

RECLAMATION

Managing Water in the West

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Final Environmental Assessment

Contra Costa Canal Replacement Project, Contra Costa
County, California

(WESTERN AREA POWER ADMINISTRATION,
COOPERATING AGENCY
DOE/EA-1589)



U.S. Department of the Interior
Bureau of Reclamation
Mid-Pacific Region

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Section 106 of the National Historic Preservation Act requires Federal agencies to evaluate the effects of Federal undertakings on historical, archeological and cultural resources. This undertaking triggered Reclamation’s compliance with Section 106 of the National Historic Preservation Act and this effort culminated in a memorandum of agreement to resolve the adverse effects from the Contra Costa Canal Replacement Project. The MOA is a two-party agreement signed by Reclamation and by the State Historic Preservation Officer and offers mitigation measures for the encasement project. Western will be required to conduct its own consultation with SHPO pursuant to Section 106 of the NHPA for Western's portion of the project.....	85
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Section 1 Purpose and Need

Introduction

The Contra Costa Canal originates at Rock Slough, near the city of Oakley, Contra Costa County, California, where it intercepts natural flow in the Sacramento-San Joaquin Delta. Water for irrigation and municipal and industrial use is lifted 127 feet by a series of four pumping plants. The 47.7 mile-long canal terminates in Martinez Reservoir. The first 3.97 miles of the Contra Costa Canal from Rock Slough to Pumping Plant 1 (PP1) are unlined (See Vicinity Map Exhibit 1-1).

The Contra Costa Water District (CCWD) has requested that the United States Bureau of Reclamation (Reclamation) permit CCWD to replace the unlined portion (3.97 miles) of the Contra Costa Canal, a Reclamation-owned facility, with a buried pipeline within Reclamation's existing Right of Way (ROW) by granting CCWD a permit (MP-620 add/alt permit), a short-term license, and a long-term easement for the new replacement pipeline to CCWD. In addition CCWD is requesting Reclamation approval of various licenses and or easements as appropriate for third-party crossing agreements over the pipeline as it is constructed. Under CCWD's proposal CCWD would own the new pipeline, and Reclamation would grant CCWD an easement for the pipeline. Reclamation would retain ownership of the land and all other Reclamation-owned facilities. Additionally, replacing the unlined portion of the Contra Costa Canal with a buried pipeline would require the Western Area Power Administration (Western) to issue a Utility Relocation Agreement to CCWD for Western to plan, design, and relocate as many as 40 structures of their existing Tracy-Contra Costa 69-kilovolt (kV) transmission line (T-line) within the vicinity of miles 13 through 17 of Western's ROW. The new structures will be in-line with the existing T-lines.

Reclamation, as the lead Federal agency for preparation of this Environmental Assessment (EA) under the National Environmental Policy Act (NEPA), invited Western to be a cooperating agency in the preparation of this EA to streamline NEPA compliance and coordination activities.

Purpose and Need

The purpose of the proposed project is to protect and improve drinking water quality, protect public safety, increase system security, reduce seepage into and out of the canal, and reduce flood risks along the unlined portion of the Contra Costa Canal. The proposed action is needed to address known water quality degradation in the unlined portion of the Contra Costa Canal and to ensure long-term compatibility with planned land uses in the project vicinity (Luhdorff and Scalmanini 2004, 2006).

Authority

Reclamation's authority to grant CCWD a permit (MP-620) would be made pursuant to the Memorandum of Agreement (Contract Number 14-06-200-6072A) dated June 28, 1972 relating to the details of the Transfer of Operation and Maintenance of the Contra Costa Canal System as amended by Amendment No.1 dated May 15, 1995. Reclamation's authority to grant CCWD licenses and easements would be made pursuant to the Act of Congress approved June 17, 1902

(32 Stat. 388) and all other amendatory or supplementary acts, particularly the Reclamation Project Act of 1939 (53 Stat. 1 187).

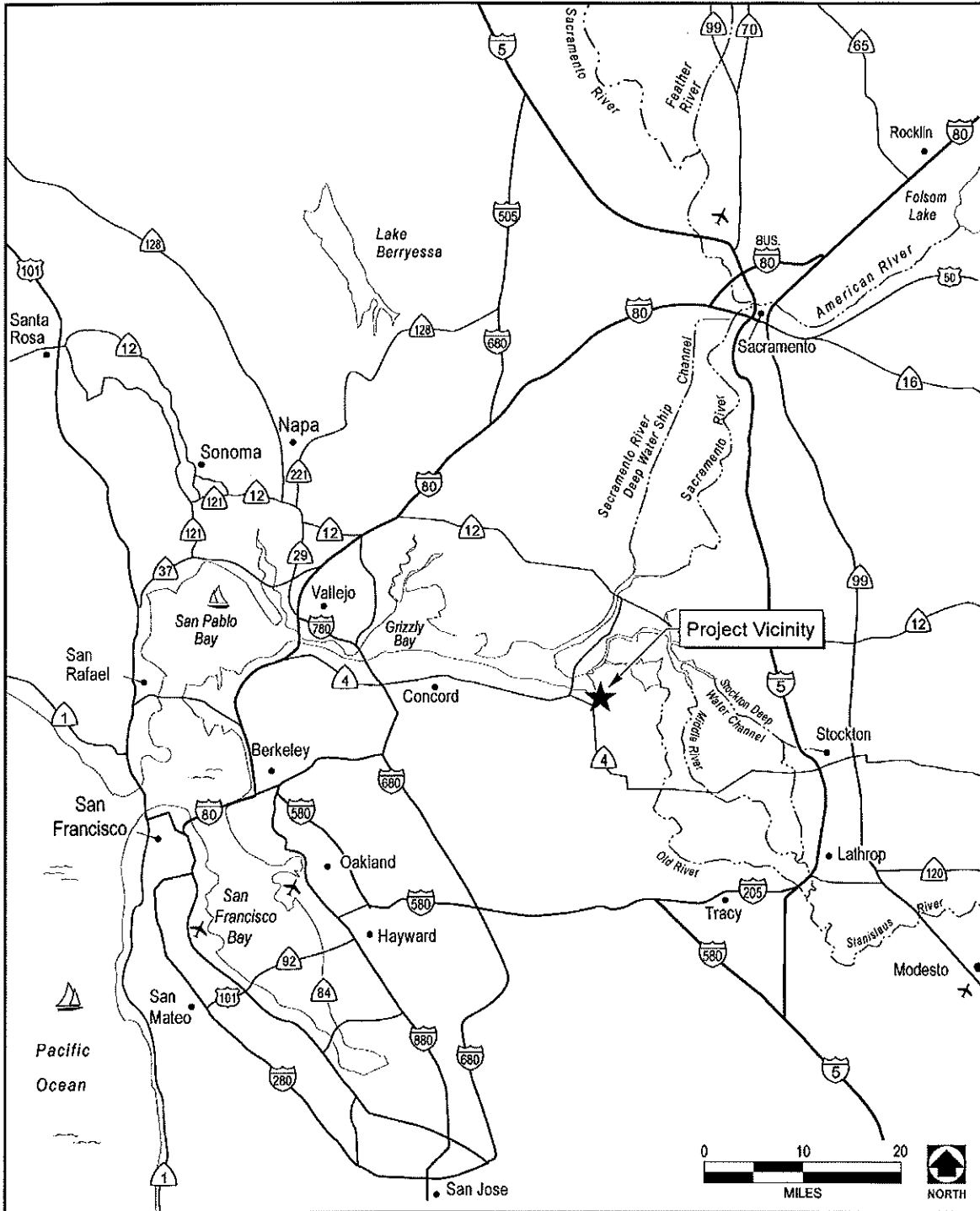


Exhibit 1-1 Project Vicinity

Section 2 Alternatives

Proposed Action

Overview

The proposed project area is located in northeastern Contra Costa County (Exhibit 1-1). For purposes of analysis, impacts are described as they relate to the project area and any additional area in which direct or indirect environmental consequences would likely occur. The project area includes 3 major areas:

- ▶ The Contra Costa Canal between the trash rack at milepost 0.0 and PP1 at milepost 3.97, totaling approximately 21,000 feet, Reclamation's ROW for the unlined canal, as well as the additional staging and laydown areas near the ROW (canal area);
- ▶ The Holland Tract mitigation site, as well as any staging and laydown areas; and
- ▶ Old River Intake near Discovery Bay and Los Vaqueros Reservoir.

Approximately 44 miles of the Contra Costa Canal are lined, and 3.97 miles are unlined. The proposed action involves only the unlined portion of the canal, which begins at the Rock Slough headworks and extends west 3.97 miles (21,000 feet) to PP1 near State Route (SR) 4 in the city of Oakley (Exhibit 2-1). The canal area ranges in elevation from approximately mean sea level (msl) to 10 feet above msl and is located in the U.S. Geological Survey 7.5-minute Brentwood quadrangle. The canal area is characterized by annual grassland intersected by drainages and seasonal wetlands.

The project area consists of the earthen (unlined) section of the canal within an approximately 300-foot ROW, 145.07 acres on the Holland Tract, and associated lands where water will be discharged. The ROW, owned by Reclamation, is surrounded by either chain-link or three-strand barbed wire fence. CCWD is proposing to install a 10-foot-inside-diameter pipeline in the open water or under the northern berm of the unlined canal. The unlined canal would be permanently dewatered and backfilled.

From west to east, the project site boundary consists of the 300-foot ROW and an additional 200-foot temporary construction easement from the beginning of the project at PP1 for approximately 1 mile. The project site boundary then narrows to the 300-foot ROW for approximately 3,200 feet (0.6 mile) and then widens again to 500 feet for approximately 1 mile from just west of the canal intersection with Dutch Slough to Cypress Road. From Cypress Road to the end of the project at Rock Slough (approximately 1.35 miles), the project site boundary returns to the 300-foot ROW (Exhibit 2-1). CCWD would acquire the rights to a 200-foot temporary construction easement would be located north of the ROW. This easement would be used for storing construction equipment and materials and for storing soil spoils. The project site covers approximately 189 acres including the Reclamation ROW covering of approximately 138 acres in the canal area plus 145.07 acres on the Holland Tract.

During each phase of project construction, replacement of the unlined portion of the Contra Costa Canal with a pipeline will result in the shutdown of the Contra Costa Canal and Rock

Slough intake. CCWD and Reclamation will request waivers of the no fill/no diversion limitation associated with the Los Vaqueros Biological Opinions (see further discussion below). It is expected that both the Old River Intake and Los Vaqueros Reservoir will be operated at somewhat higher utilization rates than if the Contra Costa Canal were in service. There are no physical construction impacts associated with increased Old River and Los Vaqueros reservoir operations and recreational activities at Los Vaqueros will not be impacted by the relatively minor increase in its usage when the Contra Costa Canal intake is shut down.

Reclamation Actions

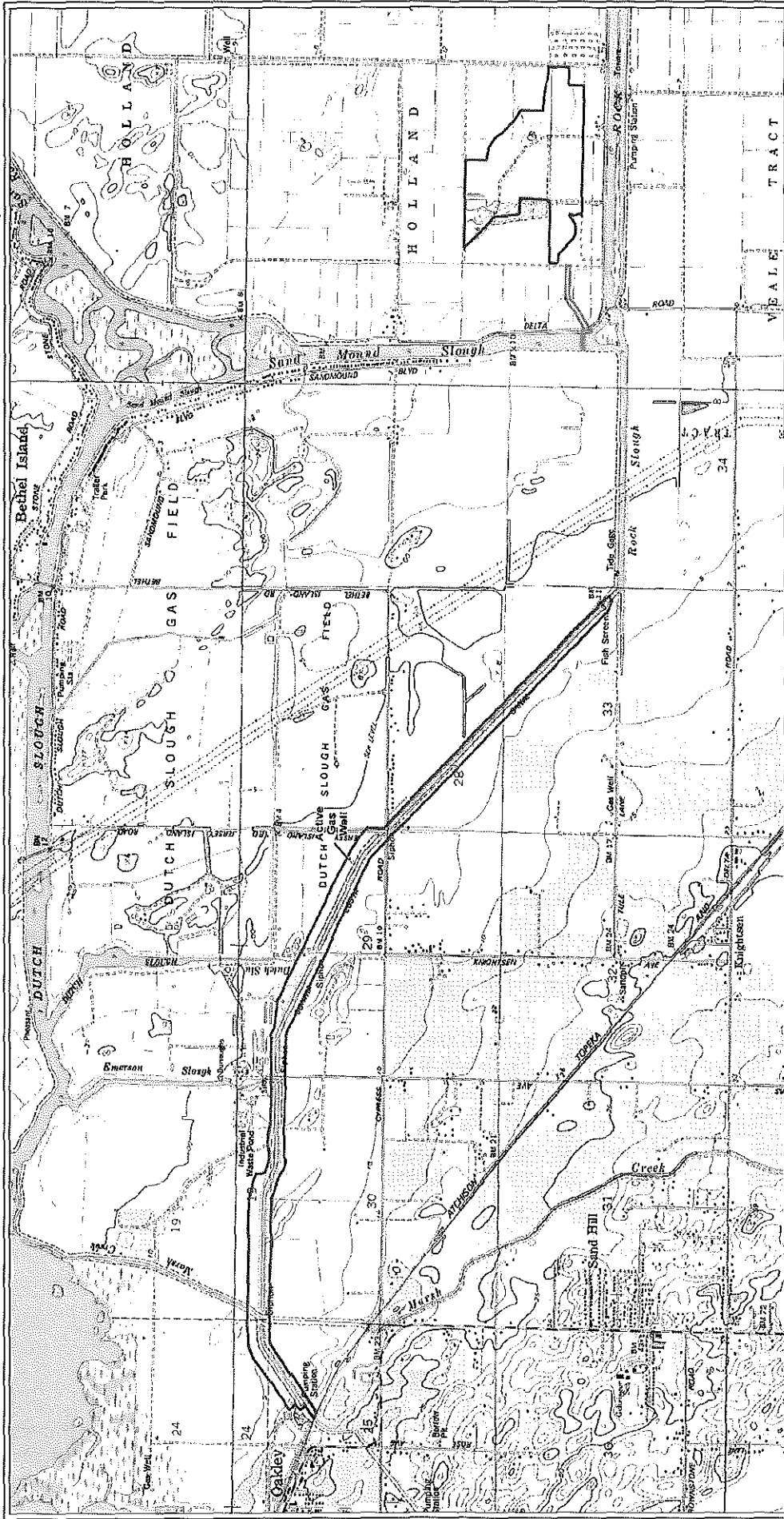
Reclamation's actions relative to the Canal Replacement Project are the proposed issuance of a permit to allow CCWD to alter the Contra Costa Canal (MP-620 add/alt permit), the granting of a short-term license and long-term easement for the new replacement pipeline in the ROW to CCWD, and approval of various licenses and or easements as appropriate for third-party crossing agreements. CCWD would retain ownership of the new pipeline while Reclamation would retain ownership of the land and all other Reclamation-owned facilities.

Reclamation would request that National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS) provide their approval of a waiver of the no-fill, no-diversion period as specified in D-1629, the State Water Resources Control Board Los Vaqueros Reservoir Water Right Decision that relied on the biological opinions issued by NMFS and USFWS in 1993 in years when CCWD must shut down Rock Slough to construct a phase of the Canal Replacement Project. Additionally, CCWD would request that the California Department of Fish and Game (DFG) waive the no-fill, no-diversion period that is specified in CCWD and DFG's 1994 Los Vaqueros Project memorandum of understanding.

Western Actions

Western would need to issue a Utility Relocation Agreement to CCWD for Western to plan, design, and relocate as many as 40 structures of their Tracy-Contra Costa 69-kV T-line within the vicinity of miles 13 through 17 of Western's ROW after the pipeline is constructed to reposition the T-line to the final grade of the proposed project. The new structures will be in-line with the existing T-line. Western would replace their existing power poles with new 60-foot copper naphthenate coated power poles that will be bored to a depth of 8 feet.

The poles removed shall be properly disposed of in a composite-lined portion of a municipal solid waste landfill that meets requirements imposed by the state policy adopted pursuant to Section 13140 of the Water Code and regulations adopted pursuant to Sections 13172 and 13173 of the Water Code. The solid waste landfill used for disposal shall be authorized to accept the wood waste under waste discharge requirements issued by the California Regional Water Quality Control Board pursuant to Division 7 (commencing with Section 13000) of the Water Code. The equipment used by Western to replace the T-line and power poles would be a line auger truck, crane, and manlift.



Legend

- Project Site Boundary
- County Water District
- Legal or Area Boundary
- Map Scale
- Map Scale: 1:24,000
- 1 inch equals 2,000 feet
- 2,000
- 4,000
- Feet

This map is to be used only for the purposes stated in the project description. It is not to be used for any other purpose without the written consent of the project manager. The project manager is not responsible for any errors or omissions on this map.

Exhibit 2-1 Project Location

Contra Costa Canal Replacement Project

Action Specific Implementation Plan

Dakley, Contra Costa County, California

Map Date: 05/23/2013

This document is intended for design use only.

Project Location: 02 1407 road

EDAW AECOM
 EDAW Natural Resources - Walnut Creek
 20000 Redwood Road, Suite 206
 Walnut Creek, CA 94598
 925.370.0589 www.edaw.com

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Detailed Description

No-fill, No-diversion Waivers

The standard 75-day no-fill period (March 15 through May 31) and the standard 30-day no-diversion period (April 1 through April 30) were set in the 1993 biological opinions to protect sensitive species. During the no-fill period, CCWD is not allowed to fill Los Vaqueros reservoir and can divert water only to supply the demands of its customers. During the no-diversion period, CCWD is not allowed to divert any water from the Delta other than minimal flows for maintenance purposes (CCWD currently has three intakes: Rock Slough, Mallard Slough and Old River). The resources agencies may change the standard set dates of the no-fill, no diversion periods each year. The agencies set the 2001 no-fill periods to be February 15 through March 18 (32 days) and April 17 through May 30 (43 days) and the 2001 no-diversion periods from February 21 through March 7 (15 days) and from May 8 through May 15 (15 days). The agencies waived the 2001 no-fill period of April 17 through May 30 and the no-diversion period of May 8 through May 15 because of the state power crisis. In late 2002, the agencies waived the 2003 no-fill and no-diversion periods because of construction on the Contra Costa Canal. Monitoring occurred behind the screens at the Old River intake during both the 2001 and 2003 March-through-May periods. No special-status species were collected during these periods.

Waiver of the no-fill, no-diversion requirement would allow CCWD to use its Old River pump station without fill and diversion constraints, which would improve CCWD's ability to provide its customers high-quality water when the unlined portion of the Contra Costa Canal is shut down and water diversions from Rock Slough are not possible. Waiver requests would be made by Reclamation and CCWD prior to construction of any phase of the Canal Replacement Project.

Construction Schedule

Construction of the proposed action is expected to begin in late 2007, when a cofferdam is erected to ensure that sensitive aquatic species are isolated from the portion of the unlined canal being replaced with a pipeline (Table 2-1). Fish rescue (fish to be rescued are not expected to be special-status fish) and dewatering of the construction area are expected to begin in spring 2008, with the first phase of construction completed by fall 2008. Although the timing and extent of future phases of pipeline construction depend on the availability of funding, the entire unlined canal is estimated to be replaced by a pipeline by the end of 2016. Regulatory and environmental approval and permitting for installation of the proposed pipeline is scheduled for completion by summer 2007. All permits and approvals would be secured before construction commences in areas where permits or other regulatory approvals are required. CCWD has requested a 20-year wetland permit from the United States Army Corps of Engineers (USACE) to assist with project implementation if funding for the project is not available to support project completion by 2016. The USACE has indicated that it will provide a ten year permit and has indicated that it will be possible to extend this permit for an additional 10 years.

Phase	Location	Distance in Feet	Timing
1	PP1 to beyond Marsh Creek	3,000	2007–2008
2	East Cypress Road crossing	500–1,000	2009–2010
3	East Cypress Road to the Rock Slough Headworks	7,000	2011–2012
4	Marsh Creek to East Cypress Road	10,000	2015–2016

Note: The ultimate construction phasing will depend on funding. At this time, only Phase 1 is adequately funded. CCWD is requesting a 20-year USACE permit and a long-term DFG streambed alteration agreement in the event that project construction extends beyond 2016.

Construction is expected to occur in three to five phases, with each phase expected to last up to 12 months. Preliminary work on the project site, including construction of the cofferdam, would ensure that no sensitive aquatic species are affected and would occur in the fall for each phase; the fish rescue and dewatering would begin in the early spring and would be followed by flattening of portions of the berms (Table 2-2). Construction of on-site access roads would be completed in the spring, with installation of the pipeline expected to be completed in the fall. Construction is expected to be substantially complete before the onset of winter rains, which typically begin in mid-November to late November.

The first phase of the Canal Replacement Project would occur in 2007/2008 and would involve construction of the pipeline from PP1 to beyond Marsh Creek with an estimated distance of approximately 3,000 feet. The first phase may include an additional 500–1,000 feet of the unlined canal to be replaced under the Cypress Road crossing. The third phase of construction is expected to begin in 2011 and would involve replacement of the unlined canal from Cypress Road to the trash rack structure on Rock Slough (estimated at 7,000 feet). It is also possible that the Cypress Road crossing work would take place between the first and second phases. The final phase is anticipated to begin in 2015 and would replace the remaining unlined canal between Phases 1 and 2 (estimated to be approximately 10,000 feet from the end of Phase 1 to Cypress Road).

Month(s) of Activity	Activity Type	Construction Duration
July through November 2007	Coffer dam, access road	Less than 1 month
March through April 2008	Dewatering	Less than 1 week
April 2008	Topple berms, build construction road	1 month
March through April 2008	Fish rescue	1 week
April 2008	Install groundwater dewatering wells	1 month
July through September 2008	Pipeline construction through Marsh Creek	1–2 months
May through October 2008	Pipeline construction	Up to 6 months
October 2008 through June 2009	Surface restoration	1–2 months
August 2008 through November 2008	Western power line replacement	In coordination with CCWD Schedule

Note: The table provides an illustration of the timing of various construction activities that would occur during any phase of project construction for the Canal Replacement Project.

Pipeline installation would be expected to progress at a rate between 50 and 100 linear feet per day. Minor adjustments to the length of pipeline installed during each phase (and location on the construction site) may be made at the time of construction bidding.

CCWD anticipates that the shut down of Rock Slough for an approximately one year period during each phase of the Canal Replacement project will result in an approximate 7,000 acre foot increased drawn down of the Los Vaqueros Reservoir as compared to Rock Slough remaining operational with removal of the no fill/no diversion constraints.

The timing of Western's pole relocation will be between August 2008 and November 2008, which coincides with the construction of Phase 1 of the Canal Replacement Project.

Construction Activities

Regrading would be required before pipe installation. For work conducted in the canal ROW, soil from the berms would be pushed back from the canal and spread out in the ROW before the pipe is installed. After the material is spread out, a portion of it would be compacted, and all-weather material (crushed rock or aggregate base) would be spread over the soil to create temporary on-site construction access roads.

Regardless of the final alignment, construction activity would be conducted and soil spoils would be temporarily located in the ROW and in the 200-foot temporary construction staging easement immediately north of the ROW. The spoils would include material excavated from the canal bottom that would be dried during construction. The excavated material would be mixed with other native materials used for backfilling.

A cofferdam would be installed at the upstream end of each construction phase of the project to isolate that portion of the canal. Before the specific section of the canal is dewatered, appropriate safeguards would be undertaken to protect aquatic species from construction impacts. In some areas, drain rock would be used to stabilize the soil, and the new pipeline would be wrapped in geo-fabric. The groundwater table would be continuously drawn down to the level of the bottom of the trench by using well points installed along the north and south sides of the canal to prevent infiltration of local groundwater while the pipeline is being installed. The groundwater would be discharged to existing agricultural areas for irrigation or temporarily stored for percolation adjacent to the project site but outside of the 200-foot staging and construction area consistent with the Central Valley Regional Water Quality Control Board (RWQCB) Waiver of Waste Discharge Requirements for Specific Types of Discharge and under agreement with adjacent landowners.

Substantial amounts of water also may be evaporated through misting or used as on-site dust control. As sections of the canal are replaced, the facilities used for dewatering the sections would be removed, and those temporarily disturbed areas would be restored.

Siphons allow the canal to pass below Marsh Creek, Emerson Slough/Sellers Avenue, Dutch Slough, and Jersey Slough/Cypress Road. All siphons are expected to eventually be replaced by the pipeline using open-cut methods across the ditches and roadways with the appropriate safeguards to minimize effects on existing habitats. A bypass pipeline would be used during construction at Marsh Creek. Sheet piles likely would be used to isolate work areas from the

more stagnant Emerson Slough/Sellers Avenue, Dutch Slough, and Jersey Slough at Cypress Road. The creek and drainages would be restored to preproject conditions or to the design standard of the jurisdictional entity after the conduit is installed and buried. Because of the large pipeline diameter, the small size of the ditches, and the need to protect the drainages from the dewatering system used to install the pipeline, open cut construction appears to be by far the most efficient and practical. It is also possible that the construction contractor could install the pipelines beneath water features using jack-and-bore methods.

The reinforced concrete pipeline is corrosion resistant and would not affect the surrounding environment. The invert of the pipe would be below the bottom of the canal grade at PP1. The pipeline capacity would be the same as that of the existing canal (350 cfs).

Few underground utilities are anticipated in the Reclamation ROW and temporary construction easement working corridor. Maps of the canal alignment would be sent to each of the utility companies providing local service, and the companies would be requested to provide system or as-built drawings identifying the locations of any facilities in the action area. These utilities would be plotted on the project drawings. Where there is a potential for utility interference, the location and elevation of utilities would be identified by potholing. In addition, the contractor would be required to use the Underground Service Alert (USA) system to notify utility companies of impending construction activities and to pothole all known utilities and provide location and elevation data to CCWD at least 10 working days before the start of excavation in any area. Construction management staff members would review the pothole information to determine whether additional utility interferences may exist. Western would need to permanently replace as many as 40 structures of their existing Tracy-Contra Costa 69-kV T-line in the existing ROW after the pipeline is constructed to reposition the T-line with the final grade of the proposed project. Western would replace their existing power poles with new 60-foot copper naphthenate power poles that will be bored to a depth of 8 feet. The equipment used by Western to replace the T-line and power poles would be a line auger truck, crane, and manlift.

Converting the open canal to buried conduit may require minor modifications to the pumps in PP1 and to the PP1 foundation. The existing PP1 façade or general structure would likely not be modified. Modifications to PP1 would be limited to replacing pump shafts and/or pumps/motors and possibly lowering the bottom of the wet wells to permit access to lower water levels in the forebay and adding possible flow direction facilities, such as flume or manifolds to the pump inlets. Modification to the PP1 foundation, if necessary, would not be visible. No modifications to the pumping plant would be required during the first phase of project construction.

Following pipe installation, a portion of the berm, along with material excavated from the canal and allowed to dry, would be used as backfill material to cover the new pipeline and fill in the open water canal, which would no longer function as a water conveyance facility. The finished grade elevation would be determined based on soil drainage and access conditions but would not be substantially different from the grade of adjacent land.

After the pipeline is completed, a permanent, all-weather maintenance road would be constructed along the length of the ROW on the action site, and the ROW would be protected by a 6-foot-tall chain-link fence. It is anticipated that a gravel maintenance road for the new pipeline would be constructed within the ROW and associated fencing. The filled-in ROW would be managed

consistent with CCWD's/Reclamation's existing biological opinions for operation and maintenance of facilities.

Sediment removed from the project site would be stored and dried in the 300-foot Reclamation ROW and the 200-foot temporary construction staging easement immediately north of the ROW. The following estimates identify the amount of earthwork anticipated for each linear foot of construction and for the entire project:

- ▶ berms – 29.6 cubic yards (621,600 cubic yards for project),
- ▶ canal excavation – 5.56 cubic yards (116,760 cubic yards for project),
- ▶ aggregate base – 5.31 cubic yards (111,510 cubic yards for project), and
- ▶ drain rock – 0.93 cubic yard (19,530 cubic yards for project).

Methods for Pipeline Installation

The pipeline installation process would consist of multiple stages: preparatory work, including staging materials; canal dewatering; pipeline installation; construction of transition structures; and pipeline testing and cleanup work. The staging of materials and sequence of work for each phase of construction would largely be decided by the construction contractor who wins the construction bid.

The first construction activities would be to build a cofferdam upstream and, if needed, downstream of the area to be dewatered. The cofferdam (Exhibit 2-2) would be built in the nonsensitive period for aquatic species (July through November).

Canal dewatering activities are anticipated to begin in the early spring for any particular phase of project construction and would be limited to those portions of the unlined canal that would be replaced with a pipeline. Shallow groundwater wells would be installed along the banks of the unlined canal to prevent adjacent groundwater from entering the work area. Water pumped from these wells would be land applied and discharged to nearby fields consistent with the Central Valley Regional Water Quality Control Board (RWQCB) Waiver of Waste Discharge Requirements for Specific Types of Discharge and under agreement with adjacent landowners. CCWD has also considered a surface water discharge but currently does not have approval from the RWQCB for this activity. In the event that CCWD is able to obtain RWQCB approval for a surface water discharge then additional information will be provided to the Resources Agencies and Reclamation and the additional environmental compliance actions will be taken as appropriate to address any impacts associated with this action.

Before dewatering, the canal would be swept with hydrophones and nets that would encourage any aquatic species to vacate the work area through the culverts in the cofferdam. The next step is to close the culverts in the cofferdam, which would serve to isolate the work area from the rest of the unlined canal. The canal would be dewatered to a depth of approximately 2–4 feet using the pumps at PP1. The next step would be to capture, remove, and relocate to the extent possible any fish that remain in the work area. The final dewatering would employ a combination of the pumps at PP1, portable pumps, and the dewatering system.

The preparatory work may include temporarily relocating some of the Western power poles and lines, installing the dewatering system used to lower the groundwater levels for construction,

regrading the existing berms to provide equipment access to the canal, constructing an access road to facilitate equipment movement, and mobilizing equipment used to install the dewatering wells and final cofferdam.

Pipeline installation includes mobilization of the pipe-laying equipment (anticipated to consist of excavators, a crane, and haul trucks), removal of the soft sediment at the bottom of the canal as needed and transport of the sediment to drying ponds identified in the action area in or adjacent to the ROW, placement of pipe bedding material, pipe laying, backfill in the pipe zone with aggregate base (to a level approximately halfway up the pipe), and trench zone backfill using the material from the berms and sediment from the canal.

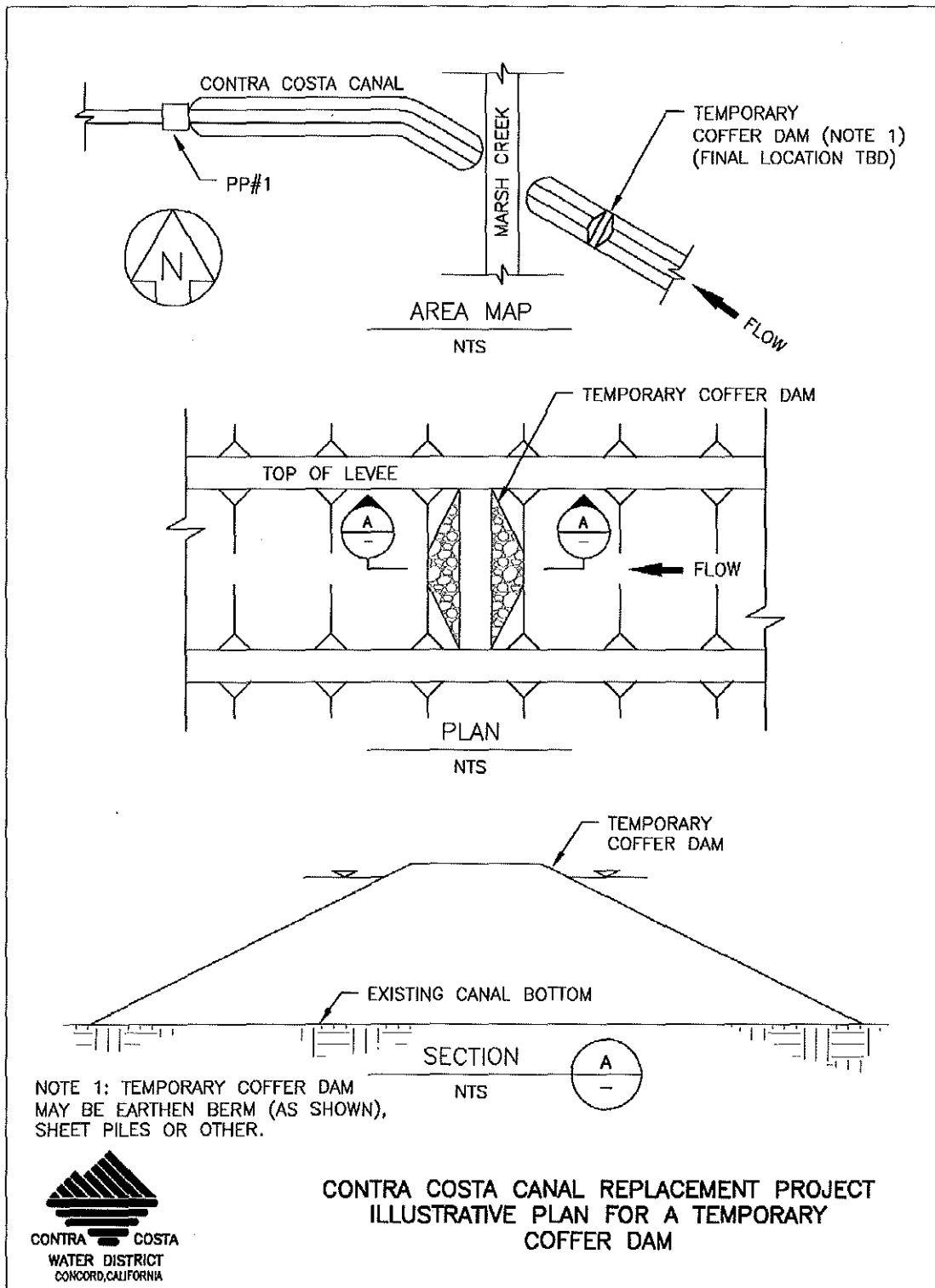
The transition structures would be built at the ends of the pipeline installed during each phase of construction. These structures would channelize the flow from the remaining open canal into the new pipeline and from the pipeline to PP1. Temporary transition structures would be provided at the ends of each of the other reaches of pipe, such as the short sections underlying existing road crossings, to prevent the flow from undermining or scouring the pipe.

Pipeline testing would be conducted to verify that the completed pipeline is properly constructed before the canal is placed back into service after each phase of construction. Each joint would be tested, possibly using compressed air, to ensure that the pipeline is watertight. Any joints that fail to meet the testing requirements would be repaired. The pipeline would be cleaned and the cofferdam removed before the canal is brought back into service.

Staging Area Establishment

Staging areas for construction equipment, materials, fuels, lubricants, and solvents would be established along the project site during construction to allow more efficient use and distribution of materials and equipment. No staging areas would be established in undisturbed areas. All staging areas would be located in the project vicinity; in previously cleared, graded, or paved areas; or in level areas where grading and vegetation clearing are not required.

Staging areas typically are selected by the construction contractor, as needed, before and/or during construction. This practice is consistent with construction methods used throughout California and the United States. To ensure that sensitive environmental resources are adequately protected or avoided, the exact locations of staging areas would be determined in consultation with qualified biologists and archeologists. Because fuels, lubricants, and solvents would be stored in staging areas, all staging areas would include containment systems for storage tanks and staged/parked vehicles to capture fuels that may spill and would be located at least 150 feet away from sensitive streams and drainage paths.



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Source: CCWD 2007

Exhibit 2-2. Illustrative Plan for a Temporary Cofferdam

Access

Some of the existing access roads may require minimal repairs to make them suitable for construction equipment. In addition, although it is possible in good weather with proper equipment to drive along the berms for the entire length of the canal, the berms generally are not accessible in all weather, are not durable enough to withstand large construction activities, and are not wide enough to accommodate all the anticipated construction activities. An approximately 1.5-mile gravel road on the east end of the canal (between the trash rack and East Cypress Road) might be wide enough and sufficiently durable to withstand these construction activities; however, most of the areas next to the canal, including portions of the berms, would be compacted and an aggregate base or crushed rock would be applied to facilitate construction access on the action site. After the pipeline is installed, access roads would be repaired, if necessary, to preconstruction conditions to prevent future erosion, and the temporary construction access roads would be removed. In addition, a permanent all-weather road with a permeable surface would be constructed along the length of the ROW on the action site to allow access for maintenance activities.

Stream and Drainage Crossings

The only stream crossing required for construction of the new pipeline is at Marsh Creek. If an open cut construction technique is used, two cofferdams would be installed in Marsh Creek, approximately 200 feet apart otherwise jack-and-bore methods would be used. Piping would be provided between the two cofferdams to allow flow to continue in Marsh Creek while the replacement pipeline for the unlined canal is installed. The existing siphon (side-by-side 6-foot by 7-foot concrete culverts) beneath Marsh Creek would be demolished and removed. Native soils from the demolition of the berms would be compacted over the pipe to restore the bottom of the creek bed. Other drainages that would be crossed are not creeks with flowing water but rather sloughs that extend from the Delta or seasonal wetlands. In the project area, Emerson Slough is connected to the Delta through a one-way flap gate that allows only surface drainage to be discharged to the Delta (i.e., flood tides cannot propagate into the wetland). Therefore, the portions of Emerson Slough in the action area are largely dry outside of the rainy months. Jersey Slough, already in a 12-inch pipeline as it crosses the action area, is also largely dry outside of the rainy months. Finally, Dutch Slough is the only drainage that may be wet, but without flowing water, when the canal is replaced with pipe. These drainages would be open cut (or via jack-and-bore methods) during pipeline installation and restored to preproject conditions after pipeline placement.

Surface Reclamation

Following installation of the pipeline, the ROW would be contoured and restored to facilitate access for maintenance; minimize erosion and sedimentation; and prevent establishment of invasive weeds. Stream, drainage, and wetland crossings temporarily affected by the action should be restored to preconstruction conditions. The reclamation effort consists of the following main steps:

- ▶ topsoil salvage, storage, and replacement;
- ▶ reclamation of ROW and associated maintenance and access roads;
- ▶ restoration of stream, drainage, and wetland crossings; and
- ▶ long-term success of buried pipeline.

Topsoil Salvage, Storage, and Replacement

The berms that line both sides of the existing canal would be reduced in height to facilitate access to the canal before pipe installation. The berms would then be used as backfill for the pipeline.

Reclamation of ROW and Associated Maintenance and Access Roads

On completion of pipeline installation, the canal cross-section area would be filled, compacted, and restored to an elevation approximately equal to that of the surrounding area. Following construction, the ROW or disturbed areas would be graded consistent with surrounding grades and contours. After the pipeline is backfilled, an all-weather canal access road would be constructed in the ROW to replace the existing access roads, and the ROW would be protected by a 6-foot chain-link fence.

Restoration of Stream, Drainage, and Wetland Crossings

The pipeline would cross Marsh Creek and three other drainages. CCWD would ensure that drainages or wetlands to be crossed receive proper permits and approval by USACE and DFG before construction. In addition, CCWD would coordinate with and obtain an encroachment permit from the Contra Costa County Flood Control District for the Marsh Creek crossing to ensure that the creek banks are in service consistent with flood protection requirements.

After the pipeline installation is completed, the pipeline trench would be partially backfilled, and the drainage channel would be recontoured to its preinstallation grades and bed conditions or to other design standards per the requirements of jurisdiction agencies. The beds and banks of the drainages would be restored in a manner that allows vegetation to reestablish to its preinstallation conditions. Where necessary, either riprap or a biodegradable erosion control blanket made of jute would be used to protect and stabilize streambanks. The edges of the erosion control blankets would be installed firmly in the soil. No plastic material would be used. All excess erosion control measures would be disposed of properly when no longer needed. Riprap would be used only where existing stream channels consist of rock armoring and lack riparian vegetation. Erosion control blankets would be used on slopes or where the soils otherwise have a high erosion potential. The type and locations for these measures would be identified during design or determined in the field with input by the construction inspector.

Long-Term Success of Buried Pipeline

Geotechnical borings were taken and laboratory analyses performed to evaluate the potential for long-term settlement of the pipeline. On the basis of these testing results, only limited differential settlement of the pipeline can be expected. The subbase would be designed to prevent settlement from affecting the integrity of the pipe. The native soil used to cover the pipe could be expected to settle over time, and the material would naturally compact. To prevent formation of gullies, the native material would be mounded over the new pipeline.

Environmental Protection Requirements

This section describes the features of the proposed action that CCWD has built into the project design and construction approaches to reduce potential environmental impacts of the project.

Avoidance of Sensitive Resources

Qualified biologists have worked closely with CCWD engineers to design the proposed action in the least environmentally damaging manner.

Sensitive biological resources would be avoided through various means during the project design. Avoidance measures also would be used in the field during construction as a result of preconstruction surveys or at the direction of construction inspectors. If required, the construction would be coordinated through a resource specialist familiar with the resource issue being avoided. The locations of all sensitive resources and the methods to avoid them would be shown on the construction drawings. Few resource issues, other than wetlands and other waters of the United States, are anticipated because the new pipeline would be located in the existing disturbed canal cross section or in areas near the cross section that have already been surveyed for biological resources. The proposed action includes conservation measures to minimize potential effects on special-status species and sensitive habitats. They are summarized in Tables 2-3 and 2-4.

Erosion and Sediment Control

Erosion is the process of soil particles being displaced and transported by wind or water. Pipeline installation would disturb soil and vegetation, exposing sites to possible erosion. Best management practices (BMPs) would be undertaken in accordance with the California Code of Regulations. Spill prevention measures detailed in the storm water pollution prevention plan (SWPPP), as required under the National Pollutant Discharge Elimination System (NPDES) permit mandated by the Central Valley Regional Water Board, would be developed to prevent or minimize soil erosion and protect against stormwater runoff. In addition, the contractor would be required to make special provisions to prevent contamination, related to fuel or oil spills from construction vehicles, and to designate specific areas for vehicle fueling, oil changing, and washout of concrete trucks with controls to eliminate runoff.

The following standard erosion and sediment control measures and practices would be used during and after construction to ensure that impacts from soil erosion and sedimentation are less than significant:

- ▶ minimize site disturbance,
- ▶ perform initial cleanup,
- ▶ compact subsurface backfill material,
- ▶ leave topsoil in roughened condition,
- ▶ construct water bars,
- ▶ perform seeding and mulching,
- ▶ install erosion control blankets,
- ▶ install silt fencing and straw bale dikes, and

- ▶ conduct daily inspections and periodic maintenance of erosion and sediment control measures.

These measures are routinely implemented in the construction industry and have been proven successful for similar projects.

**Table 2-3
Summary of Conservation Measures for Special-Status Fish Species**

Impact Mechanism/Objective		Conservation Measure	
		Physical Action	Management Action
CM-1	Minimize Construction Impacts on Fish	<ul style="list-style-type: none"> ▶ Develop and implement a fish salvage operation. ▶ After fish are allowed to vacate the area with the assistance of acoustic equipment and sweep block nets, install cofferdam and fish barrier during the designated work window between July and November to avoid and minimize impacts on special-status fish species ▶ Conduct fish rescue and relocation as dewatering proceeds ▶ Screen dewatering pumps to protect aquatic species ▶ Handle fish according to standard NMFS protocols and make specific efforts to reduce stress ▶ Maintain block nets outside cofferdam during construction ▶ Construct a bypass pipeline as appropriate for Marsh Creek that can be used by aquatic species during construction 	<ul style="list-style-type: none"> ▶ Obtain and comply with regional water board Section 401 Water Quality Certification, DFG Streambed Alteration Agreement, USACE Clean Water Act Section 404 permit, and USFWS and NMFS biological opinion as necessary ▶ Coordinate with NMFS, DWR, USFWS, and Reclamation Fish Salvage teams ▶ Provide documenting report of fish salvage and any incidental take to NMFS, USFWS, and DFG within 30 days of completion ▶ Obtain encroachment permit from Contra Costa County Flood Control District for work in Marsh Creek ROW ▶ Consult with NMFS during design and development of bypass pipeline
CM-2	Keep Hazardous Materials in an Identified Staging Area, and Prepare and Implement an Accidental Spill Prevention Plan during Construction	<ul style="list-style-type: none"> ▶ Before construction begins, CCWD shall require the construction contractor to identify a construction staging area where hazardous materials would be stored during construction. All staging areas containing fuels, lubricants, oils, and solvents for storage tanks and parked vehicles would include containment systems to capture fuels that may spill and would be at least 150 feet away from sensitive species and drainage paths. ▶ CCWD shall develop a SWPPP as required by the Central Valley Regional Water Quality Control Board under statewide NPDES General Permit for Discharges of Storm Water Associated with Construction Activity. The SWPPP may include the 	<ul style="list-style-type: none"> ▶ Develop and comply with a hazardous materials management plan similar to those that have been approved by the regional water board for similar fish screen projects ▶ Construction contractor to prepare and implement a Hazardous Materials Control and Spill Prevention and Response Plan prior to construction ▶ Construction contractor to prepare and implement an Erosion Control Plan and Stormwater Prevention Plan prior to grading and excavation that shall include BMPs to minimize erosion and sedimentation as verified by the regional water board ▶ CCWD to obtain an individual waiver as directed by the
CM-3	Prepare and Implement a Storm Water Pollution Prevention Plan as Required by the Central Valley Regional Water Board		

**Table 2-3
Summary of Conservation Measures for Special-Status Fish Species**

Impact Mechanism/Objective	Conservation Measure	
	Physical Action	Management Action
	<p>following elements:</p> <ol style="list-style-type: none"> 1) Temporary erosion control measures shall be employed for disturbed areas. 2) No disturbed surfaces shall be left without erosion control measures in place during the winter and spring months. 3) Sediment shall be retained on-site by a system of sediment basins, traps, or other appropriate measures. 4) Standard operating procedures shall be developed for the handling of hazardous waste. 5) Storm drains shall be protected from sediment intrusion. 6) Dirt and debris shall be swept from paved streets in the construction zone before rainfall. 7) Grass or other vegetative cover shall be established on the construction site as soon as possible after disturbance. 	<p>Central Valley Regional Water Quality Control Board, to meet all waste discharge requirements, including a SWPPP, and for land or surface water application of any water generated during dewatering operations.</p>
<p>Note: CCWD's operations are governed in part by three biological documents: (a) 1993 NMFS biological opinion for winter-run Chinook salmon, (b) 1993 USFWS biological opinion for delta smelt, and (c) 1994 Memorandum of Understanding between DFG and CCWD regarding the Los Vaqueros Project.</p>		

Table 2-4 Summary of Conservation Measures for Special-Status Terrestrial Species and Their Habitats	
CM-4	Minimize potential fill of jurisdictional waters of the United States and loss of sensitive habitat, and compensate for unavoidable impacts
CM-5	Conduct preconstruction surveys and implement protective measures, if required, to minimize potential effects on western burrowing owl
CM-6	Conduct preconstruction surveys and implement protective measures, if required, to minimize potential effects on nesting birds
CM-7	Conduct preconstruction surveys and implement protective measures, if required, to minimize potential effects on Swainson's hawk
CM-8	Conduct surveys and implement protective measures, if required, to minimize potential effects on western pond turtle
CM-9	Conduct surveys and implement measures as needed to minimize potential effects on giant garter snake
CM-10	Conduct preconstruction surveys for San Joaquin kit fox, and, if present, implement protective measures
CM-11	Conduct preconstruction for California red-legged frog, and, if present, implement protective measures
CM-12	Survey for special-status plants within the project footprint before construction, and, if present, implement protection measures
CM-13	Implement conservation measures BIO-1 through BIO-7 to minimize potential effects on NCCP terrestrial habitat types
CM-14	Implement conservation measures BIO-1 through BIO-7 to minimize potential effects on sensitive resources

Storm Water Pollution Prevention Plan

A SWPPP would be developed by the construction contractor and would be submitted to the Central Valley Regional Water Board in support of NPDES regulations, as required by the Central Valley Regional Water Board. The SWPPP would be completed and implemented before construction begins. The SWPPP would identify the activities that may cause pollutant discharge (including sediment) during storms and the BMPs that would be employed to control pollutant discharge. Construction techniques would be identified to reduce the potential for runoff, including minimizing site disturbance, controlling water flow over construction sites, stabilizing bare soil, and ensuring proper site cleanup. In addition, the SWPPP would specify the erosion and sedimentation control measures to be implemented, such as silt fences, trench plugs, terraces, water bars, and seeding and mulching.

The SWPPP also would specify spill prevention countermeasures, identify the types of materials used for equipment operation (mainly vehicle fluids such as fuel and hydraulic fluids), and identify measures to prevent or materials available to clean up hazardous material and waste spills. Emergency procedures for responding to spills also would be identified in the SWPPP.

The SWPPP would be required in the contract specifications.

Fire Prevention and Response Plan

A fire prevention and response plan would not be necessary.

Reclamation Plan

A reclamation plan would be developed, as required by applicable regulatory agencies, and would be completed and implemented before construction begins. The reclamation plan would identify areas that would be restored and restoration methods. Seed mixes, schedules, success criteria, and success monitoring for restoration of wetlands, streams, and drainages would be identified.

The reclamation plan, as applicable, would be included in the contract specifications.

Wetlands Mitigation - Holland Tract Mitigation Site

The approximately 263-acre Holland Tract mitigation site that is being developed and constructed under the direction of Wildlands Inc. is located just outside of Oakley city limits in northeastern Contra Costa County, approximately 3 miles east of SR 4, north of Rock Slough and east of Sand Mound Slough. A 145.07-acre portion of the Holland Tract mitigation site is proposed for the creation of 47 acres of wetlands as mitigation for the Contra Costa Canal Replacement Project wetland impacts (Exhibit 2-3). Much of the remainder of the Holland Tract mitigation site is proposed as wetland mitigation for the East Cypress Corridor development project proposed in Oakley. A portion of the East Cypress Corridor development project is adjacent to a portion of the canal from the Rock Slough Headworks to East Cypress Road (approximately 7,000 feet). The majority of the Holland Tract mitigation site is composed of pastureland with scattered seasonal wetlands, drainage ditches, and sand mounds. The site consists of low-lying, relatively level land ranging in elevation from 10 feet below to 6 feet above mean sea level. Surrounding land use consists primarily of agricultural activities, such as farming and livestock grazing. For analysis of environmental impacts only the portion of Holland Tract that will be used for mitigation for the Contra Costa Canal Replacement Project is considered.

The conservation easement holder, endowment holder, management entity, and fee title holder for the Holland Tract mitigation site have not yet been determined but will be approved by the resource and wildlife agencies. Wildlands Inc. is holding discussions with the Agricultural Trust of Contra Costa County (Ag Trust) and Wildlife Heritage Foundation regarding long-term management of the property. Documentation of fee title transfer would be provided to resource and wildlife agencies, or sufficient funds to purchase the easement would be placed in an approved third-party escrow account. Long-term management and monitoring of the wetland creation and enhancement areas would be the responsibility of the approved management entity and supported by the conservation easement. Funding to implement long-term management and monitoring would be accomplished through establishment of an endowment dedicated to management of the preservation, creation, and enhancement areas.

Upon completion of the as-built plans, a letter would be sent to the U.S. Army Corps of Engineers (USACE), DFG, USFWS, and the Regional Water Quality Control Board, notifying them of the completion of the mitigation work and the start of the monitoring period.

Site monitoring is necessary to evaluate plant health and to identify and correct problem areas. It is a subjective process and relies on the ecological and horticultural expertise of the restoration biologist. A restoration biologist would visit the mitigation site throughout the 5-year establishment and monitoring period to evaluate growth and vigor of the vegetation, evaluate the recruitment of native species, and assess any problems on-site. The restoration biologist would walk the site and document any problems requiring corrective action. The restoration biologist would provide specific recommendations regarding biological and mechanical erosion control, debris removal, exotic plant control, irrigation prescriptions, replanting, species cultural requirements and treatments, pest control, fencing, and the need for and/or removal of browse cages.

A long-term management plan would be prepared and submitted to the resource and wildlife agencies for the Holland Tract mitigation site. The plan would include management goals on the sites that focus on the adaptive management of these self-sustaining wetland habitats.

Wetland Construction

Approximately 22 acres of shallow seasonal wetlands would be constructed by Wildlands Inc. in the southwestern portion of the Holland Tract mitigation site and be placed in a conservation easement¹ as mitigation for the canal project. An additional 25 acres of seasonal marsh, created perennial marsh, and open water habitat also would be constructed by Wildlands Inc. and included in the canal project conservation easement. Seasonal wetland construction would entail shallow excavation of soils in locations suitable for creation of self-sustaining wetlands that would be supported by direct precipitation and subsurface runoff from the adjacent dunes and sandy soils. Excavation of 7–13 feet of soil and intersecting the groundwater table would create the seasonal/perennial marsh and open water habitat complex in the northeastern portion of the site. The 25 acres included in the canal project conservation easement is located along the southwestern margin of the marsh complex and depicted on Exhibit 2-3.

Construction of the created wetlands on the Holland Tract mitigation site would employ bulldozers, scrapers, excavators, dump trucks, and other large earthmoving vehicles for excavation. Construction equipment storage and staging would occur on the Holland Tract mitigation site parcel adjacent to the wetland creation sites. The soil excavated for wetland creation on the Holland Tract mitigation site associated with the creation of CCWD's Canal Replacement wetlands can be retained on the remaining portions of the 145.07-acre portion of Holland Tract containing the Contra Costa Canal Replacement Project mitigation wetlands. Alternatively, excavated soil materials could be placed on a conveyor belt that would run across the Holland Tract mitigation site. The conveyor belt may also continue west across the adjacent property and county road to the East Cypress Corridor development site, located immediately west of Sand Mound Slough, via the earthen land bridge (saltwater intrusion barrier) across the slough to convey material excavated from the Holland Tract site outside of the Contra Costa Canal Replacement mitigation area. The conveyor belt route is 100 feet wide until it reaches the 70-foot-wide and 360-foot-long saltwater intrusion barrier in Sand Mound Slough (Exhibit 2-3).

¹ A conservation easement is an easement—a transfer of usage rights—that creates a legally enforceable land preservation agreement between a landowner and a municipality or a qualified land protection organization (often called a “land trust”), for the purposes of conservation. It restricts real estate development, commercial and industrial uses, and certain other activities on a property to a mutually agreed upon level.

Some of the existing wetlands on the Holland Tract mitigation site would be expanded and enhanced; however, impacts on existing wetlands would be avoided to the maximum extent feasible during wetland construction activities. Mass grading of the created wetlands would occur during the dry season (April 15 through October 15) of the year construction activities begin. Fine grading may occur after October 15. Proposed created wetland plantings would occur following completion of fine grading activities for the wetlands.

Perimeter fencing would be erected around the 263-acre Holland Tract mitigation site, and it would be maintained in perpetuity as a wetland preservation area excluding public access.

Project Operations and Maintenance

Project operations and maintenance requirements would be the same as for any buried pipeline. The ROW would have a 6-foot property line chain-link fence, as well as a permanent access road, as described above, under "Access." Access locations would be provided with provisions to remove sediment at the trash rack at Rock Slough, and at the PP1 transition structures. Intermediate points of access may be provided along the pipeline route to assist maintenance crews. After the 3.97-mile section of the unlined canal is replaced, the effort associated with maintenance for this portion of the canal would be greatly reduced. In addition, major maintenance associated with repairing localized berms that slide because of high tides or big storm events would no longer be necessary. The application of aquatic herbicides also would no longer be necessary along the unlined canal in areas that were replaced with pipe. The filled-in ROW would be managed consistent with CCWD's/Reclamation's, and Western's existing biological opinion.

No Action Alternative

Under the No-Action Alternative the 3.97 miles of existing unlined canal would not be replaced and the 42.92 acres of open water, 3.84 acres of in-channel freshwater marsh, and up to 6.64 acres of wetlands and other waters of the United States would remain in a similar condition to what is present today.

The existing canal would continue to be affected by water quality degradation from high-salinity groundwater intrusion from seepage, which in turn would result in lower quality drinking water for more than 550,000 CCWD customers. The No-Action Alternative would not provide any increased public safety or system security. The area surrounding the Contra Costa Canal is expected to be developed such that approximately 25,000 people will be living within 1 mile of the canal, where, at present, fewer than 500 people live. Additionally, the DWR/CALFED Dutch Slough Tidal Restoration Project includes extensive regional trails, further adding to population in the vicinity. The potential risk and liability from unauthorized access to the canal is high with an open canal. Also, the security risks to the drinking water system are much higher with an open canal than with a pipeline. As mentioned previously, most of the land south of the canal is planned and proposed for residential development. For this reason, storm surges and levee/berm failure along the canal could result in increased flood risk. According to engineering studies, the berms (functioning as levees) for the Contra Costa Canal were not designed for seismic stability and are highly liquefiable. Thus, berm (levee) damage during an earthquake could result in flooding of adjacent residential properties.

Under the No Action Alternative the existing unlined portion of the channel would continue to provide good habitat for warm-water fish species (predators) Morinaka 2003; CCWD 1999, 2000a, 2000b, 2001, 2003, 2004, 2005, 2006; and Tenera unpublished data for 2006) that easily prey on special-status fish, especially juvenile salmonids (Morinaka 2003). The current pumping operations, in combination with tidal influence, draw special-status fish species into the canal, where they can be preyed on by the warm-water species or become entrapped in the canal and entrained in the pumps would continue. Although a fish screen has been considered at Rock Slough, under the No Action Alternative, the screen would need to be significantly oversized to lower the approach velocities to prescribed levels, resulting in construction, operation, and cost issues that significantly affect the ability of CCWD and Reclamation to implement the project.

Under the No Action Alternative there may be limitations on restoration at the DWR/CALFED Dutch Slough Tidal Restoration Project site could be necessary because of the hydrologic connection between the groundwater and the canal. This could limit restoration of 1,200 acres.

The No Action Alternative would not require Western to relocate their existing Tracy-Contra Costa 69-kV T-line within the ROW; therefore, no Utility Relocation Agreement with CCWD would be required.

The configuration of the Holland Tract mitigation site could change and its development could be temporarily or permanently postponed.

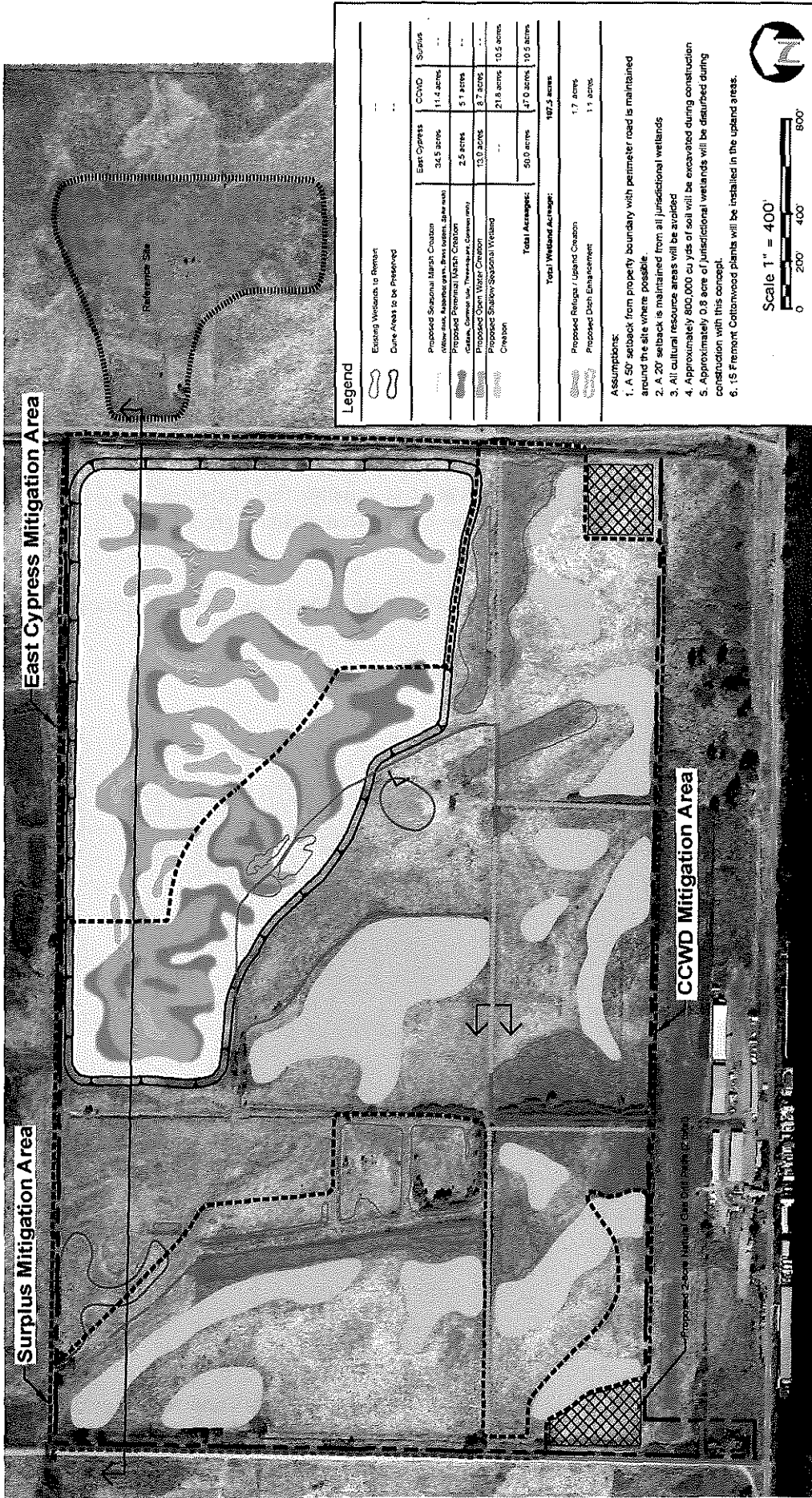


Exhibit 2-3. Proposed Wetland Creation Concept for Holland Tract

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Alternatives Considered but Eliminated from Detailed Analysis

Offsite Alternative

Discussion of off-site alternatives was eliminated since such alternatives, while possibly meeting some of the project purposes, would not be practicable in terms of cost and logistics and would have significantly fewer benefits. Construction of the project outside of the ROW is not practicable based on proposed developments and developments currently under construction in the area. Proposed residential development will be constructed adjacent to the ROW on the south side from Marsh Creek to Jersey Island Road. With regard to the Cypress Grove development, construction of this development is close to completion. Therefore, it is not practicable or feasible for the pipeline to be constructed to the south of the ROW where residential development is planned. Additionally, if CCWD were to pursue construction of the pipeline in the area to the south of the ROW where residential development is not planned, purchase of additional and substantial property and/or easement rights would be required.

Preliminary estimates of cost associated with acquisition of these property or easement rights show these alternatives have much greater cost than the cost of the proposed action.

All of the land on the north side of the ROW is already planned for use. Most of the land on the north side of the ROW, between PP1 and Cypress Road, is planned for tidal restoration and is owned by DWR. The City of Oakley is developing a portion of this area into a community park, and a regional trail system is planned throughout the DWR/CALFED Dutch Slough Tidal Restoration Project. Additionally, from Cypress Road to the Rock Slough trash rack, private developers intend to construct the East Cypress Corridor Specific Plan. Acquiring an easement with full surface rights through the restoration area would be expensive because such rights would significantly modify the design and extent of the wetlands restoration project (the easement is assumed to be 100 feet wide, to be fully accessible to CCWD, to include an all-weather maintenance road, and never to be submerged). While it may be currently technically possible for CCWD to acquire land rights within some areas outside of the 300-foot ROW for the pipeline, the cost is expected to exceed \$80,000 per acre. A new 100-foot-wide easement for the entire 21,000 feet of the unlined canal would represent approximately 50 acres and, if available at \$80,000 per acre, would cost \$4 million.

Another off-site alternative that was considered but not deemed practicable is abandoning the Contra Costa Canal and increasing pumping at CCWD's other intakes. Although CCWD operates two other Delta diversion facilities (and is planning a third), the combined capacity of these other intakes is not large enough to meet demand during the summer, particularly when the Los Vaqueros Reservoir is being filled. In addition, the Contra Costa Canal is being used to convey non Central Valley Project water supply to the City of Brentwood. Therefore, diversions from the Contra Costa Canal are needed to meet water deliveries to CCWD's 550,000 customers and major industries. Abandoning the Contra Costa Canal also does not resolve the flood control, public safety, and liability reduction objectives of the project. Therefore, overall, the only reasonable and practicable

alternatives to consider are to modify the existing canal and maintain conveyance of water supplies within the ROW.

An off-site alternative would not require Western to relocate their existing Tracy-Contra Costa 69-kV T-line within the ROW; therefore, no Utility Relocation Agreement with CCWD would be required.

Canal Lining Alternative

A Canal Lining Alternative would involve upgrading the existing berms to support a liner. Potential liner alternatives include concrete only, geomembrane (e.g., high density polyethylene [HDPE], polyvinyl chloride [PVC], very low density polyethylene [VLDPE] resins, Bentomat) with concrete cover, buried geomembrane, and clay with armorflex cover. This alternative would reduce the groundwater seepage into the canal by lining the unlined canal side slopes and bottom. The entire length of the canal would be lined between Rock Slough and PP1 to ensure that no seepage occurred into or out of the canal and to ensure that all flood risks were addressed.

Components of this alternative include taking PP1 out of service during the construction period, constructing a cofferdam to dewater the canal section, dewatering the canal before and during construction activities, installing sheet piles to prevent groundwater migration into the canal, potentially excavating the canal to remove accumulated sediment, regrading, reconstructing foundation berms for the liner, conducting surface preparation work before installation of the liner, installing the liner, and potentially conducting work on PP1 and the siphons to accommodate the hydraulics necessary to achieve the designed flow. It is not anticipated that the lined portion of the canal would need to be drained.

Because of the extensive earthwork associated with rebuilding the berms and with performing other construction activities, the installation of the liner and associated work would need to be phased over several years. This would involve multiple mobilization/demobilization activities and potential rework of the liner installation at the joints. The liner would be designed to resist uplift forces when water is in the canal either by keying the liner into the levee walls or through the liner cover design. Water quality improvement is the focus of this evaluation, so the installation of pressure relief valves, which would introduce high-saline groundwater to the canal, is not feasible.

The installation of a liner can provide for a highly effective solution to mitigating groundwater seepage into the canal; however, there are concerns about the long-term effectiveness of this alternative because of site-specific conditions. Because the canal berms act as levees but are not engineered for seismic stability and are highly liquefiable, the costs of installing the liner include rebuilding the berms to ensure that the structure can withstand a significant seismic event. In addition, the liner option would require periodic dredging (every 10–15 years).

Advantages of this alternative include ease of maintenance, reduced groundwater infiltration, and reduced vegetative growth on the banks of the canal. A concrete-only liner would last 40–60 years and would have an estimated 70% effectiveness at seepage reduction. The geomembrane with an earthen cover would last 10–25 years and would

have 90–95% effectiveness at seepage reduction. The geomembrane with a concrete cover would last 40–60 years and would have 95% effectiveness at seepage reduction.

Compared with the proposed action, this alternative would result in similar acreages of permanent and temporary effects in the Contra Costa Canal (3.84 acres of in-channel freshwater marsh permanently affected and 42.92 acres of open water temporarily affected) and potential temporary effects on 0.59 acre of waters of the United States within the Reclamation ROW and within the 200-foot temporary construction staging easement.

This alternative has several major technical disadvantages. Because of the seismic instability of the existing berms (levees) and the need to rebuild them, construction costs are very high. The liner system also has the potential to float when the canal is drained unless it is engineered to resist buoyancy related to groundwater. In addition, this alternative has the potential to increase groundwater levels in areas adjacent to the canal. Most important, this alternative would not meet the project purpose and several of the proposed action's objectives: improving public safety, increasing system security, and enhancing compatibility with planned land use in the action area.

An additional environmental factor associated with the Canal Lining Alternative would be the effect on special-status fish species. Under current operations, the existing unlined portion of the canal provides good habitat for warm-water fish species that easily prey on special-status fish, especially juvenile salmonids. The current pumping operations, in combination with tidal influence, draw special-status fish species into the canal, where they can be preyed on by the warm-water species or become entrapped in the canal and entrained in the pumps. Lining the canal would not eliminate predatory habitat for warm-water fish species and would not eliminate the high levels of predation on special-status fish. It also would not eliminate the potential for tidal influence to draw special-status fish into the canal or direct entrainment.

Although the Canal Lining Alternative would reduce effects on waters of the United States compared to the proposed action, this alternative does not meet the project purpose and several of the project objectives. The Canal Lining Alternative would not address the issues of public safety and increased system security, especially when considering the proposed adjacent land uses. Also, there is still potential for flood risk with this alternative, which would be a major issue for existing and proposed adjacent development. Because this alternative does not meet the project purpose and objectives, it is not practicable.

Many other engineering designs in addition to lining the canal were considered during the prefeasibility phase of the action. Similar to lining the canal, these designs hydraulically isolated the canal water from the surrounding groundwater. These designs involved installing a french drain system on both sides of the canal, installing sheet piles on both sides of the canal, and raising the stage in the canal to ensure that the elevation of canal water always exceeded that of the surrounding groundwater (to ensure outward seepage only). Each of these designs was deemed to be technically infeasible.

The canal lining alternative may require Western to relocate some of their existing Tracy-Contra Costa 69-kV T-line within the ROW; therefore, a Utility Relocation Agreement with CCWD would be required.

Pipeline Alignment within ROW, Retain Canal Alternative

The Pipeline Alignment within the ROW and Retain Existing Canal Alternative would involve constructing a new, 10-foot-inside-diameter (12-foot-outside-diameter) pipeline within the ROW and modifying the existing canal.

The pipeline would still need to connect to the existing canal structures at Rock Slough and at PP1, as with the proposed action. The effects on the Contra Costa Canal in these locations would consist of a total of 0.027 acre of freshwater marsh and 0.194 acre of open water permanently removed for connection of the pipeline to these areas.

In addition, the remaining canal would need to be isolated from Rock Slough to ensure that water quality objectives of the project are met. (If the canal remained tidally influenced by Rock Slough, then the continuing seepage into the canal would affect the water quality at the entrance of the new pipeline). Therefore, the remaining open canal would change from freshwater marsh and open water to more emergent marsh and seasonal wetlands and would effectively be a stagnant pool of water supplied and replenished by groundwater seepage into the canal. Public safety would not be improved, and in the case of unlined canal, it could degrade further. Managing the stagnant seasonal wetland would likely involve continual removal of aquatic weeds and vector control because of nearby housing developments.

Compared with those of the proposed action, the effects on wetlands and other waters of the United States within the project site under this alternative are estimated to be less.

This alternative is expected to partially meet the project purpose and objective of improving drinking water quality. Placement of the water in a pipeline rather than in the open, unlined canal would reduce the potential for contamination of the water supply, both intentional and unintentional, and would reduce salinity of the water because it would not be affected by groundwater seepage.

However, this alternative would not address the project objectives of improved public safety, reduced seepage out of the canal (extensive rainfall in the ROW would drain into the isolated canal and raise the groundwater table), and compatibility with planned land uses in the action area. These issues would still be a major concern for CCWD with retention of the canal. The abandoned canal would be a major safety hazard and liability concern for CCWD, especially given the encroaching nearby development.

Cost associated with this alternative would also be substantially higher than that of the proposed alternative because of the higher construction-related cost. Installing the pipeline in the existing ROW while still maintaining the existing canal involves substantially more excavation; placing the pipeline in the bottom of the existing canal and backfilling requires far less earthwork. Because this alternative does not meet the project

purpose and objectives, in addition to the above-mentioned reasons including high cost, this alternative is not practicable.

This alternative would not require Western to relocate their existing Tracy-Contra Costa 69-kV T-line within the ROW; therefore, no Utility Relocation Agreement with CCWD would be required.

Section 3 Affected Environment

Since no construction will occur in the Los Vaqueros area, the area is only described under individual resource categories where minor changes in usage related to Los Vaqueros may result in impacts during the project.

Aesthetics

The unlined Contra Costa Canal represents the easternmost 3.97 miles of the 48-mile canal. This portion of the canal is an artificial, earth-lined waterway. The facility is presently surrounded by rural land uses, but development is rapidly converting the surrounding area to dense residential use. The entire portion of the project located between Pumping Plant No. 1 (PP1) and the trash rack at Rock Slough—is located in the City of Oakley. Most of the land bordering the canal is open space and farmland; however, in 2004, construction for the Cypress Grove and the Summer Lake (formerly Cypress Lake and Country Club) residential developments began near the project site. The approximately 150-acre Cypress Grove development is located adjacent to the canal on the south, near the west end of the project site. The Summer Lake development is an approved project that occupies approximately 678 acres within the boundaries of the proposed East Cypress Corridor Specific Plan area; the plan area is adjacent to the northern boundary on the eastern portion of the project site. The canal is crossed in several locations by roadways and sloughs. Earthen berms and chain-link or three-strand barbed wire fencing are located in the canal right-of-way (ROW) on both sides of the canal for the length of the project site. Along much of the site, Western 69 kV power poles and lines also are located on top of the canal berms. No structures or trees and no visually distinctive characteristics are present in the Contra Costa Canal ROW.

The natural setting in the Los Vaqueros area provides many visual resources that attract recreational users. Los Vaqueros is a protected watershed environment of nearly 20,000 acres including the 100,000 acre foot reservoir and surrounding lands. The area includes natural lands, hiking and multi-use trails, and roads. The area provides recreational opportunities including boating, fishing, hiking, biking, horseback riding, wildlife viewing, and picnicking.

Air Quality

The project area is located in Contra Costa County, which is located in the San Francisco Bay Area Air Basin. With respect to ozone, Contra Costa County is currently designated as a marginal nonattainment area for the national 8-hour ozone standards (Environmental Protection Agency 2006). Contra Costa County is designated as an attainment and/or unclassified area for all other national ambient air quality standards.

Biological Resources including Threatened and Endangered Species

The species and habitats addressed below are from lists provided by the DFG and USFWS and previous consultation with NMFS (see appendix A), as well as data from the California Natural Diversity Database (CNDDB) and field surveys performed by consultants and Reclamation personnel.

Habitats and Status in Affected Environment

This section describes the plant communities and fish and wildlife habitats in the project area. These habitat descriptions are those defined under the Natural Communities Conservation Planning Act (NCCPA), with the exception of a few habitats that exist in the project area, but do not fit one of the NCCPA categories.

Tidal Perennial Aquatic Habitat

Tidal perennial aquatic habitat is defined as deepwater aquatic (greater than three meters deep from mean low low tide), shallow aquatic (less than or equal to three meters deep from mean low low tide), and unvegetated intertidal (i.e., tideflats) zones of estuarine bays, river channels, and sloughs. The unlined portion of the Contra Costa Canal, although heavily managed, contains approximately 42.92 acres of tidal perennial aquatic habitat. This habitat is subjected to aquatic herbicide use, as part of regular operations and maintenance.

Valley Riverine Aquatic Habitat

Valley riverine aquatic habitat includes the water column of flowing streams and rivers in low-gradient channel reaches below an elevation of approximately 300 feet that are not tidally influenced. This includes associated shaded riverine aquatic, pool, riffle, run, and unvegetated channel substrate (including seasonally, exposed channel bed) habitat features, and sloughs, backwaters, overflow channels, and flood bypasses hydrologically connected to stream and river channels. In the project area, the perennial drainages (Marsh Creek, Dutch Slough, Emerson Slough, and Jersey Slough) contain valley riverine aquatic habitat, which includes freshwater marsh vegetation, totaling approximately 1.686 acres. The canal beneath these drainages is contained in twin 7-foot by 6-foot box culvert siphons. At its location above the canal, Marsh Creek is approximately 16 feet wide and consists of open water with some freshwater marsh vegetation along the banks. Emerson Slough above the canal and just west of Sellers Avenue supports freshwater marsh vegetation and is approximately 20 feet wide. Little Dutch Slough supports open water and floating aquatic vegetation, currently dominated by water hyacinth. Jersey Slough is contained in a storm drain pipe above the unlined canal siphon at East Cypress Road.

Tidal Freshwater Emergent Habitat

Tidal freshwater emergent habitat includes portions of the intertidal zones of the Delta that support emergent wetland plant species that are not tolerant of saline or brackish conditions. The in-channel freshwater marsh at the edges of the unlined canal may be considered tidal freshwater emergent habitat, excluding those portions that are ripped. Dominant plants include common rush (*Juncus effusus*), yellow flag (*Iris pseudacoras*), curly dock (*Rumex crispus*), and dallis grass (*Paspalum dilatatum*). On-site, this habitat totals approximately 3.844 acres.

Nontidal Freshwater Permanent Emergent Habitat

Nontidal freshwater permanent emergent habitat includes permanent (natural and managed) wetlands, including meadows, dominated by wetland plant species that are not tolerant of saline or brackish conditions. Seasonal wetlands and seasonally wet meadows

are of this habitat type. Italian ryegrass (*Lolium multiflorum*) is a common plant in many of these meadows. In the project area, this habitat totals approximately 0.349 acre.

Natural Seasonal Wetland Habitat

Natural seasonal wetland habitat includes vernal pools and other nonmanaged seasonal wetlands with natural hydrologic conditions that are dominated by herbaceous vegetation and that annually pond surface water or maintain saturated soils at the ground surface for enough of the year to support facultative or obligate wetland plant species. Alkaline and saline seasonal wetlands that were not historically part of a tidal regime are included in natural seasonal wetlands. This habitat type is represented in the project area by the out-of-channel freshwater marsh. The dominant plants are broad-leaf cattail (*Typha latifolia*) and hard-stem bulrush (*Scirpus acutus*). This habitat type occupies approximately 0.514 acre of the project area.

Managed Seasonal Wetland Habitat

Managed seasonal wetland habitat includes wetlands dominated by native or nonnative herbaceous plants, excluding croplands farmed for profit (e.g., corn and rice), that land managers flood and drain during specific periods to enhance habitat values for specific wildlife species. Ditches and drains associated with managed seasonal wetlands are included in this habitat type. The irrigation/drainage ditches in the action area are managed seasonal wetlands. They vary in their composition and amount of cover, but dominant plants include duckweed (*Lemna minor*), broad-leaf cattail, hard-stem bulrush, Italian ryegrass, tufted hairgrass (*Deschampsia cespitosa*), soft chess (*Bromus hordeaceus*), floating seedbox (*Ludwigia peploides*), and chairmaker's bulrush (*Scirpus americanus*). This habitat type totals approximately 2.782 acres on-site.

Within the Holland Tract mitigation site, seasonal wetlands scattered throughout the irrigated pastures represent this habitat type and total 11.55 acres within the Canal Replacement Project mitigation area and 1.15 acres within the conveyor belt route. They are found in depressions in fields and disturbed areas where shallow, seasonal surface ponding occurs following wet-season precipitation. Characteristic native species present within seasonal wetlands on the Holland Tract mitigation site include saltgrass (*Distichlis spicata*), umbrella sedge (*Cyperus eragrostis*), creeping spike-rush (*Eleocharis macrostachya*), salt heliotrope, and spearscale (*Atriplex triangularis*), among others. Nonnative species such as rabbitsfoot grass (*Polypogon monspeliensis*), curly dock (*Rumex crispus*), strawberry clover (*Trifolium fragiferum*), spiny buttercup (*Ranunculus muricatus*), Bermuda grass, and birds-foot trefoil (*Lotus corniculatus*) are also common.

Associated drainage ditches also fall within the definition of this habitat type and total 1.73 acres within the Canal Replacement Project mitigation area and 0.02 acre within the conveyor belt route. Characteristic native species present include broadleaf cattail (*Typha latifolia*), common tule (*Scirpus acutus* var. *occidentalis*), three-square (*Scirpus americanus*), bur-reed (*Sparganium eurycarpum* ssp. *eurycarpum*), and Baltic rush (*Juncus balticus*), among others. Nonnative species such as cursed crowsfoot (*Ranunculus sceleratus*), rabbitsfoot grass, and Dallis grass (*Paspalum dilatatum*), are also common. Managed seasonal wetland habitat totals approximately 13.28 acres within the Holland Tract mitigation site and 1.17 acres within the conveyor belt route.

Valley/foothill Riparian Habitat

Valley/foothill riparian habitat includes all successional stages of woody vegetation, commonly dominated by willow (*Salix* spp.), Fremont cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), or western sycamore (*Platanus racemosa*), in the active and historical floodplains of low-gradient reaches of streams and rivers generally below an elevation of 300 feet. In the action area, individuals or small clusters of willows are present in scattered locations, generally representing poorly developed elements of riparian vegetation. Some are located in the canal channel, usually rooted close to the waterline. There are also small stands or individuals of willow in the project area but outside of the channel of the canal, associated with drainage ditches or freshwater marsh. These include red willow (*Salix laevigata*) and narrow-leaved willow (*Salix exigua*). A single mature Fremont cottonwood is present in the study area associated with Emerson Slough, and small saplings of cottonwood and red willow are associated with a freshwater marsh near the western end of the study area. A cluster of Goodding's willow (*Salix gooddingii*) is present in the study area associated with a drainage ditch on the west side of Jersey Island Road, north of the canal. The unlined canal contains little of this habitat. There are few trees in the ROW of the unlined canal, and the total canopy cover of riparian vegetation is estimated to be approximately 0.21 acre in the project area.

Grassland Habitat

Grassland habitat includes upland vegetation communities dominated by introduced and native annual and perennial grasses and forbs, including nonirrigated and irrigated pasturelands. In the project area, grassland habitat is dominant in fields on active and inactive ranch properties adjacent to both sides of the canal. Typical plant species include ripgut brome (*Bromus diandrus*), soft chess (*B. hordeaceus*), foxtail barley (*Hordeum murinum leporinum*), Italian ryegrass, tall fescue (*Festuca arundinacea*), Bermuda grass (*Cynodon dactylon*), Mediterranean barley (*Hordeum marinum* ssp. *gussoneanum*), broad-leaf peppergrass (*Lepidium latifolium*), bird-foot trefoil (*Lotus corniculatus*), strawberry clover (*Trifolium fragiferum*), white clover (*Trifolium repens*), field bindweed (*Convolvulus arvensis*), curly dock, prickly lettuce (*Lactuca serriola*), and bristly ox-tongue (*Picris echioides*), among others. Typical native species present on site include meadow barley (*Hordeum brachyantherum*), saltgrass (*Distichlis spicata*), and spearscale (*Atriplex triangularis*). Grasslands (including ruderal habitat) are present on approximately 128.45 acres in the footprint of the Contra Costa Canal Replacement Project itself. This habitat is highly disturbed by past and ongoing agricultural activities and supports largely nonnative species.

The majority of the Holland Tract mitigation site is characterized by seasonally and formerly irrigated pasturelands and ruderal vegetation similar to those found in the Contra Costa Canal Replacement Project area. Many of the plant species listed above are also found in the 118.95 acres of grassland (and ruderal) habitat present in the Contra Costa Canal Replacement Project mitigation area and three acres in the conveyor belt route.

Inland Dune Scrub Habitat

Inland dune scrub habitat is comprised of vegetated stabilized sand dunes associated with river and estuarine systems. Inland dune scrub habitat in the vicinity of the project area appears to be restricted to a narrow strip of sandy soil on the southern canal levee adjacent to Monet Drive in the Teal Cove subdivision. Grading associated with residential development has recently heavily disturbed this location. Nevertheless, native species characteristic of the inland dune community of the Oakley area are present, including several regionally uncommon species, such as California croton (*Croton californicus*), desert evening-primrose (*Oenothera deltoides* ssp. *cognata*), and Kellogg's tarweed (*Deinandra kelloggii*). Also present are the more common native species telegraph weed (*Heterotheca grandiflora*), Spanish clover (*Lotus purshianus*), and California poppy (*Eschscholzia californica*). In this spot, plant species of the dune community are restricted to the area outside of the unlined canal ROW defined by a chain-link fence. Inside the fence on the canal access road, although soils are sandy, the characteristic species of inland dune scrub, in particular California croton, desert evening-primrose, or Kellogg's tarweed, are not evident. In several other locations in the project area, sandy soils are present, but none appear to support the unique vegetation assemblage associated with inland dune scrub in this region. Approximately 0.72 acre of inland dune habitat is located immediately adjacent to, but outside of the project area. This habitat would not be disturbed by the project.

A low sand mound ridge is located in the north-central portion of the Holland Tract mitigation site and lies within the Canal Replacement Project mitigation area. No trees, shrubs, or herbaceous vegetation that characterize an interior dune community are present on this sand mound; therefore, it has not been included as part of the inland dune scrub NCCP habitat area. Nonnative species typically found in disturbed ruderal habitat, such as hare barley, yellow star-thistle, soft chess, and ripgut brome, are dominant. The native species telegraph weed, common on disturbed sites where soils are sandy, is also present. This area totals 12.36 acres.

Aquatic Species in Affected Environment

The project area serves as habitat for a variety of special-status fish species, several of which have been listed for protection under the Federal Endangered Species Act (ESA), the California Endangered Species Act (CESA), or both (Table 3-1).

Common Name	Scientific Name	Listing Status ¹		Critical Habitat in project area	Essential Fish Habitat	Documented to Occur in project area
		Federal	State			
Delta smelt	<i>Hypomesus transpacificus</i>	FT	ST	Yes	N/A	Yes
Sacramento River winter-run Chinook salmon	<i>Oncorhynchus tshawytscha</i>	FE (proposed for downlisting to FT)	SE	No	Yes	Yes

Common Name	Scientific Name	Listing Status ¹		Critical Habitat in project area	Essential Fish Habitat	Documented to Occur in project area
		Federal	State			
Central Valley spring-run Chinook salmon	<i>Oncorhynchus tshawytscha</i>	FT	ST	No	Yes	Yes
Central Valley steelhead	<i>Oncorhynchus mykiss</i>	FT	--	No	N/A	Yes
Central Valley fall-/late-fall-run Chinook salmon	<i>Oncorhynchus tshawytscha</i>	FSC	SSC	N/A	Yes	Yes
Southern DPS of North American green sturgeon	<i>Acipenser medirostris</i>	FT	SSC	No	N/A	No
Sacramento splittail	<i>Pogonichthys macrolepidotus</i>	FSC	SSC	N/A	N/A	Yes
Longfin smelt	<i>Spirinchus thaleichthys</i>	--	SSC	N/A	N/A	Yes

¹Listing status definitions: FE = Federally listed as endangered; FT = Federally listed as threatened; FSC = Federal species of concern; SE = state listed as endangered; ST = state listed as threatened; SSC = state species of special concern.

Note: DPS = distinct population segment.

The nearest critical habitat for anadromous fishes is approximately one mile away, in Dutch Slough, Sand Mound Slough, and Rock Slough, for the Central Valley steelhead (NMFS 2005). Delta smelt critical habitat includes the Contra Costa Canal, Rock Slough and Old River (affected by the proposed no-fill/no-diversion waivers). The four primary constituent elements (PCEs) of delta smelt critical habitat are: spawning habitat, larval and juvenile transport, rearing habitat and adult migration. These PCEs are not present in the Contra Costa Canal. Delta smelt may enter through the unscreened Rock Slough intake and become entrained, where they may die at Pumping Plant 1. Rock Slough may contain rearing habitat, but near the intake to the canal, rearing delta smelt are vulnerable to entrainment in the Contra Costa Canal. Old River may contain larval and juvenile transport habitat and adult migration habitat.

Essential fish habitat (EFH) for Pacific Salmon occurs in the project area. Although channelized for flood control, lower Marsh Creek supports fall-run Chinook salmon (Levine and Stewart 2004; Jones & Stokes 2003). The salmon are generally restricted to the lower reach of Marsh Creek because four miles upstream, a six-foot-high drop structure is found near the Brentwood Wastewater Treatment Plant between Delta and Sunset Roads (Levine and Stewart 2004; Jones & Stokes 2003).

DFG and Tenera Environmental have conducted studies and monitoring programs associated with operations of the Contra Costa Canal. One of these studies, a fish community study conducted by DFG in 1994, was designed to determine the relative abundance and food preference of predatory fishes in the 4-mile intake channel of the canal between the Headworks and PP1. Intake channel survival and sieve net collection efficiency experiments were conducted by DFG in 1994 and 1995. Sieve net sampling in the area of the canal downstream of the PP1 pumps was conducted by DFG in 1994–1996. DFG started collecting sieve net samples from the Contra Costa Canal Headworks in 1998. From 1998 to 2000, a large sieve net (mouth size 10 feet by 4.5 feet) was used. Because of the theft of this equipment, a smaller sieve net (4 feet by 2 feet) was used from 2001 to 2004. In June 2003, Tenera Environmental took over sampling for DFG, and in March 2004 the small sieve net was replaced with a larger sieve net. The following sections summarize the study results.

1994 Fish Community Study

Fish collections were made at two sites chosen as representative sampling sites: at the Headworks and just upstream of the Marsh Creek siphon, near PP1. Sampling was conducted at both sites in January, March, June, and August 1994. Sampling was performed each month of the study for a 3-day period using a combination of different types of gear, including large- and small-mesh gill nets, hoop nets, electrofishing, and otter trawls (Morinaka 2003). The food habits of predatory fishes (minimum fork length of 180 mm) were studied by removing the stomach contents with a pump.

Nineteen fish species were collected between the Headworks and PP1 during the fish community study in 1994. Five species made up 92.5% of the collection: white catfish, redear sunfish, bluegill, largemouth bass, and striped bass (Reclamation 1997). Hitch and steelhead were the only two native species collected; no Chinook salmon or delta smelt were collected.

The stomach contents of five predatory fishes were analyzed: largemouth bass (n=43), white catfish (n=42), channel catfish (n=22), striped bass (n=12), and brown bullhead (n=2) (Morinaka 2003). Channel catfish and white catfish stomachs contained mostly plant material; however, channel catfish had a total of 70% (by volume) of prey fish remains in August (Morinaka 2003). Between 70% and 90% of the stomach contents of largemouth bass were invertebrates, and the highest percentage (20% by volume) of prey fish remains were found in January. The percentage of prey fish found in striped bass was highest (61% by volume) in January.

Intake Channel Survival and Sieve Net Efficiency Experiments

DFG designed studies to provide a basis for estimating the “true entrainment losses” of fish entrained at the canal intake and to test the efficiency of the sieve net used to collect fishes that had passed through the pumps at PP1 (Morinaka 2003). It was determined that the logical place to estimate entrainment into the canal would have been at the Headworks because it is the location where water is first diverted from Rock Slough into the artificial canal. However, the configuration (uneven bottom and sides and large width), presence of aquatic vegetation, and tidal influence in the canal made it impractical to sample the entire channel flow. Therefore, DFG determined that the best

location to sample entrainment was at PP1 because the configuration of the canal there made it possible to deploy a sieve net that filtered 100% of the flow. However, PP1 is located approximately four miles upstream of the Headworks. Therefore, in order to accurately estimate entrainment losses, it was necessary to investigate the magnitude of juvenile salmon loss (predation) that may occur in the 4-mile intake channel.

Experiments using marked hatchery-raised fall-run juvenile Chinook salmon were conducted in May 1994, June 1995, December 1995, and January 1996.

Morinaka (2003) reported that predation was visible at most release sites; predatory fish were observed chasing the released salmon. During the May 1994 experiments, USFWS sampled in Rock Slough for approximately 9 hours over a 3-day period using a boat equipped with a push net. One marked Chinook salmon was collected from the Rock Slough intake group, which indicated that fish released in the studies may migrate out of the canal intake (Morinaka 2003).

Three experiments conducted in December 1995 and January 1996 used smaller numbers of marked salmon than during the May 1994 and June 1995 experiments. Because of the visible predation that occurred during previous experiments, it was believed that these repetitive releases of smaller numbers of fish would more closely simulate typical densities of juvenile salmon that would migrate through the intake channel, resulting in a more natural rate of predation (Morinaka 2003).

DFG concluded that additional experimentation was needed to determine the magnitude of loss from the Headworks to PP1. Morinaka (2003) stated that the losses around PP1 were likely attributable to predation by adult striped bass and white catfish that were observed in large numbers around the facility, particularly in the afterbay. He reasoned that the higher recovery rate of salmon released 50 meters upstream of the pumps in December 1995 and January 1996 may have been a result of the fish being acclimated for a longer period before release. If this approach reduced erratic swimming behavior, these salmon would be better able to avoid predators. Losses of juvenile salmon released near the pumps and in the afterbay were substantial. Morinaka (2003) concluded that many factors and the occasional heavy debris loads made it impossible to determine the collection efficiency of the sieve net. However, Morinaka (2003) estimated the predation rate to average 84%.

1994–1996 Pumping Plant No. 1 Sieve Net Sampling

A sieve net was designed to filter the entire water column of the canal at a location approximately 60 feet after the water had passed through the PP1 pumps. From January through December 1994, a total of more than 4,700 fish represented by 29 species were collected from sieve net sampling at PP1 (Table 3-9). Introduced species composed more than 97% of the total number of fish collected. Striped bass, the most abundantly collected species, represented 59% of the total number of fishes collected. Most of the striped bass were collected in June 1994, and the average fork length was 26 mm. Native species accounted for approximately 3% of the total number of fish collected: Chinook salmon (2.1%), prickly sculpin (0.4%), steelhead (0.2%), tule perch (0.1%), and six

species represented less than 0.1% each (lamprey, delta smelt, staghorn sculpin, Sacramento splittail, longfin smelt, and starry flounder). Listed species collected in 1994 were winter-run-size chinook salmon (n=2), spring-run-size Chinook salmon (n=29),² steelhead (n=10), and delta smelt (n=2).

2004–2006 Headworks and Pumping Plant No. 1 Sieve Net Sampling

Between March 2004 and October 2006, a total of 251 samples were collected at the Headworks and 98 samples from PP1. A total of 3,115 fish represented by 27 fish species and unidentified specimens of the sunfish family Centrarchidae and the herring family Clupeidae were collected. Three introduced species made up nearly 72% of the total number of fish collected: largemouth bass, bluegill, and threadfin shad (Table 3-13). Sacramento splittail (n=303), fall-run Chinook salmon (n=18), spring-run Chinook salmon (n=14), Central Valley steelhead (n=6), prickly sculpin (n=2), and delta smelt (n=1) were the only native species collected.

2004-2006 Ichthyoplankton Sampling

Ichthyoplankton sampling was conducted once a week at the Headworks site from March 31 through June 30, 2004; March 29 through June 27, 2005; and May 2 through June 2006.³ A 500-micron mesh net was used to collect larval and small juvenile fish. One 30-minute sample was taken during each sampling effort. The plankton sampling coincided with the sieve-net sampling. All larval fish were preserved and later identified at an off-site laboratory.

A total of 75 ichthyoplankton samples were collected at the Headworks in 2004, 2005, and 2006. Sixteen species and unidentified species of the sunfish family Centrarchidae and *Tridentiger* spp. gobies were collected. One taxon and three species made up 97.6% of the total number of fish collected: Centrarchidae and *Lepomis* spp., threadfin shad, prickly sculpin, and shimofuri goby. Prickly sculpin (n=460) and Sacramento splittail (n=7) were the only native species collected.

1995–2005 DFG 20 mm Surveys Near Rock Slough Intake

Data from the DFG 20-mm Delta Smelt Surveys shows that 2004–2005 densities in Rock Slough are relatively low compared to densities throughout the 1995–2005 period of the survey, with zero densities recorded at the Rock Slough sampling station for 2005 (Table 3-2). These surveys start in early spring, and sampling is conducted every other week, continuing through midsummer when catch efficiency decreases or delta smelt are not in danger of being entrained at the CVP and SWP pumps.

² Numbers of spring-run size Chinook salmon were not reported in Morinaka (2003), but were listed in a spreadsheet received from J. Morinaka (DFG) in 2005.

³ No sampling occurred during the April 2006 “no diversion period.”

Year	March	April	May	June	July	August
1995	ND	0	0	0	0	ND
1996	ND	8	4	0	0	ND
1997	0	13	8	0	0	ND
1998	ND	0	2	0	0	ND
1999	ND	2	87	20	0	ND
2000	0	7	3	3	0	ND
2001	0	14	15	0	0	ND
2002	0	14	14	4	0	ND
2003	3	0	4	1	0	ND
2004	0	2	3	0	0	ND
2005	0	0	0	0	0	ND
Mean	0	6	13	3	0	ND
No./af	0	1	2	0	0	ND
No./TAF	55	681	1,598	311	0	ND

Notes:
 No./TAF = number per 10,000 acre-feet.
 ND = no data.
 Data compiled by Tenera Environmental

Recreational Fisheries

The Contra Costa Canal is fenced, and fishing is not allowed. However, trespassers do sometimes fish from the berm for the nonnative warmwater fishes that are resident in the canal, such as white catfish and largemouth bass.

Summary

The 4-mile section of the canal from the Headworks to PP1 provides habitat primarily for introduced fish species. Introduced species represented approximately 87% of the 13,253 fish collected by sieve net during the PP1 monitoring from 1994 to 1996 and from 2004 to 2006 and Headworks monitoring from March 2004 to October 2006⁴ (Morinaka 2003; Tenera Environmental 2005a, 2005b and 2006). A total of only 344 native fish have been collected at the Headworks and PP1 from March 2004 through October 2006. DFG conducted intensive sampling at PP1 from January 1994 through August 1996. Approximately 10,150 fish were collected. Introduced species represented approximately 86% of the total number of fishes collected. Table 3-3 summarizes listed species sampled at the Rock Slough Headworks.

Protected anadromous species such as Chinook salmon and steelhead can be present at certain times of the year. For these anadromous species, the quality of habitat in the canal is low because of the dead-end configuration of the canal and high levels of predation

⁴ This period was chosen because data at the Headworks were collected with a more efficient larger net, which sampled a greater portion of the water flowing into the canal.

(Morinaka [2003] estimated salmonid mortality from predation as high as 84%) in the canal. The canal does not appear to be suitable delta smelt habitat, as evidenced by the low numbers (n=5) of delta smelt collected during 13 years of fish monitoring studies (n=1 at Headworks in 2005, n=2 at PP1 in 1994, and n=2 at PP1 in 1996). Generally speaking, following the implementation of the Los Vaqueros Reservoir Project in 1997, numbers of fish of sensitive species entrained in the Canal have declined.

Steelhead are very unlikely to spawn in Marsh Creek, due to the high summer temperatures (78°F; Jones & Stokes 2003), which are unsuitable for salmonids and therefore incompatible with the need for juveniles to overwinter in natal streams. The scientific literature does not confirm the occurrence of steelhead in Marsh Creek (Leidy et al. 2005; Gobalet 2004), and Leidy et al. (2005) suggests the species has never occurred there. However, it is possible that adults and juveniles may stray into the creek during times of the year when temperatures are lower.

**Table 3-3
Summary of Information Regarding Collection of Listed Fish Species at Rock Slough Headworks and PP1 from 1998 through October 2006**

Year	Months	Winter-Run Chinook Salmon			Spring-Run Chinook Salmon			Chinook Salmon (Run Unknown)			Central Valley Steelhead			Delta smelt		
		Month Collected	Total #	Fork Length (mm)	Month Collected	Total #	Fork Length (mm)	Month Collected	Total #	Fork Length (mm)	Month Collected	Total #	Fork Length (mm)	Month Collected	Total #	Fork Length (mm)
1998	Aug 21– Dec 10	Dec	1	Not recorded	–	0	–	–	0	–	–	0	–	–	0	–
1999	Mar 18– Dec 16	–	0	–	–	0	–	–	0	–	–	0	–	–	0	–
2000	Mar 30– Nov 21	–	0	–	–	0	–	May	3	88 ⁽¹⁾	–	0	–	–	0	–
2001	Jan–Aug	–	0	–	–	0	–	–	0	–	–	0	–	–	0	–
2002	Jan– Dec ⁽²⁾	–	0	–	–	0	–	–	0	–	–	0	–	–	0	–
2003	Jan– Dec ⁽³⁾	–	0	–	–	0	–	–	0	–	–	0	–	–	0	–
2004	Jan– Dec ⁽⁴⁾	–	0	–	Mar	1	86	–	0	–	–	0	–	–	0	–
					Apr	5	80, 80, 90, 93, 103									
2005	Jan– Dec ⁽⁵⁾	–	0	–	May	4	101, 93, 98, 107	–	0	–	Feb	1	207	Feb	1	66
					Mar	2	223, 216				Mar	2	223, 216			
					Apr	1	243				Apr	1	243			
2006	Jan–Oct ⁽⁶⁾	–	0	–	May	4	105, 106, 107, 110	–	0	–	Jan, Mar	2	230, 132	–	0	–
Total			1			14			3			6			1	

⁽¹⁾ Only the mean length was reported. Spring-run-size Chinook salmon during May range from 89 mm to 109 mm (Fisher 1992).

⁽²⁾ No surveys were conducted from February 21 through March 3 and from May 8 through May 22, 2002 because the intake was shut down for the protection of Delta fishes.

⁽³⁾ No surveys were conducted during February–March in 2003 (no reason was given).

⁽⁴⁾ No surveys were conducted from May 5 through 19, 2004, because the intake was shut down for the protection of Delta fishes. No surveys were conducted from October 1 through December 20, 2004, because the intake was shut down during a box culvert construction project.

⁽⁵⁾ No surveys were conducted from October 1 through November 30, 2005, because of reduced pumping during major canal maintenance and from March 2 through 15 and from April 18 through 24, 2005, because the intake was shut down for the protection of Delta fishes.

⁽⁶⁾ No surveys were conducted during April 2006 because the intake was shut down for the protection of Delta fishes.

Sources: Morinaka 2003; Tenera Environmental 2005a, 2005b, 2006

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Terrestrial and Semi-aquatic Species in Affected Environment

No critical habitat for any terrestrial or semi-aquatic species exists in the project area.

Plant Species

EDAW performed surveys in wetland areas for the wetland delineation (EDAW 2005) and Sycamore Associates performed a plant survey in upland and wetland habitats in October of 2006. Table 3-4 below summarizes the listing status and occurrence information for special-status plants that appear on the lists provided by DFG and USFWS.

Table 3-4. Special-status Plant Species on Lists Provided by DFG and USFWS					
Common Name	Scientific Name	Listing Status ¹			Documented in project area
		Federal	State	CNPS	
Antioch Dunes evening-primrose	<i>Oenothera deltoidea</i> var. <i>howellii</i>	FE	SE	List 1B	No
Delta button-celery (coyote-thistle)	<i>Eryngium racemosum</i>	--	SE	List 1B	No
Delta mudwort	<i>Limosella subulata</i>	--	--	List 2	No
Delta tule pea	<i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	--	--	List 1B	No
Diamond-petaled California poppy	<i>Eschscholzia rhombipetala</i>	--	--	List 1B	No
Mason's lilaepsis	<i>Lilaeopsis masonii</i>	--	SR	List 1B	No
Rose-mallow	<i>Hibiscus lasiocarpus</i>	--	--	List 2	No
Suisun Marsh aster	<i>Aster lentus</i>	--	--	List 1B	Yes

¹FE = Federally listed as endangered; SE = state listed as endangered; SR = state listed as rare; List 1B = rare threatened or endangered in California and elsewhere; List 2 = rare threatened or endangered in California but more common elsewhere.

The only true inland dune scrub habitat is not in the project area, but is only adjacent. Even this habitat does not appear to support the Antioch Dunes evening-primrose. The diamond-petaled California poppy historically occurred on heavy clay soils in Contra Costa County, but is believed to have been extirpated from the county and therefore is not expected to occur in the project area. The other plants on the list are generally wetland plants. Only the Suisun Marsh aster has been detected. Sycamore Associates found a small population near the Headworks in October, 2006. Other plants could possibly occur in the project area, but may have escaped detection.

Wildlife Species

The species listed below in table 3-5 are from the DFG and USFWS lists for this project (except the vernal pool fairy shrimp, which was added because of possible presence at Holland Tract).

Table 3-5 Federally Listed and State-Listed Terrestrial and Semiaquatic Animal Species Evaluated for the Action Area				
Common Name	Scientific Name	Listing Status ¹		Documented in project area
		Federal	State	
Valley elderberry longhorn beetle	<i>Desmocerus californicus dimorphus</i>	FT	--	No
Vernal pool fairy shrimp	<i>Branchinecta lynchi</i>	FT	--	No
California tiger salamander (central distinct population segment)	<i>Ambystoma californiense</i>	FT	CSC	No
California red- legged frog	<i>Rana aurora draytonii</i>	FT	CSC	No
Giant garter snake	<i>Thamnophis gigas</i>	FT	ST	No
Swainson's hawk	<i>Buteo swainsoni</i>	MBTA	ST	Yes
California black rail	<i>Laterallus jamaicensis coturniculus</i>	MBTA	ST, SFP	No*
San Joaquin kit fox	<i>Vulpes macrotis mutica</i>	FE	ST	No
Western pond turtle	<i>Clemmys marmorata</i>	--	SSC	Yes
Silvery legless lizard	<i>Anniella pulchra pulchra</i>	--	SSC	No
Western burrowing owl	<i>Athene cunicularia hypugaea</i>	MBTA	SSC	Yes
Tricolored blackbird	<i>Agelaius tricolor</i>	MBTA	SSC	No
White-tailed (=black shouldered) kite	<i>Elanus leucurus</i>	MBTA	SFP	Yes
¹ Listing status definitions: FE = Federally listed as endangered; FT = Federally listed as threatened; MBTA = Migratory Bird Treaty Act; SSC = California species of special concern; SFP = state fully protected species; ST = state listed as threatened. * Not documented in project area, but known from nearby. Source: Data compiled by Tenera Environmental (2005) and EDAW				

Plant surveys performed by Sycamore Associates (October 2006 along the Contra Costa Canal and staging areas; June 2006 for the Holland Tract mitigation site; November 2006 for the conveyor belt routes) have found no elderberry shrubs in the project area. Therefore, there is no suitable habitat for the valley elderberry longhorn beetle.

No vernal pools are present at the Contra Costa Canal Replacement site itself, according to the wetland delineation, although there are seasonal wetlands (EDAW 2005). However, potential vernal pool crustacean habitat is present on the Holland Tract mitigation site and conveyor belt route in the seasonal wetlands within irrigated pastures and ruderal grasslands. Potential habitat located on the Holland Tract mitigation site and conveyor belt route is considered to be of

marginal quality given the disturbed nature of the seasonal wetlands resulting from ongoing agricultural practices. Dry-season sampling for fairy shrimp cysts in wetland areas on the Holland Tract mitigation site was completed in late summer/early fall 2006. No evidence of Federally listed shrimp species was found; however, cysts of California linderiella fairy shrimp (*Linderiella occidentalis*), a species tracked by the CNDDDB, were detected in soil samples (Helm Biological Consulting 2006, pers. comm. to Sycamore Associates).

The project area is outside of the range of the California tiger salamander. The closest occurrences of the California red-legged frog, according to the CNDDDB (February 2007) are six miles to the west and eight miles to the southwest (in upper Marsh Creek). Surveys performed by Sycamore Associates and Karen Swaim for the nearby Cypress Grove Project found no evidence of the species' occurrence (Sycamore Associates 2005c; Swaim Biological Incorporated 2004). During a site visit by Reclamation, CCWD and the USFWS in May 2006, Marsh Creek was found to contain high numbers of bullfrog tadpoles. The California red-legged frog is not expected to occur in the project area.

No surveys have been conducted for silvery legless lizards in the project area; however, their potential for occurrence is very low. Inland dune scrub habitat occurs adjacent to the project area, as explained earlier under the habitat section. Surveys by Sycamore Associates in 2004 yielded several observations of adult silvery legless lizards in the interior dune habitat at the southeastern corner of the Cypress Grove project area, approximately 0.7 mile to the south (Sycamore Associates 2004). However, this habitat, which was characterized by coast live oak trees and silver bush lupine, was of higher quality than that present adjacent to and within the action area. Sandy soils in the canal study area lack suitable trees and shrubs to produce leaf litter, the preferred substrate for silvery legless lizard foraging. The sand mound habitat within the Canal Replacement Project mitigation area is characterized by ruderal vegetation and is highly disturbed. Trees and shrubs are absent; therefore, potential habitat is of very marginal quality, and the potential for occurrence of silvery legless lizard is considered to be very low.

The San Joaquin kit fox is not expected to occur on the project or mitigation site because of the low quality of habitat, lack of historical occurrence in the Oakley area, and lack of connectivity to recent observations or known populations of these species.

Four special-status wildlife species that appear on the lists provided by DFG and USFWS are known to occur in the action area: Swainson's hawk, western burrowing owl, white-tailed kite and western pond turtle. Three others, the giant garter snake, tricolored blackbird and California black rail, may occur in the project area, as they are known from nearby.

Swaim Biological Incorporated carried out aquatic trapping and visual surveys for giant garter snake in the portion of the canal between Marsh Creek and Sellers Avenue, the westernmost 5,000 feet of the unlined canal, during the appropriate period for detection in 2003 (Swaim Biological Incorporated 2004). No giant garter snakes were captured or observed, and the negative findings are supported by attributes of the canal that are not favorable for giant garter snake, despite the fact that the canal possesses some necessary habitat components, such as perennial water and emergent vegetation.

Based on data gathered as part of fish monitoring programs associated with canal operations discussed above, predatory fish species dominate the fish community composition of the canal (Morinaka 2003; Tenera Environmental 2005a, 2005b, 2006). Giant garter snakes tend to be absent from waters that support populations of predatory fish, which compete with them for prey and prey on juvenile giant garter snakes (Hansen 1988, Hansen and Brode 1980). Swaim's trapping study found a relatively diminished prey base (small fish and tadpoles) for giant garter snake in the canal. In addition, the canal lacks microhabitats, such as backwater pools, that would provide refuge for giant garter snakes from predatory fish and foraging opportunities as larvae and tadpoles tend to congregate in such areas.

Habitat evaluation and scoring forms indicate low habitat quality in the canal (Swaim Biological Incorporated 2004). Giant garter snake trapping was also completed in 2005 in potentially suitable habitats on the East Cypress Corridor Specific Plan project site and resulted in negative findings (Swaim Biological Incorporated 2005a, 2005b, 2005c, 2005d).

Riprap along the unlined canal might serve as suitable habitat for refuge and hibernation, along with any small mammal burrows in the action area. There are approximately 2,100 total feet of riprap along the unlined canal. There is potential for giant garter snakes to use the canal for dispersal to higher quality habitats in the region. Some of the wetlands in the action area, except those with excessive shading from riparian vegetation, may be more suitable for dispersing individuals if prey items are present and predators are absent. Overall, however, the canal project site is of low habitat value to giant garter snakes. Given the location of the project site on the western edge of giant garter snake range, the predominance of predatory species, low prey availability, and the supporting negative survey findings, it is believed that the project site does not support a breeding population of giant garter snake. However, potential for this species to occasionally use the project site for dispersal could not be entirely ruled out. The assessment is similar for the Holland Tract mitigation site, even more so because it currently has a lower availability of permanent water, which is needed to supply a food source for the snakes during their active period.

Western pond turtles have been documented in the unlined canal (Swaim Biological Incorporated 2004), and there is a September 2004 CNDDDB record for two nests in the ROW (both apparently destroyed by predators). Sycamore Associates observed a western pond turtle in the portion of the canal that lies between Emerson Slough and little Dutch Slough during the October 2006 field visit. The canal is open and unshaded with emergent vegetation along the banks, providing ample basking opportunities for western pond turtle. Nonnative annual grassland and ruderal habitat adjacent to the canal provides opportunities for nesting close to occupied aquatic habitat.

Rock and Sand Mound Sloughs adjacent to the Holland Tract mitigation site and conveyor belt route provide habitat for western pond turtle, although aquatic habitat in drainage ditches on the mitigation site is currently marginal because of regular fluctuations in water level associated with irrigation practices. Ruderal grassland vegetation provides potential nest sites.

The California black rail has not been documented in the action area, but the bird surveys that were conducted did not focus on the black rail. Its potential for occurrence is believed to be low because the small fragments of available marsh habitat are not large enough to provide much protection from predators such as egrets and herons (known to use the action area). However,

during a reconnaissance-level survey of a nearby project, Ibis Environmental heard a black rail a few hundred yards north of the action area; the bird was presumably in a cattail-dominated wetland near Marsh Creek (Orloff, pers. comm., 2006). There is some potential for black rail to inhabit freshwater marsh vegetation present in the drainage ditches on the Holland Tract mitigation site.

Swainson's hawks have not been documented in the project footprint itself or within the Contra Costa Canal Replacement Project mitigation area and conveyor belt route but have some potential to use the sites. However, nesting Swainson's hawks have been documented within 0.5 mile of the project footprint, which places them in the action area. White-tailed kites have been observed foraging, roosting, and nesting in the nearby Cypress Grove project area (Sycamore Associates 2003, cited in City of Oakley 2003) and were recently documented in the project area. White-tailed kites have also been observed foraging within irrigated pasturelands on the Holland Tract mitigation site. Scattered willows, walnut trees, and an individual cottonwood and oak tree are present in the project area and are suitable potential nest sites for raptors, and the project area provides foraging habitat for Swainson's hawk and white-tailed kite, as well as other raptor species that occur in the vicinity. Scattered trees and a small patch of riparian habitat offer nesting opportunities within the Contra Costa Canal Replacement Project mitigation area.

Although canal O&M tends to reduce the abundance of California ground squirrel burrows, the western burrowing owl occurs in portions of the action area. Nesting pairs were observed near the Headworks during the April 20, 2005, bird survey by Tenera Environmental. Two pairs were observed during a second survey by Tenera Environmental on April 28, 2006, and again during a site visit by USFWS, Reclamation, and CCWD personnel on May 11, 2006. On July 11, 2006, one of these pairs was observed with young owls (McDonald, pers. obs.). Both pairs were observed with owlets during Tenera Environmental's fish monitoring surveys in July 2006. These owls are using ground squirrel burrows in ruderal habitat in the ROW, which is adjacent to a cattle pasture. One burrowing owl was documented at PPI as an incidental observation by Tenera Environmental on March 23, 2004. Two burrowing owls were also seen in the ROW during Sycamore Associates' October 2006 site visit, near the intersection of East Cypress Road and the Cypress Grove project site.

A burrowing owl habitat assessment was completed on January 30 and February 2, 2007, for the Holland Tract mitigation site. Transects of the entire property were walked, and all ground squirrel burrow concentrations, burrows with burrowing owl sign, and burrowing owl sightings were mapped. Two burrowing owls and associated occupied burrows were observed during the assessment. Ground squirrel burrow concentrations are isolated in small patches; however, the upland and, in the dry season, wetland areas on-site provide ample foraging opportunities, as evidenced by the abundant vole activity noted during the assessment. One burrowing owl was observed occupying burrows on the central sand mound within the Canal Replacement Project mitigation area. This area represents the highest concentration of ground squirrel activity on the Holland Tract mitigation site.

There is also potential for burrowing owls to occur within the conveyor belt route; however, none were noted during the November 2006 site visit.

No tricolored blackbirds have been documented in the action area during bird surveys, but these surveys are a “snapshot” of bird use in the area, and the species is known to move around from year to year. The emergent freshwater marsh vegetation along the canal fringe provides potential nesting habitat. The wetlands and surrounding agricultural land provide potential foraging habitat. Sycamore Associates observed tricolored blackbirds approximately 1 mile east of the canal on the Biggs property in 2004. They have the potential to occur on the Holland Tract mitigation site as well.

Other Resident and Migratory Birds

This section provides a summary of information on other birds that may or do occur in the project area and that receive protection under the MBTA and California Fish and Game Code. These birds do not appear on the lists provided by DFG or USFWS. Many of them are not covered by the MSCS.

Several raptors have been observed in the project area, and many others have potential to forage in grassland and seasonal wetland habitats along the canal margins, including northern harrier (*Circus cyaneus*) and short-eared owl (*Asio flammeus*), both California species of special concern. Potential nest trees for species such as Cooper’s hawk (*Accipiter cooperii*), a California species of special concern, and red-shouldered hawk (*Buteo lineatus*), among others, are located immediately adjacent to the canal action area, and scattered willows, walnut trees, and an individual cottonwood and oak tree are present in isolated patches along the unlined canal. Other California species of concern with potential to forage on-site during winter include the ferruginous hawk (*Buteo regalis*) and merlin (*Falco columbarius*).

Small patches of riparian habitat on-site provide potential nest sites for California yellow warbler (*Dendroica petechia brewsteri*), a California species of concern. However, trees are absent from much of the canal ROW.

Wading birds such as the great blue heron (*Ardea herodias*) and great egret (*Ardea alba*) forage in the canal, and some waterfowl have been observed, although migratory waterfowl observations are sparse (Tenera Environmental 2005a). The emergent vegetation along the canal fringe provides potential nesting habitat for passerines such as the red-winged black bird (*Agelaius phoeniceus*) and salt marsh common yellowthroat (*Geothlypis trichas sinuosa*), a California species of special concern. Both of these species are known to occur in the region.

Special-status passerines found in open habitats in the region, such as the California horned lark (*Eremophila alpestris actia*) and loggerhead shrike (*Lanius ludovicianus*), both California species of special concern, also have potential to nest in grassland habitats present on-site. Reclamation and Sycamore Associates biologists observed long-billed curlew flocks foraging on irrigated pastures south of Cypress Road, just east of the canal, during winter 2004. During the course of biological surveys completed between 2001 and 2006 for lands adjacent to the Contra Costa Canal Replacement Project footprint, including the Cypress Grove, Dutch Slough, and East Cypress Corridor projects, Sycamore Associates has observed several of the above-mentioned species, including northern harrier, salt marsh common yellow throat, loggerhead shrike, ferruginous hawk, and merlin.

Irrigated pasturelands within the Holland Tract mitigation site and conveyor belt route provide foraging habitat for several bird species, including those with special status. During biological surveys completed between 2006 and 2007, Sycamore Associates observed the northern harrier, ferruginous hawk, and white-tailed kite, among other common raptor, passerine, and nonpasserine landbird species, foraging on the mitigation site. On January 30, 2007, flocks of greater sandhill crane (*Grus canadensis tabida*), state listed as threatened, were observed flying overhead and foraging in adjacent wetland areas. Scattered trees, small stands of riparian habitat, and dense blackberry bushes provide potential nest sites for raptors and other birds, including California yellow warbler and loggerhead shrike. A few trees and shrubs are present in the western portion of the conveyor belt route, which is contiguous with a dense riparian stand that lies immediately north of the western reach just before the route crosses the land bridge. Ground-nesting raptors and other birds such as California horned lark have potential to nest in ruderal grassland vegetation on the mitigation site and conveyor belt route.

Cliff swallows are known to nest at the Headworks. A nesting colony was observed by Reclamation, CCWD and USFWS personnel in May, 2006.

Cultural Resources

Historic sites, archeological sites, and traditional cultural properties constitute the suite of cultural resources that Federal agencies consider in evaluating the effect of specific projects. The Contra Costa Canal is considered eligible for inclusion in the National Register of Historic Places (National Register) because it is an integral component of the Central Valley Project. The study area, the first four miles of the Contra Costa Canal, passes through an area identified as the 1850 high tide line and other soil types that contain high archeological sensitivity (Waechter 2006a). No traditional cultural properties were identified in the study area.

Two areas are being considered in the cultural resource section of this EA. First, the Contra Costa Water District (CCWD) proposed to encase the first four miles of the Contra Costa Canal. This undertaking triggered Reclamation's compliance with Section 106 of the National Historic Preservation Act and this effort culminated in a memorandum of agreement (MOA) to resolve the adverse effects from the encasement project. The MOA is a two-party agreement signed by Reclamation and by the State Historic Preservation Officer (SHPO) and offers mitigation measures for the replacement project.

The cultural resources study of the Contra Costa Canal involved historical and archeological evaluations (JRP 2006; Waechter 2006a). The historical study recorded the entire Contra Costa Canal, provided a historic context and significance summary of the Contra Costa Canal, and reviewed previous studies that were performed along the canal (JRP 2006). Mitigation photographic documentation has been completed and the mitigation report is in preparation.

The archeological report summarizes previous work in the region, outlines Delta prehistory and describes subsurface testing at some archeologically sensitive areas where the 1850 high tide line coincides with the Contra Costa Canal (Waechter 2006b). This testing, conducted at a few locations on the canal's berm, failed to identify any archeological resources, and additional areas remain to be tested. The MOA stipulates that additional testing will take place prior to construction.

A portion of the Holland Tract, known as the Holland Tract Offsite Mitigation Area (Holland Area), is the second location. Habitat development is proposed at the Holland Area, in part, as CCWD mitigation for the loss of habitat from the Contra Costa Canal encasement. Other nearby projects are developing the remainder of Holland Area for habitat mitigation. The United States Army Corps of Engineers (Corps), as the permitting agency for this effort, is the lead Federal agency for purposes of complying with Section 106 of the National Historic Preservation Act.

The Holland Tract, and the smaller Holland Area, have been subject to several cultural resources studies. Researchers from the University of California conducted the first archeological investigations at the Holland Tract and the larger Delta area (e.g. Cook and Elsasser 1956; Phillips 1943). More recently, portions of the Holland Tract and the Holland Area were surveyed by Hampson (1985) and Maniery and Syda (1988). The rather complex history of archeological study at the Holland Tract is clearly described in Clark (2007). A National Register evaluation of several archeological sites found within the Holland Tract was conducted by BioSystems in 1993 (Holston et.al). This work resulted in two archeological sites, located within the Holland Area, being determined eligible for inclusion in the National Register, CA-CCO-147 and CA-CCO-678. Both sites represent habitation locations that also contain human remains.

Additional archeological investigations were conducted within the Holland Area to better define the boundaries of the previously identified historic properties (CA-CCO-147 and CA-CCO-678) to identify possible buried archeological resources (Clark 2007) that might be affected by habitat improvement projects. This work involved the excavation of 49 backhoe trenches; no additional subsurface archeological deposits were encountered. The report concluded that the two historic properties would experience no adverse effect from the habitat improvement project proposed for the Holland Area. The Corps has not forwarded this determination to the State Historic Preservation Officer in compliance with 36 CFR Part 800.5, and the Corps will soon be submitting this documentation.

Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority and Low-Income Populations," established the priority of analyzing environmental justice for any action that could cause disproportionately high and adverse human health or environmental effects to a minority and/or disadvantaged populations.

No residences are located in the ROW or in the area immediately adjacent to the ROW where the pipeline could be placed; therefore, no population is currently present on the project site. Although the site has no residences, construction of residential development has begun adjacent to the ROW, and the City of Oakley ultimately anticipates development of approximately 8,000 residences along most of the project site.

Data from the 2000 U.S. Bureau of the Census tract level data for ethnicity and income was used to determine the potential for disproportionate impacts to low income and/or minority populations within the project area. Ethnicity and race were examined for the census tracts in the proposed project construction area vicinity (Census tracts, 3010, 3020.02, and 3040). For

ethnicity, the total population of the area inhabitants is approximately 72% white only with approximately 19% of the population identified as Hispanic or Latino. African American, Asian, Native American, and Pacific Islanders make up less than 6% of the population and approximately 13% are identified as other or mixed race. In terms of income, about 7 percent of the individuals are considered to be in poverty status (U.S. Census Bureau 2000). From an economic and ethnic standpoint, the population in the project area is not considered to be predominately low income or minority.

Geology and Soils

The project site is located in the southern portion of the Delta, just south of Bethel Island and Big Break. Sediment deposition in the Delta began approximately 75 million years ago, during the Mesozoic era, and continues through the present day. The depositional history of the Delta during the late Quaternary period (the last 1 million years) was controlled by several cycles related to changes in regional and global climate. Each cycle consisted of a period of deposition followed by a period of erosion. Thus, the Delta region during the late Quaternary period had stages of wetlands and floodplain creation as tidewaters rose in the valley from the west, areas of erosion when tidewaters receded, deposition of alluvial fans that were reworked by wind to create extensive sand dunes, and alluvial fan deposition from streams flowing into the Delta from the adjacent mountain ranges.

The project site is located in Holocene-age (10,000 years B.P. to present day) alluvial fan deposits and dune sands. These deposits extend between 8 and 15 feet below the ground surface, where they are underlain by older, late-Pleistocene (10,000 to 70,000 years B.P.) alluvial fan deposits and stream terrace deposits (Helley et al. 1979, Wagner et al. 1991). Soil types at the project site consist of the Sycamore silty clay loam, Delhi Sand, Piper loamy sand, Piper fine sandy loam, Marcuse clay, and Sacramento clay (U.S. Soil Conservation Service 1977).

The active seismic source closest to the project site is the Greenville fault, located approximately 9 miles to the southwest. Other active faults in the region include the Concord-Greenville, Calaveras, Hayward, Rodgers Creek, and San Andreas faults (Jennings 1994).

The project site is located east of a seismically active area. There is a 3% probability that one or more earthquakes with a magnitude greater than 6.7 will occur along the Greenville fault within the next 28 years (Working Group on California Earthquake Probabilities 2003). Thus, the canal facilities would be subject to seismic ground shaking associated with a Modified Mercalli Intensity level VII (defined as Very Strong).

Hydrology and Water Quality

Surface Water

The surface water resources located in the project area consist of Rock Slough, Little Dutch Slough, Emerson Slough, and Marsh Creek. Rock Slough is located in the western Delta, west of Old River and north of the Old River intake. The 3.97-mile earthen canal conveys water from the west end of Rock Slough to PP1, where the water is lifted to the concrete-lined portion of the canal and subsequently distributed throughout CCWD's service area. The water resources in the project area are tidally influenced channels in the Delta.

Tidal effects and PP1 pumping are the two dominant processes that govern the flow in Rock Slough and the canal. The water level in Rock Slough and the canal is subject to tidal variations, typically with a daily range of approximately +/- 3 feet. Tidal effects induce an oscillatory flow, which transports water back and forth in the canal and Rock Slough (Carollo Engineers 2003).

Effluent from the City of Brentwood's wastewater treatment plant is discharged into Marsh Creek upstream of the canal. At certain times of the year, Marsh Creek is considered an effluent-dominated water body. The salinity of Marsh Creek is high, with typical electrical conductivity (EC) values on the order of 1,000–2,000 microsiemens per centimeter.

The soils of the berms along the sides of the canal were not engineered for flood protection. The existing canal berms are not certified to flood control standards established by the Federal Emergency Management Agency (FEMA). A recent engineering and geotechnical study confirmed the vulnerability of the berms to a significant seismic event (GeoSyntec Consultants 2000). Several new subdivisions slated for development are constructing new levees adjacent to the canal that will protect the residences in these subdivisions from the 100-year flood event. However, flood protection from these new levees is limited because of their limited elevation, and thousands of planned new homes would be situated adjacent to the canal. Furthermore, other development in select locations along the canal, including new major roads, would be vulnerable without sufficient flood protection in the event of elevated water stages in the Delta.

In general, water quality in the Delta is adequate to comply with the beneficial uses identified by the Central Valley Regional Water Quality Control Board (Central Valley Regional Water Board) in its Basin Plan. Designated beneficial uses include municipal supply, agricultural supply, industrial supply, contact and noncontact recreation, warm-water fish spawning habitat, warm- and cold-water fish migration, wildlife habitat, and navigation. However, water quality improvements will be needed for urban water agencies that rely on Delta water to meet future demands for municipal water supplies and future regulations to protect human health and safety. All waterways of the western Delta are listed as impaired by several pesticides, mercury, electrical conductivity, and unknown toxicity on the Clean Water Act Section 303(d) list of water quality limited segments that is prepared by the regional water board and EPA.

Problems associated with Rock Slough water quality are well known. Studies have shown that water quality degradation occurs between PP1 and Old River in both Rock Slough and the unlined canal.

Hydrologic conditions in the southern Delta channels are influenced by tidal action, Delta inflows, municipal and agricultural water diversions, agricultural and stormwater discharges, and channel capacity. Water quality in the project area is variable, depending on the type of water year; flow conditions; and the salt load that enters the Delta, particularly via the San Joaquin River and Suisun Bay. Salinity is typically highest in October and November, regardless of the type of water year. However, salinity may increase dramatically as early as June. Constituents of concern for municipal water supplies include salinity and dissolved organic carbon and bromide, which are potentially responsible for trihalomethane and bromate formation during the disinfection process. Agricultural drainage in the Delta contains high levels of nutrients; suspended solids; organic carbon; minerals (salinity); and trace chemicals, such as the organophosphate, carbamate, and organochlorine pesticides. Synthetic organic chemicals,

particularly the chlorinated pesticides, and heavy metals (e.g., mercury) accumulate in Delta fish in quantities that occasionally exceed acceptable standards for human consumption.

CCWD has water quality objectives to ensure that its customers receive the best possible drinking water. Of particular concern is the amount of salt in CCWD's source water. CCWD uses the Los Vaqueros Reservoir as a water quality reservoir to manage the level of salts in its source water before treatment. Typically, in the late winter and spring months, the salinity levels of the water in the Delta is lower because fresh water from the melting Sierra Nevada snowpack dilutes the amount of salt in the water. During this time, CCWD pumps lower salinity water to the Los Vaqueros Reservoir. In the late summer and early fall, when the inflow of fresh water into the Delta is reduced, salinity levels in the Delta are higher. To maintain the high quality of its water supply at its Old River and Rock Slough intakes, during the late summer and early fall, CCWD blends the lower salinity water from the Los Vaqueros Reservoir with the more saline Delta water.

Groundwater

Groundwater levels are typically one to 4.5 feet above mean sea level around the canal. Results from canal and groundwater monitoring wells in the project area indicate that local groundwater is high in salinity and interacts with water in the unlined canal, increasing the salinity by as much as 200 milligrams per liter (mg/L) of total dissolved solids. This infiltration is known to degrade water quality in the canal. Irrigation water is applied on land adjacent to the canal and is supplied from Ironhouse Sanitary District after secondary treatment of wastewater and surface water (not groundwater) via siphons that draw water from the adjacent Delta channels into the system of water supply ditches. The shallow groundwater table in the project vicinity is generally less than five feet below the ground surface and can be as little as one foot, in some areas, during the winter rainfall season. The shallow groundwater is not used as a source of potable water or irrigation water.

The primary purpose of the proposed project is to improve water quality in the canal. Studies of the canal and groundwater monitoring wells in the project area indicate that local groundwater is high in salinity and interacts with water in the canal, increasing the salinity by as much as 200 mg/L of total dissolved solids. This infiltration is known to degrade water quality in the canal. Elevated levels of salinity, total organic carbon, and bromide in Delta source water contribute to the formation of regulated disinfection byproducts in treated drinking water systems. Protecting the water quality by eliminating groundwater seepage into the canal would improve treated drinking water quality by lowering the formation potential of these regulated byproducts. Lowering salinity in source water is a major policy objective of CCWD. The proposed project also would help to meet CALFED objectives. One strategy of CALFED's Drinking Water Program is to "separate drinking water intakes from irremediable sources of pollutants" (CALFED 2000). The proposed project would hydraulically isolate the Contra Costa Canal from the influences of the local groundwater table. Therefore, the long-term operation-related water quality effects of the proposed project are considered beneficial.

Indian Trust Assets

Indian trust assets (ITAs) are legal interests in assets that are held in trust by the U.S. Government for Federally recognized Indian tribes or individuals. The trust relationship usually

stems from a treaty, executive order, or act of Congress. The Secretary of the Interior is the trustee for the United States on behalf of Federally recognized Indian tribes. "Assets" are anything owned that holds monetary value. "Legal interests" means there is a property interest for which there is a legal remedy, such a compensation or injunction, if there is improper interference. Assets can be real property, physical assets, or intangible property rights, such as a lease, or right to use something. Indian trust assets can not be sold, leased or otherwise alienated without United States' approval. Trust assets may include lands, minerals, and natural resources, as well as hunting, fishing, and water rights. Indian reservations, rancherias, and public domain allotments are examples of lands that are often considered trust assets. In some cases, Indian trust assets may be located off trust land.

Reclamation shares the Indian trust responsibility with all other agencies of the Executive Branch to protect and maintain Indian Trust assets reserved by Indian tribes, or individual Indians by treaty, statute, or Executive Order.

Land Use

The unlined canal located between PP1 and the Rock Slough Trash Rack is within the City of Oakley. The Holland Tract mitigation site is located in unincorporated Contra Costa County. The City of Oakley designates the portion of the project site in the city as waterway; the site is not part of a city zoning district. The portion of the site in unincorporated Contra Costa County is designated as Delta Recreational. The project site has functioned as a waterway since the Contra Costa Canal entered service in 1940. For most of its length, the site is bordered by open space and farmland. Most of this adjacent property is planned for conversion to other uses, and construction of residential development near the canal has begun. The city envisions residential development within 1 mile of the canal that would accommodate approximately 15,000 people. The encasement of the canal was proposed to address the public safety, system security, and water quality issues associated with this increase in population so close to an open, earth-lined canal.

The area north and south of the western end of the project site, near PP1, is owned by the Ironhouse Sanitary District, which provides wastewater treatment services for nearly 30,000 customers in the Oakley and Bethel Island area. The CALFED Dutch Slough tidal marsh restoration project and East Cypress Corridor Specific Plan project are proposed for the remaining area immediately north of the project site. The tidal marsh restoration project area is designated primarily Delta Recreation, with a portion adjacent to the canal designated Parks and Recreation. Up until several years ago, the restoration project area has been used for cattle grazing and other uses supporting dairy operations. In fall 2003, DWR finished purchasing the site. The goal of DWR, the California Bay-Delta Authority, the California State Coastal Conservancy, and the City of Oakley is to restore nearly 1,200 acres of rangeland and a dairy to tidal wetlands and create a 55-acre park with trails and access to the Delta. The portion of the East Cypress Corridor Specific Plan area adjacent to the project site is primarily agricultural land planned for development. Approximately 500 homes already exist in the plan area, and construction of the Summer Lake subdivision, an approved project occupying approximately 670 acres in the specific plan area, began in 2004. Most of the land in the specific plan area adjacent to the project site is Prime Farmland or Farmland of Statewide Importance that has been designated as Single Family Low or Very Low by the city in anticipation of the residential

development envisioned for the area. Buildout of the 2,500-acre specific plan area is anticipated for 2018.

Urban development is also planned for most of the agricultural land immediately south of the project site. Along the southern boundary of the canal ROW, the area between Marsh Creek and Jersey Island Road is primarily vacant, fallow farmland, and all of the area adjacent to the canal is designated for residential development. Construction of the Cypress Grove project, a high-density single-family residential development located on approximately 150 acres near the western end of the project site, began in 2004 and is expected to be completed in 2007. Construction of the Dutch Slough Properties project, proposed for the area immediately east of the Cypress Grove development, is expected to begin in 2010, with buildout anticipated in 2015. Single-family residential development is proposed for the property adjacent to the ROW, with multifamily residential and commercial uses proposed along the southern edge of the Dutch Slough Properties project site. The remainder of the property along the southern boundary of the proposed project site is agricultural land located in unincorporated Contra Costa County. It is designated Agricultural Limited, which allows for vineyards, orchards, and row crops; animal husbandry; and very low-density residential uses.

Noise

The proposed project site spans portions of the city of Oakley and unincorporated areas of Contra Costa County, California. Existing noise-sensitive land uses⁵ in the vicinity include single-family residences off Cypress Road east of Jersey Island Road, the closest of which is within 50 feet of Reclamation's ROW. Other noise-sensitive receptors near the canal include residences west of Jersey Island Road and Sellers Avenue. In addition, Cypress Grove, a residential development, is under construction between Cypress Road and the south side of the canal. The property line of the nearest residence will be as close as 75 feet from the berm that runs along the southern side of the canal.

The existing noise environment in the project area is influenced primarily by surface-transportation noise emanating from traffic on nearby roadways (e.g., SR 4, Cypress Road, and Sellers Avenue) and from the Burlington Northern Santa Fe Railroad track, agricultural activities (e.g., use of heavy-duty equipment), and construction activities associated with nearby development. Intermittent noise from outdoor activities at the surrounding residences (e.g., people talking, operation of landscaping equipment, car doors slamming, and dogs barking), although minor, also influences the existing noise environment.

As stated above, one of the dominant existing noise sources in the vicinity of the project site is vehicular traffic on nearby roadways. The primary source of traffic noise levels in the project area is traffic on SR 4 and Cypress Road. Existing roadway traffic noise levels were modeled for these roadways using the Federal Highway Administration (FHWA) Traffic Noise Prediction

⁵ Noise-sensitive land uses generally include those uses where exposure would result in adverse effects (e.g., sleep disturbance, annoyance), as well as uses where quiet is an essential element of their intended purpose. Residences are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Other sensitive land uses include hospitals, convalescent facilities, parks, hotels, churches, libraries, and other uses where low interior noise levels are essential.

Model (FHWA 1988) and traffic data from the California Department of Transportation (Caltrans) and the City of Oakley Long Range Circulation Plan (City of Oakley 2002).

Table 3-6 presents the modeled community noise equivalent and day-night noise levels (CNEL/L_{dn}) at 100 feet from the centerline of the near travel lane and the distance from the roadway centerline to the 60-, 65-, and 70-dBA CNEL/L_{dn} contours.

Table 3-6 Modeled Existing Vehicular Traffic-Noise Levels				
Roadway Segment	Distance (ft) from Roadway Centerline to CNEL/L _{dn} (dBA)			CNEL/L _{dn} (dBA) 100 Feet from Centerline of Near Travel Lane
	70 CNEL	65 CNEL	60 CNEL	
SR 4 (south of Cypress Road)	18	40	85	59.0
Cypress Road (east of Main Street)	44	95	205	64.7

Note: Modeled noise levels do not consider any shielding or reflection of noise by existing structures or terrain features or noise contribution from other sources and where:
A-weighted decibel (dBA) is a measure on a logarithmic scale that indicates the squared ratio of sound pressure to a reference sound pressure. A-weighted (A) refers to the specific frequency-dependent rating scale that is used to approximate human response.
Community noise equivalent level (CNEL) is the energy-average of the A-weighted noise levels during a 24-hour period with 5 dBA added to the evening (7 p.m. to 10 p.m.) hours and 10 dBA to the night (10 p.m. to 7 a.m.) hours.
Day-night level (L_{dn}) is the energy-average of the A-weighted noise levels during a 24-hour period with 10 dBA added to the night (10 p.m. to 7 a.m.) hours.
Source: City of Oakley 2002

Recreation

The project site is located in the East Bay Regional Park District, which encompasses all of Contra Costa County and most of Alameda County. The Marsh Creek Regional Trail, administered by the East Bay Regional Park District, crosses the unlined canal at Marsh Creek. The paved, multiuse trail currently provides recreational opportunities for pedestrians, bicyclists, and equestrians for approximately 6.5 miles along Marsh Creek, from Creekside Park in Brentwood to the shores of Big Break. A plan exists to extend the trail southward for an additional 7.5 miles. At its northern end, approximately 2,000 feet north of where the trail crosses the project site, the trail connects to the Big Break Regional Trail, which parallels the Big Break shoreline westward for approximately 1.6 miles. The Marsh Creek Trail also provides connectivity with the Delta de Anza Regional Trail, which extends approximately 15 miles to the west. The city of Oakley parks closest to the project site are O'Hara and Laurel Fields Parks. O'Hara city park, associated with the O'Hara Park Middle School, is located approximately 0.5 mile southwest of PP1. The Laurel Fields city park is located just south of O'Hara Park, approximately 0.75 mile southwest of PP1.

The closest state recreational facility is the Franks Tract State Recreation Area (FTSRA), accessible only by water, which is located southeast of Brannan Island, between False River and Bethel Island. FTSRA is located approximately 5 miles northeast of the project site and provides opportunities for fishing and waterfowl hunting.

Wetlands

Section 404 of the Clean Water Act establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in waters of the United States regulated under this program include fill for development, water resource projects, infrastructure development and mining projects. Section 404 requires a permit from USACE before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation. Section 10 of the Rivers and Harbors Act requires a permit from USACE for any construction, excavation, or deposition of materials in, over, or under navigable waters of the United States, or any work which would affect the course, location, condition, or capacity of those waters.

A preliminary delineation of the project site was conducted in February and April 2005 which was updated in May of 2006 for USACE verification and permitting purposes. In June 2006, the USACE verified the delineation report. Table 3-7 provides the acreage of potentially jurisdictional waters of the United States. The area of potential effect that was reviewed for wetlands and navigable waters of the U.S. covered the Contra Costa Canal, the Reclamation ROW, and associated staging and laydown areas which total approximately 189 acres. The wetlands identified in Table 3-7 overlap with the habitat types described in the Biological Resources section above.

Table 3-7					
Acreages of Potentially Jurisdictional Waters of the United States					
Habitat	Wetlands	Hydrological Connectivity¹	Adjacency¹	Acreage	Total
Contra Costa Canal (PI)					
	Canal	Rock Slough	CV	42.920	
	Canal Total				42.920
In-channel Freshwater Marsh (FM) (PI)					
	In-channel FM	Contra Costa Canal	C	3.844	
	FM Total				3.844
Perennial Drainage (PD) (TI)					
	Marsh Creek	Big Break	C	0.210	
	Emerson Slough	Dutch Slough	C	0.260	
	Dutch Slough	San Joaquin River	C	0.777	
	PD6	Dutch Slough	C	0.439	
	PD Total				1.686
Seasonal Wetland (SW) (TI)					
	SW2	Isolated		0.210	
	SW3	PD6	CV	0.027	
	SW5	D9	F	0.038	
	SW6	D11	F	0.045	
	SW7	D11	F	0.025	
	SW8	D11	F	0.016	

Table 3-7 Acreages of Potentially Jurisdictional Waters of the United States					
Habitat	Wetlands	Hydrological Connectivity ¹	Adjacency ¹	Acreage	Total
	SW9	Isolated		0.174	
	SW Total				0.349
Irrigation/Drainage Ditches (D) (TI)					
	D1	Isolated		0.024	
	D2	PD6	CV	0.124	
	D3	D4 and D5	CV	0.214	
	D4	D3 and D2	CV	0.057	
	D5	Not evident		0.033	
	D7	Not evident		1.098	
	D8	D7	CV	0.002	
	D9	Isolated		0.201	
	D11	PD6	CV	0.327	
	D12	Not evident		0.690	
	D Total				2.782
Out-of-Channel Freshwater Marsh (FM) (TI)					
	FM1	Isolated		0.078	
	FM2	Isolated		0.436	
	FM Total				0.514
Seasonally Wet Meadow (WM) (TI)					
	WM	Not evident		1.308	
	WM Total				1.308
Notes:					
PI = permanent impact.					
TI = temporary impact (either no impact or estimated disturbance time of approximately 3 months).					
In-Channel Freshwater Marsh					
In-channel freshwater marsh, totaling 3.844 acres, is present on the project site along a small bench between the mean watermark (MWM) and ordinary high-water mark (OHWM) in the Contra Costa Canal. A conservative average width of 6 feet of hydrophytic vegetation along all banks of the canal that did not contain riprap was used to calculate the total acreage of this wetland feature on the project site. The hydrophytic vegetation along the canal is strongly associated with the small bench of substrate located between the MWM and OHWM. Dominant hydrophytic vegetation in the in-channel freshwater marsh includes common rush (<i>Juncus effuses</i> , OBL), yellow flag (<i>Iris psuedocoras</i> , OBL), curly dock (<i>Rumex crispus</i> , FACW), dallis grass (<i>Paspalum dilatatum</i> , FAC), bulrush (<i>Scirpus acutus</i> , OBL), and common cattail (<i>Typha latifolia</i> , OBL).					
Seasonally Wet Meadow					
Seasonally wet meadow, totaling 1.308 acres, was delineated based on evidence of wetland hydrology and hydrophytic vegetation. Soils were not investigated because the area was not accessible. Indicators of wetland hydrology included inundation, sediment deposits, and drainage patterns in wetlands. Dominant vegetation in the seasonally wet meadow included common rush (<i>Juncus effuses</i> , OBL), Baltic rush (<i>Juncus balticus</i> , OBL), Italian ryegrass (<i>Lolium multiflorum</i> , FAC), and Mediterranean barley (<i>Hordeum marinun gussoneanum</i> , FAC).					
¹ Adjacency / Hydrological Connection to USACE Jurisdictional Waters of the United States					

Table 3-7 Acreages of Potentially Jurisdictional Waters of the United States					
Habitat	Wetlands	Hydrological Connectivity ¹	Adjacency ¹	Acreage	Total
F	=	Connects by surface flow during flood events.			
C	=	Contiguous with, or located within, the listed feature.			
D	=	Connected by ditch or other drainage feature.			
CV	=	Connected, directly or indirectly, by culvert or storm drain.			

Additionally, wetland areas are present on the Holland Tract site which includes seasonal wetlands scattered throughout the irrigated pastures represent this habitat type and total 11.55 acres within the Canal Replacement Project mitigation area and 1.15 acres within the conveyer belt route. Managed seasonal wetland habitat totals approximately 13.28 acres within the Holland Tract mitigation site and 1.17 acres within the conveyer belt route.

Section 4 Environmental Consequences

Since no construction will occur in the Los Vaqueros area, the area is only described under individual resource categories where minor changes in usage related to Los Vaqueros may result in impacts during the project.

Aesthetics

Proposed Action Alternative

The *City of Oakley General Plan* identifies Sacramento-San Joaquin River Delta (Delta) waterways, Marsh Creek, and views of Mt. Diablo as scenic resources in the city that should be preserved. The discussion of scenic resources in the *Contra Costa County General Plan* focuses primarily on protecting scenic ridges, hillsides, and rock outcroppings and the San Francisco Bay/Delta estuary system. The proposed project involves replacing an earth-lined canal with an underground pipeline in the existing ROW or adjacent to it. The canal ROW does not include Delta waterways, and implementation of the project would not affect views of Mt. Diablo. Construction of the proposed project would involve the temporary disturbance of the portion of Marsh Creek in the canal ROW or adjacent to it, under which an existing siphon would be removed and the pipeline would be installed; following pipeline installation, the channel would be restored to its preinstallation grade and bed conditions, and the beds and banks would be restored in a manner that allows the reestablishment of vegetation. Most importantly, Marsh Creek within the canal ROW is not considered to be a scenic vista. For these reasons, no scenic vistas would be adversely affected with implementation of the proposed project. No impact on scenic vistas would occur.

The portion of State Route 4 (SR 4) in the vicinity of the proposed project is designated as a state scenic highway. SR 4 crosses the cement-lined portion of the Contra Costa Canal outside of the project site, approximately 1,500 feet southwest of PP1, the western end of the project site. Where SR 4 turns north, the roadway comes within approximately 1,000 feet of PP1. The proposed project involves replacing the unlined earthen canal with an underground pipe in or adjacent to the existing canal ROW, so it would not affect any trees, rock outcroppings, or historic buildings. In addition, it is not located closer than approximately 1,000 feet from a scenic highway. No scenic resources would be damaged.

The canal is an artificial waterway with a linear, unnatural appearance that is further degraded by the presence of the fencing and power lines and poles that run alongside it. In addition, the canal is not widely seen. Most of the property adjacent to the canal is open space or agricultural land, so the canal is viewed by a limited population, and views of the canal in general are greatly limited by the berms that are elevated above the flat surrounding lands. Following implementation of the proposed project, the project site would be more visually consistent with the areas adjacent to the canal, which are primarily open space.

There will be no noticeable change due to the replacement of Western's Tracy-Contra Costa 69-kV T-line located within the ROW since it is proposed to be at a slightly lower grade.

Minor changes in the amount and duration of water level fluctuation in Los Vaqueros Reservoir could occur. CCWD estimates up to 7,000 acre-feet of additional draw down of the reservoir

during each construction phase. This could cause an increase to the width of the exposed shoreline below the reservoir high water mark.

The project would not contribute to cumulative impacts on any visual resources.

No Action Alternative

Under the no action alternative Reclamation would not permit CCWD to modify the unlined portion of the Contra Costa Canal. CCWD would continue to operate and maintain the canal as they currently do. Housing development near the Contra Costa Canal would continue. Safety and security problems associated with the unlined Canal would increase over time as more homes are occupied in this area. Water quality degradation could increase from urban development adjacent to the unlined Canal. The configuration of the Holland Tract mitigation site could change and its development could be temporarily or permanently postponed. Western would continue to operate and maintain its Tracy-Contra Costa 69-kV T-line as they currently do and no Utility Relocation Agreements would be granted to CCWD.

Air Quality

Proposed Action Alternative

The project is consistent with the EPA's General Conformity Rule under the Clean Air Act. A preliminary analysis of air contaminant emissions for the project was done to determine if the construction of the proposed plan would generate nitrogen oxide (NO_x) and volatile organic compound (VOC) emissions (ozone precursors) above de minimus levels specified in the General Conformity rules, as established by the Clean Air Act. Therefore, de minimus level used are 100 tons per year each for NO_x and VOC.

Analyses completed by CCWD (CCWD 2006a) and Sierra Research Inc. (Sierra Research 2007) evaluated the air quality impacts from the construction of phase 1 of the pipeline construction and construction of the Holland Tract wetlands were as a preliminary conformity determination for the project. The results showed that the project would be expected to generate 5.02 tons of NO_x and 0.61 tons of VOC during 2008. The construction modeled for 2008 would be the highest level of construction expected to occur during any phase of construction therefore the highest potential air quality impacts. The results show the project will be well below the de minimus thresholds for NO_x and VOC emissions and is therefore in compliance with Clean Air Act requirements. These minor increases during construction periods are not expected to result in additional degradation of the air quality in the region. Once construction is complete only minor, intermittent vehicle emissions would occur during monitoring and maintenance activities.

No Action Alternative

Under the no action alternative Reclamation would not permit CCWD to modify the unlined portion of the Contra Costa Canal. Construction activities and their associated emissions related to the Contra Costa Canal replacement project would not occur. The configuration of the Holland Tract mitigation site could change and its development could be temporarily or permanently postponed. This would delay or eliminate any emission impacts from construction of the Holland Tract mitigation site.

Biological Resources including Threatened and Endangered Species

Proposed Action Alternative

Habitats

Without conservation measures, NCCP habitats covered under USACE jurisdiction would be adversely affected. Table 4-1 summarizes the impacts on NCCP wetland habitats. As shown in Table 4-2, the tidal perennial aquatic habitat and tidal freshwater emergent habitat in the project area will be lost. However, at the Holland Tract mitigation site, non-tidal wetlands will be created and/or enhanced to mitigate for the losses.

NCCP Habitat Type	Approximate Acreage Potentially Affected by Proposed Action (acres)		Mitigation Acreage Provided by Proposed Action (acres)	
	Temporary	Permanent	Created	Preserved and Enhanced
Tidal Perennial Aquatic	0	42.920	0	0
Tidal Freshwater Emergent	0	3.844	0	0
Valley Riverine Aquatic	1.686	0	0	0
Non-Tidal Freshwater Permanent Emergent	0.349	0	5.10	1.10
Natural Seasonal Wetland	0.514	0	33.20	0
Managed Seasonal Wetland	5.852	0	0	11.38
Lacustrine (Non-tidal Permanent Aquatic)	0	0	8.70	0
Total USACE Jurisdictional Wetlands	8.401	46.764	47.0	12.48

¹ Based on the low quality of the wetlands in the unlined canal action area and consultations with USACE, DFG, USFWS and Reclamation, out-of-kind aquatic habitat (wetland) replacement was determined to be acceptable for all wetland habitat impacts. An overall wetland creation ration requirement of 1:1 was agreed to by all the parties under the assumption that the created wetlands would be of a higher ecological function than those removed by the project.

Tables 4-2 summarizes impacts on the other NCCP habitats and non-NCCP habitats. A minor amount of valley/foothill riparian habitat may be affected by the project. Inland dune scrub habitat present in the project area would be avoided under the project (note that the “sand mound” habitat does not support inland dune scrub vegetation). The temporary disturbance of grassland and ruderal areas associated with project implementation and the loss associated with the creation of wetlands at the mitigation site would be minor in relation to the total amount of these habitats present locally and regionally. Additional acreage of grassland habitat would be created in the ROW after the project is complete.

NCCP Upland Habitats	Canal Replacement Project Impacts*(Acres)	Holland Tract Mitigation Area Impacts (Acres)	Created within Canal ROW (Acres)	Created at Holland Tract (Acres)	Preserved/Enhanced at Holland Tract (Acres)	Canal Replacement Project Mitigation
Grassland	0	44.87	47	0	74.08	2.9:1
Other Non-NCCP Upland Habitats - Sand Mound	0	0.23	0	0	12.13	Holland Tract-only portion: 1.9:1 Sand mound is included in the ratio because it is functionally equivalent to grassland habitat at the Holland Tract mitigation site.
Valley Foothill Riparian	0.14	0	0	Planting of 15 cotton-woods	0.49	3.5:1

By the time the Contra Costa Canal was constructed, much of the tidal wetland habitat had been filled, according to maps provided with the wetland delineation. Cumulatively, the construction of the canal would have further affected wetlands and inland dune scrub habitat. Agricultural conversion also occurred long ago and removed and disturbed large amounts of inland dune scrub habitat. Remaining habitat has recently begun to be converted to residential development; 8,000 homes are expected to be built adjacent to the Contra Costa Canal Replacement Project footprint. Implementing the proposed action would not adversely affect other NCCP terrestrial habitats on a cumulative basis, due to mitigation efforts of the proposed project and the regional presence of larger amounts of habitats, such as grasslands.

Aquatic Species

Non-native resident warmwater fishes, including larger fish such as centrarchids and catfishes and smaller fishes such as silversides, will be removed from the unlined canal and will lose 47 acres of habitat. These species will continue to be abundant elsewhere in the Delta.

For the proposed no-fill/no-diversion waivers, effects on special-status fishes and critical habitat are to be addressed by requesting temporary modifications to the biological opinions issued by the USFWS and NMFS and the MOU between DFG and CCWD for the Los Vaqueros Project. CCWD's operations modeling indicates that total Delta diversions with the Rock Slough intake shut down and restricted periods modified are likely to be less than they would have been with the Rock Slough intake operating and with the no-fill and no-diversion periods imposed. During the construction period, CCWD will use the screened Old River intake rather than the unscreened Rock Slough intake for deliveries, thus enhancing fish protection. Monitoring at the Old River intake confirms that this screen has been successful in protecting Delta smelt and other species. The Contra Costa Canal Replacement Project will require approximately 7,000 acre feet

of additional withdrawal from the Los Vaqueros Reservoir. This is only a minimal impact on the normal operating levels of the Los Vaqueros Reservoir.

Table 4-3 summarizes anticipated effects on evaluated special-status species.

Table 4-3. Summary of Impacts on Evaluated Special-status Species and Critical Habitat		
Common Name	Species Impact Assessment	Critical Habitat Impact Assessment
Antioch Dunes evening-primrose	No effect	No effect
Valley elderberry longhorn beetle	No effect	No effect
Vernal pool fairy shrimp	No effect	No effect
California red-legged frog	No effect	No effect
California tiger salamander	No effect	No effect
Giant garter snake	May affect, likely to adversely affect	N/A
San Joaquin kit fox	May affect, not likely to adversely affect ¹	N/A
Delta smelt	May affect, likely to adversely affect ²	May affect, not likely to adversely affect
Central Valley spring-run Chinook salmon	May affect, not likely to adversely affect	No effect
Central Valley steelhead	May affect, not likely to adversely affect	No effect
North American green sturgeon	May affect, not likely to adversely affect	N/A
Sacramento River winter-run Chinook salmon	May affect, not likely to adversely affect	No effect
Central Valley fall-run Chinook salmon	May affect, not likely to adversely affect	N/A
Sacramento splittail	May affect, not likely to adversely affect	N/A
longfin smelt	May affect, not likely to adversely affect	N/A
Swainson's hawk	May affect, likely to adversely affect (habitat only)	N/A
California black rail	May affect, likely to adversely affect (habitat only)	N/A
Delta coyote-thistle	No effect ³	N/A
Delta mudwort	No effect ³	N/A
Delta tule pea	No effect ³	N/A

Table 4-3. Summary of Impacts on Evaluated Special-status Species and Critical Habitat		
Common Name	Species Impact Assessment	Critical Habitat Impact Assessment
Diamond-petaled California poppy	No effect	N/A
Mason's lilaeopsis	No effect ³	N/A
Rose mallow	No effect ³	N/A
Suisun Marsh aster	May affect, likely to adversely affect	N/A
Silvery legless lizard	No effect	N/A
Western pond turtle	May affect, likely to adversely affect	N/A
Western burrowing owl	May affect, likely to adversely affect (habitat only)	N/A
Other nesting birds (including the tricolored blackbird)	May affect, likely to adversely affect (habitat only)	N/A
<p>¹ Since finalization of the Action Specific Implementation Plan (ASIP), the USFWS has indicated that they believe the proposed action "may affect, but is not likely to adversely affect" the San Joaquin kit fox; the finalized ASIP states that the proposed action will have "no effect."</p> <p>² Since finalization of the ASIP, the USFWS has indicated that this determination is appropriate, rather than a determination of "may affect, not likely to adversely affect."</p> <p>³ These wetland plant species were not located during surveys, but because protocol-level surveys were not performed for all plants and because they may have a persistent seed bank, conservation measures are to be implemented for these plants in the event they are encountered during this long-term project.</p>		

In the short term the Contra Costa Canal Replacement Project may affect but is not likely to adversely affect the Sacramento River winter-run Chinook salmon, the Central Valley spring-run Chinook salmon, the Central Valley steelhead and the North American green sturgeon (southern DPS). The timing of cofferdam installation and other proposed conservation measures will make effects on the three salmonids and Central Valley steelhead critical habitat extremely unlikely. Although green sturgeon juveniles are salvaged (primarily in the summer) at the fish facilities for the south Delta pumping plants, the available information from monitoring in the unlined Contra Costa Canal has shown no evidence that the species occurs in the action area, making effects on the species extremely unlikely to occur. Best management practices will reduce sedimentation, turbidity and noise and a spill prevention plan will protect aquatic habitat from contamination. No false attraction flows will occur from groundwater discharge and no aquatic habitat containing fishes will be affected by wetland/terrestrial species habitat compensation.

In the long term, there will be a reduction in entrainment and predation on the juvenile salmonids due to removal of tidal influence (lowering of maximum and mean approach velocities) and loss of open water (containing non-native predators) in the dead-end canal. The loss of light input within the unlined part of the canal will prevent problematic aquatic plants from becoming abundant and will therefore reduce the use of aquatic herbicides.

It is unknown if the herbicides currently reach Central Valley steelhead critical habitat [the critical habitat closest to the project and approximately one mile away in Dutch Slough, Sand Mound Slough and Rock Slough (NMFS 2005)], so it cannot be said at this time that there will be any beneficial effect on the critical habitat.

This project is unrelated to the requirement to screen the Rock Slough intake. The Central Valley Project Improvement Act requires a mitigation program for the unscreened intake and the Los Vaqueros Project biological opinion from the USFWS requires the intake to be screened. Reclamation has been unable to screen the intake so far, due to difficulties associated with the large cross-section of water that would have to be screened, and the need to maintain a low enough approach velocity to protect the delta smelt from impingement. It is possible that because of the reduction in cross-sectional area, the replacement of the canal with a pipeline will make it possible to screen the intake.

Essential fish habitat for fall-run Chinook salmon will be protected by the timing of the Marsh Creek crossing, as well as the use of a NMFS-approved bypass, reducing the likelihood of adverse effects. By only working in Marsh Creek from July through September, any minimal adverse effects that could otherwise occur due to sedimentation and turbidity are unlikely to occur. This timeframe will avoid disruptions of upstream and downstream movements of fall-run Chinook salmon, which do not occur in Marsh Creek during times of high temperature.

The delta smelt will be protected in the short-term by the timing of cofferdam installation, making short-term effects from construction extremely unlikely. In the long-term, the species is expected to benefit from reduced levels of entrainment in the Contra Costa Canal and reduced use of aquatic herbicides. In addition, the USFWS has concluded that there may be adverse effects on the species, due to entrapment of delta smelt in the canal during dewatering and turbidity and in the long-term, due to the loss of nearly 47 acres of shallow-water habitat. As with the anadromous fishes, no effects will occur from work on the Holland Tract mitigation site. The PCEs of delta smelt critical habitat are not present in the unlined canal and the timing of the slough crossings will prevent effects on PCEs in those locations.

The Sacramento splittail and longfin smelt are also unlikely to be present in the unlined canal during cofferdam installation and also may benefit from reduced rates of entrainment and aquatic herbicide use.

Cumulative effects on EFH may occur in Rock Slough as a result of the construction of a bridge for the East Cypress Corridor Specific Plan developments. The Contra Costa Canal Replacement Project, though, is generally beneficial to sensitive fish species and so will not contribute to any adverse cumulative impacts. However, this is partially contingent upon the conservation measures proposed to protect these species, such as avoidance of cofferdam installation when these species are expected to be present.

CCWD's proposed Alternative Intake Project could reduce diversions at PP1 and may add cumulatively to the long-term benefits of the proposed action by reducing entrainment. However, this will somewhat reduce the benefit otherwise expected by replacing the unlined

canal, because sensitive fishes will already experience a lower risk of entrainment at the Rock Slough intake.

The new copper naphthenate power poles that will replace the existing poles will have a higher concentration of copper naphthenate. Copper is toxic to salmonids (Brooks 2004). However, none of these poles will be placed in aquatic habitat (open water or wetlands). Therefore, the replacement of the power poles will have no effect on aquatic species.

Terrestrial and Semi-aquatic Species

Refer to Table 4-3 for a summary of effects on special-status terrestrial and semi-aquatic species.

Ground-disturbing construction activities could destroy individual Suisun Marsh aster plants, their root system, and the seed bank. Replacing the canal with a buried pipe would remove habitat for this species. All live plants will be translocated to a suitable area that will be protected and managed in perpetuity. No other special-status plants are expected to be affected, but if others are discovered during the course of construction, they may also be translocated to a suitable site, as appropriate.

A worker awareness training program and preconstruction surveys will be implemented to help avoid or minimize effects on the giant garter snake, California red-legged frog, San Joaquin kit fox, western pond turtle, western burrowing owl, Swainson's hawk and other special-status bird species.

No effects are expected to occur on the California red-legged frog or the California tiger salamander. The project area is outside of the range of the California tiger salamander. The California red-legged frog is not expected to occur in the project area, as the unlined canal and lower Marsh Creek are inhabited by predatory fishes and bullfrogs (especially Marsh Creek) and surveys have shown no evidence of occurrence. The project area, although it contains California ground squirrels and grassland habitat, is of poor quality, has never been known to support the San Joaquin kit fox, despite several surveys, and is isolated from the closest known records by major roadways. Although the finalized ASIP stated that there would be no effect on the San Joaquin kit fox, the USFWS has since determined that the proposed action "may affect, but is not likely to adversely affect" the species. The silvery legless lizard is not expected to be affected, due to the absence of suitable habitat. No effects will occur on the valley elderberry longhorn beetle; its required host plant is absent from the project area.

The Contra Costa Canal Replacement Project will adversely affect the western pond turtle. Construction activities could result in the loss of individuals or nest sites and 47 acres of potential aquatic habitat would be permanently removed under the project. Any individuals found during pre-construction surveys will be translocated by a qualified biologist. DFG will be consulted if any nests are located. Replacement habitat will be created at the Holland Tract mitigation site.

The giant garter snake may be adversely affected. The project will remove 3.844 acres of possible movement habitat for adult giant garter snakes. Initial dewatering, which will remove prey for the species, will be conducted during the giant garter snake's active period (it is not

possible to completely avoid construction and the need for continued dewatering of groundwater during the inactive period). Any dewatered areas must remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered area. Only erosion control methods that do not pose an entanglement risk for the snakes will be used. Wetland habitat suitable for the giant garter snake will be created at the Holland Tract mitigation site.

The project may adversely affect the Swainson's hawk. Successful nest sites have been documented in the immediate vicinity of the action area. Foraging and nesting habitat would be temporarily disturbed during project construction. However, the replacement of the canal with a pipeline will increase the amount of foraging habitat for the species in the long-term. If an active Swainson's hawk nest is found within ½ mile of the area to be affected by construction activities, a qualified biologist will determine the extent of a construction-free buffer zone to be established around the nest in consultation with DFG. Intensive new disturbances (e.g., heavy equipment activities associated with construction) that may cause nest abandonment or forced fledging will not be initiated within this buffer zone between March 1 and September 15 until it is determined by a qualified biologist in coordination with DFG that the young have fledged and are feeding on their own. The Holland Tract mitigation site will provide compensation habitat for the species, including the planting of 15 cottonwood trees to help replace lost nesting habitat.

The California black rail may be adversely affected by the loss of 3.844 acres of tidal freshwater emergent habitat and temporary disturbance of other non-tidal wetland habitat. Other bird species may be affected by the temporary loss of foraging and nesting habitat. Pre-construction surveys will be performed for the California black rail, tricolored blackbird and other migratory birds. Any nests found in the project area will be protected with a buffer to avoid disturbance. The Holland Tract mitigation site will provide compensation habitat for these species.

Most of the project area consists of grassland or ruderal habitat that is suitable for the western burrowing owl and two pairs and a few individuals have been documented in the project area (a protocol-level survey of the entire project footprint has not been conducted). Construction activities are expected to disturb foraging and nesting habitat, although more grassland habitat will be created in the long term, by the replacement of the open canal with a buried pipeline. Standard DFG-approved buffers must be maintained around burrowing owls found during pre-construction surveys. Active nests will be monitored to ensure that young owls are protected as much as possible from disturbance before fledging. The Holland Tract mitigation site will provide some permanent compensation habitat for the temporary habitat losses due to construction.

No effects will occur on cliff swallows, as the swallows and their nests will be completely avoided during construction.

Cumulatively, numerous development projects are planned in the region and include the Cypress Grove project (under construction), Summer Lakes (under construction), the East Cypress Corridor Specific Plan (planning stages), the Dutch Slough Properties (early planning stages), the Ironhouse Sanitary District Expansion (capacity expansion), and the Dutch Slough Tidal Restoration Project (early planning). These projects are likely to have the potential to contribute to adverse effects on these species through temporary disturbance or permanent conversion of

potential habitat (e.g., open ruderal and grassland areas and ditches and adjacent lands), although these projects require avoidance, minimization and/or compensation themselves. Conservation measures for the Contra Costa Canal Replacement Project will reduce any cumulative impacts on these species.

No Action Alternative

Aquatic Species

Under the no action alternative Reclamation would not permit CCWD to modify the unlined portion of the Contra Costa Canal. The 47 acres of habitat for non-native warmwater fishes would remain and local children would likely continue to fish for the larger fish species from the berms. The unlined canal would continue to entrain sensitive fish species and the juvenile salmonids would be subjected to predation from catfish and bass. Aquatic herbicides would continue to be applied to the unlined canal, but in compliance with Section 7 of the ESA, which requires avoidance and minimization of adverse effects.

Habitats and Terrestrial and Semi-aquatic Species

Under the no action alternative Reclamation would not permit CCWD to modify the unlined portion of the Contra Costa Canal. There would be no loss of open water and wetlands within the Contra Costa Canal. In addition to special-status bird species, such as the California black rail, more common native birds, such as mallards, great blue herons and great egrets, would not lose the habitat associated with the unlined canal. Special status species such as the western pond turtle and giant garter snake would continue to be able to use the unlined canal ROW and would not be subject to any disturbance from construction. Areas adjacent to the ROW are expected to become more urbanized. Giant garter snake and western pond turtle habitat construction at the Holland Tract mitigation site could be reduced or eliminated if the development of the site as a mitigation area were temporarily or permanently postponed.

Some development projects, such as those under the East Cypress Corridor Specific Plan, will remove seasonal wetlands that may provide habitat for species such as the California black rail, burrowing owl, and tricolored blackbird. If funding is secured, the Dutch Slough Tidal Restoration project may provide additional habitat for tidal wetland species, such as the Suisun marsh aster, but may also remove grassland habitat used by raptors.

The western burrowing owls would not be subject to disturbance from construction, but would not gain any habitat by the replacement of the open water with a buried pipeline. Additionally, the configuration of Holland Tract mitigation site could change and its development could be temporarily or permanently postponed. The burrowing owls are expected to lose large amounts of foraging habitat, due to the construction of 8,000 homes adjacent to the Contra Costa Canal Replacement Project footprint. The same analysis applies to species such as the white-tailed kite and Swainson's hawk, which also forage in open fields.

In general, the local area near and within the project area can be expected to experience noticeable changes in biodiversity, especially as several housing developments are constructed. However, the City of Oakley is a participant in the East Contra Costa Habitat Conservation Plan/Natural Community Conservation Plan. This plan is nearing completion and will help to conserve special status species and NCCP habitats. Other projects will comply with the ESA

through a Section 7 nexus with USACE, which will serve to avoid and minimize adverse effects on Federally listed species and critical habitat.

Cultural Resources

Proposed Action Alternative

The first four miles of the Contra Costa Canal will experience adverse effects from the encasement project. The mitigating measures identified in the MOA for this undertaking are being implemented. Subsurface archeological testing will occur prior to construction in sensitive areas as stipulated in the MOA. If the USACE concurs with the conclusion offered in the Clark report (2007) and determines that the mitigation effect constitutes no adverse effect to the historic properties, CA-CCO-147 and CA-CCO-678, the Section 106 process will be completed once SHPO concurs with that determination. The regulations, however, do allow for the consideration inadvertent discoveries, if that happens.

Stipulations in the Contra Costa Canal MOA were identified to mitigate cultural resource impacts from the encasement project. These measures have been completed, in part, and work is continuing to fully implement the documentation for the Contra Costa Canal. CCWD must conduct subsurface testing in areas of high archeological sensitivity prior to construction, in compliance with a stipulation in the MOA.

Western will be required to conduct its own consultation with SHPO pursuant to Section 106 of the NHPA for Western's portion of the project.

No Action Alternative

Under the no action alternative Reclamation would not permit CCWD to modify the unlined portion of the Contra Costa Canal. Construction activities and their associated impacts to cultural resources related to the Contra Costa Canal replacement project would not occur. If the Holland Tract site is not used as a mitigation area and the area is developed for some other purpose the sensitive resources on this property could be impacted.

Environmental Justice

Proposed Action Alternative

Implementing the project would only cause minor impacts to the environment. No human health impacts would occur. Based on the information presented in the Affected Environment section the population in the project area is not considered to be predominately low income or minority. Based on these factors the temporary impacts expected to occur would not disproportionately affect any minority or disadvantaged populations within the project area.

No Action Alternative

Under the no action alternative Reclamation would not permit CCWD to modify the unlined portion of the Contra Costa Canal. The configuration of the Holland Tract mitigation site could change and its development could be temporarily or permanently postponed. There would be no environmental justice related impacts related to this project.

Geology and Soils

Proposed Action Alternative

Project facilities could be subjected to strong seismic ground shaking, because construction of the proposed project would be required to adhere to the building safety standards specified in the CBC for Seismic Zone 4, which include measures designed to prevent significant structural damage from seismic ground acceleration.

Construction activities would involve substantial excavating, moving, filling, and temporary stockpiling of soil on the project site. Grading activities would remove any vegetative cover and expose site soils to erosion via wind and surface water runoff. CCWD would be required to implement best management practices (BMPs) as part of its storm water pollution prevention plan (SWPPP).

The area within the Reclamation ROW for the canal was heavily disturbed and modified when the canal was constructed. Once the project is complete the ROW will be more consistent with surrounding land elevation and less intensively managed than under existing conditions. The Holland Tract site will be revegetated and managed to provide wildlife habitat. Soils excavated to create wetland areas on the Holland Tract will be retained within the 145.07-acre area.

Cumulatively, development in and around the Oakley area will continue to impact soils in the project area as undeveloped lands are covered to urban uses.

No Action Alternative

Under the no action alternative Reclamation would not permit CCWD to modify the unlined portion of the Contra Costa Canal. The existing facilities could still be subjected to strong seismic ground shaking which could cause the existing berms to liquefy. If this were to occur the potential for flooding neighboring lands and disruptions to CCWD's water supply could occur. The configuration of the Holland Tract mitigation site could change and its development could be temporarily or permanently postponed.

Hydrology and Water Quality

Proposed Action Alternative

Construction activities could impair water quality temporarily because grading and construction activities would disturb soil and expose potential contaminants to stormwater and runoff. Soil and associated contaminants that enter stream channels can increase turbidity, stimulate the growth of algae, increase sedimentation of aquatic habitat, and introduce compounds that are toxic to aquatic organisms. If released into the environment, construction materials such as fuels, oils, paints, and concrete are potentially harmful to fish and other aquatic life. The extent of potential environmental effects depends on the erosion characteristics of soil types encountered, type of construction practice, extent of disturbed area and length of time the area remains disturbed, timing of precipitation, and proximity to drainage channels. The construction period is expected to include late spring, summer, and early fall months (April through October), which should minimize the potential for any stormwater runoff that could erode soils at the project site.

Construction operations along the canal would require the temporary rerouting of surface flows in the drainages and sloughs in the project area: Marsh Creek, Emerson Slough, and Dutch Slough. In these areas, the installation of the pipeline would occur by open cutting across the drainages and sloughs with the appropriate safeguards for habitat. Construction activities in the waterways would be minimized both spatially and temporally to the greatest extent possible. Because of the high transmissivity of the soils in the project area and nearness to the existing siphons, the water features would need to be routed through a pipe to allow flow of the drainages and sloughs during construction. Removal of the existing siphons below the water features would likely collapse the soils and disrupt water flow and habitat. The drainages and sloughs would be restored to preproject conditions immediately after the pipeline is installed and buried beneath each waterway. Because of the large size of the pipeline and the small size of the drainages and sloughs, this is by far the most efficient construction method.

It would be necessary to shut down the Rock Slough intake facility for up to approximately 12 months, for any given phase of the project, while the pipeline is being installed. A cofferdam would be installed at the upstream end of each construction phase to dewater that portion of the canal. An initial dewatering of the canal would be necessary before construction begins. The initial operation would involve setting up a cofferdam beyond the end of each phase of pipeline replacement and drawing down the water level in that section of the canal by pumping it through PP1. The water level would be lowered to about 2 to 4 feet deep; any fish in the work area would then be captured, removed, and relocated; and then final dewatering would occur.

A continuous dewatering operation would be employed by installing well points along the north and south sides of the canal to prevent infiltration of local groundwater while the pipeline is being installed. Sections of the canal that are dewatered for pipe installation would not be rewatered.

The groundwater would be discharged to existing agricultural areas for irrigation or temporarily stored for percolation adjacent to the project site but outside of the 200-foot staging and construction area consistent with the Central Valley Regional Water Quality Control Board (RWQCB) Waiver of Waste Discharge Requirements for Specific Types of Discharge and under agreement with adjacent landowners. Substantial amounts of water also may be evaporated through misting or used as on-site dust control. As sections of the canal are replaced, the facilities used for dewatering the sections would be removed, and those temporarily disturbed areas would be restored.

Any lands used for dewatered during construction, would be applied to lands adjacent to the project site or through a surface water discharge if permitted by the regional water board and if practical.

CCWD would develop a Storm Water Pollution Prevention Plan (SWPPP) as required by the RWQCB under the statewide NPDES General Permit for Discharges of Storm Water Associated with Construction Activity. The SWPPP would include measures identified by the Central Valley Regional Water Board as Best Available Technology Economically Available (BAT) and Best Conventional Pollution Control Technology (BCT) to reduce or eliminate stormwater pollution.

PP1 is one of the water quality compliance locations outlined in the State Water Board's Decision 1641, the Water Quality Control Plan for the Sacramento-San Joaquin Bay Delta. During construction, the point of measurement at PP1 for compliance may be dewatered, stagnant, or otherwise nonrepresentative of water quality in Rock Slough and therefore not controllable by DWR and the Reclamation, who are responsible for compliance pursuant to D-1641. Before construction begins, CCWD will consult with State Water Board staff and request to temporarily move the measurement location that determines compliance to Mile Post 0.0 of the Contra Costa Canal (at the juncture with Rock Slough and outside/upstream of the construction area). After completion of the project, the compliance location would return to the present location at PP1, and there will be no impacts on CCWD, DWR, or Reclamation as a result of implementing this project.

Minor changes in the amount and duration of water level fluctuation in Los Vaqueros Reservoir could occur. CCWD estimates up to 7,000 acre-feet of additional draw down of the reservoir during each construction phase. CCWD does not expect this amount of potential increased drawdown to effect their ability to meet water demand within their service area.

No Action Alternative

Under the no action alternative Reclamation would not permit CCWD to modify the unlined portion of the Contra Costa Canal. The Holland Tract site would most likely be used as a wetland mitigation site for other development in the area similar to the proposed action resulting in similar impacts.

Indian Trust Assets

Proposed Action Alternative

There are no tribes possessing legal property interests held in trust by the United States in the areas involved with this action, therefore Indian trust assets are not affected by this action. The nearest ITA is the Buena Vista Rancheria approximately 47 miles north east of the project area.

No Action Alternative

Under the no action alternative Reclamation would not permit CCWD to modify the unlined portion of the Contra Costa Canal. The Holland Tract site would most likely be used as a wetland mitigation site of other development in the area similar to the proposed action resulting in similar impacts and Western would not replace their existing Tracy-Contra Costa 69-kV T-line and would not require a Utility Relocation Agreement with CCWD. No impacts to Indian trust assets would occur.

Land Use

Proposed Action Alternative

Most of the area surrounding the project site is open space and farmland that is rapidly being converted to residential subdivisions. No communities are currently located near the site, and implementing the project would actually remove a physical barrier (i.e., a section of the canal) in the area by placing the 3.97-mile section of the canal in a buried pipeline although fencing would remain along the ROW. No established communities would be divided.

The project involves conversion of the open water canal to an underground pipeline and leveling of the canal berms. Most of the work associated with the proposed project would be confined to the existing ROW. These actions would pose no conflict with any applicable land use plans, policies, or regulations. In addition, by removing the hazard of an open water canal and increasing the security of the canal system through encasement of the water supply in an underground pipeline, these actions would ensure the project's compatibility with plans associated with the development planned for the project area. No impact would occur.

The replacement of the Western Tracy-Contra Costa 69-kV T-line would be consistent with current ROW land use practices within the ROW.

No Action Alternative

Under the no action alternative Reclamation would not permit CCWD to modify the unlined portion of the Contra Costa Canal. Western's Tracy-Contra Costa 69-kV T-line would continue to be operated and maintained consistent with existing uses. The Holland Tract site would most likely be used as a wetland mitigation site of other development in the area similar to the proposed action.

Noise

Proposed Action Alternative

Long-term operation of the proposed project would not include any major stationary noise sources.

Short-Term Construction

On-Site Construction Equipment

Construction activities would include pipeline installation, digging, backfilling, material transport, and other miscellaneous activities. On-site construction equipment would include two cranes, up to two scrapers, backhoes, excavator loaders, dozers, trucks, one line auger truck, one manlift, and compactors. Noise levels for individual equipment can range from 79 to 101 dBA at 50 feet, as indicated in Table 4-4. Though not shown specifically in the table noise from the auger truck is anticipated to fall within the range of noise anticipated for the other types of equipment used on site.

The simultaneous operation of on-site construction equipment could result in combined intermittent noise levels up to 94 dBA at 50 feet from the project site. Based on these noise levels and a typical noise attenuation rate of 6 dBA per doubling of distance, exterior noise levels at noise-sensitive receptors located within approximately 4,500 feet from the project site (e.g., residences) could exceed 55 dBA without feasible noise controls. Specifically, construction-generated noise levels could exceed 94 dBA at the closest residence (50 feet).

Table 4-4 Typical Construction-Equipment Noise Levels		
Type of Equipment	Noise Level in dBA at 50 feet	
	Without Feasible Noise Control	With Feasible Noise Control¹
Pile driver	101	95
Dozer or tractor	80	75
Excavator	88	80
Scraper	88	80
Front-end loader	79	75
Backhoe	85	75
Grader	85	75
Crane	83	75
Truck	91	75

¹ Feasible noise control includes the use of intake mufflers, exhaust mufflers, and engine shrouds in accordance with manufacturers' specifications.
Sources: Environmental Protection Agency 1971, Federal Transit Administration 1995

Noise from construction activities between 7:30 a.m. and 5:30 p.m., Monday through Friday is exempt from the provisions of the applicable regulations. Nevertheless, if construction activities were to occur during the more noise-sensitive hours (e.g., evening, nighttime, and early morning) or construction equipment were not properly equipped with noise control devices, construction-generated source noise could result in the exposure of persons to or generation of noise levels in excess of applicable standards, annoyance, and/or sleep disruption to occupants of the nearby existing noise-sensitive land uses (e.g., residences) or could create a substantial temporary increase in ambient noise levels in the project vicinity. CCWD shall require construction contractors to ensure that, to the extent feasible, construction equipment is properly maintained and equipped with noise control devices, such as mufflers, in accordance with manufacturers' specifications. CCWD shall require construction contractors to limit construction activities to the hours of 7:30 a.m. to 5:30 p.m. Monday through Friday, during which such activities are exempt from noise levels identified in applicable standards. To the extent that contractors work outside of these hours, noise levels will be limited so as not to cause any disruption to nearby residences. CCWD shall designate a disturbance coordinator during construction. The disturbance coordinator's telephone number shall be conspicuously posted around the project site and supplied to nearby rural and developing, occupied residences. The disturbance coordinator shall receive all public complaints and be responsible for determining the cause of the complaint and implementing any feasible measures to alleviate the problem.

Off-Site Construction Traffic

Construction activities would require a maximum of 26 on-site employees at any given time. Assuming two total trips per day per employee, construction of the project would result in a maximum of approximately 52 one-way daily trips. Another 16–46 daily one-way truck trips, depending on the length of each phase, would occur from material transportation activities (e.g.,

aggregate and pipeline delivery). Materials and pipeline delivery would not take place during the same time that construction is occurring.

Typically, traffic volumes have to double before noise levels increase noticeably (3 dBA [CNEL/L_{dn}]) along roadways. Therefore, the addition of up to 52 daily trips on the local roadway system to existing volumes would be negligible. Consequently, construction of the proposed project would not noticeably change traffic noise contours of area roadways. Thus, short-term off-site construction traffic source noise would not expose people to or generate noise levels in excess of applicable standards and would not create a substantial temporary increase in ambient noise levels.

Construction activities have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and operations involved. Vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Table 4-5 displays vibration levels for typical construction equipment. Though not shown specifically in the table noise from the auger truck is anticipated to fall within the range of noise anticipated for the other types of equipment used on site.

Table 4-5 Typical Construction-Equipment Vibration Levels			
Equipment		PPV at 25 feet (in/sec) ¹	Approximate L _v at 25 feet ²
Pile driver (impact)	Upper range	1.518	112
	Typical	0.644	104
Pile driver (sonic)	Upper range	0.734	105
	Typical	0.170	93
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Truck		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58
¹ Where PPV is the peak particle velocity ² Where L _v is the velocity level in decibels (VdB) referenced to 1 microinch per second and based on the root mean square velocity amplitude. Source: Federal Transit Administration 1995			

No Action Alternative

Under the no action alternative Reclamation would not permit CCWD to modify the unlined portion of the Contra Costa Canal. Western's Tracy-Contra Costa 69-kV T-line would continue to be operated and maintained consistent with existing uses. The Holland Tract site would most likely be used as a wetland mitigation site of other development in the area similar to the proposed action resulting in similar impacts.

Recreation

Proposed Action Alternative

The proposed project involves conversion of a currently unlined, open water canal to a buried pipeline. No new recreational facilities are proposed as part of the proposed project, nor does the proposed project require the expansion of existing recreational facilities. To the extent that a portion of the Reclamation ROW is not used for maintenance of the new pipeline, or as a buffer zone for the Dutch Slough Tidal Restoration Project, or habitat for terrestrial species, as required by USFWS and/or DFG, then an East Bay Regional Park District trail may be considered.

The proposed project would include pipeline construction activities in Marsh Creek, where the Marsh Creek Regional Trail crosses the canal. The project involves replacing existing siphons with a pipeline at this location. CCWD will coordinate with the East Bay Regional Park District to keep the trail crossing over Marsh Creek available as long as conditions are safe. It is expected that the trail will need to be closed temporarily when Marsh Creek is open cut to install the replacement pipeline. Efforts will be made to restore the trail as soon as construction across Marsh Creek is completed.

The Holland Tract site is currently privately owned providing no recreational value to the general public. Once construction is complete the area will remain closed to the general public.

Cumulatively, DWR's planned Dutch Slough project and its associated trails and other trails and parks associated with planned developments could provide opportunities to enhance recreational opportunities when combined with the proposed action. Opportunities to use portions of the ROW to link new and existing recreational areas could be realized without the risks associated with recreation in the vicinity of the unlined canal.

No Action Alternative

Under the no action alternative Reclamation would not permit CCWD to modify the unlined portion of the Contra Costa Canal. The Holland Tract site would most likely be used as a wetland mitigation site for other development in the area similar to the proposed action resulting in similar impacts. Not replacing the unlined canal could constrain the ability of DWR to maximize their plans for the Dutch Slough restoration project.

Wetlands

Proposed Action Alternative

Implementation of the project would result in fill of jurisdictional waters of the United States, including wetlands subject to USACE jurisdiction under the Federal Clean Water Act, and Section 10 waters of the United States, including the canal, isolated freshwater marsh and seasonal wetland, irrigation/drainage ditches, and human-induced ponded areas. Permanent impacts from the project would total 42.92 acres of open waters and 3.84 acres of in-channel freshwater marsh and 0.23 acres of seasonal wetland/drainage ditches. The remaining wetlands impacts would be temporary, including impacts to perennial drainages, seasonal wetlands, irrigation/drainage ditches, out-of-channel freshwater marsh, and seasonally wet meadow

totaling an additional 6.64 acres in the vicinity of the canal and 3.07 acres of season wetland/drainage ditches at the Holland Tract site.

A mosaic of 47 acres of wetlands and waters will be created with improved habitat function on 145.07 acres at the 263-acre Holland Tract site to achieve minimum waters of the United States and wetland creation to impact ratio of 1:1. The off-site wetland creation property will be made available concurrently with each phase of project construction. As depicted in Exhibit 4-1, 21.8 acres of shallow seasonal wetlands will be created within the Canal Replacement Project (identified as the CCWD Mitigation Area) mitigation area. In addition, 25.2 acres of seasonal/perennial marsh and open water habitat will be created as part of a larger wetland complex in the northeast corner of the property and included as part of the Canal Replacement Project mitigation area. Drainage ditches totaling 1.1 acre will be enhanced, and 11.38 acres of existing seasonal wetlands and associated drainage ditches will be preserved within the mitigation area. A summary of wetland mitigation creation is provided on Exhibit 4-1 in the CCWD column of the table.

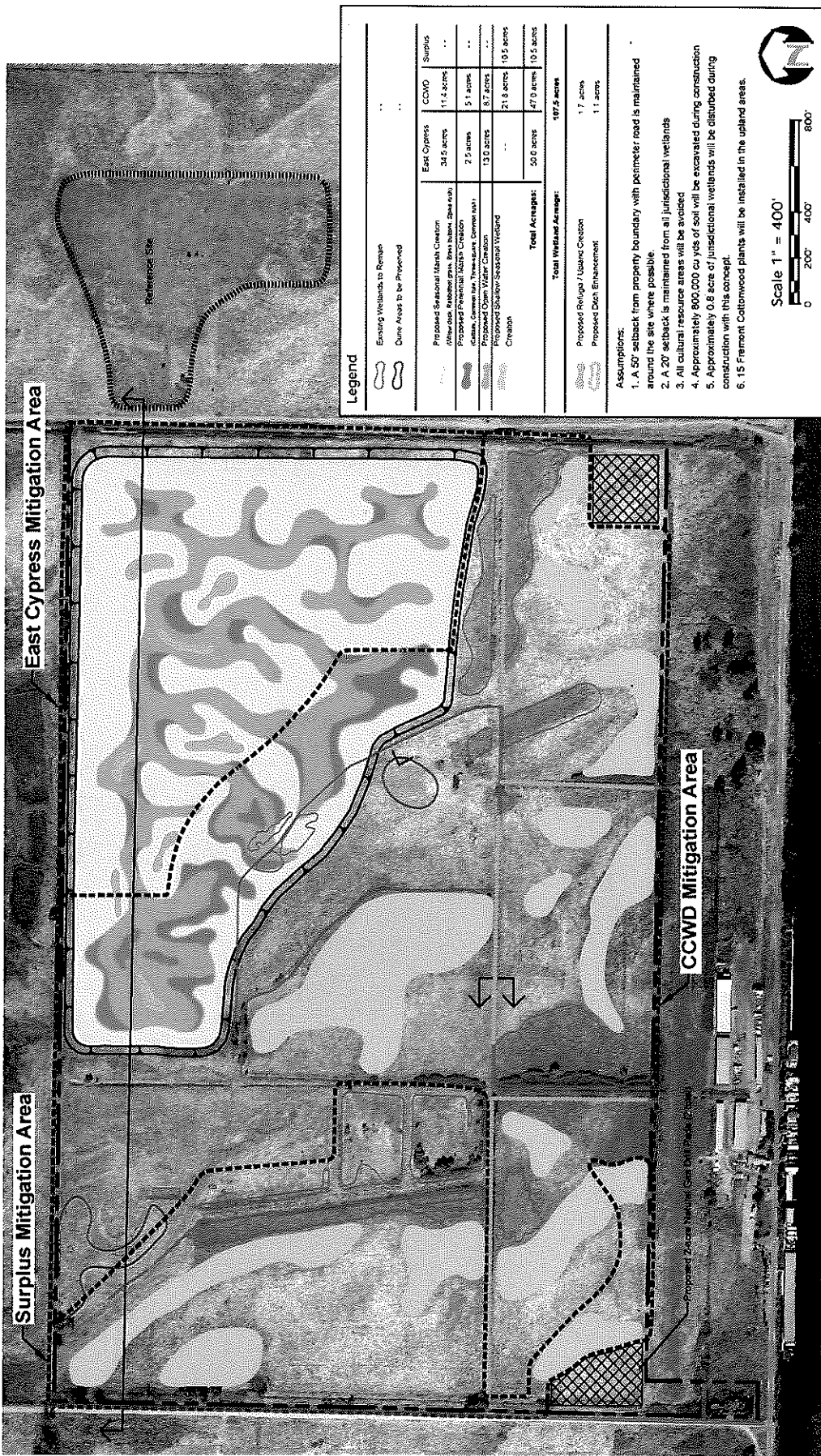


Exhibit 4-1. Holland Tract Site.

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The first phase of project construction will require approximately 6 acres of wetland creation. CCWD via its arrangement with Wildlands Inc. will maintain and monitor the mitigation area for 5 years following the completion of revegetation activities. Monitoring reports will be submitted to USACE, DFG, and USFWS as applicable upon completion of the revegetation implementation with a final report after 5 years. CCWD will maintain an 80% survival rate of each species by the third year after replacement. Replacement plantings necessary to achieve a survival rate of 80% will also be monitored for a full 5 years. CCWD is responsible for replacement planting to achieve these requirements. CCWD shall adhere to the required conditions associated with a USACE permit and associated mitigation requirements. CCWD shall obtain a report of waste discharge for the Central Valley Regional Water Board and comply with all specified permit conditions. Timing for compliance with the specific conditions of the Section 404 permit shall be in accordance with conditions specified by USACE as part of permit issuance. As required by Section 404, approval and implementation of the wetland mitigation and monitoring plan would be expected to mitigate impacts on jurisdictional waters of the United States, including jurisdictional wetlands.

The wetland mitigation features are expected to have higher functional value than the wetland habitats being impacted since the mitigation features will not be managed as a water conveyance facility which is currently managed to minimize aquatic vegetation that can impact the operation of the facility. Additionally, the existing wetland areas are fragmented and fairly narrow in width limiting its ability to provide high habitat function.

Historical, ongoing, and planned development in the eastern Contra Costa County area and throughout the Sacramento/San Joaquin River Delta (Delta) area have impacted wetlands area. Cumulatively, the reclamation of Delta islands and urban development have greatly reduced wetland acreage. Through various regulatory mechanisms including the federal Clean Water Act 404 permitting process and National Environmental Policy Act and the state's California Environmental Quality Act impacts to wetlands have been mitigated in the recent historic past and should continue to be mitigated for in the future reducing the overall cumulative impacts to wetlands.

No Action Alternative

Under the no action alternative Reclamation would not permit CCWD to modify the unlined portion of the Contra Costa Canal. The configuration of the Holland Tract mitigation site could change and its development could be temporarily or permanently postponed. Not replacing the unlined canal could constrain the ability of DWR to maximize their plans for the Dutch Slough restoration project.

Section 5 Consultation and Coordination

Cooperating Agencies

Western participated in the development and review of this Environmental Assessment since the proposed action involves the replacement of their existing Tracy-Contra Costa 69-kV T-line within the Reclamation owned ROW for the unlined portion of the Contra Costa Canal.

Endangered Species Act (16 USC § 1521 et seq.)

Section 7 of the Endangered Species Act requires Federal agencies, in consultation with the Secretary of the Interior and/or Secretary of Commerce, to ensure that their actions do not jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of these species. Reclamation began informal consultation with the USFWS and NMFS in October 2005.

In a letter dated January 23, 2006 (151422SWR2004SA9129:BFO) NMFS concurred with Reclamation's determination that the proposed Contra Costa Canal Encasement (now Replacement) Project is not likely to adversely affect the Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, Central Valley steelhead, the southern distinct population segment of the North American green sturgeon, salmonid critical habitat, or essential fish habitat (EFH) for Pacific salmon. Since that time, there have been modifications to the proposed Contra Costa Canal Replacement Project. Reclamation has determined that these modifications to the proposed Project will not change any of the previous effects determinations. Reclamation has sent a request to NMFS for confirmation that the effects determinations have not changed.

The USFWS determined that formal consultation on the giant garter snake was necessary. Reclamation and CCWD prepared an ASIP (required for CALFED projects that may adversely affect covered species) in cooperation with DFG and USFWS. The ASIP was finalized in March 2007 and submitted to the USFWS to initiate formal consultation on the giant garter snake, along with a request for concurrence that the proposed action may affect, but is not likely to adversely affect the delta smelt and its critical habitat. Following the finalization of the ASIP, with approval by the USFWS and DFG, the USFWS indicated that they could not concur with a determination of "may affect, but not likely to affect" the delta smelt. On May 8, 2007, the USFWS issued a non-jeopardy opinion with regard to effects on the giant garter snake and the delta smelt, and concluded that the proposed action would not result in the adverse modification or destruction of delta smelt critical habitat. The USFWS also determined that the proposed action "may affect, but is not likely to adversely affect" the San Joaquin kit fox.

The proposed waivers of the no-fill and no-diversion periods will be requested separately, as these periods are specified as operational conditions for the Los Vaqueros Project, which is covered under separate biological opinions from NMFS and USFWS. It is expected that the waiver of the no-fill and no diversion period for phase I construction is expected to be submitted soon.

Magnuson- Stevens Fishery Conservation and Management Act (16 USC § 1801 et seq.)

The Magnuson-Stevens Act requires Federal agencies to consult with NMFS on activities that may adversely affect EFH (MSA section 305(b)(2)). Reclamation initiated consultation on EFH for Pacific Salmon at the same time as informal consultation was initiated under the ESA. Reclamation had previously determined that minimal adverse effects would occur, particularly on the fall-run Chinook salmon in Marsh Creek. NMFS did not issue conservation recommendations, because appropriate conservation measures had already been proposed. Since then, the timing of work in Marsh Creek has changed to better protect the fall-run Chinook salmon's ability to move upstream. Reclamation has requested NMFS' concurrence with the determination that no additional adverse effects on EFH will occur, beyond those previously addressed.

Migratory Bird Treaty Act (16 USC § 703 et seq.)

The Migratory Bird Treaty Act implements various treaties and conventions between the U.S. and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds. Unless permitted by regulations, the Act provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Subject to limitations in the Act, the Secretary of the Interior (Secretary) may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing, possessing, selling, purchasing, shipping, transporting or exporting of any migratory bird, part, nest or egg will be allowed, having regard for temperature zones, distribution, abundance, economic value, breeding habits and migratory flight patterns.

The Proposed Action will comply with the Migratory Bird Treaty Act, because of the conservation measures aimed at protecting migratory birds from take.

National Historic Preservation Act (15 USC §. 703 et seq.)

Section 106 of the National Historic Preservation Act requires Federal agencies to evaluate the effects of Federal undertakings on historical, archeological and cultural resources. This undertaking triggered Reclamation's compliance with Section 106 of the National Historic Preservation Act and this effort culminated in a memorandum of agreement to resolve the adverse effects from the Contra Costa Canal Replacement Project. The MOA is a two-party agreement signed by Reclamation and by the State Historic Preservation Officer and offers mitigation measures for the encasement project. Western will be required to conduct its own consultation with SHPO pursuant to Section 106 of the NHPA for Western's portion of the project.

Fish and Wildlife Coordination Act (16 USC § 651 et seq.)

The Fish and Wildlife Coordination Act requires that Reclamation consult with fish and wildlife agencies (Federal and state) on all water development projects that could affect biological resources. Coordination with FWS has been ongoing during the development of the proposed action. The suggestions and recommendations have been incorporated into the proposed action. FWS prepared a Coordination Act Report finding no need to provide additional recommendations pursuant to the Fish and Wildlife Coordination Act for the project.

Clean Water Act (33 USC § 1251 et seq.)

Section 404 of the Clean Water Act establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in waters of the United States regulated under this program include fill for development, water resource projects, infrastructure development and mining projects. Section 404 requires a permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation. The filling of the existing canal and construction of the coffer dams under proposed action includes work in a water of the United States and would be completed in compliance with the requirements of a USACE individual permit under Section 404. The Holland Tract site provides the mitigation for impacts to wetlands and waters of the United States that will be required by CCWD's permit from USACE under Section 404.

Section 401 of the Clean Water Act establishes a program to allow States and Tribes to review and approve, condition, or deny all Federal permits or licenses that might result in a discharge to State or Tribal waters, including wetlands. The RWQCB administers the 401 program for the Central Valley region of California. The filling of the existing canal and construction of the coffer dams under proposed action are regulated under Section 401. CCWD has applied for and received a 401 Water Quality Certification from the Central Valley Regional Water Quality Control Board. The proposed project will include Section 402(p) requirements of the Clean Water Act where applicable.

Rivers and Harbors Act (33 USC § 401 et seq.)

Section 10 of the Rivers and Harbors Act requires a permit from USACE for any construction, excavation, or deposition of materials in, over, or under navigable waters of the United States, or any work which would affect the course, location, condition, or capacity of those waters. The filling of the existing canal and construction of the coffer dams under proposed action are regulated under Section 10. The Holland Tract site provides the mitigation for impacts to wetlands and waters of the United States that will be required by CCWD's permit from USACE under Section 10.

Clean Air Act (42 USC § 7401 et seq.)

The project is consistent with the EPA's General Conformity Rule under the Clean Air Act. A preliminary analysis of air contaminant emissions for the project was done to determine if the construction of the proposed plan would generate nitrogen oxide (NO_x) and volatile organic compound (VOC) emissions (ozone precursors) above de minimus levels specified in the General Conformity rules, as established by the Clean Air Act. Modeling estimates show maximum emissions during construction of 5.02 tons of NO_x and 0.61 tons of VOC which are well below the de minimus level of 100 tons per year each for NO_x and VOC.

Executive Order 11988 – Floodplain Management

This Executive Order directs Federal agencies to evaluate the potential effects of proposed actions in floodplains. The activities associated with construction of the project must be located in the floodplain to fulfill the project's basic purpose. The proposed activity will not induce increased flooding in developed areas and will reduce future flood damages.

Executive Order 11990 – Protection of Wetlands

This Executive Order directs Federal agencies to avoid undertaking or assisting in new construction located in wetlands, unless no practical alternative is available. The proposed project will result in impacts to jurisdictional wetlands. Given the water supply related nature of the project and the location of the existing facilities no practical alternative exists to avoid impacts to wetlands. The impacts from construction activities will be mitigated on the Holland Tract site.

Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority and Low-Income Populations

Executive Order 12898 established the priority of analyzing environmental justice for any action that could cause disproportionately high and adverse human health or environmental effects to a minority and/or disadvantaged populations. From an economic and ethnic standpoint, the population in the project area is not considered to be predominately low income or minority.

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Personal Communications

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Contra Costa Water District

Mark Seedall, Senior Planner

Section 8 Comments and Responses

No comments were received on the draft EA.

Appendix A – Species Lists and NMFS Correspondence

**Fish and Wildlife listed species that should be addressed in detail in the Contra Costa
Canal Encasement Project ASIP
May 23, 2006**

- San Joaquin kit fox (*Vulpes macrotis mutica*)
- giant garter snake (*Thamnophis gigas*)
- California red-legged frog (*Rana aurora draytonii*)
- California tiger salamander (*Ambystoma californiense*)
- delta smelt (*Hypomesus transpacificus*)
- valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)
- Antioch Dunes evening primrose (*Oenothera deltoides ssp. howellii*)

OPTIONAL FORM 99 (7-80)

FAX TRANSMITTAL # of pages

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DEPARTMENT OF FISH AND GAME

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Central Valley Bay-Delta Branch
4001 North Wilson Way
Stockton, California 95205-2486
(209) 948-7800



RECEIVED

MAY 26 2006

Contra Costa Water Dist.
Planning

May 23, 2006

Mr. Mark Seedall
Senior Planner
Contra Costa Water District
1331 Concord Avenue
Concord, Ca 94524

Subject: Species List for the Contra Costa Canal Encasement Project ASIP

Dear Mr. Seedall:

Enclosed please find the species list for the Contra Costa Canal Encasement Project ASIP. This species list covers the following USGS 7.5 minute quadrangles: Brentwood, Jersey Island, and Woodward Island. This list is by no means exhaustive and if additional species distribution information becomes available, we will update this list as necessary.

If you have any questions regarding the enclosed list or need additional information, please contact Ms. Anna Holmes of my staff at 209-948-7163 or email her at aholmes@delta.dfg.ca.gov.

Sincerely,

James Starr
Senior Biologist
Central Valley Bay-Delta Branch

Enclosure

cc: Contra Costa Water District
Mr. David Briggs

Department of Fish and Game
Central Valley Bay-Delta Branch
Ms. Anna Holmes

U.S. Bureau of Reclamation
Fresno, California
Ms. Shauna McDonald

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**Species List for the Contra Costa Canal Encasement Project ASIP
May 23, 2006**

<u>Species</u>	<u>MSCS Species Goal</u>
<u>Fish</u>	
Delta Smelt (<u>Hypomesus transpacificus</u>)	R
Longfin Smelt (<u>Spirinchus thaleichthys</u>)	R
Sacramento Splittail (<u>Pogonichthys macrolepidotus</u>)	R
Fall/Late Fall-Run Chinook Salmon (<u>Onchorynchus tshawytscha</u>)	R
Spring-Run Chinook Salmon (<u>Onchorynchus tshawytscha</u>)	R
Winter-Run Chinook Salmon (<u>Onchorynchus tshawytscha</u>)	R
<u>Amphibians</u>	
California Red-Legged Frog (<u>Rana aurora draytonii</u>)	m
California Tiger Salamander (<u>Ambystoma californiense</u>)	m
<u>Reptiles</u>	
Giant Garter Snake (<u>Thamnophis gigas</u>)	r
Silvery Legless Lizard (<u>Anniella pulchra pulchra</u>)	
Western Pond Turtle (<u>Clemmys marmorata</u>)	m
<u>Birds</u>	
Western Burrowing Owl (<u>Athene cunicularia</u>)	m
California Black Rail (<u>Laterallus jamaicensis coturniculus</u>)	r
Swainson's Hawk (<u>Buteo swainsoni</u>)	r
Tricolored Blackbird (<u>Agelaius tricolor</u>)	m
White-Tailed Kite (<u>Elanus leucurus</u>)	m
<u>Mammals</u>	
San Joaquin Kit Fox (<u>Vulpes macrotis mutica</u>)	m
<u>Plants</u>	
Antioch Dunes Evening Primrose (<u>Oenothera deltoides</u> ssp. <u>howellii</u>)	R
Delta coyote-thistle (<u>Eryngium racemosum</u>)	r
Delta Mudwort (<u>Limosella subulata</u>)	r
Delta Tule Pea (<u>Lathyrus jepsonii</u> var. <u>jepsonii</u>)	r
Diamond-petaled California Poppy (<u>Eschschozia rhombipetala</u>)	m
Mason's Lilaeopsis (<u>Lilaeopsis masonii</u>)	R
Rose Mallow (<u>Hibiscus lasiocarpus</u>)	m
Suisun Marsh Aster (<u>Aster lentus</u>)	R

MSCS Species Goals

R = Recovery

r = Contribute to recovery

m = Maintain



DEPARTMENT OF FISH AND GAME

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Central Valley Bay-Delta Branch
4001 North Wilson Way
Stockton, California 95205
(209) 948-7800



May 24, 2006

RECEIVED

Mr. Mark Seedall
Senior Planner
Contra Costa Water District
1331 Concord Avenue
Concord, California 94524

MAY 30 2006

Contra Costa Water Dist.
Planning

Subject: NCCP Habitats List for the Contra Costa Canal Encasement Project ASIP

Dear Mr. Seedall:

Enclosed please find the NCCP habitats list for the Contra Costa Canal Encasement Project ASIP. Evaluation of potential impacts to these habitats in the ASIP will assist the Department of Fish and Game with issuing NCCP findings for your project. This list is by no means exhaustive and if additional NCCP habitat information becomes available, we will update this list as necessary.

If you have any questions regarding the enclosed list or need additional information, please contact Ms. Anna Holmes of my staff at (209) 948-7163 or email her at aholmes@delta.dfg.ca.gov.

Sincerely,

James Starr
Senior Biologist
Central Valley Bay-Delta Branch

Enclosure

cc: Contra Costa Water District
Mr. David Briggs

Department of Fish and Game
Central Valley Bay-Delta Branch
Ms. Anna Holmes

U.S. Bureau of Reclamation
Fresno, Ca
Ms. Shauna McDonald

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**NCCP Habitats for the Contra Costa Canal Encasement Project ASIP
May 24, 2006**

NCCP Habitat

Tidal Perennial Aquatic
Valley Riverine Aquatic
Tidal Freshwater Emergent
Nontidal Freshwater Permanent Emergent
Natural Seasonal Wetland
Valley/Foothill Riparian
Grassland
Inland Dune Scrub

*NCCP Fish Groups will be addressed separately as part of the individual species evaluation.

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FRESNO, CA



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802- 4213

2006 JAN 25 A 11:17

JAN 23 2006

In response refer to:
151422SWR2004SA9129:BFO

Kathy Wood
Acting Area Manager
Chief Resources Management Division
South-Central California Area Office
1243 N Street
Fresno, California 93721-1813

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FILE CODE ENW-7.00

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Dear Ms. Wood:

This is in response to your letter of November 15, 2005 (SCC-424, ENV-7.00), requesting concurrence under section 7 of the Endangered Species Act (ESA) that the Contra Costa Canal improvement project is not likely to adversely affect Federally endangered Sacramento River winter-run Chinook salmon (*Oncorhynchus tshawytscha*), threatened Central Valley spring-run Chinook salmon (*O. tshawytscha*), threatened Central Valley steelhead (*O. mykiss*), and proposed threatened North American green sturgeon (*Acipenser medirostris*), or critical habitat and Essential Fish Habitat (EFH) for these salmon populations.

The U.S. Bureau of Reclamation (BOR) proposes to encase a four-mile stretch of the earthen Contra Costa Canal (CCC) from the City of Oakley to the water intake at Rock Slough in the Delta. An eleven-foot diameter concrete pipe would be buried five to seven feet below the existing canal bed. There will be a small open water area (100 feet) between the unscreened pipe and the headworks/trash rack that will form a transition area. Another 100-foot opening will be left between Pumping Plant One (PP1) and the pipeline. The remaining canal (above the pipeline) will be filled in and re-graded with soil from the berms on either side. The CCC is owned by BOR and is part of the Central Valley Project. Currently, the Contra Costa Water District (CCWD) operates and maintains the CCC to divert raw water from the Delta to its water treatment facilities. The operational effects of the Rock Slough Diversion on listed species have been previously addressed in the 2004 biological opinion on long-term Central Valley Project and State Water Project Operations, Criteria and Plan (OCAP). The proposed CCC encasement project is part of the larger CALFED (renamed California Bay-Delta Authority) Rock Slough Water Quality Improvement Project, under the Drinking Water Program.

The inside of the CCC is subject to tidal action and the wetted surface is 75 feet wide and 10 feet deep at mean tide. The canal is concrete lined beyond PP1 for the remaining 44 miles between Antioch and Oakley. Four pumping plants raise the water to an elevation where the raw water flows by gravity to CCWD's municipal, industrial, and limited agricultural users.



Within the project area there are four small perennial drainages (*i.e.*, Marsh Creek, Dutch Slough, Emerson Slough, and Jersey Slough) that the pipeline will have to cross. All except Marsh Creek are usually dry during the summer. Marsh Creek has sustained flows in the summer due to discharge from the Brentwood Wastewater Treatment Plant, and fall-run Chinook salmon (*O. tshawytscha*) have been observed occasionally in the creek. The surrounding land is largely rural but is rapidly being converted to residential homes. The proposed encasement project is needed to protect water quality from groundwater contamination and for public safety. The replacement of the open canal with the pipeline is expected to occur in phases over the next three to five years. Construction is planned to begin on the west side at PP1 and proceed eastward toward the intake. Pumping would be shut down from July through February each year to dewater and excavate four to five feet of sediment on the bottom of the canal.

Endangered Species Act

NOAA's National Marine Fisheries Service (NMFS) has reviewed the effects analysis and project description provided with BOR's letter dated November 15, 2005. NMFS had previously reviewed and commented on the Draft Biological Resources Report for the CCC which detailed past fish studies (Tenera 2005). Informal comments by e-mail and phone conversation were provided by NMFS to Shauna McDonald in the Fresno Office. NMFS also receives and reviews monthly fish monitoring reports on the Rock Slough Diversion, pursuant to the 2004 OCAP biological opinion. Based on the above review, we concur that the proposed CCC encasement project is not likely to adversely affect Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead, the distinct southern population segment of green sturgeon, or the critical habitat and EFH for these salmon populations. None of the primary constituent elements for critical habitat for the above listed salmonids exist in the proposed action area or would be affected by the proposed action.

This concurrence is based on NMFS's determination that the effects of the proposed project are expected to be discountable (*i.e.*, extremely unlikely to occur) and in the long term, beneficial when compared to the current baseline conditions. Based on this review and the best scientific and commercial information available, NMFS expects that adverse impacts to listed salmonids and critical habitat will be avoided due to the proposed construction schedule and conservation measures incorporated into the project description. Juvenile Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and Central Valley steelhead emigrating through the Delta are not likely to be present in CCC during the construction due to the time of year and shut down in pumping. Additionally, measures will be taken to limit sedimentation and turbidity that may enter Rock Slough, thus avoiding adverse impacts to designated critical habitat for Central Valley steelhead.

Long term benefits to listed salmonids are expected to occur after the project is completed through: (1) a reduction in entrainment into the CCC due to reduced approach velocity and tidal volume (*i.e.*, entrance to the new pipeline is significantly less than the current canal intake); (2) predation (*i.e.*, the major source of mortality) within the CCC would be eliminated; and (3) the amount of herbicide and pesticide used to maintain the canal would be reduced. There are no effects to designated critical habitat for listed salmonids within the proposed action area, because

the nearest critical habitat for Central Valley steelhead is approximately one mile away in Dutch Slough, Sand Mound Slough, and Rock Slough (70 FR 52488). The proposed action would result in no measurable change in Central Valley Project or State Water Project operations, including Delta pumping rates, which have already been analyzed in NMFS biological opinions. These biological opinions include incidental take statements pursuant to section 7(b)(4) and section 7(o)(2) of the ESA that exempt anticipated project impacts from the prohibitions of section 9.

North American Green Sturgeon

On April 6, 2005, NMFS proposed listing the southern distinct population segment (DPS) of the North American green sturgeon (green sturgeon) as threatened (70 FR 17386). The deadline under ESA for making a final decision is April 6, 2006. The description of the southern DPS was revised based on new information that showed the majority of adults spawn in only one river (*i.e.*, the Sacramento River) and that a decline in abundance had occurred at the Delta fish salvage facilities from 1968 through 2001 (*i.e.*, Skinner Fish Collection Facility and Tracy Fish Collection Facility). Juvenile green sturgeon rear from one to four years in the Delta before dispersing into salt water and both adults and juveniles are reported to feed on benthic invertebrates including shrimp, mollusks, and amphipods.

Fish monitoring studies in CCC from 1993 through 1996 (DFG 2003) and from 2004 through 2005 (Tenera 2005) have shown that green sturgeon are not present and do not use the project area for feeding or rearing, therefore, the proposed construction activity in CCC is not likely to adversely affect the southern DPS of green sturgeon.

This concludes informal consultation for the proposed action. No further action pursuant to the ESA is necessary by BOR; however, re-initiation of the consultation process may be required if one of the following criteria is met: (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this review; (2) the action is subsequently modified in a manner that causes adverse effects to listed species not previously considered; or (3) a new species is listed or critical habitat designated that may be affected by this action.

Essential Fish Habitat

BOR has determined that the proposed action will have insignificant adverse effects on EFH for Sacramento River winter-run Chinook salmon, Central Valley spring-run Chinook salmon, and fall/late fall-run Chinook salmon as described in Amendment 14 of the Pacific Salmon Fishery Management Plan pursuant to the Magnuson-Stevens Act (MSA). The four-mile section of CCC proposed to be encased is EFH for all three runs of Chinook salmon. In addition, Marsh Creek is EFH for fall/late fall-run Chinook salmon.

The proposed canal encasement project will result in reduced productivity due to the removal of emergent vegetation and dredging the substrate. There will be a loss of habitat and prey species, such as insect larvae. However, since the habitat in CCC is considered of poor quality to


salmonids, lacking in primary constituent elements (70 FR 52488), and since predation is significant, 84 percent in a three year study (DFG 2003), we anticipate that most juvenile Chinook salmon will be preyed upon before they can leave the canal. Therefore, we concur with BOR that in the long-term, the proposed canal encasement project would benefit Chinook salmon by reducing predation (*i.e.*, less Chinook salmon would enter the proposed smaller diameter pipeline than the current open canal). A similar conclusion was reached in the draft Biological Resources Report, "the loss of this habitat for anadromous fishes is negligible due to the dead end configuration of the canal and the high predation rates within this section of the canal" (Tenera 2005).

Indirect construction related impacts (*e.g.*, turbidity, sedimentation, and sound) are likely to be of short duration and minimized by: (1) the reduction in pumping during construction, (2) the use of bypass culverts approved by NMFS at stream crossings, (3) fish relocation methods, (4) best management practices, and (5) spill prevention plans. Those few individuals that may encounter the construction site are likely to avoid the project area due to the dead-end nature of the canal. The work window for Marsh Creek will be confined to the June 1 through November 15 time frame to minimize impacts to adult fall/late fall-run Chinook salmon that might be emigrating upstream. A bypass will be constructed at the Marsh Creek crossing to maintain tidal connectivity during the construction period that will allow for passage of adult and juvenile Chinook salmon. All creek and slough crossings will be restored to pre-project conditions. Temporary impacts due to loss of emergent vegetation and turbidity downstream will be limited to time periods when water temperatures are generally too high for fall/late fall-run Chinook salmon to be present in Marsh Creek and Rock Slough.

We find no additional effects of this proposed project to EFH that were not included in the effects analysis provided with BOR's letter dated November 15, 2004. Therefore, additional EFH conservation recommendations will not be provided. Written response as required under section 305(b)(4)(B) of the MSA and Federal regulations (50 CFR §600.920) will not be required. Should additional information reveal that the project may affect EFH and/or impact salmonids in a way not previously considered, or should the action be modified in a way that may cause additional effects to EFH, this determination may be reconsidered.

Please contact Mr. Bruce Oppenheim at (916) 930-3603, or via email at bruce.oppenheim@noaa.gov if you have any questions regarding this letter or require additional information.

Sincerely,


for Rodney R. McInnis
Southwest Regional Administrator

cc: NMFS-PRD, Long Beach, CA
NMFS-HC, Brian Mulvey, Santa Rosa, CA

Mark Seedall, Contra Costa Water District, 2411 Bisso Lane, Concord, CA 94520

Literature cited:

California Department of Fish and Game (DFG). 2003. Contra Costa Canal Fish Entrainment Sampling. Three-Year Summary Report (October 1993 – August 1996). Prepared for U.S. Bureau of Reclamation and Contra Costa Water District. 25 pp.

Tenera Environmental. 2005. Draft Biological Resources Report. Contra Costa Canal, Rock Slough Headworks to Pumping Plant Number One. Prepared for Contra Costa Water District. April 26, 2005. 32 pp.

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National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Sacramento Area Office
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Sacramento, California 95814-4706

June 11, 2007

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Kathy Wood
Chief, Resources Management Division
U.S. Bureau of Reclamation
South-Central California Area Office
1243 N Street
Fresno, California 93721-1813

Dear Ms. Wood:

This letter is in response to your letter dated March 19, 2007, requesting confirmation of a previous concurrence letter written by NOAA's National Marine Fisheries Service (NMFS). On January 23, 2006 (see attached), NMFS sent a letter to the U.S. Bureau of Reclamation (BOR) concurring with a "not likely to adversely affect" for the proposed joint BOR and Contra Costa Canal Replacement project (151422SWR2004SA9129:BFO). Since that time, the applicant, Contra Costa Water District (CCWD), has modified the project description (see Action Specific Implementation Plan dated March 21, 2007). BOR has determined that those changes would not alter any of the previous effects determinations.

The proposed action is the same as previously described in our January 23, 2006, letter with the exception of the nine changes summarized below:

- (1) Duration of project: the project will take nine years instead of five years, with three to five phases beginning in July 2007.
- (2) The number of pipelines has been reduced from two to one pipeline ten feet in diameter.
- (3) 47 acres of wetland mitigation for terrestrial species was added, but not for fish species.
- (4) Cofferdam construction will take place from July to November.
- (5) Dewatering and fish rescue will occur in March and April 2008.
- (6) Groundwater wells to dewater the construction site are now proposed with the discharge onto adjacent agricultural lands instead of Marsh Creek or sloughs that drain to the delta.
- (7) Minor modifications to Pumping Plant 1 are proposed to accommodate the new pipeline.
- (8) Bypass culverts are only proposed for Marsh Creek, due to one-way tide gates and existing pipelines that prevent water flowing upstream near the tidal slough crossings.
- (9) A separate waiver of the existing "No fill and No Diversion" periods will be made for each phase of the construction to comply with existing biological opinions.

The NMFS has reviewed the final Action Specific Implementation Plan (ASIP) dated March 21, 2007, containing the changes to the project description listed above and concurs with BOR's

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determination that all of the short term effects are “not likely to adversely affect” or small enough as to be wholly insignificant. The long-term effects of the project are considered beneficial as a reduction in entrainment and predation through the currently unscreened diversion will occur through removal of the tidal influence (*i.e.*, construction of a pipeline instead of an open canal) and lowering of the approach velocities. Flows through the headworks at Rock Slough will be reduced from a range of 450 to 800 cubic feet per second (cfs) to 0 to 350 cfs. Tidal inflows will be nearly eliminated at the headworks. The resulting approach velocities with a pipeline in place range from nearly 0 to 0.55 ft per second. Therefore, listed fish species that encounter the diversion are less likely to be entrained into the proposed pipeline.

Confirmation of the BOR’s original determination is based on the proposed construction periods occurring when listed fish species are not present, Table 2-2 (ASIP) below. In addition, the proposed pipeline construction will occur behind cofferdams that have been screened of all fish species. NMFS will work with CCWD to design the most appropriate bypass criteria for Marsh Creek and review the Fish Rescue Plan for behind the cofferdams. NMFS does not expect listed fish species to be caught behind the cofferdam due to timing of the cofferdam construction and past experience with similar projects on the Sacramento River and American River where listed fish are more abundant yet none have been caught.

Table 2.2. from 2007 ASIP.

Illustrative Construction Timing for the Canal Replacement Project		
Months	Activity Type	Construction Duration
July to November 2007	Coffer dam, access road	Less than 1 month
March to April 2008	Dewatering	Less than 1 week
April 2008	Topple berms, construct road	1 month
March to April 2008	Fish rescue	1 week
April 2008	Install groundwater wells	1 month
July to September 2008	Pipeline construction at Marsh Creek	1 to 2 months
May to October 2008	Pipeline construction	Up to 6 months
October 2008 to June 2009	Surface restoration	1 to 2 months
October 2008 to June 2009	Power line replacement	1 month

The proposed best management practices will reduce sedimentation, turbidity and noise and the spill prevention plan will protect aquatic habitat from contamination. The proposed discharge location for groundwater pumping will eliminate false attraction flows in Marsh Creek and no aquatic habitat containing listed fish species will be affected by the proposed 47 acre wetland mitigation plan (*i.e.*, located behind levees on Holland Tract). The use of aquatic herbicides in the Contra Costa Canal will be eliminated by the proposed pipeline, thus indirect impacts from current maintenance practices to critical habitat in Rock Slough will be reduced.

BOR has determined that the proposed action will have insignificant adverse effects on Essential Fish Habitat (EFH) for fall run Chinook salmon as described in Amendment 14 of the Pacific salmon fishery Management Plan pursuant to the Magnuson-Stevens Act. The 3.97 miles of

Contra Costa Canal proposed to be replaced with a pipeline and Marsh Creek are considered to be EFH. The proposed pipeline will result in reduced productivity due to removal of the emergent vegetation and possible food supply. However, that same emergent vegetation is considered of poor quality, lacking in primary constituent elements and high in predation impacts. Since the benefits of reduced predation outweigh the loss of the emergent vegetation the proposed project is considered beneficial for juvenile fall-run Chinook salmon. Indirect construction impacts, such as the Marsh Creek crossing are expected to be minimized through the use of a bypass during the construction phase. Short term construction impacts will be limited to the time period in which adult and juvenile fall-run Chinook are not present in Marsh Creek and Rock Slough (ASIP Table 2.2). Therefore, NMFS confirms that the changes made to the proposed project will not alter the previous concurrence determination. The proposed conservation measures provide for EFH recommendations, thus a written response is not required. Should additional information reveal that the project may affect EFH and/or impact salmonids in a way not previously considered, or should the action be modified in a way that may cause additional effects to EFH, this confirmation may be reconsidered.

Please contact Mr. Bruce Oppenheim at (916) 930-3603, or via e-mail at Bruce.Oppenheim@noaa.gov, if you have any questions concerning this project or require additional information.

Sincerely,



Maria Rea
Sacramento Area Supervisor

cc: Copy to file: ARN 151422SWR2004SA9129
NMFS-PRD, Long Beach, CA