NOTICE OF PUBLIC REVIEW

FINDING OF NO SIGNIFICANT IMPACT AND NOTICE OF INTENT TO ADOPT A MITIGATED NEGATIVE DECLARATION

ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements

Pursuant to the National Environmental Policy Act of 1969 and the State of California Public Resources Code "Guidelines for Implementation of the California Environmental Quality Act of 1970" as amended to date, this is to advise you that the United States Army Corps of Engineers intends to adopt a Finding of No Significant Impact (FOSNI) and that the Alameda County Water District (ACWD) and the Alameda County Flood Control and Water Conservation District (ACFCD) are issuing this Notice of Intent to adopt a subsequent Initial Study/Mitigated Negative Declaration (IS/MND) for the ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements (Project) in Fremont, California. An Initial Study/Mitigated Negative Declaration - Environmental Assessment FONSI (IS/MND-EA/FONSI) was prepared in accord with the Council of Environmental Quality regulations and California Code of Regulations.

The proposed Project/Action involves:

- Construction of a new fishway at ACWD's Rubber Dam 1 and ACFCD's drop structure
- Construction of a new fishway at ACWD's Rubber Dam 3; replacement of the existing Rubber Dam 3 material, equipment and controls with new materials;
- Replacement of the existing Rubber Dam 1 equipment and controls with new materials; and
- Construction of a new Shinn diversion and fish screening facility and decommissioning the existing unscreened diversion pipelines.

The purpose of this Project/Action is to remove migratory impediments and improve the migratory corridor to allow Central California Coast steelhead and other fish to migrate past the facilities to San Francisco Bay.

The IS/MND-EA/FONSI describes the proposed Project/Action, analyzes whether the Project/Action would result in any potential significant environmental impacts, describes measures that would avoid, minimize and mitigate any potential significant impacts to less than significant level, and determines that the Project/Action, which incorporates a number of mitigation measures, will not have a significant adverse effect on the environment.

The IS/MND-EA/FONSI is available for public review at the following locations during normal business hours:

ACWD Headquarters 43885 South Grimmer Blvd. Fremont, CA 94538	Fremont Public Library 2400 Stevenson Boulevard Fremont, CA 94538	Union City Library 34007 Alvarado-Niles Rd. Union City, CA 94587	ACFCD Offices 399 Elmhurst St., Room 201 Hayward, CA 94544

In addition, the IS/MND-EA/FONSI is available online at www.acwd.org under Fish Passage and Related Projects>Current Projects and at

http://acgov.org/pwa/library/environmental.htm.

Public Comment Period - The period for accepting comments on the adequacy of the environmental documents is from **October 3, 2016 to 5:00 P.M., November 3, 2016**. Any comments must be in writing or e-mail and submitted to the following address:

Alameda County Water District
43885 South Grimmer Boulevard
Fremont, CA 94538
Attn: Therese Wooding; Email: therese.wooding@acwd.com

The environmental document is expected to go before the ACWD Board of Directors and the ACFCD Board of Supervisors on **December 6, 2016.** To confirm the Board date, please contact Therese Wooding at (510) 668-4483.

Alameda County Water District
and
Alameda County Flood Control and Water Conservation District

Joint Lower Alameda Creek Fish Passage Improvements

Draft Initial Study with Mitigated Negative Declaration/ Environmental Assessment with Finding of No Significant Impacts

Prepared for

Alameda County Water District
43885 South Grimmer Boulevard
Fremont, CA 94538

Alameda County Flood Control & Water Conservation District
399 Elmhurst Street
Hayward, California 94544-1395

U.S. Army Corps of Engineers San Francisco District
2100 Bridgeway Sausalito, CA 94965

Prepared by

Hanson Environmental
446 Green View Court
Walnut Creek, CA 94596

October 2016

DRAFT
Mitigated Negative Declaration

Project Name: ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements

State Clearinghouse Number: To be determined

Project Location: Within Alameda Creek Flood Control Channel, approximately 0.75 miles downstream of I Street, Fremont, CA.

Applicant Contact Information:
Therese Wooding
Alameda County Water District
43885 South Grimmer Blvd.
Fremont, CA 94538

Email: therese.wooding@acwd.com

Project Description:
The Alameda County Water District (ACWD) and the Alameda County Flood Control and Water Conservation District (ACFCD) propose to implement the ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements (Project) in Fremont, California. The Project includes:

- Construction of a new fishway at ACWD's Rubber Dam 1 and ACFCD's drop structure
- Construction of a new fishway at ACWD's Rubber Dam 3
- Replacement of the existing Rubber Dam 3 material, equipment and controls with new materials
- Replacement of the existing Rubber Dam 1 equipment and controls with new materials; and
- Construction of a new Shinn diversion and fish screening facility and decommissioning the existing unscreened diversion pipelines

The Project is described in greater detail in the attached Initial Study/CEQA checklist.

Measures Included in the Project to Reduce Potentially Significant Effects to a Level of Less-Than-Significant (See Initial Study for more detail on the measures outlined below)

Aesthetics: The proposed Project incorporates best management practices to reduce impacts to a level of less-than-significant. See Aesthetics

Agricultural Resources: None. No significant impacts are anticipated.

Air Quality: No significant impacts are anticipated. However, the proposed Project incorporates best management practices for dust control during construction. See Air Quality.

Biological Resources: The proposed Project incorporates mitigation measures and best management practices to reduce impacts to biological resources. See Biological Resources.

Cultural Resources: None. No significant impacts are anticipated.

Geology and Soils: None. No significant impacts are anticipated.

Hazards and Hazardous Materials: The proposed Project incorporates best management practices to minimize the potential for fuel, lubricant and other fluid leaks to affect groundwater quality during construction. See Hazards and Hazardous Materials.

Hydrology and Water Quality: The Project includes best management practices for construction to avoid and minimize potential construction-related effects on drainage and water quality. See Hydrology and Water Quality.

Land Use and Planning: None. No significant impacts are anticipated.

Mineral Resources: None. No significant impacts are anticipated.

Noise: The Project incorporates noise mitigation measures to reduce construction noise impacts on residential housing adjacent to the existing facilities. See Noise.

Population and Housing: None. No significant impacts are anticipated.

Public Services and Safety: None. No significant impacts are anticipated.

Recreation: The proposed Project incorporates measures to accommodate public use of the trails during construction. See Recreation.

Transportation and Traffic: The Project incorporates mitigation measures to reduce impacts from construction related traffic. See Transportation and Traffic.

Use of Energy: None. No significant impacts are anticipated but ACWD will implement energy saving actions.

Utilities and Service Systems: None. No significant impacts are anticipated.

Greenhouse Gas Emissions: None. The proposed Project would have no significant impact on Greenhouse Gas Emissions. See Air Quality.

Cumulative Impacts: The proposed Project incorporates cooperative monitoring of potential impacts to East Bay Regional Park District's local parks. See Cumulative Impacts.

Mandatory Findings of Significance: None. The proposed Project does not cause impacts that require a mandatory finding of significance.

FINDINGS AND MITIGATION MEASURES

With the implementation of the mitigation measures outlined above and detailed in the attached Initial Study (Table 9), the ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements will have less-than-significant impacts on the environment.

Date: ______________________, 2016

____
General Manager
Alameda County Water District

Date: ______________________, 2016

____
Environmental Services Manager
Alameda County Flood Control and Water Conservation District

FINDING OF NO SIGNIFICANT IMPACT (FONSI)
(33 CFR PART 230-325)

Joint Lower Alameda Creek Fish Passage Improvements (Project)

1. **Introduction**: Alameda County Water District (ACWD) and Alameda County Flood Control and Water Conservation District (ACFCD) are proposing a series of improvements as part of a comprehensive program for fish passage in the Alameda Creek Flood Control Channel between Mission Boulevard and the ACFCD Drop Structure in the urban reach of Alameda Creek. The ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements (Project) is intended to enhance steelhead and salmon access through the constructed flood control channel to historic upstream spawning and rearing habitats. The purpose of the Joint Fish Passage Project is to improve anadromous fish passage in the urban reach of the Alameda Creek Watershed while maintaining ACWD's water supply operations at its groundwater recharge facilities and ACFCD's flood control operations in the reach downstream of Mission Boulevard. The Joint Fish Passage Project is consistent with, and an integral element of, the 2002 Draft Steelhead Restoration Plan.

2. **Action:** Elements of the Joint Fish Passage Project include:

- Construction of a new fishway at ACWD's Rubber Dam 1 and ACFCD's drop structure
- Construction of a new fishway at ACWD's Rubber Dam 3
- Replacement of the existing Rubber Dam 3 material, equipment and controls with new materials
- Replacement of the existing Rubber Dam 1 equipment and controls with new materials; and
- Construction of a new Shinn diversion and fish screening facility and decommissioning the existing unscreened diversion pipelines.

These facilities and operations proposed by ACWD and ACFCD address the need for Central California Coastal (CCC) steelhead and salmon passage through this reach of the Flood Control Channel while supporting continued ACWD water supply and ACFCD flood control functions.

3. **Factors Considered:** Factors considered for this FONSI were direct, indirect, and cumulative impacts on aesthetics; agriculture; biological resources (including special status species); historic and cultural resources; geology and soils; hazards and hazardous materials; hydrology and water quality; land use and planning; mineral resources; noise; population and housing; public services; recreation; transportation and traffic; use of energy; utilities and service systems; greenhouse gas emissions.

4. **Conclusion:** Based on a review of the information incorporated in the EA, including views of the United States Army Corps of Engineers (USACE) and resource agencies having special expertise or jurisdiction by law, the USACE concludes the proposed activity would not significantly affect the quality of the physical, biological, and human environment. In addition, avoidance, minimization, and mitigation measures are proposed to further support this determination. Pursuant to the provisions of the National Environmental Policy Act of 1969, the preparation of an additional Environmental Impact Statement (EIS) will therefore, not be required.

   Approved by:

John K. Baker, P.E., PMP
Lieutenant Colonel, U.S. Army
Commanding

Date

Alameda County Water District
and
Alameda County Flood Control and Water Conservation District

Joint Lower Alameda Creek Fish Passage Improvements

Draft Initial Study/CEQA Checklist
And NEPA Environmental Assessment

Prepared for

Alameda County Water District
43885 South Grimmer Boulevard
Fremont, CA 94538

Alameda County Flood Control & Water Conservation District
399 Elmhurst Street
Hayward, California 94544-1395

U.S. Army Corps of Engineers San Francisco District
2100 Bridgeway Sausalito, CA 94965

Prepared by

Hanson Environmental
446 Green View Court
Walnut Creek, CA 94596

October 2016

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ACRONYMS AND ABBREVIATIONS

ABAG Association of Bay Area Governments

ACFCD Alameda County Flood Control & Water Conservation District

ACWD Alameda County Water District

ATCM Airborne Toxic Control Measure

BAAQMD Bay Area Air Quality Management District

BMPs Best Management Practices

CACI Clean Air Communities Initiative

CAP Climate Action Plan

CARB California Air Resources Board

CARE Community Air Risk Evaluation

CDFW California Department of Fish and Wildlife

CEMAR Center for Ecosystem Management and Restoration

CEQA California Environmental Quality Act

CFGC California Fish and Game Code

CNDDB California Natural Diversity Database

CNPS California Native Plant Society

CWA Clean Water Act

DWR California Department of Water Resources

EA/IS NEPA/CEQA Environmental Assessment and Initial Study Mitigated Negative Declaration

EIR Environmental Impact Report

EIS Environmental Impact Statement

EPA Environmental Protection Agency

ESA Environmentally Sensitive Area

FCAA Federal Clean Air Act

FCAAA Federal Clean Air Act Amendments

FEMA Federal Emergency Management Agency

FIRMs Flood Insurance Rate Maps

GHG greenhouse gas

HDP Heritage Documentation Programs

LLCR Local Levee Critical Repair

LOS Level of Service

MBTA Migratory Bird Treaty Act

MLD Most Likely Descendent

MOU Memorandum of Agreement

MMRP Mitigation Monitoring and Reporting Plan

NAAQS National Ambient Air Quality Standards

NAHC Native American Heritage Commission

NEPA National Environmental Policy Act

NFIP National flood Insurance Program

NHPA National Historic Preservation Act

NMFS National Marine Fisheries Service

NRHP National Register of Historic Places

ODS Oliver de Silva

OPR Governor's Office of Planning and Research

PLC Programmable Logic Controller

PIT Tag Passive Integrated Transponder Tag

PM particulate matter

PRBO Point Reyes Bird Observatory

SBA Soth Bay Aquaduct

SFRWQCB San Francisco Regional Water Quality Control Board

SHPO State Historic Preservation Officer

SIP State Implementation Plan

SFPUC San Francisco Pblic Utilities Comission

SMP Surface Mining Permit

SWP State Water Project

SWPPP Stormwater Pollution Prevention Plan

TACs Toxic Air Contaminants

TMDL Total Maximum Daily Limit

UACFGP Upper Alameda Creek Filter Gallery

USACE U.S. Army Corps of Engineers Operational Division

USACE U.S. Army Corps of Engineers

USFWS U.S. Fish and Wildlife Service

USGS U.S. GEOLOGICAL SRVEY

VTO VALLECITOS TURNOUT

WPCP WATER POLLUTION CONTROL PROGRAM

WSE WATER SURFACE ELEVATION

1.0 INTRODUCTION

Alameda County Water District (ACWD) and Alameda County Flood Control and Water Conservation District (ACFCD) are proposing a series of improvements as part of a comprehensive program for fish passage in the Alameda Creek Flood Control Channel between Mission Boulevard (upstream) and the ACFCD Drop Structure between the Union Pacific RR and BART Bridge (downstream) in the urban reach of Alameda Creek (hereafter "ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements", ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project", "Joint Fish Passage Project", or "Project"). The ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project is intended to enhance steelhead and salmon access through the constructed flood control channel to historic upstream spawning and rearing habitats. To accomplish this, while ensuring their respective water supply and flood control functions are maintained, ACWD and ACFCD propose to take the joint actions described herein.

1.1 CEQA/NEPA History

ACWD and ACFCD prepared a Draft Initial Study/Mitigated Negative Declaration (Draft IS/MND) in compliance with CEQA that was submitted to the State Clearing House for circulation and public review from March 28, 2013 to April 28, 2013. Review comments were received from the San Francisco Public Utility Commission (SFPUC) and others. The ACWD Board of Directors approved a final IS/MND in August 2013. The 2013 draft IS/MND and 2013 ACWD approved final IS/MND are available for public review at the Alameda County Water District office located at 43885 S. Grimmer Blvd. Fremont, CA 94538 between 8:00 AM and 5:00 PM Monday through Friday.

Subsequently, in response to review comments and refinements to the engineering design and construction schedule/planning of the Project, the Project description has been revised. Revisions to the Project Description and analysis of potential impacts included revisions to the construction schedule, changes to the construction sequencing among project elements, changes to the area of lower Alameda Creek that would be subject to dewatering and the duration of dewatering required for fish ladder construction, changes to the design of components of the Rubber Dam 1/ACFCD Drop Structure fishway, and further explanation of bypass flow operations including flows released upstream by SFPUC for instream flows, and other refinements. As a result of these changes to the Project Description, such as extending the Project construction schedule to four years, a number of the environmental analyses required revisions and updating (e.g., air quality, etc.) to reflect the updated Project Description and construction schedule, this subsequent IS/MND for the Fish Passage Project is being recirculated pursuant to CEQA Guidelines section 15162(d). In addition, U.S. Army Corps of Engineers will issue permits for the proposed Project and therefore need to comply with NEPA. For efficiency, the CEQA IS/MND has been revised to also serve as an Environmental Assessment with Finding of No Significant Impact for compliance with both NEPA and CEQA. This subsequent IS/MND has been updated in consideration of the comments received during the previous public review period and to reflect changes to the Proposed Project scope, engineering design, and construction schedule and is being recirculated for public review and comment.

1.2 Project Authorization

Historically flooding occurred in the lower reaches of Alameda Creek. To address the flooding issues the federal government authorized funding for a number of flood control projects under Public Law 89-298 (1965 Flood Control Act). The U.S. Army Corps of Engineers was responsible for the design and construction of a 12 mile reach of flood control conveyance channel and levee between Niles Canyon and San Francisco Bay. The flood control channel was completed in 1972. The Alameda County Flood Control & Water Conservation District (ACFCD) and Zone 7 Water Agency are responsible for mitigating risks of flooding in the lower reach of the watershed. These responsibilities include overseeing channel maintenance, erosion control, and dredging and sediment removal from the flood channel.

Significant alterations to a federal flood control channel by a non-federal entity are subject to permission from the Chief of Engineers, or his designee, under Section 408 (Title 33 of the United States Code, Section 408 [33 USC 408]) based on a determination that the alterations would not be injurious to the public. ACWD and ACFCD are the local Project sponsors of the Joint Lower Alameda Creek Fish Passage Improvements Project and have requested a determination from the USACE, under Section 14 of the Rivers and Harbors Act of 1899 (33 USC 408), to allow modification of the federal project. The specific activities that would alter the federal flood control channel are described below as part of the proposed Project description.

1.3 Purpose of the Environmental Assessment/Initial Study

As part of the Section 408 application process (33 USC 408) with USACE, the ACWD, ACFCD, and USACE have prepared this joint NEPA/CEQA Environmental Assessment and Initial Study Mitigated Negative Declaration (EA/IS) to satisfy requirements under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The Section 408 process is a review process whereby the applicant, requests USACE approval to significantly modify a locally or federally maintained USACE flood protection project. Originally enacted as part of the Rivers and Harbors act of 1899, 33 USC 408 requires the secretary of the Army to review and possibly approve the proposed modification. Construction of the proposed Joint Fish Passage Project facilities is an action over and above basic operation and maintenance within the flood control channel; therefore it is considered a significant modification that needs USACE approval.

1.4 Elements of the Joint Fish Passage Project

1. ACWD will modify bypass rates in the reach below Mission Boulevard to enhance flow/depth conditions for anadromous steelhead and other fish species;
2. ACWD will construct and operate a fish passage facility ("fishway") at ACWD's Rubber Dam 3 downstream of Mission Boulevard and the Union Pacific RR Bridge; construction includes modifying the Rubber Dam 3 foundation to incorporate a plunge pool for fish passage;
3. ACWD will replace the existing Rubber Dam 3 inflatable bag with a new bag; construction includes modifying the foundation to anchor the new bag material and make seismic related structural upgrades;
4. ACWD will construct and operate fish screens at a consolidated diversion site between Rubber Dam 3 and Rubber Dam 1, replacing the existing two Shinn Pond Diversions during or prior to modification to Rubber Dam 1 which would allow steelhead access to lower Alameda Creek. Fish screens will be installed at the Shinn Pond diversions prior to the date that steelhead would be present in the area (no diversions will be made to Shinn Pond from unscreened diversions once steelhead are present in lower Alameda Creek);
5. ACWD will modify the existing Rubber Dam 1 foundation to replace worn rubber dam piping, equipment and controls, and make seismic related structural upgrades;
6. ACWD and ACFCD will construct and operate a fishway at ACWD's Rubber Dam 1 and ACFCD’s drop structure (hereafter "ACFCD Drop Structure"); construction includes modifying the Rubber Dam 1 foundation to incorporate a plunge pool for fish passage; and renovation of the Rubber Dam 1 control building to accommodate fishway control equipment; and
7. ACWD and ACFCD will jointly develop and implement an Operation and Maintenance plan for the Rubber Dam 1/ACFCD Drop Structure fishway and associated facilities; and ACWD will develop an Operation and Maintenance plan for the Rubber Dam 3 fishway; ACWD O&M responsibilities include periodic replacement of the rubber dam bags.

These facilities and operations proposed by ACWD and ACFCD address the need for Central California Coastal (CCC) steelhead and salmon passage through this reach of the Flood Control Channel while supporting continued ACWD water supply and ACFCD flood control functions. The proposed action area and general facility location are shown in Figures 1 and 2, respectively.

New facilities for the ACWD-ACFCD Joint Fish Passage Project would be constructed, operated, and maintained in a disturbed flood control channel within an urban setting that substantially limits habitat suitability for the threatened and endangered species that may occur within the USGS Niles, Newark, and Mendenhall Springs Quads. The Action Area, as shown on Figure 1, consists of four distinct sub-areas, with different characteristics and different potential to affect listed species:

- The Flood Control Channel from Mission Boulevard to approximately 250 feet downstream of the BART Bridge, where facilities will be constructed, operated, and maintained (hereafter the Construction Reach);
- The ACFCD reach from Ardenwood Boulevard crossing to the downstream limits of the Project (hereafter ACFCD Reach);
- The Alameda Creek Estuary downstream of Alvarado Boulevard, where construction and maintenance may affect water quality (hereafter Estuary Reach); and
- The upstream reach of Alameda Creek, specifically the creek and tributaries used by ACWD to deliver water from the State Water Project's South Bay Aqueduct (SBA) turnout at Vallecitos Creek, (hereafter "Upstream Reach"). Releases from the SBA Vallecitos turnout flow through Vallecitos Creek, Arroyo de la Laguna, and the Niles Canyon Reach of Alameda Creek.

The Joint Fish Passage Project would be implemented within and along the north inboard slope of the US Army Corps of Engineers (USACE) Flood Control Channel in the urban reach of Alameda Creek. ACFCD maintains this federal flood control project in accordance with the USACE Maintenance & Operations manual under an agreement with the USACE. USACE Readiness Command and Regulatory branches would be responsible for meeting the requirements of the Federal NEPA. For the CEQA decision-making process, ACWD and ACFCD would make CEQA findings and would decide whether to authorize this Joint Fish Passage Project. If the Joint Fish Passage Project is approved, ACWD and ACFCD will amend an existing agreement to define each party's responsibilities in implementation of the Joint Fish Passage Project (see Table 1).

An Initial Study (IS) has been prepared as a basis for a California Mitigated Negative Declaration (MND), and an EA has been prepared to satisfy requirements under NEPA. A federal Biological Assessment has also been prepared to address the potential for construction, operation, and maintenance of facilities to adversely affect federally-listed threatened and endangered species. The Joint Fish Passage Project would be undertaken in the context of a comprehensive steelhead restoration program in the Alameda Creek watershed. In addition to addressing past projects and current activities in the Flood Control Channel, the IS addresses the cumulative impacts of the Joint Fish Passage Project in the context of other agency potential actions to address fish passage impediments in the Flood Control Channel (Table 1), including (a) on-going ACFCD sediment management, low-flow channel development, and levee repairs downstream of the ACFCD Drop Structure down to San Francisco Bay (Bay), (b) ACFCD actions to remove fish passage impediments (grade control structures) downstream of the ACFCD Drop Structure to the Bay, and (c) potential actions by other agencies to address fish passage impediments below the Isherwood, Decoto, and Interstate 880 bridges.

The construction and maintenance of ACWD-ACFCD Joint Fish Passage Project facilities temporarily adds to prior and currently on-going construction-related water quality effects in the Construction Reach and downstream reaches. Following completion of the Joint Fish Passage Project, facility construction will be complete, and subsequent cumulative effects will be limited to those associated with operations and maintenance of these facilities. No adverse cumulative effects are anticipated from the ACWD-ACFCD Joint Fish Passage Project bypass flow provisions.

In addition to these elements of the ACWD-ACFCD Project, ACFCD will *separately* make modifications/repairs to the flood control channel in the reach downstream of the ACFCD Drop Structure to the Bay. These modifications are not a part of this Project and their separable environmental effects will be addressed and documented by ACFCD. ACWD may also separately implement a project to address on-going maintenance, including bank stability issues, within Vallecitos Channel in the upstream reach.

Table 1. Summary of actions considered in cumulative effects analysis.

PROPOSED ACTION	RESPONSIBLE PARTIES	REACH
A. JOINT FISH PASSAGE PROGRAM FACILITIES		
Rubber Dam 3 Fishway and foundation modifications for fish passage	ACWD	Mission Boulevard to immediately downstream of RD1/ACFCD Drop Structure
Rubber Dam 3 Fabric Replacement and foundation modifications for seismic strengthening	ACWD	
Shinn Diversion Fish Screens	ACWD	
Rubber Dam 1 foundation modifications for seismic strengthening, and replacement of piping, equipment and controls	ACWD	
RD1/ ACFCD Drop Structure fishway and dam control building and foundation modifications for fish passage	ACWD & ACFCD	
B. JOINT FISH PASSAGE PROGRAM FLOW BYPASS RULES AND RELATED WATER MANAGEMENT		
Implement Flow Bypass Rules	ACWD	At water diversions between Mission Boulevard and RD1
Ongoing Use of SBA Supplies in range of historic practices	ACWD	Upstream Reach
C. RELATED PROJECTS EVALUATED IN CUMULATIVE EFFECTS ANALYSIS*		
1a. ACWD Completed or in progress Facility Modifications*		
Fish screens at Alameda Creek Pipeline, Bunting Pond, and Kaiser Pond		Upstream of Mission Boulevard to RD1
Decommissioning of RD2 and Larinier Fishway Construction		Downstream of RD1
1b. ACWD future projects*		
Vallecitos Channel Maintenance and Repairs		Upstream Reach
2. Other Potential Agency Facilities*		
Grade Control Modifications at Isherwood Road Bridge	City of Union City	Isherwood Road to Interstate 880
Grade Control Modifications at Decoto Road Bridge	City of Union City	
Grade Control Modifications at Interstate 880 Bridge	CA Department of Transportation	
Union City Intermodal Station Passenger Rail Project	Union City	South of the Flood Control Channel
Low flow channel optimization*	ACFCD	Between BART & Ardenwood Boulevard
Sediment removal/grading*	ACFCD	Between BART & Ardenwood Boulevard

Grade control sill*	ACFCD	Between BART and Decoto Boulevard.
Alameda Creek Recapture Project (ACRP)*	SFPUC	Sunol Valley Reach
Conservation Plan For Sunol Quarry SMP-30 Site*	Sunol Quarries	Sunol Valley Reach
Niles Mixed Use Project*	City of Fremont	Adjacent to RD3

*Subject to a separate environmental review and permitting

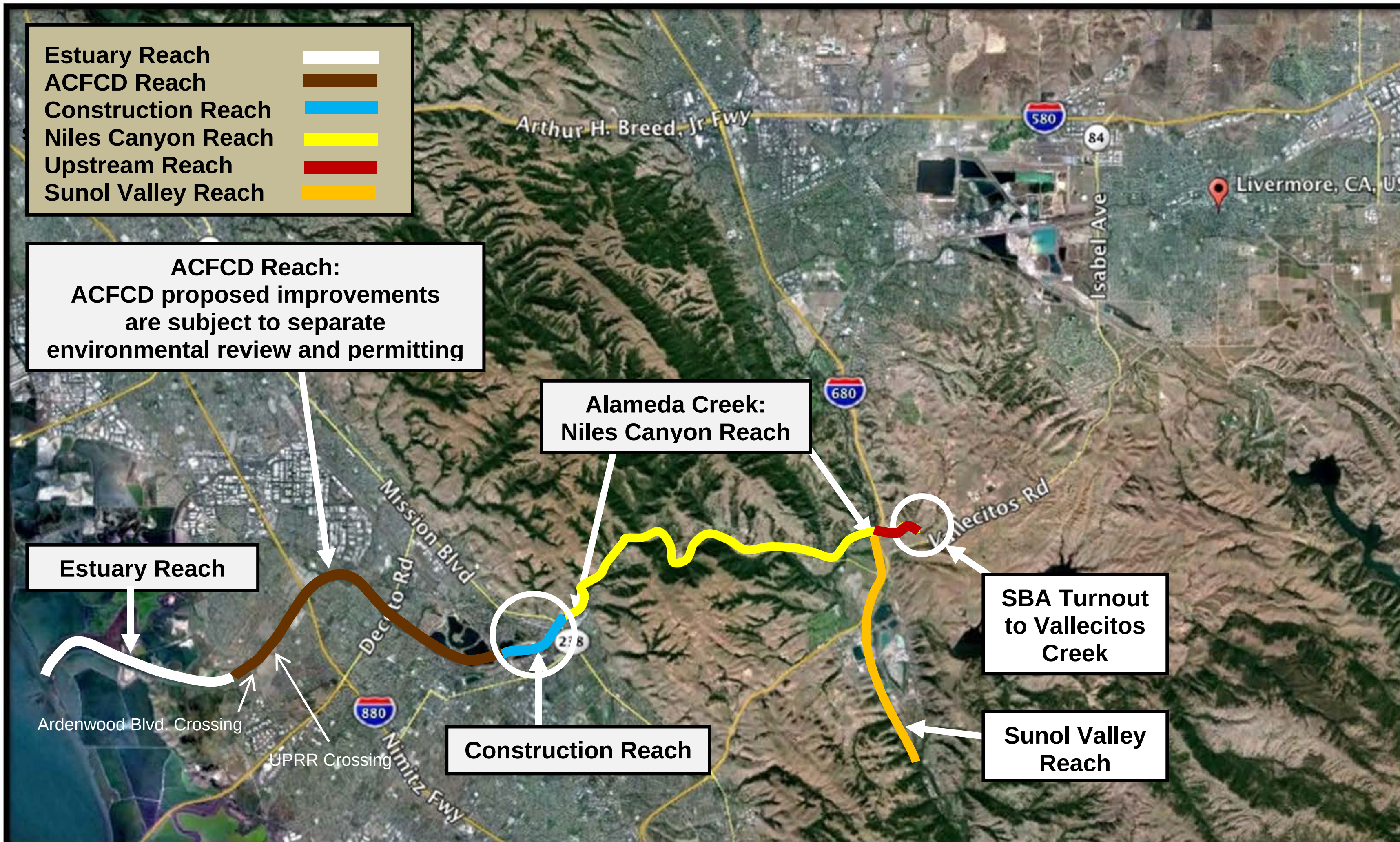

Figure 1. Action area of Joint Fish Passage Project facilities and the SBA Turnout to Vallecitos Creek (Google Earth 2012).

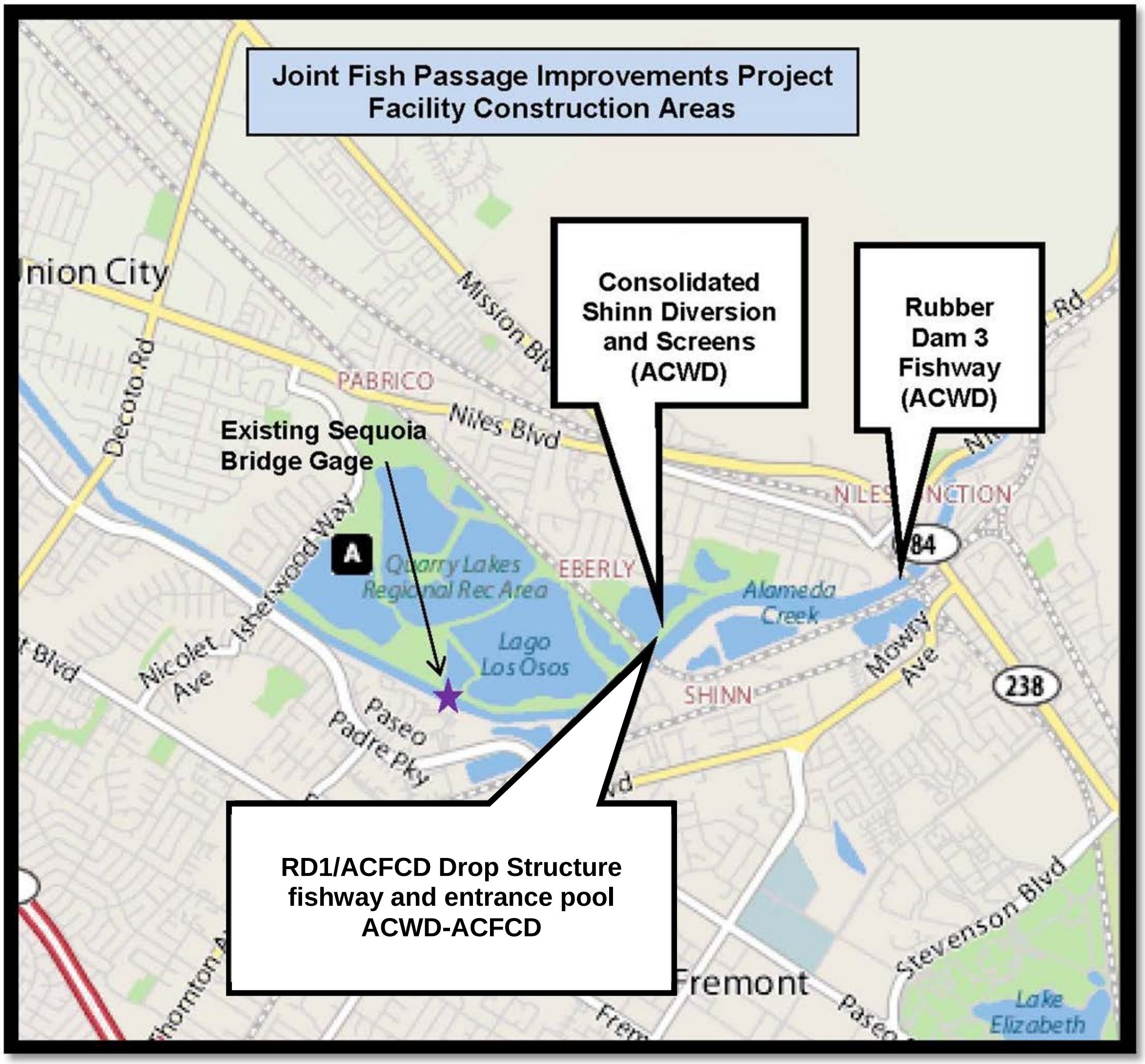

Figure 2. General location of the Joint Fish Passage Project facilities.

2.0 BACKGROUND

2.1 2002 Draft Steelhead Restoration Action Plan

As agencies with a major interest in management of water resources in Alameda Creek, ACWD and the ACFCD have been deeply involved in efforts to restore steelhead trout to Alameda Creek in collaboration with the Alameda Creek Fisheries Restoration Workgroup. Steelhead swim upstream to spawn, but man-made barriers along the creek are impairing the journey.

The Alameda Creek Watershed, including a number of perennial streams, is the largest drainage in the South San Francisco Bay region. The upper watershed areas are relatively undeveloped, and include areas designated as wilderness. Alameda Creek historically supported a number of native fish species, including Pacific lamprey (*Lampetra tridentata*), steelhead/rainbow trout (*Oncorhynchus mykiss*), California roach (*Lavinia symmetricus*), prickly sculpin (*Cottus asper*), Sacramento sucker (*Catostomus occidentalis*), Sacramento pikeminnow (*Pytchocheilus grandis*), threespine stickleback (*Gasterosteus aculeatus*), riffle sculpin (*Cottus gulosus*), and hitch (*Lavinia exilcauda*). Other anadromous salmonids are not known to use the creek (Alameda Creek Fishery Restoration Workgroup 2000). With the exception of riffle sculpin, these species continue to be found in the upper watershed. Five species of non-native fish, including largemouth bass, have been found in the creek.

Like steelhead, Pacific lamprey are anadromous, with a free-swimming parasitic or predatory marine adult stage and a freshwater immature stage (ammocoetes) that is a benthic filter feeder. Lamprey spawn in higher-gradient, cool-water streams with gravel beds. The ammocoete stage is thought to last five to seven years (Moyle 2002), although data for this stage is relatively incomplete since ammocoetes live within the substrate and are not easily captured or quantified using standard sampling methods such as electrofishing, seining, or snorkel surveys. Lamprey ammocoetes were, however, collected in 1998, 1999, 2001 and 2002 at several sites in Alameda Creek between Niles Canyon and the confluence with Calaveras Creek (Trihey & Associates, Inc. 2001 and SFPUC 2002a, 2002b, and 2002c). These collections are important because they demonstrate that lamprey can pass a number of barriers in Alameda Creek that prevent access by other anadromous fish, such as steelhead. Although the collected ammocoetes were assumed to be Pacific lamprey ammocoetes, taxonomy is inconclusive and it is possible that some of the collected ammocoetes may have been river lamprey.

Unlike Pacific lamprey, steelhead cannot pass several man-made barriers in Alameda Creek (including Rubber Dams 1 and 3, and the ACFCD Drop Structure). Resident rainbow trout inhabiting the upper portions of the Alameda Creek watershed have been identified through genetic studies (Neilsen and Fountain 1999, cited in CEMAR 2002) to be related to anadromous steelhead. These fish were probably of anadromous origin and were trapped in the upstream watershed following construction of the barriers in Alameda Creek. Anadromous steelhead, which have been listed as a threatened species under the Federal Endangered Species Act (Central California Coast ESU), do not currently inhabit upper Alameda Creek. Access to the creek by steelhead has been blocked by several impassable barriers. Although Alameda Creek has not been designated as critical habitat for anadromous steelhead, there is considerable effort regionally to restore historic runs of anadromous steelhead. Alameda Creek is a priority for regional restoration since it is considered to have adequate habitat to support a run of steelhead and it drains a relatively undeveloped watershed with high quality aquatic habitat in the upstream reaches of the creek and its tributaries.

In 1999, the Alameda Creek Fisheries Restoration Workgroup (hereafter Restoration Workgroup) was formed to cooperatively address issues related to restoring Alameda Creek Watershed fisheries, with a goal of restoring a self-sustaining population of native steelhead to the watershed. The Restoration Workgroup has been facilitated by the Center for Ecosystem Management and Restoration (CEMAR) for most of its existence. Over the 17-year course of meetings, involved parties in the Restoration Workgroup have varied. The participating organizations include:

Local Agencies

- Alameda County Flood Control and Water Conservation District
- Alameda County Water District
- Alameda County Resource Conservation District
- The City of Fremont
- East Bay Regional Parks District
- San Francisco Public Utilities Commission (SFPUC)
- Zone 7 Water Agency

State Agencies

- The Coastal Conservancy
- Caltrans
- Department of Fish and Wildlife
- Department of Water Resources
- Regional Water Quality Control Board

Federal Agencies

- National Marine Fisheries Service
- U.S. Army Corps of Engineers

Non-Agency Members

- Alameda Creek Alliance
- American Rivers
- Environmental Defense
- Natural Resources Defense Council
- Pacific Gas & Electric Company

In addition, a variety of interested parties have attended Restoration Workgroup meetings, including representatives from the American Fisheries Society, TriValley Fly Fishers, and USDA Natural Resources Conservation Services. Restoration Workgroup participants have been included in collaboration and consultation activities for the Project.

ACWD and ACFCD goals are to provide for enhanced steelhead and other species up- and downstream passage while maintaining flood protection capacity and ability to divert water from the creek. To assist in solving these problems without compromising their respective obligations for water supply and flood protection, ACWD and ACFCD have focused efforts on meeting two critical needs: make the channel passable for steelhead and other aquatic species and reduce entrainment of fish moving upstream and downstream by installing fish screens on facilities used to divert water from Alameda Creek.

For ACWD, the Joint Fish Passage Project would complete needed modifications to its water diversion facilities. For ACFCD, the Joint Fish Passage Project addresses the major barrier to steelhead migration, the ACFCD Drop Structure located between the Union Pacific RR Bridge and the BART Bridge footings. The Joint Fish Passage Project substantially enhances fish passage throughout the urban reaches of Alameda Creek.

ACFCD, under a separate CEQA effort, additionally plans to improve fish passage connectivity between the bay and RD1/Drop Structure fishway by providing for fish passage at three smaller grade control sills in the channel between the BART Bridge and Isherwood Road; and modifying the RD2 foundation and Larinier fishway to incorporate a low flow channel to support both efficient sediment transport and fish passage as part of its on-going program to manage and maintain the channel per the USACE Maintenance & Operations Manual.

2.2 Overview of Existing ACWD Water Supplies and Operations

2.2.1 Water Sources and Their Distribution

ACWD is a retail water purveyor with a service area encompassing the Cities of Fremont, Newark, and Union City. ACWD was formed in 1914 under the California County Water District Act and is governed by a five-member Board of Directors. It was originally created to protect the groundwater basin, conserve the waters of the Alameda Creek Watershed and develop supplemental water supplies, primarily for agricultural use. In 1930, urban distribution became an added function of the District. Today, operating under an Urban Water Management Plan (ACWD 2015-2020), ACWD provides water primarily to urban customers. ACWD's primary sources of water supply are from the (Table 2):

- Niles Cone Groundwater Basin;
- Natural runoff from the Alameda Creek Watershed;
- State Water Project (SWP);

- The San Francisco Public Utilities Commission's (SFPUC) Regional Water System (RWS); and
- Other sources, such as water purchases and water banking.

These supply sources are each managed differently (Table 2).

Table 2. ACWD water sources and related operations.

Supply Source	Percent of total supply*	Typical Periods of Use (m/d)	Methods of Delivery to ACWD
Natural Inflow	40	10/01 – 05/31	Natural flow in the creek, diverted to recharge and re-diversion facilities based on the October 1 to May 31 season of diversion specified in the SWRCB water right for ACWD
Del Valle Reservoir – (not included as a covered activity)		Variable	Via pipeline and release to creek managed and controlled by DWR
SFPUC Regional Water System	20	Year Round	Delivery by pipeline to ACWD's treated water system
State Water Project via South Bay Aqueduct Vallecitos Turnout	40	Year Round (typically 06/01 to 10/01)	Release to Alameda Creek at Sunol
State Water Project via Other SBA Turnouts (not included as a covered activity)		Variable	Via pipeline and release to creek
State Water Project via South Bay Aqueduct Bayside Turnouts		Year round	Delivery by pipeline to ACWD treatment plants only
Market Supplies, generally out of watershed	Variable	Variable, generally in dry years	Variable, generally via SBA turnouts or pipeline to ACWD treatment plants

*Values shown are typical averages for simplicity. Actual source contributions to overall supply may vary significantly seasonally and over time due to factors such as availability, water demands on ACWD's system, and optimization of water production efficiencies.

Niles Cone Groundwater Basin

The Niles Cone is an alluvial aquifer system that is divided by the Hayward Fault. The fault is a relatively impermeable barrier that impedes the flow of water, hence dividing the overall basin into two sub-basins. The portion of the Niles Cone on the east side of the Hayward Fault is generally referred to as the "Above Hayward Fault Sub-basin" and is composed of highly permeable sediments and the portion on the west side of the Hayward Fault is generally referred to as the "Below Hayward Fault Sub-basin" and is composed of a series of relatively flat lying aquifers separated by extensive clay aquitards. Local runoff along with imported water is percolated into the Niles Cone Groundwater Basin through recharge in Alameda Creek itself and through recharge ponds within the Quarry Lakes Regional Recreational Area and adjacent areas.

The Niles Cone is a coastal aquifer system hydraulically connected to the Bay and is subject to saltwater intrusion should groundwater levels fall below mean sea level in the Newark Aquifer. The Newark Aquifer is the shallowest regional aquifer in the Below Hayward Fault Sub-basin. Saltwater intrusion was first noticed in the 1920's as a result of many years of chronic overdraft of the basin. Since 1962, ACWD has purchased State Water Project water supplies to supplement local recharge and raise groundwater levels. This has resulted in bringing the piezometric head in the Newark Aquifer above sea level as of 1972 and returning the hydraulic gradient to its natural bayward direction.

As a result, imported supplies are a critical means of achieving these objectives particularly during locally dry conditions when natural runoff is low. Imported supplies are defined as any supplemental water imported by ACWD via Alameda Creek for the purposes of recharging the Niles Cone Groundwater Basin (Imports on Alameda Creek). Imports on Alameda Creek are typically delivered as releases from various South Bay Aqueduct turn-outs (as noted in Table 2). The availability of groundwater storage helps to stabilize the highly variable supply from the local watershed and from other sources.

Natural Runoff from the Alameda Creek Watershed

Natural flow accounts for approximately 40% of ACWD's total supply.

ACWD has existing water rights to divert and use natural inflow in Alameda Creek from October 1 through May 31. In general, ACWD diverts natural flow in the Alameda Creek Flood Control Channel throughout the 8-month period when diversion is permitted. The rubber dams used for diversion remain operational (inflated) up to daily averaged flow rates of approximately 700 cfs. When this inflow rate is exceeded, ACWD lowers the dams to let flows and debris pass downstream unimpeded.

Creek flow is measured by the USGS at the Niles Gage and ACWD measures diversions of flow to recharge basins with flow meters at the diversions. Because precipitation and runoff in the Alameda Creek Watershed is highly variable, and affected by operations of other water suppliers in the upper watershed and changes in runoff characteristics associated with urban development, particularly in the northern portions of the watershed, flow and diversions are also variable. Water diverted from the channel to the Recharge Basins is used to recharge groundwater and is subsequently pumped and put into ACWD's distribution system for use in the service area.

Lake Del Valle Reservoir was created in 1968 as a regulatory storage facility for the South Bay Aqueduct (SBA) by constructing the 235-foot high Del Valle Dam on Arroyo Valle. Del Valle Dam impounds a maximum of 77,100 AF which includes a dedicated flood storage volume between 25,000 AF to 40,000 AF during certain times of the year. The reservoir is also home to the 5,200 acre Del Valle Regional Park, which is operated by the East Bay Regional Park District. The current 40,000 AF usable storage in the reservoir is made up of approximately 10,000 AF of dead pool storage, 15,000 AF of SBA regulatory storage, and 15,000 AF of water supply storage shared by the ACWD and Zone 7.

During typical operations of Lake del Valle, DWR uses the reservoir to augment or blend deliveries from the Delta to the three South Bay Contractors. DWR typically operates the reservoir at a water surface elevation of 703 feet, or at about 40,000 AF of storage, from the end of May through the first week of September. These operational targets allow for continued access to recreational facilities during the summer months. During winter months DWR will allow the lake to fill to the maximum extent possibly by impounding water from the Arroyo Valle sub basin. During moderate to dry years DWR will pump Delta water into the lake in order to reach predefined operational water surface elevation targets.

Lake del Valle plays a key role in managing water quality in SBA deliveries to the three South Bay Contractors by blending the supplies from the Delta with the water from Lake Del Valle Reservoir before being delivered to various water treatment plants. Typically DWR will blend water from Lake del Valle to help mitigate for degraded delta water quality during the late summer.

ACWD also has a water right permit to capture and store water from natural inflows into Del Valle Reservoir. Typically, ACWD's Del Valle water is released from storage into the SBA and distributed to ACWD's surface water treatment plants in much the same way as SWP water is distributed. Usually when DWR does this they will blend a certain percentage of SWP water with Del Valle water to make water treatment easier. Del Valle water can also be delivered to ACWD by means of the Vallecitos Turnout or the Del Valle Turnout and used for groundwater recharge purposes. In addition, a portion of ACWD Del Valle water is used to meet a "live stream requirement" downstream of Del Valle Dam to the confluence of Arroyo de la Laguna. This requirement is a condition on ACWD's water rights permit for Del Valle water. This water does not reach ACWD's recharge facilities, and is not beneficially used by ACWD to recharge the Niles Cone.

The State Water Project

In 1961, the ACWD entered into a contract with the California Department of Water Resources (DWR) for a maximum annual amount of 42,000 acre-feet from the State Water Project (SWP). The SWP, managed by the DWR, is the largest state-built, multi-purpose water project in the country. The water stored in the SWP storage facilities originates from rainfall and snowmelt runoff in Northern and Central California watersheds. The SWP's primary storage facility is Lake Oroville in the Feather River Watershed. Releases from Lake Oroville flow down the Feather River to the Sacramento River, which subsequently flows to the Sacramento-San Joaquin Delta. The SWP diverts water from the Delta through the Banks Pumping Plant which lifts water from the Clifton Court Forebay (in the Delta) to the California Aqueduct and Bethany Reservoir. From Bethany Reservoir, the South Bay Pumping Plant lifts water into the South Bay Aqueduct, which delivers State Water Project supplies to ACWD and other Bay Area water agencies in Alameda and Santa Clara Counties.

As part of the State Water Project, ACWD takes imports on Alameda Creek for groundwater recharge using SBA turnouts (owned and operated by DWR) located on tributaries to Alameda Creek. These turnouts include the Del Valle turnout (directly downstream of Del Valle Reservoir) and the Vallecitos Turnout, located adjacent to Vallecitos Creek. DWR also routinely releases SBA water from these turnouts for operation of the South Bay Aqueduct. Typically, DWR utilizes the Vallecitos Turnout, rather than the Del Valle turnout, for deliveries to ACWD in order to minimize evaporative and other losses in Arroyo Valle. In addition, use of the Vallecitos Turnout for deliveries to ACWD avoids concerns about potential impacts to a sycamore grove (located adjacent to Arroyo Valle) as a result of sustained high flows in the summer months. Water releases to Alameda Creek through the SBA Vallecitos Turnout or releases from the Del Valle turnout are controlled and managed by DWR.

As a result of the use of SBA imported water for groundwater recharge, ACWD restored groundwater levels in the Niles Cone to positive elevations in 1972 and has maintained a positive Bay-ward gradient ever since. Regular import of supplemental recharge through the South Bay Aqueduct has been an essential part of maintaining the positive gradient and ACWD has imported water for recharge in all but two of the past 50 years. Historically, releases from the South Bay Aqueduct for ACWD groundwater recharge operations have ranged from approximately 5 cfs to 40 cfs. Typically these releases have occurred in the summer months, however in dry years, the releases have occurred throughout the year.

ACWD's contract for SWP supplies provides for year-round water supply from the SWP, delivered via the SBA. This source constitutes about 40% of ACWD's supply. ACWD manages SWP supplies in a number of ways.

- First, ACWD takes SWP supplies year-round, via two SBA pipeline turnouts directly to ACWD water treatment plants. This water never interacts with Alameda Creek;

- Second, ACWD uses SWP water to augment recharge by releasing supplies from the SBA Vallecitos Turnout into Vallecitos Creek. The released water is metered at the turnout, flows through this ephemeral creek into Alameda Creek at Sunol, passes downstream in the Niles Canyon, is measured at the USGS Niles Gage, and is diverted at ACWD's Recharge Facilities. This generally occurs from June through September, and these releases vary from year to year; and

- Third, ACWD may periodically use other SBA turnouts to deliver water to the downstream recharge ponds. For example, releases may be made from Del Valle Reservoir, passing downstream via Arroyo del Valle and Arroyo de la Laguna, entering Niles Canyon at Sunol, and passing downstream to the ACWD recharge facilities.

Water released into the creek from any SBA turnout is metered by DWR at the site and by ACWD's flow meters at the points of diversion. These metered releases are compiled monthly and checked to validate that the volume of water released is less than or equal to the measured diversions recorded by ACWD.

Note that releases of water to the channel and diversions are both measured routinely using flow meters. Regardless of time of year, it is thus feasible to measure and verify the accuracy of measurement for releases of water from SBA turnouts or turnouts from Del Valle Reservoir. At any time, diversions of natural inflow and releases from SBA facilities to the ACWD's Recharge Facilities can be tracked as:

Total diversion - minus metered flow at turnout = diversion of natural flow

Thus, ACWD tracks SWP imports to the stream by frequent communication with DWR, monitoring of USGS flow gages, and DWR's flow meters on the SBA turnouts. DWR has authority and responsibility for managing and controlling water releases at the SBA turnouts and Del Valle Reservoir.

SFPUC Regional Water System Supplies

ACWD may also receive treated water supplies year-round from the San Francisco Public Utilities District (SFPUC) Regional Water System (RWS). This water is delivered via SFPUC pipelines directly to ACWD's water distribution system. ACWD does not request raw water from any SFPUC sources. This aspect of ACWD's water operations has no effect on conditions in Alameda Creek or tributaries to Alameda Creek.

Other Water Sources

ACWD may also at times (a) buy water on the open market from other entities, and (b) engage in water banking/exchange programs. Water supplies from these sources would be conveyed through the Delta and exported at the SWP diversion facility. The water would then be conveyed to ACWD through the SBA delivery facilities. As a result of these conveyance mechanisms the water quality characteristics of water potentially released into Alameda Creek as a result of these transfers would be the same as water quality characteristics for water delivered to ACWD through routine SWP and SBA operations. These intermittent supplies may be obtained at any time and delivered via any of the methods described above, except for use of SFPUC facilities.

Management of local and imported water supplies from variable sources and of variable timing is inherently complex and thus continuously variable. Natural flow in Alameda Creek may fluctuate substantially. For example, in 1993, precipitation was sparse into early March, but a period of intense precipitation in late March and early April resulted in high inflows. Such variation is the norm; dry years frequently have periods of intense rainfall and wet years often include substantial periods of dry weather. Similarly, there is variation in the availability of SWP supplies and SFPUC RWS supplies.

Water released and bypassed by the SFPUC from Calaveras Dam and Upper Alameda Creek Diversion Dam, respectively, for purposes of meeting downstream flow requirements at compliance locations directly below Calaveras Dam and Alameda Creek Diversion Dam (ACDD) outlined in the National Marine Fisheries Service Biological Opinion (BO) for the Calaveras Dam Replacement Project, are not included in ACWD supplies (see Section 3.4.1).

With such variability in water sources, ACWD may alter the mix of supplies continuously.

2.2.2 Recharge Diversion Operations

Diversions of water from Alameda Creek to percolation ponds for groundwater recharge and/or re-diversion are accomplished using two rubber dams, RD3 near Mission Boulevard and RD1 in the vicinity of the BART Bridge. When the rubber dams are inflated, they create ponds that allow water to flow by gravity through diversion pipelines into the recharge ponds. Except during periods of high flow (about 700 cfs) or when maintenance is required, rubber dams are maintained in the “up” or “raised” position, and thus can be used to divert and recharge natural flow and releases from SWP facilities, whenever these sources are available. Except for high flow events and infrequent maintenance events, the dams remain in place and operational.

When a dam is being deflated before a flood event or for maintenance, what typically happens is that the upstream pool is drained about half way by operating the diversions, and the remaining volume of water is released downstream over about a 3-to-6 hour timeframe. This remaining water creates a small pulse flow as it moves down the flood control channel, and can be seen from time to time on the USGS gages downstream of the ACWD diversion facilities. This pulse tends to be a precursor to the large runoff hydrograph that is generated from a storm event. The rubber dams are raised as soon as possible following a flood event or maintenance. Raising dams is accomplished in as little as 4 but up to 24 hours depending on flow rates.

2.3 Existing ACWD Facilities

The facilities necessary for diversion to groundwater recharge are (a) Rubber Dam 1 and Rubber Dam 3 that create ponded conditions and (b) pipelines that divert ponded water through the north levee into the Quarry Lakes and through the south levee into Bunting and Kaiser Ponds. The diversion pipelines upstream of Rubber Dam 3 are screened. Upstream of Rubber Dam 1, the Kaiser Pond diversion pipeline is screened. However, the diversion pipelines that make deliveries to the Shinn Pond, included in this Project, are not. These facilities create physical barriers to adult and juvenile steelhead and salmon passage in the Flood Control Channel:

- When inflated, Rubber Dams 1 and 3 physically block steelhead and salmon migration; and

- When lowered at low flow, these dams create shallow sheet flow that also inhibits steelhead and salmon passage.

At present, the rubber dams and their foundation of flat concrete sills preclude steelhead and salmon from the channel upstream of the ACFCD Drop Structure. These facilities would be modified under the Joint Fish Passage Project so that steelhead and salmon can migrate through the urbanized Flood Control Channel to upstream locations. When this is accomplished, the Shinn Pond diversion pipelines themselves may be a barrier to movement because steelhead and salmon may be diverted from the channel to the Quarry Lakes. Thus, the Shinn Diversion pipelines would be modified with state-of-the-art positive barrier fish screens to preclude this effect prior to the time that steelhead have access to lower Alameda Creek (once steelhead have access to lower Alameda Creek no diversions to Shinn Pond will be made using the current unscreened diversions).

2.4 ACFCD Operations and Facilities

ACFCD is the steward of a vast flood control infrastructure that includes natural creeks, constructed channels, pump stations, and other facilities. The ACWD-ACFCD Project is located in the ACFCD's Zone 5, a 45,440 acre area that covers mostly the alluvial plains on the westerly sides of the East Bay Hills and includes the lower reach of Alameda Creek extending from the vicinity of Mission Boulevard through urbanized areas to the San Francisco Bay. As part of the original channel construction the Army Corps of Engineers installed a series of grade control structures across the channel.

The purpose of these structures is to protect the channel from erosion by modifying flow depth and velocity, reducing energy of the flow. The concrete ACFCD Drop Structure, which protects the channel area around the Union Pacific Railroad and BART Bridge footings, is a major barrier to fish passage. However, several smaller grouted rock grade control structures, located further downstream, have been identified as fish passage impediments as well.

The Joint Lower Alameda Creek Fish Passage Improvements will install a fishway to provide passage past the drop structure. ACFCD plans to address the smaller downstream structures as well as enhance an existing low flow channel to incorporate efficient sediment transport and fish passage, as part of a separate project with separate CEQA review. These future projects will improve fish passage connectivity through the channel between the bay and the fishway.

3.0 JOINT FISH PASSAGE PROJECT

3.1 Purpose and Need

The purpose of the Joint Fish Passage Program is to improve anadromous fish passage in the urban reach of the Alameda Creek Watershed while maintaining ACWD's water supply operations at its groundwater recharge facilities and ACFCD's flood control operations in the reach downstream of Mission Boulevard. The Joint Fish Passage Project is consistent with, and an integral element of, the 2002 Draft Steelhead Restoration Plan.

3.2 Scope of Initial Study

Under CEQA, an Initial Study need not include the evaluation of alternatives to a proposed project. If the Initial Study reveals that the project would have a significant adverse effect on the environment, an Environmental Impact Report (EIR) would be required. This would necessitate the consideration of a range of reasonable alternatives that would achieve most of the basic objectives of the project but would also avoid or substantially lessen any of the significant effects of the project (Section 15126.6 of the CEQA Guidelines).

Under NEPA, the evaluation of alternatives to a proposed action is only required when there are "unresolved conflicts concerning alternative uses of available resources" (NEPA Section 102[2][E]). For the reasons discussed below, this document does not include the evaluation of alternatives, other that the "no action" alternative. Based on coordination conducted in preparing this draft EA/IS, there are no unresolved conflicts concerning alternative uses of available resources (NEPA Section 102[2][E]), therefore this EA only analyzes the proposed action and no action. NEPA guidance from the Council on Environmental Quality September 8, 2005, ("Preparing Focused, Concise and Timely Environmental Assessments") states "When there is consensus about the proposed action based on input from interested parties, you can consider the proposed action without consideration of additional alternatives".

As described in CEQA *Guidelines* Section 15063, the function of an Initial Study is to determine if the Joint Fish Passage Project may have a significant effect on the environment. Contents of an Initial Study are specified in CEQA *Guidelines* Section 15063 (d):

(1) A description of the Joint Fish Passage Project including the location of the Joint Fish Passage Project;

(2) An identification of the environmental setting;

(3) An identification of environmental effects;

(4) A discussion of the ways to mitigate the significant effects identified, if any;

(5) An examination of whether the Joint Fish Passage Project would be consistent with existing zoning, plans, and other applicable land use controls; and

(6) The name of the person or persons who prepared or participated in the Initial Study.

An Initial Study may lead to a conclusion that an EIR or a Negative Declaration should be prepared. Accordingly, this Initial Study addresses a full range of potential Joint Fish Passage Project effects, describes feasible mitigation measures, and evaluates the significance of potential effects considering that avoidance, minimization, and mitigation measures are implemented as a part of the Joint Fish Passage Project. The potential effects are categorized to reflect CEQA *Guidelines* Appendix G (*CEQA Checklist*).

3.3 Alternatives Examined but not Considered in Detail

3.3.1 Alternative Operations and Facility Designs

ACWD and the ACFCD considered, but rejected, the following structural and operational alternatives:

- **Releases of water from storage to meet and/or increase fish bypass flows.** The focus of modified fish passage operations is to provide passage flows and depths through the construction reach (Figure 1). Use of reservoir storage to accomplish this was rejected because:

  1) “Calaveras Dam Recapture Project (CDRP) minimum flows from the southern watershed when combined with flows from the northern watershed (at the confluence with the Arroyo de la Laguna) through Niles Canyon are expected to provide suitable conditions for adult upstream migration and smolt downstream migration.” (CDRP BO, 2011);

  2) In years of low natural runoff and low SFPUC releases, ACWD storage is essential to meet minimal demands of its customers. Use of stored water for bypass flows would increase use of groundwater and potentially result in salt water intrusion; and

3) In addition, use of stored water for bypass flows may affect storage carryover from year to year, cumulatively reducing available supplies for customers.

- **Removal of Rubber Dam 1 and/or Rubber Dam 3**. This alternative would contribute to meeting the passage goals of the Joint Fish Passage Project, but would substantially and adversely affect ACWD water supply operations. In addition, it would not address the passage problem at the ACFCD Drop Structure.

- **Removal of the ACFCD Drop Structure**. This alternative was rejected because this drop structure is necessary to protect the BART and railroad bridge foundation and supports from damage during flooding; and

- **Fishways on the southern bank of the creek**. This alternative would meet all of the Joint Fish Passage Project objectives, but the construction area at both Rubber Dam 1 and Rubber Dam 3 is more constrained and there is less room for parking for workers and construction equipment. In both cases, the southern bank of Alameda Creek is also closer to residential development than the northern bank.

3.3.2 No Project (Action) Alternative

NEPA requires the evaluation of the comparative impacts of a “No Action“ alternative. The No Project (Action) Alternative was rejected under CEQA because it would not meet the Joint Fish Passage Project goals and objectives related to upstream passage of steelhead. The continued inability of anadromous steelhead to migrate past the ACFCD Drop Structure and ACWD diversion facilities would result in failure of these fish to complete an anadromous fish life cycle (that is failure to reach spawning and rearing grounds). Upstream and downstream populations of steelhead would continue to be isolated and the genetic integrity of the populations would be compromised. This would be completely inconsistent with the objective of ACWD, ACFCD, and the recovery program goal in this area, which is to restore anadromous fish passage through this reach to upstream watersheds. The No Project Alternative would also be inconsistent with watershed-wide efforts to restore the population of anadromous steelhead in the Alameda Creek watershed. Other existing and proposed elements of the general restoration plan would be rendered ineffective.

In short, the No Project Alternative would be inconsistent with the general plan for steelhead restoration in Alameda Creek and San Francisco Bay. Steelhead restoration has benefits that more than offset the temporary construction-related impacts of the Joint Fish Passage Project, and the No Project Alternative was therefore rejected.

3.4 Joint Fish Passage Project

The Project involves changes to recharge operations (new bypass flows) and construction of fish passage facilities (fishways) and fish screens.

3.4.1 Proposed Bypass Flow Rules

Diversion of water from the channel to off-channel recharge basins reduces the net flow and depth downstream of the diversion. To ensure that steelhead have adequate depth to migrate upstream and downstream, ACWD, ACFCD, NMFS, and CDFW have agreed on a minimum flow "bypass" as part of the ACWD-ACFCD Project. Bypassed flows are flows that are not diverted offstream, and as a result "bypass" the recharge facilities. The bypass regime (as described below) was designed to provide adequate flow and depth to allow steelhead, and other fish species, to swim upstream to spawn and downstream to migrate to the ocean. When water depth is less than 0.6 to 0.8 feet, adult steelhead may be unable to swim upstream to spawn, contributing to delays (impediments) in upstream passage of steelhead adults and downstream passage of steelhead kelts. Juvenile steelhead require less depth for their downstream passage in March through May, but shallow water can expose them to predation and inhibit their ability to pass over small barriers such as sediment and debris accumulations, and were taken into account when developing the bypass flow schedule. Reduced water depth in the spring may also result in passage impediments for kelts.

ACWD would therefore modify its operations at the above mentioned recharge facilities to enhance flows for adult and juvenile steelhead migrations. ACWD-ACFCD Project flow bypass rules (Table 3) would increase in-stream flow and water depth in the reach below the Mission Boulevard Bridge to the San Francisco Bay. Under the proposed bypass rules, ACWD would not utilize "stored water” to meet components of the downstream flow requirements, downstream of the ACFCD Drop Structure, thus allowing local runoff to contribute to the benefits of the downstream flow targets. Stored water is defined as (a) water stored for ACWD in upstream impoundments; (b) water stored in the Quarry Lakes or adjacent percolation ponds; and/or (c) water delivered to ACWD from sources out of the watershed. "Stored water" released to the channel is thus not subject to the bypass rules and may be diverted.

To implement the bypass flow element of the ACWD-ACFCD Project, the total flow through the Alameda Creek Flood Control Channel would be measured as an average daily flow downstream of the new fishway at RD1/ACFCD Drop Structure using the USGS streamflow gaging station on the Sequoia Road Bridge (Figure 2). The gage is located in a channelized reach of the creek downstream of the fishway and ACFCD Drop Structure, has good hydraulic characteristics for flow measurements, good access, required no in-channel construction and, thus would not be subject to damage during high flow events. The gage will be used to document flows in the flood control channel and for compliance with bypass requirements. As noted on Table 3, bypass flow requirements are based on the flow in Alameda Creek as measured upstream of Mission Boulevard at USGS Station 111790000 (Niles Gage).

The fish passage bypass rules, as described and illustrated in Table 3, incorporate considerations for variable hydrologic conditions (different water year types) and for the possibility that flow in the Upstream Reach, provided per the CDRP BO, from SFPUC fisheries bypass/releases and not lost to natural percolation in the Sunol Valley, may reach the Niles Gage (i.e., “Net SFPUC Releases at Niles Gage”). ACWD’s bypass flow rules do not specify that any SFPUC flows will arrive at Niles Gage. However, if any SFPUC flows reach the Niles Gage, any such flows would contribute to total flow at Niles Gage and would be a factor in determining ACWD’s minimum bypass flow requirement.

Table 3. Fish Passage bypass rules (flows in column 3 are daily averaged inflows at USGS Niles Gage**).**

Season	Dates	Flow at Niles Gage[3]	Minimum Bypass Flow at ACFCD Drop Structure	Additional Conditions of Bypass
Year Round	January 1-December 31	> 700 cfs	NA	Dams down; no off stream diversions
		> 400 cfs	NA	Dams may be up; no off-stream diversions when turbidity is high
Steelhead In-Migration	January 1-March 31	100 – 400 cfs	25 cfs + Net SFPUC Releases at Niles Gage[1, 2]	No water will be released from storage to meet bypass flow requirements.
		30-100 cfs	25 cfs	If less than 25 cfs arrives at the ACFCD Drop Structure, all flow arriving at ACFCD Drop Structure shall be bypassed. No water will be released from storage to meet bypass flow requirements.
		<30 cfs	20 cfs	If less than 20 cfs arrives at ACFCD Drop Structure, all flow arriving at ACFCD Drop Structure shall be bypassed. No water will be released from storage to meet bypass flow requirements.
Steelhead Out-Migration	April 1-May 31 Normal to Wet years	All flows	12 cfs + Net SFPUC Releases at Niles Gage[1, 2]	Normal/wet conditions are years when water-year rainfall to date (as of April 1, at Fremont) is *greater* than the 60% annual exceedance value. Dry/Critical conditions are years when water-year rainfall to date (as of April 1, at Fremont) is *less* than the 60% annual exceedance value. In such years, if less than 12 cfs of natural flow arrives at ACFCD Drop Structure then all flow arriving at ACFCD Drop Structure shall be bypassed. No water will be released from storage to meet bypass flow requirements.
	April 1-May 31 Dry or critical dry years	>25 cfs	12 cfs+ Net SFPUC Releases at Niles Gage[1, 2]	If flows are less than 25 cfs under dry/critical conditions, ACWD will provide 12 cfs +Net SFPUC Releases at Niles Gage 7 consecutive days in April and 7 consecutive days in May (days to be specified by NMFS/CDFW). If ACWD diversions are zero and less
		<25 cfs	5 cfs	

				than 12 cfs arrives at ACFCD Drop Structure, all of the flow at ACFCD Drop Structure shall be bypassed. No water will be released from storage to meet bypass flow requirements.
Outside of Peak Migration	June 1-December 31	All flows	5 cfs	If less than 5 cfs arrives at ACFCD Drop Structure, all of the flow at ACFCD Drop Structure shall be bypassed. No water will be released from storage to meet bypass flow requirements.

Notes:

1. Pursuant to the NMFS Biological Opinion for the Calaveras Dam Replacement Project (CDRP) (CDRP BO), the compliance locations for the SFPUC's releases are at (1) USGS Gage 11172955 in Alameda Creek immediately downstream from the Alameda Creek Diversion Dam; and (2) USGS Gage 11173500 in Calaveras Creek below Calaveras Dam. Some of these releases may, at times, contribute to flow further downstream at Niles Gage (CDRP BO, 2011), and, if they do, any such flows contributing to total flow at Niles Gage would be a factor in determining ACWD's minimum bypass flow requirement shown here.
2. Net SFPUC Releases at Niles Gage = flows from the Upstream Reach, provided per the CDRP BO, from SFPUC fisheries bypass/releases and not lost to natural percolation in the Sunol Valley. ACWD's bypass flow rules do not specify that any SFPUC flows will arrive at Niles Gage; only that those flows will be bypassed if any SFPUC flows reach the Niles Gage.

3. Not including Imports on Alameda Creek for Niles Cone basin recharge.

3.4.2 Designation of Water Year Type

Bypass flows for the peak period of juvenile and kelt steelhead outmigration (April 1 through May 31) are determined by an outmigration year type calculated on April 1st of each year as described in Table 4. ACWD determines the outmigration year type based on the cumulative precipitation measured at ACWD's Blending Facility in Fremont, Ca. ACWD used the 137 year period of record at this location to define normal/wet and dry outmigration conditions based on a 60% exceedance threshold, where it is assumed that 60% of the outmigration seasons (April and May) over this period are classified as "normal/wet" and 40% of the outmigration seasons are classified as "dry". Results of this analysis indicate that if cumulative rainfall calculated from October 1st to March 31st is less than 15.3 inches, the smolt outmigration conditions from the RD1 fishway to the San Francisco Bay are considered dry, and if the cumulative rainfall is greater than 15.3 inches, the smolt outmigration conditions for April and May in this reach are classified as normal/wet.

To date, the only other stakeholder facility in the watershed operating with a flow release schedule which fluctuates based on hydrologic conditions is the SFPUC's Calaveras Reservoir. As described in the CDRP BO, the Calaveras Reservoir release schedule was developed with a provision for changes based on dry or wet year type.

The CDRP BO also defines bypass flow releases for the Alameda Creek Diversion Dam which are not water year type dependent.

Calaveras Reservoir is located upstream of ACWD's Ground Water Recharge Facilities on Calaveras Creek which is a tributary to Alameda Creek. In conformance with the CDRP BO, the SFPUC uses their dry and normal/wet classifications to determine water year types (instead of outmigration season types), which in turn dictates which flow release schedule is used to define Calaveras Reservoir release rates[1]. This year type classification is made at two different points during the year, and is based on gaged runoff from the Arroyo Hondo basin, which is upstream of the reservoir. This basin is largely undeveloped, and typical runoff characteristics of this basin indicate an extended dry period of little or no stream flow continuing into the early winter months, and an extended period of moderate base flows (after a substantial amount of cumulative rainfall) extending into the spring months. Similar to ACWD's proposed method, SFPUC also uses a 60/40 split to define normal/wet vs. dry conditions. A comparison of the different SFPUC water year type classifications vs. ACWD's outmigration condition determinations is presented below in Table 4.

[1] Pursuant to the NMFS Biological Opinion for the Calaveras Dam Replacement Project (CDRP) (CDRP BO), the compliance locations for the SFPUC's releases are at (1) USGS Gage 11172955 in Alameda Creek immediately downstream from the Alameda Creek Diversion Dam; and (2) USGS Gage 11173500 in Calaveras Creek below Calaveras Dam. Some of these releases may, at times, contribute to flow further downstream at Niles Gage (CDRP BO, 2011). Any such flows contributing to total flow at Niles Gage would be a factor in determining ACWD's minimum bypass flow requirement shown here.

Table 4. ACWD and SFPUC water-year types 1969-2009.

Water Year	ACWD Outmigration Conditions (determined on March 31st to guide April through May Operations)	SFPUC Water Year Type (determined on December 29th to guide January through April Operations)	SFPUC Water Year Type (determined on April 30th to guide May through September Operations)
1969	normal/wet	normal/wet	normal/wet
1970	dry	dry	normal/wet
1971	normal/wet	normal/wet	normal/wet
1972	dry	normal/wet	dry
1973	normal/wet	normal/wet	normal/wet
1974	normal/wet	normal/wet	normal/wet
1975	dry	dry	normal/wet
1976	dry	dry	dry
1977	dry	dry	dry
1978	normal/wet	dry	normal/wet
1979	normal/wet	dry	dry
1980	normal/wet	normal/wet	normal/wet
1981	dry	dry	dry
1982	normal/wet	normal/wet	normal/wet
1983	normal/wet	normal/wet	normal/wet
1984	normal/wet	normal/wet	normal/wet
1985	normal/wet	normal/wet	dry
1986	normal/wet	dry	normal/wet
1987	dry	dry	dry
1988	dry	dry	dry
1989	dry	dry	dry
1990	dry	dry	dry
1991	dry	dry	dry
1992	normal/wet	dry	dry
1993	normal/wet	normal/wet	normal/wet
1994	dry	dry	dry
1995	normal/wet	dry	normal/wet
1996	normal/wet	normal/wet	normal/wet
1997	normal/wet	normal/wet	normal/wet
1998	normal/wet	normal/wet	normal/wet
1999	normal/wet	normal/wet	normal/wet
2000	normal/wet	dry	normal/wet
2001	dry	dry	dry

2002	normal/wet	normal/wet	dry
2003	normal/wet	normal/wet	dry
2004	dry	normal/wet	dry
2005	normal/wet	normal/wet	normal/wet
2006	normal/wet	normal/wet	normal/wet
2007	dry	normal/wet	dry
2008	dry	dry	dry
2009	dry	dry	normal/wet

ACWD uses rainfall as a metric to determine smolt outmigration flows because surface water flows at various stream gages within the watershed may be substantially influenced as a result of other basin stakeholder operations. Additional limitations of using stream flow to define outmigration conditions result from differing sub-basin runoff characteristics (as a result of differing land use) and limited periods of record for various streamflow gages. Classifying the outmigration period based on cumulative rainfall as of March 31st has the added benefit of defining outmigration hydrologic conditions based on a synthesis of the observed hydrologic data to date, instead of using hydrology from an earlier time period in the water year, which often does not capture rapidly varying hydrologic conditions which occur in the Alameda Creek Watershed. For example, the SFPUC makes a determination of normal/wet conditions based on cumulative runoff observed through Dec 29th, which dictates the Calaveras Reservoir releases from January 1st to March 31st. Alameda Creek typically experiences its greatest precipitation and runoff from January 1st to March 31st, and making a determination as of December 29th that the period from January 1st to March 31st is dry based on early season runoff is not descriptive enough of the rapidly changing basin hydrology historically observed in January through March.

Inspection of Table 4 reveals only 2 years (out of the 41 year period of comparison) where ACWD's determination of a normal/wet or dry outmigration season doesn't match at least one of SFPUC's designations. For these 2 years (1979, and 1992) ACWD classifies the outmigration conditions as "normal/wet" where SFPUC classifies them as "dry." This demonstrates that the rainfall designation of outmigration conditions as of March 31st allows ACWD to designate the outmigration hydrologic conditions for April/May in a manner which is consistent with the most up to date hydrologic conditions (through the end of March). It also demonstrates that use of a December 29th determination can lead to an inaccurate designation of outmigration conditions in the Alameda Creek Flood Control Channel given the change in hydrologic conditions during the January through March timeframe.

As described in SFPUC's Calaveras Dam Replacement Project NMFS Biological Opinion, the flow releases out of Calaveras Dam are determined by cumulative inflow to the reservoir measured at the Arroyo Hondo Gage for the period of October 1st to December 31st, and again for the period of January 1st to April 30th. ACWD makes a designation of dry or normal/wet outmigration conditions based on cumulative rainfall received between October 1st and March 31st, which defines outmigration season flow bypasses from ACWD's facilities for the period of April 1st to May 31st. The periods of time between ACWD's inmigration and outmigration seasons do not directly correspond to SFPUC's flow release determination dates (December 29th, and April 30th) due to differences in flow release objectives. For example, it is understood that little to no habitat for spawning or rearing currently exists in the Alameda Creek Flood Control Channel downstream of ACWD's facilities, and the flow bypass proposal defining normal/wet or dry outmigration conditions (as well as the decision date of April 1st) was developed with the intent of providing enhanced migration conditions for smolts and kelts to pass downstream to the bay. SFPUC's flow release schedule from Calaveras Reservoir and Alameda Creek Diversion Dam bypass flow releases benefit not only the migration of adults and juveniles, but also provide valuable rearing and spawning habitat for juveniles and smolts in the upper watershed. The magnitude of flow release rates from Calaveras Reservoir between normal/wet and dry periods vary between 7 cfs to 12 cfs, and may exhibit the greatest effect over the May to September period when the SFPUC's dry or normal/wet classification changes.

In summary, ACWD is proposing to use a rainfall-based year-type designation for the April/May outmigration season bypass flows for the following reasons:

1) It is most representative of outmigration hydrologic conditions at ACWD's facilities, and is not impacted by watershed stakeholder operations or differing land use effects, which can result in significant variability between rainfall and runoff timing in different portions of the watershed;
2) The period of record for ACWD's rain gage is significantly longer than the Arroyo Hondo stream gage (137 vs. 32 years);
3) Designation based on rainfall-to-date as of March 31 uses the most up-to-date information to guide outmigration flows in the Flood Control Channel for April & May;
4) Use of SFPUC's year-type designation methodology, including the December 29 year-type designation, would base ACWD's April & May flows on outdated information leading to improper determinations of outmigration hydrologic conditions;
5) The objective of ACWD's flow bypass proposal is to define normal/wet or dry outmigration conditions for April and May in order to provide enhanced migration conditions throughout the Flood Control Channel, which is best achieved using up-to-date year-type information for the outmigration period; in contrast, the objectives of SFPUC's flow bypass schedule include providing benefits for valuable rearing habitat for juveniles and smolts, which justifies an earlier year-type designation; and
6) Comparison of ACWD's proposed method and SFPUC's method indicate that the differences are minimal.

Alternatively, the designation of water year type can be in accordance with SFPUC's Calaveras Dam Replacement Project NMFS Biological Opinion; but, ACWD feels that the proposed methodology for identifying year types for purposes of bypass flow operations based on local precipitation as outlined by ACWD will be advantageous for both fish and ACWD operations for the reasons described above.

3.4.3 Calculation of the Effects of SFPUC Fish Releases on Natural Flow

As described in Table 3, if any SFPUC fisheries bypasses or releases contribute to flows measured at Niles Gage, they would become a factor in determining ACWD's minimum bypass flow requirement. Hydrologic modeling work performed by the Alameda Creek Fisheries Restoration Workgroup and documented in Dhakal *et al.* (2012) indicated that SFPUC bypasses and releases take approximately 17 hours to reach the Alameda Creek Flood Control Channel and thus the flow bypass in any given day would be based, in part, on the previous day's average fisheries release from the SFPUC, if any SFPUC flows reach the Niles Gage at all.

Interactions of surface and subsurface waters on Alameda Creek through Sunol Valley are highly complex. As discussed in Dhakal *et al*, 2012, influences on streamflows throughout this reach occur from a variety of sources including tributary inflows, natural percolation, reservoir releases/bypasses, and gravel quarry operations. The influence of quarry operations is the most challenging to assess as they create minor accretions and depletions in various sub-reaches of the valley. As was determined in Dhakal *et al*, the net effect of these accretions and depletions through Sunol Valley is a net loss of 17 cfs[2] from Alameda Creek (see Figure 3) and will be referred to as "Net Sunol Valley losses"

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[2] In addition to being empirically measured, the methods and techniques used to derive these flow losses were documented and peer reviewed in early 2012 by an independent scientific panel organized by the SFPUC as part of their effort to develop their Alameda Watershed Habitat Conservation Plan (see http://sfwater.org/modules/showdocument.aspx?documentid=2685).

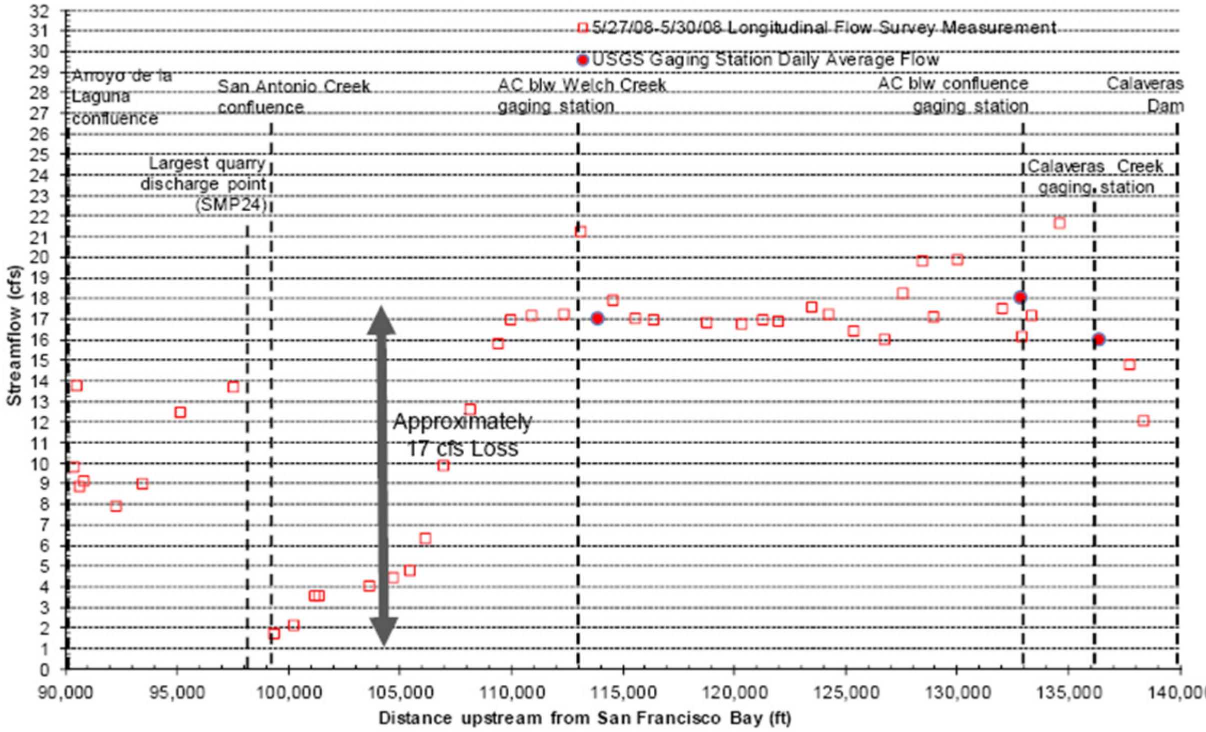


Figure 3. **Analysis of Sunol Valley losses.** This figure illustrates instantaneous streamflow measurements along different portions of the mainstem of Alameda Creek from the Calaveras Creek gage to the confluence of Arroyo de la Laguna, and demonstrates that in order to observe flow at the San Antonio Creek confluence the flow at the Alameda Creek below Welch Creek gage needs to be greater than 17 cfs (reproduced from Dhakal *et al.* 2012).

"Net SFPUC Releases at Niles Gage" (as utilized in Table 3, above) would thus be calculated by subtracting the Net Sunol Valley losses from the SFPUC fishery releases/bypasses as measured at the Calaveras Dam Replacement Project (CDRP) compliance locations. Thus:

	Previous day SFPUC fisheries bypass/releases
Minus	Net Sunol Valley losses
=	Net SFPUC Releases at Niles Gage

Examples 1 and 2 demonstrate calculation of the required ACWD bypass flows (per Table 3) for the January 1-March 31 inmigration period, based on the daily average flow at the Niles Gage (minus any imports on Alameda Creek). Note that the current estimate of 17 cfs is utilized for Net Sunol Valley losses.

Example 1 (Inmigration period, Alameda Creek at Niles Gage greater than 100 cfs, no imports on Alameda Creek):

• Flow at Niles Gage	=	120 cfs
• Previous day SFPUC fisheries bypass/releases:	=	35 cfs
• Net Sunol Valley losses:	=	-17 cfs
• Net SFPUC Releases at Niles Gage:	=	18 cfs

In this example, the bypass total per Table 3 would be:

• Net SFPUC Releases at Niles Gage:	=	18 cfs
• Natural flow bypassed:	=	25 cfs
• Minimum flow bypassed	=	43 cfs

Should the subtraction of the Net Sunol Valley loss results in a net loss, then the Net SFPUC Releases at Niles Gage will be assumed to be zero. Example 2 illustrates the calculation for this condition:

Example 2 (Inmigration period, Alameda Creek at Niles Gage equals 150 cfs, no imports on Alameda Creek):

• Flow at Niles Gage	=	150 cfs
• Previous day SFPUC fisheries bypass/releases:	=	15 cfs
• Net Sunol Valley losses:	=	-17 cfs
• Net SFPUC Releases at Niles Gage:	=	0 cfs

In this example, the bypass total per Table 3 would be:

• Net SFPUC Releases at Niles Gage:	=	0 cfs
• Natural flow bypassed:	=	25 cfs
• Minimum flow bypassed	=	25 cfs

Under lower flow conditions (flows less than 100 cfs at Niles during the inmigration period), ACWD would also be required to provide a minimum bypass flow. However, under these flow conditions, ACWD is not required to consider any Net SFPUC Releases at Niles Gage separately from the natural flows at the Niles Gage (see Example 3 below).

Example 3 (Inmigration period, Alameda Creek at Niles Gage less than 100 cfs, no imports on Alameda Creek):

- Flow at Niles Gage = 70 cfs

In this example the bypass total per Table 3 would be:

- Minimum flow bypassed: = 25 cfs

In the above examples, the "Flow at Niles Gage" component would be modified to subtract out Imports on Alameda Creek.

A key element of the above approach for the estimation of the Net SFPUC Releases at Niles Gage is the estimation of the Net Sunol Valley losses. The net loss may be influenced by a variety of factors including, but not limited to: 1) reduced streambed infiltration in Sunol Valley due to long-term SFPUC flow releases; 2) increased diversions by the SFPUC through an infiltration gallery or similar diversion in Alameda Creek in the Sunol Valley (known as the "Upper Alameda Creek Filter Gallery", "Alameda Creek Recapture Project" or "Alameda Creek Fisheries Enhancement Project"); and/or 3) installation of a slurry wall (cut off walls) to prevent seepage from the streambed to adjacent gravel quarries (as required by the "Conservation Plan For Sunol Quarry SMP-30 Site" and the terms of Revised SMP-30). (CDRP EIR, 2011, Section 6 pp. 25-26 and p 33; Dhakal *et al*, 2012 p. 32)

Due to the lack of information on these potential future projects it is not currently possible to analyze effects of these activities. As indicated above, the best available data indicates a Net Sunol Valley loss of 17 cfs. However, ACWD will collaborate with SFPUC and NMFS to develop a methodology to periodically re-evaluate the estimates of Net Sunol Valley losses. The methodology may be based on measured streamflow and operational data, hydraulic/hydrologic modeling simulation results, and/or a combination of both. However, the methodology and subsequent analyses of Net Sunol Valley losses will be based solely on publicly available data. In addition, the methodology will also include a schedule for re-evaluating Net Sunol Valley losses, especially after any physical or operational changes in Sunol Valley (or upstream) that may affect the loss rates.

To provide for adequate assessment of upstream conditions, and consistent with the collaborative approach regarding hydrologic modeling set forth in the August 11, 2009 Letter of Understanding ("Letter of Understanding") signed by ACWD and SFPUC, ACWD is committed to collaborating with the SFPUC, the Alameda Creek Fisheries Restoration Workgroup, and other stakeholders in the Sunol Valley in jointly developing the methodology. However, the final methodology will be subject to the approval of NMFS. Until development of the methodology is complete, the "Net Sunol Valley losses" will be based on the current estimate of 17 cfs.

Assuming the constant loss of streamflow from the Calaveras Gage to the Welch Gage, projected flow at Niles in normal/wet years and dry/critical years varies as shown on Figures 4, 5, and 6 (below).

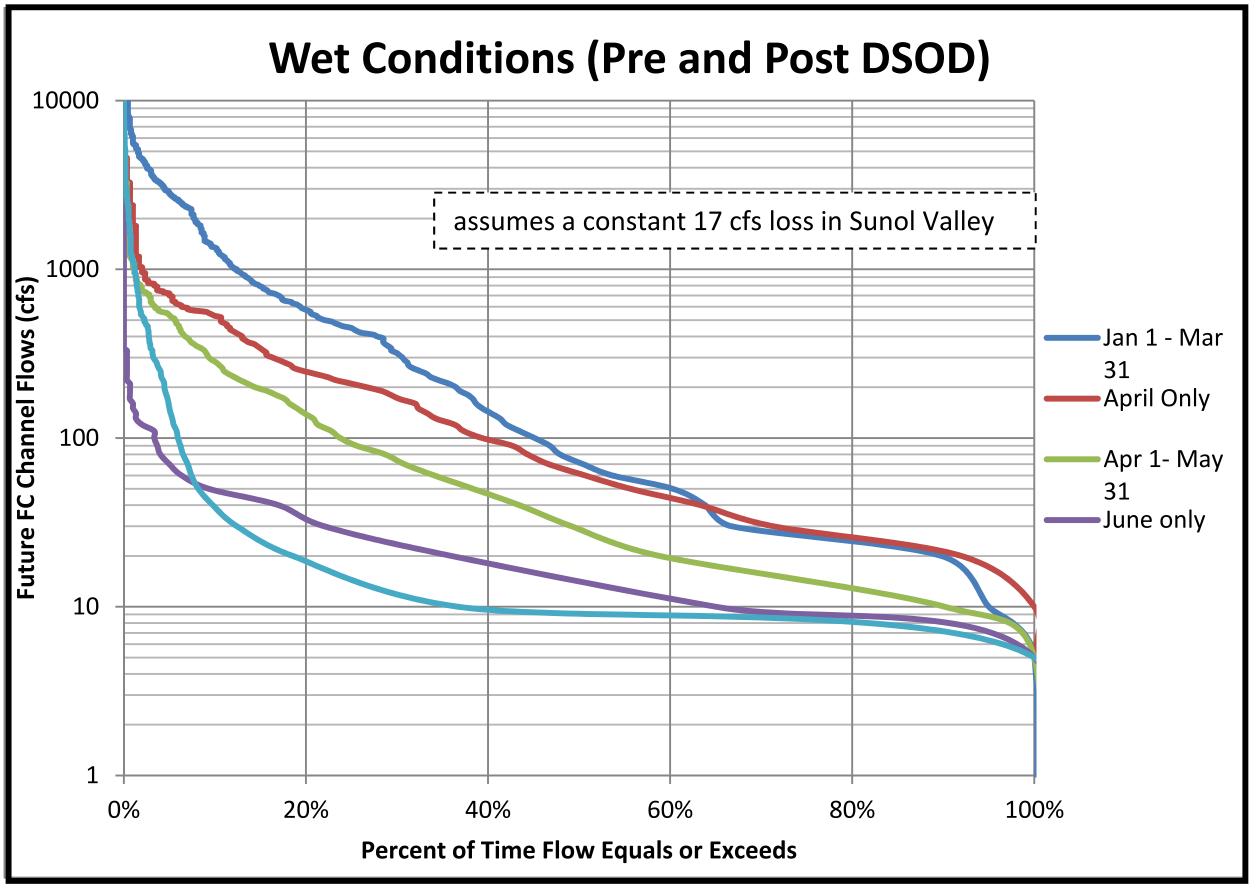


Figure 4. Unimpaired flow predictions downstream of the RD1/ACFCD Drop Structure in wet years, by frequency of flow.

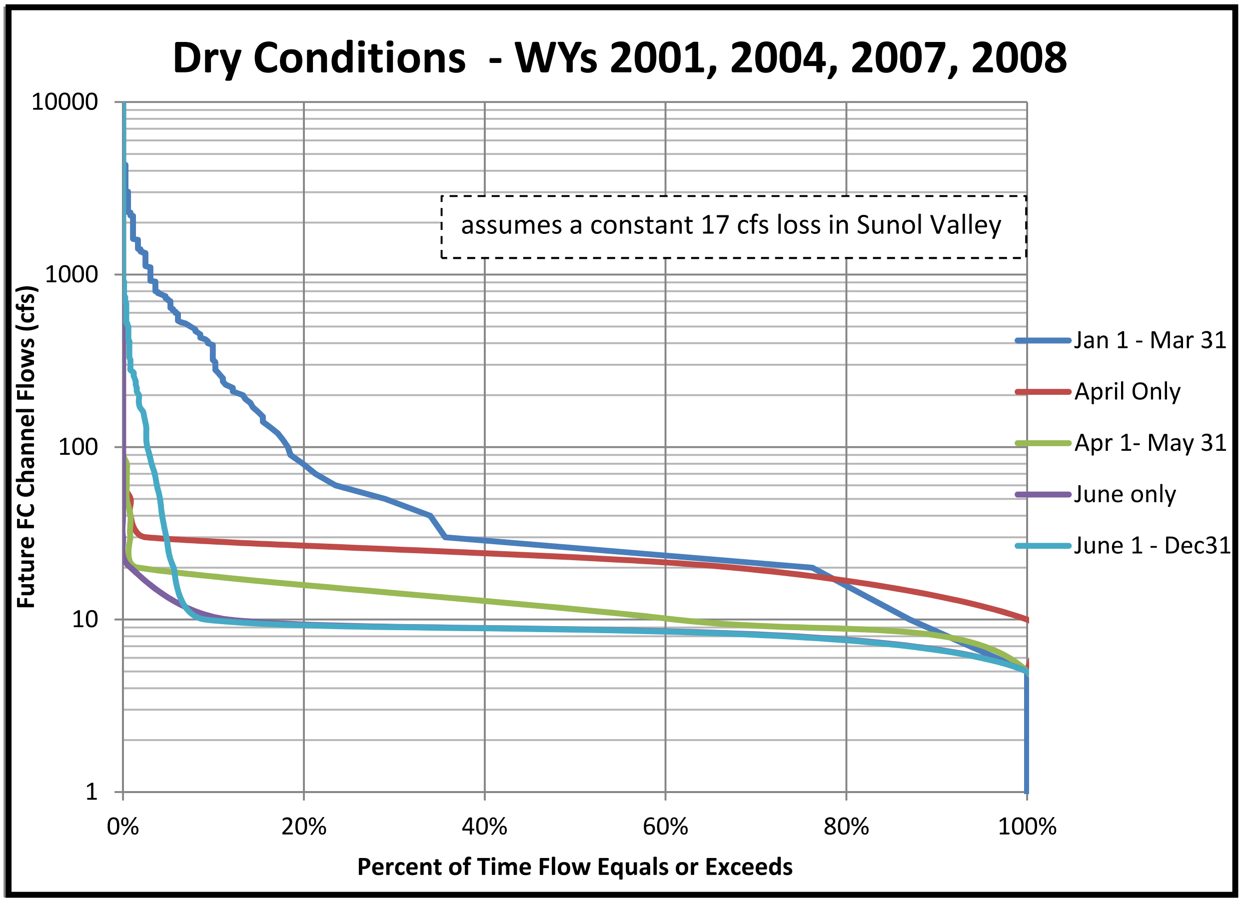


Figure 5. **Unimpaired flow predictions downstream of the RD1/ACFCD Drop Structure in dry years, by frequency of flow.**

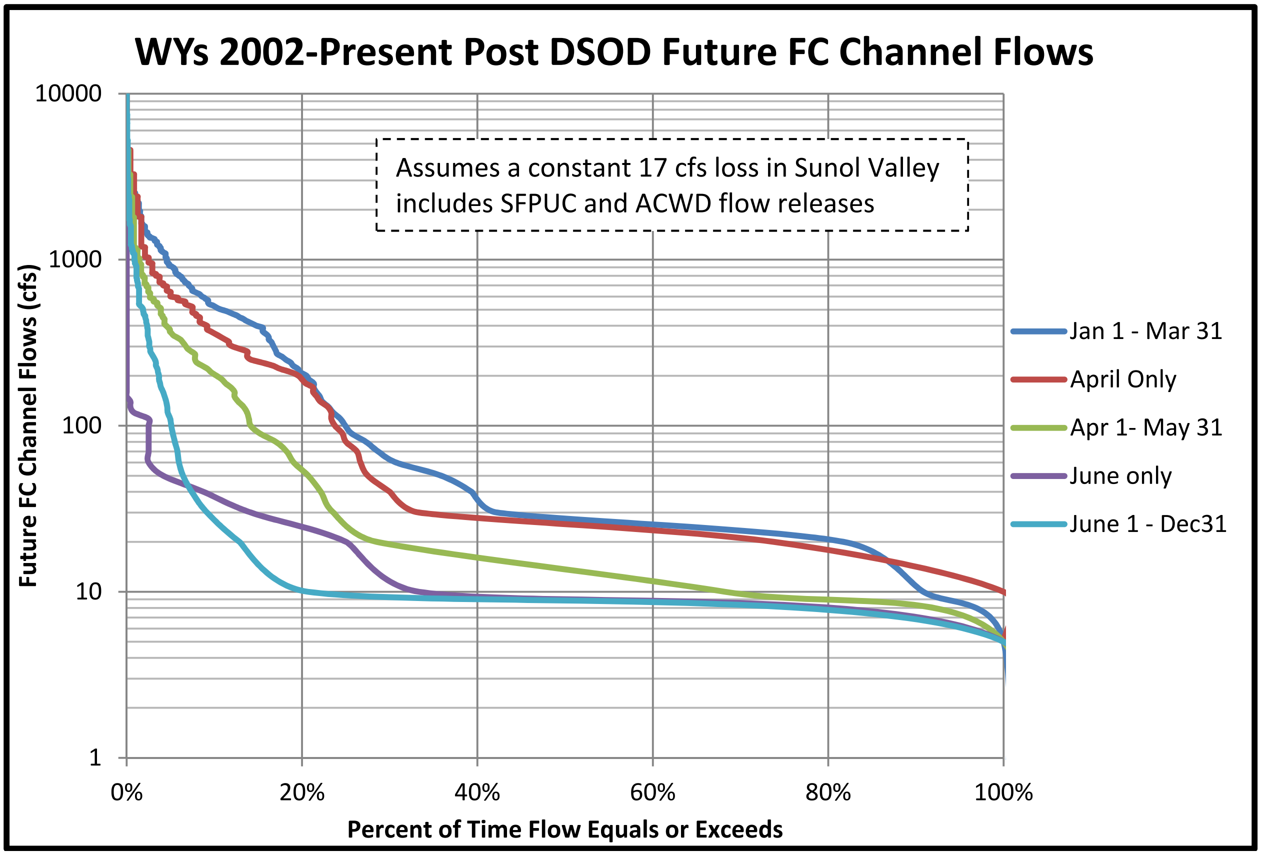


Figure 6. Unimpaired flow in 2002-2012 and projected Future Flood Control Channel Flows.

Modeling analysis indicates that the bypass flow requirements will reduce ACWD's net diversions of Alameda Creek flow in below-average years. However, the analysis also found that these reductions will be fully offset in wet-years when flows on Alameda Creek far exceed ACWD's capacity and diversion needs, even after bypass flow requirements have been met, and ACWD will be able to fully recharge the Niles Cone groundwater basin. ACWD analysis finds that through a combination of reoperation of its water supply portfolio, continued use of supplemental recharge of the Niles Cone with imported supply during below-average years, and the ability to fully recharge Niles Cone during the excess conditions of wet-years, there will be no reduction in water supply availability to its customers. These modeling analyses were included in the published reliability data in ACWD's 2015-2020 Urban Water Management Plan.

ACWD will continue to rely on releases from the South Bay Aqueduct at Vallecitos, Del Valle Reservoir, and other SBA turnouts to supplement the recharge from Alameda Creek flows throughout the year. However, the range of SBA releases (i.e. flow rate, duration, and timing) will be consistent with the range of releases under ACWD's historical operations. Therefore, the bypass element of the ACWD-ACFCD Project does not require increases in water supply from any sources.

In Alameda Creek, the peak season for adult steelhead migration and spawning is January 1 to March 31, and thus bypass rules for this season are focused on maintaining a downstream flow rate that corresponds to a minimum depth of 0.6 to 0.8 feet (although it is desirable to maintain water depths of 1 foot or greater, to the extent possible, to reduce passage impediments and adult behavioral response during migration), the depth generally recognized as necessary for steelhead and salmon to migrate successfully. Juvenile steelhead rear in upstream areas for a year or more, and migrate to the bay and ocean in the spring, with the peak outmigration occurring in April 1 through May 31. Steelhead kelts also migrate downstream primarily in the spring (March – May) after spawning. From June 1 through December 31, the ACWD-ACFCD Project also proposes a bypass flow at the ACFCD Drop Structure of up to 5 cfs.

Bypass flows would be monitored at the Sequoia Road Bridge. Inflow to the reach would be calculated based on monitoring of the Niles Gage (0.5 miles upstream of Mission Boulevard). Instantaneous flow measurements at monitoring gages vary and measurements are subject to error. Therefore, bypass flows would be based on average daily flow and average daily diversion rates.

In addition to the bypass flow rules, Project water operations in the Alameda Creek watershed include the following provisions.

3.4.4 Water Supply Emergency

In the event that the ACWD Board of Directors declares a Water Supply Emergency, NMFS and CDFW agree to meet and confer with ACWD staff in good faith to consider the potential temporary relaxation of the downstream bypass requirements. The actual adjustments of the downstream bypass requirements would be at the discretion of NMFS and CDFW, and would not extend beyond the period of the Water Supply Emergency.

3.4.5 Adequacy of ACWD Bypass Flow Requirements

NMFS and CDFW agree that best available information indicates the bypass flow requirements described in Table 3 are sufficient to facilitate steelhead inmigration and outmigration through the Alameda Creek Flood Control Channel (summary notes from the January 27, 2011 meeting of NMFS, CDFW, and ACWD regarding bypass flow operations). Some steelhead adult and juvenile migration occurs outside January 1 to May 31, but this time period encompasses the peak period of migration in the flood channel. In the event that additional environmental flows are provided in the northern watershed as defined by the Arroyo de la Laguna sub-basin (e.g. future environmental releases/bypasses provided by ACWD, and/or other entities in the northern watershed), these flows may be used by ACWD to meet their bypass flow requirements (per Table 3) or these flows may augment the bypass flow requirements, but will not be added to ACWD's required bypass flow requirements in the Alameda Creek Flood Control Channel. Bypass flows will be evaluated periodically based on water depth and adult and juvenile steelhead passage criteria and bypass flows included in Table 3 may be modified (increased or decreased) in the future through an Adaptive Management and Monitoring Plan (to be developed).

3.4.6 Bypass Flows During Designated Non-Migration Periods

Fish Bypass Flow requirements (Table 3) specify that during the period of June through December, ACWD will be required to maintain a base level of bypass flow to maintain aquatic habitat conditions. Flow/depth targets of the designated migration periods do not apply to this period “outside of the peak migration”. This approach is consistent with the proposed flow release schedule from the SFPUC Calaveras Dam.

3.4.7 Flow Fluctuations During Dam Inflation

When daily averaged streamflows in Alameda Creek drop to less than approximately 700 cfs, ACWD may inflate either or both rubber dams. ACWD will take approximately 6-12 hours to completely fill both impoundments, but may require more time depending on hydrologic conditions. RD1 will be inflated first, and will allow water to overspill the rubber dam crest for a period of 2 hours before utilizing the fishway and auxiliary flow to meet instream flow requirements. After a period of 2 hours the RD1 impoundment will continue to fill without spilling water, followed by the RD3 impoundment. During this time period, streamflow rates will slowly decrease below the dams as water is stored in the on-channel ponds within the flood channel. As the dams complete inflation and the pond storage capacity is filled, all water will be bypassed downstream (through the fishways, and, depending on flow conditions, overtopping of the rubber dams) until flows drop below approximately 400 cfs. At 400 cfs, ACWD may initiate water diversions in accordance with the bypass flow requirements. An operations plan providing more detailed specifics of the operations of the rubber dams and fishways will be developed by ACWD/ACFCD and subject to approval by NMFS and CDFW. The Operations and Maintenance Plan for the fish passage facility is expected to be completed within one year of initial operation of the fishway.

3.5 Proposed Facilities and Locations

The locations of ACWD-ACFCD Project facilities are provided in Table 5. Locations are defined in terms of USGS coordinates at each corner of the construction site. The approximate areas of temporary construction and permanent facility are shown in Table 6. Actual boundaries may vary, and construction contractors may make arrangements with near-by private property owners to utilize their property for temporary use during construction (such as equipment storage and stockpiling of materials).

Table 5. Location of ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project Facilities

Action Area	USGS Coordinates			
	NE Coordinates	SE Coordinates	SW Coordinates	NW Coordinates
Rubber Dam 3 Fishway and dam replacement	37 34 25.34 N 121 58 19.29 W	37 39 23.22 N 121 58 16.93 W	37 34 20.79 N 121 58 20.81 W	37 34 22,95 N 121 58 22.96 W
Shinn Pond Fish Screens	37 34 15.07 N 121 59 15.82 W	37 34 13.01 N 121 59 13.06 W	37 34 11.44 N 121 59 14.98 W	37 34 13.63 N 121 59 17.56 W
Rubber Dam 1/ACFCD Drop Structure fishway and dam foundation modifications	37 34 11.39 N 121 59 16.93 W	37 34 09.34 N 121 59 13.15 W	37 34 03.86 N 121 59 20.04 W	37 34 06.11 N 121 59 23.04 W

All fishways have the same function (Wood Rogers Engineering 2006). They replace a steep impassible barrier with a gently sloping, stepped, channel, with resting pools incorporated to allow fish to rest during passage. For Rubber Dam 1/ACFCD Drop Structure, ACWD and ACFCD reviewed a number of designs and selected a segmented conventional fishway because it has minimal impacts on flood management and is a proven design for this type of channel. The design for Rubber Dam 3 fishway is similar, but shorter than the Rubber Dam 1/ACFCD Drop Structure fishway.

The diversion pipe fish screens must function effectively in an environment with minimal-to-no sweeping flow and in an environment that is affected by intermittent periods of high flows with heavy debris loads as they will be installed in the pool behind Rubber Dam 1. Screen cleaning and removal of debris are therefore important elements of an effective screen. Cylindrical style screens were selected as they have a self-cleaning brush system, can be easily removed from the channel for inspection or repair without special equipment, and have been proven effective in other installations, including other ACWD diversions located in the Alameda Creek channel.

The proposed fishways and fish screens will be designed to meet current NMFS and CDFW criteria.

3.6 RD1/ACFCD Fishway and Shinn Pond Fish Screens

The approximate locations of the RD1/ACFCD Drop Structure fishway and Shinn Pond diversion fish screen facilities and construction zones are shown on Figure 7. The permanent facilities would have a combined footprint of about 1.4 acres, and temporary activities would occur on an additional 65.2 acres. In the temporary construction zone (shown in blue), the Project would protect existing infrastructure outside of the channel area and restore pre-construction conditions in the channel following completion of construction.

Figure 7. Approximate Locations of RD1/ACFCD Drop Structure Fishway and consolidated Shinn Pond Screens and construction zones.

3.6.1 Shinn Pond Diversion Consolidation and Installation of Fish Screens (Figure 8)

ACWD currently operates two unscreened diversion facilities to Shinn Pond in the reach between Rubber Dam 3 and Rubber Dam 1. The dual 54-inch Shinn Pond Diversion is located on the north levee about 3,600 feet downstream of Rubber Dam 3, and the triple 36-inch Shinn Pond Diversion is located on the north levee about 4,200 feet downstream of Rubber Dam 3. These diversions will be consolidated and replaced by a single new facility located closer to RD1, and the existing diversions will be decommissioned. The finished Shinn Pond Fish Screen facilities would be confined to the levee and the channel immediately adjacent to the levee. A total of 10 cylindrical screens are planned to be installed in banks as shown on Figure 8. The total diversion capacity (fish screen design rate of 425 cfs) will remain unchanged. The permanent facilities occupy an area approximately 300 feet long x 75 wide (about 0.5 acres). The screen facility would include pole mounted security equipment and lighting, and small cabinets for electrical and control equipment. For public safety, security fencing would also be provided around the facility. The fencing would be off-set around the facility, in a manner similar to existing installations, to provide sufficient space around the equipment for maintenance access.

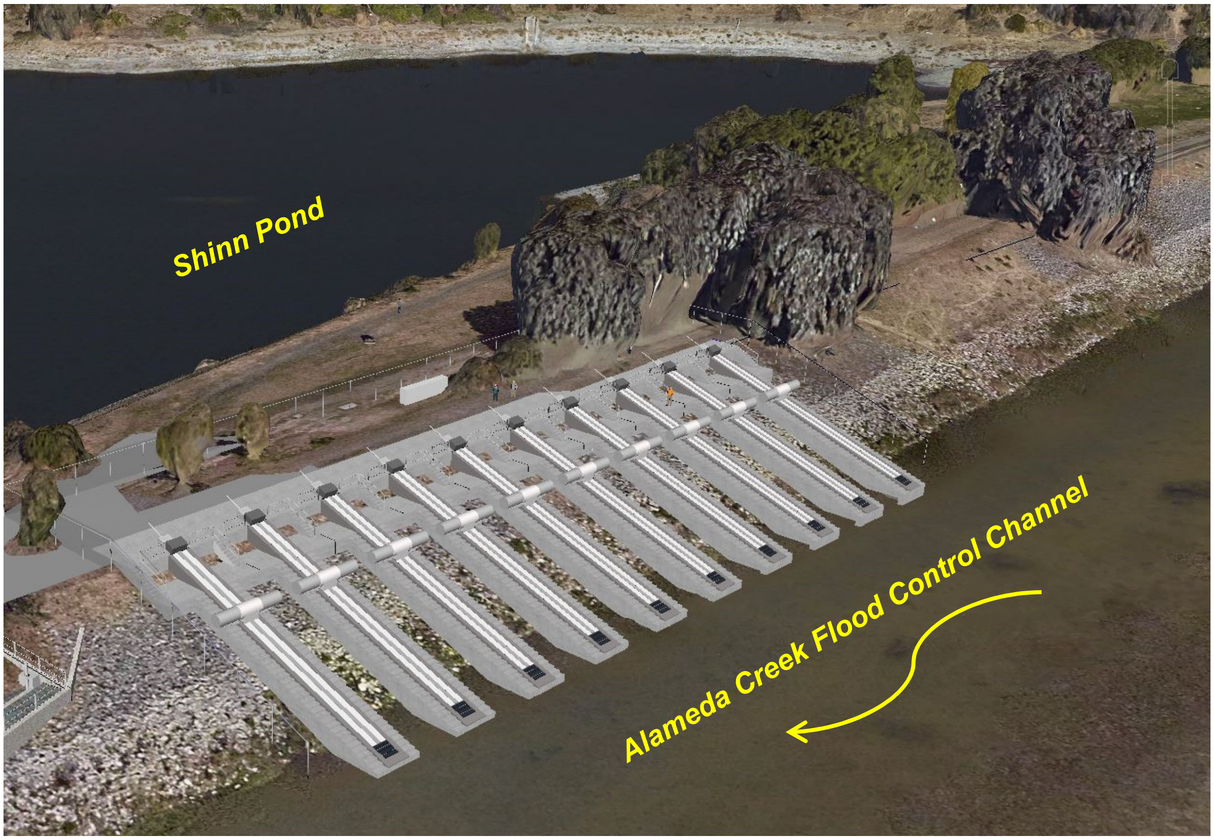


Figure 8. Rendering of the consolidated Shinn Pond Screens.

As shown on Figure 7, construction of the fish screens would also involve temporary construction in the channel and Shinn Pond, and on the existing levees. Small areas of Quarry Lakes Park would also be affected.

Figure 9. RD1/ACFCD Drop Structure fishway.

3.6.2 RD1/ACFCD Drop Structure Fishway (Figure 9)

Rubber Dam 1 is located just upstream of the ACFCD Drop Structure. Fishway construction would include modifications to the ACFCD Drop Structure and other hardscape in the channel. The permanent modifications would occur within the existing north levee inboard slope and path along the levee, within the existing footprint of the rubber dam control building and concrete foundation, and the existing grouted-rock on the downstream side of the dam foundation. Most of this area is currently rip-rapped and/or concrete.

The fishway at Rubber Dam 1 would be a three segment (upper, middle and lower) concrete structure installed along the rip-rap bank and the concrete wall of the north levee (Figure 9). The upper segment of the fishway would include an auxiliary flow screen and associated piping. The fishway would include a sluicing pipe system to help remove sediment that may build up within the fishway's exit channel. The piping would be installed adjacent and parallel to the fishway. The sluicing pipe discharge point would be near the entrance to the lower fishway segment. The screened auxiliary will discharge, via a wall diffuser, into the middle fishway entrance to enhance fish attraction flow. Trash racks on the upper segment exit channel will prevent larger debris from entering the fishway.

Modifications to the existing concrete drop structure apron will be made to construct the middle fishway segment and concrete resting pool, and construct the lower fishway segment downstream of the resting pool. A new guidewall would be constructed across the channel to guide fish to the entrance of the lower fishway segment. Downstream of the guidewall, an existing transition pool would be enhanced and maintained as the interface between the lower fishway and the downstream earthen channel. The rubber dam's foundation and the downstream grouted rock would also be modified to include a stream-wide plunge pool, about 2.5 feet deep, immediately downstream of the rubber dam. This depth was selected based on a pool depth-to-fall ratio utilized by NMFS engineers. Additionally, renovation to the Rubber Dam 1 control building will be made to accommodate new fishway control equipment; and the piping and controls used to inflate/deflate the RD1 rubber bag will be replaced.

The finished RD1/ACFCD drop structure fishway facility would include pole mounted security equipment and lighting, and small cabinets for electrical and control equipment. For public safety, the existing security fencing around RD1 would be extended around the new fishway and include sufficient added space for maintenance access. Within the Flood Control Channel, the new permanent facilities and facility modifications would extend over an area of approximately 0.8 acres adjacent to the concrete ACFCD Drop Structure apron. Temporary construction activity may extend up to 2,600 ft downstream of the RD1 Fishway. However, the majority of these temporary activities and facilities are expected to be confined to an area extending approximately 800 feet upstream and 300 feet downstream of the RD1 Fishway. These temporary facilities include construction of an access road for channel ingress/egress, installation and operation of dewatering/water control facilities, and site restoration (e.g., removal of construction material, soil stabilization, and vegetation planting). The permanent facilities, within the channel and along the rip-rap embankment, would have a total footprint of about 0.92 acres.

3.7 RD3 Fishway and Related Facilities

The fishway at Rubber Dam 3 would be a concrete structure installed on the rip-rapped north embankment. Permanent changes to Rubber Dam 3 would include the fishway and modifications to the foundation; replacing the RD3 rubber bag, and modifying the existing dam foundation to accommodate the new equipment and to make seismic related structural upgrades. The rubber dam's foundation and the downstream grouted rock would also be modified to include a stream-wide plunge pool, 3 feet deep. This depth was selected based on a pool depth-to-fall ratio utilized by NMFS engineers.

Permanent modifications would occur within the existing footprint of the north levee and maintenance road/trail along the levee crest, the rubber dam and its concrete foundation, and the existing rock downstream of the rubber dam. The finished RD3 fishway facility would include pole mounted security equipment and lighting, and small cabinets for electrical and control equipment. To provide for public safety, the existing security fencing around RD3 would be extended around the new fishway and include sufficient added space for maintenance access. The permanent facilities would thus extend approximately 150 feet downstream of Rubber Dam 3 and on the channel embankment about 150 feet upstream of Rubber Dam 3 (Figure 10). The permanent facilities would have a footprint of about 0.8 acres, and temporary activities would occur on an additional 4.6 acres.

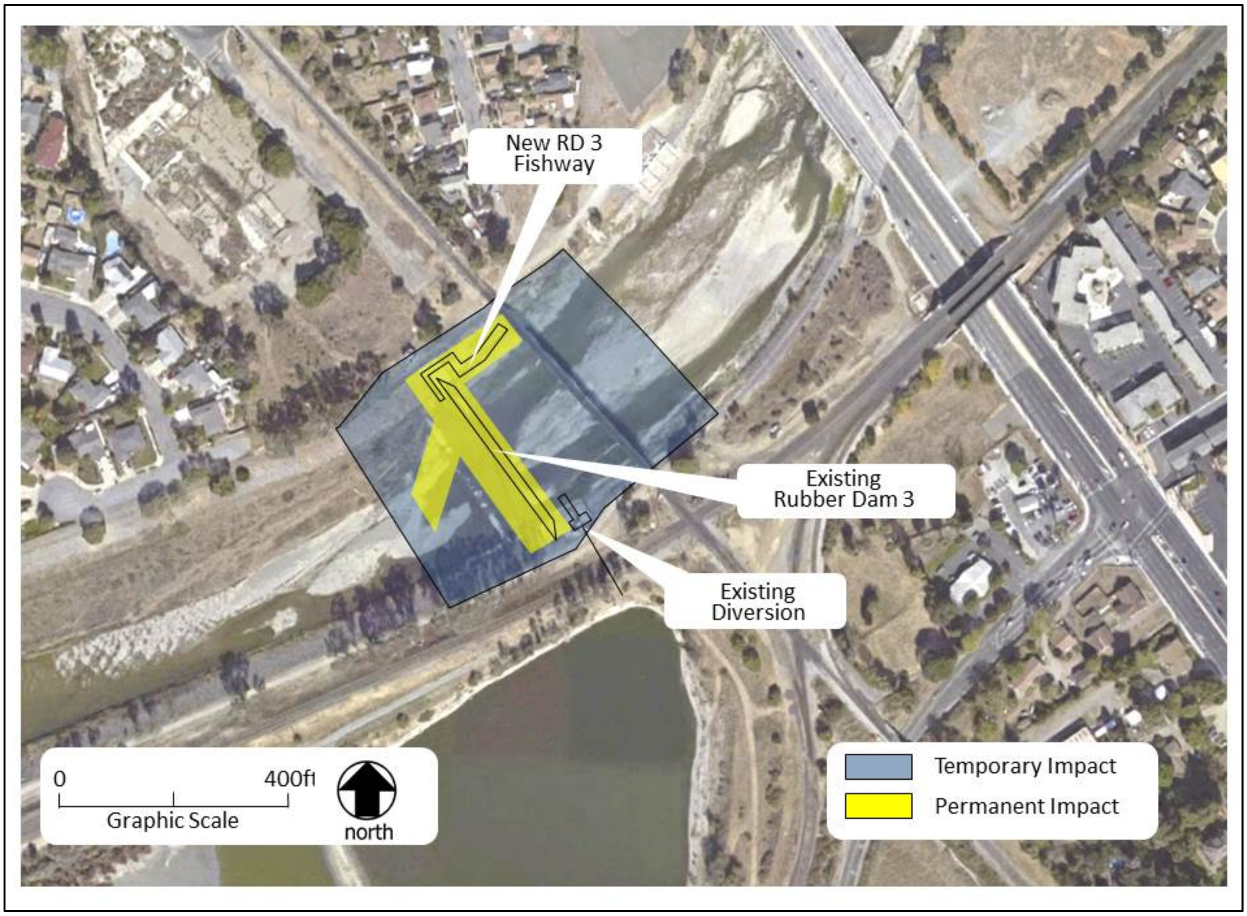


Figure 10. Approximate area of Rubber Dam 3 Fishway facility and construction zones.

In the temporary construction zone (shown in blue in Figure 10), ACWD would protect existing infrastructure outside of the channel area and restore pre-construction conditions in the channel following construction. Facilities would be maintained and operated by ACWD.

3.8 SBA Deliveries

ACWD will continue to request that DWR deliver State Water Project (SWP) supplies through the South Bay Aqueduct at the Vallecitos Turnout (about 6 miles upstream of Rubber Dam 3) in a manner consistent with existing ACWD and SWP operations.

As described in ACWD's Biological Assessment, under most conditions ACWD has agreed to preferentially utilize the Bayside Turnouts for direct deliveries of SBA water supplies to its surface water treatment plants during April, May, September, and

October to reduce and avoid potentially adverse effects of SBA deliveries on habitat conditions in Niles Canyon. During wet and normal years ACWD will not use the SBA Vallecitos Turnout in April or May.

3.9 Construction

ACWD anticipates completion of the proposed improvements over a period of four-years. A three-year period is required for construction of the RD1/ACFCD Drop Structure Fishway (including Rubber Dam 1 control building and foundation modifications, piping, equipment and controls replacement) and the construction of the Shinn Pond fish screen facility. One year is required for construction of the Rubber Dam 3 fishway including foundation modifications and bag replacement. A dual-shift construction schedule may be implemented at times during the various phases of each project to facilitate construction progress.

A four-year construction schedule is planned to mitigate environmental effects, support water management and reduce impacts to ACWD water supply operations. Rubber Dam No. 3 is located upstream of the ACFCD Drop Structure. Thus the preferred environmental approach is to construct the Rubber Dam 3 fishway first, followed by the RD1/ACFCD Drop Structure Fishway. This will minimize impact to fisheries as the ACFCD Drop Structure impedes upstream passage and steelhead are unlikely to be in the area. However, in the event of a delay to the Rubber Dam 3 fishway project, it is possible that the RD1/ACFCD Drop Structure Fishway will be constructed first, in order to continue moving forward with the overall fisheries restoration program.

The anticipated four-year construction schedule, based on construction of the Rubber Dam 3 fishway first, followed by the RD1/ACFCD Drop Structure Fishway and Shinn Screens, is generally described in Table 6.

Table 6. Summary of approximate construction area for the four elements of the ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project.

Joint Fish Passage Project Elements			
Project Element	**Permanent Footprint (acres)**	**Temporary Construction Area (acres)**	**Construction Schedule***
YEAR 1: RD3 Construction	0.8	4.6	May – October 2018
YEAR 2: RD1 Construction, year 1	1.4	65.2	May – October 2019
YEAR 3: RD1 Construction, year 2 and Shinn Screens year 1	1.4	65.2	May – October 2020
YEAR 4: RD1 Construction, year 3 and Shinn Screens year 2	1.4	65.2	May – October 2021

*Construction may begin earlier or extend later into the year if allowed by permit. See Section 3.9.3 for discussion. The construction schedule and construction sequencing of Project elements may vary from that presented above pending final engineering design and permit approvals.

The specific sequence of work will be determined by permit approvals, final engineering design and logistics, the contractor's available resources, ability to improve construction efficiencies by scheduling activities concurrently vs sequentially, weather conditions, site space constraints and compliance with city, county, state, and federal permitting considerations.

The facilities would be constructed in the dry season, from approximately May 1 through October 31. However, in-water construction may begin earlier and extended later into the year with agency approval.

3.9.1 Typical Activities

It is important to begin construction as early as possible because there are multiple and potentially overlapping elements. Scheduling may vary, depending on factors such as weather, other emergency conditions, and fiscal resources. Construction is anticipated to take place during periods of low-flow.

Access to the channel construction sites would be via existing levee maintenance roads/trails, which would be closed in the vicinity of construction activity, with detours of the levee maintenance road/trails provided to the extent feasible. General access to the levee maintenance roads/trails will be along surface streets including Hillview Drive, I Street, Riverwalk Drive, Niles Boulevard, Sequoia Terrace, Isherwood Way, Alvarado Niles Road, Montecito Drive and Vallejo Street.

Construction would occur in phases, which may overlap to some extent:

1. **Mobilization and isolation of the construction area from the active stream, which includes:**
   (a) delivery of equipment, materials, temporary buildings, and fencing to the site,

   (b) grading of storage areas as needed,

   (c) isolating construction activities in the channel from the active channel utilizing ACWD's existing Rubber Dam No. 3, in conjunction with gravel bags, fiber mats, and temporary cofferdams, or other methods, to ensure that fish will be excluded from the construction area, and that runoff from the construction area will be fully contained during construction activity. The temporary cofferdams may consist of a plastic barrier fence, k-rail barrier, an earthen levee with plastic sheeting to protect it from erosion, interlocking steel sheet-pile and piping for control of water, or another similar type of barrier. Location of these temporary facilities may be channel spanning or for isolation of smaller localized areas of the Project. Examples of typical construction conditions and channel bypass/isolation techniques are shown in Figure 11: Removal of ACWD Rubber Dam 2 and Figure 12: the replacement of ACWD Rubber Dam 1 rubberized fabric,

(d) Fish rescue: Aquatic species in the isolated construction zone would be removed and relocated to the active stream and the construction area would be dewatered (drained). Fish collection and relocation will follow the standard procedures for fish rescue that have been employed in prior ACWD in-channel construction projects. A fish rescue and relocation plan will be provided as required by NMFS and CDFW. Dewatering may be on-going;

(e) Access Road Construction**:** Construction equipment access to the work area may require a temporary roadway from the levee maintenance road/trail into and through the channel. Although construction would be focused on the north levee, at the base of the rubber dams, and in the areas of grouted rock and concrete, construction equipment will be needed to work within the Flood Control Channel to access the rubber dam foundations, toe of the levees, rip-rap placement and lower fishway guide wall construction.

2. Demolition, which includes:

(a) selective demolition of designated portions of existing structures,

(b) removal of demolition debris from the site, and

(c) disposal of debris at an appropriate landfill or, if feasible, stockpiled for future disposal.

3. Grading and excavation, which includes:

(a) grading of the construction sites and channel access roads,

(b) stockpiling and/or removal of materials, and

(c) installation of underground utilities, including piping and electrical conduit and wiring.

4. Concrete Installation, which includes:

(a) installation of concrete forms for the various concrete elements of the Project,

(b) concrete hauling and delivery,

(c) pouring concrete for RD1/Drop structure fishway (approximately 2500 cubic yards (yds^3)), Shinn Pond screens (approximately 1100 yds^3), and RD3 fishway (approximately 735 yds^3),

(d) curing and removal of forms, and

(e) drilled concrete piers and tie-backs.

5. In-channel Rip-Rap construction, which includes:

(a) hauling of stone for rip-rap to the site, and

(b) installing sections of stone rip-rap, including grouting in some areas.

6. **<u>Equipment installation, which includes:</u>**
   (a) installation of operational equipment, such as gates, screens, cranes, pole mounted and surface mounted electrical lighting, pole mounted security cameras and radio/cellular antennas, small storage cabinets with data logging, monitoring and transmission equipment, security fencing, motors, instrumentation and control equipment, piping, conduit, new Rubber Dam 3 fabric, and other appurtenances.

7. **<u>Backfill, which includes</u>**:
   Backfilling of excavated areas and restoration of levee rip-rap slope protection.

8. **<u>Site Restoration, which includes:</u>**
   (a) restoration, to pre-construction condition, all areas not covered by permanent improvements. Reconnection of the active channel,

   (b) in-kind surface restoration of the recreational trails affected by construction, i.e., crushed rock will be added to gravel areas, paved sections will be repaved. Minor re-alignment of trails past the new facilities, and

   (c) demobilization and final site clean-up, following initial testing of the rubber dam, fishway and fish screen operations, and hauling of debris to an appropriate landfill for disposal.

3.9.2 Area of Activities

Approximate area of permanent and temporary construction is summarized on Table 6. Typical equipment and workforce are summarized on Table 7. Typical methods of isolating the stream from active construction are shown on Figures 11 and 12.

Table 7. Typical construction equipment and workforce.

Project	Typical Equipment	Crews
Fishways/Rubber Dam and foundation modifications	Excavators Dump trucks Concrete trucks Pumper trucks Pickups and delivery trucks Loaders/backhoes Compaction equipment Water trucks Dewatering equipment Crane	1 foreman 3 operators 6 truck drivers 8 laborers Specialty subcontractors
Fish Screens	Excavators Dump trucks Concrete trucks Pumper trucks Pickups and delivery trucks Loaders/backhoes Compaction equipment	1 foreman 1 operators 4 truck drivers 4 laborers Specialty subcontractors

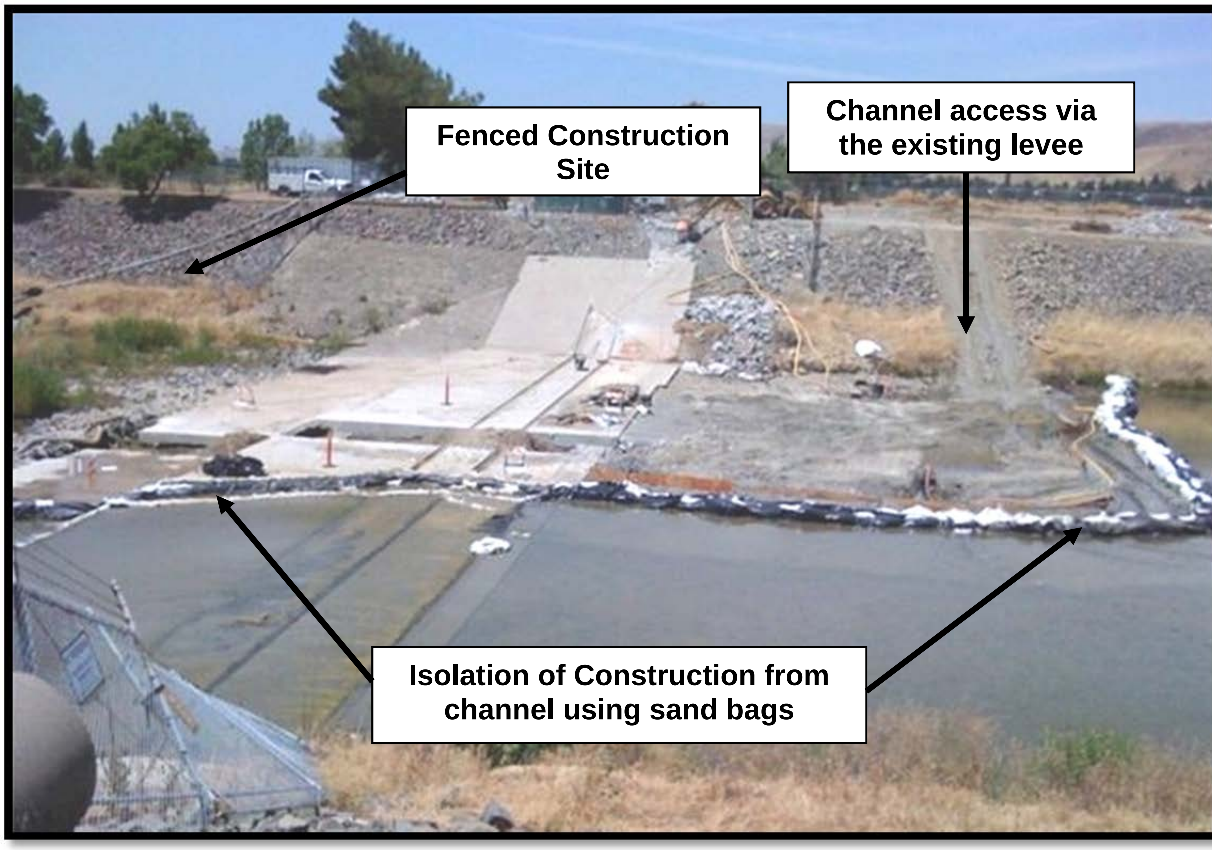


Figure 11. Typical site isolation and construction zones (per the previous ACWD removal of Rubber Dam 2).

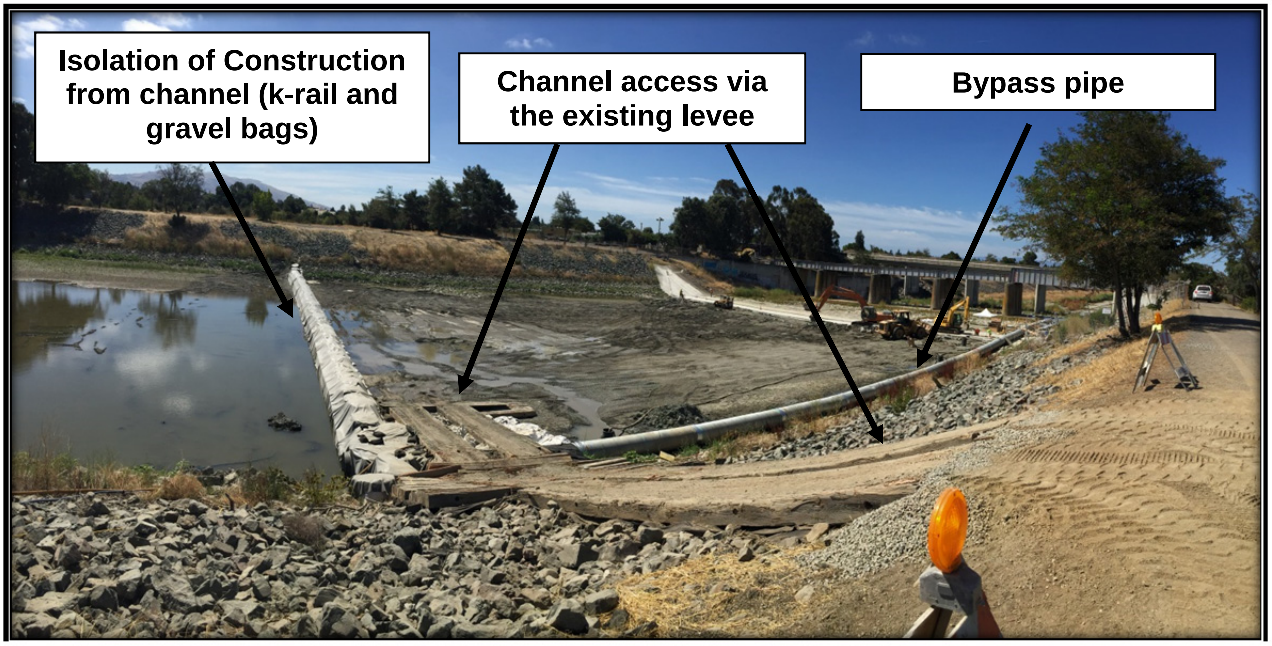


Figure 12. Typical site isolation and construction zones (per the previous ACWD replacement of Rubber Dam 1 fabric).

Construction zones would extend into the regional trails and the margins of the park at Quarry Lakes. During construction, these trails would be re-routed or possibly closed in order to ensure public safety.

Full volitional steelhead passage will not occur until all facilities have been constructed and operational. For example, if the fishway at Rubber Dam 1/ACFCD Drop Structure is completed prior to construction of the other facilities, adult fish could migrate up to Rubber Dam 3, which would still remain a barrier when inflated. In addition, unscreened diversions between Rubber Dam 1 and Rubber Dam 3 could result in diversion of fish into the recharge basins. Pending completion of all facilities, fish passage may require interim measures (see Avoidance and Minimization Measures, below).

3.10 Operations and Maintenance

3.10.1 Responsibilities

ACWD would be individually responsible for:

- Compliance with the proposed Flow Bypass Rules;
- Operation and maintenance of Rubber Dam 3 Fishway and associated facilities; and
- Operation and maintenance of all fish screens and diversions.

ACFCD would be individually responsible for operation and maintenance of in-channel flood management facilities, including the modified ACFCD Drop Structure and related rock and grouted rock features.

ACFCD and ACWD would be jointly responsible for operation and maintenance of the Rubber Dam 1/ACFCD Drop Structure fishway. ACFCD and ACWD would develop an operations and maintenance manual for the fishway. Specific responsibilities will be defined in a Memorandum of Understanding between ACWD and ACFCD.

3.10.2 General Operations

Continued Delivery of SWP Supplies via SBA Vallecitos Turnout

ACWD's diversions in the Alameda Creek Flood Control Channel are used to recharge the Niles Cone Groundwater Basin (Niles Cone). The Niles Cone is a coastal aquifer system hydraulically connected to the Bay and is subject to saltwater intrusion should groundwater levels fall below mean sea level in the Newark Aquifer. The Newark Aquifer is the shallowest regional aquifer in the Below Hayward Fault Sub-basin. Saltwater intrusion was first noticed in the 1920's as a result of many years of chronic overdraft of the basin. Since 1962, ACWD has purchased State Water Project water supplies to supplement local recharge and raise groundwater levels. This has resulted in bringing piezometric head in the Newark Aquifer above sea level as of 1972 and returning the hydraulic gradient to its natural bayward direction. To maintain water supplies and prevent saline water from affecting the Niles Cone Groundwater Basin, ACWD will continue to receive supplies from the South Bay Aqueduct (SBA), via releases from the SBA Vallecitos Turnout, within the range of historical operations.

Implementation of the proposed Flow Bypass Rules may change the quantity of natural runoff available for recharge during some years and result in greater fluctuations in groundwater levels from season to season and year to year. Analysis of the potential for these fluctuations indicates that overall recharge would be reduced in years of low inflow from the upper watershed, resulting in lower groundwater levels. However, groundwater levels are projected to recover during above normal and wetter years when higher inflow from the upper watershed is available to meet both the Flow Bypass Rules and groundwater recharge needs. A key assumption for these analyses is that SBA Vallecitos Turnout water will continue to be available from DWR to supplement natural runoff for recharge of the Niles Cone. This analysis indicates that the utilization of the SBA Vallecitos Turnout will be within the range of historical operations, both within the timing and duration of flows, and magnitude of flows. That is, SBA releases to Alameda Creek for Niles Cone groundwater recharge are projected to be in the range of about 5 cfs to 40 cfs. Depending on groundwater levels, local hydrologic conditions and availability of other sources of supply (State Water Project and San Francisco Regional Water System supplies), the releases may occur in summer months, or may be required throughout the year. However, as in the past, in some years ACWD may not take any SWP deliveries via SBA turnout releases for groundwater recharge. As proposed in ACWD's Biological Assessment, ACWD has agreed to preferentially utilize the Bayside

Turnouts for direct deliveries of SBA water supplies during April, May, September, and October to reduce and avoid potentially adverse effects of SBA deliveries on habitat conditions in Niles Canyon. During wet and normal years ACWD will not typically use the SBA Vallecitos Turnout in April or May.

Routine Maintenance

Routine maintenance of fish screens, diversions, fishways, drop structures, and associated equipment would typically involve:

- Removal and disposal of sediment, trash, and woody debris from the fishway and plunge pool, typically using hand tools, small cranes and lifts, hoses and suction pumps, and similar small equipment. Additionally, the fishways will be equipped with a trash-raking system;
- Inspection of moving parts and lubrication, painting, sealing, cleaning, and replacement of moveable parts;
- Inspection, repair and/or replacement of instrumentation and monitoring devices including sensors and flow meters;
- Patching damaged concrete and grouted rock (generally following periods of high flow and damage from debris); and
- Periodic repair of rubber dams.

Maintenance associated with these activities would be contained within the active flood control channel and levees from Mission Boulevard downstream to the Rubber Dam 1/ACFCD Drop Structure fishway intake. The fishway design includes ports in the fishway metal decking for inspection, a sluice pipe system for flushing sediment and trash rake and crane for debris removal. Proposed maintenance in years 1 and 2 following construction is found on Table 8a and Table 8b, below. Routine operations and maintenance of the facilities, including the fishway, fish screens, and other associated facilities will be conducted under a general permit as part of authorizing the Project.

In addition to routine maintenance, maintenance on a larger scale would be required at times. The fishways would have a projected lifespan of approximately 40 to 60 years. This life span may be extended by replacement of moving parts and repair of worn or damaged concrete. During periods of high flows and high debris loads, rock and other debris moving downstream may cause substantial damage to concrete facilities. In addition, seismic forces are anticipated and may damage any of the structures. Such damage is anticipated and would be repaired in a timely manner. Repair and some modification of facilities following anticipated damage is a feature of the ACWD-ACFCD Project. Periodic replacement of rubber dam inflatable bags will also occur in the future as a result of routine wear and aging. Potential impacts associated with maintenance are thus described in the impact analysis.

Operations under Various Flow Scenarios

Operation of the fishway and dams under various flow scenarios are described below. The ACWD/NMFS/CDFW Bypass Flow schedule identifies mean daily flows at the Niles Gage as the in-stream flows that are operational thresholds.

RD1/ACFCD Drop Structure Fishway and Auxiliary Flow System

The RD1/ACFCD Drop Structure fishway will be designed to operate continuously up to a flow of approximately 1,100 cfs in the channel. ACWD and ACFCD will evaluate whether the fishway can be sustainably used at flows higher than 1,100 cfs as part of the fishway monitoring and evaluation process. Factors such as water depth, water velocity, turbulence, etc., within the fishway at higher flows will be considered as part of the evaluation of passage conditions within the fishway as a function of flow. Fishway flow will vary between 24 and 45 cfs during the steelhead inmigration season and could be higher outside this season. Operation of the fishway exit gates will be controlled by a PLC system, which will receive signals from water level sensors in the fishway exit channel and each exit pool as well as forebay elevation and dam height data. As the forebay rises, one exit gate will close while the gate for the next upstream exit simultaneously opens. They will be coordinated to maintain appropriate fishway flow and head differentials based on fishway hydraulic criteria. The reverse process happens for lowering the forebay. Additional flow can enter the fishway via the juvenile kelt spillway and/or opening additional gates for juvenile and kelt passage. If the required bypass flow is more than the fishway flow at RD1, the screened auxiliary flow system will be used to convey the additional flow around the dam. For example, if the required bypass flow is 55 cfs and the forebay level results in a maximum fishway flow of 36 cfs, the auxiliary slide gate would be adjusted such that a minimum of 19 cfs flows through the auxiliary pipe.

As part of the design for both the RD1 and RD3 fish passage facilities the dam's foundation and downstream grouted rock would be modified to include a stream-wide plunge pool, (on the order of 2.5 feet deep at RD1, 3 feet deep at RD3), located immediately downstream of the rubber dam. In the event that water flows over the top of the rubber dam there is a risk that downstream migrating juvenile steelhead and kelts could pass over the top of the dam and be injured by falling directly onto the dam foundation or rock. The plunge pool would retain water that would cushion the drop of juveniles and kelts and reduce the risk of injury and damage as the fish continue their downstream migration. The depth of the plunge pool was selected based on a pool depth-to-fall ratio utilized in fish passage facility designs by NMFS engineers. In addition, there is the possibility that downstream migrating juvenile steelhead and kelts could pass over the top of the ACFCD Drop Structure and be injured or killed. This risk of passing over the top of the drop structure is greatest at high creek flows. Passage by steelhead over the rubber dams or drop structure represents a potential source of damage or mortality to steelhead and is included as a covered activity for purposes of incidental take authorization under the NMFS Biological Opinion.

The screened auxiliary flow system at RD1 can be utilized when the dam is up and while the dam is rising or falling. When the water surface elevation (WSE) rises above elevation 46.0 ft (impoundment 3.2 feet deep), the auxiliary flow screen in the upper exit channel will become partially submerged and begin operating at partial capacity. Once the forebay is at elevation 48.5 ft (impoundment 5.7 feet deep), the screen will be fully submerged and can operate at full capacity (30 cfs), if necessary to meet instream flow requirements. Because the screen is above the channel bed, it may take up to four hours during the filling of the impoundment before there is adequate submergence of the screen to allow enough water to pass and meet instream flow requirements solely through the auxiliary flow system. Flow will be passing through the fishway during the filling of the impoundments. If dam overtopping begins once the impoundment is filled, the screened auxiliary system may operate to minimize dam overtopping and improve fishway attraction.

RD3 Fishway

The RD3 fishway will not operate when RD3 is deflated. As RD3 is inflated, the RD3 fishway will begin to convey a portion of the streamflow. During the initial moments of raising the dam and the final moments of deflating the dam, there will be a small water level differential through the fishway and flow through the fishway will be less than 24 cfs. During these periods, fish will be able to swim directly over the dam as it naturally notches and flow is concentrated. The duration of these conditions is likely minutes, not hours.

However, because of the low water level differential, the fishway hydraulics will be in criteria for upstream passage. As the forebay continues to rise, the fishway flow through exit gate 1 will increase and then the fishway exit operation will switch to higher exit gates and fishway flow will vary between 24 cfs and 45 cfs. When no flow overtops the inflated dam, the only flow going around RD3 to the RD1 impoundment will be through the fishway.

Similar to RD1, the exit gate operations will be controlled by a signal from water level sensors in the fishway exit channel and each exit pool. As the forebay WSE changes, one exit gate will close while the next gate simultaneously opens. The exit gates will be coordinated to maintain appropriate fishway flow and head differentials based on fishway hydraulic criteria. There will be a complete change of exits in every two to four feet of forebay change. Fishway flow will vary from approximately 24 cfs to about 45 cfs.

Operations When Dams are Down

When the RD3 is down, all of the flow is conveyed downstream through the flood control channel and the fishway will be closed. When RD1 is down during the inmigration period, the fishway will convey a portion of the total streamflow to provide upstream passage over the ACFCD Drop Structure. The remaining flow will be over the dam. The RD1/ACFCD Drop Structure fishway will remain operational and within criteria at all streamflows up to 1,100 cfs, which is approximately the 1% annual exceedance flow at the Niles Gage. At higher flows, the exit gates will be at least partially closed to reduce the risk of excess sedimentation in front of the trash rack and in the exit channel and fishway. As noted above, observations of factors such as sediment deposition, water depths and velocity, and turbulence will be considered in evaluating fishway performance as a function of high flow events as part of post-construction monitoring and observations.

When the dams are down, the RD1/ACFCD Drop Structure fishway flow will depend on the creek stage at the fishway exit channel, but will be in the range of 25 cfs to 45 cfs, flows permitting. When RD1 is down, water will enter the fishway through one of the two lowest exit gates. When the dam is down during low-flow periods, directing enough water into the fishway may prove challenging due to potential sediment build-up in front of the fishway exit channel. It might be necessary to do minor manipulations of the channel bed in front of the trash rack.

Raising of Dams

Based on the ACWD/NMFS/CDFW Bypass Flow schedule, the raising of the dams and filling of the impoundments must be done gradually over a period of 6-12 hours (assuming both rubber dams are being inflated), but may take longer depending on varying hydrologic conditions. When streamflows are high (above approximately 700 cfs,) and both dams are down, standard operations will be to inflate RD1 first. RD1 will be raised slowly to allow for a managed decrease of the flow rate within the downstream reaches of the Flood Control Channel. As RD1 is raised, water will continue spilling over the crest of the dam for approximately the first two hours of inflation, at which point overtopping will cease and downstream bypass flows will be conveyed within the fishway and screened auxiliary water system (RD1) to the channel downstream of the ACFCD Drop Structure.

After RD1 has been completely filled, the upstream rubber dam would then start its (similar) inflation sequence. It should be noted that the default mode for both rubber dams is the “up” position under all conditions; rubber dams are lowered for infrequent maintenance and high flows. Raising and lowering dams is infrequent, and is primarily due to changing hydrologic conditions resulting from winter precipitation events. Once the impoundments are filled, streamflow not conveyed in the fishway or the auxiliary flow system (RD1) will overtop the dam. When streamflow drops below 400 cfs and the diversions are opened, the fishway and auxiliary system and possibly the diversions will be operated to minimize overtopping to the extent possible.

ACWD evaluated the baseline effects of various rates of RD1 inflation during periods when Fish Bypass Flows are proposed. The results of the analysis indicate that if (a) the lowest rubber dam is raised first and (b) water is allowed to flow over the dam for the first two hours of inflation, then approximately 85% of the time, the rates of dewatering in the Flood Control Channel from RD1 to the tidal zone are less than 0.5 ft/hr. The results of the exceedance evaluation are presented below in Figure 13.

ACWD quantified what the potential dewatering rates would be based on a steady state HEC-RAS model developed for the reach of the Flood Control Channel between the Flood Control drop structure to the tidal zone. This model used 45 cross sections to describe the configuration of the channel, as well as output stage-discharge rating curves for each of the 45 cross sections. A typical hydrograph illustrating the above mentioned operating criteria was routed through the Flood Control Channel using the Muskingum Streamflow Routing Method in order to quantify the effects of flow attenuation on streamflow. Flow predictions at each cross section were then translated to river stage predictions using the HEC-RAS generated rating curves.

Calculation of the dewatering rate at a specific cross section was completed by taking the predicted stage value at the start of an hour, the predicted stage value at the end of the hour, and subtracting the two in order to estimate a rate of change over a 1 hr period. As displayed in Figure 13, when ACWD’s ramping rate proposal is analyzed using this methodology, approximately 85% of the time when flows are ramping down due to RD1 inflation, calculated dewatering rates in the Flood Control Channel are 0.5 ft/hr or less.

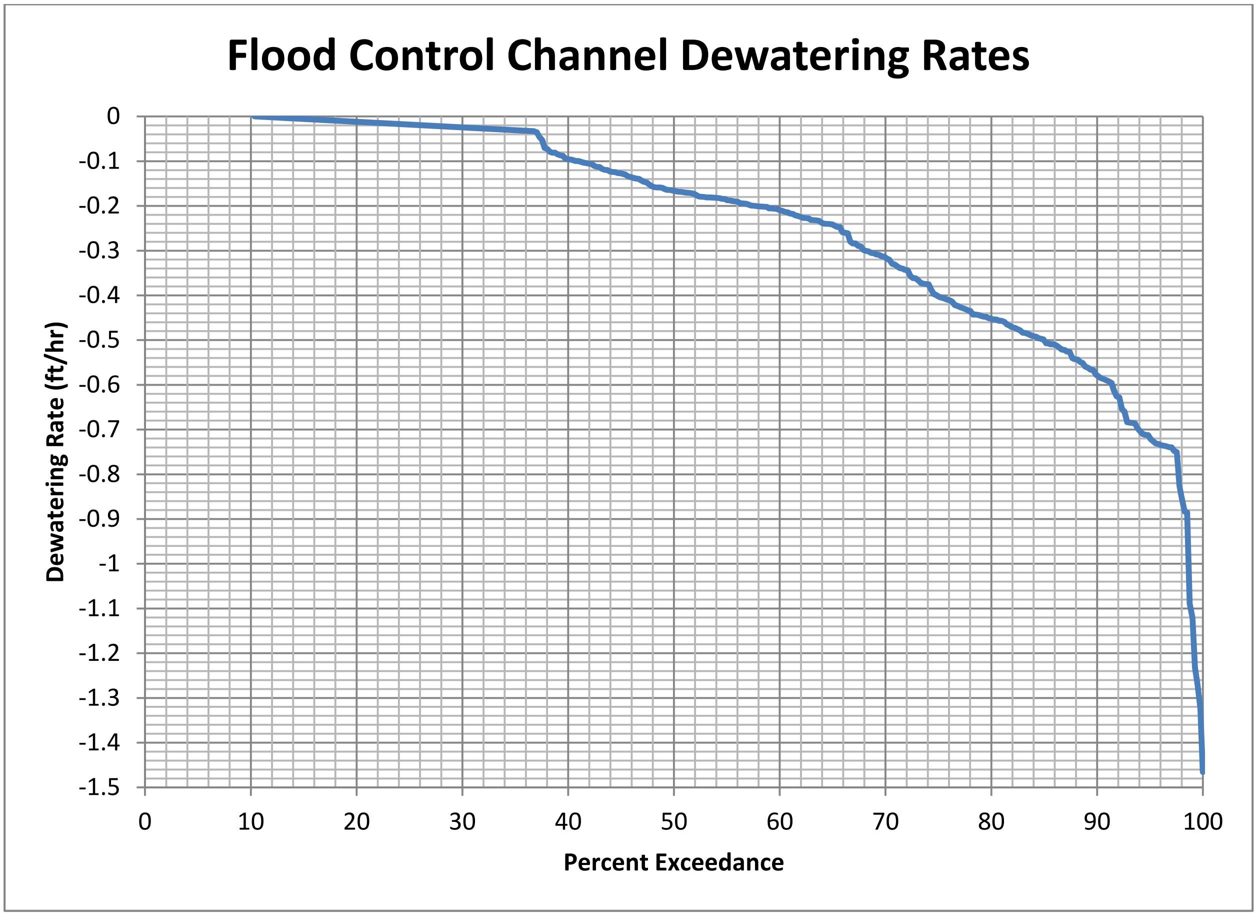


Figure 13. Exceedance plot of ramping rates in the Alameda Creek Flood Control Channel. Negative values indicate the rate of dewatering, while positive values indicate the rate of flooding.

For cross sections which demonstrated a dewatering rate greater than 0.5 ft/hr, further investigation was carried out to identify potential impacts to steelhead. Figure 14 (14a, 14b, 14c, 14d, and 14e) shows three selected cross sections in the Flood Control Channel with modeled water surface elevations corresponding to 700, 400, 100, 42, 25, 12 and 5 cfs. The baseline channel configuration that may potentially result in stranded fish will be unchanged by the project; therefore, the occurrence of stranded fish (on a percent basis of total migratory fish) is also expected to be unchanged. Additionally, topographic data indicates that as the flow rate is ramped down from 700 cfs to the typical required bypass of 25 cfs, many of the high water flow paths drain toward the existing low flow channel, thus minimizing the chance that fish may become stranded in side channels or shallow disconnected pools.

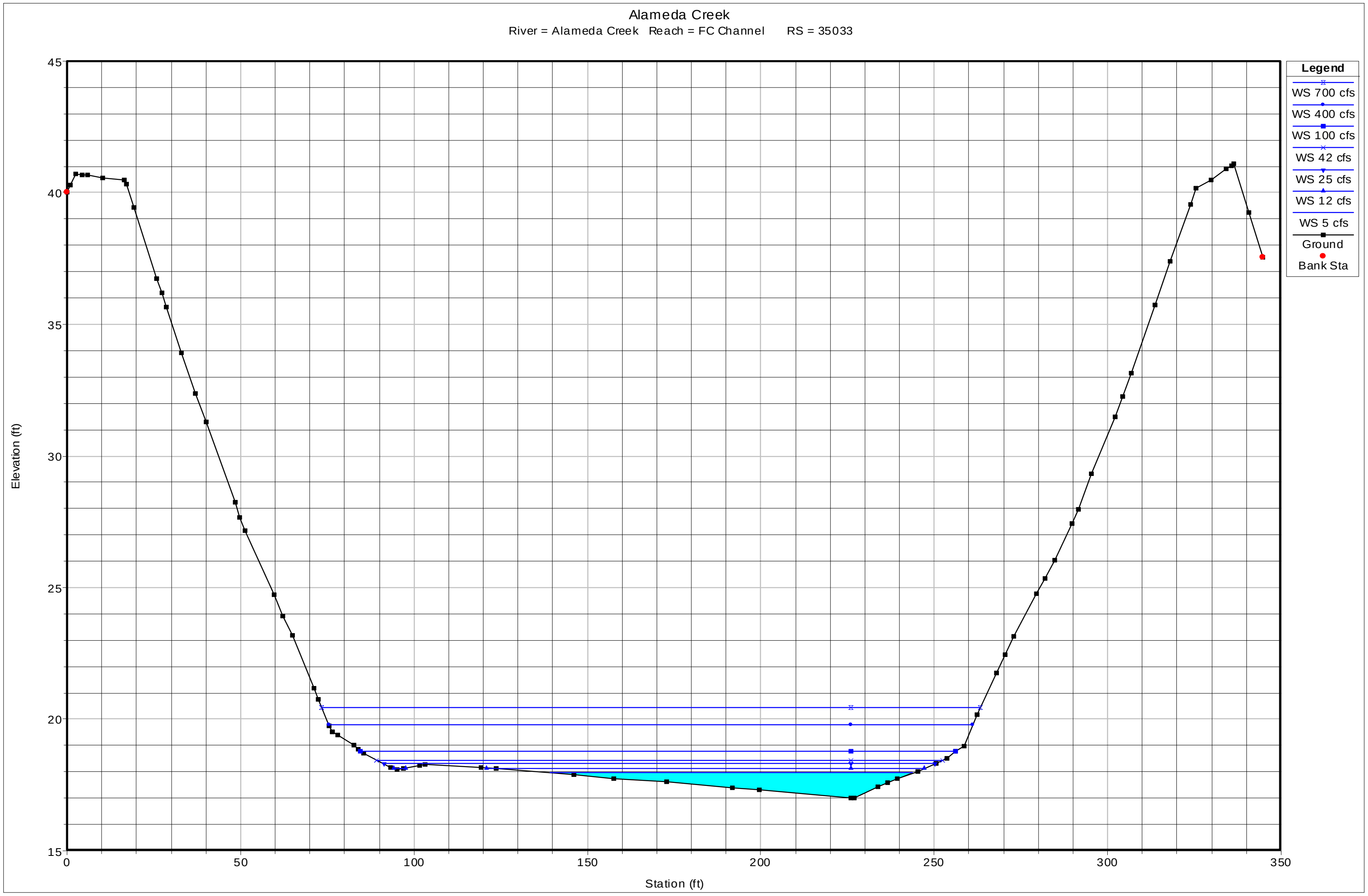


Figure 14a. Example cross sections identifying minimal chance of stranding due to water level fluctuations downstream of RD1. As water levels decline, flow becomes concentrated to a single segment of the channel.

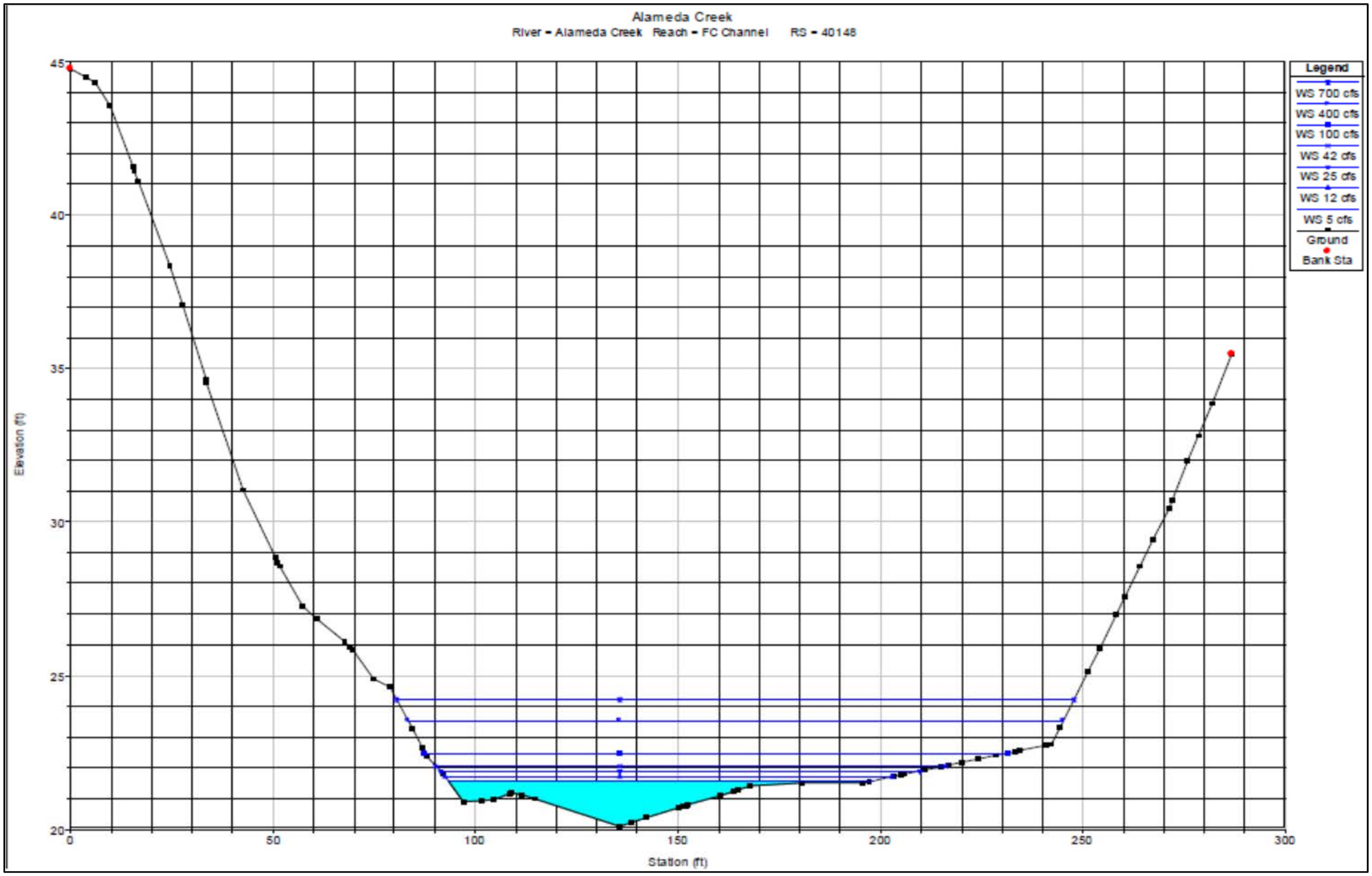


Figure 14b. Example cross sections identifying minimal chance of stranding due to water level fluctuations downstream of RD1. As water levels decline, flow becomes concentrated to a single segment of the channel.

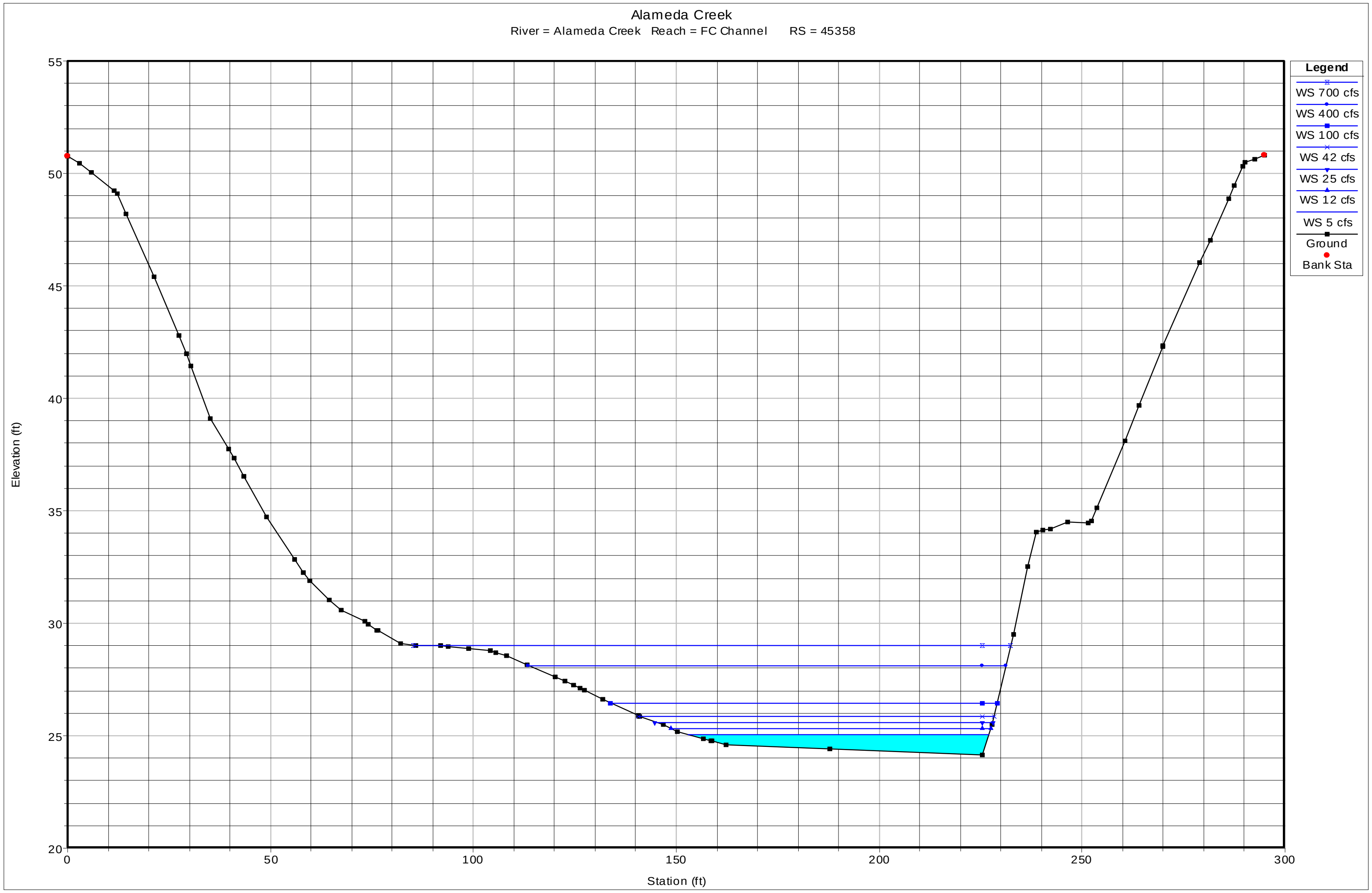


Figure 14c. Example cross sections identifying minimal chance of stranding due to water level fluctuations downstream of RD1. As water levels decline, flow becomes concentrated to a single segment of the channel.

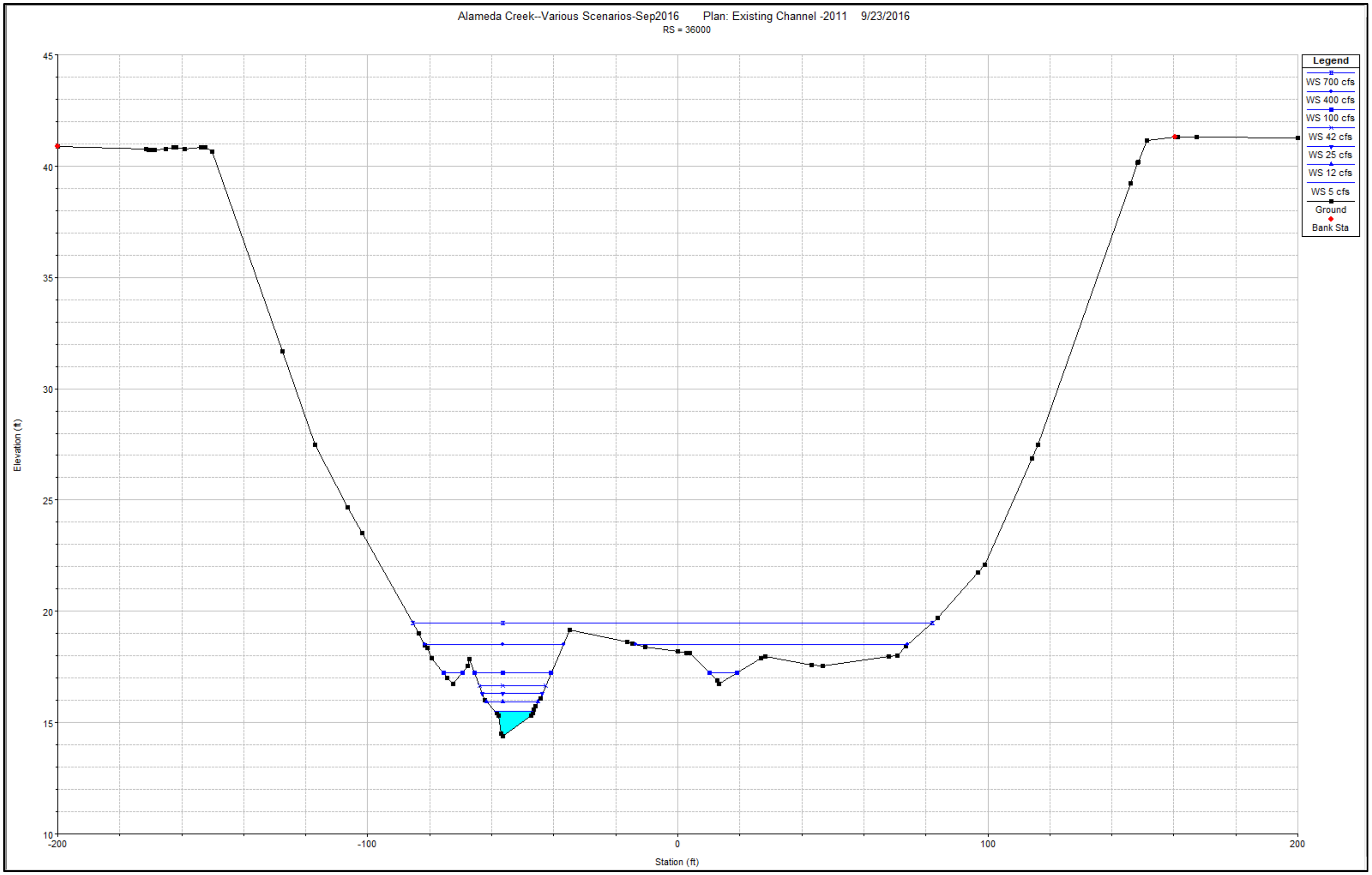


Figure 14d. Example cross sections identifying minimal chance of stranding due to water level fluctuations downstream of RD1. As water levels decline, flow becomes concentrated to a single segment of the channel.

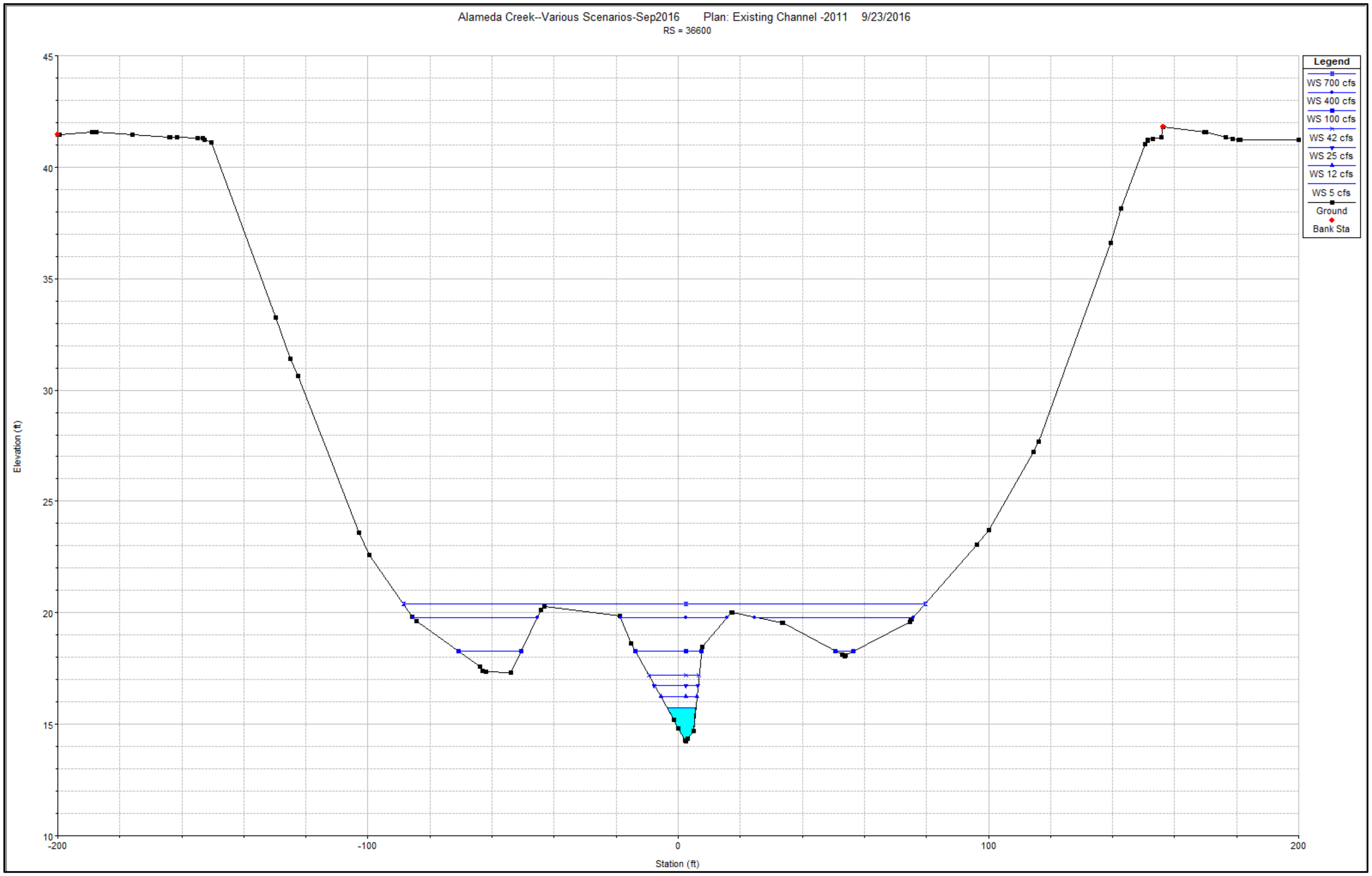


Figure 14e. Example cross sections identifying minimal chance of stranding due to water level fluctuations downstream of RD1. As water levels decline, flow becomes concentrated to a single segment of the channel.

It is understood that little to no habitat for spawning or rearing currently exists in the Alameda Creek Flood Control Channel downstream of ACWD's facilities where these predicted ramping rates are to occur, leading this section of Alameda Creek to be primarily identified as a migration corridor. In development of ACWD's downstream flow bypass scenario and Rubber Dam operational guidelines, ACWD proposed offsetting the minor impacts of these flow ramping rates on this migration corridor by providing continuous flow bypasses sufficient to meet the migration needs of both adult and juvenile steelhead, per the bypass flow table previously identified.

Lowering of Dams

When the dams are being lowered, the fishway exit gates will be switched in reverse of the operation during dam raising, and the upper exit pools will be drained. The fishway exit pools will be designed with sloping floors that will help fish move downstream out of pools being drained.

Dams Up – Impoundment Filled – No Diversion – Dams Overtopping

When mean daily streamflow at Niles Gage is less than 700 cfs, both dams may be inflated and overtopping may occur. However, diversions may be opened only when the flow is below 400 cfs. There are also occasions when diversions will be closed at lower flows due to poor water quality conditions or other operation and maintenance reasons.

When dams are up and diversions are closed, there will typically be insufficient capacity within the fishway and screened auxiliary bypass to prevent dam overtopping. During overtopping, the proposed plunge pools below each dam will receive the overspill to help protect salmonids that may go over the dams.

Dams Up – Impoundment Filled - Diversions Open – Dams May Overtop

During standard diversion conditions, the dams are raised, impoundments are at operational levels, and diversions are open. Under this scenario bypass requirements may be met by conveying flow to the downstream channel through the fishway alone. The actual flow in the fishways will vary depending on forebay levels, but will range between approximately 24 cfs and 45 cfs. Overtopping of either RD1 or RD3 is possible depending on flow into the reach, diversion rate, and flow within the fishway and auxiliary water system (RD1). Overtopping of the dams will be managed by adjusting the fishway flow and diversion rates. At RD1 overtopping may be further reduced by also adjusting the auxiliary flow.

Out-Migrant Season Operations

During the defined juvenile steelhead outmigration season (April 1 to May 31) the system will be operated to meet bypass flow requirements below RD1 while minimizing overtopping of the dams. The fishways will be operated primarily to provide a safe out-migration route for juvenile salmonids. During much of this period the required bypass flow rate will be adequate to allow the fishways to provide both in- and outmigration. When the inflows are greater than the normal operating capacity of the fishway (and auxiliary flow at RD1) and the forebay near the top of the dam crest, water will spill through an opened juvenile (smolt) bypass weir-gate and be carried down the fishway to provide safe downstream passage of smolts and kelts, but the fishway will be out of criteria for upstream passage. If the streamflow exceeds the juvenile bypass capacity, flow will overtop the dams and spill into the plunge pool.

Inmigration Example Hydrographs

It is useful to look at the intended operations of a facility during an actual storm event. Figure 15 through Figure 18 present operational scenarios at RD1 and RD3 for actual small and large storm events. The example hydrographs shown were chosen to reflect somewhat typical small (dams remain up) and large (dams are lowered) storm events. Each operational period is designated by a label and the supporting text is located on the right of the figure.

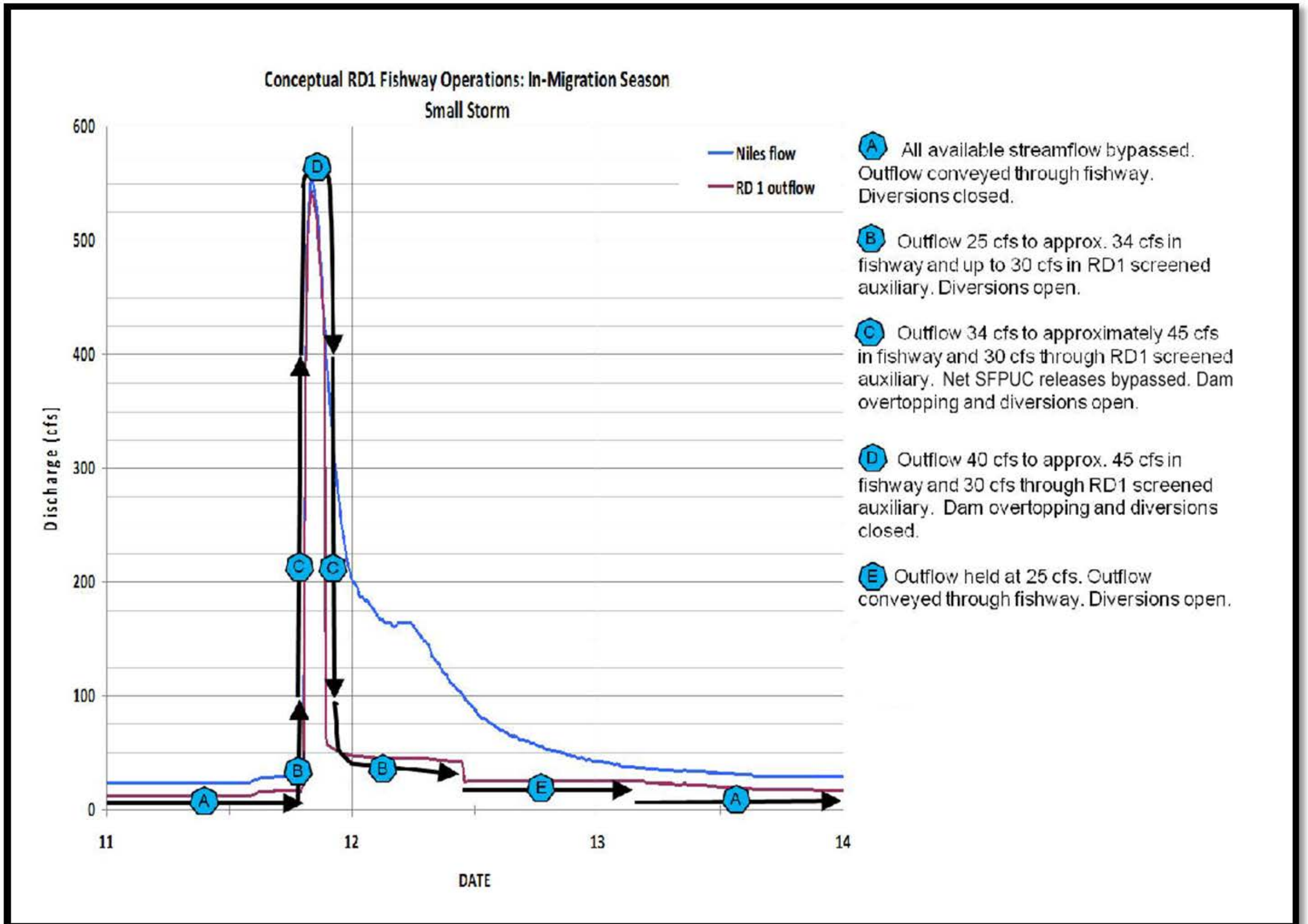


Figure 15. Conceptual RD1 Fishway Operations: Inmigration, small storm.

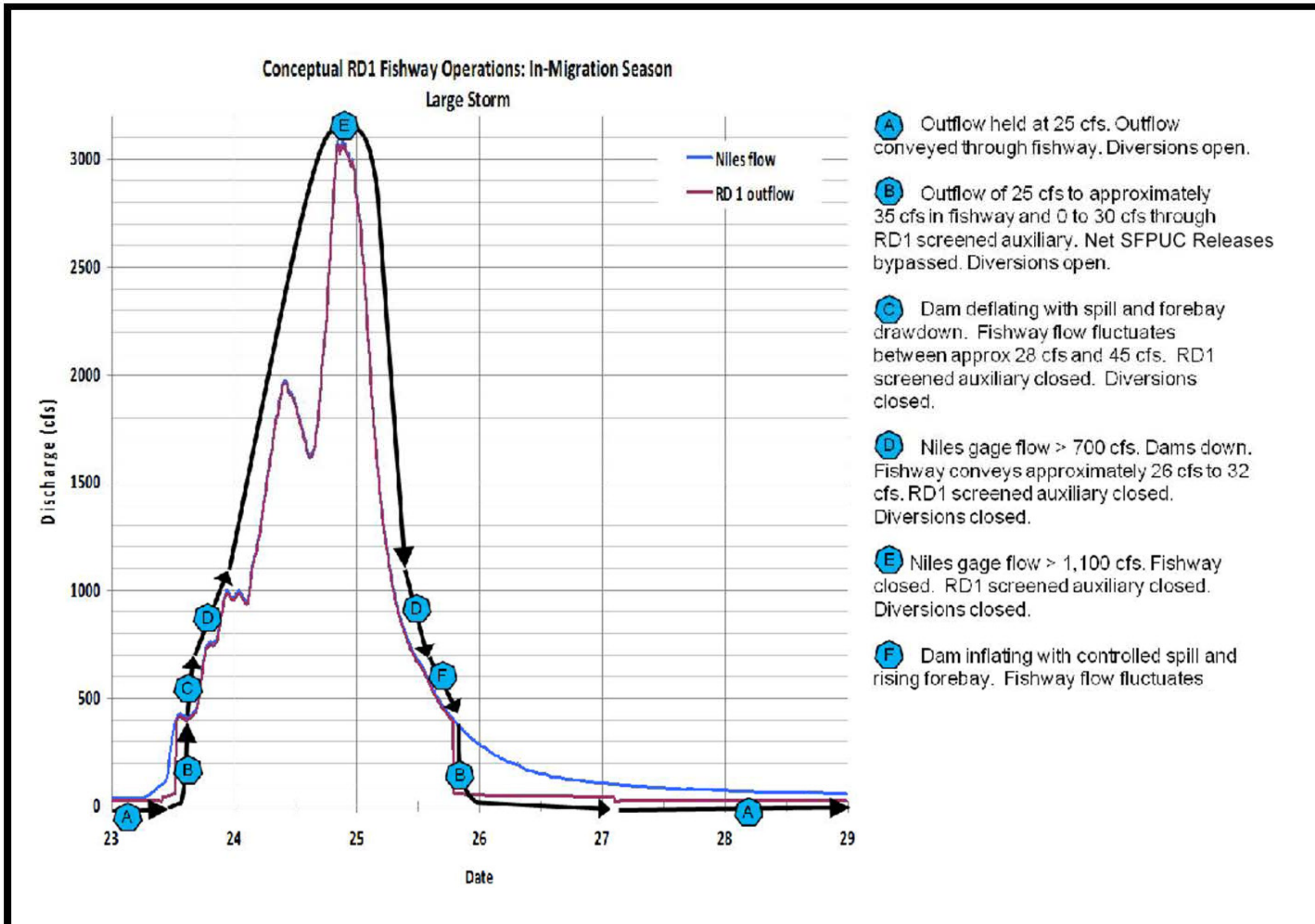


Figure 16. Conceptual RD1 Fishway Operations: Inmigration, large storm.

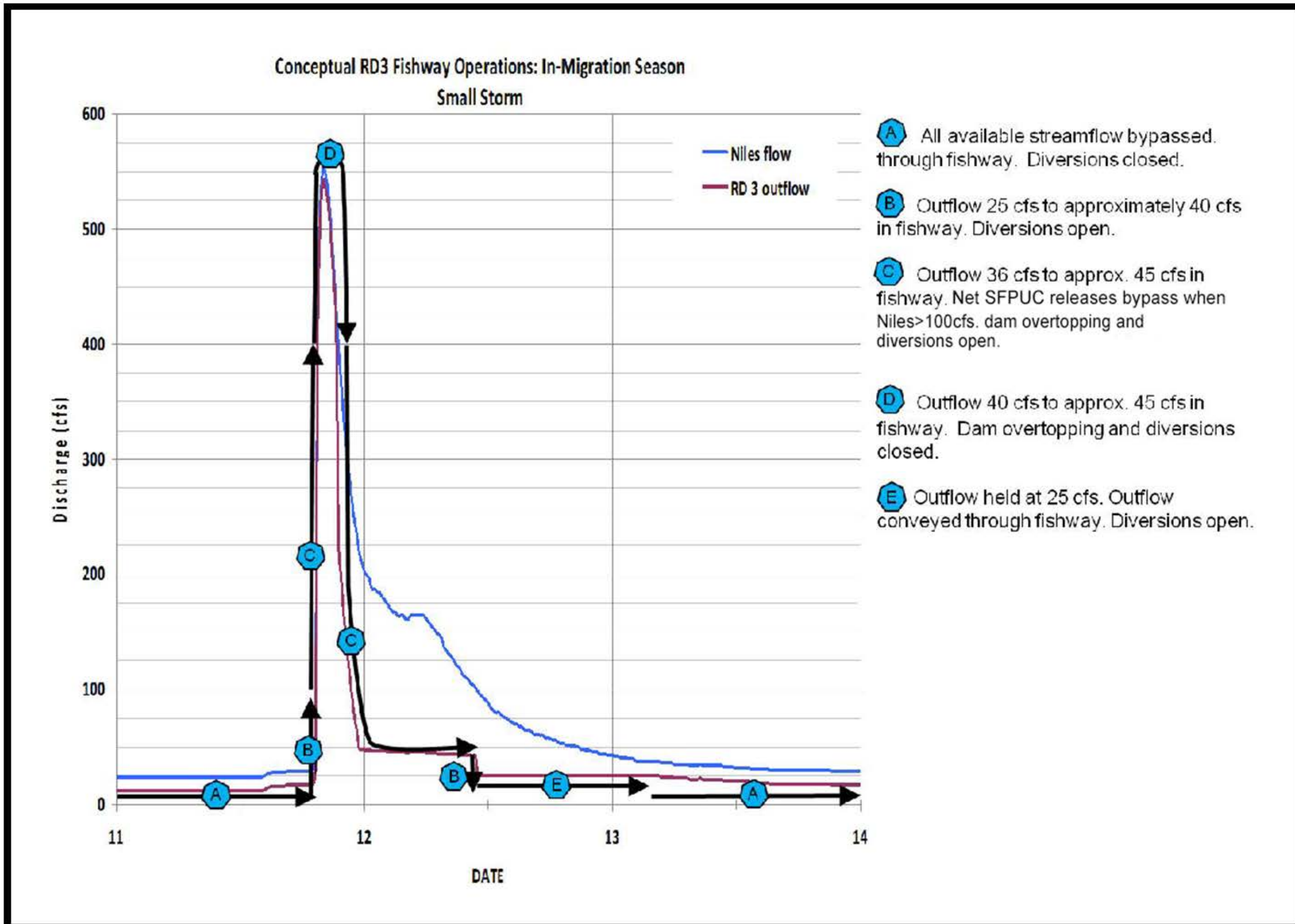


Figure 17. Conceptual RD3 Fishway Operations: Inmigration, small storm.

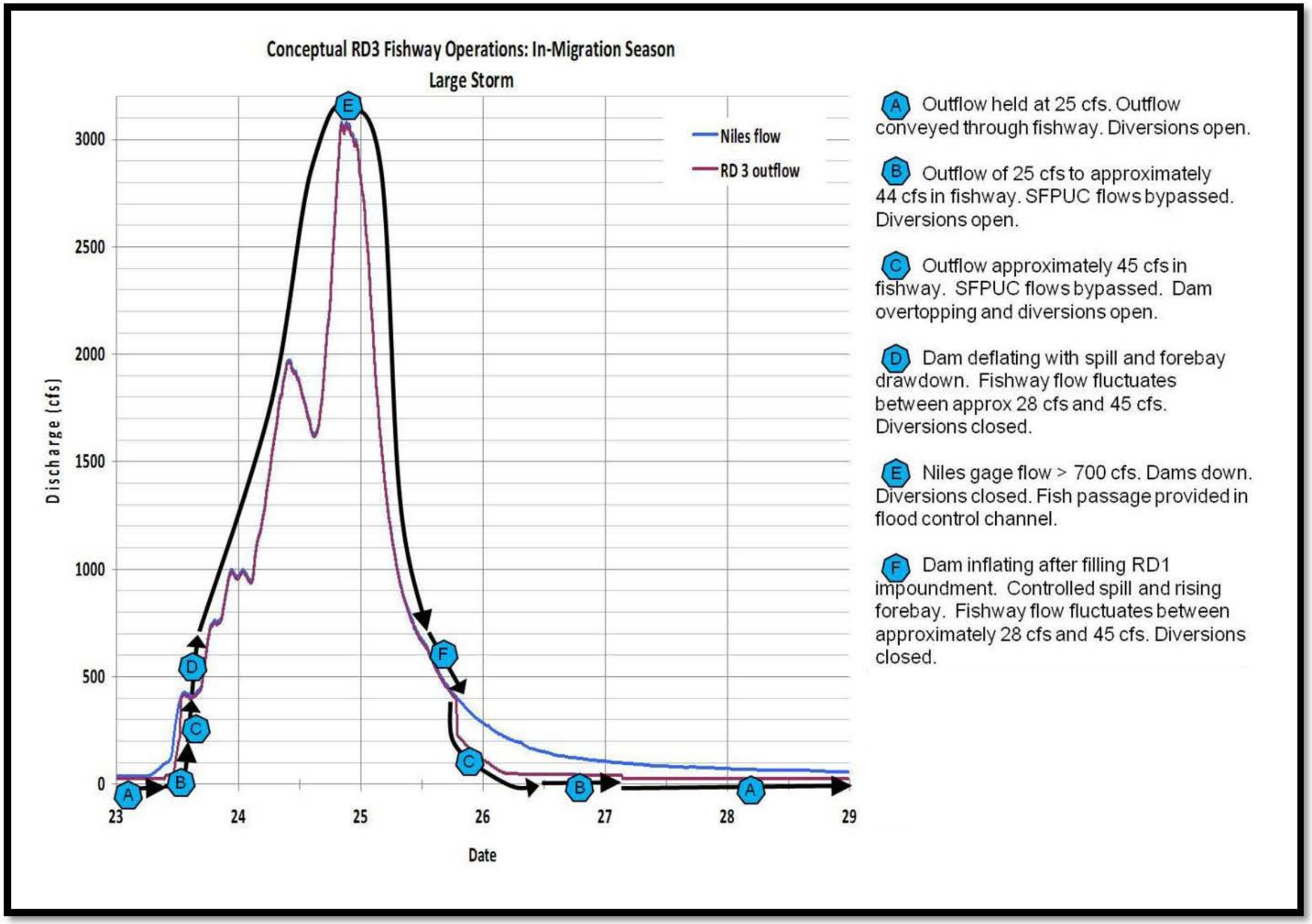


Figure 18. Conceptual RD3 Fishway Operations: Inmigration, large storm.

Table 8a. Anticipated RD1/ACFCD Fishway initial 2-years routine inspection and maintenance.

Potential Maintenance of RD1 Fish Passage Facilities For the First Two Years of Operation.
After the 2nd year, maintenance monitoring and schedules need to be evaluated again to determine a new schedule based on better understanding of the system.
Maintenance should be conducted during the in-stream maintenance period (July-October) when possible.

	Facility	What	Cause	Inspection		Maintenance			Potential Impacts to ACWD Operations
				How	Frequency	When	How	Frequency	
RD1	Pool & Weir Fishway + Guidewall	Sedimentation Build Up In Pools and at Fishway Entrance (downtream end of fishway)	Hydraulic forces unable to keep sediment moving through fishway	Visually (from top of retaining wall or in channel)	Monthly and after large storm events	When a barrier is thought to be causing fish passage concern, consult fish passage engineer.	May require large equipment, but hand crew may be able to move the obstruction. This would likely require access down the bank or from over the retaining wall. Might require the work area to be dewatered.	Once in every 50 years (2% in any given year)	Depending on the access and current flow conditions, the fishway would need to be closed temporarily although the auxiliary water system could remain operational. Water may overtop the dam. Little or no interference with diversion operations.
		Small or Large Debris Build Up	Natural or urban material too large to be moved through system due to hydraulic forces	Visually (from top of retaining wall or in channel)	After high flow season and before in-migration season	When significant scour is noted around rock bands (rock bands are large rocks that span the channel and provide the structural support of the channel), consult engineer familiar with this type of design.	Bring in new material. Could be lowered from above and tamped and jetted into place by hand crews. Significant loss (unlikely) would require large equipment.	Often RCs never need this sort of maintenance. But it is difficult to know how the system will react.	Rock could be added without impacting operations.
		Movement of Large Rock upstream of guidewall	Large storm event	Visually (from top of retaining wall or in channel)	After large storm events and before in-migration season	In summer outside of in-migration flows when sediment build-up has reduced pool volume by more than half	Isolate fishway from stream flow and remove any fish present in fishway pools. Use a vaccuum truck typically used for utility work or manual removal for occassional sedimentation. Larger equipment may be necessary after large flows.	Difficult to know how the system will react but it is not anticipated to occur often. Maybe once in every 10 years (10% in any given year)	Temporary closures of fishway. No impacts to diversions expected. Auxillary system could still operate.

Potential Maintenance of RD1 Fish Passage Facilities For the First Two Years of Operation.
After the 2nd year, maintenance monitoring and schedules need to be evaluated again to determine a new schedule based on better understanding of the system.
Maintenance should be conducted during the in-stream maintenance period (July-October) when possible.

Facility	What	Cause	Inspection		Maintenance			Potential Impacts to ACWD Operations
			How	Frequency	When	How	Frequency	
Transition Pool	Sediment builds in front of entrance pool and creates a pool too shallow to dissipate the turbulence energy caused by the entrance gate.	Forces not sufficient to remove sediment.	Manually measure depth from the deck. Then estimate the pool width and length (up to 8 ft long) to estimate the pool volume. Then use the standard Energy Dissipation Factor (EDF) equation (see CDFG's California Salmonid Stream Habitat Restoration Manual (April 2009), p. XII-115 to estimate the energy dissipation.	After large storm events and before in-migration season	Imediately if debris affects fish passage conditions. Otherwise, in summer outside of in-migration flows.	Manual removal for smaller debris. Larger equipment may be necessary if large debris builds up in fishway. May need to close fishway to remove larger debris.	Removal of small debris from the pools and/or weirs is anticipated to be required annually. then maintenance may be required annually. Removal of large debris may only be required after large storm events.	Temporary closures of fishway may be needed.. No impacts to diversions expected. Auxillary system could still operate.
Plunge pool	Large material gets trapped in pool.	Forces not sufficient to move material.	Visually (From top of levee or in channel)	After large storm events and before in-migration season	If rock failure may be suspected, consult with engineer familiar with this type of design.	Large equipment would be required to move existing rock, add additional rock. The area would need to be dewatered, potentially by passing bypass flows through the pool & weir fishway.	Unknown, but potentially once in every 50 years (2% chance in any given year)	No impacts to diversions expected. Auxillary system and fishway could still operate.
Apron Sill Notch	General maintenance	Material lodged or gate damaged.	Removing the gate	Every 2 years	Every 10 years unless there is reason to believe that the gate is damaged earlier.	Remove gate and replace it.	Every 10 years	No impact on diversion operations. No impact on fishway.

Potential Maintenance of RD1 Fish Passage Facilities For the First Two Years of Operation.
After the 2nd year, maintenance monitoring and schedules need
to be evaluated again to determine a new schedule based on better understanding of the system.
Maintenance should be conducted during the in-stream maintenance period (July-October) when possible.

Facility	What	Cause	Inspection		Maintenance			Potential Impacts to ACWD Operations
			How	Frequency	When	How	Frequency	
Vertical Slot Fishway	Sedimentation build up. Likely places: Entrance pool, diffuser pool, and pool 11 (culvert and channel).	Forces unable to keep sediment moving through system.	Visually (from grating above or from within the fishway)	After large storm event and before in-migration season.	If sedimentation begins to span channel width and becomes more than 3 inches deep, consult with fish passage engineer to determine if maintenance is necessary.	Access the fishway via gates in the deck and use hand crews to remove the material. May need to be hoisted up to the deck level (by hand or by winch) and placed back in the channel downstream of the rubber dam.	Difficult to know how the system will react. If sedimentation is going to occur, then maintenance may be required annually. Otherwise, maintenance may not be required or only required after large storm events.	Temporary closure of fishway. No impacts to diversions expected. Auxiliary system could still operate.
	Small material lodged in entrance opening, vertical slots, or exit openings	Material too large to fit through as aligned.	Visually (Generally from grating above)	Weekly and after large storm events.	Items seen lodged or excess headloss seen.	Push debris with long pole from deck. Rarely close fishway to enter fishway and remove.	Twice a month	Little to no impact. Unlikely need to close fishway. Auxiliary system could remain operational.
	General mechanical gate components	Normal wear	Visually, especially when moving position (Generally from grating above).	Run the gates through full operating range annually and per manufacturer recommendations	Per manufacturer recommendations or when problem seen or per PLC alarms	Per manufacturers recommendations for routine maintenance. See if material lodged and then remove else, consult with manufacturer	Per manufactures recommendations for routine maintenance, else irregular.	Little to no impact. Might require fishway to be closed and potential the auxiliary system as well.
Upper Fishway Exit Channel	No maintenance expected							
Lower Fishway Exit Channel	Sedimentation building up in channel	This channel is lower than the creek's elevation and therefore, sedimentation is expected.	Visually (from grating above or from within the fishway)	Monthly and after large storm events	When sediment is 6" deep. Adjust as needed based on experience. It may be prove to be difficult to sluice all material when 6" deep.	With dam in raised position, open the sluice gate. Time when dam being raised at tail end of high flow event.	2 to 3 times annually and after large storm event.	Little to no impact.

Potential Maintenance of RD1 Fish Passage Facilities For the First Two Years of Operation.
After the 2nd year, maintenance monitoring and schedules need to be evaluated again to determine a new schedule based on better understanding of the system.
Maintenance should be conducted during the in-stream maintenance period (July-October) when possible.

Facility		What	Cause	Inspection		Maintenance			Potential Impacts to ACWD Operations
				How	Frequency	When	How	Frequency	
RD1	Auxiliary System	Regular screen cleaning	Small debris and film build up on screen face, which causes velocity "hot spots."	Visually (from grating above or from within the fishway) and head difference measured by water level transducers	Regurally	When material is observed on the screen or when the level transducers detect an increase in head drop across the screen beyond some predetermined value.	Water spray system activated by operator via the PLC. If significant algae growth on screen, operator may use long handled brush to clean screen from grating above.	Daily	Little to no impact.
RD1	Auxiliary System	Screen cleaner	Normal wear	Visually from grating, per manufacturer's recommendations	Monthly and before in-migration season and/or per manufacturer's recommendations	Per manufacturer's recommendations and as needed for preventive maintenance.	Per manufacture's recommendations	Per manufacture's recommendations.	May impact ability to meet bypass requirements, but flow that would have gone down the auxiliary system could overtop the dam during maintenance.
RD1	Auxiliary System	General maintenance	Normal wear	Per manufacturer's recommendations	Per manufacturer's recommendations	Per manufacturer recommendations	Per manufacturer's recommendations	Per manufacturer's recommendations	Little to no impact.
RD1	Auxiliary System	Valve maintenance	Normal wear	Per manufacturer's recommendations	Per manufacturer's recommendations	Per manufacturer recommendations or when problem seen or per PLC alarms	Per manufacturer's recommendations	Per manufacturer's recommendations	Little to no impact.
RD1	Auxiliary System	Flow meter maintenance	Normal wear	Per manufacturer's recommendations	Per manufacturer's recommendations	Per manufacturer recommendations or when problem seen or per PLC alarms	Per manufacturer's recommendations	Per manufacturer's recommendations	Little to no impact.
RD1		General maintenance	Normal wear	Per manufacturer's recommendations	Per manufacturer's recommendations	Per manufacturer recommendations or when problem seen or per PLC alarms	Maintenace from top of fishway deck. If removal is required, the dabit crane may be used to remove the necessary components.	Per manufacturer's recommendations	Little to no impact.

Potential Maintenance of RD1 Fish Passage Facilities For the First Two Years of Operation.
After the 2nd year, maintenance monitoring and schedules need to be evaluated again to determine a new schedule based on better understanding of the system.
Maintenance should be conducted during the in-stream maintenance period (July-October) when possible.

Facility	What	Cause	Inspection		Maintenance			Potential Impacts to ACWD Operations
			How	Frequency	When	How	Frequency	
Trash Rake	Trash Accumulation on trashrack	Debris collected on trashrack face	Visually (from grating) and based on head differential upstream and downstream of the trashrack	By operator three times per week, minimum, and continuosly by PLC.	When material is observed on the trashrack face in significant quantities (significant to be determined based on field experience) or when head differential is greater than a determined value (based on field experience) or the head differential violates fish passage guidelines	Operate rake. Either automatically or by operator. Channel material removed and placed on fishway grating.	Highly dependent on the volume of material collected.	ACWD staff will use the access road to drive a truck onto the fishway. The dabit crane will be used to lift the material from the deck into the truck. It is recommended that ACWD work with the regulatory agencies to determine what can be done with the material. Optimally, material that would exist in the channel naturally would be returned to the channel at a convienient downstream location. The remainder would be landfilled.
Dabit Crane	General maintenance	Normal wear	Per manufacturer's recommendations	Per manufacturer's recommendations	Per manufacturer recommendations	Per manufacturer's recommendations	Per manufacturer's recommendations	Little to no impact.
Water Level Sensors	Calibration	Changes to system	Calibrate sensors per manufacturer's recommendations	Annually before in-migration season or when problem is suspected.	Annually or per manufacturer's recommendations	Per manufacturer's recommendations	Annually	May require more flow within the fishway than currently required by Flow Agreement to help with calibration. This would result in a loss of diversion.

Table 8b. Anticipated RD3 Fishway initial 2-years routine inspection and maintenance.

Potential Maintenance of RD3 Fish Passage Facilities For the First Two Years of Operation.
After the 2nd year, maintenance monitoring and schedules need to be evaluated again to determine a new schedule based on better understanding of the system.
Maintenance should be conducted during the in-stream maintenance period (July-October) when possible.

Facility	What	Cause	Inspection: How	Inspection: Frequency	Maintenance: When	Maintenance: How	Maintenance: Frequency	Potential Impacts to ACWD Operations
Transition Pool	Sediment builds in front of entrance pool and creates a pool too shallow to dissipate the turbulence energy caused by the entrance gate.	Forces not sufficient to remove sediment.	Manually measure depth from the deck. Then estimate the pool width and length (up to 8 ft long) to estimate the pool volume. Then use the standard Energy Dissipation Factor (EDF) equation to estimate the energy dissipation. Use photographs for comparison between inspections	After large storm event and before in-migration season.	When EDF value is above current fish passage guidelines	Depending on the volume of the material in the channel, hand crews may be able to move the material and deposit it downstream of the transition pool. Larger equipment could be used as well. May require the site to be dewatered.	Difficult to know how the system will react, but it is not anticipated to occur often. Maybe once in every 10 years (10% in any given year).	Would likely require the fishway to be temporarily closed. Little or no interference with diversion operations.
Plunge pool	Large material gets trapped in pool. Fish overtopping the dam may get injured falling onto the material instead of falling into the pools water.	Forces not sufficient to move material.	Visually	Monthly and after large storm events	The large material is suspected of harming fish overtopping the dam (i.e. when object protrudes above the water surface elevation of the pool.)	Hand crews or equipment. Would only need to move so material is not in the plunge pool.	Every 1 to 5 years	It is understood that ACWD currently lowers (maybe not the entire way) the rubber bag occasionally to allow floating debris to overtop the dam. It is not known if this coincides with larger flow event so help "push" the material over. To keep the plunge pool clear of material, it is recommended that this practice coincide with larger flow events so that the material is not only pushed over the dam but also out of the plunge pool. In the event material becomes lodged, then the flow within the fishway and diversion flows may need to be temporarily increased to minimize or completely stop flow over the dam so that a crew can move the material.

Potential Maintenance of RD3 Fish Passage Facilities For the First Two Years of Operation.
After the 2nd year, maintenance monitoring and schedules need to be evaluated again to determine a new schedule based on better understanding of the system.
Maintenance should be conducted during the in-stream maintenance period (July-October) when possible.

	Facility	What	Cause	Inspection		Maintenance			Potential Impacts to ACWD Operations
				How	Frequency	When	How	Frequency	
RD3	Vertical Slot Fishway	Sedimentation build up in areas other than areas mentioned above	Forces unable to keep sediment moving through system.	Visually.	Every 6 months or after 10 year storm event or larger.	If sedimentation begins to span channel width and becomes more than 3 inches deep, consult with fish passage engineer to determine if maintenance is necessary.	Access the fishway via gates in the deck and use hand crews to remove the material. May need to be hoisted up to the deck level and placed back in the channel downstream of the rubber dam.	Not expected to occur	Temporary closure of fishway. No impacts to diversions expected. Auxiliary system could still operate.
		Small material lodged in entrance opening, vertical slots, or exit openings	Material too large to fit through as aligned.	Visually	Weekly, when dam to be raised or lowered, and after large storm events.	Items seen lodged.	Push debris with long pole from deck. Rarely close fishway to enter fishway and remove.	Once every 3 months	Little to no impact. Unlikely need to close fishway. Auxiliary system could remain operational.
		General mechanical gate components	Normal wear	Visually, especially when moving position.	Run the gates through full operating range annually and per manufacturer recommendations	Per manufacturer recommendations or when problem seen or per PLC alarms	Per manufacturers recommendations for routine maintenance. See if material lodged and then remove else, consult with manufacturer	Per manufactures recommendations for routine maintenance, else irregular.	Little to no impact. Might require fishway to be closed and potential the auxiliary system as well.
	Fishway Exit Channel	No maintenance expected							
		General maintenance	Normal wear	Per manufacturer's recommendations	Per manufacturer's recommendations	Per manufacturer recommendations or when problem seen or per PLC alarms	Maintenace from top of fishway deck. If removal is required, the dabit crane may be used to remove the necessary components.	Per manufacturer's recommendations	Little to no impact.

Potential Maintenance of RD3 Fish Passage Facilities For the First Two Years of Operation.
After the 2nd year, maintenance monitoring and schedules need
to be evaluated again to determine a new schedule based on better understanding of the system.
Maintenance should be conducted during the in-stream maintenance period (July-October) when possible.

Facility	What	Cause	Inspection		Maintenance			Potential Impacts to ACWD Operations
			How	Frequency	When	How	Frequency	
Trash Rake	Trash Accumulation on trashrack	Debris collected on trashrack face	Visually (from grating) and based on head differential upstream and downstream of the trashrack	By operator three times per week, minimum, and continuosly by PLC.	When material is observed on the trashrack face in significant quantities (significant to be determined based on field experience) or when head differential is greater than a determined value (based on field experience) or the head differential violates fish passage guidelines	Operate rake. Either automatically or by operator. Channel material removed and placed on fishway grating.	Highly dependent on the volume of material collected.	ACWD staff will use the access road to drive a truck onto the fishway. The dabit crane will be used to lift the material from the deck into the truck. It is recommended that ACWD work with the regulatory agencies to determine what can be done with the material. Optimally, material that would exist in the channel naturally would be returned to the channel at a convienient downstream location. The remainder would be landfilled. Little to no impacts to diversion operations is expected.
Dabit Crane	General maintenance	Normal wear	Per manufacturer's recommendations	Per manufacturer's recommendations	Per manufacturer recommendations	Per manufacturer's recommendations	Per manufacturer's recommendations	Little to no impact.
Water Level Sensors	Calibration	Changes to system	Calibrate sensors per manufacturer's recommendations	Annually before in-migration season or when problem is suspected.	Annually or per manufacturer's recommendations	Per manufacturer's recommendations	Annually	May require more flow within the fishway than currently required by Flow Agreement to help with calibration. This would result in a loss of diversion.

3.11 Monitoring

3.11.1 Biological Monitoring

Facilities for monitoring inmigrating adults through the RD1/ACFD Drop Structure fishway will be incorporated into the fishway design. Facilities will include a PIT tag reader and provisions for space and power to allow the installation of a Vaki or similar infrared scanner, DIDSON high definition sonar, or similar camera sensing technology. Specific monitoring equipment will be determined during final design in consultation with, and subject to approval by, NMFS and CDFW.

Opportunities for overall population recovery monitoring in conjunction with other watershed stakeholders (e.g., SFPUC, Zone 7, East Bay Park District, etc.) will also be pursued. A monitoring sub-committee is being formed by the Alameda Creek Fisheries Workgroup to develop and implement a watershed wide monitoring plan. ACWD is committed to participating in the sub-committee, including providing staff and or/funding in support of the sub-committee efforts. The scope of potential monitoring activities has not been determined, but may include elements such as instream flows and habitat conditions, flow-passage for adults, juveniles and kelts, water temperature effects in Niles Canyon and elsewhere, steelhead passage and survival in the flood control channel, passage through the fishways, trap and tagging to determine migration rates, route selection, behavior and survival, and monitoring of population abundance, age structure, and seasonal migration timing. The monitoring sub-committee will assist in developing the monitoring plan and coordination among the various parties involved in Alameda Creek fishery restoration.

3.11.2 Compliance Monitoring

Compliance monitoring will include the following components:

- During construction and maintenance, ACWD/ACFCD will implement the suite of avoidance and minimization measures on Table 9 (below). Monitoring of compliance with these measures will be conducted as described on Table 9;

- Streamflow will be monitored via the USGS streamflow gage installed at the Sequoia Road bridge. Streamflow will also be monitored at the USGS Niles Gage 11179000;

- Water quality data collected at the Niles Gage (currently water temperature, turbidity and suspended sediment) will also be monitored;

- Auxiliary flow in the RD1/ACFCD Drop Structure fishway facility will be measured using a flow meter. A stage-discharge curve will be developed to measure flow within the vertical slot fishway; and

- Annual Monitoring Reports. ACWD and ACFCD will prepare and submit annual monitoring reports to NMFS and CDFW detailing the monitoring activities and any significant deviations from the proposed operations. Reports will include most current data available at the time of submittal.

3.12 Mitigation, Avoidance, and Minimization Measures

Proposed avoidance and minimization measures along with monitoring and reporting obligations are shown on Table 9, and their application to listed species and other wildlife is discussed, on a species-by-species basis, in Section 5. There are generally applicable measures that address a specific impact from a specific mechanism for effect. ACWD and ACFCD will prepare and implement an Operation and Maintenance Manual that describes the implementation of these avoidance and minimization measures in detail; NMFS, USFWS, and CDFW will assist ACWD and ACFCD in the development of this O&M Manual and the manner in which it will be implemented. The Avoidance and Minimization Measures shown on Table 9 will be implemented in the manner described in the detailed O&M Manual.

In addition to the implementation of specific avoidance and minimization measures on Table 9 for all construction activities and for operations and maintenance, regulatory agency permit conditions and BMPs will be implemented as appropriate. Operation and maintenance requiring substantial construction-type activities will be coordinated with NMFS, USFWS, and CDFW. For any substantial (non-routine) operation and maintenance, ACWD and/or ACFCD will informally consult with these resource agencies prior to initiation of the maintenance activity.

There is overlap among the various categories of effect and the various mitigation and monitoring measures. For example, measures to address water quality also function as measures to avoid and minimize impacts to aquatic species.

As joint lead agencies for CEQA, ACWD and ACFCD would share responsibility for implementing the avoidance and minimization measures, be ultimately responsible for compliance with all mitigation, monitoring, and reporting commitments, would provide funding for compliance as a line item in the Project budget, and would maintain records of compliance as part of the project management files. These records would be available to regulatory agencies and the public for inspection at ACWD and ACFCD offices.

To simplify compliance during construction, ACWD and ACFCD would incorporate appropriate elements of the Mitigation, Monitoring and Reporting Plan (MMRP) into construction contracts and would thus delegate day-to-day compliance and reporting responsibilities to construction contractors, who would maintain records of compliance. In addition, both ACWD and ACFCD would independently monitor and report compliance for cultural resources and biological resources, either using internal staff or specialty contractors for these functions.

In some instances, mitigation measures are described in general terms with reference to various local, regional, state, and/or federal permit requirements. For example, the mitigation for air quality effects of the Project is defined as implementation of Bay Area Air Quality Management Board "Feasible Control Measures for Construction Emissions of PM_{10} and $PM_{2.5}$." These requirements are incorporated by reference. Therefore, at the time of contract issuance, the then-current list of these control measures would be incorporated into construction specifications. Similarly, compliance actions associated with local permits would be incorporated using the most recent list of mitigation and reporting measures for each permit. ACWD and ACFCD would therefore adopt and comply with the most recent standards and procedures for mitigation and monitoring at the time construction contracts are awarded.

Table 9. Joint Fish Passage Project Mitigation, Monitoring, and Reporting Plan.

MITIGATION ACTION	RESPONSIBLE PARTY	DURATION	IMPLEMENTATION ACTIONS
AESTHETICS			
Aesthetics1. Lighting. ACWD and ACFCD will direct security lighting away from housing and include provisions for manual, timed and motion sensor activation.	Construction Contractor	On-going during operation	• ACWD and ACFCD will incorporate mitigation action into construction specifications.
Aesthetics2. Lighting. To address potential for construction lighting after sunset, ACWD and ACFCD will require the construction contractor to develop a construction Monitoring plan to include: • Monitoring of lighting levels outside of residences along the south bank of the flood control channel from Fernwood Court, Fruitwood Court, Appletree Court; and Riverwalk Drive; and on the north bank at I Street, and the Niles Mixed-Use development if occupied during construction; • Use of color-corrected halide lights for construction; • Directing construction lights away from the south bank of the flood control channel; • Placing lights at the lowest feasible level; • Use of light screens between the construction area and the housing, at	Construction Contractor	On-going during construction	• ACWD and ACFCD will incorporate mitigation action into construction specifications.

MITIGATION ACTION	RESPONSIBLE PARTY	DURATION	IMPLEMENTATION ACTIONS
the boundary of construction activity and/or on the levee crest; and the housing, at the boundary of construction activity and/or on the levee crest; and • To the extent feasible expedite construction downstream of the BART Bridge.			
AGRICULTURAL RESOURCES			
NO SIGNIFICANT EFFECTS. NO MITIGATION.			
AIR QUALITY			
AQ1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.	Construction Contractors	During Construction	• ACWD and ACFCD will incorporate mitigation action into construction specifications; • Contractors will maintain a daily compliance log; and • ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
AQ2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.			
AQ3. All visible mud or dirt tracked-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.			
AQ4. All vehicle speeds on unpaved roads shall be limited to 15 mph.			
AQ5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.			
AQ6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 2 minutes to the extent feasible (as required by the California airborne toxics control measure			

MITIGATION ACTION	RESPONSIBLE PARTY	DURATION	IMPLEMENTATION ACTIONS
Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.			
AQ7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.			
AQ8. Post a publicly visible sign with the telephone number and person to contact at the lead agency regarding dust complaints. This person shall respond and take corrective action within 48 hours. The Air District's phone number shall also be visible to ensure compliance with applicable regulations.			
AQ9. Minimizing the idling time of diesel powered construction equipment to 2 minutes to the extent feasible.			
AQ10. Equipment Emissions. ACWD and ACFCD will require the use of highway diesel fuel in all construction equipment to the extent feasible.			
BIOLOGICAL RESOURCES **(see also water quality mitigation and monitoring measures)**			
GENERAL AVOIDANCE AND MINIMIZATION MEASURES: CONSTRUCTION			
C1. Channel protection. ACWD and ACFCD will isolate in-channel construction areas from the active creek channel with sand bags, fiber mats, cofferdams, or other methods during construction.	Construction Contractors	During Construction	● ACWD and ACFCD will incorporate actions to offset impacts into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.

MITIGATION ACTION	RESPONSIBLE PARTY	DURATION	IMPLEMENTATION ACTIONS
C2. Riparian vegetation. ACWD and ACFCD will access the channel via areas where no riparian vegetation will be affected.	Construction Contractors	During Construction	● ACWD and ACFCD will incorporate actions to offset impacts into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
C3. Runoff. ACWD and ACFCD will control potential downstream runoff from the site with sand bags, fiber mats, or other methods.	Construction Contractors	During Construction	● ACWD and ACFCD will incorporate actions to offset impacts into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
C4. Fuel containment. ACWD and ACFCD will fuel and maintain construction equipment out of the channel. If this is not feasible, containment materials will be used	Construction Contractors	During Construction	● ACWD and ACFCD will incorporate actions to offset impacts into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD/ACFCD will inspect compliance logs weekly and document compliance.
C5. Concrete containment. ACWD and ACFCD will provide washout areas for vehicles outside of the channel and isolate these areas to ensure that concrete materials do not runoff into the channel or to recharge ponds.	Construction Contractors	During Construction	● ACWD and ACFCD will incorporate actions to offset impacts into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
C6. Equipment leaks. When working in the channel or where there may be runoff to the channel, ACWD and ACFCD will ensure that construction equipment will be fitted with absorbent materials at potential fuel, oil, and other fluid leak spots.	Construction Contractors	During Construction	● ACWD and ACFCD will incorporate actions to offset impacts into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly & document compliance.
C7. Spill containment and isolation. During construction and post-construction maintenance involving use of equipment in or adjacent to the channel, ACWD and ACFCD will stockpile sand bags on site so that they may be immediately filled and placed around any spill. In addition, any spills not contained within the maintenance area will immediately be isolated from the active channel.	Construction Contractors	During Construction	● ACWD and ACFCD will incorporate actions to offset impacts into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly & document compliance.

MITIGATION ACTION	RESPONSIBLE PARTY	DURATION	IMPLEMENTATION ACTIONS
C8. Re-grading. ACWD and ACFCD will restore disturbed areas to pre-project contours.	Construction Contractors	During Construction	● ACWD and ACFCD will incorporate actions to offset impacts into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
C9. Monitoring. A qualified biologist will (a) be retained to monitor construction, and (b) will conduct mandatory contractor/worker awareness training for construction personnel if special-status species are found.	Biological Consultant	During Construction	● Bio-monitoring and construction crew training will be a line item in Project Construction Budget. ● ACWD and ACFCD will provide CDFW, USFWS, and NMFS with record of crew training and of monitoring and the results of monitoring.
C10. Site survey. Prior to construction, ACWD and ACFCD will provide for a qualified biologist to survey the site to determine whether special-status species are present.	Biological Consultant	Prior to Construction	● ACWD and ACFCD/Bio. Consultant will prepare reports for submittal to CDFW, USFWS, and NMFS, as appropriate. ● ACWD and ACFCD will submit report to agencies prior to initiating construction at the site.
C11. Fish rescue. Following installation of barriers to isolate the construction site from the active channel, a qualified fisheries biologist and team will conduct a fish rescue program for stranded fish prior to initiation of construction activities. Fish removed from the site will be immediately returned to the active channel. A fish rescue and relocation plan will be provided to NMFS and CDFW for review and approval prior to initiating the fish rescue; and Prior to completion of all facilities, ACWD/ACFCD will monitor steelhead and salmon migrations from January through May. If steelhead are found to be migrating and operations of dams or unscreened diversions could adversely affect migrating	Biological Consultant	Prior to and during Construction	● ACWD and ACFCD/Bio. Consultant will prepare reports for submittal to CDFW, USFWS, and NMFS, as appropriate. ● ACWD and ACFCD will submit report to agencies prior to initiating construction at the site.

MITIGATION ACTION	RESPONSIBLE PARTY	DURATION	IMPLEMENTATION ACTIONS
steelhead, ACWD/ACFCD would consult with NMFS/CDFW and implement impact avoidance protocols which may include "trap and truck" of adults moving upstream, releasing them upstream of Mission Boulevard (in conjunction with EBRPD which currently conducts adult steelhead trap and truck efforts). Adult steelhead will not be allowed volitional passage into Alameda Creek until the RD1 and RD3 fish passage facility construction is completed and the facilities are fully functional.			
C12. Burrowing owls. To avoid impacts to nesting burrowing owls, ACWD and ACFCD will initiate burrowing owl surveys at proposed site with suitable habitat conditions when all possibility of nesting is over. Potential nest burrows will be located and observed to determine whether owls are present. If owls are not present, the burrows will be filled to prevent nesting. If owls are present, a qualified biologist, in consultation with CDFW, will passively relocate the owls to avoid any loss of individuals. Burrows will then be filled. Pre-construction survey and relocation will be on-going so that no burrowing owls will occur at the proposed construction site.	Biological Consultant	Prior to Construction	● ACWD and ACFCD/Bio. Consultant will prepare report for submittal to CDFW, USFWS, and NMFS, as appropriate. ● ACWD and ACFCD will submit reports to agencies prior to initiating construction at the site.
C13. Western pond turtle. Within 15 days prior to construction activities, a qualified biologist will survey for western pond turtles. If turtles are found the biologist shall relocate the pond turtle to suitable habitat and an exclusion fence will be installed to prevent movement of turtles back into the	Biological Consultant	Prior to Construction	● ACWD and ACFCD/Bio. Consultant will prepare reports for submittal to CDFW, USFWS, and NMFS, as appropriate. ● ACWD and ACFCD will submit reports to agencies prior to initiating construction at each site.

MITIGATION ACTION	RESPONSIBLE PARTY	DURATION	IMPLEMENTATION ACTIONS
construction area.			
C14. Disturbance of nesting birds. Within 15 days prior to construction activities, a qualified biologist will survey for raptor nests in areas within 500 feet of the proposed construction site. If nesting raptors are found, ACWD will consult with CDFW to establish appropriate no disturbance buffers around the nest sites. No construction will be initiated within the buffers until young have fledged as determined by a qualified biologist. To address potential for work in the vicinity of the lower dam to affect downstream nesting birds, a qualified biologist will conduct pre-construction surveys of downstream areas to identify nesting by special-status and/or migratory birds. If these species are found nesting within 100 yards of the lower dam, ACWD will consult with CDFW to establish appropriate no disturbance buffers around the nest sites until young have fledged. These buffers will be clearly marked to exclude construction equipment and personnel.	Biological Consultant	Prior to Construction	● ACWD and ACFCD/Bio. Consultant will prepare reports for submittal to CDFW, USFWS, and NMFS, as appropriate. ● ACWD and ACFCD will submit reports to agencies prior to initiating construction at each site.
C15. California horned lizard. Within 15 days prior to construction activities, a qualified biologist will survey for California horned lizard. If horned lizards are found in the proposed construction area, they will be removed by a qualified biologist and a fine mesh exclusion fence will be installed around the construction site to prevent them from reentering the site during construction.	Biological Consultant	Prior to Construction	● ACWD and ACFCD/Bio. Consultant will prepare reports for submittal to CDFW, USFWS, and NMFS, as appropriate. ● ACWD and ACFCD will submit report to agencies prior to initiating construction at the site.
AVOIDANCE AND MINIMIZATION DURING ON-GOING OPERATIONS AND MAINTENANCE			
O&M1. Operations and Maintenance	ACWD/ACFCD	All years	● ACWD and ACFCD will incorporate actions to offset

MITIGATION ACTION	RESPONSIBLE PARTY	DURATION	IMPLEMENTATION ACTIONS
Manual: The NMFS/CDFW-approved Operations and Maintenance Manual for the Project will include protocols for performance monitoring and impact avoidance & minimization during O&M. Proposed measures include measures described below.			impacts into a facility O&M Manual. ● Activities will be documented as part of daily activity logs.
O&M2. Avoidance and Minimization Measures. For on-going maintenance, ACWD/ACFCD will apply construction measures, similar to C1-C14 (above), as detailed in the NMFS/CDFW-approved Operations and Maintenance Manual.	ACWD/ACFCD	All years	● ACWD and ACFCD will incorporate actions to offset impacts into a facility O&M Manual. ● Activities will be documented as part of daily activity logs.
O&M3. Scheduling. To the extent feasible, ACWD/ACFCD will avoid scheduling maintenance which requires taking either fishway out of service in the period from January 1 through May 31.	ACWD/ACFCD	All years	● ACWD and ACFCD will incorporate actions to offset impacts into a facility O&M Manual. ● Activities will be documented as part of daily activity logs.
O&M4. Monitoring. ACWD/ACFCD will monitor operations of the fish passage and screening facilities.	ACWD/ACFCD and biological consultant; NMFS, and CDFW.	Post construction	● ACWD and ACFCD/Bio. Consultant will prepare reports for submittal to CDFW, USFWS, and NMFS, as appropriate. ● ACWD and ACFCD will submit report to agencies. ● ACWD and ACFCD will prepare a compliance report annually and initiate a summary review of program effectiveness on a 5-year cycle.
O&M5: If rubber dams are lowered during periods of juvenile outmigration, to the extent feasible ACWD/ACFCD will visually monitor the ponds to determine if juvenile steelhead are present and will ensure that juveniles are not stranded as pond elevations decline.	ACWD/ACFCD and biological consultant; NMFS, and CDFW.	Post construction	● ACWD and ACFCD/Bio. Consultant will prepare reports for submittal to CDFW, USFWS, and NMFS, as appropriate. ● ACWD and ACFCD will submit report to agencies. ● ACWD and ACFCD will prepare a compliance report annually and initiate a summary review of program effectiveness on a 5-year cycle.
O&M6. On-going Measures to protect steelhead. • Routine monitoring at the fishways would include monitoring for adult and juvenile	ACWD/ACFCD and Construction Contractors	Post Construction	● ACWD and ACFCD will incorporate actions to offset impacts into a facility O&M Manual ● Activities will be documented as part of daily activity logs.

MITIGATION ACTION	RESPONSIBLE PARTY	DURATION	IMPLEMENTATION ACTIONS
outmigration, and ACWD/ACFCD would, to the extent feasible, to schedule maintenance outside of the period when juveniles and adults may be migrating. • When maintenance requires isolation of the active channel from the maintenance area, ACWD/ACFCD will engage a qualified biologist to monitor for the presence of steelhead. If steelhead are found anywhere in the reach from Mission Boulevard to downstream of Rubber Dam 1, juvenile steelhead will be captured and released to (a) the downstream fishway or (if preferable) the active channel downstream of the maintenance area. • If adult steelhead are in the maintenance area, they will be (a) diverted to the isolated active channel or (b) captured and transported to the reach upstream of Mission Boulevard. • In an emergency/unplanned maintenance event, ACWD/ACFCD will notify NMFS and CDFW as soon as possible, and immediately (a) make all feasible and necessary efforts to isolate the maintenance area from the active stream as rapidly as possible			
O&M7. Minimizing Migration Effects • Minimize maintenance requiring closing of the fishways in the period from December 1 through May 31 to the extent feasible. • Evaluate the condition of fishways and fish screens immediately before the projected migration periods (January 1	ACWD/ACFCD	Post Construction	• ACWD and ACFCD will incorporate actions to offset impacts into a facility O&M Manual. • Activities will be documented as part of daily activity logs.

MITIGATION ACTION	RESPONSIBLE PARTY	DURATION	IMPLEMENTATION ACTIONS
through May 31) and take any remedial actions necessary. • To the extent feasible, manage operations to meet Fish Bypass Flows and minimize flow over rubber dams.			
O&M8. Minimizing SBA Turnout at Vallecitos Temperature Effects • Subject to operational, facility and other constraints, during the months of April, May, September and October, ACWD will, as a first priority, utilize the Bayside Turnouts for direct deliveries of SBA water to the ACWD service area prior to utilizing the Vallecitos Turnout for SBA deliveries via Alameda Creek. • During NORMAL and WET years (as classified per section 3.4.2), ACWD will not utilize the SBA Turnout at Vallecitos for SBA deliveries during the months of April and May. ACWD may utilize the Vallecitos Turnout for SBA deliveries via Alameda Creek during the months of April and May if the hydrologic conditions in the Alameda Creek watershed are classified as DRY, per section 3.4.2, or if the ACWD Board of Directors declares a Water Supply Emergency.	ACWD	Post Construction	● ACWD and ACFCD will incorporate actions to offset impacts into a facility O&M Manual. ● Activities will be documented as part of daily activity logs.
CULTURAL RESOURCES			
NO SIGNIFICANT EFFECTS. NO MITIGATION.			
GEOLOGY AND SOILS			
NO SIGNIFICANT EFFECTS. NO MITIGATION.			
HAZARDS AND HAZARDOUS MATERIALS			

MITIGATION ACTION	RESPONSIBLE PARTY	DURATION	IMPLEMENTATION ACTIONS
(see also water quality and biological resources)			
HH1. Fuel Management. ACWD and ACFCD will implement BMPs to ensure that fluid leaks during construction in the creek channel do not contaminate groundwater at adjacent facilities.	Construction Contractor	During Construction	● See Hydrology and Water Quality below.
HYDROLOGY AND WATER QUALITY **(see biological resources and hazards and hazardous materials)**			
HWQ1. Water Quality. ACWD and ACFCD will implement appropriate BMPs for all work to ensure that Joint Fish Passage Project construction does not adversely affect water quality.	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
HWQ2. Channel protection. ACWD and ACFCD will isolate the construction zone from the active Alameda Creek channel and/or adjacent recharge ponds, using sand bags, hay bales, fiber mats, sheet pile, silt screens, and/or other methods.	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
HWQ3. Concrete management. ACWD and ACFCD will wash and cure all concrete work prior to coffer dam or other barrier removal to reduce potential for leaching to affect aquatic resources.	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
HWQ4. Leak containment. Before beginning work each day, ACWD and/or ACFCD will inspect all construction equipment to ensure that oil and/or gas/diesel fuel are not leaking from equipment.	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
HWQ5. Storage. ACWD and ACFCD will ensure that secondary containment for fueling and chemical storage areas will be provided during construction and Joint Fish Passage Project operation.	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.

MITIGATION ACTION	RESPONSIBLE PARTY	DURATION	IMPLEMENTATION ACTIONS
HWQ6. Wash water containment. ACWD and ACFCD will ensure that secondary containment for equipment wash water will be provided to ensure that wash water is not allowed to run off the site.	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
HWQ7. Silt containment. ACWD and ACFCD will ensure that silt traps, ponds, sediment management methods, and/or other means will be provided to prevent runoff from the construction site.	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
HWQ8. Stockpile runoff. ACWD and ACFCD will ensure that materials stockpiles will be covered to prevent runoff.	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
HWQ9. Soil erosion. ACWD and ACFCD will ensure that loose soils will be protected from potentially erosive runoff.	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
HWQ10. Leaks. When construction equipment is used within the river channel, ACWD and ACFCD will ensure that the equipment will be fitted with secondary containment materials at potential oil/fuel leakage sites.	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
LAND USE AND PLANNING			
NO SIGNIFICANT EFFECTS. NO MITIGATION.			
MINERAL RESOURCES			
NO SIGNIFICANT EFFECTS. NO MITIGATION.			
NOISE			
N1. Noise management. ACWD and ACFCD will comply with City of Fremont noise policies, including scheduling of construction to avoid times when people are	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs

MITIGATION ACTION	RESPONSIBLE PARTY	DURATION	IMPLEMENTATION ACTIONS
most sensitive to noise to the extent practical. The construction contract will include requirements for using sound mufflers on construction equipment.			weekly and document compliance.
N2. Noise monitoring. ACWD and ACFCD will require the contractor to utilize mufflers and shields on intake and exhaust ports on power construction equipment and shrouds on impact tools.	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
N3. Noise control. • To reduce construction noise from work at RD3 and downstream of RD1 ACWD and ACFCD will monitor construction noise levels in the vicinity of Vallejo Street and install portable sound walls along the north levee immediately upstream of the railroad bridge to deflect construction noise from the residences along Vallejo Street if noise exceeds 65 dB(A) during the day or 55 dB(A) after 7 PM. • ACWD and ACFCD will monitor construction noise levels along Chase Court and install sound walls along the fence if exterior noise levels exceed 65 dB(A) during the day or 55 dB(A) after 7 PM; • ACWD and ACFCD will monitor construction noise levels in the vicintiy of the Niles Mixed-use development, if occupied during the construction period, and install sound walls along the fence if exterior noise levels exceed 65 dB(A) during the day or 55 dB(A)	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications. ● Contractors will maintain a daily compliance log. ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.

MITIGATION ACTION	RESPONSIBLE PARTY	DURATION	IMPLEMENTATION ACTIONS
after 7 PM; • ACWD and ACFCD will monitor construction noise levels on the Quarry Lakes Regional Park along the north shoreline of Shinn Pond. If exterior noise levels are found to exceed 55 dB after 7 PM, ACWD will install a noise containment fence along the boundary of the construction and maintain this fence until noise generating activity is completed; and • During the period when construction occurs in the the reach from RD1 downstream, ACWD and ACFCD will monitor exterior noise levels on the south levee from the BART Bridge to approximately 800 feet downstream of the BART Bridge in the vicinity of Fernwood and Fruitwood Courts; and Appletree Court. If exterior noise levels are found to exceed 55 dB after 7 PM, ACWD and ACFCD will install a noise containment fence along the boundary of construction and maintain the fence until noise generating activity is complete.			
POPULATION AND HOUSING			
NO SIGNIFICANT EFFECTS. NO MITIGATION.			
PUBLIC SERVICES AND SAFETY			
PS1. Materials delivery. To the extent feasible, ACWD and ACFCD will require the contractor to schedule equipment and materials transport to occur before the rush	Construction Contractor	During Construction	• ACWD and ACFCD will incorporate mitigation action into construction specifications; • Contractors will maintain a daily compliance log; and • ACWD and/or ACFCD will inspect compliance logs

MITIGATION ACTION	RESPONSIBLE PARTY	DURATION	IMPLEMENTATION ACTIONS
hour or after rush hour.			weekly and document compliance.
PS2. Materials delivery. ACWD and ACFCD will require that all construction materials and equipment be transported in accordance with Caltrans and City of Fremont rules and regulations.	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications; ● Contractors will maintain a daily compliance log; and ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
RECREATION			
R1. Trails. ACWD and ACFCD will coordinate with the East Bay Regional Parks District to post trail closure notices and schedule at all trail heads to ensure that the public knows when trails are likely to be closed well in advance.	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications; ● Contractors will maintain a daily compliance log; and ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.
R2. Trails. To the extent compatible with public safety, ACWD, ACFCD and/or the East Bay Regional Parks District, working together, will provide carefully signed detours around construction, and will separate these detours with temporary construction chain link fencing.	Construction Contractor	During Construction	
TRANSPORTATION AND TRAFFIC			
Trans1. Materials delivery. ACWD and ACFCD will require that all construction materials and equipment be transported in accordance with Caltrans and City of Fremont rules and regulations.	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications; ● Contractors will maintain a daily compliance log; and ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.

USE OF ENERGY			
E1. Energy efficiency. ACWD and ACFCD will seek to minimize operational energy use by specifying that, to the extent practical, high efficiency electric motors be utilized in the fish passage facilities.	Construction Contractor	During Construction	● Use of energy efficient equipment will be a specification in all contracts. Contractors will be required to demonstrate compliance by providing evidence that equipment uses electric motors designated as energy efficient.
E2. Equipment management. ACWD and ACFCD will seek to minimize construction-related energy use by specifying in all construction contracts that all equipment shall be turned off when not in use, with idling of construction equipment limited to not more than 2 minutes to the maximum extent practical.	Construction Contractor	During Construction	● ACWD and ACFCD will incorporate mitigation action into construction specifications; ● Contractors will maintain a daily compliance log; and ● ACWD and/or ACFCD will inspect compliance logs weekly and document compliance.

4.0 ENVIRONMENTAL SETTING AND ENVIRONMENTAL EVALUATION

4.1 Approach to Analysis of Effects

In analyzing the Joint Fish Passage Projects' environmental effects, the Initial Study/Environmental Assessment first focuses on defining the physical mechanisms by which the Joint Fish Passage Project may alter the physical environment. Both direct and indirect effects are considered. If there is no physical mechanism by which an element of the Joint Fish Passage Project may have effects under each category of impact, then the Initial Study/Environmental Assessment concludes that there would be no effects associated with the impact category.

If there is a physical mechanism by which the Joint Fish Passage Project may affect a category of impact, then the potential direct and indirect effects associated with that mechanism are evaluated. If this evaluation determines that the Joint Fish Passage Project may cause significant effects on the environment, then feasible mitigation measures are examined in terms of their ability to reduce potential effects to a level of less-than-significant. This determination is made with reference to the significance criteria defined in Section 15064 of CEQA Guidelines.

For NEPA purposes the assessment of potential impacts takes into consideration the significance of the proposed action in terms of its context and its intensity (40 CFR 1508.27). An Environmental Assessment is prepared to determine the environmental effects of the Project and whether an Environmental Impact Statement (EIS) should be prepared.

4.2 General Environmental Setting

Alameda Creek drains a watershed of approximately 700 square miles, from Mount Diablo in the north to Mount Hamilton in the south and east to Altamont Pass. Thirty-three percent of this drainage area is in Santa Clara County and the remainder is in eastern Alameda County. Average rainfall in the watershed is about 20 inches per year. Runoff is collected in a number of local reservoirs. In Alameda County these include Calaveras and San Antonio reservoirs, operated by the SFPUC, and Del Valle Reservoir, constructed by the State of California as part of the South Bay Aqueduct Project.

The Joint Fish Passage Project would be located within the City of Fremont (City), which in the 2010 Census had a population of approximately 218,000 people (City of Fremont 2015). The City is part of the greater San Francisco-San Jose Bay Area, which has a population of approximately 7 million people. The City is located between San Jose and Oakland, and is on major regional commuter routes to industrial and trade centers such as the Port of Oakland. Regional transportation corridors passing within 5 miles of the Joint Fish Passage Project are: Interstates 880 and 680 (north-south), State Route 84 (east-west), State Route 238 (north-south Union Pacific Railroad and the Bay Area Rapid Transit (BART) system (north-south) (Figure 19). The City is the site of a major automobile manufacturing plant and is part of the high-tech and bio-tech industry.

In the general vicinity of the Joint Fish Passage Project (Figure 19; Table 10), there is extensive commercial and residential development.

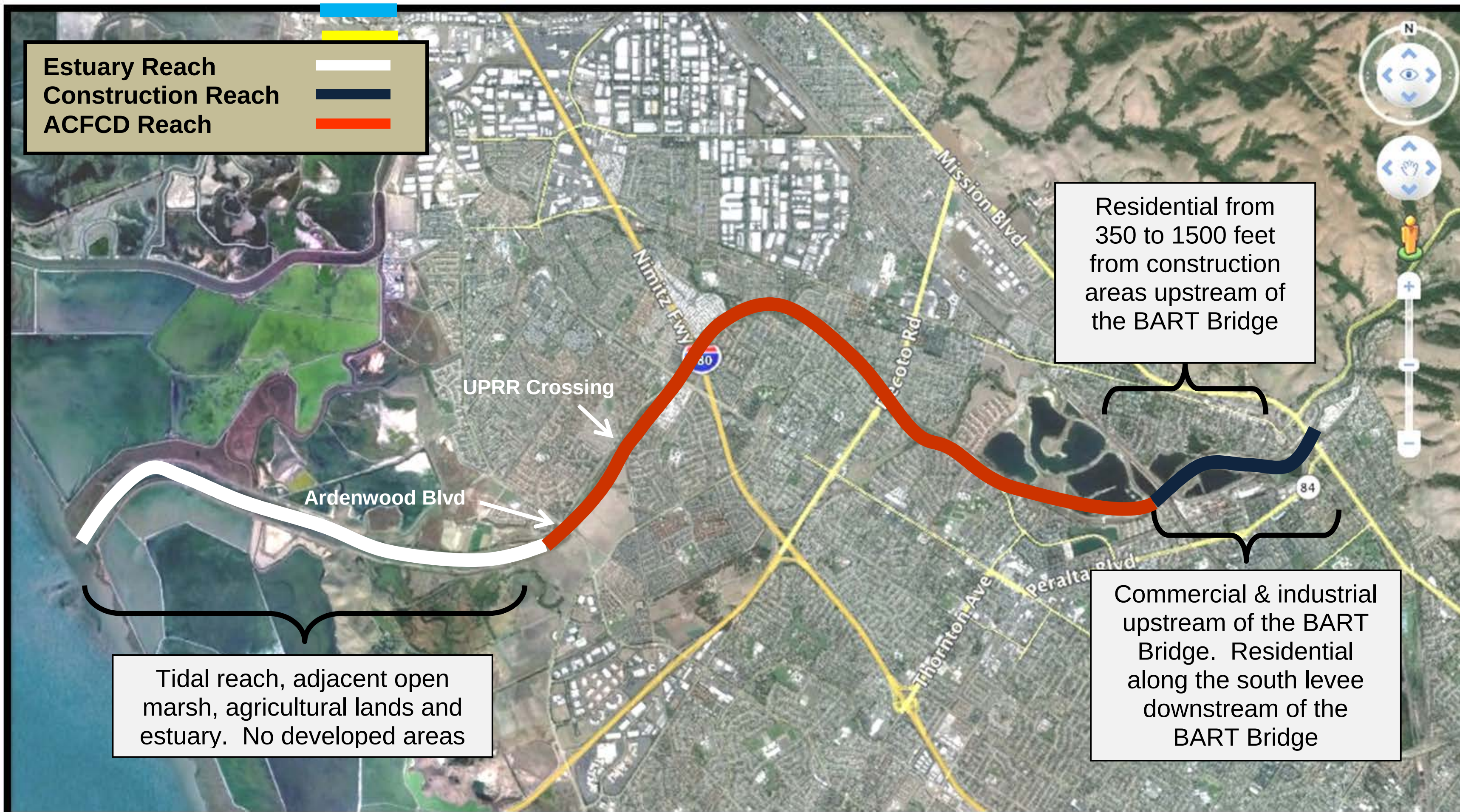


Figure 19. General development characteristics in the Alameda Creek Channel Construction Reach and Estuary Reach (Google Earth 2012).

Table 10. Typical development in the construction area of Joint Fish Passage Project facilities (Source Google Earth 2011).

Site	Existing Conditions
1. Old Niles Boulevard. View looking southeast down Niles Blvd on right. The Alameda creek flood control channel and RD3 construction area located at the end of Niles Blvd. Railroad tracks and adjacent housing behind the tracks on left.	
2. Old Niles Boulevard View from Niles Blvd looking southwest at the future Niles mixed use project area. The Alameda creed flood control channel is to the left out of view. Note adjacent housing at far end (west side) of property.	
3. Alameda Creek Flood Control Channel Maintenance Road/ Trail View looking northeast along north side of the channel maintenance road/trail. Rubber Dam 3 fence in the right foreground. Note the railroad bridge crossing in the background.	

Site	Existing Conditions
4. Alameda Creek Flood Control Channel Maintenance Road/Trail View from the Alameda Creek flood control channel south embankment maintenance road/trail, approximately 275 ft downstream of RD3. View is of adjacent railroad tracks.	
5. Alameda Creek Flood Control Channel Maintenance Road/ Trail View looking southwest along north side of Alameda Creek flood control channel maintenance road/trail. RD3 is to the left. Note the housing about 250 to 300 feet downstream of RD3.	
6. Alameda Creek Flood Control Channel Maintenance Road/ Trail View from the Alameda Creek flood control channel north embankment maintenance road/trail at the approximate location of the Shinn Pond Fish Screens. View is looking to the north west across Shinn Pond and adjacent housing. The channel is behind the viewer.	

Site	Existing Conditions
7. Alameda Creek Flood Control Channel Maintenance Road/ Trail View from the north Alameda Creek flood control channel maintenance road/trail at the approximate site of the Shinn Pond Fish Screens. View is looking south across the channel. RD1 is downstream to the right.	
8. Alameda Creek Flood Control Channel Maintenance Road/ Trail at RD1 View from the north Alameda Creek flood control channel maintenance road/trail looking south at the ACFCD Drop Structure retaining wall. Note the railroad bridge to the left and railroad tracks to the right.	
9. Alameda Creek Flood Control Channel Maintenance Road/ Trail at RD1 View from the south Alameda Creek flood control channel maintenance road/trail looking north across the channel. The railroad bridge is to the left. RD1 is to the right.	

Site	Existing Conditions
10. Cul-de-sac at end of Fernwood Court looking south View is from the cul-de-sac at the end of the Fernwood Court, looking south east at the sound wall and the 15-foot raised BART Tracks. Alameda Creek is to the left of photo	
11. North Bank of the Alameda Creek Flood Control Channel View from the south Alameda Creek flood control channel maintenance road/trail downstream of the ACFCD Drop Structure. View is of the maintenance/road trail on the north side. The ACFCD Drop Structure and BART bridge are to the right.	
12. North Bank of the Alameda Creek Flood Control Channel View is from the north Alameda Creek flood control channel maintenance road/trail at the downstream end of the RD1/Drop structure fishway Construction area, looking across the channel to Fernwood Court behind the south levee. Elevated BART tracks are visible on the left.	

Climate in the City of Fremont is mild due to the moderating influence of the San Francisco Bay, with average maximum temperatures generally above 60°F and below 80°F. Temperatures seldom exceed 95°F and seldom fall below freezing (City of Fremont 2005). Temperatures in the Alameda Creek Watershed to the east are cooler in winter and warmer in summer.

4.3 The Flood Control Channel

4.3.1 General

The Flood Control Channel in the Project reach has been subjected to numerous cycles of excavation and fill. The adjacent recharge ponds were initially created over a 100- year period by gravel mining excavation to depths of 20 to 70 feet below pre-construction ground level. In the 1950's the ponds were enlarged and reconstructed to provide water storage. The segment of Alameda Creek from the vicinity of Mission Creek crossing to San Francisco Bay was realigned and channelized by the Army Corps of Engineers in 1969-1972. The 200-foot wide earthen channel with rock rip-rapped levee slopes provides flood protection to the Cities of Fremont, Newark and Union City. Several sills or grade control structures including RD1 were installed across the channel bottom to prevent head-cutting and to secure transportation bridge footings.

Substantial sedimentation occurs within the reach between Decoto Road crossing and Ardenwood Boulevard, requiring periodic removal. Currently, a well-defined low flow channel below the channel designed invert elevation is established.

In the early 1980's, ACWD began to manage the gravel quarries (now known as Quarry Lakes) to increase the ability to recharge the Niles Cone Groundwater Basin. The various ponds were connected using pipelines and were re-graded and combined to form Lago Los Osos, Horseshoe Lake, and Rainbow Lake. These modifications served as a basis for conversion of the historic quarry to a multi-purpose facility involving recharge and recreation. During this process, the recharge ponds were re-contoured, the levees between them were removed and/or extensively graded, and spoil from construction activities was redistributed. In the current configuration, the lands around the recharge basins have been graded to accommodate recreation facilities operated by the East Bay Regional Park District, including an operations center, visitor center, trails, picnic areas, and boat launches.

4.3.2 Flood Control Channel Facilities and Operations

In the reach from Mission Boulevard (upstream) to the Rubber Dam 1 (downstream) the Flood Control Channel is frequently ponded behind two ACWD rubber dams that create wide and deep ponds to divert ponded water to the adjacent recharge basins. Ponding is the dominant condition in this reach of the Flood Control Channel. In the wet season ACWD primarily diverts natural inflow, although ACWD may (at times when natural inflow is low) supplement flow in the creek with imported water supplies. In the dry season (June through September), ACWD uses the Flood Control Channel to deliver imported water supplies to the recharge basins.

ACWD facilities in this reach include, from upstream to downstream:

- A screened water diversion (4 fish screens) upstream of Rubber Dam 3 on the north levee;
- A screened water diversion (1 fish screen) upstream of Rubber Dam 3 on the south levee (Bunting Pond Diversion);
- Rubber Dam 3;
- A screened diversion downstream of Rubber Dam 3 on the south levee (Kaiser Pond Diversion);
- Unscreened diversions to the Shinn Pond downstream of Rubber Dam 3 on the north levee; and
- Rubber Dam 1 (upstream of the ACFCD Drop Structure).

These facilities are routinely inspected, cleaned, and repaired as part of ACWD operations. Operations include year-round diversion of water from the channel to the groundwater recharge basins on both sides of the creek. As noted above, ACWD diverts natural inflow from October through May, and may (year round) receive releases of imported water supplies from DWR to the creek via the Vallecitos and/or Del Valle Turnouts for in-channel percolation and diversion to the groundwater recharge basins

ACFCD maintains the Flood Control Levees and associated sills and drop structure adjacent to RD1. ACFCD is also responsible for sediment, debris, and vegetation management in this reach. In general, this involves periodic sediment removal and maintenance repairs of the rip-raped levee slopes in accordance with the Corp's Operation and Maintenance Manual.

4.3.3 Existing Habitat

Existing Conditions: Construction Reach

Habitats on the levees and adjacent levee crest are dominated by ruderal grasses and forbs such as wild oat, ripgut grass, non-native ryegrass and barley, annual blue grass, Bermuda grass and similar species. Overstory is dominated by ornamental trees and shrubs including California live oak, eucalyptus, black locust, and California pepper tree. The levees themselves have minimal vegetation and are covered with rip-rap. The Flood Control Channel between Mission Boulevard and

Rubber Dam 1 is thus generally flooded and intermittently drained during high flows and when facilities need maintenance. There is minimal aquatic and emergent vegetation and no native riparian woodland along the channel.

The levee crest and adjacent area are 10-20 feet above the channel invert and the levee crest is gravel or paved and used as a recreational trail. Vegetation adjacent to the levees is either landscaped (pepper trees are a dominant element of this landscaping) or consists of weedy grasses and shrubs.

Adjacent development on the north levee is either suburban development or urban park. Only minimal construction activities are proposed for the Quarry Lakes Park area that rims the ACWD recharge basins or areas of existing housing and other structures. Both areas are routinely disturbed by human activity, including on-going maintenance of structures and the landscape. The urban park along the north-facing side of the north levee supports a narrow band of disturbed riparian habitat mixed with trails, fishing access sites, and areas of manicured lawn and landscape. South of the levee and adjacent bike trail, the south levee is industrialized from Mission Boulevard to the BART Bridge. There is residential development adjacent to the south levee downstream of the BART Bridge.

Existing Conditions: Rubber Dam 1 to Decoto Road

Downstream of Rubber Dam 1, there is no diversion to recharge basins and no artificial ponding occurs and the channel and floodplain constitute a disturbed freshwater marsh. In this reach, the Flood Control Channel is a wide flat and shallow floodplain with segments of narrow channel below the grade control structures alternating with segments of wide shallow channel meandering through the disturbed freshwater marsh. Similar conditions occur in the few channelized drainages flowing into the creek from the north at (a) Crandall Creek (Dominic Drive), and (b) Dry Creek (Trailside Way), except that these drainages are dry throughout the dry season.

Between the levees, the marsh area is dominated by California bulrush, with associated species including alkali bulrush, water smartweed, bur-weed, broad-leaved cattail, matted water primrose, tall umbrella sedge, common spikerush, water cress, water plantain, and common horsetail.

Marsh areas are periodically disturbed by very high flood flows. The 1-year flood event is 1,000 to 1,400 cfs and inundates about 40% of the marsh. The 100-year flood inundates the entire floodplain within the levees to within several feet of the levee crest. High flow events create scour and alter the channel configuration; some areas of the marsh are subject to scour and others accumulate sediment. The Flood Control Channel is therefore subject to substantial re-configuration (sediment removal and channel modification) on a 10-year cycle. The magnitude of sediment accumulation is lower than that downstream of Decoto Road because the channel slope from Rubber Dam 1 to Decoto Road is about 12 feet per mile, while the slope downstream is about 4 feet per mile. In this reach, the north-facing side of the levee remains in urban and park uses, with a mix of disturbed woodland, scrub, and landscape vegetation.

Existing Conditions: Decoto Road to the tidal marshes of the Don Edwards San Francisco Bay National Refuge

In this reach, the combination of rip-rapped levee and adjacent dense urban development continues. The channel slope of about 4 feet per mile results in substantial sediment deposition and accumulation. The freshwater marsh characteristics of the floodplain remain relatively consistent with the upstream conditions of the Rubber Dam 1 to Isherwood Road, except that there is greater sediment accumulation in the Flood Control Channel. Between the levees, the marsh area is dominated by California bulrush, with associated species including alkali bulrush, water smartweed, bur-weed, broad-leaved cattail, matted water primrose, tall umbrella sedge, common spikerush, water cress, water plantain, and common horsetail.

The drop structure at the Union Pacific Rail Road Bridge in the vicinity of Alvarado Boulevard generally marks the transition from freshwater marsh to tidal saline estuarine marsh (Estuary Reach shown in Figure 1). In this reach, floodplain habitats are dominated by alkali bulrush, with associated species including cattail, California bulrush, water smartweed, bur-weed, broad-leaved cattail, matted water primrose, common spikerush, and pickleweed.

In the lower portion of this reach (the Estuary Reach), adjacent development transitions from urban development to the Don Edwards San Francisco Bay National Refuge.

Existing Conditions: Upstream Reach and Typical flow in Alameda Creek

The channels upstream of Mission Boulevard (Upstream Reach) are arroyos flowing across a wide floodplain, with urban and agricultural development. The channels have been modified over the years for water supply and flood management. There are numerous reaches with minimal shade. Water quality is affected by runoff from urban, recreational, and agricultural sources. Water temperatures (see analysis in Section 6.2, below) in the dry season may exceed 25°C.

Under its water rights, ACWD may divert water from Alameda Creek during the wet season (the period from October 1 through June 1 of each year). During this period, the proposed bypass rules will be in effect from January 1 through June 1. Based on the most recent 40-years of record, mean monthly flow at Niles Canyon USGS Gage 11179000 in this period exceeds 50 cfs about 70% of the time (Figure 20). In January, February, and March, mean monthly flow exceeds 50 cfs about 87% of the time and 100 cfs about 60% of the time. Mean month flows are less than 25 cfs only about 4% of the time and mean monthly flows below 50 cfs occur only about 30% of the time, primarily in April and May.

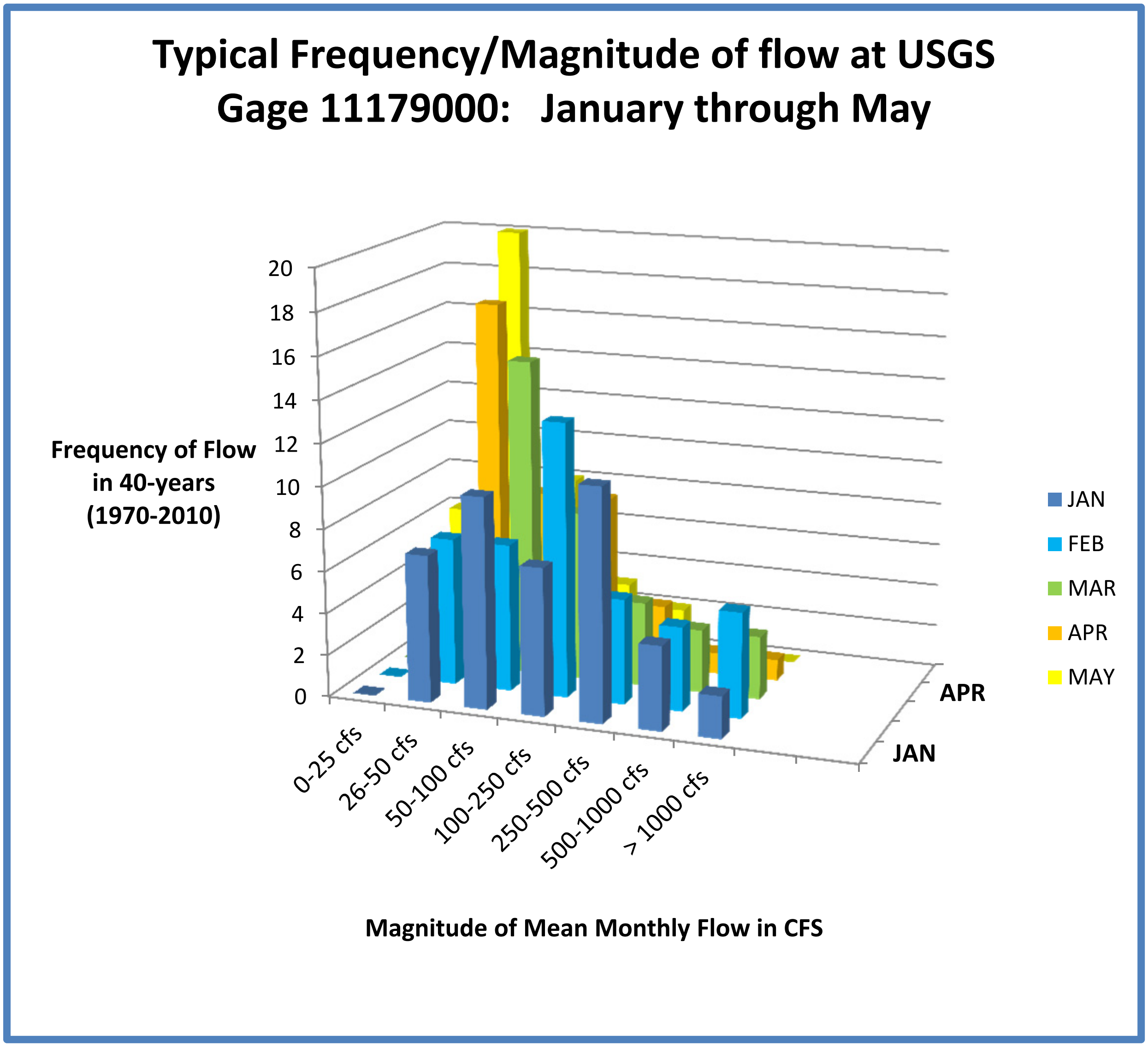


Figure 20. Typical flow frequency and magnitude in Alameda Creek (January 1 - May 31).

Given a relatively high frequency of mean monthly flows in excess of 50 cfs, ACWD does not typically make releases from the South Bay Aqueduct for recharge from January through April. ACWD has proposed to modify SBA operations in April, May, September, and October to reduce the potential effect of Vallecitos Turnout operations on water temperatures and habitat conditions in downstream Niles Canyon. There are a few exceptions:

- **Emergency Releases**. California Department of Water Resources (DWR) makes emergency releases of water to the creek from the South Bay Aqueduct, such as when water pressure is high and water needs to be released to protect facilities. In addition, emergency releases may be made from the South Bay Aqueduct if downstream users cannot take scheduled flows. These releases from the SBA are controlled by DWR. ACWD has no authority over the management or control of emergency releases from the SBA; and

- **Infrequent Release of Stored or Imported Supplies**. ACWD may import water via the South Bay Aqueduct year round. From January through May, a vast majority of this imported supply is delivered through the State Water Projects South Bay Aqueduct via the Bayside Pipeline Turnouts directly to ACWD's water treatment facilities. ACWD may make releases of imported supplies to the channel when:

    - Natural flow in the channel is low, such as during periods of drought, and/or Niles Cone Groundwater conditions require additional recharge to offset the potential for seawater intrusion;

    - A facility outage (due to natural, regulatory or other factors) adversely impacts the availability of ACWD's stored and/or imported water supplies, necessitating increased deliveries via the SBA to ACWD recharge facilities; and

    - Short-term opportunities for additional supply occur and the Bayside Pipeline Turnouts cannot deliver all of the available supply. For example, a temporary water exchange may be available and a portion of this short-term supply may need to be delivered to the channel.

In short, the existing program of deliveries to the channel for recharge via SBA turnouts is primarily concentrated in the summer and fall, and any winter-spring releases are typically of infrequent and of low volume. On-going operations of the SBA turnout at Vallecitos are an essential element of the ACWD-ACFCD Joint Fish Passage Project.

Existing Conditions: Ponding and Diversion in the Construction Reach

ACWD rubber dams are operational year round in the raised/inflated position and are lowered only when daily averaged flow exceeds 700 cfs or when there is a need to maintain facilities. With this exception, diversion of water to the Quarry Lakes and adjacent recharge basins is essentially continuous, although the source of water for diversion varies seasonally (as described above). Diversion operations create ponded conditions from Rubber Dam 1 upstream to Mission Boulevard, with patches of bare sediment.

Conditions in these diversion ponds vary from typical riverine conditions. Ponds act as heat sinks and water temperatures favor warm water species over cold water species, and thus support species such as bass, bluegill, and bullfrogs. In dry hot summer months, warm pond temperatures may allow green algae (such as *Cladophora*) which may reduce dissolved oxygen levels during nighttime respiration periods. Low dissolved oxygen may affect fish and amphibians in the ponds. As part of management of these conditions, rubber dams may need to be lowered. Algae blooms generally occur in mid-summer to early fall.

5.0 ENVIRONMENTAL EVALUATION

5.1 CEQA Determinations

1. Project title:

ACWD – ACFCD Joint Lower Alameda Creek Fish Passage Improvements (hereafter ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project", "Joint Fish Passage Project", or "Project")

2. Lead agency names and addresses:

Co-Lead Agencies:

Alameda County Water District
43855 South Grimmer Boulevard
Fremont, CA 94538

Alameda County Flood Control & Water Conservation District
399 Elmhurst Street
Hayward, California 94544-1395

3. Contact person and phone number:

Therese Wooding, ACWD
Project Engineer
510-668-4483

4. Project location:

The Project would involve new facilities at the following locations.

- Rubber Dam 3 Fishway (37 34 22.95 N; 121 58 19.92 W);
- Shinn Fish Screens (37 34 20.16 N; 121 59 01.07 W); and
- Rubber Dam 1/ACFCD Drop Structure fishway (37 24 07.27 N; 121 59 20.25 W).

5. Project sponsor's name and address:

The Lead Agencies are the Project co-sponsors.

6. General plan designation:

The Joint Fish Passage Project would occur within the interior rip-rapped channel banks of the Alameda Creek Flood Control Channel and adjacent areas designated for open space, recreation, and water management.

7. Zoning:

PF (Public facilities, flood control).

8. Description of project:

As described in Section 3, the Joint Fish Passage Project makes modifications to in-channel facilities and conditions, combined with modifications to water diversions and bypass flows, to provide conditions for steelhead and other fish migrations in the Alameda Creek Flood Control Channel from Mission Boulevard (including modifications to RD1, and RD3) to downstream of the BART Bridge.

9. Surrounding land uses and setting:

ACWD operates groundwater recharge basins, separated by levees on both sides of the Flood Control Channel. The Flood Control Channel levee crests were constructed with roads for maintenance access, unpaved on the north side and paved on the south side, which were incorporated into the Alameda Creek Trail system that extends from the Project down to the San Francisco Bay. The East Bay Regional Park District operates the trail system and other recreational facilities which use the embankments between recharge basins. In addition, there is a small parcel of land designated as mitigation for impacts to habitats associated with construction of the groundwater recharge facilities. There is residential and commercial development on the north and south sides of the Alameda Creek Trail/maintenance access roads.

10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement.) Project development has been done in consultation with the agencies listed below.

Agency	Action Required
U.S. Army Corps of Engineers	Clean Water Act 404 Permit 33 USC 408
California Department of Fish and Wildlife	Fish and Game Code Section 1600 "Lake and Streambed Alteration Agreement"
Regional Water Quality Control Board	Issuance of Construction General Permit (CGP)
Regional Water Quality Control Board	Clean Water Act Section 401 Certification
National Marine Fisheries Service	Consultation related to threatened and endangered species
U.S. Fish and Wildlife Service	Consultation related to threatened and endangered species

Consultation with the National Marine Fisheries Service and the U.S. Fish and Wildlife Service will be necessary as part of the Clean Water Act Section 404 permit process to address the *potential* for effects to threatened and endangered species and the avoidance and minimization measures to be taken to reduce such effects to a less-than-significant-level. Combined with the substantial restoration of steelhead access to historic upstream habitats and the improvement in flow regimes in the Joint Fish Passage Project reach, avoidance and minimization measures are anticipated to reduce potential effects to listed species to negligible levels:

- First, based on multiple years of survey by many agencies, there are no federal or state listed species in the Joint Fish Passage Project construction and operations area except steelhead;

- Second, *potential* effects to listed species in the estuary about 5 miles downstream of the construction zones are limited to construction-related water quality effects, which will be rigorously managed and avoided. Both ACWD and ACFCD have extensive experience and success in implementing such avoidance and minimization programs;

- There are no anadromous steelhead in the reach above the ACFCD Drop Structure under current conditions, except for random individuals captured and trucked to upstream locations by local entities. Steelhead do not have volitional passage above the ACFCD Drop Structure. In addition, construction will occur in periods when steelhead would not be in the construction reach; and

- Long-term maintenance and operation of the Joint Fish Passage Project facilities will benefit steelhead to the extent that any incidental adverse effects will be overwhelmed by the benefits of the Project.

This IS/CEQA Checklist/Environmental Assessment incorporates impact avoidance measures to avoid and minimize take of threatened and endangered species and other resources.

5.2 Environmental Factors Potentially Affected

The environmental factors checked below could be potentially affected by this Project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

- ☒ Aesthetics (mitigated to a level of less-than-significant)
- ❒ Agriculture Resources
- ❒ Air Quality (no significant impact, but ACWD will implement measures to further reduce emissions)
- ☒ Biological Resources (mitigated to a level of less-than-significant)
- ❒ Cultural Resources
- ❒ Geology/Soils
- ☒ Hazards & Hazardous Materials (mitigated to a level of less-than-significant)
- ☒ Hydrology/Water Quality (mitigated to a level of less-than-significant)
- ❒ Land Use/Planning
- ❒ Mineral Resources
- ☒ Noise (mitigated to a level of less-than-significant)
- ❒ Population/Housing
- ❒ Public Services
- ☒ Recreation (mitigated to a level of less-than-significant)
- ☒ Transportation/Traffic (mitigated to a level of less-than-significant)
- ❒ Energy Use (no significant impact, but ACWD will implement energy saving actions)
- ❒ Utilities/Service Systems
- ❒ Greenhouse Gas Emissions
- ☒ Cumulative Impacts (mitigated to a level of less-than-significant)
- ❒ Mandatory Findings of Significance

DETERMINATION:

On the basis of this initial evaluation:

- ❐ I find that the ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
- ☒ The Alameda County Water District Board of Directors and the Board of Directors of the Alameda County Flood Control and Water Conservation District find that although the ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the Project have been made by or agreed to by the Project's proponents. A MITIGATED NEGATIVE DECLARATION will be prepared.
- ❐ I find that the ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
- ❐ I find that the ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
- ❐ I find that although the ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the Joint Fish Passage Project, nothing further is required.

Signature: ____________________________________ Date: ________________

____

Printed Name For: Alameda County Water District

Signature: ____________________________________ Date: ________________

____

Printed Name For: Alameda County Flood Control and Water Conservation District

5.3 Aesthetics

Would the project:

a) Have a substantial adverse effect on a scenic vista?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
☒ Less Than Significant Impact ❒ No Impact

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

5.3.1 Environmental Setting

Alameda Creek upstream of the Mission Boulevard crossing flows through Niles Canyon that bisects the Coast Range that separates Livermore-Amador Valley from the San Francisco Bay coastal plains. The Joint Fish Passage Project area is located in the flat alluvial plain at the westerly base of the coast range. The immediate Project area is urban. Alameda Creek from Mission Boulevard westerly to San Francisco Bay flows in a constructed leveed channel. The channel passes through a mix of water recharge basins/lakes, industrial development, and housing. Views of the coastal hills are good from the multi-use trails on the north levee and the bike trail on the south levee.

In the Joint Fish Passage Project reach, Alameda Creek is contained within a trapezoidal rip-rapped channel, intermittently planted along the levee crest with non-native trees. When the rubber dams are inflated, the resulting ponds extend upstream for about 0.75 miles. In these ponded reaches, there is virtually no riparian vegetation and when the dam is deflated, the view is of a stream meandering across a sandy gravel creek bed. The primary natural viewscape in the reach from Mission Boulevard to downstream of the BART Bridge is the Quarry Lakes, which provide an expansive water view with the coastal hills in the distance.

Views of the channel are often blocked by fencing, levees, railroad bridges, and commercial development. When views are available, they are of a modified trapezoidal channel with rip-rap and several major bridges. All of the ACWD/ACFCD facilities would be located on the levee slopes, the levee crest, and in the Flood Control Channel. The existing viewscape at the various sites is (See Table 10, above):

- **Rubber Dam 3 Fishway.** Rubber Dam 3 is near two existing mixed residential areas and a planned mixed residential area on the north levee and commercial and industrial development on the south levee. The viewscape is of the rip-raped levee, chain-link security fencing, several bridges, and the concrete infrastructure associated with them. The 8-foot raised railroad berm along the south levee effectively precludes a view of RD3 from the development to the south;

- **Shinn Fish Screens**. The Shinn Fish Screens would be constructed on the north levee. The Alameda Creek Trail runs along both levees. Views of the area are of the levees, the channel, and the distant coastal hills. Views from the fish screen site to the south levee are industrial with a view of the railroad line and associated industrial facilities. The addition of the screens and fenced enclosure will add to the view, but will be consistent with the industrial character. Views from the fish screens to the north will be of the Shinn Pond and distant park areas and residential areas to the north of the park. Views of the Shinn Fish Screen site from the residential areas along the northern bank of Shinn Pond are generally blocked by trees and shrubs in the strip of park lands between the shoreline and residences; and

- **ACWD RD1/ACFCD Drop Structure fishway**. The BART Bridge piers, the BART Bridge, the Union Pacific Rail Road Bridge and piers, and raised rail line embankments to the north and south of the bridges separate the views in this reach. Viewers north of the bridges have only a partial view of the channel to the south, and the view is of bridge piers and the rail lines. Similarly, viewers from the south have a limited view to the upstream side of the channel. The view from residential development on the south bank of the channel west of the bridge complex is effectively blocked by bridge piers and raised rail lines. The creek is visible from the unpaved hiking trail along the north levee and the paved bike trail along the south levee. The viewscape is dominated by the BART and railroad bridges and the concrete infrastructure that supports them.

5.3.2 Mechanisms for Effect

Aesthetic/visual impacts would be the result of added infrastructure along the existing levee system and there would be short-term visual impairment due to construction equipment on the levee and in the channel.

5.3.3 Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

Potential for Permanent Aesthetic Effects

The proposed fishways are the largest new elements to be added to the viewscape. They would add complex concrete structures to the existing north-channel and levee walls. The fishway at the RD1/ACFCD Drop Structure would be minimally visible from residences across the channel near the ACFCD Drop Structure because the fishway would be integrated into the existing bridge and weir infrastructure. At the Rubber Dam 3 site, the fishway would also not be readily visible from across the channel because of the railroad berm and existing commercial and industrial infrastructure on the south side of the channel; the view of the RD3 fishway would also be partially blocked by existing bridges upstream. On the north embankment, the existing residential area upstream of the RD3 Fishway does not have a view of the Fishway due to the rail berm and bridge and the residential area to the downstream does not have a view of the fishway because of vegetation and existing fencing installed by residents. A mixed use development has been proposed to be located at the end of Niles Blvd. but has not been authorized pending resolution of a CEQA law suit.

The Shinn screens, mounted on their low profile concrete foundations, would not be readily visible from residences across the Shinn Ponds, whose viewscape is substantially screened by mature trees and shrubs.

The primary permanent visual impact of the fishways, screens, and channel modifications is that they would be visible from the trails along the both sides of the creek. These facilities would alter the rip-rap and concrete levee, adding and extending security fencing and small sections of industrial-type equipment. This may be considered as (a) adding some visual interest to the otherwise uniform face of the levee or (b) contributing to the urban/industrial character of the area. The permanent effect would be limited to about 4% of the total length of the channel between RD3 and the Bay. The fishways themselves may be a visual attraction, allowing the public to watch steelhead adults migrate upstream. This may be considered an aesthetic/recreational benefit of the Project.

In this context, the potential for permanent aesthetic impacts is:

a) None of the facilities would block a view of the primary scenic resources of the area, the Quarry Lakes and the coastal hills. With the exception of security fencing and equipment cabinets, the facilities are below grade and cannot block the view of either the lakes or the coastal hills.

b) None of the facilities would affect scenic resources within a State Scenic Highway.

c) For trail users along the creek, the proposed fishways and screens would alter the view of about 1500 feet of concrete wall and rip-rap embankment, primarily along the highly modified reach with the ACFCD Drop Structure and two railroad bridges. The constructed fishway at this site would not be readily distinguishable from the existing vertical concrete walls on the north bank of the channel. Views from the north side of the channel are also partially blocked by the existing concrete walls and fencing at the ACFCD Drop Structure site and raised channel embankments downstream. The view of the fishways would not adversely affect the existing view. Rather, it will add to the visual experience of trail users – seeing steelhead entering and exiting the fishway.

d) Lighting may be installed for security purposes and in order to perform maintenance at night. This could marginally increase ambient light conditions at the sites of fishways and fish screens.

Potential for Temporary Aesthetic Effects

It is possible that construction of the RD1/ACFCD Drop Structure Fishway and the simultaneous construction of the Shinn Pond Fish Screens may involve two construction shifts, resulting in construction lasting 16 hours a day (5-day work week and possible weekend work). A dual-shift 7 AM to 10 PM construction schedule, with possible earlier start and/or later finish as allowed by the City, would involve daily periods of construction after sunset (Table 11). Assuming construction begins on May 1 and ends on November 1, and the schedule is 7 AM to 10 PM (per the City of Fremont's General Plan, Element 10) construction activity outside of daylight hours would not occur in the morning except in October, but would occur in evening hours. Construction lighting would be required from about 1.5 hours (8:26 to 10) to just under 4 hours (6:12 to 10).

Table 11. Construction lighting from dual-shift construction (sunrise and sunset times will be based on data from the National Weather Service for the area).

Month	Duration of construction before sunrise	Duration of construction after sunset
May 1*	0	2 hours
June 1	0	1 hour, 34 minutes
July 1	0	1 hour, 25 minutes
August 1	0	1 hour, 43 minutes
September 1	0	2 hours, 22 minutes
October 1	6 minutes	3 hours, 8 minutes
November 1	35 minutes	3 hours, 48 minutes

*Or earlier if allowed by permit.

Construction light effects from dual-shift construction would be minimal for residents north of Shinn Pond because:

- Much of the construction will occur in the channel and the north levee will significantly block light from construction except for construction activity on the levee crest;
- The nearest residences north of Shinn Pond are about 1/4th mile from the construction site; and
- The nearest residences north of Shinn Pond are screened by landscaping at the park.

For residents north of Shinn Pond, it is not likely that periods of construction before sunrise or after sunset will substantially exceed ambient urban lighting conditions.

Downstream of the BART Bridge, construction light effects from dual-shift construction in the reach are likely. Construction of the fishway would occur within from 200 to 1600 feet of residences on the south bank of the flood control channel. Existing 2-storey residences do not have fencing that would block light in 1st-storey areas, but there are some mature trees that may screen light in 2nd-storey rooms. It is likely that evening lighting would thus be visible in residences along the south bank.

No Action Alternative

No construction activity or changes would occur. No impacts to aesthetics associated with the proposed Project would occur.

5.3.4 Significance of Effects

The Joint Fish Passage Project would not have permanent aesthetic effects. Although the view of the channel from the trail along the channel would be altered by construction of the fishways, screens, and fencing, these facilities would not change or have adverse effects on the existing viewshed. The Project effects therefore, would be considered insignificant.

Temporary lighting effects during construction in the reach downstream of the BART Bridge would affect 8 residences in the reach from Fernwood Court to Fruitwood Court. Residences downstream of this reach are (a) setback from the levee and (b) screened by trees at a local park. Setback also means that light will be blocked by the housing upstream of Fruitwood Court.

5.3.5 Proposed Mitigation

Aesthetics 1 At all permanent facilities, the Project would direct any security lighting to focus on the facilities and away from housing. Lighting would be equipped with motion sensors or manually initiated/timed-shutoff operation. Thus, operation of the facilities' lights could be limited to when motion is detected or infrequently if maintenance or operation is required at night.

Aesthetics 2 To address potential for construction lighting after sunset, the Project will require the construction contractor to develop a construction lighting plan to include:

- Monitoring of lighting levels outside of residences along the south bank of the flood control channel from Fernwood Court and Fruitwood Court and Riverwalk Drive, I Street, and Appletree Court; monitoring of the Niles-Mixed use development if occupied during construction;
- Use of color-corrected halide lights for construction;
- Directing construction lights away from the south bank of the flood control channel;
- Placing lights at the lowest feasible level;
- Use of light screens between the construction area and the housing, at the boundary of construction activity and/or on the levee crest; and
- To the extent feasible, expedite construction downstream of the BART Bridge.

5.3.6 Significance Following Mitigation

The proposed facilities would not permanently and substantially change the views for residents. There would be no substantial increase in ambient light at the residences adjacent to the fishway and screen sites and ACWD will direct any security lighting away from housing.

Temporary construction that involves work after sunset and requires construction lighting will affect a small number of residents and the construction lighting plan will reduce the potential temporary lighting effects substantially. Minimization of lighting, direction of lighting away from residences, and use of light screens will reduce lighting effects to a minimum.

After these mitigations, the aesthetic effects of the Project would be considered less-than-significant.

5.4 Agricultural Resources

In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:

a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

5.4.1 Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

There is no agricultural land within the Joint Fish Passage Project area and no mechanism by which the Joint Fish Passage Project could affect agriculture. No impacts are anticipated to agricultural resources.

5.5 Air Quality

Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:

a) Conflict with or obstruct implementation of the applicable air quality plan?

❒ Potentially Significant Impact ☒Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒Less Than Significant Impact ❒ No Impact

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
☒ Less Than Significant Impact ❒ No Impact

d) Expose sensitive receptors to substantial pollutant concentrations?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
☒ Less Than Significant Impact ❒ No Impact

e) Create objectionable odors affecting a substantial number of people?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
☒ Less Than Significant Impact ❒ No Impact

5.5.1 Environmental Setting

The structural elements of the Joint Fish Passage Project would be constructed over four years during the late spring, summer, and fall when low flow conditions prevail. During this dry period, the Bay Area Air Quality Management District (BAAQMD 2000) characterizes climate as under the influence of marine flow, with dominant daytime winds out of the northwest and off the bay, with an average speed of 6-7 mph. Summer and fall are periods when high pressure may dominate the region and pollutants from upwind cities may concentrate in the South Bay. Data from the BAAQMD Station at Fremont shows that from 1996 through 2006 the area was infrequently out of compliance with air quality standards:

- Ozone (national standard): 0-1 days per year
- Ozone (state standard): 2-7 days per year
- Fine particulates (both standards[1]): 1-3 days per year
- Carbon monoxide (both standards): 0 days per year

[1] years 2000-2006 include $PM_{2.5}$ and PM_{10}, prior to that, only PM_{10} exceedances were recorded.

Given these conditions, ambient air flow during the probable construction period would be in a southwesterly direction at velocities of about 7 miles per hour. Ambient conditions would be warm, with moderate air quality. Winds would be approximately perpendicular to the channel. Sensitive receptors would be residential neighborhoods south (downwind) of the construction zone. There are several parks and recreational trails bordering the Project area. No schools are within 0.25 miles of construction.

Existing sources of particulates include the dry levees and the well-used unpaved maintenance roads/trails on the north levee and paved maintenance road/trail on the south levee, as well as open land at the Quarry Lakes Park. The site is at a transportation hub where the BART line and the Union Pacific RR line intersect east-west State Highway 84 and a number of City of Fremont arterial roads. Traffic volume on Paseo Padre Parkway along the southern boundary of the Joint Fish Passage Project area is about 25,000 vehicles per day; on Mission Boulevard at the eastern boundary of the Joint Fish Passage Project traffic volume is about 13,000 vehicles per day (City of Fremont 2003).

5.5.2 Mechanisms for Effect

The Joint Fish Passage Project operation does not involve facilities that would generate emissions of criteria pollutants over a long term. Construction would, however, involve emissions from construction equipment and potential fugitive dust emissions from material excavated or otherwise disturbed from the channel side slopes and the channel during construction. There would also be long-term energy use for facility operations, provided by existing power lines in the vicinity of the facilities. Energy use for essentially passive facilities such as fishways and fish screens is equivalent to energy use of a small house or apartment.

5.5.3 Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

Analysis Methods for Emissions Estimates

Prior emissions modeling, (2013) utilized the URBEMIS model which was specifically developed to quantify construction emissions for large land use development projects with significant amounts of mass grading, fine grading and extensive and continuous earth moving. In 2013, the URBEMIS Model was replaced by the CalEEmod model. The CalEEmod model is primarily useful for large scale housing, industrial, and commercial projects (i.e., land use projects). However, the Joint Fish Passage Project is more linear in nature (e.g., typical of pipeline or roadway installation/widening). Therefore, modeling was revised per guidance from the Bay Area AQMD (BAAQMD 2015), using the Sacramento Metropolitan AQMD's Road Construction Emissions Model (Version 7.1.5.1), as it is more applicable for estimating emissions for linear construction projects. Estimated air quality emissions from the Road Construction Emissions Model for the Project were then compared to Bay Area as well as other AQMD Thresholds of Significance.

There are several important considerations in applying the Road Construction Emissions Model to the Project.

First, in the Road Construction Emissions Model (hereafter Road Model), estimates of construction activity are broken into four categories:

- Grubbing and land clearing
- Grading/Excavation
- Drainage, utilities/sub-grade
- Paving

Grubbing and land clearing and paving are minimal in the proposed Project. Grading and excavation and drainage/utilities/sub-grade are the dominant activities (Tables 12 and 13). Accordingly, modeling allocated (a) two months of activities dominated by grading and excavation and (b) four months of activities generally involving installation of concrete and rip-rap.

In each of these categories, construction tends to alternate between low intensity and high intensity activities. Typical low intensity activities include:

- Mobilization
- Soil Nails
- Installing concrete forms
- Equipment installation
- Site clearing
- Pipe installation

These activities tend to occur within the construction zone, with minimal hauling.

Typical high intensity activities include:

- Demolition and removal of materials
- Grading and excavation
- Pouring concrete
- Forms removal
- Rip-rap construction
- Backfill

These intermittent high intensity activities tend to include intensive periods of materials hauling. For example, in fishway construction, there is low intensity installation of forms, with minimal daily trips, followed by a period of high intensity pouring concrete and removal of forms, with daily hauling of 20 to 30 trips.

There is some potential for overlap between high intensity and low intensity activities, and thus it is appropriate (a) to include routine 4-6 daily off-site soil hauling trips for all construction periods and (b) to include specific, intermittent periods of hauling up to 35-36 trips per day. The distance to disposal sites and sources of concrete and other materials are based on a 20 mile round/trip. With 3 trucks, a maximum of 36 trips per day can be accomplished within 8 hours (a 10-hour haul period was used to ensure that high peaks of hauling would be accommodated). A combination of routine daily hauls throughout the Project and specific haul intermittent periods of high materials hauling was used in the analysis.

Second, there are two years when activities generally occur at only one construction site. In the other two years, construction will occur at two sites, involving work at RD1/Drop Structure Fishway and Shinn Fish Screens sites. In analysis of emissions in the two years of activity at two sites, emissions were assumed to overlap. For example, in Year 3 (2020), activity would occur at both RD1/Drop Structure fishway and Shinn Fish Screens sites. For purposes of emissions analysis, it is assumed that emissions are calculated:

Emissions at RD1/Drop Structure Fishway + Emissions at Shinn Screens = Total Emissions

For estimating daily (peak) emissions, summing emissions may result in an over estimate, because the RD1/Drop Structure Fishway and Shinn Ponds sites are approximately 1,000 feet apart.

Third, the Road Model addresses dust emissions based on maximum area of disturbance per day assuming a default number of water trucks. Use of the maximum area of soil disturbance per day reflects the model's focus on road construction activities, which tends to be of consistent intensity over the entire construction period. The Road Model may thus somewhat over estimate Joint Fish Passage Project dust emissions during periods of low intensity activity and under estimate dust emissions during periods of high intensity activity.

Fourth, the Road Model addresses emissions of Reactive Organic Gases, Carbon monoxide, Carbon dioxide, and Nitrogen oxides, also based on averages. The model addresses these emissions in terms of average on-site use of equipment, hauling, and average hours of equipment activity, addressing use of diesel fuels based on horsepower hours.

Adjustments to the Project

In addition to using a new emissions model, modeling was also updated to reflect Joint Fish Passage Project design refinements and anticipated construction activities. For example:

- In 2013, rip-rap placement in the RD1/Drop Structure Fishway area was estimated to require 15 days of construction and involve 15 daily material trips. The current Project provides for larger rip-rap to be installed, involving 30 days of demolition and re-construction involving 29 daily material trips.
- The 2013 estimated concrete placement for theRD1/Drop Structure Fishway was modified from a total of 10-days of activity and 15 daily material trips to a total of 13 days and 30 material trips per day.
- In 2013, backfill and rock protection was estimated to involve 5 days and 5 materials trips and this was changed to 20 days and 29 material trips per day.

Although the number of truck trips associated with the revised Project has increased, spreading construction over four years beneficially reduces the potential for high levels of construction emissions. Two 4-year construction scenarios were evaluated to allow for flexible construction sequencing.

Construction Scenario One:

- Year 1 (2018): RD3 Fishway
- Year 2 (2019): RD1/Drop Structure Fishway phase 1
- Year 3 (2020): RD1/Drop Structure Fishway phase 2+Shinn Screens phase 1
- Year 4 (2021): RD1/Drop Structure Fishway phase 3 + Shinn Screens phase 2

Construction Scenario Two (Acceleration of Shinn Fish Screens):

- Year 1 (2018): RD3 Fishway
- Year 2 (2019): RD1/Drop Structure Fishway phase 1 + Shinn Screens phase 1
- Year 3 (2020): RD1/Drop Structure Fishway phase 2 + Shinn Screens phase 2
- Year 4 (2021): RD1/Drop Structure Fishway phase 3

The two construction scenarios would have the same total (4-year) activities. However, Scenario 2 accelerates construction and completion of the Shinn Fish Screens (finishing in Year 3, not Year 4).

Fishway Construction Assumptions

The construction of the two fishways is anticipated to be quite similar. RD3 Fishway (2018) is assumed to be completed in a single year, without other activities.

Compared to the RD3 Fishway, the RD1/ Drop Structure fishway would be larger and would involve greater foundation and in-channel work. To reflect this difference, the RD3 fishway emissions were estimated at 70% of the RD1/ Drop Structure fishway construction. Given the higher level of demolition activity at the RD1/ Drop Structure fishway due to the extensive existing concrete infrastructure, the 70% construction activity estimate for the RD3 Fishway provides a reasonable, but probably high, estimate of emissions.

RD1/Drop Structure Fishway construction will be phased over three construction years. Phase 1 activities would be moderately more intense than subsequent phases because of (a) greater initial mobilization activity, (b) a larger area and intensity of demolition, grading, and materials hauling, and (c) 100% completion of soil nails and jet grouted columns. Based on these considerations, input to the Road Model divided the RD1/Drop Structure Fishway activities into:

- Phase 1, 40% of total activity
- Phase 2, 30% of total activity
- Phase 3, 30 % of total activity

The total level of construction activity and use of equipment for the RD1/Drop Structure Fishway and associated activities was evaluated in detail (Table 12). Based on this analysis, a 3-year construction schedule for the RD1/Drop Structure Fishway was assumed.

Shinn Pond Construction Assumptions

Modifications at Shinn Pond include (a) consolidation of two existing diversions into one larger diversion on the north bank of the channel and (b) installation of a bank of fish screens (Table 13). Fish screens are relatively low-intensity projects and thus a majority of heavy equipment use and activity will involve excavation for installation of pipes for the consolidated diversion. The emissions estimate was based on a worst-case assumption of an open cut through the levee for installation of the new pipelines.

The results of the Road Construction Emissions Model for Construction Scenarios 1 and 2 are shown in Tables 14 through 21. Emissions results are un-mitigated, with the following two exceptions: (a) the model incorporates 50% control of fugitive dust based on the default number of water trucks and (b) emissions from construction equipment are based on 2016 equipment (see ARB EMFAC Web Data Base). Fugitive dust emissions are averaged and detailed analysis on a step by step basis is not possible.

No Action Alternative

No construction activity or changes would occur. No air quality impacts associated with the proposed Project would occur under the no action alternative.

Table 12. Construction phases and key criteria for fishway construction. Use of water trucks is included in the Road Construction Emissions Model. Small tools such as jack hammers are assumed to use the site electrical generator.

Construction Phase	Duration (weeks)	Total/Daily Acres of Effect	Equipment	Est. hours of daily use	Crew size	Daily material trips[1]
RD1/ACFCD Drop Structure						
1 Mobilization and site isolation[2]	3	10/2	1 Excavator	4	18[3]	10[4]
			1 Loader	4		
			1 forklift	1		
			1 Backhoe	4		
			Air compressor	1		
1. Power source for electrical equipment	24	0	Site Electrical Generator	8	0	0
2 Demolition	2	2/0.5	Air compressor	8	18[3]	13[4]
			1 dozer	6		
			2 Excavator	6		
			2 Loader	6		
			2 Backhoe	6		
			2 Dump truck	6		
3 Grading and excavation	8	10/2	1 Excavator	6	18[3]	30[5]
			1 Loader	6		
			2 Backhoe	6		
			3 Dump trucks	8		
			2 Compactor	6		
3.1 Soil nails, Jet Grouted columns	6	0.2/1	1 Drill rig	6	5[3]	5[1]
			Concrete truck	2		
			Air compressor	2		
4 Install concrete forms	4	1/0.2	1 Compactor	4	18[3]	5[6]
			1 Forklift	3		
			1 Washer	2		
			1 Loader	2		
			1 Bore rig	3		

			1 Bore rig	3		
5 Pour concrete	2.5	0.2/0.1	3 Trucks	8	18[3]	30[7]
			1 Pumper truck	8		
6 Form removal	1	0.2/0.1	1 Forklift	6	18[3]	20[8]
7 In-channel Rip-Rap Construction	6	0.5/0.1	1 Loader	8	18[3]	29[9]
			1 backhoe	6		
			1 Excavator	2		
			3 Dump trucks	8		
8 Equipment installation	8	0.2/0.1	1 concrete saw	8	18[3]	5[1]
			1 Forklift	6		
			1 Crane)	1		
			1 material handling (other)	2		
			2 welder	6		
			1 washer	6		
9 Backfill and rock slope protection	4	0.2/0.2	1 Loader	8	18[3]	29[1]
			3 Dump trucks	8		
			1 Excavator	6		
			1 Backhoe	6		
10 Site cleanup	1	2/1	1 Forklift	6	18[3]	4[10]
			1 dozer/loader	4		

Notes RD1:

1. Daily material trips include a general 4-6 trips per day by typical on-highway delivery trucks *plus* specified hauling. See notes.
2. Includes creation of an access road from the existing levee maintenance road/trail and placement of sand bags or other barriers to isolate the channel from the construction area. Assumes a 10 acre construction zone for the RD1/ACFCD Drop Structure Fishway and a 7 acre construction zone for RD3 Fishway, and average daily use of about 20% of the construction zone.
3. Crew is assumed to have a 30 mile R/T to home. Material hauling assumes a 20-mile R/T.
4. Material hauling for demolition assumes 640 cubic yards per the current design, or 38 R/T with average truck of 17 cubic yards
5. Material hauling for soil excavation assumes 7850 cubic yards per the current design, or 462 R/T with average truck of 17 cubic yards
6. Material hauling assumes concrete forms delivered, R/T = 20 miles
7. Material hauling for concrete assumes 2,532 cubic yards per the current design, or 280 R/T with average truck of 9 cubic yards
8. Material hauling assumes concrete forms hauled away on diesel flatbed trucks, R/T =20 miles
9. Material hauling for rip-rap assumes 5,570 cubic yards per the current design, or 327 R/T with average truck of 17 cubic yards

10. Materials hauling assumes 3,840 cubic yards per the current design, or 226 R/T with an average truck of 17 cubic yards
11. Materials hauling assumes debris hauling of 10 truckloads with an average truck of 17 cubic yards R/T of 20 miles
12. Includes RD1 Fishway/Drop Structure and RD1 control building and foundation modifications

Notes RD3:

1. The RD3 Fishway emissions were estimated at 70% of the RD1/ACFCD Drop Structure Fishway, reflecting the smaller footprint of construction and the lower magnitude of the construction.
2. RD3 does not require soil nails, jet grouted columns.

Table 13. Construction phases and key criteria for the consolidated Shinn Fish screen complex.

Construction Phase	Duration (weeks)	Total/Daily Acres of Effect	Equipment	Est. hours of daily use	Crew size	Daily material trips[1]
Shinn 54' Diversion Fish Screen						
1 Mobilization and site isolation[2]	3	2/1	1 Excavator	6	10[3]	5[4]
			1 Loader	6		
			1 Forklift	1		
			Air Compressor	1		
			1 Backhoe	6		
2 Demolition	2	1/0.5	2 Excavator	3	10[3]	3[4]
			1 Concrete saw	6		
			1 Loader	6		
			1 Backhoe	6		
			1 Dump truck	8		
3 Grading and excavation	3	2/1	1 Excavator	8	10[3]	35[5]
			2 Loader	8		
			1 Bore rig	4		
			1 Dump truck	8		
4 Pipe Installation	3	1/0.5	2 Excavator	8	10[3]	6[5]
			2 Loader	8		
			1 Backhoe	8		
			2 Dump truck	8		
			2 Compactor	4		
5 Install concrete forms, Pour concrete, Form removal, Install Equipment, Backfill & rock slope protection, Site cleanup	Estimate based on 30% of RD1/ACFCD Drop Structure Fishway estimate or 0.01, whichever is greater. See methods discussion above.					

1. Daily material trips include a general 3 trips per day by typical on-highway delivery trucks *plus* specified hauling. See notes.
2. Includes creation of an access road from the existing levee maintenance road/trail and placement of sand bags or other barriers to isolate the channel from the construction area. Assumes a 2 acre construction zone with about 0.25 acres used daily.
3. Crew is assumed to have a 30 mile R/T to home.
4. Material hauling assumes a 20-mile R/T and a diesel truck of 400 horsepower.
5. Material hauling assumes a 20-mile R/T by flatbed trucks of about 400 horsepower

Table 14. CONSTRUCTION SCENARIO 1: Year 1 (2018) RD3 Fishway Modeled Emissions compared with BAAQMD Thresholds of Significance

Pounds Per Day										
Emissions Category	ROG	CO	NOx	Total PM10	Exhaust PM10	Fugitive Dust PM10	Total PM2.5	Exhaust PM2.5	Fugitive Dust PM2.5	CO2
Threshold of Significance	80	NA	80	80	NA	NA	NA	NA	NA	NA
Total Emissions	**4.4**	**27.5**	**40.6**	**21.9**	**1.9**	**20**	**5.9**	**1.7**	**4.2**	**7,766**
Total Tons (Per Year)										
Total Emissions	**0.3**	**1.8**	**2.7**	**1.1**	**0.1**	**1.0**	**0.3**	**0.1**	**0.2**	**506**

Table 15. CONSTRUCTION SCENARIO 1: Year 2 (2019): RD1/Drop Structure Fishway Modeled Emissions compared with BAAQMD Thresholds of Significance

Pounds Per Day										
Emissions category	ROG	CO	NOx	Total PM10	Exhaust PM10	Fugitive Dust PM10	Total PM2.5	Exhaust PM2.5	Fugitive Dust PM2.5	CO2
Threshold of Significance	80	NA	80	80	NA	NA	NA	NA	NA	NA
Total Emissions	**3.2**	**22.3**	**27.4**	**21.3**	**1.3**	**20**	**5.3**	**1.2**	**4.2**	**5,949**
Total Tons (Per Year)										
Total Emissions	**0.2**	**1.4**	**1.7**	**1.1**	**0.1**	**1.0**	**0.3**	**0.1**	**0.2**	**384**

Table 16. CONSTRUCTION SCENARIO 1: Year 3 (2020) RD1/Drop Structure Fishway and Shinn Screens Modeled Emissions compared with BAAQMD Thresholds of Significance

Pounds Per Day										
Emissions category	ROG	CO	NOx	Total PM10	Exhaust PM10	Fugitive Dust PM10	Total PM2.5	Exhaust PM2.5	Fugitive Dust PM2.5	CO2
Threshold of Significance	80	NA	80	80	NA	NA	NA	NA	NA	NA
Emissions (RD1)	2.0	14.4	16.2	20.8	0.8	20	4.8	0.7	4.2	4,475
Emissions (Shinn)	1.6	11.4	12.5	20.6	0.6	20	4.7	0.5	4.2	3,236
Total Emissions	**3.6**	**25.8**	**28.7**	**41.4**	**1.4**	**40**	**9.5**	**1.2**	**8.4**	**7,711**
Total Tons (Per Year)										
Emissions(RD1)	0.1	0.9	1.0	1.0	0.1	1.0	0.2	0.2	0	285
Emissions (Shinn)	0.1	0.8	0.9	1.0	0.0	1.0	0.2	0	0.2	203
Total Emissions	**0.2**	**1.8**	**1.9**	**2.0**	**0.2**	**2.0**	**0.4**	**0.2**	**0.2**	**488**

Table 17. CONSTRUCTION SCENARIO 1: Year 4 (2021) RD1/Drop Structure Fishway and Shinn Screens Modeled Emissions compared with BAAQMD Thresholds of Significance

Pounds Per Day										
Emissions category	ROG	CO	NOx	Total PM10	Exhaust PM10	Fugitive Dust PM10	Total PM2.5	Exhaust PM2.5	Fugitive Dust PM2.5	CO2
Threshold of Significance	80	NA	80	80	NA	NA	NA	NA	NA	NA
Emissions (RD1)	1.8	14.2	13.7	20.7	0.7	20	4.7	0.6	4.2	4,474
Emissions (Shinn)	1.4	11.2	10.7	20.5	0.5	20	4.6	0.5	4.2	3,235
Total Emissions	**3.2**	**25.4**	**24.4**	**41.2**	**1.2**	**40**	**9.3**	**1.1**	**8.4**	**7,709**
Total Tons (Per Year)										
Emissions(RD1)	0.1	0.9	0.9	1.0	0.0	1.0	0.2	0	0.2	285
Emissions (Shinn)	0.1	0.7	0.7	1.0	0.0	1.0	0.2	0	0.2	209
Total Emissions	**0.2**	**1.6**	**1.6**	**2.0**	**0.0**	**2.0**	**0.4**	**0**	**0.4**	**494**

Table 18. CONSTRUCTION SCENARIO 2: Year 1 (2018) RD3 Fishway Modeled Emissions compared with BAAQMD Thresholds of Significance

Pounds Per Day										
Emissions Category	ROG	CO	NOx	Total PM10	Exhaust PM10	Fugitive Dust PM10	Total PM2.5	Exhaust PM2.5	Fugitive Dust PM2.5	CO2
Threshold of Significance	80	NA	80	80	NA	NA	NA	NA	NA	NA
Total Emissions	**4.4**	**27.5**	**40.6**	**22.3**	**1.9**	**20**	**6.3**	**1.7**	**4.2**	**7,766**
Total Tons (Per Year)										
Total Emissions	**0.3**	**1.8**	**2.7**	**1.1**	**0.1**	**1.0**	**0.3**	**0.1**	**0.2**	**506**

Table 19. CONSTRUCTION SCENARIO 2: Year 2 (2019) RD1/Drop Structure Fishway and Shinn Screens Modeled Emissions compared with BAAQMD Thresholds of Significance

Pounds Per Day										
Emissions category	ROG	CO	NOx	Total PM10	Exhaust PM10	Fugitive Dust PM10	Total PM2.5	Exhaust PM2.5	Fugitive Dust PM2.5	CO2
Threshold of Significance	80	NA	80	80	NA	NA	NA	NA	NA	NA
Emissions (RD1)	3.2	22.3	27.4	21.3	1.3	20	5.3	1.2	4.2	5,945
Emissions (Shinn)	1.7	11.6	14.1	20.7	0.7	20	4.8	0.6	4.2	3,224
Total Emissions	**4.9**	**33.9**	**41.5**	**42.0**	**2.0**	**40**	**10.1**	**1.8**	**8.4**	**9,169**
Total Tons (Per Year)										
Total Emissions RD1	0.2	1.4	1.7	1.1	0.1	1.0	0.3	0.1	0.2	384
Total Emissions Shinn	0.1	0.8	0.9	1.0	0.0	1.0	0.2	0.0	0.2	203
Total Emissions	**0.3**	**2.2**	**1.6**	**2.1**	**0.1**	**2.0**	**0.5**	**0.0**	**0.4**	**587**

Table 20. CONSTRUCTION SCENARIO 2: Year 3 (2020) RD1/Drop Structure Fishway and Shinn Screens Modeled Emissions compared with BAAQMD Thresholds of Significance

Pounds Per Day										
Emissions category	ROG	CO	NOx	Total PM10	Exhaust PM10	Fugitive Dust PM10	Total PM2.5	Exhaust PM2.5	Fugitive Dust PM2.5	CO2
Threshold of Significance	80	NA	80	80	NA	NA	NA	NA	NA	NA
Emissions (RD1)	2.0	14.4	16.2	20.8	0.8	20	4.8	0.7	4.2	4,474
Emissions (Shinn)	1.6	11.4	12.5	20.6	0.6	20	4.7	0.5	4.2	3,236
Total Emissions	**3.6**	**25.8**	**28.7**	**41.4**	**1.4**	**40**	**9.5**	**1.2**	**8.4**	**7,710**
Total Tons (Per Year)										
Emissions(RD1)	0.1	1.0	1.2	1.0	0.1	0	0	0	0	284
Emissions (Shinn)	0.1	0.8	0.9	1.0	0	1.0	0.2	0	0.2	210
Total Emissions	**0.2**	**1.8**	**2.1**	**2.0**	**0.1**	**1.0**	**0.2**	**0**	**0.2**	**494**

Table 21. CONSTRUCTION SCENARIO 2: Year 4 (2021) RD1/Drop Structure Fishway and Shinn Screens Modeled Emissions compared with BAAQMD Thresholds of Significance

Pounds Per Day										
Emissions category	ROG	CO	NOx	Total PM10	Exhaust PM10	Fugitive Dust PM10	Total PM2.5	Exhaust PM2.5	Fugitive Dust PM2.5	CO2
Threshold of Significance	80	NA	80	80	NA	NA	NA	NA	NA	NA
Total Emissions	**2.0**	**14.4**	**16.2**	**20.8**	**0.8**	**20**	**4.8**	**0.7**	**4.2**	**4,475**
Total Tons (Per Year)										
Total Emissions	**0.1**	**0.9**	**1.0**	**0.1**	**0.1**	**0**	**0**	**0**	**0**	**284**

5.5.4 Significance of Emissions

The BAAQMD (2012) addresses potential for significance by comparing un-mitigated emissions from the Road Construction Emissions Model to an appropriate threshold of significance. "If daily average emissions of construction-related criteria air pollutants or precursors do not exceed the lead agency's determined thresholds for the project, the project has a less-than-significant impact to air quality. If daily average emissions of construction-related criteria air pollutants or precursors do exceed project thresholds, the Project has a significant impact to air quality and requires mitigation measures for emission reductions. "BAAQMD (2012)

Table 22 lists the highest emissions from each of the construction scenarios and the thresholds of significance from the following California Air Quality Management Districts.

- BAAQMD 1999 Thresholds of Significance for project operations
- South Coast AQMD Construction Emissions Thresholds of Significance for construction
- San Joaquin Valley Air Pollution Control District Construction Emissions Thresholds of Significance for construction
- Sacramento Air Quality Management District for construction

Although the BAAQMD 1999 Thresholds of Significance are not designed to address project construction, they are included as they provide a reasonable baseline for evaluation of emissions by providing a measure of significance that reflects BAAQMD general policy.

Table 22. Thresholds of Significance compared to highest emissions identified in modeling (Construction Scenario 1 and 2).

Thresholds of Significance compared with model results (Pounds per day)					
Emission Category	**Highest Emission from Table 14-21**	**BAAQMD**	**South Coast AQMD**	**Sacramento AQMD**	**San Joaquin Valley APCD**
ROG	4.9	80	NA	NA	NA
CO	33.9	NA	NA	NA	NA
NOx	41.5	80	100	85	NA
PM10	41.6	80	150	80	NA
PM2.5	10.1	NA	55	82	NA
VOC	NA	NA	75	NA	NA
SOx	NA	NA	550	NA	NA
(Tons per day)					
ROG	0.3	NA	NA	NA	10
CO	2.2	NA	NA	NA	100

NOx	2.7	NA	NA	NA	10
PM10	2.1	NA	NA	14.6	15
PM2.5	0.3	NA	NA	15	15
CO2	587	NA	NA	NA	1212
SOx	NA	NA	NA	NA	27

Given these criteria, the comparison above suggests that neither of the construction scenarios would exceed any of the thresholds of significance for BAAQMD, South Coast AQMD, Sacramento AQMD, or San Joaquin Valley APCD.

Significance: Greenhouse Gases

CEQA also requires an independent analysis of greenhouse gasses (NO_x, CO, and CO_2). For this analysis, we used the Road Model calculations of these greenhouse gasses, using the highest emissions identified in either Construction Scenario. These are reasonably accurate because they are based on EPA emissions factors (e.g., pounds of emissions per horsepower hour) and include typical construction load factors.

From Tables 14-21 the gross emissions of these three pollutants in U.S. tons would be:

Year	CO	NOx	CO2	Total
1	**1.8**	**2.7**	**506**	**510.5**
2	**1.4**	**1.7**	**384**	**387.1**
3	**1.8**	**2.3**	**488**	**492.1**
4	**1.6**	**1.8**	**494**	**497.4**
				1887.1

To put these emissions into context, greenhouse gases can be compared to the typical annual greenhouse gases emitted by an average U.S. household (25,578 pounds, USEPA, Household carbon footprint calculator, 2015):

25,578/2000 = 12.8 tons
1887 US tons/12.8 tons = 147.4 households

Given 4 years of construction, greenhouse gas emissions would be equivalent to about 37 average households:

147.4 households/4 years = 37 households per year

The BAAQMD CEQA Guidelines do not specify a threshold of significance for construction-related greenhouse gasses, but the magnitude of greenhouse gas emissions can be described in terms of all of the households in Alameda County (alamedacounty.org, 2015):

37 households/545,138 houses in Alameda County = 0.0000678 or approximately 0.007%

While any increase in emissions is adverse, the Joint Fish Passage Project emissions of greenhouse gasses would probably not be detectable or be statistically significant. Routine operation of facilities will result in minimal emissions. The fishways and fish screens are essentially passive facilities and energy to drive moving parts such as motors to raise and lower screens or operate screen brushes will be electric. Long-term emissions are not anticipated to be significant.

5.5.5 Proposed Mitigation

The BAAQMD's approach to the significance of emissions from construction recognizes that construction emissions and long-term emissions from project operations should be addressed differently.

> "The District's approach to CEQA analyses of construction impacts is to emphasize implementation of effective and comprehensive control measures rather than detailed quantification of emissions. The District has identified a set of feasible PM10 control measures for construction activities. These control measures are listed in Table 2. As noted in the table, some measures ("Basic Measures") should be implemented at all construction sites, regardless of size. Additional measures ("Enhanced Measures") should be implemented at larger construction sites (greater than 4 acres) where PM10 emissions generally will be higher. Table 2 also lists other PM10 controls ("Optional Measures") that may be implemented if further emission reductions are deemed necessary by the Lead Agency."

In addition, per BAAQMD guidelines from 2012:

> "BAAQMD recommends the implementation of all *Basic Construction Mitigation Measures* (Table 8.1) as mitigation for dust and exhaust construction impacts. In addition, all projects must implement any applicable air toxic control measures (ATCM). For example, projects that have the potential to disturb asbestos (from soil or building material) must comply with all the requirements of ARB's ATCM for Construction, Grading, Quarrying, and Surface Mining Operations. Only reduction measures included in the Project's description or recommended as mitigation in a CEQA-compliant environmental document can be included when quantifying mitigated emission levels."

Additional Mitigation

Although estimated air quality impacts will be below BAAQMD significance criteria, ACWD will implement all BAAQMD Table 8-1 mitigation measures (**AQ1-AQ8** in Table 9, above). To further reduce emissions from construction equipment, ACWD would also implement BAAQMD Table 8-2 measures 9 and 10 which require idling to be limited to 2 minutes to the maximum extent practical (**AQ9** in Table 9, above) and the use of highway diesel fuel in all construction equipment (**AQ10** in Table 9, above), which burns cleaner and reduces emissions of NOx and SOx.

In addition, as a general mitigation for its operations, in the fall of 2009, the District began using a Milwaukee County Transit System (MCTS) system to reduce fleet operating costs and emissions. Through *Networkfleet,* a provider of wireless fleet management, the District would not only be able to accurately track the location of each of the vehicles in its fleet, but perform remote engine diagnostic monitoring as well. This gives the District the ability to measure vehicle usage as well as identify and repair engine problems early and avoid expensive repair costs. In addition, the system has the ability to monitor and regulate engine idle time to reduce fuel usage as well as reduce vehicle speed and miles traveled. Both of these capabilities would have a significant impact on reducing harmful greenhouse gas emissions. By the beginning of 2010, all District vehicles were included in the program, a program that would assist in offsetting budget shortfalls and deal with the challenges of climate change.

In summary, as shown in Tables 14-21, un-mitigated construction emissions are well below the 1999 Project Operations thresholds of significance. The District compliance with all the Basic Construction Measures will result in a 5% reduction in fuel-related emissions. The 5% reduction related to fuels enhancement would thus reduce the highest level of NOx emissions to approximately 35-39 pounds per day.

The District's implementation of all eight basic construction measures and several additional construction measures for reduction of emissions will ensure emissions from construction will be substantially below thresholds of significance.

5.5.6 Significance Following Mitigation

Based on this analysis, the Project would not conflict with the BAAQMD air quality plan, violate any air quality standard or contribute substantially to an existing or projected air quality violation, result in a cumulatively considerable net increase of any criteria pollutant, or expose sensitive receptors to substantial pollutant concentrations. In addition, construction does not involve substantial use of asphalt for paving or the storage and use of large amounts of fuels or lubricants; emissions that could create objectionable odors are thus not likely. With mitigation, effects will be less than significant.

5.6 Biological Resources

Would the project:

a) Have a substantial adverse impact, either directly or through habitat modifications, on a species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by California Department of Fish and Game or U.S. Fish and Wildlife Service?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or US Fish and Wildlife Service?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒Less Than Significant Impact ❒ No Impact

c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

❐ Potentially Significant Impact ❐ Less Than Significant with Mitigation
❐ Less Than Significant Impact ☒ No Impact

5.6.1 Environmental Setting

General Habitat Conditions

Habitats on the levees and adjacent levee crest are dominated by ruderal grasses and forbs such as wild oat, ripgut grass, non-native ryegrass and barley, annual blue grass, Bermuda grass and similar species. Overstory is dominated by ornamental trees and shrubs including California live oak, eucalyptus, black locust, and California pepper tree. The levees themselves have minimal vegetation and are covered with rip-rap. The Flood Control Channel between Mission Boulevard and Rubber Dam 1 is thus generally flooded when the dam is up and intermittently reduced when the dam is down during high flows and when facilities need maintenance. There is minimal aquatic and emergent vegetation and no native riparian woodland along the channel.

The levee crest and adjacent area are 10-20 feet above the channel invert and the levee crest is either crushed rock or paved and used as a recreational trail. Vegetation along the levees is either landscaped (pepper trees are a dominant element of this landscaping) or consists of weedy grasses and shrubs (see Table 10).

Adjacent development on the north levee is either suburban development or urban park. No construction activities are proposed for the Quarry Lakes Park area that rims the ACWD recharge basins or areas of existing housing and other structures. Both areas are routinely disturbed by human activity, including on-going maintenance of structures and the landscape. The urban park along north-facing side of the north levee supports a narrow band of disturbed riparian habitat mixed with trails, fishing access sites, and areas of manicured lawn and landscape.

Wildlife Known to Occur in the Flood Control Channel

The following wildlife species have been identified as occurring in the Joint Fish Passage Project area, based on (a) multiple ACWD/ACFCD surveys from 1997 through 2009, (b) interpretation of signs such as tracks and scat, and (c) review of surveys from adjacent or nearby projects.

Fish

The active channel supports or has supported a variety of native and non-native fish and other aquatic species. The Alameda Creek Fisheries Restoration Workgroup (2000) reviewed historic reports from 1900 through 1985 and identified the following native and non-native species known to have occurred in the creek:

Native Fish

- Pacific lamprey
- California roach
- Hitch
- Sacramento blackfish
- Sacramento pikeminnow
- Speckled dace
- Sacramento sucker
- Steelhead/rainbow trout
- Three-spine stickleback
- Sacramento perch
- Prickly sculpin
- Riffle sculpin
- Tule perch

Introduced

- Goldfish
- Carp
- Golden shiner
- White catfish
- Black bullhead
- Brown bullhead
- Mosquitofish
- Inland silversides
- Green sunfish
- Bluegill
- Smallmouth bass
- Largemouth bass
- Black crappie
- Bigscale logperch

Recent (2008) surveys and collection of fish confirm the presence of native and non-native predatory fish (Ochikubo, C and PJ Alexander 2009, Alameda Creek Flood Control Channel Predator Fish Surveys, East Bay Parks District Oakland, CA). Survey of ponded areas (day and night) identified the following fish in the channel upstream of the Union Pacific RR Bridge in the vicinity of Rubber Dam 3:

- Sacramento sucker
- Sacramento pikeminnow
- Common carp
- Largemouth bass
- White catfish
- Hitch
- Prickly sculpin
- Bluegill
- Green sunfish
- Pacific lamprey (ammocoete)
- Goldfish
- Big-scale logperch

The 2008 survey identified a number of larger predatory fish (largemouth bass and Sacramento pikeminnow) 100 mm to 250 mm long. Otter trawls conducted as part of this survey in the lower (tidal) zone identified shrimp, topsmelt, staghorn sculpin, northern anchovy, and starry flounder, reflecting the more saline environment. The 2008 surveys included water temperature measurements, which in August ranged from approximately 23° to 24.5° C. The most frequently observed fish were non-natives. The 2008 surveys made no mention of either California red-legged frogs or bullfrogs, although both species occur in the Niles Canyon Reach of the stream.

Wildlife

There have been numerous surveys of the habitats adjacent to the channel and along the levees in the reach from Mission Boulevard in the north to the Union Pacific RR Bridge in the vicinity of Alvarado Boulevard. The 1997-1998 surveys and subsequent annual monitoring by ACFCD suggests that the following species are likely to be using the levees and channel habitats.

Ruderal/Disturbed Habitats on the levees, and adjacent levee-crest areas

Reptiles/Amphibians

- Western toad
- Pacific tree frog
- Western fence lizard
- Gopher snake
- Common garter snake
- Several species of racer

Birds

- California towhee
- Mourning dove
- House finch
- Lesser goldfinch

- Northern mockingbird
- Western scrub jay
- American crow
- Brewer's blackbird
- Song sparrow
- Saltmarsh common yellowthroat
- Red-winged blackbird

Mammals

- Deer mouse
- Broad-footed vole
- Botta's pocket gopher
- Western harvest mouse
- California vole
- House mouse
- Black rat
- Norway rat

Freshwater Channel below Rubber Dam 1

Reptiles and Amphibians

- Western toad
- Pacific tree-frog
- Bullfrog
- Western fence lizard
- Western skink
- Gopher snake
- Racer
- Common kingsnake
- Western pond turtle

Mammals

- House mouse
- Deer mouse
- Black rat
- Norway rat
- California ground squirrel
- Virginal opossum (foraging)
- Striped skunk (foraging)
- Yuma bat (foraging)
- Raccoon (foraging)

Avian

- Western pipistrelle (foraging)
- Saltmarsh common yellowthroat (breeding)

- Killdeer (breeding)
- Mallard (breeding)
- Marsh wren (breeding)
- Pied-billed grebe (breeding)
- Red-winged blackbird (breeding)
- Song sparrow (breeding)
- Spotted sandpiper (breeding)
- Rock dove (foraging)
- European starling (foraging)
- Barn swallow (foraging)
- Cliff swallow (foraging)
- Black phoebe (foraging)
- Northern rough-winged swallow (foraging)
- White-throated swift (foraging)
- American crow (transient along levees)
- Bushtit (transient along levees)
- Mourning dove (transient along levees)
- Northern mockingbird (transient along levees)
- Western scrub jay (transient along levees)
- Allen's hummingbird (transient along levees)
- Brewer's blackbird (transient along levees)
- House finch (transient along levees)
- American goldfinch (transient along levees)
- Caspian tern (foraging in channel)
- Double-crested cormorant (foraging in channel)
- Foster's tern (foraging in channel)
- Great blue heron (foraging in and along channel)
- Great egret (foraging in and along channel)
- Snowy egret (foraging in and along channel)

Fishes

- Central California Coast steelhead

Tidal/Freshwater Zone downstream of the Union Pacific RR Bridge in the vicinity of Alvarado Boulevard

Avian

- California clapper rail (endangered, expected to occur but not observed),
- Alameda song sparrow
- Saltmarsh common yellowthroat (breeding)
- Marsh wren (breeding)
- Red-winged blackbird (breeding)
- Song sparrow (breeding)
- Lesser goldfinch (breeding)

Mammals

- Salt marsh harvest mouse (endangered, expected to occur but not observed)

Fishes

- Central California Coast steelhead
- Green sturgeon

These survey results, from multiple years of survey by ACWD, ACFCD, and others suggest that the Flood Control Channel from Mission Boulevard to the ACFCD Drop Structure support native and non-native wildlife adapted to urban disturbance and a highly variable artificial hydrologic regime.

Wildlife in the Channel/Riverine Habitats in Niles Canyon

ACWD receives State Water Project water from the South Bay Aqueduct. Flow through Niles Canyon is a part of the route this imported water takes to reach Alameda Creek and ACWD's groundwater recharge facilities. The recent SFPUC Alameda Creek Watershed HCP (2010) identifies the following aquatic and amphibian species known to occur in Alameda Creek in the Niles Canyon reach:

Fish

- River lamprey
- Rainbow trout
- Pacific lamprey
- California roach
- Sacramento sucker
- Sacramento pikeminnow
- Hitch
- Prickly sculpin
- Carp
- Inland silversides

Amphibians and reptiles

- California red-legged frog

5.6.2 Potential for Special-Status Species Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

USFWS species lists for the Niles, Newark, and Mendenhall Springs USGS 7½ minute quadrangles were evaluated and the California Natural Diversity Data Base (CNDDB) was consulted to identify species which may utilize the Joint Fish Passage

Project reach. Additionally, recent EIRs from projects in the vicinity of the Joint Fish Passage Project were reviewed for concurrent information. Biological surveys have also been conducted by ACFCD per their 1999 EIR commitment to pre-activity surveys and were conducted for ACWD by Michael Marangio in April 2009 (Marangio, 2009). Results were:

- No nesting burrowing owls or nesting raptors were observed;
- No nesting passerines or raptors were observed within 200 feet of the Project area;
- Animal species that were observed during the field survey include: Canada Goose (*Branta canadensis*), American Coot (*Fulica americana*), Common Merganser (*Mergus merganser*), Bufflehead (*Bucephala albeola*), Mallard (*Anas platyrhynchos*), Belted Kingfisher (*Ceryle alcyon*), Western Gull (*Larus occidentalis*), Great Blue Heron (*Ardea herodias*), Green Heron (*Butorides virescens*), Snowy Egret (*Egretta thula*), Killdeer (*Charadrius vociferus*), Least Sandpiper (*Calidris minutilla*), Red-wing Blackbird (*Agelaius phoeniceus*), Song Sparrow (*Melospiza melodia*), Black Phoebe (*Sayornis nigricans*), American Crow (*Corvus brachyrhynchos*), Fox squirrel (*Sciurus niger*), and Feral Cat (*Felis catus*);
- No special status species were observed; and
- No bats were observed.

In short, with the exception of a few species in the channel itself, any use of the habitat in or adjacent to the channel is probably transient. There is no evidence of occupation or breeding by any of the special status species in the Project area. Thus, for example, the ponded areas in the channel behind the inflatable dams would be unsuitable for the California red-legged frog because (a) inflation and deflation of the dams would affect viability of eggs, (b) there is no adjacent upland aestivation habitat, and (c) the channel is subject to high scouring flows. The CNDDB(A) records reflect these conditions in the Flood Control Channel and adjacent developed areas; records of special-status species are sparse and old.

ACWD/ACFCD prepared a Biological Assessment to evaluate the potential for the Joint Fish Passage program to affect special status species. This assessment evaluated the potential direct and indirect effects of the Joint Fish Passage Project on the species in the Niles, Newark, and Mendenhall Springs USGS 7.5-minute Quadrangles. The analysis included review of ACWD and ACFCD surveys from 1999 through 2009 and review of regional analyses by other entities, including a county-wide analysis of species at regional parks throughout Alameda County. In addition, state species of concern were also evaluated. The analysis included four elements (Table 23):

- **Habitat**: Is there suitable habitat for each species within the areas in which the ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project may have direct effects?
- **Known Occurrence**: Is there evidence that the species actually occurs within the areas in which the ACWD-ACFCD Joint Fish Passage Project may have direct effects?
- **Critical Habitat**: Is the habitat designated as Critical Habitat for the species or is it a component of the species Recovery Plan (if one exists)? NMFS has not designated critical habitat for steelhead in Alameda Creek, however, the creek is an element of the NMFS multi-species salmonid recovery plan;
- **Direct and/or Indirect Effects**: Is there a probability of direct effects to the species and, if so, what is the potential magnitude of effect?

The conclusions of this evaluation of state special status species are summarized on Tables 23 and 24.

No Action Alternative

No construction activity or changes would occur. No impacts to protected or sensitive species or their habitat would occur under the no action alternative.

Table 23. Potential for the Project to affect listed species in the Niles, Newark, and Mendenhall Springs USGS 7-minute Quadrangle Maps. (UPSTREAM = the watershed upstream of Mission Boulevard; CONST = the reach from Mission Boulevard to 2,400 feet downstream of the Drop Structure; ACFCD = 2,400 ft downstream of the Drop Structure to Ardenwood Blvd.; ESTUARY = Alameda Creek from Alvarado Boulevard to San Francisco Bay).

Species[1]	**Status**[2]	**Potential for ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project Effects and Rationale**					
		Suitable habitat?	Occurrence in Project Areas?	Critical Habitat or Included in a Recover Plan?	Direct or Indirect Effects?	Avoidance & Minimization Required?	Conclusion
Invertebrates							
Vernal pool fairy shrimp (*Branchinecta lynchi*)	T: USFWS	NO	NO	NO	NO	NO	No Effect
Vernal pool tadpole shrimp (*Lepiduris packardi*)	E: USFWS	NO	NO	NO	NO	NO	No Effect
Conservancy fairy shrimp (*Branchinecta conservio*)	E: USFWS	NO	NO	NO	NO	NO	No Effect
Fish							
Green Sturgeon (*Acipenser medirostris*)	T: NMFS	YES ESTUARY Potential ACFCD	YES ESTUARY Potential ACFCD	YES ESTUARY Potential ACFCD	Potential ESTUARY ACFCD	YES	May Affect – not likely to adversely affect
Delta smelt (*Hypomesus transpacificus*)	T: USFWS E: CA	NO	NO	NO	NO	NO	No Effect
Central California Coastal steelhead & Central Valley steelhead (*Onchorynchus mykiss*)	T: NMFS	YES CONST NILES Potential ACFCD	YES CONST NILES UPSTREAM Potential ACFCD	YES CONST NILES Potential ACFCD	YES NILES UPSTREAM Potential ACFCD	YES	May Affect – not likely to adversely affect
Central Valley spring-run Chinook salmon (*Onchorynchus tshawytscha*)	T:NMFS T: CA:	NO	NO	NO	NO	NO	No Effect

Species[1]	Status[2]	Potential for ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project Effects and Rationale					
		Suitable habitat?	Occurrence in Project Areas?	Critical Habitat or Included in a Recover Plan?	Direct or Indirect Effects?	Avoidance & Minimization Required?	Conclusion
Central valley winter-run Chinook salmon. (*Onchorynchus tshawytscha*)	E: NMFS E: CA	NO	NO	NO	NO	NO	No Effect
Amphibians							
California tiger salamander (*Ambystoma californiense*)	T: USFWS T: CA	NO	NO	NO	NO	NO	No Effect
California red-legged frog (*Rana draytonii*)	T: USFWS	Potential UPSTREAM	YES UPSTREAM	NO	Potential UPSTREAM	YES	May affect – not likely to adversely affect
Reptiles							
Alameda whipsnake (*Masticophis lateralis euryxanthus*)	T: USFWS T: CA	NO	NO	NO	NO	NO	No effect
Birds							
Western snowy plover (*Charadrius alexandrines nivosus*)	T: USFWS	YES ESTUARY Potential ACFCD	YES ESTUARY Potential ACFCD	YES ESTUARY Potential ACFCD	YES ESTUARY Potential ACFCD	YES	May affect – no significant effects
California clapper rail (*Rallus longirostris obsoletus*)	E: USFWS E: CA	Potential ESTUARY ACFCD	YES ESTUARY ACFCD	Potential ESTUARY ACFCD	Potential ESTUARY ACFCD	YES	May affect – no significant effects
California least tern (*Sternula antillarum browni*)	E: USFWS E: CA	Potential ESTUARY ACFCD	YES ESTUARY Potential ACFCD	Potential ESTUARY ACFCD	Potential ESTUARY ACFCD	YES	May affect – no significant effects
Mammals							
Salt marsh harvest mouse (*Reithrodontomys raviventris*)	E: USFWS E: CA	Potential ESTUARY	YES ESTUARY	No	Potential ESTUARY	YES	May affect – no significant effects

Species[1]	**Status[2]**	**Potential for ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project Effects and Rationale**					
		Suitable habitat?	Occurrence in Project Areas?	Critical Habitat or Included in a Recover Plan?	Direct or Indirect Effects?	Avoidance & Minimization Required?	Conclusion
San Joaquin Kit Fox (*Vulpes macrotis mutica*)	E: USFWS E: CA	NO	NO	NO	NO	NO	No effect
Plants							
Contra Costa goldfields (*Lasthenia conjugens*)	E: USFWS	NO	NO	NO	NO	NO	No effect

Table 24. Summary of potential sensitive species of concern (not ESA listed) that may occur in the Joint Fish Passage Project reach and downstream areas of potential water quality direct effects. Avoidance and minimization measures refer to Table 9 as discussed below.

Species	**Status[1 2]**	**Potential for Joint Fish Passage Project Effects and Rationale**				
		Suitable habitat?	Known Occurrence in Project Area?	Direct or Indirect Effects?	Avoidance & minimization required?	Conclusion
			Reptiles			
Western pond turtle (*Emmys marmorata marmorata*)	FSC/CSC	YES CONST UPSTREAM	NO	Potential CONST	YES[4]	No significant effect
California horned lizard (*Phrynosoma coronatum frontale*)	FSC/CSC	Potential CONST	NO	Potential CONST	YES[4]	No significant effect
			Fish			
Pacific lamprey (*Lampetra tridentada*)	FSC/SCS	YES CONST UPSTREAM	YES NILES UPSTREAM	Potential CONST UPSTREAM	YES[4]	No significant effect
			Birds			
Loggerhead shrike (*Lanius ludovicianus*)	FSC/CSC	YES CONST	Potential CONST	Potential CONST	NO[5]	No significant effect
Western burrowing owl (*Athene cunicularia hypugea*)	FSC/CSC	Potential CONST	NO	Potential CONST	YES[4]	No significant effect

Notes:

1. FSC: Federal Species of Concern
2. CSC: California Species of Concern
3. Avoidance and Minimization: Construction management to avoid construction effects related to downstream water quality.
4. Avoidance and minimization: Pre-construction monitoring and rescue and relocation if found in potential construction zone
5. Species is not sensitive to construction activity and noise and would disperse to adjacent park habitats.

5.6.3 Mechanisms for Effect

In evaluating the potential for the ACWD-ACFCD Joint Fish Passage Project actions to affect each species, the initial consideration is whether there is suitable and/or occupied habitat for the species within the specific boundaries of the ACWD-ACFCD proposed actions. For example, if the species is associated only with certain soil types (such as serpentine soils), and such soils do not exist within the ACWD-ACFCD proposed area of effect, then there is no potential for direct effects. Indirect effects may still be considered if there is a mechanism for them. In addition, if the proposed Action affects an area of Designated Critical Habitat or is targeted for the recovery of the species, then there may be a potential for direct or indirect effects, whether the habitat is occupied or not. Accordingly, for each species an initial evaluation was made, focusing on:

- Is there suitable habitat for each species within the areas in which the ACWD-ACFCD Joint Fish Passage Project may have effects?

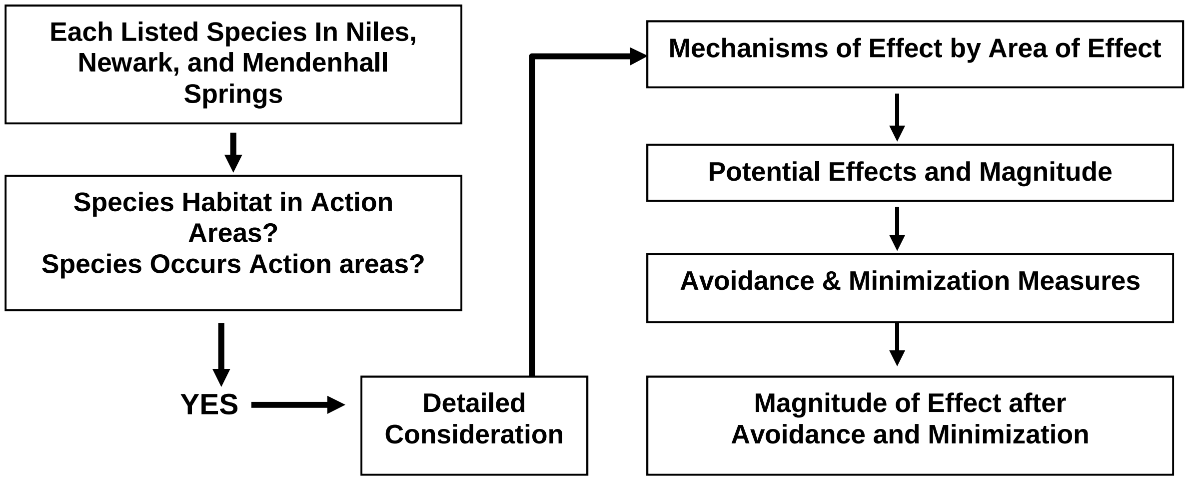
- Is there evidence that the species actually occurs within the areas affected by the Project?

If there is potential suitable habitat for a species and there is evidence that the species actually occurs in the areas affected by the Project, then, the potential for adverse impacts was addressed in detail, focusing on:

- Is the habitat designated as Critical Habitat for the species or is it a component of the species Recovery Plan (if one exists)?

- Is there a probability of direct or indirect effects to the species and, if so, what is the potential magnitude of effect?

In the detailed consideration of potential for the Project to adversely affect each species, the focus is on the various mechanisms of effect in each potential area of effect. Thus, for example, species that occur only downstream of the construction reach, the analysis of potential for effect is focused on the potential for effects associated with impaired water quality from turbidity and materials spills from construction. The following flow chart describes the initial screening process used in evaluating the potential for the Project to affect wildlife within the action area.



Mechanisms for effect on Biological Resources Evaluated and Eliminated from Detailed Consideration

The effects of the ACWD-ACFCD Joint Fish Passage Project actions are a function of specific changes to the physical environment. The ACWD-ACFCD Joint Fish Passage Project facilities would not have the following physical mechanisms for effects*:*

- The Joint Fish Passage Project will not permanently and substantially alter the capacity and basic hydrology of the flood control channel, its rip-rapped and concrete-lined levees, or adjacent landscaped areas along the levee crest maintenance road/recreational trail. Construction of new facilities will have permanent but minimal effects on existing levees and other (small) concrete structures. The total area of new structures will be less than 0.1% of the total area within the boundaries of the levees, and the new fishways will be placed on existing levee areas with virtually no change in levee footprint;

- The Joint Fish Passage Project will not substantially modify physical habitat of the floodplain. In the Construction Zone, the floodplain will be maintained in current conditions except for minor modifications at fishways. Proposed bypass flows (up to 25 cfs greater than current flow over rubber dams) are of relatively low magnitude when compared to the capacity of the dual-level low flow channel maintained by ACFCD. The minimum wet-season bypass flows represent about 3.5% of the 700 cfs flow that would routinely trigger lowering operable dams and ceasing diversions. This effect will benefit steelhead and other anadromous fish and potentially cause a small increase in sediment transport through the reach from Rubber Dam 1 to Decoto Road;

- The Project will not alter flow regimes below RD1 in a manner that would adversely affect downstream species. Bypass flows will have a relatively small effect on the general hydrology of the Flood Control Channel in this reach. Comparisons of flow within the Flood Control Channel are presented below in Figures 19 and 20 for a sample normal/wet year and dry year. These flow predictions were derived from hydrologic modeling work completed in conjunction with the SFPUC and documented in Dhakal *et al.* (2012). Values presented below demonstrate a flow regime under an unimpaired flow condition (a current flow condition and a projected future flow condition). Unimpaired calculations assume the watershed flows are not impounded behind dams, and that no urban development has taken place. Current and future flow projections take into account reservoir operations of other entities within the watershed, as well as ACWD's recharge operations in the Niles Cone area.

Figures 21 and 22 show the magnitude of bypass flow effects on flow downstream of RD1. Figure 21 is based on data taken prior to Department of Safety of Dams (DSOD) operating restrictions on Calaveras Reservoir. Figure 22 data was obtained post-DSOD restrictions. In a wet year (such as 2000), the projected effect of bypass flows is a small percentage of total flow, except in May, when bypass flows cause an increase in flow of 10 cfs to 15 cfs. This increase is about 2% of low-flow channel capacity. In dry years, the effects of Bypass Flows are greater. With the exception of infrequent high flow periods, the Bypass Flows maintain flow downstream at from 5 to 15 cfs more than would occur without the Bypass Flow requirements. This, again, represents less than 2% of the capacity of the low-flow channel. While providing substantial benefit to migrating steelhead, bypass flows are not of a magnitude that would cause substantial adverse changes in the habitat conditions downstream of RD1. Close inspection of Figure 22 indicates periods of time in April and May 2007 where observed flood control channel flows are observed as being greater than future predicted flood control channel flows. This anomaly is due to comparing historic observed operations vs. a modeled future scenario, where it is assumed future ACWD operations during dry outmigration conditions follow the flow bypass rates outlined in the current flow proposal.

- The Project will not permanently and substantially alter flow regimes outside of the low-flow channel. The new flow bypass rules may increase flow by 5 to 25 cfs, which is approximately 0.2% of the flow anticipated to occur on a 1-year interval. Combined with Net SFPUC Releases at Niles Gage, flow in the fishway at RD1 may increase by 5 to 50 cfs. The bypass flows will be contained within the low flow channel. No changes to overland flow are anticipated;

- The Project will not create elevated suspended sediment concentrations in the ACFCD Reach or the Estuary Reach. Unless there is an early and substantial runoff event, suspended sediments mobilized by construction will fall out of suspension within 200 to 400 yards downstream. This would cause no effects on downstream habitats or estuarine species inhabiting either the ACFCD or estuarine reaches of lower Alameda Creek. A high flow event would mobilize substantial sediment throughout the reach downstream of Rubber Dam 1 and construction-related suspended sediment would not constitute a substantial percentage of this total high-flow suspended sediment; and

- The Project will not alter physical habitat conditions in the Upstream Reach.

No construction will occur and ACWD water operations associated with deliveries of water to the creek and its tributaries by Department of Water Resources will not be modified by the Project. ACWD will continue to utilize SBA facilities in the watershed upstream of Mission Boulevard in a manner consistent with its historic operations. Finally, because Fish Bypass Flows involve changes only to natural flow conditions, there is no mechanism for Fish Bypass Flows to affect conditions upstream of Rubber Dam 3.

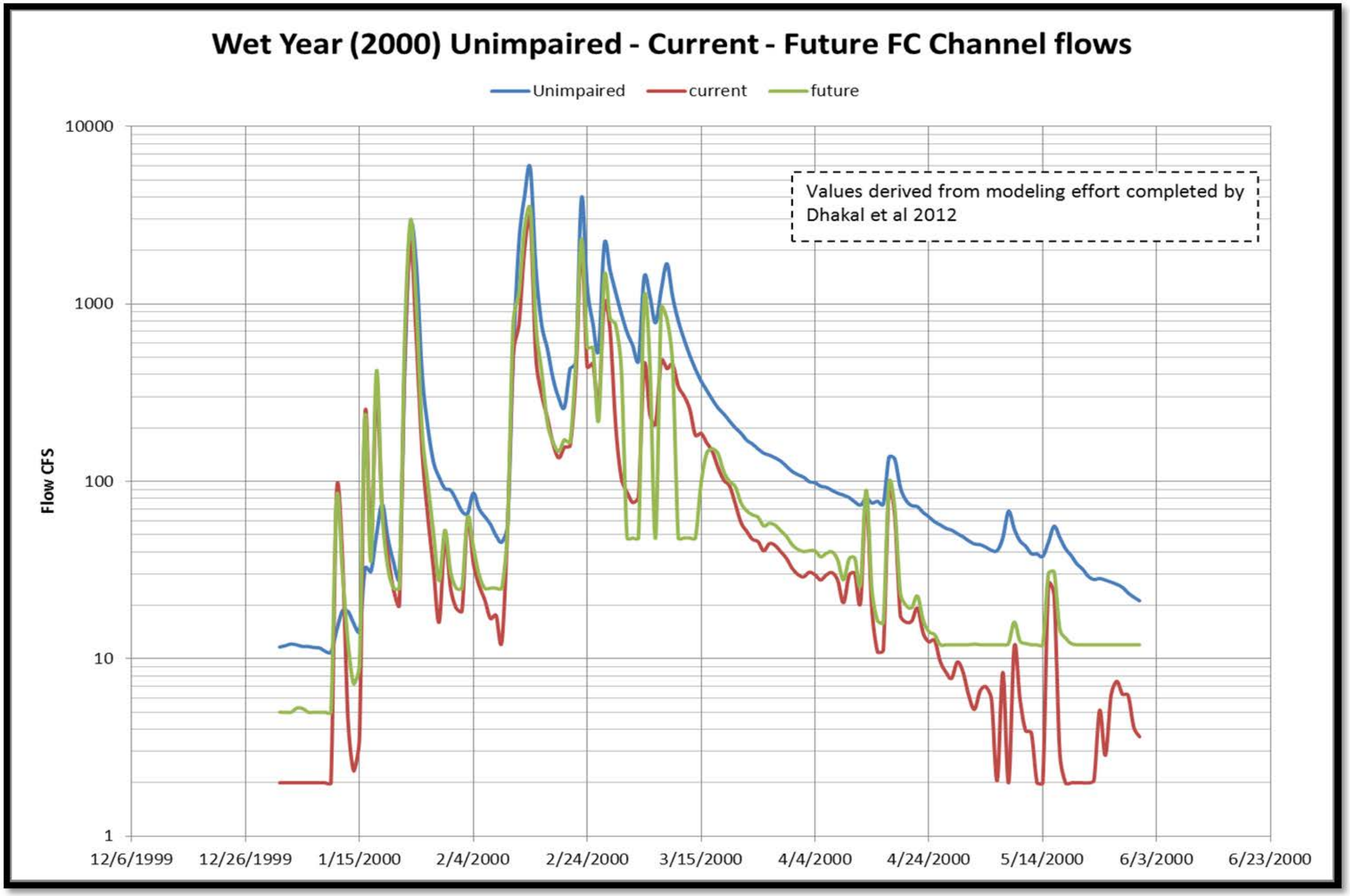


Figure 21. Wet year (2000, Pre-DSOD) current and projected Flood Control Channel flows.

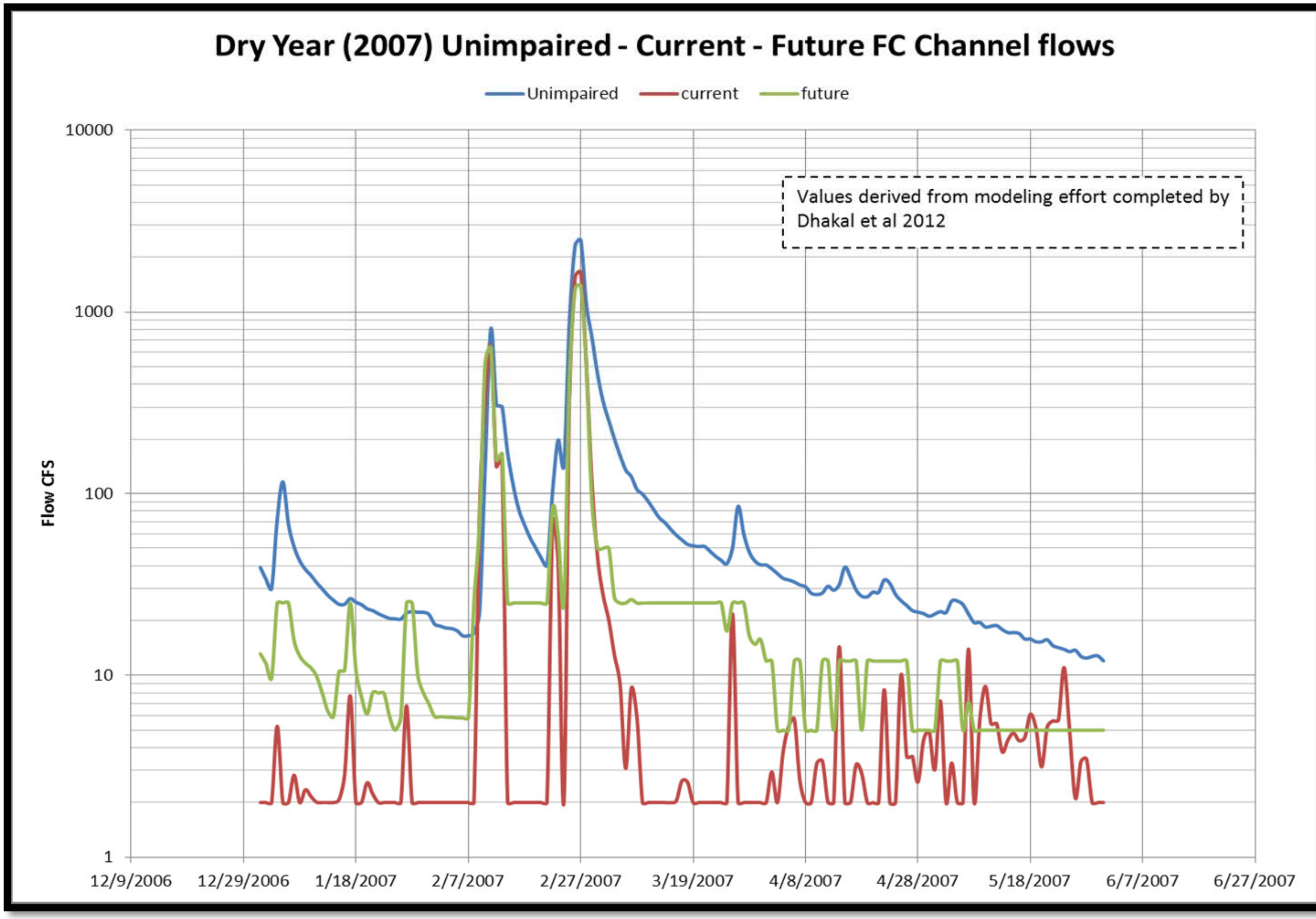


Figure 22. **Dry year (2007, Post-DSOD) current and projected Flood Control Channel flows.**

5.6.4 Physical Mechanisms of Effect Considered in Detail

There are a number of ways in which construction, operations, and maintenance of the Project could alter physical conditions and, potentially affect threatened and endangered species. The ACWD-ACFCD Joint Fish Passage Project would or could potentially have the following physical mechanisms for effects:

Prior to and During Construction

- Prior to and during construction of facilities, CCC steelhead will continue to be precluded from accessing historic habitats upstream of the RD1/ACFCD Drop Structure in the vicinity of the BART Bridge;
- In the Construction Reach, construction will potentially result in habitat loss, injury, or death of plants and animals;
- In the ACFCD Reach construction will temporarily increase levels of turbidity and, potentially cause spills of fuels, lubricants, and concrete which could affect water quality; and
- In the Estuary Reach, construction will temporarily increase levels of turbidity and, potentially cause spills of fuels, lubricants, and concrete which could affect water quality.

During On-going Operations and Maintenance (O&M)

- In Construction Reach, O&M will potentially result in habitat loss, injury, or death of plants and animals;
- In the ACFCD Reach, on-going operations and maintenance will temporarily increase levels of suspended sediment and turbidity and potentially cause spills of fuels, lubricants, and concrete which could affect water quality;
- In the Estuary Reach, O&M will temporarily increase levels of turbidity and will potentially cause spills of fuels, lubricants, and concrete which could affect water quality;
- In the Construction Reach, O&M may delay adult migration, such as by removal of debris in fishways and their approaches;
- In the Construction Reach, infrequent raising and lowering of dams during O&M may delay upstream migration, such as delays from 4-6 hour in restoring fishway function during and after dam inflation;

- In the Construction Reach, downstream juvenile and kelt migration may be affected by multiple flow cues (fishway and over-dam flows), particularly when inflow exceeds ACWD net diversion rates;

- In the Construction Reach, diversion ponds may create temperature and dissolved oxygen conditions that may adversely affect fish and amphibians;

- In the Upstream Reach, flow and temperature effects from on-going operational releases for water supply purposes at Del Valle Reservoir, the South Bay Aqueduct (SBA) at the Vallecitos Turnout, and other turnout sites; and

- In the Upstream Reach, releases from SBA facilities may at times be greater than natural inflow, potentially affecting juvenile steelhead imprinting and adult attraction/migration.

The threatened and endangered species that may be affected by these various physical mechanisms fall into three groups.

First, there are species that may occur within the Construction Reach itself, which is entirely within the USGS Niles 7.5-Minute Quadrangle. They would be affected by pre-construction conditions, construction, and post-construction maintenance. They would be affected by operations in the reach of the Flood Control Channel from Mission Boulevard to downstream of the RD1/ACFCD Drop Structure Fishway. For example, they would be affected by rubber dam raising and lowering. Species in the Construction Reach would be affected by the following mechanisms:

- Prior to and during construction of facilities, CCC steelhead will continue to be precluded from accessing historic habitats upstream of the RD1/ACFCD Drop Structure in the vicinity of the BART Bridge;

- In the Construction Reach, construction will potentially result in habitat loss, injury, or death of plants and animals;

- In the Construction Reach, O&M will potentially result in habitat loss, injury, or death of plants and animals;

- In the Construction Reach, O&M may delay adult migration, such as by removal of debris in fishways and their approaches;

- In the Construction Reach, diversion ponds may create temperature and dissolved oxygen conditions that may adversely affect fish and amphibians; and

- In the Construction Reach, downstream juvenile and kelt migration may be affected by multiple flow cues (fishway and over-dam flows), particularly when inflow exceeds ACWD net diversion rates.

Second, there are species that may occur downstream of the reach from Mission Boulevard to downstream of the BART Bridge, specifically the estuary downstream of Alvarado Boulevard, which is entirely within the Newark USGS 7.5-Minute Quadrangle. These species would be affected by the following mechanism:

- In the ACFCD Reach, construction and on-going maintenance will temporarily increase levels of suspended sediment and turbidity and potentially cause spills of fuels, lubricants, and concrete which could affect water quality; and

- In the Estuary Reach, construction and on-going maintenance will temporarily increase levels of suspended sediment and turbidity and potentially cause spills of fuels, lubricants, and concrete which could affect water quality.

Third, there are species upstream of Mission Boulevard, in the Niles and Mendenhall Springs USGS 7.5-Minute Quadrangles that may be affected by ACWD on-going water operations, which are limited to requesting and receiving water from the turnout from the SBA at Vallecitos Creek. Given that such operations involve in-channel flow only, only aquatic and amphibian species would be affected by:

- In the Upstream Reach, flow and temperature effects from on-going operational releases for water supply purposes from the SBA at the Vallecitos. ACWD has agreed to preferentially operate the Bayside Turnouts for direct deliveries of SBA water supplies during April, May, September, and October to reduce and avoid potentially adverse effects of SBA deliveries on habitat conditions in Niles Canyon. During wet and normal years ACWD will not use the SBA Vallecitos Turnout in April or May, but the turnout may be used in April and May of dry years or in response to a water supply emergency; and

- In the Upstream Reach, releases from SBA Vallecitos Turnout may at times be greater than natural inflow, potentially affecting juvenile steelhead imprinting and adult attraction/migration.

Potential effects of the Project on threatened and endangered species are thus addressed in terms of (a) construction, operation, and maintenance effects on species occurring in the Construction Reach, (b) water quality effects of construction and maintenance on species in the Estuary Reach, and (c) flow and temperature effects on species in the channels affected by on-going operations in the Upstream Reach. The species considered vary in these three reaches of Alameda Creek and its upstream tributaries, as described below.

5.6.5 Threatened and Endangered Species Considered

The Project Construction Reach is entirely in the Niles Quadrangle. Within the Niles quadrangle, USFWS and NMFS specify species that should be considered in evaluating potential for the Project to affect threatened and endangered species:

- Vernal pool fairy shrimp
- Conservancy fairy shrimp
- Vernal pool tadpole shrimp
- Bay checkerspot butterfly
- Delta smelt
- Central California Coast Steelhead
- Central Valley Steelhead
- Winter-run Chinook Salmon
- California Tiger Salamander
- California red-legged frog
- Alameda whipsnake
- California least tern
- Salt marsh harvest mouse
- San Joaquin kit fox
- Contra Costa goldfields

ACFCD Reach and Estuary Reach

USFWS and NMFS identify the following threatened and endangered species in the ACFCD and Estuary reaches downstream of the Construction Reach (Newark USGS 7.5-Minute Quadrangle):

- Vernal pool fairy shrimp
- Vernal pool tadpole shrimp
- Green sturgeon
- Delta smelt
- Central California Coast steelhead
- Central Valley steelhead
- Central Valley Spring-run Chinook salmon
- Winter-run Chinook Salmon
- California tiger salamander
- California red-legged frog
- Alameda whipsnake
- Western snowy plover
- California brown pelican
- California clapper rail
- California least tern
- Salt marsh harvest mouse

Upstream Reach

USFWS and NMFS identify the following threatened and endangered species in the Niles and Mendenhall Springs USGS 7.5-Minute Quadrangles where potential on-going water supply operations may occur:

- Vernal pool fairy shrimp
- Conservancy fairy shrimp
- Vernal pool tadpole shrimp
- Bay checkerspot butterfly
- Delta smelt
- Central California Coast Steelhead
- Central Valley Steelhead
- Winter-run Chinook Salmon
- California Tiger Salamander
- California red-legged frog
- Alameda whipsnake
- California least tern
- Salt marsh harvest mouse
- San Joaquin kit fox
- Contra Costa goldfields

5.6.6 California Central Coast Steelhead (Threatened, NMFS)

CCC Steelhead are known to occur in Alameda Creek/Alameda Creek Flood Control Channel, although anadromous steelhead do not presently have volitional access to the upper watershed. The fundamental purpose of the ACWD-ACFCD Joint Fish Passage Project is to restore a run of anadromous steelhead to Alameda Creek by removing existing barriers that prevent steelhead from spawning upstream of the ACFCD and ACWD facilities throughout the Flood Control Channel.

Species Habitat and Distribution

The National Marine Fisheries Service describes the habitat and distribution of steelhead as follows (http://www.nmfs.noaa.gov/pr/species/fish/steelheadtrout.htm):

> Steelhead can be divided into two basic reproductive types, stream-maturing or ocean-maturing, based on the state of sexual maturity at the time of river entry and duration of spawning migration.
>
> The stream-maturing type (summer-run steelhead in the Pacific Northwest and northern California) enters freshwater in a sexually immature condition between May and October and requires several months to mature and spawn.
>
> The ocean-maturing type (winter-run steelhead in the Pacific Northwest and northern California) enters freshwater between November and April, with well-developed gonads, and spawns shortly thereafter. Coastal streams are dominated by winter-run steelhead, whereas inland steelhead of the Columbia River basin are almost exclusively summer-run steelhead.
>
> Adult female steelhead will prepare a redd (or nest) in a stream area with suitable gravel type composition, water depth, and velocity. The adult female

> may deposit eggs in 4 to 5 "nesting pockets" within a single redd. The eggs hatch in 3 to 4 weeks.
>
> Steelhead are capable of surviving in a wide range of temperature conditions (less than approximately 25 C). They do best where dissolved oxygen concentration is at least 7 parts per million. In streams, deep low-velocity pools are important wintering habitats. Spawning habitat consists of gravel substrates free of excessive silt."

Alameda Creek is part of the designated Critical Habitat for the 10 western coastal steelhead distinct population segments that are listed as threatened.

Is there suitable habitat for steelhead within the areas in which the ACWD-ACFCD Joint Fish Passage Project may have effects?

YES: The Construction Reach has limited habitat value for steelhead. It functions as a movement corridor for adult steelhead inmigration and juvenile and kelt outmigration. During outmigration, there may be incidental foraging, but this is limited because the diversion ponds probably do not provide suitable insects and benthic macroinvertebrates. Habitat is otherwise not suitable for spawning or rearing.

In the ACFCD and Estuary Reaches, there is potentially suitable habitat for adult holding and juvenile rearing.

In the Upstream Reach, there is habitat for steelhead spawning and rearing, primarily in Niles Canyon and further upstream in the mainstem and larger tributaries. There is no habitat for steelhead in Vallecitos Creek, which has an intermittent flow.

Is the habitat designated as Critical Habitat for the species or is it a component of the species Recovery Plan?

YES: Alameda Creek is Critical Habitat and a feature of the NMFS Recovery Plan for Central California Coast steelhead.

Is there evidence that the species actually occurs within the areas in which the ACWD-ACFCD Joint Fish Passage Project may have effects?

YES: Adults have been observed downstream of the ACFCD Drop Structure (outside of the construction season). There is historic evidence of CCC steelhead inhabiting Alameda Creek prior to construction of ACWD's rubber dams, the ACFCD Drop Structure, and other impediments to fish passage.

In the Upstream Reach, anadromous steelhead have been precluded from accessing habitat, and there are segments of disturbed habitat that may no longer support steelhead. In the Niles Canyon area, however, Smith (2008) found rainbow trout in the fast-flowing reaches of Niles Canyon and hypothesizes that steelhead juveniles could rear in this habitat. There is thus a potential for juveniles to occupy habitats in Niles

Canyon in the reach above the USGS Gage (about 0.5 miles upstream of the ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project area). There is no absolute barrier to steelhead downstream movement and a late season storm could induce young-of-year movement into the upstream reaches of ACWD-ACFCD Joint Fish Passage Project area. The late-season storms of 2011 reflect the potential of this type of hydrologic-triggered movement. In general, rearing is more likely in areas upstream of Niles Canyon, but there is at least an hypothetical potential for young-of-year to occur in the Rubber Dam 3 construction zone only if the RD1/Drop Structure fishway has been completed and anadromous steelhead have access to the watershed. There are other existing habitats upstream that may be suitable for steelhead.

Is there a probability of direct or indirect effects to the species and, if so, what is the potential magnitude of effects?

YES 1: Prior to and during construction of facilities, CCC steelhead will continue to be precluded from accessing historic habitats upstream of the RD1/ACFDC Drop Structure in the vicinity of the BART Bridge.

Pending completion of the ACWD-ACFCD Joint Fish Passage Project, the ACFCD Drop Structure would continue to preclude adult migrations. The existing ACFCD Weir and ACWD Rubber Dams 1 and 3 could continue to preclude adult steelhead from accessing historic upstream habitats. The effect would be temporary, as ACWD-ACFCD Joint Fish Passage Project will alter these passage barriers and provide facilities for upstream and downstream passage. In addition, the Bypass Flows element of the ACWD-ACFCD Joint Fish Passage Project will provide for baseline flow and depth for adult and juvenile migrations. This potential effect is unlikely to occur. Local entities have searched for, trapped, and transported adult steelhead from below the ACFCD Drop Structure to sites upstream of Rubber Dam 3 (2006 and 2008), but there were no similar capture-transport efforts in 2009-2014. This suggests that either (a) adults are being precluded from accessing the area below the ACFCD Drop Structure due to passage impediments downstream or (b) no adults have initiated spawning runs. In either case, the potential for the Project to preclude upstream access is minimal, and can be addressed in the interim by the following Avoidance and Minimization Measure.

- If adults are observed below the ACFCD Drop Structure, then they may be captured and transported upstream and released (Measures **C1-11** and **O&M 4-6** on Table 9).

YES 2: In the reach from Mission Boulevard to approximately 2,600 feet downstream of RD1, construction will potentially result in habitat loss, injury, or death of plants and animals.

If CCC steelhead juveniles were to occur in the reach from Mission Boulevard to 2,600 feet downstream of the BART Bridge, there would be a potential for direct construction-related effects, including injury and death of individuals primarily from stranding, delay in outmigration, injury during passage over dams, high water temperatures, diversion to the recharge ponds, poor water quality, and predation in ponded reaches. The potential for such effects and the potential magnitude of such effects is limited. First, in 2006 and 2008, local entities captured and transported a male and female above the ACFCD Drop Structure and there is some potential that spawning occurred as a result. Juveniles may have reared and migrated downstream. However, juveniles from these potential spawning events have not been observed and there has not been a capture-transfer in six years. Juveniles from the 2006 and 2008 capture-transport are likely out of the system or have remained in the system as resident rainbow trout. Unless there is a new capture-transport made and it results in successful spawning, there is thus virtually no potential for juveniles to be in the Project area of potential effects. As an avoidance and minimization action the temporary construction area located downstream of RD1 will be isolated using coffer dams or other methods, and a fish rescue will be performed each year prior to dewatering the reach and initiating construction. Fish collected during the rescue will be handled in accordance with standard methods approved by NMFS and CDFW and released into the lower creek downstream of the construction area.

Second, the proposed 4-year construction schedule (Table 25) is intended to minimize such impacts. Scheduling as shown on Table 25 minimizes potential for construction to occur during steelhead inmigration, and construction and outmigration coincide only in 1 month of outmigration. Construction in May would thus have potential to affect outmigrants. If such a scenario occurs, then juveniles would be subject to stranding, delay in outmigration, injury during passage over dams, high water temperatures, diversion to the recharge ponds, poor water quality, and predation in ponded reaches. Until the Project is completed, there is thus a potential for “trap-and-truck" operations to occur and to result in successful spawning and for juveniles from this spawning to migrate through the construction reach and be affected by the existing construction. This would generally occur in March, April, and May one or two years following a successful spawning. In the unlikely event that steelhead are collected and relocated upstream of the Project area, coffer dams and other methods will be used to isolate the work area and avoid potential impacts to steelhead. A fish rescue will be performed each year prior to dewatering and initiating construction.

Third, in construction-years 3 and 4, the District will not allow volitional fish passage at the RD1/Drop Structure area until the fishway is completed and fully functional. To avoid potential impacts to juveniles, migrating steelhead adults will not be permitted to migrate upstream to potential spawning areas.

Table 25. Construction periods (4-year construction scenario) and steelhead presence in the flood control channel.

YEAR	Activity	Month											
		J	F	M	A	M	J	J	A	S	O	N	D
2018	Construct RD3												
	No steelhead in-migration												
2019	No steelhead in-migration												
	Construct RD1 Fishway												
2020	No steelhead in-migration												
	Construct RD1 and Shinn Ponds												
2021	No steelhead in-migration												
	Construct RD1 and Shinn Ponds												

The construction schedule and sequencing of construction priorities may vary from that presented above pending final engineering design and permit approvals.

In the unlikely event that an adult capture-transport event is documented prior to construction, ACWD/ACFCD would engage a qualified biologist to monitor for outmigrating CCC steelhead (a) at a site upstream of the construction area and (b) in areas being dewatered to isolate construction from the active channel. If juvenile steelhead or steelhead kelts are observed, ACWD/ACFCD would capture them and release them downstream of the construction area (Avoidance and Minimization Measures **C1-11** and **O&M 4-6** on Table 9).

YES 3: In Construction Reach, Operations and Maintenance will potentially result in habitat loss, injury, or death of plants and animals.

On-going maintenance would involve construction-type activities, and adverse effects within the construction, ACFCD, and Estuary reaches would be similar to facility construction but the impacts would generally of lower intensity:

- Stranding;
- Delay in outmigration;
- Injury during passage over rubber dams and the ACFCD Drop Structure;
- Injury from high water temperatures;

- Injury from poor water quality; and
- Predation in ponded reaches.

Except in emergencies such as equipment failure or high levels of debris accumulation, maintenance will generally take place in June through October, and thus avoid the period when adult and juvenile steelhead would most likely be in the maintenance area. Emergency events may occur at any time. There is a potential for juvenile and adult steelhead to be in the maintenance areas during some maintenance activities. Avoidance of these potential effects will involve (**O&M 1-7** on Table 9):

- Routine monitoring at the fishways would include monitoring for adult and juvenile outmigration, and ACWD/ACFCD would, to the extent feasible, schedule maintenance outside of the period when juveniles and adults may be migrating;
- When maintenance requires isolation of the active channel from the maintenance area, ACWD/ACFCD will engage a qualified biologist to monitor for the presence of steelhead. If steelhead are found anywhere in the reach from Mission Boulevard to downstream of Rubber Dam 1, juvenile steelhead will be captured and released downstream of the fishway or (if preferable) the active channel downstream of the maintenance area. If adult steelhead are in the maintenance area, they will be (a) diverted to the isolated active channel or (b) captured and transported to the reach upstream of Mission Boulevard; and
- In an emergency/unplanned maintenance event, ACWD/ACFCD will notify NMFS and CDFW as soon as possible, and immediately (a) engage a qualified biologist to determine if steelhead are in the proposed maintenance area, (b) make all feasible and necessary efforts to isolate the maintenance area from the active stream as rapidly as possible, and (c) initiate capture-transport-release of steelhead to the isolated active channel or the channel outside of the reach from Mission Boulevard to downstream of RD1.

Avoiding maintenance during the juvenile outmigration period and measures to isolate steelhead from maintenance areas and effects will reduce the potential for direct construction-type effects on individuals during maintenance to minimum levels.

YES 4: In the ACFCD and Estuary Reaches, O&M will temporarily increase levels of turbidity and will potentially cause spills of fuels, lubricants, and concrete, which could affect water quality.

Maintenance has the potential to affect rearing juvenile steelhead in the ACFCD Reach downstream of RD1 and RD3 and within the estuary downstream of Alvarado Boulevard. Turbidity effects from maintenance are likely to fall within the range of ambient turbidity in the channel and estuary, but, if they occur, spills of fuels, lubricants, and concrete could adversely affect steelhead in the channel and estuary. To avoid and minimize these potential effects, ACWD/ACFCD will implement measures to avoid such events and address them if they occur, as listed on Table 9 (**C1-11**, and **O&M 4-6**), above. ACWD/ACFCD have successfully avoided such construction/maintenance effects on a number of occasions and the potential for significant adverse effects is correspondingly minimal.

YES 5: In the Construction Reach, O&M may delay adult and juvenile migrations, such as by removal of debris in fishways and their approaches.

In the Construction Reach, infrequent raising and lowering of dams during O&M may delay upstream migration, such as delay resulting from 0 to 45 minute delays in restoring fishway function during and after dam inflation.

In the Construction Reach, downstream juvenile migration may be affected by multiple flow cues (fishway and over-dam flows, diversions), particularly when inflow exceeds ACWD net diversion rates, resulting in migration delay.

In the Construction Reach, diversion ponds may create temperature and dissolved oxygen conditions that may adversely affect fish and amphibians.

There is thus a potential for operations and maintenance of rubber dams, fishways, and fish screens to delay steelhead migrations and subject steelhead to stress. These related mechanisms would have adverse effects on steelhead. Delay may be a function of physical barriers to movement, such as debris in a fishway or behavioral barriers, such as uncontrolled flow over rubber dams that affects juvenile or adult use of the fishway. Delay may cause:

- Thermal stress. During outmigration, juveniles may be stressed if temperatures in diversion ponds rise, although ambient water temperatures from March through May are generally below 18° to 19° C. Late migrating juveniles may encounter warm temperatures and thermal stress may be a function of higher metabolic demands and low availability of food. In addition, even if there is minimal delay in steelhead migration, passage through the diversion reach of Alameda Creek may still cause thermal stress. In addition, there is a potential for SBA releases into Vallecitos Creek in the late spring (April – May), which could contribute to elevated water temperatures in Niles Canyon and the construction reach, adding potentially to thermal stress and/or false seasonal migration cues;

- Predation stress. Although warm water predators are not highly active during March through May, periods of warm water may cause predation and cause steelhead to initiate predation-avoidance strategies. This may involve selection of safe habitat versus movement to the fishway, and some actual predation may occur as well; and

- Metabolic stress. Adults delayed during inmigration to spawn will use stored resources while delayed and may have lowered resources for migration and spawning. Extended delays may result in egg resorption and poor spawning.

Juveniles may have reduced growth or may lose weight (particularly if delay is extended).

Under normal operations, these potential effects are minimized by design of the fishways and routine operation of rubber dams to reduce over-dam flow. Nevertheless, to avoid and minimize these potential delays, ACWD/ACFCD will (measure **O&M7** Table 9):

- Minimize maintenance in the period from December 1 through May 31 to the extent feasible;
- Evaluate fishway and fish screen conditions before the projected migration periods (January 1 through May 31) and take any remedial actions necessary; and
- To the extent feasible, manage operations to minimize flow over rubber dams.

YES 6: In the Upstream Reach, flow and temperature effects from on-going operational releases for water supply purposes at the South Bay Aqueduct (SBA) at the Vallecitos Turnout.

As described in "Evaluating Priority Life History Tactics for Reintroduced Alameda Creek Steelhead," land use changes and flood management techniques in the Arroyo de la Laguna and upper Alameda Creek watersheds have significantly changed streamflow and water temperature in Niles Canyon. These changes include:

- Increased channel connectivity in Arroyo de la Laguna, which intercepts stormwater runoff and shallow groundwater and quickly conveys them downstream;
- Drainage of the Pleasanton marsh complex which likely reduced summer base flows and contributions of cold water artesian springs, as well as reduced summer contributions from shallow groundwater; and
- Augmentation of warmer summer flows from South Bay Aqueduct deliveries and quarry pond discharge on Arroyo de la Laguna and Upper Alameda Creek.

There is a potential for operations involving releases of water from reservoirs and/or pipelines to affect in-channel conditions for steelhead in reaches of Alameda Creek and its tributaries upstream of the USGS Niles Gage at the downstream end of Niles Canyon. Operations of the Vallecitos Turnout, which are managed and controlled by DWR, are often concentrated in the summer-fall period, and releases from the Vallecitos Turnout in winter-spring are infrequent and of low magnitude (California Department of Water Resources data from State Water Project Operations Reports 2001-2006; Hanson 2002). Nevertheless, these releases to Alameda Creek and some of its tributaries may adversely affect steelhead:

- Releases in excess of ambient water temperatures could thermally stress steelhead during migration and during rearing. This could result in increased need for food in a food-limited system, behavioral changes that limit growth and fitness, and mortality at higher temperatures (Alameda Creek Fisheries Restoration Workgroup 2010).

Temperature effects of the Project are evaluated in the context of the effects of water temperature on species that may be temperature sensitive. Table 26 summarizes the range of optimal/suboptimal temperatures for sensitive salmonid species, by life-history stage.

Table 26. Temperature Tolerance of Steelhead and Chinook salmon (in life-history aquatic phases).

Life History Phase	Temperature Tolerance in degrees Celsius (C)			
	Steelhead[1, 2]		Chinook salmon [1]	
	Optimal	Sub-optimal	Optimal	Sub-optimal
Adult migration	10-20°C	22-23°C	10-20°C	20-21°C
Adult holding	10-15 C	16-25°C	10-16°C/	16-21°C
Breeding-spawning	4-11°C/	12 C -19°C	13-16°C/	16-19°C
Egg incubation	5-11°C	12-19°C	9-13°C	13-17°C
Juvenile rearing	10 – 17°C	>18°C	13-20°C	20-24°C
Smolting	7-15°C	>16°C	10-19°C	19-24°C

Notes: 1. Richter and Kolmes (2005)
2. Moyle, Israel, and Purdy (2008)

To evaluate these potential effects, ACWD compiled temperature data in Arroyo de la Laguna at the USGS flow gage (Gage 11176900 about 3 miles upstream of Sunol) and at the SBA turnout to Vallecitos Creek, located upstream of Sunol and Niles Canyon (Figure 23, May 1 2008 to August 17, 2011). Figure 23 shows average daily temperature, maximum measured daily high temperature, and minimum measured daily low temperature for each month. Figure 23 shows:

- The temperature of SBA water released from the turnout to Vallecitos Creek may be slightly higher (1 to 2 °C) than the temperature in Arroyo de la Laguna temperatures in late fall (< 20 C) and early winter (<18 C) months;

- The temperature of SBA water may exceed both Arroyo de la Laguna temperature and 15 °C during periods of time in late fall. Once natural ambient temperatures in the fall decrease below 20 C SBA releases should not result in an increase in water temperatures above 20 C during the winter months; and

- Early winter months show that even though SBA water temperature may exceed Arroyo de la Laguna temperature, neither exceed 15 °C.

ACWD also compared daily averaged water temperature from the Arroyo de la Laguna gage and the Niles Canyon gage (USGS 11179000), which is located about 0.5 miles upstream of Mission Boulevard (May 1, 2008 to August 17, 2011). Figure 24 compares water temperature at both sites when there were and were not releases from the turnout to Vallecitos Creek. This comparison shows:

- Releases from the turnout to Vallecitos Creek increase water temperatures at Niles by from 2° C to 3° C in April and May. In these months, releases to Vallecitos Creek increase average monthly temperature from about 13° C to about 15.5° C in April and from about 17.5°C to about 19°C in May; and
- In the remaining warm months (June, July, August, and September), increases in water temperature at Niles were driven by high temperatures in Arroyo de la Laguna.

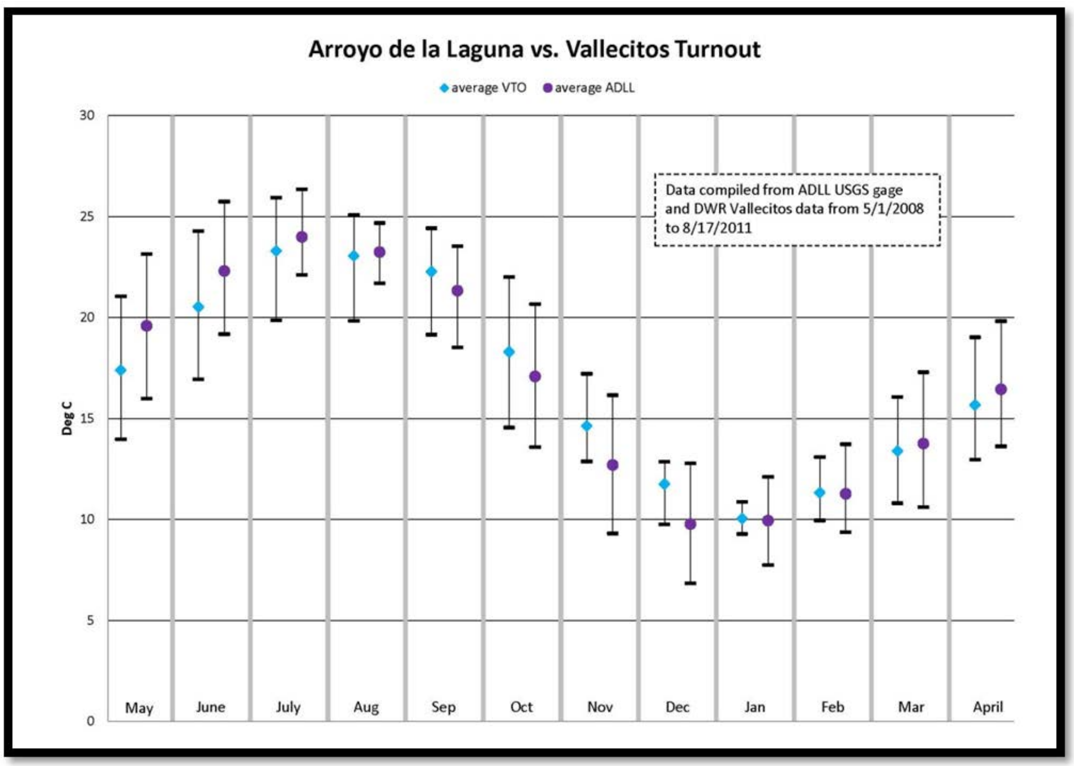


Figure 23. Average water temperatures in Arroyo de la Laguna and in released from the Vallecitos Turnout.

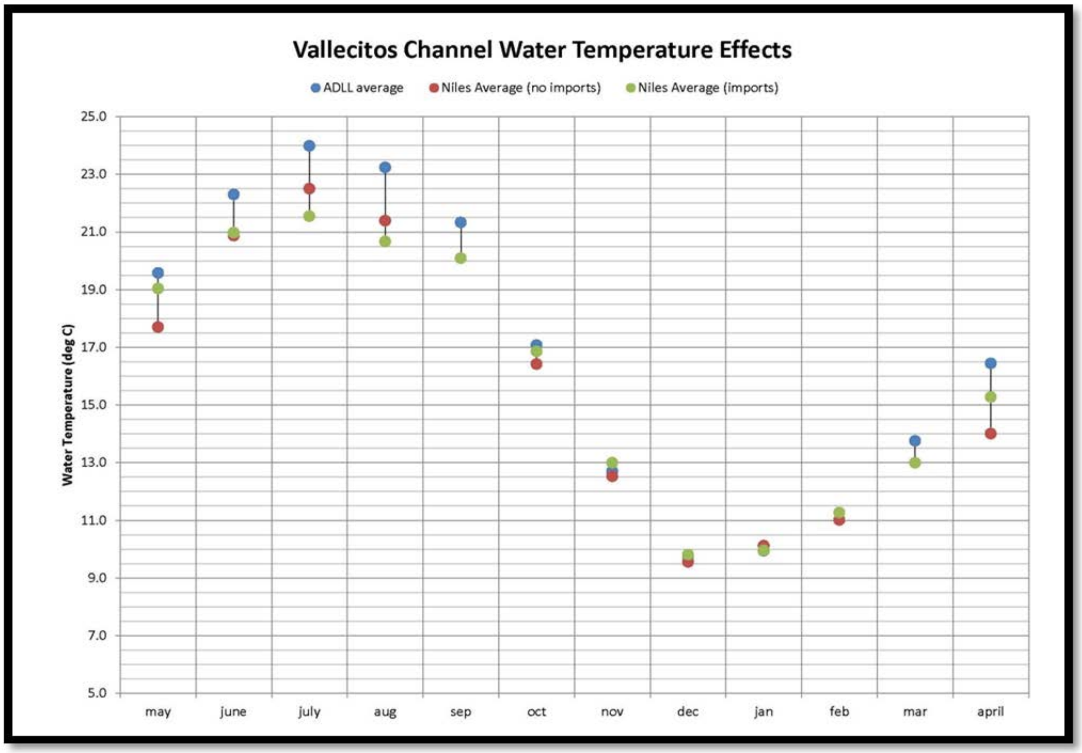


Figure 24. Water temperatures in Arroyo de la Laguna and Niles Canyon, with and without imports released into the turnout to Vallecitos Creek.

Longer-term data from the USGS water temperature monitoring at its Stream Gage 11173575 in the upper reach of Alameda Creek near Sunol and the Niles Gage reflects the patterns in the above analysis (Table 23). The water temperature in the SBA releases (wdr.water.usgs.gov/wy2008/pdfs/11173575.2008.pdf) tends to reach a given temperature threshold earlier in the spring than ambient water temperatures. SBA release temperatures may initially reach an instantaneous temperature of 14° C and 20°C several days to several weeks earlier than ambient conditions.

Table 27. Date when water temperature exceeds defined thresholds: SBA, Arroyo de la Laguna[1], and Niles Canyon[2].

YEAR	Temperature exceeds 14° C			Temperature exceeds 20° C
	SBA	NILES	ADLL	SBA Only
1998	May 1	NA[3]	NA	NA
1999	April 13	NA	NA	NA
2000	March 21	NA	NA	NA
2001	April 15	NA	NA	NA
2002	April 21	NA	NA	NA
2003	March 19	NA	NA	June 1
2004	March 7	NA	March 27	April 25
2005	March 30	NA	April 16	May 23
2006	April 25	NA	April 27	June 1
2007	NA	NA	April 24	June 18
2008	April 3	May 1	April 23	May 15
2009	March 29	April 30	May 1	May 16
2010	NA	NA	NA	May 25
2011	NA	NA	NA	June 13

Notes: 1. ADLL: Arroyo de la Laguna is a tributary entering Alameda Creek in Sunol.
2. NILES: USGS gage 11179000 in Niles Canyon, upstream of the flood control channel.
3. NA: Data not available for this period.

Table 27 illustrates a general pattern. More detailed (hourly) data from water year 2007-2008 shows water temperatures of the SBA at the Vallecitos Turnout, the Niles Gage (NILES), and Arroyo de la Laguna (ADLL) (Figures 23-27):

- Figure 25 (October 2007) illustrates the slower cooling of reservoirs than streams; the temperatures at the Vallecitos Turnout (VTO) are on average 2° C to 3° C warmer than the streams. This trend extends into mid-November;
- Figure 26 (January 2008) illustrates the heat sink effect of reservoirs. While all sources remain below 12° C in January, supplies at the Vallecitos Turnout are warmer and fluctuate less than supplies in Niles Canyon and Arroyo de la Laguna;
- Figure 27 (March 2008) illustrates the more stable temperatures at the Vallecitos Turnout. Daily stream temperatures (ADLL and Niles) fluctuate by 4° C to 6° C and peak daily temperatures exceed 18° C by late March, while VTO temperatures fluctuate less and never exceed 18° C;
- Figure 28 (April 2008) illustrates a similar pattern of higher stream temperature fluctuation and earlier peak temperatures in excess of 20° C; and

- Figure 29 (July 2008) illustrates the generally high water temperatures in ADLL and Niles, as well as in releases from Vallecitos Turnout. In summer months, ADLL flow is consistent and low, and there is low natural flow in the Niles Canyon Reach. Net flow in the Niles Canyon Reach is supplemented by releases from the Vallecitos Turnout. Water temperature in all three sources is consistent, reflecting the predominant influence of air temperature in mid-summer.

Note that flows shown on Figures 23 through 27 have a measurement margin of error of up to 10 cfs. The flow and temperature data thus illustrate general trends, not precise instantaneous measurement. The temperature variations illustrated are evaluated in terms of their potential to affect conditions in the Niles Canyon Reach in Section 5. Steelhead, salmon, and California red-legged frogs are temperature sensitive (Tables 26 and 28).

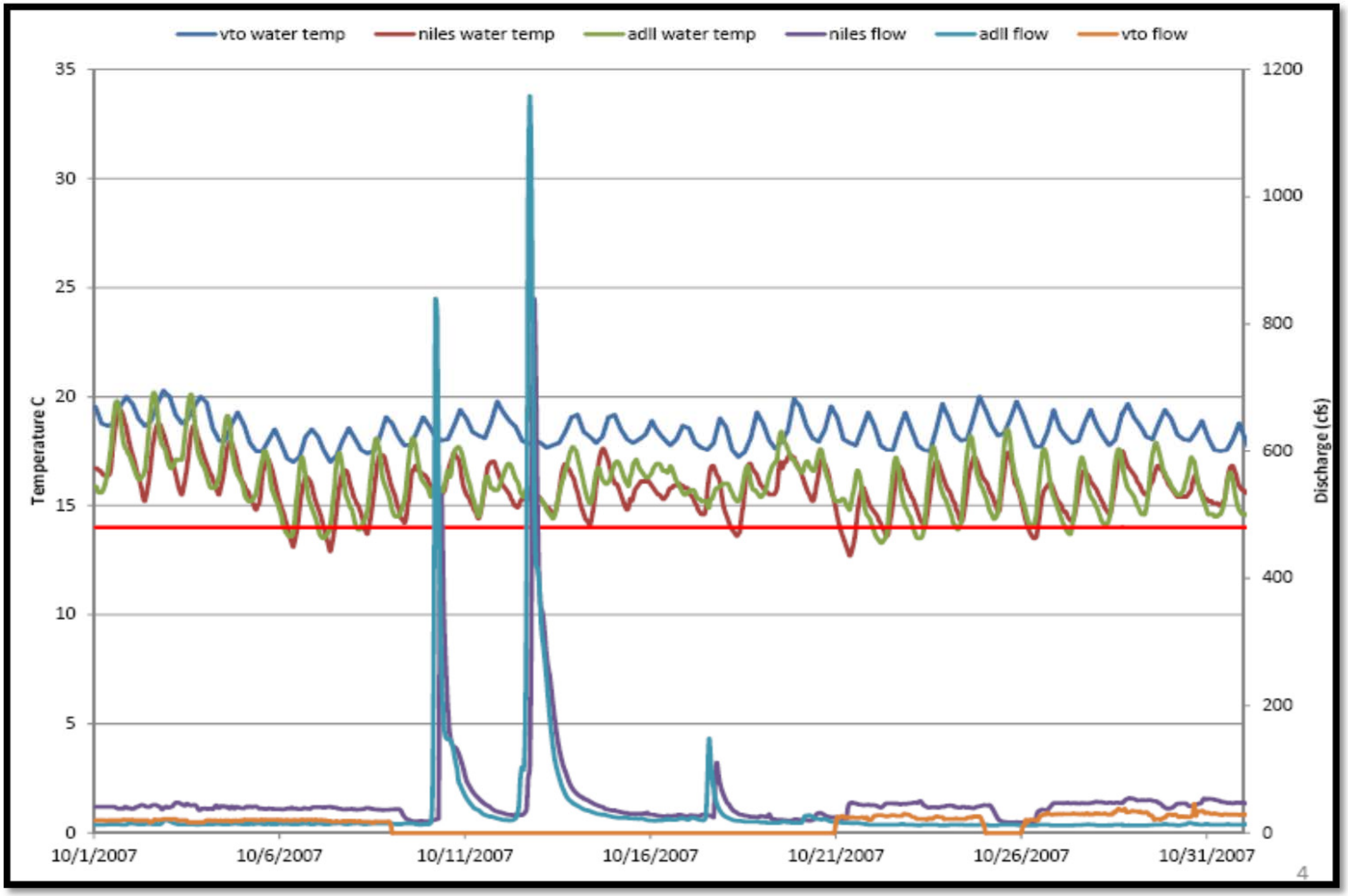


Figure 25. October 2007 Water temperatures of Vallecitos Turnout (vto), Alameda Creek at Niles Canyon (Niles), and Arroyo de la Laguna (adll).

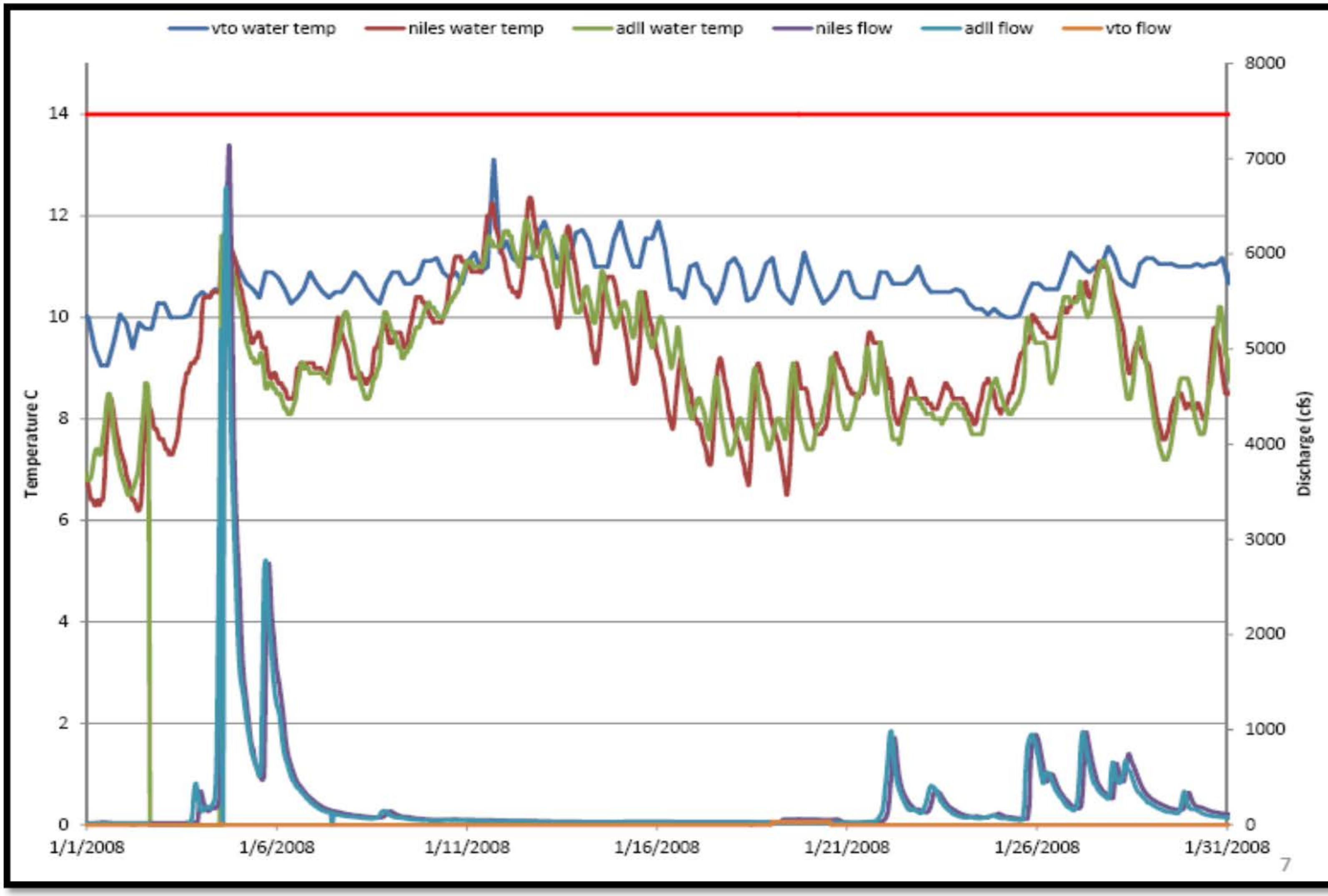


Figure 26. January 2008 Water temperatures of Vallecitos Turnout (vto), Alameda Creek at Niles Canyon (Niles), and Arroyo de la Laguna (adll).

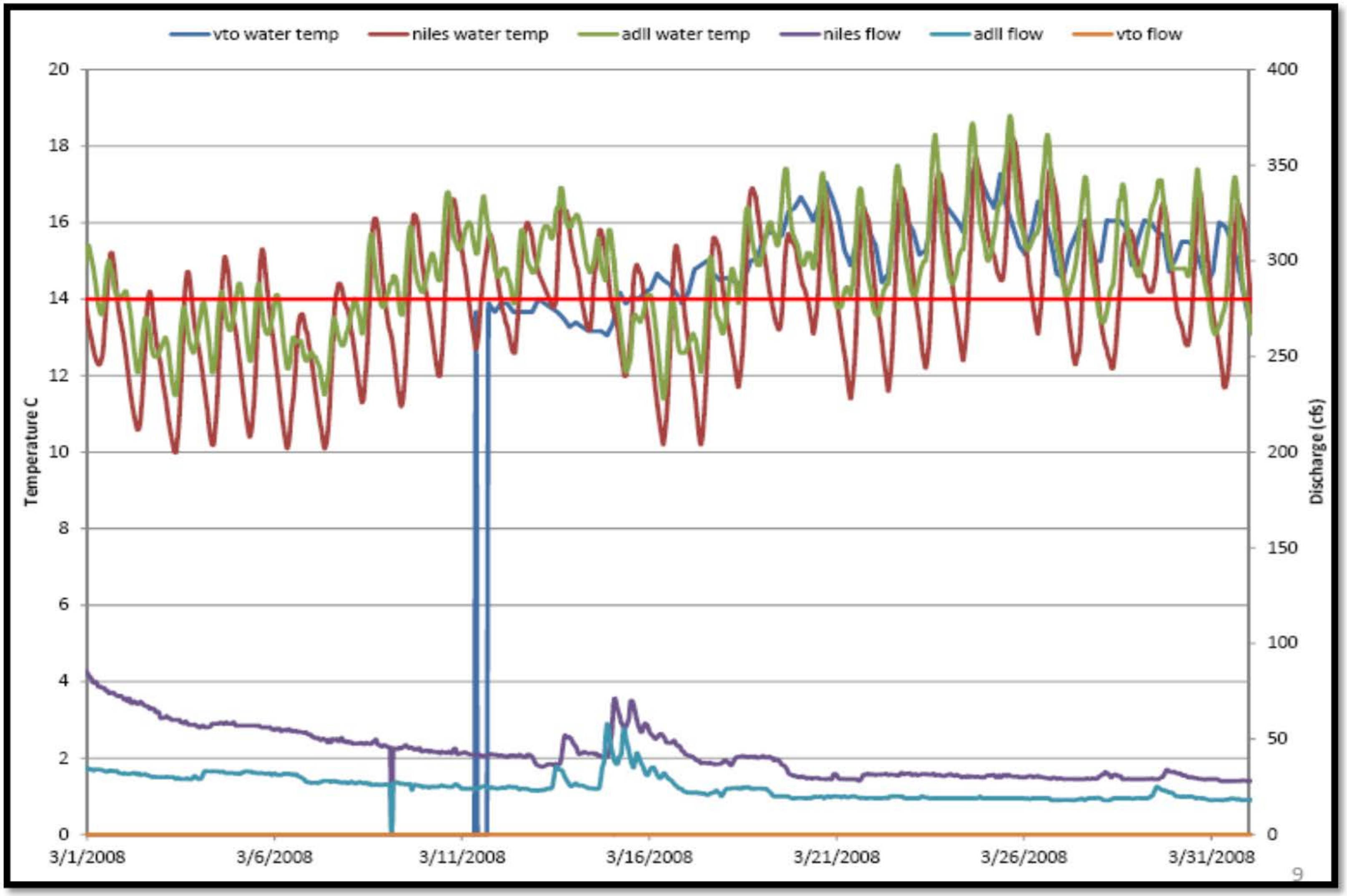


Figure 27. March 2008 Water temperatures of Vallecitos Turnout (vto), Alameda Creek at Niles Canyon (Niles), and Arroyo de la Laguna (adll).

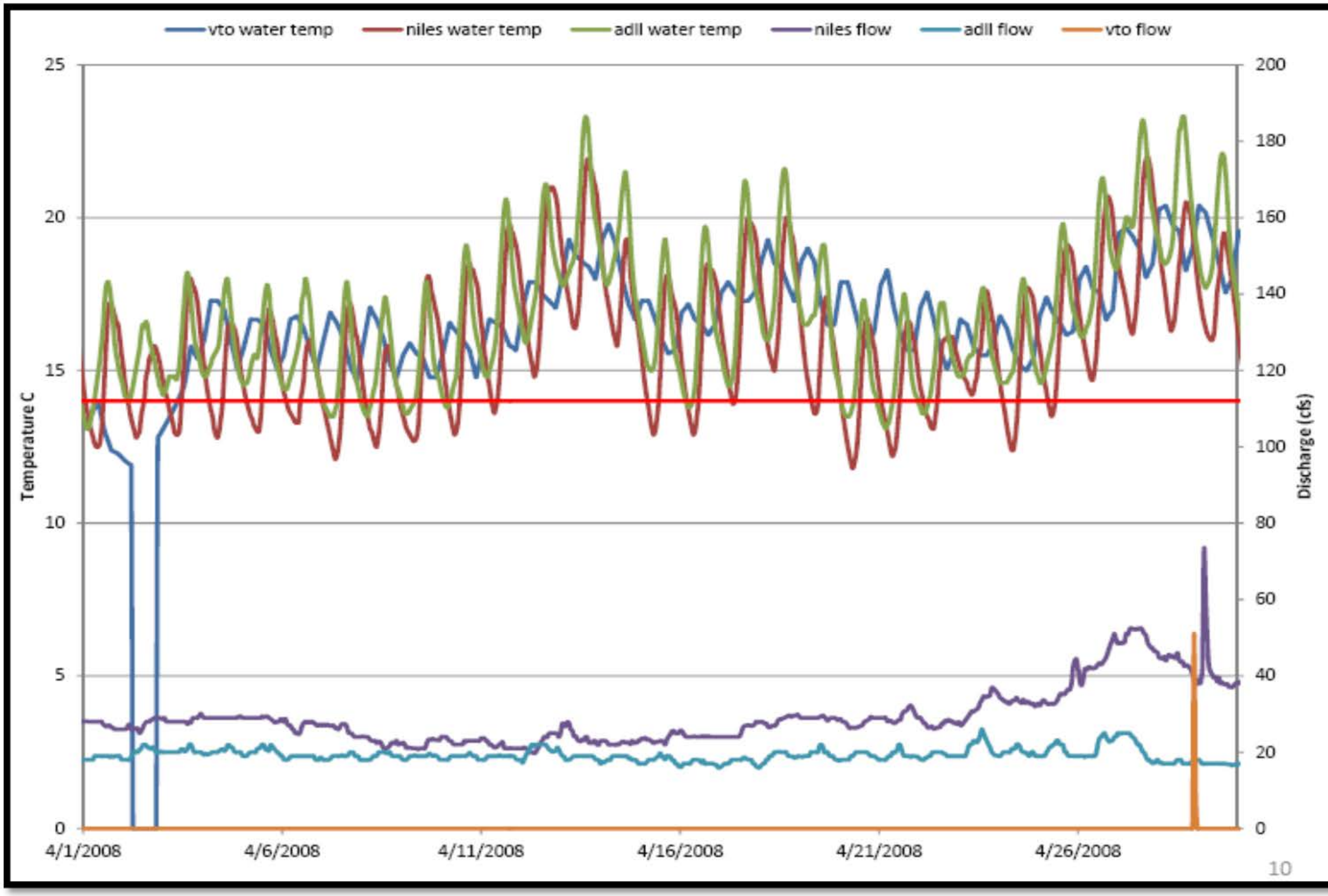


Figure 28. April 2008 Water temperatures of Vallecitos Turnout (vto), Alameda Creek at Niles Canyon (Niles), and Arroyo de la Laguna (adll).

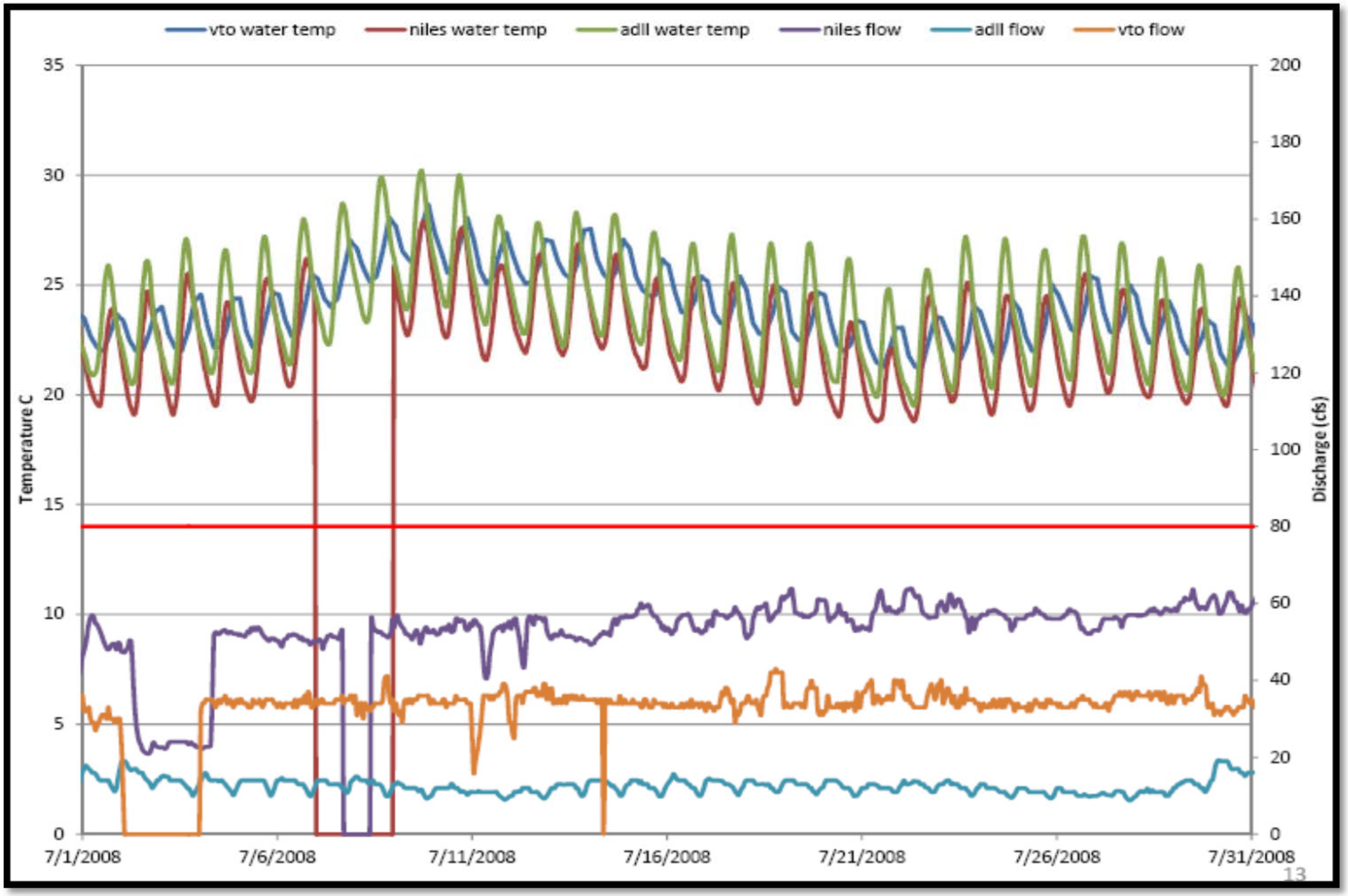


Figure 29. July 2008 Water temperatures of Vallecitos Turnout (vto), Alameda Creek at Niles Canyon (Niles), and Arroyo de la Laguna (adll).

Given the water temperature analyses above, upstream water operations consisting of releases of SBA turnouts at Vallecitos might have the potential to impart temperature changes that may impact steelhead by the following mechanisms:

- Primarily in late spring, releases from the SBA turnout to Vallecitos Creek may potentially increase downstream water temperatures, although the primary driver of water temperature stress appears to be higher temperature flows from Arroyo de la Laguna; and

- In summer and late fall, SBA releases from Vallecitos may potentially cumulatively affect downstream water temperatures, most probably in September and October (Figures 21 and 22).

These operations are likely to be of low magnitude for the following reasons:

- In the spring, when SBA releases are higher in temperature than ambient flows, the water temperatures of the SBA supplies are from 14° C to 19° C. Such temperatures are not likely to cause significant stress for outmigrating juvenile steelhead, but could potentially contribute to false emigration cues and reduced rearing and growth in the Niles Canyon reach;

- In most years, ACWD operations of the turnout to Vallecitos Creek begin after the peak outmigration period;

- In most years, ACWD operations of the turnout to Vallecitos Creek in the summer and early fall would reduce ambient water temperatures of flows from Arroyo de la Laguna; and

- Summer SBA releases are beneficial from the habitat perspective in that they provide needed summertime flows to meet the minimum flow for small juvenile rearing in Niles Canyon (29 cfs). In most years, without the SBA releases there would not be sufficient summer flow in Niles Canyon to meet this minimum flow need (reference is McBain and Trush, 2012, Evaluating Priority Life History Tactics for Reintroduced Alameda Creek Steelhead). Additional flow and water temperature monitoring may be needed to evaluate changes to juvenile rearing habitat conditions in Niles Canyon in the future.

In addition to analyzing impacts of Vallecitos import operations on water temperatures in Niles Canyon, ACWD performed an analysis to determine changes of stage and velocity associated with typical import flows in the upstream reach. To determine change in velocity and depth within the Niles Canyon reach as a result of ACWD's Vallecitos imports a 1D steady-state HEC-RAS model was utilized to determine hydraulic conditions along 136 cross-sections from the Alameda Creek Arroyo de la Laguna confluence to the USGS gage downstream of Niles Canyon. Topographic data was extracted from a LiDAR data set collected in 2006, and two steady-state flow scenarios were analyzed to identify the change in hydraulic conditions at 25 and 50 cfs. Typically, SBA deliveries to the Vallecitos Turnout by DWR are around 25 cfs, when 20 to 25 cfs of watershed base flows are present, thus changing Niles Canyon flows from base flows of about 25 cfs to 50 cfs. Within the main channel a distance of 0 ft corresponds to the start of the Alameda Creek Flood Control Channel (immediately downstream of USGS gage 11179000) and a main channel distance of 28,000 ft corresponds to the confluence of Alameda Creek and Arroyo de la Laguna in Sunol.

Results of the hydraulic simulation analyses of changes in channel water velocities, water depths, and water surface elevations within the Niles Canyon reach at flows of 25 cfs (assuming no SBA delivery) and 50 cfs (assuming an SBA delivery of 25 cfs and a 25 cfs baseflow in Niles Canyon) are shown in Figures 28-33. The incremental change in average water depth in Niles Canyon between a flow of 25 and 50 cfs was 0.18 feet, and the average change in water velocity was 0.25 ft/sec, as shown below:

XS velocity (ft/s)	25 cfs Average Velocity (ft/sec)	50 cfs Average Velocity (ft/s)	Increase Average Velocity (ft/s)	% of Locations
V < 1	0.56	0.77	0.21	58
1 < V < 2	1.28	1.59	0.31	21
V > 2	2.79	3.29	0.5	21

Average depth increase 0.18 ft
Average velocity increase 0.25 ft/s

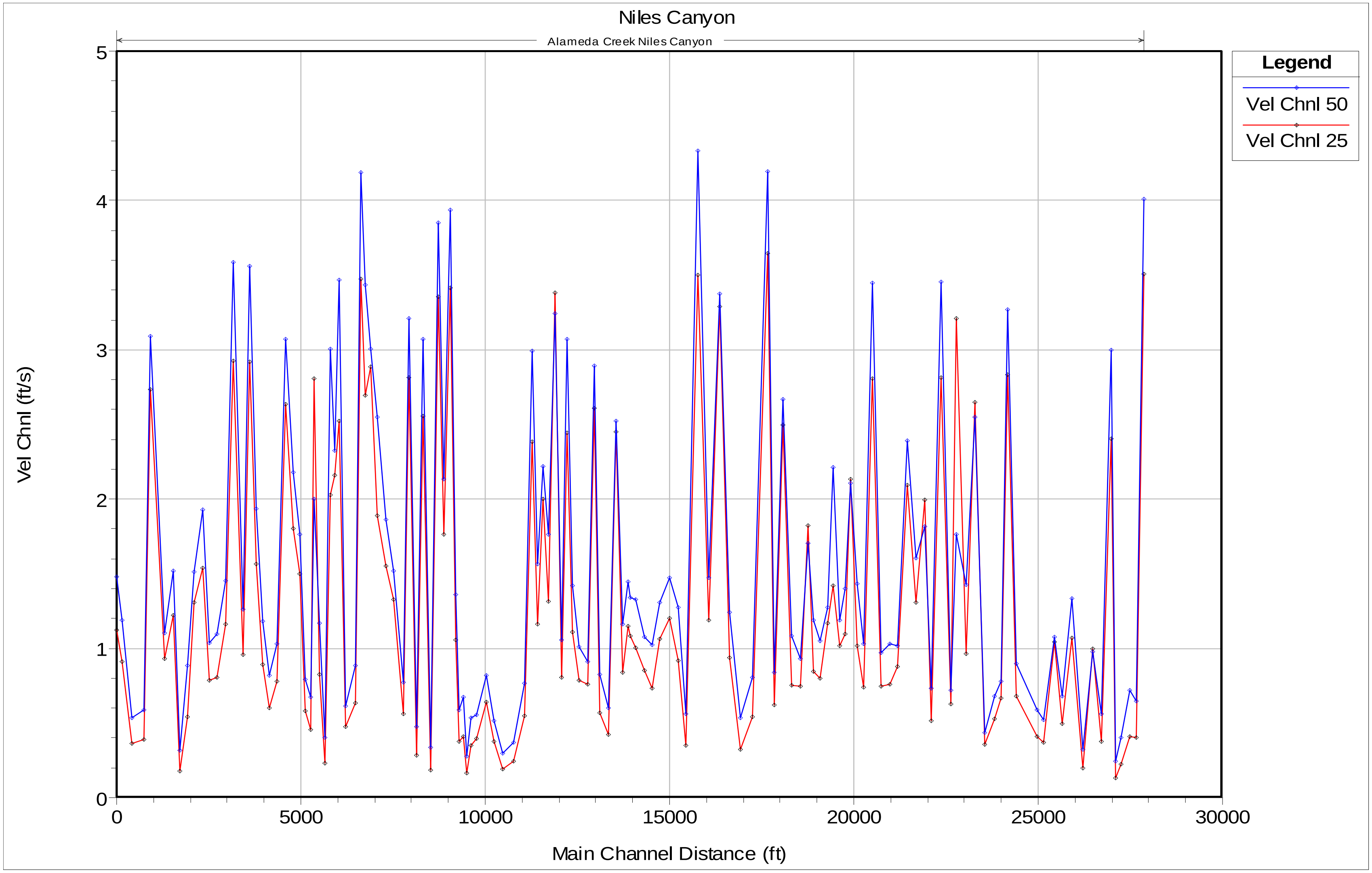


Figure 30. Comparative results of water velocities at various locations within Niles Canyon assuming flows of 25 and 50 cfs based on hydraulic model simulation results.

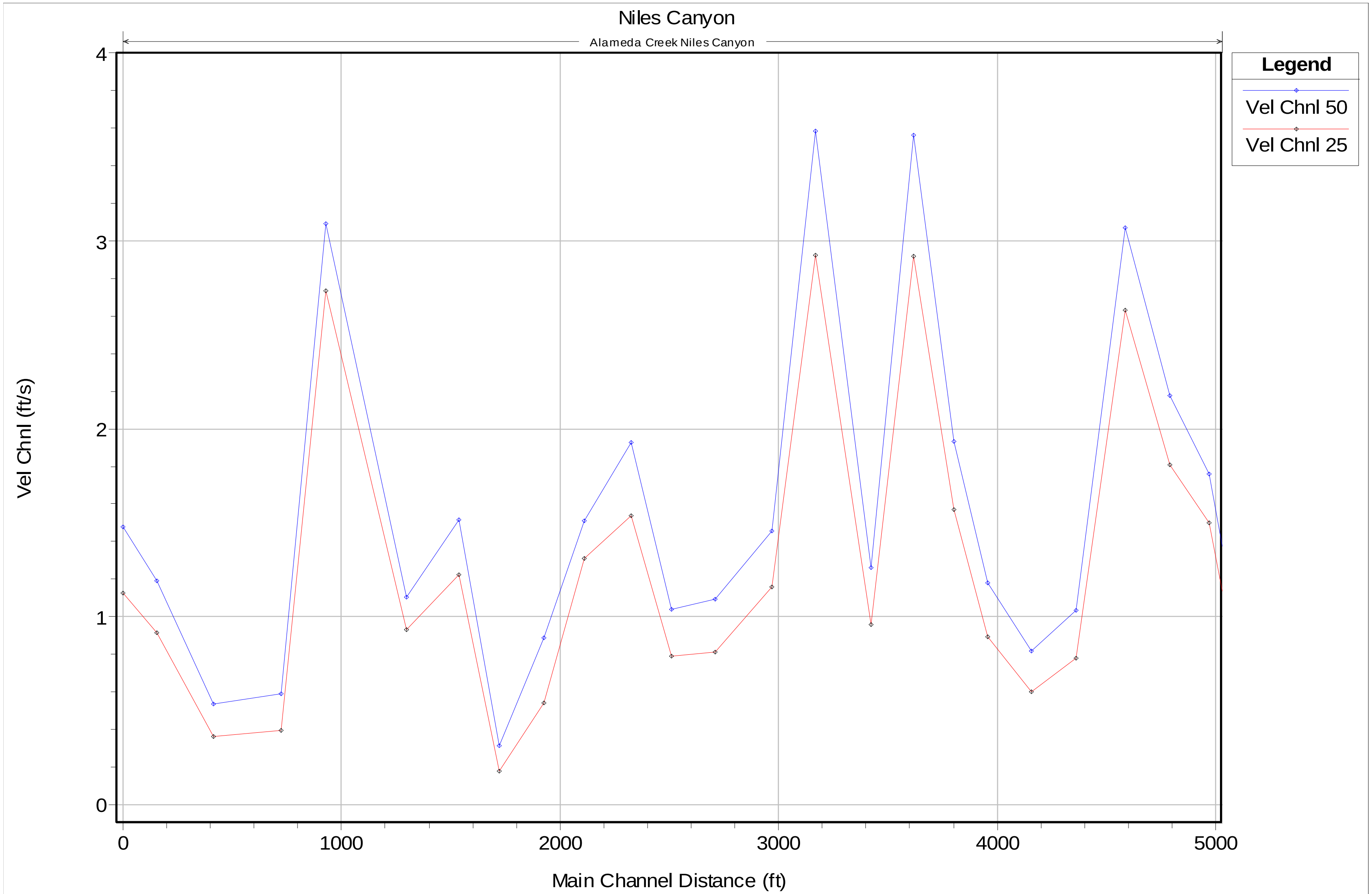


Figure 31. Comparative results of water velocities at various locations within Niles Canyon assuming flows of 25 and 50 cfs based on hydraulic model simulation results.

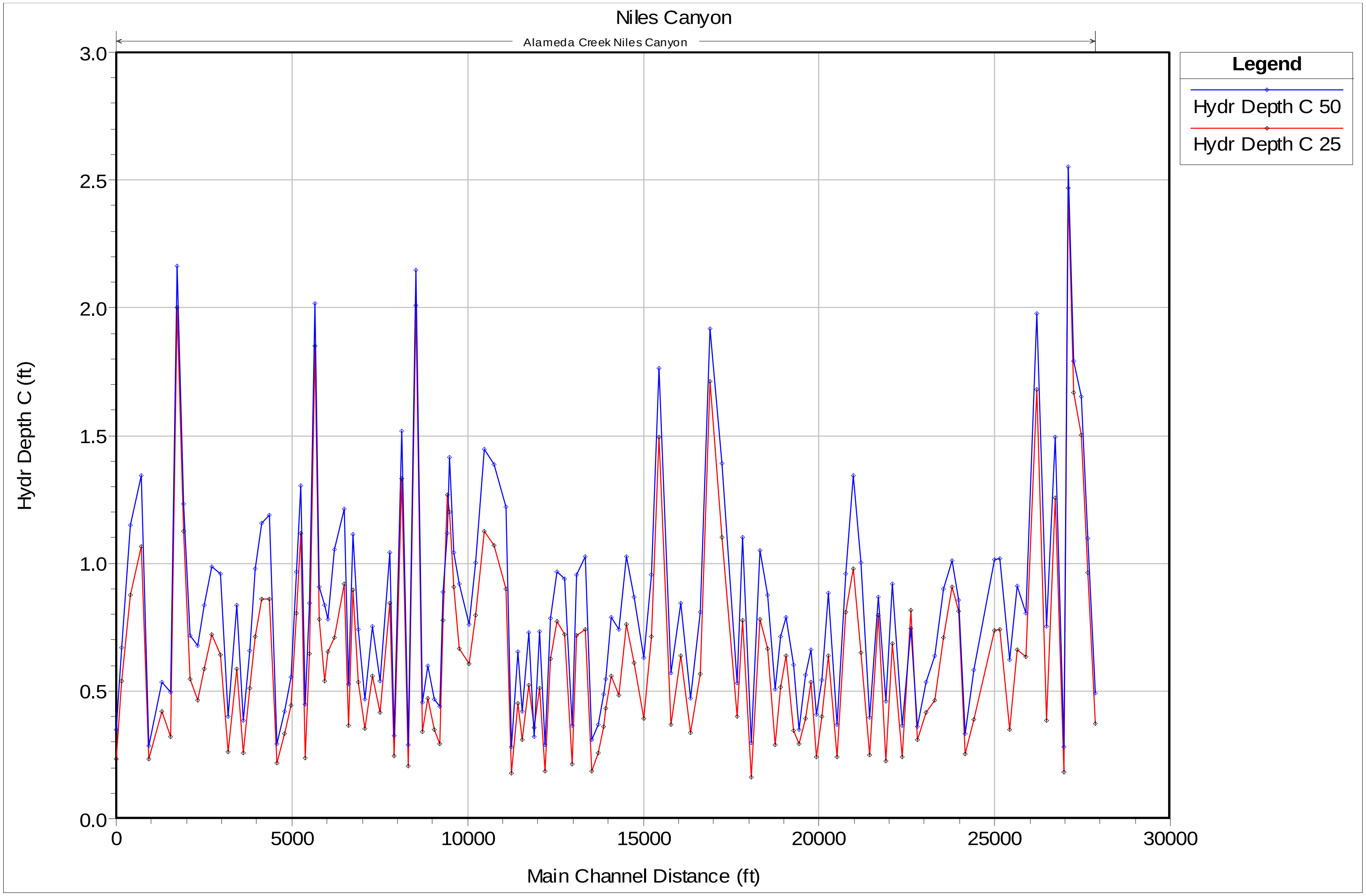


Figure 32. Comparative results of water depth at various locations within Niles Canyon assuming flows of 25 and 50 cfs based on hydraulic model simulation results.

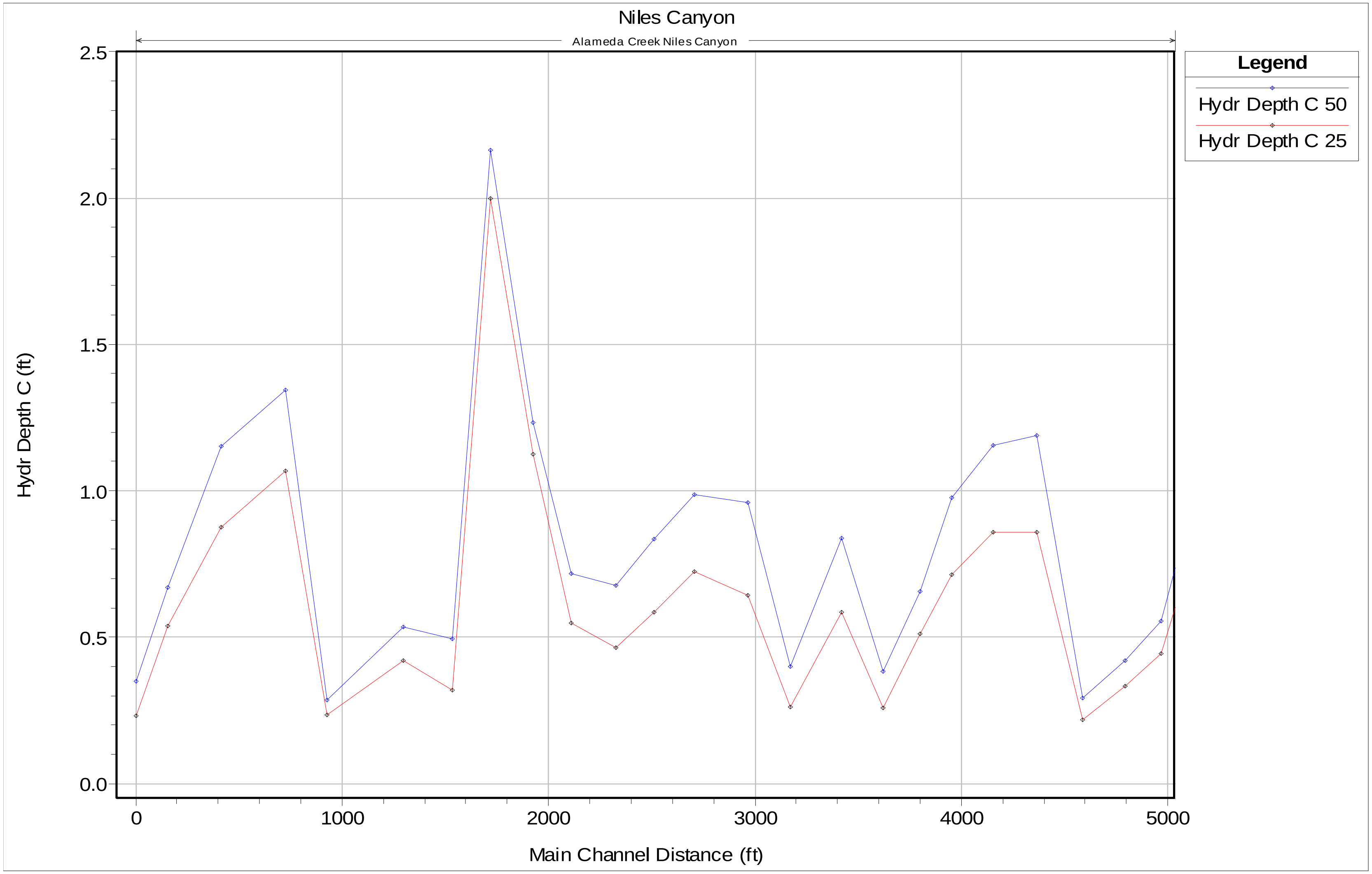


Figure 33. Comparative results of water depth at various locations within Niles Canyon assuming flows of 25 and 50 cfs based on hydraulic model simulation results.

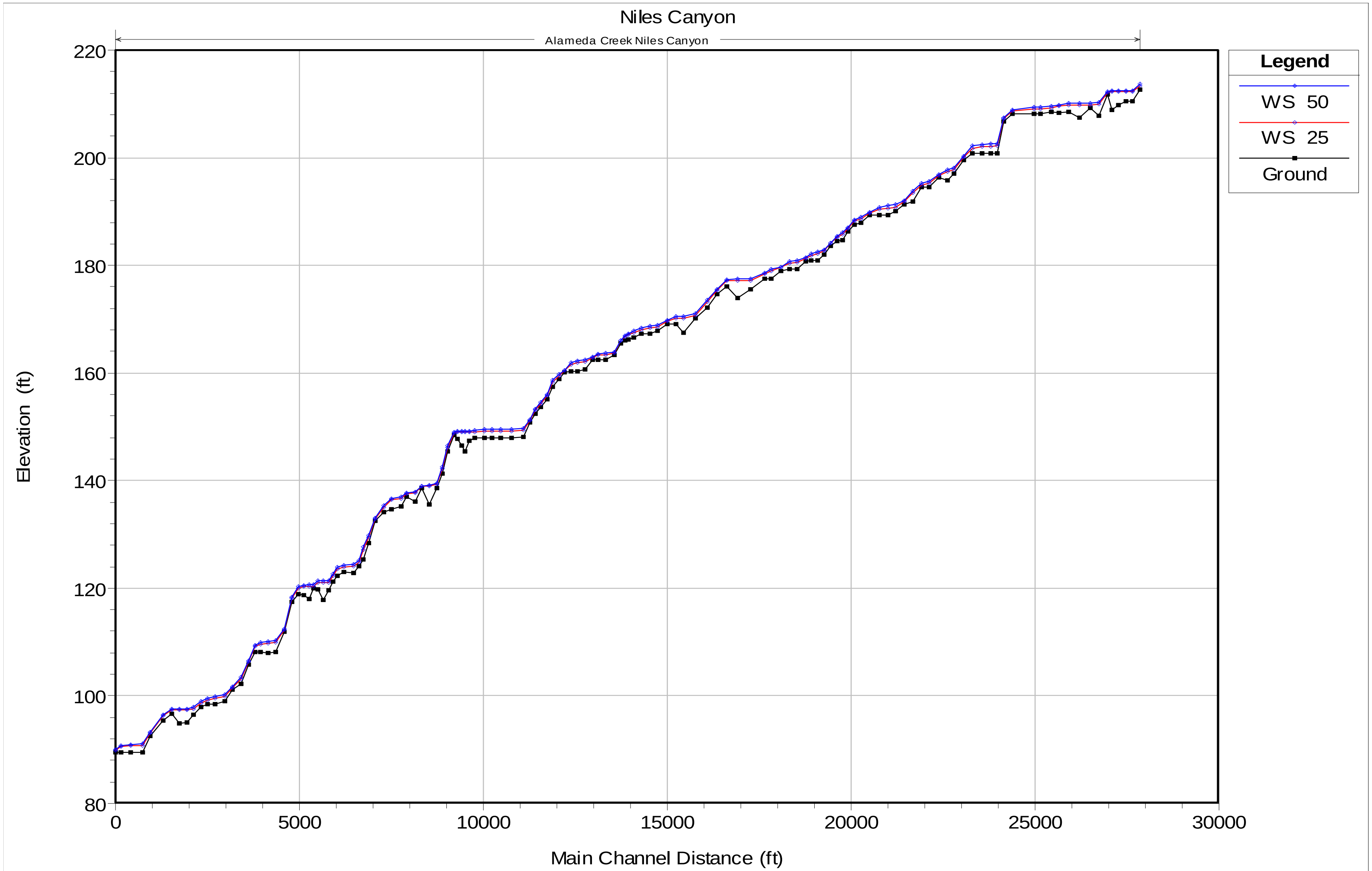


Figure 34. Comparative results of water surface elevation at various locations within Niles Canyon assuming flows of 25 and 50 cfs based on hydraulic model simulation results.

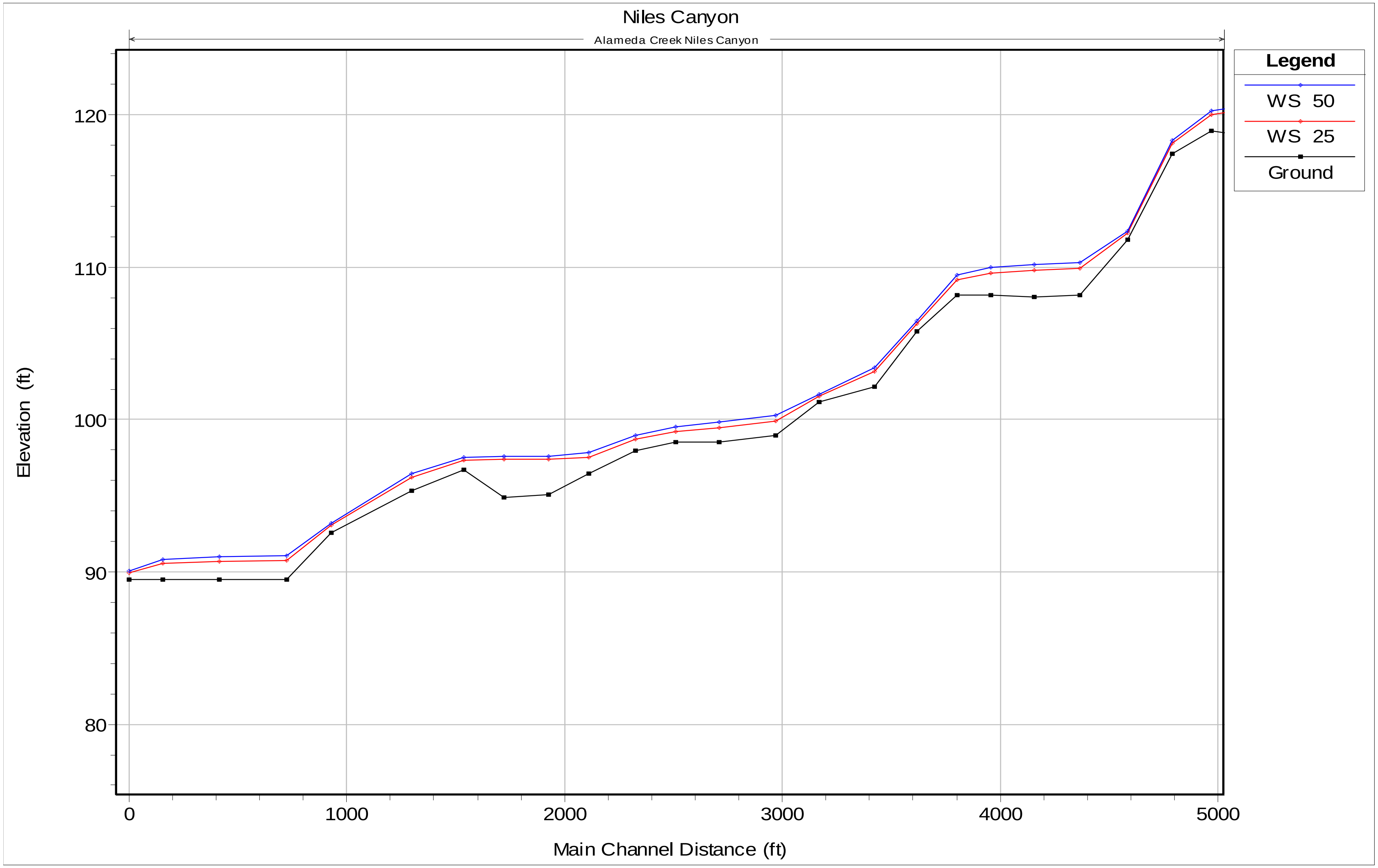


Figure 35. Comparative results of water surface elevation at various locations within Niles Canyon assuming flows of 25 and 50 cfs based on hydraulic model simulation results.

Nevertheless, in order to avoid and minimize potential temperature and hydraulic impacts of ACWD's SBA Vallecitos Turnout releases, ACWD will (Table 9, **O&M8**):

1. Subject to operational, facility and other constraints, during the months of April, May, September and October, ACWD will, as a first priority, utilize the Bayside Turnouts for direct deliveries of SBA water to the ACWD service area prior to utilizing the Vallecitos Turnout for SBA deliveries via Alameda Creek; and

2. During NORMAL and WET years, ACWD will not utilize the SBA Turnout at Vallecitos for SBA deliveries during the months of April and May. ACWD may utilize the Vallecitos Turnout for SBA deliveries via Alameda Creek during the months of April and May if the hydrologic conditions in the Alameda Creek watershed are classified as DRY, or if the ACWD Board of Directors declares Water Supply Emergency.

Conclusion

The construction of fishways and fish screens, combined with the suite of construction and operations and maintenance measures to avoid and minimize adverse effects on steelhead (Table 9) will, over the long term, enhance the potential recovery of Central California Coast steelhead in the Alameda Creek watershed. On-going operations effects on steelhead will be avoided and minimized to the maximum extent feasible. The potential for adverse impacts to steelhead is considered to be less-than-significant.

No Action Alternative

No construction activity or changes would occur. No impacts to steelhead or their habitat would occur under the no action alternative.

5.6.7 Vernal Pool Fairy Shrimp (Threatened; USFWS)

Vernal pool fairy shrimp are known to occur in portions of the upstream Alameda Creek watershed. There is one area of designated critical habitat for the species in Alameda County, a site north of Highway 580 on the outskirts of Livermore, approximately 18 miles northeast of the Joint Fish Passage Project area. In the Niles and Fremont USGS Quads, there is a vernal pool along the boundary of the Don Edwards San Francisco Bay National Refuge.

Species Habitat Requirements

The USFWS Species Account (http://ecos.fws.gov/docs/life_histories/K03G.html) describes the habitat of the species.

> "HABITAT: Vernal pool fairy shrimp populations live in ephemeral freshwater habitats, such as vernal pools and swales. None are known to occur in running or marine waters or other permanent bodies of water. Vernal pools are unique seasonal wetlands that support a wide variety of wildlife, from waterfowl to amphibians– all of which rely on the protein-rich food sources found in these ecosystems (Geer and Foulk 1999/2000).
>
> The distribution of vernal pools is highly discontinuous and some of the aquatic invertebrates that are found in this habitat occur only in specific geographic areas. Due to local topography and geology, the pools are usually clustered into pool complexes (Holland and Jain 1988). Pools within a complex typically are separated by distances on the order of meters and may form dense, interconnected mosaics of small pools or a sparser scattering of larger pools. This species has a sporadic distribution within vernal pool complexes (Jones and Stokes, 1992, 1993; County of Sacramento 1990; Patton 1984; Stromberg 1933; Sugnet and Associates 1993b) wherein the majority of pools in a given complex typically are not inhabited by the species.
>
> Although the vernal pool fairy shrimp has a relatively wide range, the majority of known populations inhabit vernal pools with clear to tea-colored water, most commonly in grass or mud bottomed swales, or basalt flow depression pools in unplowed grasslands, but one population occurs in sandstone rock outcrops and another population in alkaline vernal pools (Collie and Lathrop 1976). They are ecologically dependent on seasonal fluctuations in their habitat, such as absence or presence of water during specific times of the year, duration of inundation, and other environmental factors that include specific salinity, conductivity, dissolved solids, and pH levels. Water chemistry is one of the most important factors in determining the distribution of fairy shrimp (Belk 1977; Jamie King, University of California, in litt., 1992; Marie Simovich, University of San Diego, in litt., 1992). The water in pools inhabited by this species has low total dissolved solids (TDS), conductivity, alkalinity, and chloride (Collie and Lathrop 1976). The vernal pools the animal inhabits vary in size from over 10 ha to only 20 square meters. The vernal pool fairy shrimp occurs at temperatures between 6-20 degrees C in soft and poorly buffered waters (Eng *et al*. 1990)."

The 2007 USFWS Vernal Pool Fairy Shrimp *(Branchinecta lynchi)* 5-Year Review: Summary and Evaluation adds the following to the above:

> "The vernal pool fairy shrimp has an ephemeral life cycle and exists only in vernal pools or vernal pool-like habitats; the species does not occur in riverine, marine, or other permanent bodies of water. Roughly

80 percent of observations of the shrimp are from vernal pools (Helm 1998; Helm and Vollmar 2002). Like most other fairy shrimps, the vernal pool fairy shrimp lacks any substantial anti-predator defenses and does not persist in waters with fish (King *et al.* 1996; Eriksen and Belk 1999)."

Is there suitable habitat for vernal pool fairy shrimp within the areas in which the Joint Fish Passage Project may have effects?

NO: There is no appropriate ephemeral pool habitat in the Joint Fish Passage Project area, and the available aquatic habitat is also (a) isolated from known populations and (b) occupied by predatory amphibians and fish. The species cannot occur in the Joint Fish Passage Project construction area. In addition, the only known suitable habitat for the species is in a separate watershed above the tidal zone and thus is not subject to the water quality effects of the Joint Fish Passage Project. Specifically:

- There is no vernal pool habitat in the area between Mission Boulevard and 2,600 feet downstream of the BART Bridge. Habitats in this area consist of disturbed riverine floodplain, landscaped park grassland, and concrete-rock levees and paved areas;

- There is no vernal pool habitat in the downstream estuary, either in river and bay areas or in the active marsh; and

- There is no vernal pool habitat in the active channels that receive and convey water released from Del Valle Reservoir, the SBA turnout at Vallecitos Creek, or other SBA turnouts.

Is there evidence that vernal pool fairy shrimp actually occurs within the areas affected by the Project?

NO: ACWD has conducted field surveys three times in the period from 2002 through 2009 and no evidence of vernal pool fairy shrimp has been found. ACFCD has also monitored in-channel sediment removal efforts for over 10 years and has not found evidence of the vernal pool fairy shrimp or its habitat. The Joint Fish Passage Project thus would have no effect on vernal pool fairy shrimp. There is no evidence from multiple surveys by ACWD, ACFCD, and others that the species actually exists in the Joint Fish Passage Project area.

Conclusion

Based on these considerations, potential Project effects on vernal pool fairy shrimp were not evaluated in detail.

No Action Alternative

No construction activity or changes would occur. No impacts to vernal pool fairy shrimp or their habitat would occur under the no action alternative.

5.6.8 Conservancy Fairy Shrimp (Endangered, USFWS)

Per the USFWS Species Account, the "Conservancy fairy shrimp inhabit rather large, cool-water vernal pools with moderately turbid water (Eriksen and Belk 1999). The pools generally last until June. However, the shrimp are gone long before then. They have been collected from early November to early April." (http://www.fws.gov/sacramento/es/animal_spp_acct/acctbug.htm)

Habitat and Distribution

The USFWS Species Account describes the known distribution of the species:

> "Currently, the Service is aware of eight populations of Conservancy fairy shrimp, which include (from north to south): (1) Vina Plains, Butte and Tehama counties; (2) Sacramento National Wildlife Refuge, Glenn County; (3) Yolo Bypass Wildlife Area, Yolo County; (4) Jepson Prairie, Solano County; (5) Mapes Ranch, Stanislaus County; (6) University of California, Merced, Merced County; (7) Grasslands Ecological Area, Merced County and (8) Los Padres National Forest, Ventura County."

The USFWS 2005 Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon, December 15, 2005. Described the species distribution more specifically (http://ecos.fws.gov/docs/recovery_plans/2006/060307_docs/doc533.pdf):

> "The Conservancy fairy shrimp is known from a few isolated populations distributed over a large portion of California's Central Valley and in southern California (Figure II-35). In the Northeastern Sacramento Valley Vernal Pool Region (Keeler-Wolf *et al*. 1995), four populations are clustered around the Vina Plains area in Tehama and Butte Counties. Conservancy fairy shrimp populations are also found in the Solano-Colusa Vernal Pool Region on the greater Jepson Prairie area in Solano County, at the Sacramento National Wildlife Refuge in Glenn County, and in the Tule Ranch unit of the California Department of Fish and Game Yolo Basin Wildlife Area, in Yolo County. In the San Joaquin Valley Vernal Pool Region, Conservancy fairy shrimp are found in the Grasslands Ecological Area in Merced County, and at a single location in Stanislaus County. In the Southern Sierra Foothills Vernal Pool Region, the species is known from the Flying M Ranch, the Ichord Ranch, and the Virginia Smith Trust lands in eastern Merced County. The Conservancy fairy shrimp is found outside the Santa Barbara Vernal Pool Region at two locations on the Los Padres National Forest in Ventura County."

Designated Critical Habitat is limited to these and adjacent areas in the Central Valley and in coastal Southern California.

Is there suitable habitat for Conservancy fairy shrimp within the areas in which the Joint Fish Passage Project may have effects?

NO: As the Recovery Plan indicates, the three fairy shrimp species associated with vernal pools may co-occur and thus the vernal pool along the margin of the Don Edwards San Francisco Bay National Refuge could be considered suitable habitat for the species. This vernal pool is in a sub-watershed that does not drain to the Flood Control Channel and is separated from the Joint Fish Passage Project by about 7.5 miles of urban development.

Is there evidence that the species actually occurs within the areas in which the Joint Fish Passage Project may have direct effects?

NO: There are no records in CNDDB or in multiple years of survey of the Joint Fish Passage Project and adjacent habitats.

Conclusion

Based on these considerations, potential Project effects on Conservancy fairy shrimp were not evaluated in detail.

No Action Alternative

No construction activity or changes would occur. No impacts to Conservancy fairy shrimp or their habitat would occur under the no action alternative.

5.6.9 Vernal Pool Tadpole Shrimp (Endangered; USFWS)

In the San Francisco Bay area, vernal pool tadpole shrimp is known to occur in only one area, on the San Francisco Bay National Wildlife Refuge in the City of Fremont, south of Highway 880. The site (designated as Critical Habitat Unit 14) is located about 7.5 miles south of the ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project area in an isolated sub-drainage that was historically part of the Alameda Creek floodplain but which is now segregated from the creek as a result of flood control facilities and development (Oakland Museum: http://museumca.org/creeks).

Habitat and Distribution

The USFWS Species Account (http://ecos.fws.gov/docs/life_histories/K048.html) describes the habitat of the species:

"HABITAT: Vernal pool tadpole shrimp are sporadic in their distribution, often inhabiting only one or a few vernal pools in otherwise more widespread pool complexes (Larry Eng, California Department of Fish and Game, pers. comm., 1990; Jamie King, in litt., 1992; Marie Simovich, in litt., 1992; Richard Brusca, San Diego Museum of Natural History, pers. comm., 1992). The vernal pool tadpole shrimp inhabits vernal pools and swales containing clear to highly turbid waters (Eng et al. 1990). These pools are most commonly located in grass bottomed swales of unplowed grasslands in old alluvial soils underlain by hardpan, or in mud-bottomed pools containing highly turbid water. Pools within a complex typically are separated by distances on the order of meters and may form dense, interconnected mosaics of small pools or a sparser scattering of larger pools. The crustacean is also found in a variety of natural, and artificial, seasonally ponded habitat types including: ephemeral drainages, stock ponds, reservoirs, ditches, backhoe pits, and ruts caused by vehicular activities (Nature Serve Explorer 2002). None are known to occur in running or marine waters or other permanent bodies of water. Vernal pools are unique seasonal wetlands that support a wide variety of wildlife, from waterfowl to amphibians– all of which rely on the protein-rich food sources found in these ecosystems.

Vernal pool tadpole shrimp are ecologically dependent on seasonal fluctuations in their habitat, such as absence or presence of water during specific times of the year, duration of inundation, and other environmental factors that include specific salinity, conductivity, dissolved solids, and pH levels. Water chemistry is one of the most important factors in determining the distribution of tadpole shrimp (Belk 1977; Jamie King, University of California, in litt., 1992; Marie Simovich, University of San Diego, in litt., 1992). The pools at Jepson Prairie and Vina Plains have very low conductivity, total dissolved solids (TDS), and alkalinity (Barclay and Knight 1984; Eng et al. 1990)."

Is there suitable habitat for vernal pool tadpole shrimp within the areas in which the ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project may have effects?

NO: There is no appropriate ephemeral pool habitat in the ACWD-ACFCD Joint Fish Passage Project area, and the available aquatic habitat is also (a) isolated from known populations and (b) occupied by predatory amphibians and fish. The species cannot occur in the ACWD-ACFCD Joint Fish Passage Project area. In addition, the only known suitable habitat for the species is in a separate watershed above the tidal zone and thus is not subject to the water quality effects of the ACWD-ACFCD Joint Fish Passage Project. Specifically:

- There is no vernal pool habitat in the area between Mission Boulevard and 2,600 feet downstream of the BART Bridge. Habitats in this area consist of disturbed riverine floodplain, landscaped park grassland, and concrete-rock levees and paved areas.

- There is no vernal pool habitat in the downstream estuary, either in river and bay areas or in the active marsh.
- There is no vernal pool habitat in the active channels that receive and convey water released from the SBA turnout at Vallecitos Creek.

Is there evidence that vernal pool fairy shrimp actually occurs within the areas in which the ACWD-ACFCD Joint Lower Alameda Creek Fish Passage Improvements Project may have direct effects?

NO: ACWD has conducted field surveys three times in the period from 2002 through 2009 and no evidence of vernal pool fairy shrimp has been found. ACFCD has also monitored in-channel sediment removal efforts for over 10 years and has not found evidence of the vernal pool fairy shrimp or its habitat. The ACWD-ACFCD Joint Fish Passage Project thus would have no effect on vernal pool fairy shrimp. There is no evidence from multiple surveys by ACWD, ACFCD, and others that the species actually exists in the ACWD-ACFCD Joint Fish Passage Project area.

Conclusion

Based on these considerations, potential Project effects on vernal pool tadpole shrimp were not evaluated in detail.

No Action Alternative

No construction activity or changes would occur. No impacts to vernal pool tadpole shrimp or their habitat would occur under the no action alternative.

5.6.10 Green Sturgeon (Threatened, NMFS)

Green sturgeon are known to forage for extended periods of time in San Francisco Bay (NMFS 2011, http://www.nmfs.noaa.gov/pr/species/fish/greensturgeon.htm), utilizing estuarine/riverine habitats extending up to the freshwater zone. In the Alameda Creek watershed, this would include the Flood Control Channel from the bay to the Union Pacific RR Bridge about 3 miles downstream of the Joint Fish Passage Project area. At this point, the channel elevation is about 2 meters above mean high tide. Up to the high tide zone, all of San Francisco Bay is considered critical habitat.

Habitat and Distribution

The NMFS species account (NMFS 2011) describes green sturgeon habitat and known distribution:

"Green sturgeon utilize both freshwater and saltwater habitat. Green sturgeon spawn in deep pools or "holes" in large, turbulent, freshwater river mainstems (Moyle *et al*., 1992). Specific spawning habitat preferences are unclear, but eggs likely are broadcast over large cobble substrates, but range from clean sand to bedrock substrates as well (Moyle *et al*., 1995). It is likely that cold, clean water is important for proper embryonic development.

Adults live in oceanic waters, bays, and estuaries when not spawning. Green sturgeon are known to forage in estuaries and bays ranging from San Francisco Bay to British Columbia.

Green sturgeon are believed to spend the majority of their lives in nearshore oceanic waters, bays, and estuaries. Early life-history stages reside in fresh water, with adults returning to freshwater to spawn when they are more than 15 years of age and more than 4 feet (1.3 m) in size. Spawning is believed to occur every 2-5 years (Moyle, 2002). Adults typically migrate into fresh water beginning in late February; spawning occurs from March-July, with peak activity from April-June (Moyle *et al*., 1995). Females produce 60,000-140,000 eggs (Moyle *et al*., 1992). Juvenile green sturgeon spend 1-4 years in fresh and estuarine waters before dispersal to saltwater (Beamsesderfer and Webb, 2002). They disperse widely in the ocean after their out-migration from freshwater (Moyle *et al*., 1992).

The actual historical and current distribution of where this species spawns is unclear as green sturgeon make non-spawning movements into coastal lagoons and bays in the late summer to fall, and because their original spawning distribution may have been reduced due to harvest and other anthropogenic effects (Adams *et al*., in press). Today green sturgeon are believed to spawn in the Rogue River, Klamath River Basin, and the Sacramento River. Spawning appears to rarely occur in the Umpqua River. Green sturgeon in the South Fork of the Trinity River were thought extirpated (Moyle, 2002), but juveniles are captured at Willow Creek on the Trinity River (Scheiff *et al*., 2001), and it is suspected that the fish could be coming from either the South Fork or the Trinity River (Adams *et al*., in press). Green sturgeon appear to occasionally occupy the Eel River."

Is there suitable habitat for green sturgeon within the areas in which the Joint Fish Passage Project may have effects?

YES: There is green sturgeon habitat in the Estuary Reach downstream of the Union Pacific RR Bridge. Green sturgeon may be able to forage in the estuary reach of lower Alameda Creek.

NO: Upstream of the Union Pacific RR Bridge, there is no suitable habitat. The Flood Control Channel is generally shallow during the period of green sturgeon spawning (March through July) and water temperatures are also high during the end of this period. Thus, spawning is not anticipated.

Is there evidence that the species actually occurs within the areas in which the Joint Fish Passage Project may have effects?

YES (Estuary Reach): Green sturgeon are known to forage in the estuary and potentially downstream portions of the Flood Control Channel but could probably not pass the Union Pacific Railroad Bridge grade control structure, which has a drop of about 2 meters.

NO (Construction and Upstream reaches): There is no record of green sturgeon upstream of the Union Pacific RR Bridge and green sturgeon have not been observed in ACWD and ACFCD surveys, on in other surveys. There have not been directed surveys for green sturgeon, but review of data from Alameda Creek Fisheries Restoration Workgroup (2000) contains no record of green sturgeon upstream of the Union Pacific RR Bridge. ACWD and ACFCD surveys over 20 years have not identified green sturgeon and no juvenile green sturgeon were found in the recent (2008) fish kill in the Joint Fish Passage Project reach.

Based on these considerations, the potential for actions to affect green sturgeon is limited to construction-related chemical, sediment, and turbidity effects. Green sturgeon may occur in the vicinity of the Alameda Creek Estuary as they forage in San Francisco Bay. They may thus be affected by water quality changes associated with Joint Fish Passage Project construction.

Is the habitat designated as Critical Habitat for the species or is it a component of the species Recovery Plan (if one exists)?

YES: San Francisco Bay and the estuarine area of Alameda Creek are designated as Critical Habitat for the green surgeon.

Is there a probability of direct and indirect effects to the species and, if so, what is the potential magnitude of effect?

POTENTIAL: There is a potential direct effect. Construction and on-going maintenance of existing and new facilities could result in spills of hazardous materials such as leaks from construction equipment. Any spill of hydrocarbons or un-cured concrete could have an effect on sturgeon foraging, either directly or by contaminating benthic food resources. Spills would affect individuals and critical habitat.

NO: There are no potential indirect effects. Fish Bypass Flows are too small to affect the estuarine reach of Alameda Creek and releases from the South Bay Aqueduct are diverted to recharge.

Conclusion

Green sturgeon could be adversely affected by the Project as a result of changes in water quality. The estuary is relatively turbid and turbidity associated with construction and maintenance is a small fraction of the typical turbidity from precipitation runoff in the urban environment. Spill of hydrocarbons or un-cured concrete could have an adverse effect on sturgeon foraging, either directly or by contaminating benthic food resources. Spills would affect individuals and critical habitat.

No Action Alternative

No construction activity or changes would occur. No impacts to green sturgeon or their habitat would occur under the no action alternative.

Proposed Avoidance and Minimization Measures

The implementation of rigorous hazardous materials avoidance and minimization protocols for both initial construction and on-going maintenance (measures **C1-7, HH1** and **HWQ1-10**, Table 9) would substantially preclude adverse water quality effects in the estuarine reach of the creek, and along the margins of San Francisco Bay. The successful record of ACWD and ACFCD in implementing such protocols is documented in recent monitoring reports from similar activities. Effects are thus highly unlikely to occur, and will be rapidly addressed and minimized if they do occur.

5.6.11 Delta Smelt (Threatened, USFWS)

Delta smelt (*Hypomesus transpacificus*) are slender-bodied fish, about 2 to 3 inches long. They are in the Osmeridae family (smelts). They have a steely blue sheen on the sides and seem almost translucent. Smelt live together in schools and feed on zooplankton (small invertebrates).

Species Habitat and Distribution

The USFWS species account describes the habitat and distribution of delta smelt as (http://www.fws.gov/sacramento/es/animal_spp_acct/acctfish.htm):

> "Delta smelt are an euryhaline species (tolerant of a wide salinity range). They have been collected from estuarine waters up to 14 ppt (parts per thousand) salinity. For a large part of their one-year life span, delta smelt live along the freshwater edge of the mixing zone (saltwater-freshwater interface), where the salinity is approximately 2 ppt.

> Shortly before spawning, adults migrate upstream from the brackish-water habitat associated with the mixing zone and disperse widely into river channels and tidally influenced backwater sloughs. They spawn in shallow, fresh or slightly brackish water upstream of the mixing zone.
>
> Most spawning happens in tidally influenced freshwater backwater sloughs and channel edgewaters. Although spawning has not been observed in the wild, the eggs are thought to attach to substrates such as cattails, tules, tree roots and submerged branches."
>
> "Delta smelt are found only from the Suisun Bay upstream through the Delta in Contra Costa, Sacramento, San Joaquin, Solano and Yolo counties. Their historic range is thought to have extended from Suisun Bay upstream to at least the city of Sacramento on the Sacramento River and Mossdale on the San Joaquin River. They used to be one of the most common pelagic (living in open water away from the bottom) fish in the upper Sacramento-San Joaquin Estuary."

Delta smelt do not occur in Alameda County except at the northeast corner of the county, at Clifton Court Forebay and associated facilities, which are part of the designated Critical Habitat for the species. This area is outside of the Alameda Creek watershed and approximately 30 miles from the Joint Fish Passage Project.

Is there suitable habitat for delta smelt within the areas in which the Joint Fish Passage Project may have effects?

NO: The USGS (http://sfbay.wr.usgs.gov/hydroclimate/sal_variations/index.html) simulations of salinity in South San Francisco Bay show salinity above the tolerance of Delta smelt (> 20 ppt) both at the San Mateo and Dumbarton bridge sampling/simulation sites. Delta smelt would thus be excluded from the estuarine habitats of the Flood Control Channel and downstream. It may be assumed that the species is listed for the Niles and Newark USGS Quads because of the potential for State Water Project water operations to indirectly affect the species. The Project would not alter current diversions from the Delta for SBA deliveries.

Is there evidence that the species actually occurs within the areas in which the Joint Fish Passage Project may have effects?

NO: Neither literature review nor recent ACFCD, ACWD, and East Bay Park District (2008) surveys encountered delta smelt.

Given the limited distribution of delta smelt, there is no mechanism by which the Joint Fish Passage Project could have effects on the species or its Critical Habitat. The Joint Fish Passage Project would not affect delta smelt.

Conclusion

Based on these considerations, potential Project effects on delta smelt were not evaluated in detail.

No Action Alternative

No construction activity or changes would occur. No impacts to delta smelt or their habitat would occur under the no action alternative.

5.6.12 Central Valley spring-run Chinook salmon (Threatened, NMFS) and Sacramento River winter-run Chinook salmon (Endangered, NMFS).

Spawning adult Chinook salmon generally measure 75-80 cm SL (9-10 kg.) and are olive brown to dark maroon (Moyle 2002). Chinook salmon generally live 3 to 6 years and feed on aquatic and terrestrial invertebrates and salmon eggs in freshwater. In intertidal areas juvenile Chinook salmon feed on amphipods, insects, and fish larvae. During the oceanic life stage, Chinook salmon feed on fish, large crustaceans, and squid (Behnke 2002). The current range of Central Valley Chinook salmon extends up the Sacramento River to the Keswick Dam (a flow-regulating dam located 9 miles downstream of Shasta Dam). In addition, the range of Central Valley Chinook salmon extends up many of the Sacramento River tributaries up to significant migrational barriers. Spring-run Chinook salmon are known to occur in the Feather River up to the Oroville Dam and the Yuba River up to Englebright Dam.

There are two listed Evolutionary Significant Units (ESU's) of Central Valley Chinook Salmon: Winter–run and Spring-run.

Habitat and Distribution

Sacramento River winter-run Chinook salmon historically occurred upstream as far as the headwater reaches in the Upper Sacramento, Pit, McCloud, and Calaveras Rivers. Following the construction of dams on these rivers in the 1940s, these populations were limited to areas below the Shasta Dam. The Fall River, one of the premier salmonid streams in California, also supported spawning habitat for Chinook salmon prior to the construction of the Shasta Dam (NOAA Fisheries 2003). Currently, the Sacramento River winter-run Chinook salmon occur as far upstream as the Keswick Dam and depend on cold water releases from the Shasta Dam (located 9 miles upstream of Keswick Dam) to allow them to hold for several months until they spawn in early summer (Behnke 2002). This run is currently limited to the Sacramento River below Keswick Dam (Moyle 2002). The run size in

1969 was approximately 120,000, whereas run sizes averaged 600 fish from 1990 to 1997 (Moyle 2002).

Historically, spring-run Chinook salmon occurred up to elevations of approximately 1,500 feet. If these fish spawned early in the season, they occurred at elevations up to approximately 2,500 to 3,000 (NOAA Fisheries 2003). The Sacramento River drainage is reported to have supported more than 100,000 spring-run Chinook in many years through the 1940s (Moyle 2002). The installation of the Shasta Dam in 1945 prevented access by Chinook salmon to over 250 kilometers of the Sacramento River drainage (Moyle 2002) thereby causing a tremendous decline in their population numbers. Between 1969 and 1997, the mainstem Sacramento River and several tributaries were estimated to support a range of 3,700 to 21,000 spring-run Chinook salmon per year (Moyle 2002). However, since 1990, the average Chinook salmon run size per year has dropped to 2,500.

There are concerns that the distribution of imported water supplies to Alameda Creek via the South Bay Aqueduct could induce Central Valley Chinook Salmon to stray into Alameda Creek.

Is there suitable habitat for Chinook salmon within the areas in which the Joint Fish Passage Project may have direct and indirect effects?

NO: Neither winter-run nor spring-run Chinook salmon occur in the South San Francisco Bay.

Is the habitat designated as Critical Habitat for the species or is it a component of the species Recovery Plan (if one exists)?

NO: The Joint Fish Passage Project does not affect Critical Habitat of either winter-run or spring-run Chinook salmon.

Is there evidence that the species actually occurs within the areas in which the Joint Fish Passage Project may have direct or indirect effects?

NO: There are no data suggesting that either run ever utilized Alameda Creek. There is evidence of fall-run Chinook salmon in South Bay streams, but there is no evidence of winter-run or spring-run Chinook salmon in Alameda County except at the northeast corner of the county, at Clifton Court Forebay and associated facilities, which are part of the designated Critical Habitat for both runs. This area is outside of the Alameda Creek watershed and approximately 30 miles from the Joint Fish Passage Project area.

Conclusion

There is no mechanism by which the Joint Fish Passage Project could have direct or indirect effects on winter-run or spring-run Chinook salmon or its Critical Habitat. It may be assumed that the species is listed for the Niles and Newark USGS Quads only because of the potential for water operations to indirectly affect the species. As noted in the Joint Fish Passage Project description and discussion of potential mechanisms for indirect effect, substantial changes in the timing of imported water deliveries are not anticipated. The Joint Fish Passage Project will have no effect on these two salmon ESUs.

No Action Alternative

No construction activity or changes would occur. No impacts to winter-run or spring-run Chinook salmon or their habitat would occur under the no action alternative.

5.6.13 California Tiger Salamander (Threatened, USFWS)

California tiger salamander is found in grasslands and foothills to elevations of 1,500 feet in central California and does not overlap the range of any other species of tiger salamander. Along the coast ranges, it occurs in southern San Mateo County south to central San Luis Obispo, and also in the vicinity of northwestern Santa Barbara County. The Santa Barbara population is considered a separate DPS and is "endangered." The population in Sonoma County is also considered a separate DPS and is "endangered." That these two populations have been classified as separate DPSs means that there has been little genetic exchange with the central California DPS for some time. In the Central Valley and the surrounding Sierra Nevada foothills the California tiger salamander occurs from northern Yolo County southward to northwestern Kern County and northern Tulare County.

Critical habitat has been designated in Yolo, Solano, Sacramento, San Joaquin, Amador, Calaveras, Stanislaus, Merced, Madera, Alameda, Fresno, Tulare, Santa Clara, San Benito, Monterey, Kern and San Luis Obispo counties.

Habitat and Distribution

USFWS provides the following description of California tiger salamander habitat and distribution (http://www.fws.gov/sacramento/es/animal_spp_acct/acctherp.htm):

> "The species is restricted to grasslands and low (typically below 2000 feet/610 meters) foothill regions where lowland aquatic sites are available for breeding. They prefer natural ephemeral pools or ponds that mimic them (stock ponds that are allowed to go dry). Larvae require significantly more time to transform into juvenile adults than other amphibians such as the western spadefoot toad (*Scaphiopus hammondii*) and Pacific tree frog (*Pseudacris regilla*). Compared to the western toad (*Bufo boreas*) or

> western spadefoot toad, California tiger salamanders are poor burrowers. They require refuges provided by ground squirrels and other burrowing mammals in which to enter a dormant state called *estivation* during the dry months."

Because California tiger salamanders dig poorly, tiger salamanders depend on the upland burrows of California ground squirrels and Botta's pocket gophers. Because the ground squirrel and pocket gopher tunnels collapse within 18 months of abandonment, new burrows are essential. California tiger salamanders require two distinct habitats. At the onset of the winter rains, they emerge from their burrows to feed and migrate as far as one mile to their wetland breeding ponds: vernal pools or seasonal ponds within the grasslands or oak savannah, or even stock ponds that mimic seasonal ponds. In years of “normal” amounts of rainfall these ponds will retain water long enough for salamanders to complete their larval stage and metamorphose, but not long enough, as in the case of permanent ponds, to be habitable by major predators such as fish and bullfrogs.

For California tiger salamanders to persist in an environment thus requires:

- The presence of burrowing animals such as ground squirrels;
- The presence of ephemeral wetlands/ponds within about 1 mile of available burrows;
- The absence of predatory fish or amphibians in the ponds; and
- The ability to move to and from these two distinct habitats.

Is there suitable habitat for the species within the areas in which the Joint Fish Passage Project may have direct effects?

NO: Previous ACWD and other surveys have found some potential for burrowing ground squirrels along the flood-control levee and near adjacent bare ground and grasslands. However, there is no ephemeral pond habitat free of predatory fish and bullfrogs within the Flood Control Channel from Mission Boulevard downstream to the ACFCD Drop Structure area. The adjacent recharge ponds are also permanent, and occupied by predatory fish, and are thus unsuitable for breeding and rearing. Specifically, there is an active largemouth bass fishery in Quarry Lakes. The nearest vernal pool habitat is part of the Don Edwards San Francisco Bay National Refuge, located approximately 7.5 miles southwest of the Joint Fish Passage Project reach, in an isolated sub-drainage separated from the Joint Fish Passage Project location by miles of dense urban development.

There is also no habitat for California tiger salamanders in the stream reaches upstream of Mission Boulevard or in the downstream reach to the estuary.

Is the habitat designated as Critical Habitat for the species or is it a component of the species Recovery Plan (if one exists)?

NO: California tiger salamander Critical Habitat in Alameda County is unit 18 in the far northeastern portion of the county, about 20 miles from the Joint Fish Passage Project area.

Is there evidence that the species actually occurs within the areas in which the Joint Fish Passage Project may have direct or indirect effects?

NO: California tiger salamanders have not been found in ACWD, ACFCD, or East Bay Park District surveys. The lack of California tiger salamander in the urbanized reaches of Alameda County is further demonstrated by four system-wide intensive surveys at East Bay Regional Parks (Bobzien and DiDonato 2007). Surveys in 1990, 1996, 2000, and 2004 found no evidence of California tiger salamander in park ponds and pools in the urbanized alluvial plain west of the coastal hills.

California tiger salamander is also not a riverine species and is not found in the active channels of the estuary or the channels upstream of Mission Boulevard.

Conclusion

California salamanders are known to occur in vernal pools and ephemeral ponds in the upper Niles Canyon area, but tiger salamanders do not use rivers and streams, and on-going water operations in the reach above Mission Boulevard is limited to flow and temperature effects in the low-flow channel. Given these conditions, the Joint Fish Passage Project will not affect California tiger salamander.

No Action Alternative

No construction activity or changes would occur. No impacts to California tiger salamander or their habitat would occur under the no action alternative.

5.6.14 California red-legged frog (Threatened, USFWS)

California red-legged frog has the potential to occur in riverine-floodplain habitats, and the Joint Fish Passage Project is within the broad general range of the species. The current distribution is in isolated patches in the Sierra Nevada, northern Coast, Santa Monica Mountains, and Central Coast hills. California red-legged frog is still common in the San Francisco Bay area and along the central coast (Santa Clara County Habitat Plan, 2011 Draft). The Joint Fish Passage Project does not occur in Critical Habitat, which in Alameda County is entirely upstream of the Joint Fish Passage Project construction site and the reach of indirect water supply management areas.

Habitat and Distribution

> The historic range of California red-legged frog extended from the Sierra Nevada foothills west to the Pacific coast and from Redding in the north into Baja California, and included several desert slope drainages in southern California. The species occurs from near sea level to approximately 5,000 feet. Most documented occurrences of this species, however, are below 3,500 feet. Breeding sites include a variety of aquatic habitats—larvae, tadpoles, and metamorphs use streams, deep pools, backwaters within streams and creeks, ponds, marshes, sag ponds, dune ponds, and lagoons. Breeding adults are commonly found in deep still or slow-moving water more than 2 feet deep, with dense, shrubby riparian or emergent vegetation, although the species may breed and rear in shallower habitats. Breeding generally occurs in March-April. The typical time from egg to tadpole is about three weeks and tadpoles require at least 11 weeks before they can utilize upland habitats. Eggs and tadpoles are thus generally limited to the aquatic zone until mid-summer.

The USFWS Species Account provides the following general description of the species habitat needs (http://www.fws.gov/sacramento/es/animal_spp_acct/acctherp.htm):

> "The California red-legged frog occupies a fairly distinct habitat, combining both specific aquatic and riparian components. Adults need dense, shrubby or emergent riparian vegetation closely associated with deep (greater than 2 1/3-foot deep) still or slow moving water. The largest densities of California red-legged frogs are associated with deepwater pools with dense stands of overhanging willows and an intermixed fringe of cattails. Well-vegetated terrestrial areas within the riparian corridor may provide important sheltering habitat during winter. California red-legged frogs estivate (enter a dormant state during summer or dry weather) in small mammal burrows and moist leaf litter. They have been found up to 100 feet from water in adjacent dense riparian vegetation."

The 2002 USFWS Recovery Plan and the 2005 Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog provide additional information related to parameters relevant to the Joint Fish Passage Project site and associated activities that determine habitat suitability for the species:

> "Contra Costa and Alameda Counties contain the majority of known California red-legged frog localities within the San Francisco Bay area, although they seem to have been nearly eliminated from the western lowland portions of these counties (west of Highway 80 and Highway 580), particularly near urbanization. (2002 Recovery Plan, page 8)."

> "During periods of wet weather, starting with the first rains of fall, some individuals may make overland excursions through upland habitats. Most of

> these overland movements occur at night. Evidence from marked and radio-tagged frogs on the San Luis Obispo County coast suggests that frog movements, via upland habitats, of about 1.6 kilometers (1 mile) are possible over the course of a wet season." (2002 Recovery Plan, page 13).
>
> "During dry periods, the California red-legged frog is rarely encountered far from water (Jennings *et al. in litt.* 1992). However, California red-legged frogs will sometimes disperse in response to receding water which often occurs during the driest time of the year. For example, between September 20 and October 20 in 1999, 7 adults were observed moving through nearby uplands on the University of Santa Cruz campus as the breeding pond dried (M. Allaback *in litt.* 2000).
>
> The manner in which California red-legged frogs use upland habitats is not well understood; studies are currently examining the amount of time California red-legged frogs spend in upland habitats, patterns of use, and whether there is differential use of uplands by juveniles, subadults, and adults. Dispersal distances are considered to be dependent on habitat availability and environmental conditions (N. Scott and G. Rathbun *in litt.* 1998)." (2002 Recovery Plan, page 14)
>
> "California red-legged frogs often disperse from their breeding habitat to forage and seek summer habitat if water is not available. This summer habitat could include spaces under boulders or rocks and organic debris, such as downed trees or logs; industrial debris; and agricultural features, such as drains, watering troughs, abandoned sheds, or hay-ricks.
>
> California red-legged frogs use small mammal burrows and moist leaf litter (Jennings and Hayes 1994); incised stream channels with portions narrower and deeper than 46 centimeters (18 inches) may also provide habitat (U.S. Fish and Wildlife Service 1996a). This depth may no longer be an accurate estimate of preferred depth for this species as individuals have been found using channels and pools of various depths. Most observations are associated with depths greater than 25 cm (10 inches)." (2002 Recovery Plan, page 14)
>
> "California red-legged frogs are sensitive to high salinity, which often occurs in coastal lagoon habitats. When eggs are exposed to salinity levels greater than 4.5 parts per thousand, 100 percent mortality occurs (Jennings and Hayes 1990)." (2002 Recovery Plan, page 15).

In summary of a discussion of the effects of non-native fish and amphibians on California red-legged frog, the 2002 Recovery Plan notes (page 26):

> "Overall, while California red-legged frogs are occasionally known to persist in the presence of either bullfrogs or mosquitofish (and other non-native

> species), the combined effects of both non-native frogs and non-native fish often leads to extirpation of red-legged frogs (Kiesecker and Blaustein 1998, Lawler *et al.* 2000, S. Christopher *in litt.* 1998)."

The 2002 Recovery Plan (page 16) also addresses the potential effects of water temperature on habitat suitability:

> "Early embryos of northern red-legged frogs are tolerant of temperatures only between 9 and 21 degrees Celsius (48 and 70 degrees Fahrenheit) (Nussbaum *et al*. 1983). Study plots at Pescadero Marsh (San Mateo County) with the greatest number of California red-legged frog tadpoles had mean water temperatures between 15.0 and 24.9 degrees Celsius (60 to 75 degrees Fahrenheit). Observations by S. Bobzien (pers.comm. 1998) indicated that California red-legged frogs were absent when temperatures exceed 22 degrees Celsius (70 degrees Fahrenheit), particularly when the temperature throughout a pool was this high and there are no cool, deep portions."

Is there suitable habitat for the species within the areas in which the Joint Fish Passage Project may have direct or indirect effects?

Potential: There is hypothetically suitable habitat in the Construction Reach, although there are multiple persistent stressors affecting habitat quality. Adjacent uplands are also hypothetically suitable, although the upland habitats are also heavily disturbed and suitable estivation habitat is limited by paving and landscaping.

Is the habitat designated as Critical Habitat for the species or is it a component of the species Recovery Plan (if one exists)?

NO: In Alameda County, Critical Habitat is located in the eastern foothills 10 to 20 miles upstream of the Joint Fish Passage Project area of direct and indirect effects.

Is there evidence that the species actually occurs within the areas in which the Joint Fish Passage Project may have direct or indirect effects?

NO (Construction and Estuary Reaches): There is no recent evidence of California red-legged frog in this reach of Joint Fish Passage Project Action Area, either in the flood control channel or the estuary. East Bay Regional Park District (2007) described the species current distribution in its 97,000 acres of parks as excluding all parks to the west of the coastal foothills. None of the urban floodplain parks have California red-legged frogs, although there are local habitats that would be considered suitable for the species.

Results from the following surveys by multiple agencies resulted in negative findings: ACFCD surveyed for California red-legged frog in Crandall Creek in 2005 Alameda

County Transportation Authority (2009) surveyed potentially suitable habitat at several bridge crossing sites;. Multiple surveys for Patterson Ranch Project (2008); ACWD and ACFCD, and no California red-legged frogs were found pre, during and post monitoring of construction between Decoto and Arden Wood Boulevard in the Flood Control Channel between 1999-2010.

Similar results have occurred in other development sites in the alluvial, urbanized floodplain. There is no evidence that California red-legged frogs exist in the Joint Fish Passage Project reach.

In summary, California red-legged frogs have probably been extirpated from the flood control channel and the downstream estuarine areas (west of Niles Canyon) because of the cumulative effects of a variety of stressors:

- The flood control channel between Mission Boulevard and Ardenwood Boulevard has abundant non-native predatory fish. For example, East Bay Park District surveys of the Joint Fish Passage Project Reach in 2008 identified Sacramento pike minnow and largemouth bass. There is a substantial potential for predation stress from these predatory fish;

- Bullfrogs are known to occur in the flood control channel and in ACWD recharge basins, as well as nearby ponds on East Bay Regional Park District facilities and in Alameda Creek upstream. There is a substantial potential for bullfrog predation to adversely affect California red-legged frog in the channel and in the floodplain;

- Salinity in the estuarine portions of Alameda Creek between the nion Pacific Railroad and Ardenwood Boulevard Crossing also precludes this area from use by California red-legged frog;

- The potential small population in a vernal pool and wetland areas of the Don Edwards San Francisco Bay National Refuge are not connected to the Flood Control Channel. Overland movement between this area and the Joint Fish Passage Project area is cut off by urban development and major highways;

- Potential aestivation habitat in the flood control channel is limited because the floodplain is often inundated (bankfull) during periods when the California red-legged frog would be aestivating;

- Rip-rap along the channel does not generally provide suitable vegetation for egg masses and egg masses may thus be washed downstream during mid to late season flooding; and

- Forage and aestivation habitats adjacent to the flood control channel are highly limited and disturbed. Areas adjacent to the rip-rapped channel are limited, routinely disturbed, paved in many areas, and occupied by bullfrogs and terrestrial predators such as raccoons, domestic dogs, and domestic cats. In the urban area, upland habitats suitable for foraging and aestivation are (a) limited by development and (b) where there may be small patches of barren ground, they are isolated from the channel by frontage roads and the levee crest maintenance road/recreational trail, blocked by fencing, and maintained and landscaped.

This suite of stressors – predation by fish and bullfrogs, poor aquatic habitat, high temperatures during tadpole development, lack of aestivation habitat, and isolation from other potential populations of California red-legged frogs represents substantial, continuous, and multi-factored stress. Alone, the combination of predation by native and non-native fish and bullfrogs has been hypothesized as the mechanism for local extirpation of California red-legged frogs in otherwise potentially suitable habitats in the regional park system (East Bay Regional Park District, see above). The combination of multiple habitat stressors, isolation from other populations, and predation stresses has probably locally extirpated California red-legged frog from the urban portions of their historic range in Alameda County.

Potential: (Upstream Reach):

The California red-legged frog is known to occur in the upper Niles Canyon reach and in the upper watershed. On-going water supply operations are contained within the active channel. In these upstream channels, it is likely that California red-legged frogs will be affected by on-going water operations. Effects of water management are related to water temperature and flow. Potential effects would be adverse if (a) they resulted in temperatures outside of the suitable range for each life history stage or (b) they resulted in unsuitable flow and depth conditions in the affected reach of stream.

Is there a probability of direct or indirect effects to the species and, if so, what is the potential magnitude of effect?

Potential: In Arroyo del Valle, Arroyo de la Laguna, and other upper watershed arroyos, flow from November through April is dominated by natural inflow. Typical ACWD water supply operations involve diversion of this natural flow and operations of SBA turnouts are (a) minimal and (b) generally occur in dry years during low inflow periods. In wet years and most periods of dry years, ACWD operations from November through April do not affect flow in the upstream channels. In infrequent dry periods of low natural flows, releases from SBA turnouts would be a fraction of typical natural flows and would thus (a) not alter typical flows in an adverse manner and (b) may benefit California red-legged frogs by helping to maintain adequate flow and water depth for breeding, egg incubation, and juvenile rearing. These effects would not be considered adverse.

From October through May, ACWD water supply operations focus on natural inflow until May 31 when water supply operations involve releases from the SBA. SBA releases include contributing releases to Arroyo del Valle and Arroyo de la Laguna that are necessary to maintain a wetted channel in portions of the dry upper watershed. Similarly, releases to Vallecitos Creek contribute to maintenance of flow and ponded areas in Niles Canyon. Given quite low natural inflow in the upper reaches of the Alameda Creek Watershed, ACWD water operations contribute to maintaining creek conditions that enhance potential for California red-legged frogs to complete their life history.

Typical water temperatures in the upper watershed are shown on Figures 21-27. Ambient temperatures and SBA temperatures are within the ranges specified by the 2002 Recovery Plan for all life history phases (Table 28). Temperatures in SBA releases tend to be slightly cooler in all life history periods, and this may be beneficial for California red-legged frogs in the summer, when ambient temperatures in Arroyo de la Laguna approach 26°C in the summer, when tadpoles are still rearing. Releases of SBA supplies at an average of 23°C in July and August would help maintain water temperatures below the tadpole lethal threshold of about 25°C.

Table 28. Temperature tolerance of California red-legged frog (in life-history aquatic phases).

Life History Phase	Temperature Tolerance in degrees Celsius (C)	Length of Life History Stage	Average Temperature Arroyo de la Laguna	Average Temperature SBA
Breeding-spawning and Egg incubation	9-21°C	November - April	10°C to 17°C	9.5°C to 16.5°C
Tadpoles	15–24.9°C	January - May	10° C to 19.5°C	10°C to 17.5°C
Adult residence	up to 28°C	Year Round	10°C to 26°C	10°C to 23°C

Source: USFWS Recovery Plan; Jennings and Hayes (1990, 1993)

Conclusion

In summary, California red-legged frogs are highly unlikely to occur in the Flood Control Channel/Construction area of direct effects. No effects are anticipated in the Flood Control Channel or downstream estuary. In the upstream reaches of the watershed, water supply operations will (a) not adversely affect California red-legged frog and (b) may be beneficial to California red-legged frog by stabilizing flow and temperature conditions in stream/arroyo reaches that may support the species. No adverse effects to California red-legged frogs are thus anticipated.

No Action Alternative

No construction activity or changes would occur. No impacts to California red-legged frogs or their habitat would occur under the no action alternative.

5.6.15 Alameda Whipsnake (Threatened, USFWS)

The Alameda whipsnake is a narrowly distributed subspecies of *Masticophis lateralis*, found in chaparral, scrub, and grasslands primarily in the East San Francisco Bay hills. As described in the Designation of Critical Habitat (2006), the species utilizes a broad spectrum of habitat conditions within its limited range and appears to be adapted to upland habitats of varying canopy cover. Designated Critical Habitat includes Unit 3 which abuts Alameda Creek along Highway 84 on the north side Niles Canyon. The Joint Fish Passage Project construction zone is downstream of this reach by approximately 1.2 miles and is isolated from the Critical Habitat area by Highway 84 and urban/suburban development.

Habitat and Distribution

The USFWS Species Account for this species describes habitat and distributionhttp://www.fws.gov/sacramento/es/animal_spp_acct/acctherp.htm:

> "Alameda whipsnakes are typically found in chaparral—northern coastal sage scrub and coastal sage. Recent telemetry data indicate that, although home ranges of Alameda whipsnakes are centered on shrub communities, they venture up to 500 feet into adjacent habitats, including grassland, oak savanna, and occasionally oak-bay woodland.
>
> Telemetry data indicate that whipsnakes remain in grasslands for periods ranging from a few hours to several weeks at a time. Grassland habitats are used by male whipsnakes most extensively during the mating season in spring. Female whipsnakes use grassland areas most extensively after mating, possibly in their search for suitable egg-laying sites.
>
> The only evidence of Alameda whipsnake egg-laying is within a grassland community adjacent to a chaparral community. This egg-laying occurred within a few feet of scrub on ungrazed grassland interspersed with lots of scattered shrubs. At two sites, gravid females have been found in scrub.
> The current distribution of the subspecies has been reduced to five separate areas with little or no interchange due to habitat loss, alteration, and fragmentation:
>
> 1. Sobrante Ridge, Tilden/Wildcat Regional Parks to the Briones Hills, in Contra Costa County (Tilden-Briones population)
> 2. Oakland Hills, Anthony Chabot area to Las Trampas Ridge, in Contra Costa County (Oakland-Las Trampas population)
> 3. Hayward Hills, Palomares area to Pleasanton Ridge, in Alameda County (Hayward-Pleasanton Ridge population)

4. Mount Diablo vicinity and the Black Hills, in Contra Costa County (Mount Diablo-Black Hills population)

5. Wauhab Ridge, Del Valle area to the Cedar Mountain Ridge, in (Sunol-Cedar Mountain population)

Compared to the much more common chaparral whipsnake, the Alameda subspecies' historic range has always had a very restricted distribution. It most likely included all of the coastal scrub and oak woodland communities in the East Bay in Contra Costa, Alameda, and parts of San Joaquin and Santa Clara counties."

Is there suitable habitat for the species within the areas in which the Joint Fish Passage Project may have direct effects?

NO: The Construction zone and downstream reaches are outside of the species range. Upland habitats needed by the species do not occur in the Flood Control Channel and adjacent park and urban development. In the upper watershed, operations affect only the active channel, and no effects to upland habitats are anticipated to occur.

Is there evidence that the species actually occurs within the areas in which the Joint Fish Passage Project may have direct or indirect effects?

NO: ACWD and ACFCD have never found Alameda whipsnake in surveys and the species is not generally surveyed for in the urban floodplain. The species is not found in the aquatic habitats upstream of Mission Boulevard. It may transiently cross channels, but this action would not affect the species.

Conclusion

Given the isolation of the Joint Fish Passage Project area from suitable habitats and the extremely low likelihood of the species in the Joint Fish Passage Project area, the Joint Fish Passage Project will not affect Alameda whipsnake or its habitat.

No Action Alternative

No construction activity or changes would occur. No impacts to Alameda whipsnake or their habitat would occur under the no action alternative.

5.6.16 Western Snowy Plover (Threatened, USFWS)

The western snowy plover is a small shorebird that nests adjacent to tidal waters of the Pacific Ocean and mainland coast, peninsulas, offshore islands, adjacent bays, estuaries, and coastal rivers. Pacific coast plovers typically forage for small invertebrates in wet or dry beach-sand, among tide-cast kelp, and within low foredune vegetation (U.S. Fish and Wildlife Service 2004). Some plovers use dry salt ponds and river gravel bars. The breeding season in the United States extends from March 1 through September 30, although courtship activities have been observed during February. The species breeds and nests above the high tide line on coastal beaches, sand spits, dune-backed beaches, sparsely-vegetated dunes, beaches at creek and river mouths, and salt pans at lagoons and estuaries (U.S. Fish and Wildlife Service 2001). Less common nesting habitat includes bluff-backed beaches, dredged material disposal sites, salt pond levees, dry salt ponds, and river bars (U.S. Fish and Wildlife Service 2001).

Breeding at river bars has been studied in Northern California on the Eel River (Colwell *et al*. 2005. Snowy Plover reproductive success in beach and river habitats. *J. Field Ornithol.* 76(4):373–382). Colwell *et al.* (2005) describe the habitat characteristics of the riverine bar breeding area:

> "Plovers bred at gravel bars along the lower Eel River, from its confluence with the Pacific Ocean upriver approximately 14 km (Colwell *et al*. 2004). River-breeding plovers nested in coarse, heterogeneous substrates varying in size from sand to pea-sized gravel and large stones, which were sparsely vegetated by willow (*Salix* spp.) and white sweet clover (*Melilotus alba*)."

Habitat and Distribution

In the South San Francisco Bay, Western snowy plovers are known to breed and forage in the Don Edwards San Francisco Bay National Refuge. Review of annual breeding surveys at the refuge (San Francisco Bay Bird Observatory 2004 to 2010) documents breeding and foraging along levees and within the various salt marsh pond areas. There is no record of breeding upstream of the refuge and no record of foraging in the freshwater channel.

Is there suitable habitat for the species within the areas in which the Joint Fish Passage Project may have direct or indirect effects?

YES: At its nearest point, the Joint Fish Passage Project Construction Reach occurs approximately 5 miles upstream of known breeding habitat, but the open, sandy, beach and salt-marsh conditions typical of breeding and foraging habitat of the species does not occur in the Joint Fish Passage Project construction reach. The species is known to use gravel bars in the tidal/freshwater interface in the Eel River estuary, but this is considered a localized anomaly. There is an hypothetical potential for the species to forage in the lower reaches of the tidal/freshwater mixing zone which may be affected by construction-related runoff.

Is the habitat designated as Critical Habitat for the species or is it a component of the species Recovery Plan (if one exists)?

NO: The shoreline of the downstream marsh and Bay are designated critical habitat. Flood Control Channel is outside of this designated area.

Is there evidence that the species actually occurs within the areas in which the Joint Fish Passage Project may have direct or indirect effects?

YES: The species breeds and forages in the lower reaches of the tidal/freshwater mixing zone.

Is there a probability of direct or indirect effects to the species and, if so, what is the potential magnitude of effect?

Potential: In the Estuary Reach, construction related runoff may affect water quality in foraging areas. This could occur if construction in the channel resulted in spills of hazardous materials, such as fuels and lubricants and uncured concrete. If a substantial spill occurs, it would be considered a significant adverse impact.

To avoid and minimize such effects, ACWD and ACFCD will implement a rigorous program to avoid such spills and minimize the effects of any spills that may occur (measures **HH1** and **HWQ1-10**, Table 9). These protocols have been successfully implemented by ACWD and ACFCD.

Conclusion

Given these considerations, the implementation of rigorous hazardous materials avoidance and minimization protocols is necessary to preclude direct water-quality effects. The successful record of ACWD and ACFCD in implementing such protocols is documented in recent monitoring reports from similar activities. With these avoidance and minimization measures, the Joint Fish Passage Project may affect but is unlikely to adversely affect Western snowy plover or its habitat.

No Action Alternative

No construction activity or changes would occur. No impacts to Western snowy plover or their habitat would occur under the no action alternative.

5.6.17 California Clapper Rail (Endangered, USFWS)

The California clapper rail is a large rail now found almost entirely in brackish marsh and coastal salt marsh within the San Francisco Bay area. California clapper rail breeding and nesting/rearing occurs from February through August. The species is sensitive to disturbance, changes in hydrology and salinity, and chemical contamination of its habitat (USFWS Species Account, http://www.fws.gov/sacramento/es/animal_spp_acct/acctbird.htm). The species is threatened, in part by loss of habitat: "Much of the East Bay shoreline from San Leandro to Calaveras Point is rapidly eroding, and many marshes along this shoreline could lose their clapper rail populations in the future, if they have not already."

Clapper rails are most active in early morning and late evening, when they forage in marsh vegetation in and along creeks and mudflat edges. They often roost at high tide during the day.

Habitat and Distribution

The USFWS Species Account described the habitat and distribution as follows (http://www.fws.gov/sacramento/es/animal_spp_acct/acctbird.htm):

> "Throughout their distribution, California clapper rails occur within a range of salt and brackish marshes. In south and central San Francisco Bay and along the perimeter of San Pablo Bay, rails typically inhabit salt marshes dominated by pickleweed (*Salicornia virginica*) and Pacific cordgrass (*Spartina foliosa*). Pacific cordgrass dominates the middle marsh zone throughout the south and central Bay. Clapper rails have rarely been recorded in nontidal marsh areas."
>
> "California clapper rails are now restricted almost entirely to the marshes of San Francisco estuary, where the only known breeding populations occur. In south San Francisco Bay, there are populations in all of the larger tidal marshes. Distribution in the North Bay is patchy and discontinuous, primarily in small, isolated habitat fragments. Small populations are widely distributed throughout San Pablo Bay. They are present sporadically and in low numbers at various locations throughout the Suisun Marsh Area (Carquinez Strait to Browns Island, including tidal marshes adjacent to Suisun, Honker, and Grizzly Bays)."

Is there suitable habitat for the species within the areas in which the Joint Fish Passage Project may have direct or indirect effects?

YES: Recent (2010) surveys for California clapper rail by the San Francisco Estuary Invasive Spartina Project and the Point Reyes Bird Observatory (PRBO) generally limit surveys to areas under tidal influence, although PRBO surveys extend to the highest tidal marsh and channel boundaries. In lower Alameda Creek, maps of PRBO surveys indicate that surveys extend to approximately 0.8 miles downstream of Interstate 880 at the western end of the Don Edwards San Francisco Bay National Refuge. This is consistent with the clapper rail's primary use of salt marsh/estuarine habitats. There is no habitat within the construction areas, but downstream habitat may be affected by construction-related runoff.

Is the habitat designated as Critical Habitat for the species or is it a component of the species Recovery Plan (if one exists)?

YES: There is no designated Critical Habitat. In the Central/South San Francisco Bay, recovery units "r" and "s" extend from the mouth of Alameda Creek upstream to approximately the Union Pacific RR Bridge. This area may be affected by construction-related runoff.

Is there evidence that the species actually occurs within the areas in which the Joint Fish Passage Project may have direct or indirect effects?

YES: There is some evidence from recent surveys that California clapper rail may forage in the tidal/freshwater mixing zone (San Francisco Estuary Invasive Spartina Project 2010 and Point Reyes Bird Observatory 2006-2010). These surveys confirm foraging along the channel in the reach downstream of the freshwater/tidal mixing zone.

Is there a probability of direct or indirect effects to the species and, if so, what is the potential magnitude of effect?

Potential: The California clapper rail will not occur in the Construction or Upstream reaches, but could forage in the downstream Estuary Reach. There is thus a potential for direct construction activity effects and effects associated with construction-related water quality, such as hydrocarbon spills that could affect foraging in the Recovery Plan area. Individuals and habitats could be harmed. If a substantial spill occurs, it would be considered a significant adverse impact.

To avoid and minimize such effects, ACWD and ACFCD will implement a rigorous program to avoid such spills and minimize the effects of any spills that may occur (measures **C1-7, HH1** and **HWQ1-10**, Table 9). These protocols have been successfully implemented by ACWD and ACFCD.

Conclusion

The implementation of rigorous hazardous materials avoidance and minimization protocols would substantially reduce the likelihood and magnitude of water quality effects. The successful record of ACWD and ACFCD in implementing such protocols is documented in recent monitoring reports from similar activities. With these avoidance and minimization measures, the Joint Fish Passage Project may affect but is unlikely to adversely affect California clapper rail or its habitat.

No Action Alternative

No construction activity or changes would occur. No impacts to California clapper rail or their habitat would occur under the no action alternative.

5.6.18 California Least Tern (Endangered, USFWS)

The USFWS Five-Year Review of the California least tern (2006) provides the most recent comprehensive evaluation of the species status, habitat, and distribution, and the following analysis is based primarily on this status review.

Habitat and Distribution

The California least tern is a migratory shorebird, breeding in defined colonies and nesting on open beach habitats from San Diego to the San Francisco Bay. The species nests in colonies on relatively open beaches kept free of vegetation by natural scouring from tidal action. California least terns forage primarily in near-shore ocean waters and in shallow estuaries and lagoons and may also forage close to shore in ocean waters. Foraging is generally within 2 miles of breeding/nesting sites.

In the San Francisco Bay Area, designated management areas in the San Francisco Bay area are the Alameda Naval Station (Alameda Point), Alvarado Salt Ponds, and the Oakland Airport. The 2009 California Department of Fish and Wildlife surveys for California least terns identified breeding terns at five Bay Area locations (from north to south):

- Napa-Sonoma Marsh;
- Montezuma Wetlands;
- Alameda Point;
- Hayward Shore; and
- Eden Landing.

The Hayward Shore and Eden Landing sites are within 5 miles of the Joint Fish Passage Project activities. At these sites, primary forage was top smelt, reflecting the tern's typical foraging patterns in salt water environments.

Is there suitable habitat for the species within the areas in which the Joint Fish Passage Project may have direct or indirect effects?

YES: California least tern is not known to breed, nest, or forage in freshwater habitats and will not occur in the construction area or upstream channels. The tern may forage in the freshwater/tidal mixing zone downstream of Interstate 880 to the mouth of the creek.

Is the habitat designated as Critical Habitat for the species or is it a component of the species Recovery Plan (if one exists)?

NO: There is no Critical Habitat designated. In the South San Francisco Bay, the shoreline and estuarine habitats of the Don Edwards San Francisco Bay National Refuge constitute a functional recovery unit and include the foraging areas along the flood control channel from the boundary of the refuge and the area of urban development downstream of the Union Pacific RR Bridge.

Is there evidence that the species actually occurs within the areas in which the Joint Fish Passage Project may have direct or indirect effects?

YES: California least tern is known to forage along the Bay and the Estuary Reach of Alameda Creek where construction runoff may have direct effects.

Is there a probability of direct or indirect effects to the species and, if so, what is the potential magnitude of effect?

Potential: No direct effects are anticipated upstream of the Alvarado Boulevard, the Construction Reach and Upstream Reach are well outside of the range of the species, and there is no suitable breeding or foraging habitat in the construction zone. Downstream of the Union Pacific RR Bridge, there is a potential for foraging, primarily in the lower end of the freshwater/tidal mixing zone.

There is thus a potential for direct construction activity effects and effects associated with construction-related water quality, such as hydrocarbon spills that could affect foraging in the Recovery Plan area. Individuals and habitats could be harmed. If a substantial spill occurs, it would be considered a significant adverse impact.

To avoid and minimize such effects, ACWD and ACFCD will implement a rigorous program to avoid such spills and minimize the effects of any spills that may occur (measures **C1-7, HH1** and **HWQ1-10**, Table 9). These protocols have been successfully implemented by ACWD and ACFCD.

Conclusion

The implementation of rigorous hazardous materials avoidance and minimization protocols would substantially reduce the likelihood and magnitude of water quality effects. The successful record of ACWD and ACFCD in implementing such protocols is documented in recent monitoring reports from similar activities. With these avoidance and minimization measures, the Joint Fish Passage Project may affect but is unlikely to adversely affect the California least tern or its habitat.

No Action Alternative

No construction activity or changes would occur. No impacts to California least tern or their habitat would occur under the no action alternative.

5.6.19 Salt Marsh Harvest Mouse (Endangered, USFWS)

As described in the USFWS Sacramento Office Species Account: "The salt marsh harvest mouse (*Reithrodontomys raviventris*), also known as the "red-bellied harvest mouse," is a small native rodent in the Cricetidae family, which includes field mice, lemmings, muskrats, hamsters and gerbils. There are two subspecies: the northern (*R. r. halicoetes*) and southern (*R. r. raviventris*). The northern subspecies lives in the marshes of the San Pablo and Suisun bays, the southern in the marshes of Corte Madera, Richmond and South San Francisco Bay."

Habitat and Distribution

The USFWS species account describes the habitat of the species as follows:

> "Salt marsh harvest mice are critically dependent on dense cover and their preferred habitat is pickleweed (*Salicornia virginica*). Harvest mice are seldom found in cordgrass or alkali bulrush. In marshes with an upper zone of peripheral halophytes (salt-tolerant plants), mice use this vegetation to escape the higher tides, and may even spend a considerable portion of their lives there. Mice also move into the adjoining grasslands during the highest winter tides.
>
> The mice probably live on leaves, seeds and stems of plants. In winter, they seem to prefer fresh green grasses. The rest of the year, they tend toward pickleweed and saltgrass. They have longer intestines than the western harvest mouse, which is a seed eater. The northern subspecies of the salt marsh mouse can drink sea water for long periods but prefers fresh water. The southern subspecies can't subsist on sea water but it actually prefers moderately salty water over fresh.
>
> The two subspecies are restricted to the salt and brackish marshes of San Francisco, San Pablo, and Suisun Bay areas. The southern subspecies inhabits central and south San Francisco Bay."

The USFWS 2010 Status Review describes the current distribution of the species;

> "The current known distribution (surveyed locations) of the salt marsh harvest mouse can be found in Figure 1 (California Natural Diversity Database 2009). Staff from CDFG are currently working with their vegetation group and will have all of the potential habitat in Suisun Marsh mapped soon (Barthman-Thompson, *in litt*. 2009). In general, distribution can be estimated from the remaining suitable diked and tidal marsh habitat, and the review of live-trapping surveys, although trapping data are limited (Zetterquist 1976; Larkin 1984; Shellhammer 1984; Bias and Morrison 1993). Much of the data on local abundance and distribution of the salt marsh harvest mouse have been derived from local short-term studies, usually conducted on

privately owned diked baylands proposed for land use changes (Shellhammer, pers. comm. 2005). These data must be interpreted with caution as data become quickly outdated."

With regard to the southern population, the 2010 Status Review notes:

"Studies by Shellhammer (Shellhammer, pers. comm. 2005) indicate that population size is generally correlated with the depth of the *Sarcocornia* plain (*i.e.*, the middle zone of tidal marshes). There are indications that deep (from shore to bay) *Sarcocornia* marshes, especially if they have islands of *Grindelia* within them, may provide enough habitat for the mice such that they can compensate for extremely narrow high marshes at their upper edges. Corridors (sometimes referred to as strip or narrow fringing marshes, but also can be bands of appropriate vegetation between two larger marshes) tend to have narrower *Sarcocornia* zones, as well as extremely narrow high marsh zones, and support few to no salt marsh harvest mice (Shellhammer, *in litt*. 2009). In fact, the narrower the strip marsh, the more frequently and intensely it floods (Albertson *in litt*. 2009). Most of the marshes of the South San Francisco Bay are strip-like marshes and, as such, support few harvest mice. In strip-like marshes identified as marsh corridors to connect habitat areas, the relative value of the width and complexity of the high marsh zone increases as the width of the middle marsh, or pickleweed/*Sarcocornia* zone, diminishes (Shellhammer, pers. comm. 2005)."

Given the close linkage between pickleweed and the salt marsh harvest mouse, the range of pickleweed plays a large role in the species distribution. A recent report describes the relationship between salinity and pickleweed:

"The biomass of pickleweed is mostly affected by salinity, flooding, and nutrients. The role of salinity has been examined extensively in halophyte biology (Barbour and Davis 1970). Although many halophytes grow faster and attain a higher biomass when freshwater is available (Barbour and Davis 1970, Snow and Vince 1984), pickleweed requires some salt for optimum growth (Barbour and Davis 1970, Griffith Unpublished data). Salinities of 10 ppt typically yield optimum growth (Josselyn 1983). In freshwater, plants often accumulate less biomass, are less succulent with weakened re-rooting capabilities (Griffith Unpublished data), and are easily outcompeted (Zedler 1982, Allison 1992). Thus, while reducing salt stress can lead to rapid establishment and growth (Allison 1996), prolonged periods of growth in freshwater can stunt growth (Allison 1992) and ultimately kill the plant (Zedler 1982)." (Griffith, KA. 2010 Elkhorn Slough Technical Report Series 2010. Pickleweed: factors that control distribution and abundance in Pacific Coast estuaries and a case study of Elkhorn Slough. California Elkhorn Slough National Estuarine Research Reserve and the Elkhorn Slough Foundation).

Based on CDFW surveys cited in the 2010 Status review and the salinity of the lower reaches of the creek, the known breeding distribution of the species in Alameda Creek probably ends in the high marsh area about a mile downstream of Interstate 880 and about 4 miles from the Joint Fish Passage Improvements Project construction area. Some use of habitat in the reach below the Union Pacific RR Bridge is probable. Finally, Shellhammer (1998) describes the habitat requirements of the species:

> "Salt marsh harvest mice are what scientists call "cover dependent species" in that they only live under thick vegetation." (Shellhammer, Howard. 1998. A Marsh is a Marsh is a Marsh . . . But not Always to a Salt Marsh Harvest Mouse. Tideline Vol 18 No. 4 1-3.)

Is there suitable habitat for the species within the areas in which the Joint Fish Passage Project may have direct and indirect effects?

Potential: There is potential for salt marsh harvest mouse to occur in the Estuary Reach, at least as a transient forager or when escaping from inundation during periods of high tides. In this reach, there is a small potential for the species to be affected by runoff from construction activity while foraging along the shoreline.

Is the habitat designated as Critical Habitat for the species or is it a component of the species Recovery Plan (if one exists)?

NO: There is no Critical Habitat designated for salt marsh harvest mouse. The USFWS (2010) 5-year review maps areas of potential recovery units and shows potential use of Alameda Creek upstream to Ardenwood Boulevard. This is approximately 5-6 miles from the Joint Fish Passage Project construction zone.

Is there evidence that the species actually occurs within the areas in which the Joint Fish Passage Project may have direct effects?

YES: Annual CDFW surveys confirm that the species may use channel levees and floodplain habitats intermittently from Ardenwood Boulevard to the mouth of the creek. Post-construction runoff under high flows could therefore bring silt and contaminants from construction into the species habitat.

Is there a probability of direct and indirect effects to the species and, if so, what is the potential magnitude of effect?

Potential: There is thus a potential for direct construction activity effects and effects associated with construction-related water quality, such as hydrocarbon spills that could affect foraging in the Recovery Plan area. Individuals and habitats could be harmed. If a substantial spill occurs, it would be considered a significant adverse impact.

To avoid and minimize such effects, ACWD and ACFCD will implement a rigorous program to avoid such spills and minimize the effects of any spills that may occur (measures **C1-7, HH1** and **HWQ1-10**, Table 9). These protocols have been successfully implemented by ACWD and ACFCD.

Conclusion

The implementation of rigorous hazardous materials avoidance and minimization protocols would substantially reduce the likelihood and magnitude of water quality effects. The successful record of ACWD and ACFCD in implementing such protocols is documented in recent monitoring reports from similar activities. With these avoidance and minimization measures, the Joint Fish Passage Project may affect but is unlikely to adversely affect the salt marsh harvest mouse or its habitat.

No Action Alternative

No construction activity or changes would occur. No impacts to the salt marsh harvest mouse or their habitat would occur under the no action alternative.

5.6.20 San Joaquin Kit Fox

The San Joaquin kit fox inhabited much of California's San Joaquin Valley prior to 1930. Its range extended from southern Kern County north to eastern Contra Costa County on the Valley's west side and to Stanislaus County on the east side. By 1930 its range may have been reduced to half, mostly in the southern and western San Joaquin Valley and foothills. In 1979 only 6.7% of land south of Stanislaus County remained undeveloped. Today the San Joaquin kit fox inhabits a highly fragmented landscape of scattered remnants of native habitat and adoptable, altered lands within and on the fringe of development. The largest extant populations are in western Kern County on and around the Elk Hills and Buena Vista Valley and in the Carrizo Plain Natural Area in San Luis Obispo County. The most northerly current distribution records include the Antioch area of Contra Costa County (EPA at www.epa.gov/espp/factsheets/san-joaquin-kitfox.pdf).

Habitat and Distribution

The USFWS species account describes the habitat of the species as follows:

> "Kit foxes are, however, found in grassland and scrubland communities, which have been extensively modified by humans with oil exploration, wind turbines, agricultural practices and/or grazing. The kit fox population is fragmented, particularly in the northern part of the range."

EPA describes San Joaquin Kit Fox (www.epa.gov/espp/factsheets/san-joaquin-kitfox.pdf):

> "Because the San Joaquin kit fox requires dens for shelter, protection and reproduction, a habitat's soil type is important. Loose-textured soils are preferable, but modification of the burrows of other animals facilitates denning in other soil types. The historical native vegetation of the Valley was largely annual grassland ("California Prairie") and various scrub and subshrub communities. Vernal pool, alkali meadows and playas still provide support habitat, but have wet soils unsuitable for denning. Some of the habitat has been converted to an agricultural patchwork of row crops, vineyards, orchards and pasture. Other habitat has been converted to urban areas and roads, wind farms, and oil fields. San Joaquin kit foxes can use small remnants of native habitat interspersed with development provided there is minimal disturbance, dispersal corridors, and sufficient prey-base."

Is there suitable habitat for the species within the areas in which the Joint Fish Passage Project may have direct and indirect effects?

Potential: San Joaquin kit foxes are acclimated to urban areas as long as there is forage for them. There is a potential for the species to occur in the upstream watershed and it may be a transient in the coastal hills to the east of Mission Boulevard. The species prefers grassland and dry scrub habitats, and does not den in wetland/riverine areas. There may be suitable habitat for the species adjacent to the arroyos and streams potentially affected by water operations, but riverine habitats are not suitable habitats for the species.

Is there evidence that the species actually occurs within the areas in which the Joint Fish Passage Project may have direct effects?

Potential: A recent survey of Contra Costa County and Alameda Counties within the known range of the San Joaquin kit fox found no evidence of recent occupancy (Clark *et al*. 2003 cited in the East Contra Costa Habitat Conservation Plan 2010). "This study used a combination of ground surveys on public lands using trained dogs to find fox scat, and aircraft surveys over the entire area in search of active dens. Detection dogs have been found to be extremely effective and efficient at locating scat of San Joaquin kit fox. The identity of all scat found was verified with DNA testing. Despite a total of 139.4 km surveyed by the detection dog in 2002 in Contra Costa and Alameda Counties (81.0 km in Contra Costa County), no sign of San Joaquin kit fox was found. Nine dens were observed on the 4 days of aerial surveys that had the potential to be kit fox dens. Of the six dens that could be field checked, none were active; the remaining dens were on private land or in inaccessible areas. These results do not prove absence of kit fox from the inventory area (e.g., no private land was surveyed with detection dogs), but do suggest that kit fox density is low or their occurrence is periodic in the inventory area."

There is thus no recent record of San Joaquin kit fox in the vicinity of the arroyos and streams affected by water management. Foxes may be transients in the Project streams, using them as a water source.

Is there a probability of direct and indirect effects to the species and, if so, what is the potential magnitude of effect?

NO: There is no mechanism for the Project to affect San Joaquin kit fox, except perhaps to increase the availability of water for the species in dry periods when portions of streams are dry. This would not adversely affect the species, either directly or indirectly.

Conclusion

The Project will not affect San Joaquin kit fox.

No Action Alternative

No construction activity or changes would occur. No impacts to San Joaquin kit fox or their habitat would occur under the no action alternative.

5.6.21 Contra Costa Goldfields

The USFWS Species Account for Contra Costa goldfields (*Lasthenia conjugens*) notes that the species "historically occurred historically in seven vernal pool regions: Central Coast, Lake-Napa, Livermore, Mendocino, Santa Barbara, Santa Rosa, and Solano-Colusa (Figure II-7) (Keeler-Wolf et.al. 1998). In addition, several historical occurrences in Contra Costa County are outside of the defined vernal pool regions (Keeler-Wolf *et al*. 1998, California Natural Diversity Data Base 2003)".

Habitat and Distribution

The USFWS species account describes the habitat of the species as follows:

> "*Lasthenia conjugens* typically grows in vernal pools, swales, moist flats, and depressions within a grassland matrix (California Natural Diversity Data Base 2003). However, several historical collections were from populations growing in the saline-alkaline transition zone between vernal pools and tidal marshes on the eastern margin of the San Francisco Bay (P. Baye in litt. 2000a). The herbarium sheet for one of the San Francisco Bay specimens notes that the species also grew in evaporating ponds used to concentrate salt (P. Baye in litt. 2000b). The vernal pool types from which this species has been reported are Northern Basalt Flow, Northern Claypan, and Northern Volcanic Ashflow (Sawyer and Keeler-Wolf 1995). The landforms and geologic formations for sites where *L. conjugens* occurs have not yet been determined. Most occurrences of *L. conjugens* are at elevations of 2 to 61 meters (6 to 200 feet), but the recently discovered Monterey County occurrences are at 122 meters (400 feet) and one Napa County occurrence is at 445 meters (1,460 feet) elevation (California Natural Diversity Data Base 2003)."

Is there suitable habitat for the species within the areas in which the Joint Fish Passage Project may have direct and indirect effects?

NO: The USFWS Species Account identifies two extant sites in Alameda County, to the west of Interstate 880 at the border of Alameda and Santa Clara counties. These are the only sites known in Alameda County. The Alameda County sites are in a vernal pool complex. The Project action area does not include any suitable vernal pool area.

Is there evidence that the species actually occurs within the areas in which the Joint Fish Passage Project may have direct effects?

NO: There is no record of Contra Costa goldfields outside of vernal pool habitat and no record of such habitat in the Project Action Area.

Conclusion

There is no potential for the Project to affect Contra Costa goldfields.

No Action Alternative

No construction activity or changes would occur. No impacts to Contra Costa goldfields or their habitat would occur under the no action alternative.

5.6.22 Potential Effects on Unlisted Sensitive Species

Table 24 (above) identified five unlisted sensitive species that could occur in the Construction Reach or the Upstream Reach:

- Western pond turtle
- California horned lizard
- Pacific lamprey
- Loggerhead shrike
- Western burrowing owl
- Raptors

Western Pond Turtle

There is hypothetical suitable habitat for western pond turtle in the Construction Reach, but the species has not been found in the numerous surveys conducted by ACWD and ACFCD in this reach. The western pond turtle may occur in pools in the channels of the Upstream Reach, but water supply operations have low potential for effects to the species because releases for water supply purposes are of low magnitude and do not alter channel hydrology significantly, except to increase the wetted channel marginally and provide for connectivity from pool to pool.

If western pond turtles were found in the Construction Reach, there is a potential for injury of individuals. Accordingly, within 15 days prior to construction activities, a qualified biologist will survey for western pond turtles. If turtles are found the biologist shall relocate the pond turtle to suitable habitat and an exclusion fence will be installed to prevent movement of turtles back into the construction area (**C13** in Table 9, above). Monitoring and relocation will reduce potential effects to a less-than-significant level.

No Action Alternative

No construction activity or changes would occur. No impacts to western pond turtle or their habitat would occur under the no action alternative.

Loggerhead shrike

Loggerhead shrike occur in grasslands and open woodland, nesting in dense, often thorny brush. They are likely to forage in the Construction Reach, but there is no suitable nesting habitat in the Construction Reach action areas. Loggerhead shrike have not been found in ACWD surveys in the Construction Reach. They are likely to forage and rear in the Upstream Reach, but the limited nature of activities (flow modification) precludes any mechanism for effect in this reach.

Given these considerations, the potential for the Joint Fish Passage Project to affect loggerhead shrike is minimal. The species may be a transient forager in the area and there is a large area of foraging habitat in the Quarry Lakes. Significant effects are not anticipated.

No Action Alternative

No construction activity or changes would occur. No impacts to loggerhead shrike or their habitat would occur under the no action alternative.

Western Burrowing Owl

Western burrowing owls are known to utilize burrows in earthen levees, for example in the vicinity of San Jose Airport along Coyote Creek. They have never been found in surveys of the Construction Reach. Levees in the Construction Reach are generally paved and adjacent areas in Quarry Lakes Park are routinely maintained. Western burrowing owls may use the Estuary Reach along earthen levees and in upland portions of the marsh complex. This upland habitat is out of the potential area of effects associated with construction activities. In the Upstream Reach, the potential for small modifications in in-stream hydrology would not provide a mechanism for effect, as western burrowing owls generally do not nest in riparian vegetation.

There is a small potential for western burrowing owls to establish burrows along the levees of the Construction Reach, and a higher potential for the species to forage around the Construction Reach. To avoid and minimize these potential effects, ACWD and ACFCD will implement the following measures (measure **C12** in Table 9, above):

> To avoid impacts to nesting burrowing owls, ACWD and ACFCD will initiate burrowing owl surveys at proposed site with suitable habitat conditions when all possibility of nesting is over. Potential nest burrows will be located and observed to determine whether owls are present. If owls are not present, the burrows will be filled to prevent nesting. If owls are present, a qualified biologist, in consultation with CDFW, will passively relocate the owls to avoid any loss of individuals. Burrows will then be filled. Pre-construction survey and relocation will be on-going so that no burrowing owls will occur at the proposed construction site.

With this avoidance and minimization, the potential for the Joint Fish Passage Project to adversely affect western burrowing owls will be reduced to less-than-significant.

No Action Alternative

No construction activity or changes would occur. No impacts to western burrowing owls or their habitat would occur under the no action alternative.

California Horned Lizard

California horned lizard is typically found in open sandy areas in deserts, chaparral, grassland, often near ant hills, it is often seen basking on asphalt roads or low rocks in the morning or afternoon. The species may occur in the Construction Reach, but has not been found in multiple ACWD and ACFCD surveys in this reach. It is not likely to occur in the Flood Control Channel, but may occur on the dry, unpaved, sections of the levees and portions of the Quarry Lakes Park that may be affected by construction. It is most likely to occur as a transient. If it were to use habitat in the Construction Reach, it could be injured or killed by construction activities. To avoid and minimize this potential effect, ACWD and ACFCD will (measure **C15** in Table 9, above):

> Within 15 days prior to construction activities, a qualified biologist will survey for California horned lizard. If horned lizards are found in the proposed construction area, they will be removed by a qualified biologist and a fine mesh exclusion fence will be installed around the construction site to prevent them from reentering the site during construction.

No Action Alternative

No construction activity or changes would occur. No impacts to California horned lizards or their habitat would occur under the no action alternative.

Pacific Lamprey

Pacific lamprey are known to occur in all three reaches, and in the channel downstream of the Construction Reach. They migrate into the upper reach to spawn and juveniles burrow into the channel bottom and rear in downstream channels for an extended period of time. They can pass over the existing barriers to migration at times, and are anticipated to be able to utilize the fishways of the Joint Fish Passage Improvements Project. There is a potential for several adverse effects to Pacific lamprey:

- Construction activity may injure and kill juveniles that have burrowed into the sandy bottom of the channel in the Construction Reach;

- Drainage of the rubber dams for an extended period may result in stranding of juveniles; and

- Juveniles in the Construction Reach and downstream may be injured or killed by spills of fuels, lubricants, uncured concrete, and other materials.

These adverse effects are likely to occur in the active channel. ACWD and ACFCD will avoid and minimize these effects with a fish rescue program (measure **C11** in Table 9, above):

- Following installation of barriers to isolate the construction site from the active channel a qualified fisheries biologist and team will conduct a fish rescue program for the stranded fish prior to initiation of construction activities. Fish removed from the site will be immediately returned to the active channel.

No Action Alternative

No construction activity or changes would occur. No impacts to Pacific lamprey or their habitat would occur under the no action alternative**.**

Raptors

There is a potential for raptors in the Construction Reach and Estuary Reach to forage in the activity areas of these reaches. Nesting is unlikely due to the high levels of ambient disturbance, and there is no mechanism for effects in the Upstream Reach. Foraging may result in raptors entering these areas during Project activities. Although raptors may nest and forage in the Quarry Lakes area, they have not been identified in ACWD surveys in the Construction Reach. Dense and isolated nesting habitat is most likely to occur in the less-used areas of the Quarry Lakes Recreation Area. There is no raptor habitat to the south of the channel, which is dominated by heavy residential and industrial development. To the extent that raptors may forage, and the less likely extent that they nest, in the Construction Reach, potential effects would be:

- Construction disturbance may preclude foraging raptors from Flood Control Channel areas where they may incidentally have found prey; and

- In the unlikely event that raptors nest in the trees adjacent to the Flood Control, nesting could be affected. Noise and other disturbance may result in nest abandonment.

To address these potential adverse effects, ACWD and ACFCD will:

> Within 15 days prior to construction activities, a qualified biologist would survey for raptor nests in areas within 500 feet of proposed construction sites (measure **C14** in Table 9, above). If nesting raptors are found, CDFW would be consulted to determine appropriate management response to the presence of nesting raptors. Any raptors found nesting in the vicinity of the Joint Fish Passage Project would necessarily be in areas with high existing levels of human noise and visual disturbance. In consultation with CDFW, ACWD and ACFCD would determine the appropriate measures for addressing nesting raptors, including the possibility that no construction would be initiated until young have fledged as determined by a qualified biologist. To address potential for work in the vicinity of RD1/ACFCD Drop Structure to affect downstream nesting birds, a qualified biologist would conduct pre-construction surveys of downstream areas to identify nesting by special-status and/or migratory birds. If these species are found nesting within 100 yards of the RD1/ACFCD Drop Structure, ACWD and ACFCD would consult with CDFW to establish appropriate no disturbance buffers around the nest sites until young have fledged. These buffers would be clearly marked to exclude construction equipment and personnel.

No Action Alternative

No construction activity or changes would occur. No impacts to raptors or their habitat would occur under the no action alternative.

5.6.23 Significance Following Mitigation

The potential for adverse effects to listed and special status species is relatively low and the implementation of the avoidance and minimization measures (Table 9) will reduce any effects to a level of less-than-significant.

5.7 Cultural Resources

This section discusses cultural resources in the Action/Project vicinity, potential effects resulting from the proposed Action/Project, and mitigation measures needed to reduce any potentially significant effects to cultural resources. A Cultural resource is the term used to describe several different types of resources and properties, including archaeological, architectural, and traditional cultural properties. Archaeological sites may include both prehistoric and/or historic deposits. In addition to requiring evaluation under NEPA and CEQA such resources may be subject to various federal and state laws, and local statutes such as Section 106 of the National Historic Preservation Act (NHPA) of 1966.

NEPA: NEPA directs federal agencies to prepare a detailed statement of the environmental impacts of any “major federal action significantly affecting the quality of the human environment.” The “human environment” consists of many aspects, including what NEPA terms “cultural resources.” Under NEPA, cultural resources include historic properties as defined under Section 106 of the National Historic Preservation Act. Cultural resources also include the cultural use of the physical and natural environment, social institutions, lifeways, religious practices, and other cultural institutions. According to the NEPA regulations, in considering whether an action may "significantly affect the quality of the human environment," an agency must consider:

- Unique characteristics of the geographic area such as proximity to historic or cultural resources (40 CFR 1508.27(b)(3)) and,
- The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places (40 CFR 1508.27(b)(8)).

Section 106: Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties, and afford the State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation a

reasonable opportunity to comment. Section 101 of the NHPA authorizes the Secretary of the Interior to expand and maintain a National Register of Historic Places composed of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, engineering, and culture.

CEQA: CEQA provides for the documentation and mitigation of significant cultural resources. Prior to the approval of discretionary projects and the commencement of agency undertakings, the potential impacts of a Project on archaeological and historical resources must be considered (Public Resources Code Sections 21083.2 and 21084.1 and the CEQA Guidelines [California Code of Regulations Title 14, Section 15064.5]). The CEQA Guidelines define a significant historical resource as “a resource listed or considered eligible for listing on the California Register of

Historical Resources" (CRHR) (Public Resources Code Section 5024.1). Eligibility for listing on the CRHR is similar to eligibility for listing on the National Register.

Would the project:

a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

d) Disturb any human remains, including those interred outside of formal cemeteries?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

5.7.1 Environmental Setting

The Joint Fish Passage Project area was probably utilized by pre-European peoples for thousands of years. In a 1981 EIR for reconfiguration of the recharge pits, ACWD literature searches indicated that there were significant known archeological sites in the general area of the Niles Quarries, including two sites located about a mile southeast and one site located about 350 yards east of Mission Boulevard. There are historic sites preserved as part of the Quarry Lakes Park and adjacent to several recharge pits. However, they are not located in the area of the Joint Fish Passage Project site and would not be affected by the Joint Fish Passage Project. The 1981 EIR field surveys did not find surface evidence of archeological resources and ACWD subsequently undertook substantial re-grading of the entire area now designated as the Quarry Lakes Park. Similar re-excavation and levee enhancement was undertaken by the Corps of Engineers when levees were re-constructed in 1969-1972, and the ACFCD Drop Structure and adjacent BART bridge substantially disturbed all of the area that would be impacted by the RD1/ACFCD Drop Structure fishway of the Joint Fish Passage Project. Recent

EIRs, such as the City of Union City's 2005 EIR for its Intermodal Station Passenger Rail Project, found similar results, identifying the same suite of known sites but found no evidence of archeological resources within the area of potential impact for this Project.

The Joint Fish Passage Project activities would take place within areas that have been substantially modified multiple times including excavations to depths of 30 to 60 feet for removal of sand and gravel. Historic gravel removal operations and excavations for the construction of flood control levees clearly destroyed any evidence of prehistoric use of the site. Excavations for the flood control channel and bridge piers would have had similar effects. The flood control levees themselves were constructed using sand and gravel from the channel of Alameda Creek (ESA 1989). These prior activities, along with on-going maintenance, have obliterated any potential surface evidence of archeological resources. The only corridors where land has not been disturbed to significant depths are the rail and road corridors, which were constructed along the crest of the gravel extraction pits. None of these areas would be affected by any of the Joint Fish Passage Project elements. The change in construction schedule from a 2-year to a 4-year schedule does not alter the area of activity.

5.7.2 Mechanisms for Effect

The Joint Fish Passage Project facilities would be constructed in soils that have previously been completely disturbed by excavation, grading, and re-contouring for levees and/or at depths below those where use by prehistoric peoples is probable. Given the repeated and profound disturbance of the Joint Fish Passage Project site, there is virtually no mechanism by which the Joint Fish Passage Project could affect a known significant cultural resource of any type. At the fish screen facilities sites, excavations would not extend below levels of prior disturbance and there is thus no potential for these elements of the Joint Fish Passage Project to affect buried resources.

5.7.3 Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

There is no potential for the Joint Fish Passage Project to encounter buried paleontological materials and/or Native American burials during construction.

No Action Alternative

Under the No Action alternative no construction activities would be conducted which precludes impacts associated with significance of an archeological resource, potential destruction of a unique paleontological resource or site or unique geologic feature, or disturbance of human remains.

5.7.4 Significance

The Joint Fish Passage Project would not affect known archeological or paleontological resources. No significant impacts are anticipated.

5.7.5 Proposed Mitigation

ACWD does not anticipate impacts to cultural and paleontological resources. The entire Alameda Creek channel within the Joint Fish Passage Project area is manmade and the construction which would occur on the inboard levee would not have the potential to cause significant impacts to archeological or paleontological resources. Thus, no mitigation is proposed.

5.7.6 Significance Following Mitigation

Potential Project impacts to cultural resources are not anticipated.

5.8 Geology and Soils

Would the project:

a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:

i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

ii) Strong seismic ground shaking?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

iii) Seismic-related ground failure, including liquefaction?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

iv) Landslides?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

b) Result in substantial soil erosion or the loss of topsoil?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

5.8.1 Environmental Setting

The Joint Fish Passage Project facilities are located in the upper and middle portions of the Niles Cone alluvial fan, on coarse-grained to moderate-grained alluvium about 300 feet thick (ESA 1989). Soils are unconsolidated sands and gravels with intermittent lenses of fines. The levee consists of sands and gravels excavated from the creek bed (ESA 1989). The Joint Fish Passage Project area is crossed by the active north-south trending Hayward Fault and a splay fault of the Mission Fault. The Alquist-Priolo Earthquake Fault Zoning Map for the Joint Fish Passage Project area shows the Hayward Fault passing through the site. A Maximum Credible Earthquake of 7.5 on the open-ended Richter scale is feasible at the site. The Hayward Fault acts as a hydrologic barrier and groundwater levels are about 30 feet higher on the upstream side of the fault. General mapping of liquefaction zones (California Geological Survey 2004) shows the fishways located in an area that has not been mapped, but ESA (1989) notes that liquefaction is unlikely given the coarse nature of the alluvium. General mapping confirms this, and there is no portion of the site that is located in a zone where liquefaction is likely. Soils are coarse, well drained, resistant to erosion, and non-expansive. Recent alluvium in the stream channel includes some finer soil components which are deposited when flow rates are reduced behind the rubber dams.

5.8.2 Mechanisms for Effect

The Joint Fish Passage Project would not alter fundamental geologic conditions at the site. Following excavations, all portions of the creek channel and adjacent levees would be re-constructed to existing standards. Thus there is no mechanism by which the Joint Fish Passage Project features could affect fundamental seismic and related hydrologic processes, or the risks associated with them. In addition, both phases of the Project would necessarily be constructed during dry periods (June through October) and there is only a remote potential for precipitation and runoff during this period. Potential for soils erosion during or following construction is thus virtually zero, except in the low-flow channel modification reaches where initial wet season flows would probably scour the newly formed channel, a beneficial effect. Recruitment and downstream transport of sediments are natural stream processes and are contained within the flood control channel. This aspect of the Joint Fish Passage Project would have no effect on adjacent lands.

5.8.3 Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

The Joint Fish Passage Project would have no adverse effects on geology and soils because:

- The coarse, well-drained soils in the Project area are not subject to liquefaction;
- The rip-rapped levees have a high resistance to disturbance and modifications to the levees associated with the Project will not affect levee stability; and
- There is no urban or residential development within the construction and operations area.

No Action Alternative

No construction activity or changes would occur. No impacts to geologic features or soil would occur under the no action alternative.

5.8.4 Significance

The Joint Fish Passage Project would not affect geology and soils and would not cause any of the effects which would be deemed significant under CEQA or NEPA. No mitigation is proposed.

5.9 Hazards and Hazardous Materials

Would the project:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

5.9.1 Environmental Setting

The Joint Fish Passage Project facilities are located in an area that has historically been used for gravel mining and agriculture, followed by groundwater recharge, flood management, and recreation. There is residential housing and commercial development on both sides of the creek channel in many areas, and there is railroad-related industrial and commercial development south of the Flood Control Channel between the BART line and Mission Boulevard. There are no solid waste sites and no identified hazardous materials (superfund) sites (EPA 2005) within 2 miles of the planned facilities. There are no schools within 0.25 miles and no airports within 2 miles of the planned facilities. None of the planned facilities is in a designated fire zone.

5.9.2 Mechanisms for Effect

The Joint Fish Passage Project does not involve routine storage, handling, emissions, or transport of hazardous materials. Project construction would occur outside of public roads and could not affect implementation of plans for addressing emergencies. Materials hauling such as hauling of concrete and rock to work sites may marginally increase local traffic, but this traffic would be suspended during an emergency. All work on flood control levees would be conducted during periods of generally dry conditions and levees would be reconstructed to existing specifications. There is minimal combustible material in and around the Project sites and there is no potential for the Project to cause wildfires. To the extent that there is construction in or adjacent to the channel, there is a potential that fluid leaks from construction equipment would percolate through the soil and enter groundwater.

5.9.3 Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

The Joint Fish Passage Project has potential to result in release of fuel and oil into the creek channel and into groundwater.

No Action Alternative

No construction activity or changes would occur. No increase in the risk of accidental spills would occur under the no action alternative.

5.9.4 Significance

Well maintained, modern construction equipment has a low potential for fuel, oil, and other fluid leaks, but if such leaks occur, they could be considered significant under CEQA and NEPA.

5.9.5 Proposed Mitigation

During construction activities, ACWD and ACFCD would implement Best Management Practices (Avoidance and Minimization measures), as outlined in measures **C1-7, HH1** and **HWQ1-10**, Table 9, for inspection of equipment, fuel handling, leak and spill prevention, and cleanup if leaks are detected.

5.9.6 Significance Following Mitigation

Implementation of Best Management Practices would reduce the potential for significant hazards and hazardous materials impacts associated with construction of the proposed facilities to a level of less-than-significant.

5.10 Hydrology and Water Quality

Would the project:

a) Violate any water quality standards or waste discharge requirements?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
☒ Less Than Significant Impact ❒ No Impact

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

f) Otherwise substantially degrade water quality?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
☒ Less Than Significant Impact ❒ No Impact

j) Inundation by seiche, tsunami, or mudflow?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

5.10.1 Environmental Setting

The construction would take place in and adjacent to the Flood Control Channel. In the Project reach, Alameda Creek is listed as an impaired water body by the Regional Water Quality Control Board for Diazinon related to urban runoff to the flood control channel. Recent studies (SFEI 2005) show that diazinon and alternatives to Diazinon such as pyrethroids may concentrate in areas of fine sediments. Diazinon and other pesticides have been found in the upper layers of creek sediments, in concentrations above established and proposed Total Maximum Daily Levels (TMDL). The SF Bay Area Regional Water Quality Control Board has proposed a TMDL for Diazinon of 100 ng/l (nanograms/liter or parts per trillion). Water quality in the creek is suitable for groundwater recharge. In the Joint Fish Passage Project reach, flow is contained within a trapezoidal rip-rapped and leveed channel that varies in width from about 200 to 400 feet depending on location. The levees contain the calculated 100-year flood. Flows in the channel are completely modified by Rubber Dams 3 and 1, the ACFCD Drop Structure, some additional grade control structures in downstream reaches, and pilings from the various rail and roadway bridges. These structures provide some grade control and reduce flow rates, but this effect is minimal during high flows when the inflatable dams are not in use.

5.10.2 Mechanisms for Effect

a. The Flow Bypass Rules would change the timing and magnitude of ACWD diversion operations at the Quarry Lakes complex. Based on ACWD analyses, increased bypass flows would reduce diversions in periods of low to moderate inflow and thus reduce groundwater recharge in some years.

b. The fishways and diversion screens would be constructed on or immediately adjacent to the existing levee and would have minimal encroachments to the channel. The fishways and diversion screens would only marginally affect levee configuration. Thus, when the dams are lowered to allow flood flows to pass, there would be no substantive change in flood flows through this reach of the channel. In channel modifications would also be designed to minimize impact on the capacity of the channel.

c. The Joint Fish Passage Project has no mechanism for affecting housing or its placement within the 100-year flood zone in any way.

d. During construction of facilities, the fishways, fish screens, and in-channel facility modifications may involve use of construction equipment in the creek channel, with site grading and excavation generally in the initial construction period of a few weeks. After initial configuration of the foundation for these facilities, most of the construction would occur on or immediately adjacent to the levee slide slopes.

e. There is general potential for fuel and lubricant leaks and spills during construction.

5.10.3 Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

Flow Bypass Rules

Implementation of the proposed Flow Bypass Rules may change the quantity of natural runoff available for recharge during some years and result in greater fluctuations in groundwater levels from season to season and year to year. Analysis of the potential for these fluctuations indicates that overall recharge would be reduced in years of low inflow from the upper watershed, resulting in lower groundwater levels. However, groundwater levels are projected to recover during above normal and wetter years when higher inflow from the upper watershed is available to meet both the Flow Bypass Rules and groundwater recharge needs.

ACWD's analysis also indicates that the bypass rules would not conflict with ACWD's goal of maintaining groundwater levels above mean sea level in the Newark Aquifer so that saltwater intrusion continues to be inhibited. Therefore, the bypass rules do not cause a significant change in the condition of the Niles Cone.

Construction of Fishways, Screens, and In-Channel Facility Modifications

Construction in the channel may expose sediments to runoff following construction. In this area, it is not likely that various pesticides such as Diazinon are concentrated in the gravel and sand sediments which settle out when dams are raised. There has been limited sediment sampling in Alameda County Creeks, but this sampling suggests that Diazinon in fine sediments may at one time have been 20 to 550 times the proposed TMDL of 100 ng/l. In one study (SFEI 2005), concentrations of Diazinon in stream sediments were found to increase with depth.

Although these finer sediments would be scoured and routinely transported downstream during periods of high flow, it is possible that these pesticides may be found in the sediments below a few inches depth. Construction would disturb these sediments and post construction re-connection of disturbed areas to the active channel could result in remobilization of pesticides such as Diazinon. A potential result of construction and re-connection of the construction area to the active channel would be a short-term pulse of residual pesticides during the initial wetting of disturbed soils. However, fine-grained sediments (e.g., silt and clay) are likely to have been washed downstream during high winter-spring flows, because flows through this reach are quite high due to the steep channel drop at the ACFCD Drop Structure.

In addition, new concrete work may leach lime into the channel if the channel is reconnected to the new facility before it has cured. Properly mixed and treated concrete cures in 6-7 days, after which leaching rates decline. Leaching of alkali into the water may create localized areas of high pH downstream, and thus proper curing of concrete is essential prior to exposing it to the channel.

All In-Channel Work

Construction in and adjacent to the channel creates a potential for fuel and lubricant spills and leaks, which could have a potentially adverse impact on water quality.

No Action Alternative

No construction activity or changes would occur. No impacts to hydrology or water quality would occur under the no action alternative.

5.10.4 Significance

Flow Bypass Rules

Evaluation of all sources of water supply and demand was performed for development of ACWD's Urban Water Management Plan. Based on ACWD modeling, modification of flow bypass rules is not anticipated to adversely affect long term groundwater levels or water supply.

Construction of Fishways, Screens, and In-Channel Facility Modifications

Mobilization of Diazinon during in-channel work and when the work site is re-connected to the creek can be estimated. Except for residual use of stockpiles, the pesticide was banned for outdoor use in 2004. Assuming that Diazinon use declined to near zero in the 3 years following the ban and that the concentrations in soils identified in the SFEI (2005) study persisted through 2007, then the current range of potential Diazinon concentrations in the channel soils can be estimated using the maximum half-life of Diazinon in soil (103 days; National Pesticide Information Center, 2011). By 2016, the concentration of Diazinon could have gone through 32 half-lives.

The lowest concentration in the SFEI (2005) study of 2,000 µg/l in 2007 would therefore be reduced to well below 0.01 µg/l. Similarly, the high range from the SFEI study (55,000 µg/l) would be reduced to well below 0.04 µg/l. These levels of potential contamination, based on the longest in-soil half-life estimate, are very low when compared to the LC_{50} for fish of 90 to 7800 µg/l, and the level at which salmonids exhibit behavioral responses to Diazinon, 1.0 µg/l (National Pesticide Information Center 2011).

It is thus likely that Diazinon in the soil that may be disturbed by various aspects of the Joint Fish Passage Project would not cause adverse effects to fish and wildlife when flow in the creek encounters exposed soils in the channel.

The potential for leaching of concrete to increase the pH of the water downstream of new facilities is a function of the curing time. There is a small potential for precipitation during the construction, which could leach lime from curing concrete into the channel and cause an increase in pH which could be a potentially significant impact.

All In-Channel Work

If fuels and lubricants were spilled within the channel or at adjacent recharge ponds, they could adversely impact water quality and these impacts could be significant.

5.10.5 Proposed Mitigation

ACWD and ACFCD would implement appropriate best management practices (BMPs) for all work to ensure that Joint Fish Passage Project construction does not adversely affect water quality (measure **HWQ1**, Table 9). These BMPs would include, but are not limited to:

- **HWQ2** Isolation of the construction zones, if necessary, from the active Alameda Creek channel and/or adjacent recharge ponds. This isolation would be accomplished with sand bags, hay bales, fiber mats, sheet pile, silt screens, and/or other appropriate methods;

- **HWQ3** Washing and curing all concrete work to reduce potential for leaching from the new structures to affect aquatic resources;

- **HWQ4** Daily pre-construction inspection of all construction equipment to ensure that oil and/or gas/diesel fuel are not leaking from equipment;

- **HWQ5** Secondary containment for fueling and chemical storage areas shall be provided during construction and Joint Fish Passage Project operation;

- **HWQ6** Secondary containment for equipment wash water shall be provided to ensure that wash water is not allowed to run off the site;

- **HWQ7** Silt traps and/or ponds would be provided to prevent runoff from the construction site;

- **HWQ8** Materials stockpiles would be covered to prevent runoff;

- **HWQ9** Loose soils would be protected from potentially erosive runoff; and

- **HWQ10** When construction equipment is used within the river channel, the equipment would be fitted with secondary containment materials at potential oil/fuel leakage sites; and

5.10.6 Significance Following Mitigation

Implementation of the above construction best management practices would reduce the potential for impacts to hydrology and water quality to a level of less-than-significant.

5.11 Land Use and Planning

Would the project:

a) Physically divide an established community?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

5.11.1 Environmental Setting

Land use in the Joint Fish Passage Project area is a mix of public utility, commercial, industrial, residential, and recreational. The predominant channel use is flood control protection of the adjacent development, recharge of groundwater and recreation. Rights-of-way for rail transportation are also a significant feature of local land use.

5.11.2 Mechanisms for Effect

The Joint Fish Passage Project would occur entirely within the public right-of-way and there is no mechanism by which it would alter existing land uses. No property would be acquired and no existing land uses would be changed.

5.11.3 Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

The Project would not affect the existing community structure or linkages between elements of the community. The Joint Fish Passage Project would not change land use.

No Action Alternative

No construction activity or changes would occur. No impacts to land use would occur under the no action alternative.

The Action/Project is within the jurisdiction of the USACE Operational Division. The District is currently working with the USACE in its Section 408 process, which would ensure consistency with the policies of this branch of the USACE.

5.11.4 Significance

The Joint Fish Passage Project would not affect land use, physically divide an established community, conflict with existing land use plans, or conflict with conservation plans. No significant impacts would occur.

5.12 Mineral Resources

Would the project:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

5.12.1 Environmental Setting

The Joint Fish Passage Project facilities are located in an area that was used for the extraction of sand and gravel for well over 100 years and was abandoned following the removal of commercially exploitable resources. All areas outside of the Joint Fish Passage Project areas have been fully developed and no additional exploitation of sand and gravel resources is anticipated. The alluvial soils beneath the Project area are underlain by basalt and there are no known oil and gas resources of commercial significance in the Joint Fish Passage Project areas of effect.

5.12.2 Mechanisms for Effect

The Joint Fish Passage Project facilities would not be located in areas where commercially exploitable mineral resources may be obtained. No mineral extraction is feasible at the Project sites because such extractions would compromise the function of the flood control channel or recharge operations. There is therefore no mechanism by which the Project may affect mineral resources.

5.12.3 Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

The Joint Fish Passage Project would not affect mineral resource availability or exploitation.

No Action Alternative

No construction activity or changes would occur. No impacts to mineral resources would occur under the no action alternative.

5.12.4 Significance

The Joint Fish Passage Project would not result in loss of availability of any known mineral resources. No significant impacts would occur. No mitigation is proposed.

5.13 Noise

Would the project result in:

a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

b) Exposure of persons to or generation of excessive groundborne vibration or ground-borne noise levels?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

5.13.1 Environmental Setting

The City of Fremont General Plan addresses noise effects using the most common measure dB(A), or decibels using the generally accepted (A) measure of human hearing.

Joint Fish Passage Project facilities are located in an urban area crossed by arterial roads and several rail transportation corridors. The Project occurs within levees about 20 feet above channel invert. The rail transport systems typically generate intermittent noise levels of over 80 decibels (dB(A)), and recent studies for the City of Union City Intermodal Station Passenger Rail Project (City of Union City 2005) demonstrate that ambient average day-night noise levels in the area along the Alameda Creek Channel are in the 59 to 61 dB(A) range. There is also substantial ambient noise from traffic on the major arterials on the south bank of the creek. The ambient noise environment in the reach from Mission Boulevard to just downstream of the BART Bridge is variable. There are no airports or schools in the vicinity of the Project.

Noise Conditions in the Vicinity of the RD3 Fishway Construction

The City of Fremont (General Plan 2011, Chapter 10) has mapped noise conditions in the vicinity of the RD3 Fishway, with the primary sources of noise being Mission Boulevard traffic and rail traffic from the Union Pacific Railroad. In addition, rail traffic occurs on the south levee area and there is ambient noise from Highway 84. Along Mission Boulevard, the average day/night noise (L_{dn}) level ranges from 70 to 75 decibels (dB(A)), and maximum noise levels of up to 84 dB(A) occur in the mid-day. Noise levels at Highway 84 are similarly high. The nearest residential sites in the vicinity of the RD3 construction area are shown on Figure 36 below. Nearby residences are on the north levee. Residents at Chase Court (downstream of RD3) have installed six-foot wooden fences facing the railroad line. Residents east of the railroad bridge have installed wooden fences and noise from RD3 construction would also be blocked by the raised railroad line.

On the south levee across from the RD3 Fishway, the levee crest is a paved maintenance road/trail and to the south of this there is an additional 8-foot berm (the railroad berm) above the levee crest. There are no residences on the south levee within about 1200 feet of the construction zone, these residences are separated from the construction zone by (a) the 8-foot berm, (b) two railroad lines and associated infrastructure. In addition, the residences that face the RD3 construction area are surrounded by high noise walls.

Noise Conditions in the Vicinity of the RD1/ACFCD Drop Structure and Shinn Pond Screens

Noise in the vicinity of RD1/ACFCD Drop Structure is dominated by the BART Line and the adjacent railroad. The immediate area is mapped as having an average day/night noise level (L_{dn}) of about 65 dB(A), and an L_{dn} of 59 to 61 dB(A) in the Fernwood Court area. Topography and infrastructure affect noise transmission and ambient noise levels.

- Residences north of Shinn Pond are from 1250 to 1500 feet from the construction zone, and noise at residences north of the Shinn Pond will be partially blocked by the north levee because much of construction will occur below the levee crest. In addition, the vegetation on the north shore of Shinn Pond will scatter noise and result in some additional reduction;

- Noise from construction west (upstream) of the BART Bridge is substantially blocked from residences to the south of the BART Bridge by a 15-foot berm that separates the Industrial/Rail facilities from Fernwood Court. In addition, there is a 6-foot wood fence facing the berm along the west side of Fernwood Court;

- The concrete piers below the BART Bridge will partially block/scatter construction noise from upstream construction activities; and

- In general, the roughened rip-rap of the channel will scatter and somewhat attenuate noise from construction.

The various barriers to noise (Figure 36) created by the BART Bridge and the 15-foot berm west of Fernwood Court will minimize the potential for construction upstream of the BART Bridge to cause substantial noise at the residential housing along the levee downstream of the BART Bridge. In addition, upstream construction noise will be attenuated by distance. In terms of potential noise effects north of the Shinn Pond, the levee itself substantially eliminates the potential for construction activity *within the channel* from causing noise.

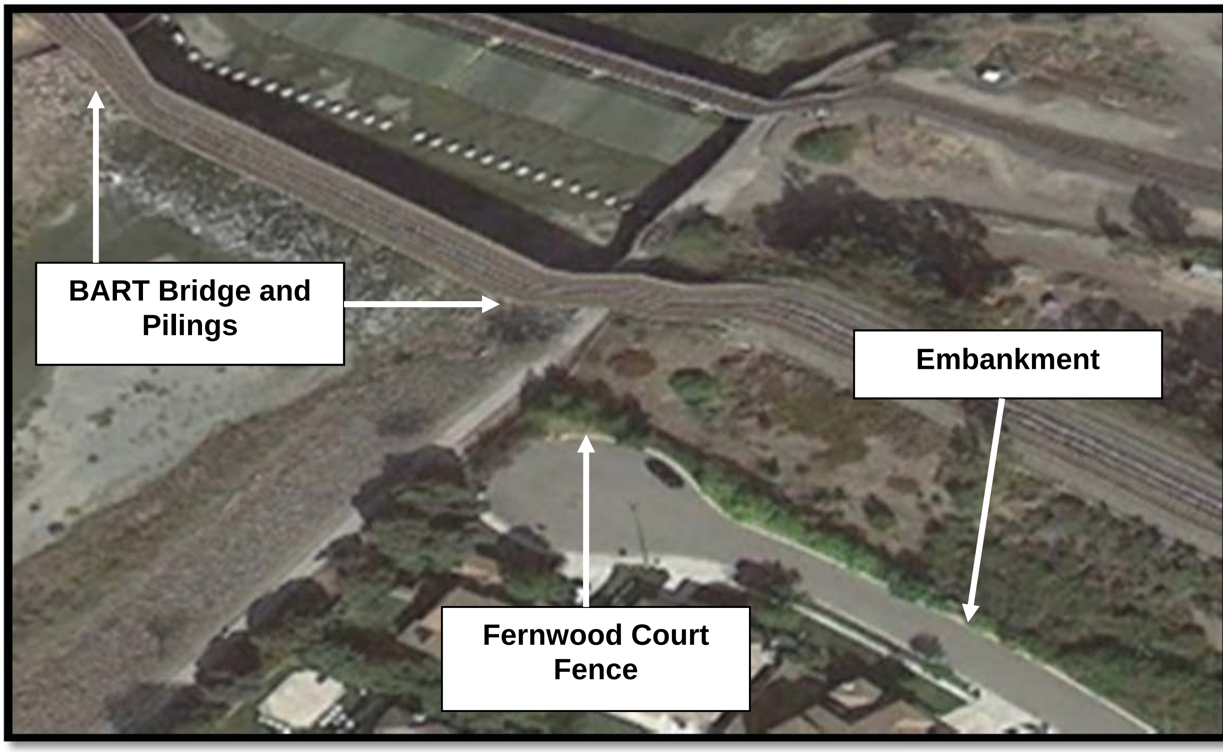


Figure 36. Features that will block noise from construction at RD1/ACFCD Drop Structure.

5.13.2 Mechanisms for Effect

All of the Joint Fish Passage Project facility and channel modifications would be constructed on and adjacent to the levees and within the Alameda Creek Flood Control Channel. There is no mechanism by which the long-term operation of Project facilities would create significant noise. Fishways and fish screens are essentially passive facilities, and fish screens typically operate underwater. Thus, construction type activities create the only substantial noise generated by the Project activities. During construction and future major repairs, the Joint Fish Passage Project would involve use of backhoes, loaders, excavators, small water trucks, small cranes, trucks, and associated machinery and tools.

Estimates of noise levels from typical construction equipment (USDOT 1976) are often used as a basis for impact analysis associated with multiple pieces of equipment, with noise levels generally predicted to decline by 6 dB(A) for each doubling of distance from the point of origination (Hoover and Keith 1996). Typical construction activities thus generate noise levels that decline with distance from the site:

- 50 feet: 78 dB(A) to 89 dB(A)
- 100 feet: 72 dB(A) to 83 dB(A)
- 200 feet 66 dB(A) to 77 dB(A)
- 400 feet: 60 dB(A) to 71 dB(A)
- 800 feet 54 dB(A) to 65 dB(A)
- 1,600 feet 48 dB(A) to 59 dB(A)
- 3,200 feet 42 dB(A) to 53 dB(A)

Impacts associated with the Joint Fish Passage Project are in the mid-range of these USDOT estimates because modern construction equipment design has been improved and is designed with control technology to minimize noise. Based on manufacturer's specifications, a typical modern backhoe/small dozer generates 75 dB(A) at 50 feet, 69 dB(A) at 100 feet and 63 dB(A) at 200 feet. Similar noise reductions have been made for other newer-model equipment. In addition:

- Fishway and screen construction would generally be intensive for only a few phases such as demolition, excavation, and concrete and stone placement;

- Noise from work in the channel would occur below grade and would buffered by the levees; and

- The sandy-gravel soils in the area would also not transmit sound well, and there is therefore no mechanism by which ground borne vibrations would affect residential development near construction sites.

Construction noise effects were based on a conservative initial equipment noise of 86 dB(A), resulting in noise levels declining to:

- 80 dB(A) at 50 feet
- 74 dB(A) at 100 feet
- 68 dB(A) at 200 feet
- 62 dB(A) at 400 feet
- 56 dB(A) at 800 feet
- 50 dB(A) at 1600 feet
- 44 dB(A) at 3200 feet

Existing wooden sound walls at residences are assumed to reduce noise by about 5 dB(A) (Washington Department of Transportation).

5.13.3 Effects

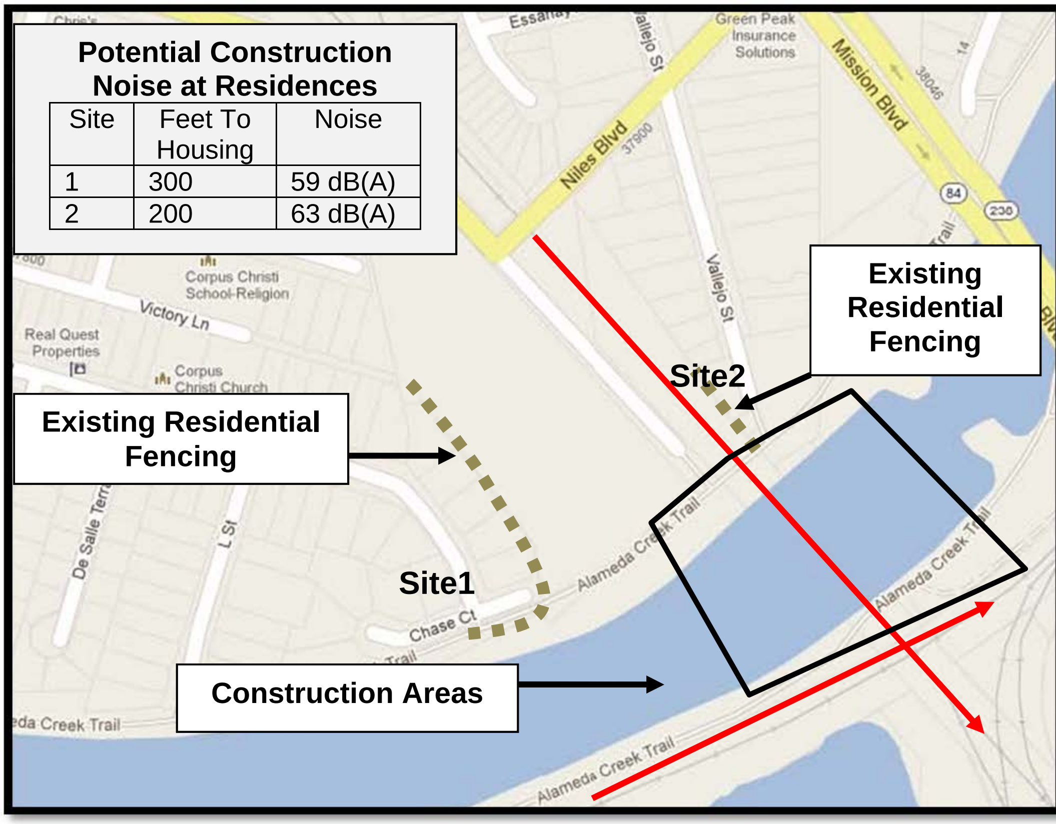
The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

RD3 Fishway

The 8-foot embankment on the south levee and the industrial development between the two railroad lines would completely block construction noise at residential sites south of the flood control channel. There would be no noise effects. There are two residential areas along the north levee that may be affected by RD3 Fishway construction noise (Figure 37): Chase Court (east) and Vallejo Street (west).

- At the fence line of houses at Chase Court, noise from RD3 Fishway construction would result in construction noise levels of about 64 dB(A), which would be reduced at the fence line by about 5 dB(A), resulting in an average noise level of about 59 dB(A); and

- At Vallejo Street, noise at the first few residences facing the levee will be partially blocked by the rail road bridge and further reduced by existing fencing and the elevated berm for the rail road. Noise levels at the residences from construction would be approximately 68 dB(A), reduced to 63 dB(A) by existing fencing.



Site	Feet To Housing	Noise
1	300	59 dB(A)
2	200	63 dB(A)

Figure 37. Approximate distance from the RD3 Fishway construction zone to nearest residential development, and projected construction noise in decibels (dB(A)). Red arrows are raised berms carrying railroad traffic.

RD1/ACFCD Drop Structure and Shinn Pond (Dual Shift Construction)

For the fishway and the Shinn Pond construction, noise effects from dual-shift construction would be limited to two residential areas. Other residences in the general Project area are more than 2,000 feet from construction and/or noise would be blocked by existing railroad berms and sound walls. Sites affected by noise are (Figure 38):

- Residential development 1,250 to 1,500 feet from the construction zone across Shinn Pond (Sites 1-3). Construction noise levels at these locations will be less than 56 dB(A), generally in the range of 53 dB(A). In addition, construction will generally be focused on the levee and the levee will partially block noise from construction below the levee crest;
- Residential development along the south bank of the Flood Control Channel (Sites 4-6). In this area, the nearest house is 250 feet from the crest of the

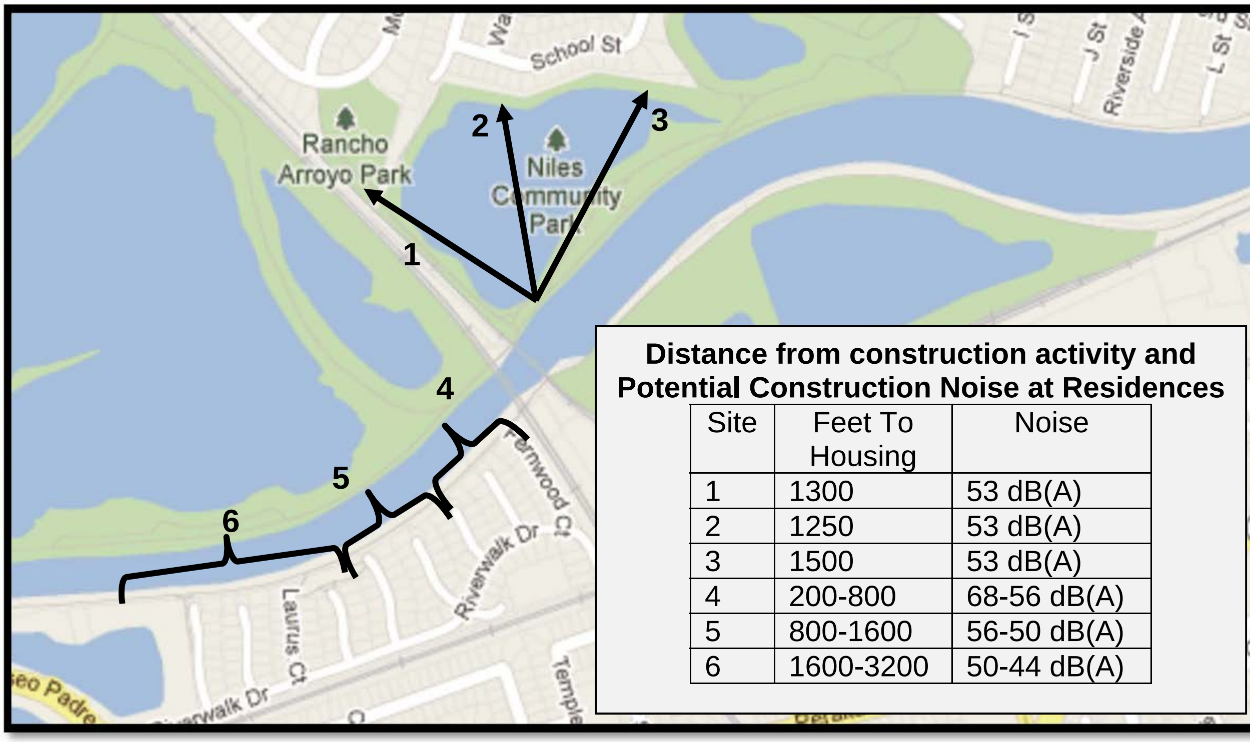
north levee at the downstream end of the BART Bridge on the west side of the channel (at Fernwood Court). In-channel construction will be about 200 feet from this first residence along the south levee. At this residence, construction noise will be approximately 62 dB(A) to 68 dB(A). This is within the City of Fremont acceptable noise range for exterior daytime noise, but would exceed the measured average day-night ambient noise level at this site. Construction noise will diminish at downstream locations (Site 5), and at 800 feet will be approximately 56 dB(A), at 1,600 feet will be 50 dB(A), and at 3,200 feet will be 44 dB(A); and

- An alternate access route to the RD1 site would be via Riverwalk Drive and exiting through I Street, while using the levee maintenance road/trail and potentially a temporary road within the flood control channel. Under this access route the nearest residential street is Appletree Court. The greatest noise from access road use is anticipated to occur when equipment and materials are delivered to the site as the delivery vehicles used are typically larger and therefore, noisier. These deliveries will typically occur during the day when ambient noise levels are higher. Use of roads in the evening is expected to be by quieter passenger vehicles used by contractor's workers departing the work site. Thus, use of access roads is not anticipated to exceed ambient day-night noise levels.

Figure 38 shows the distance of residences to the construction zone and the probable highest noise levels associated with construction activity in the vicinity of RD1/ACFCD Drop Structure.

No Action Alternative

No construction activity or changes would occur. No noise related impacts would occur under the no action alternative.



Distance from construction activity and Potential Construction Noise at Residences

Site	Feet To Housing	Noise
1	1300	53 dB(A)
2	1250	53 dB(A)
3	1500	53 dB(A)
4	200-800	68-56 dB(A)
5	800-1600	56-50 dB(A)
6	1600-3200	50-44 dB(A)

Figure 38. Approximate distance from the RD1/ACFCD construction zone to nearest residential development, and projected construction noise in decibels (dB(A)).

5.13.4 Significance

The noise effects of the Project construction activities and long-term maintenance would be considered significant if:

- Construction activity resulted in an increase in exterior ambient noise levels; or
- Construction activity resulted in exterior noise levels in excess of the acceptable level of 60 L_{dn}.

Exterior Ambient Noise Levels

The potential for construction and long-term maintenance to cause significant effects on residential areas is described below and summarized on Table 29.

For RD3 fishway construction, activity will be limited to daylight hours. At the RD1/ACFCD Drop Structure fishway and Shinn Pond Screens, construction would occur during the 16-hour period from 7 AM to 10 PM. Given these schedules, the applicable ambient noise levels are the noise levels during these periods. Ambient daytime noise levels in urban areas are generally higher than the L_{dn} level. In urban areas, the ***average*** daytime noise level is generally about 10 dB(A) higher than the ***average*** night level (Bishop and Simpson 1975). Thus an L_{dn} of 60 reflects a weighted daytime average of about 66 to 67 dB(A). Noise levels will peak during work hours and begin to decline after the commute period is over, or about 6 PM to 7 PM.

Significant Noise at RD3 Fishway

In the RD3 fishway area, daytime noise levels will vary.

- The area along Vallejo Street (upstream of the fishway) is within 500 feet of Mission Boulevard and 400 feet of Niles Road and 150 feet of the railroad. Given multiple noise sources in the vicinity of Vallejo Street, the area is mapped as having noise levels from 60 to 70 dB(A), with peak noise levels along Mission Boulevard of over 80 dB(A) noted in the 2007 Health and Safety Background Report. There are no obvious barriers to this traffic noise, and the ambient daytime noise at this site is thus routinely in excess of 60 to 65 dB(A). Construction noise levels of approximately 63 dB(A) would not significantly exceed ambient noise levels at this site; and

- In the vicinity of Chase Court (downstream of the RD3 fishway) there are generally lower levels of noise, and the area is mapped as having ambient noise levels of 55 dB(A). Ambient noise levels are reduced by existing wood fencing, but at a distance of about 300 feet from construction potential, exterior noise levels of about 59-60 dB(A) would exceed the ambient noise conditions.

Significant Noise at the RD1/ACFCD Drop Structure and Shinn Pond Construction Area

Based on City of Fremont General Plan noise mapping and data from the 2007 Health and Safety Background Report, there is a potential for construction at these sites to generate noise in excess of ambient levels at some sites:

- At the residences north of Shinn Pond, ambient noise is mapped as 55 dB(A). Sources of noise include street noise and noise from park use, but the residences are moderately isolated from sources of high noise. Construction noise will be attenuated from an initial 86 dB(A) at the site to about 53 dB(A) at these residences. Given the distance between the construction site and these residences, it is not likely that construction noise will be significant; and

- Downstream of the BART Bridge at Fernwood Court, Fruitwood Court and/or Appletree Court, the City of Fremont 2030 General Plan Health and Safety Background Report characterizes the day-night average (L_{dn}) for residences closest to construction along the south levee as from 59-61 dB(A). Given higher daylight noise levels, a mid-day noise level at this site would be from 65 to 67 dB(A) (Bishop and Simpson 1975). At a distance of about 200 feet from in-channel construction and about 300 feet from construction on the levee crest, the construction would potentially generate noise at residences of about 68 dB(A), which would marginally exceed daytime ambient noise levels.

  In addition, based on the Bishop and Simpson model (1975), ambient noise levels would be anticipated to decline in the evening hours, and the significance of construction noise would increase. This is likely as the frequency of BART trains decreases as the evening commute draws to a close. This potentially significant noise impact would decrease with distance downstream. At about 800 feet downstream noise levels from construction would decrease to about 56 dB(A). Residences further downstream have been set back from the levee and noise would be blocked by upstream housing. The potential for construction noise in excess of ambient levels is limited to 8 residences between Fernwood and Fruitwood courts.

Noise in Excess of City of Fremont Acceptable Levels

The City of Fremont General Plan (2011) defines acceptable exterior noise levels in residential areas as from 60 dB(A) to 75 dB(A), with a target of 60 dB(A). None of the elements of the Fish Passage Project would exceed 68 dB(A) (Table 29), but noise from construction could potentially be in excess of the target of 60 dB(A) at:

- Vallejo Street (63 dB(A) at RD3 Fishway Construction); and

- Fernwood Court to Fruitwood Court and Applewood Court (68 dB(A) at RD1/ACFCD Drop Structure Fishway below the BART Bridge).

Table 29. Probable maximum noise levels at residential sites. *Italicized* text indicates potentially significant construction noise effects.

Site	Distance from Construction area to Residential Site	Unmitigated dB(A)	City of Fremont Noise Standards	
			Ambient Noise (dB(A))	Acceptable residential standard (Ldn)
RD3 Fishway Construction				
1	300	**59 dB(A)**	55	60
2	200	**63 dB(A)**	***65***	***60***
RD1/ACFCD Dropstructure Fishway and Shinn Pond Screens				
1	1300 feet	**53 dB(A)**	55	60
2	1250 feet	**53 dB(A)**	55	60
3	1500 feet	**53 dB(A)**	55	60
4	250 - 800 feet	**68-56 dB(A)**	***59-61***	***60***
5	800-1600 feet	**56-50 dB(A)**	55	60
6	1600-3200 feet	**50-44 dB(A)**	55	60

The multi-year construction schedule for RD1 and Shinn Ponds extends the period of construction. This may be considered significant, however, mitigation measures outlined below are expected to reduce the potential of noise related impacts.

5.13.5 Proposed Mitigation

The City of Fremont (General Plan 2011) policy related to construction noise is:

"Control construction noise at its sources to maintain existing noise levels, and in no case to exceed acceptable noise levels"

This is essentially a requirement to reduce construction noise to ambient levels and not to exceed acceptable exterior noise levels for residential areas, which ranges 60 to 70 dB(A). The General Plan also limits construction activity hours to the period beginning at 7 AM and ending at 10 PM.

To reduce potential noise effects to a level of less-than-significant at all sites, ACWD and ACFCD would comply with these City of Fremont noise policies, including scheduling of construction to avoid times when people are most sensitive to noise to the extent practical (measure **N1**, Table 9). In addition, the following measures (**N2-3**, Table 9) would be implemented:

- ACWD and ACFCD contractors will be required to use mufflers to reduce noise levels, given that the mufflers reduce noise to 65 dB(A) or less;

- ACWD and ACFCD will be monitoring construction noise levels in the vicinity of Vallejo Street and the proposed Niles mixed use project area if occupied during the construction period and install portable sound walls along the north levee immediately upstream of the railroad bridge to deflect construction noise from the residences along Vallejo Street if exterior noise levels exceed 65 dB(A) or 55 dB(A) after 7 PM;

- ACWD and ACFCD will monitor construction noise levels along Chase Court and install sound walls along the fence if exterior daytime noise levels exceed 65 dB(A) or 55 dB(A) after 7 PM;

- ACWD and ACFCD will monitor construction noise levels in the Quarry Lakes Regional Park along the north shoreline of Shinn Pond. If exterior noise levels are found to exceed 55 dB after 7 PM, ACWD will install a noise containment fence along the boundary of the construction and maintain this fence until noise generating activity is completed; and

- During the period when construction occurs in the the reach from RD1 downstream, ACWD and ACFCD will monitor construction noise levels along the south levee to approximately 2,600 feet downstream of the BART Bridge in the vicinity of Fernwood, Fruitwood, and Appletree Courts. If exterior noise levels are found to exceed 55 dB(A) after 7 PM, ACWD will install a noise containment fence along the boundary of construction, as illustrated on Figure 39, and maintain the fence until noise generating activity is complete.

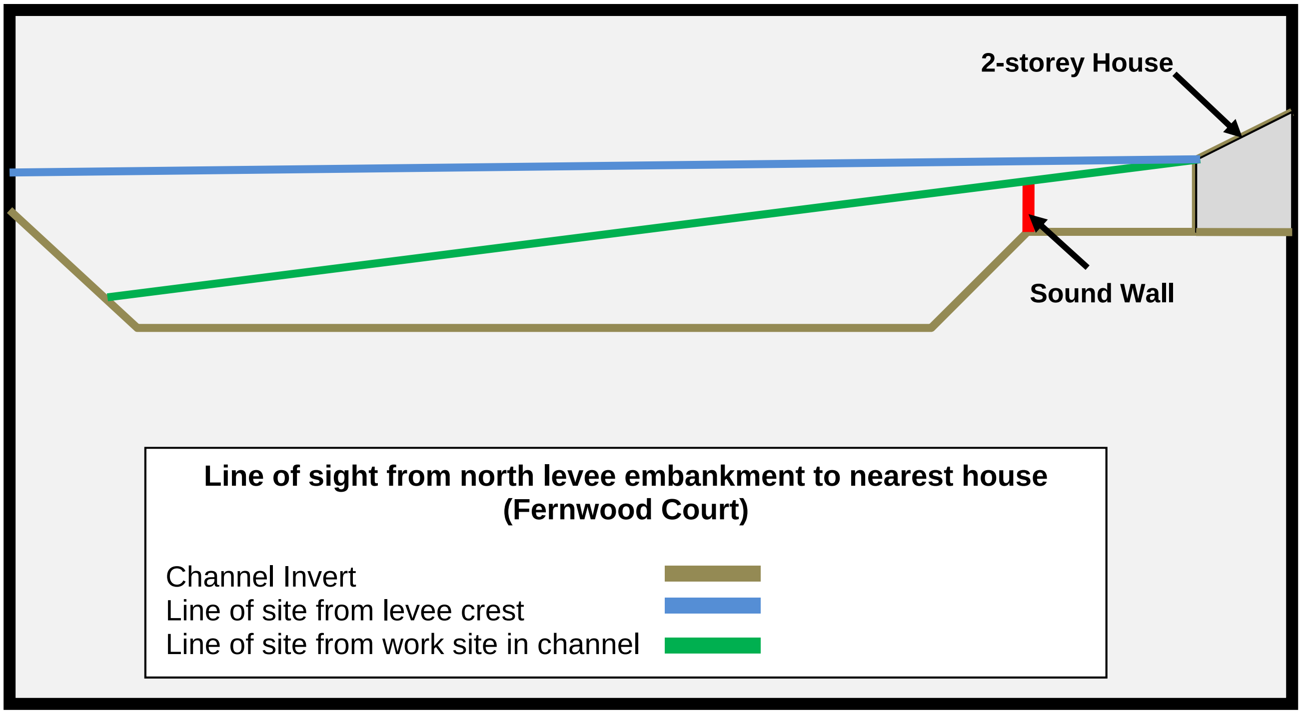


Figure 39. Typical sound wall installation.

5.13.6 Significance Following Mitigation

The proposed mitigation, including sound walls as needed, will reduce noise to levels that meet the City of Fremont's standards for construction management of noise. All construction noise will be reduced to levels of less-than-significant.

5.14 Population and Housing

Would the project:

a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

5.14.1 Environmental Setting

The City of Fremont is the fourth largest city in the San Francisco Bay Area, with a population of over 200,000 people. It is one of many generally affluent communities that surround the South San Francisco Bay area, with an average household income in 2000 of $110,000 and 61% of households earning more than $75,000 per year (City of Fremont 2005). Education levels are high and the City has expanded along with the rest of the South Bay communities such that there is little available land for development.

5.14.2 Mechanisms for Effect

Construction is in the public right-of-way. Housing is neither created nor removed by the Joint Fish Passage Project. Water is considered to be a resource that accommodates population and growth. This concept is integral to the requirement for Urban Water Management Plans and for recent requirements that local water agencies must demonstrate water supply availability before "would serve" notices are issued. The Joint Fish Passage Project potentially affects population and housing if it substantially increases the ability to recharge local groundwater, based on changes in Rubber Dam operations caused by installation of the fishways, fish screens, and a stream gage.

5.14.3 Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

The Joint Fish Passage Project would not increase the total diversion capacity of the area nor does it increase the capacity of the recharge ponds. The Joint Fish Passage Project would therefore not directly or indirectly result in substantial increases (or decreases) in water supply. No new water is created. No effects on population and housing would occur and no mitigation is proposed.

No Action Alternative

No construction activity or changes would occur. No population or housing impacts would occur under the no action alternative.

5.14.4 Significance

No aspect of the Joint Fish Passage Project would induce growth or displace existing housing or people. No significant impacts would occur, and no mitigation is proposed.

5.15 Public Services and Safety

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

a) Fire protection?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

b) Police protection?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

c) Schools?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

d) Parks?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

e) Other public facilities?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

5.15.1 Environmental Setting

In addition to ACWD and ACFCD, essential public services in the Joint Fish Passage Project areas are provided by the City of Fremont, the Alameda County Transportation Authority, and East Bay Regional Park and Open Space District. In the Joint Fish Passage Project areas, the delivery of police, fire, and emergency services is affected by the limited number of bridges across Alameda Creek. In the Project reach of the creek, there are major road crossings at Mission Boulevard, Decoto Road, and I-880. The Joint Fish Passage Project facilities are not located in the vicinity of schools or hospitals:

- The nearest school is located on Mission Boulevard about 0.65 miles from the RD3 Fishway site, separated from the construction by commercial, industrial, and residential development; and
- The nearest sensitive health facility (residential living complex) is located about 0.35 miles from the RD1/ACFCD Drop Structure fishway, and is separated from the construction by residential and commercial development.

5.15.2 Mechanisms for Effect

There is no mechanism by which the Joint Fish Passage Project could require new or altered government facilities to be constructed. No aspect of the Project would involve activities that would block access to hospitals or schools, or would prevent emergency services from accessing residential or commercial buildings.

During construction, construction traffic could affect traffic on Mission Boulevard, Isherwood Way, Decoto Road, and frontage roads to the I-880 freeway. Emergency vehicle response times could be affected during short periods of hauling of materials, but due to the low volume of construction-related traffic, this effect would probably be undetectable. See the more detailed discussion of traffic, below.

5.15.3 Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

The Project would have no significant impacts on public services.

No Action Alternative

No construction activity or changes would occur. No impacts to public services or safety would occur under the no action alternative.

5.15.4 Significance

No impacts are anticipated to public services.

5.15.5 Proposed Mitigation

No mitigation is proposed.

5.15.6 Significance Following Mitigation

No impacts are anticipated.

5.16 Recreation

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

5.16.1 Environmental Setting

On the north bank, the general area of the Joint Fish Passage Project is used for recreational purposes, and includes the Quarry Lakes Recreational Area, Niles Community Park (near the Shinn Pond Screens) and the Alameda Creek Trail. The Quarry Lakes Regional Recreation Area provides boating, fishing, hiking, biking, swimming, and picnic areas. The levees were constructed with maintenance roads which were incorporated into the Alameda Creek Trail system frequented by hikers and cyclists. The Alameda Creek Trail system provides an extended trail connection through the city, with an unpaved maintenance road/trail on the north levee and a paved maintenance road/trail on the south levee. There are connections to this trail at Isherwood Way, Decoto Road, I-880 across the river via Sequoia Bridge, from the Niles neighborhood via Rancho Arroyo Park, and from the Niles Community Park. There are smaller historical parks and community centers scattered around this core.

5.16.2 Mechanisms for Effect

Once constructed, Joint Fish Passage Project facilities would not affect recreation. Trails may be routed around any (minor) intrusion into the existing system. However, during construction, it would be necessary to utilize the north levee maintenance road/trail for construction access and Shinn Pond water levels will need to be lowered for construction access. In addition, it will be necessary to isolate construction areas, requiring levee maintenance roads/trails to be re-routed or closed.

5.16.3 Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

Biking and hiking would be diverted around construction to the extent feasible. Excavation for installation of new diversion pipelines and the fishways will require trail closure and shifting of recreation to the opposite side of the channel for several months each year. Once the area is backfilled, maintenance road/trail use may be accommodated, to the extent compatible with public safety, by providing a fenced corridor along the levee that can be closed during construction and re-opened during non-construction hours. Re-routing or closures of the maintenance road/trail will be coordinated with the East Bay Regional Park District. Lowering of the pond water level may impact recreation at adjacent Quarry Lakes as water related recreational activities (e.g., fish, boating) may be limited.

No Action Alternative

No construction activity or changes would occur. No impacts to recreation would occur under the no action alternative.

5.16.4 Significance

Although construction of the Joint Fish Passage Project will require multi-month trail closures on the north embankment, impact is considered to be less-than-significant because alternative trail routes are available, it does not result in accelerated deterioration of nearby park facilities or require new facilities to be constructed. Following construction, water levels will be restored and trails will either be restored with minor alignment changes around the new facilities or restored to pre-construction conditions.

5.16.5 Proposed Mitigation

Although no CEQA-significant or NEPA-significant impacts to recreation would occur, ACWD and ACFCD recognize the importance of the Alameda Creek trails to the local community. To address this public inconvenience, both agencies would attempt to accommodate public use of trails during construction, working closely with the East Bay Regional Park District. Specifically:

- **R1** ACWD and ACFCD would work with the East Bay Regional Parks District to post trail closure notices and schedules at all trail heads to ensure that the public knows when trails are likely to be closed well in advance; and
- **R2** To the extent compatible with public safety, ACWD and ACFCD would provide carefully signed detours around construction, and would separate

these detours with temporary construction chain link fencing. During installation of new diversion pipes, ACWD and ACFCD would temporarily divert trail use to the opposite levee.

ACWD and ACFCD would coordinate these actions with the East Bay Regional Parks District and City of Fremont as appropriate.

5.16.6 Significance Following Mitigation

With these mitigations, impacts related to construction on trails would be reduced to a level of less-than-significant.

5.17 Transportation and Traffic

Would the project:

a) Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

e) Result in inadequate emergency access?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

f) Result in inadequate parking capacity?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

5.17.1 Environmental Setting

The City of Fremont is the fourth largest city in the Bay Area. A number of major transportation corridors pass through the City, including a north-south BART line, the Union Pacific Railroad line, Interstate 880, Interstate 680, State highways 84 and 238, and a number of major arterial roads. With only major north-south road crossings in a 5-mile reach of Alameda Creek (Mission Boulevard and Decoto Road), the area near the proposed activities is an existing bottleneck for traffic.

5.17.2 Mechanisms for Effect

The Joint Fish Passage Project does not involve construction in or around public roads, except under the bridges crossing the channel. The only mechanism for effect is an increase in total traffic associated with daily construction crews and materials hauling. The review and modification of the Project noted in Section 3 resulted in substantial increases in some activities, including the volume of materials hauled to and from the construction sites.

5.17.3 Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

Joint Fish Passage Project would be located entirely outside of public roads. Construction traffic would include:

- Hauling of construction equipment to the construction site;
- Hauling of materials to and from the construction site; and
- Construction crews commuting to the site.

The general level of traffic generated by on-site construction is in the range of 18 crew round trips per day up to 40 round trips per day for all of the activities in each of the 4 years of construction. This traffic would probably be distributed along Niles Boulevard, Decoto Road, Paseo Padre Parkway, Isherwood Way, I Street, Riverwalk Drive, and Mission Boulevard, where combined average daily traffic is about 85,000 vehicles. Construction workers commuting to the site would represent about 0.02 percent of total traffic. If it is assumed that about 40 percent of total daily traffic occurs during the extended rush hour, then the maximum commute traffic generated by the Joint Fish Passage Project would add 0.05% to peak rush hour traffic. Average daily traffic varies by day, by week, by season, and in response to weather and other factors. An increase in traffic of about 0.05% in peak traffic would fall well within the average variability and thus be statistically insignificant. This change in traffic should not significantly affect response times for emergency service vehicles.

Truck traffic involved in hauling materials and equipment to and from the site is generally of greater concern because large trucks do not merge into traffic as well as cars and because hauling concrete and excavated soils from the work area may involve a concentrated effort. For short periods of time, generally only 4-8 weeks for the Fishway projects, peak construction activities may add more than 30 truck trips per day to daily traffic. This assumes use of trucks with 8 cubic yards of capacity. In general, hauling with heavier trucks in periods of high volume will be via larger trucks, typically several 20-cubic yard capacity trucks supplemented with an 8-cubic yard truck. This truck traffic may add 0.04 to 0.06 percent to total traffic. For hauling associated with removal of materials from demolition and delivery of concrete, this traffic may be concentrated on the route from the construction site and the (a) landfill or (b) the concrete supplier. This concentrated traffic could add 0.2% to traffic along the selected route.

No Action Alternative

No construction activity or changes would occur. No impacts to transportation or traffic would occur under the no action alternative.

5.17.4 Significance

The Joint Fish Passage Project would result in additions to peak traffic volumes on local arterial roads as a result of construction crews traveling to the site. The additional traffic would fall within the normal range of traffic variation. Its effects would not be detectable. Materials hauling may intermittently increase traffic, adding more than 20 trucks per day for periods of up to 4-8 weeks. This is approximately 0.06 % of daily traffic, but may increase local traffic on roads accessing the channel by a higher percentage. This extra truck traffic would be predictable and spread out over the work day.

Due to the change from a 2-year to a 4-year construction schedule, extra on-road truck traffic will be spread out over a longer period of time. In addition, the use of higher-capacity trucks will reduce the number of trucks used, particularly during periods of high-volume hauling. Although the total volume of on-road hauling will increase, average daily numbers of trucks is likely to be reduced.

There is no mechanism by which the Joint Fish Passage Project may affect air traffic patterns, alter a road design feature, or result in inadequate parking capacity. Emergency access would not be blocked. The Joint Fish Passage Project would comply with adopted transportation plans.

5.17.5 Proposed Mitigation

The City of Fremont and Caltrans both require transportation permits for construction projects. The City of Fremont designates routes for movement of construction equipment and for hauling of materials to and from construction sites. Caltrans recommends impact reduction measures that include use of roads during off-peak hours. Accordingly, ACWD and ACFCD would seek to minimize the Project's impacts on traffic, and therefore on emergency response times for public services (measure **Trans1**, Table 9):

- **PS1** To the extent feasible, ACWD and ACFCD would schedule equipment and materials transport to occur outside of peak traffic times; and

- **PS2** Both agencies would require that all construction materials and equipment be transported in accordance with Caltrans and City of Fremont rules and regulations.

5.17.6 Significance Following Mitigation

With proposed mitigation, the Joint Fish Passage Project's impacts on traffic and transportation would be less-than-significant.

5.18 Use of Energy

CEQA requires an energy use analysis, addressing construction and Project operations, but does not specify significance criteria for evaluation of impacts. Energyu se is also applicable to NEPA.

5.18.1 Environmental Setting

The Joint Fish Passage Project would occur in the context of declining worldwide energy supplies and increasing energy prices.

5.18.2 Mechanisms for Effect

The Joint Fish Passage Project would use energy during operations. Operational energy use would be limited to the fishway and fish screen facilities operations (primarily energy to operate the fishway controls and fish screens cleaning mechanisms).

5.18.3 Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

Construction Energy Use

Construction energy use can be estimated based on the estimates of CO_2 production from the Sacramento "Road Construction Emissions Model" (version 7.1.5.1) because there is a well-established ratio of CO_2 production *per* gallon of diesel fuel:

Burning 1 gallon of diesel fuel = 22.2 pounds of CO_2

This standard ratio (a key element of the model analysis) allows a simple back-calculation:

Total pounds of CO_2 generated by construction/22.2 = gallons of diesel used

Using the data from the air quality analysis (above), the estimated total energy use for the Joint Fish Passage Project is calculated:

1899.5 tons of CO_2 x 2000 = 3,799.000 pounds of CO_2
3,799,000 pounds of CO2/22.2 pounds/gallon = 171,113 gallons of diesel fuel
171,133 gallons of diesel fuel/4 = 42,780 gallons of gasoline per construction year

Operational Energy Use

As described in the Project Description, the existing two Shinn Pond diversions will be consolidated into a single screened facility on the north bank of the creek. There will be no change in capacity from the consolidation of the two unscreened diversions into a single screened facility.

Following construction, the fishways and fish screens would require electrical power for maintenance and operation. Both fish screens and fishways are essentially passive facilities and both have correspondingly low energy use. Based on energy use data from the 4 existing fish screens installed above Rubber Dam 3, total energy use of *all* fish screens would be in the range of 1 kWh to 1.5 kWh per hour or about 24 kWh to 36kWh per day. Based on 2005 data on household energy consumption in California (US Department of Energy 2005 residential Consumption Survey), average annual power use for a residence in California is 67,000,000 BTUs (all sources of power). Using the standard conversion of BTUs to kWh yields the following average daily use in kWh:

67,000,000 BTU/year/365 days/year = 183,562 BTU/day
182,562 BTU/day/3412 BTU/kWh = 53.8 kWh/day

Reflecting the extended periods when fish screens are not in operation, fish screens are likely to use less than the total average energy of a single California residence. Fishways are also passive and require little power. Total energy use for all operations is likely to be roughly equivalent to the energy use of a single residence.

Maintenance Energy Use

Reliable estimates for maintenance energy use for fishways and fish screens are not readily available. The 2008 NOAA Technical Memorandum "Habitat Restoration Cost References for Salmon Restoration Planning (NMFS-SWFSC-425) notes that average fish screen maintenance is about $1,400/year. This is about 0.01% to 0.5% per year of initial fish screen cost. Energy use would be a fraction of this total maintenance cost. We were unable to find similar data for fishways, probably because each fishway is unique in design, while fish screens tend to be similar.

No Action Alternative

No construction activity or changes would occur. No impacts to energy use would occur under the no action alternative.

5.18.4 Significance

CEQA does not specify significance criteria for energy use and the BAAQMD CEQA Guidelines do not identify a construction-related energy use significance criterion. The significance of Joint Fish Passage Project on-going operational energy use can be estimated by comparing it to other annual energy use in the region (BAAQMD 2008):

Annual construction energy use of 42,780 gallons of diesel fuel is equal to 117 gal/day compared to 1,759,000 gal/day used in Alameda County = 0.00067%; and

Operations energy use of 55 kWh/day = energy use of 1 average household
One household/525,000 households in Alameda County = 0.0002%.

The energy use from construction, operation, and maintenance is a small fraction of typical energy use levels in Alameda County. This reflects the relatively low intensity of construction and the passive nature of the finished facilities. Such energy is statistically insignificant.

5.18.5 Proposed Mitigation

ACWD and ACFCD would seek to minimize operational energy use by specifying that only high efficiency electric motors be utilized in the all facilities (measure **E1**, Table 9). Both agencies would seek to minimize construction-related energy use by specifying in all construction contracts that all equipment shall be turned off when not in use, with idling of construction equipment limited to not more than 2 minutes to the extent practical (measure **E2**, Table 9). ACWD has also recently incorporated an energy monitoring and maintenance program for all of its on-road and off-road equipment, which would result in substantial energy savings.

5.18.6 Significance Following Mitigation

Construction energy use would constitute an insignificant portion of total energy use in the region and mitigations would further reduce energy use. No significant impacts are anticipated.

5.19 Utilities and Service Systems

Would the project:

a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ☒ No Impact

g) Comply with federal, state, and local statutes and regulations related to solid waste?

❐ Potentially Significant Impact ❐ Less Than Significant with Mitigation
❐ Less Than Significant Impact ☒ No Impact

5.19.1 Environmental Setting

Although the Joint Fish Passage Project areas are within an urban matrix, the sites for construction have some unique characteristics. First, the historic excavation of gravels to a depth of at least 30 to 50 feet has generally precluded the construction of major utility lines through the Project area, except along transportation corridors. Major power transmission lines, SFPUC's Hetch Hetchy Aqueduct, and major oil and gas lines are all located outside of the Joint Fish Passage Project areas.

5.19.2 Mechanisms for Effect

The Joint Fish Passage Project has no mechanism by which it would affect public utilities.

5.19.3 Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

None.

No Action Alternative

No construction activity or changes would occur. No impacts to public utilities would occur under the no action alternative.

5.19.4 Significance

The CEQA *Guidelines* do not consider temporary effects to utility service to be significant effects. The Joint Fish Passage Project would not have significant impacts on utilities and service systems. Project engineers would identify utilities in the alignment of the Joint Fish Passage Project construction and would coordinate with utility owners to avoid these lines and/or to provide for service during construction-related disturbance of these lines. No significant impacts would occur. No mitigation is proposed.

5.20 Cumulative Impacts

5.20.1 Activities Evaluated for Cumulative Effects Analysis

Projects with impacts similar to those of the Joint Fish Passage Project include other fish passage projects being considered by other entities and ACFCD on-going maintenance of the Alameda Creek Flood Control Channel. Such projects would have similar habitat and construction-related impacts. They would be almost completely contained within the Flood Control Channel. The context for the Joint Fish Passage Project thus includes the activities shown in Table 30.

Table 30. Projects addressed in Cumulative Effects Analysis.

Past Projects	1	Sand and gravel mining
	2	Army Corp construction of flood control channel (including drop structure)
	3	ACFCD flood control channel maintenance per Corps Maintenance &Operations Manual
	4	Installation of bridges and associated channel modifications
	5	ACWD construction of water diversion facilities (dams and pipelines)
Recently Completed Projects	1	Mission Boulevard Bridge Widening Project
	2	ACWD Alameda Creek Pipeline Fish Screens (Fish Screen 1)
	3	ACWD Bunting Pond Fish Screen Project
	4	ACWD Fishway at Lower Rubber Dam (RD2) and removal of the rubber dam; and
	5	ACFCD Levee Remedial Work Along Alameda Creek North Levee from downstream of Union Pacific Railroad to Alvarado Boulevard
	6	ACWD Kaiser Pond Fish Screen Project
Potential Future Projects	1	ACFCD Flood Control Channel Maintenance
	2	ACFCD De-silting Along Alameda Creek (Line A) Ardenwood to Decoto Boulevard
	3	ACFCD low-flow channel modifications and modifications to existing grade control structures located within the flood control channel identified as low-flow fish passage impediments Upstream of Decoto Road crossing
	4	Modification to low-flow impediments identified under Isherwood Road, Decoto Road (City of Union City and I-880 bridges (Caltrans)
	5	Union City Intermodal Station Passenger Rail Project
	6	Vallecitos channel maintenance and repairs
	7	SFPUC Alameda Creek Recapture Project (ACRP)

	8	Conservation Plan For Sunol Quarry SMP-30 Site/Revised SMP-30 Improvements
	9	City of Fremont Niles Mixed Use Project

The most substantial change to the urban reach of Alameda Creek has been historic sand and gravel mining which ultimately created the ponds that ACWD now uses for groundwater recharge and also functions as a recreation area. The subsequent Federal flood control project from Mission Boulevard downstream to the estuary re-routed the creek and confined it within a rip-rapped levee that supported other infrastructure such as bridges. On-going maintenance has maintained the general configuration of the Flood Control Channel. This is a permanent change, primarily because the subsequent commercial and residential development of the floodplain must now be protected and because major transportation facilities (roads and railroads) depend on a stable flood control channel configuration.

Previous projects effectively eliminated a natural stream/floodplain habitat that could function as habitat for a suite of fish, amphibians, and birds. Installation of concrete grade control and energy dissipation structures in the channel and under major bridges also created barriers to fish and wildlife movement.

Recent Projects and Their Cumulative Effects

Recently completed projects in the Joint Fish Passage Project reach include initial ACWD actions to improve conditions in the channel for steelhead and salmon, primarily efforts to (a) remove barriers to migration and (b) reduce stress and potential for diversion of salmonids into the recharge basins. The effects of these recent projects have as yet been minimal. Implementation of the Joint Fish Passage Project would further restore conditions that are needed for salmonids to migrate upstream and downstream in a timely manner and with minimal stress from on-going ACWD water operations.

Anticipated Future Projects

In addition to support of the larger steelhead restoration program, ACFCD would be undertaking further improvements in the reach from the ACFCD Drop Structure to Interstate 880. These include low-flow channel development including adjustments to concrete grade control structures and areas of sediment deposition that have been noted in the channel.

ACFCD would also continue to maintain the Flood Control Channel, with major maintenance on an average 10-year cycle. This would involve substantial sediment removal and stockpiling and periodic maintenance of the rip-rapped levees.

In addition, it is assumed that identified impediments under the roadway bridges in the Flood Control Channel would be modified to provide for steelhead and salmon migration.

Substantial construction in the vicinity is also anticipated for expansion of the Union City Intermodal Station Passenger Rail Project.

ACWD is also anticipating a project to address on-going maintenance, including bank stability issues, within Vallecitos Channel.

The SFPUC has proposed a project in the Sunol Valley to annually re-capture up to 6,300 AF/yr of the water released/bypassed at Calaveras Dam and the Alameda Creek Diversion Dam. This project, identified as the “Alameda Creek Recapture Project” or “Alameda Creek Fisheries Enhancement Project”, was included on a programmatic level in SFPUC’s Water Supply System Improvement Program Final Programmatic EIR. (SFPUC, 2008) and discussed as the “Upper Alameda Creek Filter Gallery” (UACFGP) in the Calaveras Dam Replacement Project Environmental Impact Report (CDRP EIR, 2011).

The SFPUC recently issued a Notice of Preparation for an alternative project, known as the Alameda Creek Recapture Project (ACRP NOP, 2015). Water would be recaptured from a quarry pit, Pit F2, in the Sunol Valley located approximately 6 miles downstream of Calaveras Reservoir and 0.5-mile south of the Interstate 680/State Route 84 interchange. The ACRP is proposed to recapture an amount of water equivalent to that which is released and/or bypassed. The proposed project components for recapture of the water from Pit F2 include pumps mounted on barges, pipelines extending from the pumps to shore; a new pipeline connecting to the existing Sunol Pump Station Pipeline; and ancillary facilities such as throttle valves, a flow meter, and electrical facilities. No work would occur in the bed, bank, or channel of Alameda Creek. The Project is proposed to recapture an annual average of up to 9,820 AF/yr of water that will be released from Calaveras Reservoir and/or bypassed around the Alameda Creek Diversion Dam during future operation of Calaveras Reservoir.

The future operation of the ACRP may result in changes to the quantity of SFPUC water released and/or bypassed that may reach the Niles Gage. However, the level of detail in the NOP is insufficient to integrate into existing analyses on fisheries and water supply, which are analyzed on a daily time step.

In addition, a conservation plan has been prepared for gravel quarry operations in the Sunol Valley (“Conservation Plan For Sunol Quarry SMP-30 Site”). This Conservation Plan was prepared by Oliver de Silva, Inc., the Alameda Creek Alliance, and the Center for Biological Diversity, to protect and enhance the biological resources in the vicinity of the Sunol Quarry Site in the Sunol Valley. As described in the Conservation Plan, Oliver de Silva (“ODS”) will “fund, implement and monitor the avoidance, mitigation, and restoration measures to best protect and conserve special-status species and their habitats prior to and during the development of quarry operations at the Sunol Quarry, under Surface Mining Permit 30 (“SMP-30”), Revised SMP-30 and Further Revised SMP-30”. Consistent with the terms of Revised SMP-30, an element of this plan includes: "Minimizing percolation losses of water from Alameda Creek to benefit habitat for steelhead trout, through installation of a bentonite cutoff wall to eliminate inflow through the shallow alluvium into mining pits". Environmental impacts of the Revised SMP-30 are contained in the "SMP-30 Revised Use Permit Sunol Valley Aggregate Quarry Project Draft EIR" (SMP-30 EIR, 2012). Although the amount of increased flows has not been quantified, an element of the SPM-30 project according to the draft EIR is the instillation of a soil/bentonite slurry cutoff along the northerly portion of Alameda Creek, and another slurry cutoff wall installed along a portion of San Antonio Creek to prevent creek in-flow into the quarry pit and basins. The intent of the slurry wall is to reduce the amount of groundwater that seeps from the adjacent creeks into the quarry basin through the alluvium, which will increase stream flows through Sunol Valley.

The City of Fremont has proposed a project (known as the Niles Mixed-Use Project) in the Niles area of Fremont. The project proposes development of 98 dwelling units and 3,620 square feet of non-residential uses and is an infill project located in an urban area that was previously developed. Environmental documentation of this proposed project is provided in the City of Fremont Niles Mixed-Use Project Initial Study/Mitigated Negative Declaration (City of Fremont, 2014). The proposed mixed use project has not been authorized pending resolution of a CEQA law suit. As a result of the delay in project approval the schedule for project construction is uncertain.

5.20.2 Mechanisms for Effect

Cumulative effects that involve substantial modifications of the existing Flood Control Channel are not anticipated; the flood protection elements of the channel are assumed to remain as they are. Modifications may enhance low-flow channel characteristics for improved fish passage, but the Flood Control Channel would not otherwise be substantially altered. This reflects the necessity for maintenance of design-level protection for urban development. There are three categories of cumulative effects associated with the above activities:

- Construction-related effects of modifications to enhance fish passage and for on-going Flood Control Channel maintenance, such as noise, dust/combustion-related emissions, potential water quality impacts, and potential for impacts to sensitive species in the reaches near the estuary;

- Cumulative improvement of conditions in support of fish passage through the flood control channel to the upper Alameda Creek watershed; and

- Upstream projects also result in changes to the quantity of SFPUC fisheries bypasses/releases that reach the downstream flood control channel, as described in Section 3.4 of this MND.

5.20.3 Cumulative Effects

The assessment of potential effects takes into consideration the significance of an action in terms of its context and intensity as required under NEPA and whether or not significant impacts would occur as required by CEQA.

The Joint Fish Passage Project facilities are a part of the overall Alameda Creek program to restore fish passage and enhance the function and value of the creek. The proposed facilities are isolated and there are no mechanisms by which the Joint Fish Passage Project elements would contribute to cumulative effects of other projects on aesthetics, agriculture, biological resources, cultural resources, geology and soils, hydrology and water quality, hazards and hazardous materials, land use, mineral resources, population and housing, public services and safety, recreation, traffic, and utilities and service systems. As mitigated, the Joint Fish Passage Project's effects in terms of these categories of impact are so low that their additive effect in combination with other projects is inconsequential.

The Joint Fish Passage Project and other planned construction work in the Alameda Creek channel would potentially have additive or cumulative effects on the following:

- Construction-related trail closures may continue beyond the construction period for the Joint Fish Passage Project; thus, detouring trail users through Niles Community Park and Quarry Lakes would occur intermittently in the future. The Joint Fish Passage Project, in combination with other facility construction for steelhead restoration, would cause cumulative inconvenience for local residents and Alameda Creek trail users beyond that associated with the Joint Fish Passage Project.

- Operations and maintenance will at times involve low levels of construction, replacement of equipment, and closure of some areas adjacent to the creek and trails during such actions. Seasonal installation and demobilization of equipment will continue, such as removal of rubber dams and fish screens. Maintenance of fishways will routinely involve removal of debris and sediment. These routine activities will periodically create noise, traffic, and disturbance of trails and other recreation activities. All of these activities will generate emissions from diesel engines and from fugitive dust that would contribute to temporary increases in particulates, NOx, ROG, CO, and CO2;

- Construction associated with sediment management and channel rehabilitation would cause intermittent but on-going disturbance to habitats in the channel, potentially resulting in low levels of stress and injury to wildlife using the increasingly functional channel habitats that result from channel rehabilitations. The Joint Fish Passage Project would thus contribute to the cumulative enhancement of conditions for steelhead and salmon in the watershed. This contribution would be a significant effect, but the effect would be beneficial, not adverse.

- Mitigation measures outlined in Table 9, including adherence to all local requirements and permitting for construction vehicle traffic will reduce the incremental and cumulative impacts of the Project. Larger trucks will be used when practical to reduce vehicle trips to and from the site.

- Mitigation measures outlined in Table 9, including noise monitoring during construction at local residential sites and the proposed Niles mixed use project site if occupied during the construction period will quantify noise levels. Sound walls will be constructed to reduce noise levels to less-than – significant levels to reduce the incremental and cumulative impacts of project construction.

- The implementation of projects in the Sunol Valley (i.e. ACRP and SMP-30) may result in changes to the quantity of SFPUC fishery bypass/releases that reach the flood control channel. The analysis in this MND considers all information currently available for upstream projects. The calculation of bypass flows, including the potential effects of these projects, is discussed in Section 3.4 of this MND.

No Action Alternative

No construction activity or changes would occur. No cumulative impacts resulting from the proposed Project would occur under the no action alternative

5.20.4 Significance

CEQA does not specify criteria for determining the significance of Cumulative Impacts. Given the scale of local and regional infrastructure projects, the Joint Fish Passage Project's less-than-significant construction and very low operation and maintenance effects on air quality would not be cumulatively significant. The large scale of proposed infrastructure and other development projects in the region means that Joint Fish Passage Project's air quality effects are a fraction of a percent of total construction-related effects on air quality.

The completion of the Joint Fish Passage Project would disrupt trail use at a major recreational hub for the City of Fremont for at least 4 years (albeit only about 7 months of each year), but following construction, the frequency and duration of this inconvenience would be reduced because many of the needed projects would be in place. In addition, access to recreation trails will be restored, to the extent feasible, once construction is completed at each new facility. For trail users, disruption of activity would decrease following facility construction. In addition, with the exception of the Intermodal Station project, trail use impacts would be minimal in the future. The trend would be to lower impacts. In addition, the installation of fishways will provide an added recreation feature. The presence of salmon and steelhead is likely to draw people to the Project area to view them during their migrations. This recreational benefit will occur throughout the migration season. Over the long-term, recreation activities will be restored and enhanced by the presence of steelhead and salmon.

For wildlife, and particularly for steelhead and salmon, the cumulative impacts of continued enhancement of the channel and maintenance of the facilities proposed would be beneficial, somewhat off-setting the adverse effects of historic modifications of the channel. The Joint Fish Passage Project would make a significant but beneficial contribution to this aspect of cumulative effects. The potential take of species during enhancement and maintenance of enhanced reaches of the channel would not be cumulatively significant, because the improved habitat would more than offset short-term individual losses that are always associated with restoration.

Implementation of the proposed minimization, avoidance, and mitigation measures for traffic and noise effects during construction are expected to be effective in reducing incremental and cumulative impacts to a less-than-significant level.

As described in Section 3.4 of this MND, the SFPUC CDRP EIR, 2011 indicates that the slurry walls proposed by the SMP-30 project are expected to reduce seepage from the channel into the adjacent quarry pits, thereby increasing flows in the channel. The CDRP EIR also indicates that a re-capture project would potentially affect downstream flows in the channel and thus may affect the Net Sunol Valley Losses. ACWD is committed to developing and implementing the methodology for calculating the future Net Sunol Valley infiltration losses. The methodology will be developed collaboratively by ACWD and SFPUC, consistent with the approach to hydrologic modeling set forth in the Letter of Understanding, and reviewed with NMFS and other members of the Alameda Creek Fisheries Restoration Workgroup. This methodology is subject to the approval of NMFS and will be used to calculate the Net SFPUC Releases at the Niles Gage (as required to implement the proposed minimum flow requirements for ACWD). Additionally, Section 3.4.3 provides a means to address future changes in Net Sunol Valley losses and therefore the potential effects of existing or proposed upstream projects.

Subsequent to final certification of the CDRP EIR, the SFPUC released an NOP for the Alameda Creek Recapture Project (ACRP). Unlike the Upper Alameda Creek Recapture Project (UACFGP) which would utilize an underground network of pipes to collect percolation from Alameda Creek, the proposed ACRP will rely on groundwater-surface water interactions within the Sunol Valley to capture bypasses and releases described in the CDRP BO. While the components and location of the ACRP are different than the UACFGP, there may be potential impact to surface water flows through Sunol Valley similar to what was analyzed in the CDRP EIR for the UACFGP.

There is currently no publicly available technical information or formal studies that analyze the effects of either the proposed slurry walls or ACRP to calculate impacts on Alameda Creek flows through Sunol Valley. Therefore, the magnitude and timing of impacts on stream flows through Sunol Valley resulting from either SMP-30 or from the ACRP are, as of yet, unknown.

5.20.5 Proposed Mitigation

Recognizing that the Joint Fish Passage Project, in combination with the future planned steelhead restoration projects and the Intermodal Station project may result in re-routing of trail users to other local parks, ACWD and ACFCD would cooperatively monitor the potential effects of this diversion on the local parks. Both agencies would work with local parks to help minimize impacts on their facilities. The primary mitigation would be to re-route and modify the Alameda Creek Trail as necessary to maintain its function during and following construction.

Consistent with Table 9, all channel enhancement projects now and in the future would implement survey and species take avoidance protocols recommended by NMFS, CDFW, and USFWS (as appropriate) at the time of the proposed activity. This would minimize adverse impacts associated with passage enhancement, and reduce the impacts to less-than-significant. The net cumulative effects of in-channel enhancements would be to educe and offset historic impacts.

5.20.6 Significance Following Mitigation

With this mitigation, the Joint Fish Passage Project's cumulative effects would be less-than-significant.

5.21 Mandatory Findings of Significance

a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?

❒ Potentially Significant Impact ☒ Less Than Significant with Mitigation
❒ Less Than Significant Impact ❒ No Impact

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
☒ Less Than Significant Impact ❒ No Impact

c) Does the project have environmental effects which would cause substantial adverse effects on human beings, either directly or indirectly?

❒ Potentially Significant Impact ❒ Less Than Significant with Mitigation
☒ Less Than Significant Impact ❒ No Impact

1) The project would have only minor effects on wildlife and wildlife habitat, except to substantially enhance the potential for steelhead restoration and enhancement of fish passage in this reach of Alameda Creek. These effects are less-than-significant with mitigation.

2) The project's cumulative impacts relative to other construction projects in the region are insignificant. The project would contribute to potential cumulative impacts (benefits) on fish passage in Alameda Creek.

3) The project avoids and minimizes significant construction-related effects and the long-term effects of project operation are less-than-significant.

5.22 Assurance of Mitigation

Prior to adoption of a Mitigated Negative Declaration (MND), ACWD and ACFCD would consider and adopt a Mitigation Monitoring Plan cataloging all proposed mitigation measures (Table 9) and specifying the parties responsible for their implementation. Monitoring, reporting, and record-keeping requirements would be specified. The Mitigation Monitoring Plan would further specify that (a) compliance with the terms of the Mitigation and Monitoring Plan shall be made a term of all construction contracts, and (b) that construction-contractor compliance with mitigation and monitoring protocols delegated to construction contractors would be subject to oversight by ACWD and ACFCD. In its resolutions adopting the Joint Fish Passage Project, ACWD's and ACFCD’s Board of Directors would direct and authorize the Project Manager to take all actions necessary for compliance with the Mitigation Monitoring Plan.

6.0 CONCLUSIONS

1. The Joint Lower Alameda Creek Fish Passage Improvements Project consists of construction and operation of two CDFW/NMFS approved fishways around two inflatable dams, and a fish screen facility in the reach of Alameda Creek between Mission Boulevard and the ACFCD Drop Structure, and implementation of flow releases for fish passage (Flow Bypass Rules). These activities would enhance fish and wildlife movement in the reach. Concurrently, in-kind replacement of the inflatable dam fabric at Rubber Dam 3; and mechanical equipment and controls at both rubber dam facilities will be performed for facility maintenance to ensure operational reliability for water supply needs.

2. Given the low intensity of construction and on-going operations and maintenance of the Joint Lower Alameda Creek Fish Passage Improvements Project and the proposed mitigations to avoid and minimize associated impacts, impacts would be minimal and where impacts could be potentially significant, would be mitigated to a level of less-than-significant.

3. The Joint Lower Alameda Creek Fish Passage Improvements Project would have less-than-significant cumulative effects. Construction impacts would not make a significant contribution to the larger scale effects of channel maintenance and/or projects like the on-going Intermodal Station. Cumulative effects associated with wildlife would partially reduce the long-term cumulative effects of urbanization on steelhead and salmon. The Joint Lower Alameda Creek Fish Passage Improvements Project would, however, contribute significantly and positively to the regional recovery of steelhead and salmon in Alameda County.

7.0 REPORT PREPARERS

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8.0 REFERENCES

Alameda County Water District (ACWD). 1974. Environmental Impact Report: Fabridam 3 Report prepared by Environ, Inc. Fremont, CA.

Alameda County Water District (ACWD). 1981. Environmental Impact Report: Alameda County Water District Groundwater Recharge Facilities Plan. Report prepared by Madrone Associates. Novato, CA.

Alameda County Water District (ACWD). 1989. ACWD: A Brief History. Fremont, CA.

Alameda County Water District (ACWD). 2005. 2006-2010 UWMP update. Fremont, CA

Alameda County Water District. 2007. Initial Study and Mitigated Negative Declaration. Alameda Creek Pipeline No. 1 Fish Screen Project and Lago Los Osos Pipeline.

Alameda County Flood Control and Water Conservation District. 1999. Initial Study: Alameda Creek Flood Control Project Maintenance Desilting Program.

Alameda County Transportation Authority. 2009. East-West Connector Project Final Environmental Impact Report.

Bay Area Air Quality Management District (BAAQMD). 1999. BAAQMD CEQA Guidelines Assessing the Air Quality Impacts of Projects and Plans. San Francisco, CA. Available online: <http://www.baaqmd.gov/pln/ceqa/index.htm>

Bay Area Air Quality Management District (BAAQMD). 2000. Bay Area 2000 Clean Air Plan and Triennial Assessment. San Francisco, CA.

Bay Area Air Quality Management District (BAAQMD). 2012. Air Quality Guidelines, Updated May 2012. Available at: http://www.baaqmd.gov/~/media/Files/Planning

Bobzien, S, and JE DiDonato. 2007. The Status of the California tiger salamander (*Ambystoma californiense*), California red-legged frog (*Rana draytonii*), foothill yellow-legged frog (*Rana boylii*), and other aquatic herpetofauna in the East Bay Regional Park District, California. East Bay Regional Park District 2950 Peralta Oaks Court, P.O. Box 5381, Oakland, CA 94605.

California Data Exchange. 2011. Water temperatures at the Vallecitos Turnout of the South Bay Aqueduct, 2002-2011. cdec.water.ca.gov

CDFG. 2009. California Least Tern Breeding Survey, 2009 Season. State of California. The Resources Agency, Department of Fish and Game, Wildlife Branch, Sacramento, CA.

California Department of Fish and Game (CDFG). 2005. California's Plants and Animals: Western burrowing owl. Available: at www.dfg.ca.gov/hcpb/cgi-bin/read_one.asp?specy=birds&idNum-65.

California Department of Fish and Game (CDFG). 2005. California's Plants and Animals: California horned lizard. Available at: www.dfg.ca.gov/hcpb/cgi-bin/read_one.asp?specy=reptiles&odNum=15.

California Department of Fish and Game (CDFG). 2005. California's Plants and Animals: Southwestern pond turtle. Available at: www.dfg.ca.gov/hcpb/cgi-bin/read_one.asp?specy=reptiles&odNum=39.

California Department of Fish and Game (CDFG). 2005. California's Plants and Animals: Yellow warbler. Available at: www.dfg.ca.gov/hcpb/cgi-in/read_one.asp?specy=birds&odNum=95.

California Geological Society. 2004. Seismic Hazard Zones of Required Investigation. Map available at: http://quake.abag.ca.gov.

California Natural Diversity Data Base (CNDDB(A)). 2008. Data for the Niles and Newark USGS. Quadrangles. Sacramento, CA.

California Department of Transportation. 2010. Average daily Traffic, 2010. Sacramento, CA.

CH2M HILL. 2005. Draft technical Memorandum: Lower Alameda Creek Fish Passage Improvements Project - Screened Intake Alternative Analysis. Redding, CA.

CH2M HILL. 2005. Draft technical Memorandum: Lower Alameda Creek Fish Passage Improvements Project - Pipeline Evaluation. Redding, CA.

City of Fremont. 2005. Demographics, education levels, income. Available at: www.ci.fremont.ca. us/Business/Demographics.

City of Fremont. 2003. 2003 Traffic Volumes. Available at: www.ci.fremont.ca. us/Community/Traffic/TrafficCounts.htm.

City of Fremont. 2003. Fremont 2003 traffic flow map. Fremont, CA. Available at: www.ci.fremont.ca.us.

City of Fremont. 1991. General Plan, Figure 10-11. Fremont, CA. Cited In*:* Union City Intermodal Station Passenger Rail Project Draft Environmental Impact Report, April 2005. [A copy of the City of Fremont General Plan is available for review under Separate Cover. The relevant noise data are provided.]

Dhakal, Amod S. 2012. Draft Technical Memorandum: Overview of Methods, Models and Results to Develop Unimpaired, Impaired and Future Flow and Temperature Estimates Along Lower Alameda Creek for Hydrologic Years 1996-2009.

Dunk, J.R. 1995. White-tailed kite (*Elanus leucurus*). In: The Birds of North America. A. Poole and F. Gill, eds. Philadelphia, PA.

Earth Sciences Associates. 1989. Liquefaction Studies, Alameda County Water District, Rubber Dam Number 3. Palo Alto, CA 94304.

First Carbon Solutions. 2014. Niles Mixed-Use Project. Draft Initial Study/Mitigated Negative Declaration. Fremont, CA.

H.T. Harvey & Associates. 2008. Alameda Flood Control Channel Experimental Dredging Project 7th year Post Dredging (11th year overall Monitoring Report.

Hoover, R. M., and R.H. Keith. 1996. Noise control for buildings and manufacturing plants. Hoover and Keith, Inc. Houston, TX. [This is a standard text book for noise assessment, available at the County Library.]

Iqbal, A.R. 2005. A physical habitat assessment of Alameda creek used to determine the suitability for reintroducing native fish species. Unpublished report available at: ist-socrates.berkeley.edu/~es196/projects/2004final/

Jones and Stokes, Inc. 2005. Draft Union City Intermodal Station Passenger Rail Project. Draft Environmental Impact Report, Chapters 3.3 and 3.4. Union City, CA.

Lamphier-Gregory 2012. SMP-30 Revised Use Permit, Sunol Valley Aggregate Quarry Project. Draft Environmental Impact Report, SCH No. 2011102051.

Leidy, R. A. (1984). Distribution and Ecology of stream fishes in the San Francisco Bay Drainage. Hilgardia 52(8): 1-175.

McBain and Trush, 2012. Evaluating Priority Life History Tactics for Reintroduced Alameda Creek Steelhead.

Michael Marangio. 2009. Wildlife survey-Quarry Lakes Recharge Basins and Regional Park. April 9, 2009.

Moyle, P.B. 2002. Inland fishes of California. University of California Press, Berkeley, California.

Neilsen, J. and M. Fountain. 1999. Microsatellite analysis of Alameda Creek Rainbow/Steelhead Trout. Alaska Biological Science Center, Anchorage, AK. Cited in: Center for Ecosystem Management and Restoration. 2002. Draft Steelhead restoration Plan for the Alameda Creek Watershed.

NMFS. 2011. Species Accounts at: http://www.nmfs.noaa.gov/pr/species/fish/

- Green Sturgeon (*Acipenser medirostris*)
- Coho salmon (central coast) (*Oncorhynchus kisutch*)
- Central California Coastal steelhead and Central Valley steelhead (*Onchorynchus mykiss*)
- Central Valley spring-run Chinook salmon (*Onchorynchus tshawytscha*)
- Central Valley winter-run Chinook salmon (*Onchorynchus tshawytscha*)

NMFS. 2011. Biological Opinion - Calaveras Dam Replacement Project in Alameda and Santa Clara Counties, California (Corps File No. 299790S).

Ricketts, M. and B. Kus. 2000. Yellow-breasted chat (*Icteria virens*). In: The Riparian Bird Conservation Plan: a strategy for reversing the decline of riparian-associated birds in California. California Partners in Flight. Http://www.prbo.org.calpif/htmldocs/riparian_v-2.html.

San Francisco Planning Department. 2008. Water System Improvement Project Environmental Impact Report, SCH No. 2005092026.

San Francisco Planning Department. 2011. Calaveras Dam Replacement Project Environmental Impact Report, SCH No. 2005102102.

San Francisco Planning Department. 2015. Alameda Creek Recapture Project. Notice of Preparation of an Environmental Impact Report and Notice of Public Scoping Meeting. San Francisco, CA.

San Francisco Estuary Institute (SFEI). 2005. *Pesticides in Urban Surface Water Annual Research and Monitoring Update.* (Including a review of urban pesticide monitoring studies in California by N. Singhasemanon.) Report prepared by TDC Environmental, San Mateo, CA.

Trihey & Associates, Inc. 2001. Alameda creek aquatic resource monitoring report summer and fall, 1999. Prepared for: Bureau of Strategic and Systems Planning, Public Utilities Commission, City and County of San Francisco, San Francisco, California. Project No. 307127.

US Department of Transportation, Federal Highway Administration. 1976. Special report -- highway construction noise: measurement, prediction, and mitigation. Appendix A. Available at: http://www.fhwa.dot.gov/environment/noise/highway/hcno6.htm.

US Environmental Protection Agency (USEPA). 2005. Project Area Hazards Map. Fremont, CA. Available at: EPA EnviroMapper: www.epa.gov/enviro/htm/em/134.67.99.113/sf/

US Geological Survey (USGS). 2005. Terra-Server USA. Available at: http://terraserver.microsoft.com/

Yosef, R. 1996. Loggerhead shrike (*Lanius ludovicianus*). In: The Birds of North America. A. Poole and F. Gill, (eds.). Philadelphia, PA.