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BIOLOGICAL AND ESSENTIAL FISH HABITAT ASSESSMENT FOR THE SAN FRANCISQUITO CREEK FLOOD REDUCTION, ECOSYSTEM RESTORATION, AND RECREATION PROJECT SAN FRANCISCO BAY TO HIGHWAY 101

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Contents

Tables and Figures

Acronyms and Abbreviations

BA	biological assessment
BAAQMD	Bay Area Air Quality Management District
BMPs	Best Management Practices
Cal/OSHA	California Division of Occupational Safety and Health
Caltrans facility	U.S. 101/East Bayshore Road Bridge over San Francisquito Creek
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
Creek	San Francisquito Creek
District	Santa Clara Valley Water District
DPS	distinct population segment
DWR	California Department of Water Resources
EFH	Essential Fish Habitat
F	degrees Fahrenheit
FMP	Fishery Management Plans
FR	Federal Register
Golf Course	Palo Alto Municipal Golf Course
LDS	light-duty steel
MHHW	mean higher high water
MMP	Mitigation and Monitoring Plan
MS4s	municipal separate storm sewer systems
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
Palo Alto Airport	Palo Alto Airport of Santa Clara County
PCEs	primary constituent elements
PG&E	Pacific Gas & Electric
PRBO	Point Reyes Bird Observatory

Project	the San Francisquito Creek Flood Reduction, Ecosystem Restoration, and Recreation Project San Francisco Bay to Highway 101 Project
ROW	right-of-way
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SFCJPA	San Francisquito Creek Joint Powers Authority
SLR	Sea Level Rise
SMP	Stream Maintenance Program
SM-STOPPP	San Mateo Countywide Stormwater Pollution Prevention Program
SWPPP	Storm Water Pollution Prevention Plan
USC	U.S. Government Code
USFWS	U.S. Fish and Wildlife Service
WESCO	Western Ecological Services CompanyO

Draft Biological and Essential Fish Habitat Assessment for the San Francisquito Creek Flood Reduction, Ecosystem Restoration, and Recreation Project San Francisco Bay to Highway 101

Introduction

This biological assessment (BA) and Essential Fish Habitat (EFH) Assessment has been prepared to support consultation with U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). It documents the effects that the San Francisquito Creek Flood Reduction, Ecosystem Restoration, and Recreation Project San Francisco Bay to Highway 101 Project (Project) may have on any threatened or endangered species, critical habitat, and EFH that may occur in the action area.

This BA has been prepared in compliance with legal requirements set forth under Section 7 of the ESA of 1973 (U.S. Government Code [USC] Title 16, Section 1536 [16 USC 1536]). The BA has been prepared with the following objectives.

- To provide information to USFWS and NMFS about results of biological resource field surveys conducted along the route of the proposed action.
- To determine whether the wildlife species addressed in the BA are likely to be adversely affected by the proposed action.
- To determine whether designated or proposed critical habitat and EFH would be adversely modified by the proposed action.
- To describe conservation measures for the proposed action that would avoid Project effects on these species and their habitats.
- To determine whether formal consultation with USFWS and/or NMFS is necessary.

Project Description

Project Location

The San Francisquito Creek (Creek) watershed encompasses a 45-square-mile basin, extending from Skyline Boulevard to San Francisco Bay. The watershed encompasses public and private lands in the Cities of East Palo Alto, Menlo Park, Palo Alto, Portola Valley, and Woodside; the unincorporated areas of San Mateo and Santa Clara counties; and Stanford University. The San Francisquito Creek floodplain, which has almost no overlap with the watershed, comprises almost 5 square miles.

San Francisquito Creek represents the boundary between San Mateo and Santa Clara counties in the lower watershed. The last relatively unaltered urban creek system in the South Bay, San Francisquito Creek begins at the confluence of Corte Madera Creek and Bear Creek, just below Searsville Lake in Stanford University's Jasper Ridge Biological Preserve. The mouth of the Creek

opens to the San Francisco Bay adjacent to Palo Alto Airport of Santa Clara County (Palo Alto Airport) to the south and the Baylands Nature Preserve to the north. The system contains more than 71 miles of Creek bed; the mainstem is approximately 14 miles long. The Project is focused on the mainstem of the Creek. Figure 1 shows the Project location.

For description purposes, the Project is divided into three reaches. A *reach* is a continuous part of the Creek between two specified points. The Project reach as a whole is from San Francisco Bay to East Bayshore Road. The *lower reach* is from San Francisco Bay to Friendship Bridge, the *middle reach* from Friendship Bridge to Daphne Way, and the *upper reach* from Daphne Way to East Bayshore Road. Additionally, the *right* bank refers to the San Mateo County (East Palo Alto) side of the Creek and the *left* bank refers to the Santa Clara County (Palo Alto) side of the Creek. Figure 2 shows the Project reaches and identifies the left and right banks.

Action Area

The action area includes "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action" (50 Code of Federal Regulations [CFR] §402.02). For this Project, the action area includes the channel banks and bottom from approximately 200 feet upstream of East Bayshore and Highway 101 Bridge to approximately 500 feet into San Francisco Bay. It is assumed that suspended sediments generated during the construction and breaching of levees would settle or become diluted in the channel at a distance of approximately 500 feet downstream of the levee degrade.

The action area is located in southeastern San Mateo County and northwestern Santa Clara County, on the eastern edge of East Palo Alto. The 210.0-acre action area is situated in an alluvial plain, alluvial fan, and tidal marsh area. The Palo Alto Municipal Golf Course (Golf Course) and Palo Alto Airport are adjacent to the eastern and southern boundaries of the action area. San Francisco Bay is to the east, and residential areas and tidal marshes are to the north. The western edge is formed by East Bayshore Road. San Francisquito Creek enters the action area immediately east of U.S. 101. Consistent with its setting, much of the Creek's length within the action area has been straightened, channelized, or otherwise improved for flood protection, although it remains unlined within constructed levees.

Species and Critical Habitat that Occur or May Occur in the Action Area

The following nine federally listed fish and wildlife species may occur in the action area and may be affected by the Project (U.S. Fish and Wildlife Service 2011b).

- Central California coast steelhead (*Oncorhynchus mykiss*)—threatened.
- Green sturgeon (*Acipsenser medirostris*)—threatened.
- California red-legged frog (*Rana draytonii*)—threatened.
- San Francisco garter snake (*Thamnophis sirtalis tetrataenia*)—endangered.
- Western snowy plover (*Charadrius alexandrines nivosus*)—threatened.
- California clapper rail (*Rallus longirostris obsoletus*)—endangered.

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Figure 1
Project Site

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Figure 2
Project Components

- California least tern (*Sternula antillarum browni*)—endangered.
- Salt marsh harvest mouse (*Reithrodontomys raviventris*)—endangered.
- California seablite (*Suaeda californica*)—endangered.

Species Eliminated from the Consultation

The following eight federally listed species identified as having potential to occur in the region are unlikely to occur within the action area. Their current range is outside the action area, and they have been extirpated from the action area.

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- Bay checkerspot butterfly (*Euphydryas editha bayensis*)—threatened.
- Vernal pool tadpole shrimp (*Lepidurus packardi*)—endangered.
- California tiger salamander (*Ambystoma californiense*) (central population)—threatened.
- Marbled murrelet (*Brachyramphus marmoratus*)—threatened.
- California brown pelican (*Pelecanus occidentalis californicus*)—delisted.

Proposed Action

Project Purpose and Need

The Project would ultimately improve channel capacity for Creek flows coupled with the influence of the tides of San Francisco Bay, including projected Sea Level Rise (SLR), from the downstream face of East Bayshore Road to San Francisco Bay. It would reduce local fluvial flood risks in the action area during storm events, provide the capacity needed for future upstream improvements, increase and improve ecological habitat, and provide for improved recreational opportunities.

Goals and Objectives

The Project's goals are to improve flood protection, habitat, and recreational opportunities within the Project reach, with the following specific objectives:

- Protect properties and infrastructure between East Bayshore Road and the San Francisco Bay from Creek flows resulting from 100-year fluvial flood flows occurring at the same time as a 100-year tide that includes projected sea level rise through 2067.
- Accommodate future flood protection measures that might be constructed upstream of the Project.
- Enhance habitat along the Project reach, particularly habitat for threatened and endangered species.
- Enhance recreational uses.
- Minimize operational and maintenance requirements.

Elements of the Proposed Project

Increasing the Creek's capacity from San Francisco Bay to East Bayshore Road would be achieved by:

- Degrading a portion of an unmaintained levee downstream of Friendship Bridge to allow flood flows from the Creek channel into the Palo Alto Baylands Preserve north of the Creek.
- Excavating sediment deposits within the channel to maximize conveyance.
- Rebuilding levees and relocating a portion of the southern levee to widen the channel to reduce influence of tides and increase channel capacity.
- Constructing floodwalls in the upper reach to increase capacity and maintain consistency with Caltrans' enlargement of the U.S. 101/East Bayshore Road Bridge over San Francisquito Creek (Caltrans facility).

Major Project elements include:

- An overflow terrace at marsh elevation adjacent to the Baylands Preserve.
- Levee setback and improvements to widen the channel and increase levee height and stability between East Palo Alto and the Palo Alto Golf Course.
- Floodwalls in the upper reach downstream of East Bayshore Road.
- Extension of Friendship Bridge via a boardwalk across new marshland within the widened channel.

The majority of the Project elements would occur on properties in Palo Alto and East Palo Alto and owned by the City of Palo Alto; or within Santa Clara Valley Water District (District) or City of East Palo Alto rights-of-way.

The Project elements proposed to improve management of flood flows along the Creek from East Bayshore Road to San Francisco Bay include opening the Creek channel to flow in to the Baylands Preserve, reconfiguring levees, creating a marshplain terrace to convey high flows, installing floodwalls; widening of the Creek channel; and; constructing access roads for maintenance purposes. Project elements are summarized below in Table 1. A detailed overview of each Project component is provided in the sections that follow.

Table 1. Summary of Project Elements

Project Component	Description
Levee and floodwall construction	
Levee lowering on right bank	From the mouth of the Creek at San Francisco Bay to 200 feet downstream of the existing Friendship Bridge. This would allow floodwaters to flow into the Baylands north of San Francisquito Creek.
Levee raising on right bank	From the O'Connor Pump Station tie-in near Friendship Bridge to the floodwall.
Floodwall on right bank	The right floodwall would extend from just downstream of Daphne Way to the end of the Project reach where it would connect with the Caltrans U.S. 101/East Bayshore Road facility.

Project Component	Description
Levee raising on left bank and levee relocation	Levee relocation of the middle reach and a small portion of the upper and lower reaches. The levee would be relocated inland (currently occupied by the Golf Course), creating space on the left bank for a marshplain terrace. Except for a section around the eastern footings of Friendship Bridge, the existing levee along this stretch would be removed.
Floodwall on left bank	The left floodwall would extend from the end of the left levee, along the streambed, around the Palo Alto Pump Station, to the end of the Project reach where it would connect with the Caltrans facility.
Downstream access road on right bank	The right bank downstream access road would be approximately 16 feet wide and extend from the crown of the right levee to street level to just downstream of Daphne Way.
Upstream access road on right bank	The right bank upstream access road would be approximately 12 feet wide and would extend from just downstream of Verbena Drive to the Caltrans facility at East Bayshore Road.
Access road on left bank	The left bank access road would be generally 12 feet wide and would extend from a point downstream of the International School of the Peninsula to the Palo Alto Pump Station. The access road would also be used as a public trail within the City of Palo Alto and would connect to the Baylands Athletic Center.
Friendship Bridge	The existing Friendship Bridge would be retained and extended as a boardwalk from the retained eastern footing across the new marshplain terrace to the relocated left bank levee.
Marshplain restoration	
Downstream of Friendship Bridge on right bank	High-marsh and transitional vegetation would be planted from the edge of the Creek channel to the toe of the levee from just upstream of San Francisco Bay to just downstream of Friendship Bridge.
Upstream of Friendship Bridge on right bank	High-marsh and transitional vegetation would be planted from the edge of the Creek channel to the toe of the levee from just upstream of Friendship Bridge to East Bayshore Road.
Left bank	High-marsh and transitional vegetation would be planted from the edge of the Creek channel to the base of the floodwall or the toe of the levee. In this area the marsh would be planted adjacent to the toe of the cut-and-fill area. The marsh would extend from the point at which the new levee would diverge inland from the existing levee to East Bayshore Road.

Levee, Floodwall, and Access Road Construction

Construction of Project elements would likely occur in two phases. While all Project elements could be constructed at one time if sufficient funding was secured, the two-phase construction methodology is conservatively assumed to be the preferred construction approach. A summary of the anticipated construction methodology, the proposed starting date and duration of each activity, and the equipment to be used during each phase is listed in Table 2.

Table 2. Summary of Construction Methodology, Timing, and Equipment

Project Component	Proposed Starting Date	Activity	Proposed Duration	Equipment

Project Component	Proposed Starting Date	Activity	Proposed Duration	Equipment
Utility Relocation				
PG&E Electricity Transmission	12/2012	Site and road preparation: Trees and brush trimmed in work areas	2 weeks	1 dump truck 1 grader 1 four-door pickup
	12/2012	Wood pole relocation	4 weeks	1 flat-bed truck 3 four-door pickups 3 bucket trucks 3 line trucks 1 rope truck 1 tensioner (on a trailer)
	1/2013	Demolition of wood poles and secondary wire removal	6 days	
	1/2013	Construction of shoo-fly tower at T3	2 weeks	1 pickup 1 four-door pickup 1 2-ton tool truck with air compressor 1 dump truck 1 70-ton crane 1 caterpillar (pile driver) 1 back hoe 1 concrete truck 1 pump truck
	2/2013	Tower raises (T1 and T4)	2 weeks (1 week per tower)	
	3/2013	New tower construction and demolition of T2	4 weeks	
	3/2013	Demolition of shoo-fly	1 day	
	4/2013	Gas line work	4 weeks	2 4-door pickups 1 backhoe 2 flatbed truck
	4/8/2013	directional drilling	2 weeks	1 directional drill rig
PG&E Gas Transmission	4/18/2013	export of material	1 week	2 dump trucks 1 flatbed truck
	4/25/2013	concrete	2 days	1 concrete truck
	4/27/2013	Demobilization	1 week	2 4-door pickups 1 flatbed truck
Phase One—Levees and Excavation				
Site Preparation	1/2013	Mobilization Tree Removal Clearing and Grubbing Stripping Demolition	6 weeks	4 four-door pickups 1 backhoe 1 loader 1 jackhammer 1 flat-bed truck

Project Component	Proposed Starting Date	Activity	Proposed Duration	Equipment
Construction of new left bank levee	4/2013	Site excavation Levee construction Seeding for erosion control	5 weeks	4 four-door pickups 3 excavators 1 backhoe 2 loaders 4–6 dump trucks (20 cy each) 2 water trucks
Removal of old left bank levee	6/2013	Site excavation	3 weeks	4 four-door pickups 3 excavators 1 backhoe 2 loaders 4–6 dump trucks (20 cy each) 2 water trucks
Removal of right bank levee	6/2013	Site excavation Relocation of East Palo Alto sewer line and siphon	2 weeks	4 four-door pickups 3 excavators 1 backhoe 2 loaders 4–6 dump trucks (20 cy each) 2 water trucks
Construction of right bank levee	7/2013	Levee construction Seeding for erosion control	3 weeks	4 four-door pickups 3 excavators 1 backhoe 2 loaders 4–6 dump trucks (20 cy each) 2 water trucks
Construction of downstream access road on right and left banks	8/2013	Site preparation and paving	4 weeks	4 four-door pickups 1 dump truck 1 grader 1 four-door pickup 2 concrete trucks 1 asphalt paver 1 compactor
Friendship Bridge	9/2013	Site excavation Boardwalk construction	6 weeks	4 four-door pickups 1 backhoe 1 loader 1 flat-bed truck
Channel widening and marshplain terracing	6/2013	Site excavation Terracing	10 weeks	4 four-door pickups 3 excavators 1 backhoe 2 loaders 4–6 dump trucks (20 cy each) 2 water trucks

Project Component	Proposed Starting Date	Activity	Proposed Duration	Equipment
Revegetation	9/2013	Installation of irrigation system Revegetation	6 weeks	2 four-door pickups
Phase Two—Floodwalls				
Site Preparation	5/2014	Mobilization Clearing and grubbing	3 weeks	4 four-door pickups 1 backhoe 1 loader 1 jackhammer 1 flat-bed truck
Installation of right and left bank floodwalls	6/2014	Site excavation Preparation of foundation Construction of floodwalls	5 months	4 four-door pickups 1 excavator 1 trencher 1 backhoe 1 loader 1 dump truck 1 grader 2 concrete trucks 1 flat-bed truck
Construction of upstream access road on right and left banks	10/2014	Site preparation and paving	4 weeks	4 four-door pickups 1 dump truck 1 grader 1 four-door pickup 2 concrete trucks 1 asphalt paver 1 compactor
Site Restoration	11/2014	Demobilization	2 weeks	2 four-door pickups 1 loader 1 flat-bed truck

Phase One—Levees and Excavation

This section includes a description of levee modification and relocation and floodwall construction along the Project reach on the right and left banks. Levee modification and relocation would provide several flood protection improvements. For example, lowering the right levee from San Francisco Bay to Friendship Bridge (see discussion below) would allow floodwaters to spill over onto the Baylands located north of the Creek approximately every 2-3 years. Additionally, relocation of the left levee in the middle reach (see discussion below) would allow for the creation of a marshplain terrace on the left bank.

The levee slopes would have a slope of 3H:1V (horizontal:vertical) on the water side and H2:1V on the land side. The levee crowns would be functionally level[1] to accommodate a bicycle/pedestrian path and would generally be 16 feet wide. However, the paths would be 12 feet wide[2] on the left and right banks, respectively, near the International School of the Peninsula and East Palo Alto

[1] Levee crowns would have a 2 percent slope to aid drainage, but would appear and feel functionally level to recreational users.

[2] 10 feet is the minimum bike path width

residences (Figure 2) in order to maximize the width of the streambed where it narrows. The levee elevations would increase from downstream to the upstream Project extent to match the design water surface elevations.

Lower Reach

The right bank levee alterations would begin approximately 250 feet inland from the San Francisco Bay. The existing levee would be lowered to an elevation of 8 feet. The reduction in the levee elevation would continue upstream at this constant elevation to approximately 200 feet downstream of Friendship Bridge. At this point, the levee cut would change to an upward angle of 3:1 and would continue at this slope until it reaches the existing levee, which would remain unchanged. At the O'Connor Pump Station the levee would transition into a short floodwall that would tie into the existing structure of the O'Connor Pump Station.

The left bank levee alterations would begin approximately 460 feet downstream of Friendship Bridge, where the levee would begin to diverge landward from the existing levee starting at an elevation of 16.2 feet and increasing as the improvements move upstream.

Friendship Bridge

The abutments supporting Friendship Bridge would remain unchanged. Adjacent to the existing bridge on the left side of the Creek, the Project would include a marshplain terrace that would be graded to an elevation equal to the mean higher high water[3] (MHHW) tide elevation. This terrace would create a continuous tidal marsh beginning in the lower reach, surrounding Friendship Bridge's southeast approach, and extending upstream along the Creek's left bank. The terrace would be inundated during spring tides and more moderate stream flow events. The left end of Friendship Bridge would stand in the marshplain terrace after the Project was implemented.

A boardwalk would traverse the marsh plain from the left bank and would tie into the abutment on the left end of Friendship Bridge. The boardwalk would be the same width as Friendship Bridge, constructed of a timber deck and concrete piles, and would be designed with consideration to aesthetics that would be consistent with the Palo Alto Baylands Master Plan. The elevation of the low mark of the boardwalk would be set above the highest anticipated flood elevation, with the lowest point of the bridge a minimum of 5 feet above the marshplain terrace beneath it.

Middle Reach

The right levee would be improved to meet USACE standards in the same alignment as the existing levee, minimizing the intrusion of the Project on East Palo Alto residences. Upstream of Friendship Bridge, the right levee would be raised for much of the remaining Project extent.[4] The right levee would be constructed at elevations ranging from 16.5 to approximately 19 feet depending on the design water surface elevation. The right levee would extend for approximately 2,600 feet (0.5 mile), at which point the floodwall would begin, just downstream of Daphne Way (Figure 2). At this point,

[3] The average height of the highest tide in a tidal cycle (referred to as higher high water) over a 19-year period. For shorter periods of observation, corrections are applied to eliminate known variations and reduce the result to the equivalent of a mean 19-year value.

[4] Depending on the results of geotechnical surveys, in some locations, portions of the existing levee could be re-used in the reconstructed levees.

the levee crown would transition into the existing levee but would be designed to accommodate the floodwall that would be constructed during Phase Two. See the discussion under the subheading *Access Roads* for a description of the access road. The description of the floodwall that would be constructed in Phase Two is discussed under *Phase Two–Floodwalls*.

As described above, beginning in the lower reach, slightly downstream of Friendship Bridge, the left levee would be relocated inland from its existing location. Where the Creek turns south, the left levee would be relocated approximately 100 feet or more inland from its existing location and would cut through a portion of the Golf Course. Where the Creek straightens outs, the left levee would begin to converge with the Creek and would be located approximately 50 feet from the existing levee for the remainder of the middle reach. From Friendship Bridge, the levee would vary in elevation depending on the design water surface elevation for approximately 2,500 feet (0.5 mile). At this point, approximately 350 feet north of where the Creek turns west, the levee would transition into the existing levee but would be designed to accommodate the floodwall that would be constructed during Phase Two.

Upper Reach

In the upper reach, the Creek channel would be excavated to the interior toe of the existing right and left bank levees up to the new East Bayshore Road Bridge being constructed as part of the Caltrans facility. No other work would occur in this reach during Phase One.

Levee Construction

In the lower reach on the right bank, the levee would be degraded down to an elevation of 8 feet to approximately 200 feet downstream of Friendship Bridge. Upstream of that point, the levee would be reconstructed to USACE standards in the same alignment as the existing levee. Construction on this phase of the Project is likely to occur over 5 weeks. It is expected that vehicles would be entering and leaving the Project site at the O'Connor Street access point for 25 days (see the discussion under the subheading *Construction Staging Areas, Project Site Access, and Haul Routes*).

In the lower reach on the left bank and from Friendship Bridge to the floodwalls in the upper reach, the levees would be raised using imported fill. The fill would be geotechnically engineered to USACE and District specifications and standards. Construction on this phase of the Project is likely to occur over 5 weeks. The left levee (Palo Alto Side) is a setback levee and is expected to experience 1 foot of settlement. The right levee (East Palo Alto Side) is a raise of the existing levee and therefore will experience less settlement, anticipated to be 0.5 feet. After settlement both levees will be the same height.

Levee raising would be preceded by soil conditioning and foundation preparation that would involve use of heavy equipment over 5 days. Levee raising would last approximately 4 to 5 weeks: mass-grading operations would last approximately 20 days and miscellaneous construction activities and contingencies would occur over approximately 5 days. The levee crown would be prepared to comply with District maintenance road criteria with a Class 2 aggregate base and paved with asphalt concrete.

After levee construction is complete, the sides of the levees and the margin of the paths would be seeded with appropriate native plants for erosion control.

For levee raising activities on the right bank, it is expected that vehicles would enter and leave the Project site at the O'Connor Street access point for 25 days and the Daphne Way access point for 5 days. For levee raising activities on the left bank, it is expected that vehicles would enter and leave the Project site at the Geng Road for 25 days.

Access Roads

Phase One of the Project would include the construction of access and maintenance roads on the downstream Phase One levee improvements on the right and left bank (Figure 2). The access roads would be used for maintenance purposes and for local trail users. The right bank is presumed to be primarily used for maintenance access and would not be paved.

The right bank downstream access road would extend from the O'Connor Pump Station to just downstream of Daphne Way. The downstream access road on the right bank would be reached from the O'Connor Street access point (see the discussion under the subheading *Construction Staging Areas, Project Site Access, and Haul Routes*). The road would be approximately 16 feet wide. This access road would be surfaced with aggregate base.

The downstream access road on the left bank would be reached from the terminus of Geng Road (see the discussion under the subheading *Construction Staging Areas, Project Site Access, and Haul Routes*). The access road would be approximately 16 feet wide and would be paved with asphalt concrete between Friendship Bridge and the Geng Road access point during Phase One.

Construction of the downstream access roads would likely last 4 weeks. Preparation of the roadbed is expected to take 10 days, and surfacing the road is expected to take 10 days. Construction would be staged from the Daphne Way access point on the right bank and Geng Road on the left bank.

Phase Two—Floodwalls

Floodwalls would be built on either side of the Phase One widened channel from East Bayshore Road to roughly just downstream from the Baylands Athletic Center to accommodate flows while minimizing the need to acquire property.

The floodwall on the right bank would range in elevation from 18.6 feet to 21.3 feet and would be approximately 586 feet long extending from just downstream of Daphne Way and continuing to the end of the Project reach where it would connect with the Caltrans facility. On the landward side the floodwall would extend approximately 3.3 feet above the grade of the access road to provide a safety barrier in the floodwall section of the Project.

The floodwall on the left bank would begin where the left levee crown transitions into an access road, and would follow the streambed to the Palo Alto Pump Station where it would take a sharp turn landward and trace the outline of the Palo Alto Pump Station before turning upstream and connecting to the Caltrans facility. The floodwall on the left bank would range in elevation from 18.5 feet to 20.5 feet and would be approximately 800 feet long.

At the Caltrans facility, watertight connections would transition between the metal sheet pile floodwalls on both banks and the concrete wing wall or abutment structure of East Bayshore Road.

The placement of floodwalls in the upper reach of the Project would widen the Creek channel by 30 feet approximately from the San Francisquito Creek Pump Station in Palo Alto to the basketball court next to the International School of the Peninsula.

Floodwall Construction

As discussed above, floodwalls would be constructed and installed on both sides of the Creek channel in the upper reach and a portion of the middle reach (i.e., from East Bayshore Road to roughly just downstream of the Baylands Athletic Center). The floodwalls would be constructed of sheet pile and reinforced concrete.

For floodwall installation, all access to the right bank would be from the Verbena Drive access point; the left bank would be accessed from Geng Road (see the discussion under the subheading *Construction Staging Areas, Project Site Access, and Haul Routes*). The existing levees would be excavated to prepare for installation of the reinforced concrete wall pieces and is expected to last for 10 days. A peak of approximately 30 vehicles per day is expected. Installation of the floodwalls would be preceded by preparation and compaction to prepare the foundation; these activities would occur over 10 days.

Pieces of the floodwall would be brought to the Project site by tractor trailer. Installation of the floodwall would last approximately 4 months: 72 days for installation of the floodwall panels and 10 days for miscellaneous construction activities and contingencies. The floodwalls would be tied in with the levee and with the upstream Caltrans facility.

Access Roads

The Project would include the construction of two access and maintenance roads consistent with access roads in the Phase One reach: one upstream access road behind the floodwall on the right bank and one access road behind the floodwall on the left bank (Figure 2). The access roads would be used for maintenance purposes for the floodwalls. On the right bank, the upstream access road would extend from just downstream of Verbena Drive to East Bayshore Road. The access road on the left bank would extend from a point downstream of the International School of the Peninsula to the Palo Alto Pump Station. Both access roads are described in further detail below.

Right Bank

The upstream access road on the right bank would be reached from the Verbena Drive access point (see the discussion under the subheading *Construction Staging Areas, Project Site Access, and Haul Routes*). The road elevation would vary from 16.7 to 17.0 feet and would extend up to meet East Bayshore Road at grade. The road would be approximately 10–12 feet wide and would be surfaced with aggregate base.

Construction of the upstream road would likely last 4 weeks. Preparation of the roadbed is expected to take 10 days, and surfacing the road 10 days. Construction would be staged from the Verbena Drive access point.

Left Bank

The access road on the left bank would be reached from the Palo Alto Pump Station access point (see the discussion under the subheading *Construction Staging Areas, Project Site Access, and Haul*

Routes). At the upstream end of the levee, the path on the levee crown would transition to an access road, which would descend in elevation from 19.3 feet on the landward side of the floodwall to level out at an elevation between approximately 15 and 16 feet. The road would ascend slightly to an approximate elevation of 16.4 feet at the access road's end (at the Palo Alto Pump Station access point). The road would be approximately 12 feet wide for most of its length and would be surfaced with aggregate base. The road would be paved with asphalt concrete between the Geng Road access point and the International School of the Peninsula in Phase Two.

Marshplain Creation and Restoration

The proposed Project would create approximately 18 acres of tidal marsh on both sides of the Creek, effectively restoring tidal influence in the Project reach (see Figure 2). Marshplain creation would span the entire Project extent on both banks from East Bayshore Road to San Francisco Bay on the right bank and from East Bayshore Road to the end of the existing left levee on the left bank. Both sides of the channel would be planted from the toe of the levee or base of the floodwall to the edge of the Creek channel.

After Phase One levee construction is complete, the tidal marsh area would be terraced and revegetated with high-marsh plants. The high-marsh planting area would total 7.05 acres and the high-marsh transition planting area would total 10.77 acres. Additionally, in areas where rock slope protection is required, 10-foot vegetated shrub bands would be installed to provide refugia and promote long term vegetated protection and stability across the rock slope protection areas.

Native marsh plants would be used to revegetate the terraced land. Plants appropriate to the high marsh would be planted near the stream channel. Plants native to marsh transition areas would be planted in areas more distant from the Creek channel. The San Francisquito Creek Joint Powers Authority (SFCJPA), or its designated contractor, will be responsible for the acquisition of plant material. All container stock will be propagated from native stock collected within the south San Francisco Bay and tidally influenced creeks in coordination with Santa Clara Valley Water District staff.

Additional Construction

Associated activities required to complete the Project include the following.

- Construction of tie-ins:
    - Levee from west footings of Friendship Bridge to the right bank levee (Phase One).
    - Floodwall to O'Connor Pump Station (Phase One).
    - Interim structure to connect Phase One levees to existing levees in Phase Two reach.
    - Floodwall to Caltrans abutments on both banks (Phase Two).
    - Floodwall to levee connections on both banks (Phase Two).
- Construction of Friendship Bridge boardwalk (Phase Two).
- Installation of channel rock slope protection (Phase One and Phase Two).

Right-of-way (ROW) acquisition is expected to be required during Phase Two for property adjacent to Yeaman's Auto Body, International School of the Peninsula, the U.S. Postal Service, and during

Phase One for the Golf Course and the Baylands Athletic Center. All other land is within easements held by the City of East Palo Alto and the District (currently SFCJPA member agencies).

Construction Staging Areas, Project Site Access, and Haul Routes

Access to the Project site would be at the locations discussed below and (shown in Figure 3) potentially could be utilized during both construction phases. As previously mentioned, the *right* bank refers to the San Mateo County (East Palo Alto) side of the Creek and the *left* bank refers to the Santa Clara County (Palo Alto) side of the Creek.

Right Bank

- Site access and a construction staging area would be located at the end of O'Connor Street near the intersection with Daisy Lane in East Palo Alto. The haul route would be along O'Connor Street to Pulgas Avenue, East Bayshore Road, and Embarcadero Road to U.S. 101. This is the designated route for large vehicles, including dump trucks and flatbed trucks, in the City of East Palo Alto.
- Site access and a construction staging area would be located at the end of Daphne Way at Jasmine Way in East Palo Alto. The haul route would be along Jasmine Way to Camelia Drive, Pulgas Avenue, East Bayshore Road, and Embarcadero Road to U.S. 101. Large vehicles, including but not limited to dump trucks and flatbed trucks, will be prohibited on Daphne Way and Jasmine Way. Further vehicle restrictions on Daphne Way and Jasmine Way may be required by the City of East Palo Alto and will be determined during development of the Project Traffic Plan.
- Site access and a construction staging area would be located at the end of Verbena Drive at Abelia Way. The haul route would be along Verbena Drive to Camelia Drive, Pulgas Avenue, East Bayshore Road, and Embarcadero Road to U.S. 101. Large vehicles, including but not limited to dump trucks and flatbed trucks, will be prohibited on Verbena Drive and Camelia Drive. Further vehicle restrictions on Verbena Drive and Camelia Drive may be required by the City of East Palo Alto and will be determined during development of the Project Traffic Plan.

Left Bank

- Site access would be at the Palo Alto Pump Station, accessed from East Bayshore Road. The haul route would be along East Bayshore Road to Embarcadero Road and U.S. 101.
- Site access would be at Geng Road between the Baylands Athletic Center and the Golf Course. The haul route would be along Geng Road to Embarcadero Road and U.S. 101.

Fill Disposal and Fill Import

Approximately 108,500 cubic yards of fill would be excavated from the Project site during Phase One levee modification activities and channel widening described above. Approximately 20 percent (21,800 cubic yards) of this fill would be hauled off the site. Approximately 190,800 cubic yards of fill would need to be brought to the Project site for levee raising. It is anticipated that removed fill would be placed within the adjacent Golf Course for use in reconfiguration of the Golf Course, a separate project being managed by the City of Palo Alto. Any removed fill that cannot be utilized in the Golf Course reconfiguration project would be hauled off the site.

Path: K:\Projects_11\JointPowersAuthority\00882_09\mapdoc\flood_protection\Haul_Routes2.mxd

Figure 3
Haul Routes

Utility Relocation and Removal

Project activities would require relocation or removal of electricity transmission towers and poles; abandonment of existing and construction of new gas transmission lines; and realignment or relocation of sewer lines and storm drains (Figure 4). These activities are described in more detail below.

Electric Utilities

Pacific Gas & Electric (PG&E) would require the relocation, removal, or raising of some electric transmission towers and wood poles on both the right and left banks in order to accommodate the Project. Figure 4 shows the location of each of the existing and relocated towers and wood poles and assigns each tower and pole a corresponding letter and number (pole: P; tower: T). The following discussion summarizes the proposed actions.

- P1 through P6 are existing wood transmission poles located in the City of East Palo Alto southwest of Friendship Bridge. The secondary wires (i.e., the lowest set of wires, which provide cathodic protection to the underground gas lines) would be removed from these poles.
- P7 is an existing wood transmission pole located in the City of East Palo Alto. This pole would be removed and replaced in the same location with a light-duty steel (LDS) pole of comparable height (approximately 65 feet high). The wires would run north and south.
- P8 is an existing wood transmission pole located in the City of East Palo Alto. This pole would be removed.
- P9 would be a new LDS transmission pole in the City of East Palo Alto replacing P8. P9 would be approximately 65 feet high (comparable to P8). The wires would run north and south.
- P10 would be a new LDS transmission pole. This pole would be approximately 75 feet high and the wires would be angled in an "L" from north to east, thereby crossing the Creek. The LDS pole would be anchored to the ground with additional wires.
- P11 is an existing wood transmission pole located in the City of Palo Alto that would be removed.
- P12 is an existing wood transmission pole in the City of Palo Alto that would be replaced with a new LDS transmission pole. This pole would be approximately 75 feet high and the wires would be angled in an "L" from east to south.
- T1 is an existing transmission tower in the City of East Palo Alto. This tower would be raised by 15 feet and the tower design would otherwise not change.
- T2 is an existing transmission tower in the City of Palo Alto. This tower would be removed.
- T3 would be located approximately 25 feet north of T2 and would replace T2. T3 would be 25 feet taller than T2, but would otherwise have the same design. Following completion of the Project, T3 would be located within the Creek. Therefore, there would be a fortified concrete pier supporting each leg of the tower. A shoo-fly structure would be built to allow for the construction of the new tower. The shoo-fly structure would have two wooden poles; one pole would be approximately 25 feet south of the existing tower and the second pole would approximately 75 feet north of the existing tower. The shoo-fly poles would be placed in the toe of the existing levee and would be removed once the new tower is fully operational.

- T4 is an existing transmission tower in the City of Palo Alto. This tower would be raised by 15 feet and the tower design would otherwise not change.

Gas Utilities

Portions of the PG&E gas transmission line immediately downstream of the International School of the Peninsula and upstream of Friendship Bridge on both right and lefts banks are located within the realigned channel and would need to be relocated during Phase One. Approximately 3,000 feet of the existing 20-inch gas line would be abandoned, slurried, and closed off. A new 24-inch gas pipeline would be installed on the Palo Alto side of the Creek. The pipe would cross to the East Palo Alto side near Friendship Bridge, where it would tie in to the existing pipeline (Figure 4).

The new pipe would tie into old pipe at the electrical transmission tower east of the recreation area parking lot, at the end of Geng Road in Palo Alto. The new pipeline would extend northward on the left bank to the approximate location of Friendship Bridge just south of O'Connor Street. Between Geng Road and Friendship Bridge, the pipeline would lie within the Palo Alto Golf Course at a minimum of 15 feet east of the proposed new levee. At Friendship Bridge, the pipeline would cross under the Creek channel to the right bank, where the new pipe would tie into old pipe.

The tunnel for the new pipeline under the Creek channel would be bored. The trench for the pipe on the left bank would be constructed by cut and fill. The pipeline would be located a minimum of 4 feet below grade.

Construction access on the left bank would be from Geng Road across the Palo Alto Golf Course. Gas pipe construction equipment would use the same construction access route used for relocation and installation of electrical transmission lines and towers on the left bank. Three spoils storage areas, each approximately 100 by 100 feet, would be spaced evenly on the left bank. An approximately 100- by 150-foot staging area for the construction bore would be located near the terminus of Geng Road at the Baylands Athletic Center.

Construction access on the right bank would be from O'Connor Street. Gas pipe construction equipment would use temporary roads. These roads would either be used by construction equipment for both gas pipeline and electrical transmission line and tower installation or by construction equipment for gas pipeline installation only. One approximately 100- by 100-foot spoils storage area and a 100- by 100-foot termination hold would be located adjacent to the borehole site.

Use of spoils storage areas would be contingent on the suitability to reuse the spoils for covering the new pipeline at the end of construction.

Storm Drains and Sewer Lines

- An East Palo Alto Sanitary District sanitary sewer trunk line and associated manholes immediately upstream of Friendship Bridge and downstream of Friendship Bridge adjacent to the Golf Course on the left bank are located within the marshplain terrace and the realigned channel, respectively, and would be relocated during Phase One.
- Storm drains and outfalls at the East Palo Alto Pump Station would be relocated outside of the new levee footprint during Phase One.

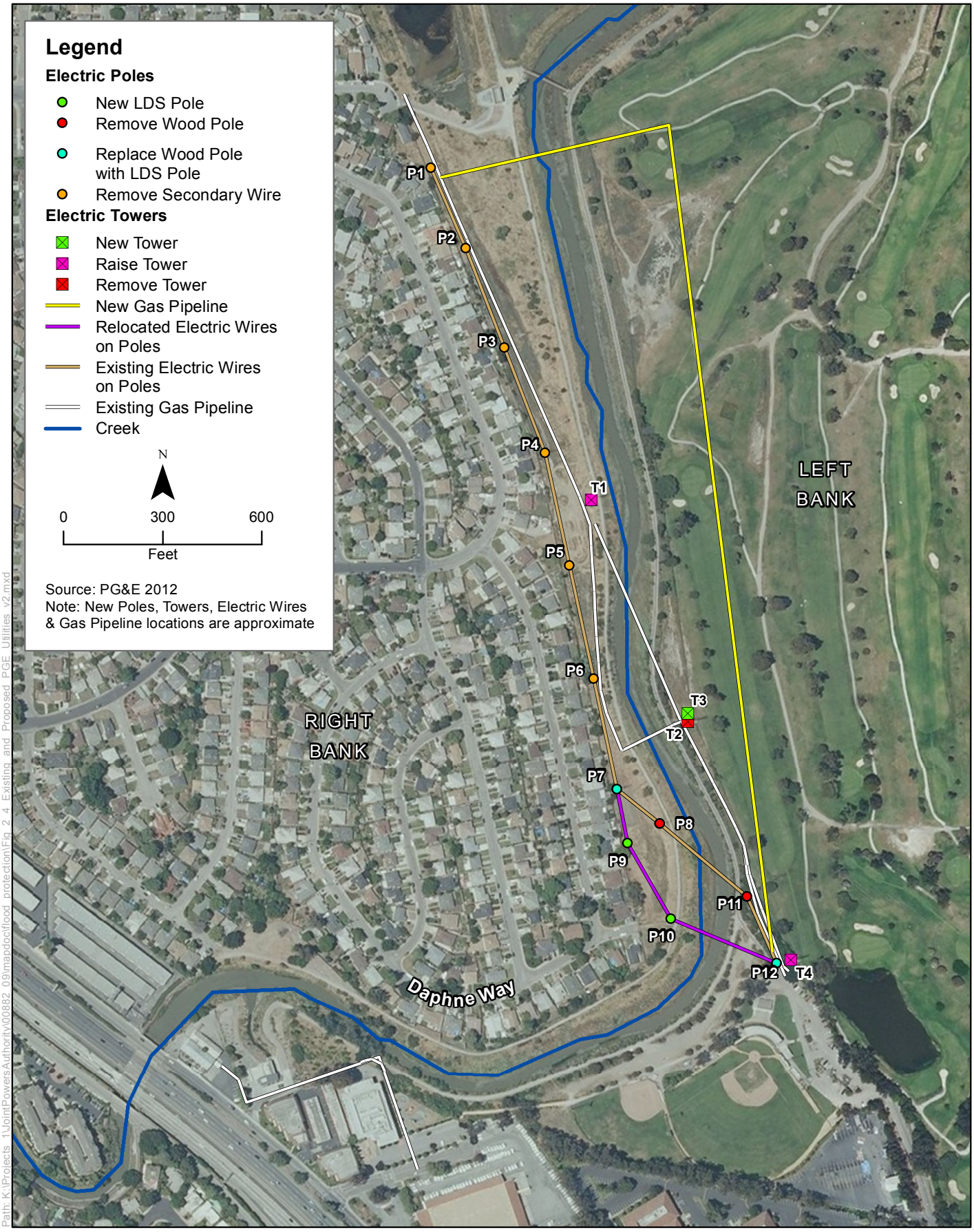

Figure 4
Existing and Proposed PG&E Utilities

- Storm drains and outfalls immediately downstream of the East Bayshore Frontage Road on both sides of the Creek are located within the floodwall footprint and would be relocated during Phase Two.

Construction Schedule

Phase One construction would begin in 2013 and be completed by 2015. Construction would begin with building the new levee structure outside of the existing levee, during or after completion of PG&E and EPASD modifications to existing utilities and modifications to the PAGC, and would proceed at Friendship Bridge and upstream with the excavation of the channel up to East Bayshore Road being the final Project activity. Phase Two construction of upstream floodwalls and associated maintenance roads would occur once funding was secured.

Construction activities would take place between 8 a.m. and 6 p.m. on weekdays, and 9 a.m. and 5 p.m. on Saturdays, in accordance with City of Palo Alto and City of East Palo Alto municipal codes. Final construction permits issued for the Project may place additional constraints on construction timing. Table 2 shows the Project elements, when construction on each is expected to begin, construction activities, and construction duration.

Operation and Maintenance

Once the Project elements are constructed, they would require maintenance to continue to function effectively, similar to existing facilities. Maintenance for the new Project elements would include activities such as removing debris from channels, which could occur during any flood season, and infrequent post-flood clean-up of the marshplain, which would be needed only after major flood events. In places where the Project is limited to replacing, expanding, or improving existing facilities (for example, the widened and deepened channel segment), post-Project maintenance would be similar to existing maintenance. Additionally, monitoring and maintenance of replacement trees and new marsh vegetation would occur, at a minimum, for three years following completion of the Project. This activity would be minimal, consisting of invasive plant weeding and inspection of newly planted vegetation.

New facilities, such as the floodwalls and marshplain terrace, would create new maintenance needs. Routine post-Project maintenance within the Creek channel corridor within the District's right-of-way (in Santa Clara County) would continue to be included under the District's Stream Maintenance Program (SMP). The District has not conducted sediment removal in this reach of San Francisquito Creek in the past, other than right below the Highway 101 culvert. This is not expected to change in the future. Under the SMP, the maintenance of the newly constructed floodwalls and marshplain terrace would also be covered. The Project would also replace and upgrade existing sections of concrete channel for the channel-widening Project element. Maintenance of the replaced concrete sections would be covered under the SMP.

Routine post-Project maintenance within the Creek channel corridor within the East Palo Alto's right-of-way (in San Mateo County) would continue to be conducted by the city and would primarily consist of yearly inspections and regular cleaning of graffiti off of the floodwalls.

The extent and nature of post-Project activities under the SMP would be similar to what is currently taking place in both jurisdictions. No new or additional maintenance activities beyond the scope of the SMP would be required to maintain the SMP-covered Project features, and routine channel and bank maintenance would continue to incorporate all of the Best Management Practices (BMPs) required under the SMP. Because there would be no material change in SMP activities as a result of the Project, SMP maintenance is not discussed further.

Conservation Measures

In addition to the BMPs covered under the Districts' SMP, the Project would also incorporate the following Conservation Measures for all elements of the Project.

General Construction Site Housekeeping

1. The work site, areas adjacent to the work site, and access roads will be maintained in an orderly condition, free and clear from debris and discarded materials. Personnel will not sweep, grade, or flush surplus materials, rubbish, debris, or dust into storm drains or waterways. Upon completion of work, all building materials, debris, unused materials, concrete forms, and other construction-related materials will be removed from the work site. (Santa Clara Valley Water District Water Quality BMP 18)
2. To prevent mosquito breeding on construction sites, the SFCJPA will require the construction contractor to ensure that surface water is gone within four days (96 hours). All outdoor grounds will be examined and unnecessary water that may stand longer than 96 hours will be drained. Construction personnel will properly dispose of unwanted or unused artificial containers and tires. If possible, any container or object that holds standing water that must remain outdoors will be covered, inverted, or have drainage holes drilled. (California Department of Public Health 2008)
3. The following general construction site housekeeping measures will be implemented as necessary within staging areas.
    - Staging areas that are not already paved or covered with compacted aggregate base, and that are used for parking vehicles, trailers, workshops, maintenance areas, or equipment, piping, formwork, rebar, storing masonry on pallets, and metal product storage, will be graded as required, and surfaced with a minimum of 3 inches of compacted aggregate base rock over a high modulus, woven, and soil separation geo-textile. Areas storing aggregate base or other rock products will also be placed on this same geo-textile. The objective is to maintain separation between native and construction materials. Areas storing soils and sand are not required to be surfaced with aggregate base course.
    - Aggregate base will be removed from all staging areas prior to Project completion and the surfaces will be regraded to their original grades or matching surrounding conditions as directed by the Engineer.
    - Any soils contaminated with petroleum product or other hazardous materials by the Contractor will be removed by the Contractor and disposed of in accordance with local, state, and federal laws.

- Contractor is responsible for weed control in staging areas and material storage areas.

4. The spread of invasive nonnative plant species and plant pathogens will be avoided or minimized by implementing the following measures:
   - Construction equipment will arrive at the Project clean and free of soil, seed, and plant parts to reduce the likelihood of introducing new weed species.
   - Any imported fill material, soil amendments, gravel, etc., required for construction and/or restoration activities that will be placed within the upper 12 inches of the ground surface will be free of vegetation and plant material.
   - Certified weed-free imported erosion control materials (or rice straw in upland areas) will be used exclusively.
   - To reduce the movement of invasive weeds into uninfested areas, the contractor will stockpile topsoil removed during excavation and will subsequently reuse the stockpiled soil for re-establishment of disturbed project areas.

Water Quality Protection

1. The following measures will be implemented as necessary to reduce and minimize stormwater pollution during ground disturbing maintenance activities:
   - 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 preference for erosion control fabrics will be to consist of natural fibers.
   - Appropriate measures include, but are not limited to, the following:
     - Silt Fences.
     - Straw Bale Barriers.
     - Brush or Rock Filters.
     - Storm Drain Inlet Protection.
     - Sediment Traps.
     - Sediment Basins.
     - Erosion Control Blankets and Mats.
     - Soil Stabilization (i.e. tackified straw with seed, jute or geotextile blankets, etc.).
     - Wood chips.
     - Straw mulch.
   - All temporary construction-related erosion control methods will be removed at the completion of the Project (e.g., silt fences). (Santa Clara Valley Water District Water Quality BMP 41)

2. Sediments will be stored and transported in a manner that minimizes water quality effects.
    - Wet sediments may be stockpiled outside of a live stream or may be stockpiled within a dewatered stream so water can drain or evaporate before removal.
    - This measure applies to saturated, not damp, sediments and depends on the availability of a stockpile site.
    - For those stockpiles located outside the channel, water draining from them will not be allowed to flow back into the Creek or into local storm drains that enter the Creek, unless water quality protection measures recommended by RWQCB are implemented.
    - Trucks may be lined with an impervious material (e.g., plastic), or the tailgate blocked with dry dirt or hay bales, for example, or trucks may drain excess water by slightly tilting their loads and allowing the water to drain out.
    - Water will not drain directly into channels (outside of the work area) or onto public streets without providing water quality control measures
    - Streets and affected public parking lots will be cleared of mud and/or dirt by street sweeping (with a vacuum-powered street sweeper), as necessary, and not by hosing down the street. (Santa Clara Valley Water District Water Quality BMP 4)
3. Oily, greasy, or sediment-laden substances or other material that originate from the Project operations and may degrade the quality of surface water or adversely affect aquatic life, fish, or wildlife will not be allowed to enter, or be placed where they may later enter, any waterway.
4. The Project will not increase the turbidity of any watercourse flowing past the construction site by taking all necessary precautions to limit the increase in turbidity as follows.
    - Where natural turbidity is between 0 and 50 Nephelometric Turbidity Units (NTU), increases will not exceed 5 percent.
    - Where natural turbidity is greater than 50 NTU, increases will not exceed 10 percent.
    - Where the receiving water body is a dry creek bed or storm drain, waters in excess of 50 NTU will not be discharged from the Project.
    - Water turbidity changes will be monitored. The discharge water measurements will be made at the point where the discharge water exits the water control system for tidal sites and 100 feet downstream of the discharge point for non-tidal sites. Natural watercourse turbidity measurements will be made in the receiving water 100 feet upstream of the discharge site. Natural watercourse turbidity measurements will be made prior to initiation of Project discharges, preferably at least 2 days prior to commencement of operations. (Santa Clara Valley Water District Water Quality BMP 40)
5. No washing of vehicles will occur at job sites. (Santa Clara Valley Water District Hazards & Hazardous Materials BMP 9)
6. No fueling will be done in a waterway or immediate flood plain, unless equipment stationed in these locations is not readily relocated (i.e., pumps, generators).
    - For stationary equipment that must be fueled on the site, containment will be provided in such a manner that any accidental spill of fuel will not be able to enter the water or contaminate sediments that may come in contact with water.

- Any equipment that is readily moved out of the waterway will not be fueled in the waterway or immediate flood plain.
- All fueling done at the job site will provide containment to the degree that any spill will be unable to enter any waterway or damage riparian vegetation. (Santa Clara Valley Water District Hazards & Hazardous Materials BMP 10)

7. No equipment servicing will be done in a stream channel or immediate flood plain, unless equipment stationed in these locations cannot be readily relocated (i.e., pumps, generators).
   - Any equipment that can be readily moved out of the channel will not be serviced in the channel or immediate flood plain.
   - All servicing of equipment done at the job site will provide containment to the degree that any spill will be unable to enter any channel or damage stream vegetation.
   - If emergency repairs are required in the field, only those repairs necessary to move equipment to a more secure location will be done in a channel or flood plain.
   - If emergency repairs are required, containment will be provided equivalent to that done for fueling or servicing. (Santa Clara Valley Water District Hazards & Hazardous Materials BMP 11)
8. Measures will be implemented to ensure that hazardous materials are properly handled and the quality of water resources is protected by all reasonable means.
   - Prior to entering the work site, all field personnel will know how to respond when toxic materials are discovered.
   - The discharge of any hazardous or nonhazardous waste as defined in Division 2, Subdivision 1, Chapter 2 of the California Code of Regulations (CCR) will be conducted in accordance with applicable state and federal regulations.
   - In the event of any hazardous material emergencies or spills, personnel will call the Chemical Emergencies/Spills Hotline at 1 800 510 5151. (Santa Clara Valley Water District Hazards & Hazardous Materials BMP 12)
9. Prevent the accidental release of chemicals, fuels, lubricants, and non-storm drainage water.
   - Field personnel will be appropriately trained in spill prevention, hazardous material control, and cleanup of accidental spills.
   - No fueling, repair, cleaning, maintenance, or vehicle washing will be performed in a creek channel or in areas at the top of a channel bank that may flow into a creek channel. (Santa Clara Valley Water District Hazards & Hazardous Materials BMP 13)
10. Spill prevention kits appropriate to the hazard will always be in close proximity when using hazardous materials (e.g., crew trucks and other logical locations).
    - Prior to entering the work site, all field personnel will know the location of spill kits on crew trucks and at other locations within District facilities.
    - All field personnel will be advised of these locations and trained in their appropriate use. (Santa Clara Valley Water District Hazards & Hazardous Materials BMP 14)

11. Runoff from soil stockpiles will be avoided. If soil is to be stockpiled, no runoff will be allowed to flow to a creek.
12. Coffer dams will be used for tidal work areas. For tidal areas, a downstream cofferdam will be constructed to prevent the work area from being inundated by tidal flows. By isolating the work area from tidal flows, water quality effects are minimized. Downstream flows continue through the work area and through pipes within the cofferdam.
    - Installation of coffer dams will begin at low tide.
    - Waters discharged through tidal coffer dam bypass pipes will not exceed 50 NTU over the background levels of the tidal waters into which they are discharged.
    - Coffer dams shall not be constructed of earthen fill due to potential adverse water quality impacts in the event of a failure.
    - Coffer dams constructed of gravel shall be covered by a protective covering (e.g., plastic or fabric) to prevent seepage.
13. Groundwater will be managed at work sites. If high levels of groundwater in a work area are encountered, the water will be pumped out of the work site. If necessary to protect water quality, the water will be directed into specifically constructed infiltration basins, into holding ponds, or onto areas with vegetation to remove sediment prior to the water re-entering a receiving water body. Water pumped into vegetated areas will be pumped in a manner that will not create erosion around vegetation.
14. Sanitary/septic waste will be managed. Temporary sanitary facilities will be located on jobs that last multiple days in compliance with California Division of Occupational Safety and Health (Cal/OSHA) regulation 8 CCR 1526. All temporary sanitary facilities will be placed outside of the Creek channel and flood plain and removed when no longer necessary.

In addition, as part of the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) and the San Mateo Countywide Stormwater Pollution Prevention Program (SM-STOPPP), required under Waste Discharge Requirements and National Pollutant Discharge Elimination System (NPDES) Permit for the discharge of stormwater runoff from the municipal separate storm sewer systems (MS4s) overseen by the San Francisco Bay Water Board, all construction sites are required to have site-specific and seasonally and phase-appropriate effective BMPs (San Francisco Bay Regional Water Quality Control Board 2009). SFCJPA will be responsible for ensuring compliance with all local and State regulations, including the RWQCB NPDES permits and local BMPs for jurisdictions adjoining the Project site. The Project specifications require that the Project construction contractor prepare a SWPPP and erosion control and sedimentation plan showing placement of BMPs at various stages of construction in conformance with requirements, and all SWPPP documents and plans will be stamped by a State-certified Qualified SWPPP Developer (QSD). The Project will implement measures to accomplish objectives specified in SFCJPA's *San Francisquito Creek Watershed Analysis and Sediment Reduction Plan*, which fulfills NPDES permit provisions that require the co-permittees of the SCVURPPP and SM-STOPPP within the Creek watershed to assess and implement sediment management measures in the watershed (San Francisquito Creek Joint Powers Authority 2004). Water quality protection standards during construction will comply with the most protective BMPs of the local jurisdictions and the State of California.

Safe Use of Herbicides and Pesticides

1. Pesticides products are to be used only after an assessment has been made regarding environmental, economical, and public health aspects of each of the alternatives. The following pesticides are used by the District.
    - Herbicides.
        - To control algae, weeds and undesirable vegetation.
        - To minimize fire hazards.
        - To maintain flood conveyance of waterways.
        - To maintain compliance with state and federal requirements.
    - Insecticides.
        - Used only in and around District buildings, or in the case of a serious pest outbreak, on landscape and re-vegetation facilities.
        - Used only after all other methods, such as prevention or natural nontoxic control methods, have proven ineffective.
        - Where required, the lowest toxicity will be used in accordance with the label and the details of this policy.
    - Rodenticides.
        - To control burrowing rodents, including ground squirrels, moles and gophers, in District flood control levees, excluding known and potential habitat for salt marsh harvest mouse and salt marsh wandering shrew. No rodenticides or fumigants will be used within the range of the salt marsh harvest mouse or California clapper rail as identified on District range maps. Methods of rodent control within salt marsh harvest mouse or California clapper rail 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 salt marsh harvest mouse that inadvertently enter the trap to easily escape. All traps will be placed outside of pickleweed areas and above the high tide line.
        - In areas where rodenticides are used, carcass retrieval surveys will be conducted daily for acute toxins and weekly for anticoagulants to minimize secondary poisoning impacts during the use period. Any spilled bait will be cleaned up immediately.
        - Alternatives such as trapping and smoke bombs are used wherever practical prior to rodenticide use. (Santa Clara Valley Water District Hazards & Hazardous Materials BMP 2)
2. All herbicide use will be consistent with approved product specifications. Applications will be made by, or under the direct supervision of, state-certified applicators under the direction of a licensed Pest Control Advisor. (Santa Clara Valley Water District Hazards & Hazardous Materials BMP 1)
3. Only herbicides and surfactants registered for aquatic use will be applied within the banks of channels within 20 feet of any water present. Aquatic herbicide use will be limited to July 1st

through October 15th. If rain is forecast then application of aquatic herbicide will be rescheduled. (Santa Clara Valley Water District Hazards & Hazardous Materials BMP 8)

Construction Dust Control

1. Dust control measures for all construction sites:
    - Bay Area Air Quality Management District (BAAQMD) Basic Control Measures for construction emissions of PM10 will be implemented at all construction sites. Current measures stipulated by the BAAQMD CEQA Guidelines include the following (Bay Area Air Quality Management District 2010):
        - All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) will be watered two times per day under normal conditions. Watering periodicity can be increased or decreased as necessitated by site specific conditions as determined by the SFCJPA's designated construction manager and with the SFCJPA's approval.
        - All haul trucks transporting soil, sand, or other loose material off the site will be covered.
        - All visible mud or dirt track-out onto adjacent public roads will be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
        - All vehicle speeds on unpaved roads will be limited to 15 mph.
        - All roadways, driveways, and sidewalks to be paved will be completed as soon as possible. Building pads will be laid as soon as possible after grading unless seeding or soil binders are used.
        - Idling times will 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 CCR). Clear signage will be provided for construction workers at all access points.
        - All construction equipment will be maintained and properly tuned in accordance with manufacturer's specifications. All equipment will be checked by a certified mechanic and determined to be running in proper condition prior to operation.
    - A publicly visible sign will be posted, with the telephone number and person to contact at the Lead Agency regarding dust complaints. This person will respond and take corrective action as soon as is feasible and no later than 24 hours after the complaint is made.. The Air District's phone number, as well as the contact numbers for the SFCJPA Project Manager, Designated Construction Manager, and a designated contact with the City of East Palo Alto will also be visible to ensure compliance with applicable regulations.

Biological Resources Protection

1. Prior to construction, Worker Awareness Training must be conducted to inform construction Project workers of their responsibilities regarding sensitive environmental resources. The training will include environmental education about the western pond turtles, nesting raptors

and migratory birds, western burrowing owl, California clapper rail, California black rail, salt marsh harvest mouse, salt marsh wandering shrew, California least tern, western snowy plover, California red-legged frog, San Francisco garter snake, and steelhead, as well as sensitive habitat (e.g., in-stream habitat, riparian habitat, wetlands). The training will include visual aids to assist in identification of regulated biological resources, actions to take should protected wildlife be observed within the action area, and possible legal repercussions of affecting such regulated resources.

2. Existing access ramps and roads to waterways will be used where possible. If temporary access points are necessary, they will be constructed in a manner that minimizes effects on waterways:
    - Temporary Project access points will be created as close to the work area as possible to minimize running equipment in waterways and will be constructed so as to minimize adverse effects.
    - Any temporary fill used for access will be removed upon completion of the Project. Site topography and geometry will be restored to pre-Project conditions to the extent possible. (Santa Clara Valley Water District Biological Resources BMP 4)
3. Migratory bird nesting surveys will be performed prior to any Project-related activity that could pose the potential to affect migratory birds during the nesting season. Inactive bird nests may be removed, with the exception of raptor nests. No birds, nests with eggs, or nests with hatchlings will be disturbed. (Santa Clara Valley Water District Biological Resources BMP 8)
4. Nesting exclusion devices may be installed to prevent potential establishment or occurrence of nests in areas where construction activities would occur. All nesting exclusion devices will be maintained throughout the nesting season or until completion of work in an area makes the devices unnecessary. All exclusion devices will be removed and disposed of when work in the area is complete. (Santa Clara Valley Water District Biological Resources BMP 10)
5. Effects on native aquatic vertebrates will be avoided or minimized. Native aquatic vertebrates (fish, amphibians and reptiles) are important elements of stream ecosystems. Native aquatic vertebrates may or may not be able to rapidly recolonize a stream reach if the population is eliminated from that stream reach. If native aquatic vertebrates are present when cofferdams, water bypass structures, and silt barriers are to be installed, an evaluation of the project site and the native aquatic vertebrates will be conducted by a qualified biologist. The qualified biologist will consider:
    a. Native aquatic species present at the site.
    b. The ability of the species to naturally recolonize the stream reach.
    c. The life stages of the native aquatic vertebrates present.
    d. The flow, depth, topography, substrate, chemistry and temperature of the stream reach.
    e. The feasibility of relocating the aquatic species present.
    f. The likelihood the stream reach will naturally dry up during the work season.

    Based on consideration of these factors, the qualified biologist may make a decision to relocate native aquatic vertebrates. The qualified biologist will document in writing the reasons to relocate native aquatic species, or not to relocate native aquatic species, prior to installation of cofferdams, water bypass structures or silt barriers.

If the decision is made to relocate the native aquatic species, then the operation will be based on the District's Fish Relocation Guidelines. If steelhead or other fish species are present, the measures in number 8 (below) will be followed.

6. Local ecotypes of native plants will be planted and appropriate erosion-control seed mixes will be chosen. Whenever native species are prescribed for installation on District fee properties or easements, the following steps will be taken by a qualified biologist or vegetation specialist:
    - Evaluate whether the plant species currently grows wild in Santa Clara County.
        - If the plant species currently grows wild in Santa Clara County, the qualified biologist or vegetation specialist will determine whether the plant installation must include local natives, i.e. grown from propagules collected in the same or adjacent watershed, and as close to the Project site as feasible.
        - A qualified biologist or vegetation specialist will be consulted to determine which seeding option is ecologically appropriate and effective. The following guidelines will inform the biologist or vegetation specialist's determination.
        - For areas that are disturbed, an erosion control seed mix may be used consistent with the District Guidelines and Standards for Land Use Near Streams, Design Guide 5, 'Temporary Erosion Control Options.'
        - In areas with remnant native plants, the qualified biologist or vegetation specialist may choose an abiotic application instead, such as an erosion control blanket or seedless hydro-mulch and tackifier to facilitate passive revegetation of native species.
        - Temporary earthen access roads may be seeded when site and horticultural conditions are suitable.
        - If a gravel or wood mulch has been used to prevent soil compaction per BI-11, this material may be left in place [if ecologically appropriate] instead of seeding.
        - Seed selection will be ecologically appropriate as determined by a qualified biologist, per *Guidelines and Standards for Land Use Near Streams, Design Guide 2: Use of Local Native Species; and, Supplemental Landscaping\Revegetation Guidelines* (ISO document WQ71001).
7. Animal entry and entrapment will be avoided.
    - All pipes, hoses, or similar structures less than 12 inches diameter will be closed or covered to prevent animal entry. All construction pipes, culverts, or similar structures, greater than 2-inches diameter, stored at a construction site overnight, will be inspected thoroughly for wildlife by a qualified biologist or properly trained construction personnel before the pipe is buried, capped, used, or moved.
    - If inspection indicates presence of sensitive or state- or federally-listed species inside stored materials or equipment, work on those materials will cease until a qualified biologist determines the appropriate course of action.
    - To prevent entrapment of animals, all excavations, steep-walled holes or trenches more than 6-inches deep will be secured against animal entry at the close of each day. Any of the following measures may be employed, depending on the size of the hole and method feasibility.

- Holes will be securely covered (no gaps) with plywood or similar materials at the close of each working day, or any time the opening will be left unattended for more than one hour.
- In the absence of covers, the excavation will be provided with escape ramps constructed of earth or untreated wood, sloped no steeper than 2:1, and located no farther than 15 feet apart.
- In situations where escape ramps are infeasible, the hole or trench will be surrounded by filter fabric fencing or a similar barrier with the bottom edge buried to prevent entry.

8. Implement avoidance measures for steelhead trout prior to construction activities. No in-channel construction activities will occur during the steelhead migration period (October 1–May 30), to reduce the likelihood that steelhead are present during construction activities.

   A qualified fisheries biologist, approved by NMFS, will survey the construction area 1 to 2 days before work on the Project begins. If water is present in the immediate construction area, the following procedures will be implemented.

   - Before a work area is dewatered, fish will be captured and relocated to avoid injury and mortality and minimize disturbance.
   - Before fish relocation begins, a qualified fisheries biologist will identify the most appropriate release location(s). Release locations should have water temperatures similar to the capture location and offer suitable habitat (migratory and rearing) for released fish, and should be selected to minimize the likelihood that fish will reenter the work area or become impinged on the exclusion net or screen. At this time the open reach below the Project site is anticipated to have suitable conditions for relocation.
   - Seining or dip netting will be utilized to keep stress and injury to fish at a minimum. Given the salinity of the Project reach, electrofishing would be ineffective and not utilized.
   - To the extent feasible, relocation will be performed during morning periods. Water temperatures will be measured periodically (every hour or so), and relocation activities will be suspended if water temperature exceeds 20^0C (National Marine Fisheries Service 2000).
   - Handling of salmonids will be minimized. When necessary to touch the fish, personnel will wet hands or nets before touching a fish.
   - Fish will be held temporarily in cool, shaded Creek water in a container with a lid. Overcrowding in containers will be avoided. Fish will be relocated promptly. If water temperature reaches or exceeds NMFS limits, fish will be released and relocation operations will cease.
   - If fish are abundant, capture will cease periodically to allow release and minimize the time fish spend in holding containers.
   - Fish will not be anesthetized or measured. However, they will be visually identified to species level, and year classes will be estimated and recorded.
   - Reports on fish relocation activities will be submitted to the California Department of Fish and Game (DFG) and NMFS within 30 days of completion.

- If mortality during relocation exceeds 5 percent or mortality of any state or federally listed species occurs, relocation will cease, and DFG and NMFS will be contacted immediately or as soon as feasible.
- Fish relocation efforts will be performed concurrent with the installation of the diversion and will be completed before the channel is fully dewatered. The fisheries biologist will perform a second survey 1 to 2 days following the installation of the diversion to ensure that fish have been excluded from the work area and spot checks will be performed at least biweekly while the diversion is in place.

9. Identify and protect riparian habitats. To avoid unnecessary damage to or removal of riparian habitat, the SFCJPA will retain a qualified biologist or ecologist to survey and demarcate riparian habitat on or adjacent to the proposed areas of construction in the upper reach of San Francisquito Creek. Riparian areas not slated for trimming or removal to accommodate Project construction will be protected from encroachment and damage during construction by installing temporary construction fencing to create a no-activity exclusion zone. Fencing will be brightly colored and highly visible, and installed under the supervision of a qualified biologist to prevent damage to riparian habitat during installation. The fencing will protect all potentially affected riparian habitat consistent with International Society of Arboriculture tree protection zone recommendations and any additional requirements of the resource agencies with jurisdiction. Fencing will be installed before any site preparation or construction work begins and will remain in place for the duration of construction. Riparian vegetation that must be trimmed will be trimmed by an International Society of Arboriculture certified arborist who will minimize stress and potential damage to trees and shrubs. Construction personnel will be prohibited from entering the exclusion zone for the duration of Project construction. Access and surface-disturbing activities will be prohibited within the exclusion zone.
10. Restore riparian habitat. The SFCJPA will be responsible for restoring permanently affected riparian habitat at a mitigation-to-effect ratio of 2:1, and restoring temporarily affected habitat at a minimum effect-to-mitigation ratio of 1:1 to ensure no net loss of riparian habitat in the affected stream reach. The SFCJPA will develop a Mitigation and Monitoring Plan (MMP) to ensure that all removed habitat is replaced "in kind" with the appropriate native overstory and understory species to maintain structural complexity and habitat value. The MMP will be developed in the context of the federal and state permitting processes under the CWA and California Department of Fish and Game Code, and will include success criteria as specified by the permitting agencies. The MMP will also include adaptive management guidelines for actions to be taken if the success criteria are not met. The success criteria will be met if 80 percent of the riparian plantings become established after ten years. Monitoring will occur, at a minimum, during years 1, 2, 3, 5, 7, and 10, with the plantings taking place in year 0. The initial annual monitoring will assess progress of the plantings according to predetermined success criteria. If progress is not satisfactory, adaptive management actions (including replanting, nonnative species removal, etc.) could be implemented. The MMP will remain in force until the success criteria are met.

Species Status and Critical Habitat

The action area is within the designated critical habitat for Central California coast steelhead and North American green sturgeon. Critical habitat is defined as specific areas that contain the physical and biological features (termed primary constituent elements or PCEs) essential to the conservation of the species and which may require special management considerations or protections.

The PCEs of critical habitat considered essential for the conservation of Central California coast steelhead are the following.

- Freshwater spawning sites with water quantity, water quality, and substrate supporting spawning, incubation, and larval development.
- Freshwater rearing sites with water quantity, water quality, floodplain connectivity, forage, and natural cover supporting juvenile growth, mobility, and development.
- Freshwater migration corridors free of obstructions and with water quantity and quality supporting migratory movements.
- Estuarine areas free of migratory obstructions and with water quantity, water quality, and salinity supporting juvenile and adult transitions between fresh and salt water.

The primary constituent elements of critical habitat for the southern DPS of green sturgeon in freshwater riverine and estuarine areas encompass abundant prey for larval, juvenile, subadult, and adult life stages; substrates suitable for egg deposition and development; water quantity and quality necessary for normal behavior, growth, and viability of all life stages; migratory pathways necessary for safe and timely passage between essential habitats; water depths necessary for shelter, foraging, migration, and holding of juvenile, subadult, and adult life stages; and sediment quality (i.e., chemical characteristics) necessary for normal behavior, growth, and viability of all life stages.

The action area is not within critical habitat designated for California red-legged frog or western snowy plover. Critical habitat has not been designated for San Francisco garter snake, California clapper rail, California least tern, salt marsh harvest mouse, or California seablite.

Species Accounts

Central California Coast Steelhead (*Oncorhynchus mykiss*)

Listing Status

Central California coast steelhead is currently listed as federally threatened (71 Federal Register [FR] 834; January 5, 2006). Critical habitat was designated on September 2, 2005 (70 FR 52488) and encompasses the Russian River (inclusive) to Aptos Creek (inclusive); and the drainages of San Francisco, San Pablo, and Suisun Bays eastward to Chipps Island at the confluence of the Sacramento and San Joaquin Rivers.

Distribution

Historically, runs of steelhead trout were prominent in a number of Santa Clara Basin streams: Guadalupe River, Coyote Creek, San Francisquito Creek, Stevens Creek, and Saratoga Creek. Passage

barriers, water diversions, and overall habitat degradation have diminished steelhead populations not only in Santa Clara Basin streams, but also throughout California and the West. Reproducing populations of steelhead are known to exist in Coyote Creek, Guadalupe River, Stevens Creek, and San Francisquito Creek (Santa Clara Basin Watershed Management Initiative 2000). A genetic study of steelhead sampled in all creeks in Santa Clara County found little gene flow between Santa Clara and Central Valley populations (Garza and Pearse 2008).

Habitat Requirements and Life Ecology

Only winter steelhead occur in the central California coast steelhead DPS (61 FR 41541–41561). Generally, adults start to enter rivers from October (in larger basins) through late November (in smaller basins) and may be present in the river through June. Adult spawning begins in November in larger basins and December in smaller basins and can continue through April, with a peak in February and March (61 FR 41541–41561). Because little more recent additional life-history information exists for this steelhead DPS, the following life-history information is summarized from Shapovalov and Taft (1954), who conducted one of the most comprehensive investigations of steelhead life history in the area as part of studies conducted on Waddell Creek in Santa Cruz County.

Adult steelhead leave the ocean to migrate up coastal streams and inland rivers with high flows from early November through early May, although the majority probably enter fresh water from late December through late April. The timing and rate of migration depend on several factors, including stream discharge and water temperatures. Spawning can occur either shortly after migration or some time later, depending on the sexual maturity of the fish, but probably peaks from January through March. Adult steelhead spawn in shallow redds (nests) constructed in relatively clean, loose gravel, typically at the ends of pools and at the heads of riffles that have appropriate water depths and velocities. Unlike all Pacific salmon, which die after spawning, adult steelhead are capable of returning to the ocean after spawning, typically by June of that same year (Shapovalov and Taft 1954).

Steelhead eggs incubate in the gravel and hatch in about 19 days at 60 degrees Fahrenheit (°F) water temperature and in about 80 days at 40°F. The average incubation period is approximately 4 to 6 weeks. After hatching, the young fish (aelvins) remain in the gravel for an additional 2 to 6 weeks before emerging and taking up residence in the shallow margins of the stream. The juvenile fish feed primarily on aquatic and terrestrial insects for periods ranging from less than 1 year to 4 years. Most juvenile steelhead spend 1 to 3 years in fresh water before emigrating to the ocean as smolts (Shapovalov and Taft 1954).

Steelhead smolt (juveniles developed sufficiently to live in saltwater) typically migrate to the ocean as flow declines and water temperature increases in April, May, and June. Before their downstream migration, juveniles undergo physiological changes (smoltification) to prepare them for life in the saltwater of the ocean. Steelhead live in the ocean for 1 to 3 years before maturing and returning to fresh water to spawn.

Because juvenile steelhead rear year-round in fresh water, adequate flows and water temperatures and an abundant food source are necessary throughout the year to sustain steelhead populations. Conditions adequate to sustain steelhead populations are especially important during summer, when declining flows could reduce habitat availability, water temperatures might exceed the

species' tolerance levels, and rearing juveniles experience increased competition for living space and food.

Current Status and Distribution

The central California coast steelhead inhabits river basins from the Russian River to Aptos Creek and the drainages of San Francisco and San Pablo Bays (62 FR 159). The abundance of steelhead populations in the Russian and San Lorenzo Rivers is less than 15 percent of that in the 1960s. Comparable data are not available for other streams in which this DPS occurs, but recent population estimates for Lagunitas, Waddell, Scott, San Vicente, Soquel, and Aptos Creeks suggest that run sizes are 500 fish or fewer in these streams (62 FR 43937). Steelhead populations in most tributaries to San Francisco and San Pablo Bays have been extirpated (McEwan and Jackson 1996).

Steelhead (*Oncorhynchus mykiss*) is the only special-status fish species known to have been historically present in Peninsula watersheds, including San Francisquito Creek. While the present-day hydrology of the San Francisquito Creek watershed has been highly altered, the Creek still supports an anadromous run of steelhead up to Searsville Dam. Searsville Dam is the only complete migration barrier in the watershed (Leidy et al. 2005).

Cumulative Effects of State and Private Actions in the Action Area

Habitat for Central California coast steelhead in San Francisquito Creek has been modified by human activities. Existing populations of central California coast steelhead are threatened by deterioration or loss of habitat resulting from urbanization and development of the watershed, flood control activities, migration barriers, and water pollution. Simplification of the channel has resulted in the removal of floodplain areas and off-channel habitat. Effects on hydrology as a result of channel simplification have resulted in the mobilization and loss of larger substrates that provide refuge for juvenile rearing. Loss of rearing habitat for juvenile steelhead results from the removal of upstream sources of refuge habitat, such as larger bed material and large woody debris. Urbanization will continue to expand in the watershed and is likely to continue to have an effect on steelhead habitat throughout the Creek.

Green Sturgeon—Southern DPS (*Acipsenser medirostris*)

Listing Status

The southern DPS of North American green sturgeon was listed as threatened on April 7, 2006 (71 FR 17757). Critical habitat was designated on October 9, 2009 (73 FR 52300). Critical habitat encompasses the Sacramento River, lower Feather River, lower Yuba River, Yolo and Sutter Bypasses, Sacramento-San Joaquin Delta, Suisun Bay, San Pablo Bay, and San Francisco Bay.

Distribution

Green sturgeon have been found in saltwater from Ensenada, Mexico, to the Bering Sea and Japan (Miller and Lea 1972). No historical abundance data is available.

Habitat Requirements and Life Ecology

Adults of this species tend to spend more time in saltwater than the more common white sturgeon, although spawning populations have been identified in the Sacramento and Klamath Rivers (Beak Consultants 1993). Virtually all green sturgeon spawning occurs upstream of Hamilton City and as far upstream as Keswick Dam (Adams et al. 2002). Green sturgeon are believed to spawn upstream of the Red Bluff Diversion Dam. Migration of green sturgeon occurs between late February and late July in the Klamath River. Peak spawning periods occur from mid-April to mid-June. The preferred spawning substrate is thought to be large cobble, although the substrate type may range from clean sand to bedrock. Eggs are broadcast and fertilized in relatively fast-flowing water where depths typically exceed 3 meters (9.9 feet) (Moyle 2002). In the Sacramento River, green sturgeon spawn at temperatures ranging from 46 to 57°F (Beak Consultants 1993).

Current Status and Distribution

Green sturgeon are known to occur in the lower reaches of large rivers from the San Francisco Bay Delta northwards, including the Klamath, Eel, and Smith Rivers (Moyle 2002). Current distribution of the southern DPS of green sturgeon is in the Sacramento River and possibly the Feather River (Beamesderfer et al. 2004). DFG (2002) estimated green sturgeon populations based on catches of white sturgeon during the DFG sturgeon-marking program. An average abundance from years 1954 to 2001 estimate 1,509 fish per year. Monitoring at the Red Bluff Diversion Dam and the Glen Colusa Irrigation District have caught between 0 and 2,068 juvenile sturgeon per year (Adams et al. 2002). A total of 99 green sturgeon were salvaged from the Skinner Fish Facility and the Central Valley Project facility from January 1993 to February 2003. No green sturgeon were salvaged in 2004 or 2005. The total number of green sturgeon caught from 1969 to 2006 from various projects throughout the San Francisco Bay and the Sacramento River was 370 fish (DFG no date).

Recent spawning population estimates used sibling based genetics (NMFS 2011). The study indicates a spawning population of 32, 64, 44, 92, and 124 respectively from years 2002 to 2006. All these estimates were taken from fish above Red Bluff Diversion Dam, and it appears the majority of southern green sturgeon were spawning above the dam (National Marine Fisheries Service 2011).

Green sturgeon have not been documented in San Francisquito Creek, but do occur in the San Francisco Bay. It is possible sturgeon could use San Francisquito Creek for feeding.

Cumulative Effects of State and Private Actions in the Action Area

As discussed for central California coast steelhead, urbanization in the San Francisquito watershed has caused excess sedimentation, degradation of water quality, and modification of habitat. San Francisco Bay, where green sturgeon may occur, has also been affected by human activities. Projects in and around the Bay could affect green sturgeon habitat if they are reared in nearshore habitat.

California Red-Legged Frog (*Rana draytonii*)

Listing Status

California red-legged frog is currently listed as federally threatened (58 FR 38553; July 19, 1993). Revised critical habitat was designated on March 17, 2010 (75 FR 12816 12959) and encompasses portions of Los Angeles, Ventura, Santa Barbara, San Luis Obispo, Monterey, San Benito, Santa Cruz,

Santa Clara, Merced, Stanislaus, Alameda, Contra Costa, San Mateo, Marin, Sonoma, Mendocino, Solano, Napa, Calaveras, El Dorado, Placer, Yuba, Nevada, and Butte Counties. The California red-legged frog is a California species of special concern.

Distribution

The taxon is relatively common in the San Francisco Bay area and along the central coast. It is known from isolated locations in the Sierra Nevada, North Coast, and northern Transverse Ranges. The California red-legged frog is believed to be extirpated from the floor of the Central Valley (U.S. Fish and Wildlife Service 2002). The majority of California red-legged frog observations made within San Mateo County are from the San Mateo Peninsular hills and further west (California Department of Fish and Game 2012). Similarly, the majority of California red-legged frog observations made within Santa Clara County are from the Peninsular Range-Santa Cruz Mountains, the Diablo Range, and areas of the County south of San Jose away from the South Bay (California Department of Fish and Game 2012).

Habitat Requirements and Life Ecology

California red-legged frogs use a variety of habitat types; these include various aquatic systems as well as riparian and upland habitats (U.S. Fish and Wildlife Service 2002). However, they may complete their entire life cycle in a pond or other aquatic site that is suitable for all life stages (66 FR 14626). California red-legged frogs inhabit marshes; streams; lakes; ponds; and other, usually permanent, sources of water that have dense riparian vegetation (Stebbins 2003). The highest densities of frogs are found in habitats with deepwater pools (at least 2.5 feet deep) with dense stands of overhanging willows (*Salix* sp.) and a fringe of tules (*Schoenoplectus* sp.) or cattails (*Typha* sp.) (Jennings 1988; Jennings and Hayes 1994). Juvenile frogs seem to favor open, shallow aquatic habitats with dense submergent vegetation. Although California red-legged frogs can inhabit either ephemeral or permanent streams or ponds, populations probably cannot be maintained in ephemeral streams in which all surface water disappears (Jennings and Hayes 1994).

As adults, California red-legged frogs are highly aquatic when active but depend less on permanent water bodies than do other frog species (U.S. Fish and Wildlife Service 2002). Adults may take refuge during dry periods in rodent holes or leaf litter in riparian habitats (U.S. Fish and Wildlife Service 2002). Adult California red-legged frogs have been observed using large cracks in the bottom of dried ponds as refugia (Alvarez 2004). Although California red-legged frogs typically remain near streams or ponds, marked and radio-tagged frogs have been observed to move more than 2 miles through upland habitat. These movements are typically made during wet weather and at night (U.S. Fish and Wildlife Service 2002).

California red-legged frogs typically lay their eggs in clusters around aquatic vegetation from December to early April (Jennings 1988). Larvae generally undergo metamorphosis 3.5–7 months after hatching (Jennings and Hayes 1990). However, larvae have been observed to take more than a year to complete metamorphosis in four counties in the central coast of California (Fellers et al. 2001).

Current Status

The decline of the California red-legged frog is attributable to a variety of factors. Large-scale commercial harvesting of California red-legged frogs led to severe depletions of populations at the

turn of the century (Jennings and Hayes 1985). Subsequently, exotic aquatic predators such as bullfrogs, crayfish, and various species of predatory fish became established and contributed to the continued decline of the species (Hayes and Jennings 1986). Habitat alterations such as conversion of land to agricultural and commercial uses, reservoir construction which effects downstream riparian environments, and in some places unauthorized off-highway vehicle use threaten remaining populations (Zeiner et al. 1988; Jennings and Hayes 1994).

Cumulative Effects of State and Private Actions in the Action Area

As discussed for California red-legged frog, development in the San Francisquito watershed has caused habitat loss and degradation, excess sedimentation, altered hydroperiod, and degradation of water quality. Projects around the San Francisco Bay that would affect California red-legged frog habitat could directly and/or indirectly affect California red-legged frog if the species is present.

San Francisco garter snake (*Thamnophis sirtalis tetrataenia*)

Listing Status

San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) was listed as federally endangered on March 11, 1967 (32 FR 4001). The species is also a state endangered and fully protected species. No critical habitat has been designated for this species.

Distribution

Historically, San Francisco garter snakes occurred in scattered wetland areas on the San Francisco Peninsula from approximately the San Francisco County line south along the eastern and western bases of the Santa Cruz Mountains at least to the Upper Crystal Springs Reservoir, and along the coast south to Año Nuevo Point in San Mateo County, and Waddell Creek in Santa Cruz County. There are 37 California Natural Diversity Database (CNDDB) records of the species, all of which are within San Mateo County (California Department of Fish and Game 2012). Currently, although the geographical distribution may remain the same, reliable information regarding specific locations and populations status is not available. Much of the remaining suitable habitat is located on private property, and no surveys for the presence of the snake have been done. USFWS is aware that many locations that previously had healthy populations of garter snakes now have populations in decline. (U.S. Fish and Wildlife Service 2007.).

Habitat Requirements and Life Ecology

The snakes' preferred habitat is a densely vegetated pond near an open hillside where they can sun themselves, feed, and find cover in rodent burrows. However, individuals successfully occupy considerably less ideal habitats; temporary ponds and other seasonal freshwater bodies are also used. The snakes avoid brackish marsh areas because their preferred prey (California red-legged frogs) cannot survive in saline water. Emergent and bankside vegetation such as cattails (*Typha* spp.), bulrushes (*Scirpus* spp.) and spike rushes (*Juncus* spp. and *Eleocharis* spp.) apparently are preferred and used for cover. The area between stream and pond habitats and grasslands or bank sides is used for basking, while nearby dense vegetation or water often provide escape cover. Snakes also use floating algal or rush mats, if available, for escaped cover and basking habitat (U.S. Fish and Wildlife Service 2007.)

Females give live birth from June through September, with litters averaging 16 newborn. Adult snakes sometimes aestivate (enter a dormant state in summer) in rodent burrows during summer months when ponds dry. On the coast, snakes hibernate during the winter, but further inland, if the weather is suitable, snakes may be active year-round. Although primarily active during the day, captive snakes housed in an outside enclosure were observed foraging after dark on warm evenings (U.S. Fish and Wildlife Service 2007).

San Francisco garter snakes forage extensively in aquatic habitats, feeding primarily on California red-legged frogs. They may also feed on juvenile bullfrogs (*Rana catesbeiana*), but they are unable to feed on the larger adults that may actually prey on smaller San Francisco garter snakes and be a contributing factor in their decline. Newborn and juvenile San Francisco garter snakes depend heavily on Pacific treefrogs (*Hyla regilla*) as prey. If newly metamorphosed Pacific treefrogs are not available, the young may not survive. San Francisco garter snakes are also one of the few animals able to eat the toxic California newt (*Taricha torosa*) without suffering serious side effects. (U.S. Fish and Wildlife Service 2007).

Recent studies have documented San Francisco garter snake movement over several hundred yards away from wetlands to hibernate in upland small mammal burrows (U.S. Fish and Wildlife Service 2007). This species has been documented dispersing up to 590 feet (California Department of Fish and Game 1990) and migrating up to 2,201 feet (Larsen 1994). However, little recent information is available about this species' movements, likely due to the fact that much of the remaining suitable habitat is located on private property preventing extensive studies of these populations.

Current Status

Many of the threats that led to the listing of the San Francisco garter snake in 1967 continue to have an effect on the species. These included loss of habitat from agricultural, commercial, and urban development and collection by reptile fanciers and breeders. These historical threats to the species remain, but there are now additional threats to the species, such as the documented decline of the California red-legged frog (an essential prey species) and the introduction of bullfrogs into San Francisco garter snake habitat. Bullfrogs are capable of preying on both San Francisco garter snakes and California red-legged frogs. Extirpation of California red-legged frogs in San Francisco garter snake habitat is likely to cause localized extinction of the snake (U.S. Fish and Wildlife Service 2007).

Cumulative Effects of State and Private Actions in the Action Area

As discussed above, development in and along the San Francisquito watershed has resulted in habitat loss and degradation, excess sedimentation, and altered hydroperiod of San Francisco garter snake habitat. Projects around the San Francisco Bay that would affect San Francisco garter snake habitat could affect the species if it is present, and could affect future opportunities to occupy suitable habitat.

Western Snowy Plover (*Charadrius alexandrines nivosus*)

Listing Status

Western snowy plover (*Charadrius alexandrines nivosus*) is federally threatened (53 FR 45788) and a state species of special concern. Critical habitat was designated for this species in 2005 (76 FR 16055–16056). The designation equated to 24 critical habitat units in California, totaling 7,477

acres. Revised critical habitat was finalized for this species on June 19, 2012 (77 FR 36728–36869). Under the 2012 revised critical habitat designation, there is a total of 16,337 acres designated in California. No critical habitat is located within the action area, but the nearest unit of the species' critical habitat to the action area (Unit 14) is located fairly nearby, immediately south of the Dumbarton Bridge.

Distribution

The Pacific coast population of the snowy plover includes birds that nest adjacent to tidal waters of the Pacific Ocean as well as all nesting birds on the mainland coast, peninsulas, offshore islands, adjacent bays, estuaries, and coastal rivers. The current known breeding range of this population extends from Damon Point, Washington, to Bahia Magdelena, Baja California, Mexico. Snowy plovers that are inland nesters are not included as part of the Pacific coast population, although they may migrate to coastal areas during winter months (U.S. Fish and Wildlife Service 2011).

Habitat Requirements and Life Ecology

The Pacific coast population of the western snowy plover breeds primarily on coastal beaches from southern Washington to southern Baja California, Mexico (U.S. Fish and Wildlife Service 2011). Plovers nest on the ground typically in the open on sandy beaches (Page et al. 2009). The population breeds above the high tide line on coastal beaches, sand spits, dune-backed beaches, sparsely vegetated dunes, beaches at creek and river mouths, and salt pannes at lagoons and estuaries. Less common nesting habitat includes bluff-backed beaches, dredged material disposal sites, salt pond levees, dry salt ponds, and river bars. Suitable nesting habitat is distributed throughout the listed range, but may be widely separated by areas of rocky shoreline (U.S. Fish and Wildlife Service 2011).

This species feeds in beaches, tide flats, river mouths, lagoon margins, salt flats, and salt ponds. At beaches, it gathers food from above and below the mean high tide, from wet and dry sand as well as in very shallow water (Page et al. 2009).

The Pacific coast population of the western snowy plover consists of both migrants and year-round residents (Page et al. 2009). Migrant birds leave nesting areas in late summer or fall and generally return in early spring. These birds travel north or south to wintering areas extending from Bandon, Oregon, to San Carlos, Baja Sur, Mexico (Page et al. 2009).

Pair formation generally occurs in February but varies depending on whether a bird is a migrant or resident. Multiple scrapes are typically constructed for courtship before one is chosen by the female for egg-laying. Egg-laying begins the first or second week of March for the Pacific coast population. Typical clutch size is three eggs, although five or six eggs are usually seen in nests belonging to two females. Multiple clutches are typical, and nests seldom are reused because the wind often destroys them within days of eggs hatching. (Page et al. 2009.)

Current Status

From 2001 to 2005, the size of the breeding population of plovers in Recovery Unit 2 has ranged from 60 to 74 adults, with the non-breeding population likely exceeding 100 birds. Reproductive success in Recovery Unit 2 during this time period has ranged from 0.8 to 1.7 fledglings per adult male. In recent years, nesting has occurred at the following locations in northern California: Gold Bluffs Beach, Big Lagoon, Clam Beach, South Spit, Eel River Wildlife Area, Centerville Beach, Eel

River gravel bars, Brush Creek, Ten Mile River, and Virgin Creek (U.S. Fish and Wildlife Service 2011).

Declines in this species are generally due to poor reproductive success, resulting from human disturbance, predation, and inclement weather, combined with permanent or long-term loss of nesting habitat due to encroachment of non-native European beachgrass (*Ammophila arenaria*) and urban development. Specifically, human disturbance (walking, jogging, running pets, horseback riding, and vehicle use) at breeding sites (i.e., beaches) are major factors in the ongoing decline in breeding sites and populations (U.S. Fish and Wildlife Service 2011).

Cumulative Effects of State and Private Actions in the Action Area

As discussed above, development along the San Francisquito watershed and San Francisco Bay has resulted in habitat loss and degradation, excess sedimentation, altered hydroperiod, and erosion of western snowy plover nesting habitat. Projects around the San Francisco Bay that would affect western snowy plover nesting habitat could affect the species if it is present, and could affect future opportunities to occupy suitable habitat.

California Clapper Rail (*Rallus longirostris obsoletus*)

Listing Status

The California clapper rail (*Rallus longirostris obsoletus*) is state and federally listed as endangered (35 FR 16047 16048) and listed as fully protected by the state. The species was listed by the California Fish and Game Commission pursuant to the California Endangered Species Act (Fish and Game Code, Sections 2050 et seq.) on June 27, 1971, and by the U.S. Fish and Wildlife Service pursuant to the federal Endangered Species Act on October 13, 1970 (35 FR 8491). Critical habitat has not been designated for this species.

Distribution

Historically, California clapper rail were abundant in all tidal salt and brackish marshes in the San Francisco Bay vicinity, with their range extending northward to coastal tidal marshes in Humboldt Bay and southward to Morro Bay. The largest populations of California clapper rail could be found in the salt marshes of south San Francisco Bay, including portions of San Mateo, Santa Clara, and Alameda Counties (U.S. Fish and Wildlife Service 2010). The current distribution of this species is restricted almost entirely to the tidal marshes of San Francisco estuary, including San Francisco Bay, San Pablo Bay, Suisun Bay, and associated tidal marshes; the only known breeding populations occur in these areas (California Department of Fish and Game 2000).

Habitat Requirements and Life Ecology

California clapper rail occur in salt and brackish marshes throughout their range and has only rarely been recorded in nontidal marsh areas (U.S. Fish and Wildlife Service 2010). The vegetation dominating the marshes this species uses includes pickleweed (*Sarcocornia* spp.), Pacific swampfire (*Sarcocornia pacifica*), Pacific cordgrass (*Spartina foliosa*), gumplant (*Grindelia* spp.), saltgrass (*Distichlis spicata*), alkali heath (*Frankenia grandifolia*), and jaumea (*Jaumea carnosa*). California clapper rail prefers areas that receive direct tidal circulation; its preferred foraging habitat includes areas of shallow water and mudflats with abundant invertebrate populations (Foerster et al. 1990).

Small tidal channels with banks covered by dense vegetation are important habitat features for this species, providing foraging habitat as well as covered travel routes (Keldsen 1997; Garcia 1995). Foraging mainly occurs in the lower and middle marsh zones at low tide, while higher marsh and transitional zones with dense vegetation are used for nesting and high-tide refugia (Harvey 1988; Foerster et al. 1990; Evens and Collins 1992; Collins et al. 1994).

Additional factors that influence the quality of marsh habitat for this species include marsh size, location relative to other marshes, presence of buffers or transitional zones between marshes and upland areas, marsh elevation, and hydrology (Collins et al. 1994; Albertson 1995). Population density is highest on habitat patches greater than 100 hectares (247 acres) (Collins et al. 1994).

California clapper rails are not migratory and exhibit strong site fidelity; 78 percent of resightings were within 1,640 feet (500 meters) of the original capture site in a U.S. Fish and Wildlife Service banding study conducted in the mid-1980s (cited in U.S. Fish and Wildlife Service 2010). The average home range of this species was found to be 11.6 acres (4.7 hectares) in a 1991–1992 radiotelemetry study conducted in south San Francisco Bay (Albertson 1995). Additionally, the average core use area was 2.2 acres (0.9 hectare) in this study (Albertson 1995). In general, average home ranges expanded during the breeding season.

In this species, pair bonding and nest building are generally initiated in mid-February, with nesting beginning in late February or early March and extending through July or August (Evens and Page 1983; U.S. Fish and Wildlife Service 2010). Nest site selection is important; nests must be built at an elevation that protects the nest bowl from inundation during high tides, to prevent the nest from being damaged and subsequent abandonment (Evens and Collins 1992; Collins et al. 1994). Nesting generally occurs in the upper-middle to high tidal marsh zones, with vegetation 20 inches high or greater near mean high water to allow for nest concealment and prevent inundation (U.S. Fish and Wildlife Service 2010). Estimates of clutch size range from five to 14 eggs (DeGroot 1927; Gill 1972), with both sexes taking part in incubation, which lasts 18–29 days (Taylor 1996). The reproductive success of California clapper rail is below the natural potential, and this species experiences a low hatching success rate, when compared to other species of clapper rails (Schwarzbach et al. 2006; U.S. Fish and Wildlife Service 2010).

Current Status

Gill (1979) estimated the California clapper rail population at 4,200–6,000 birds in the years 1971–1975. Harvey (1988) then estimated the population at 1,500 birds between 1981 and 1987; the disparity between these results has been attributed to differences in survey intensity (U.S. Fish and Wildlife Service 2010). An all-time low estimate of 500 birds was reached in 1991 (Harding et al. 1998). Surveys in the late 1990s indicated that the North and South Bay populations contained approximately 500–600 birds each (California Department of Fish and Game 2000). Subsequent surveys by Point Reyes Bird Observatory (PRBO) Conservation Science have indicated a slight increase in population numbers, with 938 individuals detected in 2007, 543 in 2008, 500 in 2009, and 601 detected in 2010 (PRBO Conservation Science 2009, 2010, 2011).

A number of factors threaten this species' survival. California, and the San Francisco Bay area specifically, has lost a large portion of coastal wetland habitat to urban and industrial development. Remaining habitat continues to be disturbed and degraded. Much of the remaining marsh habitat has been fragmented by levee systems that reduce and isolate patches of habitat and reduce high marsh and refugial habitat, while increasing human and predator accessibility to patches of

remaining habitat. Many areas of marsh habitat have been exposed to contaminants, land subsidence, and the spread of nonnative saltmarsh vegetation, all of which degrade habitat for this species. Additionally, some areas of salt marsh have been converted to less suitable brackish/fresh marsh by urban fresh wastewater discharges. Other threats include increased predation by avian and mammalian predators due to the availability of human-made structures for roosting and access routes and disturbance from recreational access, including humans and dogs (U.S. Fish and Wildlife Service 2010).

California clapper rail management and conservation generally includes protection of existing habitat, control of invasive marsh plants and hybrids, and reduction of recreation-based human disturbance. According to the *Draft Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California* (U.S. Fish and Wildlife Service 2010), the strategy for recovery of the California clapper rail involves the following.

- The protection and management of marsh complexes where core populations exist in the Central/Southern San Francisco Bay Recovery Unit, where each population must have a minimum area of 1,250 acres of contiguous high-quality marsh habitat for this species.
- The protection and management of marsh complexes where core populations exist in the San Pablo Bay Recovery Unit, where each population must have a minimum area of 2,500 acres of contiguous high-quality marsh habitat for this species.
- The protection and management of marsh complexes where core populations exist in the Suisun Bay Area Recovery Unit, where the population must have a minimum area of 5,000 acres of contiguous high-quality marsh habitat for this species.
- The protection and management of 800 acres of contiguous high-quality marsh habitat for this species at Tomales Bay, in the event of a catastrophic event within San Francisco Bay.
- Control of invasive *Spartina alterniflora* and its hybrids.
- Implementation of management plans to reduce recreation-based human disturbance to rails.
- Development and implementation of a predator management plan for all areas with significant predation issues.

Cumulative Effects of State and Private Actions in the Action Area

As discussed above, development in and along the San Francisco Bay has resulted in habitat loss and degradation, excess sedimentation, increased erosion, and altered hydroperiod of California clapper rail habitat. Projects around the San Francisco Bay that would affect California clapper rail habitat could affect the species if it is present, and could affect future opportunities to occupy suitable habitat.

California least tern (*Sternula antillarum browni*)

Listing Status

The California least tern (*Sternula antillarum browni*) is state and federally listed as endangered. The species was listed by the California Fish and Game Commission pursuant to the California Endangered Species Act (Fish and Game Code, Sections 2050 et seq.) on June 27, 1971, and by the

U.S. Fish and Wildlife Service pursuant to the federal Endangered Species Act on October 13, 1970 (35 FR 8491). Critical habitat has not been designated for this species.

Distribution

The California least tern, the smallest of the five recognized North American subspecies of *S. antillarum*, is the only subspecies that occurs in California (Thompson et al. 1997). The historical breeding range of the California least tern was described as extending along the Pacific Coast from approximately Moss Landing to the southern tip of Baja California (Grinnell and Miller 1944). However, since about 1970, colonies have been reported north to San Francisco Bay (U.S. Fish and Wildlife Service 2006). The nesting range in California is somewhat discontinuous due to the availability of suitable estuarine shorelines, where California least terns often establish breeding colonies. Marschalek (2006) identifies six geographic population clusters along the Pacific Coast in California including San Diego, Camp Pendleton, Los Angeles/Orange County, Ventura County, San Luis Obispo/Monterey County, and San Francisco Bay. The majority of the California population is concentrated in three counties: San Diego, Orange, and Los Angeles. Little reliable historical information on breeding populations exists. The first statewide surveys were conducted in 1969–70 (Craig 1971). Annual breeding surveys began in 1973 (Bender 1974) and continue to the present (Marschalek 2009). Recent statewide surveys estimated between 6,744 and 6,989 breeding pairs in California, with approximately 85 percent of the breeding colonies occurring in Southern California and only a small percentage (6.3 percent) occurring in the San Francisco Bay area (Marschalek 2009). Statewide, the trend in the breeding population has been dramatic since state and federal listing of the California least tern, from only several pairs in the late 1960s to a current estimate of 6,998 and 7,698 pairs (Marschalek 2009). Marschalek (2009) monitored six active breeding colonies in the San Francisco Bay area in 2008 with a total number of breeding pairs estimated at approximately 443. Colony sites included Alameda Point, Hayward Regional Landing, and Eden Landing on the western edge of Alameda County; Green Island at the southern tip of Napa County; the Pittsburg Power Plant in northern Contra Costa County; and the Montezuma Wetlands at the southern edge of Solano County. Approximately 73 percent (323) of the breeding pairs were documented at the Alameda Point site. The remaining sites included between two and 57 breeding pairs (Marschalek 2009).

Habitat Requirements and Life Ecology

California least terns are migratory and are present at nesting areas from mid-April to late September (Massey 1974; Cogswell 1977; Anderson and Rigney 1980; Patton 2002). Wintering areas are largely unknown, but are suspected to be along the Pacific Coast of Central and South America (Massey 1977).Nesting colony sites are selected that are free of human or predatory disturbance. The availability of such sites is a limiting factor for the species. Nest sites are shallow depressions without nesting material, typically in barren sandy or gravelly substrate near water.

California least terns nest in loose colonies on barren or sparsely vegetated sandy or gravelly substrates above the high tide line along the coastline and in lagoons and bays of the California coast. Coastal colonies are typically located on sandy shorelines that are kept free of vegetation from tidal action. Colonies are always near water that provides foraging opportunities. Foraging typically occurs in shallow estuaries or lagoons (Thompson et al. 1997; U.S. Fish and Wildlife Service 2006). In the San Francisco Bay area, nesting colonies are typically located in abandoned salt ponds and along estuarine shores, often using artificially or incidentally created habitat (Rigney and Granholm

2005; Marschalek 2008). Foraging occurs in the bay or large river estuaries. California least terns roost on the ground. Prior to egg-laying, adults generally roost away from nest sites, from 0.25 miles at coastal sites to several miles at estuarine sites. This behavior is thought to be in response to predator avoidance (U.S. Fish and Wildlife Service 2006). California least terns are very gregarious and nest, feed, roost, and migrate in colonies. California least terns are highly sensitive to nest disturbance and will readily abandon nest sites if disturbed (Davis 1974).

Courtship generally occurs during April and May and usually takes place away from the nesting area on exposed tidal flats or beaches. Nesting begins by mid-May (Massey 1974). Clutch size ranges from one to four eggs and is usually two or three, with a single brood raised each year. Incubation is usually 20–25 days, and young are fledged by 28 days, but continue to depend on adults for an additional two weeks (Rigney and Granholm 2005). No information is available on home range size. Nests are typically spaced 1 to 5 meters (3 to 16 feet) apart, and an approximately 1-meter radius area around the nest is defended by the adults (Thompson et al. 1997). The California least tern feeds in shallow estuaries and lagoons for small fish including anchovies (*Engraulis* spp.), silversides (*Atherinops* spp.), and shiner surfperch (*Cymatogaster aggregata*) (Rigney and Granholm 2005). It hovers above the water, then plunges, but does not completely submerge. It will also forage in the shallow tidal zone of the open ocean and in bays (Cogswell 1977; Rigney and Granholm 2005).

Current Status

The degradation and disturbance of suitable estuarine shoreline habitat is the primary reason for the historical reduction of California least tern populations. Most extant colonies occur on small patches of degraded nesting habitat surrounded on all sides by human activities. The majority of colony sites are in areas that were incidentally created during development projects. There is no other available natural habitat for expansion or dispersal other than artificial or incidentally created nesting habitat. Further expansion and recovery of the California least tern population may require the creation or restoration of habitat (U.S. Fish and Wildlife Service 2006).

Human disturbance was noted as early as the mid-1920s as a factor in causing colony abandonment and population declines (Schneider 1926 in: Rigney and Granholm 2005), and is still considered a major threat to remaining colonies (Garrett and Dunn 1981; Marschalek 2009). There is no suitable natural habitat in California that is free of development, military, or recreation-related human disturbances; thus, opportunities for the species to develop new breeding territories are mostly restricted to artificially or incidentally created habitat. Fencing has been used to prohibit entry into colony sites, but this also restricts the movement of birds and has led to nesting failures (U.S. Fish and Wildlife Service 2006).

Predation is regarded as the most significant threat to existing colonies. Marschalek (2009) reports 45 avian and mammalian predators or suspected predators of California least tern colonies in 2008. Most depredated terns were taken by American crow (*Corvus brachyrhynchos*), gull-billed tern (*Sterna nilotica*), common raven (*Corvus corax*), and coyote (*Canis latrans*). Peregrine falcon (*Falco peregrinus*), American kestrel (*Falco sparverius*), burrowing owl (*Athene cunicularia*), northern harrier (*Circus cyaneus*), and black skimmer (*Rynchops niger*) were also responsible for a significant proportion of predation events. Marschalek (2009) calculated that 1686–1693 eggs, 304–443 chicks, 73–100 fledglings, and 28 adults were lost to predation events in 2008.

Several conservation efforts to benefit the species' numbers have been implemented. In addition to the guidance provided by the federal recovery plant (U.S. Fish and Wildlife Service 1985), which

establishes 23 coastal management areas, and state and federal laws and regulations, conservation efforts include the following.

- U.S. Marine Corps, Camp Pendleton Integrated Natural Resources Management Plan. Provides specific direction regarding least tern protection and conservation on the military base.
- San Diego Unified Port District. Conducts monitoring and management of least tern colonies on their properties around San Diego Bay as well as public information programs.
- San Diego Multiple Species Conservation Program. Addresses conservation of California least tern within its planning area.
- Feeding ecology and monitoring studies at the Alameda Point colony by the Point Reyes Bird Observatory.
- Predator control programs – cooperative agreements and efforts by Navy, Marine Corps, and theUSFWS and Animal Damage Control.
- California Coastal Management Program, administered by the California Coastal Commission in accordance with the Coastal Zone Management Act, requires a review, permit, and appeal process; implementation of local coastal programs; and a federal consistency review to guide development along the coast.
- Protection under the Migratory Bird Treaty Act of 1918.
- Audubon efforts to use decoys and recorded calls to lure terns to protected habitat that offer a better chance at breeding success.
- Los Angeles trash removal and invasive plant control at nesting sites by local community groups and government agencies.

Cumulative Effects of State and Private Actions in the Action Area

As discussed above, development in and along the San Francisco Bay has resulted in habitat loss and degradation as a result of increased erosion of California least tern nesting habitat. Projects around the San Francisco Bay that would affect California least tern nesting habitat could affect the species if it is present, and could affect future opportunities to occupy suitable habitat.

Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*)

Listing Status

The USFWS listed the salt marsh harvest mouse (*Reithrodontomys raviventris*) as endangered in 1970 (35 FR 16047). The State of California listed the mouse as endangered in 1971 (Fish and Game Code, Sections 2050 et seq.). The salt marsh harvest mouse is also designated as a state fully protected species. A recovery plan for the species was prepared in 1984 and is currently under revision. Critical habitat has not been designated for this species.

Distribution

The salt marsh harvest mouse is a small native rodent endemic to the salt marshes of San Francisco, San Pablo, and Suisun Bays. The historical range of the species likely included most of the marshland in the San Francisco Bay area. Closely associated with saline habitats, the species' eastern

distribution is generally considered to extend as far as approximately Collinsville. The waters of wetlands and marshes east of this point are currently considered too fresh to support the habitat of this species (U.S. Fish and Wildlife Service 2001).

The species has been divided into two subspecies. The southern subspecies (*R. r. raviventris*) occurs in the marshes of Corte Madera, Richmond, and South San Francisco Bay. The northern subspecies (*R. r. halicoetes*) is found in the marshes of San Pablo and Suisun Bays, from San Rafael Bridge to approximately Collinsville on the north and from Martinez to Pittsburg on the south (U.S. Fish and Wildlife Service 2001).

Today, the species potentially occupies an area representing approximately 15 percent of the historical salt marsh habitat that formerly occurred in the San Francisco Bay area (Dedrick 1989). Much of this remaining habitat, isolated by dikes and landfill, is subject to backfilling, subsidence, and vegetation changes, making it unable to support harvest mice (Shellhammer 1989). Thus, the remaining 26 populations are small and separated by large areas of unsuitable habitat.

Habitat Requirements and Life Ecology

The salt marsh harvest mouse is buff or brownish in color and has a long bicolored tail, large ears, and grooves in the outer surface of its upper incisors. The underside is variable, ranging from white to a cinnamon- or rufous-colored belly. Adult salt marsh harvest mice are 118–175 millimeters in length and weigh between 0.28 and 0.42 ounces (8 and 12 grams). The maximum life expectancy for salt marsh harvest mice is generally considered to be approximately 1 year; however, California Department of Water Resources (DWR) data indicate that the life expectancy can be longer (Patterson pers. comm.). A generally solitary animal outside of the breeding season, this species typically remains beneath the canopy of dense low-lying vegetation and will sometimes use the ground runways of other rodents. Active year-round and primarily at night, this species responds to tidal action and can escape tidal or seasonal flooding by swimming or climbing, and will move into adjoining grasslands during the highest winter tides. Grasslands are otherwise used as habitat primarily when new grass growth affords suitable cover in spring and summer months. These movements probably occur only on a daily basis and do not represent a seasonal shift in habitat use. Young are able to disperse considerable distances, but can be restricted with fragmentation of suitable marsh habitats (Fisler 1965; Shellhammer et al. 1982; LSA Associates 2007).

Salt marsh harvest mice breed from spring through autumn, with females reproductively active from March to November. The breeding season for *R. r. raviventris* usually begins in March, and the breeding for *R. r. halicoetes* begins approximately 2 months later, in May (Fisler 1965). Adults typically construct an aboveground nest of grasses and sedges about 150–175 millimeters (6–7 inches) in diameter. They sometimes construct the nest on top of bird nests and have been reported to use the nests of song sparrows. Females have a relatively low reproductive potential, bearing an average of four young per litter, following a gestation period of 21–24 days. Also, while *R. r. raviventris* often produces two litters per year, *R. r. halicoetes* usually produces only one due to the shorter breeding season (Fisler 1965). Adults make up the majority of the population. Reproduction can also be suppressed by increasing populations of California meadow voles (*Microtus californicus*), which respond to decreasing salinities and vegetation cover. In years when *Microtus* populations are high, breeding for salt marsh harvest mice is suppressed further into the spring. If *Microtus* populations are high enough in a given area, populations of harvest mice can be reduced to the point of local extirpation. However, when water salinities and vegetation cover increase, harvest mice

have a competitive edge due to their ability to withstand higher salinities in the water and food, and populations can recover (Geissel et al. 1988).

The diet of the salt marsh harvest mouse consists of seeds, grasses, forbs, and insects. During winter, fresh green grasses are preferred. During the rest of the year, the stems and leaves of pickleweed and saltgrass are main food sources (Fisler 1965). As noted, salt marsh harvest mice can tolerate high salinities in both food and drink intake, which can give them a competitive advantage over Microtus when the salinity of the marsh increases (Geissel et al. 1988).

Salt marsh harvest mice depend on dense cover of native halophytes (salt-tolerant plants). Pickleweed (*Sarcocornia pacifica*, formerly *Salicornia virginica*) is the species' primary habitat (Shellhammer 1977). Deep (60–75 centimeters) and dense pickleweed, intermixed with fat hen (*Atriplex patula*) and alkali heath (*Frankenia grandifolia*), is preferred. Salt marsh harvest mice are rarely found in alkali bulrush (*Schoenoplectus maritimus*), pure stands of salt grass (*Distichlis spicata*), or cordgrass (*Spartina* spp.) (Shellhammer et al. 1982), which can displace pickleweed. However, more recent research has documented the species in dense stands of three-square bulrush (*Schoenoplectus americanus*) in densities similar to that found in pickleweed (Patterson pers. comm.). Non-submerged escape cover is also required during high tides (Shellhammer et al. 1982). Fisler (1965) reported that populations can be concentrated on high marsh levels during periods of high tides. They have also been found in the top zone of tidal marshes and in transitional zones, which rarely flood (Shellhammer 1989). They will also move into adjacent grasslands during high tides. Fisler (1965) and Shellhammer et al. (1982) reported that the species will occupy adjoining grasslands during the highest winter tides and will occasionally use grasslands during spring and summer, when new growth affords sufficient cover. Western Ecological Services Company (WESCO) (1991) also reported use of nontidal uplands up to 150 feet from the wetland edge. Further, Sustaita et al. (2011) found salt marsh harvest mouse populations in Suisun Marsh managed wetlands in equal or higher abundance than in adjacent tidal brackish marsh.

Current Status

Loss and degradation of tidal marsh habitats continue to be the most significant threat to the salt marsh harvest mouse and other tidal marsh species. Tidal marshes have been reduced by 84 percent since historical times (Dedrick 1989). The loss and fragmentation of suitable habitats from commercial and residential development have isolated populations and reduced dispersal opportunities. The loss of tidal marsh habitat through filling and diking has largely been curtailed. However, other current factors associated with declining populations include the conversion of salt marshes to brackish marshes due to freshwater discharges from sewage treatment plants; introduction of nonnative cordgrass, saltgrass, and other plant species; predation by nonnative red foxes and feral cats; and invasion of runoff, industrial discharges, and sewage effluent (Shellhammer et al. 1982; California Department of Fish and Game 2000; LSA Associates 2007). Probably the most significant long-term issue is the predicted sea level rise as high as 1.2 meters within this century.

Several tidal marsh restoration projects are also planned or being implemented within the range of the salt marsh harvest mouse and are expected to benefit the species. These projects, implemented through the direction or support of the San Francisco Bay National Wildlife Refuge, National Biological Service, East Bay Regional Park District, Regional Water Quality Control Board, California Department of Fish and Game, and the City of San Jose include the following:

- Restoration of the 1,500-acre Napa Marsh Unit in the Napa River in the North Bay.

- Restoration of the Knapp Property, a 452-acre former salt pond in the Alviso area, on the edge of the bay, between Alviso and Guadalupe Sloughs.
- Enhancement of the 325-acre Oro Loma Marsh, an area of diked salt marsh and adjacent uplands located along the shore of Hayward. The area will be restored to tidal marsh and seasonal wetland habitat.
- Restoration of the Baumberg Tract, an 835-acre inactive salt evaporator in Hayward, to tidal marsh and seasonal wetlands.
- Restoration of the Moseley Tract, located just north of the west approach to the Dumbarton Bridge from the Port of Oakland.
- A proposal to cover salt marsh harvest mouse under the Solano County Multispecies Habitat Conservation Plan.

In addition, several facilities have been construction in the Suisun Marsh to protect and improve water quality and protect and enhance wildlife habitat including:

- Roaring River Distribution System (1979–80).
- Morrow Island Distribution System (1979–80).
- Goodyear Slough Outfall (1979–80).
- Suisun Marsh Salinity Control Gates (1988).
- Cygnus and Lower Joyce Facilities (1991).

Cumulative Effects of State and Private Actions in the Action Area

As discussed above, development in and along the San Francisco Bay has resulted in habitat loss and degradation, excess sedimentation, altered hydroperiod, and increased erosion of salt marsh habitat. Projects around the San Francisco Bay that would affect salt marsh harvest mouse habitat could affect the species if it is present, and could affect future opportunities to occupy suitable habitat.

California Seablite (*Suaeda californica*)

Listing Status

California seablite was federally listed as endangered on December 23, 1991 (56 FR 66400 66408). The species is ranked 1B.1 under the California Rare Plant Rank system, indicating that this species is rare throughout its range and is endemic to California. Critical habitat has not been designated for this species.

Distribution

California seablite's range is restricted to the Central Coast region. This range includes portions of Alameda, Santa Clara, and Contra Costa Counties. In these counties, six occurrences have been documented, and of these, four are presumed to be extant (California Department of Fish and Game 2012). Documented historical CNDDB occurrences include Bay Farm Island (Alameda), Albany, and San Leandro, Alameda County; these populations have been extirpated. Current known locations

include Morro Bay and Cayucos Point in San Luis Obispo County, several reintroduced populations on the San Francisco Peninsula (Crissy Field, Pier 94 and Pier 98), and in Emeryville at Eastshore State Park (Bloom 2007). Future reintroductions are planned for Berkeley, San Leandro, and Oakland in Alameda County (Baye 2007).

Habitat Requirements and Life Ecology

California seablite is a perennial partially woody shrub in the goosefoot family (*Amaranthaceae*) with a low-growing habit, several sprawling branches supporting succulent linear leaves, and inconspicuous dull green axillary flowers. This species blooms from July to October. Suitable habitat is sandy upper salt marshes and sandy or estuarine beaches in the high tide line.

Current Status

The habitat of California seablite may have been naturally rare, but urban, port, and airport development along the East Bay and the elimination of the Bay Farm Island significantly contributed to the extirpation of the San Francisco Bay population. The Morro Bay population has been relatively stable in number, where habitat for California seablite is still relatively abundant. Additionally, shoreline erosion, dune migration, and high variances in fluctuating water levels cause changes and disturbances to the amount of available suitable habitat and, consequently, the number of individuals in each population (U.S. Fish and Wildlife Service 2010).

Cumulative Effects of State and Private Actions in the Action Area

As discussed for California seablite, development in and along the San Francisco Bay has caused habitat loss and degradation and increased erosion. Projects around the San Francisco Bay that would affect California seablite habitat could affect the species if it occupies the habitat, and could affect future opportunities to occupy suitable habitat.

Status of Critical Habitat

Within the action area, critical habitat is designated for central California coast steelhead and green sturgeon. The primary constituent elements in the action area include freshwater rearing habitat and freshwater migration corridors that have adequate substrate, water quality and quantity, temperature, velocity, cover/shelter, food, riparian vegetation, space and safe passage conditions.

Central California Coast Steelhead

Degradation of critical habitat for central California coast steelhead is the result of human-induced factors such as urbanization, stream channelization, wetland loss, water withdrawals, and artificial propagation. Effects include alteration of stream bank and channel morphology, alteration of water temperatures, loss of spawning and rearing habitat, fragmentation of habitat, degradation of water quality, removal of riparian vegetation resulting in increased stream bank erosion, increases in sedimentation in streams from upland areas, loss of shade, and loss of nutrient inputs (Busby et al 1996, 70 FR 52488). Depletion and storage of stream flows have disrupted the natural hydrologic cycles in many streams. Alteration of flows results in migration delays, loss of suitable habitat due to dewatering and blockage, stranding of fish from rapid flow fluctuations, entrainment of juveniles into poorly screened or unscreened diversion, and increased water temperatures harmful to

salmonids. Overall, current condition of central California coast steelhead critical habitat is degraded and may not provide the conservation value necessary for the recovery of the species (National Marine Fisheries Service 2011).

Status of Critical Habitat within the Action Area

The stream channel in the action area is tidally influenced and is used for migration. Adults use this section of the Creek during winter and spring, and smolts emigrate out to the ocean during the spring. Substrate is silt and mud, and water is brackish, so no spawning can occur. The channel is heavily channelized, and some areas are armored with concrete to prevent erosion. Bank vegetation is dominated by ruderal vegetation. Although the stream channel in the action area does not provide spawning and rearing habitat for central California coast steelhead, the upper portion of San Francisquito Creek does support spawning and rearing. Overall, critical habitat in San Francisquito Creek is degraded due to barriers upstream, channelization, limited pool development and overwintering habitat, and poor water quality conditions (National Marine Fisheries Service 2011). Spawning habitat is also degraded due to sedimentation (Jones & Stokes 2006).

Green Sturgeon

As with central California coast steelhead, alteration of flows has led to degradation of water quality and quantity, resulting in effects on migration of green sturgeon. Additionally, the alterations to the Sacramento-San Joaquin River Delta may have a strong effect on survival and recruitment of juvenile green sturgeon because of the time they spend rearing in the Delta and estuary. Loss of juveniles has an effect on all year classes for decades to follow (National Marine Fisheries Service 2011).

Status of Critical Habitat within the Action Area

For green sturgeon, the action area provides suitable rearing habitat in the tidal portions of the channel. However, the overall condition of the habitat is poor due to lack of emergent marsh, limited depth and cover, and reduced channel complexity (National Marine Fisheries Service 2011).

California Red-Legged Frog

The loss and alteration of aquatic habitat, namely breeding habitat, have had an effect on California red-legged frog, resulting from development, the alteration of flows, excess sedimentation, and erosion. The introduction of nonnative predators (e.g., bullfrog [*Rana catesbeiana*] and mosquito fish [*Gambusia affinis*]) has led to reduced recruitment and, in some cases, elimination of California red-legged frog from suitable habitat.

Status of Critical Habitat within the Action Area

The action area does not include areas of critical habitat, nor is it adjacent to critical habitat for this species.

Western Snowy Plover

The loss and alteration of nesting habitat has affected western snowy plover, resulting from shoreline development, levee construction, and increased erosion. Human-derived disturbance and the introduction of nonnative plant species (e.g., European beachgrass [*Ammophila arenaria*]) has

altered habitat and stabilized areas of open sand, resulting in the unsuitability of habitat for nesting activities.

Status of Critical Habitat within the Action Area

The action area does not include areas of critical habitat, nor is it adjacent to critical habitat for this species.

Effects of the Proposed Action

Assessment Approach

The assessment of effects on listed species was conducted using the following analytical steps:

- Identify the physical, chemical, or biological stressors resulting from the action.
- Describe the observed or predicted responses of fish and wildlife to these stressors.
- Estimate the number or relative abundance of individuals potentially affected by the action (based on the spatial and temporal overlap between the stressor and listed species/life stage).
- Estimate the probable response of the individuals or population to the action.

The Project has both short- and long-term effects. For both central California coast steelhead and green sturgeon, short-term effects, which are caused primarily by construction activities, include potential disturbance or harassment of fish from noise and degradation of water quality from increased suspended sediment and turbidity, potential mortality or physiological stress from spills of toxic substances, and modification to nearshore and instream habitat. Long-term effects resulting from operation and maintenance include noise and disturbance. Also long term habitat effects are expected from tidal marsh restoration activities.

Construction Effects

Central California Coast Steelhead and Green Sturgeon

Disturbance

Central California coast steelhead are known to occur within San Francisquito Creek year-round, with adults migrating through the action area and juveniles potentially rearing in the action area. Construction activities for each Project element would occur near suitable habitat for these species and could disturb individuals present in San Francisquito Creek. Such an effect would be considered an adverse effect.

Central California coast steelhead will be protected during construction by Project Conservation Measures to protect biological resources as discussed above. These include evaluating the stream and native aquatic vertebrates if these are present and relocating individuals as appropriate. Further, implementation of worker awareness training required for all construction personnel and Measure 16 (implement avoidance measures for steelhead trout prior to construction activities) would reduce this effect to a level not likely to adversely affect central California coast steelhead.

Green sturgeon are not known to use San Francisquito Creek, but could be present in the Bay within the action area. Construction activities would occur upstream of the Bay so green sturgeon are unlikely to be affected by noise and disturbance.

Sediment and Turbidity

Construction-related ground disturbance could result in increased delivery of sediment into San Francisquito Creek, depending on the location of the work. This disturbance has potential to degrade habitat immediately adjacent to the Project work site, which receives direct sediment input, and could also degrade downstream habitat to the extent that fine sediment is carried downstream. In both cases, the areas of principal concern are those that support habitat for steelhead and green sturgeon in San Francisquito Creek and the Bay.

High concentrations of suspended sediment can have both direct and indirect effects. The severity of these effects depends on the sediment concentration, duration of exposure, and sensitivity of the affected life stage. Short-term increases in turbidity and suspended sediment could disrupt feeding activities or result in avoidance or displacement of fish from preferred habitat. Chronic exposure to high turbidity and suspended sediment could also affect growth and survival by impairing respiratory function, reducing tolerance to disease and contaminants, and causing physiological stress (Waters 1995). Such effects would be adverse.

The District routinely implements comprehensive BMPs to protect water quality during construction. Project construction work would also require implementation of a SWPPP, providing further oversight. As discussed above under *Water Quality Protection*, these BMPs have been adopted as Conservation Measures. With adherence to these Conservation Measures, the effect would be not likely to adversely affect central California coast steelhead or green sturgeon.

Contaminants

During construction, the potential exists for spills or leakage of toxic substances to enter San Francisquito Creek and the Bay. Refueling and operation and storage of construction equipment and materials could result in accidental spills of pollutants (e.g., fuels, lubricants, concrete, sealants, oil). High concentrations of contaminants can cause direct (sublethal to lethal) and indirect effects on fish. The severity of these effects depends on the contaminant, concentration, duration of exposure, and sensitivity of the affected life stage. Sublethal effects include increased susceptibility to disease that reduces the overall health and survival of the exposed fish. An indirect effect of contamination is reduced prey availability. Invertebrate prey species survival can be reduced, thereby making food less available for fish. Also, fish consuming infected prey can absorb toxins directly.

As discussed above under *Water Quality Protection,* the District routinely implements comprehensive BMPs to protect water quality during construction. Project construction work would also require implementation of a SWPPP, providing further oversight. Compliance with the SWPPP and BMPs will reduce the effect to a level not likely to adversely affect central California coast steelhead or green sturgeon.

Modification of Physical Habitat

Disturbance or Loss of Riparian and Nearshore Habitat

Central California coast steelhead use riparian and nearshore habitat for rearing. Juvenile green sturgeon could use nearshore habitat for feeding. However, it is unknown if juvenile green sturgeon would be present in San Francisquito Creek and more likely occur in San Francisco Bay. Nearshore habitat in the Bay will not be modified and therefore will not affect green sturgeon.

Nearshore habitat extends along San Francisquito Creek and would be affected by channel widening, levee construction, rock slope protection, and marshplain creation and restoration. Riparian habitat is found in a small area along San Francisquito Creek in the southwestern portion of the action area. The only Project element that would affect riparian habitat is channel widening and marshplain creation and restoration in the upper reach of San Francisquito Creek in the action area. Extensive trimming, pruning, or removal of riparian habitat could represent an adverse effect.

Riparian Habitat

Riparian habitat will be protected to the maximum extent practicable during construction by Project environmental commitments to protect biological resources, as discussed above under *Biological Resources Protection*. Further, implementation of Conservation Measures 17 (identify and protect riparian habitats) and 18 (restore riparian habitat) would reduce effects to a level not likely to adversely affect steelhead by replacing any riparian areas permanently affected.

Nearshore Habitat

Nearshore habitat will be affected during construction and restoration activities. Breaching of levees, dredging of channel sediments, placing rock slope protection, and creating tidal marsh habitat will disturb nearshore habitat. Also, any channel excavation will deepen the channel and may eliminate nearshore shallow habitat. While all these activities will disturb nearshore habitat, the creation of 18 acres of tidal marsh habitat will compensate for any temporary loss of rearing juvenile steelhead habitat. Therefore, this effect is not likely to adversely affect central California coast steelhead or green sturgeon.

Operations and Maintenance Effects

As discussed above, *Project Description*, all maintenance of facilities improved by the Project located in upland areas near the Project element sites identified above would take place under the District's and East Palo Alto's respective maintenance programs. The Project would create minimal in-channel maintenance needs, primarily limited to monitoring and removal of invasive weeds, and thus would not result in new effects on steelhead or green sturgeon. Further, ongoing maintenance will be performed through adherence to Project Conservation Measures, described above. Emergency maintenance may need to be performed during the life of the Project, but is not reasonably foreseeable and would be subject to separate approval. There would be no new effect.

Habitat

The expanded channel and new flood control facilities could potentially affect conditions for rearing steelhead in the Project reach, resulting in degraded habitat and potential entrapment. In the Phase One reach, widening of the channel, planting of vegetation strips near rip-rap, the higher elevation

marshplain terrace, and overflow into the Faber Tract are all anticipated to contribute to varied velocities and create velocity refuge for rearing steelhead during flood events. These changes in velocities are anticipated to be beneficial to steelhead. Conservatively, no effect, beneficial or otherwise, is assumed. In the Phase Two reach, channel excavation and the installation of floodwalls are anticipated to have no appreciable net effect on in-channel velocities or in-channel refuge for steelhead. The marshplain benches and terrace are designed to slope back into the low-flow channel and would not entrap steelhead. Distributary channels in the Faber Tract provide pathways for rearing steelhead movement that would prevent entrapment of juveniles passed into the Faber Tract during high flow events. Overall, while conditions are anticipated to improve, the benefits for steelhead rearing cannot be fully guaranteed, and thus no effect is conservatively assumed.

Sedimentation

Maintenance-related ground disturbance could result in increased delivery of sediment into San Francisquito Creek depending on the location of the work. This could degrade habitat in areas that support habitat for fish in San Francisquito Creek and the Bay.

The Project would create minimal in-channel maintenance needs, primarily limited to monitoring and removal of invasive weeds and thus would not result in new effects on instream habitat. Further, ongoing maintenance will be performed through adherence to Project Conservation Measures described above. There would be no new effect.

California Red-Legged Frog and San Francisco Garter Snake

Disturbance

California red-legged frog and San Francisco garter snake have a low potential to occur within the portions of the freshwater ponds that occur within the action area. A pond located outside of and immediately northwest of the Project site is understood to catch and convey stormwater runoff from the residential neighborhood and supply it to the O'Connor Pump Station located immediately south of the pond. The pond within the Project site is entirely surrounded by a parking lot and the Golf Course, and is likely managed by the Golf Course for aesthetic value. While the Project is within historic salt marsh, these ponds represent low-quality habitat for these species.

Project elements that have potential to disturb California red-legged frog and San Francisco garter snake include levee lowering on the right bank, levee raising on the right bank, and levee raising and levee relocation on the left bank. Construction activities would occur near suitable habitat for California red-legged frog and San Francisco garter snake and could disturb individuals that might be present in the uplands and in the ponds. Such an effect could have a serious effect on a local population.

However, these species will be protected during construction by Project environmental commitments to protect biological resources. These include minimizing new temporary access points and preventing animal entry and entrapment. Further, implementation of Conservation Measures BIO1 (California red-legged frog and San Francisco garter snake awareness will be included in the preconstruction worker awareness training required for all construction personnel) and the effect after the implementation of BIO2 would be negligible.

Operations and Maintenance Effects

All maintenance of facilities improved by the Project located in upland areas near the Project element sites would take place under the Santa Clara Valley Water District's and East Palo Alto's respective maintenance programs. Maintenance of Project facilities identified as being in or near suitable habitat would have some potential to disturb California red-legged frog and San Francisco garter snake.

The Project would create minimal in-channel maintenance needs, primarily limited to monitoring and removal of invasive weeds, and thus would not result in new effects on California red-legged frog and San Francisco garter snake. Further, ongoing maintenance will be performed through adherence to Project environmental commitments. Emergency maintenance may need to be performed during the life of the Project, but is not reasonably foreseeable and would be subject to separate approval. Therefore, there would be no new effect from operation and maintenance activities.

Western Snowy Plover and California Least Tern

Disturbance

Two protected species of coastal nesting birds, California least tern and western snowy plover, use portions of unvegetated habitat on the Faber Tract. Salt panne and other unvegetated habitats within the Faber Tract provide suitable nesting and resting habitat for these species. California least terns are considered more likely to nest within the study area due to their ability to nest at a greater distance from water than western snowy plovers, and suitable nesting habitat in proximity to the South San Francisco Bay. The South Bay provides suitable foraging habitat for California least tern, and marsh, unvegetated, and intertidal habitat within the Faber Tract provide suitable foraging habitat for western snowy plover, but neither species has been observed in the vicinity of the Project site.

Levee lowering on the right bank has potential to disturb California least tern and western snowy plover. Construction activities serving this Project element would occur near suitable habitat for these species and could disturb nesting or foraging individuals that could be present. Disturbance of nesting or foraging California least tern and western snowy plover would be a significant effect. The Project could affect habitats within the Faber Tract through the hydrologic reconnection of San Francisquito Creek to this area and potential subsequent flooding. Because California least tern and western snowy plover have potential to occur in habitat in the Faber Tract, flooding from San Francisquito Creek and subsequent habitat alteration could affect these species as well. This habitat alteration would be considered a significant effect.

However, these species will be protected during construction by Project environmental commitments to protect biological resources. These commitments include minimizing new temporary access points, conducting surveys for nesting raptors and migratory birds, and installing nesting exclusion devices. Further, implementation of Conservation Measures BIO1 (California least tern and western snowy plover awareness will be included in the preconstruction worker awareness training required for all construction personnel) and BIO3 would reduce the potential of this effect.

Operations and Maintenance Effects

All maintenance of facilities improved by the Project and located in upland areas near the Project element sites would take place under the District's and East Palo Alto's respective maintenance programs. The Project would create minimal in-channel maintenance needs, primarily limited to monitoring and removal of invasive weeds, and thus would not result in new effects on California least tern and western snowy plover. Further, ongoing maintenance will be performed through adherence to Project environmental commitments. Emergency maintenance may need to be performed during the life of the Project, but is not reasonably foreseeable and would be subject to separate approval.

As mentioned in the construction effect discussion, the Project could affect habitats within the Faber Tract through the hydrologic reconnection of San Francisquito Creek to this area and potential subsequent flooding. Because California least tern and western snowy plover have potential to occur in habitat in the Faber Tract, flooding from San Francisquito Creek and subsequent habitat alteration could affect these species as well. This habitat alteration would be significant. Implementation of Conservation Measure BIO4 would reduce the effect. Therefore, there would be no new effect from operation and maintenance activities.

California Clapper Rail

Disturbance

California clapper rail is considered to have a high potential to be present in suitable habitat within and adjacent to the action area. California clapper rail is known to use marshes adjacent to San Francisquito Creek. The action area would only affect the top of the existing levee on the right hand side; adjacent areas that support wetland vegetation and offer clapper rail foraging habitat and refuge would not be directly affected. Surveys conducted in 2009 and 2010 by the Point Reyes Bird Observatory report the mean number of California clapper rail individuals on the Faber Tract were 46. No California clapper rails were observed within San Francisquito Creek during survey efforts in 2009 or 2010 (Liu et al. 2010).

However, this species will be protected during construction by Project environmental commitments to protect biological resources. These commitments include minimizing new temporary access points, conducting surveys for nesting raptors and migratory birds, and installing nesting exclusion devices. Further, Implementation of Conservation Measures BIO1 (California clapper rail awareness will be included in the preconstruction worker awareness training required for all construction personnel), BIO4, and BIO5 would reduce disturbance to California clapper rail.

Operations and Maintenance Effects

All maintenance of facilities improved by the Project and located in upland areas near the Project element sites would take place under the District's and East Palo Alto's respective maintenance programs. Maintenance of Project facilities identified as being in or near suitable habitat would have some potential to disturb California clapper rail. Additionally, the Project would result in spill flows into the Faber Tract every 2 to 3 years. Thus, operation and maintenance effects could be significant.

The Project would create minimal in-channel maintenance needs, primarily limited to monitoring and removal of invasive weeds, and thus would not result in new effects on California clapper rail.

Further, ongoing maintenance will be performed through adherence to Project environmental commitments, described above under. Emergency maintenance may need to be performed during the life of the Project, but is not reasonably foreseeable and would be subject to separate approval. There would be no new effect due to maintenance.

As part of the Project, Fluvial flows above the 5-year event (20% chance of happening once in any given year) currently access the Faber Tract under average tidal conditions. When the project is built, this frequency would increase to roughly the 2-3 year event, or a roughly 40% chance of happening once in any given year, when this Project and when future projects upstream are built. This is because constrictions upstream (such the Pope-Chaucer Bridge, Highway 101 and the channel near Highway 101) do not allow enough flow to reach the Faber Tract area to significantly increase the frequency of overtopping, even with a degraded levee on the north side of the creek. Additionally, the 5 to 10-year tide would connect the channel to the Faber Tract.

Because a very high creek flow would still be required for the levee separating the creek from the Faber Tract to be overtopped, fluvial inputs into the Faber Tract are unlikely to occur during the California clapper rail and California black rail breeding season, which extends from February through August. When future projects upstream of this Project are built, at the design criteria conditions of the 100-year riverine flow coincident with the 100-year tide plus 2.17 feet of sea level rise, the maximum increase in water surface elevation in the Faber Tract is estimated to be a negligible 0.2 feet (approximately 2 inches) at the point flow enters the Faber Tract. This increase dissipates quickly as water moves away from the entry point, resulting in negligible, episodic impacts on rail habitat that are consistent with the existing conditions.

Because the inundation of the Faber Tract would be negligible and continue to be episodic, with the predominant influence remaining tidal, it is not anticipated that the overall flood regime of the Project would result in effects on rail habitat. With conservation measure BIO4 requiring post-Project monitoring of the Faber Tract, potential effects on California clapper rail are considered significantly reduced.

The proposed activities are expected to affect 0.21-acre of high-quality clapper rail habitat, 0.80-acre of moderate-quality habitat, and 2.30 acres of low-quality habitat, totaling 3.31 acres of effect on California clapper rail habitat within the existing levees of San Francisquito Creek. However, the Project would also restore a net 14 acres of high marsh/transitional habitat for California clapper rail within the wider channel. Therefore, a beneficial increase in the amount of suitable habitat for California clapper rail would occur as a result of the Project.

Salt Marsh Harvest Mouse

Disturbance

Suitable habitat for salt marsh harvest mouse occurs within the Faber Tract portion of the action area; CNDDB contains records documenting occurrences of salt marsh harvest mouse in this area. Further, suitable salt marsh habitat occurs along the channel of San Francisquito Creek, and this species has potential to occur here. Construction activities occurring in the Project element sites could disturb salt marsh harvest mouse habitat. Marshplain restoration on the left bank could have an effect on salt marsh habitat occurring within or adjacent to the Project footprint. Additionally, levee modifications have potential to affect the salt marsh habitat within the Faber Tract through potential flooding of San Francisquito Creek into this habitat.

Because construction activities would occur within suitable salt marsh habitat and could affect adjacent salt marsh habitat, significant effects on salt marsh harvest mouse could occur.

However, this species will be protected during construction by Project environmental commitments to protect biological resources. These include minimizing new temporary access points and preventing animal entry and entrapment. Further, implementation of Conservation Measure BIO1 (Salt marsh harvest mouse and salt marsh wandering shrew awareness will be included in the preconstruction worker awareness training required for all construction personnel), BIO4, and BIO6 would reduce these effects to a less-than-significant level.

Operations and Maintenance Effects

All maintenance of facilities improved by the Project located in upland areas near the Project element sites would take place under the District's and East Palo Alto's respective maintenance programs. The Project would create minimal in-channel maintenance needs, primarily limited to monitoring and removal of invasive weeds, and thus would not result in new effects on salt marsh harvest mouse. Further, ongoing maintenance will be performed through adherence to Project environmental commitments. Emergency maintenance may need to be performed during the life of the Project, but is not reasonably foreseeable and would be subject to separate approval. Therefore, there would be no new effect from operations and maintenance activities.

The hydrologic reconnection of San Francisquito Creek to the Faber Tract resulting from flooding following adjacent levee lowering activities could change current salt marsh and salt panne habitat within the Faber Tract. As part of the Project, fluvial flows, depending on the concurrent tide, are conservatively estimated to overflow into the Faber Tract every 2 to 3 years during storm events. Additionally, the 5 to 10-year tide would connect the channel to the Faber Tract. Fluvial inputs would occur slowly, allowing a similar amount of time as under existing conditions for salt marsh harvest mouse to reach upland refugia; these fluvial inputs are not anticipated to result in direct effects to the species. However, regular fluvial inputs could potentially result in habitat changes detrimental to salt marsh harvest mouse. Based on modeling of the overflow into the Faber Tract (HDR 2010), at the design criteria conditions of the 100-year riverine flow coincident with the 100-year tide plus 2.17 feet of sea level rise, the maximum increase in water surface elevation in the Faber Tract is estimated to be a 0.2 feet (approximately 2 inches), an amount which is considered negligible compared to the estimated 2.17 feet of sea level rise. Additionally, the Faber Tract already receives fluvial input at events approaching the 5-year event, so this would not be a new effect, but would represent an increase in the periodicity of events. Because the proposed increase in water surface elevation in the Faber Tract would be negligible and continue to be episodic, with the predominant influence remaining tidal, it is not anticipated that the overall flood regime of the Project would result in effects on salt marsh harvest mouse habitat. With conservation measure BIO4 requiring post-Project monitoring of the Faber Tract, potential effects on salt marsh harvest mouse would be reduced.

The Project activities are expected to affect 0.21-acre of high-quality habitat, 0.79-acre of moderate-quality habitat, and 1.91 acres of low-quality habitat, totaling 2.90 acres of effect on salt marsh harvest mouse.

The Project would also restore 17.8 acres of high-quality habitat for salt marsh harvest mouse. Therefore, an overall increase in the amount of suitable habitat for salt marsh harvest mouse would result from implementation of the Project.

California Seablite

Disturbance

California seablite has the potential to occur in the action area. If present, individuals of this species could be damaged or removed by construction. Substantial loss of individuals as a result of construction disturbance (earthwork, staging activities, foot traffic, vehicle traffic, etc.) or destruction of suitable habitat adjacent to an existing population could result in a significant effect on the species.

However, this species will be protected during construction by Project environmental commitments to protect biological resources. These commitments include minimizing new temporary access points and removing temporary fill used for access after construction is complete, planting local ecotypes of native plants and using appropriate erosion-control seed mixes as needed, and encouraging passive revegetation as appropriate. Further, implementation of Conservation Measures BIO7, BIO8, and BIO9 will ensure that effects are avoided, reduced if they cannot be avoided, and compensated as appropriate. With these conservation measures in place, effects would be lessened.

Operations and Maintenance Effects

The Project would create minimal in-channel maintenance needs, primarily limited to monitoring and removal of invasive weeds, and would not result in new effects on special-status plants in channel or bank areas. Emergency maintenance may need to be performed during the life of the Project, but is not reasonably foreseeable and would be subject to separate approval. Therefore, there would be no effect on California seablite.

Effects on Critical Habitat

Steelhead and Green Sturgeon

The proposed Project is expected to have short- and long-term effects on the designated critical habitat of central California coast steelhead and southern DPS North American green sturgeon. Potential Project effects include short- to long-term water quality degradation from localized increases in turbidity and suspended sediment, and potential discharges of contaminants in San Francisquito Creek and San Francisco Bay during restoration construction. Potential water quality effects from increased sediment and turbidity or contaminant spills will be avoided or minimized through implementation of approved BMPs, compliance with water quality standards, and implementation of an approved spill prevention and response plan. Long-term effects on designated critical habitat include the removal or disturbance of vegetation and the modification of nearshore habitat. These modifications will result in little change to rearing primary constituent elements because of the low quality of the existing nearshore and riparian habitat in the action area. Native riparian and marshplain vegetation will be planted on disturbed or exposed soils to control erosion and offset losses of existing vegetation. The action area will continue to function as a migration corridor for adults and juvenile salmonids by providing adequate passage and as a rearing area for green sturgeon. After marshplain terracing and level breaching occurs, the reach will provide improved critical habitat for steelhead and green sturgeon.

California Red-Legged Frog

Because the Project is not located within or immediately adjacent to California red-legged frog critical habitat, Project implementation is not expected to affect critical habitat for this species.

California Clapper Rail

Because the Project is not located within or immediately adjacent to California clapper rail critical habitat, Project implementation is not expected to affect critical habitat for this species.

Effects from Interrelated and Interdependent Actions

Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are actions that have no independent utility apart from the action under consideration. There are no interrelated or interdependent effects on central California coast steelhead, green sturgeon, California red-legged frog, San Francisco garter snake, western snowy plover, California least tern, salt marsh harvest mouse, or California seablite resulting from this Project.

Cumulative Effects

For purposes of the ESA, cumulative effects are defined as the effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR §402.02). Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultations pursuant to Section 7 of the ESA.

Non-federal actions that may affect the action area include increased urbanization that may affect riparian, wetland, salt marsh, and upland habitats in the watershed and lead to increased erosion, sedimentation, and discharge of pollutants into waterways supporting listed aquatic species. Municipal stormwater and irrigation discharges contain numerous pollutants that may adversely affect the survival and reproductive success of salmonids and other fishes. The South Bay Salt Pond Restoration Project is in the process of restoring salt ponds back to 15,100 acres of natural bayland habitat, including salt marsh, salt panne, and sand spit. In 2010, an annual report indicated that the Project is approximately 15 percent complete (South Bay Salt Pond Restoration 2010). The restoration of these habitats is expected to ultimately benefit species that depend on these habitat types, including western snowy plover, California clapper rail, California least tern, salt marsh harvest mouse, and California seablite.

Conservation Measures

Conservation Measure BIO1—Develop and Implement Worker Awareness Training

Prior to construction, Worker Awareness Training must be conducted to inform construction Project workers of their responsibilities regarding sensitive environmental resources. The training will include environmental education about nesting raptors and migratory birds, California clapper rail, salt marsh harvest mouse, California least tern, western snowy plover,

California red-legged frog, San Francisco garter snake, and steelhead, as well as sensitive habitat (e.g., in-stream habitat, riparian habitat, wetlands). The training will include visual aids to assist in identification of regulated biological resources, actions to take should protected wildlife be observed within the action area, and possible legal repercussions of affecting such regulated resources.

Conservation Measure BIO2—Implement Survey and Avoidance Measures for California Red-Legged Frog and San Francisco Garter Snake Prior to Construction Activities

SFCJPA will retain a permitted biologist to conduct a survey of the freshwater ponds and surrounding upland habitat prior to initiation of construction activities. The surveys will be conducted according to applicable protocols and will be performed during optimal observation periods of the day when detection potential for these species is maximized. The survey will be conducted prior to initiation of construction, but such that enough time is allowed to coordinate with USFWS and DFG to develop a species avoidance plan if needed. If California red-legged frog or San Francisco garter snake individuals are observed or heard during the survey, proposed Project activities within 500 feet of the observation will be postponed. A species avoidance plan will be developed in coordination with USFWS and DFG and implemented during construction and maintenance. If no individuals are observed during the surveys, no further action will be necessary.

Conservation Measure BIO3—Implement Survey and Avoidance Measures for California Least Tern and Western Snowy Plover Prior to Construction Activities

Construction work, including site preparation, will be avoided to the extent possible within and near (500 feet) suitable habitat for these species during their breeding seasons (March 1 to August 31). Western snowy plover may be present within suitable habitat year-round. Prior to the initiation of work within 500 feet of suitable habitat (regardless of the time of year), a permitted biologist will be retained to conduct surveys of appropriate habitat for California least tern and western snowy plover and their nests. The surveys will be conducted no more than 48 hours prior to commencement of construction activities and will be performed during optimal observation periods when these species are most active. If active nests for California least tern or western snowy plover are observed during the survey, Project activities within 500 feet of the observation will be postponed until young have fledged. If individuals are observed outside of the breeding season within 500 feet of the work area, a biologist will establish a no-disturbance buffer. No work will occur within the buffer until the biologist verifies that individuals have left the area. If individuals are routinely observed in or within 500 feet of the work area or do not leave the work area, species avoidance plan will be developed in coordination with USFWS and DFG. If no individuals are observed in accordance with the survey protocols, no buffers will be required.

Conservation Measure BIO4—Produce and Implement Habitat Monitoring Plan for Habitat within the Faber Tract Prior to Construction Activities

The SFCJPA or its approved designee will be responsible for the development and implementation of a habitat monitoring plan for existing (i.e., pre-Project) habitat within the Faber Tract that will document baseline conditions prior to Project implementation. The plan will include routine monitoring of the habitat within the Faber Tract to document changes

resulting from the hydrologic reconnection of San Francisquito Creek and potential subsequent flooding into the Faber Tract. The habitat monitoring plan will include adaptive management measures to rectify potential conversion of habitat types and other issues that might arise in the Faber Tract as a result of Project implementation. Additionally, contingency measures will be developed and included in the plan in the event of habitat conversion or loss resulting from the Project. Plan approval by USFWS will be necessary before implementation of activities recommended by the plan. Routine monitoring reports will be submitted to the appropriate agencies following their completion.

Conservation Measure BIO5—Implement Survey and Avoidance Measures for California Clapper Rail Prior to Construction Activities

Work activities within 50 feet of California clapper rail habitat will not occur within 2 hours before or after extreme high tides (6.5 feet or above) when the marsh plain is inundated, which could prevent individuals from reaching available cover.

If work is to be conducted during the species' breeding and rearing seasons (February 1st–August 31) within 700 feet of suitable habitat, a permitted biologist will be retained to conduct protocol level surveys at the Project site including rail call surveys and rail-track surveys in appropriate habitat for California clapper rail (California Coastal Conservancy 2011). The surveys will be conducted no more than 48 hours prior to commencement of construction and maintenance activities and will be performed at dawn or dusk, the vocalization periods of highest intensity. Project activities occurring within 700 feet of active nests will be postponed until after young have fledged.

Outside of breeding season, a permitted biologist will be retained to conduct surveys of appropriate habitat for California clapper rail within the work area, including all staging and access routes, no more than seven days prior to initiation of work within suitable habitat. If individuals are observed during this survey, a biologist will conduct an additional survey immediately prior to initiation of construction activities. If individuals are observed within or near the work area, a no-disturbance buffer (minimum 50 feet) will be implemented. If the daily work area is expanded, then a qualified biologist will survey the suitable habitat prior to initiation of work and movement of equipment that day. No work will occur within the buffer until the biologist verifies that California clapper rail individuals have left the area.

If individuals are routinely observed in the work area, a species avoidance plan will be developed in coordination with USFWS and DFG. If no individuals are observed in accordance with the survey protocols, no buffers will be required. All vegetation removal within suitable habitat of these species, as determined by a biologist, will be done by hand to the extent possible. If movement of heavy equipment in necessary in suitable habitat or within 50 feet of habitat, then a biological monitor will observe the area in front of the equipment from a safe vantage point. If these species are detected within the area in front of the equipment, then the equipment will stop and the biologist will direct the equipment on an alternative path. If this is not possible, then equipment will stop until a clear path can be identified.

Additional conservation measures during the construction period will include:

- An annual search for and subsequent destruction of any cat feeding stations along public walkways shall be conducted

- Before the onset of winter high tides, an annual capture and removal effort of feral cats and rats in the surrounding disturbed areas shall be conducted.

Conservation Measure BIO6—Implement Survey and Avoidance Measures for Salt Marsh Harvest Mouse Prior to Construction

Construction and maintenance work, including site preparation, will be avoided to the extent possible within suitable habitat for this species during their breeding seasons (February 1 to November 30). As work during the species breeding seasons will be necessary, a species avoidance plan will be developed in consultation with USFWS and DFG and implemented. The avoidance plan, at a minimum, will include the following.

- Hand vegetation removal shall start at the edge farthest form the largest contiguous salt marsh area and work its way towards the salt marsh, providing cover for salt marsh harvest mice and allowing them to move towards the salt marsh as vegetation is being removed.
- In consultation with DFG and USFWS, exclusion fencing shall be placed around a defined work area immediately following vegetation removal and before Project activities begin. The final design and proposed location of the fencing shall be reviewed and approved by DFG and USFWS prior to placement.
- Prior to initiation of work each day within 300 feet of tidal or pickelweed habitats, a qualified biologist shall thoroughly inspect the work area and adjacent habitat areas to determine if saltmarsh harvest mice are present. The biologist shall ensure the exclusion fencing has no holes or rips and the base remains buried. The fenced area will be inspected daily to ensure that no mice are trapped.

Prior to initiation of work within suitable habitat, a permitted biologist will be retained to monitor the hand removal of pickleweed to avoid effects on salt marsh harvest mouse. Monitoring will occur for the duration of all clearing work within suitable habitat. If salt marsh harvest mouse are observed during clearing activities, clearing will cease and workers will move to a new area. Clearing work may begin in the area of the observation one day or more after the observation date.

During the survey, if salt marsh harvest mouse individuals are observed, or if active nests of these species are observed, proposed Project activities within 100 feet of the observation will be postponed and a no-disturbance buffer will be established. The buffer will remain in place until the biologist determines that the individuals have left the area and are not present in or near (100 feet) of the work area. If no individuals are observed in accordance with the survey protocols, no buffers will be required.

Work activities within 50 feet of 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, which could prevent individuals from reaching available cover.

Conservation Measure BIO7—Conduct Botanical Surveys

SFCJPA will retain a qualified botanist to survey suitable habitat in the action area for California seablite. Surveys will be preferentially conducted from July to August the year before

construction will begin, as the blooming period for the species is July to October. Exact timing of surveys should account for annual variations in climate and weather; surveys should be timed to coincide with blooming periods of known local populations whenever possible

Surveys will follow the CNPS Botanical Survey Guidelines (California Native Plant Society 2001). Special-status plants identified during the surveys will be mapped using a handheld global positioning system unit and documented as part of the public record. A report of occurrences will be submitted to SFCJPA and the CNDDB. Surveys will be completed before ground-disturbing activities begin; survey timing will allow for follow-up mitigation, if needed. If it is determined that identified individuals could be affected by construction traffic or activities, Conservation Measure BIO7 and, if necessary, Conservation Measure BIO8, will be implemented.

Conservation Measure BIO8—Confine Construction Disturbance and Protect California Seablite Individuals during Construction

Construction disturbance will be confined to the minimum area necessary to complete the work, and will avoid encroachment on adjacent habitat. If California seablite individuals are found, a setback buffer will be established around individuals or the area occupied by the population, based on judgment of a qualified botanist. The plants and a species-appropriate buffer area determined in consultation with USFWS staff will be protected from encroachment and damage during construction by installing temporary construction fencing. Fencing will be brightly colored and highly visible. Fencing will be installed under the supervision of a qualified botanist to ensure proper location and prevent damage to plants during installation. Fencing will be installed before site preparation or construction work begins and will remain in place for the duration of construction. Construction personnel will be prohibited from entering these areas (the exclusion zone) for the duration of Project construction. Fencing installation will be coordinated with fence installation required by other conservation measures protecting wetlands, riparian habitat, and mature trees.

Conservation Measure BIO9—Compensate for Loss of California Seablite

If California seablite individuals are present and cannot be effectively avoided through implementation of Conservation Measure BIO7, SFCJPA will develop and implement a compensation plan. The compensation plan will preserve an offsite area containing individuals of the species. The plan will be implemented so that there is no net loss of California seablite. If an offsite population is not located or is not available for preservation, SFCJPA will employ a qualified nursery to collect and propagate the affected species, collected at the appropriate time of year, prior to population disturbance at the affected areas of the Project. Transplantation will also be implemented if practicable for the species affected, including mature native plants to the extent feasible.

The compensation plan will be developed by a qualified botanist in coordination with and approval of USFWS. The compensation area will contain a population and/or acreage equal to or greater than that lost as a result of Project implementation and will include adjacent areas as needed to preserve the special-status plant population in perpetuity. Compensation of the affected population will occur in an amount equal to or greater than the amount lost as a result of the Project to ensure that genetic diversity is preserved and no net loss of the number of individuals occurs. The quality of the population preserved will also be equal to or greater than

that of the affected population, as determined by a qualified botanist retained by the SFCJPA. Compensation sites and populations will be subject to USFWS approval. The SFCJPA will be responsible for ensuring that the compensation area is acquired in fee or in conservation easement, maintained for the benefit of the special-status plant population in perpetuity, and funded through the establishment of an endowment.

A monitoring and adaptive management plan will be developed for each compensation site, subject to DFG and USFWS approval. This plan will establish success criteria for the site and will include protocols for annual monitoring of the site. The goal of monitoring will be to assess whether the plan has successfully mitigated Project effects; monitoring will be designed to ensure that the required number of plants and/or plant acreage is being sustained through site maintenance. Factors to be monitored could include density, population size, natural recruitment, and plant health and vigor. If monitoring indicates that special-status plant populations are not maintaining themselves, adaptive management techniques will be implemented. Such techniques could include reseeding/replanting, nonnative species removal, and other management tools. The site will be evaluated at the end of the monitoring period to determine whether the mitigation has met the goal of this conservation measure to preserve a population the same size as that affected and of equal or greater quality as that lost as a result of Project activities at the site. Criteria by which this determination will be made will be established in the monitoring plan. The monitoring plan will also address adaptive management strategies to be adopted if the evaluation determines that the site does not meet the success criteria. In that case, a monitoring plan will stay in place until the success criteria are met.

Conclusions

This BA was prepared for SFJPA to assess the effects of the proposed Project on the threatened central California coast steelhead DPS, threatened green sturgeon, California red-legged frog, San Francisco garter snake, western snowy plover, California clapper rail, California least tern, salt marsh harvest mouse, and California seablite in accordance with Section 7 of the ESA of 1973 as amended. A BA may conclude that a proposed action/project would have one of the following results, with the associated requirements.

- *No effect*—The effects of the action would not affect any listed species or its critical habitat.
- *May affect, not likely to adversely affect*—The effects of the action on a species or its critical habitat are likely to be insignificant, discountable, or wholly beneficial; informal consultation is required.
- *May affect, likely to adversely affect*—The action is likely to directly or indirectly have an adverse effect on a listed species or its critical habitat; formal consultation is required.

Implementation of the proposed Project could result in short- to long-term effects on the following species.

- Central California coastal steelhead.
- Green sturgeon.
- California red-legged frog.

- San Francisco garter snake.
- Western snowy plover,
- California clapper rail.
- California least tern.
- Salt marsh harvest mouse.
- California seablite.

These effects include potential harm or harassment of individual fish, wildlife, and plants from construction equipment, earthmoving activities, surface and underwater noise, localized increases in turbidity and suspended sediment, and potential discharges of toxic substances during in-water construction activities. All in-water construction activities will be restricted to a single construction season (June 1 and November 30) to avoid the primary adult and juvenile salmonids migration seasons.

The Project is not expected to result in any long-term adverse effects on the South Bay, fish habitat, avian habitat, salt marsh harvest mouse habitat, or California seablite habitat. In addition, various environmental commitments and conservation measures have been identified to minimize, avoid, or compensate for potential effects on aquatic species, avian species, salt marsh harvest mouse, California seablite, and associated habitat. Although it is possible that adult salmonids and green sturgeon could be present, the probability that any individuals would remain in the action area during construction is low. California red-legged frog and San Francisco garter snake have the potential to occur within the ponds in and adjacent to the action area; however, with the implementation of Conservation Measures 1 and 2, the possibility of direct mortality or harassment is highly unlikely. California least tern, western snowy plover, and California clapper rail have the potential to occur within the action area during foraging and nesting activities; however, with the implementation of Conservation Measures 1, 3, and 5 the possibility of direct mortality or harassment is highly unlikely. Salt marsh harvest mouse has the potential to occur within the action area during foraging and nesting activities; however, with the implementation of Conservation Measures 1 and 6 the possibility of direct mortality or harassment is highly unlikely. California seablite is highly unlikely to occur within the action area; however, with the implementation of Conservation Measures 1, 7, 8, and 9 would ensure the possibility of direct mortality or harassment does not occur. Additionally, Conservation Measure 4 requires that a monitoring plan for the habitat within the Faber Tract adjacent to the San Francisquito Creek channel be developed and implemented to address unintentional habitat alteration. Therefore, the action may affect, but is not likely to adversely affect, central California coastal steelhead, Chinook salmon, green sturgeon, California red-legged frog, San Francisco garter snake, western snowy plover, California clapper rail, California least tern, salt marsh harvest mouse, and/or California seablite.

Essential Fish Habitat

The Project action area is within the region designated as EFH for various life stages of fish species managed under the following Fishery Management Plans (FMP).

- Pacific Groundfish FMP. Various species of rockfishes, flatfishes, sharks, etc.

- Coastal Pelagics FMP. Northern anchovy, Pacific sardine, jack mackerel.
- Pacific Coast Salmon FMP. Chinook salmon.

The Magnuson-Stevens Act requires that EFH be identified and described in federal fishery management plans. The Pacific Coast Salmon Fishery Management Plan includes designation of EFH and requires federal action agencies to consult with NMFS on any activity that they fund, permit, or carry out that may adversely affect EFH. NMFS is required to provide EFH conservation and enhancement recommendations to the federal action agencies. EFH is defined as the aquatic habitat necessary for spawning, breeding, feeding, or growth.

Important elements of EFH are substrate; water quality; water quantity, depth, and velocity; channel gradient and stability; food; cover and habitat complexity; space; access and passage; and habitat connectivity.

Pacific Groundfish

Fish in the Pacific Groundfish FMP include flatfishes, rockfish, and sharks. Fish in this group are typically bottom dwellers (flatfish and sharks) and use substrate for foraging and shallow areas as nursery habitat. In the action area, they would occur in San Francisquito Creek in tidally influenced water and San Francisco Bay at the outlet with San Francisquito Creek.

Project Effects

The proposed action could have short- and long-term effects on EFH for groundfish.

Water Quality. Potential action effects include short- to long-term water quality degradation from localized increases in turbidity and suspended sediment and potential discharges of contaminants in the action area during construction activities. Potential water quality effects from increased sediment and turbidity or contaminant spills will be avoided or minimized through implementation of approved BMPs, compliance with water quality standards, and implementation of an approved spill prevention and response plan.

Water Quantity. No change in water quantity is expected due to the Project actions.

Depth and Velocity. Excavation of the channel and construction of marshplain habitat would affect the depth of the channel. However, any changes in depths would not be significant and would not keep Pacific groundfish from using the action area. No changes in velocity are expected from excavation or other Project activities.

Channel Gradient and Stability. Channel gradient and stability is expected to remain the same; therefore, no effects on channel gradient or stability would occur.

Food. Channel excavation would decrease prey items temporarily during marshplain restoration. Consequently, effects on prey items associated with construction and maintenance activities would be minimal and temporary.

Cover and Habitat Complexity. Long-term cover and habitat complexity effects on EFH include the addition of marshplain habitat. This could have a beneficial effect on groundfish in that more habitat would be available and an increase in invertebrates may occur due to increased productivity.

Space. Long-term effects on EFH include an increase in habitat from marshplain restoration. In the long-term, the action would result in an increase of available space for groundfish species in the action area, thus increasing the conservation value of EFH.

Access and Passage. The proposed action may reduce access or passage through the action area during construction. Fish species may avoid the action area during construction due to noise or if cofferdams are installed. The action area would be accessible to all fish species after construction. No change in migratory habitat would occur.

Connectivity. The proposed action will not affect the connectivity to San Francisquito Creek or the Bay.

Coastal Pelagics

Fish species in the coastal pelagic FMP include northern anchovy and Pacific sardine. The action area would be utilized by these species as a nursery area.

Project Effects

Water Quality. Potential action effects include short- to long-term water quality degradation from localized increases in turbidity and suspended sediment and potential discharges of contaminants in the action area during construction and operation activities. Potential water quality effects from increased sediment and turbidity or contaminant spills will be avoided or minimized through implementation of approved BMPs, compliance with water quality standards, and implementation of an approved spill prevention and response plan.

Water Quantity. No change in water quantity is expected due to the Project actions.

Depth and Velocity. Excavation of the channel and construction of marshplain habitat would affect the depth of the channel. However, any changes in depths would not be significant and would not keep coastal pelagic species from using the action area. No changes in velocity are expected from excavation or other Project activities.

Channel Gradient and Stability. Channel gradient and stability is expected to remain the same; therefore, no effects on channel gradient or stability would occur.

Food. Channel excavation would decrease prey items temporarily during marshplain restoration. Consequently, effects on prey items associated with construction and maintenance activities would be minimal and temporary.

Cover and Habitat Complexity. Long-term cover and habitat complexity effects on EFH include the addition of marshplain habitat. This could have a beneficial effect on coastal pelagic species in that more habitat would be available and an increase in invertebrates may occur due to increased productivity.

Space. Long-term effects on EFH include an increase in habitat from marshplain restoration. In the long term, the action would not increase space for coastal pelagic species because they use more open water habitat.

Access and Passage. The proposed action may reduce access or passage through the action area during construction. Fish species may avoid the action area during construction due to noise or if cofferdams are installed. The action area would be accessible to all fish species after construction. No change in migratory habitat would occur.

Connectivity. The proposed action will not affect the connectivity to San Francisquito Creek or the Bay.

Pacific Coast Salmon

Fall-run Chinook salmon are present in the action area.

Project Effects

Water Quality. Potential action effects include short- to long-term water quality degradation from localized increases in turbidity and suspended sediment and potential discharges of contaminants in the action area during construction and operation activities. Potential water quality effects from increased sediment and turbidity or contaminant spills will be avoided or minimized through implementation of approved BMPs, compliance with water quality standards, and implementation of an approved spill prevention and response plan.

Water Quantity. No change in water quantity is expected due to the Project actions.

Depth and Velocity. Excavation of the channel and construction of marshplain habitat would affect the depth of the channel. However, any changes in depths would not be significant and would not keep Pacific salmonids from using the action area. No changes in velocity are expected from excavation or other Project activities.

Channel Gradient and Stability. Channel gradient and stability is expected to remain the same; therefore, no effects on channel gradient or stability would occur.

Food. Channel excavation would decrease prey items temporarily during marshplain restoration. Consequently, effects on prey items associated with construction and maintenance activities would be minimal and temporary.

Cover and Habitat Complexity. Long-term cover and habitat complexity effects on EFH include the addition of marshplain habitat. This could have a beneficial effect on Pacific salmon in that more rearing habitat would be available and an increase in invertebrates may occur due to increased productivity.

Space. Long-term effects on EFH include an increase in habitat from marshplain restoration. In the long-term, the action would result in an increase of available space for Pacific salmon in the action area, thus increasing the conservation value of EFH.

Access and Passage. The proposed action may reduce access or passage through the action area during construction. Fish species may avoid the action area during construction due to noise or if cofferdams are installed. The action area would be accessible to all fish species after construction. No change in migratory habitat would occur.

Connectivity. The proposed action will not affect the connectivity to San Francisquito Creek or the Bay.

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