Basin completes the remaining mitigation requirement.
3. 0.3 acres of additional wetland created in Pajaro Basin to fulfill the 11 acre Pajaro Basin SWPP requirement
4. This includes the required 108 acres plus a 20 acre penalty.

Table 10-2. Summary of SMP I freshwater wetland mitigation, stream and watershed protection and red-legged frog credit.

Basin	Property	Total Site Acreage	Acreage of SMP-1 Wetlands/SWPP Credits Acquired	Acreage of SMP-1 Red-legged Frog Credits Acquired
Pajaro Basin	Pajaro Freshwater Wetland	10	4.65	
	Carnadero Preserve	198	10.7	
Pajaro Basin Total		208	15.35	
Santa Clara Basin				
	Coyote Parkway Freshwater Wetland	12	7	
	Stevens Canyon Ranch	69	5.43	
	Moore Property	57	4.51	56
	Coyote Ridge[1]	454	34.7	72
	Hendry's Creek[2]	100	8.4	
	Upper Penitencia Creek (Kammerer)[2]	197	16	
Santa Clara Basin Total		889	76.04	128

1. Coyote Ridge red-legged frog credit consists of 52 acres of SMP I credit + 20 acre additional timelag penalty from USFWS.
2. Acreages reported are approximate as LTMP's aren't final yet.

The impacts associated with SMP-1 instream activities, where work was actually performed, have been provided through the compensatory mitigation program of SMP-1. These areas are known as the Previously Mitigated Areas (PMAs). The maps in Figures 10-2 through 10-6 identify the PMA channel locations (and maintenance activities) that are mitigated under SMP-1. No additional mitigation during the SMP-2 period (2014-2023) is necessary for SMP-2 maintenance activities that are of the same type as those mitigated under SMP-1 and that occur in the channels shown in Figures 10-2 through 10-6 and listed in Table 10-3. There are no PMAs for impacts to anadromous salmonid streams associated with sediment removal and LWD removal. Mitigation requirements for sediment removal in anadromous salmonid streams (specified in Attachment I) and mitigation requirements for LWD removal (specified in Attachment E) apply to all SMP-2 projects in anadromous salmonid streams (Figures 3-1 and 3-2). While canals are listed in Table 10-3 and were included in the SMP-1 Previously Mitigated Areas, these facilities are not included in SMP-2.

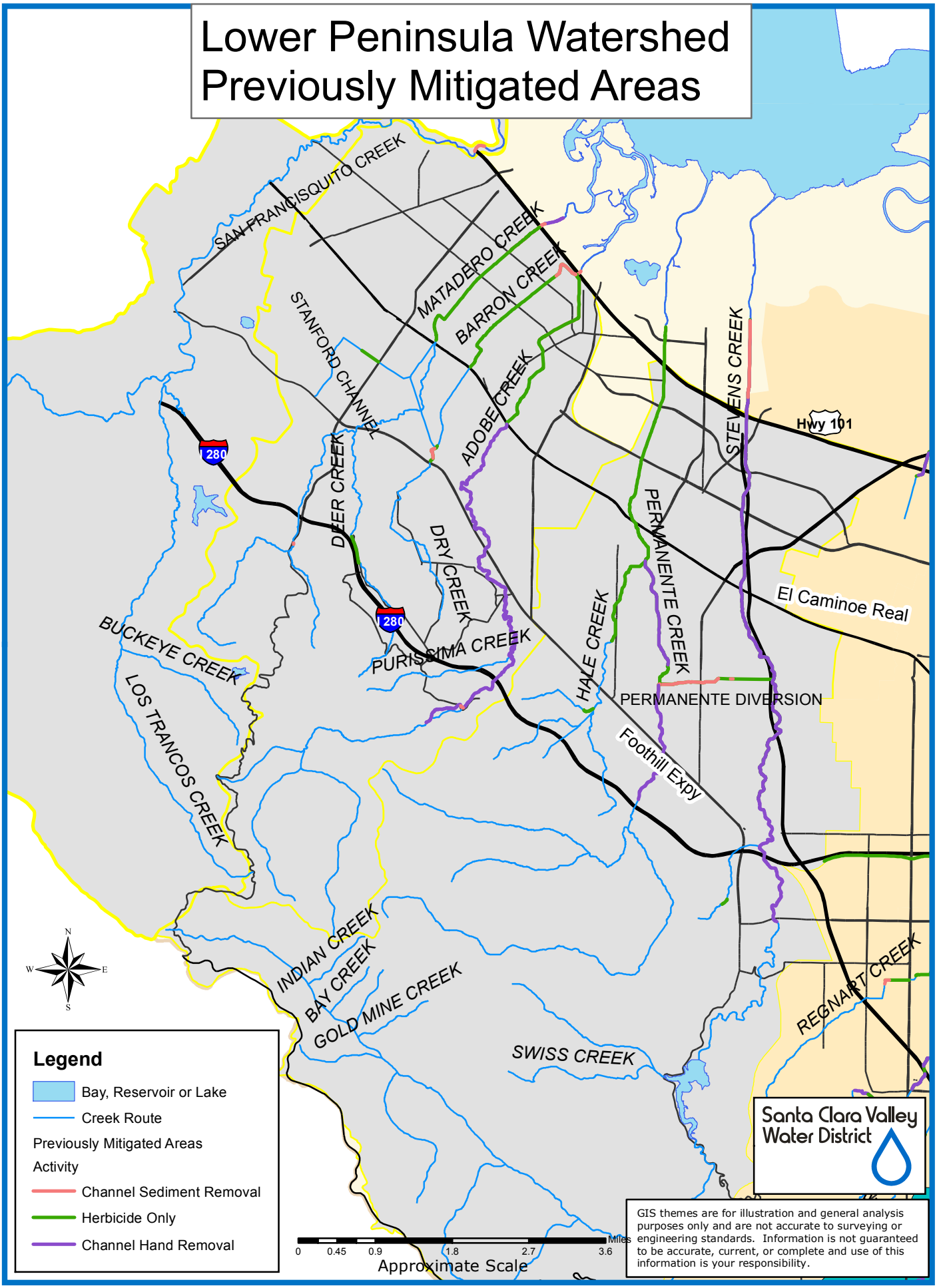


Figure 10-2: Lower Peninsula Watershed - Previously Mitigated In Channel Areas

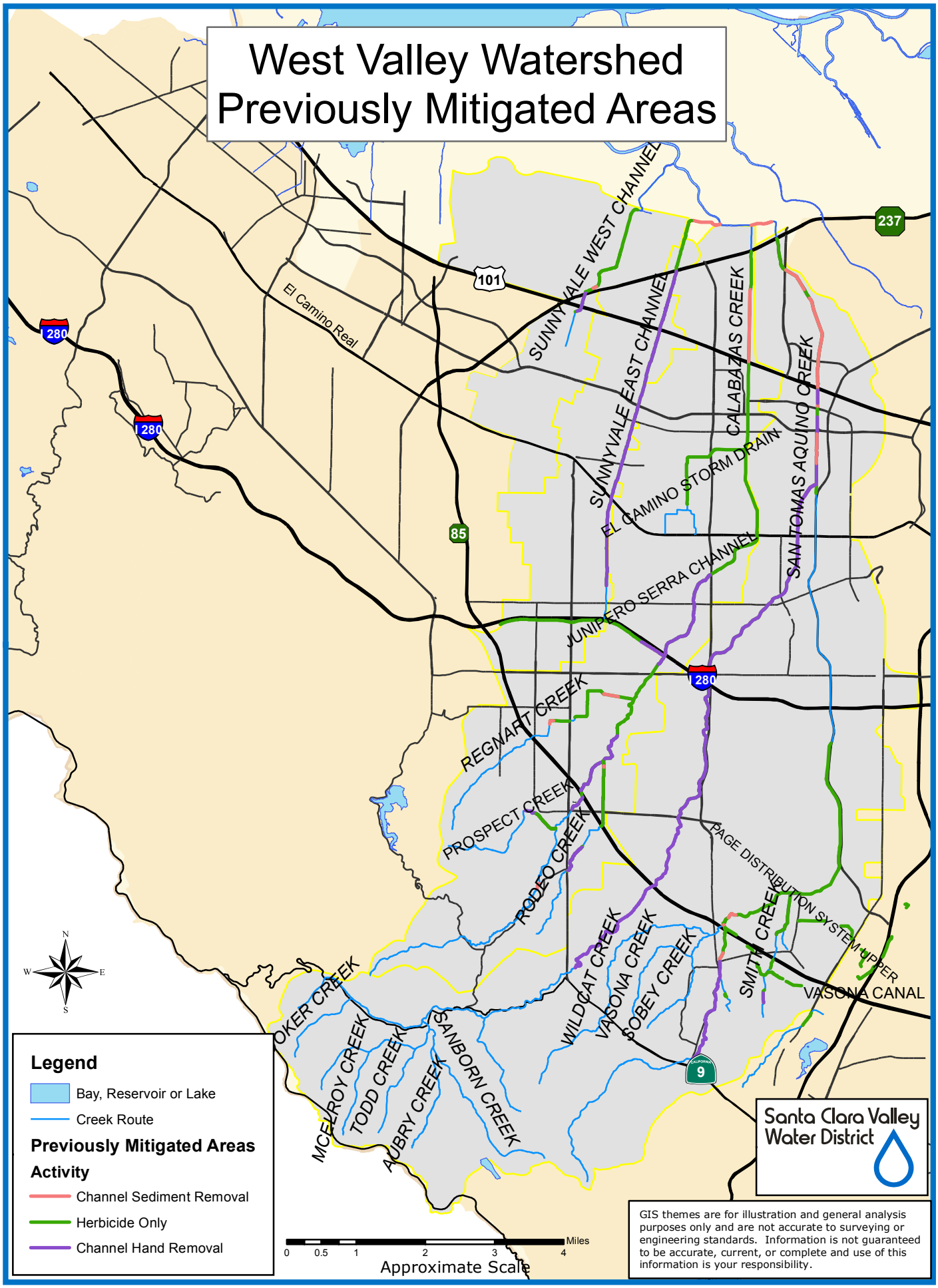


Figure 10-3: West Valley Watershed - Previously Mitigated In Channel Areas

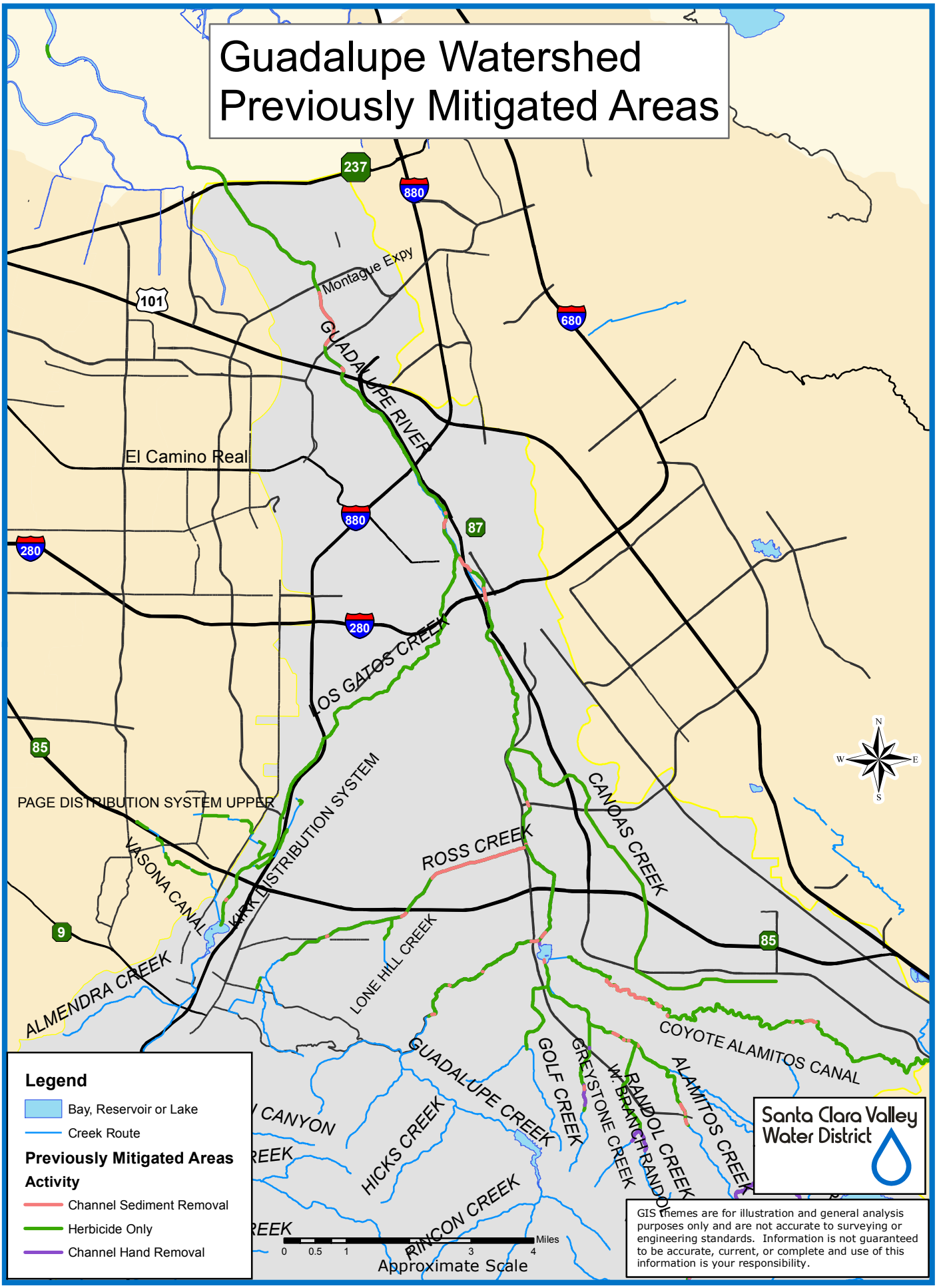


Figure 10-4: Guadalupe Watershed - Previously Mitigated Areas

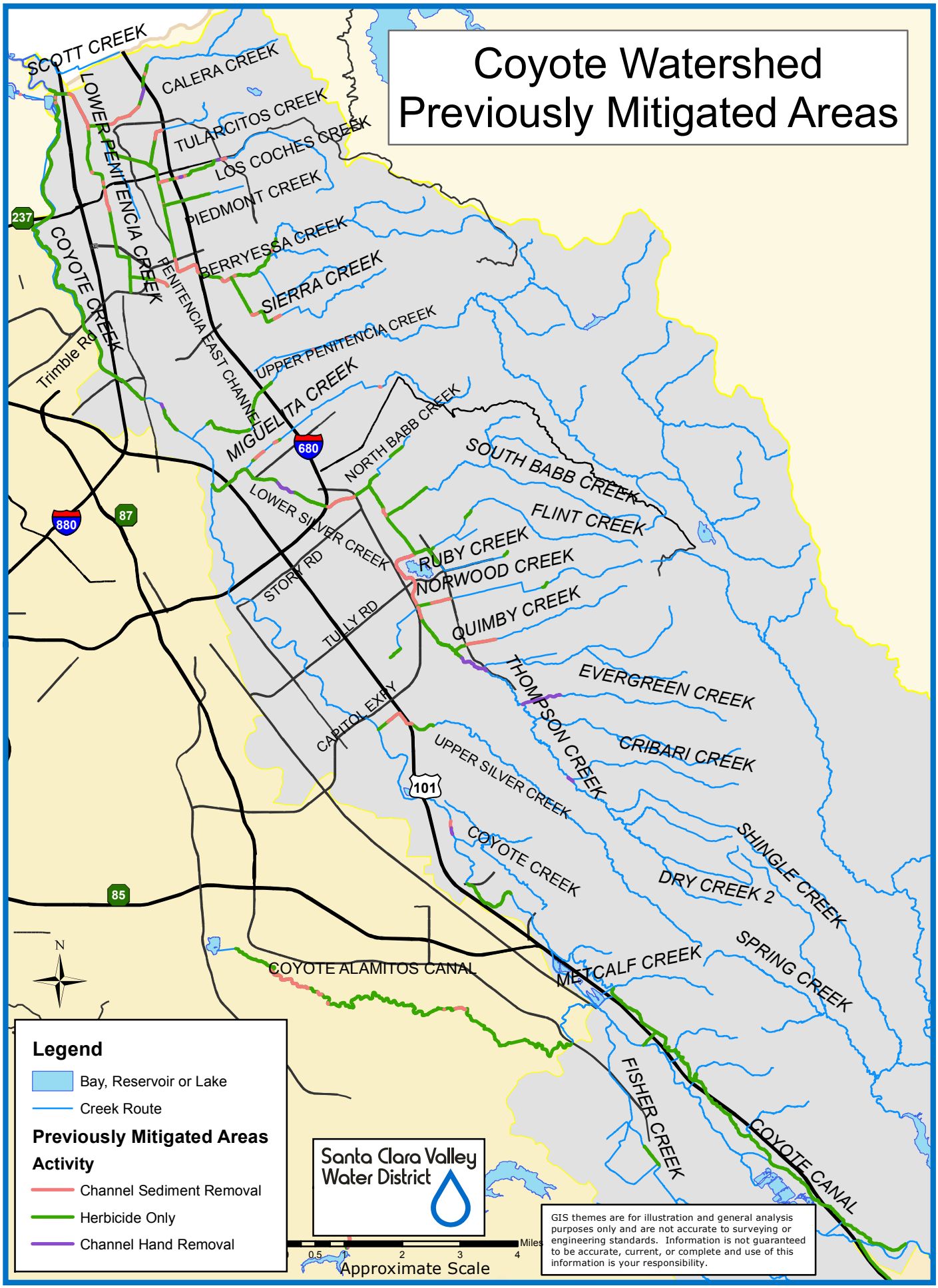


Figure 10-5: Coyote Watershed - Previously Mitigated In Channel Areas

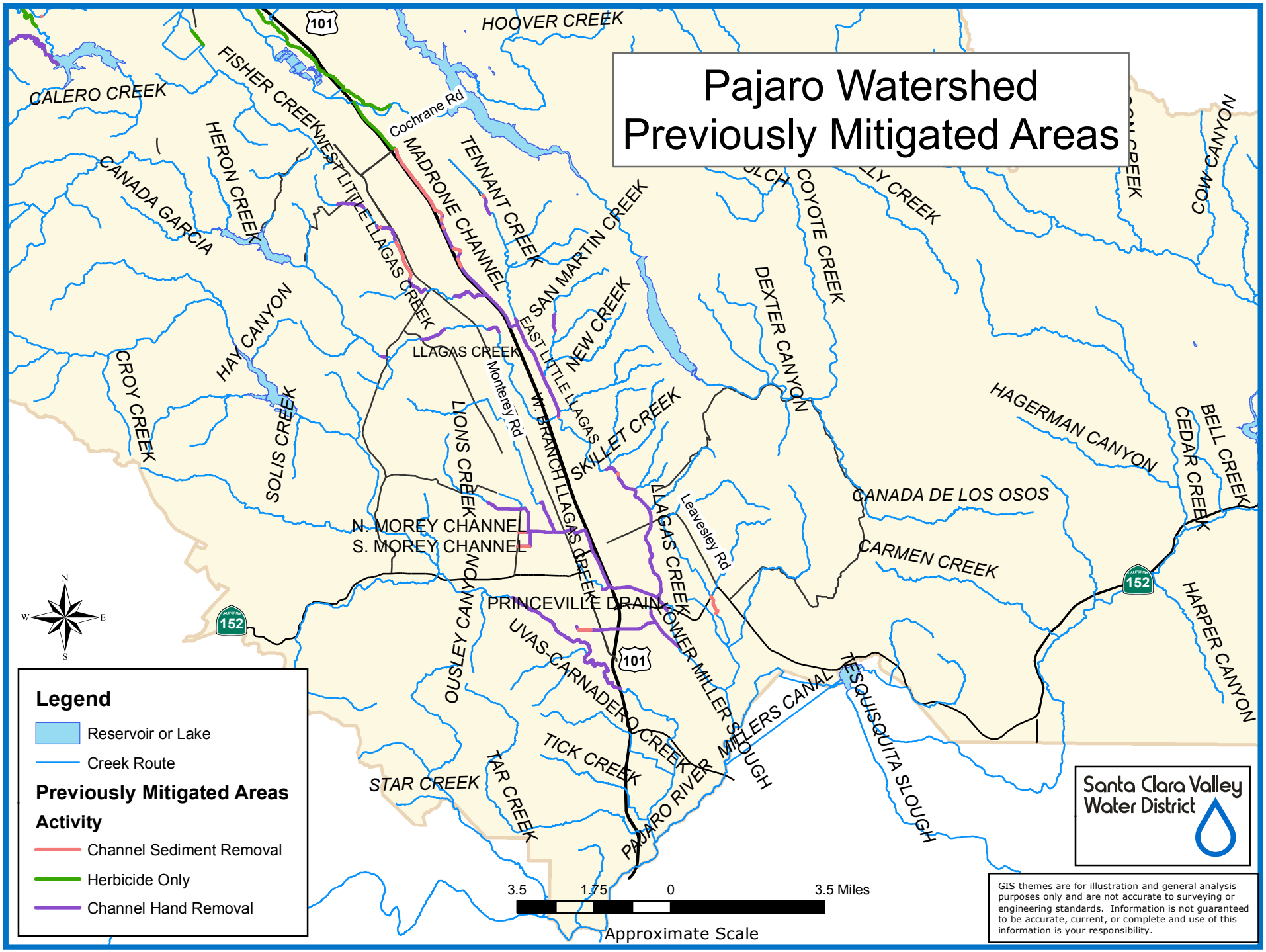


Figure 10-6: Pajaro Watershed - Previously Mitigated In Channel Areas

Table 10-3: Previously Mitigated Areas

Table 10-3a: Overhanging Growth

Watershed Name	GIS ID	Facility Name	From Station	To Station	Length (feet)
Lower Peninsula	10100	ADOBE CREEK	12917	24690	11773
Lower Peninsula	10120	BARRON CREEK	0	10401	10401
Lower Peninsula	10210	MATADERO CREEK	9602	10916	1314
Lower Peninsula	10210	MATADERO CREEK	10916	19908	8992
Lower Peninsula	10230	PERMANENTE DIVERSION CHANNEL	0	7100	7100
Lower Peninsula	10240	PERMANENTE CREEK	11484	12948	1464
Lower Peninsula	10240	PERMANENTE CREEK	13144	26026	12882
Lower Peninsula	10240	PERMANENTE CREEK	26026	34304	8278
Lower Peninsula	10280	SAN FRANCISQUITO CREEK	6164	7705	1541
West Valley	20100	CALABAZAS CREEK	10542	36605	26063
West Valley	20100	CALABAZAS CREEK	36906	37735	829
West Valley	20100	CALABAZAS CREEK	38771	52487	13716
West Valley	20130	JUNIPERO SERRA CHANNEL	0	13425	13425
West Valley	20170	REGNART CREEK	0	6082	6082
West Valley	20170	REGNART CREEK	7086	8591	1505
West Valley	20180	RODEO CREEK	0	5014	5014
West Valley	20180	RODEO CREEK	6393	9940	3547
West Valley	20190	SAN TOMAS AQUINO CREEK	15896	23000	7104
West Valley	20190	SAN TOMAS AQUINO CREEK	43476	67413	23937
West Valley	20210	SARATOGA CREEK	0	28306	28306
West Valley	20210	SARATOGA CREEK	37113	41768	4655
West Valley	20230	SMITH CREEK	0	6328	6328
West Valley	20260	SUNNYVALE EAST CHANNEL	6444	31301	24857
West Valley	20300	WILDCAT CREEK	1912	7716	5804
West Valley Watershed	20370	EL CAMINO STORM DRAIN	3356	9547	6191
Guadalupe	30110	CANOAS CREEK	0	39032	39032
Guadalupe	30130	GOLF CREEK	1498	6929	5431
Guadalupe	30140	GREYSTONE CREEK	530	2122	1592
Guadalupe	30140	GREYSTONE CREEK	2228	5626	3398
Guadalupe	30150	GUADALUPE RIVER	54034	60339	6305
Guadalupe	30190	LONE HILL CREEK	0	1787	1787
Guadalupe	30230	ROSS CREEK	0	23355	23355
Guadalupe	30230	ROSS CREEK	27284	27601	317
Guadalupe	30230	ROSS CREEK	29329	30049	720
Guadalupe	30290	RANDOL CREEK	0	4565	4565

Watershed Name	GIS ID	Facility Name	From Station	To Station	Length (feet)
Coyote	40120	NORTH BABB CREEK	0	1410	1410
Coyote	40120	NORTH BABB CREEK	4105	5402	1297
Coyote	40130	SOUTH BABB CREEK	0	4498	4498
Coyote	40180	CALERA CREEK	4141	6302	2161
Coyote	40250	LOS COCHES CREEK	1893	5249	3356
Coyote	40260	LOWER SILVER CREEK	0	24617	24617
Coyote	40260	LOWER SILVER CREEK	36827	38068	1241
Coyote	40290	MIGUELITA CREEK	1126	2345	1219
Coyote	40290	MIGUELITA CREEK	3677	4297	620
Coyote	40310	PIEDMONT CREEK	0	1786	1786
Coyote	40310	PIEDMONT CREEK	1886	2580	694
Coyote	40330	LOWER PENITENCIA CREEK	6892	10423	3531
Coyote	40370	SIERRA CREEK	0	7290	7290
Coyote	40380	UPPER SILVER CREEK	0	3649	3649
Coyote	40420	NORWOOD CREEK	0	3057	3057
Coyote	40430	QUIMBY CREEK	0	3780	3780
Coyote	40470	THOMPSON CREEK	6375	9416	3041
Coyote	40490	PENITENCIA EAST CHANNEL	0	3654	3654
Uvas/Llagas & Pajaro	50170	PRINCEVALLE DRAIN	6825	9535	2710
Uvas/Llagas & Pajaro	50310	WEST BRANCH LLAGAS CREEK	6328	16509	10181

Table 10-3b: In-channel Work Activities
Note: Channel types are listed per SMP-1, not SMP-2 definition.

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Lower Peninsula	ADOBE CREEK	Channel Sediment Removal	12600	18500	5900	Modified
Lower Peninsula	ADOBE CREEK	herbicide only	12917	24690	11773	Modified
Lower Peninsula	ADOBE CREEK	Vegetation Hand Removal Only	24690	55960	31270	Unmodified, Modified
Lower Peninsula	ADOBE CREEK	Channel Sediment Removal	52940	53150	210	Modified
Lower Peninsula	BARRON CREEK	herbicide only	0	10250	10250	Modified
Lower Peninsula	BARRON CREEK	Channel Sediment Removal	50	1988	1938	Modified
Lower Peninsula	BARRON CREEK	herbicide only	15790	17054	1264	Unmodified, Modified
Lower Peninsula	BARRON CREEK	Channel Sediment Removal	16044	16779	735	Modified
Lower Peninsula	HALE CREEK	herbicide only	0	6174	6174	Unmodified, Modified
Lower Peninsula	HENEY CREEK	herbicide only	4875	5325	450	Modified
Lower Peninsula	MATADERO CREEK	Vegetation Hand Removal Only	7980	9245	1265	Unmodified
Lower Peninsula	MATADERO CREEK	Channel Sediment Removal	9198	12231	3033	Unmodified, Modified
Lower Peninsula	MATADERO CREEK	Herbicide Only	9602	19908	10306	Modified
Lower Peninsula	MATADERO CREEK	Channel Sediment Removal	40000	40100	100	Modified
Lower Peninsula	PERMANENTE DIVERSION CHANNEL	Herbicide Only	0	7239	7239	Modified
Lower Peninsula	PERMANENTE DIVERSION CHANNEL	Channel Sediment Removal	2600	2735	135	Modified
Lower Peninsula	PERMANENTE DIVERSION CHANNEL	Channel Sediment Removal	3500	7150	3650	Modified
Lower Peninsula	PERMANENTE CREEK	Herbicide Only	10665	35641	24976	Unmodified, Modified

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Lower Peninsula	PERMANENTE CREEK	Vegetation Hand Removal Only	26026	33000	6974	Unmodified, Modified
Lower Peninsula	PERMANENTE CREEK	Channel Sediment Removal	34508	35641	1133	Modified
Lower Peninsula	PERMANENTE CREEK	Vegetation Hand Removal Only	34611	42945	8334	Modified
Lower Peninsula	SAN FRANCISQUITO CREEK	Channel Sediment Removal	7300	8100	800	Modified
Lower Peninsula	STEVENS CREEK	Herbicide Only	8846	41643	32797	Unmodified, Modified
Lower Peninsula	STEVENS CREEK	Vegetation Hand Removal Only	8899	51770	42871	Unmodified, Modified
Lower Peninsula	STEVENS CREEK	Channel Sediment Removal	8900	13648	4748	Modified
Lower Peninsula	SUMMERHILL CREEK	Herbicide Only	0	664	664	Modified
Lower Peninsula	DEER CREEK	Herbicide Oonly	7400	9100	1700	Unmodified
Lower Peninsula	STANFORD CHANNEL	Herbicide Only	2330	3560	1230	Modified
West Valley	CALABAZAS CREEK	Herbicide Only	2000	52600	50600	Modified
West Valley	CALABAZAS CREEK	Channel Sediment Removal	4900	10400	5500	Modified
West Valley	CALABAZAS CREEK	Vegetation Hand Removal Only	29000	37735	8735	Modified
West Valley	CALABAZAS CREEK	Vegetation Hand Removal Only	44730	50787	6057	Modified
West Valley	CALABAZAS CREEK	Vegetation Hand Removal Only	51289	52600	1311	Modified
West Valley	CALABAZAS CREEK	Channel Sediment Removal	59677	60144	467	Unmodified
West Valley	JUNIPERO SERRA CHANNEL	Herbicide Only	0	13425	13425	Modified
West Valley	JUNIPERO SERRA CHANNEL	Channel Sediment Removal	0	1997	1997	Modified
West Valley	JUNIPERO SERRA CHANNEL	Vegetation Hand Removal Only	0	2097	2097	Modified

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
West Valley	MISTLETOE CREEK	Herbicide Only	1369	1669	300	Unmodified, Modified
West Valley	REGNART CREEK	Herbicide Only	0	6480	6480	Modified
West Valley	REGNART CREEK	Channel Sediment Removal	1189	2318	1129	Modified
West Valley	REGNART CREEK	Herbicide Only	7086	8591	1505	Modified
West Valley	REGNART CREEK	Channel Sediment Removal	8290	8792	502	Modified
West Valley	RODEO CREEK	Vegetation Hand Removal Only	0	5014	5014	Modified
West Valley	RODEO CREEK	Herbicide Only	0	5014	5014	Modified
West Valley	RODEO CREEK	Channel Sediment Removal	353	453	100	Modified
West Valley	RODEO CREEK	Herbicide Only	7477	10000	2523	Unmodified, Modified
West Valley	RODEO CREEK	Vegetation Hand Removal Only	7575	9940	2365	Unmodified
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	0	1600	1600	Modified
West Valley	SAN TOMAS AQUINO CREEK	Vegetation Hand Removal Only	3220	15690	12470	Modified
West Valley	SAN TOMAS AQUINO CREEK	Herbicide Only	3220	23800	20580	Modified
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	5800	7900	2100	Modified
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	8689	15690	7001	Modified
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	15875	17145	1270	Modified
West Valley	SAN TOMAS AQUINO CREEK	Vegetation Hand Removal Only	15896	16926	1030	Modified
West Valley	SAN TOMAS AQUINO CREEK	Vegetation Hand Removal Only	17955	23000	5045	Modified
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	19250	21500	2250	Modified

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
West Valley	SAN TOMAS AQUINO CREEK	Herbicide Only	43476	67413	23937	Unmodified, Modified
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	62960	63690	730	Modified
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	64430	64701	271	Modified
West Valley	SAN TOMAS AQUINO CREEK	Channel Sediment Removal	66690	67413	723	Unmodified, Modified
West Valley	SAN TOMAS AQUINO CREEK	Vegetation Hand Removal Only	67400	76000	8600	Unmodified
West Valley	SARATOGA CREEK	Herbicide Oonly	0	30915	30915	Unmodified, Modified
West Valley	SARATOGA CREEK	Channel Sediment Removal	0	3389	3389	Modified
West Valley	SARATOGA CREEK	Vegetation Hand Removal Only	0	47430	47430	Unmodified, Modified
West Valley	SMITH CREEK	Vegetation Hand Removal Only	0	3639	3639	Modified
West Valley	SMITH CREEK	Herbicide Only	0	3639	3639	Modified
West Valley	SMITH CREEK	Herbicide Only	5621	6328	707	Modified
West Valley	SMITH CREEK	Herbicide Only	8220	9257	1037	Unmodified, Modified
West Valley	SMITH CREEK	Vegetation Hand Removal Only	8500	9257	757	Unmodified
West Valley	SUNNYVALE EAST CHANNEL	Channel Sediment Removal	0	2250	2250	Modified
West Valley	SUNNYVALE EAST CHANNEL	Herbicide Only	2305	31301	28996	Modified
West Valley	SUNNYVALE EAST CHANNEL	Vegetation Hand Removal Only	6444	31301	24857	Modified
West Valley	SUNNYVALE WEST CHANNEL	Herbicide Only	5320	15465	10145	Modified
West Valley	SUNNYVALE WEST CHANNEL	Channel Sediment Removal	12700	13000	300	Modified
West Valley	SUNNYVALE WEST CHANNEL	Vegetation Hand Removal Only	13702	14718	1016	Modified
West Valley	SUNNYVALE WEST CHANNEL	Vegetation Hand Removal Only	14876	15323	447	Modified
West Valley	DAVES CREEK	Herbicide Only	1187	2340	1153	Modified

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
West Valley	PROSPECT CREEK	Vegetation Hand Removal Only	0	2974	2974	Unmodified, Modified
West Valley	PROSPECT CREEK	Herbicide Oonly	0	2010	2010	Unmodified, Modified
West Valley	EL CAMINO STORM DRAIN	Herbicide Only	0	8400	8400	Modified
Guadalupe	ALAMITOS CREEK	Vegetation Hand Removal Only	0	315	315	Unmodified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	1682	1978	296	Unmodified
Guadalupe	ALAMITOS CREEK	Herbicide Only	2162	23250	21088	Unmodified, Modified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	11700	12200	500	Unmodified, Modified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	12750	12843	93	Unmodified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	13170	13242	72	Unmodified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	14075	14210	135	Unmodified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	21270	21546	276	Unmodified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	21600	21919	319	Unmodified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	22150	22250	100	Unmodified
Guadalupe	ALAMITOS CREEK	Channel Sediment Removal	22685	23100	415	Unmodified
Guadalupe	CANOAS CREEK	Channel Sediment Removal	0	39032	39032	Modified
Guadalupe	CANOAS CREEK	Herbicide Only	0	39032	39032	Modified
Guadalupe	CALERO CREEK	Herbicide Only	12800	13200	400	Unmodified
Guadalupe	CALERO CREEK	Herbicide Only	13465	16507	3042	Unmodified
Guadalupe	GOLF CREEK	Herbicide Only	0	7550	7550	Modified
Guadalupe	GREYSTONE	Herbicide Only	0	7850	7850	Modified

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
	CREEK					
Guadalupe	GREYSTONE CREEK	Vegetation Hand Removal Only	2048	2151	103	Modified
Guadalupe	GREYSTONE CREEK	Vegetation Hand Removal Only	5626	7411	1785	Modified
Guadalupe	GREYSTONE CREEK	Channel Sediment Removal	5745	6036	291	Modified
Guadalupe	GUADALUPE RIVER	Herbicide Only	6205	7151	946	Modified
Guadalupe	GUADALUPE RIVER	Vegetation Hand Removal Only	24477	107415	82938	Unmodified, Modified
Guadalupe	GUADALUPE RIVER	Herbicide Only	24477	107415	82938	Unmodified, Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	42000	47000	5000	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	49578	49902	324	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	65445	65545	100	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	66075	66775	700	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	69750	71215	1465	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	73235	74325	1090	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	79850	79950	100	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	93700	94040	340	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	97600	97750	150	Modified
Guadalupe	GUADALUPE RIVER	Channel Sediment Removal	106522	107027	505	Modified
Guadalupe	LONE HILL	Hherbicide Only	0	2027	2027	Modified

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
	CREEK					
Guadalupe	LOS GATOS CREEK	Hherbicide Only	0	42379	42379	Unmodified, Modified
Guadalupe	LOS GATOS CREEK	Channel Sediment Removal	40040	40170	130	Modified
Guadalupe	ROSS CREEK	Vegetation Hand Removal Only	0	23570	23570	Modified
Guadalupe	ROSS CREEK	Herbicide Only	0	23979	23979	Modified
Guadalupe	ROSS CREEK	Channel Sediment Removal	255	3051	2796	Modified
Guadalupe	ROSS CREEK	Channel Sediment Removal	3121	8560	5439	Modified
Guadalupe	ROSS CREEK	Channel Sediment Removal	12316	12799	483	Modified
Guadalupe	ROSS CREEK	Channel Sediment Removal	19350	19500	150	Modified
Guadalupe	ROSS CREEK	Herbicide Oonly	26700	27050	350	Modified
Guadalupe	ROSS CREEK	Herbicide Only	27284	27601	317	Modified
Guadalupe	GUADALUPE CREEK	Vegetation Hand Removal Only	107431	120238	12807	Unmodified, Modified
Guadalupe	GUADALUPE CREEK	Herbicide Only	107431	120870	13439	Unmodified, Modified
Guadalupe	GUADALUPE CREEK	Channel Sediment Removal	107535	107794	259	Modified
Guadalupe	GUADALUPE CREEK	Channel Sediment Removal	107820	108125	305	Modified
Guadalupe	GUADALUPE CREEK	Channel Sediment Removal	113345	113360	15	Modified
Guadalupe	GUADALUPE CREEK	Channel Sediment Removal	116700	116800	100	Unmodified
Guadalupe	GUADALUPE CREEK	Channel Sediment Removal	120314	120575	261	Unmodified
Guadalupe	RANDOL CREEK	Herbicide Only	0	10185	10185	Unmodified, Modified
Guadalupe	RANDOL CREEK	Vegetation Hand	8230	10185	1955	Unmodified,

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
		Removal Only				Modified
Guadalupe	SOUTH EAST SANTA TERESA CREEK	Channel Sediment Removal	2420	2470	50	Modified
Guadalupe	WEST BRANCH RANDOL CREEK	Vegetation Hand Removal Only	0	1350	1350	Modified
Coyote	NORTH BABB CREEK	Herbicide Only	0	1410	1410	Modified
Coyote	NORTH BABB CREEK	Herbicide Only	3970	5402	1432	Modified
Coyote	SOUTH BABB CREEK	Herbicide Only	0	4570	4570	Modified
Coyote	BERRYESSA CREEK	Channel Sediment Removal	0	8771	8771	Modified
Coyote	BERRYESSA CREEK	Herbicide Only	0	29907	29907	Modified
Coyote	BERRYESSA CREEK	Channel Sediment Removal	11511	11671	160	Modified
Coyote	BERRYESSA CREEK	Channel Sediment Removal	16620	16680	60	Modified
Coyote	BERRYESSA CREEK	Channel Sediment Removal	16816	20310	3494	Modified
Coyote	BERRYESSA CREEK	Channel Sediment Removal	22555	23355	800	Modified
Coyote	BERRYESSA CREEK	Channel Sediment Removal	23375	23993	618	Modified
Coyote	BERRYESSA CREEK	Channel Sediment Removal	28639	28800	161	Modified
Coyote	CALERA CREEK	Herbicide Only	305	8264	7959	Unmodified, Modified
Coyote	CALERA CREEK	Channel Sediment Removal	1026	4058	3032	Modified
Coyote	CALERA CREEK	Channel Sediment Removal	4227	4312	85	Modified
Coyote	CALERA CREEK	Vegetation Hand Removal Only	5025	6105	1080	Modified

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Coyote	CALERA CREEK	Channel Sediment Removal	7364	7460	96	Modified
Coyote	RUBY CREEK	Herbicide Only	0	1340	1340	Modified
Coyote	RUBY CREEK	Herbicide Only	7945	8440	495	Modified
Coyote	COYOTE CREEK	Vegetation Hand Removal Only	45340	81800	36460	Unmodified, Modified
Coyote	COYOTE CREEK	Herbicide Only	45340	81800	36460	Unmodified, Modified
Coyote	COYOTE CREEK	Channel Sediment Removal	46395	46470	75	Modified
Coyote	COYOTE CREEK	Channel Sediment Removal	46848	46923	75	Modified
Coyote	COYOTE CREEK	Vegetation Hand Removal Only	83530	85560	2030	Modified
Coyote	COYOTE CREEK	Herbicide Only	84145	86400	2255	Modified
Coyote	COYOTE CREEK	Channel Sediment Removal	143520	144228	708	Unmodified
Coyote	COYOTE CREEK	Vegetation Hand Removal Only	144200	144800	600	Unmodified
Coyote	COYOTE CREEK	Herbicide Only	150906	156738	5832	Unmodified, Modified
Coyote	FISHER CREEK	Herbicide Only	13500	15673	2173	Modified
Coyote	LOS COCHES CREEK	Herbicide Only	0	6790	6790	Modified
Coyote	LOS COCHES CREEK	Channel Sediment Removal	55	846	791	Modified
Coyote	LOS COCHES CREEK	Channel Sediment Removal	1577	2523	946	Modified
Coyote	LOS COCHES CREEK	Vegetation Hand Removal Only	1998	2209	211	Modified
Coyote	LOS COCHES CREEK	Vegetation Hand Removal Only	5975	6800	825	Modified
Coyote	LOS COCHES CREEK	Channel Sediment Removal	6400	6750	350	Modified
Coyote	LOWER SILVER CREEK	Vegetation Hand Removal Only	0	5245	5245	Modified
Coyote	LOWER SILVER CREEK	Herbicide Only	0	31880	31880	Modified

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Coyote	LOWER SILVER CREEK	Vegetation Hand Removal Only	7563	9348	1785	Modified
Coyote	LOWER SILVER CREEK	Channel Sediment Removal	12876	15540	2664	Modified
Coyote	LOWER SILVER CREEK	Channel Sediment Removal	19668	20333	665	Modified
Coyote	LOWER SILVER CREEK	Vegetation Hand Removal Only	24590	29210	4620	Modified
Coyote	LOWER SILVER CREEK	Channel Sediment Removal	24719	31862	7143	Modified
Coyote	LOWER SILVER CREEK	Herbicide Only	36827	38114	1287	Modified
Coyote	MIGUELITA CREEK	Herbicide Only	1126	2460	1334	Modified
Coyote	MIGUELITA CREEK	Channel Sediment Removal	1451	2453	1002	Modified
Coyote	MIGUELITA CREEK	Herbicide Only	3650	4297	647	Modified
Coyote	MIGUELITA CREEK	Channel Sediment Removal	3677	3987	310	Modified
Coyote	MIGUELITA CREEK	Channel Sediment Removal	15840	15990	150	Unmodified
Coyote	PIEDMONT CREEK	Herbicide Only	0	1797	1797	Modified
Coyote	PIEDMONT CREEK	Vegetation Hand Removal Only	1797	1896	99	Modified
Coyote	PIEDMONT CREEK	Herbicide Only	1886	4300	2414	Modified
Coyote	UPPER PENITENCIA CREEK	Herbicide Only	1965	6512	4547	Unmodified, Modified
Coyote	UPPER PENITENCIA CREEK	Channel Sediment Removal	7200	7215	15	Modified
Coyote	UPPER PENITENCIA CREEK	Herbicide Only	7241	11792	4551	Unmodified, Modified
Coyote	UPPER PENITENCIA	Channel Sediment	17050	17150	100	Modified

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
	CREEK	Removal				
Coyote	UPPER PENITENCIA CREEK	Channel Sediment Removal	20400	20410	10	Unmodified
Coyote	LOWER PENITENCIA CREEK	Vegetation Hand Removal Only	0	4975	4975	Modified
Coyote	LOWER PENITENCIA CREEK	Herbicide Only	0	21693	21693	Modified
Coyote	LOWER PENITENCIA CREEK	Channel Sediment Removal	1193	4975	3782	Modified
Coyote	LOWER PENITENCIA CREEK	Channel Sediment Removal	8979	9126	147	Modified
Coyote	LOWER PENITENCIA CREEK	Channel Sediment Removal	10599	10852	253	Modified
Coyote	LOWER PENITENCIA CREEK	Channel Sediment Removal	11374	13311	1937	Modified
Coyote	SIERRA CREEK	Herbicide Only	0	7290	7290	Modified
Coyote	SIERRA CREEK	Channel Sediment Removal	3825	4161	336	Modified
Coyote	SIERRA CREEK	Channel Sediment Removal	4295	4395	100	Modified
Coyote	SIERRA CREEK	Channel Sediment Removal	6693	7293	600	Modified
Coyote	UPPER SILVER CREEK	Herbicide Only	0	6374	6374	Modified
Coyote	UPPER SILVER CREEK	Channel Sediment Removal	1115	4112	2997	Modified
Coyote	TULARCITOS CREEK	Vegetation Hand Removal Only	100	3600	3500	Modified
Coyote	TULARCITOS CREEK	Herbicide Only	100	3705	3605	Modified
Coyote	TULARCITOS CREEK	Channel Sediment Removal	2500	3700	1200	Modified
Coyote	NORWOOD	Herbicide Only	0	3113	3113	Modified

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
	CREEK					
Coyote	NORWOOD CREEK	Channel Sediment Removal	1300	3070	1770	Modified
Coyote	NORWOOD CREEK	Herbicide Only	12402	13110	708	Unmodified, Modified
Coyote	QUIMBY CREEK	Channel Sediment Removal	0	1018	1018	Modified
Coyote	QUIMBY CREEK	Herbicide Only	0	3790	3790	Modified
Coyote	QUIMBY CREEK	Channel Sediment Removal	1170	3790	2620	Modified
Coyote	EVERGREEN CREEK	Vegetation Hand Removal Only	0	3700	3700	Unmodified, Modified
Coyote	THOMPSON CREEK	Herbicide Only	0	7070	7070	Unmodified, Modified
Coyote	THOMPSON CREEK	Channel Sediment Removal	0	1005	1005	Modified
Coyote	THOMPSON CREEK	Vegetation Hand Removal Only	6983	10000	3017	Unmodified, Modified
Coyote	THOMPSON CREEK	Vegetation Hand Removal Only	27225	27840	615	Unmodified
Coyote	FLINT CREEK	hHerbicide Only	0	1957	1957	Modified
Coyote	FLINT CREEK	Herbicide Only	6290	7130	840	Unmodified, Modified
Coyote	PENITENCIA EAST CHANNEL	Herbicide Only	0	3654	3654	Modified
Coyote	PENITENCIA EAST CHANNEL	Channel Sediment Removal	2400	3600	1200	Modified
Coyote	COCHRAN CHANNEL	Herbicide Only	0	7556	7556	Modified
Coyote	COYOTE BYPASS	Channel Sediment Removal	8879	8897	18	Modified
Uvas/Llagas & Pajaro	LLAGAS CREEK	Vegetation Hand Removal Only	17316	38880	21564	Modified
Uvas/Llagas & Pajaro	LLAGAS CREEK	Channel Sediment Removal	36900	37100	200	Modified
Uvas/Llagas & Pajaro	LLAGAS CREEK	Channel Sediment Removal	50250	50510	260	Unmodified

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Uvas/Llagas & Pajaro	LLAGAS CREEK	Vegetation Hand Removal Only	66430	68108	1678	Unmodified
Uvas/Llagas & Pajaro	LLAGAS CREEK	Vegetation Hand Removal Only	74000	77175	3175	Unmodified
Uvas/Llagas & Pajaro	LLAGAS CREEK	Vegetation Hand Removal Only	82727	83175	448	Unmodified
Uvas/Llagas & Pajaro	JONES CREEK	Channel Sediment Removal	11200	13624	2424	Modified
Uvas/Llagas & Pajaro	WEST LITTLE LLAGAS CREEK	Vegetation Hand Removal Only	4480	16304	11824	Unmodified, Modified
Uvas/Llagas & Pajaro	WEST LITTLE LLAGAS CREEK	Channel Sediment Removal	7700	12350	4650	Modified
Uvas/Llagas & Pajaro	WEST LITTLE LLAGAS CREEK	Channel Sediment Removal	15680	15788	108	Modified
Uvas/Llagas & Pajaro	WEST LITTLE LLAGAS CREEK	Vegetation Hand Removal Only	19015	22420	3405	Modified
Uvas/Llagas & Pajaro	MADRONE CHANNEL	Vegetation Hand Removal Only	0	21840	21840	Modified
Uvas/Llagas & Pajaro	MADRONE CHANNEL	Channel Sediment Removal	4637	5608	971	Modified
Uvas/Llagas & Pajaro	MADRONE CHANNEL	Channel Sediment Removal	6637	7606	969	Modified
Uvas/Llagas & Pajaro	MADRONE CHANNEL	Channel Sediment Removal	10302	10602	300	Modified
Uvas/Llagas & Pajaro	MADRONE CHANNEL	Channel Sediment Removal	11300	11600	300	Modified
Uvas/Llagas & Pajaro	MADRONE CHANNEL	Channel Sediment Removal	12100	21840	9740	Modified
Uvas/Llagas & Pajaro	PRINCEVALLE DRAIN	Channel Sediment Removal	0	251	251	Modified
Uvas/Llagas & Pajaro	PRINCEVALLE DRAIN	Vegetation Hand Removal Only	0	10000	10000	Modified
Uvas/Llagas & Pajaro	PRINCEVALLE DRAIN	Channel Sediment Removal	8036	9536	1500	Modified
Uvas/Llagas &	UVAS-	Vegetation Hand	27000	49425	22425	Unmodified,

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Pajaro	CARNADERO CREEK	Removal Only				Modified
Uvas/Llagas & Pajaro	CORRALLITOS CREEK	Vegetation Hand Removal Only	0	952	952	Modified
Uvas/Llagas & Pajaro	TENNANT CREEK	Vegetation Hand Removal Only	8235	10739	2504	Modified
Uvas/Llagas & Pajaro	TENNANT CREEK	Channel Sediment Removal	10570	10700	130	Modified
Uvas/Llagas & Pajaro	WEST BRANCH LLAGAS CREEK	Vegetation Hand Removal Only	0	22000	22000	Modified
Uvas/Llagas & Pajaro	SAN MARTIN CREEK	Vegetation Hand Removal Only	7200	9285	2085	Modified
Uvas/Llagas & Pajaro	EAST LITTLE LLAGAS CREEK	Channel Sediment Removal	0	12300	12300	Modified
Uvas/Llagas & Pajaro	EAST LITTLE LLAGAS CREEK	Vegetation Hand Removal Only	0	22509	22509	Unmodified, Modified
Uvas/Llagas & Pajaro	LIONS CREEK	Vegetation Hand Removal Only	0	10719	10719	Unmodified, Modified
Uvas/Llagas & Pajaro	SOUTH MOREY CHANNEL	Vegetation Hand Removal Only	0	3312	3312	Modified
Uvas/Llagas & Pajaro	SOUTH MOREY CHANNEL	Channel Sediment Removal	1883	3312	1429	Modified
Uvas/Llagas & Pajaro	NORTH MOREY CHANNEL	Vegetation Hand Removal Only	0	1348	1348	Modified
Uvas/Llagas & Pajaro	NORTH MOREY CHANNEL	Channel Sediment Removal	575	1348	773	Modified
Uvas/Llagas & Pajaro	LOWER MILLER SLOUGH	Vegetation Hand Removal Only	0	5501	5501	Modified
Uvas/Llagas & Pajaro	UPPER MILLER SLOUGH	Vegetation Hand Removal Only	0	1022	1022	Modified
Coyote	COYOTE CANAL	Herbicide Only	0	37982	37982	Modified
Coyote	COYOTE CANAL EXTENSION	Herbicide Only	0	6323	6323	Modified
Guadalupe	COYOTE ALAMITOS CANAL	Herbicide Only	2149	47283	45134	Modified
Guadalupe	COYOTE ALAMITOS CANAL	Channel Sediment Removal	6748	7600	852	Modified
Guadalupe	COYOTE ALAMITOS	Channel Sediment	7823	11341	3518	Modified

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
	CANAL	Removal				
Guadalupe	COYOTE ALAMITOS CANAL	Channel Sediment Removal	12373	12900	527	Modified
Guadalupe	COYOTE ALAMITOS CANAL	Channel Sediment Removal	14233	14353	120	Modified
Guadalupe	COYOTE ALAMITOS CANAL	Channel Sediment Removal	30208	30258	50	Modified
Guadalupe	COYOTE ALAMITOS CANAL	Channel Sediment Removal	31463	32463	1000	Modified
Guadalupe	KIRK DISTRIBUTION SYSTEM	Herbicide Only	380	930	550	Modified
Guadalupe	KIRK DISTRIBUTION SYSTEM	Herbicide Only	3394	5129	1735	Modified
Guadalupe	KIRK DISTRIBUTION SYSTEM	Herbicide Only	6165	7920	1755	Modified
Guadalupe	PAGE DISTRIBUTION SYSTEM - UPPER	Herbicide Only	960	3100	2140	Modified
Guadalupe	PAGE DISTRIBUTION SYSTEM - UPPER	Herbicide Only	4550	6344	1794	Modified
Guadalupe	PAGE DISTRIBUTION SYSTEM - UPPER	Herbicide Only	7980	9630	1650	Modified
Guadalupe	VASONA CANAL	Herbicide Oonly	0	1050	1050	Modified
Guadalupe	VASONA CANAL	Herbicide Oonly	2450	3190	740	Modified
Guadalupe	VASONA CANAL	Herbicide Oonly	4130	7030	2900	Modified
Guadalupe	VASONA CANAL	Herbicide Oonly	7380	8615	1235	Modified
Guadalupe	ALMADEN-CALERO CANAL	Herbicide Only	0	23919	23919	Modified
Guadalupe	ALMADEN-CALERO CANAL	Vegetation Hand Removal Only	150	2950	2800	Modified
Guadalupe	ALMADEN-CALERO CANAL	Channel Sediment Removal	250	300	50	Modified

Watershed Name	Facility Name	Activity	From Station	To Station	Reach Length (feet)	Channel Type
Guadalupe	ALMADEN-CALERO CANAL	Channel Sediment Removal	500	9000	8500	Modified
Guadalupe	ALMADEN-CALERO CANAL	Vegetation Hand Removal Only	3610	9240	5630	Modified
Guadalupe	ALMADEN-CALERO CANAL	Vegetation Hand Removal Only	9700	23919	14219	Modified

For channels and maintenance activities that were identified and permitted in 2002, but for which the projected maintenance work did not occur during the 2002-2013 period, these channel locations do not have on-going mitigation provided for them under SMP-1. For such channels and activities that may have been previously projected, but no work was conducted, these channel locations and activities will be mitigated under SMP-2 as described below in Section 10.4.

During the SMP-1 period 2002-2013 the SCVWD conducted on-site mitigation activities for bank stabilization projects. The SCVWD also conducted large woody debris (LWD) mitigation for projects where LWD was removed from an anadromous salmonid channel during SMP-1. The maps in Figures 10-7 and 10-8 show on-site mitigation projects for bank stabilization and LWD SMP-1 (2002-2013). Bank stabilization projects are listed in Table 10-4a and the LWD projects are listed in Table 10-4b. Mitigation was not required for sites where LWD was modified or relocated.

Tables 10-4. Mitigation Sites for SMP-1 Bank Stabilization and Large Woody Debris Projects

Table 10-4a. Revegetation Sites for Bank Stabilization Projects in SMP-1

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
LOWER PENINSULA	10100	ADOBE CK.	24800	25260	PROJECT #164 ADOBE U/S FTHL TO EL CAMINO	21780	2005
LOWER PENINSULA	10100	ADOBE CK.	34180	34450	PROJECT #164 ADOBE U/S FTHL TO EL CAMINO	750	2006
LOWER PENINSULA	10100	ADOBE CK.	37460	38200	PROJECT #179 ADOBE CK. Moos, Ward Property	700	2003, 2004
LOWER PENINSULA	10100	ADOBE CK.	48100	48300	PROJECT #273 ADOBE D/S O'KEEFE	290	2008, 2009
LOWER PENINSULA	10120	BARRON CK.	120	250	PROJECT #292 BARRON CRK. U/S ADOBE CONFL.	300	2009
LOWER PENINSULA	10160	HALE CK.	10510	10575	PROJECT #257 HALE @ 1st BAPTIST CHURCH	5000	2007
LOWER PENINSULA	10160	HALE CK.	11480	11520	PROJECT #208 HALE D/S MAGDALENA	1615	2004
LOWER PENINSULA	10240	PERMANENTE CK.	28500	28550	PROJECT #241 PERMANENT D/S BARBARA	100	2006
LOWER PENINSULA	10240	PERMANENTE CK.	40100	40200	PROJECT #226 PERMANENTE @ LUNDY	1600	1998
LOWER PENINSULA	10240	PERMANENTE CK.	44560	44635	PROJECT #265 PERMANENTE @ ROTH PROPERTY	2050	2007

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
LOWER PENINSULA	10290	STEVENS CK.	18180	18225	PROJECT #254 STEVENS CK. D/S MIDDLEFIELD RD.	500	2007
LOWER PENINSULA	10290	STEVENS CK.	43925	43960	PROJECT #248 STEVENS CK D/S HOMESTEAD	1920	2000
LOWER PENINSULA	10290	STEVENS CK.	50850	50920	PROJECT #167 STEVENS CK. CLEAR CK CT	1200	2002
WEST VALLEY	20100	CALABAZAS CK.	36987	37145	PROJECT #356 CALABAZAS U/S HWY. 280	1288	2012
WEST VALLEY	20100	CALABAZAS CK.	42405	44400	PROJECT #307 CALABAZAS D/S BOLLINGER BRIDGE	1190	2010
WEST VALLEY	20100	CALABAZAS CK.	44800	45330	PROJECT # 246 CALABAZAS U/S BOLLINGER BRIDGE	10100	2006, 2009
WEST VALLEY	20100	CALABAZAS CK.	48761	49100	PROJECT #329 CALABAZAS CK U/S & D/S RAINBOW DR.	3985	2010, 2012
WEST VALLEY	20100	CALABAZAS CK.	51750	51880	PROJECT #245 CALABAZAS D/S PROSPECT	600	2005
WEST VALLEY	20100	CALABAZAS CK.	55440	56850	PROJECT #355 CALABAZAS U/S UPRR SITE SB30, SB11, 13, SB38	3985	2011
WEST VALLEY	20100	CALABAZAS CK.	59350	59400	PROJECT #258 CALABAZAS D/S COMER DR.	250	2007
WEST VALLEY	20100	CALABAZAS CK.	60860	60880	PROJECT #333 CALABAZAS CK @ PADERO CT.	250	2010

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
WEST VALLEY	20100	CALABAZAS CK.	64160	64180	PROJECT #171 CALABZAS @ QUARRY RD.	600	2002
WEST VALLEY	20140	MISTLETOE CK.	1639	1654	PROJECT #259 MISTLETOE CR. D/S MISTLETOE CT.	500	2007
WEST VALLEY	20170	REGNART CK.	12500	12600	PROJECT #145 REGNART U/S UPRR	1050	2000
WEST VALLEY	20170	REGNART CK.	5450	5550	PROJECT #244 REGNART CK U/S PACIFICA DR.	225	2006
WEST VALLEY	20180	RODEO CK.	1325	1340	PROJECT #243 RODEO U/S RAINBOW	120	2006
WEST VALLEY	20190	SAN TOMAS CK.	59490	59710	PROJECT #176 SAN TOMAS U/S MCCOY	2850	2002
WEST VALLEY	20190	SAN TOMAS CK.	60415	60485	PROJECT #372 SAN TOMAS U/S MCCOY (2013)	1000	2012
WEST VALLEY	20190	SAN TOMAS CK.	63820	63950	PROJECT #357 SAN TOMAS D/S WESTMONT	8333	2011, 2012
WEST VALLEY	20190	SAN TOMAS CK.	66650	66850	PROJECT #255 SAN TOMAS D/S POLLARD	2400	2007
WEST VALLEY	20190	SAN TOMAS CK.	68400	68475	PROJECT #275 SAN TOMAS U/S SOBEY	105	2008
WEST VALLEY	20190	SAN TOMAS CK.	70725	70775	PROJECT #256 SAN TOMAS D/S MONTCLAIRE	250	2007

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
WEST VALLEY	20190	SAN TOMAS CK.	73000	73275	PROJECT #174 SAN TOMAS @ AVON	1140	2003
WEST VALLEY	20210	SARATOGA CK.	15040	15065	PROJECT #387 SARATOGA U/S PRUNERIDGE	125	2011
WEST VALLEY	20210	SARATOGA CK.	23550	23600	PROJECT #202 SARATOGA D/S BOLLINGER	250	2003
WEST VALLEY	20210	SARATOGA CK.	27490	27580	PROJECT #274 SARATOGA D/S ENGLISH	50	2009
WEST VALLEY	20210	SARATOGA CK.	31515	31960	PROJECT #153 SARATOGA U/S PROSPECT	3220	2009
WEST VALLEY	20210	SARATOGA CK.	35725	35900	PROJECT #242 SARATOGA U/S COX	1350	2006
WEST VALLEY	20210	SARATOGA CK.	38920	38960	PROJECT #144 SARATOGA D/S VIA MONTE	1500	2000
WEST VALLEY	20210	SARATOGA CK.	46400	46450	PROJECT #223 SARATOGA D/S WALNUT	4000	2008
WEST VALLEY	20210	SARATOGA CK.	50240	50400	PROJECT #222 SARATOGA U/S 4TH	2000	2005
WEST VALLEY	20300	WILDCAT CK.	2880	3000	PROJECT #359 WILDCAT CK. D/S PORTOS	2300	2012
WEST VALLEY	20300	WILDCAT CK.	960	980	PROJECT #203 WILDCAT D/S QUITO	300	2004

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
WEST VALLEY	20360	PROSPECT CK.	3985	4065	PROJECT #201 PROSPECT CREEK @ BLUE HLLS	1500	2004
GUADALUPE	30100	ALAMITOS CK.	11000	11050	PROJECT #175 ALAMITOS U/S & D/S GRAYSTONE	3500	2004
GUADALUPE	30100	ALAMITOS CK.	12050	12225	PROJECT #175 ALAMITOS U/S & D/S GRAYSTONE	3500	2001
GUADALUPE	30100	ALAMITOS CK.	12500	12630	PROJECT #276 ALAMITOS @ BUBBLINGWELL	2750	2007
GUADALUPE	30100	ALAMITOS CK.	13160	13440	PROJECT #291 ALAMITOS @ BRET HARTE	792	2009
GUADALUPE	30100	ALAMITOS CK.	14110	14170	PROJECT #318 ALAMITOS CK. @ RANDOL CK. CONFL.	3825	2010
GUADALUPE	30100	ALAMITOS CK.	21300	21900	PROJECT #212 ALAMITOS @ PRICEWOOD	6723	2004
GUADALUPE	30100	ALAMITOS CK.	21300	21405	PROJECT #321 ALAMITOS CK. @ FIELDWOOD CT.	2250	2010
GUADALUPE	30100	ALAMITOS CK.	22150	22350	PROJECT #296 ALAMITOS CRK D/S ALMADEN EXPRSSWY	3300	2010
GUADALUPE	30100	ALAMITOS CK.	22685	22775	PROJECT #316 ALAMITOS CRK U/S ALMADEN EXPRSSWY	3500	2010
GUADALUPE	30100	ALAMITOS CK.	3175	3575	PROJECT #142 ALAMITOS D/S MAZZONE	10800	2000

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
GUADALUPE	30100	ALAMITOS CK.	40225	40280	PROJECT #295 ALAMITOS CRK D/S ALMADEN DAM	212	2009
GUADALUPE	30100	ALAMITOS CK.	8900	10100	PROJECT #272 ALAMITOS @ GREYSTONE CONFL.	15144	2008, 2009, 2010
GUADALUPE	30110	CANOAS CK.	10000	10830	PROJECT #231 CANOAS D/S CAPITOL AVE. BOTH BANKS	12500	2006
GUADALUPE	30110	CANOAS CK.	9220	10000	PROJECT #231 CANOAS D/S CAPITOL AVE. BOTH BANKS	1500	2005
GUADALUPE	30130	GOLF CK.	4070	4195	GOLF D/S CULLIGAN	2500	2004
GUADALUPE	30130	GOLF CK.	580	1110	PROJECT #228 GOLF CREEK U/S ALMADEN EXPR, &	14625	2005
GUADALUPE	30140	GREYSTONE CK.	5840	5940	PROJECT #278 GREYSTONE U/S OLIVE BRANCH	2500	2007
GUADALUPE	30150	GUADALUPE RVR.	74725	75025	PROJECT #177 GUADALUPE RVR D/S VIRGINIA	780	2003
GUADALUPE	30150	GUADALUPE RVR.	81230	81440	PROJECT #178 GUADALUPE RVR U/S ALMA	2800	2003
GUADALUPE	30150	GUADALUPE RVR.	90700	90800	PROJECT #172 GUADALUPE RIVER @ HILLSDALE	3000	2003
GUADALUPE	30150	GUADALUPE RVR.	93780	94020	PROJECT #370 GUADALUPE RVR U/S CAPITOL EXPRSWY.	6500	2012

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
GUADALUPE	30200	LOS GATOS CK.	13750	14140	PROJECT #187 LOS GATOS U/S LEIGH	17250	2001
GUADALUPE	30200	LOS GATOS CK.	17885	18125	PROJECT #187 LOS GATOS U/S MERIDIAN	5500	2001
GUADALUPE	30200	GUADALUPE RVR.	45440	46815	PROJECT #250 GUADALUPE RVR D/S TRIMBLE	22440	2006, 2007
GUADALUPE	30200	GUADALUPE RVR.	72660	72700	PROJECT #155 GUADALUPE RVR D/S WOZ WAY (2 SITES	10367	1998, 1999
GUADALUPE	30230	ROSS CK.	12400	12700	PROJECT # 247 ROSS CRK D/S HARWOOD RD.	4407	2006
GUADALUPE	30230	ROSS CK.	13880	14023	PROJECT #294 ROSS CRK U/S HARWOOD	1540	2009
GUADALUPE	30230	ROSS CK.	14990	15450	PROJECT #260 ROSS CRK D/S LEIGH AVE.	1600	2009
GUADALUPE	30230	ROSS CK.	17975	18150	PROJECT #277 ROSS CRK D/S UNION	3660	2008
GUADALUPE	30230	ROSS CK.	18275	18840	PROJECT #312 ROSS CRK U/S UNION AVE	2560	2010
GUADALUPE	30230	ROSS CK.	21280	21415	PROJECT #293 ROSS CRK U/S LOS GATOS/ALMADEN RD.	1350	2009
GUADALUPE	30230	ROSS CK.	7700	8350	PROJECT #262 ROSS CRK KIRK AVE. D/S TO MERIDIAN	20000	2007

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
COYOTE	40180	CALERA CK.	5910	5950	PROJECT #206 CALERA CRK. U/S HILLVIEW	300	2003
COYOTE	40210	COYOTE CK.	85500	85730	PROJECT #261 COYOTE CR @ SBMHP, Nottinghill d/s Berryessa	13950	2007, 2009
COYOTE	40260	LOWER SILVER CK.	28800	29640	LOWER SILVER D/S TULLY AVE.	1800	2012
COYOTE	40320	UPPER PENITENCIA CK.	11300	11730	PROJECT #279 UPPER PENITENCIA D/S CAPITOL	6400	2008, 2009
COYOTE	40320	UPPER PENITENCIA CK.	19960	20025	PROJECT #156 UPPER PENITENCIA @ NOBLE	600	2000
COYOTE	40470	THOMPSON CK.	28810	28870	PROJECT #323 THOMPSON U/S FARNSWORTH	1300	2010
COYOTE	40470	THOMPSON CK.	3560	4275	PROJECT #169 THOMPSON AT EVERDALE, Pettigrew	16652	2002, 2003, 2010
COYOTE	40470	THOMPSON CK.	6210	6970	PROJECT #346 THOMPSON D/S ABORN RD.	16500	2010
COYOTE	40470	THOMPSON CK.	7270	7520	PROJECT #207 THOMPSON U/S ABORN RD.	5721	2013
COYOTE	40470	THOMPSON CK.	8340	8380	PROJECT #207 THOMPSON U/S ABORN RD.	560	2004

WATERSHED	GIS ID	FACILITY	FROM STATION	TO STATION	BANK REPAIR PROJECT WHERE REVEGETATION OCCURRED	REVEGETATION AREA (square feet)	YEAR REVEGETATION INSTALLED
COYOTE	40470	THOMPSON CK.	9400	9550	PROJECT #361 THOMPSON U/S CADWALLADER	1640	2012
PAJARO	50100	LLAGAS CK.	50300	50425	PROJECT. #251 LLAGAS @ E. LITTLE LLAGAS CONFL.	1690	2007
PAJARO	50490	BODFISH CK.	1190	2240	PROJECT #141 BODFISH CREEK U/S & D/S RANCHO VISTA	2500	2002

Table 10-4b. Large Woody Debris Mitigation Sites in SMP-1

WATERSHED	CREEK NAME	GIS ID	FROM STATION	TO STATION	YEAR	LWD VOLUME (cubic yards)	Notes
Guadalupe	Alamitos	30100	11881	11938	2004	8	Large woody debris installed in 2004 as part of SMP bank repair project (B16).
Guadalupe	Alamitos	30100	12750	12843	2007	20.3	Large woody debris installed in 2007 as part of SMP bank repair (B14).
Guadalupe	Alamitos	30100	13170	13242	2008	12.33	Large woody debris installed in 2008 as part of SMP Bank Repair (5B20).
Guadalupe	Alamitos	30100	21600	21865	2008	13.55	Large woody debris installed in 2008 as part of SMP Bank Repair projects (5B22 & 5B23).
Guadalupe	Calero	30120	2800	3000	2005	23	Live leaning tree cabled in place to protect infrastructure. Lateral scour bars installed into eroding bank.
Coyote	Coyote	40210	144200	144800	2010	9	LWD added as part of the bank protection and sediment removal work.
Coyote	Coyote	40210	174600	175550	2012	6.82	Redwood logs used to create a log weir for large woody debris mitigation.
Lower Peninsula	Stevens	10290	10700	11525	2012	6.08	Installation of 5 redwood logs in-stream for large woody debris. The logs were tagged (#13-#17).
Coyote	Upper Penitencia	40320	6357	6373	2010	13	Log weir installation.

WATERSHED	CREEK NAME	GIS ID	FROM STATION	TO STATION	YEAR	LWD VOLUME (cubic yards)	Notes
Coyote	Upper Penitencia	40320	11100	11101	2009	10	LWD mitigation project
Pajaro	Uvas-Carnadero	50180	32590	32990	2012	11.35	12 seasoned eucalyptus logs 0.00 11.35 11.35 were installed for large woody debris mitigation credit. The logs were tagged #1-12.

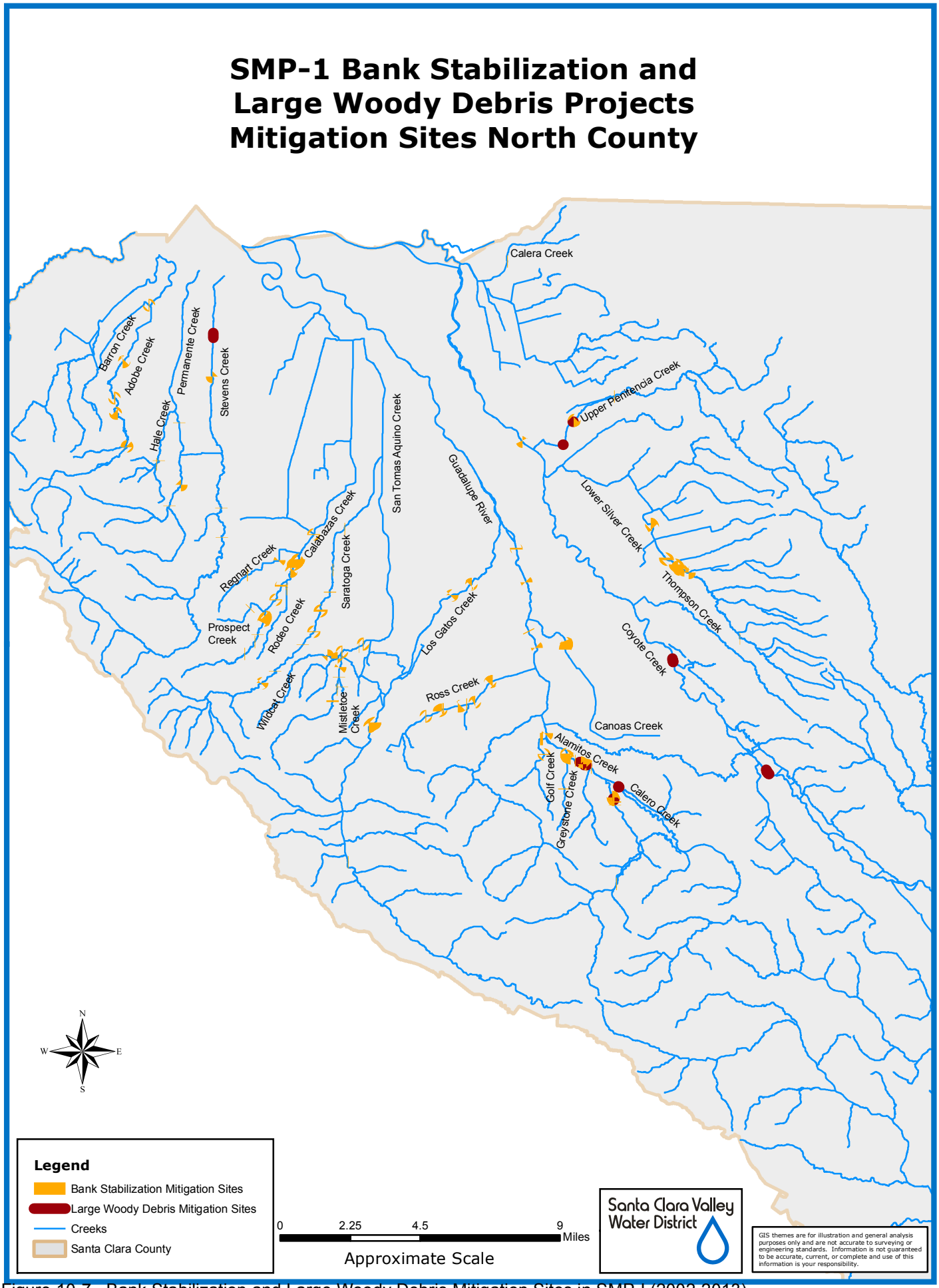


Figure 10-7. Bank Stabilization and Large Woody Debris Mitigation Sites in SMP-I (2002-2013).

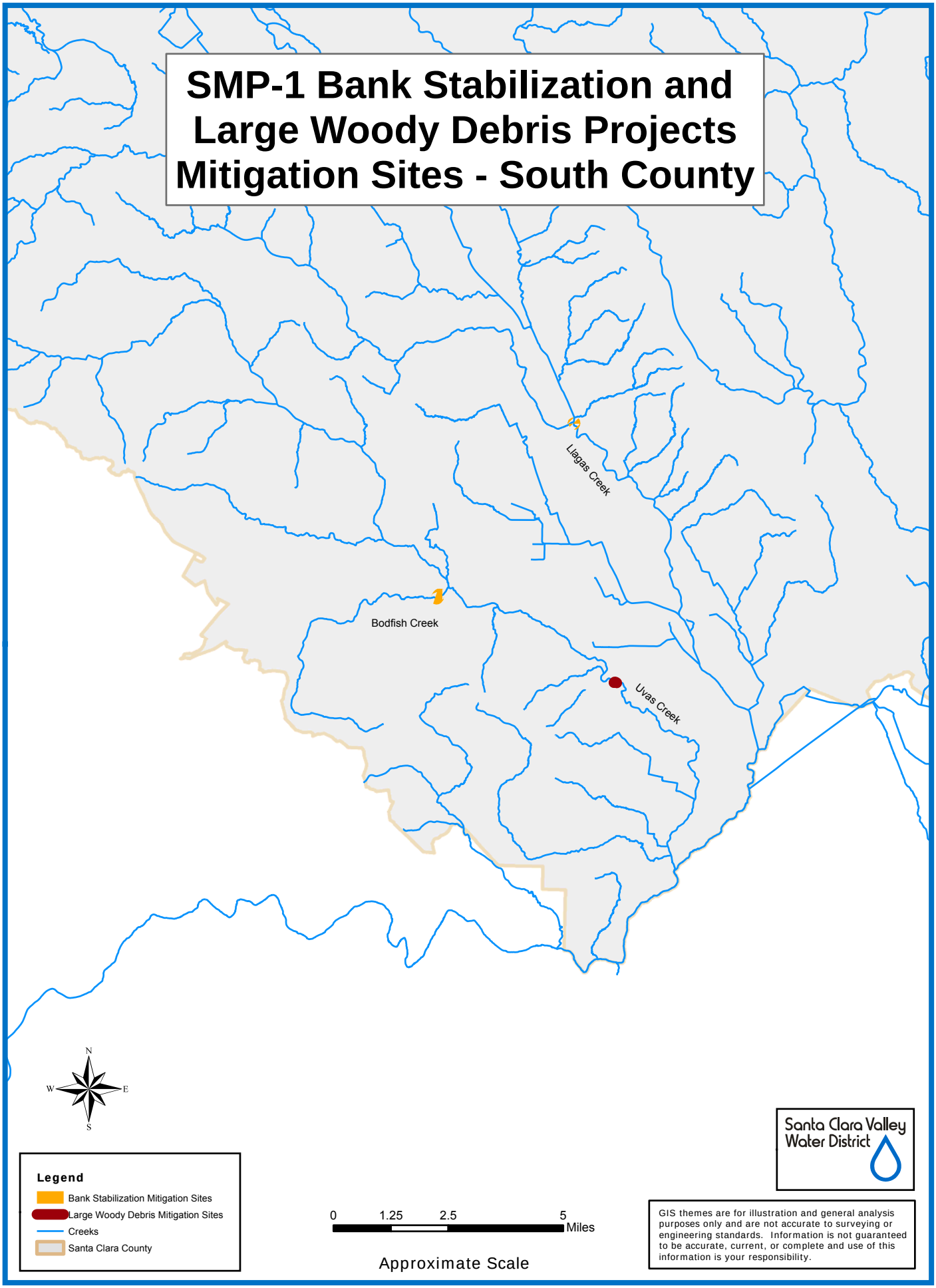


Figure 10-8. Bank Stabilization and Large Woody Debris Mitigation Sites in SMP-1 (2002-2013).

10.4 Mitigation Approach for SMP-2 (2014-2023)

Mitigation will be provided for routine stream maintenance activities under SMP-2 in new work areas, defined as the following: (1) areas not covered by SMP-1 mitigation; (2) areas where maintenance in SMP-1 channels was previously identified, but where work never occurred; (3) and for SMP-1 channels where work was conducted, but the work under SMP-2 is of a different type than conducted under SMP-1. The mitigation requirements described in this chapter will be applied as necessary to address SMP-2 mitigation needs. Compensatory mitigation plans are only required for mitigation sites that are outside of the SMP area (above the 1000' contour).

10.4.1 Overview of Mitigation Strategies for SMP-2

Four potential mitigation approaches will be used during SMP-2 including: (1) on-site and off-site ecologic services based mitigation; (2) land acquisition based mitigation; (3) species-specific mitigation; and (4) a single-user mitigation bank as required by the USACE, and developed in coordination with the USACE and other regulatory agencies. This multi-faceted mitigation strategy provides a range of solutions to address the variety of maintenance activities, impact types, and resource conditions that occur along the SMP channels, and the availability of appropriate mitigation opportunities.

On-site and Off-site Ecologic Services Based Mitigation

On-site and Off-site Ecological Services Based Mitigation consists of replacing or enhancing ecological services at the impact site or nearby. Ecological services may include the removal of non-native invasive species to facilitate growth of native species; restoration of native plant communities following maintenance activities; replacement or reconstruction of habitat features following maintenance activities.

Land Acquisition Based Mitigation

As a component of the overall SMP-2 mitigation strategy, the SCVWD will continue to seek opportunities to acquire lands to address longer-term mitigation needs. As such lands are identified, the SCVWD will coordinate with the regulatory agencies to evaluate, review, and approve how such potential lands could be used for SMP-2 mitigation.

Species Specific Mitigation

For impacts to listed species regulated by the USFWS and covered by the VHP, the SCVWD will compensate for species-specific impacts by paying land cover fees (based on the VHP fee schedule) to the Santa Clara Valley Habitat Agency for conservation of these species. Mitigation for impacts to salmonids, as regulated by the NMFS, will be ecological services based and will include coarse sediment augmentation, and instream complexity replacement, as described below in 10.8.3. Mitigation for state listed species will be in an Incidental Take Permit, while mitigation for the pallid bat will be determined based on negotiations with the CDFW. Mitigation for tidal wetland impacts will be covered (up to 9 acres) at the Island Ponds Mitigation site. For the loss of yellow warbler habitat, the SCVWD will restore riparian habitat at a 1:1 ratio. Special status plant species impacts will provided by preservation and enhancement of occupied habitat or payment of fees to the VHP for covered species. Permanent impacts to

burrowing owls will be handled through the payment of burrowing owl impact fees to the Valley Habitat Agency.

Single-User Umbrella Mitigation Bank

The SCVWD may develop a single-user umbrella mitigation bank in coordination with the USACE. The single user umbrella bank will allow for establishment of multiple mitigation sites over time and establish the site protection requirements set forth in a formal banking agreement between the USACE, the SCVWD, and possibly the RWQCBs, NMFS, and CDFW. Each agency will need to approve the mitigation bank prior to accepting mitigation credits for impacts within their jurisdiction. As new mitigation banks are established, the approval of the bank will need to go through the appropriate regulatory agency and their bank approval process.

This single-user mitigation bank will afford a structure with which to provide "consolidated" or "programmatic" mitigation. This bank will be used for impacts that cannot be addressed, or are not appropriately addressed, through the ecologic services based mitigation. The single-user mitigation bank would incorporate any new land acquisition based mitigation, the potential roll-over of excess mitigation from SMP-1 if available, off-site mitigation for bank stabilization projectsand mitigation for other permanent or repeat impacts not accommodated in the other mitigation approaches. Tidal mitigation is available at this time, but not stream and watershed protection. This umbrella banking structure would not apply to SMP-1 mitigation that was already accepted and permitted.

10.4.2 Overview of Mitigation Ratios for SMP-2

SMP-2 will use mitigation criteria, metrics, and ratios based on measured impacts to determine the mitigation requirement. Table 10-5 provides an overview of the mitigation ratios for sediment removal and vegetation management activities. Table 10-6 provides a summary of mitigation ratios for bank stabilization activities. More information regarding the ratios presented in Tables 10-5 and 10-6, including the rationale and additional explanation of how the ratios will be used is provided in Section 10.5. The mitigation ratios developed for SMP-2 considered the nature and extent of potential impacts caused by maintenance activities, including how functions and values are potentially affected. A key update for SMP-2 is the classification of SMP Channels as either Modified, Modified with Ecological Value, or Unmodified in considering the appropriate mitigation ratio. In developing the mitigation ratios shown in Tables 10-5 and 10-6, the SCVWD reviewed mitigation ratio guidance and standard operating procedures from the USACE (12501 – SPD, Regulatory Program, Standard Operating Procedure for Determination of Mitigation Ratios, 2013; http://www.spd.usace.army.mil/Portals/13/docs/regulatory/qmsref/ratio/12501-7-13.pdf).

Table 10-5: Summary of Mitigation Compone nts and Ratios by Channel Type for SMP-2 New Work Areas

Maintenance Activity	Mitigation Type		Modified Channel		Modified Channel with Ecological Value		Unmodified Channel	
			Non-Land Acquisition Based Mitigation		Non-Land Acquisition Based Mitigation		Non-Land Acquisition Based Mitigation	
Sediment Removal	Invasive Plant Management Program		1:1, 2:1		1:1, 2:1		1:1, 2:1	
	Riparian Restoration and Planting Program		1.1:1		1.3:1		1.5:1	
	Individual Tree and Shrub Plantings: Trees <6”		1.1:1		1.3:1		1.5:1	
	Individual Tree and Shrub Plantings: Trees 6-12”[1]		1:1, 2:1, 3:1		1:1, 2:1, 3:1		1:1, 2:1, 3:1	
	Instream Complexity		1:1		1:1		1:1	
	Large Woody Debris Replacement		1:1		1:1		1:1	
	Land Acquisition Based Mitigation	**Function**	**In-kind**	**Out-of-kind**	**In-kind**	**Out-of-kind**	**In-kind**	**Out-of-kind**
		Preservation	3:1	4:1	3:1	4:1	3:1	4:1
		Enhancement	2:1	3:1	2:1	3:1	2:1	3:1
		Restoration	2:1	2:1	2:1	2:1	2:1	2:1
		Establishment	2:1	2:1	2:1	2:1	2:1	2:1
Vegetation Management[1]	Invasive Plant Management Program		1:1, 2:1		1:1, 2:1		1:1, 2:1	
	Riparian Restoration and Planting Program		1.1:1		1.3:1		1.5:1	
	Individual Tree and Shrub Plantings: Trees <6”		1.1:1		1.3:1		1.5:1	
	Individual Tree and Shrub Plantings: Trees 6-12” [1]		1:1, 2:1, 3:1		1:1, 2:1, 3:1		1:1, 2:1, 3:1	
	Land Acquisition Based Mitigation	**Function**	**In-kind**	**Out-of-kind**	**In-kind**	**Out-of-kind**	**In-kind**	**Out-of-kind**
		Preservation	3:1	4:1	3:1	4:1	3:1	4:1
		Enhancement	2:1	3:1	2:1	3:1	2:1	3:1
		Restoration	2:1	2:1	2:1	2:1	2:1	2:1
		Establishment	2:1	2:1	2:1	2:1	2:1	2:1
Bank Stabilization	Invasive Plant Management Program		1:1, 2:1		1:1, 2:1		1:1, 2:1	
	Riparian Restoration and Planting Program		1:1, 2:1		1:1, 2:1		1:1, 2:1	
	Individual Tree and Shrub Plantings: Trees <6”		1.1:1		1.3:1		1.5:1	
	Individual Tree and Shrub Plantings: Trees 6-12”[1]		1:1, 2:1, 3:1		1:1, 2:1, 3:1		1:1, 2:1, 3:1	
	Land Acquisition Based	**Function**	**In-Kind**	**Out-of-kind Multiplier**	**In-Kind**	**Out-of-kind Multiplier**	**In-Kind**	**Out-of-kind Multiplier**

	Mitigation	Preservation[2]	3	4	3	4	3	4
		Enhancement	2	3	2	3	2	3
		Restoration	1.5	2	1.5	2	1.5	2
		Establishment	1.5	2	1.5	2	1.5	2

1. Ratio depends on the Tree Appraisal result per Attachment C.
2. Preservation is described as a method in 33 CFR Section 332.3(a)(2), but will not be acceptable to RWQCBs.
3. Any combination of the listed mitigation options may be used singularly or in combination to meet project mitigation requirements.
4. Land acquisition ratios will be used for planning purposes only. Ratios are subject to agency approval through the NPW review process or separate land acquisition proposal(s).

Note: Mitigation for one-time vegetation impacts includes up to 5 years of repeat impacts in the same location for the same work type.

Table 10-6: Summary of Bank Stabilization Mitigation by Channel Type for SMP-2 New Work Areas

Method Number	Method Name	Method Type (Soft, Hybrid, Hard)	Modified Channel		Modified Channel with Ecological Value		Unmodified Channel		Requires Agency Notification?
			Temporary	Permanent[1]	Temporary	Permanent[1]	Temporary	Permanent[1]	
1	Earth Repair	Soft	1:1		1:1		1:1		Yes
1A	Earth Repair with Buried Rock	Soft	1:1		1:1		1:1		Yes
1B	Earth Repair with Rock Base	Hybrid	1:1	1:1 off-site for rock base impacts	1:1	1.3:1 off-site for rock base impacts	1:1	1.5:1 off-site for rock base impacts	Yes
2	Live Construction	Soft	1:1		1:1		1:1		Yes
2A	Live Construction with Boulder Base	Hybrid if rock area is vegetated	1:1 if boulder base is vegetated		1:1 if boulder base is vegetated		1:1 if boulder base is vegetated		Yes
		Hard if rock area is not vegetated		1.5:1 off-site for base impacts if boulder base is not vegetated		2:1 off-site for base impacts if boulder base is not vegetated		3:1 off-site for base impacts if boulder base is not vegetated	
2B	Live Construction with Log Base	Soft	1:1		1:1		1:1		Yes
3	Contour Wattling	Soft	1:1		1:1		1:1		Yes

Table 10-6: Summary of Bank Stabilization Mitigation by Channel Type for SMP-2 New Work Areas

Method Number	Method Name	Method Type (Soft, Hybrid, Hard)	Modified Channel		Modified Channel with Ecological Value		Unmodified Channel		Requires Agency Notification?
			Temporary	Permanent[1]	Temporary	Permanent[1]	Temporary	Permanent[1]	
3A	Contour Wattling with Boulder Base	Hybrid if rock area is vegetated	1:1 if boulder base is vegetated		1:1 if boulder base is vegetated		1:1 if boulder base is vegetated		Yes
		Hard if rock area is not vegetated		1.5:1 off-site for base impacts if boulder base is not vegetated		2:1 off-site for base impacts if boulder base is not vegetated		3:1 off-site for base impacts if boulder base is not vegetated	
3B	Contour Wattling with Log Base	Soft	1:1		1:1		1:1		Yes
4	Brush Mattress (Brush Layering)	Soft	1:1		1:1		1:1		Yes
4A	Brush Mattress (Brush Layering) with Boulder Base	Hybrid if rock area is vegetated	1:1 if boulder base is vegetated		1:1 if boulder base is vegetated		1:1 if boulder base is vegetated		Yes
		Hard if rock area is not vegetated		1.5:1 off-site for base impacts if boulder base is not vegetated		2:1 off-site for base impacts if boulder base is not vegetated		3:1 off-site for base impacts if boulder base is not vegetated	

Table 10-6: Summary of Bank Stabilization Mitigation by Channel Type for SMP-2 New Work Areas

Method Number	Method Name	Method Type (Soft, Hybrid, Hard)	Modified Channel		Modified Channel with Ecological Value		Unmodified Channel		Requires Agency Notification?
			Temporary	Permanent[1]	Temporary	Permanent[1]	Temporary	Permanent[1]	
4B	Brush Mattress (Brush Layering) with Log Base	Soft	1:1		1:1		1:1		Yes
5	Surface Matting (Erosion Mats)	Soft	1:1		1.5:1		2:1		Yes
5A	Surface Matting (Erosion Mats) with Boulder Base	Hybrid if rock area is vegetated	1:1 if boulder base is vegetated		1.5:1 if boulder base is vegetated		2:1 if boulder base is vegetated		Yes
		Hard if rock area is not vegetated		1.5:1 off-site for base impacts if boulder base is not vegetated		2:1 off-site for base impacts if boulder base is not vegetated		3:1 off-site for base impacts if boulder base is not vegetated	
5B	Surface Matting (Erosion Mats) with Log Base	Soft	1:1		1.5:1		2:1		Yes

Table 10-6: Summary of Bank Stabilization Mitigation by Channel Type for SMP-2 New Work Areas

Method Number	Method Name	Method Type (Soft, Hybrid, Hard)	Modified Channel		Modified Channel with Ecological Value		Unmodified Channel		Requires Agency Notification?
			Temporary	Permanent[1]	Temporary	Permanent[1]	Temporary	Permanent[1]	
6	Add Rock to Invert (Channel stabilization method; considered hard for notification purposes)	Hard		3:1		3:1		3:1	Yes
6A	Rock Cross Vanes (Grade control structure; considered hard for notification purposes)	No additional mitigation required if the agencies provide written concurrence that rock placed along channel bed provides habitat complexity functions		1:1		1:1		1:1	Yes
		Off-site mitigation required if the placement of rock is extensive along the channel bed and uniform.		2:1		2.5:1		3:1	

Table 10-6: Summary of Bank Stabilization Mitigation by Channel Type for SMP-2 New Work Areas

Method Number	Method Name	Method Type (Soft, Hybrid, Hard)	Modified Channel		Modified Channel with Ecological Value		Unmodified Channel		Requires Agency Notification?
			Temporary	Permanent[1]	Temporary	Permanent[1]	Temporary	Permanent[1]	
6B	Root Wads and Boulders	Hybrid	1:1		1:1		1:1		Yes
6C	Live Log Crib Walls	Soft	1.5:1		2:1		2.5:1		Yes
6D	Log Revetment	Hybrid	1.5:1		2:1		2.5:1		Yes
7	Cellular Confinement System	Hybrid		3:1		3:1		3:1	Yes
8	Rock Blanket	Hard		3:1		3:1		3:1	Yes
8A	Boulder Revetment	Hard		3:1		3:1		3:1	Yes
8B	Boulder Revetment with Soil and Vegetation	Hybrid	1.5:1		2:1		2.5:1		Yes
9	Articulated Concrete Blocks	Hard		3:1		3:1		3:1	Yes
9A	Articulated Concrete Blocks with Planted Areas	Hard		3:1		3:1		3:1	Yes
10	Concrete Crib Walls	Hard		3:1		3:1		3:1	Yes
11	Sacked Concrete	Hard		3:1		3:1		3:1	Yes
12	Gunite Slope Protection	Hard		3:1		3:1		3:1	Yes

Table 10-6: Summary of Bank Stabilization Mitigation by Channel Type for SMP-2 New Work Areas

Method Number	Method Name	Method Type (Soft, Hybrid, Hard)	Modified Channel		Modified Channel with Ecological Value		Unmodified Channel		Requires Agency Notification?
			Temporary	Permanent[1]	Temporary	Permanent[1]	Temporary	Permanent[1]	

[1] Mitigation ratio applies to the hardened area only.

[2] Mitigation ratios shall be applied to calculate mitigation requirements in both linear feet and square feet.

[3] Mitigation ratios in this table apply to establishment and re-establishment. The ratios in this table would be increased by the multipliers shown in Table 10-5 when compensatory mitigation is provided through preservation, enhancement, or rehabilitation of habitat functions.

[4] Mitigation for permanent impacts is necessarily off-site. 1-1 mitigation for temporary impacts is on-site.

[5] For the purposes of this document, on-site is within the project disturbance area. Off-site is outside of the project disturbance area.

[6] These ratios are for non-land acquisition mitigation.

[7] The ACOE will not accept IPMP mitigation as mitigation for permanent bank stabilization impacts.

10.4.3 Overview of Mitigation Selection Process

Figure 10-9 illustrates the decision making process to identify and prioritize mitigation during the SMP-2 period. Work sites are identified as being in or out of a PMA If not part of a PMA, then mitigation is required. Selection of mitigation sites and activities will be sequenced;

- On-site ecological services
- Off-site ecological services
- SCVWD mitigation bank.

10.5 Ecologic Services Based Mitigation: Mitigation for Impacts to Waters of the U.S. and State, and CDFW 1602-jurisdictional Habitats for SMP-2 Sediment Removal and Vegetation Management Activities

This section describes how ecologic services based mitigation will be provided for sediment removal and vegetation management activities at SMP-2 new work locations, and at SMP-1 locations that were previously identified but were never worked. Mitigation will be provided for impacts to all waters of the U.S. and State, as well as for riparian habitats outside of waters of the U.S. and State (pursuant to CDFW jurisdiction), as necessary.

The mitigation approaches described below in Sections 10.5.1 through 10.5.5 will be considered for on-site application based on an assessment of the maintenance site's existing functions and the opportunities and constraints to applying mitigation treatments. A mitigation approach for the maintenance site and reach will be developed to prioritize habitat restoration and enhancement activities that best match existing functions (in-kind mitigation), but also have the highest likelihood for success, sustainability, and do not result in an increased maintenance effort. If there is not an opportunity to provide feasible mitigation on-site, then off-site opportunities will be evaluated with a similar priority of matching the off-site mitigation with in-kind ecologic functions to those that are affected by the maintenance activities.

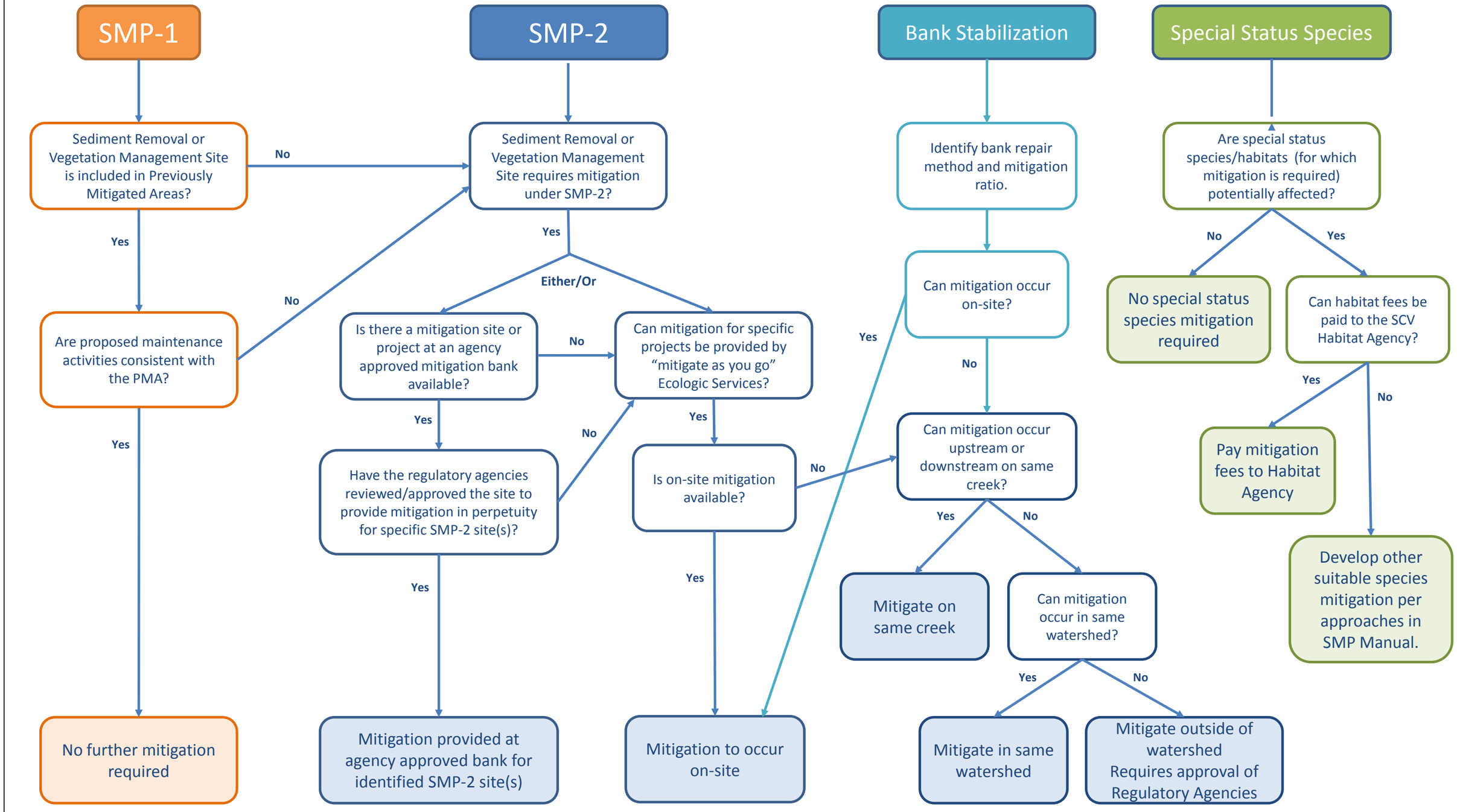


Figure 10-9
Mitigation Decision Process for the SMP-2 (2014-2023) Period

10.5.1 Invasive Plant Management Program

The primary goal of the Invasive Plant Management Program (IPMP) element of the SMP's compensatory mitigation package is to enhance and improve habitat within Santa Clara County streams and riparian corridors by reducing the populations of ecologically impacting invasive plant species. The IPMP will provide compensatory mitigation for temporary SMP impacts to upland, riparian, freshwater and tidal wetlands from vegetation, bank stabilization, and sediment management activities by eliminating or significantly reducing the population of invasive plant species from these affected habitats. Invasive species removal for flow conveyance will be considered impact neutral and no compensation will be required. Invasive removal will be conducted such that it does not significantly reduce the functions and values of the site, and that it provides a net environmental benefit in the short and long term. Invasive species less than 6" dbh which may be removed for mitigation credit are listed in Table 1 of Attachment D – IPMP. All species >6" dbh, even though they may be included in Table 1, must first be assessed via the Tree/Shrub Assessment of Attachment C. See Attachment D for further description.

10.5.2 Riparian Planting Program

The primary goal of the riparian planting program is to compensate for the loss of quality and quantity of riparian habitat from sediment removal, bank stabilization, and vegetation management activities. Riparian planting will establish and/or enhance and habitat for birds, amphibians, and other wildlife using terrestrial riparian areas while providing shade, sources of organic matter and coarse woody debris, improve root and soil structure, and provide other water quality benefits to aquatic species.

Restoration, enhancement and establishment will be accomplished primarily via the revegetation of creek banks and terraces within the SMP area where the existing physical conditions (i.e., topography, hydrology, and soils) are suitable to establish native-dominated riparian habitat. The planting palette for the Riparian Planting Program is shown in Table 10-7. Figure 10-10 presents an example of a cross-section and plan view for a riparian planting plan and references the plants listed in Table 10-7. These figures are included with the submitted bank stabilization projects as required, in the NPW. The target species composition, location, and extent of riparian planting and restoration, enhancement and establishment will be directly related to the functions impacted from SMP maintenance activities. Riparian planting may also include site preparation, including minor grading and topsoil preparation, and incorporation of soil amendments.

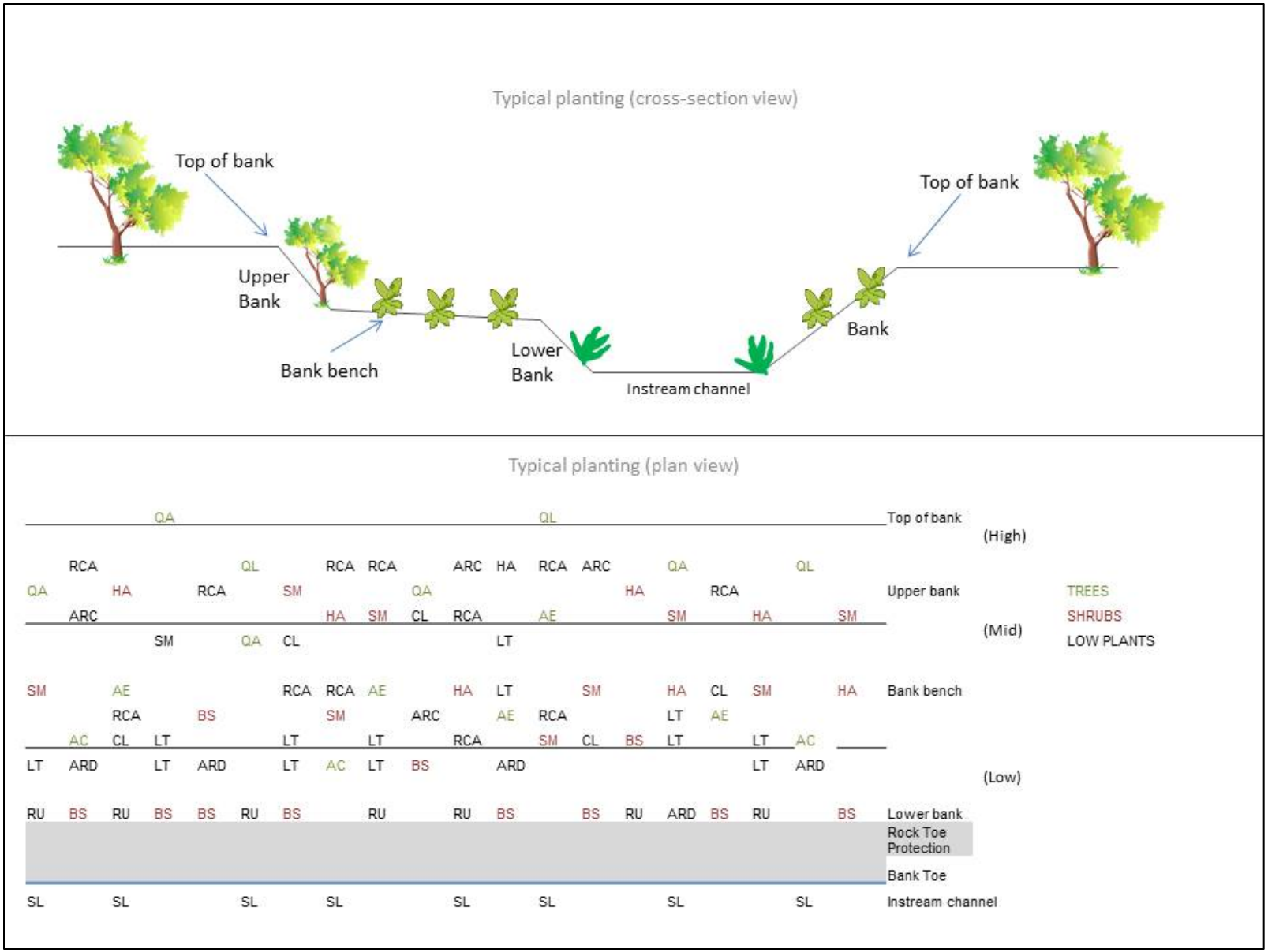


Figure 10-10: Typical Planting Plan

Table 10-7: Typical Riparian Planting Palette for Mitigation Program

	Botanical Name	Common Name	Slope Planting Location
SYMBOL	**TREES**		
AC	Acer negundo	Box elder	low to mid, riparian and upland
AE	Aesculus californica	Buckeye	mid to high, upland
AR	Alnus rhombifolia	Alder	waters edge, low, riparian
PR	Platanus racemosa	Western sycamore	low to mid, riparian and upland
PF	Populus fremontii	Fremont cottonwood	low to mid, riparian
PT	Populus trichocarpa	Black cottonwood	waters edge, low, riparian
QA	Quercus agrifolia	Coast live oak	mid to high, upland
QD	Quercus douglasii	Blue oak	High, upland
QL	Quercus lobata	Valley oak	mid to high, upland
SL	Salix laevigata	Red willow	waters edge, low, riparian
SLAS	Salix lasiandra	Arroyo willow	waters edge, low, riparian
SLU	Salix lucida	Shining willow	waters edge, low, riparian
	SHRUBS		
BS	Baccharis salicifolia	Mulefat	low to mid, riparian and upland
CG	Cornus glabrata	Brown dogwood	low to mid, riparian
HA	Heteromeles arbutifolia	Toyon	mid to high, upland
RC	Rhamnus californica	Coffeberry	mid to high, upland
SE	Salix exigua	Sandbar willow	waters edge, low, riparian
SM	Sambucus mexicana	Elderberry	mid to high, upland
	LOW PLANT, VINES		
ARC	Artemesia californica	California sage	mid to high, upland
ARD	Artemesia douglasiana	Mugwort	low to mid, riparian and upland
ASC	Aster chilensis	Chilean aster	low to mid, riparian and upland
CL	Clematis ligusticifolia	Virgin's bower	mid to high, upland
EF	Eriogonum fasciculatum	California buckwheat	mid to high, upland
EO	Euthamia occidentalis	Goldenrod	low to mid, riparian and upland
RCA	Rosa californica	California rose	mid to high, upland
RU	Rubus ursinus	California blackberry	low to high, riparian and upland
LT	Leymus triticoides	Blue wild rye	low to high, riparian and upland
SYL	Symphoricarpos albus	Snowberry	mid to high (shade), upland
BD	Baccharis douglasii	Marsh baccharis	low, riparian
	GRASSES (SEED)	SCVWD Erosion Control Mix	
	Hordeum californicum	Prostrate California Barley	All slope locations
	Elymus glaucus "Berkeley"	Berkeley' Blue Wildrye	All slope locations
	Bromus carinatus	California Brome	All slope locations
	Vulpia microstachys	Three Weeks Fescue	All slope locations
	OPITIONAL:		
	Nassella pulchra	Purple needlegrass	high
	Elymus X triticum	sterile wheat	temporary, all slope locations

The Riparian Planting Program will address impacts associated with bank stabilization projects. Riparian planting activities will provide mitigation for bank stabilization projects as described in Section 10.6 below.

The preference is to prioritize riparian planting at on-site maintenance locations, and in this way provide direct on-site mitigation for maintenance activities. Specific revegetation plan details are highly dependent on conditions at each site, particularly with regard to hydrology and soils. Where opportunities for on-site riparian planting and restoration are unavailable or highly constrained, off-site locations will be identified that can provide suitable mitigation opportunities.

10.5.3 Rationale and Mitigation Ratios for Invasive Plant Management and Riparian Planting Programs

The riparian planting mitigation will be applied at the following ratios (mitigation area to impact area): 1.1:1 for Modified Channels, 1.3:1 for Modified with Ecological Value Channels, and 1.5:1 for Unmodified Channels. Mitigation using the IPMP will be applied at the following ratios (Invasive plant area removed to impact area): 1:1 for Tier 1 species (control requires 2 years or less time to achieve); and 2:1 for Tier 2 species (control requires more than 2 years to achieve).

Either the IPMP or the riparian planting program (or a combination of the programs) can be used to achieve the net mitigation ratio targets for individual projects.

Mitigation will be provided for routine vegetation work (e.g.routine pruning) one time for a 5-year work period. Routine vegetation work that may occur in year 6, even if it is within the same reach, for the same type of work, will require mitigation that will cover another 5-years of work[1].

The mitigation provided for 5 years only applies to vegetation management work and does not apply to sediment removal activities. Impacts caused by sediment removal activities are mitigated on a “one time, mitigate as you go” basis, unless mitigation lands are acquired that would enable a more programmatic (collective) mitigation for sediment removal.

The removal of individual trees 6-12” dbh will be mitigated per the tree assessment protocol in Attachment C. Removal of non-native (both invasive and non-invasive) trees < 6” dbh will be calculated as mitigation credit, to the extent that such removal is intended to improve ecological values at the site, rather than serve another objective (e.g. flow conveyance). Removal that results in areas of bare soil potentially vulnerable to erosion after tree removal, will be either targeted for riparian planting or hydroseeding to reduce erosion potential and improve habitat conditions.

Riparian planting mitigation areas will not be impacted for at least 10 years. If it is necessary to impact a riparian planting mitigation area, mitigation for the activity will be provided using the

[1] However, the CDFW has indicated that mitigation for take of state-listed species will be required for each year in which an area is impacted.

standard approach and mitigation ratio (1.1, 1.3, or 1.5) for that channel type; in addition, the impacted mitigation area will be replaced in-kind (either on- or off-site), the monitoring clock for the impacted mitigation area will extend in duration for another 5 years, and the site will not be impacted for at least another 10 years from the date of the maintenance activity. This approach reflects the fact that most vegetation removed for SMP activities is relatively young, and as a result, the ability to impact (with subsequent mitigation) riparian planting sites after 10 years will not lead to a net reduction in the maturity of riparian vegetation in the SMP area. Activities performed to enhance the health of the mitigation site as a whole, such as pruning or thinning to reduce overcrowding that may have occurred due to abundant and vigorous growth, may be performed at any time without the need for additional mitigation.

The annual NPW will describe the targeted invasive plant management or riparian planting mitigation activities and implementation of the mitigation will be verified in the annual ASR as described in Chapter 12.

10.5.4 Mitigation for Tree and Shrub Removals Less Than or Equal To 12 Inches in Diameter

Trees and shrubs less than or equal to 12” diameter at breast height (dbh) may be removed under the SMP.

- Removal of trees less than 6” dbh, and not within the PMA, will be mitigated through the invasive plant management and riparian planting programs described above that address general impacts to wetlands, aquatic, and riparian habitat. Impacted area will be calculated by area of tree canopy. Mitigation will be provided according to the 1.1:1 (Modified channels), 1.3:1 (Modified channels with Ecological Value), and 1.5:1 (Unmodified channels) ratio described above in Section 10.5.3.

    - Removal of trees between 6-12” dbh will be mitigated through tree replacement and planting based on a counting and appraisal of the removed trees. Attachment C (Tree Scoring for Removal of Trees and Shrubs 6-12” DBH - April, 2011) provides a tree appraisal and evaluation protocol to determine how replacement tree planting will occur. The protocol in Attachment C involves carefully assessing targeted tree removals for their existing conditions and functions. Based on the Attachment C methodology, tree replacement ratios occur at either a 1:1, 2:1, or 3:1 replacement rate depending on the overall quality and function of the removed tree(s). These tree replacement ratios are consistent with other recent tree replacement ratios approved by regulatory agencies for channel maintenance programs. Performance standards and success criteria for tree replacement are described further in Chapter 11.

10.5.5 Other Vegetation Management Mitigation Conditions

<u>Pruning</u>

1. Mitigation will be calculated by the square footage (area) of vegetation removed multiplied by the vertical proportion/percentage of the tree or stand that is pruned.

2. Mitigation is only required for routine pruning. Mitigation is not required for corrective pruning that promotes long term tree health, coppicing to remove annual sucker growth, or new overhanging growth locations (of roadways and fence lines).

3. Mitigation for pruning activities is required only for the specific work area and the specific portions of the trees that have been pruned.

4. Mitigation that is developed and applied for specific pruning impacts has a coverage period of 5 years. The SCVWD can return to the specific maintenance site to conduct additional pruning for up to 5 years without incurring additional mitigation. The 5 year mitigation coverage applies only to the specific work area. If pruning involves simply removing branches and foliage that have resprouted from areas pruned in the prior 5 years, then no new mitigation is required. If pruning involves removing new branches and foliage, whether on the same trees that were previously pruned or on new trees, then additional mitigation for these new impacts is required.

Herbicide

1. Mitigation is required for maintenance impacts in new SMP work areas at the 1.1:1 (Modified channels), 1.3:1 (Modified Channels with Ecological Value), and 1.5:1 (Unmodified Channels) ratios as described in Section 10.5.3 above.

2. Mitigation is not required for maintenance road spraying, unless there are potential impacts to special-status species (see Table 10-9).

Hand Removal

1. All woody vegetation <6” dbh that is not on the IPMP Invasive Species List (Attachment D, Table-1) will be calculated as a mitigation debt.

Mowing

1. Mitigation is required for mowing of sensitive habitats such as wetlands or woody riparian vegetation, mowing of special-status plants, or mowing of habitat for the least Bell’s vireo, California tiger salamander, or California red-legged frog (see Table 10-8). Outside such habitats, mitigation will not be required for mowing grasses and non-woody vegetation.

10.6 Bank Stabilization Mitigation

10.6.1 General Approach

Stabilizing and repairing eroding stream channel banks and levees is a routine SMP activity. While bank stabilization is routine and expected, the specific work locations are not certain until after each winter season. Bank stabilization maintenance needs are assessed annually on an

as-needed basis. Site-specific mitigation for bank stabilization projects is also determined on an annual basis depending on the project impacts.

Table 10-6 identifies the 12 bank stabilization treatments (and variations) used for the SMP. Table 10-6 describes whether the techniques use softscape, hardscape, or hybrid elements; mitigation ratios according to channel types; and whether the technique requires review by regulatory agencies. The bank stabilization techniques shown in Table 10-6 are described in detail in Attachment A.

Potential impacts from bank stabilization projects are avoided and minimized through evaluating and refining the project need, designing projects to affect the minimum area as feasible, and employing BMPs to reduce impacts during project construction. The preference is to first consider softscape approaches on-site to address the bank erosion issue and also provide in-kind, enhanced, or restored ecologic functions. If on-site mitigation opportunities are not available within the specific project location (reach), then potential mitigation opportunities along the same creek, either upstream or downstream of the bank repair site are considered as the first preference for off-site mitigation. If mitigation opportunities on the same channel are not available, then other channels within the same watershed of the bank stabilization project are considered for off-site mitigation.

10.6.2 Mitigation Ratios for Bank Stabilization

The goal of mitigation for bank failures is to return the bank to its pre-failure condition. Beneficial bank stabilization projects, particularly approaches that use entirely softscape or biotechnical techniques, are generally self-mitigating as they provide an improved condition with improved functions. Treatments that incorporate native tree and understory plantings and (where possible) rootwads, may also support native flora, shade and lower bank complexity that benefits both birds and aquatic species. “Hybrid” biotechnical methods may also incorporate some rock or boulder protection to provide immediate bank strength while the vegetation develops (East Merced RCD, 2005). The treatments with mitigation ratios of 1:1 in Table 10-6 are self-mitigating.

Hybrid treatments rely on live native vegetation for much of their strength, but are aided by the strategic placement of cobble/boulders in the lower bank zone. Use of rootwads and other geomorphic treatments to increase channel and bank complexity are included in project designs where feasible. Live vegetation increases bank resistance to erosion through protecting the bank toe against hydraulic forces through root development; providing mechanical reinforcement of the banks; and reducing soil moisture (and associated soil pore pressure that can increase bank instability) through canopy interception and evapotranspiration. The SMP’s hybrid approaches will stabilize banks and also reduce fine sediment delivery to the channel; increase instream habitat complexity relative to only rocked banks; reduce the relative percent cover of non-native, invasive plant species; and promote native vegetation that provides multiple ecosystem functions and values.

On this basis (rationale), the mitigation ratios for the hybrid treatments were developed. Hybrid treatments (where the rock area is left unplanted) typically have mitigation ratios of either 1:1 or

1.5:1, 2:1, or 2.5:1 for Modified Channels, Modified Channels with Ecological Value, or Unmodified Channels, respectively. The additional mitigation area is required to compensate for the loss of channel functions with the placement of non-vegetated rock. If the rock area for hybrid treatments is planted, such as for treatments 2A, 3A, and 4A; ecologic functions are provided in the lower bank zone and the mitigation ratios become 1:1 (self-mitigating). Hybrid treatment 6B involves root wads, crib walls, and log revetment bio-technical approaches and are self-mitigating.

The SCVWD conducts bank stabilization mitigation activities along the entire bank slope to provide integrated functions above and below the OHWM. Enhancement and restoration activities (as described above) may physically occur above the OHWM, but the functions occur along the entire bank slope, and extend into the lower bank zone below the OHWM. This is particularly true for the ecologic benefits of shade, reduced non-native cover, increased overhanging protective cover, greater root strength throughout the bank, improved soil structure throughout the bank, reduced bank erosion and fine sediment yields, etc. (East Merced RCD, 2005). Additionally, experience from other restoration and mitigation projects indicates that mitigation efforts targeted or occurring below the OHWM elevation are more likely to be removed or washed-out during large storm events (Ambrose, et. al., 2007; SCWA, 2010). Hydroseeding or other winterization methods are performed at all bank stabilization sites that result in exposed soils.

Hardscape techniques 9, 10, 11, and 12 require 3:1 mitigation where hardscape replaces earthen or softer bank conditions. This is to compensate for the permanent loss of potential habitat including the loss of shading, overhanging escape cover, structural complexity, refugia, and other functions provided by natural streambanks that are in good condition and provide these services. It is noted that most SMP channels requiring such hardened techniques do not provide these ecosystem functions in their current condition. Mitigation is not required for the in-kind repair or replacement of existing concrete or hardened banks. However, replacement of existing hardscape with soft or hybrid treatments may be eligble for mitigation credits. In general, bank stabilization techniques 9-12 have had minimal or no application in the SMP since 2002. However, such techniques are retained in the Program in the event that specific hydraulic conditions at a bank stabilization site may require such approaches.

As necessary, mitigation to special-status species due to bank stabilization projects will be provided through species-specific mitigation that will be assessed annually (see Section 10.8 below).

Under USACE permit conditions, the approved mitigation approaches described above have an additional requirement if consolidated (i.e., programmatic) off-site mitigation is sought. Namely, the use of off-site programmatic mitigation for bank stabilization projects (that can't be mitigated on-site) will require the single-user umbrella mitigation banking structure, as described above in Section 10.4, to facilitate the mitigation for USACE approval. However, this banking requirement can be avoided if the following mitigation approaches are followed:

- On-site mitigation is used to satisfy the mitigation requirements, including the use of plantings for hybrid bank treatments with rock at their base; or

- Project-specific off-site mitigation is identified and pursued. This off-site mitigation will be directly applied to the specific bank stabilization project, and a compensatory mitigation plan will be developed. The compensatory mitigation plan will be consistent with the objectives and requirements of the USACE's Habitat Mitigation and Monitoring Proposal Guidelines as described in Section 10.2 above. If pursued, project specific off-site mitigation will be individually tracked and reported as described in Chapters 11 and 12. Because the mitigation area required for bank stabilization projects may be relatively small for individual projects, it may be prudent to seek to combine project specific off-site mitigation sites. Such combinations, or "pooling" of off-site mitigation for more than one bank stabilization project would be coordinated with USACE staff and reviewed/approved by USACE staff prior to implementation.

Depending on the size, and functions, of the natural resources enhanced and restored on-site as mitigation for bank repair activities, if the area restored exceeds the required mitigation ratio, then the excess mitigation can be applied (as appropriate) to another specifically identified mitigation need associated with another bank stabilization project within that watershed. This type of excess mitigation, and its application to another bank stabilization site, will be identified and tracked in the annual NPW and ASR as described in Chapters 11 and 12.

10.7 Land Acquisition Mitigation Process

The SMP-2 mitigation program includes land acquisition and mitigation activities as compensatory strategies to address SMP impacts. Land acquisition under SMP-2 is separate from and independent of the land acquisition requirements that occurred under SMP-1. For SMP-2, land acquisition and associated mitigation activities can be used to mitigate for maintenance work in new channel areas or for SMP-1 areas that were never worked. As described above in Section 10.4, the USACE requires a mitigation banking structure to facilitate the use of acquired lands as consolidated or programmatic mitigation while using a Regional General Permit (RGP). The SCVWD envisions establishing a single-user umbrella mitigation bank in coordination with the USACE to facilitate land acquisition type mitigation for SMP-2.

The SCVWD will coordinate with regulatory staff to assess, review, and approve the use of potential lands as suitable mitigation for SMP-2 activities. Table 10-8 summarizes mitigation ratios for land acquisition based mitigation depending upon the type of mitigation activities that occur with the acquisition and whether the acquisition site provides in-kind or out-of-kind mitigation functions. Definitions for the terms preservation, enhancement, restoration, and establishment (creation) are provided in Section 10.2 above. In Table 10-8, a ratio of 3:1 means that 3 acres of land shall be acquired for every 1 acre impacted.

For any land acquisition-based mitigation that is outside of the SMP area (above the 1000' contour), the SCVWD will develop a compensatory mitigation plan that will be consistent with the objectives and requirements of the USACE's Habitat Mitigation and Monitoring Proposal Guidelines as described in Section 10.2 above. The compensatory mitigation plan will identify the ecological functions and values to be preserved, enhanced, restored, or created. The

mitigation plan will identify the management measures to be implemented to ensure that the identified functions and values are maintained into the future. As a performance standard, the quality of the identified functions and values will be maintained in a similar state to the time the lands began to function as mitigation. The SCVWD will develop a long-term management plan for each land acquisition site in addition to (or in combination with) the site's compensatory mitigation plan.

Table 10-8: Land Acquisition Protection Mitigation Ratios

Mitigation Activity on Acquired Lands	Mitigation Ratios	
	In-kind	Out-of-kind
Preservation[1]	3:1	4:1
Enhancement	2:1	3:1
Restoration	2:1	2:1
Establishment	2:1	2:1
1. RWQCB will not accept preservation without enhancement, restoration or establishment of wetlands or riparian values on the preserved lands.		

As shown in Table 10-8, mitigation activities that provide in-kind ecologic functions and values to the habitat areas impacted by maintenance activities have lower mitigation ratios than sites that provide out-of-kind benefits. Mitigation ratios are also determined by the amount of relative lift, benefit, and investment the SCVWD provides for the acquired lands. In this way, preserved lands have a higher mitigation ratio requirement than sites where aquatic resource enhancement, restoration, or creation will occur as those additional investments will provide a greater relative ecologic lift. For acquisition sites that provide resource enhancement or restoration opportunities, the sites will be assessed and described in the compensatory mitigation plan for how enhancement or restoration actions can be used to improve ecologic conditions.

Lands where the SCVWD undertakes aquatic resource establishment (creation) have a mitigation ratio consummate with the degree of relative ecologic lift. Successful aquatic resource establishment (creation) may only be suitable in very specific locations that provide the right physical and biological conditions to enable successful establishment. The USACE provides guidance for wetland creation and restoration approaches in *Operational Guidelines for creating or restoring wetlands that are ecologically sustaining for aquatic resource impacts under the Corp regulatory program pursuant to Section 404 and Section 10 of the Rivers and Harbors Act* (USACE, 2003). Acquisition site conditions will be described and explained in the compensatory mitigation plan. The mitigation ratios in Table 10-8 are consistent with other recently approved land acquisition and restoration programs in the S.F. Bay Area and Central California.

In addition to the approach where the SCVWD purchases mitigation lands outright, other mitigation opportunities may occur where lands are owned by other parties. Under such "mitigation partnership" arrangements, the SCVWD would collaborate with landowners to fund, develop, monitor, and ensure success of aquatic resource preservation, enhancement, restoration, or establishment projects on non-SCVWD owned lands. The SCVWD would develop the compensatory mitigation plan for such lands, including the detailed description of how the mitigation activities will be developed, monitored and maintained for the long-term, and how the SCVWD will fund these practices for the long-term. Such lands would require long-term conservation easements and permits to protect their status for providing mitigation. The mitigation plan for such partnership projects would be developed, reviewed, and approved with regulatory staff on a project-by-project basis

10.8 Mitigation for Impacts to Special-Status Species and Associated Habitat

10.8.1 General Mitigation Approach

The mitigation of impacts to regulated and sensitive habitats, and to certain special-status species, is required by the 2011 SFEIR and regulatory agency permits. The Biology section of the 2011 SFEIR provides a detailed description of potential program impacts to special-status species and mitigation appropriate under CEQA to reduce impacts to less-than-significant levels. The mitigation approaches in this Manual will be consistent with the USACE's Section 404 permit (and associated USFWS and NMFS BOs and EFH recommendations), the SFBRWQCB 401 certification/Waste Discharge Requirements (WDRs), CCRWQCB 401 Certification, and the CDFW CESA incidental take permit and streambed alteration agreement.

Table 10-9 identifies the special-status species and sensitive habitats for which mitigation will be required, and the type and amount of mitigation required. Mitigation for impacts to specific special-status species (except for those requiring mitigation for CESA compliance) may take the form of the payment of impact fees to the Santa Clara Valley Habitat Agency (see Table 10-9).

Whenever the SCVWD has to acquire new land for CESA listed speciesmitigation, a conservation easement will be obtained and a long term management plan will be prepared to describe the long-term enhancement, management, and maintenance activities that will occur on the habitat mitigation lands. In addition, financial instruments will be provided for long-term management.

10.8.2 Applicability of Mitigation for Impacts to Waters of the U.S. and State, and CDFW 1602-jurisdictional Habitats, towards Impacts to Special-Status Species and Associated Habitat

To the extent feasible, habitat mitigation for impacts to individual special-status species will dovetail with mitigation efforts to address impacts to waters of the U.S., waters of the State, and riparian habitats, as described above. Ideally, a given set of mitigation actions can be performed and integrated to compensate for effects on multiple sensitive habitats and resources. For example, mitigation for impacts to the Monterey roach, Pacific lamprey, western

pond turtle, and non-special-status fish and amphibians is being provided through the implementation of wetland, aquatic, riparian, and anadromous salmonid mitigation. Similarly, instream complexity or gravel augmentation activities along a creek supporting anadromous salmonids can help address wetland impacts.

10.8.3 Mitigation for Impacts to Anadromous Salmonids

Mitigation for impacts to waters of the U.S., waters of the State, and riparian habitats, as described above, would be designed to benefit anadromous salmonids (i.e., steelhead and Chinook salmon) when performed along creeks supporting those species. Where feasible, bank stabilization treatments will incorporate habitat complexity features into the project-specific designs. These habitat complexity features may be used to compensate for impacts to existing instream complexity elements at bank stabilization sites. Additionally, habitat complexity features will be incorporated into bank stabilization treatments to compensate for the program's overall impact due to removal of in-channel wood smaller than 12" diameter. For loss of instream habitat complexity features at bank stabilization sites which can not be mitigated on-site, the SCVWD will mitigate for these features according to Attachment I. For loss of anadromous salmonid spawning gravels at sediment removal project sites and removal of LWD (Tier 4), the SCVWD will mitigate for the loss of coarse sediment according to Attachment I and for LWD (TIER 4 according to Attachment E. Mitigation for the loss of spawning gravels and instream complexity features will be determined by maintenance site assessments in anadromous salmonid channels. Maintenance site assessments will be conducted prior to sediment removal and bank stabilization projects to determine the presence and extent of coarse substrate and instream complexity features. This assessment will inform mitigation planning and design. These mitigation measures are briefly summarized below and described in detail in Attachment I.

Table 10-9: Mitigation for Sensitive Habitats and Special-Status Species Affected by Vegetation Management and Sediment Removal

Resource Requiring Mitigation	Determination of Impact Area	Mitigation Type	Mitigation Factor (area or volume)	Activities Affecting the Resource
Anadromous salmonid creeks (Coarse gravel)	A SCVWD fisheries ecologist will assess the volume of coarse substrate removed.	Gravel augmentation in suitable channel location.	1:1 (cubic yard)	Sediment removal
Anadromous salmonid creeks (Instream complexity)	A SCVWD fisheries ecologist will assess the type and extent of instream complexity feature(s) impacted.	Installation/enhancement of instream complexity features.	1:1 (on the basis of the function of the habitat features)	Large woody debris removal, sediment removal, bank stabilization
Burrowing owl	Permanent impact to nesting owls or foraging habitat acreage will be determined in collaboration with the SCVHA, USFWS and CDFW.	Payment of Burrowing Owl Conservation Fees to SCVHA.	N/A	Access construction
California tiger salamander	For the USFWS the impacts will be determined by overlaying SMP activity areas on VHP habitat modeling for this species (within the VHP area) or SMP mapping of this species' distribution (outside the VHP area). For CDFW impacts will be determined by overlaying activity areas on the CTS distribution map contained in the FSEIR.	For the USFWS payment of impact fees will be based on the land use fees in the VHP. Mitigation for state listed species will be through an Incidental Take Permit in consultation with CDFW.	N/A	Herbicide, sediment removal, and any pruning, hand removal, hand removal, large woody debris removal, or management of animal conflicts that results in ground disturbance within CTS distribution.
California red-legged frog	Impacts will be determined by overlaying SMP activity areas on VHP habitat modeling for this	Payment of impact fees based on the fee schedule in the VHP or habitat	N/A (necessary ratios are already incorporated into VHP fee schedule)	Herbicide, pruning, hand removal, hand removal, large woody

Resource Requiring Mitigation	Determination of Impact Area	Mitigation Type	Mitigation Factor (area or volume)	Activities Affecting the Resource
	species (within the VHP area) or SMP mapping of this species' distribution (outside the VHP area).	preservation and management.	[ratio for habitat preservation or management is pending BO finalization].	debris removal, or management of animal conflicts.
Least Bell's vireo/yellow-breasted chat	Impacts will be determined by overlaying SMP activity areas on VHP habitat modeling for this species.	Payment of impact fees based on the fee schedule in the VHP or habitat preservation and management.	N/A (necessary ratios are already incorporated into VHP fee schedule) [ratio for habitat preservation or management is pending BO finalization].	Herbicide, mowing, pruning, hand removal, hand removal, sediment removal (primarily due to access).
Pallid bat	A SCVWD biologist will determine, based on pre-activity surveys and existing data, whether an activity will result in the loss of a tree containing a pallid bat roost.	Will be based on consultation with CDFW.	To be determined.	Hand removal, tree pruning, or sediment removal.
Special-status plant species	A SCVWD botanist will determine whether special-status plants are present using existing survey data/mapping of known plant occurrences and pre-activity field surveys for special-status plants. The botanist will estimate the impact on the basis of the highest number of individuals known to be present within the impact area by comparing pre-	Preservation, enhancement, and management of occupied habitat (or payment of impact fees based on the VHP fee schedule for covered species).	Mitigation area must (a) already support equal or greater numbers (and health) of individuals of the species in question and (b) contain sufficient unoccupied habitat to allow for an increase in populations, the increase being at least equivalent to the number impacted,	Herbicide, mowing, pruning, hand removal, hand removal, or sediment removal (primarily due to access).

Resource Requiring Mitigation	Determination of Impact Area	Mitigation Type	Mitigation Factor (area or volume)	Activities Affecting the Resource
	impact mapping with a post-impact assessment, based on field surveys and/or GIS overlays.		through habitat enhancement and management.	
Tidal wetland/ aquatic species	A SCVWD biologist will estimate the area of impact to these habitats visually or via GIS, based on field mapping of extent of these habitats prior to maintenance and field mapping (or GIS overlay) of the footprint of the actual impact area.	Tidal wetland restoration that has already occurred at the Island Ponds will count as permanent mitigation (in perpetuity) for potential impacts to this habitat.	1.2:1 (acreage) Mitigation to be debited from the 9 ac of tidal wetland restoration credit that has already occurred at the Island Ponds, and not used during the 2002-2012 SMP period.	Pruning, mowing, hand removal, herbicide, sediment removal.
Yellow warbler	The area of habitat impacts will be determined based on a GIS overlay, with field assessment if needed, on the basis of the area of impacts to occupied breeding habitat.	Restoration of riparian habitat in areas with little adjacent development (where yellow warblers may breed).	1:1 (area)	Herbicide, pruning, hand removal, hand removal, sediment removal (primarily due to access).

Gravel Augmentation

The SCVWD will conduct a survey of streams supporting anadromous salmonids, to identify potential gravel augmentation sites. The SCVWD will recommend a list of sites for review and approval by the agencies. Mitigation will be provided by placement of coarse substrate at identified and approved sites. Each year the estimated volume of coarse substrate removed from anadromous salmonid channels in each watershed will serve as the basis for the volume of gravel needing to be replaced. The SCVWD will recommend gravel augmentation sites in the NPW.

Prior to conducting all sediment removal projects in anadromous salmonid streams, SCVWD will complete pre-project site assessments by the procedures described in Attachment I. In the NPW, the total volume of coarse substrate proposed for removal from anadromous salmonid channels at each project site will be presented and the cumulative total by watershed will serve as the basis for determining the annual off-site mitigation requirement for this SMP activity. Prior to the development of the list of possible enhancement/restoration actions mitigation requirements will accumulate and implementation of mitigation actions deferred until 2016. Post 2016, the NPW will propose one or more mitigation projects from the master list of projects to mitigate for impacts anticipated to occur during the current year. All mitigation proposals will be identified in the annual NPWs for approval the appropriate resource agencies.

Instream Complexity Mitigation

The SCVWD will conduct a survey of streams supporting anadromous salmonids to identify potential sites for establishment of instream habitat complexity features. The SCVWD will recommend a list of sites for review and approval by the agencies.

Prior to conducting all bank stabilization projects in anadromous salmonid streams, SCVWD will complete pre-project site assessments by the procedures described in Attachment I. Mitigation for impacts to instream complexity features at bank stabilization sites will be replaced on-site where conditions allow. For bank stabilization projects that do not fully compensate on-site for impacts to instream habitat complexity features on-site, and for impacts to instream habitat complexity features at sediment removal project sites, mitigation will also be provided off-site. Prior to the development of the list of possible enhancement/restoration actions, mitigation requirements will accumulate and implementation of mitigation actions deferred until 2016. Post 2016, the NPW will propose one or more mitigation projects from the master list of projects to mitigate for impacts anticipated to occur during the current year. All mitigation proposals will be identified in the annual NPWs for approval by the appropriate resource agencies.

10.8.4 Large Woody Debris

Large Woody Debris (LWD) includes downed logs, trees, and other woody debris positioned along the streambed. LWD can provide important ecologic, geomorphic, and hydraulic functions in the stream channel. LWD can also increase flooding risk through diverting erosive flows towards streambanks, trapping debris near facilities, and create erosive eddies and other

flow obstructions. LWD functions will be preserved in anadromous salmonid channels where possible, where flood considerations and flow conveyance conditions allow the presence of LWD without increasing the flood or erosion risk. Attachment E describes the 4-tiered LWD management approach is applied whereby site-specific LWD conditions are assessed for either (1) retaining the feature; (2) modifying the feature; (3) removing and replacing the feature; or (4) removing the feature. Tier 4 on anadromous salmonid channels will be replaced at a ratio of 1:1 (mitigation to impact) based on the volume of the LWD removed.

LWD mitigation will be required any time LWD is removed from an anadromous salmonid channel (Tier 4 above). Prior to removing LWD in anadromous salmonid streams, SCVWD will complete pre-project site assessments by the procedures described in Attachment E. The mitigation requirement associated with removal of LWD will be based on the volume of wood removed. All mitigation proposals will be identified in the annual NPWs for approval by appropriate resource agencies.

10.8.5 Mitigation for Impacts to California Tiger Salamander, California Red-legged Frog, and Least Bell's Vireo

The mitigation required by the USFWS (PBO and annual ITS) for impacts for California tiger salamanders, California red-legged frogs and least Bell's vireos will be provide through the payment of land use fees to the SCV Habitat Agency or through habitat acquisition, preservation and mangement. Mitigation required by the CDFW (ITP) for California tiger salamanders is to be determined in consultation with the Department.

10.8.6 Mitigation for Impacts to Tidal Wetland/Aquatic Species

Mitigation for impacts to special-status species using tidal wetland/aquatic habitats (as well as non-tidal salt marsh), including the California clapper rail, salt marsh harvest mouse, salt marsh wandering shrew, Alameda song sparrow, longfin smelt, and green sturgeon, consists of the restoration of tidal wetland/aquatic habitats suitable for use by these species. Although no take (as defined by CESA) of fully protected species such as the California clapper rail or salt marsh harvest mouse will occur as a result of SMP activities, mitigation for indirect impacts (such as habitat impacts) will be needed.

As mitigation for impacts to tidal habitats and tidal marsh species predicted to result from the 2002–2012 SMP work activities, the SCVWD restored the "Island Ponds" (Ponds A19, A20, and A21), located between Coyote Slough and Mud Slough near Alviso, to tidal action. By restoring these ponds, the SCVWD obtained credit for 30 acres of tidal habitat that is suitable, or that will be suitable as habitat matures, for the aforementioned tidal marsh species (the Island Ponds project). Monitoring has documented achievement of all performance criteria appropriate for the development of both vegetated tidal salt/brackish marsh and tidal aquatic habitat, with the formation of nascent tidal marsh habitat, including extensive channel networks, within these ponds. SMP-1 was responsible for 21 acres of tidal mitigation. The 2002-2012 SMP permit applications included a tidal mitigation debt of 12 acres for work performed prior to SMP-1 and 9 acres of tidal mitigation was needed to compensate for SMP-1 impacts for work performed from 2002-2012. This resulted in a total SMP-1 mitigation debt of 21 acres. Because the Island

Ponds project provides 30 acres of mitigation credit, 9 acres of excess tidal habitat restoration at the Island Ponds is available as mitigation and will be used by the SCVWD for impacts to tidal wetlands and aquatic habitats, as well as tidal marsh species that may occur under SMP-2. The District does not anticipate needing more than 9 acres of tidal habitat mitigation during SMP-2. As discussed above in Section 10.4, a mitigation banking structure between the SCVWD and the USACE will be sought to apply the use of SMP-1 excess mitigation for other maintenance impacts.

10.8.7 Mitigation for Impacts to Yellow Warbler Breeding Habitat

Mitigation for impacts to occupied yellow warbler breeding habitat (i.e., riparian habitat known to have been occupied in recent years by the species) will be provided via riparian habitat restoration and preservation in relatively undeveloped reaches of creeks rather than in creeks surrounded closely on both sides by development, so that this habitat will benefit breeding yellow warblers. Such mitigation will be provided at a ratio no less than 1:1 (on an acreage basis), and it will be combined with programmatic mitigation for impacts to riparian habitat in general. The SCVWD will determine whether impacted riparian habitat is suitable for this species on the basis of breeding-season surveys or comparison of habitat conditions to those in known occupied areas.

10.8.8 Mitigation for Impacts to the Burrowing Owl

The SCVWD will implement the following avoidance and minimization measures to avoid take of burrowing owl:

- Identify locations of known nesting burrowing owls by updating the District's database of burrowing owl occurrences on a regular basis and through the use of the California Natural Diversity Data Base, local experts, and the Santa Clara County Habitat Agency.
- For each SMP project, determine whether the project site and surrounding work area are located in grassland or bare ground habitat.
- If an SMP project is located in grassland or bare ground habitat, survey the surrounding work area and associated grassland habitat to identify any nest sites and/or any burrowing owl foraging habitat (Valley Habitat Plan Western Burrowing Owl Conservation Strategy (Strategy) assumes a burrowing owl breeding site requires a minimum of 140 acres of foraging habitat) that is located within 0.5 mile of a nest site.
- If there are nests on site, or if there are nests dependent on the grasslands on site, conduct an impacts analysis to determine whether there will be any permanent impacts (permanent impacts under the Strategy are defined as those impacts where the site cannot be restored to pre-project conditions within 1 year) to burrowing owl nests or associated foraging habitat.
- If there are burrowing owl nests within 250 feet of project activities, adopt the following measures:
    - The SCVWD will establish a 250-foot radius, no work buffer zone (Gen-7) around occupied burrowing owl burrows. Buffers may be modified, with CDFW approval, by a qualified biologist based on location of paved roads, intervening riparian

corridors, and levees. No construction work will occur within the buffer zones except as described in Gen-7.

- No rodenticide or fumigant use will occur within 656 yards of known occupied burrowing owl locations (ANI-3).

Mitigation

Consistent with the Strategy, no take of burrowing owl will occur as a result of SMP activities. For permanent impacts to burrowing owl nests or to burrowing owl foraging habitat that cannot be avoided, the SCVWD will provide burrowing owl conservation fees to the Valley Habitat Agency.

10.8.9 Mitigation for Impacts to the Pallid Bat

If a tree or structure containing a pallid bat colony is to be removed or physically disturbed by an SMP activity, the SCVWD will identify the roost, the approximate number of pallid bats using the colony, and an assessment of the impacts to the pallid bat colony. The SCVWD will then formulate a plan to mitigate the impacts to the colony. The SCVWD will submit the plan to the DFW for review, negotiation and approval. The SCVWD will then implement the approved plan.

10.8.10 Mitigation for Impacts to the San Francisco Dusky-footed Woodrat

BMP GEN-14 includes measures to minimize impacts to San Francisco dusky-footed woodrats and their nests, including pre-activity screening for the potential for occurrence, pre-activity surveys in suitable habitat, nest avoidance where feasible, measures to evict woodrats from their nests (to avoid mortality), and measures to relocate the nest materials to appropriate habitat nearby. In certain circumstances (e.g., if large numbers of nests would be affected by a maintenance activity), the CDFW may require the preparation of a mitigation plan describing these measures, and CDFW review of the plan.

10.8.11 Mitigation for Impacts to Special-Status Plant Species

If SMP activities result in the loss of individual special-status plants (SMP activities will not impact serpentine habitats or species), other than the Santa Clara red ribbons, Hospital Canyon larkspur, western leatherwood, Hall's bush-mallow, and robust monardella, compensatory mitigation will be provided. Prior to initiation of SMP activities that may impact these special-status species, a qualified 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. The SCVWD will determine the extent of impacts to non-serpentine-associated special-status plants that will occur, after consideration of avoidance and minimization measures, to determine mitigation requirements.

Compensation for unavoidable impacts to populations of non-serpentine-associated special-status plants will be provided by a combination of preservation and enhancement of those species' populations outside SMP maintenance 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. Under (b) the increase in population would be 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. Mitigation for impacts to special-status plants may occur via the payment of mitigation impact fees to the SCV Habitat Agency.

10.9 Annual Mitigation Assessment Process

The general process to assess impacts, identify and develop the mitigation workplan, conduct the necessary mitigation, and provide relevant notification and summary reports involves seven main steps. These steps will be conducted annually and coordinated with the regulatory agencies. These steps are described below:

1. Impacts and mitigation requirements are estimated based on the NPW:
    A. Maintenance needs, activities, and locations are identified for the coming in-channel maintenance season.

    B. A SCVWD biologist conducts a desktop assessment of potential maintenance sites, which may include review of aerial photos, a GIS-based review of habitat or species distribution mapping, or review of other available information. The SCVWD biologist determines whether sensitive resources requiring BMPs, detailed impact/mitigation assessment, or other measures are necessary, or whether maintenance activities are not expected to result in impacts to any sensitive resources.

    C. If maintenance activities could potentially impact sensitive resources, a SCVWD biologist may conduct a site assessment and determine what on-site resources require further assessment or survey (such as whether tidal wetlands or special-status plants are present) using professional judgment, GIS mapping, or aerial photos.

    D. A SCVWD biologist identifies the limits of the potentially affected resources (e.g., mapping the limits of tidal wetlands along a levee or the locations of special-status plants) using aerial photos or by field inspection and evaluation.

    E. The SCVWD evaluates how applying BMPs to the maintenance activities in question can avoid or reduce the magnitude, scope, or extent of potential impacts to sensitive resources such as tidal wetlands, and thereby reduce the mitigation requirement.

    F. The SCVWD quantifies the projected impacts of the proposed activities to each

biological resource that requires mitigation.

G. The SCVWD repeats steps 1.B-F above for each maintenance activity proposed that year and summarizes the total impacts and associated mitigation requirements for each biological resource that will require mitigation.

2. SCVWD develops the annual mitigation strategy and workplan for new work areas:

Based on the results of Step 1, as summarized in Step 1(G) – the SCVWD will determine the most appropriate manner to satisfy the year's estimated mitigation requirements, following the process shown on Figure 10-9 and the mitigation site selection sequence outlined in Section 10.4.3.

For Land Acquisition Based Mitigation

A. The SCVWD considers mitigation needs first for resources requiring the most specialized type of mitigation (i.e., those resources with the fewest or most difficult mitigation options). Compensatory mitigation involving land acquisition and preservation will also likely provide some mitigation for impacts to waters of the U.S., waters of the State, and riparian habitats, which have the most diverse mitigation options. In general, biological resources requiring mitigation would be considered in the following order (from most to least specialized):

i. Special-status plants. (There are limited areas where mitigation for impacts to these plants can be provided.)

ii. California tiger salamander habitat; California red-legged frog habitat; burrowing owl habitat. (Mitigation lands for these species may overlap with each other and/or with habitat that is preserved for plants listed in 2.A.i above.)

iii. Coarse gravel in creeks supporting anadromous salmonids; yellow warbler habitat. (These are specialized forms of mitigation for impacts to certain types of non-tidal waters, woody riparian vegetation, or trees, and they could occur on lands preserved for other resources listed above.)

iv. Non-tidal wetlands and other waters; woody riparian vegetation; trees 6-12" dbh. These lands, if also preserved for other resources above can serve as mitigation (according to the mitigation ratios in Table 10-5) for non-tidal wetlands and other waters and woody riparian vegetation, and as locations for mitigation of impacts to 6-12" dbh trees.

v. Pallid bat artificial roost; instream complexity. Although these impacts may be mitigated in areas identified for other resources above, mitigation for impacts to pallid bats, or to instream complexity, does not count toward mitigation of other resources listed above.

vi. Tidal wetlands and other waters. This mitigation has already been provided via Island Pond restoration.

B. Before considering mitigation options that involve the acquisition of new properties or the payment of mitigation fees, the SCVWD considers lands it already owns that have not been committed as mitigation for other purposes or projects to determine what resource mitigation can be provided by such lands. These lands are assessed for how they may provide mitigation either through preservation [e.g., for existing habitat] or by restoration [e.g., riparian vegetation or wetlands]), focusing on the species/community-specific measures in 2.A.i-iii above. The SCVWD will assess the extent (i.e., acreage or, in the case of special-status plants, number of individuals) of those resources that SCVWD-owned lands provide, and then quantify the amount of required mitigation that cannot be satisfied on those lands.

C. The SCVWD considers which of its mitigation requirements can be met through payment of impact fees to the SCV Habitat Agency and determines whether implementing that mitigation option is desirable.

D. The SCVWD evaluates lands that it does not currently own, but that may be available for acquisition, to determine whether such lands may provide resources to satisfy mitigation needs that cannot be satisfied on existing SCVWD-owned lands (focusing on the species/community-specific measures in 2.A.i-iii above). The SCVWD focuses first on lands that provide the most specialized type of mitigation required, and then within those areas, on lands that provide resources that will satisfy the greatest number of mitigation requirements. The SCVWD then pursues acquiring new mitigation lands as necessary.

E. In consideration of all SCVWD lands (including those recently acquired), the SCVWD then identifies the smallest acreage of mitigation that would satisfy the most mitigation requirements, again focusing on the species/community-specific measures in 2.A.i-iii above.

F. The SCVWD determines the amount of mitigation credit for impacts to waters of the U.S., waters of the State, and riparian habitats that would be provided via the preservation of lands to satisfy species/community-specific requirements listed in 2.A.i-iii above or via riparian restoration to satisfy the requirements listed in 2.A.iv above. The SCVWD determines the acreage of waters of the U.S./State/riparian habitat impact to which this credit would apply. The SCVWD then determines the residual impacts to waters of the U.S., waters of the State, and riparian habitats that still require mitigation.

<u>For Ecological Services Based Mitigation</u>

A. For general waters of the U.S., waters of the State, and riparian habitat mitigation

needs the SCVWD will identify either on-site or off-site annual mitigation through the ecologic services based mitigation approaches described in Section 10.5, or addressed through acquisition based mitigation (if applicable opportunities exist).

3. SCVWD identifies mitigation approach in the annual NPW submittal:

   The SCVWD will describe the proposed mitigation approach and workplan in the annual NPW submittal to the regulatory agencies for review and approval.

4. Regulatory agencies will review annual mitigation approach during NPW review:

   The regulatory agencies will review the annual mitigation workplan concurrent with their review of the maintenance projects in the NPW as described in Chapter 12.

5. SCVWD will track and log the actual impact areas:

   As maintenance work occurs, the SCVWD will track actual project impacts. Using GIS and/or field-based methods, the SCVWD will quantify the actual impacts from each maintenance activity on each aquatic or biological resource that requires mitigation.

6. Mitigation is conducted and tracked:

   The SCVWD will conduct and track the planned mitigation according to the mitigation workplan.

7. Post Maintenance Mitigation Accounting and Reporting

   Following the maintenance season, the SCVWD will account and record the impacts that occurred and the mitigation that was conducted. These impact and mitigation values will be compared to the impacts and mitigation values that were developed for the mitigation workplan as notified in the annual NPW. Based on this accounting and reconciliation between estimated impacts and mitigation with actual mitigation, a mitigation balance will be identified as a mitigation credit, debit, or match. The mitigation balance will be reported in the annual ASR report as described in Chapter 12.

CHAPTER 11: MITIGATION MONITORING

This chapter describes the monitoring requirements for the mitigation approaches in Sections 10.5 and 10.7. Monitoring reports may be provided to the resource agencies in the Annual Summary Report (ASR) or as a separate submittal. This chapter describes the monitoring requirements, success criteria and any potential remedial actions that may be necessary, by work activity. Monitoring will be used to determine compliance with success criteria and to assist in the determination of the efficacy of particular mitigation methods. Any changes to these monitoring requirements will be approved by the resources agencies prior to implementation. Changed site conditions that affect the ability to meet monitoring requirements will be described in the monitoring reports.

11.1 Invasive Plant Management Program

11.1.1 Monitoring

Invasive Plant Management Program (IPMP) sites will be assessed annually following planting until success criteria are achieved. Treatment areas, and any replanting, will be mapped with Global Positioning System (GPS) devices at the time of treatment. Geographic Information System (GIS) layers will be developed from the GPS data for long-term tracking. Annual assessments will be used to determine if additional control work or follow-up control work is necessary at treatment sites. Results of control activities including success or remediation will be reported in the ASR. Tier 1 (from Table 1 of Attachment D) will be reported in years 1 and 3. Tier 2 will be reported in years 1, 3, and 5. An analysis of treatment methods will be conducted after the 5th year of the program to determine the efficacy of the particular treatment methods.

Specific monitoring methods, treatment activities, and treatment timing will be identified in the NPW for each site, specific to the targeted species on the site. The approach can vary by species, year of treatment, size of the treatment area, adjacent land activities, and protected species/habitats. Monitoring reports will include the technique used to remove the plant, species of the plant, and type and amount of follow-up needed. This information will assist in determining successful techniques for different plant species. Monitoring results will be critical for prioritizing follow-up treatments and planning seasonal work. Specific reporting items are listed in chapter 12.2.2 #3 IPMP.

11.1.2 Success Criteria and Remedial Actions

Success criteria will be developed for each site, and/or for each individual target species. Exclusion or containment strategies may be used where an invasive poses a threat to a sensitive species or habitat type and complete eradication is deemed infeasible. These control strategies may also be used to suppress highly competitive invasive species and give existing native species the ability to thrive.

Examples of what may be described for Success Criteria include:

- Target species is not found on control site.
- The site has not been colonized by a different non-native species.
- Native species colonized site.
- Native species planted on-site and population thrives.

- No erosion or other water quality problems have occurred.

While complete eradication is the ultimate goal, this would be immensely difficult in the highly urbanized channels of the SMP. Additional control actions may be necessary if re-sprouts or re-colonization occur. Any remedial actions taken will be included in the monitoring reports.

Short-term management and remedial actions for the site may include:

- Replanting
- Different treatment method
- Site Modification
    - Soil amendments
    - Decompacting soil

11.2 Riparian Planting

11.2.1 Monitoring

Mitigation planting sites will be monitored by a qualified biologist or a qualified vegetation program specialist to evaluate the survival and successful establishment of the plantings. Monitoring will be conducted over a 5-year period with assessments performed in Years 1, 3, and 5 following planting. The data collected during monitoring visits will be used to determine if success criteria are met and to recommend management modifications or the implementation of contingency measures, as necessary, to help meet the final success criteria. Site performance and final success will be evaluated through both quantitative and qualitative monitoring. If the final success criteria are not met by Year 5, remedial measures will be implemented and monitoring will continue annually or as otherwise stipulated in writing by the interagency work group until the success criteria are achieved.

The baseline site conditions at the time of plant installation will be documented in the field. Planting sites will be mapped with GPS devices at the time of planting; GIS layers will be developed from the GPS data for long-term tracking of planting areas. At the time of planting the number, location, and species of trees and shrubs planted and the square footage of the area planted will be recorded. Baseline photographs will be taken at fixed, pre-designated photo points immediately following initial plant installation.

11.2.2 Success Criteria

Plant Survival: Plant survival will be monitored in Years 1, 3, and 5. Plant survival will be assessed in upland areas, which are defined by the Stream Maintenance Program as the areas above the normal reach of streams or rivers and characterized by non-wetland vegetation. Percent survival is appropriate in drier upland areas where the associated vegetation is slower growing. The plant survival success criterion will be 80% in Years 1 and 3 and 75% in Year 5. Replanting will occur if these criteria are not met at any point during the monitoring period. If the final success criterion is not met at Year 5, remedial measures will be discussed with the permitting agencies.

Percent plant survival will be assessed only in year 5 in riparian areas. The success criteria will be 75% of planted plants in year 5. This criteria only applies to woody species and excludes all cuttings installed.

Percent cover: Percent cover of all native woody vegetation will be assessed in Years 3 and 5 in riparian areas, which are located along the water's edge. As defined in the Stream Maintenance Program, "riparian" is the area located along the edge of a channel, generally on the floodplain, characterized by access to and influence of the channel, but not in it. A riparian zone or riparian area is the interface between land and a river or stream. The success criterion for percent cover in riparian areas is 30% in Year 3 and 75% in Year 5. There are no percent cover related success criteria in riparian areas for Year 1 as it is assumed the mitigation plantings will be in the early stages of development. Percent cover of all native woody vegetation will be assessed in Year 5 in upland areas. The success criterion for percent cover in upland areas is 30% in Year 5. There are no percent cover related success criteria for upland areas in Years 1 and 3 as it is assumed the mitigation plantings will be in the early stages of development. If the success criterion is not met in Year 5, remedial measures will be discussed with the permitting agencies.

Health and vigor. Health and vigor will be assessed in Years 1, 3 and 5 at all planting locations. There will be no success criteria for this parameter but it will be used to help evaluate plant establishment and guide future maintenance activities.

Table 11-1. Performance and Success Criteria for Upland Areas

Criteria	Year 1 Success Criteria	Year 3 Success Criteria	Year 5 Success Criteria
Percent survival of individual plants (%)	80%	80%	75%
Health and vigor[1] (number)	Rating greater than or equal to 2	Rating greater than or equal to 2	Rating greater than or equal to 2
Percentage of maximum non-native cover (%)	<10%	<10%	<10%
Natural recruitment of native vegetation (yes/no)	N/A (planting is new)	Yes	Yes
Supplemental irrigation	Yes	Yes	None within last 2 years (normally years 4 and 5)
Percent cover by natives (%)	N/A	N/A	50%
1. Potential health and vigor ratings listed in Table11-3			

Table 11-2. Performance and Success Criteria for Riparian Areas

Criteria	Year 1 Success Criteria	Year 3 Success Criteria	Year 5 Success Criteria
Percent cover by natives (%)	N/A	50%	75%
Percentage of maximum non-native cover (%)	<10%	<10%	<10%
Natural recruitment of planted vegetation (yes/no)	N/A (planting is new)	Yes	Yes
Supplemental irrigation	Yes	Yes	None within last 2 years (normally years 4 and 5)
Percent survival of individual plants planted (%)	N/A	N/A	75%

Monitoring Methodology

Both quantitative and qualitative monitoring will be conducted. The methodologies used during quantitative and qualitative monitoring are described as follows.

Quantitative Monitoring. Quantitative monitoring will be conducted to assess the establishment and survival of the plantings, as determined by percent survival, percent cover, and health and vigor.

Plant Survival: The total number of planted trees, shrubs, and herbaceous plants that are living at the time of monitoring will be counted in the field. Plant survival will only be assessed in upland areas. Plant survival will be tallied by species; the survival of each species will be calculated using the following equation:

> Percent Survival of Species A = (Number of Individuals of Species A Alive During Monitoring Period / Total Number of Species A Installed) * 100

The overall percent survival will be calculated using the following equation:

> Overall survival = (Total Number of all Species Alive at Time of Monitoring/Total Number of Plantings Installed) * 100

*Percent Cover***:** Percent cover of native woody species will be determined using the line intercept method (Bonham 1989) along permanently established fixed length transects. A sufficient number of transects will be used to adequately assess the performance of vegetation, with a minimum of one transect per 2,500 square feet of area. The end points of the transects will be marked with a T-post and mapped in Year-1 so that the same transects can be used throughout the monitoring period. Transects will be oriented parallel or perpendicular to the creek channel. The length of the transects will be determined in the field. The length of cover for each native woody species will be recorded to the nearest 0.5 feet along each transect. The data will be used to calculate the total percent cover of all species, the average percent cover of each individual species, and the total percent cover of trees versus shrubs.

Health and Vigor: A qualitative assessment of the overall plant health and vigor will be made for all mitigation plantings by considering such factors as: plant leaf color, bud development, new growth, herbivory, drought stress, fungal/insect infestation, and physical damage. The table below describes the rating system. Health and vigor will be assessed using the scale shown in the table below. The average health and vigor for each tree and shrub species will be calculated by averaging the individual numerical values for each species using the numerical and qualitative scale. If there are too many plantings for the health and vigor of each one to be assessed, assessments may be limited to a representative selection of the plantings, which includes individuals of all planted species.

Table 11-3. Health and Vigor Ratings for Mitigation Plantings

Health and Vigor Rating	Numerical Value	% Healthy Foliage
High	3	67-100%
Medium	2	34-66%
Low	1	1-33%
Dead	0	dead

Qualitative monitoring. Qualitative monitoring will be conducted in years 1 -5 to assess the broader context of the site and its overall ecological condition, and to identify problems that may affect the ability of the planting sites to effectively meet the success criteria, including weed invasion and erosion. During qualitative monitoring assessments, a qualified biologist or a qualified vegetation program specialist will walk the planting site to assess overall plant health and vigor, describe the presence of naturally recruited native plants, and identify the occurrence of invasive species, signs of erosion, evidence of drought stress and supplemental irrigation effectiveness, signs of deer browse or disease, the presence of trash/refuse, or signs of vandalism. Photo-documentation will be conducted so that changes in site conditions can be evaluated over time. Results of qualitative monitoring that is conducted in years 2 and 4 will be included in monitoring reports prepared for years 3 and 5.

Natural Recruitment: Trends in natural recruitment will be assessed by estimating, by species, the number of naturally recruited native species in each planting area and the qualitative abundance of seedlings and saplings of these species.

Invasive Species: Trends in invasive species will be assessed by documenting species presence and estimating the number of plants and/or the approximate percent cover of invasive species in each planting area. The extent to which any invasive species are out-competing or otherwise harming the plantings will also be noted.

Erosion: Evidence of erosion including bare soil, bank slumps, and the formation of rills, etc. will be noted. The extent to which erosion may compromise plant survival will also be evaluated.

Drought stress: Signs of drought stress include wilted vegetation, chlorotic (yellow) leaves, cracks in the bark, and stem and twig die-back particularly on the outermost branches. Indications of drought stress will be assessed in the late spring and summer, depending on precipitation amounts and frequency, so that supplemental irrigation can be scheduled as needed.

Effectiveness of Irrigation: If supplemental irrigation is performed, plants that had previously shown indications of drought stress will be re-visited to assess if their health and vigor have improved.

Deer Browse: Deer browse can be detected by looking for broken twigs on outer branches and damaged bark caused by antler-rubbing. The impact to plant health caused by deer browse will be evaluated so that remedial measures (e.g., installation or repair of foliage protection cages, etc.) can be implemented if needed.

Trash/Refuse and Vandalism: The extent of anthropogenic impacts to each planting site, including the presence of trash and human disturbance, will be assessed and described.

Photo-documentation: Photo-documentation of each planting area will be conducted from the fixed locations selected during installation. Photographs will also be taken to record any events that may have a significant effect on the success of the mitigation site such as flood, erosion, fire, or vandalism.

Monitoring Schedule

Monitoring will be conducted between July and October of each monitoring year.

Completion of Mitigation

Monitoring of the planting sites will be conducted for a minimum of 5 years. At the end of the monitoring period, a final report will be prepared to describe whether the sites have met the success criteria. If the criteria have been met, a letter will be submitted to all appropriate regulatory permitting agencies requesting final "sign-off" of the project. The project will be considered a success and "signed-off" when an acceptance letter is received from each agency.

Contingencies and Remedial Actions

If final success criteria are not met, an analysis of the cause(s) of failure and proposed remedial actions will be prepared and submitted to the appropriate regulatory permitting agencies. The project proponent shall provide funding for the planning, implementation, and monitoring of any remedial actions that may be required by the permitting agencies to meet the goals of the mitigation.

11.3 Tree and Shrub Plantings

11.3.1 Monitoring

Tree and shrub planting sites will be monitored by a qualified biologist or a qualified vegetation program specialist to evaluate the survival and successful establishment of the plantings. Monitoring will be conducted over a 5-year period with assessments performed in Years 1, 3, and 5 following planting. The data collected during monitoring visits will be used to determine if success criteria are met and to recommend management modifications or the implementation of contingency measures, as necessary, to help meet the final success criteria. Site performance and final success will be evaluated through both quantitative and qualitative monitoring. If the final success criteria are not met by Year 5, remedial measures will be implemented and monitoring will continue annually or as otherwise stipulated in writing by the interagency work group until the success criteria are achieved.

The baseline site conditions at the time of plant installation will be documented in the field. Planting sites will be mapped with GPS devices at the time of planting; GIS layers will be developed from the GPS data for long-term tracking of planting areas. At the time of planting the number, location, and species of trees and shrubs planted and the square footage of the area planted will be recorded. Baseline photographs will be taken at fixed, pre-designated photo points immediately following initial plant installation.

Planting areas will not be impacted for a minimum of 10 years after planting. If there are impacts to a tree and shrub planting mitigation area, the impacted mitigation area will be replaced in-kind and the monitoring clock will be reset for those areas for another 5 years. (See section 10.5.3 for more details.)

11.3.2 Success Criteria and Remedial Actions

Plant Survival: Plant survival will be monitored in Years 1, 3 and 5. Plant survival will be assessed in upland areas, which are defined by the Stream Maintenance Program as the areas above the normal reach of streams or rivers and characterized by non-wetland vegetation.

Percent survival is appropriate in drier upland areas where the associated vegetation is slower growing. The plant survival success criterion will be 80% in Years 1 and 3 and 75% in Year 5. Replanting will occur if these criteria are not met at any point during the monitoring period. If the final success criterion is not met at Year 5, remedial measures will be discussed with the permitting agencies.

Percent plant survival will be assessed only in year 5 in riparian areas. The success criteria will be 75% of planted plants in year 5. This criteria only applies to woody species and excludes all cuttings installed.

Percent cover: Percent cover of all native woody vegetation will be assessed in Years 3 and 5 in riparian areas, which are located along the water's edge. As defined in the Stream Maintenance Program, "riparian" is the area located along the edge of a channel, generally on the floodplain, characterized by access to and influence of the channel, but not in it. A riparian zone or riparian area is the interface between land and a river or stream. The success criterion for percent cover in riparian areas is 30% in Year 3 and 75% in Year 5. There are no percent cover related success criteria in riparian areas for Year 1 as it is assumed the mitigation plantings will be in the early stages of development. Percent cover of all native woody vegetation will be assessed in Year 5 in upland areas. The success criterion for percent cover in upland areas is 30% in Year 5. There are no percent cover related success criteria for upland areas in Years 1 and 3 as it is assumed the mitigation plantings will be in the early stages of development. If the success criterion is not met in Year 5, remedial measures will be discussed with the permitting agencies.

Health and vigor. Health and vigor will be assessed in Years 1, 3 and 5 at all planting locations. There will be no success criteria for this parameter but it will be used to help evaluate plant establishment and guide future maintenance activities.

Table 11-4. Performance and Success Criteria for Upland Areas

Criteria	Year 1 Success Criteria	Year 3 Success Criteria	Year 5 Success Criteria
Percent survival of individual plants (%)	80%	80%	75%
Health and vigor (number)[1]	Rating greater than or equal to 2	Rating greater than or equal to 2	Rating greater than or equal to 2
Percentage of maximum non-native cover (%)	<10%	<10%	<10%
Natural recruitment of native vegetation (yes/no)	N/A (planting is new)	Yes	Yes
Supplemental irrigation	Yes	Yes	None within last 2 years (normally years 4 and 5)
Percent cover by natives (%)	N/A	N/A	50%
1. Potential health and vigor ratings are listed in Table 11-6.			

Table 11-5. Performance and Success Criteria for Riparian Areas

Criteria	Year 1 Success Criteria	Year 3 Success Criteria	Year 5 Success Criteria
Percent cover by natives (%)	N/A	50%	75%
Percentage of maximum non-native cover (%)	<10%	<10%	<10%
Natural recruitment of planted vegetation (yes/no)	N/A (planting is new)	Yes	Yes
Supplemental irrigation	Yes	Yes	None within last 2 years (normally years 4 and 5)
Percent survival of individual plants planted (%)	N/A	N/A	75%

Monitoring Methodology

Both quantitative and qualitative monitoring will be conducted. The methodologies used during quantitative and qualitative monitoring are described as follows.

Quantitative Monitoring. Quantitative monitoring will be conducted to assess the establishment and survival of the plantings, as determined by percent survival, percent cover, and health and vigor.

Plant Survival: The total number of planted trees, shrubs, and herbaceous plants that are living at the time of monitoring will be counted in the field. Plant survival will only be assessed in upland areas. Plant survival will be tallied by species; the survival of each species will be calculated using the following equation:

> Percent Survival of Species A = (Number of Individuals of Species A Alive During Monitoring Period / Total Number of Species A Installed) * 100

The overall percent survival will be calculated using the following equation:

> Overall survival = (Total Number of all Species Alive at Time of Monitoring/Total Number of Plantings Installed) * 100

*Percent Cover***:** Percent cover of native woody species will be determined using the line intercept method (Bonham 1989) along permanently established fixed length transects. A sufficient number of transects will be used to adequately assess the performance of vegetation, with a minimum of one transect per 2,500 square feet of area. The end points of the transects will be marked with a T-post and mapped in Year-1 so that the same transects can be used throughout the monitoring period. Transects will be oriented parallel or perpendicular to the creek channel. The length of the transects will be determined in the field. The length of cover for each native woody species will be recorded to the nearest 0.5 feet along each transect. The data will be used to calculate the total percent cover of all species, the average percent cover of each individual species, and the total percent cover of trees versus shrubs.

Health and Vigor: A qualitative assessment of the overall plant health and vigor will be made for all mitigation plantings by considering such factors as: plant leaf color, bud development, new growth, herbivory, drought stress, fungal/insect infestation, and physical damage. The table below describes the rating system. Health and vigor will be assessed using the scale shown in

the table below. The average health and vigor for each tree and shrub species will be calculated by averaging the individual numerical values for each species using the numerical and qualitative scale. If there are too many plantings for the health and vigor of each one to be assessed, assessments may be limited to a representative selection of the plantings, which includes individuals of all planted species.

Table 11-6. Health and Vigor Ratings for Mitigation Plantings

Health and Vigor Rating	Numerical Value	% Healthy Foliage
High	3	67-100%
Medium	2	34-66%
Low	1	1-33%
Dead	0	dead

Qualitative monitoring. Qualitative monitoring will be conducted in years 1 -5 to assess the broader context of the site and its overall ecological condition, and to identify problems that may affect the ability of the planting sites to effectively meet the success criteria, including weed invasion and erosion. During qualitative monitoring assessments, a qualified biologist or a qualified vegetation program specialist will walk the planting site to assess overall plant health and vigor, describe the presence of naturally recruited native plants, and identify the occurrence of invasive species, signs of erosion, evidence of drought stress and supplemental irrigation effectiveness, signs of deer browse or disease, the presence of trash/refuse, or signs of vandalism. Photo-documentation will be conducted so that changes in site conditions can be evaluated over time. Results of qualitative monitoring that is conducted in years 2 and 4 will be included in monitoring reports prepared for years 3 and 5.

Natural Recruitment: Trends in natural recruitment will be assessed by estimating, by species, the number of naturally recruited native species in each planting area and the qualitative abundance of seedlings and saplings of these species.

Invasive Species: Trends in invasive species will be assessed by documenting species presence and estimating the number of plants and/or the approximate percent cover of invasive species in each planting area. The extent to which any invasive species are out-competing or otherwise harming the plantings will also be noted.

Erosion: Evidence of erosion including bare soil, bank slumps, and the formation of rills, etc. will be noted. The extent to which erosion may compromise plant survival will also be evaluated.

Drought stress: Signs of drought stress include wilted vegetation, chlorotic (yellow) leaves, cracks in the bark, and stem and twig die-back particularly on the outermost branches. Indications of drought stress will be assessed in the late spring and summer, depending on precipitation amounts and frequency, so that supplemental irrigation can be scheduled as needed.

Effectiveness of Irrigation: If supplemental irrigation is performed, plants that had previously shown indications of drought stress will be re-visited to assess if their health and vigor have improved.

Deer Browse: Deer browse can be detected by looking for broken twigs on outer branches and damaged bark caused by antler-rubbing. The impact to plant health caused by deer browse will

be evaluated so that remedial measures (e.g., installation or repair of foliage protection cages, etc.) can be implemented if needed.

Trash/Refuse and Vandalism: The extent of anthropogenic impacts to each planting site, including the presence of trash and human disturbance, will be assessed and described.

Photo-documentation: Photo-documentation of each planting area will be conducted from the fixed locations selected during installation. Photographs will also be taken to record any events that may have a significant effect on the success of the mitigation site such as flood, erosion, fire, or vandalism.

Monitoring Schedule

Monitoring will be conducted between July and October of each monitoring year.

Completion of Mitigation

Monitoring of the planting sites will be conducted for a minimum of 5 years. At the end of the monitoring period, a final report will be prepared to describe whether the sites have met the success criteria. If the criteria have been met, a letter will be submitted to all appropriate regulatory permitting agencies requesting final "sign-off" of the project. The project will be considered a success and "signed-off" when an acceptance letter is received from each agency.

Contingencies and Remedial Actions

If final success criteria are not met, an analysis of the cause(s) of failure and proposed remedial actions will be prepared and submitted to the appropriate regulatory permitting agencies. The project proponent shall provide funding for the planning, implementation, and monitoring of any remedial actions that may be required by the permitting agencies to meet the goals of the mitigation.

11.4 Land Management for Conservation

11.4.1 Monitoring

Monitoring requirements for lands set aside to mitigate for maintenance activities will be described in the Long Term Management Plans developed for each site.

11.4.2 Success Criteria and Remedial Actions

Success criteria and any necessary remedial actions will be included within the Long Term Management Plans developed for each site.

11.5 Instream Complexity in Anadromous Salmonid Channels

11.5.1 Monitoring

The SCVWD in collaboration with the resource agencies will develop mitigation designs for instream habitat complexity projects. The mitigation designs will include the objectives for each project. The specific information included in the mitigation designs will include a monitoring plan and success criteria. The monitoring plan will establish the type of monitoring to be conducted, the timing of the monitoring to be conducted, the duration of the monitoring to be conducted, and adaptive management alternatives if the final success criteria are not met. The SCVWD will include instream habitat complexity sites in the NPW prior to implementation. These may be combined with gravel augmentation projects and objectives.

11.5.2 Success Criteria and Remedial Actions

The SCVWD in collaboration with the resource agencies will develop mitigation designs for instream habitat complexity projects. The mitigation designs will include the objectives for each project. The specific information included in the mitigation designs will include a monitoring plan and success criteria. The monitoring plan will establish the type of monitoring to be conducted, the timing of the monitoring to be conducted, the duration of the monitoring to be conducted, and adaptive management alternatives if the final success criteria are not met. The SCVWD will include instream habitat complexity sites in the NPW prior to implementation.

11.6 Gravel Augmentation in Anadromous Salmonid Channels

11.6.1 Monitoring

The SCVWD in collaboration with the resource agencies will develop mitigation designs for coarse sediment augmentation projects. The mitigation designs will include the objectives for each project. The specific information included in the mitigation designs will include a monitoring plan and success criteria. The monitoring plan will establish the type of monitoring to be conducted, the timing of the monitoring to be conducted, the duration of the monitoring to be conducted, and adaptive management alternatives if the final success criteria are not met. The SCVWD will include coarse sediment augmentation sites in the NPW prior to implementation. These may be combined with instream habitat complexity projects and objectives.

11.6.2 Success Criteria and Remedial Actions

The SCVWD in collaboration with the resource agencies will develop mitigation designs for coarse sediment augmentation projects. The mitigation designs will include the objectives for each project. The specific information included in the mitigation designs will include a monitoring plan and success criteria. The monitoring plan will establish the type of monitoring to be conducted, the timing of the monitoring to be conducted, the duration of the monitoring to be conducted, and adaptive management alternatives if the final success criteria are not met. The SCVWD will include coarse sediment augmentation sites in the NPW prior to implementation.

11.7 Bank Stabilization

11.7.1 Monitoring

District facilities and banks are assessed annually. All bank stabilization projects will be reported in years 1, 3, and 5 following construction. This includes previous bank repair sites. Monitoring will include a visual observation of erosion conditions 200 feet upstream and downstream of the site, conditions of the bank stabilization repair, and conditions of any vegetation planting that was performed. Annual reports will include at least 10 project sites per Basin, plus any sites which have had chronic failures. Chronic is defined as 3 or more times within 10 years. S. County will report up to 10 sites per year.

11.7.2 Success Criteria and Remedial Actions

The success criterion for a bank stabilization repair is the retention of the repair itself. For bank stabilization sites that have failed more than twice in a five year period, the District shall monitor creek flows (cfs) and water levels (stage) during two storm events per rainy season. These will be “high flow” events, typically a 1.5 to 5 year recurrence interval storm. Monitoring shall include photo documentation and explanation of visual inspections of: (1) conditions upstream and downstream of the site and (2) conditions of the bank stabilization repair. Revegetation plantings on-site will be monitored per section 11.2. Information gathered during storm events may aid in determining the cause of the bank failure site.

The purpose of the investigations is to identify potential causes of bank failures. Many factors affect bank repair success. Assessing sites within or shortly after “high flow” events will provide value in assessing bank repair methods under different flow conditions.

If a bank stabilization repair has failed or partially failed, it will be assessed and prioritized for remediation along with other eroded sites. Remedial actions may include repair or modification of the site. Failure of vegetative or other mitigation will be remediated as described above for the particular type of ecological service mitigation chosen.

11.8 Species Targeted Monitoring

Table 10-10 indicates the special-status species and sensitive habitats for which mitigation will be required, per work activity type. The monitoring requirements per species are listed below.

Anadromous Salmonids (Steelhead and Chinook Salmon), Green Sturgeon in SF Bay
Monitoring, success criteria and remedial actions for instream complexity and gravel augmentation in anadromous salmonid channels is provided in Sections 11.5 and 11.6 above.

Fish ladders in anadromous salmonid channels will be monitored annually. Sediment deposition within the footprint (i.e. below/above/within) fish ladders will be assessed in order to maintain access during migration seasons for anadromous fish. Sediment impediments vary depending upon the size of the ladder, flow regimes during migration seasons, and depth of sediment. Each ladder/fish screen will be assessed based on its functionality. The following fish ladders/screens will be monitored and reported on annually; as to their status and whether or not sediment removal work will be proposed that year. Work activities will be performed consistent with the Program Manual.

Table 11-7. Annual Fish Ladder/Screen Monitoring Areas

Facility Name	Monitoring Item
Coyote Creek	Coyote Canal Diversion - fish screen, Coyote Percolation Ponds/Steel Dam - fish ladder
Upper Penitencia Creek	Mabury Diversion - fish screen and fish ladder, Noble Avenue Diversion - fish screen and fish ladder
Guadalupe Creek	Masson Diversion - fish screen and fish ladder
Guadalupe River	Alamitos Diversion - fish screen and fish ladder
Stevens Creek	Evelyn Avenue fish ladder, Central Avenue fish ladder, Fremont Avenue fish ladder, Moffett Boulevard fish ladder
Llagas Creek	14 fish ladders

California Tiger Salamander and California Red-legged Frog
Mitigation will be provided via the protection, enhancement, and management of habitat that currently supports or could support these species, monitoring requirements, success criteria and any remedial actions will depend on the specific characteristics of the mitigation site and the enhancements implemented. As a result, such information would be described in a site-specific Long-Term Management Plan, approved in writing by the Service and CDFW.

Least Bell's Vireo
It is expected that mitigation will be provided via payment of fees to the SCV Habitat Agency, in which case no monitoring is required.

However, if mitigation is provided via the protection, enhancement, and management of habitat that currently supports or could support this species, monitoring requirements, success criteria and any remedial actions will depend on the specific characteristics of the mitigation site and the enhancements implemented. As a result, such information would be described in a site-specific HMP, approved in writing by the Service and CDFW.

Yellow Warbler
For impacts in areas supporting yellow warblers and mapped as LBV habitat under the SCV HCP, the District will mitigate as per the least Bell's vireo above, and no additional monitoring is required.

For areas that are not mapped as LBV habitat and that support yellow warbler nesting, the District will monitor replanting sites within areas that could support the yellow warbler (i.e., more rural/natural areas as opposed to urban areas) according to section 11.2 to ensure that the mitigation has been successful in establishing riparian habitat. Because of the patchy distribution of the yellow warbler, even in ostensibly suitable riparian habitat, no monitoring for presence of the species is proposed. Success criteria and remedial actions will therefore be as described in section 11.2.

Tidal Wetland/Aquatic Species
Mitigation for impacts to special-status species using tidal wetland/aquatic habitats (as well as non-tidal salt marsh), including the California clapper rail, salt marsh harvest mouse, salt marsh wandering shrew, Alameda song sparrow, longfin smelt, and green sturgeon, consists of the restoration of tidal wetland/aquatic habitats suitable for use by these species.

The SCVWD has pre-mitigated for 9 acres of tidal wetlands and aquatic habitats. The mitigation obligation was met by restoring 30 acres of tidal habitat with the "Island Ponds" (Ponds A19,

A20, and A21), located between Coyote Slough and Mud Slough near Alviso. Since the mitigation obligation has successfully been completed, no further monitoring is necessary.

Burrowing Owl
If occupied owl burrows cannot be avoided, the SCVWD will meet with the Santa Clara Valley Habitat Agency, the US Fish and Wildlife Service and the California Department of Fish and Wildlife to develop a management strategy for dealing with the occupied burrow.

Where burrows are located in proximity of SCVWD projects but more than 250 feet from any work activities, no monitoring is required. Where burrows are located within 250 feet of any work activities, the SCVWD will apply BMP GEN-7.

Pallid Bat
The SCVWD will conduct site specific monitoring activities described in a plan approved by the CDFW. Success criteria and remedial actions will be described in the plan.

Special-Status Plant Species
Compensation for unavoidable impacts to populations of non-serpentine-associated special-status plants will be provided by a combination of preservation and enhancement of those species' populations outside SMP work sites. Monitoring requirements, success criteria and any required remedial actions will be described in the Habitat Management Plan for the area.

If mitigation occurs via the payment of mitigation fees to the SCV Habitat Agency, no further actions are required.

11.9 Large Woody Debris (LWD)

The removal of LWD (Tier 4) from anadromous salmonid channels will be mitigated by installing LWD instream complexity features at a ratio of 1:1 (mitigation to impact) for the habitat function. Monitoring of LWD will occur for one year post construction when wood is replaced within a channel that supports anadromous salmonids. Monitoring will occur after relatively high flow events (as possible) to determine if the objective of the wood installation is met or if it is creating any adverse effects in the channel. Other treatments can be considered if additional erosion protection is required. Lateral scour bars may be installed if bank erosion is an issue. Stream channels are dynamic and natural recruitment of wood and movement is a natural process, therefore if the wood placement is stable for one year post construction it will be deemed to have met the mitigation obligation for removal of wood elsewhere in the watershed. Mitigation may be provided on-site or be "pooled" into the single user mitigation bank.

11.9.1 Monitoring

Large woody debris (LWD) placement (Tier 4 only) will be monitored annually for one year post construction. The purpose of monitoring is to better understand the response of the channel to LWD placement under a range of flow conditions and identify if improvements in LWD placement can be achieved. This information will assist in guiding the type of placement of future LWD.

11.9.2 Success Criteria and Remedial Actions

LWD is a naturally active resource within streams and channels. Movement of LWD is anticipated and often desired. The success criteria for placement of the LWD will largely depend on the objective of the installation. The objective and measurable criteria will be included in the NPW. Additionally, successful placement of wood should not induce any adverse effects to the stream channel including accelerated erosion or deposition, physical structure failure or displacement of other ecologically beneficial features (i.e. lateral scour pool, loss of riffle habitat etc.). If the wood has achieved the desired objective for installation as stated in the NPW (i.e. provide cover, provide velocity refuge, induce lateral scour, encourage deposition of spawning gravels) and has not created any unintended adverse effects to the stream course and stayed in place for one year post construction it will be deemed successful and no further actions are required.

CHAPTER 12: PROGRAM MANAGEMENT AND REPORTING

This chapter describes the management and reporting process for the SMP. Section 12.1 describes the annual planning process and work cycle. Sections 12.2 and 12.3 describe the pre-work season Notice of Proposed Work (NPW) and post-work season Annual Summary Report (ASR) respectively. Section 12.4 provides a brief overview of the data management system the SCVWD uses to manage and report SMP projects. Section 12.5 describes additional planning to be conducted during the SMP-2 program period, and the next permit renewal process.

12.1 Annual Planning and Work Cycle

The SCVWD's annual stream maintenance planning, implementation, and reporting process occurs in three phases: 1) annual workplan development and notification; 2) implementation of annual routine stream maintenance work; and 3) annual summary reporting. Maintenance work is proposed either as part of the Annual Work Plan through the NPW or as other identified work throughout the year via individual work orders. New projects may be submitted to the agencies for approval throughout the in-channel work season. Winter rains and high flows regularly occur after the creation of the NPW. This can cause trees to fall and cause blockages, and banks to fail that were not a condition of concern during the initial field inspections used to prepare NPW work proposals. These projects will be consolidated and submitted to the agencies per the 12.2 below.

Internally, work orders are used to describe, request, and implement stream maintenance projects. Work orders describe the project, implementation schedule, project cost, permit requirements and other special conditions. Work orders will continue to be the primary vehicle for the implementation of maintenance projects.

12.2 Annual Work Notification

This section describes the contents of the annual NPW and identifies which projects require notification, which agencies will be notified, the protocol for how the NPW will be reviewed by agencies, how project changes will be handled, and which types of projects will be exempt from the NPW. Projects are not defined by simply performing a work activity. Projects may extend along a reach of creek and include several different types of work activities. For example, one project may include: minor maintenance sediment removal, bank repair, and mitigation planting. These are managed as distinct activities, and the Project identification number would be the same for all of them.

Work projected and performed under SMP-1 (2002-2012) has already been mitigated and is defined as the Previously Mitigated Areas (PMAs). The NPW will identify those projects that are included in the PMA for sediment removal, in-channel vegetation hand removal, in-channel vegetation herbicide, and pruning – Overhanging Growth.

12.2.1 Projects Requiring Notification

The following table shows the notification requirements per work activity and identifies the jurisdiction of each regulatory agency. Agencies will need to respond to the NPW for the projects under their jurisdiction.

Table 12-1: Projects Requiring Notification and Agency Jurisdiction

Maintenance Activity	USACE[1]	CDFW[2]	RWQCBs[3]	NMFS[4]	USFWS[5]	BCDC
Bank Stabilization	X	X	X	X	X	X
Sediment Removal	X	X	X	X	X	X
Dewatering and Temporary access road construction	X	X	X	X	X	X
In-Channel Vegetation Management						
Large Woody Debris	X	X	X	X	X	
Hand Removal		X	X	X	X	
Pruning		X	X	X	X	
Mowing		X	X	X	X	
Herbicide		X	X	X		
Non-In-Channel and Below Top of Bank Vegetation Management						
Hand Removal		X	X	X	X	
Routine Pruning		X	X	X	X	
Corrective Pruning		X	X	X	X	
Coppicing		X	X	X	X	
Herbicide		X	X	X		
Grazing		X	X	X	X	
Mowing		X			X	
Management of Animal Conflicts						
Physical Alteration of the Facility	X	X	X		X	X
Habitat Modification		X	X		X	X
Non-lethal Trapping and Relocation		X				
Lethal Control						
Fumigants		X	X		X	
Chemical Baits		X	X		X	
Trapping		X			X	
Minor Maintenance – Only if there may be greater than 0.01 ac of wetland/riparian vegetation impacts.						
Vegetation Removal		X	X	X	X	
Sediment Removal	X	X	X	X	X	X
Road Maintenance – below top of bank only		X	X		X	X
Grading for Improved Drainage and Reduced Erosion		X	X		X	X
Stream Gauge Maintenance	X	X	X	X	X	
Repair of Existing Structures	X	X	X	X	X	X
Mitigation Sites/Landscape Maintenance		X	X			
Minor Erosion Repair Above OHWM		X		X	X	X
Fish Ladder/Fish Screen Maintenance	X	X	X	X	X	

Notes: "X" denotes the regulatory authorization needed for the work activity.

1. Generally applies to work within Waters of the U.S. (including tidal areas) – generally below

Maintenance Activity	USACE[1]	CDFW[2]	RWQCBs[3]	NMFS[4]	USFWS[5]	BCDC

the Ordinary High Water Mark. NOTE: All SMP activities below the Mean High Water Line in tidal areas may require Corps authorization.

2. Includes all areas and species within CDFW jurisdiction (F&G Code Section 1600 et seq.). Notification will be made to CDFW for any work that could potentially affect a state listed species, even if it is outside of CDFW jurisdictional area.

3. Only applies to work within Waters of the State, which includes the area below top-of-bank of the outermost bank or levee, and the riparian corridor to the upland dripline of riparian vegetation.

4. Only applies to anadromous/sturgeon streams.

Only applies in federal species-specific areas.

12.2.2 Contents of Project Notification

The following section describes what will be included in the Notice of Proposed Work (NPW) by work activity.

1. **Vegetation Management** – **Below Top of Bank.** Hand Removal, Pruning, Herbicide. In-channel mowing includes all of the following and for non-in-channel mowing, see section 2 below.
   Where Maintenance Guidelines exist, the following line items may reference the Maintenance Guidelines.

   a. Project identification number;
   b. Creek name, location of impact (including channel stations and observable landmarks, such as street crossings),
   c. Classification of the channel reach as modified, modified with ecological value, or unmodified;
   d. Statement as to whether the channel reach and proposed maintenance activity is covered in the Previously Mitigated Area (PMA) for the proposed activity;
   e. For modified and modified with ecological value channel reaches, the design flood return period for each reach (e.g., the one-hundred-year flood) and the design flow rate;
   f. For unmodified channel reaches, a description of the SCVWD's best estimate of the natural condition of the reach, and the assumptions used to develop it.
   g. Roughness and sediment objectives for the proposed maintenance, including the assumptions and rationale used to develop the objectives;
   h. Determination of any increase in water surface elevation compared to the as-built condition and whether the work site is a hydraulic constriction, or is subject to backwater effects caused by a downstream constriction, using available field data and/or a hydraulic model, if available;
   i. General channel reach dimensions;
   j. Anticipated work site conditions (including a description of vegetation and approximate density of plants);
   k. Detailed description of the type, size, and amount of vegetation proposed for removal, compared to the roughness and vegetation objectives, desired vegetation condition, and how the vegetation will be removed;
   l. Reason for removing vegetation;

m. Evaluation of alternative approaches that could achieve the same result (e.g., removing a hydraulic constriction, removing sediment instead of in-channel vegetation, etc.);
n. Anticipated frequency of maintenance;
o. Whether the site has been subject to similar maintenance in the past, and how often;

Biological Section

p. Estimated area of impact (for work in non-PMA areas);
q. Proposed Mitigation approach (for work in non-PMA areas); and
r. Creek name and location of proposed mitigation (including channel stations and observable landmarks, such as street crossings);
s. Anticipated mitigation site conditions (including a description of vegetation and approximate density of plants and special-status species potentially occurring on the site), only if different than the work site;
t. Listed species habitat areas as mapped under the SMP, federal and state listed species occurrences and/or designated critical habitat;
u. Identification if the channel has been identified as an "anadromous salmonid channel" and whether the proposed project would impact any channel providing habitat for different life cycles for anadromous salmonids (i.e., migration, spawning, rearing, or refugia).
v. Vegetation Impacts (excluding hand removal, wetlands, and pruning): Temporary OR Permanent OR No Impact. If invasive vegetation is being impacted and calculated under the IPMP for mitigation credit, it will be included under that section. For temporary and/or permanent impacts;
    i. Temporary or Permanent
    ii. Linear Feet
    iii. Total Area (acres)
w. Tree impacts: Yes OR No. If yes:
    i. Tree Species
        1. Number of trees to be removed
        2. Range of trunk diameters (DBH) in inches
x. Impacts to wetlands below the OHWM of waters of the United States and the State:
    i. Temporary OR Permanent OR No Impact
    ii. Temporary Impact area (type and dimension):
    iii. Permanent Impacts (type and dimension):
y. Pruning that is estimated to result in the removal of more than 0.01 acres (436 sq ft) of wetland or riparian vegetation per project.
    i. Estimated area of impact by the square footage (area) of vegetation removed multiplied by the vertical proportion/percentage of the tree or stand that is pruned.
z. Identification if the specific work area has been worked and mitigated in the past five (5) years.
aa. Compensatory Mitigation: Describe means by which compensatory mitigation will be achieved for any permanent impacts. Attach compensatory mitigation plan as appropriate.

1.1 Hand Removal Additional Requirements

a. Removal of trees less than 6" dbh and within the PMA will be identified. No further quantification, mitigation, nor notification is required.
b. Removal of trees less than 6" dbh and not within the PMA and trees 6-12" dbh.

i. Type, size, and number of trees proposed for removal;
ii. Reason for removing the trees;
iii. How the trees will be removed;
iv. Estimated area of impact by tree canopy; and
v. Proposed Mitigation approach. Hand removals 6-12" may include results of the tree appraisal and evaluation protocol, Attachment C.

2. Mowing

Notification is required for mowing only those areas in sensitive habitats such as wetlands or woody riparian vegetation, mowing of special-status plants, or mowing of habitat for the least Bell's vireo, California tiger salamander, California red-legged frog, California clapper rail, and salt marsh harvest mouse (see Table 10-9). Notification information shall include:

a. Project identification number;
b. Creek name and location of impact;
c. Channel type of impact site (modified, modified with ecological value, or unmodified);
d. Anticipated site conditions, including a description of vegetation and approximate density of plants and special-status species potentially occurring on the site, and whether standing or flowing water is present;
e. Detailed description of the type and amount of vegetation proposed for mowing;
f. Reason for removing the vegetation;
g. Creek name and location of mitigation, only if different; and
h. Proposed Mitigation approach, if applicable.

3. Invasive Plant Management Plan

A proposal for IPMP mitigation credit will be submitted annually for each project, as applicable. This proposal will discuss the mitigation details of both the systematic and opportunistic components of the IPMP. Acreage of target species to be controlled as well as general locations of control activities will be discussed. Many interconnected factors go into determining the level of success that can be expected. Each proposal for invasive management will be reviewed by permitting agencies and will include the following elements:

a. Project identification number for which mitigation is being provided;
b. Creek name and location of mitigation, including channel stations and observable landmarks, such as street crossings, only if different;
c. Channel type (modified, modified with ecological value, or unmodified);
d. Cross-section location;
e. Area of project (square feet or acres);
f. Description of the target species including the proposed mitigation credit/ratio as described in Table 1 of Attachment D;
g. Description of how the targeted plants will be removed;
h. Description of site constraints or limitations in the techniques that can be used due to regulatory and/or ESA concerns;
i. Description of control timeframes and strategies. Different species require different repeat treatments to be effective. Therefore, the success strategy might be laid out over a period of time for difficult to control species (Level 2 species in Table 1 of Attachment D); and
j. Description of site specific success strategies. Adjacent invasive plant populations will have a significant effect on individual site success.

4. Riparian Planting and Revegetation / Tree and Shrub Replacement

A proposal for mitigation credit will be submitted annually per work activity project, as applicable. Each proposal for revegetation plantings will be reviewed by permitting agencies and will include the following elements:

a. Project identification number for which mitigation is being provided;
b. Creek name and location of impact, including channel stations and observable landmarks, such as street crossings;
c. Creek name and location of mitigation, including channel stations and observable landmarks, such as street crossings, only if different;
d. Channel type (modified, modified with ecological value, or unmodified);
e. Cross-section location;
f. Area of project (square feet or acres); and
g. Photos of site.

5. Instream Complexity/Large Woody Debris

A proposal for mitigation will be submitted annually per work activity project. Each proposal for instream habitat complexity/LWD will be developed and reviewed by permitting agencies and will include the following elements:

a. Mitigation proposal (instream complexity, gravel augmentation);
b. Project identification number for which mitigation is being provided;
c. Creek name and location of impact, including channel stations and observable landmarks, such as street crossings;
d. Creek name and location of mitigation, including channel stations and observable landmarks, such as street crossings, only if different;
e. Channel type (modified, modified with ecological value, or unmodified);
f. Pre-project site assessment per Attachment E or I as applicable; and
g. Habitat function to be replaced.

6. Sediment Removal

6.1 Agencies requiring notification

All agencies. Sediment removal projects that use direct excavation and result in sediment discharge not regulated by the USACE, will not require USACE authorization. See Chapter 2 for more information. Instream habitat complexity and coarse substrate impacts will still need project assessments in anadromous salmonid channels, and any vegetation impacts in non-PMA or removal of trees/shrubs > 6” dbh will still need to be mitigated.

6.2 Notification Items

Where sediment removal is necessary for non-Minor Maintenance activities, Maintenance Guidelines will provide the rationale for the location and depth/extent of sediment removal. If maintenance guidelines do exist, the rationale will make reference to those documents.

See the Project Notification Form at the end of this chapter.

7. Bank Stabilization

a. Agencies requiring notification

All agencies will be notified.

b. Notification Items

See the Project Notification Form at the end of this chapter.

8. Management of Animal Conflicts

Management of Animal Conflict activities are being reporting in order to identify what activities are being performed, what the results are, whether the activity is effective in achieving the desired result, and if there are any secondary impacts.

a. Project identification number;
b. Creek name and location of impact (including GIS stationing, channel stations and observable landmarks, such as street crossings) and anticipated site conditions;
c. Nearest cross street, if it is an isolated site;
d. Type of animal conflict management activity (surface compaction, placement of physical barriers [describe what type], burrow filling, burrow collapsing, rodenticide, live traps, kill traps, etc.)
    i. Burrow destruction or exclusion materials within special status species habitat areas.
        a. Creek name and location
        b. Activity
    ii. Rodenticide type (strychnine, zinc phosphide, anticoagulant).
e. Listed species habitat areas as mapped under the SMP, federal and state listed species occurrences and/or designated critical habitat;

9. Minor Maintenance

a. Project identification number;
b. Any activity that results in the removal of more than 0.01 acres (436 sq ft) of wetland or riparian vegetation per project.
    i. Creek name and location of impact (including GIS stationing, channel stations and observable landmarks, such as street crossings);
    ii. Anticipated work site conditions;
    iii. Channel type (modified, modified with ecological value, or unmodified);
    iv. Detailed description of the proposed maintenance activity;
    v. Reason for the activity;
    vi. Estimated amount of vegetation to be impacted; and
    vii. Proposed mitigation activities.
c. Inventory of fish ladders/screens, their status, and whether sediment removal work is proposed.
d. In-kind bank stabilization repairs that are replacing rock in anadromous salmonid channels.

12.2.3 Review Process for Agencies

The NPW will be submitted to the agencies by April 15 of each year for their review and comment. Agencies will have 45 days to respond to the NPW and issue a notice to proceed. Agency staff are committed to providing a response for projects under their jurisdiction within the allotted time period. Agency staff will ensure that a staff member from their agency will respond within the allocated review period. If responses are not provided within 45 days, the SCVWD is advised to contact the agency staff supervisor for confirmation to proceed. (See Table 12 -1) If the ACOE needs additional review time for projects requiring compensatory mitigation for permanent impacts, it may provide an initial response on all projects not requiring compensatory mitigation for permanent impacts. If the ACOE does not provide a response on the NPW, only those projects not requiring compensatory mitigation for permanent impacts may proceed. Agencies will provide a response within 45 days.

A "Second Submittal" NPW may be submitted, at the discretion of the SCVWD, for additional project authorization. Late season high flow events are a frequent cause for work to be identified later than is feasible to incorporate into the primary NPW. This "second submittal" enables the SCVWD to identify high priority projects that need to be addressed. The "second submittal" will be submitted by August 1st and will include the same information as the NPW, with the same agency review period and process. While this provides some flexibility to manage the annual work cycle, it will be a smaller, focused list of projects intended to address and appropriately prioritize needed maintenance projects.

12.2.4 Notification of Project Changes

Project changes typically include length (linear distance) and duration of dewatering activities. When changes are requested the following information will be provided as appropriate, such as:

1. Project length – Waivers for extending the length of a project may be granted via a waiver request in the NPW, as described in Chapters 5 and 6.
2. The dewatering BMP will allow project dewatering to extend an additional 30 days beyond completion of the project, though project work windows still apply.

For any other project changes that may be requested, the SMP Project Manager will send an email to all agencies, but state in the body of the email which agencies have authority over the project. The SCVWD will request written responses from agencies with jurisdiction for the project within three (3) business days.

12.2.5 Projects Not Requiring Notification

The following activities will not be subject to any notification requirements:

1. Beyond Top of Bank Vegetation
   a. Routine Pruning – Overhanging Growth (of roadways and fence lines)
      i. OHG in the PMAs
      ii. Pruning of vegetation that is expected to result in the removal of less than 0.01 acres (436 sq ft) of riparian vegetation per project.
   b. Corrective Pruning
   c. Coppicing
   d. Flaming

e. Grazing
f. Herbicide spraying on maintenance roads and revegetation sites.

2. Mowing, unless it is in sensitive habitats such as wetlands or woody riparian vegetation or there are potential impacts to special-status species (see Table 10-10).

3. Minor Maintenance sediment removal on non-anadromous salmonid channels.

4. All other Minor Maintenance activities that will impact less than 0.01 acres of wetland or riparian vegetation per work site.

12.3 Annual Summary Report

The Annual Summary Report (ASR) will report on bank stabilization monitoring sites, sediment characterization results (per Attachment G - Sediment Characterization Plan), and Water Quality Monitoring reports (per Attachment H - Water Quality Monitoring Plan). Annual mitigation monitoring report(s) may be submitted separately or as an attachment to the ASR. The ASR will include actual impact numbers (e.g., linear footage/acreage) for activities where such numbers were only estimated in the NPW. The SCVWD shall submit the annual summary report by January 31. The ASR will describe maintenance activities completed the previous year, will list what projects were proposed in the NPW but not performed, and will include, by work activity:

1. Sediment removal conducted during the preceding maintenance season:
   a. Project identification number;
   b. Creek name and location of impact (including channel stationing and observable landmarks, such as street crossings);
   c. Channel type;
   d. A description of site conditions encountered, vegetation types and approximate density;
   e. A detailed description of the type, size, and amount of vegetation removed and how the vegetation was removed, highlighting any changes from what was proposed in the NPW;
   f. A brief description of any water quality problems or impacts encountered during maintenance activities;
   g. A description of special-status species impacts;
   h. A detailed description of sediment removed: including the length, width, and depth of sediment removed, and how the sediment was removed, highlighting any changes from what was proposed in the NPW;
   i. Photographs: The ASR shall include pre-project and post-project photographs for each maintenance site;
   j. Results of sediment characterization;
   k. Anadromous salmonid channels will include the post-project assessment as described in Attachment I;
   l. Mitigation:
      i. Creek name and location of mitigation (including channel stationing and observable landmarks, such as street crossings);
      ii. Anticipated mitigation site conditions (including a description of vegetation and approximate density of plants and special-status species potentially occurring on the site immediately prior to mitigation);

iii. A description of the amount and type of mitigation implemented, or which will be implemented, including on-site mitigation;
iv. Identification of activities that are proposed for mitigation credits; and
v. Identification of maintenance sites and activities proposed for inclusion into the PMA pool of work areas.
vi. Monitoring of mitigation features in anadromous salmonid channels will be consistent with Attachment I.

2. Bank Stabilization conducted during the preceding maintenance season:
   a. Project identification number;
   b. Creek name and location of impact (including channel stationing and observable landmarks, such as street crossings;
   c. Channel type;
   d. A detailed description of the bank stabilization work performed, highlighting any changes from what was proposed in the NPW;
   e. A detailed description of the type, size, and amount of any vegetation removed and how the vegetation was removed, highlighting any changes from what was proposed in the NPW;
   f. A description of special-status species impacts;
   g. A brief description of any water quality problems or impacts encountered during maintenance activities;
   h. Photographs: The ASR shall include pre-project and post-project photographs for each maintenance site.
   i. Anadromous salmonid channels will include the post-project assessment as described in Attachment I.
   i. Mitigation:
      i. Creek name and location of mitigation (including channel stationing and observable landmarks, such as street crossings);
      ii. Anticipated site conditions (including a description of vegetation and approximate density of plants and special-status species potentially occurring on the site immediately prior to mitigation);
      iii. A description of the amount and type of mitigation implemented, or which will be implemented, including on-site mitigation;
      iv. Identification of activities that are proposed for mitigation credits; and
      v. Identification of maintenance sites and activities proposed for inclusion into the PMA pool of work areas.
      vi. Monitoring in mitigation features in anadromous salmonid channels will be consistent with Attachment I.

3. Monitoring of Bank Stabilization Sites: Sites identified per the requirements in Chapter 11, shall be monitored and reported in years 3 and 5 after construction.

4. Large Woody Debris (LWD)
   a. Mitigation debt as determined by Attachment E for Tier 4.
   b. Mitigation payment/credit. This will be included in the mitigation approach description per work activity.
   c. Mitigation debt as determined by Attachment E for Tier 4.
      i. Project identification number;
      ii. Creek name and location – LWD impact
      iii. Creek name and location – LWD mitigation, only if different.

   iv. Channel type of LWD mitigation site (modified, modified with ecological value, or unmodified).
   v. Amount of mitigation owed, cubic yards (cy).
   vi. Amount of mitigation estimated to be placed, cubic yards (cy).

5. Vegetation Removal for Ecological Health/Stewardship
   a. Project identification number:
   b. Creek name and location of work site (including channel stationing and observable landmarks, such as street crossings);
   c. A description of site conditions encountered, vegetation types and approximate density;
   d. Channel type;
   e. Purpose for vegetation removal;
   f. Detailed description of the type, size, and amount of vegetation removed;
   g. Creek name and location of mitigation site (including channel stationing and observable landmarks, such as street crossings); and
   h. Listed species habitat areas as mapped under the SMP, federal and state listed species occurrences and/or designated critical habitat and/or essential fish habitat.

6. Sediment Characterization Plan: This report shall summarize sediment characterization results for which the SCVWD submitted a proposal for re-use of sediments that exceeded the Beneficial Re-use Guidelines as specified in the Sediment Characterization Plan.

7. Water Quality Monitoring Plan: This report shall describe monitoring results in accordance with the Water Quality Plan.

8. Minor Maintenance: This report shall describe minor maintenance activities that resulted in impacts greater than 0.01 acre of wetlands or riparian habitat. Minor maintenance vegetation projects that are less than 0.01 acre per work site are exempt from annual notification requirements and may occur any time consistent with the SMP Manual.

9. California EcoAtlas: It has been determined through regional, state, and national studies that tracking of mitigation/restoration projects must be improved to better assess the performance of these projects, following monitoring periods that last several years. Therefore, the SCVWD shall provide Regional Water Board staff with the information necessary to use the California Wetlands Form to provide an annual summary of SMP projects reported in the ASRs. San Francisco Bay Regional Water Board staff will complete the standard California Wetlands form using the information provided in the ASRs. The SCVWD shall electronically submit the completed standard form and map(s) showing the locations and boundaries of all SMP projects to habitatdata@waterboards.ca.gov.

10. Mitigation and Monitoring Report: This report shall describe monitoring results of mitigation sites identified in the NPWs as specified in the Mitigation Approach, as described in Chapter 11. The SCVWD shall provide reports until mitigation success criteria have been achieved; construction at the mitigation site(s) is complete; and a notice of mitigation completion has been submitted to the Regional Water Boards' Executive Officer. After submittal of the acceptable notice of mitigation completion, submittal of annual mitigation monitoring reports is no longer required.

a. Depending on the size, functions, and values of the natural resources enhanced and restored on-site as mitigation activities, if the area restored exceeds the required mitigation ratio, then the excess mitigation can be applied (as appropriate) to another specifically identified mitigation need associated with another bank stabilization project.
b. For land acquisition provided as mitigation in perpetuity for all sediment removal and vegetation maintenance activities conducted under the SMP, a long term management plan and easement will be developed, acceptable to the Regional Water Board's Executive Officer.

11. A list of project names and Project identification numbers that were included in the NPW but were not performed.

12. IPMP reporting will provide details regarding the species treated, control methods used, and locations of treatment work. Recommendations will be provided, including future management needs and the feasibility of active revegetation, if necessary. Tier 1 (from Table 1 of Attachment D) will be reported in years 1 and 3. Tier 2 will be reported in years 1, 3, and 5.

13. Riparian Planting and Revegetation / Tree and Shrub Replacement
    Annual monitoring reports will be submitted as part of the ASR in years 1, 3, and 5. Results of qualitative monitoring that is conducted in years 2 and 4 will be included in monitoring reports prepared for years 3 and 5. Maps showing monitoring locations and representative photographs will be included with each report.

    Reports will be prepared in the following format:
    - Introduction
    - Methods
    - Results
    - Discussion (including performance in relation to success criteria)
    - Management Recommendations
    - Literature Cited
    - Appendices

    And include the following items:
    a. Plant species;
    b. Percent survival for the entire site;
    c. Discussion (habitat development and comparisons to success and performance criteria for each site)
    d. Remedial actions taken;
    e. Future management recommendations;
    f. Natural recruitment notes; and
    g. Status of irrigation (increased/decreased/removed).

14. Animal Conflict Management
    a. Rodenticide
        i. Project identification number;
        ii. Creek name and location of mitigation (including channel stationing and observable landmarks, such as street crossings);

iii. Anticipated site conditions (including a description of vegetation and approximate density of plants and special-status species potentially occurring on the site immediately prior to work);
iv. Describe what type was used (strychnine, zinc phosphide, anticoagulant);
v. Effectiveness of carcass surveys (summarize the results of the carcass surveys, including number and type of species);
vi. If any problems arose, and effects to any special status and common species that were observed.

b. Trapping
   i. Project identification number;
   ii. Creek name and location of mitigation (including channel stationing and observable landmarks, such as street crossings);
   iii. Anticipated work site conditions (including a description of vegetation and approximate density of plants and special-status species potentially occurring on the site immediately prior to work);
   iv. Effectiveness (summarize the results, including number and type of species);
   v. If any problems arose, and effects to any special status and common species that were observed.

c. Burrow destruction
   i. Project identification number;
   ii. Creek name and location of mitigation (including channel stationing and observable landmarks, such as street crossings);
   iii. Anticipated work site conditions (including a description of vegetation and approximate density of plants and special-status species potentially occurring on the site immediately prior to work);
   iv. Type of destruction performed: slurry filling, covering of burrows;
   v. If any problems arose, and effects to any special status and common species that were observed.
   vi. Is there a net increase/decrease in rodent burrows being observed as a result of burrow filling or collapsing?

12.4 Data Management

The SCVWD will electronically store SMP project information, including project notification packages, annual monitoring reports, and agency correspondence, over the entire period of the program (i.e., at least the 10-year period of 2014-20123. This information can be used in GIS to track SMP projects and mitigation. This information will identify SMP project locations and dimensions and provide historical information that will facilitate cumulative impact analyses throughout the life of the program.

This information will help ensure that both project impacts and enhancement of habitat and other aquatic resource functions in the SMP-2 coverage area are well documented and adequately monitored to achieve the program goal of no net loss of aquatic and other ecological resource functions.

Information will be provided in a software format accessible to all agency staff. In its current format, Microsoft Excel would be the most compatible format at this time. The SCVWD will, at a minimum, providing the following data to the regulatory agencies to facilitate its use in GIS.

The NPW and ASR submittal processes will be evaluated after the first two years of SMP-2. If it is determined that regulatory agency staff is not reviewing, using, or applying the submitted information, the information to be included in these reports will be discussed and renegotiated. Verification of receipt of reports submitted to the agencies will be provided via electronic signature of the file opening.

Data parameters

- Latitude
- Longitude
- Project identification number
- Year
- Creek name
- Station from
- Station to
- Size of project area
- Type of mitigation paid, if any
- Related mitigation project identification number
    - Year installed
    - Creek name
    - Station from
    - Station to
    - Size of project area
- Anadromous
- Other listed species habitat

Invasive Plant Management Program (IPMP)

The county-wide vegetation mapping conducted in 2010 by Aerial Information Systems, Inc. (AIS) for the SMP will be used to develop a baseline inventory of invasive species in the SMP footprint. This data layer will be supplemented with pertinent information collected by SCVWD staff and regional databases (e.g., CAL-IPC, Cal Flora, etc.) to establish the Year 1 baseline inventory.

The inventory will be updated annually based on field inspection data collected by Vegetation Management staff, biologists, and Field Operations Administrators. Over the life of the program, important information will be collected regarding the distribution of invasive species in Santa Clara County watersheds, their overall ecological impact, the efficacy of management efforts, and the best direction for future management to reduce the negative ecological impacts of invasive plants.

Anadromous Salmonid Compensatory Mitigation Sites

A list of potential gravel augmentation projects in designated watersheds will be developed in collaboration with the resource agencies during the initial two (2) years of SMP-2. Assessments will continue to be conducted for work that is performed for gravel extraction during this period; with assessment results being reported and gravel volumes tallied. With concurrence from the resource agencies, the SCVWD may combine the mitigation requirements within a watershed and mitigate at a single mitigation site for both gravel and instream habitat complexity. Conversely the District may need to use several separate mitigation sites within a watershed to fulfill all mitigation obligations. When the annual NPW identifies the need for mitigation of impacts to gravel, the resource agencies will approve the SCVWD's selection of gravel augmentation projects from this list. As new mitigation site opportunities are identified over the

permit period, these sites will be submitted to the agencies for addition to the gravel augmentation projects' list.

12.5 Future Planning and Permit Reauthorization

Lessons Learned

After each maintenance season, the SCVWD and agency staff may meet in February or March to discuss the performance of the SMP and review lessons learned from the completed construction season. Since project specific problems will already be included in the ASR, Lessons Learned meetings will only occur if large scale problems arose that should be discussed and all agency representatives can participate in the meeting. The Lessons Learned meetings may also be used to revise BMPs.

After four years of SMP implementation, the SCVWD, ACOE, CDFW, and Water Board(s) will review the SMP to evaluate its overall effectiveness. The review will include an assessment of maintenance activities conducted, BMPs, adequacy of the SMP mitigation program, data management, adaptive updates and SMP Manual revisions, and overall program coordination and communication. The SMP Manual and permit authorizations may be revised or updated based on this review. It is understood by all parties that while an automatic renewal of permit authorizations is not presumed, it is also understood that without any critical issues being raised or detrimental environmental effects caused by SMP actions, the issuance of permit authorizations for an additional five years would be granted.

The USFWS and NMFS are expected to issue 10-year Biological Opinions that will not require a 5-year update process.

Reporting Requirements

The NPW and ASR submittal processes will be evaluated after the first two years of SMP-2 and again at year 5. Based on this information, the information to be included in these reports may be revised and simplified upon agreement by the SCVWD and regulatory agency staff.

Guidelines for Future Permit Renewals

The SMP-2 update process brought the regulatory agencies together over a 3 year period to comment and assist in the development of the SMP-2 program. While a collaborative approach is often desirable, individual agency regulatory changes, timing to acquire permits while maintaining a continuous implementation of the SMP, are key challenges. Decisions made by agencies and the SCVWD early into the process may need to be changed due to timing constraints and priorities later in the process.

It is recommended SMP-3 development process consider these factors. Questions such as: "what program changes may be needed by SCVWD", "what elements of the program weren't ideally suited to meet SCVWDobjectives", "did the mitigation structure work", "are there elements of the program that could be combined or simplified", "are there regulatory changes that would necessitate large program changes", "is the SMP an effective tool compared to other regulatory venues", "is there a critical time limitation"? Answers to these questions and discussions with regulatory agency staff will assist in creating a more efficient and effective SMP.

Table 12-2. List of Agency Representatives

Last	First	Agency	Title	Phone	E-mail
Blinn	Brenda	California Department of Fish & Wildlife	Senior Environmental Scientist (Supervisor)	(707) 944-5541	Brenda.Blinn@wildlife.ca.gov
Schane	Tami	California Department of Fish & Wildlife	Environmental Scientist	(415) 831-4640	tami.schane@wildlife.ca.gov
Weightman	Craig	California Department of Fish & Wildlife	Environmental Program Manager	(707) 944-5577	Craig.Weightman@wildlife.ca.gov
Wilson	Scott	California Department of Fish & Wildlife, Bay Delta Region 3	Acting Regional Manager	(707) 944-5584	Scott.Wilson@wildlife.ca.gov
Valiela	Luisa	EPA		415-972-3400	valiela.Luisa@epamail.epa.gov
Ambrose	John	NMFS		707-575-6091	Jonathan.Ambrose@NOAA.gov
Stern	Gary	NMFS		(707) 575-6096	Gary.stern@noaa.gov
Beth	Margarete (Maggie)	RWQCB, SF	Environmental Specialist	(510) 622-2338	mabeth@waterboards.ca.gov
Hurley	Bill	RWQCB, SF	Section Lead (Supervisor to M. Beth)	(510) 622-2364	WHurley@ waterboards.ca.gov
Lee	Shin-Roei	RWQCB, SF	Watershed Division Chief	(510) 622-2376	SRLee@waterboards.ca.gov
White	Dyan	RWQCB, SF	Assistant Executive Officer	(510) 622-2441	DWhyte@waterboards.ca.gov
Rohrbough	Jon	RWQCB-Central Coast	Water Resource Control Engineer	(805) 549-3458	Jon.Rohrbough@waterboards.ca.gov
Hammer	Phil	RWQCB-Central Coast	401 Section Lead (Supervisor to J. Rohrbough)	(805) 549-3882	Phil.Hammer@waterboards.ca.gov
McCann	Lisa	RWQCB-Central Coast	Watershed Planning and Protection Manager	(805) 549-3132	Lisa.McCann@waterboards.ca.gov
Batha	Bob	SF Bay Conservation and Development Commission (BCDC)		415-352-3612	bobb@bcdc.ca.gov
Hicks	Jane	USACE	Division Manager Regulatory, South Branch	(415) 503-6769	jane.hicks@usace.army.mil
Mangione	Lisa	USACE	Regulatory Project Manager Regulatory Division, South Branch	(415) 503-6763	Lisa.Mangione@usace.army.mil
Griego	Vincent	USFWS		(916) 414-6493	Vincent.Griego@fws.gov
Olah	Ryan	USFWS		(916) 414-6600	ryan.olah@fws.gov

PROJECT NOTIFICATION FORM

As required by the agency authorizations issued for the Stream Maintenance Program (SMP), the Santa Clara Valley Water District is providing this project notification to conduct bank stabilization and non-minor maintenance sediment removal under the SMP. The project specifics are as follows:

Notification Attachment Checklist

- ☐ Checklist of agencies with jurisdiction over project
- ☐ CD/DVD of NPW (additional data may be submitted in a program suitable to be converted to mapping purposes [Example, Microsoft Excel, shapefiles or xml])
- ☐ USGS 7.5-minute quadrangle project vicinity map
- ☐ Project location included in cover map of all projects in this SMP NPW (at sufficient scale to identify waterway)
- ☐ All projects included in NPW shown and referenced by SMP Project number listed in block 1. of the notification form
- ☐ Projects color coded by activity type: e.g. non-minor maintenance sediment removal, bank stabilization
- ☐ Cross-section of repair (delineate ordinary high-water mark [OHWM], mean high- water mark, and/or high tide line)
- ☐ Site plan diagram
  - ☐ Showing project footprint including access roads, staging areas, and dewatering activities
  - ☐ Showing delineation of special aquatic sites and other waters of the United States and/or the state

Photographs of Project Site (label photographs accordingly):

☐	Upstream Photograph
☐	Downstream Photograph
☐	Perpendicular Photograph
☐	Photograph of the immediately adjacent land use

- ☐ Map showing federal and state listed species occurrences and/or designated critical habitat and/or essential fish habitat
- ☐ Map showing adjacent SMP repairs (within 500 radial feet), if any.
- ☐ Compensatory Mitigation Plan prepared in accordance with USACE Guidelines, or as otherwise stipulated in the SMP-2 permits.
- ☐ USFWS Review Criteria for Section 7 Off-Site Compensation
- ☐ SCVWD Contact Person: Name, Email, Phone Number, Address

SMP PROJECT NOTIFICATION FORM
Site Assessment Information

1. SMP Project Number:		
2. SMP Project Name:		
3. Water Body Name:	4. Location (channel station):	
5. Date assessment was conducted:		
6. Maintenance staff that conducted assessment:		
7. Engineering staff that conducted assessment:		
8. Environmental staff that conducted assessment:		
9. Directions to Project, including observable landmarks, such as street crossings):		
10. Center Point of Project (Lat/Long in decimal degrees):		
11. UTM northing:	UTM easting:	Zone:
12. ☐ Left Bank OR ☐ Right Bank (Looking downstream)	13. ☐ Outer bend, ☐ Inner bend, OR ☐ Straight section	
14. General channel reach conditions; 15. Description of site conditions requiring maintenance: 16. Has the site been subject to similar SMP maintenance in the past? ☐ Yes ☐ No If so, how often? 17. Will native soil be disturbed? ☐ Yes ☐ No		
18. For bank stabilization projects: Description of pre-erosion condition of levee: Describe, for example, whether rock or other structures or facilities were present.		
19. Description of vegetation at work site: Provide general overview, for example, "the majority of the upper third of the slope is covered by non-native grasses; extending down the slope to the toe of the levee, perennial pepperweed is the dominant vegetation type; and at the toe, where the slope has sloughed off and the soil has pushed into the low-flow channel, some patchy areas of emergent vegetation, including common tules and cattails, are growing."		
20. Description of vegetation at project staging area and access routes:		
21. Description of instream woody material and instream structural elements at bank stabilization site: Describe fallen trees and other instream woody material at the project site. Also describe instream structural elements, such as pump intakes, docks, and other submerged structures that provide flow deflection and hiding cover for fish species. Instream material is considered material that is either crossing the bank or lying adjacent to the bank out to the channel centerline. Describe instream structure as a		

percentage of the project bank-line length, and provide trunk/stem diameter ranges for woody vegetation.
22. Description of vegetation up- and downstream of project site:
23. Sensitive Biological Resources present: ☐ Yes OR ☐ No If yes, describe known resource issues, such as proximity to known habitat or sightings of Chinook salmon, Central Coast steelhead DPS, North American green sturgeon southern DPS, burrowing owl, nesting birds/migratory birds, raptors, SF dusky footed woodrat, western pond turtle, California tiger salamander, California red-legged frog, longfin smelt, least Bell's vireo. and any other state- or federally-listed endangered or threatened species.
24. Cultural Resources present: ☐ Yes OR ☐ No If yes, please summarize below and attach report:
25. Adjacent SMP Repairs within 500 radial feet ☐ Yes OR ☐ No If yes, fill out boxes below and include on map:
Distance from this site (feet):
Date repair completed:
Description of adjacent repair:

Project Description

26. Project Description (including length):					
27. Estimated Start Date:					
28. Estimated End Date: (be clear about when construction activities and restoration activities end):					
29.	Project width (feet):	Project depth/ vertical (feet):	Project Area (square feet and acres):	Approximate levee slope at erosion site:	Approximate scour velocity at erosion site:
30. Volume/material excavated (CY):			31. Volume/material fill (CY):		
32. ☐ Water will OR ☐ will not be present in work area:					
33. Project equipment to be used (including dewatering and construction of temporary access roads):					
34. Dewatering activities: Describe dewatering methodology, including length, and the method for disposing of dewater effluent (for groundwater pumping):					

For bank stabilization projects:

35. Recommended SMP design template: (Select from Attachment A of SMP Manual):

For bank stabilization projects

36. Rationale for design template selection (identifying the least invasive bank stabilization treatment that can withstand the shear stress) and the analysis supporting the selection: Additionally provide rationale for any deviations from selected templates, i.e., only rock not soil filled rock will be used for slope of the bank, or if vegetation plantings will not be placed used as described in the selected template.

37. Project requires temporary access/staging:
☐ Yes ☐ No

38. If temporary access/staging area:
☐ Landside OR ☐ Waterside location

39. Access route: Existing roads will be used (dirt or paved)
☐ Yes OR ☐ No If no, then fill out boxes below:

40. Access Length (feet):	Access Width (feet):	Acres:
41. Staging Length (feet):	Staging Width (feet):	Acres:

42. Will the Access Route and/or Staging Area require grading activities or vegetation disturbance:
☐ Yes OR ☐ No : If Yes, describe activities and amount of vegetation disturbance below:

43. Instream woody material removal required:
☐ Yes OR ☐ No If yes describe fallen trees and other instream woody material to be removed, and attach photograph(s). Also describe instream structural elements that require removal, such as pump intakes, docks, and other submerged structures that provide flow deflection and hiding cover for fish and other federal and state-listed species. Instream material is considered material that is either crossing the bank or lying adjacent to the bank out to the channel centerline. Describe instream structure to be removed as a percentage of the total instream structure along the project bank line length, and provide trunk/stem diameter ranges for woody vegetation.

44. Riparian Habitat Impacts:
☐ Temporary AND/OR ☐ Permanent OR ☐ No Impact: For temporary and/or permanent impacts fill out the boxes below:

Temporary Impacts	Permanent impacts
Linear Feet:	Linear Feet:
Total Area (acres):	Total Area (acres):

45. Vegetation Communities Impacted:
☐ Temporary AND/OR ☐ Permanent OR ☐ No Impact: For temporary and/or permanent impacts fill out the boxes below:

Temporary Impacts	Permanent Impacts
Linear Feet:	Linear Feet:
Total Area (acres):	Total Area (acres):

46. Are trees to be removed due to project activities?
☐ Yes OR ☐ No If yes fill out the boxes below:

Tree Species	Number of trees to be removed	Range of Trunk Diameters (DBH) in inches

47. Impacts below the OHWM of waters of the United States and/or the state:
☐ Temporary AND/OR ☐ Permanent OR ☐ No Impact: For temporary and/or permanent impacts fill out the boxes below:

Temporary Impact area (type and dimensions):	Permanent Impact area (type and dimensions):
Volume/material excavated (CY)	Volume/material excavated (CY)

48. Impacts within wetland boundaries:
☐ Temporary AND/OR ☐ Permanent OR ☐ No Impact:

Temporary Impact area (type and dimension):	Permanent Impacts (type and dimension):
Volume/material excavated (CY):	Volume/material excavated (CY) :

49. U.S. Army Corps of Engineers Regulatory Jurisdiction
Tidal Waters:
☐ Rivers and Harbors Act Section 10 (Mean High Water) AND/OR
☐ CWA Section 404 (High Tide Line)
Non-Tidal Waters:
☐ Rivers and Harbor Section 10 (OHWM); AND/OR
☐ CWA Section 404 (OHWM and/or wetlands)

50. Potential Federally and State-Listed Species Impacts in the Project Area:
☐ Yes OR ☐ No If yes, list species below, including listing status:

51. Is the Project Area within a designated Essential Fish Habitat and/or Critical Habitat area, and if so, for what species?
☐ Yes OR ☐ No Please describe below, and indicate on attached map:

52. Has the waterway been identified as an "anadromous salmonid channel" and whether the proposed project would impact any channel providing habitat for different life cycles for anadromous salmonids (i.e., migration, spawning, rearing, or refugia);
☐ Yes OR ☐ No

53. Would the proposed project impact any channel providing habitat for any life cycle of anadromous salmonids (i.e., migration, spawning, rearing, or refugia)?
☐ Yes OR ☐ No If yes, please describe below:

54. Do the project site and proposed maintenance activity qualify as a Previously Mitigated Area (PMA)?
☐ Yes OR ☐ No

55. Channel type.
☐ Modified ☐ Modified with ecological value ☐ Unmodified

56. For modified and modified with ecological value channel reaches, provide the design flood return period and design flow rate for each reach:

57. Pre-project assessment of coarse substrate and instream complexity to be removed within anadromous salmonid channels (required even if within PMA):

Additional Sediment Removal Notification Requirements:

58. Anticipated mitigation site conditions (including a description of vegetation and approximate density of plants and special-status species potentially occurring on the site), only if not on-site.
59. For unmodified channel reaches, a description of the District's best estimate of the natural condition of the reach, and the assumptions used to develop it.
60. Roughness and sediment objectives for the proposed maintenance, including the assumptions and rationale used to develop the objectives.
61. Vegetation objectives for the proposed maintenance describing the desired vegetation condition (e.g., vegetation type, density, etc.) that optimizes environmental values while still providing the design flood flow conveyance.
62. Determination of any increase in water surface elevation compared to the as-built condition and whether the work site is a hydraulic constriction, or is subject to backwater effects caused by a downstream constriction, using available field data and/or a hydraulic model, if available.
63. Evaluation of alternative approaches that could achieve the same result (e.g., removing a hydraulic constriction, removing sediment instead of instream vegetation, etc.).
64. Anticipated frequency of maintenance.
65. For unmodified reaches, the design flow used for hydraulic analysis, the return period of the selected design flow, and the rationale for selecting the design flow.
66.

Additional Bank Stabilization Notification Requirements:

67. Plan view of the eroded site.
68. Cross-section of the eroded site.
69. Reason for the bank failure.
70. Delineate ordinary high-water mark [OHWM], mean high- water mark, and/or high tide line in repair cross-section.
71. Where hardscape methods are proposed, a discussion of alternatives and a quantitative demonstration of why non-hardscape means of stabilization are infeasible.
72. For any <u>new proposed</u> <u>hardscape</u>, an assessment of the potential fluvial geomorphologic impacts of the activity and/or impact associated with alteration of the channel configuration, including:
    a. The response of flow to stabilization structures or channel shaping, including potential resultant undercutting or erosion to upstream, opposite, and/or downstream bed and banks;
    b. Impacts on vegetation and aquatic habitat resulting from changes in waterbody flow and morphology; and
    c. Impacts to sediment transport within the waterbody.
73. Repair method(s) selected (identifying the least invasive bank stabilization treatment that can withstand the shear stress) and the analysis supporting the selection;

74. CHECKBOX FOR CDFW LISTED SPECIES: Check the appropriate box below: Note: Final determination regarding potential for take of state-listed species to be made by CDFW.
☐ It has been determined that with implementation of the proposed conservation measures the project will not result in take of state-listed species as defined in California Fish and Game Code Section 86.
☐ Take of state-listed species may result
Reason for decision:
75. CHECKBOX FOR NMFS LISTED SPECIES: Check the appropriate box below: Note: Final determination regarding potential for take of federally listed species to be made by USACE
☐ No effect. NMFS will NOT be consulted [sensitive species/habitat administered by NMFS are not present in the project area and indirect effects will not occur.]
☐ Project may affect the following federally listed species and qualifies for application of the NMFS Biological Opinion for the SMP
Reason for decision: Provide a rationale for the effects determination for each NMFS-protected species listed in the 'Potential Species Impacts in the Project Area' box, incorporating information from the 'Sensitive Biological Resources Present' box.
76. CHECKBOX FOR USFWS LISTED SPECIES: Check the appropriate box below: Note: Final determination regarding potential for take of federally-listed species to be made by USACE
☐ No effect. USFWS will NOT be consulted [sensitive species/habitat administered by the USFWS are not present in the project area and indirect effects will not occur.]
☐ Project may affect the following federally listed species and qualifies for application of the USFWS Programmatic Biological Opinion for the SMP.
Reason for decision: Provide a rationale for the effects determination for each USFWS-protected species listed in the Potential Species Impacts in the Project Area box, incorporating information from the Sensitive Biological Resources Present box.
77. Compensatory Mitigation (both on-site and off-site): Describe means by which compensatory mitigation will be achieved for impacts in USACE, USFWS, NMFS, RWQCB, and CDFW jurisdiction. Attach compensatory mitigation plan and/or USFWS Review Criteria for Section 7 Off-Site Compensation as appropriate. 78. Proposed mitigation ratio and calculations used to determine proposed ratio. 79. Identification of activities that are proposed for mitigation. 80. Mitigation proposal (*instream complexity, gravel augmentation) for anadromous salmonid channels only*:

81. Non-land-based mitigation for one-time impacts :
    a) Description of mitigation activities that are proposed; and
    b) Identification (including map) of any areas that are proposed for inclusion into the PMA pool of work areas.
    c) Map of location of mitigation activities associated with this project.

82. Creek name and location of mitigation (including channel stations and observable landmarks, such as street crossings).

83. Anticipated mitigation site conditions (including a description of vegetation and approximate density of plants and special-status species potentially occurring on the site), only if different.

84. Proposed planting plan for temporarily disturbed areas.

85. Proposed success criteria if proposing IPMP.

ATTACHMENT A

Bank Stabilization Methods

Attachment A - Bank Stabilization Methods

Introduction

Attachment A includes the range of methods available for conducting stream bank stabilization in the Stream Maintenance Program.

For each method, a stream flow velocity that is appropriate for that design is included. However, stream velocities will vary with the type of vegetation, the maturity of the vegetation, and the channel type. Bank stabilization projects in unmodified channels and modified channels with ecological value are designed in consideration of both impact avoidance and acceptable risk of flooding and damage to District facilities. The factors and rationale supporting the District's determination of "acceptable risk" will be included in the NPW.

For all methods that include a revegetation or planting component, the following planting guidelines apply:

The plant palette will be based on an evaluation of the vegetation communities up- and down- stream of the erosion site, and the local soil, moisture, and hydraulic conditions. The species' relative erosion control effectiveness will also be considered. Plants utilized in the restored project area will consist of native herbaceous, shrub and/or tree species, or a mixture of these species selected from the SMP plant palette provided in Table 10-7 of the Program Manual. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows:

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live stakes/cuttings:	2 feet average on-center

For any tree removals or other associated vegetation impacts with the project, mitigation will be accounted for separately.

Attachment A applies to on-site[1] mitigation associated with bank stabilization activities authorized under the SMP. Off-site mitigation (i.e. mitigation outside the footprint of the authorized bank stabilization structure) requires submittal of compensatory mitigation plans to the permitting agencies (see Chapter 10 and SMP2 permits). Off-site compensatory mitigation plans must be approved in writing by the agencies, and must be implemented prior to or concurrent with the bank stabilization impacts for which off-site mitigation is being provided.

For off-site mitigation sites located within the mapped SMP coverage area, the compensatory mitigation plans must include a map showing the location of the mitigation site, an SMP mitigation site identification number, a planting plan diagram (to scale), planting specifications, and the date the plantings are to be installed. For off-site mitigation sites outside of the mapped SMP coverage area, the compensatory mitigation plans must be prepared in accordance with the USACE mitigation plan requirements for general permits (33 CFR 332.4[c]) and the most current version of the USACE San Francisco District's Mitigation and Monitoring Proposal Guidelines.

[1] For the purposes of this document, on-site is within the project disturbance area. Off-site is outside of the project disturbance area.

Attachment A - Bank Stabilization Methods

#1: Earth Repair

Description:

Earth repair involves the replacement and repair of eroded channel banks using compacted soil. The eroded slope is scarified and readied for fill placement. A three-foot deep key is cut into the invert. Fill is placed and compacted 80% to 90% in 8-inch lifts. The new slope is trimmed to a 2:1 slope. The surface is seeded with fast sprouting native grass species. Geotextile/erosion control fabric is placed over hydroseeding to secure newly compacted bank, where needed per site velocity and bank slope.

The fill material needs to be appropriate to this purpose. There should be no deleterious or organic material or other debris contained in the fill. The Atterberg Plasticity Index of the material should be between 15 and 25, with the Liquid Limit no higher than 40. The material must contain at least 20% clay (by weight) passing U.S. standard sieve number 200.

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter.

Appropriate for local stream velocities of 6 feet per second or less.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. Seed shall be hydroseeded or hand seeded as site conditions require. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

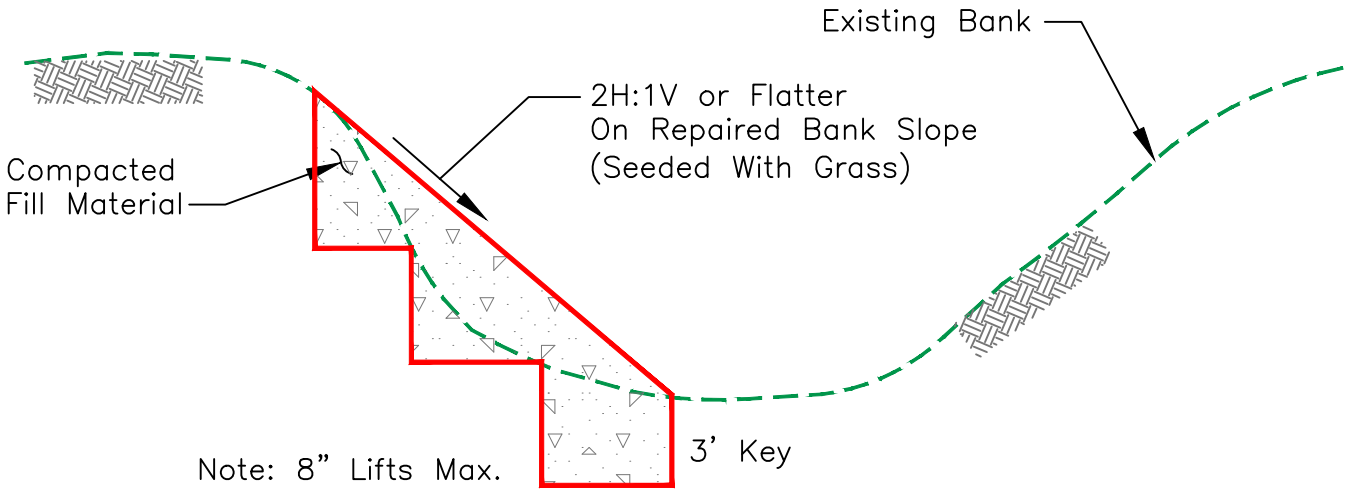
Habitat Impact Assessment:

Channel bottom:	Provides limited biotic resources
Bank:	Provides limited biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits.

This repair method includes revegetation of the repair area using native grass and herbaceous species. This repair method will only be used on grass-lined channels where grass is the predominant vegetation, and that contain no significant (i.e. more than scattered, isolated trees and shrubs) riparian vegetation. Consequently, no additional mitigation is required. If trees and shrubs are removed as part of the bank repair they will be replaced pursuant to the requirements set forth in Chapter 10.

Attachment A – Bank Stabilization Methods
#1: Earth Repair



SECTION

#1: Earth Repair

Before – Quimby Creek u/s White

After – Quimby Creek u/s White

Attachment A - Bank Stabilization Methods

#1A: Earth Repair with Buried Rock

Description:

Earth repair with buried rock protects against erosion scour and stabilizes excavated or steep channel embankments. The buried rock (rock buttress) contributes to slope stability and prevents embankment failure (e.g., slumps, slides, sags). The rock structure will guard against bank scour, loss of adjacent property, protect infrastructure, and arrest future erosion, thereby reducing the loss of riparian vegetation during high flow events. The rock buttress is buried and compacted earth is placed over the top to provide an area for revegetation. No hardscape features are visible above-ground upon completion of this method.

The buried rock typically requires a cutoff wall to prevent undermining. The cutoff wall is an excavated trench with revetment, rock, or boulders placed inside. The rock buttress is composed of rock revetment or boulders placed and stacked in such a manner as to construct a gravity retaining wall. The buttress height is limited and may be installed on cut benches in the embankment for purposes of stability. Earth is placed in successive lifts adjacent to the base of the rock buttress and over the tops of the boulders. Once the earth has been placed, the overbuilt embankment is cut and trimmed back to match the upstream and downstream channel side slopes and toes.

Design Criteria:

Appropriate on bank slopes of 1.5:1 or flatter.

Appropriate for local stream velocities of 6 feet per second or less.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

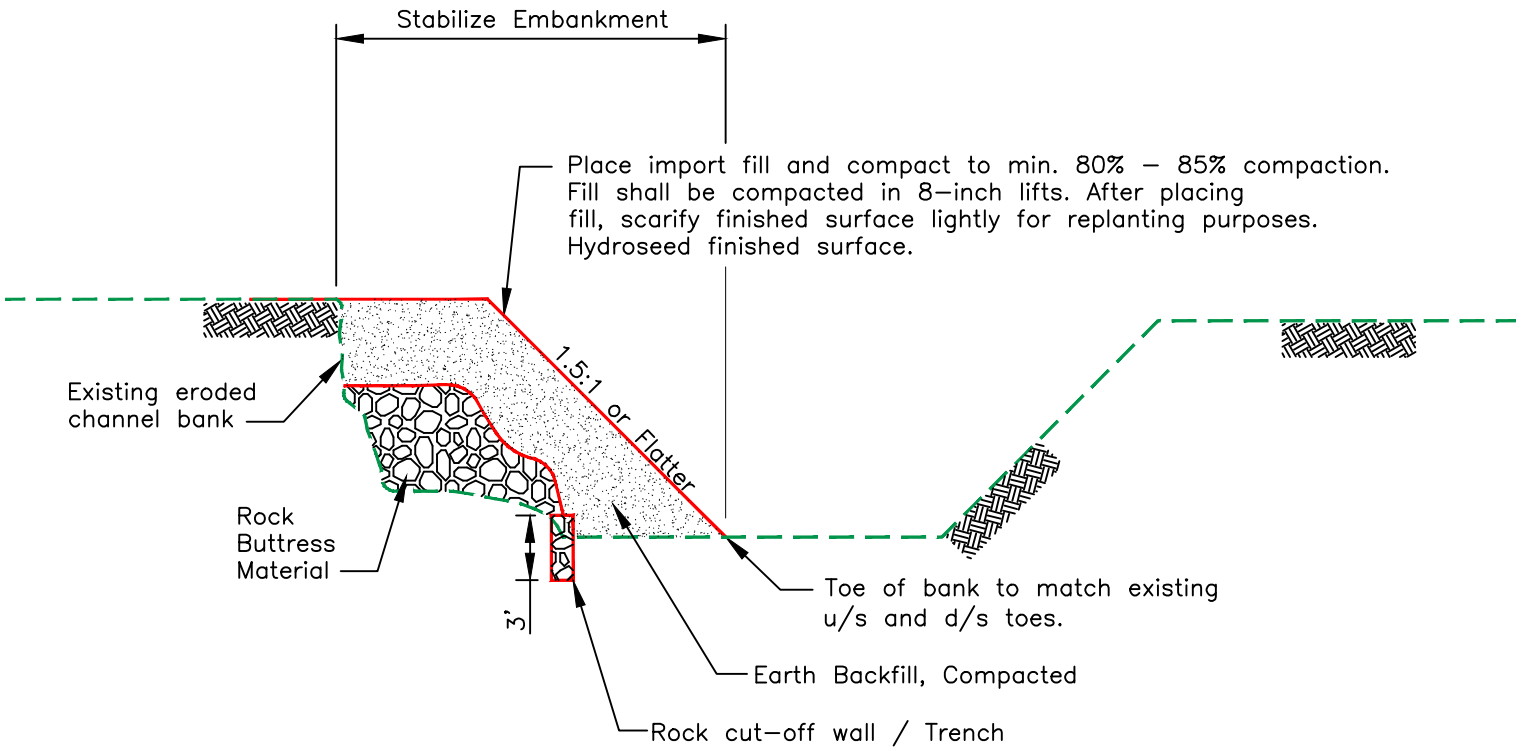
Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live Stakes/Cuttings:	2 feet average on-center or as rock placement allows

Habitat Impact Assessment:

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits. This repair method includes revegetation of buried revetment. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

Attachment A – Bank Stabilization Methods
#1A: Earth Repair with Buried Rock



SECTION

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Attachment A - Bank Stabilization Methods

#1B: Earth Repair with Boulder Base

Description:

Earth repair with rock base is used to protect against erosion scour and stabilizes steep embankments. This method is typically applied to small “flashy” channels in order to stabilize and prevent embankment failure. Due to the high erosive stresses on the channel embankments during storm events, the rock base will be sized appropriately to the localized hydraulic conditions to protect against bank scour, and loss of embankment material above the rock base. Compacted earth (80% to 90% relative compaction) is placed over the rock base to provide a uniform slope transition from the rock base to the top of bank.

The final earth repair slope will be consistent with the design criteria. At the upstream and downstream limits of the restored creek bank, the transitions zones will provide a bank slope similar to the adjacent channel conditions. Erosion control for the new earth slope will include the installation of seeding with fast sprouting native grass species, or applying geotextile/erosion control fabric over hydroseeding to secure the newly compacted bank.

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter for live construction section. 1.5:1 or flatter for boulder section.

Boulders must be keyed in (minimum 3 feet deep) at the base of the bank.

Appropriate for local stream velocities of 6 feet per second or less.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

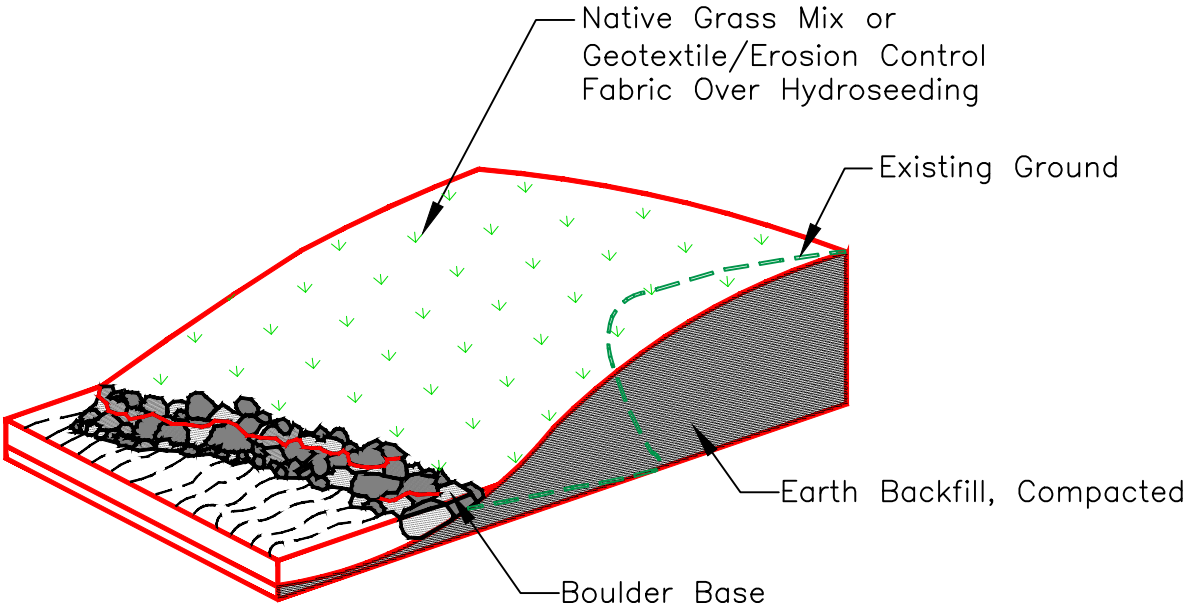
Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live Stakes/Cuttings:	2 feet average on-center or as rock placement allows

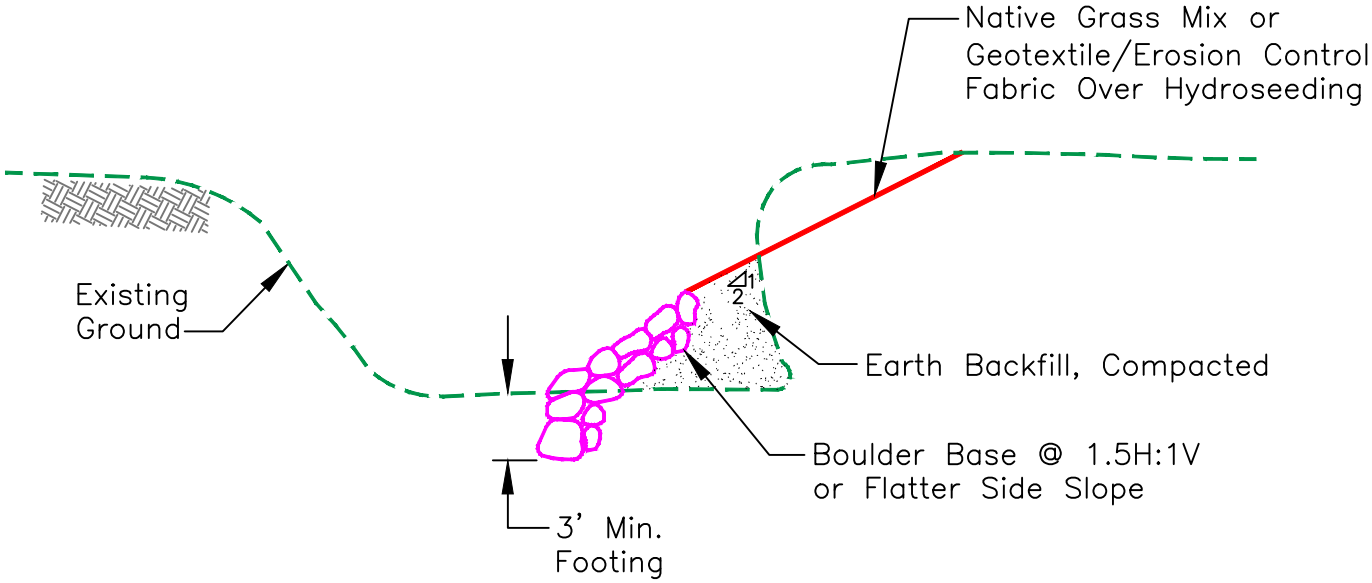
Habitat Impact Assessment:

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

Attachment A – Bank Stabilization Methods
#1B: Earth Repair With Boulder Base





SECTION

#1B: Earth Repair with Boulder Base

Before – Canos Creek u/s Hillsdale

After – Canos Creek u/s Hillsdale

Attachment A - Bank Stabilization Methods

#2: Live Construction

Description:

Live construction consists of traditional methods of grading slopes and planting live grasses and other plants to control erosion and to restore habitat. Vegetation planting methods commonly used include cuttings, transplants, live staking, and direct seeding (including hydro-seeding). Biodegradable erosion control materials will be used where necessary in conjunction with live construction to assist in plant establishment.

Excellent revegetation potential. Most successful in stream banks where moderate erosion and channel migration are anticipated. Bank slope, eroding velocity, and reinforcement at the toe of the bank are limiting factors. Enhances conditions for colonization of native species. Stream bank soil materials, probable groundwater fluctuation, and bank loading conditions are factors for determining appropriate design.

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter.

Appropriate for local stream velocities of 6 feet per second or less.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live Stakes/Cuttings:	2 feet average on-center or as rock placement allows

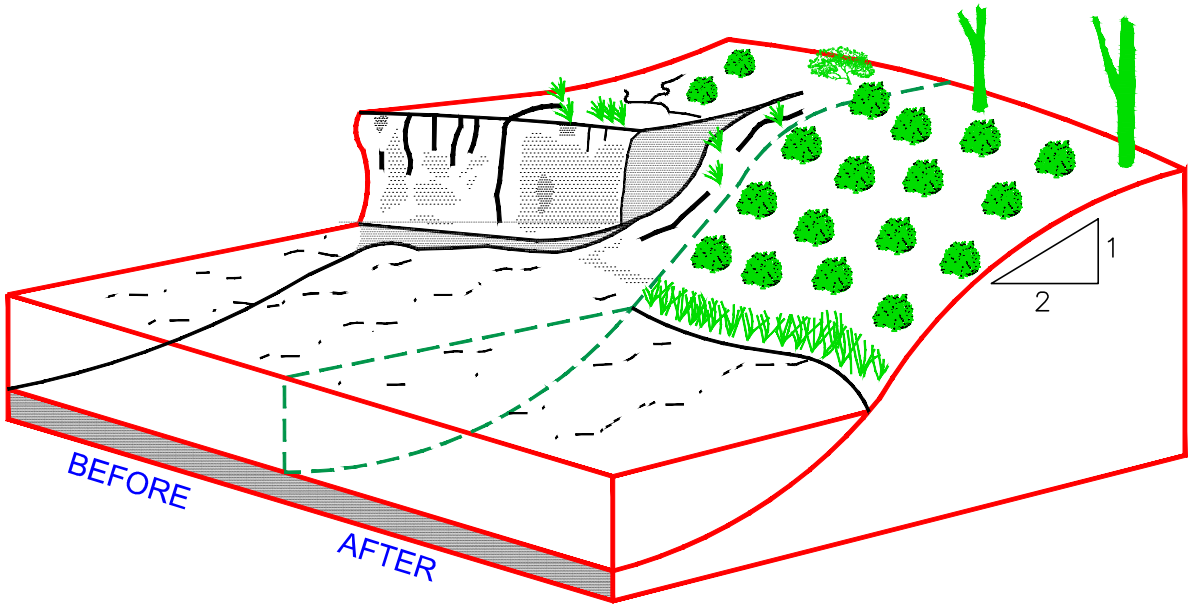
Habitat Impact Assessment:

Channel bottom:	Enhances biotic resources
Bank:	Enhan ces biotic resources

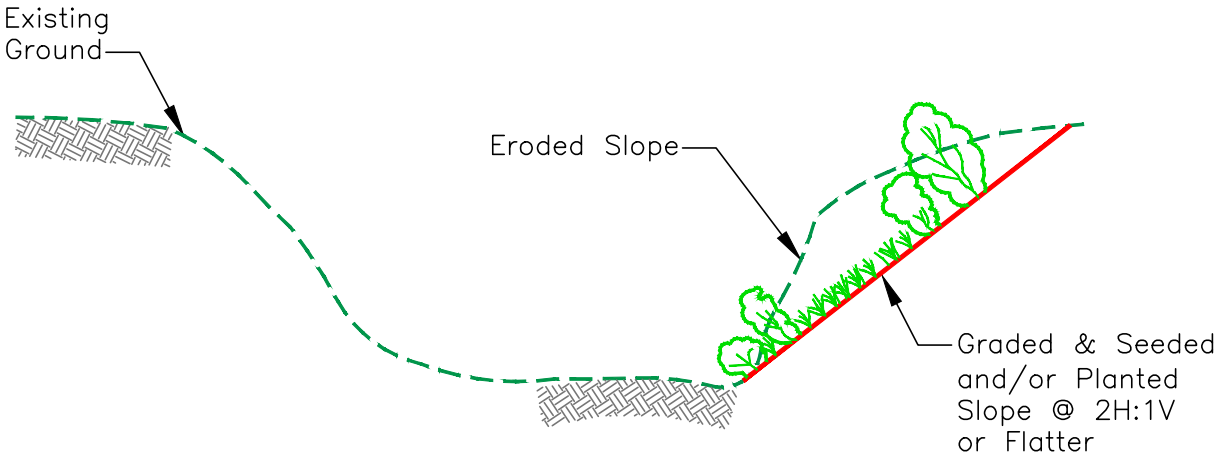
Mitigation: On-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Attachment A – Bank Stabilization Methods
#2: Live Construction



Source: Adapted from Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



SECTION

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Attachment A - Bank Stabilization Methods

#2A: Live Construction with Boulder Base

Description:

Live construction consists of traditional methods of grading a flatter slope and planting live grasses and other plants to control erosion. Vegetation planting methods commonly used include cuttings, transplants, live staking, and direct seeding (including hydro-seeding). Biodegradable erosion control materials are used where necessary in conjunction with live construction to assist in plant establishment.

Appropriately-sized boulders are placed along the base of the rebuilt bank up to the elevation indicated by the hydraulic analysis and ecological site conditions. Voids in between the boulders can be planted using live stakes.

Excellent revegetation potential. Enhances conditions for colonization of native species. Streambank soil materials, probable groundwater fluctuation, and bank loading conditions are factors for determining appropriate design.

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter for live construction section. 1.5:1 or flatter for boulder section.

Boulders must be keyed in (minimum 3 feet deep) at the base of the bank.

Appropriate for local stream velocities of 6 feet per second or less.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live Stakes/Cuttings:	2 feet average on-center or as rock placement allows

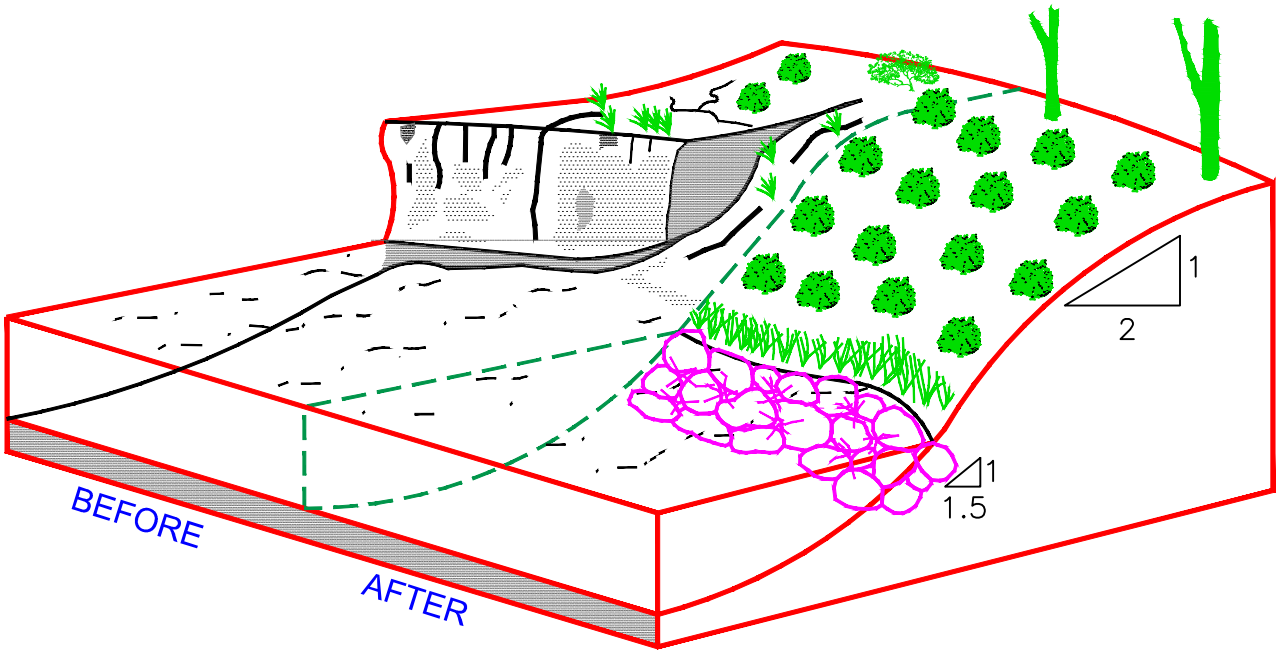
Habitat Impact Assessment:

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

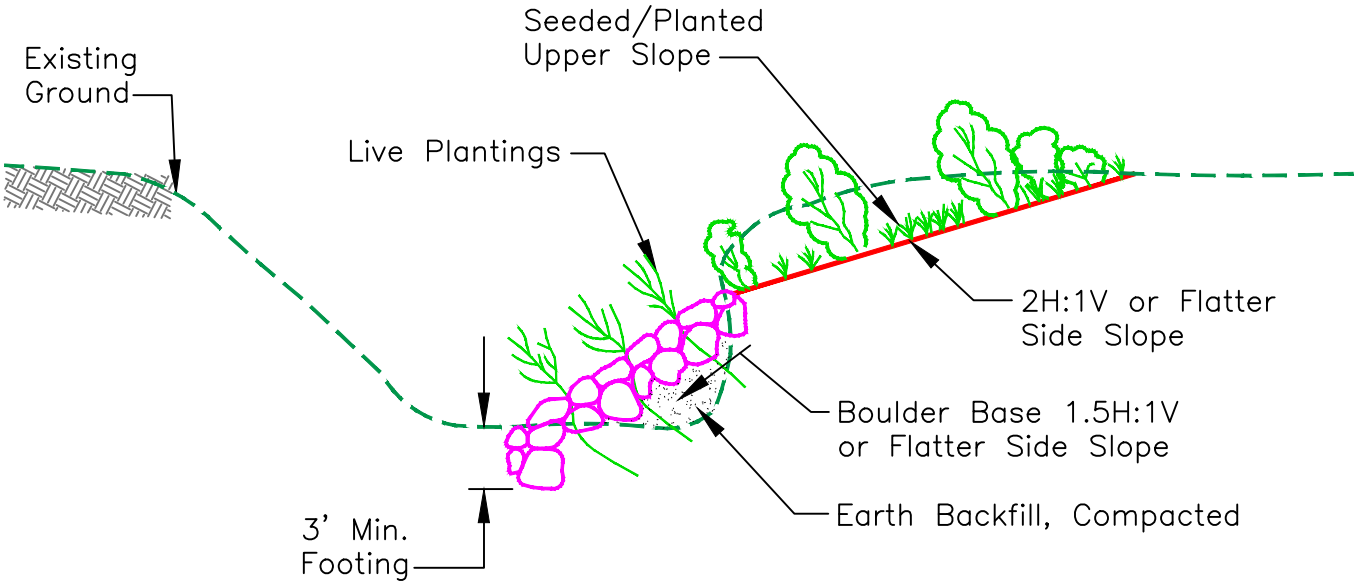
Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Attachment A – Bank Stabilization Methods
#2A: Live Construction with Boulder Base



Source: Adapted from Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



SECTION

#2A: Live Construction with Boulder Base

Before – Canos Creek u/s Hillsdale

After – Canos Creek u/s Hillsdale

Attachment A - Bank Stabilization Methods

#2B: Live Construction with Log Base

Description:

Live construction consists of traditional methods of grading a flatter slope and planting native vegetation to control erosion. Biodegradable erosion control materials are used where necessary in conjunction with live construction to assist in plant establishment[1].

Logs are anchored to the bed and/or native bank up to ordinary high water mark or the elevation indicated by the hydraulic analysis. Determine scour depth, log size (typically between 6 inches to 24 inches in diameter), and anchor system based on specific site conditions. Root wads may also be used where applicable and/or available.

This repair method is used to protect the toe line from erosion. It is especially useful for long straight channel reaches. The logs provide immediate protection from erosion while live branch cuttings contribute long-term durability and ultimately replace the decaying logs[2].

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter for live construction section. 1.5:1 or flatter for the log base section.

Install the log base with anchors.

Appropriate for local stream velocities of 15 feet per second or less.

A typical planting plan is illustrated in Figure 10-9 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-8. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-8. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live Stakes/Cuttings:	2 feet average on-center or as log placement allows

Habitat Impact Assessment:

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

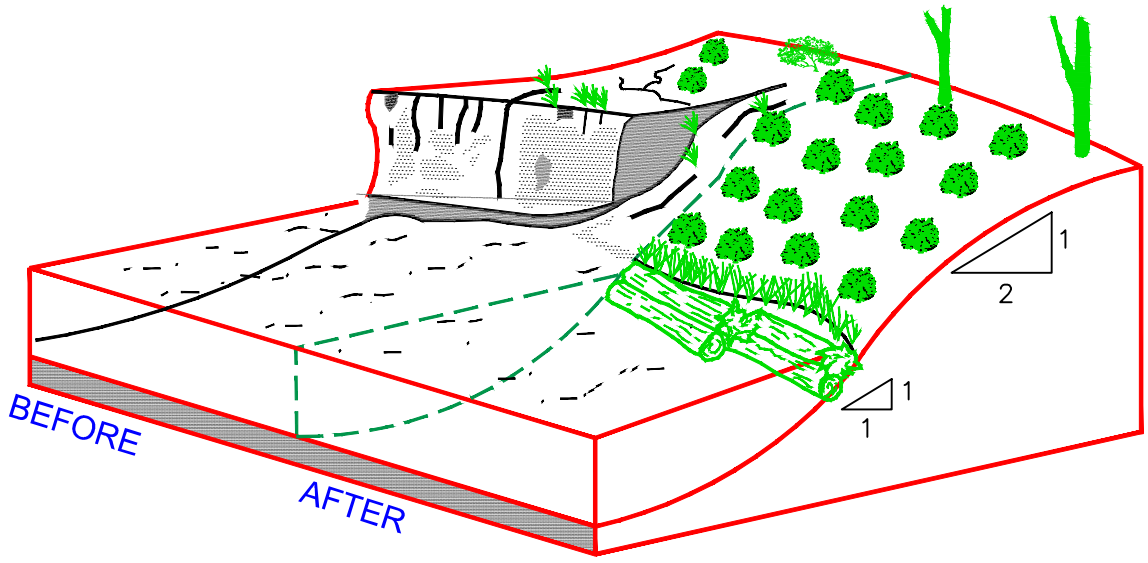
Mitigation: On-site as specified in Table 10-6 and the SMP permits. Installation of the logs is self-mitigating. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[1]Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

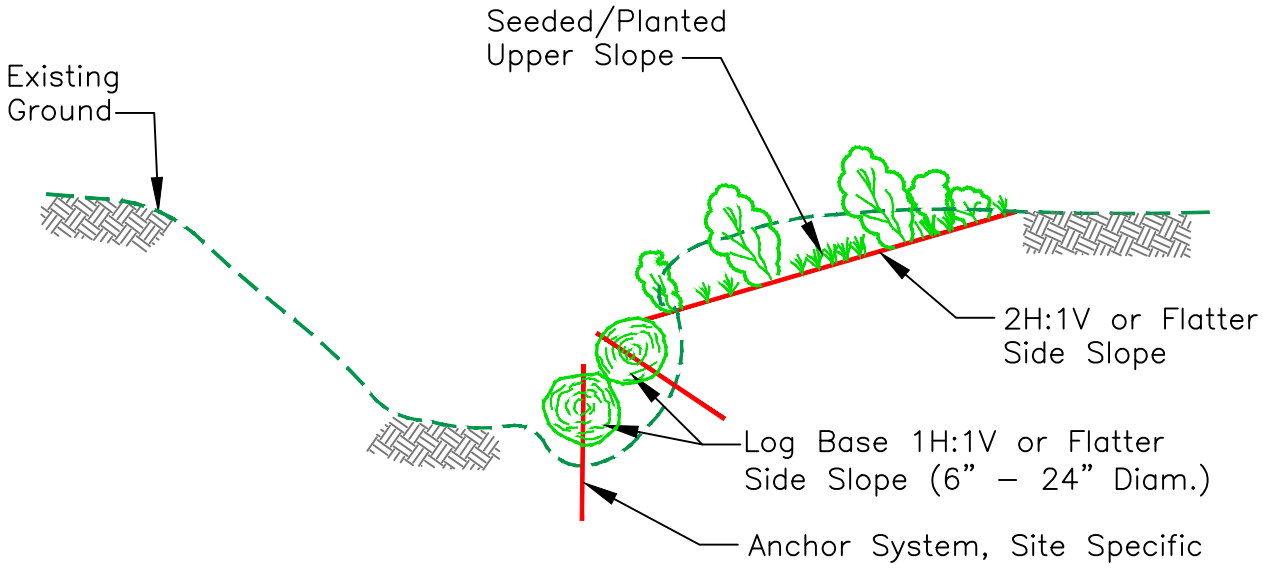
[2]Source: Santa Clara Valley Water District, “Design Manual Open Channel Hydraulics and Sediment Transport”. July 2009

Attachment A – Bank Stabilization Methods

#2B: Live Construction with Log Base



Source: Adapted from Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



SECTION

Source: Adapted from Santa Clara Valley Water District; "Design Manual Open Channel Hydraulics and Sediment Transport", July 2009

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#3: Contour Wattling

Description:

This method consists of tying long bundles of plant stems (typically willows or cottonwoods) together with twine and anchoring them in shallow trenches with wooden stakes or cuttings. When the stems develop root systems and mature, the plants establish structural soil stabilization properties. This technique is generally used to manage surface erosion.

Excellent revegetation potential. The long bundles trap and hold soil on banks by creating small, dam-like structures, effectively cutting the slope length into a series of shorter slope lengths. This method enhances the conditions for colonization of native species and should, where appropriate, be used with other soil bioengineering systems and live plantings. Reinforcement at the base of the bank slope may be a limiting factor (see bank stabilization methods 3A and 3B). Not appropriate for treatment of slopes actively undergoing mass earth movement[1].

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter.

Appropriate for local stream velocities of 6 feet per second or less.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Planting shall be installed as follows: Wattle wood shall be collected and soaked at least 10 days prior to installation. Prepare trenches (1/2 depth of wattle) and install wattles in location as approved by engineer. Live stakes/cuttings may be used as wattle stakes. Firmly attach bundles with rope to stakes. Provide supplemental irrigation if needed. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

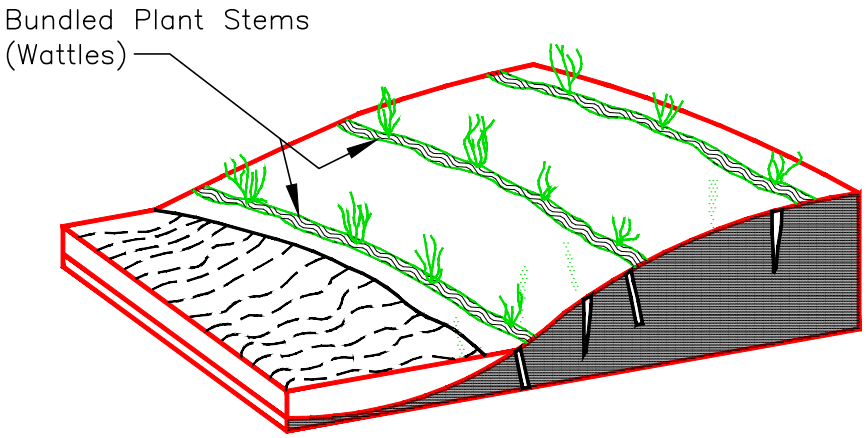
Habitat Impact Assessment:

Channel bottom: Enhances biotic resources
Bank: Enhan ces biotic resources

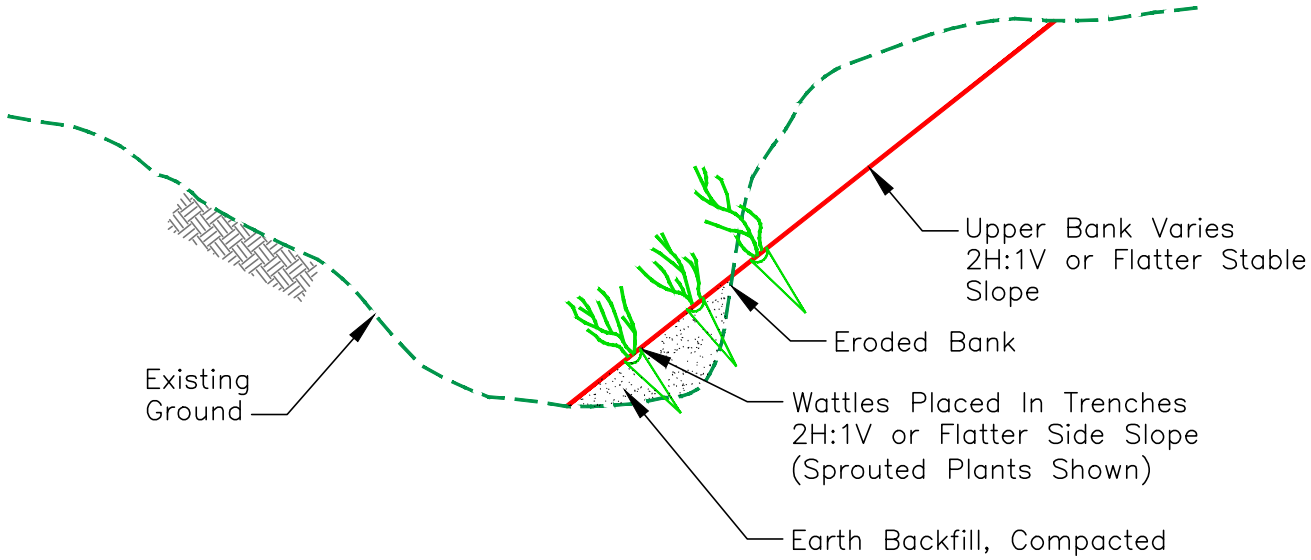
Mitigation: On-site as specified in Table 10-6 and the SMP permits. Installation of the planted contour wattles is self-mitigating. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[1]Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Attachment A – Bank Stabilization Methods
#3: Contour Wattling



Source: Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



SECTION

Attachment A - Bank Stabilization Methods

#3A: Contour Wattling with Boulder Base

Description:

This method consists of tying long bundles of plant stems together with rope and anchoring them in shallow trenches with wooden stakes or cuttings. When the stems develop root-systems and mature, the plants establish structural soil stabilization properties.

Appropriately-sized boulders are placed at the base of the rebuilt bank up to the elevation indicated by the hydraulic analysis. Voids in between the boulders can be planted using live stakes.

Excellent revegetation potential. The long bundles trap and hold soil on banks by creating small, dam-like structures, effectively cutting the slope length into a series of shorter slope lengths. This method enhances the conditions for colonization by native species and should, where appropriate, be used with other soil bioengineering systems and live plantings. Not appropriate for treatment of slopes actively undergoing mass earth movement[1].

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter for contour wattling section of slope, and slopes of 1:5 or flatter for boulder section.

Boulders must be keyed in (minimum 3-foot depth) at the base of the bank.

Appropriate for local stream velocities of 6 feet per second or less.

A typical planting plan is illustrated in Figure 10-9 of the Program Manual. Planting shall be installed as follows: Wattle wood shall be collected and soaked at least 10 days prior to installation. Prepare trenches (1/2 depth of wattle) and install wattles in location as approved by engineer. Live stakes/cuttings shall be used as wattle stakes. Firmly attach bundles with rope to stakes. Provide supplemental irrigation if needed. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

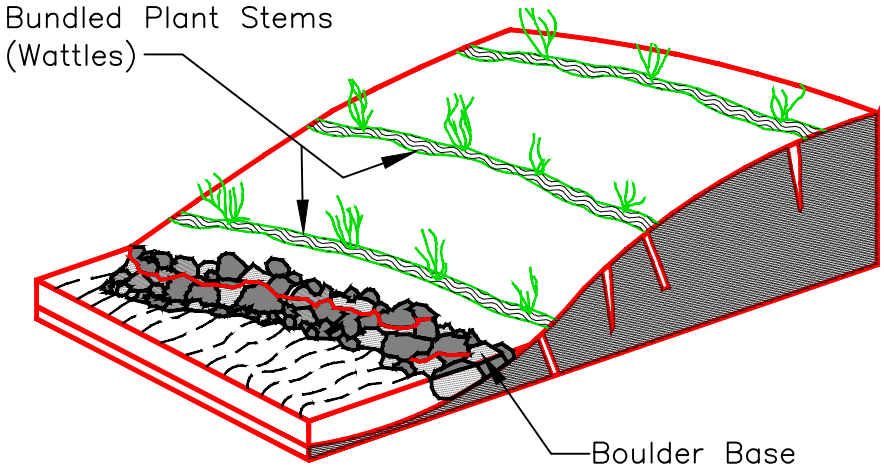
Habitat Impact Assessment:

Channel bottom: Enhances biotic resources
Bank: Enhan ces biotic resources

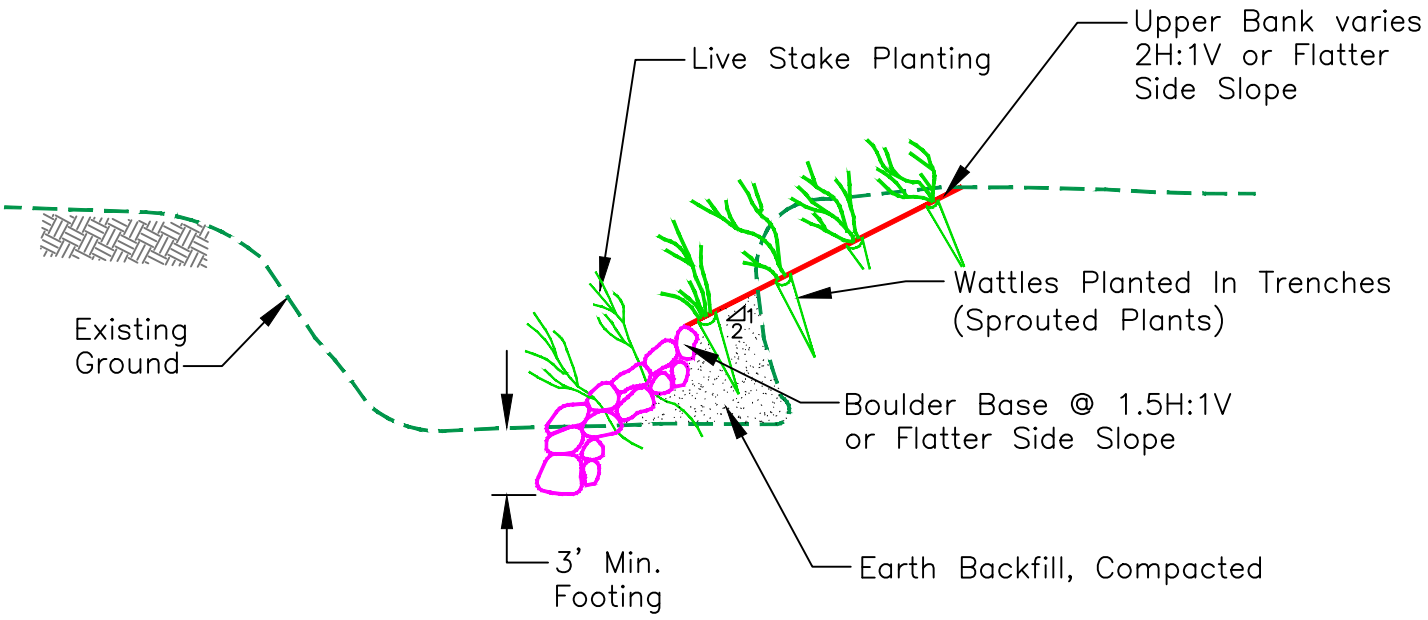
Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Attachment A – Bank Stabilization Methods
#3A: Contour Wattling with Boulder Base



Source: Adapted from Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



SECTION

FILENAME: \\SRVFILE1\global\Temporary\Current Month\Keiron\SMP CAD Files\Measure_03A (NEW)

#3B: Contour Wattling with Log Base

Description:

Contour wattling consists of tying bundles of plant stems together with rope and anchoring them in shallow trenches with wooden stakes or cuttings. When the stems develop root systems and mature, the plants establish structural soil stabilization properties.

Logs are anchored to the bed and/or native bank up to the elevation indicated by the hydraulic analysis. Determine scour depth, log size (typically between 6 inches to 24 inches in diameter), and anchor system based on specific site conditions. Where applicable and/or appropriate, rootwads may also be used.

This repair method is used to protect the toe line from erosion as well as manage surface erosion. It is especially useful for long straight channel reaches. The logs provide immediate protection from erosion while contour wattlings contribute to long-term durability and ultimately replace the decaying logs.

Excellent revegetation potential. The long bundles trap and hold soil on banks by creating small, dam-like structures, effectively cutting the slope length into a series of shorter slope lengths. This method enhances the conditions for colonization by native species and should, where appropriate, be used with other soil bioengineering systems and live plantings. Not appropriate for treatment of slopes actively undergoing mass earth movement[1].

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter for contour wattling section of slope, and slopes of 1.5:1 or flatter for the log base section.

Install the log base with anchors.

Appropriate for local stream velocities of 15 feet per second or less.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Planting shall be installed as follows: Wattle wood shall be collected and soaked at least 10 days prior to installation. Prepare trenches (1/2 depth of wattle) and install wattles in location as approved by engineer. Live stakes/cuttings shall be used as wattle stakes. Firmly attach bundles with rope to stakes. Provide supplemental irrigation if needed. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Habitat Impact Assessment:

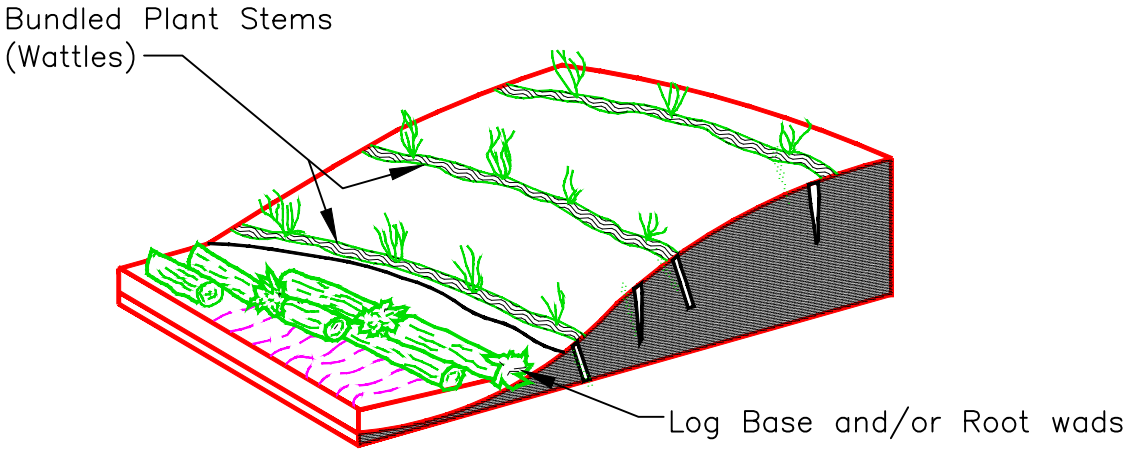
Channel bottom: Enhances biotic resources
Bank: Enhan ces biotic resources

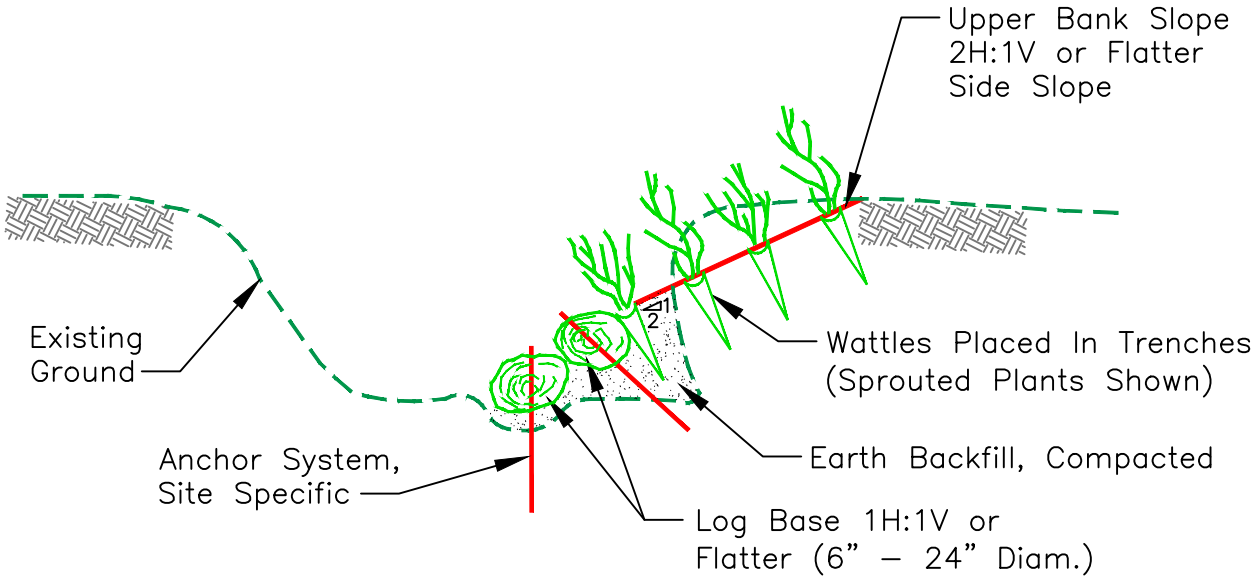
Mitigation: On-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[1]Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Attachment A – Bank Stabilization Methods

#3B: Contour Wattling with Log Base





SECTION

Source: Adapted from Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices

#4: Brush Mattress (Brush Layering)

Description:

The eroded slope is graded and smoothed to ensure all stakes are in contact with soil. A minimum 2-foot deep trench is dug at the base of the bank for the butt ends of the branches. Wood, steel, or live stakes are partially driven in rows on three-foot centers in the area that will be covered by the mattress. After the stakes have been placed, live branches are put on the bank with their butt ends in the trench. Straight branches no shorter than 4 feet in length and ½-inch to 1-inchin diameter are used. If the branches are not long enough to reach the upper end of the mattress, several layers may be used; however, it is necessary to "shingle" the layers by lapping each new layer over the one below by at least 18 inches. Once the bank is covered by a thick layer, cross branches are placed horizontally over the bottom layer. These branches are placed against the stakes and then tied to the stakes using wire or rope. The stakes are then driven into the bank a minimum of two feet or deeper, if possible. After the completion of the mattress, the base trench is filled with appropriately sized boulders and rocks to anchor the butt ends of the branches. The entire mattress is then covered by earth or fine stream material[1].

This method forms an immediate protective cover over the stream bank, captures sediment during flood flows, and rapidly restores riparian vegetation and streamside habitat. This method is not appropriate where toe scour is anticipated (see bank stabilization methods 4A and 4B). This method should not be used on slopes that are experiencing ongoing mass movement or other slope instability[2].

Design Criteria

Appropriate on bank slopes of 2:1 or flatter.

Appropriate for local stream velocities of 6 feet per second or less.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Planting shall be installed as follows. Wood for mattressing shall be collected and soaked at least 10 days prior to installation. Install in location as approved by engineer. Prepare trenches. Install butt ends so that excellent contact with moist soil is maintained. Keep moist throughout installation. Live stakes/cuttings may be be used as mattress stakes. Firmly attach rope to stakes in a criss-cross fashion so that bottom layer of wood is in contact with the slope. Provide supplemental irrigation if needed. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Habitat Impact Assessment:

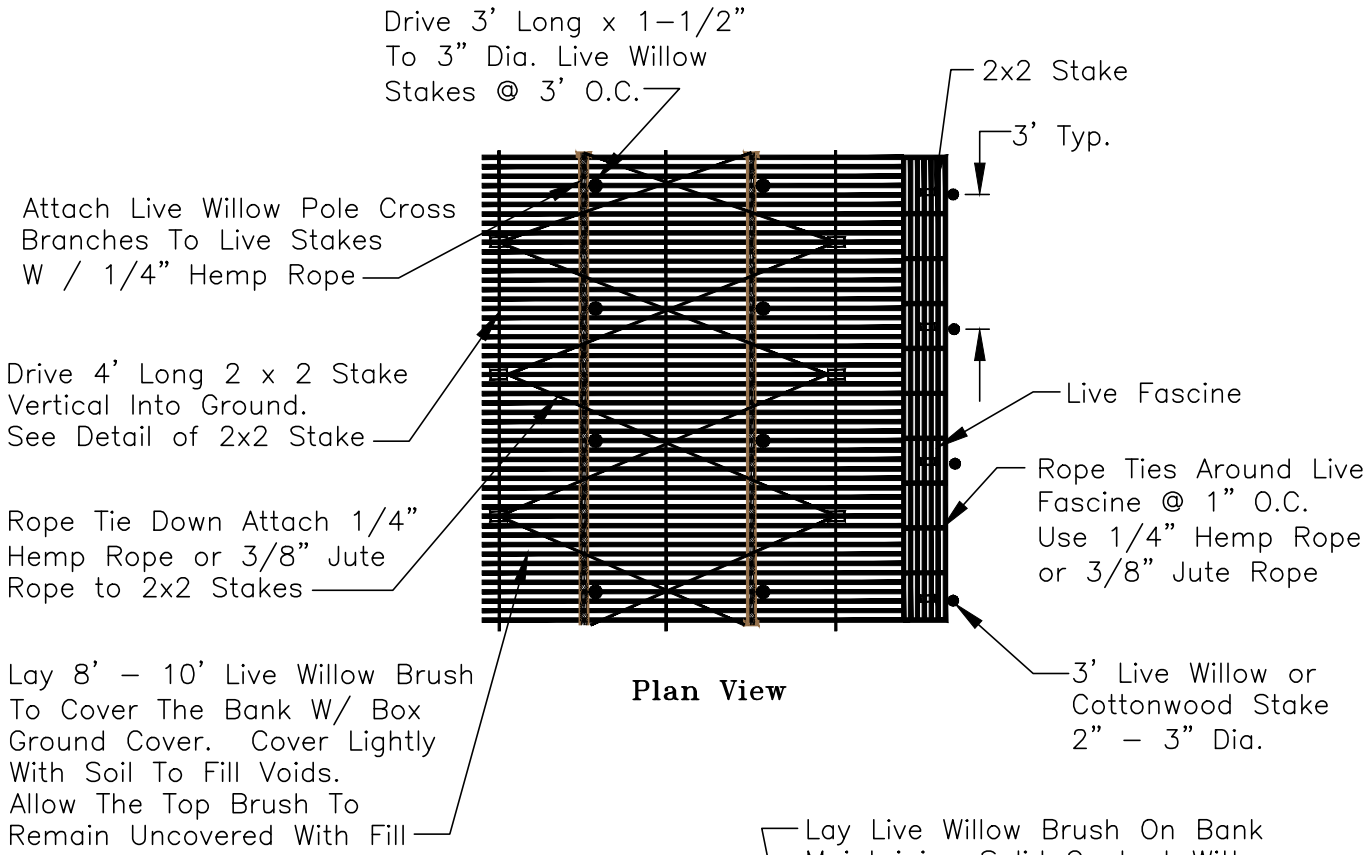
Channel bottom: Enhances biotic resources
Bank: Enhan ces biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

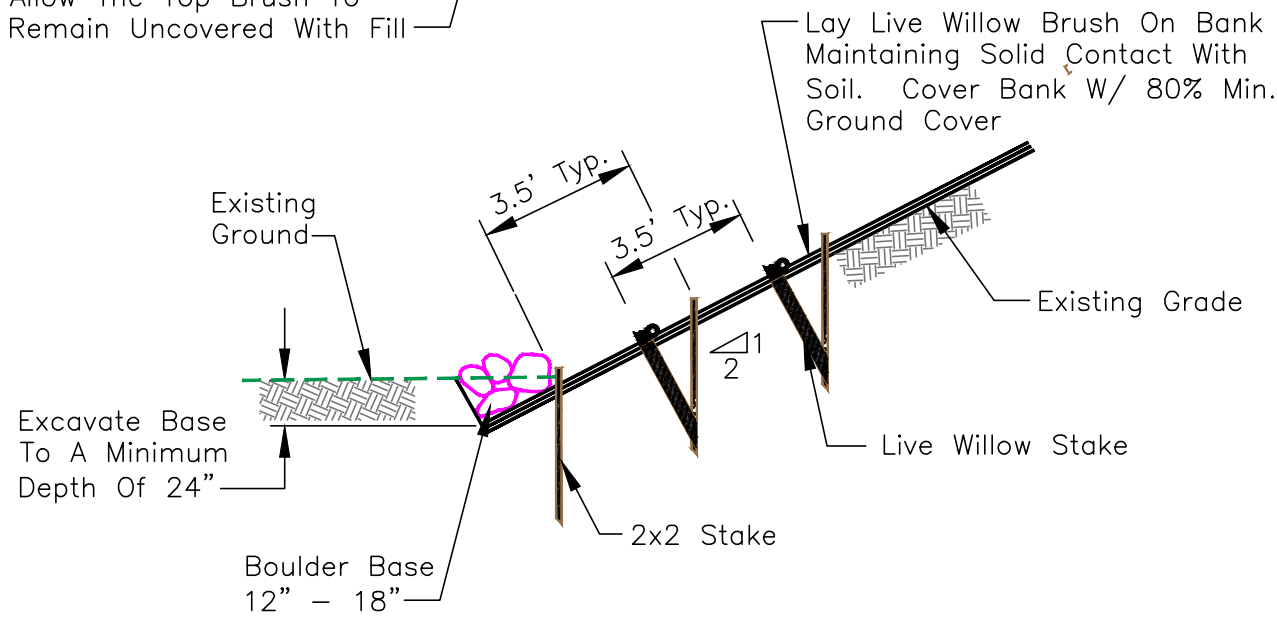
[1]Source: California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

[2]Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Attachment A – Bank Stabilization Methods
#4: Brush Mattress (Brush Layering)



Plan View



SECTION

Source: Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices

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#4A: Brush Mattress (Brush Layering) with Boulder Base

Description:

The lower portion of the eroded slope (as indicated by the hydraulic analysis) is graded at a maximum of 1.5:1 slope. The upper portion of the slope is graded at a minimum slope of 2:1 and smoothed to ensure all plantings are in contact with soil. Appropriately-sized boulders are placed at the base of the rebuilt bank up to elevation indicated by the hydraulic analysis. Voids between the boulders can be planted using live stakes.

A minimum 2-foot deep trench is dug at the top of the boulder line for the butt ends of the branches. Wood, steel, or live stakes are partially driven in rows on three foot centers in the area that will be covered by the mattress. After the stakes have been placed, live branches are put on the bank with their butt ends in the trench. Straight branches no shorter than 4 feet in length and ½-inch to 1-inch in diameter are used. If the branches are not long enough to reach the upper end of the mattress, several layers may be used; however, it is necessary to "shingle" the layers by lapping each new layer over the one below by at least 18 inches. Once the bank is covered by a thick layer of willows, cross branches are placed horizontally over the bottom layer. These branches are placed against the stakes and then tied to the stakes using wire orrope. The stakes are then driven into the bank a minimum of two feet or deeper, if possible. After the completion of the mattress, the toe trench is back filled with boulders and rocks to anchor the butt ends of the branches. The entire mattress is then covered by earth or fine stream material[1].

This method forms an immediate protective cover over the stream bank, captures sediment during flood flows, and rapidly restores riparian vegetation and streamside habitat. This method should not be used on slopes that are experiencing ongoing mass movement or other slope instability[2].

Design Criteria

Appropriate on bank slopes of 2:1 or flatter for brush mattress section of slope. 1.5:1 or flatter for the boulder section.

Boulders must be keyed in (minimum 3-foot depth) at thebase of the bank.

Appropriate for local stream velocities of 6 feet per second or less.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Planting shall be installed as follows: Wood for mattressing shall be collected and soaked at least 10 days prior to installation. Install in location as approved by engineer. Prepare trenches. Install butt ends so that excellent contact with moist soil is maintained. Keep moist throughout installation. Live stakes/cuttings may be used as mattress stakes. Firmly attach rope to stakes in a criss-cross fashion so that bottom layer of wood is in contact with slope. Provide supplemental irrigation if needed. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Habitat Impact Assessment:

Channel bottom: Enhances biotic resources
Bank: Enhan ces biotic resources

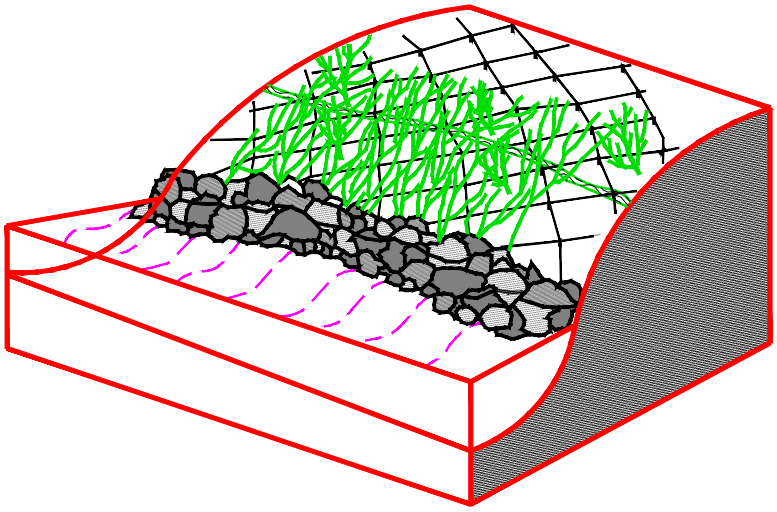
Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. This repair method includes revegetation of the repair area using native species. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[1]Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

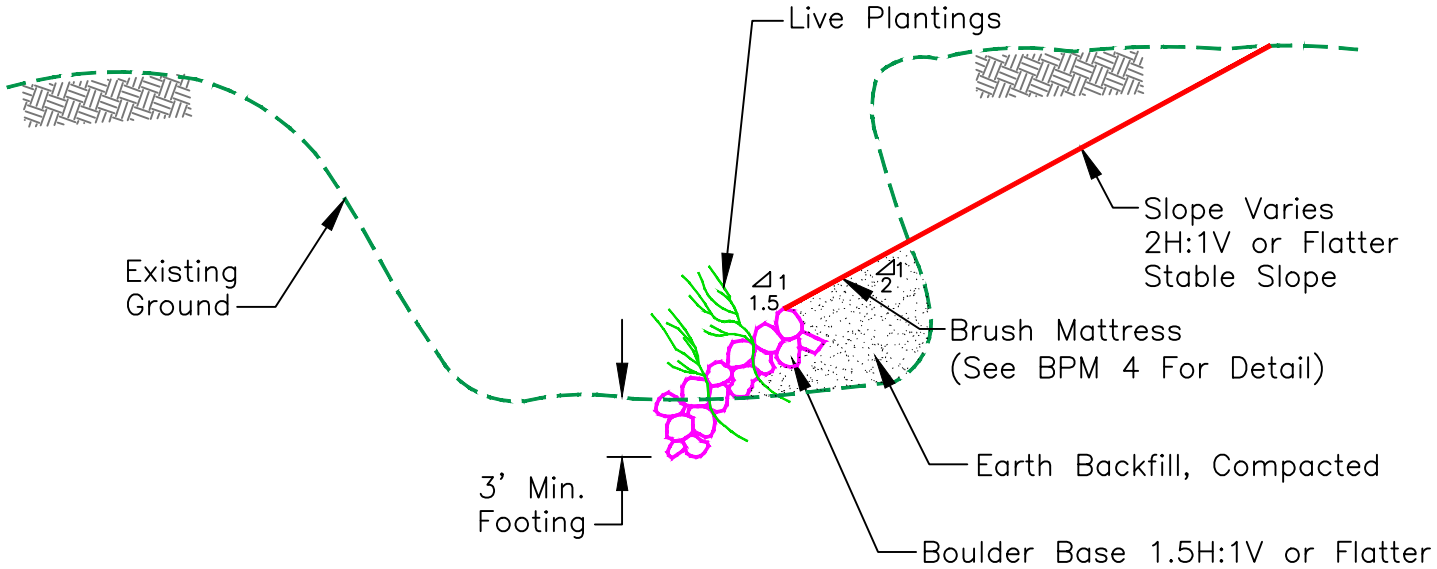
[2]Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Attachment A – Bank Stabilization Methods

#4A: Brush Mattress (Brush Layering) with Boulder Base



Source: Adapted from Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



SECTION

FILENAME: \\SRVFILE1\global\Temporary\Current Month\Keiron\SMP CAD Files\Measure_04A(NEW)

Attachment A - Bank Stabilization Methods

#4B: Brush Mattress (Brush Layering) with Log Base

Description:

Brush mattress with log base consists of grading the upper and lower portions of the eroded slope at a minimum of 2:1 and maximum of 1:1 slopes respectively, and smoothed to ensure all willows are in contact with soil. Logs are placed at the base of the native bank up to the elevation indicated by the hydraulic analysis. Where applicable and or available, rootwads may be used in combination with logs.

A maximum 2-foot deep trench is dug at the top of the log base for the butt ends of the willow branches. Wood, steel, or live willow stakes are partially driven in rows on three-foot centers in the area that will be covered by the mattress. After the stakes have been placed, live branches are put on the bank with their butt ends in the trench. Straight branches no shorter than 4 feet in length and ½-inch to 2-inch in diameter are used. If the branches are not long enough to reach the upper end of the mattress, several layers may be used; however, it is necessary to "shingle" the layers by lapping each new layer over the one below by at least 18 inches. Once the bank is covered by a thick layer of willows, cross branches are placed horizontally over the bottom layer. Stakes are then driven into the bank as deep as possible. These branches are placed against the stakes and then tied to the stakes using biodegradable wire or rope. After the completion of the mattress, the toe trench is back filled with logs to anchor the butt ends of the branches. The entire mattress is then covered by earth or fine stream material[1].

This method forms an immediate protective cover over the stream bank, captures sediment during flood flows, and rapidly restores riparian vegetation and streamside habitat. This method should not be used on slopes that are experiencing ongoing mass movement or other slope instability[2].

Design Criteria

Appropriate on bank slopes of 2:1 or flatter for brush mattress section of slope. 1:1 or flatter for the log base section.

Install log base with anchors. An evaluation of the vegetation communities up- and down-stream of the erosion site, the optimal vegetated habitat the site can support given the local soil, moisture, and hydraulic conditions determines appropriate vegetation species.

Appropriate for local stream velocities of 15 feet per second or less.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Planting shall be installed as follows: Wood for mattressing shall be collected and soaked at least 10 days prior to installation. Install in location as approved by engineer. Prepare trenches. Install butt ends so that excellent contact with moist soil is maintained. Keep moist throughout installation. Live stakes/cuttings may be used as mattress stakes. Firmly attach rope to stakes in a criss-cross fashion so that bottom layer of wood is in contact with slope. Provide supplemental irrigation if needed. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Habitat Impact Assessment:

Channel bottom: Enhances biotic resources
Bank: Enhan ces biotic resources

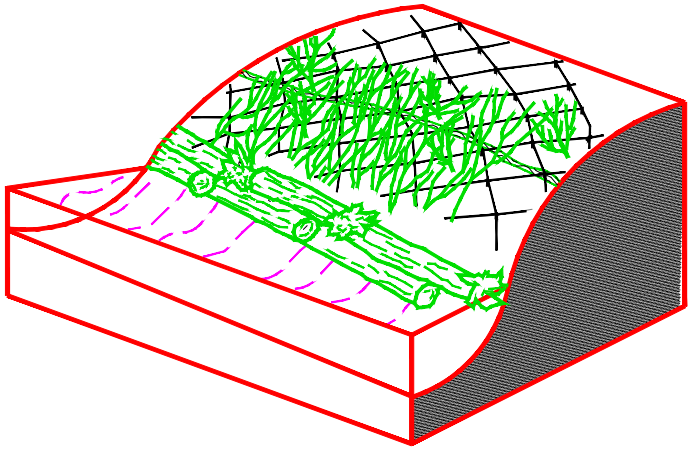
Mitigation: On-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[1]Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

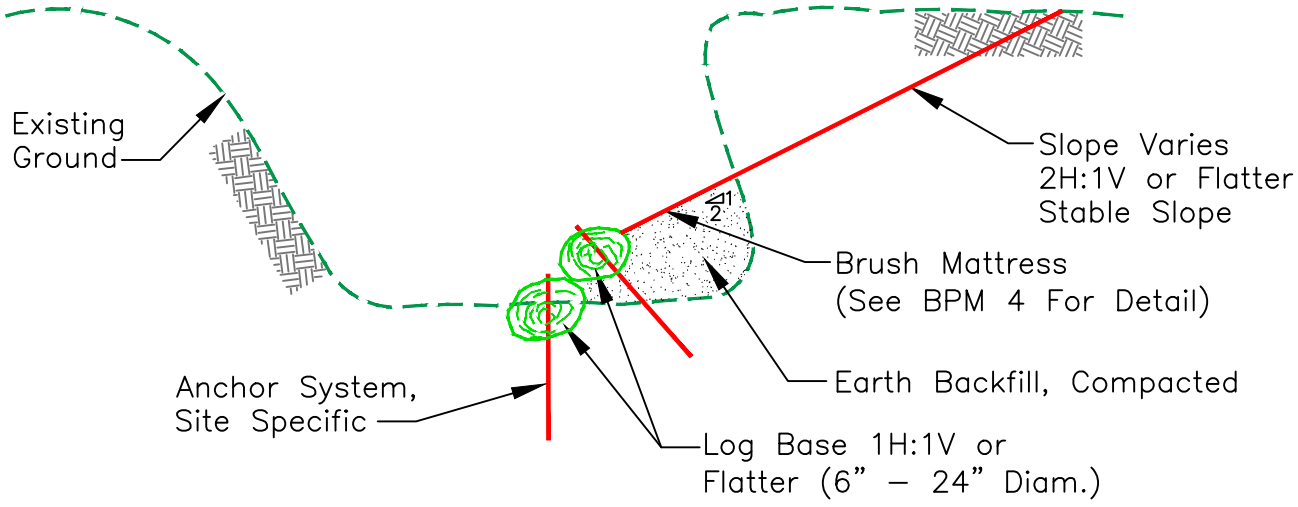
[2]Source: California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

Attachment A – Bank Stabilization Methods

#4B: Brush Mattress (Brush Layering) with Log Base



Source: Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



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Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

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Attachment A - Bank Stabilization Methods

#5: Surface Matting (Erosion Mats)

Description:

This method consists of securing, jute, or geotextile erosion control fabric to channel banks using stakes or staples. These materials provide soft armor protection against erosive forces and are combined with plantings. Abrasive sediment, debris, foot traffic, and sunlight will wear, snag, and tear these fabrics with time, potentially undermining the structure. These methods are intended to be the skeleton of a vegetated erosion control system. The establishment of vegetation is crucial to the long-term success of erosion mats.

Works best in small, uniform, improved channels with mild bank slopes. This method has good revegetation potential. Baseprotection is required where scour is anticipated at the base of the slope (see bank stabilization methods 5A and 5B).

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter.

Typically appropriate for local stream velocities of 12 feet per second or less depending on the type of erosion mat and revegetation method selected.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. and the optimal vegetated habitat the site can support given the local soil, moisture, and hydraulic conditions, as well as erosion control effectiveness. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live Stakes/Cuttings:	2 feet average on-center or as log placement allows

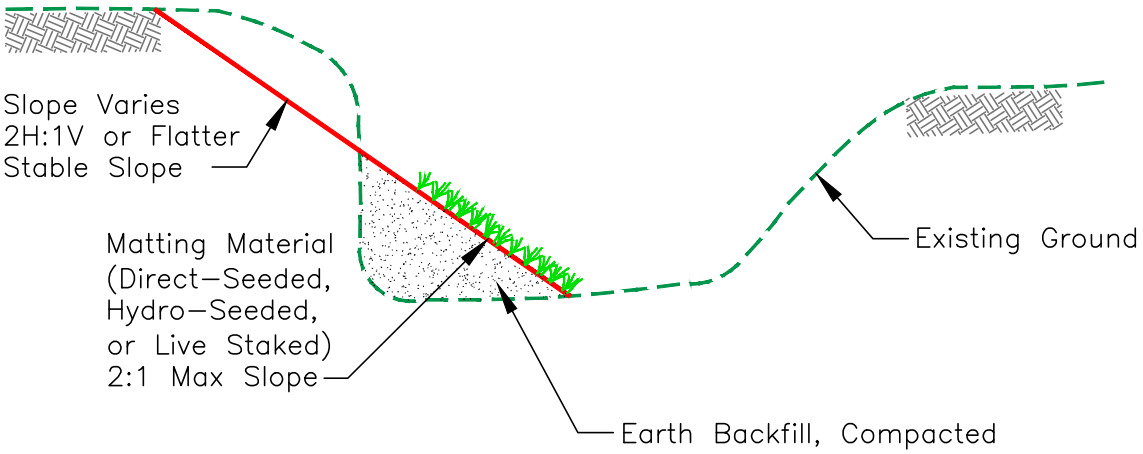
Habitat Impact Assessment:

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits. This repair method includes revegetation of the repair area using native species. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

Attachment A – Bank Stabilization Methods

#5: Surface Matting (Erosion Mats)



SECTION

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#5 Surface Matting (Erosion Mats)

Before –Guadalupe River d/s Trimble

After – Guadalupe River d/s Trimble

Attachment A - Bank Stabilization Methods

#5A: Surface Matting (Erosion Mats) with Boulder Base

The lower portion of the eroded slope (below the elevation indicated by the hydraulic analysis) is graded at a maximum of 1.5:1 slope. The upper portion of the slope is graded at a minimum slope of 2:1 and smoothed to ensure erosion mat is in full contact with soil. Appropriately-sized boulders are placed at the base of the rebuilt bank up to the elevation indicated by the hydraulic analysis. Voids between the boulders can be planted.

In the upper portion of the slope, jute, or geotextile erosion control fabric is attached to channel banks using staking or staples. These materials provide soft armor protection against erosive forces and are combined with planting. Debris, foot traffic, and sunlight will wear, snag, and tear these fabrics with time. The boulder base protection will prevent undermining of the structure. These methods are intended to be the skeleton of a vegetated erosion control system.

Works best in uniform improved channels with mild bank slopes. This method has good revegetation potential.

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter for erosion mat section of slope. 1.5:1 or flatter for the boulder section.

Boulders must be keyed in (minimum 3-foot depth) at the base of the bank.

Appropriate for local stream velocities of 6 feet per second or less if boulders are planted with live stakes; 12 feet per second if boulders are not planted.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live Stakes/Cuttings:	2 feet average on-center or as log placement allows

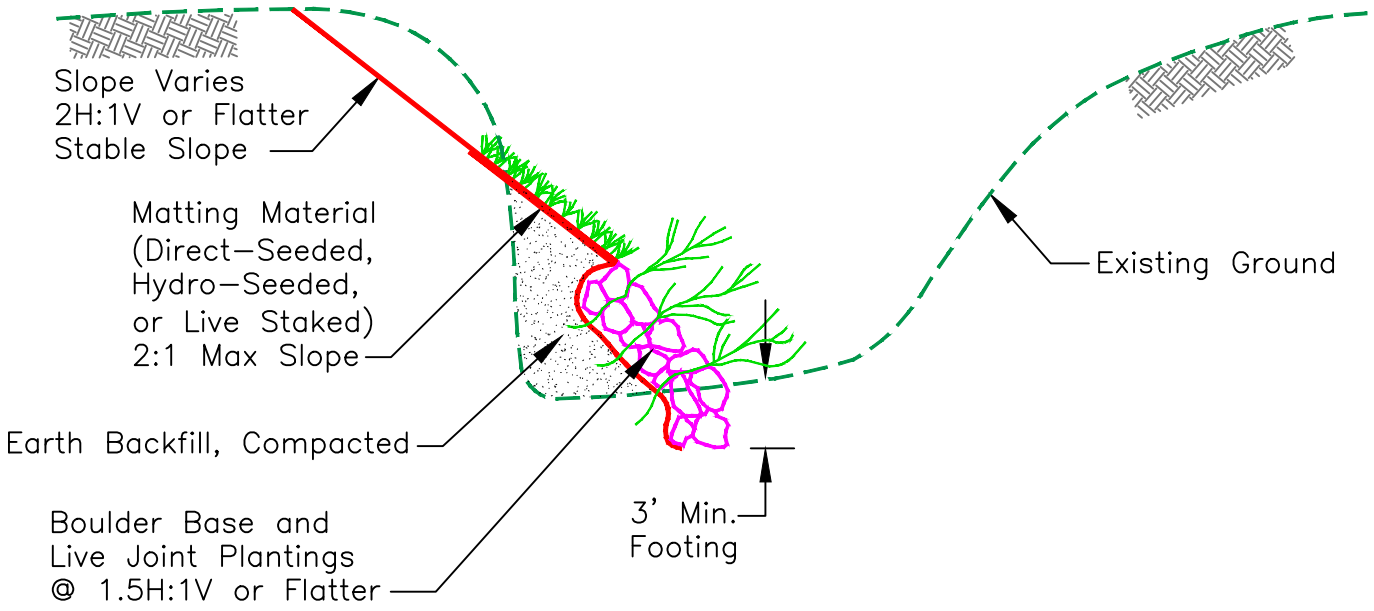
Habitat Impact Assessment:

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. This repair method includes revegetation of the repair area using native species. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

Attachment A – Bank Stabilization Methods

#5A: Surface Matting (Erosion Mats) with Boulder Base



SECTION

#5A: Surface Matting (Erosion Mats) with Boulder Base (Hybrid)

Before –Veg Saratoga Creek d/s Bollinger

After – Veg Saratoga Creek d/s Bollinger

#5A: Surface Matting (Erosion Mats) with Boulder Base (Hard)

Before – Greystone Creek u/s Olive Branch

After – Greystone Creek u/s Olive Branch

Attachment A - Bank Stabilization Methods

#5B: Surface Matting (Erosion Mats) with Log Base

Description:

Surface matting with log base consists of grading the upper and lower portions of the eroded slope (up to the elevation indicated by the hydraulic analysis) at a minimum of 2:1 and maximum of 1.5:1 slopes respectively, and smoothed to ensure erosion mat is in full contact with soil. Logs are placed at the base of the native bank up to the elevation indicated by the hydraulic analysis. Root wads may be used, where applicable and/or available.

In the upper portion of the slope, jute, or geotextile erosion control fabric is attached to channel banks using stakes, staples, or anchors. These materials provide soft armor protection against erosive forces and are combined with planting. Debris, foot traffic, and sunlight may wear, snag, and tear these fabrics with time. The log base protection will prevent undermining of the structure. These methods are intended to be the skeleton of a vegetated erosion control system.

This repair type works best in uniform improved channels with mild bank slopes and has good revegetation potential.

Design Criteria:

Appropriate on bank slopes of 2:1 or flatter for erosion mat section of slope. 1.5:1 or flatter for the log section.

Install the log base with anchors.

Appropriate for local stream velocities of 15 feet per second or less.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Plantings will be installed as follows:

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live Stakes/Cuttings:	2 feet average on-center or as log placement allows

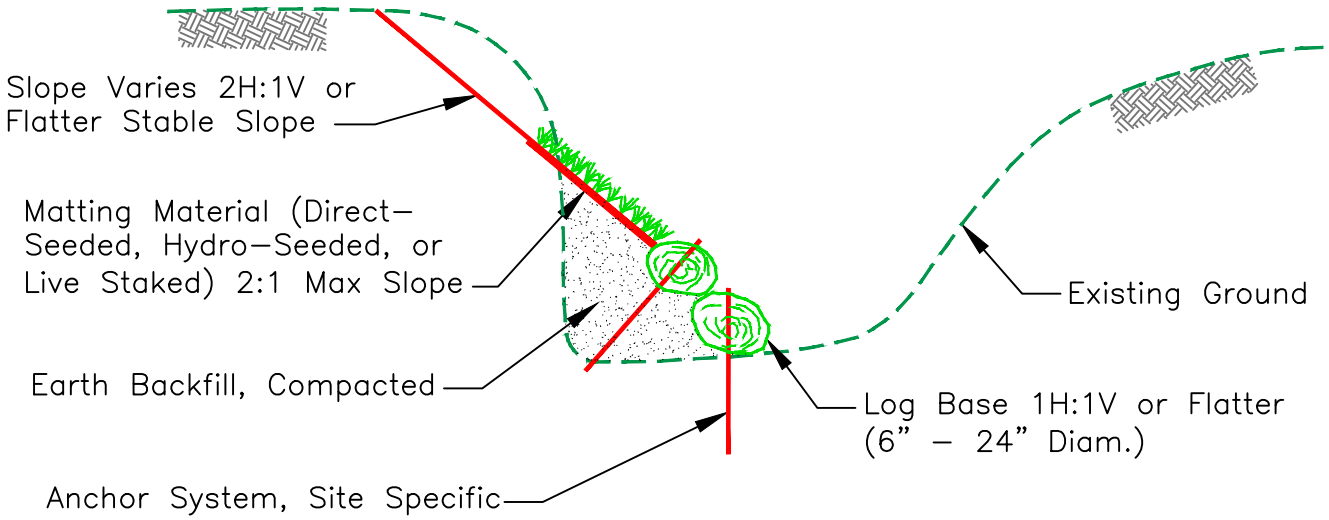
Habitat Impact Assessment:

Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

Attachment A – Bank Stabilization Methods

#5B: Surface Matting (Erosion Mats) with Log Base



SECTION

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#6: Add Rock to Invert

Description:

This is a technique most commonly used to armor a channel invert susceptible to incision or scour downstream of various control structures such as bridges or concrete channels. Rock channel bottoms can also be valuable in terms or reoxygenation of water in the creek. This installation method can also retard stream turbidity in many cases[1].

Rocks are placed in scour holes or along the invert for the appropriate length as indicated by the hydraulic analysis, depending on the length and depth of repair needed. This can include scour holes just downstream of a drop structure that needs armoring, or an entire reach of channel can be armored with well-graded, angular rock to stop incision. If lining a long length of channel, rocks can be formed into a concave shape and a key can be constructed every few hundred feet to stabilize the lining.

Design Criteria:

Appropriate for incised channels or scour holes downstream of a concrete portion of creek.

Habitat Impact Assessment:

Channel bottom:	May adversely impact biotic resources
Bank:	May adversely impact biotic resources

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

[1]Source: Santa Clara Valley Water District, Design Manual, Open Channel Hydraulics and Sediment Transport, June 2009

#6: Add Rock to Invert

Before – Regnart Creek d/s Pacifica

After – Regnart Creek d/s Pacifica

Attachment A - Bank Stabilization Methods

#6A: Rock Cross Vanes

Description:

The cross-vane is a grade control structure that decreases near-bank shear stress, velocity and stream power, but increases the energy in the center of the channel. The structure will establish grade control, reduce bank erosion, create a stable width/depth ratio, and maintain channel capacity, while maintaining sediment transport capacity and sediment competence. The cross-vane is also a stream habitat improvement structure.

The cross-vane is typically composed of a row of header rocks and a row of footer rocks. The header rocks can be installed with half of its size embedded below the final grade. The footer rocks are installed downstream of and at a lower elevation than the header rocks to provide support. The top of the footer rocks are positioned at the final grade[2].

With the channel boundary opening up at the floodplain level, the vane may be properly keyed into the side slopes, an advantage not easily afforded by incised channels[2]. Each leg of the vane typically makes an angle of 20-30 degrees with the bank[1].

Design Criteria:

Appropriate in “B” and “F” type channels, according to Rosgen’s stream classification system.

Habitat Impact Assessment:

Channel bottom: Enhances biotic resources
Bank: Enhan ces biotic resources

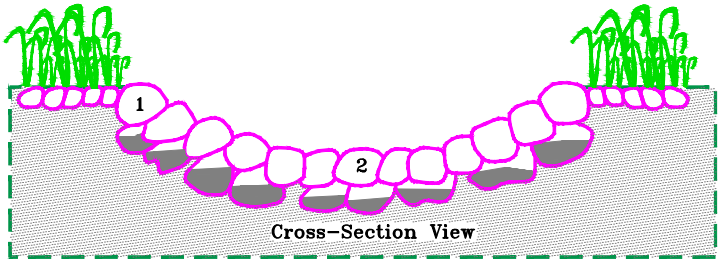
Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies. Permanent impacts associated with rock placement will be mitigated on-site through a NMFS-approved methodology as described in Chapter 10 of the Manual. No additional mitigation is required if the agencies provide written concurrence that rock placed along the channel bed provides habitat complexity functions.

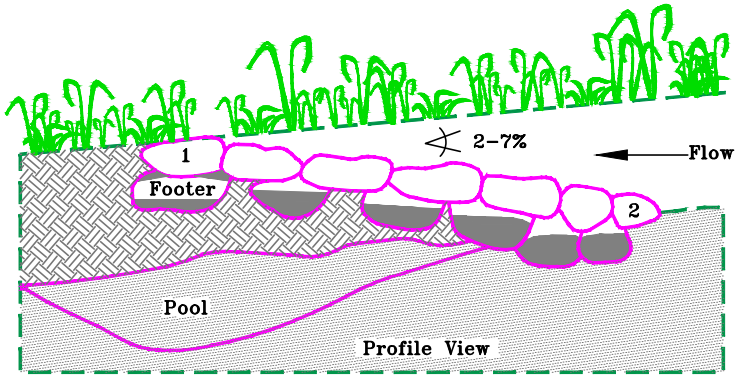
[1]Source: Wildland Hydrology, Inc.; Rosgen, David L.P.H.; “The Cross-Vane, W-Weir and J-Hook Vane Structures…Their Description, Design and Application for Stream Stabilization and River Restoration”.

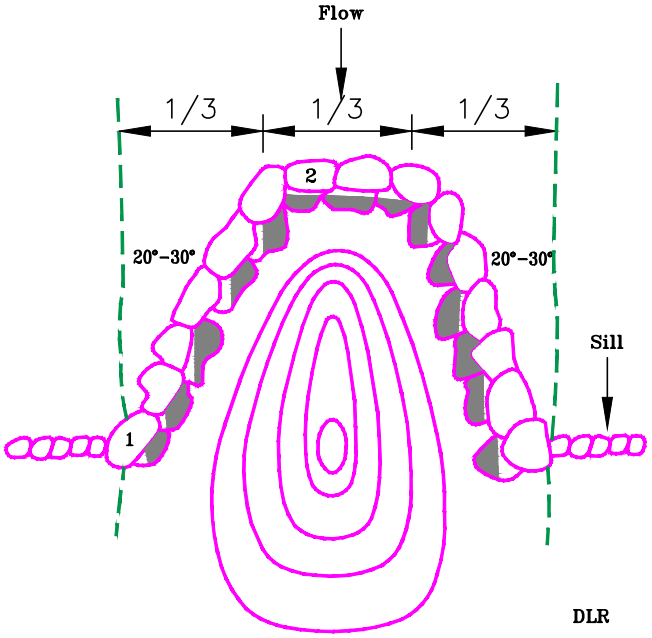
[2]Source: Santa Clara Valley Water District, Design Manual, Open Channel Hydraulics and Sediment Transport, June 2009

Attachment A – Bank Stabilization Methods

#6A: Rock Cross-Vanes







Plan View

Source: Wildland Hydrology, Inc.: Rosgen, David L, P.H.; "The Cross-Vane, W-Weir and J-Hook Vane Structures... Their Description, Design and Application for Stream Stabilization and River Restoration".

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#6A: Rock Cross Vanes

Before – Permanente Creek u/s Charlston

After – Permanente Creek u/s Charlston

Attachment A - Bank Stabilization Methods

#6B: Root Wads and Boulders

Description:

This method combines boulders, logs, and live plant material to armor a stream bank. Fish habitat is enhanced in addition to creating a natural-looking bank stabilization structure[1].

Footer logs are set in a toe trench below the thalweg line with the channel end pointed downstream and the butt end angled 45 to 60 degrees upstream. A second log (with root wad) is set on top of the footer log diagonally, forming an "X". The root wad end is set pointing upstream and the butt end lying downstream 45 to 60 degrees. The apex of the logs is anchored together using boulders, re-bar or cables. Large boulders are placed on top and between the logs at each apex. After all the logs and boulders are set in place, live plant material such as willows is placed within the spaces of the structure, behind the boulders. Excavated gravel and stream materials can then be placed over the bank end portion of the structure.

This method will tolerate high boundary shear stresses if logs and root wads are well-anchored. This method should, where appropriate, be used in conjunction with soil bioengineering or live vegetation plantings to stabilize the upper bank and ensure a regenerative source of stream bank vegetation. The life of the structure depends on the species of logs used. It might need replacement if vegetative colonization does not take place. This method can create local scour (channel bottom) and erosion (opposite bank)[2].

Design Criteria:

Appropriate for channel velocities at 10 feet per second or less.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species: 4 feet average on-center
Shrub species: 8 feet average on-center
Tree species: 12 feet average on-center
Live Stakes/Cuttings: 2 feet average on-center or as log placement allows

Habitat Impact Assessment:

Channel bottom: Enhances biotic resources
Bank: Enhan ces biotic resources

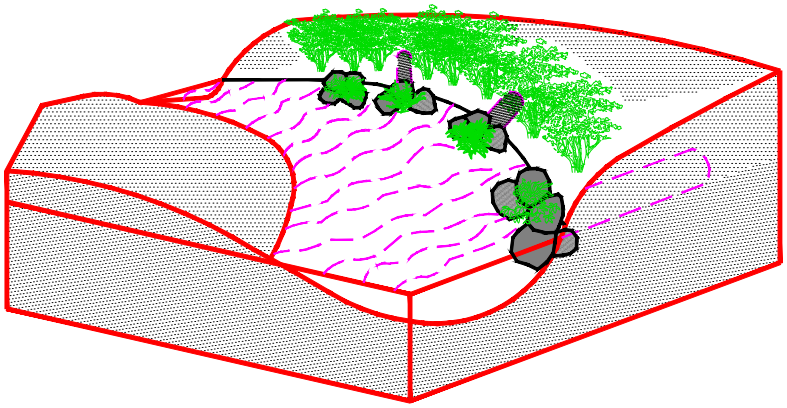
Mitigation: On-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[1]Source: California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

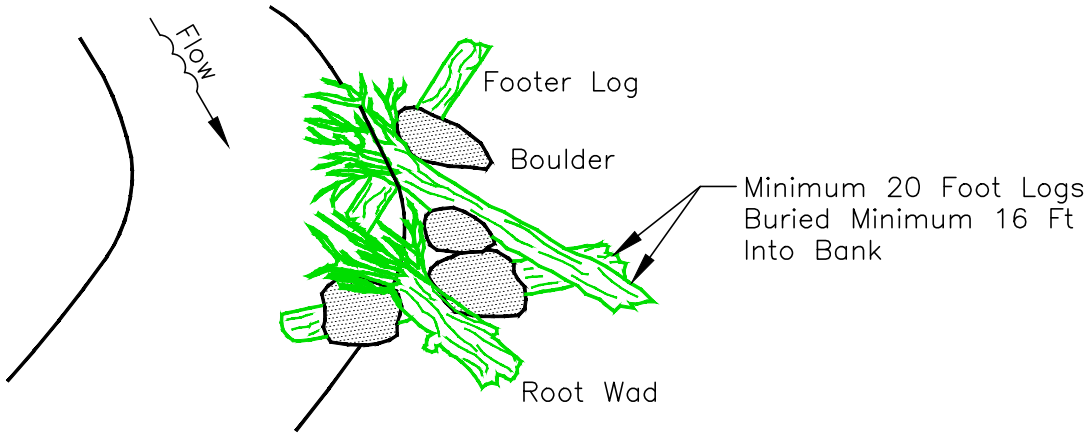
[2]Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Attachment A – Bank Stabilization Methods

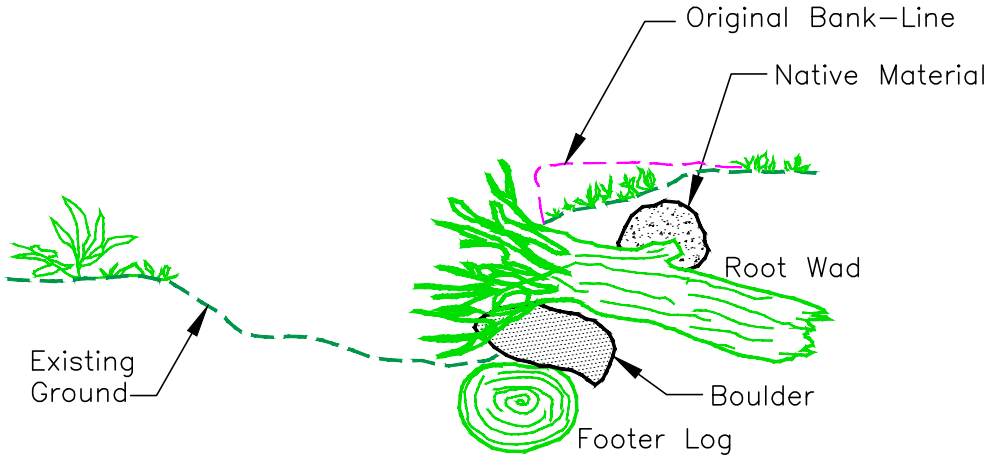
#6B: Root Wads and Boulders



Source: Adapted from Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



Plan



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Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

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Attachment A - Bank Stabilization Methods

#6C: Live Log Crib Walls

Description:

Log crib walls are used to reduce sediment input and protect banks in areas where logs are available and boulders are not practical[1]. Cribbing provides protection in areas with near-vertical banks where bank sloping options are limited by issues such as right of way restrictions[2]. Crib walls afford a natural appearance, immediate protection, and accelerate the establishment of woody species[2]. This method is effective on the outside of bends where high velocities are present and in situations where a low wall may be required to stabilize the base of thebank and reduce slope steepness[2]. This method does not adjust to toe scour and should be used in combination with soil bioengineering systems and live plantings to stabilize the upper slopes[2]. Logs should be selected for soundness, durability, uniformity of size, and ease of handling (straight logs much preferred) and delivery.

Two rows of base logs or untreated timbers are placed in trenches below stream grade to prevent undercutting of the structure. Base logs should be as large (long and thick) as can be manipulated while conforming to the contour of the stream bank. Good base logs are crucial to ensure stability and durability of the cribwall[1]. Geotextile fabric should be placed behind and inside the face of (to keep material in) the structure. Tie-back logs are notched, nailed, or bolted into the base logs and placed at regular intervals (6 to 8 feet typically) along the base logs. Tie-back logs are attached to both rows of base logs. Once the first row of tie-back logs has been connected a second set of face logs is placed on top of the tie-backs. These logs are placed approximately 6 inches back into the slope. This procedure is repeated until the desired level of bank protection is achieved. As each lift is constructed, the face logs and tie-backs are filled with a mix of gravel and cobbles to the top of the face log. It is not necessary to use topsoil in the fill material; but there should be sufficient fine grained material to insure vegetation growth. Live cuttings are then laid in to form a complete cover layer. These live branches should be long enough to have their butt end in the native soil behind the crib wall. The tips should stick out of the crib wall no more than a quarter of the cutting total length. The branches are then covered with gravel/cobble mix to the top of the tie-backs and the nest layer is continued.

Design Criteria:

Appropriate for slopes up to ¼:1.

Appropriate for velocities from 6 feet per second up to 12 feet per second, depending on opening size.

A typical planting plan is illustrated in Figure 10-9 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-8. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-8. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live Stakes/Cuttings:	2 feet average on-center or as log placement allows

Habitat Impact Assessment:

Channel bottom:	Minimizes further degradation of biotic resources, with limited revegetation potential.
Bank:	Minimizes further degradation of biotic resources, with limited revegetation potential.

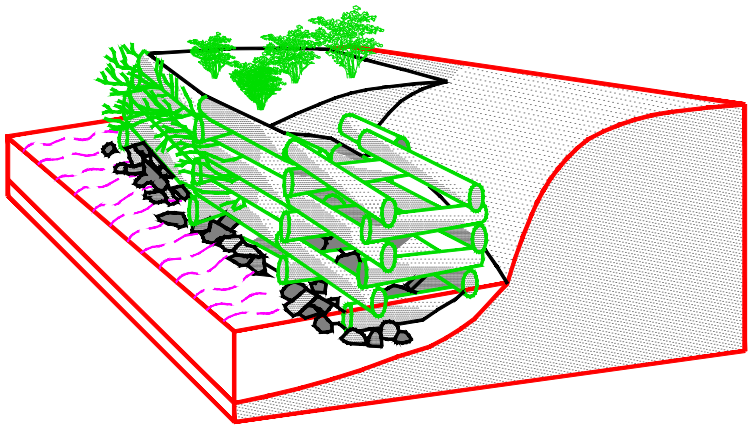
Mitigation: On-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[1]Source: California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

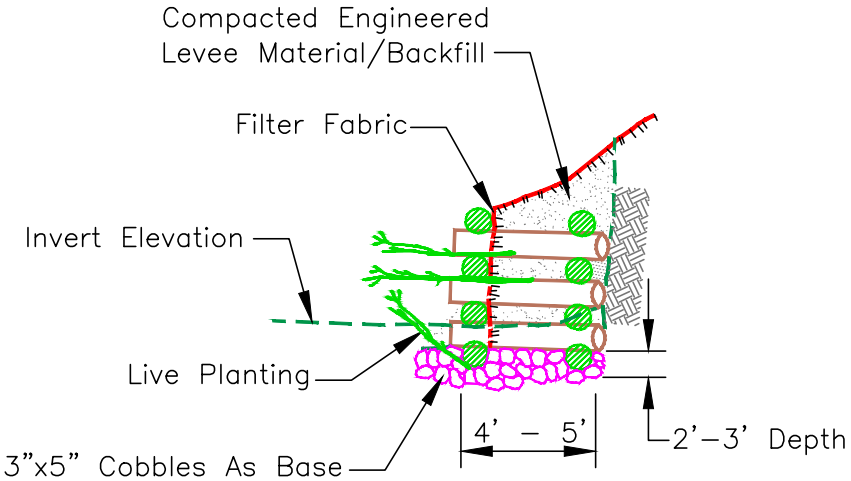
[2]Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Attachment A – Bank Stabilization Methods

#6C: Live Log Crib Walls



Source: Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



SECTION

Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

#6D: Log Revetment

Description:

For sites where erosion has cut out the base of the bank and a portion of a steep bank and there is no room for shaping back the bank slope, log revetment may be used for bank repair. Log revetment is a stack of logs that forms the protected bank slope with compacted soil backfill behind the logs. Each individual log is anchored to the foundation and rebar is used to connect logs to each other. The logs are cut to fit the size of the eroded bank. There is minimal excavation except to clear away debris and loose materials. Live tree roots are saved as much as possible by burying them in the soil backfill[1].

Log revetment will be mitered to match the upstream and downstream bank slopes. The bottom log of the log revetment is aligned with the upstream and downstream toe line to minimize encroachment into the flow area[1]. Two adjacent logs are laid below grade to act as a footing for the structure. These footer logs are anchored into the native ground using either rebar or duckbill anchors and cable, or some other site-appropriate anchoring method. Logs are then stacked one on top of the other, at the appropriate slope, and are rebarred to one another. Each log is anchored into existing ground using duckbill anchors and cable, rebar, or another site-appropriate method, until the appropriate height is obtained.

Design Criteria:

Appropriate on steep bank slopes ¼:1 or flatter.

Appropriate for velocities up to 15 feet per second.

Habitat Impact Assessment:

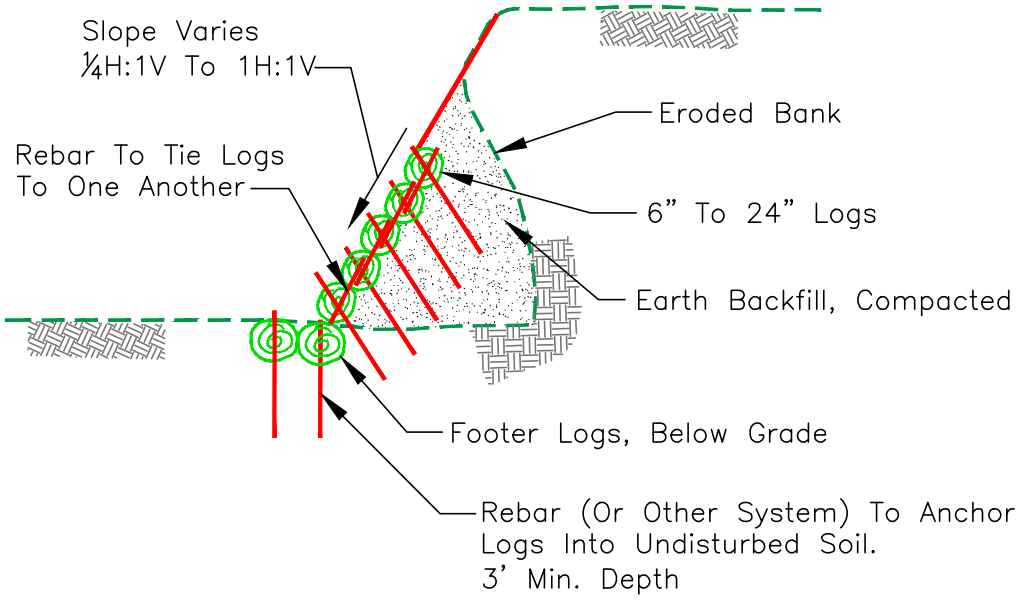
Channel bottom:	Enhances biotic resources
Bank:	Enhances biotic resources

Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[1]Source: Santa Clara Valley Water District, Design Manual, Open Channel Hydraulics and Sediment Transport, June 2009

Attachment A – Bank Stabilization Methods

#6D: Log Revetment



SECTION

FILENAME: \\SRVFILE1\global\Temporary\Current Month\Keiron\SMP CAD Files\Measure_06D(NEW)

#7: Cellular Confinement System

Description:

Soil cellular confinement system (geocell) is a polyethylene plastic cellular system where structural strength is developed by the composite design of soil, plant roots, and the plastic's cellular configuration. This system is available in 8-inch deep honeycomb mats that are installed in offset vertical layers to create terraced planting areas. The honeycomb cells are filled with soil, moderately compacted, and planted with woody vegetation and grasses. The structure functions similarly to a crib wall structure.

This method has limited potential for vegetation establishment.

Design Criteria:

Appropriate for slopes up to ½:1.

Appropriate for velocities up to 6 feet per second.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live Stakes/Cuttings:	2 feet average on-center or as log placement allows

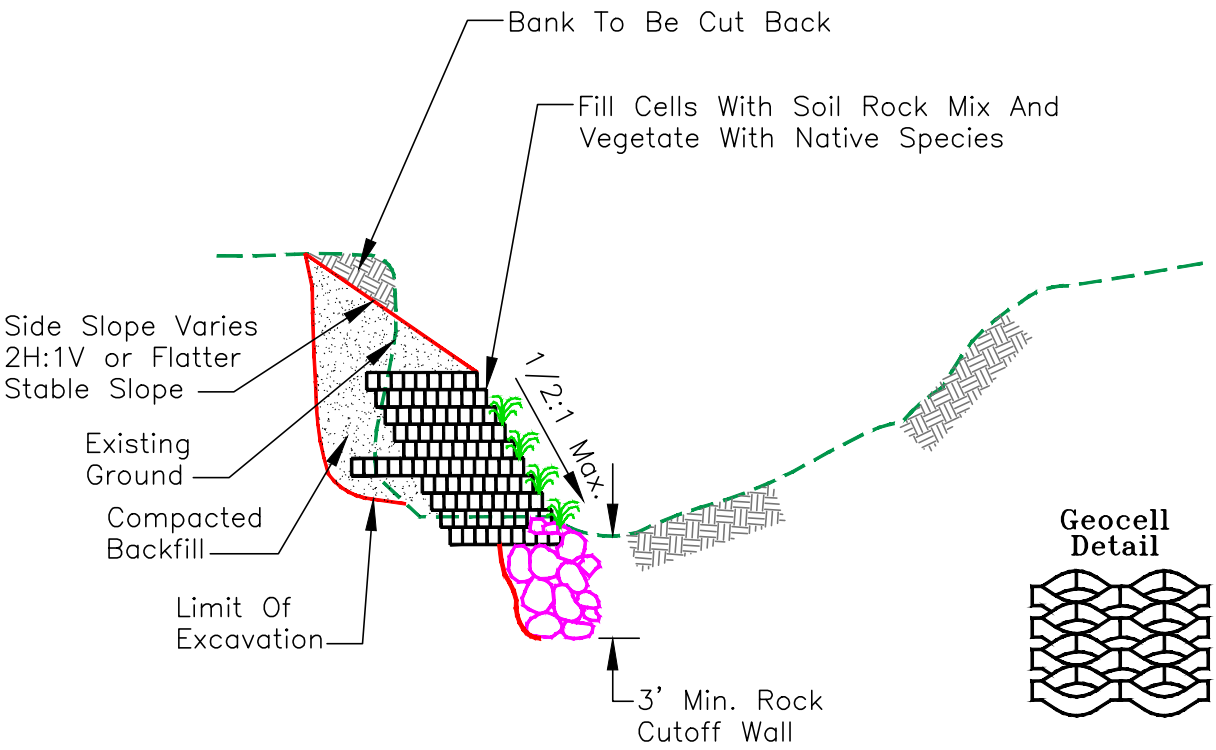
Habitat Impact Assessment:

Channel bottom:	Permanent impact
Bank:	Permanent impact

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

Attachment A – Bank Stabilization Methods

#7: Cellular Confinement System



SECTION

FILENAME: \\SRVFILE1\global\Temporary\Current Month\Keiron\SMP CAD Files\Measure_07(NEW)

#8: Rock Blanket

Description:

This method consists of placing a blanket of appropriately-sized rock over the bank, to the extent indicated by the hydraulic analysis, to control erosion. Smaller cobbles may be placed in the voids of the rock to create a solid structure so as to minimize scour behind the rock and failure of the structure. This method is appropriate where long-term durability is needed, design discharge is high, there is significant threat to life or property, or there is no practical way to otherwise incorporate vegetation into the design. This method should, where appropriate, be used with soil-bioengineering systems or live vegetation to stabilize the upper bank and ensure a regenerative source of streambank vegetation. A major benefit to this method is that the components are flexible and function is not impaired by slight movement from settlement or other adjustments[1].

Angular rock should be used, because they tend to interlock, making the structure act like a single structure rather than a collection independent stones.

Design Criteria:

Appropriate for slopes up to 1.5:1, preferably 2:1.

Rock sizes of 6 inches to 18 inches in diameter.

Appropriate for velocities up to 15 feet per second.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live Stakes/Cuttings:	2 feet average on-center or as log placement allows

Habitat Impact Assessment:

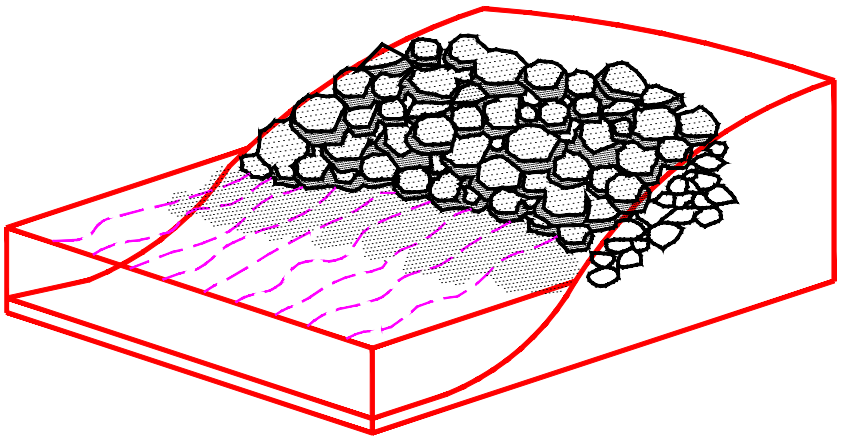
Channel bottom:	Permanent Impact
Bank:	Permanent Impact

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

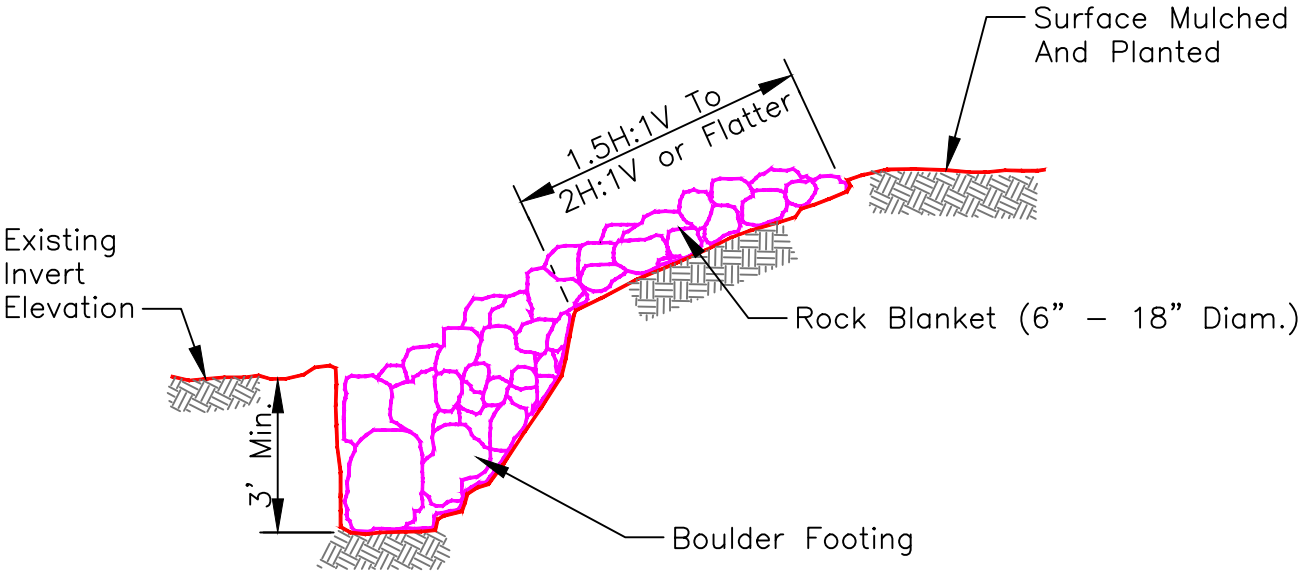
[1]Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Attachment A – Bank Stabilization Methods

#8: Rock Blanket



Source: Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



SECTION

Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

#8: Rock Blanket

Before - Calabazas Creek d/s Bollinger

After - Calabazas Creek d/s Bollinger

Attachment A - Bank Stabilization Methods

#8A: Boulder Revetment

Description:

Boulder revetment is a method for armoring stream banks with large boulders for preventing bank erosion. Revetment footing is laid in a "toe" trench dug along the base of the bank. Large boulders are then laid on the bank slopes up to the elevation indicated by the hydraulic analysis. Large angular boulders are best suited for this purpose. Boulder revetment can provide protection in areas where log or boulder instream structures may lead to bank erosion. The boulders used should be dense and structurally competent[1].

Geotextile fabrics should be avoided, as they prevent the natural establishment of vegetation[1].

This method should, where appropriate, be used with soil bio-engineering systems or live vegetation to stabilize the upper bank and ensure a regenerative source of streambank vegetation. A major benefit of this method is that the components are flexible and function is not impaired by slight movement from settlement or other adjustments[2].

This structure would allow for some natural revegetation of the bank.

Design Criteria:

Appropriate for slopes up to 1:1, preferably 2:1.

Appropriate for velocities up to 6 feet per second if boulder joints are planted, 15 feet per second if boulders are not planted.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live Stakes/Cuttings:	2 feet average on-center or as log placement allows

Habitat Impact Assessment:

Channel bottom:	Permanent impact
Bank:	Permanent impact

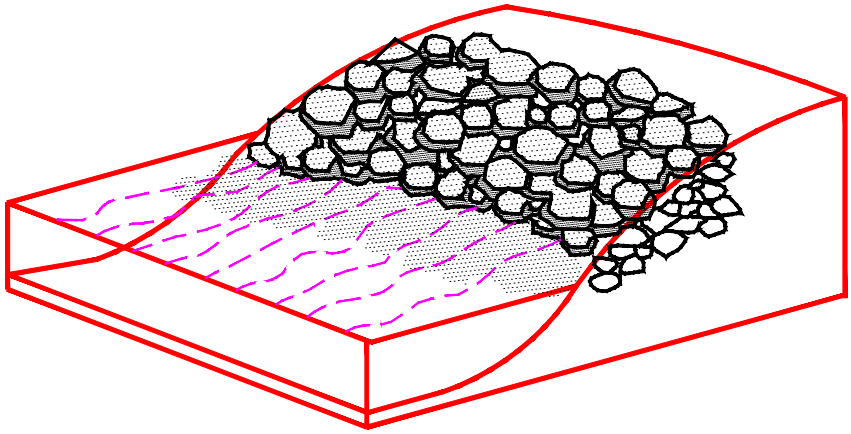
Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

[1]Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

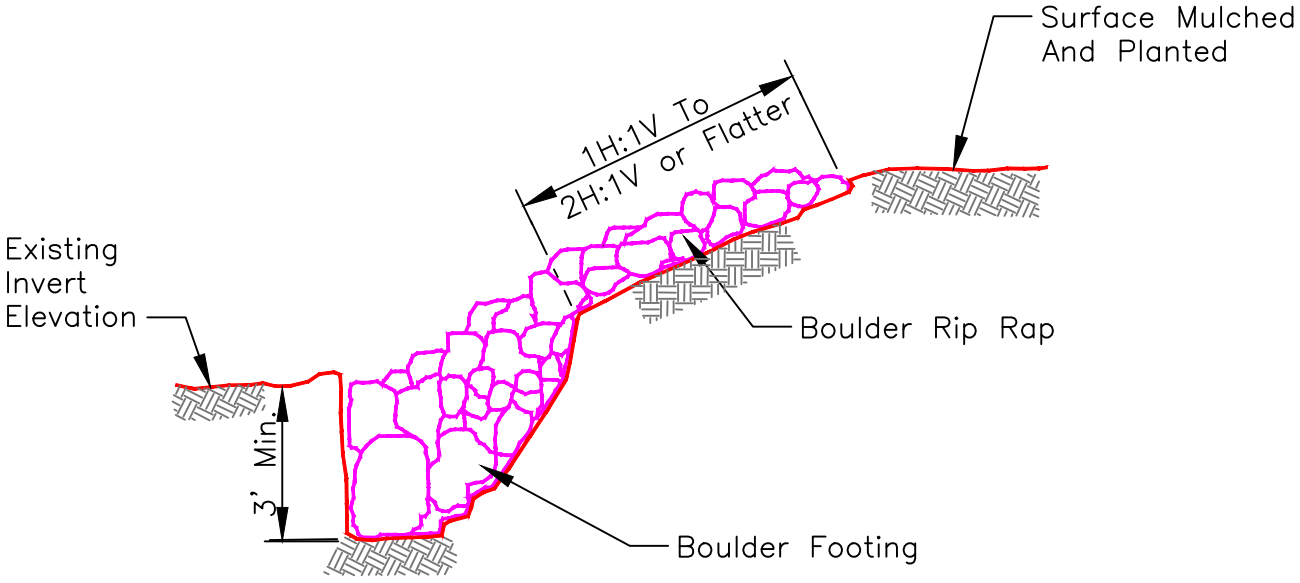
[2]Source: Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Attachment A – Bank Stabilization Methods

#8A : Boulder Revetment



Source: Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



SECTION

Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

#8A: Boulder Revetment

Before - Golf Creek d/s Culligan

After - Golf Creek d/s Culligan

#8B: Boulder Revetment with Soil and Vegetation

Description:

Boulder revetment is a method for armoring stream banks with large boulders for preventing bank erosion. Revetment footing is laid in a "toe" trench dug along the base of the bank. Large boulders are then laid on the bank slopes up to the elevation indicated by the hydraulic analysis. Large angular boulders are best suited for this purpose. Boulder revetment can provide protection in areas where log or boulder instream structures may lead to bank erosion. The boulders used should be dense and structurally competent[1].

Soil is placed over the boulders and vegetation is installed by staking and/or direct seeding. Bio-degradable erosion control mats may be placed over the soil to help control erosion until vegetation establishes itself. Special care must be taken in staking to avoid damage to the stakes' cambium and to ensure good soil/water/stake contact. Thick revetment layers may require special tools for establishing staking pilot holes[2].

Geotextile fabrics should be avoided, as they prevent the natural establishment of vegetation[1].

This method should, where appropriate, be used with soil bio-engineering systems or live vegetation to stabilize the upper bank and ensure a regenerative source of streambank vegetation. A major benefit of this method is that the components are flexible and function is not impaired by slight movement from settlement or other adjustments[2].

Design Criteria:

Appropriate for slopes up to 1:1, preferably 2:1.

Appropriate for velocities up to 6 feet per second.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live Stakes/Cuttings:	2 feet average on-center or as log placement allows

Habitat Impact Assessment:

Channel bottom:	Enhances biotic resources.
Bank:	Provides limited biotic resources.

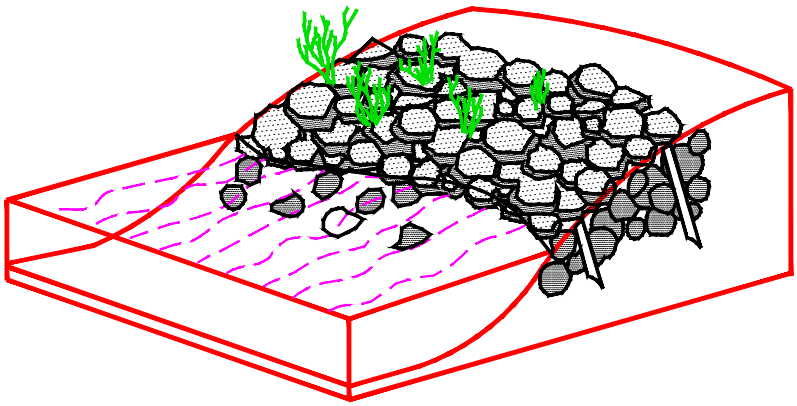
Mitigation: On-site/off-site as specified in Table 10-6 and the SMP permits. This method includes replanting of the repair area. Mitigation may be required depending on whether or not this method is used with soil bio-engineering systems or live vegetation to stabilize the upper bank and ensure a regenerative source of streambank vegetation. The revegetation effort will be monitored and tracked as set forth in the Manual and SMP permits until the established success criteria are met.

[1]Source: Adapted from California Department of Fish and Game. California Salmonid Stream Habitat Restoration Manual

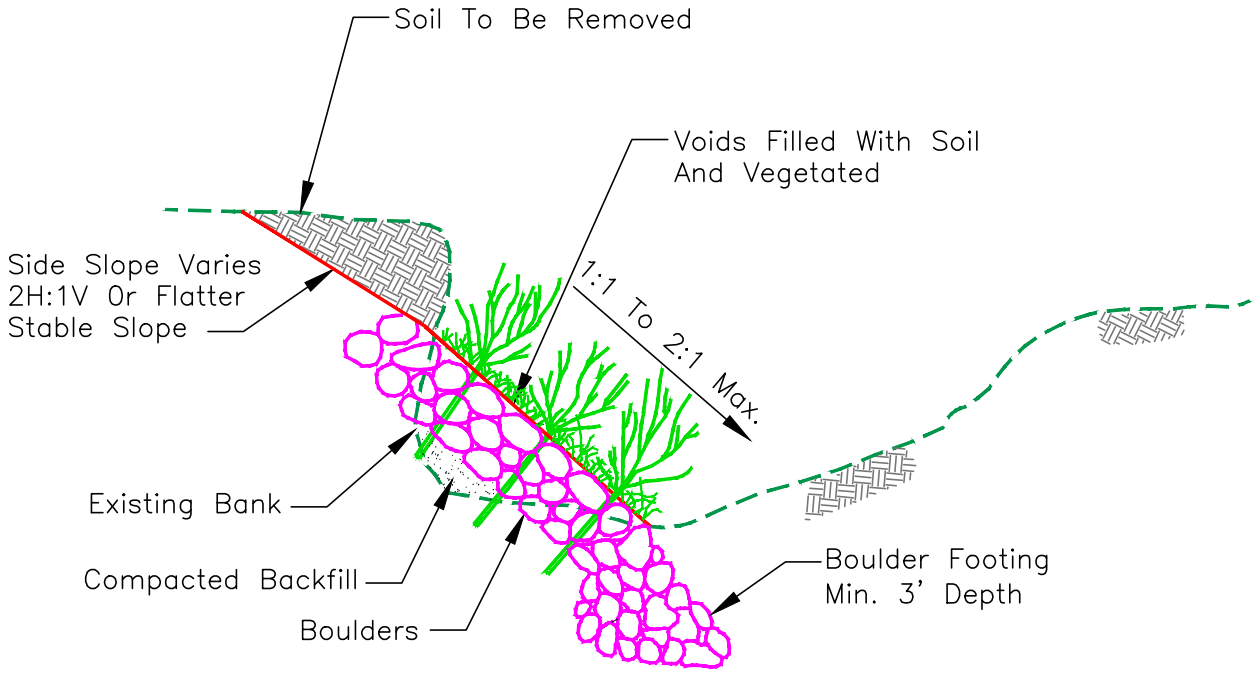
[2]Source: Adapted from Natural Resources Conservation Service. Stream Corridor Restoration Principles, Processes and Practices

Attachment A – Bank Stabilization Methods

#8B: Boulder Revetment with Soil and Vegetation



Source: Natural Resources Conservation Service, Stream Corridor Restoration Principles, Processes and Practices



SECTION

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#8B: Boulder Revetment with Soil and Vegetation

Before – Ross Creek u/s Los Gatos-Almaden

After - Ross Creek u/s Los Gatos-Almaden

#9: Articulated Concrete Blocks

Description:

Articulated concrete blocks (ACB) consists of concrete interlocking blocks that are cabled together to form mats that can be laid on the channel slope and/or channel bottom. The ACB is extended below the invert to form a cutoff wall.

ACBs are available in two styles: open cell and closed cell. The open cell style allows for vegetation to be recruited into the soil filing of the cell. Vegetation growth is restricted by the sizes of the cell openings and by the disconnection caused by the cell walls.

Design Criteria:

Appropriate for slopes 0.75:1 up to 3:1.

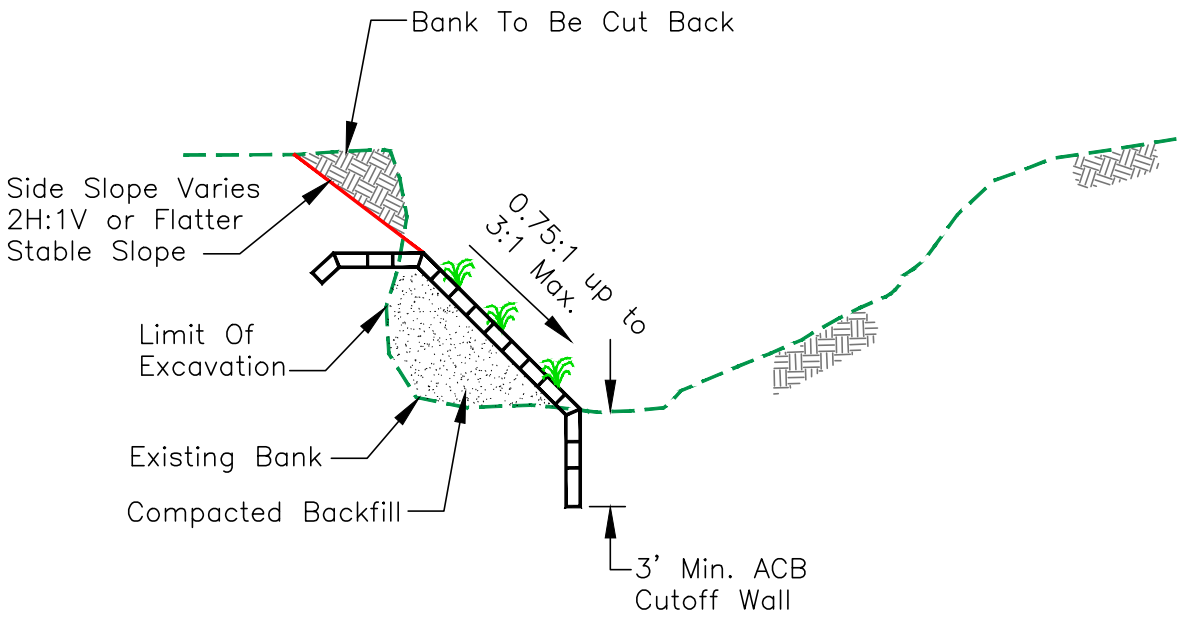
Appropriate for velocities up to 15 feet per second for closed cell ACBs, 6 feet per second for open cell ACBs.

Habitat Impact Assessment:

Channel bottom:	Permanent impact
Bank:	Permanent Impact

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

Attachment A – Bank Stabilization Methods
#9: Articulated Concrete Blocks (ACB)



SECTION

FILENAME: \\SRVFILE1\global\Temporary\Current Month\Keiron\SMP CAD Files\Measure_09(NEW)

Attachment A - Bank Stabilization Methods

#9A: Articulated Concrete Blocks with Planting Areas

Description:

Articulated concrete blocks (ACB) consists of concrete interlocking blocks that are cabled together to form mats that can be laid on the channel slope and/or channel bottom. The ACB is extended below the invert as a cutoff wall to prevent undermining of slope protection.

ACBs are available in two styles: open cell and closed cell. The open cell style allows for vegetation to be recruited into the soil filing of the cell. Vegetation growth is restricted by the sizes of the cell openings and by the disconnection caused by the cell walls.

Open planting areas can be constructed into the ACB mats by creating an opening in the mat by removing some of the blocks. The open areas can be revegetated with shrubs and trees. Irrigation is provided to the planted vegetation to aid plant establishment.

Design Criteria:

Appropriate for slopes up to 1:1.

Appropriate for velocities up to 15 feet per second for closed cell ACBs, 6 feet per second for open cell ACBs.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

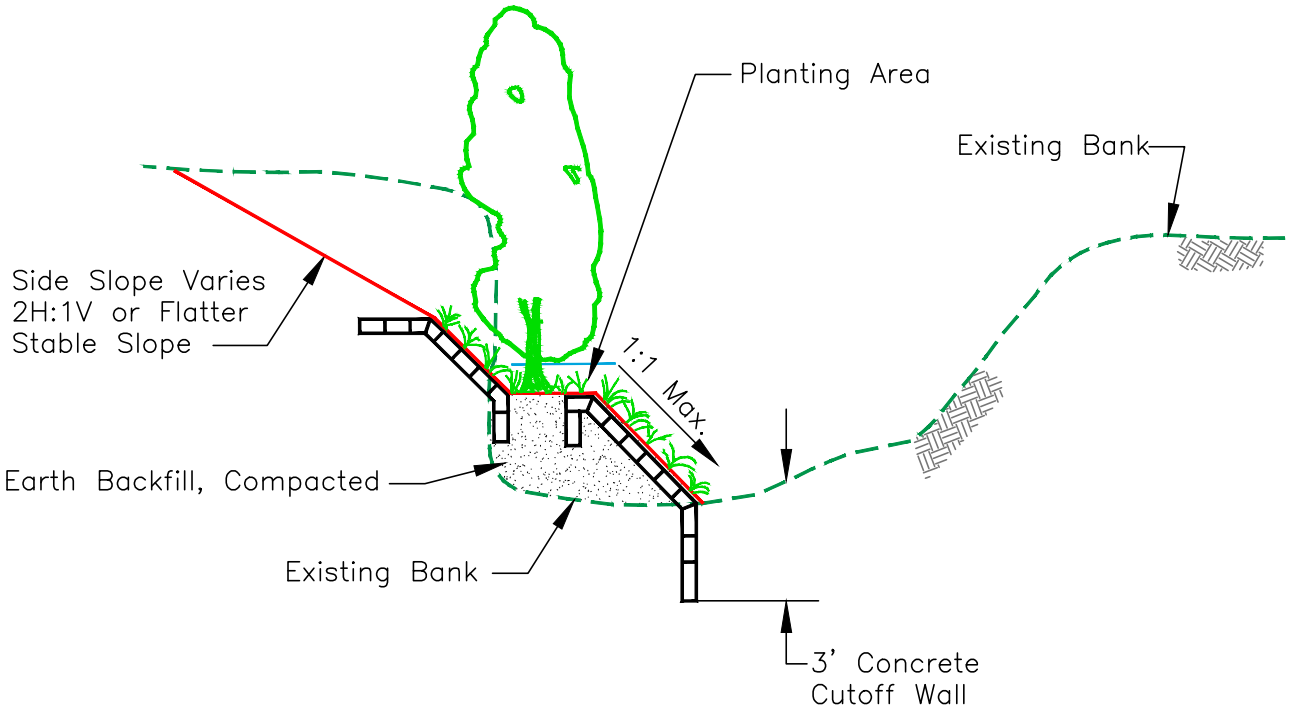
Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live Stakes/Cuttings:	2 feet average on-center or as log placement allows

Habitat Impact Assessment:

Channel bottom:	Permanent Impact
Bank:	Permanent Impact

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

Attachment A – Bank Stabilization Methods
#9A: Articulated Concrete Blocks with Planting Areas



SECTION

FILENAME: \\SRVFILE1\global\Temporary\Current Month\Keiron\SMP CAD Files\Measure_09A(NEW)

#10: Concrete Crib Walls

Description:

Concrete crib walls consist of stacked interlocking concrete frames that form a retaining wall. The structural strength is developed by the composite design of a concrete frame with compacted backfill. Crib walls are constructed with open face panels that are planted by live staking. This method restricts plant growth by the size of the panel opening. As the crib wall slope is flattened and the lattice becomes more open, the vegetation potential increases and the allowable velocity decreases because of the exposed soil and vegetation.

Design Criteria:

Appropriate for slopes up to 1:1.

Appropriate for velocities from 6 feet per second up to 15 feet per second, depending on the size of the crib wall's openings.

A typical planting plan is illustrated in Figure 10-10 of the Program Manual. Plantings will be installed as follows: Plant palette will be based on an evaluation of vegetation communities up and down stream of the repair site. A mix of tree, shrub, and herbaceous species will be selected as appropriate from the SMP Table 10-7. Grass species utilized will be SCVWD Erosion Control Mix per Table 10-7. An as-built planting plan diagram (to scale) and plant list will be provided to the permitting agencies.

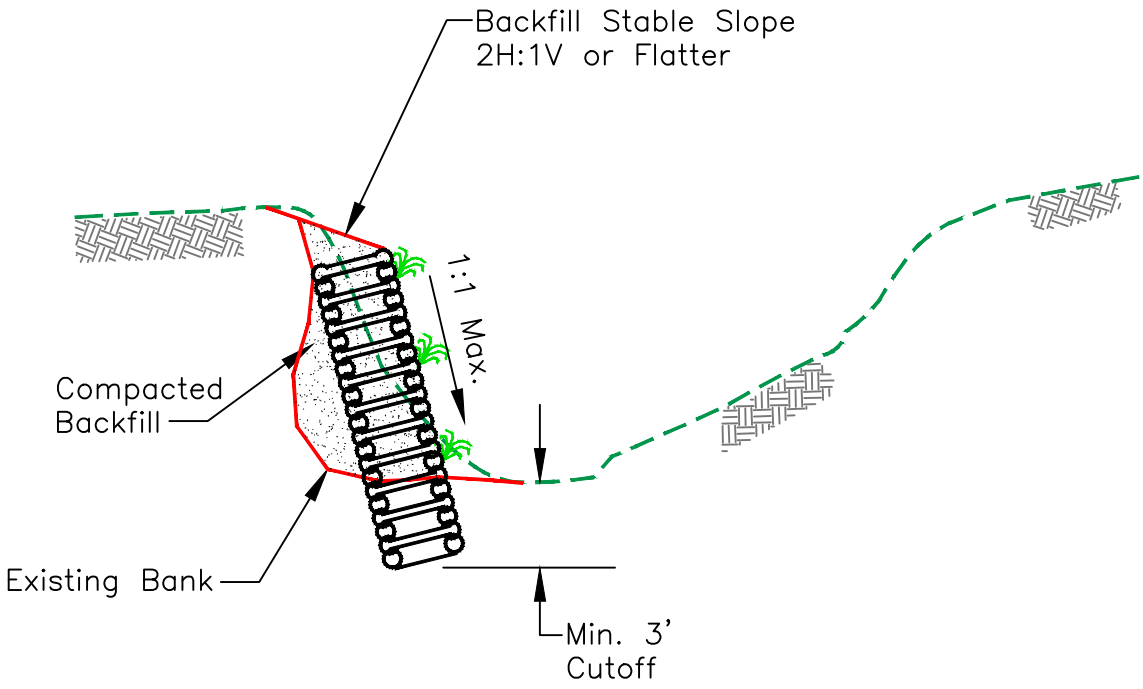
Herbaceous species:	4 feet average on-center
Shrub species:	8 feet average on-center
Tree species:	12 feet average on-center
Live Stakes/Cuttings:	2 feet average on-center or as log placement allows

Habitat Impact Assessment:

Channel bottom:	Permanent impact
Bank:	Permanent Impact

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

Attachment A – Bank Stabilization Methods
#10: Concrete Crib Walls



SECTION

FILENAME: \\SRVFILE1\global\Temporary\Current Month\Keiron\SMP CAD Files\Measure_10(NEW)

#11: Sacked Concrete

Description:

Sacked concrete slope protection (SCSP) consists of burlap bags filled with concrete and placed against channel banks. SCSP requires a three-foot deep concrete or SCSP cutoff wall at the base of the slope to prevent failure. SCSP does not provide any revegetation potential. However, it offers the opportunity to contour walls such that impacts to existing vegetation are avoided

Design Criteria:

Appropriate for slopes up to ½:1.

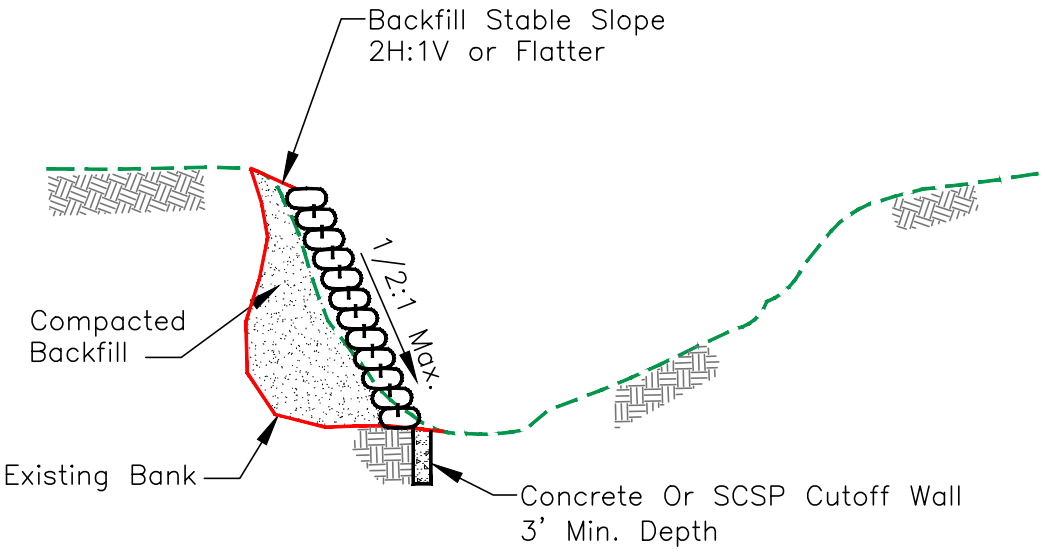
Appropriate for velocities up to 15 feet per second.

Habitat Impact Assessment:

Channel bottom:	Permanent impact
Bank:	Permanent impact

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

Attachment A – Bank Stabilization Methods
#11: Sacked Concrete



SECTION

FILENAME: \\SRVFILE1\global\Temporary\Current Month\Keiron\SMP CAD Files\Measure_11(NEW)

#12: Gunite Slope Protection

Description:

Gunite slope protection consists of a concrete mixture sprayed under pressure oven an eroded bank. Reinforcing steel may be placed against the bank prior to spraying.

Design Criteria:

Appropriate for slopes up to 0.1:1 (near vertical).

Appropriate for velocities up to 15 feet per second.

Habitat Impact Assessment:

Channel bottom:	Permanent impact
Bank:	Permanent impact

Mitigation: Off-site as specified in Table 10-6 and the SMP permits.

ATTACHMENT B

Fish Relocation Guidelines

ATTACHMENT B

Fish Relocation Guidelines

1. PURPOSE and SCOPE:

This work instruction is designed to respond to planned and unplanned de-watering events (drybacks) in streams and other water bodies in the jurisdiction of the Santa Clara Valley Water District. The purpose of these efforts is to recover fish and wildlife resources that are at risk during dryback events in order to minimize potential impacts on these natural resources. The primary strategy is to capture organisms ("fish" to include all aquatic species) in areas where water is dried back and relocate them to flowing or standing water. Reconnaissance and operational guidelines for planned and unplanned dryback events are provided in this document.

While these guidelines have been adopted to effectively conduct safe and orderly fish relocations, specific situations may dictate a deviation from these guidelines. As such, each guideline element should be viewed as modifiable to adapt to the immediate circumstances on-site.

2. REFERENCE DOCUMENTS:

Q822F01	Ecological Monitoring & Assessment Program quality Assurance Systems Requirements
EMAP-W20006	Ecological Equipment Checkout Instructions
EMAP-W20007	Disinfection of Biological Equipment

Smith-Root Inc. Model LR-24 and Model 12 Backpack Electrofisher User Manuals

3. DEFINITIONS:

Unplanned Dryback Operations: Unscheduled events where the flow of water is unintentionally modified by reducing the volume of water in the channel or redirecting flows so that the channel downstream becomes dry. Mobilization for unplanned dryback operations are based on the elements of a planned dryback event.

Planned Dryback Operations: Scheduled events where the flow of water is intentionally modified by reducing the volume of water in the channel or redirecting flows so that the channel downstream becomes dry.

4. REQUIREMENTS:

4.1. ISO 9001

7.5.1 Control of Production and Service Provision

4.2. ISO 14001

4.4.6 Operational Control

4.3. Other Requirements

Board Ends Policy No. E-4 (12/15/09): There is water resources stewardship to protect and enhance watersheds and natural resources and to improve the quality of life in Santa Clara County.

4.1.1.1 Balance the protection and restoration of sensitive fisheries and aquatic species, such as steelhead trout, with a reliable water supply.

5. MONITORING AND MEASUREMENT:

Conduct biennial desk audit of fish relocation activities to ensure that fish relocation activities are documented.

6. PROCEDURE:

Overview	Details	Quality Records
(1) Determine Need for Fish Relocation (Fisheries Biologist)	• Determine rationale for the rescue and be prepared to communicate this information to other staff and the environmental resource agencies.	
↓		
(2) Conduct Reconnaissance Survey (Fisheries Biologist)	*NOTE: A member of the District biological staff with a current scientific collecting permit must be on-site before fish rescues are attempted and resource agency authorization is obtained, unless pre-approval to relocate fish has been granted in a standing agreement (e.g., under the Stream Maintenance Program or other permits).* • Upon arrival at the site, District personnel will determine the extent of the dryback and if there will be any immediate or foreseeable impacts to fish and wildlife. • Conduct a reconnaissance survey of the dryback zone to establish an operational response. Depending on the species and site, fish and aquatic wildlife may need to be transported to various release sites. • A variety of elements to be considered in executing a fish resource relocation operation include: a) Staging area: Identify staging areas in the dryback zone. Sites should be selected on the basis of proximity and access to the dryback zone and safe operation of the equipment. b) Relocation sites: Priority shall be given to close proximity to the dryback zone within the same stream; if no suitable site within the stream is available, then “second choice” locations within	

Overview	Details	Quality Records
	the watershed will be selected. In all cases, the closest site that is likely to result in a successful rescue will be used. c) Transport routes. d) Need for pumping: Determine if pumping activities are necessary and begin as early as possible and timed for optimum relocation activities. e) Downstream vs. Upstream: Species rescued will be transported downstream if possible and upstream only for short distances if downstream sites are not feasible. f) Disease Considerations: Fish will not be moved upstream over substantial barriers or long distances upstream to guard against disease transmission. g) Relocation of anadromous Fish: Salmonid fry and non-smolted juveniles should be moved upstream to a location of perennial running water; smolts should be moved downstream to a location where flow runs continuously to the bay; and adults should be moved according to their spawning condition: unspawned fish upstream to perennial flow; spawned fish downstream where flow runs continuously to the bay. h) Collection and transport methods will be determined per site conditions. Methods will also be selected to maximize efficiency of collection effort while minimizing handling and transport time and stress. Local transport of fish may be executed by various methods including: i) Net transfer: Appropriate for short distances where rapid transfer is possible. j) Live car: Appropriate for temporary holding in stream and short distances where rapid transfer is required. a) Bucket: Appropriate for temporary holding and transport over short-medium distances. Holding	

Overview	Details	Quality Records
	time should be minimized if possible or supplemental aeration supplied. b) Prioritization of species and collection/relocation sites to be prioritized as follows: 1. Endangered species 2. Threatened species 3. Species of special concern 4. Native fishes not under the above categories 5. Non-native fishes if appropriate	
↓		
(3) Notify Resource Agencies (Fisheries Biologist)	• Identify a point person to contact appropriate resource agencies (California Department of Fish and Game, National Marine Fisheries Service, U.S. Fish and Wildlife Service). This is typically the collecting permittee. • Notify appropriate environmental resource agencies to communicate the details of the fish relocation and to confirm disposition instructions. Notification is typically done 24 hours in advance when possible.	
↓		
(4) Coordinate Media and Public Relations (Public Information Officer and/or lead Fisheries Biologist)	• Contact the District's Public Information Office to serve as a point person for media coverage. As appropriate, PIO staff will develop media information and coordinate appropriate onsite media activities to minimize onsite risk to press and onlookers during operations. • Coordinated media events minimize disruption to operation logistics and timing to maximize safety to participants. Isolation of media activities out of channel is preferred. • For safety, escort media personnel if in-channel or close-proximity events are staged.	
↓		
(5) Plan Operational Logistics (Fisheries Biologist)	• Identify and secure all necessary equipment for the fish relocation activities (*EMAP-W20006 Ecological Equipment Checkout Instructions*) • Arrange multiple transport vehicles to minimize holding time and fish stress.	

Overview	Details	Quality Records
	• Contact operational personnel and confirm the degree of mobilization required. • Ensure that mobile communication devices are available in transport vehicles.	
↓		
(6) Conduct Fish Relocation (Lead Fisheries Biologist and Field Crew)	1. Setup • Upon arrival at the site, review the operational sequence and logistics and designate field assignments. Conduct a review of safety and operation methods. Discussion elements may include: site access; local hazards; environmental considerations; media and public safety; equipment operation, etc. 2. Live well Operation • If necessary, set up live wells early in the operation in order to stabilize tank conditions. • Use local “native” water to fill live wells if available and clean. • Reduce and manage temperature of live wells as appropriate at 5-10 degrees F to lessen stress in fish. Slightly lower temperature slows metabolism and ammonia production and at the same time will avoid thermal shock. • Start the aeration system prior to placing fish into the live well to ensure that sufficient oxygen is present during the adjustment period. When salmonids are placed in the live well, managed the live well to the extent possible so that the dissolved oxygen concentration will be greater than 6 ppm but less than saturation. • Salmonids may be transported separately from other fish to reduce stress, handling time, and potential predation in the live well. • To reduce stress in salmonids, at times, a 0.8-0.9	

	ppt salt solution (never exceeding 1.0 ppt), may be used in the live well to relax the osmotic stress and better manage crowded conditions. This treatment will also help rid the fish of fungal and bacterial agents. This will be administered and managed by trained fisheries biologists if deemed necessary. 3. Electrofishing Operation • Adjust the electrofishing unit settings to the conductivity and temperature of the water. Adjust setting for either varying width (wide to narrow) or varying frequency (high to low) to minimize possible fish injury when these settings elicit proper taxis for fish capture. • Record the settings used and any incidental electrofishing mortalities in the field notebook. If electrofishing mortalities for salmonids and other species listed as threatened or endangered exceed 5% of the total capture, electrofishing activities will be reevaluated and possibly terminated. • Note fish other than salmonids that are mortalities from electrofishing activities as an indicator of possible injury or mortality rate to salmonids and other fish (i.e. Sacramento suckers are more susceptible to electrofishing injury and mortality than other species and give an ancillary indication of electrofishing success). 4. General Collection Guidelines • Execute collection of fish in a manner to minimize handling time and stress, yet maintain the safety of personnel. • Use multiple buckets and/or live cars to reduce crowding during collection and transfer. • Pre-sort fish as needed for transport. • Equip buckets that hold salmonids until subsequent transfer to a live well with portable aerators. 5. Transport • Transport fish to minimize holding time an alternately	EMAP-F30001 Field Notebook Form

	sequenced in tandem with ongoing collection activities. • Only fisheries biologist with appropriate permits will transportation and accompany all transport operations. • Continue normal live well operations during transport. 6. Records and Data • Inventory fish and record other pertinent data, including species, numbers of each species, disposition, and other data such as fork length, etc. as appropriate. If conditions preclude a complete inventory, at a minimum, document species present, their disposition, and an estimate of their abundance. • Record information on ambient site conditions, including photo documentation at collection and release sites, as appropriate, and other information on collection, handling, and transport.	
(7) Conduct Demobilization (Fisheries Biologist)	• Sterilize equipment according to *Disinfection of Biological Equipment* (EMAP-W20007). • Conduct an assessment of the fish relocation to identify lessons learned, estimate the number of individual fish and fish species moved and determine the mortality rate. • Prepare a report summarizing the cause of the dryback, the merits of the fish relocation, and the results of the assessment. This report will be kept on file and copies forwarded to the appropriate environmental resource agencies or interested parties.	Fish Relocation Report

7. QUALITY RECORDS:

QUALITY RECORD	Location Kept	Filing Order	Duration Kept	Disposition	Comments
Field Notebook Form	Project File	Date	Permanent	Archive	
Fish Relocation Report	Project File	Date	Permanent	Archive	

8. CHANGE HISTORY:

Date	Revision	Comments
3/18/10	R1	New Release

ATTACHMENT C

Tree Scoring for Removal of Trees and Shrubs 6-12” dbh

Tree Scoring for Removal of Trees and Shrubs 6 - 12" dbh

Trees and shrubs 6 to 12" dbh may be removed under the Stream Maintenance Program 2014-2023. The sum value from the assessment of four (4) attributes will provide a mitigation ratio for the trees/shrubs proposed for removal. Trees >12" dbh are not included as a part of this removal program. High scores equate to higher value trees, with greater potential impacts if they are removed; and therefore, will require more mitigation. Low scores equate to lower value trees, having fewer potential impacts if they are removed; and therefore, require lower mitigation.

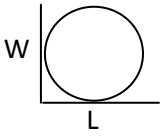
Multi-stem: A tree or shrub with a root ball and multiple trunks or stems. This may occur at ground level or several feet above ground. The dbh of trees with multiple stems will be calculated by adding the diameters of the individual stems at 4.5 feet above ground. Individuals with greater than seven (7) stems at dbh will be assessed by their canopy cover.

A. Approach

Tree replacement would start with a baseline ratio of 1:1. Replacement ratios would increase or decrease based on specific ecological attributes of the individual(s) to be removed and the setting in which it is/they are located. Scoring would add to or subtract from the baseline ratio. Final ratios would be calculated using the methodology outlined below. Non-native species may result in a mitigation ratio of 1:1. While they may be ecological undesirable, they may also provide best available habitat in site specific locations. Native trees will have a minimum 2:1 mitigation ratio. Due to the habitat value of native oaks and sycamores, these species will be replaced in-kind, with like native species.

B. Ranking

1. Canopy cover
   a) Square footage of canopy is measured at the widest drip-line extension of the subject tree.
   b) Grouping or stands of trees are calculated as the summation of each individual tree canopy, even if the canopies overlap. Open space between the trees would not be factored into the square footage calculation.
   c) Calculations may be made on approximations (+/- 5 feet) with areas converted to measurable geometry. Width x length = square footage. (Estimating by a triangle or circle is also acceptable.)
   d) 0-100 sq. ft. is ranked 0 as the baseline from which mitigation starts is 1:1



Metric: Choose 1. Assess at widest dripline extension point.

Attribute	**Score**
0-100 Square Feet of Canopy (< 10' diameter)	0 points
101-400 Square Feet of Canopy (10 - 20' diameter)	+ 1 points
>401 Square Feet (> 20' diameter)	+ 2 points

0-2 points

2. Local Area Value
    a) Is the affected vegetation unique to its geographic location based on a measurable attribute (species, size, structure, absence of adjacent comparable vegetation).
    b) There is a 2000 sq ft maximum for removal of a stand of trees.

Metric: Choose all that apply. Score = 0 if none of these apply.

Attribute	**Score**
Native Species	+1 point
No similar vegetation within 500 feet radius (Size of canopy, height, or similar measurable criteria; even if non-native).	+1 point
Stand Reduction (Removal of target trees would reduce stand by more than…)	+1 point for 20-50% reduction +2 points for greater than 50% reduction

0-4 points

3. Ecosystem Benefits (wildlife, fisheries, streams)
    a) Tree used by wildlife. Examples include: cavity nesting, nectar feeders, high wildlife food value (seeds, fruits, flowers), cavities and crevices for bats, dead wood for woodpeckers and insect feeders, perching, roosting, nesting, etc. This will rarely ever be zero.
    Supports macroinvertebrate and biomass decomposition processes.
    b) Provides structure/cover : Nurse tree, horizontal or vertical cover.
    c) Provides SRA: Shaded Riverine Aquatic, $\leq$ 15 ft from the water's edge or overhangs water, shade, roots or branches in water providing habitat for fish and aquatic organisms, could contribute instream woody debris.
    d) Tree is 6-12" dbh, provides more mature structure and life form to the surrounding environment.

Metric: Choose all that apply.

Attribute	**Score**
Used by wildlife	+ 1 point
Structure/Cover (vertical, horizontal)	+ 1 point
SRA	+ 1 point
Tree is 6-12" dbh (life form)	+ 1 point

1-**4 points**

4. Ecosystem Detriments

    a) Tree has ecologically undesirable attributes.
    b) Ecological arboriculture would include a tree failing to thrive with little or no hope of recovery. Note: this distinguishes between tree removals that may benefit the ecological setting versus hazard trees.

Metric: Choose all that apply. Score = 0 if none of these apply.

Attribute	**Score**
Significant structural defects	-1 point
Non-native species OR Invasive species	-1 point OR -2 points
Removal for ecological arboricultural reasons (diseased, infestation), excludes hazard trees	-1 point

-4-0 points

C. Mitigation Calculation

Baseline is 1:1 ratio for trees impacted in this size class.
Point reductions could result in a final score that reduces the ratio to less than 1:1.
Due to the habitat value of native oaks and sycamores, these species will be replaced in-kind, with like native species.

Attributes	Min.	Max.
Vegetation Cover	0	2
Local Area Value	0	4
Ecosystems Benefits	1	4
Ecosystems Detriments	-4	0
Total Range	**-3**	**10**

Attribute Range	Mitigation Ratio in sq. ft.
-3 - 2	1:1
3 - 5	2:1
6 - 10	3:1

Tree Scoring for Removal of Trees and Shrubs 6 - 12" dbh

Site Location_____ Species_____
Assessors Name_____ DBH_____
Date_____ Canopy Cover sq ft_____
ESU #_____ Reason for Removal_____

1. Canopy cover

Metric: Choose 1. Assess at widest dripline extension point.

Attribute	Score
0-100 Square Feet of canopy cover (< 10' diameter)	0 points
101-400 Square Feet of canopy cover (10-20' diameter)	+ 1 points
>401 Square Feet (> 20' diameter)	+ 2 points

0-2

Vegetation Cover
Score:_____

Stand maximum = 2000 sq ft

2. Local Area Value

Metric: Choose all that apply. Score = 0 if none of these apply.

Attribute	Score
Native Species	+1 point
No similar vegetation within 500 feet radius (Size of canopy, height, or similar measurable criteria; even if non-native).	+1 point
Stand Reduction (Removal of target trees would reduce stand by more than:…..)	+1 point for 20-50% reduction +2 points for greater than 50% reduction

0-4

Local Area Value
Score:_____

3. Ecosystem Benefits (wildlife, fisheries, streams)

Metric: Choose all that apply.

Attribute	Score
Used by wildlife	+ 1 point
Structure/Cover (vertical, horizontal)	+ 1 point
SRA	+ 1 point
Tree is 6-12" dbh (life form)	+ 1 point

1-**4**

Ecosystem Benefit
Score:_____

4. Ecosystem Detriments

Metric: Choose all rows that apply. Score = 0 if none of these apply.

Attribute	Score
Significant structural defects	-1 point
Non-native species or Invasive species	-1 point or -2 points
Removal for ecological arboricultural reasons (diseased, infestation) excludes Hazard trees	-1 point

-4 – **0**

Ecosystem Detriment
Score:_____

C. Mitigation Calculation

Due to the habitat value of native oaks and sycamores, these species will be replaced in-kind, with like native species.

Attributes	min	max
Vegetation Cover	0	2
Local Area Value	0	4
Ecosystems Benefits	1	4
Ecosystems Detriments	-4	0
Total Range	**-3**	**10**

Total 4 Attributes
Score:_____

Attribute Range	Mitigation Ratio
-3 - 2	1:1
3 - 5	2:1
6 - 10	3:1

Mitigation Ratio:_____

Canopy Cover sq ft **X** Ratio quotient = Amount Owed

_____

ATTACHMENT D

Invasive Plant Removal Program

ATTACHMENT D

Invasive Plant Removal Program

Invasive Plant Management Plan

1.0 PLAN OVERVIEW

Controlling the spread of invasive plant species is a critical element in improving the ecological health of our streams and watersheds. Invasive plants tend to thrive and spread aggressively, negatively altering resource allocation regimes, wildlife patterns, soil stability and water quality thus degrading habitat quality and the overall ecological value of a site. In addition, invasive plants can exacerbate flooding and fire danger, undermine structural assets, and obstruct access to roads, levees and trails.

The Invasive Plant Management Program (IPMP) will serve as compensatory mitigation for SMP (Stream Maintenance Program) vegetation impacts to upland, riparian, freshwater and tidal wetlands by eliminating or significantly controlling the population of invasive plant species from these affected habitats. The IPMP will be a two-pronged approach including: 1) a systematic program to control priority invasive plants throughout Santa Clara County; and 2) an opportunistic program to manage invasive plants within active individual SMP work sites. These two approaches will dovetail together to enhance the overall ecological health of our creeks and watersheds.

The IPMP may be implemented in any location within the coverage area of the SMP. Priority, however, will be given to conducting control work in locations that contain sensitive habitats, sensitive species and/or provide quality habitat for a variety of wildlife. When possible, the SCVWD/District will coordinate with adjacent landowners to try and accomplish a complementary and consistent approach to invasive plant management.

2.0 PLAN GOALS AND MITIGATION COMMITMENTS

The overall goal of the IPMP is to preserve and improve habitat within Santa Clara County streams and riparian corridors through removal of invasive plants. This will be achieved through early detection and systematic removal of invasive plants in existing high quality habitats, opportunistic removal of invasive plants in SMP work locations, as well as undertaking control efforts in currently degraded habitats to improve the overall ecological site condition.

A. Over the course of the 10 year permit, the systematic portion of the IPMP will target: 1) removal of priority invasive plants in existing high quality habitats and 2) control efforts in currently degraded habitats to improve overall ecological site conditions. Mitigation needs and credit will be determined annually, dependent on the proposed work for the year. A proposal for mitigation credit and the associated acreage to be treated for this program will be submitted with the “Notice of Proposed Work” (NPW).

B. The opportunistic portion of the IPMP will target removal of invasive plants at specific SMP work sites. This effort will be variable each year dependent on the number of project sites where invasive plant removal is feasible. Mitigation credit accrued will be used to compensate for on-site vegetation impacts for on-going vegetation maintenance activities,

or sediment removal. Proposed mitigation credit for each project site will be submitted with the annual Notice of Proposed Work.

The IPMP plans to coordinate and collaborate with other regional control and early detection programs in order to stay apprised of regional issues (e.g., Bay Area Early Detection Network (BAEDN), California Invasive Plant Council (CAL-IPC), San Francisco Estuary Invasive Spartina Program (ISP), Arundo Del Norte, etc.). Coordination will also take place with other landowners in Santa Clara County to try and accomplish a complementary and consistent approach to invasive plant management throughout the County (ex., Don Edwards National Wildlife Refuge, Cities of Palo Alto, Mountain View and San Jose, etc.).

3.0 PLAN IMPLEMENTATION

A. Systematic Component

A priority matrix of invasive plant species has been developed which integrates and weights a variety of factors including: the 2006 CAL-IPC ratings, the anticipated rate of spread without management intervention, the feasibility of effective control, impacts to fish and wildlife, impacts to sensitive plant communities, increases in flood or fire danger, and aggressive growth patterns known to cause structural damage to flood control facilities or impede maintenance access (Table 1).

California Department of Food and Agriculture (CDFA), CAL-IPC, and BAEDN invasive plant databases will be consulted periodically to ensure the SCVWD's species list is up to date. Any revisions to Table 1 will be submitted to the agencies for approval. Specific locations targeted for control activities will be selected based on the baseline inventory (See Section 4 below) as well as a variety of other factors including: quality of habitat, feasibility of control, access constraints, etc. Integrated Vegetation Management techniques will be employed (ex., mechanical, chemical, combination, etc.) to utilize the most effective method for each species while providing the greatest amount of protection to environmental resources.

Success criteria will be developed for each site, and/or for each individual target species. Eradication will be the ultimate goal for defined sites where conditions exist to make it a realistic goal. Exclusion or containment strategies may be used where an invasive poses a threat to a sensitive species or habitat type and complete eradication is deemed infeasible. These control strategies may also be used to suppress highly competitive invasive species and give existing native species the ability to thrive.

Control work for certain species may require only 1 - 2 years of treatment to be. Some species require greater effort to achieve effective eradication or containment. Therefore management of these species will result in greater mitigation credit. Table 1 divides the invasive species list into two tiers based on the level of effort required for effective management. Species in the "Tier 1" category will result in a mitigation credit of 1:1 (mitigation area credited:impact area). Species needing 3 years or more of treatment are in the "Tier 2" category and will result in a mitigation credit of 2:1. "Tier 2" provides mitigation at a ratio of 2:1 to recognize the additional resources needed to be successful, difficulty in managing/eradicating the species, and benefits

provided to the site ecology. Invasive species removed for the purposes of flow conveyance will be considered neutral, requiring neither mitigation credit nor debt (mitigation ratio is 0:1). The proposed mitigation ratio will be included in the NPW.

Efforts will be made to encourage natural revegetation/recruitment at treatment sites, including suppression of other weed species. In areas where revegetation does not occur naturally within 1-2 years, a biological/horticultural assessment will be made to determine what impediments may exist to natural revegetation. In areas where revegetation potential exists, a plan will be developed to install site-appropriate vegetation. Mitigation credits for revegetation may be applied, consistent with SMP-2 mitigation accounting.

IPMP may be combined with other forms of mitigation such as revegetation or land acquisition to encourage a holistic mitigation program that is sustainable in the long term.

B. Opportunistic Component

Invasive plant species are frequently found during field inspections and are often associated with other identified SMP work activities (i.e., vegetation management, sediment removal, minor maintenance). In these instances, opportunistic control of invasive plants may enhance habitat quality and benefit the ecological landscape. Invasive species removed for the purposes of flow conveyance will be considered neutral, requiring neither mitigation credit nor debt.

There is no specific target acreage for the opportunistic component of the Program. Credit for these removals will be on a case by case/ site by site basis. Proposed mitigation credit for each project site will be submitted with the annual Notice of Proposed Work.

C. Coordination & Education

The SCVWD will coordinate and collaborate with other regional control and early detection programs in order to stay apprised of regional issues (e.g., BAEDN, CAL-IPC, ISP, Arundo Del Norte, etc.). The IPMP will document invasive species occurrence and control data and submit pertinent information to regional databases (e.g., CAL-IPC, Cal Flora, and BAEDN).

Coordination will also take place with other landowners in Santa Clara County to try and accomplish a complementary and consistent approach to invasive plant management throughout the County (ex., Don Edwards National Wildlife Refuge, Cities of Palo Alto, Mountain View and San Jose, etc.).

An informational brochure highlighting priority invasive species will be published which includes pictures, provides descriptions, and discusses the threats posed by each plant to help educate SCVWD field staff and the public about these species. Increased awareness will aid with early detection and/or identification of previously unidentified locations of these species. In addition, during control activities, informational postings will be placed at publicly accessible sites.

4.0 MONITORING

A. Baseline Inventory and Database Development

The county-wide vegetation mapping conducted in 2010 by Aerial Information Systems, Inc. (AIS) for the SMP will be used to develop a baseline inventory of invasive species in the SMP footprint. This data layer will be supplemented with pertinent information collected by SCVWD staff and regional databases (e.g., CAL-IPC, Cal Flora, etc.) to establish the Year 1 baseline inventory.

The inventory will be updated annually based on field inspection data collected by Vegetation Management staff, biologists, and Field Operations Administrators. Over the life of the program, important information will be collected regarding the distribution of invasive species in Santa Clara County watersheds, their overall ecological impact, the efficacy of management efforts, and the best direction for future management to reduce the negative ecological impacts of invasive plants.

B. Treatment Monitoring

Treatment areas will be mapped with a GPS and tracked for long-term success at all programmatic and opportunistic control sites. This will help determine the efficacy of the particular treatment and determine if additional control work and/or a different technique will be necessary. Results of the treatment monitoring will be critical for prioritizing follow-up treatments and planning seasonal work. Tier 1 (from Table 1) will be monitored in years 1 and 3. Tier 2 will be monitored in years 1, 3, and 5.

5.0 REPORTING

The NPW will include a discussion of the mitigation details of both the systematic and opportunistic components of the IPMP. Acreage of target species to be controlled as well as general locations of control activities will be discussed.

Annual summary reports will be submitted to the regulatory agencies providing details regarding the species treated, control methods used, and locations of treatment work. Tier 1 (from Table 1) will be reported in years 1 and 3. Tier 2 will be reported in years 1, 3, and 5.
Recommendations will be provided, including future management needs and the feasibility of active revegetation, if necessary.

6.0 SCHEDULE

The IPMP will be implemented over the course of the 10 year permit. Specific project milestones include:

- Regional coordination will be ongoing upon initiation of the program.
- Baseline invasive plant inventory will be completed within the first two years of the program.
- Priority matrix of invasive plant species will be updated as needed.
- Proposal for mitigation credit will be submitted annually with the Notice of Proposed Work.

- Control efforts for the opportunistic component will begin in year 1 of the program.
- Control efforts for the programmatic component will begin in Year 2 after the baseline inventory is complete.
- Mitigation status will be reported annually.

7.0 PLAN ADMINISTRATION

This program has been constructed for the sole purpose of meeting the mitigation requirements of the SMP.

As a mitigation element of the SMP, the IPMP is defined as a separate work category. While it has elements of vegetation management, revegetation and maintenance it is not subject to the limitations defined for these separate work activities to the extent that these activities are performed as mitigation. As described elsewhere in the SMP Manual, IPMP will only be conducted up to the optimal level to maximize ecological values at a site; removal beyond that for other purposes (e.g., flood conveyance) would be considered an impact requiring mitigation, and would be subject to applicable Program limits. Since the IPMP is a mitigation element, the IPMP will have a higher level of biological oversight and resource protection than other "impact" program components.

Table 1. Invasive Plant List

Species	Common Name	Habitat	Life Form	Systematic Program Mitigation Ratios
Species with 1-2 years of control work (TIER 1)				
Casuarina cunninghamiana	river she-oak, beefwood	Riparian & upland	tree	1:1
Cotoneaster spp.	cotoneaster	Riparian & upland	tree	1:1
Eucalyptus spp.	eucalyptus, gum	Riparian & upland	tree	1:1
Fraxinus spp.	ash	Riparian & upland	tree	1:1
Juglans spp. (J. regia, J. californica)	walnut	Riparian & upland	tree	1:1
Ligustrum spp.	privets	Riparian & upland	tree/shrub	1:1
Nicotiana glauca	tree tobacco	Upland & ruderal (levees)	tree/shrub	1:1
Olea europaea	olive	Riparian & upland	tree	1:1
Palm Spp. (Phoenix canariensis, Washingtonia robusta)	palms	Riparian & upland	tree	1:1
Populus nigra 'Italica'	Lombardy poplar	Riparian & upland	tree	1:1
Rhamnus alaternus	Italian buckthorn	Riparian & upland	tree/shrub	1:1
Schinus molle	Peruvian pepper tree	Riparian & upland	tree	1:1
Sesbania punicea	red sesbania, rattlebox	Riparian & upland	perennial herbaceous	1:1

Species	Common Name	Habitat	Life Form	Systematic Program Mitigation Ratios
Species with 3 years or more of control work (TIER 2)				
Acacia spp.	acacia	Riparian & upland	tree	2:1
Ailanthus altissima	tree of heaven	Riparian & upland	tree	2:1
Arundo donax	giant reed	Riparian & upland	perennial grass	2:1
Broom spp.	Broom species	Riparian & upland	shrub	2:1
Centaurea solstitialis	star thistle	Upland & ruderal (levees)	annual herbaceous	2:1
Conium maculatum	poison hemlock	Upland & ruderal (levees)	annual/biennial	2:1
Cortaderia spp.	pampas grass, jubata grass	Upland & ruderal (levees)	perennial grass	2:1
Cynara cardunculus	artichoke thistle	Tidal & FW marsh & ruderal	perennial herbaceous	2:1
Delairea odoata	Cape Ivy	Riparian & upland	vine	2:1
Dittrichia graveolens	stinkweed	Upland & ruderal (levees)	annual herbaceous	2:1
Foeniculum vulgare	fennel	Riparian & upland	perennial herbaceous	2:1
Hedera spp.	English ivy, Algerian ivy	Riparian & upland	vine	2:1
Lepidium latifolium	pepperweed	Tidal & FW marsh & ruderal	perennial herbaceous	2:1
Myriophyllum aquaticum + spicatum	parrotfeather	Aquatic	aquatic	2:1
Phalaris aquatica	Harding grass	Riparian & upland	perennial grass	2:1
Phragmites australis	common reed	Tidal and FW marsh	perennial grass	2:1
Quercus ilex	holly oak	Riparian & upland	tree/shrub	2:1
Ricinus communis	castor bean	Upland & ruderal (levees)	annual, biennial	2:1
Robinia pseudoacacia	black locust	Riparian & upland	tree	2:1
Rubus armeniacus	himalayan blackberry	Riparian	vine	2:1
Salix babylonica (and hybrids)	weeping willow	Riparian	tree	2:1
Spartina alterniflora	atlantic cordgrass	Tidal marsh	perennial grass	2:1
Tamarix ramosissima	salt cedar	Riparian & upland	tree/shrub	2:1
Ulmus spp.	elm	Riparian & upland	tree	2:1
Vinca major	vinca, periwinkle	Riparian & upland	perennial herbaceous	2:1

ATTACHMENT E

Large Woody Debris (LWD)

Mitigation Accounting Criteria

Management of Large Woody Debris in Santa Clara County Streams

Guidelines for Implementation

Objective

Retain woody debris in streams throughout Santa Clara County in order to preserve the physical and biological processes associated with the natural recruitment of wood to waterways. This is the process of altering urban streams so that their behavior corresponds as closely as possible with that of natural streams while providing some measure of flood protection (Keller and Hoffman, 1977).

Location, Size and Description of Large Woody Debris

These guidelines pertain to the instream area which is defined as the stream channel within bankfull discharge demarcations. Bankfull is the river elevation (stage) at which time the most effective geomorphic work occurs. This is also referred to as the dominant discharge and is the stage that generally corresponds to a flow event with a 1-2 year recurrence interval. See Figure 1. Furthermore, these guidelines will utilize established methods of defining and classifying large woody debris (LWD) as outlined in California Salmonid Stream Habitat Restoration Manual (CDFG, 1998).

While LWD management occurs throughout the County, this management process is required for the following channels:

Central California Coast Steelhead Distribution in the Project Area

Creek/River	Upper Limit Of Steelhead Distribution
Alamitos Creek	Almaden Dam
Arroyo Aguague[1]	Falls upstream from confluence with Upper Penitencia Creek
Calero Creek	Calero Dam
Coyote Creek	Leroy Anderson Dam
Guadalupe River/Creek	Guadalupe Dam
Los Gatos Creek	Camden Avenue Drop Structure
Los Trancos Creek[1]	Approximately 0.4 mile north of headwaters
San Francisquito Creek	Searsville Dam
Stevens Creek	Stevens Creek Dam
Upper Penitencia Creek	Cherry Flat Reservoir

South-Central California Coast Steelhead Distribution in the Project Area

Creek/River	Upper Limit Of Steelhead Distribution
Bodfish Creek	Bodfish Creek Falls
Cedar Creek[1]	Approximately 3 miles north of Cedar Creek Boulder Falls #2
Little Arthur Creek[1]	Cement Dam (near Redwood Retreat Road crossing)
Llagas Creek	Chesbro Reservoir Dam

Pacheco Creek[1]	North Fork Dam
Pajaro River	Steelhead occur in all portions of the creek within Santa Clara County
Pescadero Creek[1]	Creek source
Tar Creek[1]	Southern end of Castro Valley approximately 1.8 river miles from source
Uvas/Carnadero Creek	Uvas Dam
South Fork Pacheco Creek[1]	South Fork Pacheco Creek Boulder Falls

[1] Although work is not expected on these creeks, they are within the SMP project area and are therefore included here.

During the initial biological survey of the woody debris site, the biologist will be responsible for recording the size and position of the wood in relation to the channel. Large woody debris is defined as having a minimum diameter of 12 inches (30.5 cm) with a minimum length of 6 feet (1.82 meters). Management of the area beyond the instream zone, the recruitment zone, which encompasses the floodplain, is not incorporated in these guidelines.

Management Strategy

In order to effectively manage large woody debris in streams within the urban landscape of Santa Clara County, the District will use a four tiered, multi-disciplined approach. To address the range of issues that LWD can pose in a channel, the assessment of LWD will be performed by an engineer, biologist and field operations administrator. The four tiered, multi-disciplined approach is described below, though minor modifications may occur based on individual site conditions. Mitigation is only required for Tier 4) Remove LWD.

Tier 1) Retain LWD in the Channel

Watershed maintenance crews will identify sites in which large woody debris is proposed for removal. Each site will be evaluated by a biologist to determine the ecological and geomorphic integrity the wood is providing to the stream channel. During the biological evaluation the size and position of the wood in relation to the wetted channel should be described. Additionally, a GPS point or GIS coordinates of the wood should be recorded regardless of the fact that the wood may eventually be removed. Watershed engineers may be asked to evaluate the woody debris to determine the potential for bank erosion, channel incision or infrastructure safety. If a consensus is reached to leave the wood in place, the watershed personnel may collectively decide if the woody debris will require additional monitoring.

Tier 2) Modify Instream LWD

If the LWD cannot be left in its original configuration and position within the wetted channel due to flooding, trash or erosion potential, the wood can be modified and left in place. Modification can include; removal of small, lateral branches which capture debris, changing position of the LWD to avoid excessive bank scour, or reconfiguration of the LWD to avoid aggradations or channel incision in select locations. The most important consideration in the decision making

process to modify the LWD, is to retain its biological and geomorphic integrity. If that is not a feasible option, watershed staff should consider removal or remove/replace alternatives (Tiers 3 and 4).

Tier 3) Remove LWD and Replace

If the watershed staff decide the wood is an imminent flood risk or infrastructure safety is of great concern, the third tier in the decision making process is to remove the wood from its original location and replace it elsewhere within the watershed. Considerations for the new location of wood placement would be the presence of a floodplain, larger width/depth ratio, greater biological value (i.e. natural channel versus modified), or simply improved access.

Tier 4) Remove LWD

If all other avenues of wood management are exhausted, Tiers 1-3, watershed staff may decide that the wood requires complete removal from the stream channel. Complete removal may occur in highly modified streams with low or zero tolerance for instream vegetation or structures such as LWD. Cutting LWD into smaller pieces and leaving it within the channel is also considered to be removal, as the habitat values have been loss. LWD completely removed from an anadromous salmonid stream will need to pay mitigation consistent with Chapter 10 of the SMP Manual.

Monitoring LWD

The selection of when and what to monitor will be derived from any concerns that arose during the decision making process (Tiers 1-3) to leave the wood in place. For example, if the potential for bank scour was cited as a chance of occurrence, the team may decide to install lateral scour bars into the bank. Painted rebar will be installed laterally into the stream bank at selected locations to determine if local scour occurs due to the presence of the wood in the channel. If excessive aggradations or channel incision is a concern for watershed staff, then scour chains can be installed in appropriate locations.

After a decision is reached to monitor the LWD, the biologist will be responsible for installation of the agreed upon monitoring tools (i.e. lateral scour bars, scour chains) and installation of the tree tag. All LWD that requires monitoring will be fitted with an aluminum tree tag and given a unique identifying number. An important component to monitoring LWD is to determine the flow rate at which the wood will move. If the wood moves from its original location during a storm event, the biologist will survey downstream locations for the LWD and determine the maximum discharge from the closest upstream gauge. This information can be utilized in future decision making processes to leave/remove LWD within a watershed. Most geomorphic effects of wood in rivers arise from large, stable logs (Montgomery, 2003). Finding the threshold for size and movement will assist the watershed staff in long term management of wood in local urbanized drainages. If the LWD does move from its original location it will have to be reassessed for safety/flooding concerns. Success criteria and objectives for each project will be included in the Notice of Proposed Work.

After the watershed staff decides to monitor the wood, a determination on the frequency of the monitoring will occur. Factors to consider when deciding how often the biologist should monitor the LWD can be determined based on location of the LWD within the watershed, presence of a floodplain, water management upstream of LWD structure, the spatial relationship of LWD with urban infrastructure (i.e. bridges), or duration and amount of rainfall.

Database Management

Each request submitted by watershed maintenance staff for biological evaluation of LWD will be tracked in the database management system. The database can track what percentage of wood is left in place within a watershed, what is modified and what is removed. Effectively managing LWD overtime can improve channel processes which will enhance habitat features as well as reduction of trucking and disposal costs of LWD.

Summary of Roles and Responsibilities

1) Watershed maintenance staff submits work request for removal of LWD.
2) Biologist surveys wood to determine ecological/geomorphic integrity.
3) Engineer, maintenance staff, and biologist determine if LWD stays in place. Staff can then determine a course of action based on the four tiered approach.
4) If monitoring is required, the biologist assigned to the original evaluation will be in charge of installation of monitoring devices and periodic monitoring.
5) The biologist is responsible for entry of all applicable data into the management system.

Literature Cited

CDFG. California Department of Fish and Game. 1998. California Salmonid Stream Habitat Restoration Manual. State of California Resources Agency. Third Edition.

Keller, E.A., and E.K. Hoffman. 1977. Urban streams: sensual blight or amenity. Journal of Soil and Water Conservation 32:237-242.

Montgomery, D.R., B.D. Collins and J.M. Buffington. 2003. Geomorphic Effects in Rivers. American Fisheries Society Symposium 37: 21-47.

Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs, Colorado.

Stream Maintenance Program Renewal Project

Prepared by Watershed Management Division

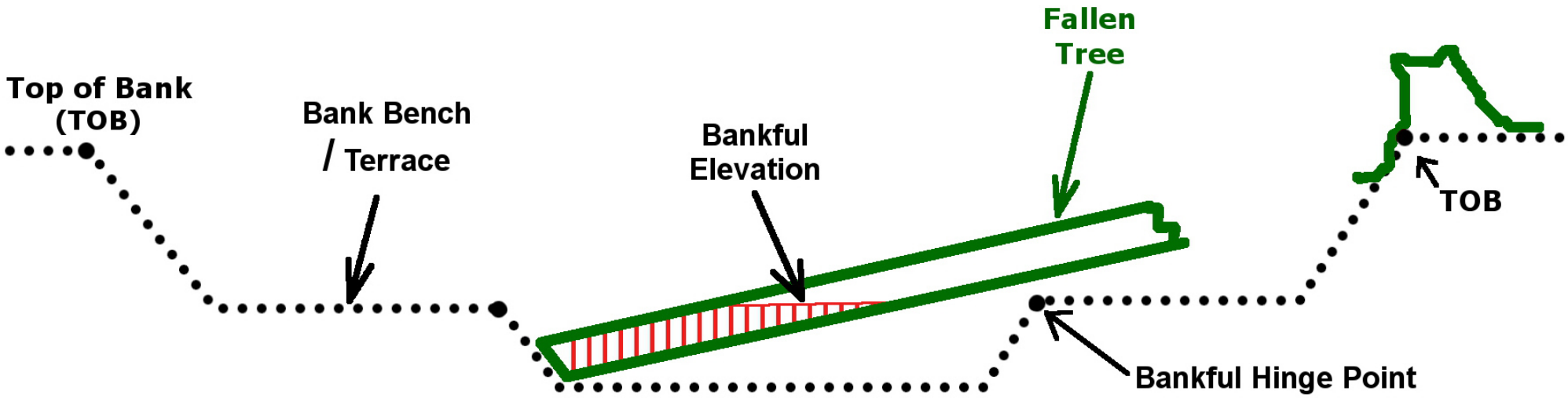
Melissa Moore

Figure 1: LARGE WOODY DEBRIS (LWD)
MITIGATION ACCOUNTING CRITERIA

Mitigation is required for all fallen trees within anadromous salmonid channels with the following characteristics:

Minimum 30cm (12 inches) diameter and 183 cm (6 feet).

Only the portion below the "bankful" elevation (hatched area) will be measured for mitigation accounting purposes



These guidelines pertain to the in-channel area which is defined as the stream channel within bankfull discharge demarcations. Bankfull is the river elevation (stage) at which time the most effective geomorphic work occurs. This is also referred to as the dominant discharge and is the stage that generally corresponds to a flow event with a 1-2 year recurrence interval. This coincides with bankful hinge point in this figure.

A typical small storm occurring on a regular basis will bring water up to the bankful elevation as shown on the diagram above.

Please see “Attachment E” of the SMP Manual for full details of the Four Tier LWD Management process.

ATTACHMENT F

Best Management Practices

Best Management Practices

A. SECTION A –Pre-Project Planning and General BMPs

General BMPs are applicable program-wide, for most routine SMP maintenance activities. These measures include standard construction practices and impact avoidance measures that will minimize potential environmental impacts. These BMPs will be implemented by the stream maintenance crew, as appropriate and as overseen by site managers, for all activities associated with the maintenance program. The majority of these BMPs are implemented prior to and during maintenance operations, though the level of activity varies depending on the work type.

Other General BMPs are conducted prior to implementing maintenance activities on site. This group of measures includes procedures to identify site or maintenance constraints, such as biological or cultural resource surveys which coincide with permit compliance requirements. Site design constraints for sediment and bank stabilization activities in particular are also identified as part of the pre-project planning process.

BMP Number	BMP Title	BMP Description
GEN-1	In-Channel Work Window	All ground-disturbing maintenance activities (i.e., sediment removal, bank stabilization, tree removal, and mechanized vegetation management) occurring in the channel (below bankfull) will take place between June 15 and October 15. Requests for work window extensions must be submitted to the regulatory agencies by October 1st, listing the creek names and reaches where a work extension will occur. Work extensions vary per work activity. The agencies will provide a single response within one week. Significant rainfall applies after October 15. An extension through December 31 may apply if the following requirements are met and regulatory agency approval is received: For ground-disturbing activities: ▪ Work may continue if no significant rainfall, defined as greater than 0.5 inches per 24 hours within a local watershed, is either forecasted[1] or observed. Following October 15th, maintenance work shall cease for the season if such a rain event is forecasted or observed. Sediment removal ▪ Extended Work Window: 1. Creeks supporting anadromous fish: An extended work window may occur from October 15 through October 31, or until local rainfall of 0.5 inches or greater falls within the subject watershed within a 24-hour period, whichever occurs first. 2. Creeks not supporting anadromous fish: An extended work window may occur from October 15 through November 30th, or until local rainfall of 0.5 inches or greater falls within the subject watershed within a 24-hour period, whichever occurs first. ▪ Extended Work Window in Lower Quality Areas: 1. Sediment removal work may occur until December 31. 2. Work will only occur on Berryessa Creek (0-88+80; 232+70-236+00; 284+30-288+00), Lower Silver Creek (Reach 3 between Stations 37+40 and 381+19), Thompson Creek (0+00-10+00), Canoas Creek (0+00-390+00), Ross Creek (0+00-86+30), Calabazas Creek (35+00-105+00), and San Tomas

[1] Weather Forecasts. No phase of the project may be started if that phase and its associated erosion control measures cannot be completed prior to the onset of a storm event if that construction phase may cause the introduction of sediments into the stream. Seventy-two-hour weather forecasts from the National Weather Service or other localized and more detailed weather forecast service will be consulted prior to start up of any phase of the project that may result in sediment runoff to a stream.

BMP Number	BMP Title	BMP Description
		Aquino Creek (80+00-100+00) with the following conditions: o site conditions are dry and access for all construction equipment and vehicles will not impact waterways; and ~~o~~ all work will stop if any rainfall is forecast for the next 72 hour period. 3. Work may occur after a significant rainfall event but no later than December 31. 4. Sites must be maintained in a rapidly winterizable[2] state (implement control measures BMP GEN-20). Bank stabilization projects may continue until the approved date stated below. Prior to a forecasted significant rainfall event (0.5 in/24 hrs), all incomplete bank stabilization projects must be winterized. 1. In Creeks Supporting Anadromous Fish o An extended work window may occur until October 31st for bank stabilization projects that will be 50% complete by October 15th. 2. In Creeks Not Supporting Anadromous Fish o An extended work window may occur until November 30th for projects that will be 50% complete by October 15th or until significant rainfall. o An extended work window may occur until November 30th for new bank stabilization projects that will be completed in five (5) days or less, or until significant rainfall. ▪ Instream hand pruning and hand removal of vegetation will occur year round, except when: o Wheeled or tracked equipment needs to access the site by crossing a creek, ponded area, or secondary channel; or o Work occurs in streams that support steelhead. In these streams instream vegetation maintenance will cease on December 31 or when local rainfall greater than 0.5 inches is predicted within a 24-hour period of planned activities, whichever happens first. Modification and removal of instream large woody debris will occur at any time of the year, and as further described in the NMFS Biological Opinion.
GEN-2	Instream Herbicide Application Work Window	Instream herbicide applications will take place between June 15 and October 15, or until the first occurrence of any of the following conditions; whichever happens first: ▪ local rainfall greater than 0.5 inches is forecasted within a 24-hour period from planned application events; or ▪ when steelhead begin upmigrating and spawning in the 14 anadromous steelhead creeks, as determined by a qualified biologist (typically in November/December), o A qualified biologist will determine presence/absence of sensitive resources in designated herbicide use areas and develop site-specific control methods (including the use of approved herbicide and surfactants). Proposed herbicide use would be limited to the aquatic formulation of glyphosate (Rodeo or equal). Surfactant use would be limited to non-ionic products, such as Agri-dex, Competitor, or another brand name using the same ingredients. Any modifications to these materials would require review and approval by NMFS and CDFW. o A qualified fisheries biologist will review proposed herbicide application methods and stream reaches. The fisheries biologist would conduct a pre-construction survey (and any other

[2] Winterization is the process to maintain work sites with the appropriate BMP's to prevent erosion, sediment transport, and protect water quality. Winterization occurs upon completion of bank repairs or on incomplete projects after October 15 and prior to the forecast of significant rainfall, 0.5 inches or greater of local watershed rainfall within 24 hours. Winterization shall be completed prior to the occurrence of such actual significant rainfall.

BMP Number	BMP Title	BMP Description
		appropriate data research) to determine whether the proposed herbicide application is consistent with SMP approvals concerning biological resources and determine which BMPs would be instituted for work to proceed. In addition, herbicide application requirements are as follows: ▪ no direct application into water; ▪ herbicide application shall not occur when wind conditions may result in drift; ▪ herbicide shall only be applied after the surfactant has a "wet" appearance on the target plants in order to avoid run off; and ▪ where permitted, surfactants shall be added to the spray solution prior to application.
GEN-3	Avoid Exposing Soils with High Mercury Levels	Sediment removal and bank stabilization projects in portions of the Guadalupe River watershed affected by historic mercury mining may expose soils containing mercury. 1. In Basin Plan identified creeks in the Guadalupe River Basin, soils that are likely to be disturbed or excavated shall be tested for mercury (Hg). Soils shall be remediated if disturbed or excavated soils exposed to streamflow have a residual sample test exceeding 0.2 mg mercury per kg erodible sediment (dry wt., median). 2. Remediation may be accomplished either by: a. treating the site so that contaminated soils excavated for the purpose of bank stabilization shall not be susceptible to erosion; or b. further excavating contaminated soils and replacing them with clean fill or other bank stabilization materials that are free from contaminants. c. Soils with residual sample mercury concentrations exceeding 0.2 mg mercury per kg erodible sediment (dry wt., median) shall be removed and disposed of in a Class I landfill following established work practices and hazard control measures. Soils with residual sample mercury concentrations less than 0.2 mg mercury per kg erodible sediment (dry wt., median) will remain at the project site. 3. To ensure worker safety during sediment removal and bank stabilization projects with elevated mercury concentrations in the exposed surfaces, personal protective equipment will be required during project construction to maintain exposure below levels established by the Occupational Safety and Health Agency (OSHA).

Biological Resources

GEN-4	Minimize the Area of Disturbance	To minimize impacts to natural resources, soil disturbance will be kept to the minimum footprint necessary to complete the maintenance operation.
GEN-5	Mitten Crab Control Measure	Sediment from the San Francisco Bay Watershed, including that for reuse, cannot be moved to areas any farther south than Coyote Creek Golf Drive in south San Jose, and the intersection of McKean and Casa Loma Roads.
GEN-6	Minimize Impacts to Nesting Birds via Site Assessments and Avoidance Measures	1. For activities occurring between January 15 and August 31, project areas will be checked by a qualified biologist or Designated Individuals (DI – for limited ground nesting species surveys) for nesting birds within 2 weeks prior to starting work. If a lapse in project-related work of 2 weeks or longer occurs, another focused survey will be conducted before project work can be reinitiated. 2. If nesting birds are found, a buffer will be established around the nest and maintained until the young have fledged. Appropriate buffer widths are 0.5 mile for bald and golden eagles; 250 feet for other raptors and the

BMP Number	BMP Title	BMP Description
		least Bell's vireo, herons, and egrets; 25 feet for ground-nesting non-raptors; and 50 feet for non-raptors nesting on trees, shrubs and structures. Mowing and weed whacking will have a 25 feet buffer. A qualified biologist may identify an alternative buffer based on a site specific-evaluation. No work within the buffer will occur without written approval from a qualified biologist, for as long as the nest is active. 3. All vegetation management, sediment reuse, road grading, or other SMP activities in or immediately adjacent to suitable California clapper rail or Alameda song sparrow nesting habitat, as determined by a qualified biologist, shall not be conducted prior to September 1 (the non-nesting season). 4. If a pre-activity survey in high-quality San Francisco common yellowthroat breeding habitat (as determined by a qualified biologist) identifies more singing male San Francisco common yellowthroats than active nests, then the inconspicuous nests of this species might have been missed. In that case, maintenance activities in that area shall be delayed until the San Francisco common yellowthroat non-breeding season (i.e., August 16–March 14). 5. The boundary of each buffer zone will be marked with fencing, flagging, or other easily identifiable marking if work will occur immediately outside the buffer zone. 6. All protective buffer zones will be maintained until the nest becomes inactive, as determined by a qualified biologist. 7. If monitoring shows that disturbance to actively nesting birds is occurring, buffer widths will be increased until monitoring shows that disturbance is no longer occurring. If this is not possible, work will cease in the area until young have fledged and the nest is no longer active.
GEN-6.5	Protection of Nesting Least Bell's Vireos	1. To the extent feasible, SMP activities within woody riparian habitat along portions of lower Llagas Creek downstream from Highway 152, the Pajaro River from Llagas Creek downstream, and lower Uvas/Carnadeo Creek downstream from Hecker Pass Road shall be scheduled to occur outside of the least Bell's vireo nesting season (March 15 – July 31). If it is not feasible for maintenance activities along these reaches to be scheduled during the non-nesting season, the following measures will be implemented. 2. For activities within woody riparian habitat along the aforementioned creek reaches that will occur between March 15 and July 31, any work will be preceded by a focused survey for least Bell's vireos. Pre-activity surveys will consist of two site visits, conducted on separate days within 14 days before the initiation of maintenance activities in the given area, with at least one of these surveys occurring within 5 calendar days before the initiation of such activities. Surveys will be conducted between dawn and 11:00 a.m., during mild weather conditions (i.e., not during excessive cold, heat, wind, or rain), within all riparian habitat in and within 250 feet of any proposed maintenance location along these reaches. The surveys will be conducted by a qualified biologist who is familiar with the visual and auditory identification of this species. 3. The biologist will look and listen for individual vireos. If a least Bell's vireo is detected, it will be observed to determine whether it is actively nesting. The biologist will note the nest location, or if finding the actual nest could result in excessive disturbance or risk damaging the nest, the biologist will determine the approximate location, based on observation of birds carrying nesting material, carrying food, or repeatedly visiting a certain area. 4. If an active nest is found, a minimum 250-foot no-activity buffer will be established around the nest. If a territorial male is found but no nest can be detected, then the approximate centroid of the bird's area of activity will be the point from which the buffer will be applied. The required buffer may be reduced in areas where dense riparian forest occurs between the construction activities and the active nest or where sufficient barriers

BMP Number	BMP Title	BMP Description
		or topographic relief exists to protect the nest from excessive noise or other disturbance. The biologist will coordinate with the USFWS and CDFW to evaluate exceptions to the minimum no-activity buffer distance on a case-by-case basis. 5. No work will occur within the buffer without verification by a biologist that the nest is inactive and until any fledged young are no longer dependent on adults for food. 6. If a least Bell's vireo and/or its nest is detected during pre-activity surveys, the District will contact the USFWS and CDFG within two working days regarding the presence and location of the bird/nest.
GEN-7	Protection of Burrowing Owls	1. If occupied burrows are identified, a 250 foot radius no work buffer zone will be established around the burrow. The buffer may be modified, with CDFW approval, to take into consideration of paved roads, intervening riparian corridorsand levees. 2. No construction work will occur within the 250 foot buffer zone until after the nesting season. 3. After the nesting season work may occur within the 250 foot buffer zone provided: a. A qualified biologist monitors the owls for at least 3 days prior to construction to determine baseline foraging behavior (i.e., behavior without construction) b. The same qualified biologist monitors the owls during construction and finds no change in owl foraging behavior in response to construction activities. c. If there is any change in owl foraging behavior as a result of construction activities, these activities will cease within the 250-foot buffer. d. If the owls are gone for at least one week, the project proponent may request approval from the Santa Clara County Habitat Agency that a qualified biologist excavate the usable burrows to prevent owls from re-occupying the site. After the usable burrows are excavated, the buffer zone will be removed and construction may continue. e. Monitoring must continue as described above for the non-breeding season as long as the burrow remains active. 5. Routine use of existing District maintenance roads within the 250 foot buffer will be allowed. However, no construction traffic will be allowed to use the maintenance road during the active nesting period. 6. Exceptions. a. Mowing on levees may occur during the nesting season and within 250 feet of active burrows provided the burrows are marked by a qualified biologist. b. No vehicle mounted mowers will be used within 10 ft of occupied burrows. c. A qualified biologist will monitor the mowing within the buffer zone and stop the mowing if burrowing owls are observed on the surface at the nest or another burrow. d. Areas within 10 feet of the burrows may be mowed using hand equipment when no owls are visible on the surface. e. All mowing activities within the buffer zone will be completed within 30 minutes.
GEN-8	Protection of Sensitive Fauna Species from Herbicide Use	Approved herbicides and adjuvants may be applied in habitat areas for sensitive wildlife species (including steelhead, California red-legged frog, California tiger salamander, salt marsh harvest mouse, and Bay checkerspot butterfly); all applications will occur in accordance with federal and state regulations. For sprayable or dust formulations: when the air is calm or moving away from sensitive wildlife habitat, applications will commence on the side nearest the habitat and proceed away from the habitat. When air currents are moving toward habitat, applications will not be made within 200 yards by air or 40 yards by ground upwind from occupied

BMP Number	BMP Title	BMP Description
		habitat. However, these distances may be modified for the control of invasive species on salmonid streams if the following measures are implemented: ▪ A qualified biologist will determine presence/absence of sensitive resources in designated herbicide use areas and develop site-specific control methods (including the use of approved herbicide and surfactants). Proposed herbicide use would be limited to the aquatic formulation of glyphosate (Rodeo or equal). Surfactant use would be limited to non-ionic products, such as Agri-dex, Competitor, or another brand name using the same ingredients. Any modifications to these materials would require review and approval by NMFS and CDFW. ▪ A qualified fisheries biologist will review proposed herbicide application methods and stream reaches. The fisheries biologist would conduct a pre-construction survey (and any other appropriate data research) to determine whether the proposed herbicide application is consistent with SMP approvals concerning biological resources and determine which BMPs would be instituted for work to proceed.
GEN-9	Avoid Impacts to Special-Status Plant Species and Sensitive Natural Vegetation Communities	A qualified botanist will identify special status plant species and sensitive natural vegetation communities and clearly map or delineate them as needed in order to avoid and/or minimize disturbance, using the CDFW protocols and the *CNPS Botanical Survey Guidelines* to formulate the following protocols: 1. A qualified botanist will use the GIS database, CNDDB, and/or other suitable tools to identify special status plants and sensitive natural vegetation communities located within or near work areas. 2. Surveys of areas identified as sensitive natural communities or suitable habitat for special status plant species will be conducted by a qualified botanist prior to commencement of work. 3. Surveys will be conducted during the appropriate time of the year to adequately identify special-status plants that could occur on the site of proposed maintenance activities. 4. The qualified botanist will ensure avoidance and/or minimize impacts by implementing one or more of the following, as appropriate, per the botanist's recommendation: a) Flag or otherwise delineate in the field the special status plant populations and/or sensitive natural community to be protected; b) Allow adequate buffers around plants or habitat; the location of the buffer zone will be shown on the maintenance design drawings and marked in the field with stakes and/or flagging in such a way that exclusion zones are visible to maintenance personnel without excessive disturbance of the sensitive habitat or population itself (e.g., from installation of fencing). c) Time construction or other activities during dormant and/or non-critical life cycle period; d) Store removed sediment off site; and e) Limit the operation of maintenance equipment to established roads whenever possible. 5. No herbicides, terrestrial or aquatic, will be used in areas identified as potential habitat for special status plants species or containing sensitive natural communities, until a qualified botanist has surveyed the area and determined the locations of special status plant species present. 6. If special status plant species or sensitive communities are present, then a qualified botanist will determine if a given type of vegetation management method is ecologically appropriate for a given area. Alternative strategies based on the botanist's recommendations will be coordinated with appropriate staff. 7. All impacts to sensitive natural communities and special status plants identified by the qualified botanist will be avoided and/or minimized
GEN-10	Avoid Impacts to Bay Checkerspot Butterfly and	1. Areas supporting Bay checkerspot larval host plants will be identified by a qualified botanist and protected from disturbance to the extent feasible, by establishing buffer zones around individual plants or populations.

BMP Number	BMP Title	BMP Description
	Associated Critical Habitat	The size of the buffer will be determined by a qualified botanist; the actual distance will depend on the plant species potentially affected and the type of disturbance. No herbicide will be applied to the buffer area, and to the extent feasible, maintenance personnel and equipment will not operate within such areas. 2. Herbicides may be used in serpentine areas that do not contain Bay checkerspot butterfly larval host plants or sensitive plant species and habitat when approved by a qualified botanist and for the following maintenance purposes: a) To protect sensitive species and habitat; b) To manage for control of invasive and non-native plants; and/or c) To maintain access to a facility.
GEN-11	Protection of Salt Marsh Harvest Mouse and California Clapper Rail	1. A District qualified biologist will conduct a desk audit to determine whether suitable Salt Marsh Harvest Mouse (SMHM) or California Clapper Rail (CCR) habitat is present in or adjacent to a maintenance activity. 2. Within 7 days prior to work within the range of the Salt Marsh Harvest Mouse (SMHM) or California Clapper Rail (CCR), as depicted on the District's GIS layers, the proposed project area will be surveyed by a qualified biologist to identify specific habitat areas. Surveyed areas will include work locations and access routes. 3. To minimize or avoid the loss of individuals, activities within or adjacent to California clapper rail and salt marsh harvest mouse habitat will not occur within two hours before or after extreme high tides (6.5 feet or above) when the marsh plain is inundated, because protective cover for those species is limited and activities could prevent them from reaching available cover. 4. Specific habitat areas are vegetated areas of cordgass (*Spartina* spp), marsh gumplant (*Grindelia* spp.), pickleweed (*Sarcocornia pacifica*), alkali heath, (*Frankenia* sp.), and other high marsh vegetation, brackish marsh reaches of creek with heavy accumulations of bulrush thatch (old stands), and high water refugia habitat that may include annual grasses, and shrubs immediately adjacent to channels. 5. Within the identified specific habitat areas, vegetation will be removed by hand from areas to be directly impacted by the work activities. If within the mapped range of the mouse but outside of areas identified as specific habitat areas, then other methods may be possible.. 6. Prior to the initiation of work each day for all vegetation management work, ground or vegetation disturbance, operation of large equipment, grading, sediment removal, and bank stabilization work and prior to expanding the work area, if suitable habitat occurs within the immediate work area, a qualified biologist will conduct a pre-construction survey of all suitable habitat that may be directly or indirectly impacted by the day's activities (work area, access routes, staging areas). a. If during the initial daily survey or during work activities a CCR is observed within or immediately adjacent to the work area (50 feet), initiation of work will be delayed until the CCR leaves the work area. b. If during the initial daily survey or during work activities a SMHM or similar rodent is observed within or immediately adjacent to the work area (50 feet), initiation of work will be delayed until a *Site Specific Species Protection Form* can be developed and implemented by a qualified biologist to protect the SMHM or similar rodent is developed and implemented by the qualified biologist. Acceptable plan activities may include one or more of the following activities: 1) establishment of a buffer zone at least 50 feet in radius from the rodent; 2) ongoing active monitoring, 3) construction of silt fence barrier between maintenance work and location of the rodent, 4) delay of work activity until the qualified biologist can contact CDFW and USFWS for additional direction.

BMP Number	BMP Title	BMP Description
		7. Mowing using heavy equipment (tractors, boom mowers, rider mowers) will not be conducted in habitat areas or within 50 feet of habitat areas. If mowing with hand equipment is necessary within 50 feet of habitat areas, an on-site monitor will observe the area in front of the mower from a safe vantage point while it is in operation. If SMHM are detected within the area to be mown, no mowing will occur in that area. If CCR are detected within the area to be mown, the mowing will stop until the individual(s) have left the work area. 8. See ANI-2 for additional restrictions.
GEN-12	Protection of Special-Status Amphibian and Reptile Species	1. A District qualified biologist will conduct a desk audit to determine whether suitable special-status amphibian or reptile habitat is present in or adjacent to a maintenance activity. 2. If the District Wildlife or Fisheries Biologist determines that a special-status amphibian or reptile could occur in the activity area, a qualified biologist will conduct one daytime survey within a 7 day period preceding the onset of maintenance activities. a. If a special-status amphibian or reptile, or the eggs or larvae of a special status amphibian or reptile, are found within the activity area during a pre-activity survey or during project activities, the qualified biologist shall notify the project proponent about the special-status species and conduct the following work specific activities: i. For minor maintenance activities and for vegetation removal activities that will take less than 1 day, a qualified biologist shall conduct a special status species survey on the morning of and prior to the scheduled work. A. If no special status species is found, the work may proceed. B. If eggs or larvae of a special status species are found, a buffer will be established around the location of the eggs/larvae and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled until the time that eggs have hatched and/or larvae have metamorphosed. C. If an active western pond turtle nest is detected within the activity area, a 50-foot buffer zone around the nest will be established and maintained during the breeding and nesting season (April 1 – August 31). The buffer zone will remain in place until the young have left the nest, as determined by a qualified biologist. D. If adults or non-larval juveniles of a special status species are found, one of the following two procedures will be implemented: i. If, in the opinion of the qualified biologist, capture and removal of the individual to a safe place outside of the work area is less likely to result in adverse effects than leaving the individual in place and rescheduling the work (e.g., if the species could potentially hide and be missed during a follow-up survey), the individual will be captured and relocated by a qualified biologist (with USFWS and/or CDFW approval, depending on the listing status of the species in question), and work may proceed. ii. If, in the opinion of the qualified biologist, the individual is likely to leave the work area on its own, and work can be feasibly rescheduled, a buffer will be established around the location of the individual(s) and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled. ii. For minor maintenance and vegetation removal activities that will take more than 1 day, the qualified biologist shall conduct a special-status species survey on each morning of and prior to the scheduled work commencing.

BMP Number	BMP Title	BMP Description
		E. If eggs or larvae of a special status species are found, a buffer will be established around the location of the eggs/larvae and work may proceed outside of the buffer zone. No work will occur within the buffer zone. Work within the buffer zone will be rescheduled until the time that eggs have hatched and/or larvae have metamorphosed. F. If an active western pond turtle nest is detected within the activity area, a 50 ft-buffer zone around the nest will be established and maintained during the breeding and nesting season (April 1 – August 31). The buffer zone will remain in place until the young have left the nest, as determined by a qualified biologist. G. If adults or non-larval juveniles of a special status species are found, the individual will be captured and relocated by a qualified biologist (with USFWS and/or CDFW approval, depending on the listing status of the species in question), and work may proceed. iii. For Sediment Removal and Bank Stabilization Projects the wildlife or fisheries biologist in cooperation with the project proponent shall complete a *Site Specific Species Protection Form for the project*. Elements of the form include: work rescheduling, training work crews, daily surveys, establishment of buffers and buffer fencing, on-site monitoring, habitat modification in advance of work activities, capture and relocation of individual special-status species, methods of documentation, and reporting of results. b. If no special status amphibian or reptile is found within the activity area during a pre-activity survey, the work may proceed. c. During animal conflict management activities, if special status species are found within a burrow proposed for destruction, a qualified biologist will determine an appropriate buffer distance around that burrow to ensure adequate protection of the habitat. The buffer area may include not destroying adjacent burrows as that may damage subterranean networks of the occupied burrow or produce substrate vibrations which could interfere with prey detection mechanisms. If two consecutive follow up surveys are conducted (spaced 30 days apart) in which the burrow is found to be unoccupied, work can proceed as planned. A naturally found back filled burrow known to have been inhabited by a special-status species will be presumed to still be occupied by that species and a clearly delineated buffer demarcation of the burrow area will be in place for the duration of nearby work activities. In rare instances in which destruction of the burrow is not avoidable during animal conflict management, the animal will be relocated to a safe burrow outside the impact area, with USFWS and/or CDFW approval, depending on the listing status of the species in question. A biologist will observe the relocated animal until it is certain that the animal is not in immediate danger of desiccation or predation.

BMP Number	BMP Title	BMP Description
GEN-13	Protection of Bat Colonies	1. A District Wildlife Biologist will conduct a desk audit to determine whether suitable habitat (appropriate roost trees or anthropogenic structures) is present for bat colonies within 100 feet of the work site, staging areas, or access routes. 2. If potential bat colony habitat is determined to be present, within two weeks prior to the onset of work activities a qualified biologist will conduct a survey to look for evidence of a bat use. If evidence is observed, or if potential roost sites are present in areas where evidence of bat use might not be detectable (such as a tree cavity), an evening survey and/or nocturnal acoustic survey may be necessary to determine if the bat colony is active and to identify the specific location of the bat colony. 3. If an active bat colony is present then the qualified biologist will make the following determinations: a. The work can proceed without unduly disturbing the bat colony b. There is a need for a buffer zone to prevent disturbance to the bat colony, and implementation of the buffer zone (determined on a case-by-case basis by a qualified biologist) will reduce or eliminate the disturbance to an acceptable level. 4. If a bat colony is found in a tree or structure that must be removed or physically disturbed the qualified biologist will consult with DFW prior to initiating any removal or exclusion activities.
GEN-14	Protection of San Francisco Dusky-footed Woodrat	1. Prior to work within riparian, oak woodland, or coyote brush scrub habitat, or the removal of any oak trees outside these habitats, a District Wildlife Biologist will conduct a desk audit to determine whether woodrats could be present within suitable habitat for San Francisco dusky-footed woodrat or is known to be present in or adjacent to a maintenance activity site. 2. If the District Wildlife Biologist determines that no San Francisco dusky-footed woodrat habitat is present, or there is habitat present but it will not be affected by the maintenance activity, then no further action is required. 3. If the District Wildlife Biologist determines that suitable San Francisco dusky-footed woodrat habitat is present and may be affected by the maintenance activity, a qualified biologist shall conduct a pre-activity survey within 2 weeks prior to the start of work to determine if woodrat nests are present, or within 5 feet of, the immediate activity area. If woodrat nests are determined to be present, the following measures shall be implemented: a. To the extent feasible, impacts to woodrat nests will be avoided by maintaining a minimum 5-ft buffer between maintenance activities and nests. Even if a 5-ft buffer cannot be maintained, the District will minimize impacts to nests by avoiding the direct destruction or modification of the nests to the extent feasible. b. If one or more woodrat nests are determined to be present and physical disturbance or destruction of the nests cannot be avoided, then the woodrats shall be evicted from their nests and the nest material relocated outside of the disturbance area, prior to onset of activities that would disturb the nest, to avoid injury or mortality of the woodrats. First, an alternate location for the nest material shall be chosen by a qualified biologist based on the following criteria: 1) proximity to current nest location; 2) safe buffer distance from planned work; 3) availability of food resources; and 4) availability of cover. An alternate nest structure will then be built at the chosen location. The structure will be made up of small logs (e.g., available materials 2 inches in diameter or greater) stacked to provide a foundation on which the woodrats can add nest material. Subsequently, during the evening hours (i.e., within 2 hours prior to sunset), a qualified biologist will slowly dismantle the existing woodrat nest to allow any woodrats to flee and seek cover. All sticks from the nest will be collected and spread over the

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		alternate structure. If young woodrats that are still dependent on their mother are discovered, relocation efforts will cease for the evening and the California Department of Fish and Wildlife will be contacted for guidance on how to proceed.
GEN-15	Salvage Native Aquatic Vertebrates from Dewatered Channels	If fisheries or native aquatic vertebrates are present when cofferdams, water bypass structures, and silt barriers are to be installed, a fish and native aquatic vertebrate relocation plan shall be implemented to ensure that fish and native aquatic vertebrates are not stranded. Relocation efforts will be based on the District's Fish Relocation Guidelines (Attachment B). Streams that support a sensitive species (i.e. steelhead) will require a relocation effort and/ or initial onsite monitoring by a qualified biologist depending on seasonal conditions: 1. In non-tidal channels, where water is to be diverted, prior to the start of work or during the installation of water diversion structures, native aquatic vertebrates shall be captured in the work area and transferred to another reach as determined by a qualified biologist. Timing of work in streams that supports a significant number of amphibians will be delayed until metamorphosis occurs to minimize impacts to the resource. Capture and relocation of aquatic native vertebrates is not required at individual work sites when site conditions preclude reasonably effective operation of capture gear and equipment. 2. Aquatic invertebrates will not be transferred (other than incidental catches) because of their anticipated abundance and colonization after completion of the repair work.
GEN-15.5	Avoidance of Impacts on the San Joaquin Kit Fox	1. A qualified District biologist will conduct a desk audit to determine whether an SMP activity will occur in an area where the San Joaquin kit fox could potentially occur (i.e., roughly east of Frazier Lake Road and south of Bloomfield Avenue), and in potential habitat for the species. 2. If the District biologist determines that an SMP activity could occur in an area that could potentially support a kit fox, the SCVWD will implement applicable pre-activity surveys and other measures in accordance with the USFWS's *San Joaquin Kit Fox Survey Protocol for the Northern Range*, as follows: a) Conduct a preconstruction/pre-activity survey no less than 14 days and no more than 30 days prior to the beginning of project implementation. Surveys shall identify kit fox habitat features on the project site and evaluate use by kit fox and, if possible, and assess the potential impacts to the kit fox by the proposed activity. The status of all dens shall be determined and mapped in accordance with the survey protocol. b) If a natal/pupping den is discovered within the project area or within 200 feet of the project boundary, the USFWS shall be immediately notified. Disturbance to all San Joaquin kit fox dens should be avoided to the maximum extent possible. Destruction of any known or natal/pupping kit fox den would require take authorization from the USFWS. c) The project proponent will establish exclusion zones around the kit fox dens, if determined to be present. The configuration of the exclusion should have a radius measured outward from the entrance or cluster of entrances. The following radii are minima to be applied: ▪ Potential den: 50 feet ▪ Known den: 100 feet ▪ Natal/pupping den: Service must be contacted (occupied and unoccupied) ▪ Atypical den: 50 feet. 3. If take of the San Joaquin kit fox will occur, take authorization from the USFWS and CDFW will be necessary.

BMP Number	BMP Title	BMP Description
General Maintenance Practices		
GEN-16	In-Channel Minor Activities	For in-channel minor work activities, work will be conducted from the top of the bank if access is available and there are flows in the channel.
GEN-17	Employee/Contractor Training	All appropriate District staff and contractors will receive annual training on Stream Maintenance Program BMPs. The training will also include an overview of special-status species identification and habitat requirements. District staff and contractors will receive fact sheets to assist with in-the-field identification of special-status species and their habitats.
GEN-18	Paperwork Required On-site	1. Copies of regulatory permits related to the Stream Maintenance Program will be kept on-site and available for review, if requested by regulatory personnel. 2. Copies of the Stream Maintenance Program Manual and this BMP Manual will be kept on-site.
GEN-19	Work Site Housekeeping	1. District employees and contractors will maintain the work site in neat and orderly conditions on a daily basis, and will leave the site in a neat, clean, and orderly condition when work is complete. 2. Slash, sawdust, cuttings, etc. will be removed to clear the site of vegetation debris. As needed, paved access roads and trails will be swept and cleared of any residual vegetation or dirt resulting from the maintenance activity. 3. For activities that last more than one day, materials or equipment left on the site overnight will be stored as inconspicuously as possible, and will be neatly arranged. Any materials and equipment left on the site overnight will be stored to avoid erosion, leaks, or other potential impacts to water quality (see BMPs GEN-24). 4. The District's maintenance crews are responsible for properly removing and disposing of all debris incurred as a result of construction within 72 hours of project completion. 5. All trash that is brought to a project site during maintenance activities (e.g., plastic water bottles, plastic lunch bags, cigarettes) will be collected at the site daily.
GEN-20	Erosion and Sediment Control Measures	1. Soils exposed due to maintenance activities will be seeded and stabilized using hydroseeding, straw placement, mulching, and/or erosion control fabric. These measures will be implemented such that the site is stabilized and water quality protected prior to significant rainfall. The channel bed and areas below the Ordinary High Water Mark (OHWM) are exempt from this BMP. 2. The preference for erosion control fabrics will be to consist of natural fibers; however, steeper slopes and areas that are highly erodible may require more structured erosion control methods. No non-porous fabric will be used as part of a permanent erosion control approach. Plastic sheeting may be used to temporarily protect a slope from runoff, but only if there are no indications that special-status species would be impacted by the application. 3. Erosion control measures will be installed according to manufacturer's specifications. 4. Appropriate measures include, but are not limited to, the following: o Silt Fences o Straw Bale Barriers o Brush or Rock Filters o Storm Drain Inlet Protection o Sediment Traps o Sediment Basins o Erosion Control Blankets and Mats

BMP Number	BMP Title	BMP Description
		o Soil Stabilization (i.e. tackified straw with seed, jute or geotextile blankets, etc.) o Wood chips o Straw mulch 5. All temporary construction-related erosion control methods shall be removed at the completion of the project (e.g. silt fences). 6. Surface barrier applications installed as a method of animal conflict management, such as chain link fencing, woven geotextiles, and other similar materials, will be installed no longer than 300 feet, with at least an equal amount of open area prior to another linear installation; and only on one side of levee slopes. Inboard and outboard areas will only have installations set in an alternating pattern, such that no inboard and outboard levee faces would have erosion control blankets along the same levee stationing.
GEN-21	Staging and Stockpiling of Materials	1. To protect on-site vegetation and water quality, staging areas should occur on access roads, surface streets, or other disturbed areas that are already compacted and only support ruderal vegetation. Similarly, all maintenance equipment and materials (e.g., road rock and project spoil) will be contained within the existing service roads, paved roads, or other pre-determined staging areas. 2. Building materials and other maintenance-related materials, including chemicals and sediment, will not be stockpiled or stored where they could spill into water bodies or storm drains. Materials will not be stockpiled longer than seven (7) calendar days. 3. No runoff from the staging areas may be allowed to enter water ways, including the creek channel or storm drains, without being subjected to adequate filtration (e.g., vegetated buffer, swale, hay wattles or bales, silt screens). 4. The discharge of decant water to water ways from any on-site temporary sediment stockpile or storage areas is prohibited. 5. Wet material removed from an isolated creek reach may be pulled to the side of the channel (within the channel and below top of bank) and allowed to naturally drain prior to removal from the channel. Pulled material will be removed from the channel prior to deactivation of the site or forecast of rain. 6. During the wet season, no stockpiled soils will remain exposed, unless surrounded by properly installed and maintained (i.e., per manufacturer specifications) silt fencing or other means of erosion control. During the dry season; exposed, dry stockpiles will be watered, enclosed, covered, or sprayed with non-toxic soil stabilizers (GEN-24). 7. All pipes, culverts, or similar structures stored at a site within sensitive species areas, for one or more overnight periods shall be securely capped prior to storage or inspected before the pipe is subsequently moved. If any potential special-status species are observed within a pipe, a District biologist shall be consulted on what steps should be taken to protect the species. If a District biologist is on-site, they may remove the special status species from the pipes and relocate to the nearest appropriate and unaffected habitat.
GEN-22	Sediment Transport	To prevent sediment-laden water from being released back into waterways during transport of spoils to disposal locations, truck beds will be lined with an impervious material (e.g., plastic), or the tailgate blocked with wattles, hay bales, or other appropriate filtration material. Trucks may then drain excess water by slightly tilting the loads and allowing the water to drain out through the applied filter, but only within the active project area of the creek where the sediment is being loaded into the trucks or within an identified vegetated area (swale) that is separated from the creek.

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GEN-23	Stream Access	District personnel will use existing access ramps and roads to the extent feasible. If necessary to avoid large mature trees, native vegetation, or other significant habitat features, temporary access points will be constructed in a manner that minimizes impacts according to the following guidelines: 1. Temporary access points will be constructed as close to the work area as possible to minimize equipment transport 2. In considering channel access routes, slopes of greater than 20 percent will be avoided, if possible. 3. Any temporary fill used for access will be removed upon completion of the project and pre-project topography will be restored to the extent possible. 4. When temporary access is removed, disturbed areas will be revegetated or filled with compacted soil, seeded, and/or stabilized with erosion control fabric immediately after construction to prevent future erosion. 5. Personnel will use the appropriate equipment for the job that minimizes impacts and disturbance to the stream bottom. Appropriately-tired vehicles, either tracked or wheeled, will be used depending on the site and maintenance activity.
GEN-24	On-Site Hazardous Materials Management	1. An inventory of all hazardous materials used (and/or expected to be used) at the worksite and the end products that are produced (and/or expected to be produced) after their use will be maintained by the worksite manager. 2. As appropriate, containers will be properly labeled with a “Hazardous Waste” label and hazardous waste will be properly recycled or disposed of off-site. 3. Contact of chemicals with precipitation will be minimized by storing chemicals in watertight containers with appropriate secondary containment to prevent any spillage or leakage. 4. Quantities of toxic materials, such as equipment fuels and lubricants, will be stored with secondary containment that is capable of containing 110% of the primary container(s). 5. Petroleum products, chemicals, cement, fuels, lubricants, and non-storm drainage water or water contaminated with the aforementioned materials will not contact soil and not be allowed to enter surface waters or the storm drainage system. 6. All toxic materials, including waste disposal containers, will be covered when they are not in use, and located as far away as possible from a direct connection to the storm drainage system or surface water. 7. Sanitation facilities (e.g., portable toilets) will be placed outside of the creek channel and floodplain. Direct connections with soil, the storm drainage system, and surface waters will be avoided. 8. Sanitation facilities will be regularly cleaned and/or replaced, and inspected daily for leaks and spills.
GEN-25	Existing Hazardous Materials	If hazardous materials, such as oil, batteries or paint cans, are encountered at the maintenance sites, the District will carefully remove and dispose of them according to applicable regulatory requirements. District staff will wear proper protective gear and store the waste in appropriate hazardous waste containers until it can be disposed at a hazardous waste facility.
GEN-26	Spill Prevention and Response	The District will prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water into channels following these measures: 1. District field personnel will be appropriately trained in spill prevention, hazardous material control, and clean up of accidental spills. 2. Equipment and materials for cleanup of spills will be available on site and spills and leaks will be cleaned up immediately and disposed of according to applicable regulatory requirements. 3. Field personnel will ensure that hazardous materials are properly handled and natural resources are protected by all reasonable means.

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		4. Spill prevention kits will always be in close proximity when using hazardous materials (e.g., at crew trucks and other logical locations). All field personnel will be advised of these locations. 5. District staff will routinely inspect the work site to verify that spill prevention and response measures are properly implemented and maintained. *Spill Response Measures:* For small spills on impervious surfaces, absorbent materials will be used to remove the spill, rather than hosing it down with water. For small spills on pervious surfaces such as soil, the spill will be excavated and properly disposed rather than burying it. Absorbent materials will be collected and disposed of properly and promptly. If a hazardous materials spill occurs that cannot be contained or cleaned up with the onsite materials, the onsite District field personnel will be responsible for immediately initiating an emergency response sequence by notifying the proper authorities (i.e., District Emergency Response (ER) Team and public fire and hazmat agencies) of the release; taking appropriate defensive steps from a safe distance to secure the site to minimize damage to people, environment, and property (PEP); and deferring all other response activities to public emergency response agencies and/or the District Emergency Response (ER) Team or District ER Contractor. Depending on the nature of the release, the District ER Team's actions will include: urgent (responding within 2 hours of notification) field response site reconnaissance, emergency sequence initiation, defensive containment, release control, incident command; or priority (non 2-hour) field response site reconnaissance and clean-up operations. If a "reportable" spill of petroleum products occurs, the District's Stream Maintenance Implementation Program Manager will be notified and action taken to contact the appropriate safety and cleanup crews. A reportable spill is defined as when: ▪ a film or sheen on, or discoloration of, the water surface or adjoining bank/shoreline is observed; or ▪ a sludge or emulsion is deposited beneath the surface of the water or adjoining banks/shorelines (40 Code of Federal Regulations 110); or when ▪ another violation of water quality standards is observed. A written description of the reportable release must be submitted to the appropriate Regional Water Quality Control Board and the California Department of Toxic Substances Control (DTSC). This submittal must contain a description of the release, including the type of material and an estimate of the amount spilled, the date of the release, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future releases. If an appreciable spill has occurred, and results determine that project activities have adversely affected surface water or groundwater quality, a detailed analysis will be performed to the specifications of DTSC to identify the likely cause of contamination. This analysis will include recommendations for reducing or eliminating the source or mechanisms of contamination. Based on this analysis, the District or contractors will select and implement measures to control contamination, with a performance standard that surface and groundwater quality will be returned to baseline conditions. These measures will be subject to approval by the District, DTSC, and the Regional Water Quality Control Board.
GEN-27	Existing Hazardous Sites	Upon selection of maintenance project locations, the District will conduct a search for existing known contaminated sites, as part of its annual preparation of the Notice of Proposed Work (NPW), on the State Water Resource Control Board's GeoTracker Web site (http://www.geotracker.waterboards.ca.gov). The Geotracker search will only be

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		performed for the District's ground disturbing activities. For any proposed ground disturbing maintenance sites located within 1,500 feet of any "open" sites where contamination has not been remediated, the District will contact the RWQCB case manager listed in the database. The District will work with the case manager to ensure maintenance activities would not affect cleanup or monitoring activities or threaten the public or environment.
GEN-28	Fire Prevention	1. All earthmoving and portable equipment with internal combustion engines will be equipped with spark arrestors. 2. During the high fire danger period (April 1–December 1), work crews will ~~: a) H~~have appropriate fire suppression equipment available at the work site.
GEN-29	Dust Management	The District will implement the Bay Area Air Quality Management District's (BAAQMD) required Dust Control Measures (http://www.baaqmd.gov/~/media/Files/Planning%20and%20Research/CEQA/BAAQMD%20CEQA%20Guidelines%20May%202011.ashx?la=en). Current measures stipulated by the BAAQMD Guidelines include the following: 1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. 2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered. 3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited. 4. Water used to wash the various exposed surfaces (i.e., parking areas, staging areas, soil piles, graded areas, etc.) will not be allowed to enter the water way. 5. All vehicle speeds on unpaved roads shall be limited to 15 mph. 6. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used. 7. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. 8. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator. 9. Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.

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GEN-30	Vehicle and Equipment Maintenance	1. All vehicles and equipment will be kept clean. Excessive build-up of oil and grease will be prevented. 2. All equipment used in the creek channel will be inspected for leaks each day prior to initiation of work. Maintenance, repairs, or other necessary actions will be taken to prevent or repair leaks, prior to use. 3. Incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) will be checked for leaking oil and fluids. Vehicles or equipment visibly leaking operational fluids will not be allowed on-site. 4. No heavy equipment will operate in a live stream. This will not apply to activities for which no other option exists, such as sediment removal which cannot be conducted from top of bank, etc. In these cases, dewatering will be conducted as necessary, following the protocols in BMPs GEN-33 or GEN-34. 5. No equipment servicing will be done in the creek channel or immediate floodplain, unless equipment stationed in these locations cannot be readily relocated (i.e., pumps and generators). 6. If emergency repairs are required in the field, only those repairs necessary to move equipment to a more secure location, and that can be performed without releasing any material into the floodway or water, will be conducted in the channel or floodplain. 7. If necessary, all servicing of equipment done at the job site will be conducted in a designated, protected area to reduce threats to water quality from vehicle fluid spills. Designated areas will not directly connect to the ground, surface water, or the storm drain system. The service area will be clearly designated with berms, sandbags, or other barriers. Secondary containment, such as a drain pan, to catch spills or leaks will be used when removing or changing fluids. Fluids will be stored in appropriate containers with covers, and properly recycled or disposed of offsite.
GEN-31	Vehicle Cleaning	1. Equipment will be cleaned of any visible sediment or vegetation clumps before transferring and using in a different watershed to avoid spreading pathogens or exotic/invasive species. 2. Vehicle and equipment washing can occur on-site only as needed to prevent the spread of sediment, pathogens or exotic/invasive species. No runoff from vehicle or equipment washing is allowed to enter water bodies, including creek channels and storm drains, without being subjected to adequate filtration (e.g., vegetated buffers, straw wattles or bales, fiber rolls, and silt screens). The discharge of decant water from any on-site wash area to water bodies or to areas outside of the active project site is prohibited. Additional vehicle/equipment washing will occur at the approved wash area in the District's corporation yard.
GEN-32	Vehicle and Equipment Fueling	1. No fueling will be done in the channel (top-of-bank to top-of-bank) or immediate floodplain unless equipment stationed in these locations cannot be readily relocated (e.g., pumps and generators). 2. All off-site fueling sites (i.e., on access roads above the top-of-bank) will be equipped with secondary containment and avoid a direct connection to soil, surface water, or the storm drainage system. 3. For stationary equipment that must be fueled on-site, secondary containment, such as a drain pan or drop cloth, will be used to prevent accidental spills of fuels from reaching the soil, surface water, or the storm drain system.

BMP Number	BMP Title	BMP Description
Dewatering		
GEN-33	Dewatering for Non-Tidal Sites	When sediment removal and bank stabilization work area includes a flowing stream, the entire streamflow will be diverted around the work area by construction of a temporary dam and/or bypass. Where appropriate, stream flow diversions will occur via gravity driven systems. *A. Planning to avoid and minimize impacts to water quality and aquatic wildlife:* 1. For construction and monitoring of a stream flow bypass, the *Sediment Removal and Bank Stabilization Projects* checklist will be completed. 2. Recommendations by a qualified Fisheries Biologist to protect native fisheries and aquatic vertebrates will be incorporated into the bypass design. The recommendations may include but are not limited to: i. Screening the stream flow diversion source or pump to prevent entrainment of native fish or amphibian species. The screening dimensions will be appropriate to the species present. ii. Relocation of native aquatic vertebrates. This will include the methods to be used to capture and hold and move the aquatic vertebrates and a description of where the aquatic vertebrates will be relocated. 3. Depending on the channel configurations, sediment removal activities may occur where the flows are not bypassed around the work site as long as a berm is left between the work area and stream flows to minimize water quality impacts during excavation activities. The berm between the work and the live channel will be wide enough to prevent introduction of turbid water from the cell into the live channel. *B. Construction*: 1. The construction of facilities will be based on the water bypass plan. 2. Coffer dams will be installed both upstream and downstream of the work area to minimize impacts or the distance necessary to accomplish effective passive systems. 3. In streams where water may enter the construction site from downstream (reverse flow) additional coffer dams (downstream) may be necessary. When multiple coffer dams are constructed, the upstream dam will be constructed first. 4. Instream cofferdams will only be built from materials such as sandbags, earth fill, clean gravel, or rubber bladders which will cause little or no siltation or turbidity. 5. Plastic sheeting will be placed over k-rails, timbers, and earth fill to minimize water seepage into and out of the maintenance areas. The plastic sheets will be firmly anchored, using sandbags, to the streambed to minimize water seepage. 6. When pumping is necessary to dewater a work site, a temporary siltation basin and/or use of silt bags may be required to prevent sediment from re-entering the wetted channel. Pump intakes will be screened to prevent harm to aquatic wildlife. 7. If necessary to prevent erosion an energy dissipater will be constructed at the discharge point. 8. Timing of flow diversions will be coordinated with the completion of the dam structure to facilitate not drying up the downstream creek area and to minimize dry back conditions. *C. Implementation*: 1. Water flows downstream of the project site will be maintained to prevent stranding aquatic vertebrates.

BMP Number	BMP Title	BMP Description
		2. Water diverted around work sites and water detained by coffer dams will be protected from maintenance activity-related pollutants, such as soils, equipment lubricants or fuels. 3. The *Fish Relocation Guidelines* (Attachment B) will be implemented to ensure that fish and other aquatic vertebrates are not stranded during construction and implementation of channel dewatering. a) Native aquatic vertebrates shall be captured in the work area and transferred to another reach as determined by a qualified biologist. Timing of work in streams that supports a significant number of amphibians will be delayed until metamorphosis occurs to minimize impacts to the resource. Capture and relocation of aquatic native vertebrates is not required at individual work sites when site conditions preclude reasonably effective operation of capture gear and equipment. b) Aquatic invertebrates will not be transferred (other than incidental catches) because of their anticipated abundance and colonization after completion of the repair work. 4. Filtration devices (silt bags attached to the end of discharge hoses and pipes to remove sediment from discharged water) or settling basins will be provided as necessary at discharge sites to ensure that the turbidity of discharged water is not visibly more turbid than the water in the channel upstream of the maintenance site. If increases in turbidity are observed, additional measures will be implemented such as a larger settling basin or additional filtration. If increases in turbidity persist, the District's Stream Maintenance Program Implementation Project Manager will be alerted since turbidity measurements may be required. 5. Water remaining in the work area will be removed by evaporation, seepage, or pumping. When pumping is required to dewater a site, the decanted water will be discharged with water bypassed around the site or in a separate erosion control – energy dissipation area/vegetated swale. The turbidity of discharged water will not be visibly more turbid than the receiving water. *Deconstruction*: 1. When maintenance is completed, the flow diversion structure will be removed as soon as possible. Impounded water will be released at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat. 2. Removal will normally proceed from downstream in an upstream direction. 3. When diversion structures are removed, the ponded water will be directed back into the low-flow channel in a phased manner to minimize erosion and downstream water quality impacts. Normal flows will be restored. 4. The area disturbed by flow bypass mechanisms will be restored to the pre-project condition at the completion of the project (to the extent practical). This may include, but is not limited to, recontouring the area and planting of riparian vegetation.

BMP Number	BMP Title	BMP Description
GEN-34	Dewatering in Tidal Work Areas	For tidal areas, a downstream cofferdam will be constructed to prevent the work area from being inundated by tidal flows. 1. Installation of cofferdams and fish exclusion measures will be installed at low tide when the channel and project site are at their driest. 2. It is preferable to not use any bypass pipes when work is being conducted on one side of the channel, if~~s~~ isolated by the cofferdam, and flows can continue on the other side of the creek channel without entering the project area. 3. If downstream flows cannot be diverted around the project site, the creek waters will be transmitted around the site through cofferdam bypass pipes. Waters discharged through tidal cofferdam bypass pipes will not exceed 50 NTUs over the background levels of the tidal waters into which they are discharged. 4. Cofferdams in tidal areas may be made from earthen or gravel material. If earth is used, the downstream and upstream faces will be covered by a protected covering (e.g., plastic or fabric) if needed to minimize erosion. A protected covering or sheeting will be placed on the water side of an earthen coffer dam to protect water quality. 5. When maintenance is completed, the cofferdams and bypass pipes will be removed as soon as possible but no more than 72 hours after work is completed. Flows will be restored at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat.
GEN-35	Pump/Generator Operations and Maintenance	When needed to assist in channel dewatering, pumps and generators will be maintained and operated in a manner that minimizes impacts to water quality and aquatic species. 1. Pumps and generators will be maintained according to manufacturers' specifications to regulate flows to prevent dryback or washout conditions. 2. Pumps will be operated and monitored to prevent low water conditions, which could pump muddy bottom water, or high water conditions, which creates ponding. 3. All pump intakes will be screened. Pumps in steelhead creeks will be screened according to NMFS criteria (http://www.swr.noaa.gov/sr/fishscrn.pdf) to prevent entrainment of steelhead.
Public Safety		
GEN-36	Public Outreach	The public will be informed of stream maintenance work prior to the start of work as part of the preparation of the NPW for all projects in the NPW: 1. Each spring, a newspaper notice will be published with information on the NPW work sites, approximate work dates, and contact information. 2. Neighborhood Work Notices will be distributed as part of the NPW preparation prior to the start of work. 3. Local governments (cities and County) will be notified of scheduled maintenance work. The NPW will be submitted to the public works departments, local fire districts, and the District's Flood Protection and Watershed Advisory Committees. 4. The District will post specific information on individual maintenance projects on the Stream Maintenance Web site: (http://valleywater.org/EkContent.aspx?id=379&terms=stream+maintenance) 5. For high profile projects, at the District's discretion, signs will be posted in the neighborhood to notify the public at least one week in advance of maintenance schedules, trail closures, and road/lane closures as necessary and as possible. Signage used at work sites will include contact information for lodging comments and/or complaints regarding the maintenance activities.
GEN-37	Implement Public Safety Measures	The District will implement public safety measures during maintenance as follows: 1. Construction signs will be posted at job sites warning the public of construction work and to exercise caution,

BMP Number	BMP Title	BMP Description
		as appropriate to public accessed areas. 2. Where work is proposed adjacent to a recreational trail, warning signs will be posted several feet beyond the limits of work. Signs will also be posted if trails will be temporarily closed. 3. If needed, a lane will be temporarily closed to allow for trucks to pull into and out of access points to the work site. 4. Temporary fencing, either the orange safety type or chain link, will be installed above repair sites on bank stabilization projects. 5. When necessary, District or contracted staff will provide traffic control and site security.
GEN-38	Minimize Noise Disturbances to Residential Areas	The District will implement maintenance practices that minimize disturbances to residential areas surrounding work sites. 1. With the exception of emergencies, work will be conducted during normal working hours. Maintenance activities in residential areas will not occur on Saturdays, Sundays, or District observed holidays except during emergencies, or with approval by the local jurisdiction and advance notification of surrounding residents. 2. Vehicles, generators and heavy equipment will be equipped with adequate mufflers. 3. Idling of vehicles will be prohibited beyond 5 minutes unless operation of the engine is required to operate a necessary system such as a power take-off (PTO).
GEN-39	Planning for Pedestrians, Traffic Flow, and Safety Measures	1. Work will be staged and conducted in a manner that maintains two-way traffic flow on public roadways in the vicinity of the work site. If temporary lane closures are necessary, they will be coordinated with the appropriate jurisdictional agency and scheduled to occur outside of peak traffic hours (7:00 – 10:00 a.m. and 3:00 – 6:00 p.m.) to the maximum extent practicable. Any lane closures will include advance warning signage, a detour route and flaggers in both directions. When work is conducted on public roads and may have the potential to affect traffic flow, work will be coordinated with local emergency service providers as necessary to ensure that emergency vehicle access and response is not impeded. 2. Bicycle and pedestrian facility closures will be scheduled outside of peak traffic hours (7:00 – 10:00 a.m. and 3:00 – 6:00 p.m.) to the maximum extent practicable. 3. Public transit access and routes will be maintained in the vicinity of the work site. If public transit will be affected by temporary road closures and require detours, affected transit authorities will be consulted and kept informed of project activities. 4. Adequate parking will be provided or designated public parking areas will be used for maintenance-related vehicles not in use through the maintenance period. 5. Access to driveways and private roads will be maintained. If brief periods of maintenance would temporarily block access, property owners will be notified prior to maintenance activities.

BMP Number	BMP Title	BMP Description
Cultural Resources		
GEN-40	Discovery of Cultural Remains or Historic or Paleontological Artifacts	Work in areas where remains or artifacts are found will be restricted or stopped until proper protocols are met. 1. Work at the location of the find will halt immediately within 50 feet of the find. A "no work" zone shall be established utilizing appropriate flagging to delineate the boundary of this zone, which shall measure at least 50 feet in all directions from the find. 2. The District shall retain the services of a Consulting Archaeologist or Paleontologist, who shall visit the discovery site as soon as practicable, and perform minor hand-excavation to describe the archaeological or paleontological resources present and assess the amount of disturbance. 3. The Consulting Archaeologist shall provide to the District and the Corps, at a minimum, written and digital-photographic documentation of all observed materials, utilizing the guidelines for evaluating archaeological resources for the California Register of Historic Places (CRHP) and National Register of Historic Places (NRHP). Based on the assessment, the District and Corps shall identify the CEQA and Section 106 cultural-resources compliance procedure to be implemented. 4. If the find appears to not meet the CRHP or NRHP criteria of significance, and the Corps archaeologist concurs with the Consulting Archaeologist's conclusions, construction shall continue while monitored by the Consulting Archaeologist. The authorized maintenance work shall resume at the discovery site only after the District has retained a Consulting Archaeologist to monitor and the Watershed Manager has received notification from the Corps to continue work. 5. If the find appears significant, avoidance of additional impacts is the preferred alternative. The Consulting Archaeologist shall determine if adverse impacts to the resources can be avoided. 6. When avoidance is not practical (e.g., maintenance activities cannot be deferred or they must be completed to satisfy the SMP objective), the District shall develop an Action Plan and submit it to the Corps within 48 hours of Consulting Archaeologist's evaluation of the discovery. The action Plan may be submitted via e-mail to (rstradford@spd.usace.army.mil). The Action Plan is synonymous with a data-recovery plan. It shall be prepared in accordance with the current professional standards and State guidelines for reporting the results of the work, and shall describe the services of a Native American Consultant and a proposal for curation of cultural materials recovered from a non-grave context. 7. The recovery effort will be detailed in a report prepared by the archaeologist in accordance with current archaeological standards. Any non-grave artifacts will be placed with an appropriate repository. 8. The Consulting Paleontologist will meet the Society for Vertebrate Paleontology's criteria for a "qualified professional paleontologist" (Society of Vertebrate Paleontology Conformable Impact Mitigation Guidelines Committee 1995). 9. The paleontologist will follow the Society for Vertebrate Paleontology's guidelines for treatment of the artifact. Treatment may include preparation and recovery of fossil materials for an appropriate museum or university collection, and may include preparation of a report describing the finds. The District will be responsible for ensuring that paleontologist's recommendations are implemented. 10. In the event of discovery of human remains (or the find consists of bones suspected to be human), the field crew supervisor shall take immediate steps to secure and protect such remains from vandalism during periods when work crews are absent.) 11. Immediately notify the Santa Clara County Coroner and provide any information that identify the remains as Native American. If the remains are determined to be from a prehistoric Native American, or determined to be a Native American from the ethnographic period, the Coroner shall contact the Native American Heritage

BMP Number	BMP Title	BMP Description
		Commission (NAHC) within 24 hours of being notified of the remains. The NAHC then designates and notifies within 24 hours a Most Likely Descendant (MLD). The MLD has 24 hours to consult and provide recommendations for the treatment or disposition, with proper dignity, of the human remains and grave goods. 12. Preservation in situ is the preferred option. Human remains shall be preserved in situ if continuation of the maintenance work, as determined by the Consulting Archaeologist and MLD, will not cause further damage to the remains. The remains and artifacts shall be documented and the find location carefully backfilled (with protective geo-fabric if desirable) and recorded in District project files. 13. Human remains or cultural items exposed during maintenance that cannot be protected from further damage shall be exhumed by the Consulting Archaeologist at the discretion of the MLD and reburied with the concurrence of the MLD in a place mutually agreed upon by all parties.
GEN-41	Review of Projects with Native Soil	A cultural resources specialist will conduct a review and evaluation of those sites that would involve disturbance / excavation of native soil previously undisturbed by contemporary human activities to determine their potential for affecting significant cultural resources. The evaluation of the potential to disturb cultural resources will be based on an initial review of archival information provided by the California Historical Resources System/Northwest Information Center (CHRIS/NWIC) in regard to the project area based on a 0.25 mile search radius. It is recommended that this initial archival review be completed by a professional archaeologist who will be able to view confidential site location data and literature to arrive at a preliminary sensitivity determination. If necessary, a further archival record search and literature review (including a review of the Sacred Lands Inventory of the Native American Heritage Commission); and a field inventory of the project area will be conducted to determine the presence/absence of surface cultural materials associated with either prehistoric or historic occupation. The results along with any mitigation and/or management recommendations would be presented in an appropriate report format and include any necessary maps, figures, and correspondence with interested parties. A summary table indicating appropriate management actions (e.g., monitoring during construction, presence/absence testing for subsurface resources; data recovery, etc.) will be developed for each project site reviewed. The management actions will be implemented on site to avoid significant effects to cultural resources.
Utilities		
GEN-42	Investigation of Utility Line Locations	An evaluation of the locations of utility lines that could be affected by maintenance activities will be conducted annually as part of the preparation of the Notice of Proposed Work (NPW). Utilities will be avoided as much as possible. For maintenance areas with the potential for adverse effects on utility services, the following measures shall be implemented: 1. Utility excavation or encroachment permits shall be required from the appropriate agencies. These permits include measures to minimize utility disruption. The District and its contractors shall comply with permit conditions. Such conditions shall be included in construction contract specifications. 2. Utility locations shall be verified through a field survey (potholing) and use of the Underground Service Alert services. 3. Detailed specifications shall be prepared as part of the design plans to include procedures for the excavation, support, and/or fill of areas around utility cables and pipelines. All affected utility services shall be notified of the District's maintenance plans and schedule. Arrangements shall be made with these entities regarding protection, relocation, or temporary disconnection of services. 4. Residents and businesses in the project area shall be notified of planned utility service disruption 2 to 4 days in advance, in conformance with state standards. 5. Disconnected cables and lines shall be reconnected promptly.

B. SECTION B – Sediment Removal BMPs

This group of BMPs is intended to be implemented specifically during sediment removal activities to avoid potential impacts on biological resources.

BMP Number	BMP Title	BMP Description
SED-1	Groundwater Management	If high levels of groundwater (i.e., visible water) are encountered during excavations in a work area, the water will be pumped out of the work site or left within the work area if the work activity is not causing water quality degradation in a live stream. Water Quality monitoring would need to occur. If necessary to protect water quality, the extracted water will be discharged into specifically constructed infiltration basins, holding ponds, or areas with vegetation to remove sediment prior to the water re-entering a creek. Water discharged into vegetated areas or swales will be pumped in a manner that will not create erosion around vegetation.
SED-2	Prevent Scour Downstream of Sediment Removal	Sediment removal sites in the transport zone on alluvial fans may cause increased scour downstream if they experience scouring flows or rapid sediment accumulation after maintenance. After sediment removal, the channel will be graded so that the transition between the existing channel both upstream and downstream of the maintenance area is smooth and continuous between the maintained and non-maintained areas and does not present a sudden vertical transition (wall of sediment) or other blockage that could erode once flows are restored to the channel.
SED-3	Restore Channel Features	Low-flow channels within non-tidal streams will be contoured to facilitate fish passage and will emulate the pre-construction conditions as closely as possible, within the finished channel topography.
SED-4	Berm Bypass	Where sediment removal is accomplished without a bypass by removing alternating cells, the berm between the work and the live channel will be wide enough to prevent introduction of turbid water from the cell into the live channel.
SED-5	Sediment Characterization	Projects involving sediment removal at stream gauges, outfalls, culverts, flap gates, tide gates, grade control structures, bridges, fish ladders, and fish screens in excess of 25 cubic yards shall be characterized in accordance with the SCVWD's Sediment Characterization Plans for SMP-2. These projects shall be reported in the annual summary report. Sediment removed will not be reused without pre-approval from appropriate regulatory agencies. See section 5.4 for information on the waiver process.

C. SECTION C – Vegetation Management BMPs

These BMPs provide specific and detailed guidance on the variety of vegetation management procedures implemented by the District. BMPs for the following maintenance techniques are included: tree pruning, tree removal, plant removal, woody debris management, herbicide application, mowing, discing, flaming, and grazing. Practices will be implemented by fully trained and qualified field crews.

BMP Number	BMP Title	BMP Description
VEG-1	Minimize Local Erosion Increase from In-channel Vegetation Removal	To minimize the potential effect of localized erosion, the toe of the bank will be protected by leaving vegetation to the maximum extent possible and consistent with the maintenance guidelines or original design requirements.
VEG-2	Non-native Invasive Plant Removal	Invasive species (e.g. cape ivy [*Delairea odorata/Senecio mikanoides]*, arundo [*Arundo donax*]) will be disposed of in a manner that will not contribute to the further spread of the species. Cape ivy removed during a project shall be bagged and disposed of in a landfill. Arundo canes will be prevented from floating downstream or otherwise entering the creek or waterway.
VEG-3	Use Appropriate Equipment for Instream Removal	When using heavy equipment to cut or remove instream vegetation, low ground pressure equipment, such as tracked wheels will be utilized to reduce impacts to the streambed.
VEG-4	Use Flamers with Caution	1. A fire extinguisher, water supply and other appropriate fire suppression equipment will always be kept close to the work site in case of an emergency. 2. Propane tanks will be checked for leaks and proper functioning prior to and proceeding use of flaming equipment. The propane tank will be treated as a hazardous material.
VEG-5	Conduct Flaming During Appropriate Weather and Seasonal Conditions	Flamers will not be used during periods of high fire danger or in areas where fuel or climate conditions could accidentally ignite a fire.
VEG-6	Standard Grazing Procedures	1. Vegetation and areas to be preserved will be fenced off to exclude grazing animals. 2. Grazing animals will be excluded from stream channels, using fencing or other barriers.

D. SECTION D – Bank Stabilization BMPs

These BMPs provide additional guidance during implementation of bank stabilization projects to avoid impacts on biological and cultural resources. Review of the Post-Project Restoration BMPs in Section F is recommended because those measures will be implemented after bank stabilization projects are complete. The BMPs included in this section are implemented by the field crew and site manager.

BMP Number	BMP Title	BMP Description
BANK-1	Bank Stabilization Design to Prevent Erosion Downstream	To further prevent potential downstream erosion impacts due to bank stabilization, the site design will be adjusted to provide proactive protection of vulnerable areas within the reach of the worksite. Such measures include, but are not limited to, appropriately keyed-in coir logs, riparian planting, strategic placement of rock, and flow deflectors. Bank stabilization will include appropriate transition designs upstream and downstream of the work site to prevent potential erosion impacts.
BANK-2	Concrete Use Near Waterways	Concrete that has not been cured is alkaline and can increase the pH of the water. Fresh concrete will be isolated until it no longer poses a threat to water quality using the following appropriate measures: 1. Wet sacked concrete will be excluded from the wetted channel for a period of 30 days after installation. During that time, the wet sacked concrete will be kept moist (such as covering with wet carpet) and runoff from the wet

BMP Number	BMP Title	BMP Description
		sacked concrete will not be allowed to enter a live stream. 2. Poured concrete will be excluded from the wetted channel for a period of 30 days after it is poured. During that time, the poured concrete will be kept moist, and runoff from the wet concrete will not be allowed to enter a live stream. Commercial sealants (e.g., Deep Seal, Elasto-Deck Reservoir Grade) may be applied to the poured concrete surface where difficulty in excluding water flow for a long period may occur. If a sealant is used, water will be excluded from the site until the sealant is dry. 3. Dry sacked concrete will not be used in any channel. 4. An area outside of the channel and floodplain will be designated to clean out concrete transit vehicles.
BANK-3	Bank Stabilization Post-Construction Maintenance	The District may maintain or repair bank stabilization projects that are less than 2 years old that are damaged by winter flows. The District will notify the regulatory agencies 24 hours prior to beginning the work and the work will be reported as part of the Post-Construction Report submitted by January 15 of each year or if necessary, the subsequent year. Appropriate BMPs will be applied during maintenance repairs.

E. SECTION E – Post-Project Restoration BMPs

These BMPs will be implemented, as appropriate, on all sites that involve ground disturbance.

BMP Number	BMP Title	BMP Description
REVEG-1	Seeding	Sites where maintenance activities result in exposed soil will be stabilized to prevent erosion. Disturbed areas shall be seeded with native seed as soon as is appropriate after maintenance activities are complete. An erosion control seed mix may be applied to exposed soils, and down to the ordinary high water mark (OHWM). 1. The seed mix should consist of California native grasses (e.g., *Hordeum brachyantherum*, *Elymus glaucus*, and *Vulpia microstachyes*) or annual, sterile seed mix. 2. Temporary earthen access roads may be seeded when site and horticultural conditions are suitable, or have other appropriate erosion control measures in place (GEN-20).
REVEG-2	Planting Material	Revegetation and replacement plantings will consist of locally collected native species. Species selection will be based on surveys of natural areas on the same creek that have a similar ecological setting and/or as appropriate for the site location.

F. SECTION F – Management of Animal Conflict BMPs

Methods of animal management included in the SMP are avoidance, biological controls, physical alterations, habitat alterations, and lethal controls. Of all these methods, implementation of lethal controls has the highest potential for environmental and biological impacts. Therefore, the animal management BMPs provided in this section focus on lethal controls. The application area for lethal controls will be identified during the annual planning process (see the Biological Resource Planning BMPs) and guided as directed by wildlife biologists. Species habitat areas are defined by the District's GIS species mapping, updated CNDDB and known local biological information and are included in the SMP Update Subsequent EIR.

BMP Number	BMP Title	BMP Description
ANI-1	Avoid Redistribution of Rodenticides	Carcass surveys will be conducted periodically when acute poisons and first generation anticoagulants are used. The frequency of the carcass surveys will be specific to the type of rodenticide used, to minimize secondary poisoning impacts: • Acute toxins – Daily carcass surveys, beginning the first day after application until the end of the baiting period for acute toxins used above-ground. • Anticoagulants - Within 7 days of installation of first generation anticoagulant bait, and weekly thereafter. Anytime a carcass is found, daily carcass surveys will begin for as long as carcasses are found until no carcasses are found during a daily survey. Once no carcasses are found, carcass surveys will return to the weekly carcass survey timeline maximum from the date of initial installation of an anticoagulant bait station. To verify that the frequency of carcass surveys is adequate, a biologist will conduct daily carcass surveys 2 times per year over one baiting cycle. Based on the results of these surveys, the timing of carcass surveys will be adjusted if necessary. Any spilled bait will be cleaned up immediately.
ANI-2	Prevent Harm to the Salt Marsh Harvest Mouse and California Clapper Rail	1. No rodenticides or fumigants will be used within the range of the SMHM or CCR as identified on District range maps. 2. Methods of rodent control within SMHM or CCR habitat will be limited to live trapping. All live traps shall have openings measuring no smaller than 2 inches by 1 inch to allow any SMHM that inadvertently enter the trap to easily escape. All traps will be placed outside of pickleweed areas and above the high tide line.
ANI-3	Burrowing Owl, Bald Eagle and Golden Eagle Buffer Zone	Per the California Department of Fish and Wildlife's 2008 *Guidance for Burrowing Owl Conservation*, a 656-yard buffer will be established around known burrowing owl locations where no rodenticides or fumigants (including smoke bombs) will be used. A 0.5-mile buffer will be established around known bald eagle and golden eagle nesting locations where no rodenticides will be used.
ANI-4	Animal Control in Sensitive Amphibian Habitat	1. Fumigants will not be used within the habitat areas of special status amphibians. 2. The use of bait stations within the potential habitat areas of California red-legged frog, California tiger salamander, or foothill yellow-legged frog will be limited to bait stations specifically designed to prevent entry by these species. 3. Any live traps will allow California red-legged frogs, California tiger salamanders, or foothill yellow-legged frogs to safely exit (e.g., by having openings measuring no smaller than 2 inches by 1 inch).
ANI-5	Slurry Mixture near Waterways	All slurry type mixes used to fill rodent burrows will be prevented from entering any waterway by using appropriate erosion control methods and according to the manufacturer's specifications. If the creek bed is dry or has been dewatered, any material that has entered the channel will be removed.
ANI-6	Species requiring depredation permit	Animal Conflict Management will not include lethal control of species listed in California F&G Code Section 4181 inlcuding beaver and gray squirrel without first obtaining a depredation permit.

G. SECTION G – Use of Pesticides

Pesticides may be used for vegetation management or control of animal damage.

BMP Number	BMP Title	BMP Description
HM-4	Posting and Notification for Pesticide Use	Posting of areas where pesticides are used will be performed in compliance with District Policy Ad-8.2 Pesticide Use as follows: 1. Posting will be performed in compliance with the label requirements of the product being applied. 2. In addition, posting will be provided for any products applied in areas used by the public for recreational purposes, or those areas readily accessible to the public, regardless of whether the label requires such notification. In doing this, the District ensures that exposure risk is minimized further by adopting practices that go beyond the product label requirements. (The posting method may be modified to avoid destruction of bait stations or scattering of rodenticide.) 3. These postings will notify staff and the general public of the date and time of application, the product's active ingredients, and common name, and the time of allowable re-entry into the treated area. 4. Signs will not be removed until after the end of the specified re-entry interval. 5. Right-to-know literature on the product will be made available to anyone in the area during the re-entry period. 6. A District staff contact phone number will be posted on the sign, including a cellular phone number. 7. Notification of pesticide activities will be made as required by law. Also, the District will maintain records of neighbors with specific needs relative to notification before treatment of an adjacent area so that such needs are met.

Source: Data compiled by Horizon Water and Environment in 2011

ATTACHMENT G

Sediment Characterization Plan

SEDIMENT CHARACTERIZATION PLAN

FOR THE
SANTA CLARA VALLEY WATER DISTRICT
MULTI-YEAR STREAM MAINTENANCE PROGRAM

Revised by

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Under the Direction of

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November 2013

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Introduction

The Santa Clara Valley Water District (District) conducts sediment removal, vegetation management, bank protection repairs, minor maintenance, and canal maintenance activities in channels/creeks for the purpose of alleviating the potential for local flooding problems and to meet the requirements of the Federal Emergency Management Agency for flood protection. Under the aforementioned activities of the Multi-Year Stream Maintenance Program (SMP), channel/creek sediment is often removed as a result of these activities. In order to effectively manage the removal and disposal of the sediments removed as a result of these activities, it is necessary to characterize the chemical and physical properties of the sediments (or also known as creek material as some of the tested material is from the creek banks or stockpiles, etc.). This characterization allows the District to (1) effectively plan for disposal of the sediments and (2) assist with determining the best management practices (BMP) to implement in order to avoid and minimize impacts to water quality, aquatic life, and Beneficial Uses as specified in the San Francisco and Central Coast Water Water Quality Control Boards' (Water Board) Basin Plans. The sediment characterization plan proposed for the District's SMP, as presented herein, is a result of the District's sediment testing and evaluation effort, and continuous improvement process based on guidance from regulatory agencies and other stakeholders, since 1997.

Purpose

According to the Basin Plans, the Water Boards establish and enforce Waste Discharge Requirements (WDRs) for point and nonpoint source of pollutants at levels necessary to meet numerical and narrative water quality objectives. The sediment tests performed by the District each year, as part of its SMP are based on the historic occurrence of pollutants within Santa Clara Valley streams, in accordance with the Basin Plans' water quality objectives, and the Water Boards' WDR through a stakeholder process. The stakeholder process and lessons learned meetings involved participation of the Water Boards, the California Department of Fish and Wildlife (DFW), the U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers (Corps), and various environmental organizations which assisted the District in continuous evaluation and improvement of the sediment characterization plan.

There are four main reasons for characterizing the sediments described as follows:

Landfill Acceptance

Landfills require creek sediment to be characterized before they accept the material for disposal.

Reuse Sites

The evaluation of test results for the placement of excavated materials in beneficial reuse sites. The beneficial reuse options include wetland creation and restoration, levee maintenance, and construction fill. Material reused within the 500 feet upstream or downstream is done without sediment testing with prior approval by the Regional Water Board.

The San Francisco and Central Coast Regional Water Quality Control Boards

The Water Boards have required characterization of the materials to determine if the proposed disposal method is acceptable. The Water Boards must ensure that the disposal of the material will not pose a threat to the waters of the State. The Water Boards are interested in determination of total mercury and polychlorinated biphenyls (PCB's) in residual sediment after sediment removal.

The California Department of Fish and Wildlife

DFW requests that the materials be characterized to determine if they will adversely impact fish and wildlife as the removal operations may cause sediments to be re-suspended and migrate downstream where it may have an impact on fish and wildlife. DFW defers to the Water Boards for the determination of suitability for creek material removal.

Scope

Under the SMP, sediment will only be tested using the San Francisco Bay Regional Water Quality Control Board's Beneficial Reuse of Dredged Materials: Sediment Screening and Testing Guidelines (May 2000) to facilitate any beneficial reuse of sediment generated by the District. The physical and chemical properties of sediments tested by the District include metals, pesticides and organophosphorous compounds, polychlorinated biphenyls, polynuclear aromatic hydrocarbons, moisture content, chloride, pH, total sulfides, ammonia, and toxicity (as described below).

This sampling plan documents sampling and analytical procedures which will be utilized for the creek sites under the SMP. It is not intended to be a full characterization of all the stream sediments. The Sediment Characterization Plan is primarily designed to characterize sediment designated for removal (using composite, continuous core and residual sediment sampling methods). Residual sediment samples will only be collected in an attempt to characterize the sediment that may be subject to erosion and transport during flows.

The Sediment Characterization Plan addresses the following sampling methods designed to meet the overall objectives of landfill acceptance, sediment reuse sites, water quality protection, and fish and wildlife protection:

1. Composite sediment sampling
2. Continuous Core sampling
3. Residual sediment sampling

Objectives

The specific objectives of the Sediment Characterization Plan are as follows:

1. Characterize the sediments for acceptance by landfills.

2. Characterize the sediments to determine their suitability for beneficial reuse (i.e., non-landfill reuse sites).

3. Compliance with regulatory requirements for the sediment removal activities.

4. Provide data for evaluation of the feasibility of long-term disposal, reuse, and recycling opportunities for sediment generated by the District.

Sampling Methods and Procedures

This section describes the frequency of sampling and the location of sample collection at the SMP sites involving sediment removal activities. From both the regulatory and scientific perspectives, the primary objectives of a sampling plan for a solid material are twofold: namely, (1) to collect samples that are representative samples as exhibiting average properties of the whole solid material and (2) to collect samples that will allow measurements of the chemical properties of the waste that are both accurate and precise.

Sediment samples will be collected for characterization of sediment designated for removal and analyzed in accordance with the contaminants listed on Table 4 Recommended Sediment Chemistry Screening Guidelines for Beneficial Reuse of Dredged Material (Re-use Guidelines) from the Water Board's Basin Plan. Sampling parameters/analytes listed in Table 4 may be modified after a history of sampling is obtained. This may result in not requiring monitoring for some of these contaminants under certain situations or at certain locations, or adding more parameters/analytes if deemed necessary by the Executive Officer of the Water Board.

Reliable information concerning the chemical properties of a solid waste is needed for the purpose of comparing chemical properties with applicable regulatory thresholds. For chemical information to be reliable, it must be accurate and precise. Accuracy is usually achieved by incorporating some form of randomness into the selection process for the samples that generate the data. Precision is most often obtained by selecting an appropriate number of samples.

For this Sediment Characterization Plan, the District will utilize a systematic random sampling technique generated by the sediment sampling database, in which all sampling points from a population are randomly selected. The advantages of systematic random sampling over other sampling techniques are the ease with which samples are identified, and collected, an increase in precision, and to collect representative data on chemical properties. All samples shall be collected in accordance with the most recent U.S. EPA Guidelines and sampling methodologies. The methods of analyses and detection limits must be appropriate for the expected concentrations. Specific methods of analyses must be identified. If methods other than U.S. EPA – approved methods of Standard Methods are used, the exact methodology must be submitted for review and approved by the Executive Officer of the Water Board.

The following techniques provide a general sampling approach and will suffice for most projects. Where these techniques would not provide a representative sample of the project area, Regional Board staff will be consulted to provide additional sampling direction.

Composite Sediment Samples

The purpose of composite sediment sampling is to conduct the widest range of characterization along the project sites' lengths and widths in order to capture the most variation of the area. This broader scope of randomly generated 4 point sampling will give a greater sense of the variability of the channel material than a specific sample point.

Composite Sample Collection Frequency

In order to characterize the sediment, one composite, which consists of 4 random samples, in-situ sample shall be collected and analyzed approximately every 4,000 cys. Approximately one sample shall be collected every 1,000 cys. These samples will be composited together by the laboratory. The length of the channel is also taken into consideration as the District's database will generate sampling points based on the length of the project area. As such, projects with long project lengths will have sample points farther apart in order to better characterize the variability in sediment contaminants along the entire length of the worksite.

Composite Sample Locations

The location of each sample at the Sediment Removal Program sites must be selected in the following three dimensions: (1) the creek station, or the location along the length of the creek; (2) the location along the creek cross section; and (3) the depth below ground surface (bgs). With these parameters, a sample point is randomly generated. The rationale for selection of a sampling location in all three dimensions is described below:

Composite Sample Depth

The sampling depth of the composite samples are also randomly generated varied from surface sampling to maximum excavation depth of the proposed project.

Continuous Core Sediment Samples

The purpose of continuous core sampling is to take samples at selected locations (e.g. below outfalls, depression areas of the creek, likely contaminated areas) where the highest likelihood of contamination exists in the project site. This type of sample is not taken on the banks (above the toe of the channel) nor from stockpiles, only from within toe to toe of the channel.

Continuous Core Sample Collection Frequency

One continuous core sample is taken every 4000 cubic yards per project site.

Continuous Core Sample Locations

The location of the sample is determined in the field upon attempting to locate areas of depression or outfalls within the project site. As these features are not always apparent, the location will sometimes have to be placed in the most likely areas of these features.

Continuous Core Sample Depth

The depth of the sample is randomly generated by the District's sediment sampling database and printed on the sediment sampling plan generated in the office and used out in the field.

Residual Sediment Samples

The purpose of residual sediment sampling is to conduct limited characterization of sediment left behind after sediment removal from earthen channels and creeks. The exposed sediment in the channel/creek bottom will only be sampled and analyzed for total mercury and PCB.

Residual Sample Collection Frequency

Residual sediment samples will be collected at one every 4000 cys on earthen channels.

Residual Sample Locations

This type of sample will be collected at each earthen channel/creek site. The location of the residual sample will coincide with the continuous core sample.

Residual Sample Depth

The samples will be collected from within 1 foot below the planned maximum depth of excavation for that project.

Sample Collection

All samples shall be collected by means of a hand trowel, a hand auger, or another sampling method approved by the regulatory agencies. The individual collecting the sample will have the discretion of choosing the sampling method which is the most efficient to perform.

Sampling will be conducted in accordance with the methods described below:

Hand Trowel Procedure

1. Remove vegetation and woody debris from the ground surface.
2. If collecting a subsurface sample, use a shovel to dig down to the desired sampling interval.
3. Use a stainless-steel hand trowel to collect soil.
4. Place soil in an appropriate sampling container.
5. Replace all excavated soils to their original location (i.e., backfill the sampling hole).

Hand Auger Procedure

1. Remove vegetation and woody debris from the ground surface.
2. Use the hand auger to advance down to the top of the sampling interval.
3. Use a hand auger to collect soil from the desired depth.

4. Use a clean (decontaminated) tool to scoop the soil out of the auger and place in an appropriate sampling container.

5. Replace all excavated soils to their original location (i.e., backfill the sampling hole).

6. If hand auger refusal is encountered, sample will be collected from an alternate location.

Sample Containers and Sample Volumes

All samples shall be collected using wide-mouthed glass jars or other sampling containers as directed or supplied by the laboratory.

Sampling volume and number of containers necessary shall be specified by the District's contract of internal laboratory. It is anticipated that multiple containers of sediment will need to be collected at each location.

Decontamination Procedures

All equipment used to collect soil samples (hand trowel or hand auger) shall be decontaminated prior to collecting each sample, on-site. Equipment shall be decontaminated by at least rinsing the equipment twice with water, drying and then visually inspecting to ensure that there are no residual particles from the previous sample. The final rinse shall be with de-ionized or distilled water.

Sample Preservation

All samples shall be immediately preserved in accordance with the EPA sampling and testing procedures. This is most commonly done by placing the samples in an insulated cooler with ice. Samples may also be stored in a refrigerator.

The laboratory shall immediately record the temperature of the sample containers upon receipt of the samples, if required by the EPA sampling and testing procedures for the contaminants that are being analyzed.

Chain of Custody Procedures

Standard chain of custody procedures shall be used throughout the sampling collection procedures. A chain of custody shall be prepared for all samples. Each individual who has responsibility for the samples is required to sign the chain of custody upon relinquishing the samples to another party. The receiving party taking custody of samples shall also sign the chain of custody form.

When in the field, samples shall always be in sight of the individual responsible for the samples, or the samples shall be stored within a locked vehicle. If the samples are stored in an office prior to delivery to the laboratory, the samples shall be stored in a secure location. Applicable sample storage and preservation procedures shall be followed.

Survey of Sampling Locations

All sampling locations will be identified by Geographic Information Stationing.

Analytical Procedures

Every sediment sample location, with the exception of residual samples, shall be sampled for the full list of parameters/analytes listed in Table 4 for the Reuse Guidelines. Sampling parameters/analytes listed in Table 4 may be modified after a history of sampling is obtained. This may result in not requiring monitoring for some of these contaminants under certain situations or at certain locations, or adding more parameters/analytes if deemed necessary by the Executive Officer.

Rational for Analytical Test Method Selection

The rationale used for selecting test methods is based largely on the laboratory's ability to meet the detection limit requirements of the Table 4. All methods are EPA standards but may vary from time to time (based on changes from the EPA). Although, the driving force behind the selection of the test methods will be Water Board's Re-use Guidelines.

Moisture Content

Sediments in creeks naturally contain moisture; moisture content may fluctuate during the year and is dependent on creek flows, groundwater elevation, and other local conditions. The moisture content of in-situ soils will be higher than the moisture content of excavated sediments, due to the natural process of evaporation and infiltration.

Analysis of moisture content is required for Class III landfill acceptance for wet soils. In addition, it is necessary to measure the moisture content in order to determine the dry weight concentrations of constituents within the sediment.

Selected Test Method and Frequency of Testing

All samples except residual sediment samples shall be analyzed for moisture content by EPA Method 160.3 or the most current prescribed method.

Toxicity

Creek sediments may be toxic due to nonpoint source pollutants which may have been deposited into the creeks. Toxicity is of concern if the sediment is to be reused. Sediment toxicity test will be conducted only on composite samples from sites where the waters may not be controlled during sediment removal operations due to tidal action; therefore toxicity sampling shall only be conducted on sediment removal projects which would not divert the water around the project site during excavation.

Selected Test Method and Frequency of Testing

All samples in tidal areas only, except residual sediment samples, shall be tested for toxicity by means of a toxicity screening bioassay, by the test method specified in California Code of Regulations, Title 22. The samples will be tested using Eohaustorius estuarius species, unless otherwise specified by the EPA.

Methyl-Mercury Testing

Past mining operations allowed mining tailing and debris discharge to some creeks and this has increased mercury levels in sediments and soils in those watersheds, specifically the Guadalupe Watershed.

Selected Test Method and Frequency of Testing

Only the following creeks will be required to have the additional analysis of methyl mercury be performed for all composite samples, in accordance with EPA 1630:

Alamitos Creek
Guadalupe Creek
Guadalupe River
Los Gatos Creek
Randol Creek.

Quality Control

A QA/QC plan is an important component of a monitoring program involving extensive field sampling and laboratory analyses. The two objectives of the QA/QC plan are: 1) to provide a means of ongoing control and evaluation of the sampling and analysis procedures; and 2) to quantify data precision and accuracy for use in data interpretation. Duplicate samples are no longer required. The QA/QC plan will be followed in all phases of the monitoring program including sampling and validation reporting. QA/QC requirements are noted below.

The District will utilize a sampling contractor or internal staff to conduct field sampling. The assigned field staff and/or contractor will be responsible for managing all field sampling equipment. The actual assignment of sampling areas and analysis are given to the sampling staff by the Stream Maintenance Program Project Manager (PM). Verification of equipment, analysis, chain of custodies, etc. will also be conducted by the PM.

All equipment used for field sampling will be kept in good working order and as required, will be tested and/or calibrated before leaving the office. Verification of working order/calibration (if necessary) should be re-verified, visually, upon arrival at the site to ensure the instruments are in proper working condition.

Laboratory

Whichever laboratory is used to perform analysis under this sediment sampling plan, they must be certified by the State of California Department of Health Services under the Environmental Laboratory Accreditation Program. For sub-labs that are out of state, they must hold current certification in their state's accreditation program. Further, the contract lab is required to perform their own quality control tests with the results published in the final lab report.

Reporting

Upon receipt of the analytical results from the laboratory, the District will submit the results to the Water Board and request approval for reuse as described below.

The District shall attempt to compile the results in 2 to 3 submittals to the Water Board

1. For ease of review, only the contaminants that test above the Water Board's Table 4 detection limits will be reported to the Water Board.

2. The entirety of the results, for detected and non-detected, shall be maintained in the District's database and made available upon request. Further, the signed lab copy of the results shall be maintained for no less than 3 years by the District
3. For project site sediments that are going to landfill, the Water Board is only required to approve the removal of the material as the landfill will approve acceptance to their disposal facility.

Table 4: Recommended Sediment Chemistry Screening Guidelines for Beneficial Reuse of Dredged

ANALYTE	Wetland Surface Material		Wetland Foundation Material	
	Concentration	Decision Basis	Concentration	Decision Basis
METALS (mg/kg)				
Arsenic	15.3	Ambient Values	70	ER-M
Cadmium	0.33	Ambient Values	9.6	ER-M
Chromium	112	Ambient Values	370	ER-M
Copper	68.1	Ambient Values	270	ER-M
Lead	43.2	Ambient Values	218	ER-M
Mercury	0.43	Ambient Values	0.7	ER-M
Nickel	112	Ambient Values	120	ER-M
Selenium	0.64	Ambient Values		
Silver	0.58	Ambient Values	3.7	ER-M
Zinc	158	Ambient Values	410	ER-M
ORGANOCHLORINE PESTICIDES/PCBS (µg/kg)				
DDTS, sum	7.0	Ambient Values	46.1	ER-M
Chlordanes, sum	2.3	TEL	4.8	PEL
Dieldrin	0.72	TEL	4.3	PEL
Hexachlorocyclohexane, sum	0.78	Ambient Values		
Hexachlorobenzene	0.485	Ambient Values		
PCBs, sum	22.7	ER-L	180	ER-M
POLYCYCLIC AROMATIC HYDROCARBONS (µg/kg)				
PAHs, total	3,390	Ambient Values	44,792	ER-M
Low molecular weight PAHs, sum	434	Ambient Values	3,160	ER-M
High molecular weight PAHs, sum	3,060	Ambient Values	9,600	ER-M
1-Methylnaphthalene	12.1	Ambient Values		
1-Methylphenanthrene	31.7	Ambient Values		
2,3,5-Trimethylnaphthalene	9.8	Ambient Values		
2,6-Dimethylnaphthalene	12.1	Ambient Values		
2-Methylnaphthalene	19.4	Ambient Values	670	ER-M
2-Methylphenanthrene		Ambient Values		
3-Methylphenanthrene		Ambient Values		
Acenaphthene	26.0	Ambient Values	500	ER-M
Acenaphthylene	88.0	Ambient Values	640	ER-M
Anthracene	88.0	Ambient Values	1,100	ER-M
Benz(a)anthracene	412	Ambient Values	1,600	ER-M
Benzo(a)pyrene	371	Ambient Values	1,600	ER-M
Benzo(e)pyrene	294	Ambient Values		
Benzo(b)fluoranthene	371	Ambient Values		
Benzo(g,h,i)perylene	310	Ambient Values		
Benzo(k)fluoranthene	258	Ambient Values		
Biphenyl	12.9	Ambient Values		
Chrysene	289	Ambient Values	2,800	ER-M
Dibenz(a,h)anthracene	32.7	Ambient Values	260	ER-M
Fluoranthene	514	Ambient Values	5,100	ER-M
Fluorene	25.3	Ambient Values	540	ER-M
Indeno(1,2,3-c,d)pyrene	382	Ambient Values		
Naphthalene	55.8	Ambient Values	2,100	ER-M
Perylene	145	Ambient Values		
Phenanthrene	237	Ambient Values	1,500	ER-M
Pyrene	665	Ambient Values	2,600	ER-M

ATTACHMENT H

Water Quality Monitoring Plan

WATER QUALITY MONITORING PLAN

FOR THE
SANTA CLARA VALLEY WATER DISTRICT
MULTI-YEAR STREAM MAINTENANCE PROGRAM

Revised by

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Stream Maintenance Program Unit

Under the Direction of

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Deputy Operating Officer
Watershed Operations and Maintenance Division

November 2013

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Introduction

The purpose of the Stream Maintenance Program (SMP) is to alleviate local flooding problems and to meet the requirements of the Federal Emergency Management Agency for flood protection. To ensure compliance with the San Francisco Bay and Central Coast Regional Water Quality Control Boards' (Water Board) Waste Discharge Requirements (WDRs) field water quality parameters will be measured/observed by the Santa Clara Valley Water District (District) during SMP operations using active diversions, which include pH, turbidity, temperature and dissolved oxygen. This plan has been revised based on field conditions encountered during the years of operation of the SMP.

Purpose

The purpose of the Water Quality Monitoring Plan (Plan) is to verify and document compliance with the requirements and prohibitions established by the Water Board as specified in the WDRs. This includes field/data reporting forms, sample collection, and formal reports to the Water Board. A water quality monitoring report will be submitted to the Water Board and other agencies/organizations (if requested) after the completion of each year's active diversion operations, in accordance with the Water Board's WDRs.

Scope

The scope of this plan is to outline the process, means and verification of monitoring water quality during SMP projects that use active diversions for all 4 authorized types of construction (Bank Protection, Minor Maintenance, Vegetation Management and Sediment Removal).

Definition of Terms

Grab sample: an individual sample collected in a short period of time not exceeding 15 minutes. They are to be used primarily in determining compliance with effluent and receiving water limits. Grab samples only represent the condition that exists at the time the water and effluent are collected.

Point of discharge: the location point at which water diverted around the active site is discharged into **tidal or non-tidal** waters of the State.

Active site: the confine of a SMP activity occurring on a waterway in which a pump is being used to divert water around the project site.

Duly authorized representative: one who is

a. Authorization is made in writing by a principal executive officer, or

b. Authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity (e.g., field supervisor, project manager, chief engineer).

Downstream discharge/Effluent water: the water that flows out of a diversion, the discharged water (passive or active diversion).

Upstream water: water from a river or stream that is being diverted around a project site, from the upper end of the project site.

Receiving water: any water body that actually or potentially receives surface or ground water at the point of discharge, which passes over, through, or under dredged sediment during placement, dewatering, settling/consolidation, and excavation/removal activities – the water body that receives the discharge.

Active diversion: any method of diverting water around a project site other than non-mechanical means.

Passive diversion: the method of diverting water around a project site using no mechanical means. As well, working in channel where the project is being conducted outside of the live stream because of a natural buffer, such as excavating in pockets of sediment, will be considered a passive diversion.

Specifications for Sampling and Analyses

The District will perform sampling and analyses in accordance with the following conditions and requirements included in the WDRs issued by the Water Boards. Two types of data collection will be conducted at the sites - water quality observations and water quality analyses using field instruments. No laboratory analyses will be conducted.

Water Quality Standard Observations:

Standard observations of surface water conditions shall be conducted upstream and downstream of the active project area to visually detect impacts of the water diversion. The following standard observations of the receiving waters will be collected on every day of operation on the field reporting form (Appendix A):

1. Floating and suspended materials of waste origin (to include, but not limited to, oil, grease, or other material that may come from the diversion/project site) presence or absence and size of the affected area.
2. Discoloration and turbidity: description of color, source, distance of travel and wind direction
3. Odor: presence or absence, characterization, source, distance of travel, and wind direction
4. Hydrographic condition including: depth of water columns, sampling depths, time and height of corrected low and high tides
5. Weather condition including: air temperature, wind direction and velocity (speed), and precipitation

Water Quality Analysis using Field Instruments:

Water Quality Testing:

Water Quality data will be collected by direct immersion of the instrument probe into the water column, or directly immersed into collection apparatus. The sample will be immediately analyzed on site for constituents in Table 1. Samples shall be collected with accurately calibrated field measurement instrument(s) and the results logged.

Table 1

Constituents	**Type of Sample**	**Units**
Turbidity	Grab/Dip	NTUs
pH	Grab/Dip	Not Applicable
Dissolved Oxygen	Grab/Dip	mg/l
Temperature	Grab/Dip	Degrees Fahrenheit

Water Quality Testing Locations

Samples will be collected at a distance of 100 feet (or at a location that is most representative of the typical undisturbed condition) upstream of the beginning of the active diversion and 100 feet (or at a location that is most representative of surface water affected by the diversion) directly downstream from the point of discharge into the receiving water of the non-tidal sites. For tidal sites, water samples will be collected only at the point of discharge on the receiving waters (with no upstream collection). The samples will not be taken during a rainstorm event or subsequent runoff event. For sites that straddle both freshwater and tidal areas, tidal sampling protocol will be followed. Samples of the discharge from temporary storage sites (if utilized) are to be collected as near as possible to the point of discharge without compromising the safety of personnel. Wherever possible, the probes will collect data from 1 foot below the surface (tidal and non-tidal sites)

Water Quality Testing Frequency

At every active diversion site, water quality samples shall be collected at least twice daily. Each sample set collected at the upstream and downstream locations must be taken within no more than a half an hour of each other (unless limiting circumstance exists, such as creek access over long creek reaches).

Background Sampling (pre-construction baseline sampling):

Prior to the installation of an active diversion and/or its components, at least 1 day of background water samples (two samples per day evenly spaced during working hours) will be collected from the established testing locations. If there is a change in stream conditions (eg. storm

event) while there is a shutdown of the active diversion, new baseline sampling shall be conducted.

Operational Sampling:

Water quality samples will be collected from the established testing locations at the active diversion sites, at least two samples per day, evenly spaced during the work hours, with the first sample collected no earlier than 1 hour after work has commenced each day.

Background Sampling (post-construction baseline sampling):

After the removal of an active diversion and/or its components (either/or when pumps are shutoff and water is reintroduced into the project site), at least 1 day of background water samples (two samples per day evenly spaced during working hours) will be collected from the established testing location upstream of the planned placement of the active diversion. The samples will be representative of typical undisturbed conditions and will not be taken during a rainstorm or subsequent runoff event.

Stock Pile Sampling

Water draining from a temporary sediment stockpile will be sampled on every day that there is a discharge which enters into a live stream. Sampling will be conducted at all points of discharge/runoff. Stockpile(s) must meet SMP Best Management Practices and Water Board – Permit Condition standards. The sample will be immediately analyzed on site for constituents in Table 1.

What is an Exceedance?

An exceedance is where the receiving (downstream) water quality sample result for constituent(s) analyzed on site show an exceedance of the upstream water sample results, as specified in Table 2.

TABLE 2

Parameter	**Exceedance Limit**
pH	>0.5 units deviation from background (upstream)
Dissolved Oxygen	minimum of 5.0 mg/l for tidal waters or non-tidal warm water Minimum 7.0 mg/l for non-tidal cold waters *or* no change if background <5.0 mg/l
Turbidity	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal

	background light penetration or turbidity relatable to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50 NTU.
Temperature	The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above the natural receiving water temperature

What to do if there is an Exceedance

If any water quality monitoring sample results in an exceedance, then the District will implement the following process to correct the exceedance:

1. Upon discovery of an exceedance, the District shall identify the source of the exceedance and immediately implement procedures to correct the source of the exceedance. Equipment and supplies shall be on-site (or readily available nearby) that could be quickly deployed to provide additional filtration if turbidity is observed. These supplies may include the following options: bladders for settling, filter bags and pumps, silt filter dams, or silt barrier as appropriate depending on site conditions.
2. A report to the Water Board case manager shall be made by telephone of any exceedances of whatever origin immediately after it is discovered.
3. Confirmation samples will be taken within two (2) hours following the exceedance.
4. The District shall stop all work at the site for exceedances lasting longer than two hours. The District shall update the Water Board staff of site conditions and the corrective actions that are taken.
5. Sampling every 2 hours will continue until the exceedance has been corrected. All constituents will continue to be monitored.
6. If all exceedances have been eliminated within four (4) hours of confirmation, work may proceed at the site, and the Regional Board case manager will be notified.
7. The District shall notify Water Board staff in writing within five calendar days of all exceedances. An electronic mail report shall include the following information: time and date of incident, duration, estimate of discharge or bypass volume exceedance, and documentation of sampling results/observations determining compliance status. The report shall also include detailed discussion of reasons for non-compliance, and specific steps that were or will be taken to correct the failure and prevent it from reoccurring.

Exceedance Reporting

A report to the Executive Officer and Water Board case manager shall be made by telephone of any exceedances of whatever origin immediately after it is discovered. A written report shall be filed with the Water Board within five calendar days and shall include the following information:

a. A map showing the location(s) of exceedances(s);
b. Approximate flow rate;
c. Nature of effects, i.e., all pertinent observations and analyses; and
d. Corrective measures underway or proposed.

Records to be Maintained

Written reports, calibration and maintenance records, and other records shall be maintained by the District and accessible at all times. Records shall be kept at the District for a minimum of 5 years. This period of retention shall be extended during the course of any unresolved litigation regarding this exceedance or when requested by the Water Board. Records shall include notes and observations for each sample as follows:

a. Identification of sampling site by creek name, cross street, and item number (if available from the annual reports).

b. Date and time of sampling.

c. Date and time analyses are started and completed and the name of person conducting analyses.

f. Data and results of analyses and/or observations.

Records shall include a map or maps of the site showing the location of the project(s) and water sampling locations, coffer dams, discharge pipes, access ramps, etc.

Quality Assurance and Quality Control

The QA/QC portion of the WDRs is an important component of the Plan involving, at the core of compliance, quality assurance of field sampling. As such, this section describes the two major elements of the QA/QC plan which are (1) field sampling to ensure compliance with WDRs criteria and (2) reporting of that compliance.

District utilizes sampling contractors and/or internal staff to conduct water quality sampling for the SMP projects. These monitors will use District approved field sampling instruments and sampling equipment. As field sampling is the ultimate means of ensuring compliance with WDRs requirements, it is imperative to have operating procedures that show the field sampling is being conducted in a manner that will collect analysis in an accurate way. In order to do this, the following criteria must be followed:

1. All personnel conducting water quality monitoring must read the relevant SMP best management practices, this WDRs plan, the Boards' Orders , and manufacture calibration/instruction manuals for all sampling instruments used.
2. The SMP Project Manger must train personnel conducting this activity on all aspects of water quality monitoring.
3. Verification document signed that the relevant documents have been read and additional training has occurred.

All this documentation will be held with the SMP Project Manager (PM), for a period of five years. Further, all equipment will be tested and calibrated, in accordance with the equipment's manufacture requirements, at least once a week to ensure the instruments are in proper working condition.

The reporting of the compliance/non-compliance of each project meeting the WDRs criteria is captured in an end of season report that is submitted to the Water Board, see "Final Water Quality Monitoring Report, attachments to the WDR and the District's SMP Program Manual".

Reporting

Responsible Entity

The SMP PM is responsible for implementing this Plan as required in the WDRs issued by the Water Board for the SMP. The PM will evaluate the data for compliance with the requirements of the WDRs and will inform the Watershed Field Operations of any non-compliance event in order for them to take immediate corrective action.

Reports to the Water Board

Permit Exceedances

The District shall notify the Water Board staff in electronic mail within five calendar days of all exceedances. Written reports shall include time and date of incident, duration, estimate of discharge or bypass volume exceedances, and documentation of sampling results/observations determining compliance status. The report shall also include detailed discussions of reasons for non-compliance and specific steps that were or will be taken to correct the failure and prevent it from re-occurring.

Final Monitoring Report

Upon completion of active diversion activities, a draft annual monitoring report will be filed with the Water Boards within 60 days of completion of all work, permitted activities end no later than December 31st.

The report will include:

1. Certification Statement
2. Introduction

3. Compliance Summary
4. Purpose and Scope
5. Description of Work Performed
6. Water Quality Sampling Data by Individual Site
7. Maps – County level showing where monitoring activities occurred

Embedded within these sections:

1. A transmittal letter which includes a summary of all violations of WDRs, any changes to the project design, and any unplanned releases or failures that occurred during the active diversion operations.
2. The report shall provide: the magnitude of the releases or failures; any discharge limit exceedances; dates of all exceedances, cause of the failure, releases or other violations; any corrective actions taken or planned; and the dates of completion of corrective action.

Final Report

Within 30 days after receipt of agency comments on the draft report, a final monitoring report will be filed with the Water Boards. The final report will be signed by the Chief Operating Officer of the Watersheds or a duly authorized representative of that person.

Field Reporting Forms

Stream Maintenance Program Data Reporting Form

Creek Name/Item Number	Sample Date/Time	Direction	Turbidity	Dissolved Oxygen	pH	Temperature	Activity Monitored

Stream Maintenance Program Calibration Form

Instrument Identification	Time of Calibration	Date of Calibration	Issues

Field Observation Reporting Form

Site Information

Site Name	Site Location	Date

Standard Observations

Weather

Air Temperature	Precipitation (Heavy/Light)	Wind Direction/Speed

Visual

Floating Suspended Materials — Present Absent

Turbidity/Discoloration — Present Absent

If present, what is the suspected source?

Water Depth — U/S D/S

If present, Site Foreman Notified? _____ Time/Name_____

Odor

Present Absent

If present, describe suspected source and estimate of affected area (wind direction and travel distance)

If present, Site Foreman Notified? _____ Time/Name_____

Flow (FOR NON TIDAL SITES)

Estimated rate (cubic feet per second)

Tides (FOR TIDAL SITES) from NOAA tide chart

Time	Height

ATTACHMENT I

Steelhead Impact Minimization Measures

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Steelhead Impact Minimization Measures

The following measures will be applied to sediment removal and bank stabilization projects that occur in anadromous salmonid channels. These measures will be performed in the anadromous salmonid streams within the SMP area (Table 1).

Table 1. Anadromous salmonid creeks within the Stream Maintenance Program area**.**

Alamitos Creek	Little Arthur Creek[1]	San Francisquito Creek
Arroyo Aguague[1]	Llagas Creek	South Fork Pacheco Creek[1]
Bodfish Creek	Los Gatos Creek	Stevens Creek
Calero Creek	Los Trancos Creek[1]	Tar Creek[1]
Cedar Creek[1]	Pacheco Creek[1]	Upper Penitencia Creek
Coyote Creek	Pajaro River	Uvas/Carnadero Creek
Guadalupe River/Creek	Pescadero Creek[1]	

[1] Although work is not expected on these creeks, they are within the SMP project area and are therefore included here.

1. Mitigation Site Identification

1.1 Coarse Sediment Augmentation Site Identification

During the first 2 years of SMP-2, the SCVWD will collaborate with the resource agencies to conduct a survey of potential locations for gravel augmentation in each of the following salmonid occupied watersheds: Alamitos Creek, Guadalupe Creek, Los Gatos Creek, Guadalupe River, Upper Penitencia Creek, Coyote Creek, Stevens Creek, and San Francisquito Creek. Based on this survey, the SCVWD will develop a list of coarse sediment augmentation sites. The SCVWD will then prepare design plans in collaboration with the resource agencies. Sites for coarse sediment augmentation may be combined with instream habitat mitigation sites. The resource agencies may approve any or all of the projects on the list. The SCVWD may supplement the approved list at any time, pending the approval of the resource agencies. Sites for coarse sediment augmentation may occur in locations where finer sediments need to be removed.

1.2 Instream Habitat Complexity Mitigation Site Identification

During the first 2 years of SMP-2, the SCVWD will collaborate with the resource agencies to conduct a survey of potential locations for instream habitat complexity in each of the following salmonid occupied watersheds: Alamitos Creek, Guadalupe Creek, Los Gatos Creek, Guadalupe River, Upper Penitencia Creek, Coyote Creek, Stevens Creek, and San Francisquito Creek. Based on this survey, the SCVWD will develop a list of instream habitat complexity sites. The SCVWD will then prepare 50-90 percent design plans in collaboration with the resource agencies. Sites for instream habitat complexity may be combined with coarse sediment augmentation mitigation sites. The resource agencies may approve any or all of the projects on the list. The SCVWD may supplement the approved list at any time, pending the approval of the resource agencies.

1.3 Mitigation Plan Elements

The SCVWD in collaboration with the resource agencies will develop mitigation designs for off-site coarse sediment augmentation and instream habitat complexity projects. Coarse sediment augmentation and instream habitat complexity features may be combined into the same project. The mitigation designs will include the objectives for each project. The specific information included in the mitigation designs will include: affected watershed, location (stream, reach), pre-project site assessment, methods for coarse sediment placement, timing of coarse sediment placement, dewatering plan (if needed), proposed success criteria, and a monitoring plan. The monitoring plan will establish the type of monitoring to be conducted, the timing of the monitoring to be conducted, the duration of the monitoring to be conducted and adaptive management alternatives if the success criteria are not met. The SCVWD will include off-site coarse sediment augmentation projects and instream habitat complexity sites in the NPW prior to implementation.

For projects where coarse sediment replacement occurs on-site, the SCVWD will develop mitigation designs which include all of the components listed above. These on-site coarse sediment replacement and instream complexity projects will be submitted in the NPW for review and approval by the agencies. Mitigation proposed on-site or within sites closer to the project impact site, are desirable as they provide direct instream benefits closer to the area of impact and are therefore replacing loss features within a similar channel reach in which they have been displaced. This provides a higher level of benefit to the species within that reach of channel. Sites will not be chosen for coarse sediment augmentation if sediment removal is anticipated to occur more than twice in the 10-year SMP-2.

2 Coarse Sediment Augmentation

2.1 Project Assessments

2.1.1 Pre-project Coarse Sediment Assessment

The qualified biologist will conduct a surface assessment of the affected reach of channel to determine the location and quantity of coarse sediment (gravel and cobble [12.5 to 250 mm in diameter]) that may be removed by the proposed project. Patches of coarse sediment equal to or greater than 10 square feet, 0.5 foot thick, and containing more gravel than sand, will be mapped with GPS coordinates and the surface area measured. For coarse substrate within the project site, a map, diagram (i.e., hand sketch), or table will be prepared indicating the number and location of coarse sediment patches within the channel project site. Photographs of the project site will be taken to show the patches of coarse sediment areas. Patches of coarse sediment meeting the measurements stated above, will be multiplied by 1.5 feet to calculate the volume of coarse substrate to be mitigated. The pre-project assessment results will be submitted in the NPW.

2.1.2 Post –project Coarse Sediment Assessment

At the completion of the sediment removal project a qualified biologist will conduct a post-project assessment of the surface gravels within the project area using the same methods as the pre-project assessment. Patches of coarse sediment equal to or greater than 10 square feet, 0.5 foot thick, and containing more gravel than sand, will be mapped with GPS coordinates and the surface area measured. For coarse substrate within the project site, a map, diagram (i.e., hand

sketch), or table will be prepared indicating the number and location of coarse sediment patches within the channel. The coarse sediment area remaining onsite will be multiplied by 1.5 to determine the amount of available sediment remaining onsite. Photographs of the project site will be taken to show the patches of coarse sediment areas and will be submitted in the Annual Summary Report (ASR).

2.2 Impact Calculations

2.2.1 Coarse Sediment Removal Impact

The volume of sediment calculated in 2.1.1 will be the estimated volume of coarse sediment needed for mitigation for each sediment removal project. Each sediment removal project within individual watersheds will be added together to determine the amount of coarse sediment mitigation required for that watershed. The SCVWD will then select sites from the list of coarse sediment augmentation sites, or newly proposed sites, to meet the quantity of coarse sediment needed to offset the debt.

The estimated volume of coarse sediment required for mitigation may decrease based upon the post-project assessment. Where the areas of sediment removal is less than indicated in the pre-project assessment, the volume of coarse sediment in the areas of sediment not removed will be subtracted from the debt calculation. Where coarse sediment remains in areas where sediment was removed, the volume of sediment will be considered a watershed enhancement. At the end of the season, the coarse sediment debts in each watershed will be added up and the volume of coarse sediments not removed will be subtracted from the volume of sediment placed at augmentation sites. Where the SCVWD has placed more coarse sediments than it removed, the difference will be credited to the SCVWD in subsequent years.

2.3 Coarse Sediment Mitigation and Monitoring

2.3.1 Coarse Sediment Augmentation

To mitigate for the loss of coarse sediment, the SCVWD, in the NPW, will propose to augment coarse sediment at one or more of the sites on the approved coarse sediment augmentation list. The SCVWD may propose to add sites to the approved list at any time. Additional sites will be reviewed and approved by the resource agencies. In addition, the SCVWD may propose to use sediment removal sites for coarse sediment augmentation provided all the elements listed in section 1.3 are included in the submittal. All sites proposed for gravel augmentation will be included in the NPW.The sites selected for mitigation, either from the coarse sediment augmentation site list or as proposed in the annual NPW, will be in the same watershed where the impact occurs. The amount of coarse sediment augmentation will be commensurate with the volume of coarse sediment removed from the watershed that year.

2.3.2 Monitoring Coarse Sediment Augmentation

Sites used for coarse sediment augmentation will be monitored according to the monitoring plan described in the approved design plans and submitted in the NPW for review.

3 Instream Habitat Complexity Features Requirements

3.1 Instream Habitat Complexity Feature Assessments

3.1.1 Pre-Project Assessment of Instream Habitat Complexity Features.

A habitat assessment will be conducted at sediment removal sites that occur below the bankfull elevation and at bank stabilization sites on salmonid streams. The habitat assessment will be conducted by a qualified biologist during the late winter or spring months. Habitat complexity features may include the following:

1. Channel bed area with large cobble (defined as substrate with a medium diameter of 6 to12 inches).
2. Boulders (defined as substrate with medium diameter of 12 inches or greater)
3. Shrub or tree root mass
4. Tree branches or collection of floating and submerged branches/vegetation (branches with diameter less than 12 inches, any length)
5. Large woody debris (greater than 12 inches in diameter, any length)
6. Undercut bank
7. Surface turbidity/bubble curtain

If the site is a perennial stream or contains water during the survey the qualified biologist will conduct a level 3 Habitat Typing (Flosi et al., 2010) methods. The habitat assessment area will include the entire proposed project site and extend upstream and downstream 5 times the in-channel width, or up to a maximum of 300 feet. The habitat complexity assessment will be conducted during the late winter or spring of the year. For habitat complexity features within the project site, a map, diagram (i.e, hand sketch), or table will be prepared listing each of the habitat features, the surface area, location and function. This includes all features within the SMP project site, both those that are expected to be impacted by the SMP activity and those not expected to be impacted. Photographs will also be taken of the site and features. The pre-project assessment results will be submitted in the NPW. If the site does not contain flowing water during the survey, a SCVWD biologist will assess the length of the project site to identify the above habitat complexity features.

Assessments will not be conducted at sediment removal projects at fish ladders, stream gauges, Sediment Depositional Reaches (SDRs), outfalls, or at sediment removal sites needed for fish passage.

3.1.2 Post-project Habitat Complexity Features Assessment for Sediment Removal

Post project habitat complexity assessments for sediment removal will use the same methods as the pre-project assessment.

3.1.3 Post-project Habitat Complexity Features Assessment for Bank Stabilization Projects

A post project assessment will be conducted by a qualified biologist using level 3 Habitat Typing (Flosi et al., 2010) methods. The habitat assessment area will be conducted along the length of the project site. The post project assessment will include sufficient documentation to determine the retention or loss of the pre-project habitat complexity. The post-project survey will also present all habitat/bioengineering features of the bank stabilization project that have been constructed to benefit aquatic habitat at the project site. A diagram (i.e. hand sketch) and

photographs will be taken of the site and used to illustrate the conditions. The post-project assessment report will include a table identifying the habitat complexity feature, the surface area, location, and function of the habitat features on-site.

3.2 Determination of the Extent of Impact and Mitigation Requirement

3.2.1 Instream Habitat Complexity Feature Impacts from Bank Stabilization and Sediment Removal Projects.

If the pre-project survey indicates the potential loss of instream habitat complexity features, the surface area of the features, type of features, the location of the features in the channel and other characteristics will be used to estimate the area and value of features to be impacted.

3.2.2 Instream Habitat Complexity Features Mitigation For Sediment Removal

To mitigate for the loss of the instream complexity features, the SCVWD will propose to construct one or more habitat mitigation projects from the list of projects described in section 1. above for each watershed where there are SMP project impacts. The habitat value of the mitigation projects installed within each watershed will be commensurate with the habitat value of the features anticipated to be impacted that year.

Where the post-project assessment identifies instream habitat complexity features that may be impacted by the project, the post project assessment will identify the features that remain on-site following construction. The value of habitat complexity features remaining on-site following construction will be used to offset the value of mitigation required.

3.2.3 Instream Habitat Complexity Features Mitigation For Bank Stabilization Projects

The proposed bank stabilization design must incorporate, at minimum, habitat enhancement features to compensate for the loss of pre-project habitat complexity features. Since most bank stabilization projects are proposed at sites with active erosion, the project sites commonly have exposed soil with little to no vegetation. It is expected that SMP bank stabilization projects will generally be designed with bioengineering methods that have the ability to address both bank protection and restore habitat values to the sites' pre-erosion conditions. It is not sufficient for the SMP project design to restore on-site habitat values to the existing eroded bank condition. The NPW will provide the bank stabilization design and incorporate features to restore habitat conditions of the site to pre-erosion conditions, at minimum.

If the proposed bank stabilization design does not self-mitigate for the loss of existing instream complexity features, the SCVWD will propose to construct one or more of the instream habitat complexity features from the approved list developed above. The instream habitat complexity feature will be located in the same watershed as the SMP bank stabilization project impact.

3.3 Monitoring

3.3.1 Monitoring Instream Habitat Complexity Features

Sites used for coarse sediment augmentation will be monitored according to the monitoring plan developed per project site and described in the approved design plans.