Appendix A

U.S. Fish and Wildlife Service Biological Opinion

United States Department of the Interior

FISH AND WILDLIFE SERVICE
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Sacramento, California 95825-1846

In Reply Refer to:
08ESMF00-
2015-F-0008-R001

DEC 22 2016

Memorandum

To: Rain Emerson, Supervisory Natural Resources Specialist, U.S. Bureau of Reclamation, Mid-Pacific Region, South-Central California Area Office, Fresno, California

From: Field Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Reinitiation of Formal Consultation on the Contra Costa Water District Shortcut Pipeline Improvement Project near the Unincorporated Community of Clyde, Contra Costa County, California

This memorandum is in response to the U.S. Bureau of Reclamation's (USBR) November 18, 2016, request for reinitiation of formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed Contra Costa Water District (CCWD) Shortcut Pipeline (SCPL) Improvement Project (proposed project) near the unincorporated community of Clyde in Contra Costa County, California. Your request was received by the Service on November 23, 2016. USBR is requesting the reinitiation of formal consultation because CCWD is requesting (1) to add an additional staging area adjacent to Site 4, (2) to include improvements to an existing gravel road adjacent to Site 10, (3) to include annual mowing of the SCPL right-of-way (ROW) adjacent to the newly constructed roads and repaired valves, and (4) to compensate at a 3:1 ratio for the permanent loss of habitat along the SCPL ROW instead of restoring habitat onsite and compensating at the 1:1 ratio for temporary effects. At issue are the proposed project's effects on the federally endangered salt marsh harvest mouse (*Reithrodontomys raviventris*). This response is provided under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act), and in accordance with the implementing regulations pertaining to interagency cooperation (50 CFR 402).

The federal action we are consulting on is the CCWD's repair of the existing USBR-owned SCPL and construction of new access roads to some of the inaccessible portions of the SCPL. Pursuant to 50 CFR 402.12(j), you submitted a biological assessment for our review and requested concurrence with the findings presented therein. These findings conclude that the proposed project may affect, and is likely to adversely affect the salt marsh harvest mouse.

In considering your request, we based our evaluation on the following: (1) your November 18, 2016, memorandum requesting the reinitiation of consultation on the proposed project; (2) the October 2014 *Biological Assessment Shortcut Pipeline Improvement Project* (Biological Assessment) (USBR 2014); (3) the CCWD's June 10, 2015 electronic mail message with responses to the Service's October 17, 2014 request for additional information and the attached "Shortcut Pipeline – Phase 2 Valve Improvements Site 10 Hydrology Discussion" (M. Seedall, CCWD, *in litt.* 2015); (4) the June 2015 *Responses to October 2014 U.S. Fish and Wildlife Service Information Request for the Contra Costa Water District Shortcut Pipeline Improvement Project Onsite Habitat Mitigation and Monitoring Plan for Temporary Construction*

Impact Areas, Contra Costa County, California (Olberding Environmental, Inc. 2015); (5) the January 2015 *Final Cordelia Slough Preserve for Salt Marsh Harvest Mouse and Wetland Enhancement Long-Term Management Plan* (Wildlands 2015); (6) electronic mail and conversations among CCWD, USBR, U.S. Army Corps of Engineers, Olberding Environmental, Inc., and the Service; and (7) other information available to the Service.

The remainder of this document provides our biological opinion on the effects of the proposed project on the salt marsh harvest mouse. Changes to the original biological opinion are illustrated below with additions in *italics* and deletions with ~~strikethrough~~ notation.

Consultation History

February 17, 2005:	The Service issued a biological opinion to USBR on the Operations and Maintenance Program Occurring on USBR lands within the South-Central California Area Office (Service file number 1-1-04-F-0368, Service 2005). For the SCPL, this 2005 biological opinion only covers the most routine activities, *i.e.* Facilities Inspection and Supervisory Control and Data Acquisition System Repair and Upgrade.
April – June 2014:	The Service participated in conference calls with USBR, CCWD, Olberding Environmental, Inc., U.S. Army Corps of Engineers, and California Department of Fish and Wildlife (CDFW) regarding the proposed project.
October 10, 2014:	The Service received from USBR the Biological Assessment (USBR 2014) and request for the initiation of formal consultation on the proposed project.
October 17, 2014:	The Service sent a letter to USBR and CCWD requesting additional information on the proposed project (Service file number 08ESMF00-2015-TA-0008-1).
February 6, 2015:	The Service approved the Final Long-Term Management Plan for the Cordelia Slough Preserve (Wildlands 2015).
June 10, 2015:	The Service received via electronic mail from CCWD draft responses to the Service's October 17, 2014 letter requesting additional information on the proposed project (M. Seedall, CCWD, *in litt.* 2015; Olberding Environmental, Inc. 2015).
June 22, 2015:	The Service sent an electronic mail message to CCWD and USBR requesting clarification of the estimates of salt marsh harvest mouse habitat compensation and whether any operation and maintenance (O&M) activities would occur outside of the "permanent impact areas."
July 28, 2015:	The Service participated in a conference call with CCWD, USBR, and Olberding Environmental, Inc., to discuss salt marsh harvest mouse habitat compensation and O&M activities.

July 31, 2015: The Service received from CCWD the revised habitat compensation proposal.

September 23, 2015: *The Service issued the biological opinion for the proposed project (Service file number 08ESMF00-2015-F-0008).*

November 23, 2016: *The Service received the memorandum from USBR requesting the reinitiation of formal consultation due to changes in the proposed project including the addition of a staging area adjacent to Site 4, improvements to an existing gravel road adjacent to Site 10, annual mowing of the SCPL ROW, and compensation for permanent effects instead of restoring habitat onsite.*

BIOLOGICAL OPINION

Description of the Proposed Project

Background

The SCPL is a 48-inch cement mortar lined steel water supply pipeline built in 1972 that conveys untreated water from the Contra Costa Canal to the Martinez Reservoir, which provides the primary water supply for the City of Martinez and the Shell Oil Martinez refinery. The SCPL is owned by USBR. It is approximately 28,000 feet long and located generally within a 40-foot to 60-foot non-exclusive easement that passes through several private and publicly owned property parcels (Figure 1). There are pipeline appurtenances associated with the SCPL that include numerous valves that allow for sealing, draining and refilling of the pipe, settlement monitors to allow for detection of SCPL settling, and a cathodic protection system to prevent corrosion. Access to the pipeline and infrastructure is gained through various routes. CCWD is responsible for O&M of the SCPL. CCWD has identified repairs deemed critical to ensure reliable long-term water supply to the City of Martinez and the Shell Oil Martinez refinery. In addition, there are on-going O&M activities that require unobstructed access to the SCPL to ensure reliable operation.

There are five valves that are currently not readily accessible for maintenance or repair due to lack of usable roads at Sites 5, 7, and 10. The proposed project includes construction of unpaved gravel access roads and infrastructure rehabilitation activities, followed by permanent and long-term ongoing O&M activities. These O&M activities, currently constrained due to limited access conditions, would be facilitated by the planned access road construction.

Location

The SCPL is located in north-central Contra Costa County, approximately 1.5 miles north of State Highway 4 and about 1.5 miles south of the San Joaquin/Sacramento Delta (Figure 1). The western portion of the alignment crosses Interstate 680 (I-680). The alignment passes through undeveloped open space (primarily grassland and marshland), two refineries, and an industrial development; it also passes adjacent to two residential neighborhoods. The eastern end of the SPCL begins at the Contra Costa Canal, located on the northern edge of the unincorporated community of Clyde, approximately 950 feet east of the Port Chicago Highway and approximately 3,500 feet northeast of Mallard Reservoir. The alignment runs adjacent to an existing residential neighborhood within Clyde, crosses under the Port Chicago Highway, and traverses open fields containing salt marsh and

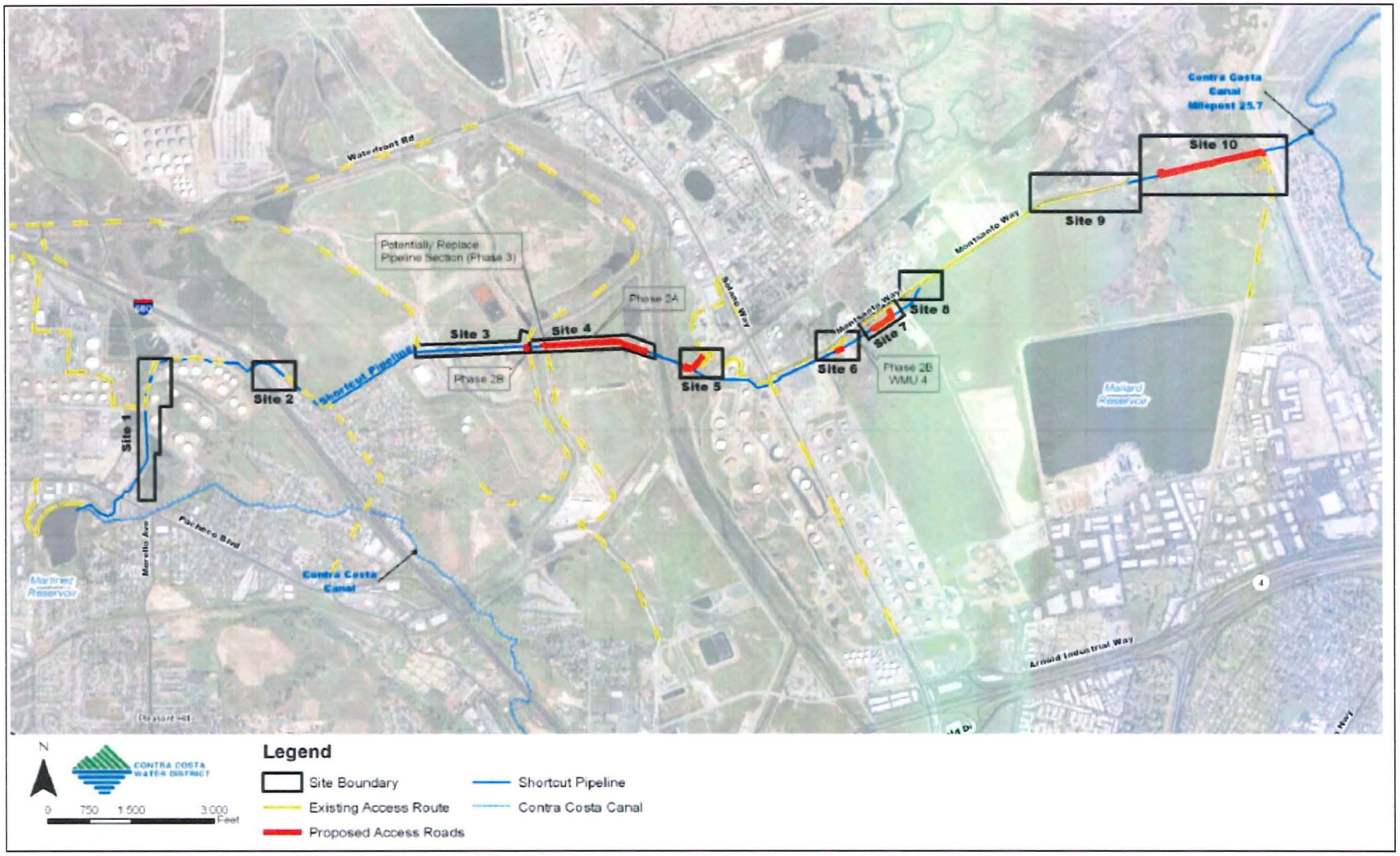

Figure 1. Map of the Action Area and Proposed Project Components.

low-lying grasslands. Approximately 4,000 feet west of the Port Chicago Highway, the alignment turns to the southwest and follows Monsanto Way, a private road within the Tesoro Golden Eagle Refinery property. Continuing in a southwesterly direction, the SCPL crosses developed Tesoro refinery property, then crosses under Walnut Creek, continues west for another 2,000 feet across a flat, vacant field, then crosses under Pacheco Creek. The SCPL continues west for approximately 1,800 feet across open ground, passing adjacent to the Martinez Gun Club property. It then follows Arthur Road in a southwesterly direction, passing between a residential subdivision and open space property owned by the East Bay Regional Park District. After passing under I-680, the alignment runs through the Shell Oil Martinez Refinery, crosses Pacheco Boulevard, passing a commercial property, then veers east and terminates at the Martinez Reservoir (Figure 1).

Purpose

The purpose of the proposed project is to perform repairs to the existing pipeline and associated valves, construct new access roads to some of the inaccessible portions of the SCPL, and install several new butterfly and air valves and settlement monitors that will improve operational flexibility so that maintenance and repairs can be performed with reduced environmental effects. Table 1 below summarizes proposed improvements at each of proposed project sites (Sites 1- 10), and Table 2 summarizes the phasing of work activities at each site in chronological order.

Seasonal Timing of Construction

Construction of access roads would likely occur during summer or fall to avoid wet weather. Valve replacement and installation will require shutdown of the SCPL, so this work would need to occur when the Loop Canal can handle expected water demands. The Loop Canal is typically out of service for cleaning from November to March. There are no operational based restrictions for settlement monitor or cathodic protection work, although this would likely coincide with valve repair work.

In addition to operational constraints, there are other site-specific environmental scheduling restrictions. Access road construction is subject to the most significant constraints as it involves the greatest disturbance of wetlands and habitat, including potential salt marsh harvest mouse habitat. Sites 3, 4, 7, and 10 are the most constrained since road construction would take place in wetlands and also would have to avoid the disturbance of nesting migratory birds. At these sites, the possible work window is very narrow and would need to occur from September 1 to October 15.

At Sites 4 and 5, road construction would not be subject to constraints from nesting migratory birds. Work there could proceed from April 15 through October 15. Site 6, located on Tesoro property on the Waste Management Unit 4 (WMU4) site, has the least habitat and wetland constraints; however, this site does have potential for hazardous waste.

Access Roads and Road Construction

CCWD has obtained a long-term license from Contra Costa County to utilize roads to access the SCPL at Sites 3 and 4. CCWD is working with the East Bay Municipal Utility District to obtain any related permits or licenses to use their maintenance road along the Mokelumne Aqueduct ROW to access Site 10.

Table 1. Summary of Information about Each Site.

Work Site	Site Description	Proposed Improvements	Land Use	Habitats and Wetlands	Hazardous Materials
Site 1	Shell Refinery	Settlement Monitors	Heavy Industrial	None	Potential
Site 2	Tree Service Company	Blow-off Valve	Heavy Industrial	Adjacent to McNabney Wetlands	Minimal
Site 3	Martinez Gun Club	Settlement Monitors, Blow-off Valve	Heavy Industrial	Grasslands	Minimal
Site 4	IT Ponds	Air Valve, Settlement Monitors and Access Road	Heavy Industrial	Wetlands	Medium
Site 5	Foster Wheeler Power Plant	Access Road, Blow-off Valve and new Butterfly Valve, Settlement Monitor	Heavy Industrial	Grasslands and wetlands	Minimal
Site 6	Tesoro Refinery	Blow-off, Air and Butterfly Valves, Access Road, Settlement Monitors	Heavy Industrial	None	Potential (WMU4)
Site 7	Tesoro Refinery	Blow-off Valve and Access Road	Heavy Industrial	Grasslands and wetlands	Minimal
Site 8	Tesoro Refinery	Air Valve	Heavy Industrial	Grasslands	Minimal
Site 9	Tesoro-end of Monsanto Way	Air Valve, Blow-off Valve, Settlement Monitors	Heavy Industrial	Grasslands	Minimal
Site 10	Concord Naval Weapons Station	Blow-off, Air and Butterfly Valves, new Access Road, Settlement Monitors	Heavy Industrial	Grasslands and wetlands	Minimal

Table 2. List of Proposed Project Activities by Phase.

Phase[1]	Activity
Phase 2 Anticipated construction summer/fall 2016	• Construct four new gravel at-grade access roads 12 to 20 feet wide including shoulders (Sites 4, 5, 7, and 10). • Construct minor gravel, paved or concrete access to remaining valves at five locations. • Refurbish five existing air valves and eight blow-off valves. • Replace two butterfly valves and construct two new air valves, two new butterfly valves, and one blow-off valve. • Install or replace up to 25 settlement monitors. • Maintain valves that have been repaired or newly installed. • Maintain new access roads. • Restore temporary impact areas. • Install seven new culverts under the new access road to Site 10. • Inspect pipeline.
Phase 3	• Construct levee turnout and refurbish one blow-off valve (Site 3). Restore temporary impact area. • Inspect pipeline in the area where prior break occurred in 1989. • Based on the inspection, if necessary, repair pipeline section either through slip lining existing pipeline or working within permanent impact areas, conduct spot repairs with minor excavation or via trenching and installation of replacement pipeline.
Routine O&M	• Access pipeline. Test valves as required. Inspect and repair cathodic protection system as needed. Inspect settlement monitors. • Perform maintenance activities as described in the "Future SCPL O&M Activities" section within "permanent impact areas" as required while minimizing and avoiding impacts to sensitive resources.

[1] Phase 1 was completed in 2010.

The proposed project will require construction of five primary segments of new access roads; the locations are shown in Figure 1. Additional minor road segments will be constructed at some locations to provide connections to existing roads. Approximately 5,130 feet of new access roads will be constructed, and an additional 480 feet of existing road located in Site 9 will be re-graveled. The access roads will be surfaced with compacted gravel and will be 18 inches high above the existing ground surface (but only 6 inches high at Site 4) and 12 feet wide at the top, tapering to 20 feet wide at ground level. All new access road construction will take place within the existing USBR ROW with the exception of approximately 160 feet of road at Site 7 and approximately 115 feet of road in two segments at Site 10. At Site 7, the access road would extend north beyond the ROW to connect to Monsanto Way on the Tesoro Golden Eagle Refinery property. At Site 10, 100 feet of road will extend north outside the ROW to form a turn-around at the western terminus, and 15 feet will be constructed to the south of the ROW to meet an existing access road on Tesoro Refinery property.

To construct the new access roads, a dozer will clear, grub (clear of roots and stumps), and scarify (remove any existing pavement) the ground, then an excavator will over-excavate the roadbed to a depth of one to two feet below the natural ground surface. Debris and excess soil will be off-hauled for disposal at an off-site location. The roadbed will be uniformly graded and crowned for positive

drainage away from the road. A non-woven geotextile fabric will be laid, and then the roadbed will be backfilled with soil, crushed rock, and compacted with a vibratory compactor. The roadbed—consisting of imported California Department of Transportation Type II aggregate base—will be built up to a height of four to six inches, including a geofabric layer for road strength and stability. In some locations, the road will be at grade rather than built up. The roadbed will be finished with gravel compacted by a two-roller compactor.

Culverts under the proposed access roads will be required at some locations to maintain existing hydrology, including storm drainage and encroachment from particularly high tides (higher high water) or 100-year flood events. The proposed project will install culverts up to 36 inches in diameter at each of the seven drainage paths identified in field investigations at Site 10 to maintain existing hydrology. It is anticipated that the culverts will be part of surface road construction at this location. Rip-rap will be installed on each end of the seven culverts at Site 10 to prevent erosion. Each rip-rapped area will be 10 feet by 10 feet. The installation of the rip-rap will disturb approximately 1,400 square feet of wetland habitat. Slurry cement to coat and bind the rip-rap will be implemented to minimize voids in between the rocks and prevent predators from denning.

Construction of the access roads will require four to eight weeks to complete. Some roads may be constructed concurrently with the valve work (subject to environmental constraints). Approximately 8,190 cubic yards of fill material (primarily aggregate) will be imported, resulting in approximately 546 roundtrip truck trips to the sites, or an average of about 84 one-way trips per work day, or 42 round trips over the construction period. Only 10 valves will require excavation of soils. It is estimated that no more than 300 cubic yards will be exported from the site if all of the excavated materials are removed. Exported spoils will be less than imported fill. Because it is unlikely that trucks exporting excavated spoils off the site during valve repair and replacement will involve the same trucks importing fill to the site, an additional 20 one-way trips and 10 round trips will be added, resulting in a total of approximately 100 one-way trips and 50 round trips per workday. Any new hazardous materials found within the ROW are expected to be disposed of at approved waste disposal sites. CCWD will contact existing property owners and seek to dispose of any hazards at the property owner's approved disposal site.

Proposed access roads in sensitive areas will require the permanent filling of about 1.494 acres of wetlands and other waters of the United States (plus 1.831 acres affected on a temporary basis). The proposed project will include onsite restoration of temporary impacts.

New Project Areas to Support Construction Improvements to the SCPL

CCWD will use two small areas outside of the project area to support the existing project. One of these areas will be used for staging. The other is an existing unimproved road. These areas are in close proximity to Site 4 and Site 10 (Figures 2 and 3):

1. *Site 4 staging area (Figure 2) is an upland area adjacent to Site 4 and is located in a filled-in former Class I Hazardous Waste pond. This site is approximately 4,500 square feet (0.103 acre). This Site 4 staging area is needed to meet the requirements of avoiding staging areas within wetlands; and*

2. *Improvements to the existing access road near Site 10 (Figure 3). This site is approximately 500 feet long and 23 feet wide and is approximately 11,700 square feet (0.269 acre). The existing gravel access road within this location requiring improvements is approximately 5,100 square feet (0.117 acre).*

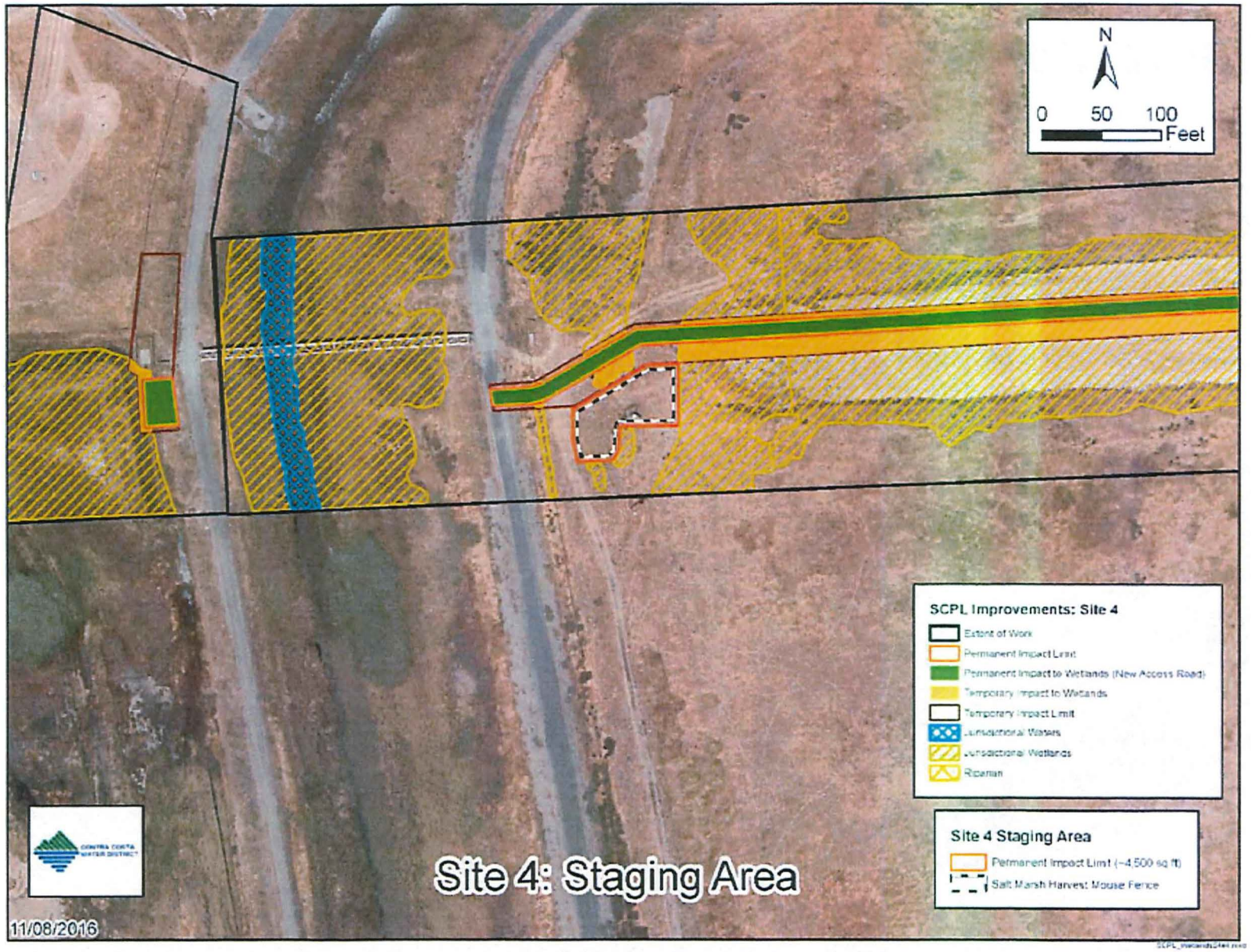

Figure 2. Site 4 Staging Area.

Figure 3. Site 10 Road Improvements.

Valve Replacement and Installation

There are three types of valves on the SCPL: butterfly valves, blow-off valves, and combination air valves. Phase 1 replacement of valves began in June 2010 and was completed in January 2011 at locations on the SCPL where existing paved access roads already provided impact-free access to the valve locations. A total of three existing air valves and one blow-off valve were refurbished as part of the approved Phase 1 work. Phase 1 also included replacement of three existing butterfly valves and construction of four new air valves.

Valve refurbishment and replacement will continue during Phase 2 of the proposed project, which will commence following completion of the new access roads (Table 2). In total, two butterfly valves, eight blow-off valves, and five air valves will be replaced, and two new air valves and one new butterfly valve will be installed.

Butterfly valves are located at strategic locations along the SCPL to regulate or shut off water flow to the pipeline or isolate water within certain sections of pipe. There are a total of five 48-inch butterfly valves on the SCPL. The proposed project will replace two butterfly valves at Site 10 and Site 6 and add one new butterfly valve at Site 5. The new butterfly valve at Site 5 will support maintenance of the intertie between the SCPL and the Foster Wheeler Power Plant.

Blow-off valves are located at intervals along low points on the SCPL to allow for drainage of isolated pipeline segments for purposes of repairs or maintenance. There are a total of nine 6-inch blow-off valves on the SCPL. When the gate valve is opened, water drains from the SCPL into a discharge pipe that drains to an appropriate downstream discharge location. As the blow-off valves are replaced, some discharge pipes will be abandoned in place and new flexible pipes used for discharge. The flexible pipe will allow water to drain to a nearby discharge location or if necessary (*e.g.*, to protect species or their habitat) to tanks that could be trucked away.

Air valves allow air to be drawn into the pipe and are necessary to avoid damage that could result from negative pressure (vacuum) developing during dewatering or failure of the pipe, such as might occur during a seismic event. The air valves also function to release excess air when the pipe is filled. There are currently a total of eight 8-inch air valves on the SCPL. The air valves are located at high points (elevations) on the SCPL; they are located above ground, mounted vertically on a concrete pad, and protected in a locked, vented enclosure. They are laterally offset from the pipeline by approximately eight feet, connected to the SCPL by steel riser pipe and appropriate fittings.

In addition to replacing five existing air valves, CCWD will install two new air valves to provide increased operational flexibility in taking limited pipe segments out of service for maintenance. One will be located at Site 10, just downstream of the first butterfly valve at the eastern end of the SCPL. The second will be located at Site 6, within the Tesoro Golden Eagle Refinery. These new locations will ensure there is an air valve on each side of a butterfly valve.

Replacement or new installation of butterfly and air valves requires excavation around the pipeline in an area measuring approximately 10 feet wide by 10 feet long, with depths up to 10 feet. Replacement of the blow-off valves will not require any excavation; the valves will be accessed through the existing manhole covers, with workers climbing down to the valves on ladders mounted in the manholes.

Prior to excavation along the pipeline in areas of suspected or known contamination, CCWD will determine if the valve location has potential for hazardous waste. For excavations around the pipeline, crushed stone foundation and bedding material will be used to stabilize the pipe. A minimum 12-inch thick layer of foundation material will be placed at the bottom of the excavation and around the new manhole structures. Additional thickness of foundation material will be placed where native soils in the excavation bottom are unstable. Foundation material will consist of clean, natural 1.5-inch crushed (*i.e.* angular) rock.

During replacement or installation of new valves, the SCPL will be shut down and segments of the SCPL will be drained to provide necessary access. Raw (untreated) water will be discharged via the blow-off valves, with the water drained down to an intermediate water level, below the elevation of the particular valve to be replaced. There are five major elevation peaks along the SCPL, each separated by butterfly isolation valves. If the butterfly valves are operable, the valves will be closed so that only SCPL segments where the work is occurring would be drained. Draining will require disposal of untreated water from several discharge points. Possible discharge locations include nearby Walnut, Pacheco, or Seal creeks or other storm water conveyance structures. Groundwater may be encountered during excavation to install some valves and settlement monitors, and dewatering of the excavations would be required. Groundwater within excavated valve sites will either be applied to land or if necessary pumped into holding tanks and hauled off site.

Excavated areas near valves may require minor dewatering. In most cases groundwater quantities are expected to be minor. CCWD will dispose of any groundwater containing hazardous materials at an appropriate location for such materials. If groundwater levels are greater than anticipated, construction of temporary detention basins may be employed at some locations for groundwater disposal from dewatering sites. This would require reinitiation of consultation under the Act.

Settlement Monitor Replacement and Installation

The proposed project also includes the installation of settlement monitors at several locations along the SCPL to monitor settlement that may occur with natural ground subsidence or as a result of seismic activity. Although the exact number and locations are still being determined, up to 25 settlement monitors will be installed along the SCPL. New settlement monitors will be installed where valve repair or replacement will occur or where new valve installation is planned. Additional settlement monitors, if required, will require excavation of an area about 10 feet wide and 10 feet long, down to the depth of the top of the pipe and will be sited to avoid disturbance of sensitive habitat.

Phase 3 Pipe Inspection and Repair

Phase 3 of the proposed project will entail inspection and repair of the SCPL (Table 2). Following completion of Phase 2 of the proposed project, the SCPL interior will be visually inspected for damage, particularly the area where the prior break occurred as a result of the 1989 Loma Prieta earthquake, located on Site 4. It is possible that some sections of pipe located between Walnut Creek on the east and Site 3 are cracked and would need to be repaired or replaced. This activity would entail excavation of an area—centered on the pipeline—of about 10 feet wide and 10 feet deep, with length varying depending on the length of damaged pipe section. The cracked pipe sections, if reparable, would be wrapped and sealed, and then the pipe will be stabilized with crushed stone and backfilled with compacted soil.

Under a worst-case scenario, an approximately 2,100-foot-long SCPL section between Walnut Creek and Pacheco Creek would be replaced. In order to replace the pipe, a 10-foot-wide trench would be excavated by backhoe and excavator following dewatering of the pipeline. Replacement pipe would be laid on a crushed stone foundation, and then the trench would be backfilled with compacted soil.

Future SCPL O&M Activities

As noted in the "Consultation History", the Service's 2005 biological opinion on the Operations and Maintenance Program Occurring on USBR lands within the South-Central California Area Office (Service file number 1-1-04-F-0368, Service 2005) did not address some O&M activities for the SCPL, although they were addressed for various other facilities. USBR requests that the biological opinion for the proposed project address some of those same additional activities, identified by CCWD as necessary O&M activities for the SCPL. These activities are listed below, taken from Table 1 in the 2005 biological opinion (Service 2005), with the original numbering. Future O&M activities will typically occur once or twice per year for one or two days per site. These O&M activities will occur within the SCPL ROW and along the permanent gravel access roads. ~~O&M activities are not expected to extend beyond the permanent road areas. If there are any future O&M activities that would disturb suitable salt marsh harvest mouse habitat within the ROW that is not within the "permanent impact area" (*i.e.*, within the restored areas), then CCWD will advise USBR of this work. USBR will determine whether consultation is needed with the Service before work may commence. Any USBR-approved maintenance work outside of the "permanent impact areas" will be supervised by a Service-approved biological monitor. If salt marsh harvest mice are present, then work will not commence or cease and reconsultation with the Service will be initiated. At this time, only restoration of temporary impact areas within the ROW is anticipated outside of the permanent gravel road impact areas.~~ However, this biological opinion authorizes the temporary disturbance of an additional ~~1.0~~ *0.243* acre of salt marsh harvest mouse habitat within the SCPL ROW beyond the "permanent impact area" during O&M activities.

Activity 2: Blading and Disking

A grader or tractor with mounted blade or disc would be used to scrape or shallowly till the soil to kill, prevent, or retard growth or spread of weeds, to reduce cover for pests, and to limit vegetation fuel load while providing fire breaks. This activity would be conducted once to several times per year and may be conducted at any time of year, but primarily would occur during the dry season (March through November).

Activity 3: Blading of O&M Roads

A grader or tractor with mounted blade would be used to scrape unpaved roadways and road shoulders to remove weedy vegetation, ruts, and to level and maintain the surface for access to the proposed project. This activity would be conducted once annually during the dry season, primarily from May through November.

Activity 5: Canal/Tunnel/Conduit Liner Repair

Cracked or broken pipe liner panels or the aprons or outlets would be patched with concrete, grout compound, shotcrete, or other similar material that would be pumped, blown, or fed from a mixture

by gravity. Damaged liner that cannot be repaired would be overlaid with shotcrete or removed with heavy equipment and a new panel fashioned in place.

Activity 8: Contact Herbicide Applications

Contact herbicides would be applied to control nuisance vegetation within the O&M areas. Contact herbicides would be sprayed from pressurized tanks via vehicle-mounted booms, backpack sprayers or other application rig, bean gun, wand, or by manually wicking herbicides directly onto vegetation. Herbicides would be applied under the direct supervision of a qualified and appropriately licensed applicator and according to the recommendations of a qualified and appropriately licensed Pest Control Advisor.

Activity 11: Drain Ditch and Channel Maintenance

Debris, trash, soil, sediment, and vegetation would be cleaned from open ditches, canals, basins, or pipe in order to ensure the conveyance of water through facilities or away from facilities. Material may be removed by hand, shovel, backhoe, gradall, excavator, or tractor. Cleared soil and vegetation would be transported in trucks to an appropriate offsite spoil site. This activity would be conducted annually, primarily in spring and/or fall, but concentrated during the end of the dry season (August through October).

Activity 13: Hand Control of Vegetation

Small amounts of nuisance vegetation and/or weeds would be removed at facilities or around structures where use of equipment or herbicides is impractical. Removal would be done by hand pulling or with aid of spades, hoes, shovels, adzes, saws, or other hand implements. This activity would be conducted year-round.

Activity 14: Insecticidal Sprays

Insecticides would be applied year-round, as needed, but primarily from spring through fall, to control bees, wasps, spiders, ants, cockroaches, fleas, termites, mosquitoes, and other arthropods. They would be applied directly from canisters, applicators, or by hired structural pest control specialists. They would be applied at structures along conveyance facilities and appurtenant structures.

Activity 15: Mudjacking/Injecting Grout

Mudjacking and/or injecting grout would be used to repair leaks, cracks, holes, or voids in the canal or pipeline in order to prevent a blowout failure that could result in flooding of surrounding land. Repairs would be conducted when defects are discovered, with work preferentially conducted during dewatering. Holes would be bored behind the liner with an auger, then grout or fill (liquefied clay) would be gravity fed from a mixer through tubes or hole borings into the void until the void is filled.

Activity 16: Pre-emergent Herbicide Applications

Pre-emergent herbicides would be used where nearly year-round invasive weeds threaten the facility integrity or increase fire hazards through the growth of fuel load. The herbicides would be applied

directly to soil before seeds germinate, usually once annually in fall or early winter. Applications would be made from pressurized spray tanks with a vehicle-mounted boom sprayer, backpack sprayer, or, for granular formulations, with spreaders. Herbicides would be applied under the direct supervision of a qualified and appropriately licensed applicator and according to the recommendations of a qualified and appropriately licensed Pest Control Advisor.

Activity 18: ROW Dust Abatement

Dust abatement would be conducted to minimize the fugitive dust where the unpaved roadway is graded and where construction is occurring or spoils soil is being hauled during work operations at facilities. Typically, a water truck would traverse the roadway or work area and spray water directly onto the soil surface during single or multiple passes.

Activity 19: ROW Mowing

Mowing will be conducted primarily in the spring to control weeds and reduce or eliminate the need for herbicide applications along the canal and adjacent ROWs. Mowing will be conducted with a rotary, sickle bar, or other mower blade attached to a tractor.

Activity 20: Rip-Rap

Rip-rap would be used to prevent erosion of inlets, outlets, and other water control structures to stabilize and strengthen the area from erosion. Rip-rap is typically comprised of large rocks and boulders of varying sizes. Rock would be delivered to the site by truck and trailer; dumped rock would be piled with the aid of backhoes and excavators. The work would be conducted when needed to protect the structures, but would preferentially be performed during the dry season.

Activity 23: Bargate/Fence Installations

Gate and fence installations for CCWD maintained areas would be limited to replacing existing gates and fences and not to install additional fencing. Any additional fencing or gates would be subject to approval by the Service prior to installation. Gate and fences limit access to facilities, provide security and safety, and protect resources where encroachment is a problem. Chain-link fence is typically used to restrict public access and prevent dumping or vandalism. Bargates provide additional security when installed where structures or facilities intersect public roadways, such as corners of bridges, on secondary or primary roads, or on parallel fences at or near structures. Holes for fence supports would be dug by hand implements, power auger, or backhoes. Holes for bargates would be dug with power augers or a backhoe. Pipe rods to which chain-link fencing is attached would be set in the ground with concrete. Gates would be cleaned and painted.

Activity 29: Drainage Improvements

Heavy equipment, including dozers, tractors, backhoes, longsticks, graders, etc., would be used to excavate drainage trenches and install drain pipe or to fill low spots to improve drainage. Trenches and drains would be cleared of vegetation and silt with heavy equipment or by hand. Excavated material would be piled on levees ROW or transported by truck to an offsite location. Drainage improvements would be made as needed, though mostly annually, and preferentially during dry conditions—usually in the fall, before rains begin.

Activity 30: Electrical Repairs by Utility Companies

Electrical repairs would be made year-round on an as-needed basis by utility line crews operating from service vehicles. Repairs (or replacements) would be made at all utility-serviced facilities, including power poles, transformers, and underground utility lines.

Activity 31: Embankment Maintenance

Fill embankments would be used to reduce runoff and erosion of soil and/or divert water toward underdrains or overchutes. The embankments would be maintained with backhoes, graders, excavators, or hand implements employed to fill gullies and burrows, compact soil, and grade slopes. Trucks would be used to haul fill. Embankment maintenance would be conducted as needed, but primarily during the dry season.

Activity 32: Facilities Inspection

All proposed project facilities would be inspected once annually. Mechanical equipment (gates, valves, etc.) and electrical equipment (communications, monitoring, computer systems, etc.) would be visually inspected and operated to test functioning.

Activity 33: Graffiti Removal from Concrete Structures

Graffiti would be painted over by hand with a brush or roller, or removed by sandblasting. Waste paint from sandblasting would be collected and disposed of at an appropriate waste disposal site.

Activity 35: Valve Rehabilitation

Valve function would be checked annually, and when they do not operate, they would be removed and repaired or replaced. Valve rehabilitation work would be contained within the existing features and not involve new installations.

Activity 41: ROW Trash Removal

Tires, plastics, lumber, bedding, scrap metal, and other trash and garbage would be removed by hand and hauled by truck to an appropriate offsite waste disposal site. Larger items such as vehicles and appliances would be removed with the aid of service trucks with hoists or winches. Where needed, trained waste handlers would be used to collect and dispose of hazardous wastes.

Activity 42: Supervisory Control and Data Acquisition System Repair and Upgrade

Supervisory Control and Data Acquisition electrical, computer, or communications equipment—primarily modular components or panels— located at control structures would be repaired or replaced as needed.

Activity 48: Utility Trenching

Utility trench would be excavated with a trencher, backhoe, or excavator to lay underground utilities to facilities and upgrade the systems in place. Most utility infrastructure has been provided, and the need for trenching would be infrequent.

Activity 54: Minor Road Construction/Rehabilitation

Minor road rehabilitation or construction would be done to provide new access to facilities or to recondition existing roads. Rehabilitation would involve ripping and removal of existing road base, re-grading of roadbed, and compaction of the new bed and underlying soil. Sand would be spread by truck, along with crushed rock, and compressed. Road construction would be done irregularly or annually on a limited scale.

Activity 57: Structure Construction

Structures (blockhouses, stilling wells, etc.) are constructed when new operational facilities would be added. Sites are graded and forms set for pouring concrete pads framing may use concrete block, metal, or would, with metal siding. Trenching may be done to provide underground utilities to the site.

Activity 58: Utility and Facilities Repair

Utility companies may send a service vehicle to repair electrical connections or replace transformers. Repairs may occur anywhere along facilities, but would primarily be conducted inside structures, and would be completed irregularly on an as-needed basis.

Activity 59: Pump-In System Set-Up during Flood Years

During flood years, pumped diversion of water into the canal would occasionally be required, as permitted by operational agreements. Pump sites would be cleared and leveled with heavy equipment and temporary piping would be laid down.

Additional Ongoing Maintenance Activities

Additional ongoing maintenance activities not included above would include regular inspection and maintenance of the cathodic protection system, which protects the external surfaces of the mortar-coated steel cylinder of the SCPL from corrosion. The system consists of seven deepwell ground beds with high silicon, cast iron anodes connected to pole mounted rectifiers, and test stations installed at various locations along the pipeline. CCWD O&M staff would take system power input and output readings on a monthly basis and perform a pipe-to-soil potential survey annually to test the protective potential of the cathodic protection system.

Conservation Measures

CCWD and its contractors will implement the following conservation measures to avoidance minimize the effects of the proposed project on the salt marsh harvest mouse and its habitats.

Conservation measures for Phase 2 and Phase 3 of the proposed project are listed below, and conservation measures for routine O&M activities are listed at the end.

Conservation Measures for Proposed Project Phase 2 and Phase 3

1. No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction related materials or wastes, oil or petroleum products, or other organic or earthen material will be allowed to enter into or be placed where it may be washed by rainfall or runoff into marsh, salt pannes, or open water/ditches adjacent to the work areas.

2. Sediment (visqueen or equivalent) barriers will be installed prior to initial disturbance of wetlands or uplands adjacent to wetlands to prevent the flow of spoil or heavily silt-laden water into any water body. Sediment barriers will be properly maintained throughout construction and reinstalled as necessary (such as after passage of the excavator).

3. All protective coating material removed from pipe surfaces will be captured and disposed of appropriately.

4. If used, sand-blasting material will be a manufactured substance that is either biodegradable or biologically and chemically inert. As much of this material as possible will be captured by placing tarps or plastic tubs beneath sand-blasting locations. Captured material will be disposed offsite.

5. Contaminated trench spoils, if any are encountered, will be hauled away from the work area, tested to determine concentration of contaminants, and disposed of offsite at an appropriate waste disposal site.

6. CCWD will schedule as much work as possible during the dry season in order to minimize the potential for wet weather, surface flooding, and high water tables in the work sites. Where possible, the work will be conducted during periods of reduced daily tidal peaks to further minimize the chance of encountering surface and groundwater. CCWD will minimize the potential for injuring or killing salt marsh harvest mice seeking unsubmerged cover within the ROW during flood events by avoiding construction activities and O&M activities when the adjacent marsh is flooded to the maximum extent practicable (this requirement does not apply to emergency conditions that require immediate repair of the pipeline).

7. All personnel and their equipment will be required to stay within the designated construction sites and access corridors to perform job-related tasks and will not be allowed to enter wetlands outside of the proposed project area, drainages, and habitat of listed species.

8. Pets will not be allowed in or near the construction areas.

9. Firearms will not be allowed in or near the construction areas. No intentional killing or injury of wildlife will be permitted.

10. The construction site will be maintained in a clean condition. All trash (*e.g.*, food scraps, cans, bottles, containers, wrappers, cigarette butts, and other discarded items) will be placed in closed containers and properly disposed of offsite.

11. Equipment maintenance, refueling, and staging areas will occur in upland areas at least 30 feet from the edge of aquatic habitat. Prior to the onset of work, CCWD will ensure that a plan is in place for prompt and effective response to any accidental spills. All workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

12. Hazardous materials used during the repair work period (*e.g.*, fuels, lubricants, solvents, and pipe coating substances) will be controlled, cleaned up, and properly disposed of outside the tidal marsh areas.

13. To control erosion during and after implementation of the proposed project, the contractor will implement a Stormwater Pollution Prevention Plan with appropriate best management practices, in accordance with San Francisco Bay Regional Water Quality Control Board guidelines.

14. High-density polyethylene (HDPE) marsh mats will be used in most instances where heavy vehicles must traverse marsh surfaces. Plywood marsh mats will be used at selected locations where lighter wheeled vehicles or pedestrians only will be deployed.

15. After construction is completed, final cleanup will include removal of all stakes, temporary fencing, flagging, and other refuse generated by construction. Vegetation will not be removed or disturbed in the cleanup process.

16. The Project's approach is to avoid and minimize lasting impacts to the marsh and adjacent uplands in the work sites, as described above. Natural contours in the work sites will be left largely intact or returned to the approximate original elevations. Vegetation in most work sites will be left intact, though the vegetation in some work sites potentially inhabited by salt marsh harvest mice will be mowed to stubble as a salt marsh harvest mouse protection measure.

17. Service-approved biological monitor: A Service-approved biologist will be present onsite to monitor for salt marsh harvest mice.

    a. The Service-approved biological monitor will have the authority to stop work if deemed necessary for any reason to protect the salt marsh harvest mouse.

    b. The Service-approved biological monitor will be present during vegetation clearing and salt marsh harvest mouse exclusion fence installation. Once the salt marsh harvest mouse exclusion fencing has been installed and all work activity is confined to the cleared work site, the biological monitor will inspect the site at least once per day while construction is ongoing (inspections by the biological monitor will be weekly once the salt marsh harvest mouse exclusion fencing is installed around the work area as described below).

    c. The Service-approved biological monitor will have demonstrated experience in monitoring sensitive resource issues on construction projects. Specifically, the monitor will have at least a bachelor's degree in the biological or allied sciences or the equivalent, at least one field season of prior monitoring experience under the

supervision of a qualified biological monitor, and knowledge of the natural history of the salt marsh harvest mouse and related sensitive biological resources in the vicinity of the proposed project area. Resumes of candidate biological monitors will be submitted to the Service for their approval prior to the monitor being deployed in the field.

d. In summary, the biological monitor will have the following responsibilities:

    1) Review the appearance, habitats, and life history of the salt marsh harvest mouse with construction crews.

    2) Review the conservation measures and permit conditions with construction crews.

    3) Inspect work sites for salt marsh harvest mice and approve salt marsh harvest mouse exclusion fencing.

    4) Visit active construction sites daily to inspect biological protection measures and assist construction personnel with resource conservation.

e. Prior to initiation of construction, CCWD will submit to the Service for its review the qualifications of its biologist(s) proposed for use as Service-approved biologist(s). Service-approved biologist(s) will be given the authority to stop work that may result in the harassment, harm, injury, or mortality of the salt marsh harvest mouse. The Service-approved biologist(s) will be the contact for personnel who observe a salt marsh harvest mouse or who find a salt marsh harvest mouse. Service-approved biologist(s) will be onsite for exclusion fence installation and removal, vegetation clearing, and initial ground disturbances in salt marsh harvest mouse habitat. When vegetation is cleared, exclusion fence erected, and after initial ground disturbance, the Service-approved biologist will conduct weekly visits to the proposed project area. The Service-approved biologist will conduct weekly inspections of exclusion fencing, document compliance, and conduct construction education training if necessary. The Service-approved biologist will be available on an "on call" basis, as necessary, between site visits.

18. Vegetation removal:

a. If any areas with pickleweed vegetation or other marsh vegetation within 50 feet of the edge of pickleweed vegetation need to be cleared for proposed project activities, vegetation will be removed.

b. Initial vegetation removal will preferably be accomplished with a band of sheep and/or goats in order to avoid injuring any salt marsh harvest mice within the construction areas. Grazing with sheep and/or goats will involve the use of a portable battery powered electric fence system to keep the livestock in the correct locations. This electric fencing cannot touch any vegetation or shorting may occur, compromising the efficacy of the system. Thus, a four-foot wide path will need to be cleared of vegetation initially in order to install the sheep/goat fence. A string

trimmer (*i.e.*, weed whacker) or hand clearing tools will be used to clear a four-foot wide path centered on the location of the sheep/goat fencing. The Service-approved biologist will inspect the path to be mowed immediately prior to the mowing field work to clear the path of any salt marsh harvest mice within the mow area. Once the four-foot wide path is mowed, then the sheep/goat fencing will be installed by the grazing contractor within the center of the mowed path. The sheep and/or goats will be allowed to graze the construction areas and exclusion fence area (including pickleweed) vegetation to remove as much above ground plant material as possible.

Pickleweed vegetation is mostly unpalatable for sheep/goats and all that remains after sheep/goat grazing will be harvested, stored, and re-applied post construction.

c. If initial clearing of the vegetation is not feasible with sheep/goats, then string trimmers (*i.e.*, weed whackers) may be used to conduct the initial vegetation removal; however, the Service-approved biologist will need to walk immediately in front of the trimmer to clear vegetation to be mowed of any salt marsh harvest mice or nests for the entire mow area.

d. As directed by the Service-approved biological monitor, cut native vegetation will be stored onsite and re-spread as mulch at the completion of the proposed project in areas where the impact is temporary. Any cut vegetation stored onsite will be surrounded with salt marsh harvest mouse-proof exclusion fencing. Cut non-native vegetation listed as moderately to highly invasive by the California Invasive Plant Council (http://www.calipc.org/ ip/inventory/, California Invasive Plant Council 2006) will be bagged and removed offsite at a suitable disposal site. Areas of vegetation removal that are part of "permanent impact areas" will not be restored as part of the proposed project; therefore, cut vegetation in "permanent impact areas" will be removed and disposed of offsite.

e. If necessary, maintenance will be conducted to keep vegetation trimmed down. Maintenance will be conducted using one or several typical technologies such as mowing, use of string trimmers, application of bonded fiber matrix, and/or herbicide application. The Service-approved biologist will conduct a pre-maintenance survey to determine that no areas needing maintenance provide vegetative cover that may attract or hide salt marsh harvest mice. As determined by the Service-approved biologist, areas that do provide vegetative cover will first be removed of vegetation by the methods described above in the preceding measures.

19. Contingency if a salt marsh harvest house is onsite:

a. If a salt marsh harvest mouse is observed within the areas being removed of vegetation or elsewhere within the work site, the biological monitor will stop work in the immediate area until the salt marsh harvest mouse leaves the work area on its own volition.

b. If the salt marsh harvest mouse does not leave the work area, work in the immediate area will not be reinitiated until the Service is consulted regarding appropriate avoidance measures, and permission is granted by the Service to commence work.

c. No salt marsh harvest mice may be handled or captured at any time during site preparation or proposed project activities.

20. Salt marsh harvest mouse exclusion fencing:

a. Exclusion fencing for salt marsh harvest mice will be installed between areas of salt marsh harvest mouse habitat and work sites immediately following vegetation removal and before excavation activities begin to prevent entry of the salt marsh harvest mice into cleared areas. Exclusion fencing will not be used during annual vegetation maintenance.

b. The final design and proposed location of the fencing will be submitted to the Service for review and approval prior to placement. The Service-approved biologist will have the ability to make field adjustments to the location of the fencing based on site-specific habitat conditions.

c. The wildlife exclusion fence will be a minimum of two feet in height. The fencing will be constructed from a material (*i.e.*, plastic or metal) so that the outside is too smooth to be climbed by salt marsh harvest mouse. The toe of the fence will be buried approximately 4 inches in the ground to prevent salt marsh harvest mouse from crawling or burrowing underneath it. Entrance gates will be similarly protected with a rolling fence exclusion device or similar on the bottom of the gate with close ground contact making it extremely difficult for a salt marsh harvest mouse to enter the site. Other alternatives that provide equivalent exclusion will be allowed at the discretion of the Service-approved biological monitor. Attachment 4 in Olberding Environmental, Inc. (2015) provides more detailed information regarding various options for small mammal exclusion fencing suitable for salt marsh harvest mouse.

d. Maintenance of the fencing will be conducted as needed throughout the work period. Any necessary repairs to the fencing will be completed within 24 hours of the initial observance of damage. Work will not continue within 300 feet of the damaged fencing until the fence is repaired and the site is surveyed by a Service-approved biologist to ensure that salt marsh harvest mice have not entered the work area.

e. A qualified biologist or site manager will monitor site fencing periodically throughout each day when work is conducted within 300 feet of the fence. If there is no construction activity within 300 feet of the exclusion fencing, the qualified biologist or site manager will inspect the fencing: (1) at least twice per week during clear weather, and (2) within 24 hours after a storm.

21. Work will be confined to daylight hours *as a normal practice. Nighttime work will not be performed except as required to restore hydraulic integrity of the pipeline when working on in-line valves or should an emergency event occur that requires the full pipeline to be returned to service.*

22. Endangered species training for construction personnel:

a. All construction personnel will participate in an endangered species training program to be given by the Service-approved biological monitor. The training will provide

information about the salt marsh harvest mouse, measures being implemented to avoid impacts to this species, and procedures to follow should a salt marsh harvest mouse be encountered during routine activities. Training materials will be in Spanish and English.

b. The Service-approved biologist will provide training to field management and construction personnel on the importance of protecting environmental resources.

c. Communication efforts and training will take place during pre-construction meetings so that construction personnel are aware of their responsibilities and the importance of compliance.

d. Construction personnel will be educated on the types of sensitive resources located in the proposed project area and the measures required to avoid impacts on these resources. Materials covered in the training program will include environmental rules and regulations for the proposed project and requirements for limiting activities to the construction ROW and avoiding demarcated sensitive resources areas.

e. Training meetings will educate construction supervisors and managers on: the need for resource avoidance and protection; construction drawing format and interpretation; staking methods to protect resources; the construction process; roles and responsibilities; project management structure and contacts; conservation measures; and emergency procedures.

~~23. Onsite habitat restoration:~~

~~a. Restoration period: The temporarily disturbed sites are anticipated to restore to full functions and values in the year following impacts. A three-year monitoring and maintenance period is prescribed for these sites.~~

~~b. Restoration goals: The goals for the onsite restoration of temporarily disturbed habitat to pre-project conditions or better are: (1) restoration of at least 1.43 acres of wetland habitat; (2) restoration of at least 0.22 acre of waters of the U.S.; and (3) restoration of at least 0.70 acre of grassland habitat. CCWD has elected to compensate for permanent impacts (3:1 ratio) for the temporary disturbance of 0.166 acre of pickleweed-dominated wetland habitat rather than restoring this habitat (see the compensation ratios in the "Offsite Salt Marsh Harvest Mouse Compensation" measure below). However, if pickleweed is restored, then CCWD and its contractors will follow the procedures recommended in Olberding Environmental, Inc. (2015, pp. 18-19) for harvesting the pickleweed.~~

~~c. Reference sites: Reference notes and photographs will be made of all work sites prior to ground disturbance by the monitoring biologist. Revegetation reference sites will be designated at that time and delineated with a Global Positioning System for future analysis. The revegetation sites will be paired with disturbance sites and should have comparable biological values, vegetation cover, and plant species composition.~~

d. Revegetation techniques: Within six months following road and infrastructure construction completion, the construction areas subject to temporary impacts will be planted and seeded with native species. The only areas that will not be planted or seeded within the temporary impact areas include the areas that were designated as waters of the U.S. The revegetation techniques are described in more detail in Olberding Environmental, Inc. (2015, pp. 19-20). Two seed mixes will be used as appropriate within wetlands and uplands, respectively. Within wetlands the seed mix will consist of: meadow barley at eight pounds per acre, small fescue at five pounds per acre, marsh rosemary at one pound per acre, saltgrass at five pounds per acre, and alkali heath at two pounds per acre. Within uplands the seed mix will consist of: saltgrass at five pounds per acre, blue wildrye at 10 pounds per acre, small fescue at 10 pounds per acre, and California barley at 15 pounds per acre.

e. Non-native invasive plant control: Non-native invasive plants listed as moderately to highly invasive by the California Invasive Plant Council (http://www.calipc.org/ip/inventory/, California Invasive Plant Council 2006) shall be controlled for three years. The Service-approved biologist will inspect the site at least three times per year to detect and record occurrences of non-native invasive vegetation within the construction areas and within reference site areas. The site visits will roughly occur during the following time frames: April/May, June/July, and August/September. Maps with inset recommendation boxes will be prepared by the Service-approved biologist following each site visit and sent to CCWD regarding target weeds for control and methodology. Both hand weeding and herbicide applications (with possible cutting) will be conducted as recommended by the Service-approved biologist. Hand weeding of stinkwort will be done as new plants emerge. No mowing or use of power tools will be allowed to be used for weed control during the three-year establishment period. Herbicides will be applied as a part of the restoration maintenance contract under the direct supervision of a qualified and appropriately licensed applicator and according to the recommendations of a qualified and appropriately licensed Pest Control Advisor. The Pest Control Advisor will be familiar with herbicide application within and among special-status species and wetlands, and will provide recommendations suitable to avoid impacting said entities. AquaMaster® or an equivalent herbicide will be the preferred herbicide for control of perennial pepperweed. The herbicide must be aquatically approved to control emergent vegetation in and around bodies of fresh or salt water. The active ingredient would be glyphosate (AquaMaster® is 53.8 percent glyphosate). The active ingredient becomes deactivated once it touches water so that vegetation only on or above the waterline is controlled. An aquatically approved surfactant such as Activator 90 is required to obtain best performance. Herbicide will be applied in a focused stream to minimize losses of non-target plants due to drift or overspray. The solution will be sprayed on large infestations and/or wicked onto isolated plants.

f. Restoration success criteria: Restoration will be considered successful when:

1) Absolute plant cover within restored wetland areas will be at least 80 percent of adjacent reference site values (areas designated as waters of the U.S. during preconstruction will be allowed to remain unvegetated but will be graded to provide functions and values similar to preconstruction condition);

~~2) Plants within the restored wetland areas will have an average height of at least 8 inches;~~

~~3) The species composition and abundance of non-native plants does not exceed those of adjacent reference sites;~~

~~4) All three federal parameters - hydrophytic vegetation, hydric soils, and wetland hydrology – will be achieved within the restored wetlands;~~

~~5) Restored pickleweed areas will be dominated by pickleweed. Restored pickleweed areas will remain true to type and will not revert to another habitat type; and~~

~~6) The species composition of the restored grassland will be similar to adjacent reference sites.~~

~~g. Monitoring of restoration sites: Monitoring of the restoration sites will occur annually during the three-year establishment period (as described in Olberding Environmental, Inc. (2015)) to determine success in comparison to the performance standards specified above. Monitoring data (including photo documentation) will be collected at restored and reference habitats as shown on the maps provided in Attachment 3 of Olberding Environmental, Inc. (2015). The extent of inundation or saturation during the rainy season will be monitored annually during the three-year establishment period to document hydrologic conditions of the sites. The biological monitor will conduct a site visit during the middle of the rainy season (January/February) within two weeks after a saturating rainfall event (at least one inch rainfall) in order to document inundation and/or soil saturation within the restored wetland habitats. Photo documentation will occur at each data collection point and other relevant areas to document inundation and/or saturated soil conditions. If inundation is observed, then the maximum depth of ponding will be measured with a hand held meter stick. Monitoring reports will be submitted to the Corps, USBR, Service, and San Francisco Bay Regional Water Quality Control Board beginning with the as-built report. Annual reports will be submitted by December 15 of each of the three establishment years as described in Olberding Environmental, Inc. (2015). The Corps, USBR, Service, and San Francisco Bay Regional Water Quality Control Board will be notified following successful completion of the three-year monitoring period. If performance standards are not met within the three-year period, monitoring, habitat maintenance, and remedial actions will continue until the performance standards are met.~~

24. Offsite salt marsh harvest mouse habitat compensation:

a. CCWD will compensate *at a 3:1 ratio* for *both* the temporary disturbance and permanent loss of salt marsh harvest mouse habitat offsite at Wildlands' Cordelia Slough Preserve in Suisun Bay (Wildlands 2015) (or another Service-approved site within the Suisun Bay Area Recovery Unit if not possible at this location). *CCWD has elected to compensate at a 3:1 ratio for both temporary and permanent effects instead of restoring temporarily disturbed areas under a Service-approved restoration plan and compensating at a 1:1*

ratio for temporary effects. All access roads, *annual SCPL ROW mowing areas, temporarily disturbed areas (not restored within one year)* and other permanent features within the SCPL ROW will be compensated at a 3:1 ratio. *CCWD will purchase a total of 13.5 acres of salt marsh harvest mouse habitat compensation at Wildlands' Cordelia Slough Preserve. Using the 3:1 compensation ratio for the temporary staging area at Site 4 and the road improvements at Site 10 along with all other habitat compensation requirements to address coverage of the entire SCPL ROW with the compensation ratio for permanent effects results in 13.257 acres of the 13.5 acres of habitat compensation being used for proposed project implementation. This leaves 0.243 acre of habitat compensation available for future O&M/pipeline repair.* ~~Temporary impact compensation ratios will be as low as 0.5:1 if restored within six months of the start of construction and will increase to 1:1 if restored within one year of the start of construction and will further increase to 2:1 if restored within two years of the start of construction. If longer than two years, this is effectively a permanent impact and will be compensated at a 3:1 ratio. CCWD will strive to restore temporary impacts within six months but may need up to one year to restore temporary impacts depending on actual project conditions.~~

b. CCWD has elected not to restore any pickleweed habitat within the SCPL ROW. Therefore, CCWD will compensate for all pickleweed habitat within the site that is impacted on a temporary or permanent basis assuming a permanent impact compensation ratio of 3:1.

c. Habitat will be preserved in perpetuity under a Service-approved compensation plan with an endowment and Service-approved long-term management plan (*e.g.*, Cordelia Slough Preserve Long-term Management Plan (Wildlands 2015)). CCWD will have a final compensation plan reviewed and approved by the Service and provide the funding for the compensation plan prior to the initiation of construction of the proposed project. ~~If the performance-based criteria for the recovery of vegetation onsite to pre-project conditions or better is not achieved, then the total amount of offsite compensation that CCWD will provide at the Cordelia Slough Preserve (or another Service-approved site if not possible at this location) will increase based on the compensation ratios discussed above.~~ As stated previously, CCWD may elect to compensate for permanent impacts (3:1 ratio) for the 0.166 acre of temporary disturbance to pickleweed-dominated wetland habitat rather than restoring this habitat.

d. CCWD will obtain ~~0.5~~ *0.243* acre of salt marsh harvest mouse habitat compensation for expected future O&M work (this is consistent with the 2011 California Environmental Quality Act documentation that estimated up to 21,000 square feet (0.48 acre) of further repairs under Phase 3 once the pipeline is able to be inspected). If this level of repair is not needed once the pipeline is inspected, then CCWD would use the ~~0.5~~ *0.243* acre of habitat compensation over time for potential road repairs that may develop. The compensation ratios discussed ~~above~~ *below* would apply to future O&M work based on the timeline for restoration of temporarily disturbed habitats. *Temporary impact compensation ratios will be as low as 0.5:1 if restored within six months of the start of construction and will increase to 1:1 if restored within one year of the start of construction and will further increase to 2:1 if restored within two years of the start of construction. If longer than two years, this is effectively a permanent impact and will be compensated*

at a 3:1 ratio. CCWD will strive to restore temporary impacts within six months but may need up to one year to restore temporary impacts depending on actual project conditions.

25. CCWD will install chain link gates at the entrance to the access road at Site 10 to help deter mammal predators and people from using the access road.

26. CCWD will include Special Provisions that incorporate the proposed avoidance measures for salt marsh harvest mouse in the solicitation for bid information. In addition, CCWD will inform all contractors involved in the proposed project about the requirements and measures to avoid impacts or adverse effects to this species.

Conservation Measures for Routine O&M Activities:

1. A Service-approved biologist will oversee implementation of environmental protection for O&M activities. The Service-approved biologist shall be responsible for documentation of compliance with the terms and conditions in the biological opinion and the revegetation and monitoring plan (Olberding Environmental, Inc. 2015). Some of the O&M activities consist of visual inspections only and will not require pre-event surveys or biological monitoring. Any O&M activity that involves vegetation removal, grading/excavation, and/or maintenance work will require a pre-event survey and biological monitoring during implementation for protection of salt marsh harvest mouse and/or wetlands as appropriate. Activities may occur after the Service-approved biologist has conducted a detailed search of the appropriate area and cleared the area of any salt marsh harvest mouse individuals. Should any pickleweed grow within the O&M areas it will be thoroughly searched for nests and signs of salt marsh harvest mouse activity then removed by hand prior to the activity. Wildlife exclusion fencing may be installed to prevent injury to salt marsh harvest mouse depending on the activity as determined by the Service-approved biologist.

2. Trucks will routinely traverse the gravel road, and thus to avoid impacts to sensitive resources, drivers will undergo environmental awareness training and update/renew their training on a regular basis. Any motorized equipment or materials stored onsite overnight will be inspected prior to the commencement of work the next morning. The operator will conduct a visual inspection for the presence of any animals that may have used the equipment or materials for cover during the night. If an animal (especially a mouse) is discovered, then it will be avoided with a 50-foot buffer and allowed to exit the work area unassisted.

3. Any soil that is disturbed will be revegetated by seeding with a native seed mix and/or container planting as appropriate.

4. Any O&M activities that extend beyond the "permanent impact areas" may require compensatory mitigation if ground disturbing activities occur within wetlands, waters of the U.S., or potential salt marsh harvest mouse habitat and are not already covered through the purchase of additional wetland and habitat mitigation. CCWD may obtain additional salt marsh harvest mouse habitat compensatory mitigation to satisfy temporary habitat impacts from future temporary habitat impacts. Impacts to pickleweed habitat from O&M activities are unlikely; however, the Service will be consulted should they occur.

5. All work will be during daylight hours *as a normal practice*, and no artificial illumination will be used. *However, nighttime work may be required to restore hydraulic integrity of the pipeline when working on in-line valves or should an emergency event occur that requires the full pipeline to be returned to service.*

6. Personnel will limit their vehicular travel to the access roads. Any off-road access would be on-foot.

7. CCWD will minimize the potential for injuring or killing salt marsh harvest mice seeking unsubmerged cover within the ROW during flood events by avoiding construction activities and O&M activities when the adjacent marsh is flooded to the maximum extent practicable (this requirement does not apply to emergency conditions that require immediate repair of the pipeline).

8. Personnel will be required to implement the following general protection measures:

    a. No vehicles will be allowed in the marsh. All entry will be on-foot.

    b. Equipment will be fueled outside of the marsh.

    c. Any spills will be contained and properly disposed.

    d. All equipment will be properly maintained to reduce the potential for spills of petroleum-based products.

    e. If any materials or wastes are inadvertently released to the marsh, project supervisors will immediately halt all work and use all available resources to assure containment and removal.

    f. Pets will not be allowed in or near the work area.

    g. Firearms will not be allowed in or near work areas. No intentional killing or injury of wildlife will be permitted.

    h. The work area will be maintained in a clean condition. All trash (*e.g.*, food scraps, cans, bottles, containers, wrappers, cigarette butts, and other discarded items) will be placed in closed containers and properly disposed of offsite.

<u>O&M Non-Native Invasive Plant Species Control Strategy</u>

Since much of the areas immediately adjacent to the SCPL ROW are currently inhabited at various levels by non-native invasive plant species, the strategy for non-native invasive control within the permanently impacted areas centers on preventing the establishment and spread of invasive non-native plant species. The invasive non-native plant control strategy for the permanently impacted areas includes:

1. <u>Operations and Maintenance</u>: To allow routine O&M activities of the SCPL as identified by CCWD as necessary to occur with maximum efficiency and efficacy.

2. Prevention and Early Detection: To prevent the establishment and spread of non-native invasive and other nuisance plant species through an integrated and comprehensive approach that emphasizes the prevention of invasive plant species establishment through early detection, and treatment of new populations. Regular surveys will be conducted to detect new species and monitor those already in place, and the qualified biologist will provide recommendations on targeted control as necessary.

3. Prioritization and Control: Remove invasive non-native vegetation that hinder routine O&M activities and/or pose a risk to special-status species, their habitats, and/or other sensitive habitats (*i.e.*, wetlands).

4. Protection of Special-Status Species: Control and eradication activities will be conducted to minimize risk to special-status species, their habitats, and/or other sensitive habitats (*i.e.*, wetlands).

5. Monitoring and Quality Control: Ensure that the control and eradication activities are regularly monitored, improved, and environmentally safe.

Non-native invasive species plant control and eradication measures will be similar to those described above for the temporary impact areas, namely hand pull and herbicide application. ~~No mowing is proposed within the ROW.~~ Any grading will occur only under the direct supervision of a Service-approved biologist and only after they have conducted a pre-construction survey to visually inspect for salt marsh harvest mouse.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the proposed project, the action area encompasses the approximately ~~4.165~~ *4.419* acres of suitable salt marsh harvest mouse habitat that will be directly disturbed during access road construction, culvert installation, settlement monitor installation, valve installation and replacement, *annual mowing,* and SCPL repair along the approximately 28,000-foot-long by 40 to 60-foot wide ROW for the USBR's SCPL. The action area also includes an additional ~~1.0~~ *0.243* acre of suitable habitat within the SCPL ROW that may be disturbed by future O&M activities beyond the "permanent impact areas." The action area also includes areas within 50 feet of blow-off valves that would be affected by SCPL drainage.

Analytical Framework for the Jeopardy Determination

~~The following analysis relies on four components to support the jeopardy determination for the salt marsh harvest mouse: (1) the *Status of the Species*, which evaluates the species' range wide condition, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which evaluates the condition of this species in the action area, the factors responsible for that condition, and the role of the action area in the species' survival and recovery; (3) the *Effects of the Action*, which determines the direct and indirect effects of the proposed Federal action and the effects of any interrelated or interdependent activities on this species; and (4) *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on this species.~~

~~In accordance with the implementing regulations for Section 7 and Service policy, the jeopardy determination is made in the following manner: the effects of the proposed Federal action are evaluated in the context of the aggregate effects of all factors that have contributed to the current status of the salt marsh harvest mouse. Additionally, for non-Federal activities in the action area, we will evaluate those actions likely to affect the species in the future, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both its survival and recovery in the wild.~~

~~The following analysis places an emphasis on using the range-wide survival and recovery needs of the salt marsh harvest mouse, and the role of the action area in providing for those needs as the context for evaluating the significance of the effects of the proposed programmatic Federal action, taken together with cumulative effects, for purposes of making the jeopardy determination.~~

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion considers the effects of the proposed Federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) the *Status of the Species*, which describes the rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the species; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the species.

Status of the Species

Salt Marsh Harvest Mouse

There are two subspecies of the salt marsh harvest mouse: the northern subspecies (*R. r. halicoetes*) and the southern subspecies (*R. r. raviventris*). Both subspecies are listed as endangered. For the most recent comprehensive assessment of the species' range-wide status, please refer to *Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California* (Recovery Plan; http://ecos.fws.gov/docs/recovery_plan/TMRP_Final.pdf; Service 2013). No change in the species' listing status was recommended in the February 2010 5-year review (Service 2010). Threats evaluated during that review and discussed in the final document have continued to act on the species since the February 2010 5-year review was finalized, with loss of habitat being the most significant effect. While there have been continued losses of salt marsh harvest mouse habitat throughout the various recovery units, including the Suisun Bay Area unit where the proposed project is located, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species. The Service is in the process of finalizing its most current 5-year review for the species.

Environmental Baseline

The approximately 28,000-foot (5.3-mile)-long by 40 to 60-foot-wide SCPL ROW is located in north-central Contra Costa County, approximately 1.5 miles north of State Highway 4 and about 1.5 miles south of the San Joaquin/Sacramento Delta (Figure 1). The western portion of the alignment crosses I-680. The alignment passes through undeveloped open space (primarily grassland and marshland), two refineries, and an industrial development; it also passes adjacent to two residential neighborhoods.

Habitats within the SCPL ROW

Creeks and Local Hydrology

Lands to the south of the SCPL are mainly upland grasslands. A few creeks cross the alignment. These creeks receive most of their water from rainfall. Freshwater falling to the ground as rain flows north to Suisun Bay, either underground, across the ground, or through seeps and creek channels. Lands to the north of the SCPL are mostly marshes that receive the majority of their water from tidal movement of brackish water from the adjacent Suisun Bay (USBR 2010).

Several creeks cross the SCPL. Seal Creek and Mount Diablo Creek are located within the first 50 feet of the eastern end of the SCPL. Both are small drainages that appear to have been channelized upstream of the pipeline. One or both creeks have been blocked by the pipeline. One of the small channels of Hastings Slough is also crossed by the pipeline about mid-way along the alignment in the Tosco Refinery (USBR 2010). The remaining two creeks, lower Walnut Creek and upper Pacheco Creek, are larger channelized features in the industrialized areas contained within well-developed levee systems. The SCPL crosses under these creeks just upstream of their intersection (USBR 2010).

Field investigations after a rain event on December 18, 2014, identified seven small drainage paths that convey flow across SCPL Site 10. The drainage paths ranged from a width of 1.0 feet to 2.5 feet and a depth of 0.5 feet to 1.5 feet (M. Seedall, CCWD, *in litt.* 2015). Field investigations during an extreme high tide event on February 18, 2015 confirmed that there is no tidal influence at Site 10 (M. Seedall, CCWD, *in litt.* 2015).

Developed and Industrial Areas

Developed areas along the approximately 5.3-mile-long stretch of the SCPL consist of industrial development (primarily active refinery), dirt lots, infrastructure pads, and roads containing few species of vegetation. These areas provide little to no value as habitat for the salt marsh harvest mouse due to the high level of disturbance, human activity, and lack of suitable cover. Plant species present in these areas include stinkweed, artichoke thistle, and Italian thistle. Developed and industrial areas occur within the action area at Sites 1, 5, 6, 7 and 8.

Ruderal/Grassland Habitat

Ruderal/grassland habitat is generally present in areas that have been disturbed in the past, but have been left fallow or undeveloped for a number of years following the disturbance. Ruderal/grassland habitat can provide suitable foraging and dispersal habitat for salt marsh harvest mice depending on

the amount of past disturbance and the proximity to suitable salt or brackish marsh habitat. Salt marsh harvest mice have been observed foraging within ruderal/grassland habitats more than 328 feet from suitable marsh habitat (Service 2010); therefore, the Service considers the salt marsh harvest mouse to potentially be present within all suitable ruderal/grassland habitat contiguous with and within 328 feet of suitable marsh habitat. Ruderal/grassland habitat is present adjacent to and among the developed areas within the SCPL alignment. Typical plant species that occur in ruderal/grassland habitat include fennel, vetch, artichoke thistle, Italian thistle, stinkweed and annual grasses including wild oats, various species of brome grass, and creeping wild-rye. Ruderal/ grassland habitat occurs within the action area at Sites 2 through 10.

Seasonal Wetland Habitat

Seasonal wetland plant communities occur in swales and depressions where water ponds during the rainy season for sufficient duration to support vegetation adapted to wetland conditions. Seasonal wetlands in the action area consist of low-lying areas adjacent to emergent marsh habitat. Typical plant species observed in the seasonal wetlands include baltic rush, western goldenrod, and bristly ox-tongue. Halophytic plant species, including alkali heath and salt grass, are also present in seasonal wetlands along portions of the action area. Seasonal wetlands occur within the action area at Sites 3, 5, 6, 7, 9, and 10. The seasonal wetlands within the action area provide suitable foraging and dispersal habitat for salt marsh harvest mice.

Coastal Brackish Marsh Habitat

Coastal brackish marsh is dominated by perennial, robust emergent monocots which grow to an average height of approximately six feet. Brackish marsh within the action area is dominated by cattail, pickleweed, and various species of tule. The marsh within the center portion of the action area is hydrologically connected to Hastings Slough, but tidal influence to this feature appears limited due to severe muting upstream, resulting from a series of culverts. In the winter when primary hydrologic inputs to the marsh are rainfall and stormwater runoff, the salinity in the marsh is likely to be very low. Areas within the action area containing this habitat include Sites 2 through 10. Coastal brackish marsh within the action area provides suitable breeding, foraging, and dispersal habitat for salt marsh harvest mice.

Salt Panne Habitat

Salt panne habitats, sometimes referred to as marsh pannes, are typical features of extensive, well-developed tidal marshes. The term refers to natural ponds that form in the marsh plain. These ponds, usually less than one foot in depth, fill with tidal water only during very high tides. They may be hypersaline in late summer (*i.e.*, they may contain significant concentrations of sodium chloride or other mineral salts), but they do not develop thick deposits of salts as do natural or commercial salt ponds. For this reason, most pannes are unvegetated, but some support wigeongrass and green macroalgae. During the August 2010 surveys, a thin layer of dead wigeongrass was observed to cover the salt panne habitat located at Site 4.

Salt panne habitat occurs to the west of the action area in between the Martinez Gun Club and Pacheco Creek (Site 4). This area was devoid of water and, aside from the layer of died-back wigeongrass, nearly devoid of vegetation at the time of the August 2010 surveys. Sparse vegetation was observed to the south of this habitat due to the high salinity content of the area. However, the

northern portion of this habitat contained dense marsh habitat suitable to support halophyte species such as salt grass, pickleweed, and alkali heath. Walnut Creek flows to the west of this habitat. Salt marsh harvest mice typically avoid unvegetated areas like salt pannes; however, they may occasionally disperse through salt panne habitat or take shelter within cracks in the soils of salt panne habitat (Smith and Barthman-Thompson 2013).

CCWD SCPL Improvement ROW Sites

Site 1 is mainly industrial, consisting of the Shell Oil Refinery and thus unsuitable for the salt marsh harvest mouse. Therefore, the environmental baseline section of this biological opinion focuses on Sites 2 through 10. Undeveloped habitats that occur along the action area consist mainly of disturbed, ruderal grassland habitat within seasonal wetlands and emergent marsh. Table 3 below summarizes the type of habitat at particular sites that could support the salt marsh harvest mouse. In addition to the pickleweed habitat in the action area at Sites 2-5 and 9-10, appropriate upland grassland habitat occurs at all six of these sites where the salt marsh harvest mice may seasonally forage, disperse, or escape tidal and non-tidal flooding. While sparse industrial development occurs in some areas along the SCPL, the salt marsh harvest mouse has virtually no barriers to movement into the action area. The habitat conditions for Sites 2 through 10 are discussed below starting from the eastern end of the action area at Site 10 moving westward to Site 2.

Site 10

Site 10 represents the easternmost portion of the action area (Figure 1). Site 10 occurs within a large expanse of wetland habitats. Field investigations at Site 10 observed seven drainage paths crossing the SCPL ROW after a rain event on December 18, 2014 (M. Seedall, CCWD, *in litt.* 2015). A field visit on February 18, 2015 during an extreme high tide event confirmed that Site 10 is not tidally influenced (M. Seedall, CCWD, *in litt.* 2015). Several areas containing sparse patches of pickleweed occur within Site 10. This portion of the site was also the only area along the SCPL that contained mature trees suitable for nesting raptor species they may prey on salt marsh harvest mice.

Transmission towers and barbed wire fencing line Site 10 from east to west with open space and more wetland areas occurring on either side of the SCPL. Site 10 is bordered by active refinery facilities to the west, Port Chicago Highway to the east, and the Point Edith Wildlife Area and Hastings Slough to the north. Areas south of Site 10 include Mallard Reservoir, ball fields, and industrial developments.

Site 9

Site 9 continues west from Site 10 and generally contains the same habitats observed in Site 10. Site 9 is devoid of trees, however, and lies just south of expansive tidal marsh habitat. Open space and wetland habitats occur on both sides of Site 9 as well.

Site 8

Site 8 is bound on the north by Monsanto Road, on the west by the Tesoro Refinery, and on the south and east by emergent marsh. This portion of the action area includes an inactive waste management unit. In the 1950's and 1960's, acids, catalyst fines, and caustic waste were disposed of in ponds that were located within the upland areas along with construction debris and solid process

Table 3. Habitat Types and Potential for Salt Marsh Harvest Mouse Occurrence (Sites 2-10).

Study Area	**Habitat Type**	**Potential for salt marsh harvest mouse**
Site 2	Coastal brackish marsh with pickleweed Grassland	Yes
Site 3	Coastal brackish marsh with pickleweed Grassland	Yes
Site 4	Salt panne Coastal brackish marsh with pickleweed Grassland	Yes
Site 5	Developed industrial Coastal brackish marsh with pickleweed Seasonal wetlands Grassland	Yes
Site 6	Developed industrial Coastal brackish marsh without pickleweed Seasonal wetlands Grassland	No
Site 7	Developed industrial Coastal brackish marsh without pickleweed Seasonal wetlands Grassland	Yes
Site 8	Developed industrial Coastal brackish marsh without pickleweed Grassland	No
Site 9	Seasonal wetlands Coastal brackish marsh with pickleweed Grassland	Yes
Site 10	Seasonal wetlands Coastal brackish marsh with pickleweed Grassland	Yes

wastes which were placed outside of the ponds. Thus, much of this portion of the action area has been covered with introduced fill material resulting from its years as a waste management unit.

Site 7

Site 7 continues west from Site 8, with Monsanto Way making up its northern boundary. This area is characterized as mainly industrial development associated with the refinery. The undeveloped habitat includes a large drainage area bisected by Monsanto Way. Tidally-influenced brackish marsh and seasonal wetland habitats occur within the action area adjacent to the drainage.

Site 6

Continuing west along Monsanto Way is Site 6. Similar to Site 7, this area is also characterized by the surrounding industrial development.

Site 5

Site 5 occurs roughly 0.5 mile west of Site 6 and is to the west of Solano Way, the Atchison Topeka and Santa Fe Railroad tracks, and the Southern Pacific Railroad tracks, just to the east of Pacheco Creek. This portion of the action area opens up into more natural open space containing grassland habitat before transitioning into marsh habitat adjacent to Pacheco Creek. Widely scattered patches of pickleweed also occur in this area. Lands adjacent to this portion of the alignment have similar habitat types.

Site 4

Site 4 lies to the west of Walnut Creek and contains salt panne habitat. This is the only portion of the action area containing this particular habitat type. This habitat contains a moderate amount of vegetation suited to its high salinity content. The transition to wetland habitat to the north of this habitat was evident during the surveys. Large patches of pickleweed occur along the edges of Site 4. This habitat will pond brackish water during high tides, as evidenced by the salt, biotic crust, and wigeongrass observed during surveys, but is dry throughout most of the year.

Site 3

Site 3 occurs along the western portion of the action area and spans the length of the Martinez Gun Club. Eucalyptus trees occur in this area, though they are not likely to be suitable for nesting raptors given the proximity of the gun club. A constructed engineered earthen ditch originates on the eastern side of Site 3 transitioning to brackish marsh habitat as it flows to the western arm of Pacheco Creek. Surrounding habitat is mainly ruderal, consisting of the gun club to the south and a landfill to the north.

Site 2

Site 2 occurs just to the east of I-680 and Service Road. Marsh habitat occurs adjacent to Site 2 to the east. Several areas to the south of Site 2 contain scattered patches of pickleweed. Ruderal grassland and a small firewood operation make up the majority of Site 2.

Cordelia Slough Preserve

Wildlands' proposed Cordelia Slough Preserve is located at the former Green Lodge Duck Club property about 9.5 miles north of the action area for the proposed project on the west side of the Suisun Marsh in southwestern Solano County, California, east of I-680 at the end of Goodyear Road, approximately five miles south of the City of Fairfield. The proposed Cordelia Slough Preserve is located in a rural area of Suisun Marsh where the primary land use is duck and hunting clubs. It is bordered by a levee and Cordelia Slough to the south and east, a levee to the north, and Union Pacific Railroad tracks to the east. The proposed Cordelia Slough Preserve is managed marsh habitat that currently supports a mosaic of pickleweed. The site also has upland habitats on the levees and full tidal habitats in the slough along the outboard levee.

The vegetative cover varies from dense stands of pickleweed to dense cover of facultative wetland species such as creeping wild rye, fat hen, and alkali heath and limited stands of salt grass. Habitats within the proposed Cordelia Slough Preserve include semi-permanent open water, pickleweed-

dominated managed marsh, upland refugia, tidal marsh (along the outboard levee), transition zone/refugia, and levee/refugia (Wildlands 2015).

Wildlands is under contract with the Green Lodge Land Company to purchase in fee title the 195-acre property which contains the proposed Cordelia Slough Preserve and has developed a Service-approved long-term management plan for the site for the benefit of the salt marsh harvest mouse (Final Cordelia Slough Long-term Management Plan, Wildlands 2015). The proposed Cordelia Slough Preserve would provide a substantial area of protected salt marsh habitat in an area that lies between other existing conservation parcels within the Suisun Marsh. Wildands will manage water levels across the entire 195-acre property (aside from the area currently occupied by the duck club facilities) for the benefit of salt marsh harvest mice at the proposed Cordelia Slough Preserve. However, management activities as described in the Final Cordelia Slough Preserve Long-term Management Plan will only occur within the Preserve.

Salt Marsh Harvest Mouse

Suisun Bay Area Recovery Unit

Portions of the action area for the proposed project (*e.g.*, SCPL Sites 2, 3, 4, 5, 6, 7, 9, and 10) and all of the proposed Cordelia Slough Preserve occur within the Recovery Plan's Suisun Bay Area Recovery Unit for the salt marsh harvest mouse (Service 2013). The Suisun Bay Area Recovery Unit is within the range of the northern subspecies of the salt marsh harvest mouse (*R. r. halicoetes*) (Service 2013). The Suisun Bay Area Recovery Unit includes suitable or restorable tideland habitats in the Suisun Bay area from Carquinez Strait to the edge of the Sacramento-San Joaquin River Delta (Delta) (legal Delta boundary), representing the eastern extent of the range of the salt marsh harvest mouse. It is separated from the San Pablo Bay Recovery Unit by gaps in habitat in the Carquinez Strait and intervening hills. Limited populations of salt marsh harvest mouse exist within the Suisun Bay Area Recovery Unit.

The action area for the proposed project occurs near one of the largest and most stable populations of the salt marsh harvest mouse within the Suisun Bay Area Recovery Unit (the tidal marshes along the Contra Costa County shoreline between Point Edith and Middle Point) (Service 2013). The Recovery Plan (page 261, Figure III-9, Segment C; Service 2013) identifies the portion of the action area immediately north of SCPL Sites 9 and 10 as a priority area for likely future tidal marsh restoration.

The proposed Cordelia Slough Preserve occurs within the Western Suisun/Hill Slough marsh complex of the Suisun Bay Area Recovery Unit. One of the criteria in the Recovery Plan for the downlisting of the salt marsh harvest mouse to threatened is for the protection, management, and restoration of at least 1,000 acres of suitable marsh habitat within the Western Suisun/Hill Slough marsh complex including five viable habitat areas each 150 acres or more in size (Table III-3 in Service 2013). The proposed preservation of the diked wetlands within the Cordelia Slough Preserve could count toward the downlisting criteria for the protection, management, and restoration of suitable marsh habitat within the Western Suisun/Hill Slough marsh complex. However, the preservation of the diked wetlands of the Cordelia Slough Preserve would not count toward the downlisting criteria for the protection of a viable habitat area as defined in the Recovery Plan unless the diked wetlands were restored to tidal marsh (Service 2013, p. 179).

Suisun Marsh Habitat Management, Preservation and Restoration Plan

On April 21, 2014, the U.S. Bureau of Reclamation and the Service issued the Record of Decision for the *Suisun Marsh Habitat Management, Preservation and Restoration Plan* (USBR and Service 2014). The *Suisun Marsh Habitat Management, Preservation and Restoration Plan* is a comprehensive 30-year framework for a broad partnership to restore 5,000 to 7,000 acres of marsh to tidal wetlands and protect and enhance more than 40,000 acres of managed wetlands within the Suisun Marsh near the City of Fairfield, Solano County, California (USBR, Service, and CDFW 2013). The objectives of the *Suisun Marsh Habitat Management, Preservation and Restoration Plan* include improving habitat for multiple special-status species including the salt marsh harvest mouse; maintaining the heritage of waterfowl hunting and other recreational opportunities; improving water quality to assist fish migration and spawning; and improving and maintaining the levee system to protect property, infrastructure, and wildlife habitats from flooding. The action area for the proposed project occurs outside of the *Suisun Marsh Habitat Management, Preservation and Restoration Plan* area. However, the proposed Cordelia Slough Preserve occurs within Suisun Marsh Region 1 of the *Suisun Marsh Habitat Management, Preservation and Restoration Plan* area (Figure 2 in USBR, Service, and CDFW 2013). Between 8.4 and 12.6 percent (1,000 to 1,500 acres) of existing managed wetlands within Suisun Marsh Region 1 will be restored to tidal marsh within 30 years under the *Suisun Marsh Habitat Management, Preservation and Restoration Plan* (Table 2 in USBR, Service, and CDFW 2013).

Occurrences near the Action Area for the CCWD SCPL Improvement Project

The California Natural Diversity Database (CNDDB) reports five occurrences of the salt marsh harvest mouse within one mile of the action area for the proposed project: (1) at Avon-Port Chicago Marsh about 1,800 feet north of SCPL Sites 9 and 10 in the eastern quarter of the action area (CNDDB occurrence number 64; CDFW 2015); (2) at the Point Edith Wildlife Area located within 4,500 feet north of SCPL Sites 9 and 10 in the eastern quarter of the action area (CNDDB occurrence number 4; CDFW 2015); (3) along Pacheco Creek about 900 feet north of the SCPL Site 4 (CNDDB occurrence number 139; CDFW 2015); (4) at McNabney Marsh (also known as Shell Marsh) about 2,000 feet north of SCPL Sites 3 and 4 (CNDDB occurrence number 62; CDFW 2015); and (5) at McNabney Marsh adjacent to and along the SCPL ROW at Site 2 (CNDDB occurrence number 138; CDFW 2015).

The San Francisco Estuary Institute reports the following survey data for salt marsh harvest mice within 2,000 feet of the action area (http://www.sfei.org/content/salt-marsh-harvest-mouse-database-and-maps):

1. One salt marsh harvest mouse captured during 800 trapping nights in diked marsh habitat in Shell Marsh near SCPL Site 2 (capture efficiency (CE) = 0.13; site number 349; WESCO, unpubl. data, 1990).

2. Eight salt marsh harvest mice captured during 1,475 trapping nights in diked marsh habitat in Shell Marsh near SCPL Site 2 (CE = 0.54; site number 341; WESCO, unpubl. data, 1994).

3. Six salt marsh harvest mice captured during 2,270 trapping nights in diked marsh habitat in Shell Marsh near SCPL Site 2 (CE = 0.26; site number 216; H.T. Harvey and Associates, unpubl. data, 1988).

4. One salt marsh harvest mouse captured during 800 trapping nights in diked marsh habitat in Shell Marsh near SCPL Site 2 (CE = 0.13; site number 241; H.T. Harvey and Associates, unpubl. data, 1990); and

5. Nine salt marsh harvest mouse captured during 1,200 trapping nights in diked marsh habitat at the Acme Landfill about 2,000 feet north of SCPL Site 4 (CE = 0.75; site number 343; HSA, unpubl. data, 1989).

On the basis of habitat assessment and the proximity of known records, the Service considers the salt marsh harvest mouse to have a high potential to occur within all suitable coastal brackish marsh and seasonal wetland habitat and contiguous grassland/ruderal habitat (within 328 feet of suitable marsh and wetland habitat) at SCPL Sites 2, 3, 4, 5, 7, 9, and 10.

Effects of the Proposed Project

Salt Marsh Harvest Mouse

Direct effects of the proposed project are effects occurring within the action area during construction of the proposed project. Direct effects may be temporary (lasting less than one year with habitat restored to pre-project conditions by the following growing season) or permanent (lasting more than two years). Indirect effects are the effects of the proposed project generally occurring later in time after construction has been completed (*e.g.*, degradation of habitat due to the spread of invasive plant species or altered hydrology). The direct and indirect effects of the proposed project on the salt marsh harvest mouse are summarized below. Table 4 below summarizes the amount of habitat for the salt marsh harvest mouse that will be temporarily disturbed or permanently lost by the proposed project and the amount of habitat compensation.

Habitat Disturbance

The proposed project will result in the permanent loss of about 0.40 acre of suitable grassland habitat and about 1.530 acres of suitable wetland habitat *(Table 4). The proposed project will also result in* ~~and~~ the temporary disturbance ~~(less than one year)~~ of about ~~0.79~~ *1.044* acre*s* of suitable grassland habitat and about 1.445 acres of suitable wetland habitat for the salt marsh harvest mouse (Table 4)*; however, since CCWD has elected not to restore temporarily disturbed areas under a Service-approved restoration plan, the Service considers the effects to be permanent. Additionally the ongoing disturbance of habitat within the SCPL ROW due to annual mowing is considered a permanent loss of habitat although suitable habitat for the salt marsh harvest mouse would still occur within the ROW in between mowing events.* The majority of the wetland habitat that will be lost or disturbed is seasonal wetlands with little or no pickleweed vegetation; however, about 0.346 of pickleweed-dominated wetlands will be permanently lost (including about 0.166 acre of temporarily disturbed pickleweed-dominated wetlands that CCWD has elected not to restore within the SCPL ROW). CCWD may also temporarily disturb up to ~~1.0~~ *0.243* acre of additional salt marsh harvest mouse habitat within the SCPL ROW during *future* O&M activities outside of the "permanent impact areas" *(Table 4)*; however, it is not known at this time how much of the additional habitat disturbance from *future* O&M activities will be grassland versus wetland habitat. The disturbance of suitable grassland habitat will remove habitat the salt marsh harvest mouse utilizes for foraging, dispersal, and sheltering. The disturbance of suitable wetland habitat will remove habitat the salt marsh harvest mouse utilizes for breeding, foraging, dispersal, and sheltering.

Table 4. Acres of Permanent Loss and Temporary Disturbance of Salt Marsh Harvest Mouse Habitat in the Proposed Project.

Habitats	Acres Impacted	Compensation Ratio[2]	Compensation (Acres)
Permanent Loss[1]			
Grassland	0.400	3:1	1.200
Wetland[1]	1.530	3:1	4.590
Total Permanent Loss	**1.930**	3:1	**5.790**
Temporary Disturbance *(but not restored)*[2]			
Grassland	0.790	~~0.5:1 to 1:1~~ *3:1*	~~0.395 to 0.790~~ *2.370*
Wetland	1.445	~~0.5:1 to 1:1~~ *3:1*	~~0.723 to 1.445~~ *4.335*
Additional Impacts to Grassland at Sites 4 and 10	*0.254*	*3:1*	*0.762*
Total Temporary Disturbance *(but not restored)*	~~**2.235**~~ ***2.489***	~~0.5:1 to 1:1~~ *3:1*	~~**1.118 to 2.235**~~ ***7.467***
Future O&M Temporary Disturbance[3]			
Grassland or Wetland	~~**1.000**~~ ***0.243***	~~0.5:1 to~~ 1:1	~~**0.500 to 1.000**~~ ***0.243***
Total All Effects	**5.165** ***4.662***		~~**7.408 to 9.025**~~ ***13.500***

[1] Permanent impacts are effects lasting for more than two years from the initial disturbance. The temporary disturbance of 0.166 acre of pickleweed-dominated wetland habitat is counted as a permanent loss of habitat in this table because CCWD has elected not to restore temporarily disturbed pickleweed wetland habitat within the SCPL ROW.

[2] ~~Compensation ratios for temporary disturbance are dependent on the timeline for the restoration of habitat to pre-construction conditions or better. If temporarily disturbed habitat is restored to pre-construction conditions or better within six months of the initial disturbance, than a 0.5:1 ratio will apply. If restored within one year of the initial disturbance, than a 1:1 ratio will apply. If restored within two years of the initial disturbance, than a 2:1 ratio will apply. If not restored within two years of the initial disturbance, than a 3:1 ratio will apply. Based on CCWD's anticipated timeline for restoration, the estimates of the amount of habitat compensation in this table assume temporarily disturbed habitats will be restored within six months or one year of the initial disturbance. However, the total amount of compensation shown in the table could be higher if temporarily disturbed habitats are not restored within one year.~~ *CCWD has elected not to restore temporarily disturbed areas and instead will compensate at the 3:1 ratio for permanent effects. The "temporary disturbance" estimates also include areas within the SCPL ROW that will be subjected to annual mowing which will also compensated at a 3:1 ratio.*

[3] *Future salt marsh harvest mouse habitat compensation (beyond areas of the SCPL ROW already fully compensated for at the 3:1 ratio) for any future O&M work in support of future repairs and maintenance.*

As noted previously in the *Description of the Proposed Project* section, CCWD has also proposed a set of conservation measures, including the commitment to provide compensatory habitat as a condition of the proposed project. This compensatory habitat is intended to minimize the effect on the salt marsh harvest mouse of the proposed project's anticipated incidental take, resulting from the permanent loss and temporary disturbance of habitat described above. The compensatory habitat proposed will be in the form of funding the preservation in perpetuity and long-term management of *13.5 acres of* suitable salt marsh harvest mouse habitat at the Service-approved Cordelia Slough Preserve within the Suisun Bay Area Recovery Unit (or other location approved by the Service

within the Suisun Bay Area Recovery Unit). This component of the action will have the effect of protecting and managing lands for the species' conservation in perpetuity. The compensatory lands will provide suitable habitat for breeding, feeding, or sheltering commensurate with or better than habitat lost as a result of the proposed project. Providing this compensatory habitat as part of a relatively large, contiguous block of conserved land may contribute to other recovery efforts for the species.

~~The total amount of salt marsh harvest mouse habitat compensation that will be funded by CCWD is dependent on the timeline for the successful restoration of temporarily disturbed areas to pre-construction conditions or better (*i.e.*, 0.5:1 compensation ratio if restored within six months of the initial disturbance, 1:1 if within one year, 2:1 if within two years, or 3:1 if more than two years). Based on CCWD's anticipated timeline for the restoration of temporarily disturbed habitats within six months or one year of the initial disturbance, the total amount of salt marsh harvest mouse habitat compensation that will be funded by CCWD is estimated to be between 7.408 acres and 9.025 acres.~~

Direct Effects to Individuals

Any salt marsh harvest mice occurring within the proposed project area during road construction, pipeline repair, culvert installation, valve replacement, settlement monitor installation, or O&M activities could be injured or killed by being crushed by the use heavy equipment within suitable wetland and grassland habitat. Individual salt marsh harvest mice may be displaced by noise and vibrations associated with construction activities and the operation of heavy equipment within and adjacent to suitable habitat. Displaced salt marsh harvest mice may have to compete for resources in occupied habitat and may be more vulnerable to predators. Disturbance of female salt marsh harvest mice from March to November may cause abandonment or failure of the current litter. Displaced salt marsh harvest mice may suffer from increased predation, competition, mortality, and reduced reproductive success.

The type and severity of effect depends on several factors, including the intensity and characteristics of the sound, the distance of the salt marsh harvest mice from the source, the timing of actions, and the frequency and duration of the noise-generating activities. The range of effects potentially includes behavioral effects, physiological stress, physical injury, and mortality.

CCWD will minimize the potential for injury and mortality of salt marsh harvest mice and reduce the level of disturbance during construction activities within suitable salt marsh harvest mouse habitat by having a Service-approved biological monitor supervise the removal of all vegetation within the work area and a four-foot buffer around the work area by hand tools or sheep/goat grazing to bare ground or stubble no higher than one inch. Vegetation removal will proceed in a manner that passively herds salt marsh harvest mice into adjacent areas of suitable habitat outside of the work area. The Service-approved biologist will then supervise the installation of salt marsh harvest mouse-proof exclusion fencing around the work areas immediately after the vegetation is cleared. Once the salt marsh harvest mouse exclusion fencing has been installed and all work activity is confined to the cleared work site, the biological monitor will regularly inspect the site while construction is on-going. ~~All~~ *The majority of* work will be restricted to the daytime *as a normal practice* to minimize the disturbance of salt marsh harvest mouse foraging and dispersal activities which occur primarily at night. *However, nighttime work may be required to restore hydraulic integrity of the pipeline when working on in-line valves or should an emergency event occur that requires the full pipeline to be returned to service.*

A worker awareness program will be presented to all construction personnel before they start work on the proposed project; the program will summarize relevant laws and regulations that protect biological resources, discuss sensitive habitats and listed species with the potential to occur in the work zone, explain the role and authority of the biological monitors, and review applicable avoidance measures to protect listed species and habitats.

CCWD will minimize the potential for attracting predators of the salt marsh harvest mouse to the work area by enclosing all foods and food-related trash items in sealed trash containers and properly disposing of all trash offsite.

The level of disturbance of salt marsh harvest mice would be exacerbated if construction activities near tidal areas occurred during an extreme high tide event when the mice climb emergent vegetation within the marsh or escape the flooded marsh to seek upland refugia cover; this is when the salt marsh harvest mouse is most vulnerable to predation. However, since the majority of the marsh habitat within the action area is isolated from tidal flows, salt marsh harvest mice within the action area are unlikely to be affected by extreme high tide events. However, salt marsh harvest mice within the action area may be affected by non-tidal flooding events. This is when the salt marsh harvest mouse is most likely to approach the upland habitats near the work area to seek cover that is not flooded. CCWD will minimize the potential for injury and mortality of salt marsh harvest mice within the SCPL ROW during construction and O&M activities by avoiding working when the adjacent marsh is flooded to the maximum extent practicable.

Increased traffic associated construction activities and with the ongoing O&M activities could alter salt marsh harvest mouse breeding, foraging, dispersal, and sheltering activities. However, implementation of the avoidance and minimization measures including environmental awareness training, restriction of maintenance-related travel to existing roads, and restriction of *the majority of* O&M activities to the daytime will minimize the level of disturbance of salt marsh harvest mice during ongoing O&M activities. The access roads will not be accessible to the public; therefore, traffic along the access roads will be restricted to proposed project-related traffic. Once construction of Phases 2 and 3 of the proposed project are completed, the access roads will be used infrequently (one or two days per site per year) for monitoring and O&M along the SCPL.

Invasive Plant Species

The proposed project has the potential to degrade salt marsh harvest mouse habitat through the introduction of invasive weeds during proposed project construction. Invasive weeds, such as perennial pepperweed, could spread into marsh habitats when seeds are attached to vehicles, equipment, and clothing. The potential for the introduction of invasive weeds into suitable marsh habitat will continue post-construction due to ongoing O&M activities, and the construction of new access roads through suitable marsh habitat will create new vectors for the spread of invasive weeds into the marsh. The spread of perennial pepperweed and other invasive plants can displace native marsh vegetation and lower habitat quality for salt marsh harvest mice by reducing the amount of plants they use for cover, nesting, and food, such as marsh gumplant and pickleweed. Perennial pepperweed provides poor upland refugia cover because the plant is leafless in the winter when the salt marsh harvest mouse is in most need of suitable upland refugia cover during the more frequent winter extreme high tides and storm events. Without suitable upland refugia cover, the salt marsh harvest mouse is more vulnerable to predation during extreme high tide and flooding events. ~~CCWD will weed the work sites after construction for the duration of the monitoring period (three~~

~~years or until success criteria are achieved).~~ CCWD will continue invasive plant control within the SCPL ROW as a part of its ongoing O&M activities. Weed abatement will target perennial pepperweed and stinkwort. This approach will reduce the prevalence of non-native invasive plant species at the work sites, but will not eliminate them. Complete elimination, rather than control, is not deemed feasible. Further, over time given natural processes even weed-free sites may become colonized by non-native plants in the future.

Contamination of Marsh Habitat

Construction activities within and near suitable habitat for the salt marsh harvest mouse could result in the contamination and degradation of the marsh if appropriate measures were not taken to reduce the potential for a spill of fuel or other hazardous materials. Trenching activities within a former waste management unit could release hazardous materials into salt marsh harvest mouse habitat. Salt marsh harvest mice could be directly injured or killed if exposed to hazardous chemicals. Salt marsh harvest mouse foraging activities or predator avoidance would be impaired if marsh or grassland vegetation were killed or vegetative growth were stunted by being exposed to contaminants. CCWD will minimize the potential for the contamination and degradation of the marsh by: implementing water quality best management practices, a Stormwater Pollution Prevention Plan, and an emergency spill containment and contingency plan; removing any contaminated trench spoils if encountered and disposing them offsite at an appropriate waste disposal site; equipment maintenance, refueling, and staging areas will occur in upland areas at least 30 feet from the edge of aquatic habitat; and hazardous materials used during the repair work period (*e.g.*, fuels, lubricants, solvents, and pipe coating substances) will be controlled, cleaned up, and properly disposed of outside the marsh areas.

Altered Hydrology

The construction of new gravel access roads through marsh habitat at Sites 4 and 10 could alter the hydrology of the adjacent marshes and their suitability as habitat for the salt marsh harvest mouse. The salt marsh harvest mouse is most vulnerable to predation during flooding and extreme high tide events when suitable cover is limited. Thus any increases in the frequency, height, or duration of flooding of tidal marsh and upland refugia habitat for the salt marsh harvest mouse could result in increased predation on the mouse or the flooding of salt marsh harvest mouse nests. Additionally, altering the hydrology could change the vegetative composition of the marsh through changes in salinity or hydroperiods; this would affect the quality of the marsh habitat for salt marsh harvest mouse breeding, foraging, and sheltering activities.

Site 4 is a ponded area containing salt panne habitat with no connectivity to other water bodies. The planned height of the gravel access road at Site 4 is only 6 inches, and thus would create a minimal change to the topography at this location. Therefore, the installation of the new gravel access road at Site 4 is anticipated to have negligible effects on the hydrology of suitable salt marsh harvest mouse habitat at Site 4 (M. Seedall, CCWD, *in litt.* 2015).

CCWD will minimize the potential for altered hydrology at Site 10 by installing culverts under the proposed access road to maintain existing hydrology, including storm drainage and encroachment from particularly high tides (higher high water) or 100-year flood events. Seven culverts will be installed underneath the proposed access road along drainage pathways observed after a rain event at Site 10 to maintain the existing marsh hydrology. Therefore, the proposed project is anticipated to

result in negligible effects on the hydrology of the surrounding marsh at Site 10 (M. Seedall, CCWD, *in litt.* 2015).

Dewatering of the SCPL could result in the flooding of a salt marsh harvest mouse nest if the water were released into suitable breeding habitat for the salt marsh harvest mouse (*e.g.*, pickleweed-dominated wetland habitat). Water drained from the SCPL is not expected to affect salt marsh harvest mice or their habitat because the water would drain into the local creeks and wetlands, which in the action area do not overlap with the pickleweed habitat.

Predation

The installation of rip-rap near suitable salt marsh harvest mouse habitat may provide denning sites for mammalian predators and competitors (*e.g.*, foxes, raccoons, feral cats, skunks, rats) that may prey on or compete with the salt marsh harvest mouse. CCWD will minimize the potential for rip-rap to provide denning habitat for predators by installing a slurry cement to coat and bind the rip-rap to minimize voids in between the rocks.

The installation of fencing near suitable salt marsh harvest mouse habitat may provide perch sites for raptors resulting in increased predation on salt marsh harvest mice within the action area. Gate and fence installations for the SCPL would be limited to replacing existing gates and fences and not to install additional fencing. The existing gates and fences for the SCPL are generally located far from the SCPL ROW, and therefore, not likely to increase raptor predation on salt marsh harvest mice within the action area.

CCWD will also minimize the potential for attracting predators of the salt marsh harvest mouse to the work area by enclosing all foods and food-related trash items in sealed trash containers and properly disposing of all trash offsite.

The installation of new access roads through wetland habitat may increase mammal predator access (*e.g.*, foxes, raccoons, feral cats, skunks) resulting in increased levels of predation on salt marsh harvest mice in the adjacent marshes. CCWD will reduce the potential for mammal predators utilizing the access road at Site 10 by installing a chain link gate on the access road to discourage people and mammal predators from entering the site.

CCWD will also reduce the risk of predation on salt marsh harvest mice within the action area by continuing to control invasive plant species (*e.g.*, perennial pepperweed and stinkwort) along the SCPL ROW that displace suitable native upland refugia plant species (*e.g.*, marsh gumplant) which the salt marsh harvest mouse relies on for providing suitable cover from predators.

Ongoing O&M Activities

Ongoing O&M activities will typically occur once or twice per year for one or two days per site. Ongoing O&M activities will be confined to the "permanent impact areas" within the SCPL ROW *(including the areas labeled in Table 4 as "temporarily disturbed but not restored")* and along the permanent gravel access roads where suitable salt marsh harvest mouse cover was removed during Phase 2 and Phase 3 of the proposed project (with the exception of the temporary disturbance of up to ~~1.0~~ *0.243* acre of salt marsh harvest mouse habitat outside of the "permanent impact areas" during O&M activities within the SCPL ROW). Therefore, ongoing O&M activities are not expected to result in

any additional effects to salt marsh harvest mice (beyond the additional ~~1.0~~ *0.243* acre of habitat temporarily disturbed outside of the "permanent impact areas"). However, it is possible that areas cleared of vegetation within the "permanent impact areas" during initial proposed project implementation could revegetate with suitable salt marsh harvest mouse cover. *Additionally, any salt marsh harvest mice occurring within the SCPL ROW during annual mowing could be injured or killed; however, the most likely affect would be salt marsh harvest mice fleeing the SCPL ROW during annual mowing events.* Any O&M activity that involves vegetation removal, grading/excavation, and/or maintenance work will require a pre-event survey and biological monitoring during implementation for protection of the salt marsh harvest mouse and its habitats as appropriate. CCWD and its contractors will minimize the potential for injury and mortality of the salt marsh harvest mouse during O&M activities by requiring that O&M personnel receive training in the identification of the salt marsh harvest mouse and its habitats and the implementation of the avoidance and minimization measures. Also a Service-approved biologist will supervise the work to ensure no salt marsh harvest mice are injured or killed. If a salt marsh harvest mouse is observed, then work will not commence or will cease and the Service will be consulted. USBR will consult with the Service if any O&M activities are proposed within salt marsh harvest mouse habitat beyond the "permanent impact areas." O&M activities that involve controlling invasive plant species will benefit the salt marsh harvest mouse by minimizing the spread of invasive plant species into the adjacent marsh habitat for the salt marsh harvest mouse.

Barriers to Dispersal

Installation of the access roads through suitable salt marsh harvest mouse habitat could create barriers to salt marsh harvest mouse dispersal across the SCPL ROW because salt marsh harvest mice tend to avoid unvegetated areas. CCWD will install seven culverts underneath the access road through Site 10 which will facilitate salt marsh harvest mouse dispersal across this section of the SCPL ROW. Traffic along the access roads is unlikely to disrupt salt marsh harvest mouse dispersal across the SCPL ROW because the access roads would be utilized infrequently (one or two days per site per year) once construction of Phases 2 and 3 is completed, access would be limited to CCWD personnel and their contractors, and the access roads would be used only during the daytime when salt marsh harvest mice are less likely to disperse across the SCPL ROW.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions unrelated to the proposed project are not considered in this section, because they require separate consultation pursuant to section 7 of the Act. During this consultation, the Service did not identify any future non-Federal actions that are reasonably certain to occur in the action area of the proposed project.

Conclusion

After reviewing the current status of the salt marsh harvest mouse, the environmental baseline for this species within the action area, the effects of the proposed CCWD SCPL Improvement Project, and the cumulative effects, it is the Service's biological opinion that the CCWD SCPL Improvement Project, as proposed, is not likely to jeopardize the continued existence of the salt marsh harvest mouse. The Service reached this conclusion because the project-related effects to the species, when added to the environmental baseline and analyzed in consideration of all potential cumulative

effects, will not rise to the level of precluding recovery or reducing the likelihood of survival of the species. We based this determination on the following: (1) successful implementation of the conservation measures by CCWD and their contractors as described in this biological opinion will minimize the adverse effects on individual salt marsh harvest mice; ~~(2) the restoration onsite of areas temporarily disturbed under a Service-approved restoration plan with success criteria and monitoring; (3)~~ *(2)* the implementation of an ongoing invasive plant species control plan within the action area; and ~~(4)~~ *(3)* the preservation and management in perpetuity of ~~between 7.408 acres and 9.025~~ *13.5* acres of salt marsh harvest mouse habitat within the Suisun Bay Area Recovery Unit under a Service-approved long-term management plan at the proposed Cordelia Slough Preserve or other Service-approved location.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by Service regulations at 50 CFR 17.3 as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the same regulations as an act which actually kills or injures wildlife. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the USBR so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The USBR has a continuing duty to regulate the activity covered by this incidental take statement. If the USBR (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the USBR or CCWD must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Amount or Extent of Take

Salt Marsh Harvest Mouse

The Service anticipates incidental take of individual salt marsh harvest mice will be difficult to detect or quantify because of the variable, unknown size of any resident population over time, their elusive and cryptic behavior, and the difficulty of finding killed or injured animals. Due to the difficulty in quantifying the number of salt marsh harvest mice that will be taken as a result of the proposed project, the Service is quantifying take incidental to the proposed project as the following:

1. The harassment and non-lethal harm of all salt marsh harvest mice within the ~~0.40~~ *1.444* acre*s* of suitable grassland habitat and ~~1.530~~ *2.975* acres of suitable wetland habitat permanently lost ~~and the 0.79 acre of suitable grassland habitat and 1.445 acres of suitable wetland habitat temporarily disturbed~~ within the SCPL ROW.

2. The harassment and non-lethal harm of all salt marsh harvest mice within ~~1.0~~ *0.243* acre of suitable habitat temporarily disturbed during future O&M activities within the SCPL ROW.

3. The injury or morality of ~~one~~ *two (2) adult* salt marsh harvest *mice* ~~mouse~~ and ~~all~~ *four (4) juvenile* salt marsh harvest mice ~~within one nest~~.

Upon implementation of the following reasonable and prudent measures, incidental take of salt marsh harvest mouse associated with the CCWD SCPL Improvement Project will become exempt from the prohibitions described in section 9 of the Act. No other forms of take are exempted under this opinion.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the salt marsh harvest mouse.

Reasonable and Prudent Measures

All necessary and appropriate measures to avoid or minimize effects on the salt marsh harvest mouse resulting from implementation of the proposed project have been incorporated into the project's proposed conservation measures. Therefore, the Service believes the following reasonable and prudent measure is necessary and appropriate to minimize incidental take of the salt marsh harvest mouse:

1. All conservation measures, as described in the biological assessment and restated here in the Description of the Proposed Project section of this biological opinion, shall be fully implemented and adhered to. Further, this reasonable and prudent measure shall be supplemented by the terms and conditions below.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, USBR must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

1. USBR shall include full implementation and adherence to the conservation measures as a condition of any permit or contract issued for the proposed project.

Monitoring:

In order to monitor whether the amount or extent of incidental take anticipated from implementation of the project is approached or exceeded, USBR shall adhere to the following

reporting requirements. Should this anticipated amount or extent of incidental take be exceeded, USBR must immediately reinitiate formal consultation as per 50 CFR 402.16.

a. For those components of the action that will result in habitat degradation or modification whereby incidental take in the form of harm is anticipated, USBR shall provide monthly updates to the Service with a precise accounting of the total acreage of habitat impacted. Updates shall also include any information about changes in project implementation that result in habitat disturbance not described in the Description of the Proposed Project and not analyzed in this Biological Opinion.

b. For those components of the action that may result in direct encounters between listed species and project workers and their equipment whereby incidental take in the form of harassment, harm, injury, or death is anticipated, USBR shall immediately contact the Service's Sacramento Fish and Wildlife Office (SFWO) at (916) 414-6623 to report the encounter. If encounter occurs after normal working hours, USBR shall contact the SFWO at the earliest possible opportunity the next working day. When injured or killed individuals of the listed species are found, USBR shall follow the steps outlined in the Salvage and Disposition of Individuals section below.

~~c. USBR shall provide annual reports to the Service during the three-year post-construction monitoring period on the status of revegetation and invasive plant species control within the action area in meeting the success criteria. USBR shall provide annual updates to the Service on the amount of salt marsh harvest mouse habitat compensation purchased by CCWD which is based on the timeline of meeting the success criteria for the restoration of temporary impact areas.~~

d. USBR shall provide annual reports to the Service on *any future* O&M activities along the SCPL ROW. The annual reports shall summarize any activities disturbing suitable habitat for the salt marsh harvest mouse, avoidance and minimization measures implemented, any observations of listed species, whether those activities occurred within the "permanent impact areas" authorized under this biological opinion, and whether any activities are proposed outside of the "permanent impact areas." USBR shall also annually report the cumulative total amount of suitable salt marsh harvest mouse habitat disturbed by O&M activities outside of the "permanent impact areas."

Disposition of Individuals Taken

Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Dead individuals must be sealed in a resealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site, until instructions are received from the Service regarding the disposition of the dead specimen. The Service contact persons ~~are~~ *is* the Coast/Bay Division Chief of the Endangered Species Program at the SFWO at (916) 414-6623.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

1. Restore and preserve tidal marsh and marsh ecotone/transition zone habitat for the salt marsh harvest mouse, California clapper rail, and soft bird's beak within the Suisun Bay Area Recovery Unit along the Contra Costa County shoreline consistent with the Recovery Plan (Figures III-8 and III-9 on pp.260-261 in Service 2013).

2. Enhance salt marsh harvest mouse habitat within McNabney Marsh by improving tidal exchange.

3. Implement a predator management program, invasive plant species control plan, and marsh ecotone restoration activities on USBR and CCWD lands within and near suitable tidal marsh habitat for the salt marsh harvest mouse, California clapper rail, and soft bird's beak.

4. Remove non-native trees that provide perch and nest sites for avian predators near suitable habitat for the salt marsh harvest mouse and California clapper rail.

5. Control invasive plant species and plant suitable high-tide refugia cover (*e.g.*, marsh gumplant) in transition zone habitat adjacent to suitable tidal marsh habitat for the salt marsh harvest mouse and California clapper rail.

6. Report sightings of any listed or sensitive animal species to the CNDDB of the CDFW. A copy of the reporting form and a topographic map clearly marked with the location the animals were observed also should be provided to the Service.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION—CLOSING STATEMENT

This concludes formal consultation on the CCWD SCPL Improvement Project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required and shall be requested by the Federal agency or by the Service where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and:

(a) If the amount or extent of taking specified in the incidental take statement is exceeded;

(b) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;

(c) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or

(d) If a new species is listed or critical habitat designated that may be affected by the identified action.

If you have any questions regarding this biological opinion, please contact Joseph Terry, Senior Biologist (joseph_terry@fws.gov), or Ryan Olah, Coast/Bay Division Chief (ryan_olah@fws.gov), at the letterhead address or at (916) 943-6721 or (916) 414-6623.

cc:
Robert Stanley, California Department of Fish and Wildlife, Napa, California
Mark Seedall, Contra Costa Water District, Concord, California

LITERATURE CITED

California Department of Fish and Wildlife (CDFW). 2015. California Natural Diversity Database. RareFind Version 5. Natural Heritage Division. Sacramento, California.

California Invasive Plant Council. 2006. Invasive Plant Inventory. Regularly updates list published by California Invasive Plant Council. http://www.cal-ipc.org/ip/inventory/. Accessed on June 22, 2015.

Olberding Environmental, Inc. 2015. Responses to October 2014 U.S. Fish and Wildlife Service Information Request for the Contra Costa Water District Shortcut Pipeline Improvement Project Onsite Habitat Mitigation and Monitoring Plan for Temporary Construction Impact Areas, Contra Costa County, California. June. Prepared by Olberding Environmental, Inc., San Ramon, California, for Contra Costa Water District, Concord, California. 33 pp. plus appendices.

San Francisco Estuary Institute. Undated. Salt Marsh Harvest Mouse, *Reithrodontomys raviventris*, Database and Maps. Developed by Howard Shellhammer, H.T. Harvey and Associates. http://www.sfei.org/content/salt-marsh-harvest-mouse-database-and-maps. Accessed on June 22, 2015.

Smith, K., and L. Barthman-Thompson. 2013. What does the mouse say? Investigating detailed habitat use to improve conservation and management of the salt marsh harvest mouse. Presented on December 5, 2013, at the Bay/Delta Fish and Wildlife Office, Sacramento, California.

U.S. Bureau of Reclamation (USBR). 2010. Bureau of Reclamation. U.S. Department of the Interior. Reclamation: Managing Water in the West. Draft Environmental Assessment/Initial Study for the Shortcut Pipeline Improvement Project. October.

_____ 2014. Biological Assessment Shortcut Pipeline Improvement Project. 09-098. October. U.S. Department of Interior, U.S. Bureau of Reclamation, Mid-Pacific Region, South-Central California Office, Sacramento, California. 52 pp. plus appendices.

U.S. Bureau of Reclamation (USBR) and U.S. Fish and Wildlife Service (Service). 2014. Record of Decision for the Suisun Marsh Habitat Management, Preservation and Restoration Plan. April 21. U.S. Bureau of Reclamation, Mid-Pacific Region, Sacramento, California. http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=781. Accessed on April 28, 2014.

U.S. Bureau of Reclamation (USBR), U.S. Fish and Wildlife Service (Service), and California Department of Fish and Game (CDFW). 2013. Suisun Marsh Habitat Management, Preservation and Restoration Plan. May. U.S. Bureau of Reclamation, Mid-Pacific Region, Sacramento, California. http://www.usbr.gov/mp/nepa/nepa_projdetails.cfm?Project_ID=781. Accessed on April 28, 2014.

U.S. Fish and Wildlife Service (Service). 2005. Formal Endangered Species Consultation on the Operations and Maintenance Program Occurring on Bureau of Reclamation Lands within the South-Central California Area Office. February 17. Service file number 1-1-04-F-0368. Sacramento Fish and Wildlife Office, Sacramento, California. 152 pp.

_____ 2010. Salt Marsh Harvest Mouse (*Reithrodontomys raviventris*) 5-Year Review: Summary and Evaluation. Sacramento Fish and Wildlife Office, Sacramento, California. 49 pp. http://ecos.fws.gov/docs/five_year_review/doc3221.pdf. Accessed on June 17, 2015.

_____ 2013. Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California. Sacramento Fish and Wildlife Office, Sacramento, California. xviii + 605 pp. http://ecos.fws.gov/docs/recovery_plan/TMRP_Final.pdf. Accessed on June 17, 2015.

Wildlands. 2015. Final Cordelia Slough Preserve for Salt Marsh Harvest Mouse and Wetland Enhancement Long-Term Management Plan. January. Wildlands, Rocklin, California.

In Litt.

Seedall, Mark. 2015. Electronic mail message from Principal Planner, Contra Costa Water District, Concord, California, to Joseph Terry, Senior Biologist, U.S. Fish and Wildlife Service, Sacramento Fish and Wildlife Office, Sacramento, California, dated June 10, 2015. Subject: Contra Costa Water District, Shortcut Pipeline Improvement Project Draft Responses to Service's October 2014 information request.