Final Environmental Assessment/Initial Study: Authorization of Incidental Take and Implementation of the Calaveras River Habitat Conservation Plan

Prepared By:

Stockton East Water District and
The National Oceanic and Atmospheric Administration
National Marine Fisheries Service

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Executive Summary

In accordance with the National Environmental Policy Act (NEPA), the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NMFS) has developed this Environmental Assessment/Initial Study (EA/IS) to evaluate the effects of the proposed action of issuing an Incidental Take Permit (ITP) under Section 10(a)(1)(B) of the Endangered Species Act (ESA) of 1973, as amended, to Stockton East Water District (District or the applicant) related to the District's Calaveras River Operations (Project). The District is applying to NMFS for an ITP for a 50-year period authorizing the incidental take of threatened Central Valley (CV) steelhead (*Oncorhynchus mykiss*) Distinct Population Segment (DPS), threatened CV spring-run Chinook salmon (*O. tshawytscha*) Evolutionarily Significant Unit (ESU), endangered Sacramento River winter-run Chinook salmon ESU, and species of special concern CV fall/late fall-run Chinook salmon ESU. As a species of special concern, the fall/late fall-run Chinook salmon ESU does not currently have any protective regulations against take and no Federal permit is needed to incidentally take them, but there may be a change in listing status during the permit period. As such, the ITP authorization would be effective immediately upon issuance for all threatened and endangered species (i.e., CCV steelhead DPS, CV spring-run Chinook salmon ESU, and Sacramento River winter-run Chinook salmon ESU); while the ITP authorization would become effective for the fall/late fall-run Chinook salmon ESU if it is listed as threatened or endangered.

On September 30, 2019, NMFS published a notice of receipt in the Federal Register (84 FR 51518) that a request for a permit for the incidental take of winter-run Chinook salmon, spring-run Chinook salmon, fall/late fall-run Chinook salmon, and CCV steelhead associated with the activities as described in the Habitat Conservation Plan, had been submitted by the District. A draft version of this EA/IS was made available for a 45-day public comment period. NMFS received several comments and these comments were addressed as changes to this Final EA/IS or as a response to comments in section 9 below.

NMFS' issuance of the ITP is contingent on the District's implementation of the Calaveras River Habitat Conservation Plan (CHCP), which was developed in coordination with NMFS (FISHBIO et al. 2018). The District has developed and will implement the CHCP to ensure that the ongoing management and operation of the Project is coordinated with the needs of Calaveras River salmonid populations and to meet the issuance criteria for an ITP. Under the CHCP, the District will continue to function as a regional water supplier, and will retain the ongoing operation and maintenance of existing structures and facilities in the lower Calaveras River corridor, in some instances modified to provide fish protection. The CHCP includes a series of conservation strategies (CS) to minimize and mitigate the effects of Project operations on potential take of listed steelhead and Chinook salmon. This EA/IS analyzes a permit term of 50 years, assuming initial permit issuance would occur in 2019.

The conclusion from the evaluation of this EA/IS is that the Proposed Action will not result in any significant adverse direct, indirect, or cumulative impacts to the human environment.

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List of Acronyms

AF – Acre-feet
AFRP – Anadromous Fish Restoration Program
AMP – Adaptive Management Plan
AWS - Attraction water system
BLM – Bureau of Land Management
BMP – Best Management Practices
CCWD – Calaveras County Water District
CDFW - California Department of Fish and Wildlife (formerly California Department of Fish and Game)
CDHS - California Department of Health Services
CEQA - California Environmental Quality Act
CESA - California Endangered Species Act
CFS – Cubic feet per second
CHCP – Calaveras River Habitat Conservation Plan
CRFG – Calaveras River Fish Group
DWR –California Department of Water Resources
EPA – Environmental Protection Agency
ESA – Endangered Species Act
ESU – Evolutionarily significant unit
FFC - Fishery Foundation of California
HCP – Habitat conservation plan
ITP - Incidental take permit
M&I – Municipal & Industrial
NEPA - National Environmental Policy Act
NMFS – National Marine Fisheries Service
RM – River mile
RMA – Routine Maintenance Agreement
RST – Rotary screw trap
RWQCB – Regional Water Quality Control Board, Central Valley Region
SDC - Stockton Diverting Canal
SEWD – Stockton East Water District
SJCCMP – San Joaquin County Congestion Management Plan
SJMSCP – San Joaquin County Multi-Species Habitat Conservation and Open Space Plan
SPC – S.P. Cramer & Associates
SWRCB – State Water Resources Control Board
USACE – United States Army Corps of Engineers
USFWS – U.S. Fish and Wildlife Service
WTP – Water Treatment Plant

Authorization of Incidental Take and Implementation of the Calaveras River Habitat Conservation Plan Environmental Assessment/Initial Study

1.0 Introduction

The Stockton East Water District (SEWD) provides surface water for both agricultural and urban uses. By providing surface water for agricultural irrigation, SEWD supports San Joaquin County's agricultural industry. SEWD also ensures proper management of the groundwater basin and supplemental surface water supplies. SEWD (hereinafter referred to as "District" or "SEWD") uses the Calaveras River as an important source of water to serve its customers. During non-flood control periods, Calaveras River water resources are managed by SEWD as Watermaster. The Calaveras River is also an important source of in-river habitat for fall-run Chinook salmon and steelhead, below New Hogan Dam.

As such, the District is applying to the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS or Service) for an incidental take permit (ITP) under the Endangered Species Act (ESA) Section 10(a)(1)(B) for a 50-year period authorizing the incidental take of the following listed and un-listed species (hereinafter referred to collectively as "Covered Species"): threatened Central Valley (CV) steelhead (*Oncorhynchus mykiss*) Distinct Population Segment (DPS), threatened CV spring-run Chinook salmon (*O. tshawytscha*) Evolutionarily Significant Unit (ESU), endangered Sacramento River winter-run Chinook salmon ESU, and species of special concern CV fall/late fall-run Chinook salmon ESU. As a species of special concern, the fall/late fall-run Chinook ESU does not currently have any protective regulations against take and no Federal permit is needed to incidentally take them, but there may be a change in listing status during the permit period. As such, the ITP authorization would be effective immediately upon issuance for all threatened and endangered species; while the ITP authorization would become effective for the fall/late fall-run Chinook salmon ESU if it is listed as threatened or endangered.

The ITP would require implementation of the Calaveras River Habitat Conservation Plan (CHCP) Conservation Program, which contains a series of conservation strategies to minimize and mitigate to the maximum extent practicable the District's Calaveras River Operations (Project) effects on potential incidental take of Covered Species during the duration of the ITP.

The CHCP plan area generally encompasses the lower Calaveras River and its adjacent riparian zone between New Hogan Dam and the confluence with the San Joaquin River, as well as New Hogan Reservoir. Figure 1 depicts the area of the lower Calaveras River watershed within the CHCP plan area. According to the HCP Handbook (USFWS and NMFS 2016), "The plan area, sometimes referred to as the HCP area, is comprised of all areas that will be used for any activities described in the HCP, including covered activities and the conservation program. It includes all lands necessary for the HCP to be fully implemented. The

plan area must at a minimum include the permit area, but it may be larger." Therefore, the CHCP plan area encompasses the reservoir where the water is impounded, and those waterways that are potentially accessible to one or more Covered Species within the District's service areas, as follows:

1) Lower Calaveras River from New Hogan Dam (RM 42) to the confluence where it enters the San Joaquin Delta (RM 0) via both the Old Calaveras River channel and Mormon Slough/Stockton Diverting Canal (SDC) routes.
2) Potter Creek from the headwaters to its two branches (North and South) and its two confluences with Mormon Slough (the North branch enters Mormon Slough at the old Southern Pacific Railroad Bridge and the South branch enters Mormon Slough just upstream of Panella Dam).
3) Mosher Slough/Creek from the headwaters at Mosher Creek Dam to its confluence with Pixley Slough/Bear Creek.[1]

[1] The District does not operate in this area during the non-irrigation season (begins on or about October 16 and ends on or about April 14, dependent on weather), nor do their activities covered under the permit affect this area during this timeframe. Accordingly, the District do not seek coverage that occurs here during the aforementioned period.

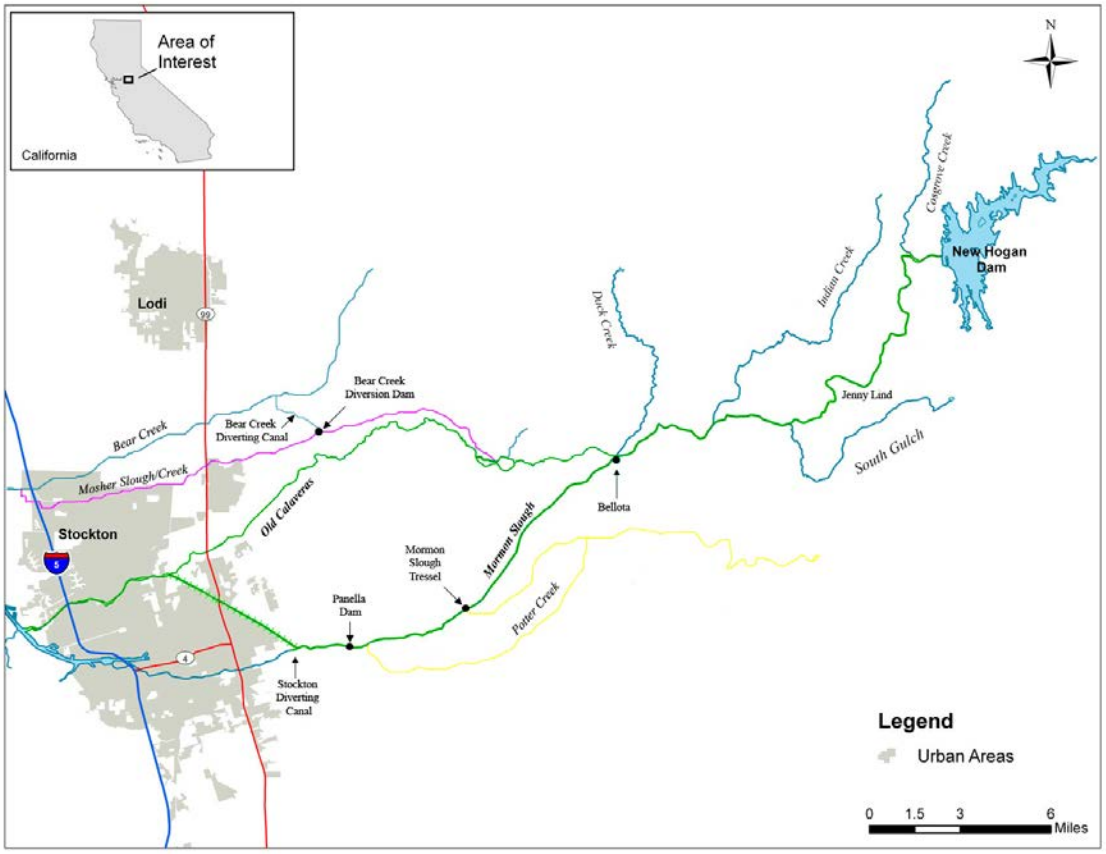


Figure 1. Overview of the lower Calaveras River basin. Calaveras River Habitat Conservation Plan area highlighted in green (Lower Calaveras River via both Old Calaveras channel and Mormon Slough/Stockton Diverting Canal), pink (Mosher Slough/Creek), and yellow (Potter Creek).

This Environmental Assessment/Initial Study (EA/IS) evaluates the potential effects of NMFS's proposed action of issuance of an ESA Section 10(a)(1)(B) ITP and of the District's implementing the proposed Covered Activities summarized in Section 3.2 and further detailed in Chapters 5 and 7 of the CHCP.

The EA provisions of this document were prepared pursuant to the National Environmental Policy Act (NEPA), 42 U.S.C. §§ 4331 et seq., with NMFS serving as the federal lead agency.

The IS provisions of this document were prepared pursuant to the California Environmental Quality Act (CEQA), California Public Resource Code §§ 21000 et seq., with SEWD serving as lead agency.

2.0 Purpose and Need

NMFS' purpose for the proposed action of issuance of an incidental take permit for operations of the District's Project is to protect the covered species and their habitat. The purpose of the Proposed Action is to enable the District to continue operation and maintenance of existing facilities, and to develop and construct other water facilities covered by the CHCP with the goal to provide protection and conservation of Covered Species and to allow take of listed species, as provided for under Section 10(a)(1)(B) of the ESA.

The Proposed Action is needed because normal, otherwise lawful operations of the Project could result in incidental take of the covered species, and the covered species needs protection as provided in the ESA. The Project is necessary because it constitutes an established, essential service provided by the District as regional water supplier. This water supply and delivery is essential to the welfare of Calaveras and San Joaquin counties.

Therefore, NMFS, in this action, will review the District's application for an ITP, including the CHCP that the District submitted with their application, and decide whether to issue the requested ITP pursuant to the requirements of Section 10(a)(1)(B) of the ESA, and in accordance with NEPA policy and guidelines.

3.0 Description of Proposed Action and Alternatives

This section describes the Proposed Action and alternatives to the Proposed Action. Alternative 1 is the No Action Alternative, or what activities would be expected to occur if the Proposed Action were not implemented. Alternative 2 is the Proposed Action, which is NMFS's issuance of an ITP and the District's implementation of the CHCP.

3.1 No Action Alternative

Under this No Action Alternative, NMFS would not issue an ITP to the District and the District would continue to operate the Project in a manner consistent with existing authorizations, rights and legal requirements.

Water storage and conveyance for Municipal and Industrial (M&I) groundwater recharge and agriculture uses are the primary activities conducted at Project facilities. Detailed descriptions of Project facilities and their operations and maintenance are provided in Chapter 5 (Covered Activities) and Appendix C of the CHCP (FISHBIO et al. 2018). For purposes of this EA, brief descriptions of current Project facilities and their operations and maintenance (OM) are provided as follows:

OM1. New Hogan Reservoir Water Impoundment and Non-Flood Control Operations

Operate flow releases (typical ranges: 75-250 cfs from April-Oct & 20-86 cfs from Oct-May) from New Hogan Dam year-round during non-flood control periods to provide M&I and irrigation water supplies to constituents.

OM2. SEWD Old Calaveras River Headworks Facility Operations
Operate and maintain Old Calaveras River Headworks Facility (up to 150 cfs) year-round during non-flood control periods to provide irrigation water supplies to constituents and for groundwater recharge.

OM3. SEWD Bellota Diversion Facility Operations
Operate and maintain Bellota Diversion Facility (up to 75 cfs) to provide M&I and irrigation water supplies to constituents.

OM4. Artificial Instream Structures and SEWD Small Instream Dam Operations
Operate and maintain numerous instream dams (28 flashboard dams, two earthen dams, and one headgate dam) to provide irrigation water supplies to constituents.

OM5. Privately Owned Diversion Facilities Operated within the District's Service Areas
There are 194 known privately owned diversions in the District's service areas that may divert water for irrigation purposes.

OM6. SEWD Channel Maintenance for Instream Structures
Channel maintenance is performed, as needed, on numerous structures (i.e., instream dams, road and low water crossings; and water intake structures with slide gates and trash racks) during authorized timeframes specific to each structure.

OM7. Fisheries Monitoring Program
Fishery investigations have been conducted in the lower Calaveras River downstream of New Hogan Dam since 2001 to provide resource managers on the Calaveras River with sufficient data to make informed adaptive management decisions for sustained native fishery management.

The District has also been implementing many conservation strategies/mitigation measures (CS) voluntarily since 2006 or earlier under the assumption that the ITP would be issued. The District, however, does not have any obligation to continue implementation in the event an ITP is not issued. Therefore, NMFS is assuming under the No Action Alternative that most of the conservation strategies that have been implemented would cease. Some conservation strategies are required by other authorities and would continue irrespective if an ITP is issued. These include CS4, CS8, and CS13, described as follows:

CS4. Agriculture and municipal conservation programs
Promote water conservation in the basin through Best Management Practices (BMPs) to help reduce the potential for water storage levels to fall to critical levels.

CS8. Temporary fish ladders at Bellota Diversion Facility
Prior to a permanent solution, operate temporary fish ladders at the Bellota Weir during the non-irrigation season (typically November 1-March 31) to improve passage opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam at low flows.

CS13. Supervisory control and flow data acquisition system
Improve identification of fish passage opportunities and increase water use efficiency through use of flow sensors at 10 potential flashboard dam locations.

With respect to CS8, this has been implemented prior to the CHCP. Requirements of the District's existing permits, such as Section 404 of the Clean Water Act from the United States Army Corps of Engineers (USACE), Fish & Game Code Section 1602 streambed alteration agreement with the California Department of Fish and Wildlife (CDFW), and water rights from the State Water Resources Control Board (SWRCB), would also be in effect.

3.2 Proposed Action

The proposed action is also the preferred alternative. The proposed action being evaluated by this EA/IS is the issuance of an ESA ITP by the Service. The ITP would authorize incidental take of the Covered Species resulting from the following covered actions: (1) activities described under Section 3.2.1 and in the CHCP that are necessary to operate and maintain Project facilities during the ITP duration ("Covered Activities"), and (2) activities associated with conservation strategies identified in the District's CHCP (FISHBIO et al. 2019), in accordance with the statutory and regulatory requirements of the ESA. The term of the proposed ITP is 50 years, unless the Permit is terminated prior to the expiration of the Permit term in accordance with applicable regulations.

3.2.1 Covered Activities

The Covered Activities necessary to operate and maintain Project facilities during the ITP duration are briefly described under the No Action Alternative in Section 3.1 (OMs) and are categorized by activity type (e.g., reservoir impoundment, controlled release, water withdrawals, and activities within the stream channel) in Table 1. Detailed descriptions of Project facilities and their operations and maintenance are provided in Chapter 5 (Covered Activities) and Appendix C of the CHCP (FISHBIO et al. 2019).

Table 1. Covered activities necessary to operate and maintain Project facilities during the Incidental Take Permit duration categorized by activity type.

Activity	New Hogan Impoundment	New Hogan Controlled Releases	Water Withdrawal – Diversions	Activities within stream channel
OM1. New Hogan Reservoir Water Impoundment and Non-Flood Control Operations	SEWD controls volume during non-flood control season	New Hogan releases serve M&I & agricultural customers through OM2, and OM3-OM5 and provide groundwater recharge through OM3-4; typ. releases range Apr-Oct: 75-250cfs & Oct-May: 20-86 cfs – non-flood control reasons.		
OM2. SEWD Old Calaveras River Headworks Facility Operations		See OM1	Diversion controlled by slides gates: closed to prevent flooding; opened to provide water for agricultural customers and periods when natural flows are available for groundwater recharge (Nov-Jun)	
OM3. SEWD Bellota Diversion Facility Operations		See OM1. Reduced several days annually, as required for flashboard dam installation/ removal.	Diversion year-round to provide water for M&I water treatment plant and to augment irrigation supply for agricultural customers and for groundwater recharge	Install & remove 8' & 2' weirs/ fish ladders- start & finish of irrigation season
OM4. Artificial Instream Structures and SEWD Small Instream Dam Operations		See OM1	Water diverted into channels (MRS/SDC, Old Calaveras River, Mosher Creek, Bear Creek, and Potter Creek) impounded by small dams and used by Agricultural customers	Install and remove flashboard dams-start & finish of irrigation season
OM5. Privately Owned Diversion Facilities Operated within the District's Service Areas		See OM1	Water diverted by agricultural customers primarily downstream of Jenny Lind	
OM6. SEWD Channel Maintenance		Reduced up to 5 days annually, as required for maintenance activities concurrent with flashboard dam installation mid-April	Dewatering during rebuilding of earthen dams	Maintenance (debris removal, vegetation erosion control, control, repair of previous erosion work, rip rap placement using heavy equipment)
OM7. Fisheries Monitoring Program				Checking and clearing all traps of fish and debris daily

3.2.2 Conservation Program

The District's Covered Activities may result in take of Covered Species, as identified in Chapters 5 and 6 of the CHCP (FISHBIO et al. 2019). Therefore, a Conservation Program has been developed to minimize and mitigate incidental take associated with the seven Covered Activities in Table 1, and is more thoroughly described in Chapter 7 and Appendix D of the CHCP (FISHBIO et al. 2019). In addition, the adaptive management process (AMP), as described in Chapter 9 under the CHCP, would help to ensure that individual actions and projects would be modified as necessary in order to maximize their success and beneficial impacts towards the Covered Species. The CHCP includes implementation of an adaptive management plan decision-making process (which includes compliance and effectiveness monitoring as described below) to assess the effectiveness of conservation strategies, propose alternative or modified conservation strategies as the need arises, and address changed and unforeseen circumstances.

For the purposes of this EA/IS, Section 3.3 below reproduces discussions from Chapter 7 of the CHCP (FISHBIO et al. 2019) to describe the Conservation Program, which consists of biological goals and objectives and corresponding conservation strategies designed to avoid and minimize take to the maximum extent practicable and to ensure that permitted activities will not appreciably reduce the likelihood of survival and recovery of the Covered Species.[2] In addition, Section 3.3 describes the compliance and effectiveness monitoring (CM and EM) contained in the Conservation Program which are intended to verify that the conservation strategies are being implemented as described and to evaluate whether the conservation strategies are achieving the biological goals and objectives as predicted (Table 2).

3.3 Conservation Strategies/Mitigation Measures

The conservation strategies/mitigation measures (CS) and associated targets (i.e., biological metrics) incorporated within the CHCP are summarized below according to their implementation status (i.e., interim or long-term), and are followed by a conclusion of overall effects associated with their implementation.

Interim (prior to permanent improvements at specific facilities)

CS6. Temporary fish barrier at the Old Calaveras River Headworks Facility
Prior to a permanent solution, operate a temporary barrier to prevent downstream entrainment into the Old Calaveras River.

CS8. Temporary fish ladders at Bellota Diversion Facility*
Prior to a permanent solution, operate temporary fish ladders at the Bellota Weir during the non-irrigation season (typically November 1-March 31) to improve passage opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam at low flows.

[2] Any environmental conclusions drawn under Section 3.3 (i.e., describing rationale and ecosystem benefits to salmonids) are those made by the District, not the Service.

CS9. Temporary fish screens at Bellota Diversion Facility
Prior to a permanent solution, operate temporary fish screens at the Bellota Diversion Facility to reduce entrainment.

Long-term

CS1. Minimum instream flow commitment
Guaranteed minimum, continuous instream flows maintained at Shelton Road (20 cfs) to protect important salmonid spawning, incubation, and rearing habitats above Bellota.

CS2. Non-dedicated fall storage flow management strategy
In years when suitable water storage is available on October 15 (i.e., >152,000 AF), implement a flow release schedule designed to optimize salmonid migration opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam for the period between October 15 and November 30.

CS3. Flood control release coordination with, and advisory support to, the U.S. Army Corps of Engineers
During flood control season periods not covered by CS2, coordinate flood control releases with USACE to optimize salmonid migration opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam, and to optimize salmonid spawning and rearing habitat.

CS4. Agriculture and municipal conservation programs*
Promote water conservation in the basin through Best Management Practices (BMPs) to help reduce the potential for water storage levels to fall to critical levels.

CS5. Old Calaveras Headworks Facility improvement
Avoid migration delays and blockage, and entrainment within the Old Calaveras River Channel by constructing a non-entraining barrier at the Old Calaveras River Headworks Facility and at the downstream end of the channel near the confluence with the SDC within the first ten years of the ITP.

CS7. Bellota Diversion Facility improvement
Construct and implement a combined crest gate/fishway/fish screen at the Bellota Diversion Facility with a target to be completed within the first five years, but no later than the first ten years, of issuance of the ITP to improve salmonid passage opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam and to prevent fish entrainment.

CS10. Artificial instream structural improvements

Implement improvements at a minimum of five (5) artificial instream structures in Mormon Slough/SDC that block or impede fish passage (FISHBIO 2009) to improve passage into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam. The structures identified for improvement are Budiselich Flash Board Dam (completed 2011), Caprini Low Flow Road Crossing (completed 2013), the Central California Traction Railroad Company Bridge, Hosie Low Flow Crossing, and Watkins Low Flow Crossing.

CS11. Fall flashboard dam removal operations
Reduce potential stranding conditions during end-of-irrigation-season flashboard dam removal by sequential removal of dams in a downstream direction.

CS12. Flashboard dam notches
Improve juvenile downstream migration during the irrigation season by installing passage notches into otherwise impassable flashboard dams.

CS13. Supervisory control and flow data acquisition system*
Improve identification of fish passage opportunities and increase water use efficiency through use of flow sensors at 10 potential flashboard dam locations.

CS14. Fish screens for privately owned diversions
Through the AMP process, prioritize diversion structures within first two years of ITP and help implement fish screens at privately owned diversions until priority list is exhausted, thereby preventing entrainment of salmonids into priority unscreened diversions.

CS15. Stakeholder education program
Educate stakeholders (first workshop within first six months of ITP issuance; annual newsletters; regular website updates) regarding potential fish impacts from irrigation practices.

CS16. Instream structures maintenance timing and actions
Avoid or minimize potential mortalities or injuries associated with heavy equipment and turbidity-related impacts through implementation of approved instream structure maintenance BMPs.

CS17. Fish handling protocols
Conduct approved handling protocols to minimize handling stress and reduce injuries and mortality.

* Conservation strategies anticipated to continue under the No Action Alterative.

Table 2. Summary of effects addressed, biological objectives and targets, conservation strategies, and monitoring for California Central Valley steelhead and fall-run Chinook salmon related to each covered activity.
** Asterisk indicates non-core monitoring that may be conducted if deemed necessary through the AMP process.*

Activity	Effects Addressed	Biological Objectives	Target	Conservation Strategy	Monitoring Compliance	Monitoring Effectiveness
OM1. New Hogan Reservoir Water Impoundment and Non-flood Control Operations	Flow-related spawning, incubation, and rearing habitat	Flow	**F1.** Guaranteed minimum flow (20 cfs) maintained at Shelton Road	**CS1.** Minimum Instream Flow Commitment	**CM1.** Maintain daily flow and operation records in an operations database	**EM1.** Environmental conditions monitoring **EM2.** Adult salmonid monitoring **EM3.** Juvenile salmonid monitoring **EM12.*** Alternative fisheries monitoring
	Flow-related migration opportunities	Flow	**F2.** Under high storage conditions (storage >152,000 AF on October 15), manage fall water storage to optimize migration opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam	**CS2.** Non-Dedicated Fall Storage Management Strategy	**CM1**	**EM1, EM2, EM3, EM12***

Activity	Effects Addressed	Biological Objectives	Target	Conservation Strategy	Monitoring Compliance	Monitoring Effectiveness
	Flow-related spawning, incubation, and rearing habitat and migration opportunities	Flow	**F3.** During flood control season periods not covered by F2 and CS2, coordinate flood control releases with USACE to optimize salmonid migration opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam	**CS3.** Flood Control Release Coordination with, and Advisory Support to, the U.S. Army Corps of Engineers (USACE)	**CM1**	**EM1, EM2, EM3, EM12***
	Flow-related spawning, incubation, and rearing habitat and migration opportunities	Flow	**F4.** Promote water conservation in the basin to help reduce the potential for water storage levels to fall to critical levels	**CS4.** Agriculture and Municipal Conservation Programs	**CM2.** Document implementation of Agriculture and Municipal Conservation Programs	NA
OM2. SEWD Old Calaveras River Headworks Facility	Migration delays and blockage, and Entrainment	Fish Passage and Avoid Entrainment	**FP1 and AE1**. Avoid migration delays and blockage, and entrainment within the Old Calaveras River Channel by constructing a non-entraining barrier at the Old Calaveras River Headworks Facility and at the downstream end of the channel near the confluence with the SDC within the first ten years of the ITP	**CS5.** Old Calaveras Headworks Facility Improvement	**CM3.** Document completion of the Old Calaveras Headworks Facility Improvement Project	**EM4.** Fish evaluation and salmonid relocation during fall flashboard dam removal operations **EM12***
	Entrainment	Avoid Entrainment	**AE2.** Prior to a permanent solution (AE1), operate a temporary barrier to prevent downstream entrainment into the Old Calaveras River	**CS6.** Temporary Barrier at Old Calaveras Headworks Facility	**CM1**	**EM4, EM12***

Activity	Effects Addressed	Biological Objectives	Target	Conservation Strategy	Monitoring Compliance	Monitoring Effectiveness
OM3. SEWD Bellota Diversion Facility Operations	Migration delays and blockage, and Entrainment	Fish Passage and Avoid Entrainment	**FP2/AE3.** Construct and implement a combined crest gate/fishway/fish screen at the Bellota Diversion Facility to improve passage into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam and to prevent entrainment; target completion within first five years, but no later than 10 years of the ITP	**CS7.** Bellota Diversion Facility Improvement	**CM4.** Document completion of Bellota Diversion Facility Improvement Project	**EM1, EM2 EM12***
	Migration delays and blockage	Fish Passage	**FP3.** Prior to a permanent solution (FP2), operate temporary fish ladders (typically November 1-March 31) to improve passage into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam at low flows	**CS8.** Temporary Fish Ladders at the Bellota Diversion Facility	**CM1**	**EM1, EM5.** Monitor pool downstream of Bellota for salmonids during interim fish ladder operations
	Entrainment	Avoid Entrainment	**AE4.** Prior to a permanent solution (AE3), operate temporary fish screens at the Bellota Diversion Facility to reduce entrainment	**CS9.** Temporary Fish Screens at the Bellota Diversion Facility	**CM1**	**EM6.** Fish screen effectiveness monitoring **EM12***

Activity	Effects Addressed	Biological Objectives	Target	Conservation Strategy	Monitoring Compliance	Monitoring Effectiveness
OM4. Artificial Instream Structures and SEWD Small Instream Dam Operations	Migration delays and blockage	Fish Passage	**FP4.** Implement improvements at artificial instream structures in Mormon Slough/SDC that block or impede fish passage (FISHBIO 2009) to increase passage opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam; at minimum, Tier 1 structures in Mormon Slough/SDC owned and operated by Stockton East Water District (i.e., 5) will be improved	**CS10.** Artificial Instream Structural Improvements	**CM1, CM5.** Document schedules and implementation status for artificial instream structure improvement projects and flow sensors	**EM1, EM2, EM7.** Structural improvement monitoring **EM8.** Stakeholder education efforts **EM12***
	Stranding	Fish Passage	**FP5.** Reduce potential stranding conditions during end-of-irrigation-season flashboard dam removal by sequential removal of dams in a downstream direction	**CS11.** Fall Flashboard Dam Removal Operations	**CM6.** Document annual fall flashboard dam removal operations and any associated salmonid relocation	**EM4, EM12***
	Migration delays and blockage	Fish Passage	**FP6.** Improve juvenile downstream migration during the irrigation season by installing passage notches into otherwise impassable flashboard dams	**CS12.** Flashboard Dam Notches	**CM7** Document annual installation of flashboard dam notches	**EM9.** Fyke net evaluation of flashboard dam notches **EM12***
	Migration opportunities	Fish Passage	**FP7.** Improve identification of fish passage opportunities and increase water use efficiency through use of flow sensors at 10 potential flashboard dam locations	**CS13.** Supervisory Control and Flow Data Acquisition System	**CM1**	**EM1, EM7, EM12***

Activity	Effects Addressed	Biological Objectives	Target	Conservation Strategy	Monitoring Compliance	Monitoring Effectiveness
OM5. Privately Owned Diversion Facilities Operated within the District's Service Areas	Entrainment	Avoid Entrainment	**AE5.** Through the AMP process, prioritize diversion structures within first two years of ITP and help implement fish screens at privately owned diversions until priority list is exhausted*;* thereby, preventing entrainment of salmonids into priority unscreened diversions	**CS14.** Fish Screens for Privately Owned Diversions	**CM8.** Document prioritization of fish screens for privately owned diversions	**EM8, EM12***
	Entrainment	Avoid Entrainment	**AE6.** Educate stakeholders (workshop within first six months of ITP issuance; annual newsletters; regular website updates) regarding potential fish impacts from irrigation practices	**CS15.** Stakeholder Education Program	**CM9** Document Stakeholder Education Program activities	**EM8, EM12***
OM6. SEWD Channel Maintenance for Instream Structures	Direct equipment related injury and mortality; Water quality (turbidity)	Avoid Direct Injury and Mortality; and Water Quality	**AD1/WQ1.** Avoid or minimize potential mortalities or injuries associated with heavy equipment and turbidity related impacts through implementation of approved Instream Structure Maintenance BMPs	**CS16.** Instream Structures Maintenance Timing and Actions	**CM10.** Document SEWD Instream Structures maintenance	**EM10.** SEWD Instream Structures maintenance operations water quality monitoring and/or visual assessment
OM7. Fisheries Monitoring Program	Direct handling related injury and mortality	Avoid Direct Injury and Mortality	**AD2.** Conduct approved handling protocols to minimize handling stress and reduce injuries and mortality	**CS17.** Fish Handling Protocols	**CM11.** Document take associated with fisheries monitoring	**EM11.** Fisheries Monitoring take assessment

In general, conservation strategies have been designed to achieve the ***Biological goals*** of the CHCP, which are to:

(1) maintain a viable population of *O. mykiss* within the conservation area, and
(2) maintain adequate habitat conditions upstream of Bellota for fall, late-fall, spring, or winter-run Chinook salmon that may opportunistically migrate into the conservation area, but are not expected to maintain a viable population based on both pre-dam and current conditions.

These biological goals are divided into specific ***Biological objectives*** that identify the various components needed to achieve the biological goals. Five biological objectives have been identified (i.e., Flow, Fish Passage, Avoid/Minimize Fish Entrainment, Water Quality, and Avoid/Minimize Direct Fish Injury/Mortality) and each includes metrics, referred to as ***targets***, to track progress toward achieving the particular objective and ultimately goals, as follows:

Biological Objective: Flow - Over the term of the ITP, provide instream flows in the Calaveras River downstream of New Hogan Dam to support the California Central Valley steelhead conservation and the biological needs of, fall, late-fall, spring, and winter-run Chinook salmon should they migrate into the Calaveras River system (See Biological Goal 2).

The **Flow (F) Objective** has four targets:

F1. Implement minimum guaranteed, continuous instream flows in the Calaveras River at Shelton Road (20 cfs) to protect important salmonid spawning, incubation, and rearing habitats upstream of Bellota.

F2. Under high, end of irrigation-season storage conditions (i.e., when storage is >152,000 AF on October 15), flood control releases must be undertaken by December 1 to achieve a storage level of 152,000 AF by December 1. Therefore, coordinate, as needed, with the USACE to manage flood control releases during the October 15-November 30 period that will optimize migration opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam. This water release pattern would take into account the proposed release patterns for the San Joaquin River tributaries and the Mokelumne River to optimize the anadromous fish attraction flow into the San Joaquin River basin. Deviations from the scheduled water release pattern are highly unlikely; however, if substantial precipitation were to occur in October/November, there is a possibility that higher than scheduled releases could become necessary to maintain an adequate flood control reservoir level. These elevated releases would be the result of a naturally occurring weather event, which native fishes would likely be well-adapted for and possibly benefit from.

F3. Flood control releases that occur after December 1 will be managed with the USACE to optimize fish migration opportunities (into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam), and spawning and egg

incubation by reducing the peak of the release peaks and implementing ramping rates.

F4. Promote water conservation in the basin through BMPs (see page 37 for list of BMPs) to help reduce the potential for water storage levels to fall to critical levels.

Biological Objective: Fish Passage. Over the term of the ITP, improve access into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam that is within the range of the California Central Valley steelhead DPS and opportunistic usage by identified runs of Chinook salmon (see Biological Goal 2).

The **Fish Passage (FP) Objective** has seven targets:

FP1. Avoid migration delays and blockage within the Old Calaveras River Channel by constructing a non-entraining barrier at the Old Calaveras River Headworks Facility and at the downstream end of the channel near the confluence with the SDC within the first ten years of the ITP.

FP2. Construct and implement a combined crest gate/fishway/fish screen at the Bellota Diversion Facility no later than the first ten years of the ITP to improve passage opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam and to prevent fish entrainment.

FP3. Prior to improving passage at the Bellota Diversion Facility through use of a combined crest gate/fishway/fish screen (FP2), operate temporary fish ladders at the Bellota Weir during the non-irrigation season (typically November 1-March 31) to improve passage opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam at low flows.

FP4. Implement improvements at artificial instream structures in Mormon Slough/SDC that block or impede fish passage (DWR 2007a) to increase passage opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam; at minimum, Tier 1 structures in Mormon Slough/SDC owned and operated by Stockton East Water District (i.e., 5) will be improved. Additional structures in Mormon Slough/SDC identified during the AMP process (Chapter 9) may also be improved as agreed upon by the Governing Board during the course of the ITP.

FP5. Reduce potential stranding conditions during end-of-irrigation-season flashboard dam removal by sequential removal of dams in a downstream direction.

FP6. Improve juvenile downstream migration during the irrigation season by installing fish passage notches into otherwise impassable flashboard dams (i.e., >4 feet high) within Mormon Slough/SDC.

FP7. Improve identification of fish passage opportunities and increase water use efficiency through use of flow sensors at 10 potential flashboard dam locations

Biological Objective: Avoid/Minimize Fish Entrainment. Over the term of the ITP, avoid or minimize entrainment of California Central Valley steelhead, fall, late-fall, spring, and winter-run Chinook salmon (should they migrate into the Calaveras River system) at diversion structures identified as priority structures.

The **Avoid/Minimize Fish Entrainment (AE) Objective** has six targets:

> **AE1.** Avoid entrainment within the Old Calaveras River Channel by constructing a non-entraining barrier at the Old Calaveras River Headworks Facility and at the downstream end of the channel near the confluence with the SDC within the first ten years of the ITP.
>
> **AE2.** Prior to the construction of a permanent non-entraining barrier at the Old Calaveras River Headworks Facility (AE1), operate a temporary barrier (e.g., net, and/or rock weir) to prevent downstream entrainment into the Old Calaveras River channel.
>
> **AE3.** Construct and implement a combined crest gate/fishway/fish screen at the Bellota Diversion Facility no later than the first ten years of the ITP to improve passage opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam and to prevent fish entrainment.
>
> **AE4.** Prior to improving passage at the Bellota Diversion Facility through use of a combined crest gate/fishway/fish screen (AE3), operate temporary fish screens at the diversion facility to reduce entrainment.
>
> **AE5.** Prioritize diversion structures and establish a recommended screening schedule within the first two years of the ITP and subsequently help implement fish screens at privately owned diversions until priority list is exhausted;[3] thereby, preventing entrainment of salmonids into priority unscreened diversions.
>
> **AE6.** Educate stakeholders (workshop within first six months of ITP issuance; annual newsletters; regular website updates) regarding potential fish impacts from irrigation practices to reduce potential fish entrainment at priority, privately owned diversions.

Biological Objective: Water Quality. Over the term of the ITP, maintain adequate water quality conditions for California Central Valley steelhead and identified runs of Chinook salmon (see Biological Goal 2) in the Calaveras River downstream from maintenance sites.

The **Water Quality (WQ) Objective** has two targets:

3 Screening at a privately owned diversion is contingent upon locating outside funding sources; accordingly, the District acknowledges this activity is not reasonably certain to occur. However, there is some indication that smaller diversions may not have much, if any effect, on salmonids (Moyle and Israel 2005); therefore, there may be a low number of diversions where screens may provide benefits.

WQ1. Avoid or minimize potential mortalities or injuries associated with turbidity related impacts during instream channel maintenance at numerous instream structures through implementation of Instream Structure BMPs (see Attachment C-2 to Appendix C of the CHCP for further details of BMPs).

Biological Objective: Avoid Direct Injury/Mortality. Over the term of the ITP, avoid direct injury and mortality of California Central Valley steelhead and identified runs of Chinook salmon in the Calaveras River (see Biological Goal 2) during instream channel maintenance and fisheries monitoring activities.

The **Avoid Direct Injury/Mortality** (**AD) Objective** has two targets:

AD1. Avoid or minimize potential mortalities or injuries associated with heavy equipment impacts during instream channel maintenance (limitation of activities to low or no flow periods) at numerous instream structures through implementation of Instream Structure BMPs (see Attachment C-2 to Appendix C of the CHCP for further details of BMPs).

AD2. Conduct approved handling protocols during fisheries monitoring to minimize handling stress and reduce injuries and mortality.

3.3.1 Conservation Strategies for New Hogan Reservoir Water Impoundment and Non-flood Control Operations (OM1)

Conservation strategies for OM1 were designed to meet the Flow Objective and associated targets described above under the *Biological Objective: Flow* section. Due to natural hydrologic conditions and limited reservoir capacity, it is impossible to provide year-round flows ***downstream of Bellota*** capable of supporting various life stages of salmonids. The Calaveras River is a relatively small, low-elevation drainage that receives runoff mainly from rainfall during November through April (Reynolds et al. 1993), and its lower reaches historically were dry during part of the year (Carson 1852). However, year-round flows can be managed ***between New Hogan and Bellota*** in most years and migration opportunities into the reach upstream of Bellota will be optimized to the extent practicable. The highest priority reach for habitat protection and improvement has been identified as New Hogan Dam to Shelton Road based upon: (1) typical instream flow patterns, (2) water temperature, (3) quality and suitability of existing habitat for spawning and rearing, and (4) accessibility under existing and future improved passage conditions. To minimize impacts associated with reservoir operations, SEWD has, and will continue to implement four conservation strategies, which will improve instream flow conditions for salmonids during different times of the year and for different life stages including:

(1) CS1. Minimum Instream Flow Commitment. New Hogan releases will be managed to ensure a minimum of 20 cfs at Shelton Road year-round in all years with exception of periods during potential critical water storage levels. Minimum flows of 20 cfs or greater at Shelton Road were considered for implementation year-round in all years under all water

year types and reservoir conditions; however, 20 cfs was determined to be infeasible under critical water storage periods (typically associated with successive drought years) due to the potential for reducing the reservoir to the minimum pool.

(2) CS2. Non-Dedicated Fall Storage Management Strategy. In years when suitable water storage is available on October 15 (i.e., >152,000 AF), flood control releases must be undertaken by December 1 to ensure the reservoir remains at or below 152,000 AF. The Governing Board will identify, and SEWD in coordination with the USACE will implement, a flow release schedule designed to optimize salmonid migration opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam for the period between October 15 and November 30.

(3) CS3. Flood Control Release Coordination with, and Advisory Support to the USACE. During the flood control season not covered by number 2 above, coordination of flood control releases with the USACE will be conducted to optimize salmonid migration opportunities and optimize spawning and rearing habitat.

(4) CS4. Agriculture and Municipal Conservation Programs. Agricultural and municipal water conservation programs will be implemented to help reduce the potential for water storage levels to fall to critical levels.

Implementation of these conservation strategies has already been initiated prior to completion of the CHCP, as identified in section 6.1 of the CHCP, and will be continued throughout the term of the ITP.

Rationale and Ecosystem Benefits: The Calaveras River has been subject to impoundment since 1930, when Hogan Dam (76,000 AF capacity) was constructed for flood control. Prior to 1949, there were no outlet controls on the dam and flows were not regulated in the lower river. In 1949, outlet controls were installed at the dam and the Stockton and East San Joaquin Water Conservation District (previous name of SEWD) together, with the City of Stockton, began operating the dam in a manner to conserve runoff for later release for irrigation purposes. Immediately below the original dam, the USACE constructed New Hogan Dam (NHG) from November 1960 to June 1964. The new dam increased the storage capacity of the reservoir to 317,000 AF at gross pool, with up to 165,000 AF of flood control storage space during the flood season and a minimum carryover storage pool of 15,000 AF for sediment storage, fish and wildlife, and general recreation. When NHG was originally proposed, the USFWS and CDFW agreed that releases would provide fishery benefits between the dam and Bellota but would not support a fishery downstream of Bellota, as indicated by the following statements:

> (1) Operational studies indicate that substantial releases will be made from the reservoir March through October. The increased flow will materially improve fish habitat in the reach between the dam and Bellota. The reach between Bellota and the mouth of the Calaveras will not support a fishery with the project inasmuch as most of the water will continue to be diverted at Bellota (USFWS 1960).

> (2) Project effects on fishery resources will generally be enhancement…With New Hogan Reservoir under operation, larger and firmer flows will be released below the dam from March through October. This will eliminate the no flow problem during August, September, and October, and should greatly benefit the fishery. Due to the diversions for irrigation, this benefit would not be realized downstream of Bellota. The river downstream of Bellota will continue to be dry several months of the year (CDFW 1963).

In 1978, SEWD began operation of a 75-cfs-capacity diversion at Bellota, resulting in low but sustained flows upstream of Bellota in most years. Year-round flows upstream of Bellota have provided good habitat conditions for salmonids in priority spawning and rearing areas, as evidenced primarily by the relatively high annual abundance of *O. mykiss* and good condition factors (Fulton's K factor) of both *O. mykiss* and salmon measured during rotary screw trap monitoring during 2002-2013 (SEWD unpublished data).

The average annual number of *O. mykiss* juveniles captured in the Calaveras River has been 1,179 (range: 319-2,769) while the average estimated downstream migrant population has been 5,736 (range: 1,127-13,670). These numbers are substantially higher (i.e., about 10-fold greater) than nearby tributaries such as the Stanislaus River where annual numbers captured are about 50 and estimates of downstream migrants are 500-700 fish each year. Due to a variety of factors (e.g., differences in relative catch rates between the two rivers; differences in population estimation methods; potential underestimates on Stanislaus River due to low daily captures; potential overestimates of Calaveras River due to intermittent trap operation), the magnitude of this difference in abundance may not be as large as predicted but even after accounting for all these factors, higher abundance on the Calaveras River would still be evident.

Condition factors provide a general indicator of the overall health of an individual fish and have been used to assess overall salmonid population health and habitat conditions (e.g., prey availability) in various rivers and streams (Hanson and Bajjaliya 2005). In addition, a recent review of Central Valley salmonids by Williams (2006) indicates that habitat use "may be more reliably inferred from measures of the organisms' condition [including Fulton's K factor]" rather than the presence or abundance of organisms in a habitat, which are "not necessarily a good index of the quality of the habitat (Van Horne 1983; Manly et al. 2002)." Based on a comparison of K values with general appearance, fat content, and other factors, a K factor of 1.25 and above was found to indicate good condition for salmonid fishes (Barnham and Baxter 1998, Baxter et al. 1991, as cited in Povslen 1993). Average *O. mykiss* K factors measured in the Calaveras River during 2002-2008, even during low flow periods, ranged from 1.28 to 1.55 (n=1,765) each year. Also, for the two years that Chinook salmon juveniles were also captured, average K factors for salmon ranged from 1.49 to 1.62 (n=1,040). *O. mykiss* K values, coupled with high abundance, indicates that habitat conditions upstream of Shelton Road are able to support a viable population of salmonids even under low fall/winter flow conditions. A potential exception may occur during an extended drought where a prolonged period of very low flows might result in a temporary population decline.

Further evidence to support good habitat conditions in the spawning and rearing reach are provided by other recently collected data regarding water temperatures, water depths, Habitat Suitability Indices (HSI), Weighted Usable Area/Physical Habitat Index (WUA/PHI), and fish assemblage. Water temperature is one of the most important environmental factors affecting fish (Willey 2004, Fry 1967, Lantz 1969, and Fry 1971). Based on 2001-2012 temperature data collected in the primary spawning and rearing reach between New Hogan and Shelton Road, recommended water temperature criteria identified by the Environmental Protection Agency (EPA 2003) for salmonid spawning, egg incubation, and fry emergence (i.e., <13°C; 55°F)[4] are generally met under typical base flow releases from November through March between New Hogan and Jenny Lind (Figure 2). However, as ambient air temperatures begin to rise between April and June, water temperatures often exceed this objective even though flows are relatively high (i.e., >150 cfs). EPA recommended water temperatures for "core" rearing (<16°C; 61°F)[5] are generally met between New Hogan and Shelton Road under typical fall/winter base flow (Figure 3). In the spring and summer, water temperatures generally are within the "core" rearing range at New Hogan and Jenny Lind and are generally within the "non-core" rearing range[5] at Gotelli and Shelton Road (Figure 3). These water temperatures indicate that suitable conditions are available year-round in much of the spawning and rearing reach. It is unknown whether water temperatures greater than the recommended criteria would have any effect on salmonid energetics in the Calaveras River since water criteria are considered conservative and were developed for more northern stocks where temperatures are naturally cooler. Water temperatures that are above the recommended criteria in the Calaveras River are highly correlated with high ambient air temperatures occurring in spring and summer.

Water depths are an important component of redd selection for spawning adults and rearing habitat for fry and juveniles. Barnhardt (1986) identified typical water depths that steelhead select during various life stages including 0.12-0.70 m for adult spawning, 0.08-0.36 m for fry, and 0.25-0.5 m for juveniles. Average water depths upstream of Bellota under low flow conditions (i.e., 25 cfs at NHG) were within or were slightly greater than these typical depths during a fall 2005 snorkel survey (SEWD unpublished data). Average depths were 0.86 for Reach 1 (range: 0.5-1.5), 0.90 for Reach 3 (range: 0.1-2.1), and 0.49 for Reach 4 (range: 0.2-0.9); no survey was conducted in Reach 2. These preliminary measurements

4 Little is known about the specific responses of Central Valley salmonid species to water temperatures (Williams et al. 2007). In absence of Central Valley specific data, criteria developed for more northern stocks are typically used as a conservative objective. For example, a Peer Review Panel on the nearby Stanislaus River recommended that EPA Region 10 criteria (developed based on laboratory studies of Pacific Northwest and Alaskan stocks) be used as objectives to evaluate potential benefits of various operating scenarios against one another (Deas et al. 2004). These temperature criteria are believed to be conservative for Central Valley salmonids since water temperatures in more southern areas have always been naturally higher, particularly in the San Joaquin basin, and regional salmonids have likely evolved to withstand higher temperatures. Therefore, it was assumed that as long as temperatures were within the EPA criteria which are based on a 7-day average of the daily maximum (DADM) values (i.e., <13°C [55°F] for salmonid spawning, egg incubation, and fry emergence; <16°C [61°F] for "core" rearing areas; and <18°C; 64°F for migration plus "non-core" rearing areas), the likelihood of temperature effects to salmonids would be minimized. These objectives can be applied in a similar approach to the Calaveras River.

5 Refer to footnote 4 regarding the applicability of EPA temperature recommendations in the Calaveras River.

indicate that water depths are suitable under typical low conditions for all life stages of *O. mykiss*.

HSI values were calculated from data collected in 2003 during a California Fish and Game Rapid Biomonitoring and Physical Habitat Assessment (Tetra Tech 2005). Data used to generate HSIs included Epifaunal Substrate/ Available Cover, Embeddedness, Velocity/Depth Regime, Sediment Deposition, Channel Flow Status, Channel Alteration, Frequency of Riffles, Bank Stability, Vegetative Protection, and Riparian Vegetative. HSI values were recorded under moderate flow conditions (i.e., about 100 cfs) at multiple locations including three monitoring sites between Bellota and New Hogan. HSIs at all three locations in this reach were greater than 139 (i.e., values were 151.3, 160.3, 166.7) indicating that optimal habitat conditions existed for fisheries upstream of Bellota (Tetra Tech 2005).

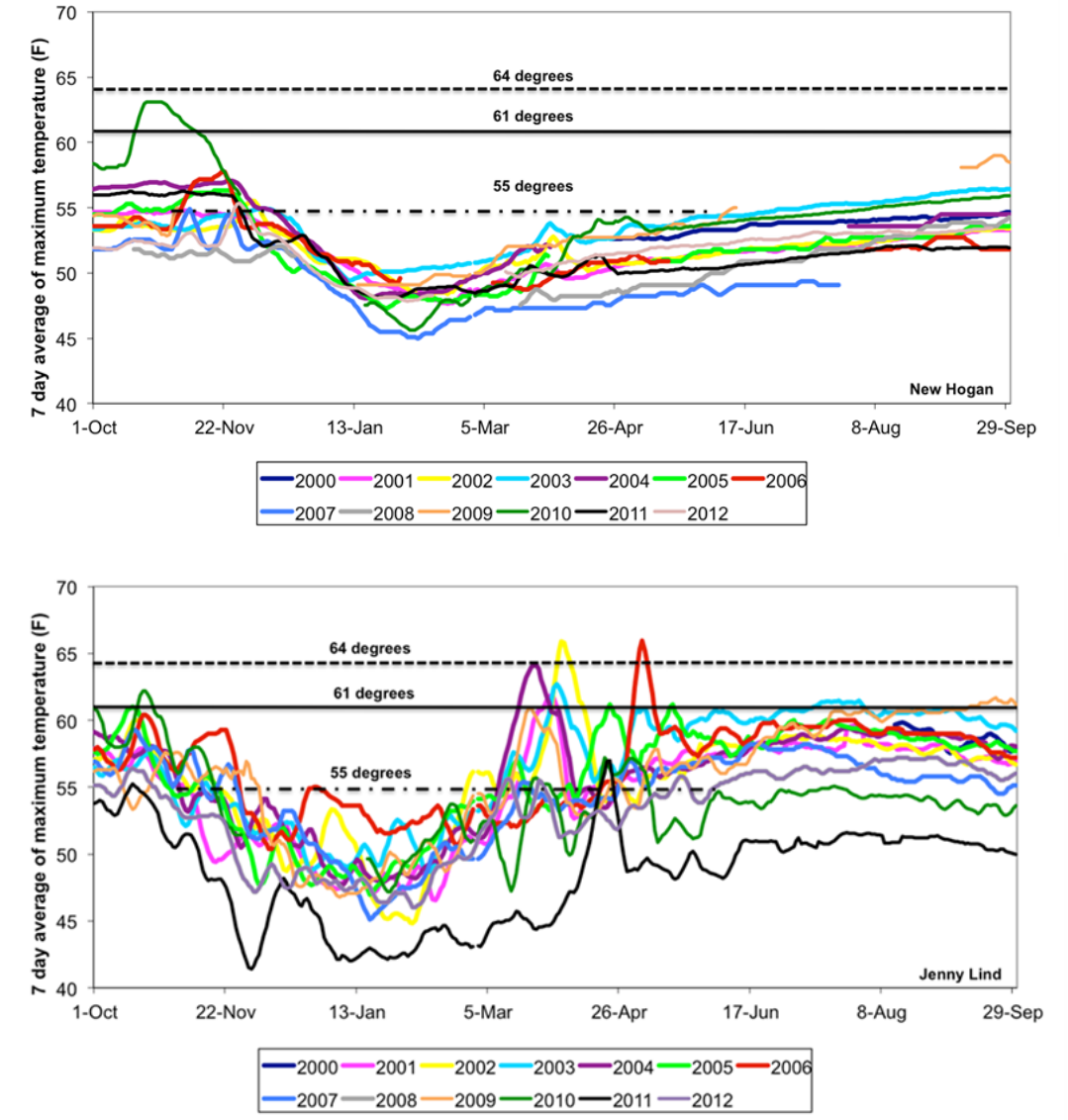
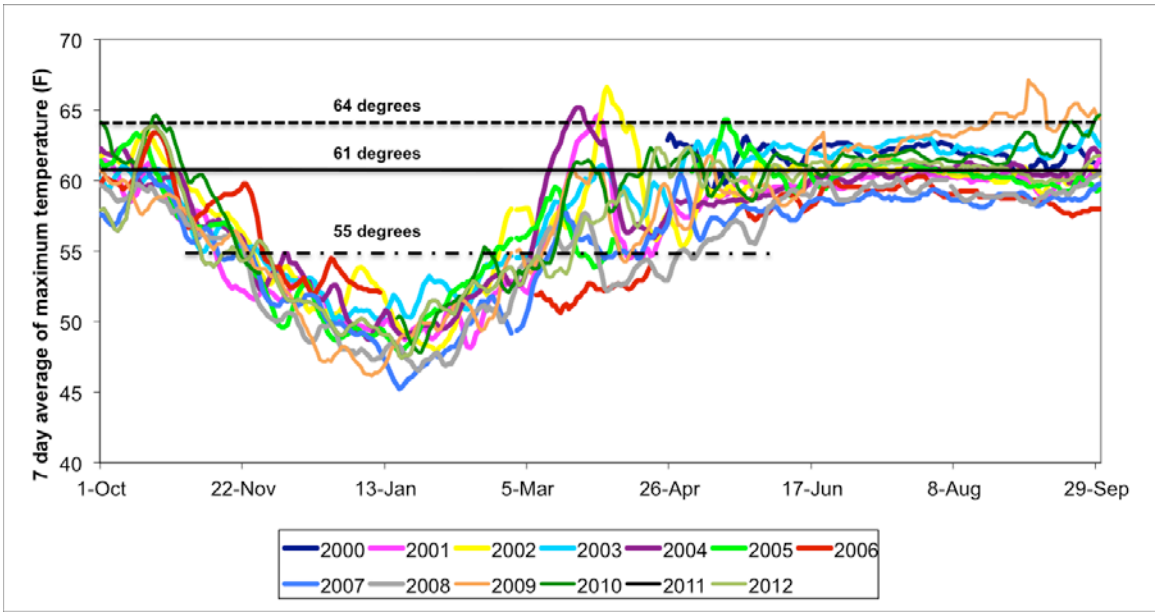


Figure 2. Seven day moving average of the daily maximum at New Hogan (RM 42) and Jenny Lind (RM 34.6), Water Years 2000-2011.



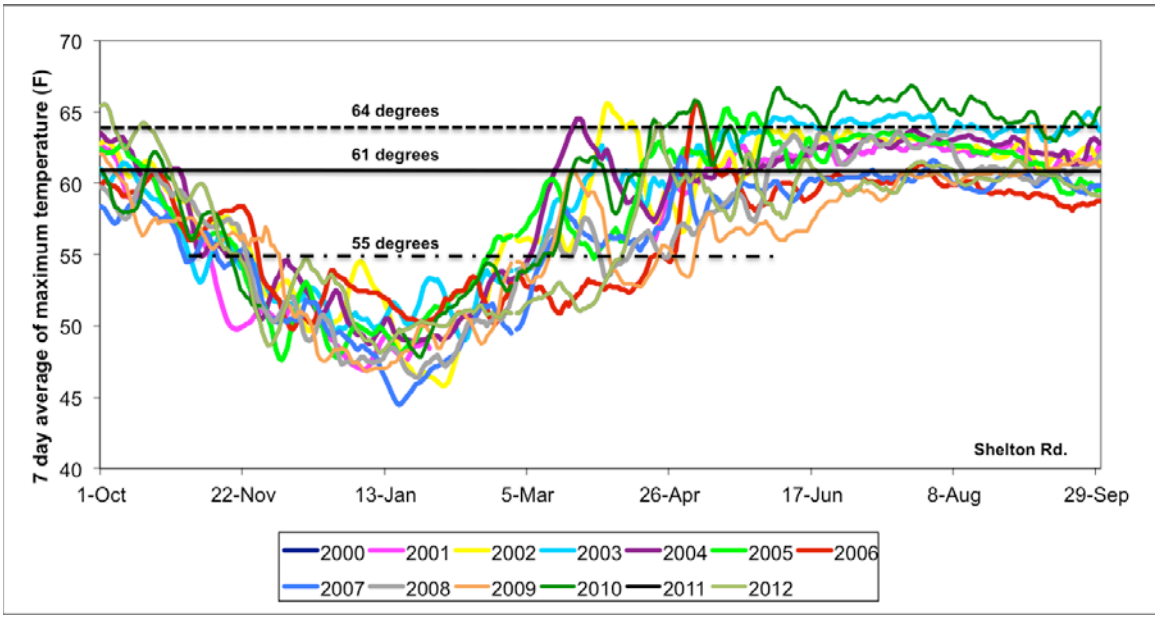


Figure 3. Seven day moving average of the daily maximum at Gotelli Ranch (RM 32) and Shelton Road (29.3), Water Years 2000-2011.

In 2008, an instream flow study was conducted in the lower Calaveras River (New Hogan to Bellota) using a Physical Habitat Simulation (PHABSIM) model to calculate an index relationship between streamflow and potential habitat for steelhead (Appendix E of the CHCP). Four reaches were evaluated including:

- Reach 1- New Hogan Dam to Canyon (RM 42.0 to RM 41.3);
- Reach 2- Canyon to Jenny Lind (RM 41.3 to RM 34.6);
- Reach 3- Jenny Lind to Shelton Road (RM 34.6 to RM 29.3); and
- Reach 4- Shelton Road to Bellota (RM 29.3 to RM 24)

Results of the PHABSIM study indicate that low flows ranging from 12 cfs for fry and 30-40 cfs for spawning adults optimize the amount of weighted usable area/physical habitat index (WUA/PHI) in the upper two reaches where the majority of spawning and early rearing occurs (Stillwater Sciences 2004). Based on WUA/PHI curves, a minimum flow commitment of 20 cfs at Shelton Road (equivalent to about 25 cfs released from New Hogan) ensures that suitable habitat is available in the important spawning and rearing area during the non-irrigation season from late fall through early spring, which encompasses the steelhead spawning season (December through March) as well as year-round rearing. During the non-irrigation season, natural freshet events and/or flood control releases provide migration opportunities during normal to above normal precipitation years, particularly for steelhead. These flow events create conditions that allow adult fish to migrate into the spawning reach where habitat is suitable for spawning and that allow juvenile fish to migrate out of the river on their way to the ocean.

During the irrigation season (late spring through early fall), flows are higher than those that would optimize WUA/PHI for fry and juvenile rearing in Reaches 1 and 2 but provide water temperatures that are typically within EPA recommended water temperatures for "core" steelhead rearing (<16°C; 61°F)[6]. Irrigation flows provide a relatively high amount of suitable physical habitat in Reach 3 and maintain over- summering water temperatures that are generally within those recommended for "non-core" rearing areas (<18°C; 64°F). Reach 4 is considered to be mostly a migration corridor due to limited habitat structure, presence of predators (e.g., smallmouth bass), and unsuitable over-summering temperatures.

Interspecific interactions between native species and competition with introduced species can be limiting factors for salmonids. Few predator or competitive species have been observed during snorkel surveys conducted from March to mid-October 2002 (FFC 2002) and in fall 2005 and 2006 (SEWD unpublished data). These surveys encompassed a range of flows from 25 to 500 cfs. Minimal predation and competition indicates that salmonids are able to fully utilize available resources.

Besides good spawning and rearing conditions, adequate salmonid migration flows generally exist but flow magnitude and timing are different than historical conditions. For example, Marsh (2006) evaluated adult salmonid migration potential based on years and seasons in which average daily flows exceeded 25, 50, 100 and 200 cfs for periods of at least 4 days, the migration opportunity criteria, over the period of record for Jenny Lind, New Hogan Dam, and Mormon Slough gauges.

Marsh (2006) found that migration opportunities for flows greater than 25, 50, 100, and 200 cfs occur more often in fall and spring under post-New Hogan dam conditions (Figure 4). During the winter, salmonid migration opportunities were found to be similar between pre- and post-dam conditions for flows greater than 25 cfs but occurred less often under post-dam conditions for flows greater than 50, 100, and 200 cfs. Nonetheless, Marsh (2006)

6 - Refer to footnote 4 regarding the applicability of EPA temperature recommendations in the Calaveras River.

determined that migration opportunities occurred at least 75% of years for flows greater than 50 cfs and at least 60% of years for flows greater than 100 and 200 cfs under post-dam conditions (Figure 4).

Although flows are typically suitable for spawning and rearing upstream of Bellota and flood control releases and/or freshet events generally provide a number of migration opportunities, New Hogan Dam operations can be adjusted and measures can be taken that will help minimize extremely low flow conditions and optimize migration and rearing opportunities as indicated in the following sections.

Minimum Instream Flow Commitment

Typically, average flow releases from New Hogan have been and will continue to be greater than 150 cfs during the irrigation period while base flow releases have ranged and will continue to range from 20-60 cfs during the non-irrigation period; nonetheless, flow releases in past years have been known to decline below 20 cfs primarily during periods within the non-irrigation season. Therefore, in order to ensure that adequate spawning, incubation, and rearing habitat conditions are maintained in the priority rearing area located upstream of Shelton Road, SEWD will ensure that flows at Shelton Road are 20 cfs or greater (equivalent to about 25 cfs released from New Hogan) year-round except during critical water storage periods, which is defined as periods when conservation storage has fallen below 84,100 AF (equivalent to reservoir storage of 99,100 AF) (note: a new flow gage will be installed just upstream of Shelton Road within one year of issuance of the ITP).

When critical water storage occurs, and flows at Shelton Road are below 20 cfs, New Hogan releases may be reduced to a minimum of 10 cfs until critical water storage is no longer in effect. Actual releases will be determined by the District, in consultation with NMFS, based on a consideration of potential storage impacts (and commensurate effects on future supplies for M&I deliveries, irrigation diversions, and fishery needs) as well as short-term impacts on M&I deliveries and fishery needs.

The reason for reduced releases during critical water storage is to ensure some quantity of water is available for beneficial use in areas largely or completely dependent on the Calaveras River for their supply in a drought. As one example of the need for reduced releases, at the beginning of the non-irrigation season in 1976 (i.e., November), storage was 68,180 AF. Due to the 1976–77 drought, storage at the same month next year diminished to only 10,735 AF. Had the HCP been in place at that time, at least 10 cfs would have been released for fishery purposes in three non-irrigation months: Dec. 1976, Jan. and Nov. 77 (92 days). A 10 cfs release for those 92 days would have been 1,821 acre feet, further reducing New Hogan storage from 10,735 AF to 8,914 AF. If the 20 cfs commitment at Shelton Road had been in effect, 3,727 AF more would have been released, drawing the reservoir down to only 7,008 AF before the start of an uncertain hydrological year.

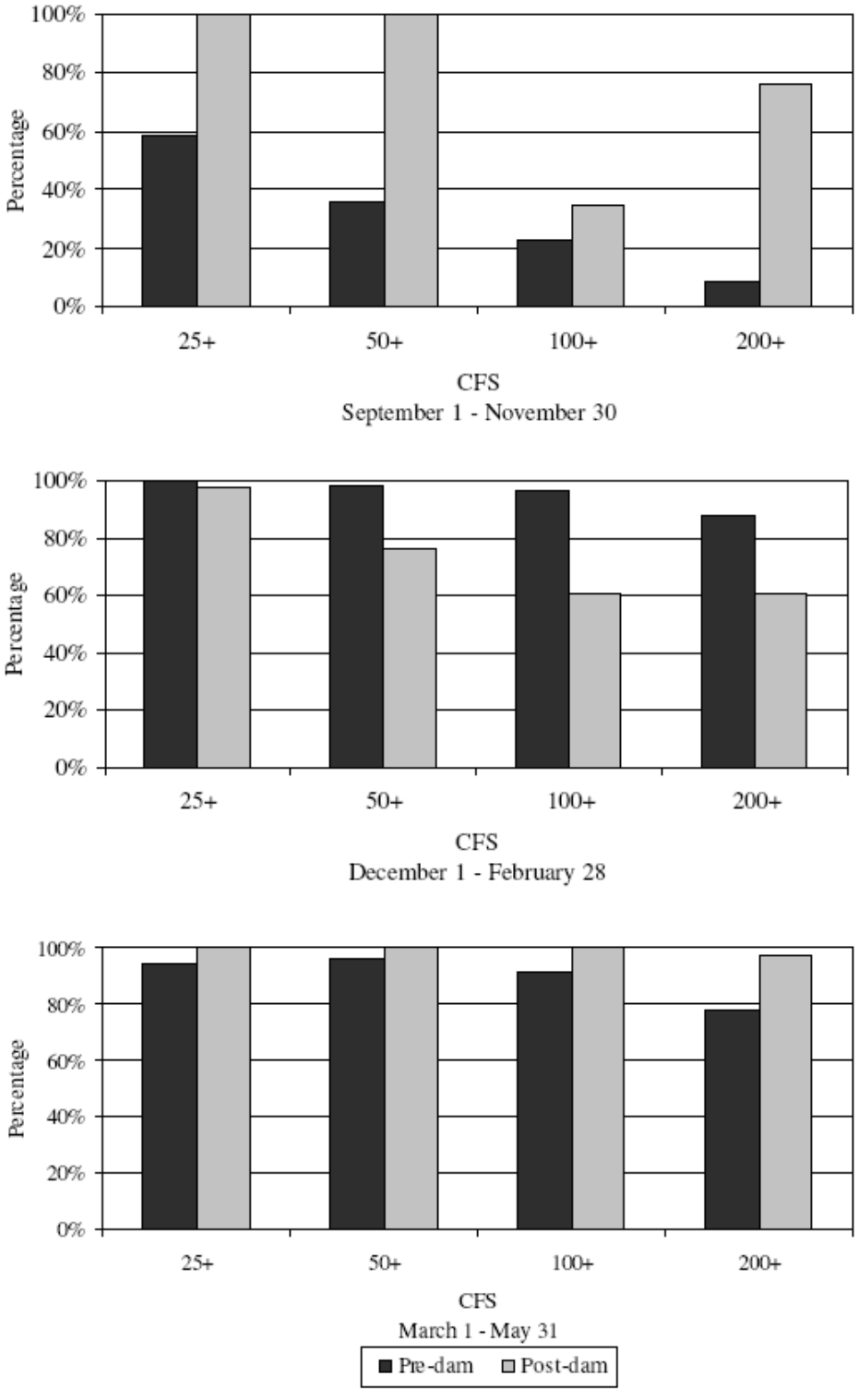


Figure 4. Percentage of years by season when average daily flows exceeded 25, 50, 100, and 200 cfs for at least four days over period of record before and after New Hogan Dam regulated the river. Data: Jenny 1907-1964, USGS. New Hogan Dam 1965-2002, USACE. Source: Marsh 2006.

Based on historical flows, reducing fishery releases to a minimum of 10 cfs would be infrequent under the HCP. In the period of record (Jan. 1965 through Dec. 2013), critical water storage has occurred in only 51 of 247 (or 20.6%) non-irrigation months, or 8.9% of months in the entire 573-month period of record (Table 3). Although no gage has been maintained near Shelton Road during all 573 months,[7] historical records show that of the 24 gaged non-irrigation months during critical water storage, an average of 20 cfs was in the stream at or near Shelton Road in 11 of them—presumably due to a combination of New Hogan Dam releases and below-dam inflow—indicating that a reduction to a minimum of 10 cfs will likely occur in, at most, 46% of the critical storage non-irrigation months. In summary, reduction to the 10 cfs or more minimum could be expected to occur approximately 4.0% of all months (23 months of 573). It is expected that 10 cfs releases would provide a wetted channel in at least a portion of spawning and rearing habitat. A survey was conducted between New Hogan Dam and Shelton Road (except for the Canyon reach) in February 2014 when flow releases were reduced to 10 cfs during a critical water storage period and little difference in river stage was observed compared to typical 25 cfs base flows and there was no evidence of stranding or dewatered redds (SEWD unpublished data). During critical water storage periods, extended periods of 10 cfs (or greater) releases may be implemented by the District that may result in take (e.g., reduced spawning success or reduced juvenile survival) to an unknown extent.

The 20 cfs minimum flow commitment is expected to yield a viable population of *O. mykiss* and offer suitable conditions to Chinook salmon that infrequently occur. For example, flow releases between mid-January and early April in 2002 were less than the minimal flow releases needed to achieve the proposed 20 cfs criteria at Shelton Road (i.e., flows were less than 25 cfs) and were less than typical base flows. During this period, fish abundance (n= 1,045) was close to the annual average; average fish condition factors were good (K= 1.35-1.53) and were comparable to those observed under typical, higher base flows in 2003-2011; and water temperatures were generally similar to most years with the exception of slightly higher temperatures for several days from late March to mid-April at Gotelli and Shelton Road.

Based on aforementioned WUA/PHI values and observations during 2002 that found relatively high numbers of *O. mykiss*, good condition factors, and suitable water temperatures at flows less than the target, it appears that the minimum flow target will provide adequate fall/winter conditions for salmonids in the priority spawning and rearing area upstream of Shelton Road. Irrigation deliveries required at Bellota and areas downstream will maintain adequate spring and summer rearing conditions. With this minimum instream flow target in place, there will be an increased percentage of days that spawning and year-round rearing conditions will be improved over existing operations. As mentioned earlier, New Hogan releases of about 25 cfs are anticipated to create flows of 20 cfs at Shelton Road. Dependent on month, the percent of monthly flows that did not meet this target (i.e., less than 25 cfs released from New Hogan) in the past when conservation storage was greater than 84,100 AF (reservoir storage 99,100 AF) ranged from 0 to 19% (Table 4).

7 - Gage 11308900, near Shelton Road, was maintained during New Hogan operations from January 1965 to September 1990.

Table 3. Number and percentage of days per month that NHG flow releases were less than 25 cfs, water years 1967-2004 (Limited to years prior to implementation of Instream Flow Commitment). Reservoir storage of 99,100 AF is equivalent to conservation storage of 84,100 AF.

1996-2004 Month	All Years Combined Number Days	All Years Combined Percentage Days	Only Years > 99,100 AF storage Number Days	Only Years > 99,100 AF storage Percentage Days	Only Years < 99,100 AF storage Number Days	Only Years < 99,100 AF storage Percentage Days
Oct	266	23	149	13	117	10
Nov	315	28	198	18	117	11
Dec	328	29	201	18	127	11
Jan	358	31	203	18	155	14
Feb	294	27	158	15	136	13
Mar	360	31	220	19	140	12
Apr	195	17	68	6	127	11
May	62	5	12	1	50	4
Jun	53	5	15	1	38	3
Jul	35	3	0	0	35	3
Aug	48	4	0	0	48	4
Sep	93	8	3	0.3	90	8

Table 4. New Hogan Reservoir monthly storage conditions (AF). Bold indicates months where conservation storage was less than 84,100 AF (i.e., reservoir storage of 99,100 AF). Highlights indicate months where NHG releases were ≤ 10 cfs for ≥ 7 days when conservation storage was less than 84,100 AF. Source: CDEC.

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1965	159,048	162,242	169,920	214,076	211,604	201,516	188,333	176,320	167,836	164,554	170,100	182,744
1966	186,233	200,277	203,813	199,497	189,882	177,266	163,177	149,272	142,244	137,953	139,026	165,440
1967	175,384	181,235	184,117	219,029	237,367	234,028	221,493	206,967	197,108	196,238	195,466	197,108
1968	203,594	202,772	200,809	199,246	190,046	178,252	164,321	151,177	142,816	139,834	141,456	155,628
1969	161,862	184,428	168,226	198,921	198,661	190,901	179,172	166,534	158,932	156,515	159,192	171,756
1970	--	172,328	172,057	173,837	169,179	160,147	147,658	134,149	125,368	122,703	134,334	158,528
1971	160,960	166,474	182,813	186,207	181,451	171,936	158,787	145,556	135,951	134,784	135,553	159,886
1972	163,206	180,063	177,425	172,539	164,527	151,656	137,124	123,436	115,091	112,044	113,780	119,895
1973	174,140	164,409	184,709	196,206	189,603	178,711	165,499	151,627	143,722	143,116	150,279	173,384
1974	184,678	192,554	234,969	272,456	267,963	255,798	244,015	228,823	218,615	215,011	194,760	172,268
1975	176,876	--	177,273	196,592	193,415	181,420	167,482	154,146	144,979	143,110	142,593	141,290
1976	140,479	136,754	137,874	129,104	116,381	103,400	**88,678**	**77,183**	**70,900**	**68,964**	**68,180**	**67,672**
1977	**68,107**	**65,006**	**56,930**	**47,769**	**41,610**	**28,806**	**16,128**	**11,578**	**11,178**	**10,844**	**10,735**	**14,624**
1978	**73,416**	118,834	171,608	220,112	222,165	206,890	189,497	171,187	161,805	152,980	151,149	151,908
1979	162,608	192,046	235,847	246,709	238,652	224,287	208,507	190,864	177,147	171,984	171,833	176,535
1980	166,519	198,991	209,746	215,633	207,270	193,905	178,957	161,441	148,801	142,039	138,776	137,627
1981	153,375	157,394	179,081	179,944	167,141	150,224	131,830	114,926	102,563	96,996	105,711	130,583
1982	170,421	184,890	252,639	276,189	275,913	264,291	249,440	232,632	221,992	220,678	208,373	158,804
1983	174,433	193,424	192,782	236,815	261,653	255,334	242,861	227,470	217,685	221,598	170,571	157,423
1984	158,084	180,438	199,905	200,494	190,991	177,239	159,266	141,307	127,828	124,448	130,143	135,186
1985	138,429	153,659	173,887	172,738	159,989	145,123	127,828	111,008	100,807	**95,426**	**96,384**	99,179
1986	108,938	186,901	195,808	202,234	194,582	179,574	162,461	145,123	135,503	131,000	127,400	125,380
1987	123,870	128,960	144,110	135,950	120,520	104,267	**87,049**	**70,078**	**59,230**	**56,202**	**54,121**	**52,652**
1988	**55,187**	**55,250**	**55,412**	**52,000**	**48,302**	**39,000**	**28,480**	**19,448**	**15,431**	**15,431**	**14,933**	**16,006**
1989	**18,065**	**19,880**	**38,518**	**41,401**	**37,473**	**32,643**	**27,756**	**22,191**	**21,706**	**21,662**	**19,673**	**17,397**
1990	**21,255**	**31,507**	**42,390**	**44,369**	**40,820**	**36,053**	**30,242**	**23,592**	**20,164**	**17,135**	**15,604**	**15,275**
1991	**15,088**	**15,438**	**54,669**	**59,050**	**54,528**	**47,795**	**40,531**	**33,453**	**27,487**	**24,046**	**20,930**	**19,265**
1992	**20,939**	**57,212**	**70,952**	**71,944**	**62,201**	**51,690**	**41,894**	**33,232**	**29,138**	**25,449**	**22,255**	**27,311**
1993	116,719	160,193	197,689	212,138	202,465	189,909	171,112	152,387	137,815	128,803	122,816	119,265
1994	117,792	128,623	127,726	118,773	107,469	**90,339**	**71,484**	**54,106**	**40,938**	**34,062**	**30,440**	**30,860**

Year	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1995	136,537	147,967	248,664	271,524	297,103	285,392	266,329	243,081	222,513	206,039	184,202	181,430
1996	190,195	194,357	221,335	223,834	218,577	202,696	182,020	160,831	148,384	143,536	144,028	172,135
1997	171,894	177,944	180,377	173,101	162,783	150,784	136,749	123,468	113,006	108,097	105,344	105,138
1998	169,524	167,854	214,307	241,188	239,665	237,859	222,652	205,042	191,247	185,581	185,675	182,331
1999	181,927	193,939	203,058	211,430	204,479	192,847	177,791	164,396	154,255	147,606	147,884	147,662
2000	178,497	205,906	198,959	201,741	201,052	190,386	177,545	164,425	155,678	151,908	150,840	150,364
2001	153,687	169,494	184,014	183,889	173,555	160,309	146,859	133,476	123,242	119,216	116,743	131,960
2002	147,579	158,545	181,678	180,223	174,130	163,427	150,028	138,055	128,572	124,121	122,116	134,501
2003	139,018	141,362	144,959	158,315	158,257	146,804	132,508	118,675	108,611	100,584	98,892	105,275
2004	116,160	137,735	146,528	140,013	129,705	117,915	105,046	**93,162**	**83,850**	**81,610**	**80,208**	**95,426**
2005	166,460	194,035	237,391	249,256	253,947	246,304	232,490	218,646	206,172	199,318	174,282	193,136
2006	181,275	191,726	255,072	262,455	262,990	247,888	227,857	206,937	192,975	189,210	175,803	171,954
2007	169,972	187,849	191,471	187,849	178,374	165,751	151,711	136,431	127,113	123,217	120,549	119,093
2008	138,563	156,506	157,768	150,000	139,314	126,348	111,838	**96,975**	**87,379**	**83,167**	**80,051**	**79,562**
2009	**81,472**	**93,806**	118,970	114,276	107,446	**95,600**	**81,313**	**69,462**	**61,308**	**58,869**	**55,948**	**56,762**
2010	**56,730**	**82,806**	99,981	121,991	145,289	147,856	139,932	128,469	117,353	108,938	105,413	109,641
2011	166,194	182,424	217,411	225,578	241,806	243,044	234,951	217,891	202,037	189,655	186,146	172,829
2012	167,171	168,182	168,509	183,514	200,135	191,630	179,420	165,397	151,542	141,335	136,192	134,554
2013	166,283	167,617	165,308	159,700	149,107	13,6510	122,966	111,032	102,880	**98,958**	**96,624**	**94,668**

Prior to implementing a minimum instream flow commitment, releases below 25 cfs generally occurred for one of two reasons: (1) conservation storage dropped substantially below 84,100 AF resulting in release curtailments to prevent storage from further declining to the minimum pool, or (2) New Melones contract water was made available to SEWD for up to 100% of M&I supplies during the non-irrigation season resulting in release curtailments since zero diversions of Calaveras River water was needed for the WTP.

In the future, if New Melones water is made available to SEWD during the non-irrigation season more often, NHG releases would not be necessary for M&I diversion at Bellota, which would then—in absence of the minimum flow commitment—cause an increased frequency in the occurrence of releases less than 25 cfs from October through March. Establishing a minimum flow commitment at Shelton Road ensures that adequate rearing conditions will be provided in the primary rearing reach regardless of Bellota M&I diversion status under most storage conditions. During critical water storage periods, extended periods of 10 cfs (or greater) releases may be implemented by the District that may result in take (e.g., reduced spawning success or reduced juvenile survival) to an unknown extent. The extent of additional take is expected to be correlated with the seasonal timing and duration of low flow releases. For example, low flows in early fall and late spring are more likely to result in elevated water temperatures and associated impacts because of high ambient air temperatures than low flows in the winter when ambient air temperatures are cool.

Under historical drought conditions (e.g., 1987-1992), flow releases from New Hogan were reduced below 10 cfs during extended periods when conservation storage was near the minimum pool. Under these low storage conditions, monthly maximum reservoir release temperatures exceeded EPA's recommended spawning/incubation temperature of 55°F during October, November, March, and April, and exceeded 65°F during most years in October and at least one year in April (no data for 1989)(USACE 2001). Due to these suboptimal instream temperatures combined with very low to non-existent flows, it is questionable whether salmonids were able to persist below the dam, and no salmonid observations were recorded from 1989 through 1994. Despite this drought period where flows were less than 10 cfs, salmonid populations appear to have re-colonized the Calaveras River within a short period of time as evidenced by renewed observations of salmon and steelhead beginning in 1995 and continuing through present.

It is unknown whether a 10 cfs release provided under similar drought conditions would result in cooler water temperatures that would help reduce potential impacts to fish; but, it is expected that 10 cfs releases would provide a wetted channel in at least a portion of spawning and rearing habitat, which would possibly promote fish conservation compared with historical conditions. In addition, if necessary, adaptive management of flow conditions under critical water storage conditions will provide an opportunity to examine whether impacts to fisheries can be further minimized during successive dry years.

Non-Dedicated Fall Storage Flow Management Strategy

In preparation for the flood control season, New Hogan Reservoir storage must be no greater than 152,000 AF by December 1 each year (USACE 1983). In some years (i.e., expected frequency is about 20% based on historical records[8]), there is a substantial amount of storage above 152,000 AF (i.e., between 10,000-70,000 AF) remaining at the end of the irrigation season (i.e., October 15), which must be released to meet this December 1 requirement. However, the USACE has some discretion to retain a storage buffer of about 15% above the 152,000 AF criterion in December (i.e., about 175,000 AF), which allows SEWD to coordinate releases with the USACE between October 15 through November 30 to optimize migration opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam during this period.

By October 10, SEWD will determine the projected reservoir and conservation storage at the end of the irrigation season and the projected beneficial uses of conservation storage (i.e., M&I or groundwater recharge) during October 15 through November 30[9]. SEWD will then calculate the amount of estimated storage remaining that can be scheduled to assist fish migration (FM) between October 15 and November 30 based on subtracting the amount of storage for beneficial use (B) and 152,000 AF from the projected reservoir storage on October 15 (P), as follows:

$$FM = P - B - 152{,}000$$

Under high, end of irrigation-season storage conditions (storage >152,000 AF on October 15), the Governing Board, taking into consideration the recommendations of interested stakeholders including, but not limited to, individual members of the Calaveras River Technical Review Group (CRTRG; see Chapter 9 of the CHCP for description of the CRTRG), will identify a flow release schedule by October 10 to optimize migration opportunities into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam from October 15 through November 30. The District will coordinate with NMFS and the USACE to determine the quantity of water to be released between October 15 and November 30 of each year when storage is above 152,000 AF. Based on the timing of adult fall-run Chinook Salmon entering the Delta, the lower San Joaquin River and the Calaveras River, if any, and the amount of water needed to facilitate passage through or over fish passage impediments existing at the time of release, the Governing Board will develop and approve (no later than October 10) a flow schedule for October 15-November 30 of that year to optimize flows through/over the current fish passage impediments in the lower Calaveras River and time the releases to correlate with when adults are waiting to enter the Calaveras River. Due to annual variability in the amount of water available and in migration timing, the flow release pattern will be made on a case-by-case basis but is anticipated to consist of at least one ≥5 day high flow pulse period followed by a ramped

8 Frequency of occurrence is not expected to decrease in the future (since climate change projections indicate an increase in spring and fall inflows, which contribute to fall storage levels) and may increase if SEWD receives full water supply entitlements from its New Melones contract.

9 The amount of projected use will vary depending on hydrology, water year type, precipitation, existing carryover storage, and related factors.

return to lower baseline flows to prevent stranding. Monitoring will be conducted to document occurrence of passage facilitation under prescribed flow releases.

To put this conservation strategy into perspective, a comparison between traditional releases under high end-of-year storage conditions is made to a year when this conservation strategy was first put into practice as one of several conservation strategies to be implemented prior to completion of the HCP. Prior to implementation of this conservation strategy, storage above 152,000 AF was typically released in the latter half of November with flows ranging from about 400 to 3,000+. Under a typical scenario, releases in 2005 (a year when NHG storage was at 203,000 AF on October 15) would have ranged from 800-1,200 cfs per day during the latter part of November in order to reduce the reservoir to 152,000 AF by December 1. Instead, SEWD coordinated with members of the Calaveras River Technical Review Group (CRTRG; see Chapter 9 of the CHCP for description of group) and the USACE to retain a slightly higher reservoir storage level than the criterion for December as described above, resulting in about 28,000 AF to be released between October 15 and November 30. SEWD, taking into consideration recommendations from members of the CRTRG, then recommended a release schedule for this period to optimize fish passage opportunities. Under the recommended flow schedule and current configuration of instream structures, several hundred fall-run Chinook salmon migrated through Mormon Slough and some were able to successfully ascend the Bellota Weir.

Once passage improvements are implemented in the lower river, particularly at the Bellota Weir, this conservation strategy as implemented through the AMP is expected to result in an increased number of salmonids (consistent with the number of salmonids that have previously been impeded by passage structures; see Table 17 in Chapter 7 in Appendix A of the CHCP) able to access the river upstream of Bellota during the fall in at least 20% of years (i.e., those years when there is between 10,000-70,000 AF of storage that must be released between October 15 and November 30).

Flood Control Release Coordination with, and Advisory Support to, the U.S. Army Corps of Engineers

In a biological opinion (Opinion) regarding the USACE's New Hogan Dam and Lake Project (NMFS 2002), NMFS required the following in Term and Condition #4b: "The Corps shall agree to work cooperatively with NOAA Fisheries, the Bureau of Reclamation, and water agencies to develop a water management plan which meets the flood control requirements; the water contracts to SEWD and CCWD; and allows fish to ascend, spawn, rear, and migrate to the maximum extent possible". The existing Opinion does not apply to the District and the District is currently under no legal obligation to comply with this request.

A joint water management plan between the USACE and SEWD is impracticable from a logistical and legal standpoint. The USACE has no legal authority to impose water management conditions upon SEWD as Watermaster pursuant to Contract number 14-06-200-5057A. The only discretion the USACE exercises is over flood control releases when the project is in flood control operations in accordance the Water Control Manual. The

USACE has no general discretion over the storage, regulation and release of water outside of the flood season and therefore has no ability to enter into a joint water management plan. However, the USACE has and will continue to work cooperatively with SEWD to coordinate with NMFS on an as needed basis during the flood control season to determine whether flood control releases during the winter/early spring months can be modified to reduce impacts to salmonids. SEWD, in cooperation with the USACE, will establish criteria that will provide flexibility for releasing flood control flows and reduce impacts to fishery resources. Flexible flow management and coordination will provide benefits to salmonids by maximizing migration opportunities in both the winter and spring.

As part of the terms and conditions of the 2002 Opinion, the USACE is also required to implement actions to restore channel characteristics within the river including activities such as channel reconfiguration, creation of low-flow channel, and gravel supplementation. To help the USACE achieve its restoration goals, SEWD will provide advisory assistance to the USACE by (1) educating streamside landowners so that owners understand the importance of proposed restoration activities and (2) obtaining landowner permission to access areas where USACE restoration activities are proposed. SEWD's advisory support to the USACE will help ensure that restoration activities will be implemented where needed, which will ultimately benefit salmonids through improved habitat conditions.

Agriculture Conservation Program

Agriculture Conservation Program BMPs will help to conserve water resources in the basin, which will ultimately help maintain adequate habitat conditions for anadromous fisheries in the Calaveras River.

SEWD distributes and sells irrigation water to SEWD agricultural users. SEWD is subject to Section 210 of the Reclamation Reform Act of 1982 because of its water contract with the United States Bureau of Reclamation (Reclamation) for water from New Melones Reservoir, and is required to prepare and submit to the Reclamation a Water Management Plan with definite goals, appropriate water conservation measures, and timetables, which has been implemented since 1993. SEWD implements the following Best Management Practices (BMP) for its agricultural users:

BMP A-1. Water Measurement
Volume of water delivered by SEWD to each turnout is measured with devices that are operated and maintained to a reasonable degree of accuracy, under most conditions, to +/-6%.

BMP A-2. Water Conservation Coordinator
Water Conservation Coordinator is responsible for program management, tracking, planning, documenting, and reporting on the implementation of BMPs.

BMP A-3. Water Management Service
Provide or support the availability of water management services to water users through (1) on-farm irrigation evaluations and water delivery information provided to water

users, (2) real-time and normal irrigation scheduling and crop ET information via CIMIS website, (3) surface, ground, and drainage water quantity and quality data provided to water users, and (4) agricultural water management educational programs and materials for farmers, staff, and the public.

BMP A-4. Price Structure
SEWD provides a quantity-based water pricing structure (cost per acre-foot).

BMP A-5. Policy Review
SEWD has three water contracts all with different contract years. For ease of scheduling and providing the most economical water for customers, SEWD continues to negotiate for a standard contract year.

BMP A-6. Contractor Pump Efficiencies
Evaluate and improve efficiencies of district pumps.

BMP A-7. Facilitate/Promote On-Farm Irrigation System Capital Improvements Surface Water Incentive Program
Program encourages the conversion to surface from groundwater through water pricing.

BMP A-8. Line or Pipe Ditches and Canals/Regulatory Reservoirs
Conveyance routes are often unlined but are exempt from lining since they assist in groundwater recharge. Reservoirs surrounding the treatment plant act as buffers during storm events and percolate water, recharging the aquifer at the treatment plant. Reservoir maintenance and groundwater monitoring are ongoing.

BMP A-9. Flexible Water Ordering and Delivery
SEWD operates an on-demand delivery ordering system where customers are asked to call or email 24-48 hours in advance. The SCADA system is used to optimize management of deliveries.

BMP A-10. Construct and Operate Spill and Tail Water Recovery Systems
USBR grant funds are utilized for this BMP. SEWD will continue to apply for these grants as they become available. In 2005, SEWD applied for and was awarded a Challenge Grant in the amount of $150,255 to implement a SCADA system. SEWD's contribution was $154,553. Although SCADA is not a spill or tail water recovery system, it allows enhanced surface water management abilities to minimize already limited system losses.

BMP A-11. Optimize Conjunctive Use
Optimize conjunctive management of surface and groundwater through recharge and surface water usage pricing incentives.

BMP A-12. Automate Canal Structures
This BMP is being implemented in conjunction with BMP B7.

BMP A-13. Facilitate/Promote Pump Testing and Evaluation
SEWD currently provides free pump tests and irrigation evaluations to its customers.

Municipal Conservation Program

Municipal Conservation Program BMPs are intended to reduce long-term urban demands from what they would have been without implementation of these practices. They will help to conserve water resources in the basin, which will ultimately help maintain adequate habitat conditions for anadromous fisheries in the Calaveras River. Water conservation will reduce demand on water storage in New Hogan Reservoir, which in turn is expected to reduce the period of time when the reservoir is in critical water storage, which is the threshold for when flows at Shelton Road may drop below 20 cfs.

Since 1985, BMPs have been implemented by the City of Stockton and California Water Service Company under an Urban Water Management Plan (UWMP) as required by the Urban Water Management Planning Act. The City of Stockton and California Water Service Company are also signatories to a Memorandum of Understanding administered by the California Urban Water Conservation Council (CUWCC), which maintains a list of BMPs for MOU signatories to implement in order to reduce municipal water consumption across the State. CUWCC BMPs are consistent with those implemented under the UWMP. SEWD wholesales treated surface water to the City of Stockton, California Water Service Company (Cal Water), and San Joaquin County. Because of contractual requirements, SEWD cannot fund or cause the retailers to fund conservation BMPs. Currently, there are a total of five BMP measures identified. For SEWD, the urban contractors report to the CUWCC and addresses BMPs. Further, SEWD's water management plan does not specify direct compliance to any of the listed BMPs; however, it is important to note that SEWD does regularly perform activities during daily operations that address BMP M-1 and M-2. Relevant BMPs currently implemented by the water purveyors serving Calaveras River water diverted by SEWD to their constituents are presented below:

BMP M-1. Utility Operations
Water conservation programs implemented by utilities that provide essential services to customers. There are four subcategories that comprise signatory utility operation program responsibilities: 1) Operational Practices; 2) Water Loss Control; 3) Metering and Billing; and 4) Retail Conservation Pricing.

BMP M-2. Public Education and School Education
Education programs to encourage wise water usage for the public or for school-aged children.

BMP M-3. Residential Programs
Effective water conservation methods and measures that residents can work in conjunction with water agencies to implement.

BMP M-4. Commercial, Institutional, and Industrial Programs

Comprehensive and flexible programs to allow for water agencies to work with businesses and tailor implementation to fit local business needs and opportunities.

BMP M-5. Landscape Programs
Programs to improve the efficiency and usage of outdoor water consumption for the purpose of irrigation urban landscapes.

Compliance Monitoring: SEWD will maintain daily flow and operation records in an operations database (CM1) to document implementation of flow and operation related conservation strategies (Attachment D-1 in Appendix D of the CHCP). The operations database will contain data that is recorded year-round and seasonally. Year-round data includes USACE gauging station flow records for New Hogan Dam releases, Cosgrove Creek, and Mormon Slough and precipitation records for New Hogan (data sources: California Data Exchange Center and USACE); SEWD daily diversion records, status of the temporary fish screens at Bellota, and status of the temporary fish barrier (e.g., net, rock weir) upstream of the Old Calaveras Headworks Facility. Seasonal data includes flow records collected during the irrigation season at SEWD sensors located in Mormon Slough, Old Calaveras River channel, Mosher Slough/Creek, and Potter Creek; SEWD daily diversion records at the Headworks Facility; SEWD manual flow readings at Shelton Road (to be installed) during the business week (Monday-Friday) whenever NHG flow releases are less than 35 cfs; and SEWD operational data collected during the non-irrigation season regarding the status of the Bellota ladder (data source: SEWD). The operations database will be provided to NMFS and the Governmental Resource Agencies via a bi-weekly electronic newsletter.

To ensure compliance with the Agriculture and Municipal Conservation Programs, implementation efforts will be documented (CM2).

Effectiveness Monitoring: Fisheries and environmental conditions monitoring will be performed to collect information that will be used to determine whether biological goals are being met (Appendix D of the CHCP). A core suite of fisheries and environmental conditions monitoring will be conducted to determine adult and juvenile migration and rearing opportunities, which will include (1) one or more adult monitoring components (e.g., automated fish passage monitoring system, redd counts, carcass surveys), (2) RST monitoring to infer spawning and rearing success, as well as determine juvenile migration opportunities, and (3) flow, water temperature, and turbidity measurements recorded during fishery monitoring (EM1 through EM3 in Appendix D of the CHCP).

If deemed necessary through the AMP process, additional or alternative monitoring activities to document spawning and rearing success such as seining, snorkel surveys, electrofishing, and telemetry (EM12 in Appendix D of the CHCP) will be conducted within funding constraints (i.e., an annual monitoring budget is identified in Chapter 12 of the CHCP and varying monitoring activities can be selected each year, taking into consideration the recommendations of interested stakeholders including, but not limited to, individual members of the CRTRG).

Fisheries and environmental conditions monitoring data will be provided to NMFS and any other interested parties via a bi-weekly electronic newsletter.

3.3.2 Conservation Strategies for SEWD Old Calaveras River Headworks Facility Operations (OM2)

Conservation strategies for OM2 were designed to meet the Fish Passage and Avoid/Minimize Fish Entrainment Objectives and associated targets described above under the *Biological Objective: Fish Passage* and *Biological Objective: Avoid/Minimize Fish Entrainment* sections. Existing data indicates that it is infeasible to operate the Old Calaveras River as a secondary migration route for salmonids (see *Rationale and Ecosystem Benefits* below), thus the conservation strategies for this activity are focused on preventing entrainment of salmonids into this channel. To minimize impacts associated with the Old Calaveras River Headworks Facility operations, SEWD will implement three conservation strategies that will prevent entrainment, and associated passage delays and stranding at instream passage impediments including:

(1) CS5. Old Calaveras Headworks Facility Improvement. A permanent non-entraining barrier will be implemented within the first ten years of the ITP to prevent entrainment into the Old Calaveras River and subsequent migration delays or stranding at numerous instream structures within the channel.

(2) CS6. Temporary Fish Barrier at Old Calaveras River Headworks Facility. In the interim period prior to implementing a permanent non-entraining barrier, SEWD will install and maintain a temporary barrier (e.g., net) on the upstream side of the Headworks Facility whenever water is diverted down the Old Calaveras River channel for irrigation or groundwater recharge, to prevent juvenile salmonids from migrating into the channel. The barrier will be installed prior to water diversion and will remain in place during diversion activities. Implementation of this conservation strategy began in 2005, as described in Section 6.3 of the CHCP, and will continue until a permanent non-entraining barrier is implemented at the Headworks Facility.

The temporary barrier currently consists of a net that extends perpendicularly across the entire width and depth of the channel, which is held in place by a pulley system. The pulley system allows the net to be pulled to the streambank for cleaning, debris removal, or repair. Prior to pulling the net aside for maintenance, a back-up net is extended in front of the barrier net using a separate pulley system, which ensures that a barrier is always in place. Maintenance activities occur as needed, which is typically once a week. The net barrier reduces the possibility that juvenile salmonid and steelhead kelt migrating downstream are entrained into the Old Calaveras River channel downstream of the Headworks Facility.

3) Non-Entraining Upstream Passage Barrier Near Confluence of Old Calaveras River/SDC. A permanent non-entraining, upstream passage barrier (e.g., rock weir or flashboard dam) will be installed at the downstream end of the Old Calaveras River near the confluence with the SDC to prevent adult salmonids from inadvertently entering the channel during the few occasions when there is connectivity with the SDC.

Rationale and Ecosystem Benefits: Since 1934, when the Linden Irrigation District built the Old Calaveras Headworks Facility and flows were primarily directed into Mormon Slough (Crow 2006), the Old Calaveras River has been considered a secondary channel that is only used for irrigation and groundwater recharge. Due to its smaller channel size and configuration (i.e., some areas with overhanging vegetation), it has been suggested that this channel could potentially provide a better migration route for salmonids under low flow conditions compared with the wider, minimally vegetated Mormon Slough/SDC channel. However, existing data (including results of fish passage evaluations [DWR 2007a], flow data from the USACE gauges at New Hogan Dam and Bellota, and rotary screw trap data collected seasonally since 2002) indicates that it would be infeasible to operate the Old Calaveras River as a secondary salmonid migration route.

Numerous fish passage impediments throughout the Old Calaveras River channel (i.e., 5 plus the Headworks Facility) would need to be improved for the channel to become functional as a migration corridor. Based on improvements to structures in Mormon Slough, it is anticipated that the total cost to improve all seven structures would be at least $5 million (assuming $3 million for the Headworks facility and an average of $300,000 for each of the other structures). According to DWR's (2007a) evaluation of structures in the Calaveras River, at least 67 cfs would be necessary to provide unimpaired passage for adult Chinook and *O. mykiss* at the modeled structures in the Old Calaveras River downstream of the Headworks Facility. Results of the flow duration analysis for Clements Road flashboard dam (the structure most likely to cause impairment) indicate that adult Chinook have unimpaired passage only 2% of the time between September and December (DWR 2007a) and juvenile salmonids have unimpaired passage only 15% of the time between January and June (DWR 2007a). Furthermore, DWR (2007a) cautions that more than 67 cfs is likely needed because channel roughness (caused by accumulated sediment deposits, woody debris, riprap, or excessive instream vegetation) may result in energy losses. Considering that flows actually need to be greater than 67 cfs for adequate passage, and given that these existing constraints will be met less than 2% of the time, then there are very few periods in which the Old Calaveras River channel would benefit salmonids under current, unimproved passage conditions.

Additionally, the range of flows that may potentially provide passage opportunities under improved passage conditions is 25-150 cfs since diversions through the Headworks Facility during the flood season are limited to about 150 cfs because of flooding concerns associated with the Podesta Reservoir. The frequency of passage opportunities (>25 cfs for 4 days) that may occur under these passage conditions where all structures are improved would remain low (average= 8%, median=4%, range=2-23%) and may result in increased potential for stranding in both Mormon Slough and the Old Calaveras River as a result of alternating flows between the two channels under highly fluctuating, uncertain flow conditions that often occur in the Calaveras River. The latter may result under various scenarios such as whenever fish enter the Old Calaveras River after the Headworks Facility is opened because it appears that flows will be within the passage range for the minimum migration period (i.e., 4 days), but flows drop suddenly to <25 cfs prior to fish being able to migrate through the entire channel. This narrow flow range (i.e., 25-150 cfs) and the

inability to effectively prevent stranding associated with alternating flow deliveries between channels, limits the Old Calaveras River's utility as a migration corridor, particularly given the frequency that flows in the Calaveras River are within this range.

Considering the limited benefits to salmonids and the costs to improve passage impediments prior to any benefits, it is infeasible to operate the Old Calaveras River as a secondary migration route. Consequently, to prevent entrainment, either a permanent non-entraining barrier (e.g., rock weir) will be installed at the Headworks Facility or the facility will be decommissioned within the first 10 years of the ITP.

Additionally, adult salmonids that are inadvertently attracted into the Old Calaveras River by flows resulting from Headworks Facility operations may experience migration delays or stranding at the numerous instream structures within the channel. Therefore, a non-entraining upstream passage barrier will be installed at the downstream end of the channel near the confluence with the SDC to prevent adults from inadvertently entering the channel during the few occasions when there is connectivity with the SDC.

Compliance Monitoring: SEWD will document completion of the Headworks Facility Improvement project, and whether the project was completed in accordance with the project objectives and timeframes (CM3). SEWD will maintain daily flow and operation records in an operations database to document implementation of flow and operation related conservation strategies including the status of the temporary fish barrier (e.g., net). Details regarding the operations database are provided under section 7.1 of the CHCP and CM1 in Appendix D of the CHCP.

Effectiveness Monitoring: (EM4 in Appendix D of the CHCP). Prior to construction of permanent improvements at the Headworks Facility, SEWD will implement salmonid relocation protocols associated with flashboard dam removal in the Old Calaveras River as described under section 7.*5 Effectiveness Monitoring*. SEWD will annually document whether salmonid relocation was necessary, which will provide an indication of the effectiveness of interim salmonid entrainment reduction measures (e.g., net).

Once permanent improvements are made at the upstream (non-entraining barrier or Headworks Facility is decommissioned) and downstream end (non-entraining barrier) of the Old Calaveras River channel, salmonids will no longer be entrained into the Old Calaveras River and no monitoring in the channel will be necessary.

3.3.3 Conservation Strategies for SEWD Bellota Diversion Facility Operations (OM3)

Conservation strategies for OM3 were designed to meet the Fish Passage and Avoid/Minimize Fish Entrainment Objectives and associated targets described above under the *Biological Objective: Fish Passage* and *Biological Objective: Avoid/Minimize Fish Entrainment* sections. To minimize impacts associated with the Bellota Diversion Facility operations, SEWD will implement three conservation strategies that will improve

passage conditions into/out of the spawning and rearing reach between Bellota and New Hogan Dam and/or entrainment including:

(1) CS7. Bellota Diversion Facility Improvement. CH2M Hill (2005), on behalf of SEWD, completed preliminary designs and an environmental assessment for a combined crest gate/fishway/fish screen that will improve salmonid passage opportunities and prevent entrainment at the Bellota Diversion Facility. Details are provided in a *Preliminary Design Report: Calaveras River Anadromous Fish Protection Project* (CH2M Hill 2005; copies available from SEWD). The preliminary designs were developed in close coordination with CDFW, NMFS, USFWS, USACE, and DWR. This project will complement other fish passage improvements on the lower Calaveras River and Mormon Slough being evaluated by DWR in collaboration with SEWD. The proposed improvement identified for the Bellota Diversion Facility in the CH2M Hill (2005) report is targeted to be completed within the first five years, but will be implemented no later than the first ten years, of issuance of the ITP. The improved facility will include the following:

- The existing SEWD intake will remain in operation at its current position on the south side of the channel during construction. A new intake structure and fish screen will be constructed immediately upstream, and the new structure will screen flows for the Bellota pipeline, the fishway attraction water system (AWS), and irrigation releases into the Mormon Slough.
- A pneumatically operated crest gate will be installed on the bottom sill of the Bellota Weir, partially replacing the existing flashboards. This configuration will increase the efficiency and safety of the weir operations.
- A fishway will be constructed on the south bank to provide volitional fish passage when the crest gate is in both the raised and lowered positions. An auxiliary steep-pass fishway will be provided to enable upstream fish passage during the "shoulder" seasons when the pool elevation is raised and downstream juvenile fish passage is undesirable.

This project represents one of the most important elements that will improve the ability of anadromous fish runs to access the reach upstream of Bellota and to survive their downstream migration. Although SEWD has committed to implementing the proposed CH2M Hill (2005) permanent solution for the Bellota Diversion Facility, the exact implementation schedule is dependent on a variety of factors (e.g., final engineering designs, permitting, and construction,); therefore, the project will be implemented as soon as practicable within the first ten years of the issuance of the ITP.

The schedule for completion of fish passage and protection facilities at Bellota will be affected by the normal timetables required for completing final facility designs, conducting environmental assessments and obtaining associated permit authorizations, obtaining sufficient funding and performing construction activities. These activities are anticipated to take anywhere from five to ten years. Although these activities will likely take several years to accomplish, SEWD recognizes the potential importance of providing better migration opportunities for salmonids into spawning and rearing reaches immediately below New Hogan Dam. Therefore, SEWD will make every effort to complete the planning

design, environmental permitting, and construction of fish passage and protection facilities at Bellota within the first five years, but no later than the first ten years, of the ITP. In the meantime, interim measures identified below will continue to be implemented in order to reduce impacts to salmonids associated with passage problems and entrainment.

Oversight of the design, construction, and operation of fish passage and protection facilities will be provided by SEWD with recommendations integrated from NMFS and interested stakeholders including, but not limited to, individual members of the CRTRG. Initiation of construction will be subject to SEWD's ability to fund, gain the necessary permits, and complete the necessary NEPA/CEQA review process as described above. Until construction begins, SEWD will continue to provide interim conservation measures including installing and operating temporary fish ladders and temporary fish screens at Bellota Diversion Facility.

Construction activities for improvements at the Bellota Diversion Facility are expected to take up to nine months to complete with only six months of activity conducted within the river channel from mid-April and mid-October. This timeframe allows instream activities to occur when there is no danger of flood control releases exceeding the capacity of the cofferdam.

During construction activities, no more than 5 acres (up to 1.25 acres, instream) will be disturbed as a result of staging and implementation. The completed project footprint is expected to be 4 acres and no riparian vegetation is expected to be removed. A sheetpile cofferdam will be installed and dewatered prior to construction to route water and any aquatic species around the project activity. The cofferdam will span between one-third to one-half of the channel, leaving the remainder of the channel functional for upstream and downstream fish passage. The cofferdam will be constructed starting at the upstream end and ending at the downstream end so that fish have an opportunity to disperse downstream. Prior to dewatering the cofferdam, any fish remaining behind the cofferdam will be captured and relocated downstream of the project site by qualified fish biologists according to NMFS approved methods. Less than 10,000 cubic yards of material will be removed and only a concrete screen housing and screen will be added (no fill) using heavy equipment (e.g., dump truck, backhoe, crane, excavator). Since construction would be implemented behind the cofferdam, potential impacts are expected to be minimal and only associated with dispersal and relocation efforts during cofferdam installation, and with temporary turbidity increases during cofferdam installation and removal.

(2) CS8. Temporary Fish Ladders at the Bellota Diversion Facility. Until the permanent combined crest gate/fishway/fish screen at Bellota is implemented, SEWD has begun to, and will continue to, increase migration opportunities for salmonids by operating two Denil fish ladders at the Bellota Weir during the non-irrigation season whenever minimum fish ladder passage flows are available (>10 cfs). The ladders are designed to assist passage under low flow conditions and details regarding the operating protocols are provided in the *Bellota Fish Ladder Operating Criteria* (Attachment C-1 in Appendix C of the CHCP).

SEWD has installed a seasonal 2-foot temporary dam and a Denil fish ladder at the upstream edge of the Bellota Weir. The ladder is designed to increase upstream fish passage opportunities from the pool on the apron of Bellota Weir to the pool upstream of the Bellota Weir under low flow conditions. SEWD has also installed a second 2-foot temporary dam on the downstream side of the Bellota Weir apron in order to create a deeper pool on the apron of the weir for more effective fish passage into the upper ladder.

A second seasonal Denil fish ladder has also been installed on the downstream side of the weir. The lower ladder is designed to allow fish to pass over the initial portion of the weir structure and onto the apron of the weir under low flow conditions. At this point, fish can rest and orient themselves in the pool created by the lower 2-foot temporary dam before entering the upper fish ladder.

(3) CS9. Temporary Fish Screens at the Bellota Diversion Facility. SEWD has installed a temporary screen system at Bellota, which became fully operational in 2006, to help reduce entrainment of juvenile salmonids until a permanent solution is fully implemented. A permanent screen, which will meet screening criteria for all life stages, requires more extensive designs and construction, than could be reasonably implemented prior to implementation of the permanent combined crest gate/fishway/fish screen. The temporary screen system consists of two individual screens that can be operated independently dependent on whether one or both diversion intakes are open. One of the screens was originally installed in December 2005 and modifications were made over the several months to improve its operational range. Since early 2006, the temporary screen system has been fully operational.

The temporary screens have a mesh size of 3/16-inch, which meets the current federal and state screening criteria of 1/4” mesh for fingerlings (≥60 mm) but not the 3/32” mesh for fry (<60 mm). Although these temporary screens will not meet fry screening criteria, the fishery agencies (i.e., NMFS, USFWS, and CDFW) agreed that it will provide at least some level of protection for fish during the interim period prior to implementation of the permanent combined crest gate/fishway/fish screen.

Rationale and Ecosystem Benefits: Since 1933, Mormon Slough channel has been the primary migration route for salmonids because flows in the historical Old Calaveras River channel are generally too low for passage. The Bellota Diversion Facility, located at the upstream end of Mormon Slough, has been operational since 1978. The Bellota Weir, operational since 1967, creates a complete or partial migration barrier to anadromous salmonids dependent on flashboard dam configuration (i.e., 8-foot dam typically installed between April 15 and October 15, but may be installed as early as mid-February under critical water storage conditions; and 2-foot dam installed during the remainder of the year) and flow conditions.

In the fall of 1998, SEWD installed a temporary fish ladder on the upper side of the Bellota Weir to help facilitate adult upstream passage over the 2-foot flashboard dam under low flow conditions but the ladder did not perform well. An improved fish ladder was designed by CDFW and was installed during the following fall migration season. In 2001, an

additional ladder was added to the downstream end of the weir to help fish access the original upper ladder. However, these temporary ladders are both limited to assisting fish passage under a small range of low flows and a permanent solution that will provide passage opportunities under a wider range of flow conditions has been investigated.

CH2M Hill, on behalf of SEWD, completed a preliminary design report in 2005 for a permanent fish passage solution whereby a pool-and-weir fishway will operate when flows in Mormon Slough are between 10 cfs and 2,100 cfs (the 5 and 95 percent streamflow exceedances). The steep-pass fishway would be operated during the "shoulder" seasons [i.e., at the beginning and end of the irrigation season whenever the Bellota Pool is above the maximum headwater level for the pool and weir fishway (116.0 feet)] to facilitate upstream fish passage when the crest gate is raised but downstream juvenile fish passage is undesirable. The steep-pass fishway would operate with approximately 7 cfs of screened water pumped from the existing intake. Upstream migrating fish would enter the pool and weir fishway at this 7-cfs flow and continue up the steep-pass fishway section from the upper fishway pool area.

Once the pool-and-weir fishway is completed, fish passage opportunities at Bellota will be available under a majority of flow conditions (i.e., between the 5 and 95 percent streamflow exceedances). In contrast, current passage opportunities only occur under a narrow range of flows and are limited to periods when the temporary fish ladders are functional (currently unknown but design capacity between 10 and 24 cfs) and when there are sufficient hydraulic conditions during weir overtopping events (currently unknown). Based on adult migration surveys between November 23 and December 26, 2005 (FFC 2007), about 32% of 685 salmon (i.e., 221) attempting to migrate upstream were able to pass over the weir. During the survey, New Hogan releases ranged from 33 cfs to 140 cfs and flows at Bellota ranged from 5.6 cfs to 251 cfs (FFC 2006). In the future, it is anticipated that fish passage improvements at the weir will result in approximately a three-fold increase in fish passage at the weir based on assumptions that the fishway works as intended and that the proportion of salmonids able to pass the weir is equivalent to the proportion of flow conditions that the weir is passable (i.e., 90% of streamflow conditions). Increased passage opportunities at the weir are expected to substantially increase the number of adult salmonids that are able to access the spawning reach upstream of Bellota and reduce the potential for stranding and migration delays that can occur under current conditions. In addition, improvements at fish passage impediments downstream of Bellota will complement the increased passage opportunities at Bellota to provide even more benefits to migrating salmonids.

In addition to the fishway, a permanent fish screen has also been included as part of the Bellota Diversion Facility Improvement Project. Currently, two temporary screens have been installed and have reduced the potential for entrainment. However, they do not fully meet the NMFS and CDFW criteria and some fry may be entrained. Once the permanent fish screen is completed, all size classes will be protected from entrainment.

Compliance Monitoring: SEWD will document completion of the Bellota Diversion Facility Improvement project, and whether the project was completed in accordance with the project objectives and timeframes (CM5). SEWD will maintain daily operation records

in an operations database (CM1) to document implementation of operation related conservation strategies (e.g., temporary ladder installation and operation). Details regarding the operations database are provided under section 7.1 of the CHCP and CM1 in Appendix D of the CHCP.

Effectiveness Monitoring: Prior to construction of improvements at the Bellota Diversion Facility, SEWD will implement protocols established in the *Interim Bellota Ladder Operating Criteria* (Attachment C-1 of Appendix C of the CHCP), which includes monitoring the pool downstream of Bellota for salmonids to ensure that the ladder is open when salmonids are present (EM5). An infrared scanner or similar device will be used to monitor fish passage through the permanent fishway (EM2 in Appendix D of the CHCP), and flow data will be collected (EM1). Information regarding the effectiveness of the fishway may also be gathered from alternative fisheries monitoring activities (EM12). Monitoring data will be provided to NMFS and any other interested parties via bi-weekly electronic newsletters and via the www.calaveras-river.com website.

A fish screen effectiveness monitoring plan for Bellota is provided in EM6 and Attachment D-5 in Appendix D of the CHCP.

3.3.4 Conservation Strategies for Artificial Instream Structures and SEWD Small Instream Operations (OM4)

Conservation strategies for OM4 were designed to meet the Fish Passage Objective and associated targets described above under the *Biological Objective: Fish Passage* section. To minimize impacts associated with artificial instream structures and flashboard dam operations, SEWD will implement four conservation strategies that will improve passage conditions into/out of the spawning and rearing reach between Bellota and New Hogan Dam including:

(1) CS10. Artificial Instream Structures Improvements. Over the past several years, SEWD has been working collaboratively with DWR to identify specific fish passage problem areas including those associated with flashboard dams, low flow crossings, and bridge aprons in the Old Calaveras River channel and Mormon Slough/SDC. Thirty-seven instream structures have been identified as potential passage impediments to salmon and steelhead trout in the lower Calaveras River downstream of Bellota Weir via both the Mormon Slough/SDC and Old Calaveras River channel routes (DWR 2007). Twenty-two structures are located in the Mormon Slough/SDC route while 15 are located in the Old Calaveras River channel. Based on scores developed by DWR (2007a), three priority tiers have been identified where structures with the highest potential to impair fish passage are assigned to Tier 1, those with a moderate potential assigned to Tier 2, and those with the lowest potential assigned to Tier 3, as follows:

1) Tier 1- structures with a score of five or above (nine structures including two in Old Calaveras River channel);
2) Tier 2- structures with a score of three or four (15 structures including four in Old Calaveras River channel);

3) Tier 3- structures with a score of one or two (13 structures including nine in Old Calaveras River channel)[10].

SEWD is committed to implementing the replacement or retrofitting of all Tier 1 structures in Mormon Slough/SDC owned and operated by Stockton East Water District (i.e., 5). Additional structures in Mormon Slough/SDC identified during the AMP process (Chapter 9 of the CHCP) may also be improved as agreed upon by the Governing Board during the course of the ITP. As described under section 7.3 of the CHCP, a permanent non-entraining structure will be implemented at the upstream end of the Old Calaveras River channel (barrier or decommissioning of the Headworks Facility); therefore, salmonids will no longer be entrained or inadvertently migrate into the Old Calaveras River so additional structural improvements within this channel are unnecessary.

Improvements were completed in 2011 at Budiselich Flashboard Dam and in 2013 at Caprini. It is expected that improvements to additional SEWD-owned Tier 1 structures in Mormon Slough/SDC will be completed within the first ten years of the ITP. The additional structures identified include the Central California Traction Railroad Company Bridge, Hosie Low Flow Crossing, and Watkins Low Flow Crossing. An implementation schedule for individual Tier 1 structures in Mormon Slough/SDC, as well as for any additional structures agreed upon, will be identified each year through the AMP Process (Chapter 9 of the CHCP) during the pre-irrigation season meeting (March).

Construction activities for structural improvements will generally take up to three-four weeks to complete for each structure and construction activities would be implemented during the non-irrigation season between October 15 and December 31 when the channel is "dry" downstream of Bellota (i.e., reach is dewatered and there is no connection between confluence and reach above Bellota) and flows are generally lowest in the New Hogan to Bellota reach. The fall construction timeframe was chosen for the lower Calaveras River because it minimizes the potential for impacts to listed species by occurring outside of breeding and rearing periods for various species, as well as outside of salmonid migratory periods (i.e., flood control releases or freshet flows). Provisions will be made to allow migrating salmonids to bypass construction work areas in the channel in the event that flood control releases or freshets occur. For projects that will occur in flowing water, a cofferdam (either earthen or sheet pile) will be installed and dewatered prior to construction to route water and any aquatic species around the project activity. The cofferdam will be constructed starting at the upstream end and ending at downstream end so that fish have an opportunity to disperse downstream. Prior to dewatering the cofferdam, any fish remaining behind the cofferdam will be captured and relocated downstream of the project site by qualified fish biologists according to NMFS approved methods.

10 Structures in the Old Calaveras River Channel may be not be improved or may be reassigned to different tiers, because their implementation is dependent on whether a fish passage solution can be developed and implemented for the Old Calaveras Headworks Facility through a separate process. Structures not owned by SEWD may not be improved or may be reassigned to different tiers, because their implementation is dependent on receiving written landowner approval; SEWD will make every effort to obtain landowner approval, particularly in the case of Tier 1 structures within Mormon Slough/SDC.

During construction activities, no more than 3.5 acres (with up to 80%, or 3 acres, instream) will be disturbed at a project site as a result of staging and implementation. Completed instream project footprints for individual projects are expected to be ≤3 acres. The typical amounts of material removal include: 50-1,000 cubic yards of concrete (maximum of 4,000 cubic yards at some structures), 100-1,000 cubic yards of rip-rap (maximum of 2,000 cubic yards at some structures), 500-2,000 cubic yards of soil near structure (maximum of 10,000 cubic yards at some structures), and 500-2,000 cubic yards of soil upstream of structure (maximum of 10,000 cubic yards at some structures). The typical amount of imported material (fines to 4-foot boulders) incorporated ranges between 400-2,500 cubic yards (maximum of 4,000 cubic yards at some structures). Structural elements that may be installed at some sites include, but are not limited to, new culverts (up to 48' bankwidth X 12' high X 12' long), concrete full-span bridge, new piles at existing abutments, and new screens. Since construction activities will either occur when the project area is naturally dry or would be implemented behind a cofferdam, potential impacts are expected to be minimal and only associated with dispersal and relocation efforts.

(2) CS11. Fall Flashboard Dam Removal Operations. Each year after the irrigation season is over in October; SEWD removes flashboard dams within and drains the Mormon Slough/SDC. Flashboard dams in the Old Calaveras, Potter Creek, Mosher Slough/Creek, and Bear Creek are generally removed at the same time as those in Mormon Slough. However, in some years (<15% frequency expected occurrence), flashboards are left in place in these latter waterways through November for percolation benefits.

Regardless of removal timing, dams will be removed beginning upstream at the head of each channel and continuing in sequential order downstream in a fashion that will allow water and any salmonids present to travel downstream over a 2-3-day period (Attachment D-4 in Appendix D of the CHCP). Based on past experience, no fish are anticipated to be found in Mormon Slough/SDC, Potter Creek, Mosher Slough/Creek, and Bear Creek during these activities throughout the term of the ITP. And, this sequential removal should allow any salmonids encountered within the Old Calaveras River channel prior to the permanent Headworks facility improvement to voluntarily travel downstream as water recedes, eliminate or reduce the incidence of salmonid stranding, and alleviate the need to relocate fish.

(3) CS12. Flashboard Dam Notches. At the beginning of the irrigation season, SEWD installs flashboard dams in Mormon Slough. Since 2006, with exception of critical water storage conditions (i.e., 2014), SEWD has installed flow conveyance openings (one square foot notched openings) located about 3-4 ft. above the base and 6-10 ft. from the south abutment of each dam. These outlets have been created to be as "fish friendly" as possible in that they spill into pool areas and not onto exposed riprap or concrete. They are installed to provide a pass-through area for downstream migrating juvenile salmonids, particularly under those conditions when flashboard dams are not spilling and juvenile salmonids would not have any other way to travel downstream.

The outlets are typically operated from the beginning of the irrigation season (on or about April 15) to around May 15[11] to encompass the majority of the salmonid outmigration period; outlets are targeted for removal during mid-May because juvenile migration is typically reduced after this period (according to rotary screw trap data) and water conservation becomes necessary.[12] Under critical water storage conditions, these openings would not be installed and water would be routed around—instead of over —Bellota weir, which will prevent juvenile salmonids from travelling downstream of Bellota; these measures will reduce the possibility of stranding downstream of Bellota under low flow conditions associated with critical water storage releases (e.g., 10 cfs).

(4) CS13. Supervisory Control and Flow Data Acquisition System. In 2005, SEWD received a $150,255 contribution from a *Water 2025 Challenge Grant* to implement a Supervisory Control and Flow Data Acquisition System (SCADA) project totaling $335,236. Installation of this system was completed in mid-2007 and consists of two new automated flow sensors (sensor programmed with a known cross section and measures velocity and height to automatically determine flow) and 10 automated level sensors (sensor programmed with a known cross section and measures depth to-water to automatically determine flow) at 10 potential flashboard dam locations including two in Mormon Slough, five in Old Calaveras River channel, four in Mosher Slough/Creek, and one in Potter Creek (Figure 5); note: one flow sensor already in place and operated by USACE at Bellota and one flow sensor already in place and operated by SEWD at the Old Calaveras Headworks.[13] The project also provides for off-site water gate control at three locations including Bellota Weir, Old Calaveras Headworks, and Mosher Creek Dam. The SCADA system improvement will allow gate control and monitoring of key pumping pools on a 24-hour a day basis during the irrigation season (generally mid-April to mid-October). It will also provide a measurement of the water that enters or leaves the conveyance system. Trend information will be analyzed from all sites and used to provide better water management. For example, many irrigation pumpers only run for 12-hours (6 am to 6 pm). By analyzing the trends and using the gate controllers, water will be stored when pumping demand decreases and then released before pumping demand increases the next day. Reduction in system end losses will increase water availability for agricultural, urban and/or groundwater recharge uses, reduce current and potential conflict caused by a lack of efficient water management capabilities for the delivery system, and may have a beneficial effect on reservoir storage with the potential for increased opportunities to manage New Hogan flood control releases in the fall. Although conserved water could result in carryover storage in both New Hogan and New Melones, a more likely scenario is that more water will be made available for groundwater recharge operations. This recharged groundwater will address symptoms of the critically over-drafted groundwater basin, and equally important, be available in dry years when surface water supplies are

11 Modifications to outlet installation and removal periods may be made through the AMP process. The Governing Board will consider factors such as environmental conditions, numbers of fish observed migrating at Shelton Road, and water conservations needs to determine whether installation may be delayed or cancelled for the season and whether removal may occur earlier or later in the season.

12 As ambient temperatures begin rising and irrigation needs increase, full head is required between flashboard dams for irrigators to divert enough water for their crops.

13 It is anticipated to take up to three years of data collection to begin efficient remote operation of the system including efficient operation of the existing Old Calaveras Headworks sensor.

limited. The benefits of recharge would be realized in the event of drought or limited surface water supply situations. The availability of real time data during the irrigation season and ability to operate gate structures automatically will increase the efficiency of SEWD's agricultural water delivery system with an estimated 75% water savings, or 3,600 acre-feet of water per year (Thomas et al 2005). Merced Irrigation District has implemented similar systems and realized up to 90 percent water savings (Dr. Stuart Styles, ITRC Cal Poly, as cited in Thomas et al. 2005). Data will also be used to provide an indication of flow levels associated with juvenile migration, which will allow documentation and evaluation of fish passage opportunities. In the event that one or more SCADA system sensors are not functioning as intended, SEWD will manage water deliveries according to procedures used prior to the system being in place that are based on visual inspections of water levels, air temperatures, and requests from farmers.

A manual flow level sensor was installed at Shelton Road Bridge and has been operated since November 2009. A manual sensor is being employed at this location since San Joaquin County denied a permanent sensor on the bridge. Visual data, along with a rating table, were established to reflect flow levels in the 20 cfs general range. Visual data is manually collected whenever New Hogan Dam releases are less than 35 cfs during the business week (Monday-Friday; no personnel available on Saturday and Sunday) to determine whether the minimum flow of 20 cfs is being maintained at Shelton Road.

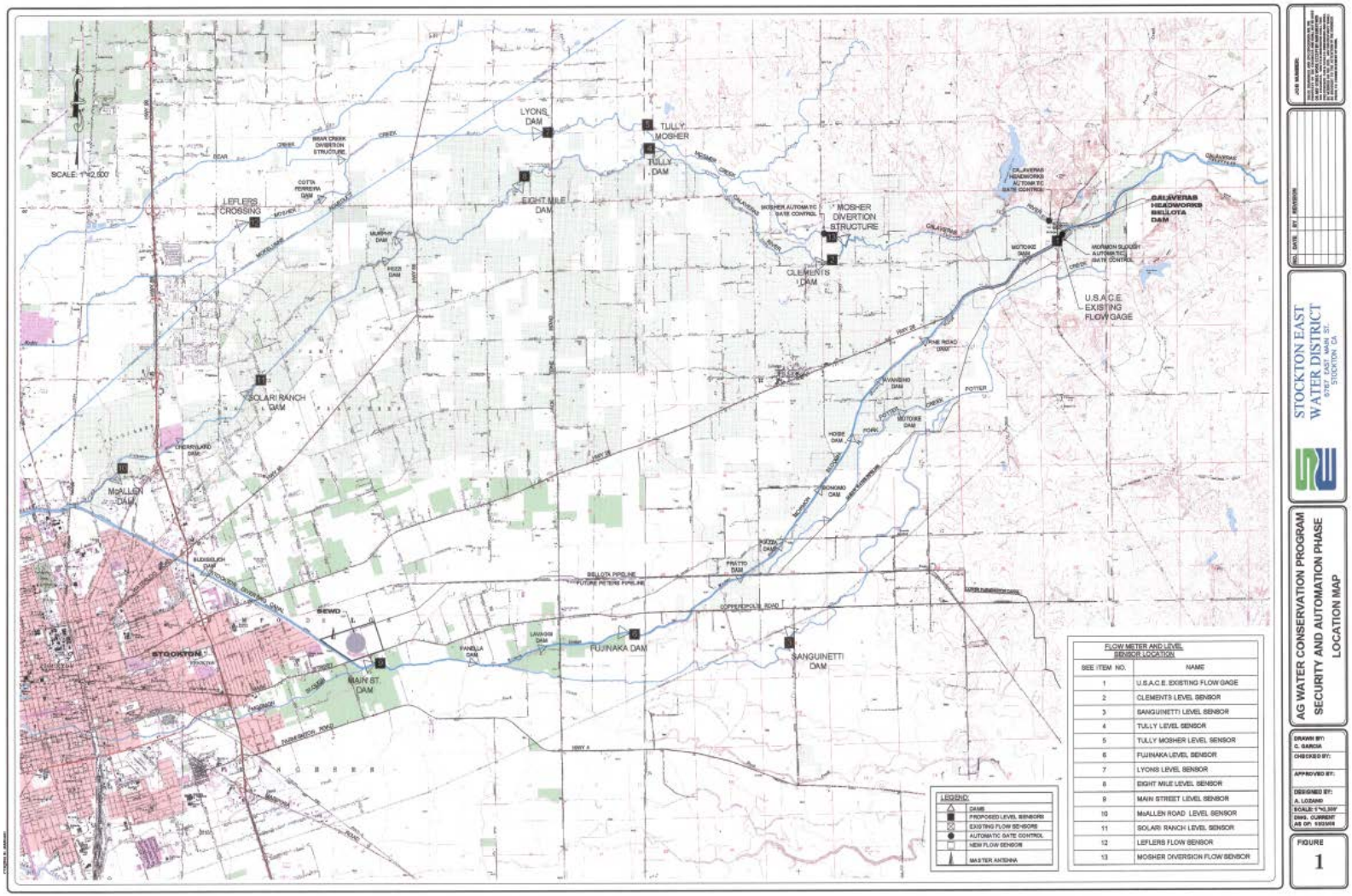


Figure 5. Location of three automated gate structures, three automated flow sensors, and 10 automated level sensors in the lower Calaveras River.

SEWD will investigate the feasibility of installing a flow-measuring device(s) downstream of the junction of the Old Calaveras River channel and the Mormon Slough/SDC within six months of issuance of the ITP. The ability to measure flow at this location during the migration season, combined with measurements recorded for flows entering Mormon Slough at Bellota, will provide a measure of passage opportunities for adults entering and juveniles migrating out of the river. Due to the potential for tidal influence and vandalism at this location, it may be determined that this site is not feasible. In this event, a site within the Mormon Slough/SDC that is closest to the confluence with the mainstem will be investigated. Dependent on the outcome of this investigation, SEWD will seek technical assistance from the USACE and DWR to install and operate a flow-measuring device immediately below downstream of the junction of the Old Calaveras River channel and the Mormon Slough/SDC within the first five years of the ITP. If installation and operation of a lower flow measuring station is found to be technically infeasible, flows recorded entering Mormon Slough at Bellota will continue to provide some information regarding passage opportunities. Under this scenario (i.e., no new lower flow station), a preliminary study will be made to determine whether a rough estimate of flows at the lower end of the Calaveras river near the confluence with the San Joaquin River can be calculated by using existing flow data at Old Calaveras Headworks and/or Bellota coupled with some targeted, manual measurements in the lower channel. If preliminary measurements indicate that an approximate relationship can be developed between flows recorded at the upper end of each channel with measurements at the lower end of the channel and that manual measurements need to be taken periodically to continue to derive rough estimates of lower channel flow, then additional manual measurements will be taken in the lower channel on a frequency determined necessary during the preliminary study.

Rationale and Ecosystem Benefits: For decades, flashboard dams have been used in the lower Calaveras River, Potter Creek, and Mosher Slough/Creek to assist agricultural diversions during the irrigation season. Actual timing of installation and removal is variable and is influenced by the type of water year, location, and Central Valley Flood Protection Board (CVFPB) and CDFW Streambed Alteration Agreements. For instance, in wet water years, irrigation demands do not begin until later in the year and flashboards may not be installed until as late as mid-May. Conversely, in dry water years, irrigation demands may begin earlier in the year and agricultural users may request that flashboards be installed as early as mid-February under critical water storage conditions. Installation of flashboards earlier than identified in permits is done through a waiver. As for timing of flashboard removal, flood control requirements require that flashboard dams in Mormon Slough be removed by October 15, but the other channels do not have this requirement. In practice, SEWD removes all flashboards in conjunction with the schedule restrictions for Mormon Slough. However, in some years, the flashboards in the Old Calaveras River channel, Mosher, and Bear Creeks may be left in place for up to 45 days longer to increase percolation benefits. During periods when flashboards are not installed, fish passage may be prevented or impeded by flashboard foundations. Once structural improvements identified under 7.5(1) of the CHCP above are made, salmonids passage opportunities will be increased under a wider range of flow levels.

Flow sensors and automated gates allow more efficient use of limited water resources so that limited New Hogan storage supplies are conserved; and sensors will provide data used to evaluate fish passage opportunities by identifying flows occurring during migration.

Compliance Monitoring: SEWD will maintain daily flow and operation records in an operations database year-round to document implementation of flow and operation related conservation strategies. Details regarding the operations database are provided under section 8.1 and CM1 in Appendix D of the CHCP. SEWD will document the schedules and implementation status for artificial instream structure improvement projects and flow sensors (CM5). Compliance monitoring for the fall flashboard dam removal process will include the documentation of the process and a record of whether the dams were removed in accordance with project objectives (CM6). Compliance monitoring for the installation of notches in the flashboards dams in the spring will include documentation of the process (CM7). A Stakeholder Education Program will inform stakeholders regarding the potential benefits of artificial instream structure improvements, and compliance monitoring will document the process.

Effectiveness Monitoring: As part of long-term flashboard dam removal operations, SEWD will notify NMFS (currently Monica Gutierrez), CDFW (currently Chris McKibbin), and its fishery biologist (currently FISHBIO) a minimum of three days prior to the initiation of the de-watering process. The dam removal process itself will begin at the upstream end of each channel and proceed downstream which will allow any fish within the channel to voluntarily travel downstream over a 2-3 day period as the water recedes, alleviating the need for relocation of any salmonids that may be present. SEWD personnel will visually monitor the drainage of water from each dam and its movement downstream to identify whether any fish have entered the waterway and may become stranded. In the event that salmonids are observed stranded, a salmonid relocation protocol developed and approved by CDFW and NMFS in 2004 (CDFG 2004; EMA 4 and Attachment D-4 in Appendix D of the CHCP) will be implemented. SEWD's fisheries biologists will implement salmonid relocation either under a directly issued long-term scientific collecting permit received from CDFW or under the authorization of an on-site federal representative (requires either a FWS or NMFS representative to be on site during the relocation efforts). For the latter, a point-of-contact list for federal representatives (in order of priority) will be established by October 10 each year to ensure that at least one federal representative is available in the event that salmonid relocation becomes necessary. SEWD will annually document whether salmonid relocation was necessary, which will provide an indication of the effectiveness of salmonid stranding reduction measures.

Effectiveness of instream structure modifications in meeting passage design criteria will be evaluated using as-built surveys and streamflow records (EM7). This information will also be used to identify duration and frequency of passage opportunities. Information regarding the effectiveness of instream structure modifications for passage may also be gathered from alternative fisheries monitoring activities (EM12).

A fyke net evaluation of flashboard dam notches will also be conducted during at least one season to determine the effectiveness of notches for passage improvement (EM9 and Attachment D-6 in Appendix D of the CHCP).
SEWD will document the completion of Stakeholder Education Program activities (periodic workshops, annual newsletters, and a regularly updated website) under EM8 and will

document individual stakeholder's willingness to participate in conservation activities to determine effectiveness of education. These efforts will ensure that local landowners understand the Calaveras River basin's fishery issues and have the information available to make informed choices regarding how they can contribute to maintaining good fishery conditions.

3.3.5 Conservation Strategies for Privately Owned Diversion Facilities Operated within the District's Service Areas (OM5)

Conservation strategies for OM5 were designed to meet the Avoid/Minimize Fish Entrainment Objective and associated targets described above under the *Biological Objective: Avoid/Minimize Fish Entrainment* section.

(1) CS14. Fish Screens for Privately Owned Diversions. CH2M Hill, on behalf of SEWD, completed an evaluation of 28 unscreened diversion facilities between New Hogan Dam and Bellota (27 privately owned within the District's service areas and included in this CHCP) in 2005. For each facility, CH2M Hill identified preliminary fish screen design recommendations and anticipated costs. Although this evaluation only considered diversions upstream of Bellota, the same types of fish screen designs and costs are anticipated to apply to various diversions downstream of Bellota. Results from CH2M Hill's evaluation will help the Governing Board (taking into consideration recommendations from interested stakeholders including, but not limited to, individual members of the CRTRG) prioritize representative types of diversions for screening through the AMP process (see Chapter 9 of the CHCP). The priority of individual diversions located throughout the river will follow the process established by the CVPIA Anadromous Fish Screen Program (AFSP), which evaluates and prioritizes fish screening projects based on "…biological benefits, the size and location of the diversion, project costs, and the availability of cost-share funding partners." Biological benefits to fish will need to be identified through a targeted evaluation of representative diversion types.

The next step is to develop a recommended implementation schedule for individual facilities under SEWD's authority that receive a recommendation for a fish screen, SEWD will provide advisory assistance to the landowner to ensure that they understand the ESA issues and requirements necessary for installing a screen at their facility. In addition, SEWD will help the landowner to locate and apply for funding opportunities that will allow cost-effective placement of screens at their facility. Screening of any of these diversions will be dependent upon the landowner successfully obtaining outside funding for the individual structures.

Due to the large number of diversions, the prioritization effort is anticipated to take up to two years, followed by several years for implementation. Although the number of individual structures determined to need screens and the timeframe for completing fish screening at the structures is unknown at this time, SEWD is committed to helping implement fish screen projects that are deemed beneficial through the AMP and will coordinate with NMFS, members of the CRTRG, and private landowners to complete the planning design, environmental permitting, and construction of individual projects during the ITP period.

While the participation of individual landowners is uncertain, the District will provide some certainties to facilitate take coverage of private diversions. For existing diversions above Bellota and below New Hogan Reservoir, the District will work with the landowners to screen any diversion greater than 10 cfs within 5 years of execution of the CHCP. Existing diversions within the same reach that are less than 10 cfs will reviewed within the first two years by a biologist to see if any modifications are merited that may further reduce the potential of interaction with a pump. Juvenile fish are the most susceptible to entrainment due to their developing swim speed and small size. Evaluation of small Sacramento River diversions by Vogel (2013) during peak juvenile salmonid migration periods found that diversions less than 10 cfs had a very low potential for entrainment. These diversions create reduced entrainment water velocity that is within the range for smaller fishes to swim away from when encountered. In addition, he also found that the potential for interaction with smaller diversions was significantly lower when compared to large intake sizes. Any modification will be coordinated and implemented by SEWD and the landowner. All future diversions, regardless of size both above or below Bellota will be screened. SEWD will work with landowners to ensure that these requirements are met.

(2) CS15. Stakeholder Education Program regarding Fishery Issues. SEWD will implement a stakeholder education program via periodic workshops, annual newsletters, and a regularly updated website to ensure that local landowners understand Calaveras River basin fishery issues and how they can assist in providing good fishery conditions, which is anticipated to result in fish screens being installed at private diversions more rapidly than in the absence of stakeholder education. The education program may also result in landowners being able to delay flashboard dam installation and water diversions, if they determine that watering of certain crops can be initiated later in the spring.

The first stakeholder workshop will be held within six months of the ITP issuance. This workshop will be designed to educate private diverters regarding fish entrainment issues and how they can obtain funding for screening individual diversions. Similar workshops may be held up to once a year if deemed necessary through the AMP process.

Rationale and Ecosystem Benefits: According to Moyle and Israel (2005):

> Diversions from streams are often screened to prevent loss of fish. Because construction of fish screens competes for scarce dollars with other fish conservation projects, the widely accepted premise that fish screens protect fish populations merits thorough examination…The impact on fish populations of individual diversions is likely highly variable and depends upon size and location…Studies are needed to determine which diversions have the greatest impact on fish populations in order to set priorities for screening, and to make the best use of limited public funds available for restoration and conservation. (Abstract excerpt).

During CH2M Hill's evaluation of unscreened diversion facilities between New Hogan Dam and Bellota, they identified preliminary fish screen design recommendations and anticipated costs for representative diversion types. Preliminary designs indicated that several different screen types would be necessary to accommodate individual site's characteristics. Five

different screen types were identified ranging in 2005 cost from approximately $65,000 to $170,000. Total cost in 2005 to screen all 27 diversions was estimated at a little over $2.4 million. Details can be found in CH2M Hill's preliminary design report (2005) available at the offices of SEWD. Due to the expected costs, it is anticipated that individual owners will need governmental assistance to implement.

No preliminary design evaluations were conducted for any of the diversions located downstream of Bellota in Mormon Slough/SDC, Old Calaveras River channel, and the Calaveras mainstem below the SDC junction, Mosher Slough/Creek, Bear Creek, and Potter Creek; however, diversion sizes and attributes are likely similar to those identified upstream of Bellota so screen types and range of costs are expected to be similar. In the absence of specific data, it is not possible to estimate total costs for screening all diversions, but total costs could range from $12.6 million ($65,000* 194) to $33 million ($170,000*194).

Compliance Monitoring: SEWD will document the AMP planning process outcomes (e.g., priority list and recommended schedule for screening diversions) (CM8). Additionally, SEWD will document the completion of periodic workshops, annual newsletters and website updates related to the Stakeholder Education Program (CM9).

Effectiveness Monitoring: No site-specific monitoring is planned at this time for evaluating the effectiveness of screening at individual, privately owned diversions. As individual structures are proposed for screening improvements, a monitoring plan for representative projects will be prepared (see additional fisheries monitoring, EM12) if deemed appropriate by NMFS and will be developed through the AMP process (see Chapter 9 of the CHCP).

3.3.6 Conservation Strategies for SEWD Channel Maintenance for Instream Structures (OM6)

Conservation strategies for OM6 were designed to meet the Avoid Direct Injury/Mortality and Water Quality Objectives and associated targets described above under the *Biological Objective: Avoid Direct Injury/Mortality and Biological Objective: Water Quality* sections. SEWD in coordination with CDFW has established BMPs (conservation strategy equivalents) in an RMA (Attachment C-2 of the CHCP), which will be implemented during instream channel maintenance activities (CS16), including:

(1) Timing Restrictions. Maintenance timing restrictions include June 15-October 30 for mechanical crews and June 15-March 1 for hand crews.

(2) "Mitigation Measures." Various BMPs identified as "mitigation measures" (see attachment C-2) including but not limited to, BMPs related to debris removal methods, proper disposal of excavated materials, and limitation of activities to low or no flow periods. If work will occur in flowing water, then additional measures will be required including diverting flows around the site. In addition, if fish are observed in the area, SEWD personnel will disperse fish out of the work area by wading the river ahead of heavy equipment as recommended by NMFS.

Rationale and Ecosystem Benefits: SEWD and CDFW worked cooperatively to identify the most protective BMPs possible for minimizing potential impacts to fisheries associated with instream maintenance activities. Implementation of these BMPs will ensure that there are limited to no opportunities for salmonids to be injured or killed during instream maintenance.

Compliance Monitoring: SEWD will document compliance with BMPs, including notation of whether any salmonids were observed (CM10). If any *O. mykiss* mortalities are observed, SEWD will notify NMFS (currently Monica Gutierrez) and CDFW (currently Chris McKibbin) immediately and will make arrangements with CDFW (currently Lea Koerber) for turning carcass(es) over.

Effectiveness Monitoring: If work occurs when no water is within the vicinity of the maintenance site, then no monitoring will be conducted. If work will occur in water, SEWD personnel will visually assess work areas for fish as work proceeds and will disperse any fish observed to ensure that fish are not impacted by equipment (EM10 in Appendix D of the CHCP).

3.3.7 Conservation Strategies for Fisheries Monitoring Program (OM7)

Conservation strategies for OM8 were designed to meet the Avoid Direct Injury/Mortality and associated targets described above under the *Biological Objective: Avoid Direct Injury/Mortality*. To minimize impacts associated with fisheries monitoring, SEWD's fisheries biologists will implement CDFW and NMFS approved capture and handing protocols (CS17) designed to minimize handling stress and reduce mortality including:

(1) All investigators are well qualified and have provided evidence of experience working with salmonids and the concepts outlined in the project.

(2) NMFS has developed nondiscretionary conditions that are necessary and appropriate to minimize take of ESA-listed salmonids, as described in the incidental take permit and Appendices A and B of the Central Valley research opinion. The investigators will ensure that all persons operating under the incidental take permit are familiar with the terms and conditions therein. In addition to the terms and conditions of the aforementioned opinion, the District will ensure compliance with any additional terms and conditions described in the ITP.

(3) NMFS will receive monitoring information from the District concerning their project activities; this monitoring information will indicate whether the project is operating satisfactorily or not. NMFS will monitor actual annual take of ESA-listed species associated with the proposed research activities (as provided in annual reports or by other means) and will adjust annual permitted take levels if they are deemed to be excessive or if cumulative take levels are determined to operate to the disadvantage of listed fish.

(4) All persons operating under the CHCP permit will be properly trained and have access to properly maintained state-of-the-art equipment.

(5) All listed fish captured will be processed immediately and before any other fish are

processed and returned to the water.

(6) All traps will be checked and cleared of fish and debris daily.

(7) All California Central Valley steelhead unintentionally killed during sampling activities will be preserved as voucher specimens and sent to CDFW (currently Lea Koerber).

Rationale and Ecosystem Benefits: NMFS has previously identified the most protective fish handling protocols possible for minimizing potential impacts to fisheries associated with research activities. Implementation of these protocols will ensure that there are limited to no opportunities for salmonids to be injured or killed during fish monitoring activities.

Compliance and Effectiveness Monitoring: During each sampling season, weekly data summaries will be provided to NMFS and/or CDFW to ensure that take does not exceed expected values (CM11, EM11).

3.4 Construction Activities

Under the Proposed Action, instream construction activities would occur associated with improvements at the Bellota Diversion Facility (such as installation of fish ladders and fish screens), Old Calaveras River Headworks Facility, and artificial instream structures; and installation of a non-entraining upstream passage barrier near the confluence of Old Calaveras River/SDC (OM2). Additionally, construction activities would occur at any individual, privately owned diversion facilities selected for fish screen installation. Some of these construction activities would involve earthmoving procedures that are ground-disturbing activities, which include excavating, staking, digging, filling, compacting, and hauling of earth, using heavy equipment and/or manpower.

Environmental analysis has already been completed for improvements at the Bellota Diversion Facility and at artificial instream structures (FONSI and Mitigated Negative Declarations are available from SEWD office). However, construction elements previously addressed and analyzed for these projects are applicable to other projects (i.e., Old Calaveras River Headworks, and artificial instream structures; non-entraining upstream passage barrier near the confluence of Old Calaveras River/SDC); therefore, applicable components are included in this analysis.

In general, instream project footprints for individual projects are expected to be $\leq$ 3 acres; however, some may be up to 5 acres. The typical amounts of material removal include: 50-1,000 cubic yards of concrete (maximum of 4,000 cubic yards at some structures), 100-1,000 cubic yards of rip-rap (maximum of 2,000 cubic yards at some structures), 500-2,000 cubic yards of soil near structure (maximum of 10,000 cubic yards at some structures), and 500-2,000 cubic yards of soil upstream of structure (maximum of 10,000 cubic yards at some structures). The typical amount of imported material (fines to 4-foot boulders) incorporated ranges between 400-2,500 cubic yards (maximum of 4,000 cubic yards at some structures). Structural elements that may be installed at some sites include, but are not limited to, new

culverts (up to 48’ bank width X 12’ high X 12’ long), concrete full-span bridge, new piles at existing abutments, and new screens.

Activities for each of the structural improvements would consist of construction (clearing and grubbing, site staking, site grading, placement of materials). Construction activities would be implemented during the non-irrigation season between October 15 and December 31 when the channel is “dry” downstream of Bellota (i.e., reach is dewatered and there is no connection between confluence and reach above Bellota) and flows are generally lowest in the New Hogan to Bellota reach. The fall construction timeframe was chosen for the lower Calaveras River because it minimizes the potential for impacts to listed species by occurring outside of breeding and rearing periods for various species, as well as outside of salmonid migratory periods (i.e., flood control releases or freshet flows). Provisions would be made to allow migrating salmonids to bypass construction work areas in the channel in the event that unanticipated flood control releases or freshets occur. Most construction projects would generally take up to three to four weeks to complete for each structure; however, some structures (e.g., Bellota Diversion Facility and Old Calaveras River Headworks) may take six months or more. For extended duration projects and/or projects that would occur in flowing water, cofferdams would be installed and dewatered prior to construction.

Prior to construction, equipment would be brought to staging locations near the construction sites. Each site would need approximately one to five acres to accommodate construction and materials staging. Open, lightly vegetated areas immediately adjacent to the construction footprint would be used. The staging areas would be used to store materials and equipment. Typical staging area items include backfill materials, cranes, backhoes, compressors, and tools. The staging areas would also be used for construction crew parking. Generally, as many as 10 construction workers per site could be required at the height of construction. Staging areas would be fenced to keep the general public out of the construction area.

After sites are dewatered, construction crews would begin removing any existing features that need to be removed. Work could include concrete or bedrock demolition, and minor excavation. Equipment such as excavators and jackhammers may be used. Demolition materials would be taken to a landfill that accepts construction debris. Soil excavated from the construction areas would be taken offsite to a landfill for use as cover soil or to existing fill-placement areas. Other materials (e.g., rip-rap) may be re-used at the Project site.

Upon project completion, site alterations caused by construction staging would be restored to pre-construction conditions to the extent possible and pursuant to BMPs.

As individual projects are designed and scheduled for completion, each would be subject to applicable local, state, and federal laws and associated permitting requirements (e.g., USACE Section 404 permit, CDFW Section 1602 permit). If it is determined that an individual project would create impacts not described in this document or create impacts greater in magnitude, extent, or duration than those described in this document, then a supplemental Environmental Assessment/Initial Study would be prepared to address the specific action.

3.5 Alternatives Considered but Dismissed from Further Analysis

During the development of this EA, NMFS considered several other alternatives in addition to the alternatives that are being carried forward for detailed analysis. These other alternatives are described in this section, along with a brief discussion of why they are not being carried forward for detailed analysis. In general, these alternatives were not selected for detailed analysis because they do not meet the agencies' purpose and need or they are beyond the scope of the EA. The alternatives that were identified but eliminated from consideration are as follows:

- Flashboard dams installed later than April 15
- Artificial adult O. mykiss and Chinook migration flows
- Artificial juvenile O. mykiss and Chinook migration pulse flows
- Moving the SEWD Intake from Bellota to a location closer to the Dr. Joe Waidhofer Water Treatment Plant
- Reduced Permit term (25 years)

3.5.1 Flashboard Dams installed later than April 15

Under this alternative, all the District's proposed activities would continue with the exception that flashboards would be installed by SEWD later than April 15. In addition, all the conservation strategies identified in the CHCP would be implemented. Installation of flashboards later in the season could allow more opportunities for migrating juveniles to exit the system unobstructed by dam structures.

Benefit of this action would vary between *O. mykiss* and the different runs of Chinook. *O. mykiss* and fall- or spring-run Chinook (if present) juvenile outmigration may possibly occur during this period, but in a very low frequency. Spring- and winter-run adult migration (if present) could also overlap this period, also in a very low frequency. There does not appear to be any negative effect as a result of this proposed action on all CHCP species. The exact number of additional fish that could benefit from unobstructed passage is unknown due to the likelihood of annual fluctuations in the flashboard dam installation period (between April 15 and May 15) and the annual fluctuations in the number of salmonids migrating after mid-April as indicated by the estimated number of juveniles migrating downstream before and after April 15 during the past five years. The historic presence of any Chinook is low, but if they were to be present a benefit may occur.

Precipitation patterns in the lower Calaveras River usually do not provide sufficient rainfall for agricultural use after March. Typically, agriculture customers request surface water deliveries by the end of March for both frost protection of permanent crops and essential irrigation of newly planted row crops. Most irrigators rely on SEWD deliveries to fulfill their irrigation needs and few irrigators can afford the expense of operating a dual water supply (i.e., ground and surface sources). To provide sufficient deliveries, SEWD must install flashboard

dams to create enough head for irrigators to withdraw surface water through their intake pumps.

Flashboard dam installation may occur between March 15 and April 15 of each year. Historically the flashboards are installed on or near April 15. The District has committed to installing flashboards as late as possible within that window based on water conditions to allow for unobstructed migration opportunities for spring- or winter-run Chinook that may be infrequently present. For the reasons mentioned above, this alternative was not carried forward.

3.5.2 Artificial adult O. mykiss and Chinook migration flows

Under this alternative, all the District's activities would continue, and all the conservation strategies identified in the CHCP would be implemented. In addition, artificial pulse flows would be released from New Hogan Dam to attract and assist passage for adult fall-run Chinook salmon and steelhead in the Calaveras River in the fall and winter, respectively. Although there are freshet events and/or flood control releases of sufficient magnitude and duration (i.e., >100 cfs for at least 4 days) for upstream adult migration to occur during normal to above normal precipitation years, adult attraction flows of a higher magnitude (>500 cfs) and longer duration (7 to 10 days) have been proposed as a potential way to increase passage opportunities. The magnitude of pulse flows would initially be set at 730 cfs until passage improvements are made at Caprini Low Flow Crossing, reflecting the flows required for unimpaired passage at this structure (DWR 2007a). Once improvements to Caprini Low Flow Crossing are implemented within the near future, artificial pulse flows of 500 cfs would be provided. Pulse flows of 500 cfs are considered the minimum flow necessary to provide attraction flows that are comparable, after adjustment for basin size differences, to those provided in the nearby Stanislaus River; the Stanislaus River is more than twice the size of the Calaveras River and attraction flows of 1,000-1500 cfs are implemented.

Chinook. A 7- to 10-day adult attraction pulse would be provided sometime between mid-October through November for fall-run Chinook. Assuming artificial pulse flows attract adult Chinook salmon into the river and spawning is successful, then an associated, 7 to 10-day outmigration pulse would be necessary the following spring (in late March/early April) to encourage and assist juvenile Chinook salmon to migrate prior to the irrigation season after which flashboard dams can impede downstream passage and, unlike steelhead, salmon do not typically oversummer. Based on previous data (FISHBIO 2008/09, 2009/10, 2010/11, 2011/12, 2012/13, 2013/14, 2014/15), a majority of progeny during the artificial outmigration pulse period is expected to be fry (mean: 76%; range: 53-99%); therefore, artificial outmigration pulse flows would encourage mostly Chinook fry to migrate out of the river. Since fry contribution to adult escapement is expected to be minor (Sogard 1997, Miller et al. 2010), it is unlikely that providing an artificial pulse flow for Chinook fry will result in enough adult returns to create a self-sustaining population. Within the context of the CHCP, the pulse flows for Chinook would utilize a portion of the limited storage in New Hogan Reservoir that might be better allocated for other uses. The biological goal of the CHCP is to maintain conditions in that reach for Chinook when opportunistic passage (i.e., natural freshets or flood control) occurs, not to intentionally allocate storage to facilitate passage for Chinook. Furthermore, a majority of adult Chinook observed in the river have been hatchery origin strays

(i.e., 80% of all in-river Central Valley Chinook carcasses in 2011 were ad-clipped with an unknown additional proportion of hatchery origin non-ad-clipped fish; Palmer-Zwahlen and Kormos 2013). As a result, any adult salmon attracted into the Calaveras River through an artificial pulse flow would likely be hatchery fish straying from other tributaries. Therefore, the need to artificially attract stray hatchery adult salmon whose progeny are unlikely to contribute to a self-sustaining, Calaveras Chinook salmon population is also unwarranted.

Steelhead. A 7- to 10-day adult attraction pulse would be provided sometime between December and March for steelhead. Unlike salmon, which generally migrate to the ocean during their first spring after emergence, *O. mykiss* progeny typically reside within the Calaveras River for at least one summer before migrating downstream, and most Age 1+ migrate downstream during the winter months (i.e., December to February) when unimpeded passage is available. Therefore, assuming that artificial pulse flows attract adult steelhead into the river and spawning is successful, artificial outmigration pulse flows during late March/early April are unnecessary for *O. mykiss*, and potentially detrimental. Although artificial pulse flows have the potential to attract an increased number of steelhead adults (above and beyond those that already migrate under existing opportunities), providing artificial attraction flow releases to benefit steelhead would negatively influence water storage in New Hogan Reservoir, which has a more limited storage capacity and reduced inflows (average runoff 157,000 AF) relative to other reservoirs in the San Joaquin basin. Critical water storage periods may occur under certain conditions once reservoir storage has fallen below 99,100 AF (equivalent to conservation storage of 84,100 AF); this has occurred in 14 of 47 years (29.8%) between 1965 and 2011 (See Table 19 of the CHCP). To assess the potential impacts of artificial pulse flows on the storage of New Hogan Reservoir, actual end of October storage data from 2007 to 2011 were adjusted to reflect the annual release of either 7- or 10-day pulses of 730 cfs or 500 cfs (See Table 19 of the CHCP) and then adjusted reservoir storage was compared to 99,100 AF (critical storage volume) and 15,000 AF (minimum pool). End of October storage was selected since it represents the end of the irrigation season when the greatest water demands have already been met. Years 2007-2011 were chosen because they represent the most recent period of time following a "resetting" of the reservoir (i.e., storms in 2006 resulted in end of October storage that required evacuation of water to draw the reservoir level down to 152,000 AF by December 1). Each year, the effects of adult migration pulses were assessed, and it was assumed that inflows and outflows would not have changed under alternative scenarios. Table 19 indicates that under all scenarios reservoir storage dropped below 99,100 AF during three consecutive years and pulse flows under the scenario of 730 cfs for 10 days came within 507 AF of draining the reservoir to the minimum pool. Even under a lower migration pulse scenario of 500 cfs for 7 days, reservoir storage still dropped substantially to a low of 38,079 AF, leaving only 23,029 AF of active storage (See Table 19 of the CHCP).

The analysis of this alternative demonstrates that providing even relatively small volumes of stored water for migration results in negative consequences to storage. Any of these scenarios would increase the risk that storage drops below 99,100 AF in successive years as described in Section 6.2, resulting in negative effects to both water supply deliveries (i.e., reductions in deliveries and reliance on groundwater in critically over-drafted aquifer) and salmonids (i.e.,

decrease in instream spawning and rearing conditions associated with flow reductions to the minimum 10 cfs associated with critical storage conditions.

Providing artificial adult pulse flow releases for steelhead would remove a substantial quantity of water from beneficial consumptive use (i.e., 6,237-47,520 AF annually) and in most years would reduce the reservoir storage to below 99,100 AF (See Table 19 of the CHCP); therefore, it would be significantly detrimental to the District (due to reductions in surface water deliveries and associated increase in groundwater usage in a critically overdrafted basin) and would result in decreased spawning and instream rearing conditions for Chinook and *O. mykiss* in successive years (i.e., through reduced flows to the minimum 10 cfs associated with critical storage conditions). New Hogan Reservoir is the sole reliable surface water source for the District's M&I customers and agricultural users on the Calaveras River throughout much of the year. Such an obligation of flow would reduce the average yield from this source, thereby affecting water supply and substantially affecting the ability of the District to address critical groundwater overdraft (i.e., water users would resort to using groundwater instead of surface water, which would exacerbate existing critical groundwater overdraft conditions) within their respective jurisdictions. Given the detrimental impacts on beneficial consumptive use by providing an artificial adult pulse flow for steelhead and the lack of practical benefits of providing an artificial adult pulse flow for Chinook salmon, this alternative was dismissed.

3.5.3 Artificial juvenile O. mykiss and Chinook migration pulse flows

Under this alternative, all the District's activities would continue, and all the conservation strategies identified in the CHCP would be implemented. No artificial adult attraction flows would be provided, and adult migration would be dependent on natural freshets and/or flood control releases; however, a 7- to 10-day pulse flow would be provided just prior to flashboard dam installation (installation occurs between April 15 and May 15) to encourage and assist juvenile salmonids to migrate out of the river before passage is impeded by flashboard dams. Species potentially exposed to pulse flows may include: *O mykiss* and fall-, late fall-, and spring-run Chinook. Winter-run Chinook would not be harmed because juveniles would not be present based on life history periodicity and their overall reliance on the Sacramento River system.

Environmental and biological factors influence the timing, size, and number of juvenile salmonids migrating downstream. Priming factors, environmental factors that condition smolts physiologically to prepare for migration (e.g., photoperiod and temperature), influence the range of dates in which salmonids are prepared to migrate, while variables such as flow, precipitation, and turbidity may function as "releasing factors" that trigger the actual migration (Wagner 1974; Wedemeyer et al. 1980; McCormick et al. 1998; Zydlewski et al. 2005; Sykes et al. 2009). Releasing factors that influence downstream salmonid migration timing have not been well studied in comparison to research on the priming factors. Studies investigating flow as a releasing factor have found varying results. Roper and Scarnecchia (1999) did not find evidence that wild Chinook smolts used changes in flow as an emigration cue. Models developed by Sykes et al. (2009) to examine environmental releasing factors for Chinook salmon smolts indicated a negative influence of flow on the probability of migration, with peak migration occurring just before peaks in flows. However, there is evidence that both juvenile

O. mykiss and Chinook salmon may be stimulated to migrate by flow pulses attributed to either natural freshets (i.e., short pulses in flow due to rainfall events) or flood control releases (Demko and Cramer 1995, 1996; Demko et al. 2000, 2001). Thomas (1975) found that Chinook fry emigration events from experimental troughs were of short duration, usually during the night following heavy rains even when flows were held constant. Bjornn (1971) concluded: "I found no evidence that food or stream flow induced the movements [of juvenile *O. mykiss* and Chinook salmon] observed in the study streams. Small freshets during the usual migration period occasionally coincided with temporary increases in the number of migrants but such occurrences only modified the basic migration pattern." In the Calaveras, natural winter and spring freshets sometimes coincide with brief peaks in downstream migration of juvenile *O. mykiss* (FISHBIO 2008/09, 2009/10, 2010/11, 2011/12, 2012/13, 2013/14, 2014/15); however, these events are correlated with increased precipitation and turbidity, which makes it difficult to ascertain which parameters are actually functioning as releasing factors and their relative contribution to migration stimulation and maintenance.

Additionally, juvenile salmonid response to both priming and releasing factors is influenced by their developmental state, condition, and size (Wedemeyer et al. 1980). The developmental stage affects their swimming ability (Thomas et al. 1969), which in turn affects their response to flow. Small fish (e.g., YOY *O. mykiss* and Chinook salmon fry) have weak swimming abilities (Thomas et al. 1969; Greenland and Thomas 1972). Thomas et al. (1969) noted a period of reduced swimming ability in Chinook fry occurred shortly before complete yolk sac absorption, which coincided in a peak in emigration, possibly due to the inability of the fish to maintain their location. Thus, fry likely move passively downstream in response to flow pulses due to weak swimming abilities and their distance travelled is dependent on the magnitude and duration of flows. Larger juvenile salmonids (e.g., Age 1+ *O. mykiss* and Chinook salmon smolts), rather than moving passively with the flow, are strong swimmers that can actively swim against significant currents (Peake and McKinley 1998). As such, pulse flows are likely not effective for triggering larger juveniles to migrate all the way out of a river unless additional releasing factors, listed above, are also present, which are dependent on climatological conditions within a given year.

From previous studies, it is unclear whether manipulations of flow (i.e., artificial pulses of flow) independent of other variables would provide a migration cue. For example, in an experimental manipulation of environmental factors, Thomas (1975) found that increasing water temperature and turbidity independently each produced increases in Chinook fry migration while doubling the water flow did not. These confounding factors led Sykes et al. (2009) to caution, "Flow manipulations that change the timing, duration, or magnitude of increases of temperature and flow in spring could have adverse effects for the migration behavior of Chinook salmon."

Due to typical migration timing and aforementioned releasing/priming factors, artificial flow pulses provided immediately prior to the irrigation season (late March to early April) to stimulate juvenile migration would likely be detrimental to Calaveras River *O. mykiss* and Chinook salmon. Daily estimated abundances for *O. mykiss* at the Shelton Road screw trap (monitoring years 2002-2015) indicate that most Age 1+ have already migrated prior to the irrigation season (mean: 84%; range: 55-100%) beginning approximately April 15th of each

year, while most individuals migrating during the irrigation season are YOY (mean: 92%; range: 82-97%) that generally do not show signs of smoltification and readiness to emigrate out of the system (FISHBIO 2008/09, 2009/10, 2010/11, 2011/12, 2012/13, 2013/14, 2014/15). Juvenile Chinook salmon have been absent from the river in 73% of the years studied, indicating that Calaveras River fall-run Chinook salmon is a sink population that is rescued from extinction by immigration from source populations where reproduction is greater than mortality. During years when they have been present, daily estimated abundances for Chinook salmon at the Shelton Road screw trap indicate that the proportion of Chinook salmon that have not yet migrated out prior to the irrigation season can be high (mean: 67%; range: 50-84%).

Since available data indicate that most Age 1+ *O. mykiss* in the Calaveras River migrate prior to the proposed pulse flow, there would be little, if any, benefit to this age class by providing a spring pulse. Although no artificial pulse flows have previously been provided in the Calaveras River for encouraging juvenile migration and natural flow pulses during this period have been too high for sampling, monitoring in the nearby Stanislaus River indicates that Age 1+ *O. mykiss* migration is not substantially influenced by artificial spring flow pulses provided for fall-run Chinook. In general, YOY *O. mykiss* that migrate out of their natal tributaries are expected to have low survival and contribute negligibly to adult escapement (Ward et al. 1989; Bond et al. 2008); therefore, encouraging this age class to migrate out of the river would be detrimental to the population by reducing their potential to achieve adulthood. By remaining in the river, YOY *O. mykiss* likely increase their survival to adulthood and may become either resident adults that would produce resident or steelhead progeny, or they may eventually migrate to the ocean as Age 1+ individuals and become steelhead adults that return to the river to spawn.

Juvenile Chinook salmon have been absent from the river in 73% of the years studied. During years when they have been present[14], daily estimated abundances for Chinook salmon at the Shelton Road screw trap indicate that the proportion of Chinook salmon that have not yet migrated out prior to the irrigation season can be high (mean: 67%; range: 50-84%). Similar to *O. mykiss*, most Chinook salmon passing the Shelton Road rotary screw trap during the proposed spring pulse are fry (mean: 76%; range: 53-99%). There is no evidence that moving fry out of the tributary system and into the Delta more quickly by using an artificial pulse flow will result in successful adult returns, particularly since a majority of adults observed in the system are hatchery origin strays (i.e., 80% of carcasses in 2011 were ad-clipped with an unknown additional proportion of hatchery origin non-ad-clipped fish; Palmer-Zwahlen and Kormos 2013). Therefore, similar to *O. mykiss*, their contribution to adult escapement is expected to be negligible (Sogard 1997; Miller et al. 2010) and there would be few benefits realized by Chinook salmon by providing a spring pulse. Additionally, spring pulse flows provided for Calaveras River fall-run Chinook salmon, which are primarily the progeny of hatchery origin strays, would be at the expense of Calaveras River *O. mykiss*, a self-sustaining,

[14] Chinook salmon are only present in years when there are early flow events (i.e., November-December) that provide access into the spawning reach upstream of Bellota. Since monitoring began in 2002, there have only been three such years (2005, 2006, and 2011) and juvenile monitoring from 2012 is not yet complete so estimates are not available.

independent population, which may be moved downstream before they are physiologically ready to migrate to the ocean.

Upon consideration, this alternative was dismissed. Biological Goal 2 of the CHCP is to manage for passage of *O. mykiss*, but Chinook passage will occur based on opportunistic events (i.e. freshets or flood control). In addition, juvenile pulse flows provided in this alternative may detrimentally impact steelhead, which is contrary to Biological Goal 1.

3.5.4 Moving the SEWD Intake from Bellota to a location closer to the Dr. Joe Waidhofer Water Treatment Plant

Under this alternative, all the District's proposed activities would continue with the exception that the SEWD intake at Bellota is moved to a location closer to the treatment plant. In addition, all the conservation strategies identified in the CHCP would be implemented except for those related to structural improvements at Bellota, which would no longer be needed if the Bellota intake were moved. The relocation of the Bellota intake to a point further downstream would result in flows provided year-round in an extended reach of river, supporting Biological Objective 1.

The Calaveras River reach from New Hogan Dam downstream to Bellota is generally ideal as a drinking water source and as habitat for aquatic species. The reach of the flood control channel downstream of Bellota, known as Mormon Slough, is not ideal for either. SEWD is regulated by the California Department of Health Services (CDHS) for the operation of its drinking water treatment facility. Representatives from CDHS have confirmed that relocating the intake from Bellota to a location anywhere downstream of Bellota is not feasible. For this reason, this alternative was dismissed.

3.5.5. Reduced Permit Term (25 years)

Under an alternative with a reduced permit term, NMFS would issue an ITP for the covered species and the terms and conditions of the proposed CHCP would apply for 25 years instead of the 50 years under the proposed CHCP. Incidental take of the covered species would only be authorized for a term of 25 years. This alternative was considered but is not being carried forward for detailed analysis because a shorter permit term would not allow for appropriate application and interpretation of site-specific management actions using the CHCP's adaptive management and monitoring provisions. This alternative, therefore, would not meet the purpose of protecting, conserving, and enhancing listed and unlisted species and their habitat for the continued benefit of the people of the United States because a shorter permit term would not allow adequate time to implement the CHCP. Additionally, the CHCP contains several mechanisms for adjustments over the permit term, including the changed circumstances and unforeseen circumstances provisions. These mechanisms help address concerns about the long-term flexibility of the conservation program. Therefore, this alternative is not being carried forward for additional evaluation.

4.0 Affected Environment

Calaveras River Basin Overview. The Calaveras River Basin originates in the Sierra Nevada and extends southwesterly for roughly 60 miles to the Stockton metropolitan area. The Calaveras River itself is formed by the junction of the North Fork Calaveras River and the South Fork Calaveras River, a short distance above the upper extent of New Hogan Reservoir, and is the basin's primary drainage channel from the headwaters to Bellota where the river splits into the Old Calaveras River channel and Mormon Slough. The basin encompasses an area of approximately 590 square miles. The mountainous portion upstream from New Hogan Reservoir comprises roughly 360 square miles. The lower basin consists of approximately 230 square miles, including 100 square miles of foothill drainage between New Hogan Dam (RM 42) and Bellota (RM 24) and 120 square miles of valley floor downstream of Bellota (USAED 1981).

Elevations in the Calaveras River Basin range from near sea level at the confluence with the San Joaquin River to 130 feet at Bellota, 500 feet at New Hogan Dam, and approximately 6,000 feet at the headwaters. Only about 5% of the basin is found above 4,000 feet in elevation.

The Calaveras River Basin climate is characterized by cool, relatively wet winters, and hot, dry summers. Winters are characterized as short and mild with relatively frequent rains, with snow only occurring in limited amounts within the upper reaches of the watershed. Due to the low elevation of the upper watershed, snow pack does not persist into late-spring or summer. Summers are long and hot with little or no rainfall. Seasonal rainfall is variable, ranging from less than 16 inches to over 45 inches (USAED 1981). In normal years, more than 90% of the precipitation occurs between November and April and normal annual precipitation for above New Hogan Dam is 33.3 inches, ranging from 24 inches at New Hogan reservoir to 50 inches in the upper basin.

Average annual runoff in the basin is 157,000-acre feet (years 1907 to 1980). Due to its relatively small drainage area and limited snow pack, the hydrology of the Calaveras River is characteristic of many North Coast California streams and rain-driven systems in California, whereby unimpaired flows range from low to non-existent during the dry season (summer and early fall) to moderately high with sporadic peaks during the wet season (late fall through spring). Prior to SEWD's operations, the lower river would frequently dry up during the late summer. Now, water stored in New Hogan Reservoir during wet seasons is released year-round for diversion, which results in sustained year-round flows between at least New Hogan Dam and Bellota Weir in all but drought years.

Although the historic use of the Calaveras River by salmonids is uncertain, there are two primary environmental factors that have limited salmonid populations within the basin: the area's geography/topography and hydrology. The geography/topography of the Calaveras River, with respect to salmonid abundance and distribution, can be partitioned into 2 zones, an upper and a lower zone, that are characterized by their flow regimes and ability to opportunistically support salmonid populations. Currently, the upper and lower zones are delineated by the presence of New Hogan Dam (RM 42, elevation 500 feet) and it is unknown how much farther upstream the lower zone may have extended prior to impoundment.

In the upper zone, "all streams in the Calaveras River are dry in late summer where they cross Highway 49" (Linn 1963). However, low perennial flows exist in some portions of several major tributaries during at least normal to wet years (Linn 1963; BLM 1980a and 1980b). These perennial flows likely arise from springs that occur in the upper watershed which provide conditions able to "maintain natural trout populations at elevations from 1,200 to 2,000 feet" (Linn 1963). However, habitat for winter-run and spring-run was lacking in the upper basin (Yoshiyama 2001). Based on the presence of rainbow trout in the upper watershed (Linn 1963; BLM 1980a and 1980b), steelhead may have opportunistically used the upper basin prior to impoundment whenever flows were sufficient for migration.

In the lower zone, the intermittent nature of flows in the Calaveras River would have historically limited the year-round use of this reach by salmonids and provided marginal habitat for various salmonid life stages. Due to the low elevation and associated low summer flows, the lower river would not have supported spring-run and winter-run spawning and incubation, or late-fall run Chinook rearing. Nevertheless, high flows during the winter and spring months (i.e., December-April) of normal to wet years, as well as during the late fall (i.e., November) of years when significant rainfall and associated freshets occurred early, could have provided some opportunities for spawning, rearing, and emigration consistent with requirements of fall-run Chinook and steelhead.

Today, although the duration and magnitude of peak winter/spring flows have been reduced due to reservoir operations, salmonids are able to opportunistically access the lower zone for spawning whenever adequate migration flows are available. Upstream and downstream migration opportunities are currently limited to occasions between November and March/early April when substantial precipitation occurs, which often does not begin until December. Once the Bellota Weir and other flashboard dams are installed near the beginning of April, their operation limits the ability of adult salmonids to migrate above, and juvenile salmonids to migrate downstream of Bellota. However, sustained summer flows that are now provided during most years between New Hogan Dam and Bellota for water management purposes result in over-summer rearing opportunities for salmonids within the reach between New Hogan Dam and Bellota and in the Old Calaveras River channel.

Figure 1 depicts the lower Calaveras River watershed. According to the HCP Handbook (USFWS and NOAA Fisheries 2016), "The plan area, sometimes referred to as the HCP area, is comprised of all areas that will be used for any activities described in the HCP, including covered activities and the conservation program. It includes all lands necessary for the HCP to be fully implemented. The plan area must at a minimum include the permit area, but it may be larger." Therefore, the Project area includes the lower Calaveras River via both the Old Calaveras River channel and Mormon Slough/Stockton Diverting Canal routes, Potter Creek, Mosher Slough/Creek, and Bear Creek and the New Hogan Reservoir (as it pertains to reservoir diversions and impoundment that may have impacts downstream of New Hogan Dam). The width of the CHCP area is the bankfull channel and adjacent riparian zone. The CHCP impact assessment area's upstream plan area is the New Hogan Dam (RM 42) for the Calaveras River, and the headwaters for Potter Creek, Mosher Slough/Creek, and Bear Creek. The CHCP impact assessment area's downstream plan area is defined as the Calaveras River confluence with the San Joaquin Delta; the terminus of Potter Creek where it enters Mormon Slough, and the

terminus of Mosher Slough/Creek and Bear Creek where they enter the San Joaquin Delta. This area consists of seven visually distinct reaches as described below:

- Reach 1- New Hogan Dam (RM 42.0 to RM 41.3) to Canyon is characterized by a relatively low gradient with a broad floodplain. Riparian vegetation is characterized by trees and shrubs, with an obvious absence of large woody debris within the wetted channel; built structures include one small, unscreened diversion pump.
- Reach 2 - Canyon to Jenny Lind (RM 41.3 to RM 34.6) is the highest gradient section of the river, dropping approximately 300 feet in elevation over the course of a few miles. The reach is characterized by high gradient riffles and plunge-pools. Built structures include one small diversion and one low-flow road crossing.
- Reach 3 - Jenny Lind to Shelton Road (RM 34.6 to RM 29.3) consists of a moderate gradient that meanders through a relatively unused and inaccessible area. The floodplain throughout the reach is relatively undisturbed, with agricultural interests somewhat separated from the immediate riparian area. An abundance of large trees provides shade cover. This reach has been subject to historical gravel mining and the floodplain continues to be mined near Jenny Lind. The gravel is surprisingly free of silt, possibly due to the abundance of gravel recruitment from tailing piles. Instream woody debris, undercut banks, and overhanging vegetation are typical. Built structures include sixteen small privately-owned diversions (one screened), which may be operated during the irrigation season and two low-flow road crossings.
- Reach 4 - Shelton Road to Bellota (RM 29.3 to RM 24) is characterized by low gradient, which meanders through the valley, consisting mostly of glides with only an occasional riffle. Bank vegetation is brush with agriculture frequently abutting the stream. Although sand and silt are present, there is a large supply of gravel and cobble. Built structures include ten small privately-owned diversions which are operated during the irrigation season; a relatively large (i.e., 75 cfs capacity) diversion known as Bellota that is generally operated year-round; two low-flow crossings, one culvert crossing, and one earthen dam.
- Reach 5 - Old Calaveras River Channel (RM 24 to RM 5.6) is characterized by a narrow channel with ample vegetative cover and large instream woody debris. Much of the vegetative cover consists of agricultural and non-native invasive plant species, such as Himalayan Blackberry. The Old Calaveras River becomes more channelized with less cover as it reaches the valley floor. This reach has nine flashboard dam foundations where flashboards are installed during the irrigation season and 71 small privately-owned diversions, which may be operated during the irrigation season. In addition, there are two head gates and multiple bridge structures.
- Reach 6 - Mormon Slough/Stockton Diverting Canal (RM 24 to RM 5.6) comprises a wide channel with steep contoured banks and little to no cover. This section of channel has 12 flashboard dam foundations where flashboards are installed during the irrigation season and 63 small privately-owned diversions, which may be operated during the irrigation season. In addition, there are two low-flow road crossings and multiple bridges and railroad trestles.

- Reach 7 - Junction of Old Calaveras River/Stockton Diverting Canal to Confluence (RM 5.6 to RM 0) begins where the narrow, low capacity Old Calaveras River Channel joins with the much wider, higher capacity channel of the Stockton Diverting Canal. The channel continues to exhibit the same characteristics of steep levee banks confining a wide low gradient streambed with little natural riparian cover as the maintenance practices of the San Joaquin County Flood Control and Water Conservation District prevent the growth of shrubs and trees larger than one inch in diameter. The river shows signs of tidal influence within about four miles of the confluence with the San Joaquin River Stockton Deep Water Channel. There are multiple bridges and railroad trestles in this reach.

The four main tributaries downstream of New Hogan Dam are South Gulch, Indian, Duck, and Cosgrove Creeks. All are intermittent streams that dry up during the summer months and flow during winter and spring runoff events.

Potter Creek, a tributary channel to Mormon Slough, receives water deliveries from the Calaveras River during the irrigation season for use in adjacent farmland. During the winter, Potter Creek receives natural surface runoff from within its own watershed, and then empties into Mormon Slough and substantially increases flows below Bellota during runoff events. The channel has three flashboard dam foundations where flashboards are installed during the irrigation season and 16 small privately-owned diversions, which may be operated during the irrigation season. In addition, there are two low-flow road crossings and one small, earthen dam.

Mosher Slough/Creek and Bear Creek receive water during the irrigation season from the Old Calaveras River channel by means of a small headworks control structure with a slide gate. There are 25 privately owned diversions, which may be operated during the irrigation season. During the winter, the control structure is closed for flood control.

4.1 Agricultural Resources

Primary surface water, and to some degree groundwater, from the lower Calaveras River watershed serves thousands of acres of important farmland, with some of this farmland under Williamson Act contracts. Of these total acres, most of the land in agricultural production adjacent to the river is classified as Prime Farmland, Farmland of Statewide Importance, and Unique Farmland. Typical uses include crop production, feed and grain storage and sales, and animal husbandry. Preservation of agricultural land is a goal of San Joaquin and Calaveras counties.

Allocations and Obligations to Agricultural Customers. Approximately 50,000-acre feet of surface water is delivered annually to the District's agricultural service area. SEWD serves approximately 168 private landowners with irrigation water from the old Calaveras River channel, Mosher Creek, Potter Creek, and Mormon Slough/Stockton Diverting Canal channels by means of small, privately owned diversions. A total of 194 diversions have been identified within the District's Calaveras service areas using SEWD data and 53 additional diversions may exist according to CDFW data. Of the 194 "known" diversions, 35 (one screened and 34

unscreened) exist within the Calaveras River between New Hogan Dam and Bellota, 61 in the Old Calaveras River channel, 52 in Mormon Slough, 22 in Mosher Slough/Creek, and 24 in Potter Creek. These agricultural diversions are small pumped diversions that are individually owned and operated by agricultural customers of SEWD. Diversion facilities range in intake size from 2 to 48 inches diameter (average = 10 inches) and known capacities range from 1 to 10 cfs. Individual diversions below Bellota have not been inventoried so specific information is unavailable; however, diversions are expected to be within the same flow capacity range (i.e., 1-10 cfs) as those identified above Bellota by CH2M Hill (2005).

During the diversion periods, which typically occur from mid-April through mid-October, pumps may operate in a variety of different patterns (e.g., continuously, during daylight hours only, a few hours each day, or during non-peak power periods) depending on various factors such as weather, size of diversion and irrigated acreage, and type of crop.

4.2 Air Quality

Emissions of particulate matter or visible emissions are regulated by the San Joaquin Valley Air Pollution Control District (SJVAPCD) under Regulation 6 “Particulate Matter and Visible Emissions.” Specifically, visible particulate emissions are prohibited where the particulates are deposited on real property other than that of the person responsible for the emissions and cause annoyance.

Non-attainment Area for Federal $PM_{2.5}$ and PM_{10} Standards. The Project Area is within a non-attainment area for federal $PM_{2.5}$ and PM_{10} standards (Table 5). Therefore, per 40 CFR Part 93, analyses are required for conformity purposes. However, the EPA does not require hot-spot analyses, qualitative or quantitative, for projects that are not listed in section 93.123(b)(1) as an air quality concern. It was determined that the Proposed Action would not contribute to a $PM_{2.5}$ or PM_{10} hot spot that would cause or contribute to a violation of the federal $PM_{2.5}$ or PM_{10} standards.

Naturally Occurring Asbestos (NOA). Asbestos is a term used for several types of naturally occurring fibrous minerals that are a human health hazard when airborne. Asbestos can be released from serpentinite and ultramafic rocks when the rock is broken or crushed. At the point of release, the asbestos fibers may become airborne, causing air quality and human health hazards. Asbestos is classified as a known human carcinogen by state, federal, and international agencies and was identified as a toxic air contaminant by the California Air Resources Board (CARB) in 1986. All types of asbestos are hazardous and may cause lung disease and cancer (Governor's Office of Planning and Research State Clearinghouse, Memorandum, October 26, 2000). Serpentinite and/or ultramafic rock are known to be present in 44 of California's 58 counties. These rocks are particularly abundant in the counties of the Sierra Nevada foothills, the Klamath Mountains, and Coast Ranges. The Project Area is located in the San Joaquin Valley, which is among the counties listed as potentially containing serpentine and ultramafic rock. Serpentinite may contain chrysotile asbestos, especially near fault zones. Ultramafic rock, a rock closely related to serpentinite, may also contain asbestos minerals.

Table 5. Attainment Status of Criteria Pollutants in the San Joaquin Valley

POLLUTANT	FEDERAL STANDARDS	STATE STANDARDS
Ozone – 1 hour	No Federal Standard	Non-attainment/Extreme
Ozone – 8 hour	Non-attainment/Serious	Non-attainment
PM_{10}	Non-attainment/Serious	Non-attainment
$PM_{2.5}$	Non-attainment	Non-attainment
CO – San Joaquin County	Unclassified/Attainment [1]	Attainment
NO_2	Unclassified/Attainment	Attainment
Sulfur Dioxide	Unclassified	Attainment
Lead	*No Designation	Attainment
Hydrogen Sulfide	*No Federal Standard	Unclassified
Sulfates	*No Federal Standard	Attainment
Visibility Reducing Particles	*No Federal Standard	Unclassified

Source: San Joaquin Valley Air Pollution Control District, October 2006. www.valleyair.org

4.3 Cultural and Historical Resources

The Proposed Action is an undertaking, as defined at 36 CFR §800.16(y), which has the potential to cause effects on historic properties (36 CFR §800.3(a)), and it is necessary to identify cultural resources within the Project Area that may be eligible for listing in the National Register of Historic Places (National Register) and consult with the State Historic Preservation Officer (SHPO). Accordingly, a programmatic level cultural and paleontological study was prepared (LSA 2010) based on previous cultural resources and paleontological studies conducted within and adjacent to the Project Area. Summaries regarding cultural and paleontological resources within the Project Area are provided below, while details regarding National Register of Historic Places and Archaeological Sites are contained in Appendix B of the EA/IS.

Historical Environment. Historic-period archaeological resources in the project area include, but are not limited to, four settlements (Bellota, Jenny Lind, Brushville, and Taylor's Bar, the latter two are no longer extant) along with numerous homesteads; two transportation-related resources between Stockton and Milton (the Old Stockton and Mokelumne Hill Road and Fisher's Bridge); 11 mining-related areas between Jenny Lind and Milton (Plymouth Rock quartz mine; North Hill, South Hill, and Whiskey Hill hydraulic mines; Butte, Calaveras Gold, California Gold, Folsom, Isabel, Lilly, and Milton placer dredge mining operations), two cemeteries (Jenny Lind and Chinese cemetery near Jenny Lind), and river crossings. In addition, any equipment, infrastructure, or facilities related to water resource management, such as fish ladders, dams, or gauging stations, over 50 years of age are considered historic-period resources and need to be addressed at the project-level when encountered. Mining, farming, and ranching were historically the main activities in the project area; with many of the early gold seekers turning to farming and stock husbandry after leaving the gold fields. Portions of the old Stockton and Mokelumne Hill Road, the main route between Stockton and the gold camps, lie within the Project Area. In 1850, there were 17 public houses within 24 miles of Stockton along this road (Thompson and West 1968:109).

Prehistoric Environment. Settlement pattern data from previous cultural resources studies of the area indicate that the favored locations for prehistoric village sites were at low elevations on the flat valley floor and terraces near rivers and main tributaries. Despite only a very small portion of the Project Area having been systematically surveyed, Gilbert (1990) lists 21 prehistoric archaeological sites and one built environment site previously recorded in the Project Area. Surveys of Taylor's Bar, where Jenny Lind WTP is located indicate the past usage of this site as a small residential hamlet (Milliken et al. 1997).

Paleontological Environment. An online fossil locality search was done in January 2007, using the Berkeley Natural History Museums (BNHM) online database, specifically data from the University of California, Museum of Paleontology (UCMP), Berkeley. The Project Area spans a range of geologic units including Jurassic, Cretaceous, and Tertiary of the Sierra Foothills, to the Quaternary alluvial deposits of the Sacramento Valley. The fossil locality search and a literature review revealed a total of six fossil localities: five localities lie within approximately 10 miles of the Project Area and one vertebrate fossil locality lies within the project area. Fossil specimens from these localities include mammoths and elephants (Order Proboscidea), horse (Family Equidae), rodents (Order Rodentia), birds (Class Aves), rabbits (Order Lagomorpha), and amphibians (Class Amphibia). These fossils only represent a few examples of the vertebrate fossil taxa commonly found in similarly aged sediments. The locality within the Project Area, identified within the Mormon Slough area of San Joaquin County, represents Late Pleistocene Rancholabrean land mammal fossils. These fossils include horse (Equidae; *Equus*) and mammoth (*Mammuthus columbi*) and are found in Pleistocene sandstone. All six fossil localities are located in geologic units that are represented in the project area and are considered paleontologically sensitive.

4.4 Geology, Soils, and Seismicity

Most of the soils located in the San Joaquin Valley consist of sand, silt, loamy clay alluvium, peat, and other organic sediments. These soils are the result of long-term natural soil deposition and decomposition of marshland vegetation. The Project Area is located in the San Joaquin Valley in an area of relatively flat terrain with a slight slope towards Bellota to the west. Surface elevations range from about 11 feet mean sea level (msl) on the eastern boundary at the confluence with the San Joaquin River to about 156 feet msl in the western boundary near Bellota. Soils in the area are classified as predominantly the Jacktone-Hollenbeck-Stockton Series (NCSS 1992). These soils are an association of clay-to-clay loam soils with clay hardpan 1.5 to 3 feet below the surface.

Jacktone clay consists of alluvium derived from mixed rock sources. This soil is somewhat poorly drained; however, drainage has been improved by levees and reclamation projects. Typically, the surface layer is very dark gray and dark gray clay about 28 inches thick. The underlying material to a depth of 34 inches is a light gray clay loam. The next layer is a light gray strongly cemented to indurated hardpan about three inches thick. The upper nine inches of the substratum is a yellowish-brown loam. Depth to hardpan ranges from 20 to 40 inches.

Hollenbeck clay consists of deep to duripan, moderately well drained soils that formed in alluvium from mixed rock sources. Hollenbeck soils are on basin rims and interfan basins.

Permeability is slow. Typically, the surface layer is dark grayish brown and brown clay about 32 inches thick. The upper 23 inches of the subsoil is dark grayish-brown clay. The lower part to a depth of 60 inches is a dark grayish-brown, strongly cemented hardpan.

Stockton clay is formed in alluvium from mixed rock sources. The soil is somewhat poorly drained. Typically, the surface layer is dark gray about 29 inches thick. The underlying material to a depth of eight inches is also dark gray clay. The next layer is a light brownish-gray and grayish brown clay loam to a depth of five inches. The lower part to a depth of 60 inches is a variegated dark grayish-brown and dark brown, weakly cemented to strongly cemented hardpan. Depth to hardpan ranges from 40 to 60 inches.

The Alquist-Priolo Earthquake Fault Zoning Act of 1972 (prior to January 1, 1994 called the Alquist-Priolo Special Studies Zones Act – CCR, Title 14, Section 3600) sets forth the policies and Criteria of the State Mining and Geology Board that governs the exercise of governments' responsibilities to prohibit the location of developments and structures for human occupancy across the trace of active faults. The policies and criteria are limited to potential hazards resulting from surface faulting or fault creep within Earthquake Fault Zones. Faults within the region include the Melones, Bear Mountain, Midway, Black Butte, Patterson Pass, Tesia Fault, San Andreas, Hayward, Calaveras, Midland, Green Valley-Concord, or Stockton Fault Carson Valley Faults. The most likely sources of seismic hazards are from the San Andreas, Hayward, Calaveras, Midland, Green Valley-Concord, or Tracy-Stockton Faults.

4.5 Biological Resources

There are several special status species that have been documented to occur or have the potential to occur in the Project Area (Table 6). As identified in Table 6, some of the non-salmonid species may occupy riparian habitats in the lower Calaveras River basin and, as a result, may occur near the various facilities included in the CHCP.

As for salmonids, SEWD's management of the river on behalf of the District and its constituents over the past forty years has created conditions that maintain a healthy and abundant resident rainbow trout (*Oncorhynchus mykiss*) fishery as evidenced by relatively high abundance and fish condition factors (i.e., Fulton's K Factor) recorded during the past several years during rotary screw trap (RST) monitoring and by anecdotal accounts from local fishermen. During the past 10 years, SEWD's fisheries monitoring program indicates that anadromous salmonids (i.e., steelhead, a form of rainbow trout; and Chinook salmon) opportunistically use the watershed when sufficient rainfall produces passage flows in the system. However, due to the inherent plasticity in *O. mykiss* populations whereby both resident and anadromous forms can produce the other, it is unknown whether the steelhead component within the Calaveras River population could be considered self-sustaining.

Table 6. Special-status species potentially located within the lower Calaveras River.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Birds	Tricolored blackbird	*Agelaius tricolor*	—/SC/—	Foraging occurs in grassland and agricultural fields. Seeks cover in emergent wetland vegetation such as cattails, tule, and bulrush. Breeding season is mid-April to late July.	**Moderate**. Some foraging habitat is found adjacent to Project sites. Construction would occur outside of breeding season.
Birds	Great blue heron	*Ardea Herodias*	—/SA/—	Typically found in shallow estuaries and fresh and saline emergent wetlands. Less common along riverine shores, in croplands, and pastures. Breeding season is February to August.	**Moderate.** Some foraging habitat found adjacent to Project sites. Construction would occur outside of breeding season.
Birds	Burrowing owl	*Athene cunicularia*	—/SC/—	Habitat includes open grassland with fossorial mammal burrows, often associated with ground squirrels. Use small mammal burrows for cover and natal dens. Breeding season is February through August.	**Moderate.** Foraging habitat is found adjacent to Project sites. Construction would occur outside of breeding season.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Birds	Golden eagle	*Aquila chrysaetos*	—/SFP/—	Grasslands, deserts, savannahs, and early successional stages of forest and shrub habitats. Breeding season is late January through August.	**Moderate**. Some foraging habitat is found adjacent to Project sites. Construction would occur outside of breeding season.
Birds	Ferruginous hawk	*Buteo regalis*	*	Grasslands, grassland/agricultural, and desert scrub habitats. Breeding season is April through August. Uncommon winter resident and migrant in Central Valley.	**Low.** Emigrates from area in fall/winter when construction will occur.
Birds	Swainson's hawk	*Buteo swainsoni*	—/T/—	Typical habitat is open desert, grassland, or cropland near water containing scattered, large trees or small groves. Breeding season is late March to late August. Primarily spring/summer migrant to the Central Valley; migrates to Central and South America in the fall/winter.	**Low.** Emigrates from area in fall/winter when construction will occur.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Birds	Northern harrier	*Circus cyaneus*	—/SC/—	Found in meadows, grasslands, open rangelands, desert sinks, fresh and saltwater emergent wetlands; seldom found in wooded areas. Breeding season is from April through August.	**Moderate.** Some foraging habitat found adjacent to Project sites. Construction would occur outside of breeding season.
Birds	Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	C/E/—	Forage predominantly in Fremont cottonwood stands and upland areas. Breeding season is from late May through August.	**Moderate.** Some foraging habitat is found adjacent to Project sites. Construction would occur outside of breeding season.
Birds	Yellow warbler	*Dendroica petechia brewsteri*	—/SC/—	Found in a variety of sparse to dense woodland and forest habitats during migration season. Usually arrives in California in April, and mostly gone by October.	**Low.** Emigrates from area in fall/winter when construction will occur.
Birds	White-tailed kite	*Elanus leucurus*	—/SFP/—	Small raptor that nests in isolated trees in dry grass savannahs, meadows, and oak woodlands or trees along marsh edges. Breeds from February through September.	**Moderate.** Some foraging habitat is found adjacent to Project sites. Construction would occur outside of breeding season.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Birds	California horned lark	*Eremophila alpestris actia*	*	Frequents grasslands and other open habitats with low, sparse vegetation. Breeds from March through July.	**Moderate.** Some foraging habitat is found adjacent to Project sites. Construction would occur outside of breeding season.
Birds	Merlin	*Falco columbarius*	*	Frequents coastlines, open grasslands, savannahs, woodlands, lakes, wetlands, edges, and early successional stages. Uncommon winter migrant from September to May.	**Low.** Uncommon in area in fall/winter when construction will occur.
Birds	Yellow-breasted chat	*Icteria virens*	—/SC/—	Frequents dense, brushy thickets and tangles near water, and thick understory in riparian woodland. Usually arrives in April and departs by late September for wintering grounds in Mexico and Guatemala.	**Low.** Emigrates from area in fall/winter when construction will occur.
Birds	Loggerhead shrike	*Lanius ludovicianus*	—/SC/—	Prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. Breeding season is March through August.	**Moderate.** Some foraging habitat is found adjacent to Project sites. Construction would occur outside of breeding season.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Birds	California black rail	*Laterallus jamaicensis coturniculus*	—/T/—	Found in salt and freshwater marshes. Usually found in immediate vicinity of tidal sloughs. Breeding season is March through August.	**Low.** Limited preferred habitat in Project Area. Construction would occur outside of breeding season.
Birds	Song sparrow "Modesto population"	*Melospiza melodia*	—/SC/—	A year-round resident; breeds from mid-March to early August. They have an affinity to emergent freshwater marshes dominated by tules and cattails as well as riparian willow thickets. They also nest in riparian forests of Valley Oak with a sufficient understory of blackberry along vegetated irrigation canals and levees, and in recently planted Valley Oak restoration sites.	**Moderate.** Some foraging habitat found adjacent to Project sites. Construction would occur outside of breeding season.
Birds	Osprey	*Pandion haliaetus*	*	Lives near bodies of water, like lakes, rivers, marshes. Breeding season is March through August.	**Moderate.** Some foraging habitat is found adjacent to Project sites. Construction would occur outside of breeding season.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Birds	California clapper rail	*Rallus longirostris obsoletus*	E/E/—	Populations of the California clapper rail now live almost exclusively in the marshes of the San Francisco estuary (San Mateo, Santa Clara, Alameda, Contra Costa, Solano, Napa, Sonoma, and Marin Counties). They inhabit a range of salt and brackish water marshes. Typically, they utilize salt marshes dominated by both pickleweed (*Salicornia virginica*) and Pacific cordgrass (*Spartina foliosa*). California clapper rails nest from mid-March into July.	**None.** Suitable habitat is not found at the Project site.
Birds	Bank swallow	*Riparia*	—/T/—	Bank swallows excavate nesting burrows in river and stream banks, coastal bluffs, sand and gravel pits, and road cuts. They prefer variable overstory vegetation: grassland, orchard, riparian, and fallow lands. They breed and raise young from April through August then depart for their wintering grounds in Mexico and South America.	**Low.** Most bank swallows in California nest along the Feather River and Sacramento River and its tributaries. Emigrates from area in fall/winter when construction will occur.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Birds	Least Bell's vireo	*Vireo bellii pusillus*	E/E/—	Least Bell's vireos winter in southern Baja California, Mexico. Vireos usually arrive in California during mid- to late-March and usually leave their breeding grounds by September. Bell's Vireo often uses dense shrubbery including willows, mulefat California wild rose, mugwort, Fremont cottonwood, and Western poison oak, shrubs or vines as nesting locations.	**Low.** The northernmost reported sighting in recent years is of a nesting pair of vireos near Gilroy in Santa Clara County in 1997.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Birds	Yellow-headed blackbird	*Xanthocephalus*	—/SC/—	Forages in emergent vegetation, along moist shorelines, and in nearby grasslands and croplands, preferably near water or on moist ground. Occurs primarily as a migrant and summer resident from April to early October; breeds from mid-April to late July. They breed almost exclusively in marshes with tall emergent vegetation, such as tules (*Scirpus spp*.) or cattails (*Typha spp*.), generally in open areas and edges over relatively deep water.	**Low.** Some foraging habitat is found adjacent to Project sites. Emigrates from area in fall/winter when construction will occur.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Amphibians and Reptiles	California tiger salamander	*Ambystoma californiense*	T/T(SC)/—	Restricted to grasslands and low foothill regions with aquatic sites for breeding (primarily vernal pools and ephemeral ponds; occasionally constructed stock ponds). Other habitats include valley-oak woodland.	**None.** Suitable breeding habitat (ephemeral ponds, etc.) is not present at Project sites.
Amphibians and Reptiles	California red-legged frog	*Rana aurora draytonii*	T/SC/—	Highly aquatic- spends most of life in water. Occurs in the vicinity of quiet, permanent pools of streams, marshes, and occasionally ponds.	**None.** Suitable breeding habitat (permanent pools, etc.) is not present at Project sites.
Amphibians and Reptiles	Giant garter snake	*Thamnophis gigas*	T/T/—	Prefers freshwater marsh and low-gradient streams. Has adapted to drainage canals and irrigation ditches. Uses burrows and soil crevices in uplands during winter dormant period. Breeding period March through April.	**Low.** Some foraging habitat is found within and adjacent to Project sites. Construction would occur outside of breeding season.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Plants	Alkali milk-vetch	*Astragalus tener var. tener*	—/—/1B	An annual member of the pea family. The habitat for this species is grassy alkaline flats and vernally moist meadows at elevations below 500 feet.	**Low.** Presumed to exist in only three counties (Merced, Solano, and Yolo) and presumed extirpated from a single location in the Stockton West quad in San Joaquin County.
Plants	Heartscale	*Atriplex cordulata var. cordulata*	—/—/1B	An annual herb that grows in sandy, saline or alkaline flats or scalds, in chenopod scrub, meadows, and valley and foothill grassland.	**Low.** Believed to be extirpated in San Joaquin, Stanislaus and Yolo Counties.
Plants	San Joaquin spearscale	*Atriplex joaquiniana*	—/—/1B	Occurs in the broad flood basins of the valley floor and on alluvial fans associated with the major streams draining from the inner Coast Ranges foothills. It is generally found at low elevations but has been collected up to 1,055 feet above sea level.	**Low.** Regular maintenance of the channels for flood control likely prevents plants sensitive to disturbance from becoming established.
Plants	Big tarplant	*Blepharizonia plumosa*	—/—/1B	Big tarplant occurs in annual grassland on clay to clay-loam soils, usually on slopes and often in burned areas, below 1,500 feet.	**Low.** Big tarplant occurs in only a few highly-restricted populations and is endangered throughout its range.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Plants	Watershield	*Brasenia schreberi*	—/—/2B	An aquatic, perennial herb with floating leaves that grows in ponds, lakes, and slow-moving streams.	**Moderate.** Some suitable habitat located adjacent to the Project sites.
Plants	Round-leaved filaree	*California macrophylla*	—/—/1B	Occurs in grasslands on friable clay soils most often between 200-2,000 feet. It has been found in non-native grassland on clay soils with relatively low cover of annual grasses.	**None.** Suitable habitat (annual grassland) is not present at the Project sites.
Plants	Succulent owl's clover	*Castilleja campestris ssp. succulenta*	T/E/1B	Occurs in Northern Claypan and Northern Hardpan vernal pools within annual grassland communities.	**None.** Suitable habitat (vernal pools and annual grassland) is not present at the Project sites.
Plants	Palmate-bracted bird's-beak	*Cordylanthus palmatus*	E/E/1B	Hemiparasitic annual that is restricted to seasonally flooded, saline-alkali soils in lowland plains and basins at elevations of less than 500 feet. Grows primarily along the edges of channels and drainages.	**Low.** Regular maintenance of the channels for flood control likely prevents plants sensitive to disturbance from becoming established.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Plants	Recurved larkspur	*Delphinium recurvatum*	—/—/1B	Perennial herb occurs in seasonal alkali wetlands of chenopod scrub, grassland, and montane woodland communities, typically on valley bottoms on heavy clay alkali soils.	**Low.** Regular maintenance of the channels for flood control likely prevents plants sensitive to disturbance from becoming established.
Plants	Delta button-celery	*Eryngium racemosum*	—/E/1B	Herbaceous perennial in the carrot family. Found in areas adjacent to rivers and streams where periodic flooding occurs, typically in alkaline clays.	**Low.** Regular maintenance of the channels for flood control likely prevents plants sensitive to disturbance from becoming established.
Plants	Wooly rose-mallow	*Hibiscus lasiocarpus*	—/—/1B	Perennial herb (rhizomatous) that occurs along waterways of the Delta, habitat includes marshes and swamps. Most populations are very small consisting of only a few individuals.	**Low.** Regular maintenance of the channels for flood control likely prevents plants sensitive to disturbance from becoming established.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Plants	Delta tule pea	*Lathyrus jepsonii var. jepsonii*	—/—/1B	Perennial herb occurs along stream banks and in freshwater-marsh habitat.	**Low.** Regular maintenance of the channels for flood control likely prevents plants sensitive to disturbance from becoming established.
Plants	Mason's lilaeopsis	*Lilaeopsis masonii*	—/—/1B	Perennial herb in the carrot family. Found in marshes, swamps, riparian scrub from sea level to 25 feet elevation.	**Low.** Regular maintenance of the channels for flood control likely prevents plants sensitive to disturbance from becoming established.
Plants	Sanford's arrowhead	*Sagittaria sanfordii*	—/—/1B	Perennial herb in the arrowhead family. Endemic to California. Associated with shallow freshwater marsh and swamp communities.	**Low.** Regular maintenance of the channels for flood control likely prevents plants sensitive to disturbance from becoming established.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Plants	Suisun Marsh aster	*Symphyotrichum lentum*	—/—/1B	Perennial herb occurs in freshwater-marsh, brackish-marsh, and along the banks of sloughs and watercourses.	**Low.** Regular maintenance of the channels for flood control has likely prevented plants sensitive to disturbance from becoming established.
Plants	Saline clover	*Trifolium hydrophilum*	—/—/1B	An annual herb in the pea family grows in salt marshes and in alkaline soils in moist valley and foothill grasslands and vernal pools.	**Low.** Saline clover is found in all central coast counties. Solano and possibly Colusa are the only inland counties with reported occurrences of this species
Plants	Greene's tuctoria	*Tuctoria greenei*	E/R/1B	Annual herb in the grass family that occurs in large and relatively deep vernal pools.	**None.** No suitable habitat (vernal pools) is present.
Mammals	Pallid bat	*Antrozous pallidus*	—/SC/—	Occupies grasslands, shrublands, and woodlands. Needs drinking water. Day roosts are in caves, crevices, mines, and occasionally in hollow trees and buildings.	**Low.** Woodlands and buildings may provide roost sites. Suitable foraging habitat (open ground) is present adjacent to the Project Area.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Mammals	Riparian brush rabbit	*Sylvilagus bachmani riparius*	E/E/—	Found both in old-growth riparian forest (primarily valley oak (Quercus lobata), and riparian communities dominated by thickets of willows (Salix spp.), and other successional trees and woody plants.	**None.** Only known populations are confined to Caswell Memorial State Park on the Stanislaus River and along an overflow channel of the San Joaquin River.
Invertebrates	Conservancy fairy shrimp	*Branchinecta conservatio*	E/—/—	Conservancy fairy shrimp inhabit rather large, moderately turbid cool-water vernal pools which fill with water in the rainy season, then slowly dry up from their outer, shallower edges to their deeper areas in the center.	**None.** No suitable habitat (vernal pools) present.
Invertebrates	Vernal pool fairy shrimp	*Branchinecta lynchi*	T/—/—	Local resident. Associated with ephemeral swales and vernal pools in grassland communities. Cysts hatch and shrimp become active when pools fill during the winter rainy season.	**None.** No suitable habitat (seasonal wetlands or vernal pools) present.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Invertebrates	Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	T/—/—	Endemic with patchy distribution. Valley elderberry longhorn beetles are completely dependent on their host plant, the elderberry shrub. Adult active period is from March to June.	**None.** No suitable habitat (elderberry shrub) present.
Invertebrates	Vernal pool tadpole shrimp	*Lepidurus packardi*	E/—/—		**None.** No suitable habitat (elderberry shrub) present.
Invertebrates	California linderiella	*Linderiella occidentalis*	—/SC/—	Local resident. Associated with vernal pools in grassland communities. These pools are often formed in rock depressions. Cysts hatch and shrimp become active when pools fill during the winter rainy season.	**None.** No suitable habitat (seasonal wetlands or vernal pools) present.
Fish	Green sturgeon	*Acipenser medirostris*	—/T/—	Anadromous species using both freshwater and saltwater habitat. Known to forage in estuaries and bays. Begin entering freshwater in late February and spawn in March-July.	**None.** Not found in lower Calaveras River.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Fish	Delta smelt	*Hypomesus transpacificus*	T/E/—	Spends most of its life in the Sacramento–San Joaquin estuary. Spawns in shallow, fresh or slightly brackish water upriver from the mixing zone, including in the Sacramento River, Mokelumne River system, Cache Slough region, San Francisco Bay Delta, and Montezuma Slough area.	**Low.** Delta smelt may enter the tidally influenced area of the lower Calaveras River during winter of very wet years.
Fish	California Central Valley Steelhead trout	*Oncorhynchus mykiss*	T/SC/—	Anadromous species using freshwater, estuarine, and saltwater habitat. Migration potentially occurs during November through June (adults: Nov-Mar; and juveniles: Nov-Jun). Lower Calaveras River is designated critical habitat for this species.	**Low-Moderate.** Construction proposed during periods when the channel is projected to be "dry" (no flood control releases or freshets) and steelhead would not have access to the Project Area. Freshets and flood control releases provide migration opportunities during all but critical drought years.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Fish	Central Valley Chinook salmon, winter-run and spring-run	*Oncorhynchus tshawytscha*	E/E/— T/T/—	Anadromous species using freshwater, estuarine, and saltwater habitat. Migration potentially occurs from January through May.	**None.** Winter-run and spring-run not found in San Joaquin River Basin. If they existed in this basin, then construction will occur outside of potential migration timeframe, and freshets and flood control releases would provide migration opportunities during all but critical drought years.
Fish	Central Valley Chinook salmon, fall/late fall-run	*Oncorhynchus tshawytscha*	SC/—/—	Anadromous species using freshwater, estuarine, and saltwater habitat. Migration potentially occurs during November through June (adults: Nov-Dec; juveniles: Jan-Jun). Lower Calaveras River is designated Essential Fish Habitat for this species.	**Low.** Construction during periods when the channel is projected to be "dry" (no flood control releases or freshets) and salmon would not have access to the Project Area. Freshets and flood control releases provide migration opportunities during some years.

Class	Common Name	Scientific Name	Status Federal/State/CNPS	Primary Habitat and Critical Seasonal Periods	Likelihood for Occurrence at Project Sites
Fish	Longfin smelt	*Spirinchus thaleichthys*	—/SC/—	They spend their adult life in bays, estuaries, and nearshore coastal areas, and migrate into freshwater rivers to spawn. Spawning occurs primarily from January through March, after which most adults die.	**Low.** Longfin smelt have been observed in their winter and spring spawning period as far upstream as Isleton in the Sacramento River, Santa Clara shoal in the San Joaquin system, Hog Slough off the South-Fork Mokelumne River, and in Old River south of Indian Slough.

Source:
Federal Endangered and Threatened Species 7½ minute quads available (December 2013) at: http://www.fws.gov/sacramento/es/spp_lists/auto_letter.cfm.
State Special Status Species [Quads: Stockton East, Stockton West, Lodi South, Waterloo, Linden, Peters] available (December 2013) at: http://imaps.dfg.ca.gov/viewers/cnddb_quickviewer/app.asp.

Key to Status Codes:

Federal Status:
C: Candidate for listing
E: Endangered
T: Threatened

State Status:
E: Endangered
T: Threatened
SC: California species of special concern
SFP: State fully protected
SA: Special animal
R: Rare species

CNPS- California Native Plant Society Status:
1B = Rare, threatened or endangered in California and elsewhere and are rare throughout their range. According to CNPS, all the plants constituting List 1B meet the definitions of Sec. 1901.
2 = Rare in California, but not elsewhere.

On the contrary, the Calaveras River does not support a self-sustaining population of Chinook salmon since precipitation patterns do not typically provide passage conditions during their adult upstream migration period. The Central Valley (CV) steelhead distinct population segment (DPS)[15], which includes the Calaveras River, is listed as threatened (63 FR 13347, 65 FR 42422, 70 FR 37160) under the Endangered Species Act (ESA) by NMFS. The CV fall-run Chinook salmon Evolutionarily Significant Unit (ESU) is considered a Species of Concern (69 FR 19975) by NMFS.

Although the extent of historic use of the Calaveras River basin by salmonids is uncertain, California Central Valley steelhead and fall-run Chinook salmon are currently able to access the reach of the Calaveras River between Bellota and New Hogan Dam for spawning whenever adequate naturally occurring migration flows are available and no structural barriers are installed (i.e., flashboard dams). Upstream and downstream migration opportunities are currently limited to occasions between November and early April when passage conditions within the Project Area are created by substantial precipitation events that result in flood control releases and/or runoff (i.e., freshet) events below the dam. In many years, precipitation events resulting in passage conditions do not begin until December or January because rainfall from initial storm events is generally absorbed into the ground through infiltration and runoff does not occur until the ground becomes saturated.

Due to year-round flows provided between New Hogan Dam and Bellota and the associated suitable temperature conditions created in a majority of this reach as a result of reservoir operations, the lower Calaveras River between New Hogan Dam and Bellota has supported a prized rainbow trout fishery for decades, as evidenced by the number of large trout caught by recreational users. In addition, year-round *O. mykiss* rearing has been observed below New Hogan to at least Shelton Road (RM 28; SEWD unpublished data). Besides resident rainbow trout, there has also been a small number of steelhead observed in the lower river in recent years, including one confirmed steelhead adult out of three *O. mykiss* carcasses recovered in 2000 (Titus 2000); another confirmed steelhead adult out of three additional and recently analyzed carcasses (CDFG unpublished); one steelhead adult carcass collected in 2002 (Demko 2002); and several hundred juvenile trout expressing an anadromous life-history (smolt indices of 4 and 5) captured in a downstream migrant trap in 2002-2008 (SEWD unpublished data). These limited observations indicate that steelhead are able to migrate into the river as adults and opportunistically spawn within the river when conditions are available and that some progeny of either resident rainbow trout or steelhead are stimulated to begin the physiological process of smoltification in preparation for an anadromous life-history. Although the number of *O. mykiss* carcasses analyzed is very limited, results demonstrate the presence of three unique life history strategies (i.e., residency, potamodromy, and anadromy) in the river which is a reminder of the diverse life history strategies exhibited by *O. mykiss* populations. Due to the lack of population estimates for *O. mykiss*, the overall population characteristics of *O. mykiss* (e.g., proportion of population which is anadromous versus resident) within the lower Calaveras River are unknown. However, the presence of a relatively abundant resident

[15] The ESA defines a "species" to include any distinct population segment of any species of vertebrate fish or wildlife. For Pacific salmon, NMFS considers an evolutionarily significant unit, or "ESU," a "species" under the ESA. For Pacific steelhead, NOAA has delineated distinct population segments (DPSs) for consideration as "species" under the ESA.

rainbow trout population below New Hogan Dam combined with the presence of a smaller number of steelhead indicate that current conditions within the lower river are able to support a mixed population.

The historic flow regime in the Calaveras River would have provided limited upstream migration opportunities during the early portion of the fall-run spawning migration period (i.e., prior to December). In most years, significant rainfall and associated freshets large enough to provide migration opportunities did not occur until December; however, in some years, substantial rain events began as early as November. In fall 2001-2004, small numbers of adult fall-run Chinook were occasionally observed attempting to migrate upstream in the Calaveras River beginning with the first substantial freshet (flows approximately >150 cfs; FFC unpublished data). There were no juvenile migrants captured at Shelton Road (RM 28) in three of the corresponding juvenile migration seasons (i.e., 2003-2005) and only six were captured in 2002. In fall 2005, there were a total of 685 adult salmon observed in the river and 221 were found to have migrated above Bellota Weir. An unknown number of these adults spawned above Shelton Road but a relatively high number of juvenile salmon (i.e., 5,943) were captured at the Shelton Road screw trap in 2006 and calculations indicate that juvenile salmon abundance was 39,123 (80% CI= 16,158-57,322). Later that year, a moderately high number of adult salmon (i.e., 77) were observed below Bellota Weir. Although no adults were recorded above Bellota, juvenile salmon migrant numbers in 2007 (i.e., 2,124 captured; 20,791 estimated with 80% CI= 19,507-38,821) indicate that a number of adult salmon must have migrated and spawned above Shelton Road (SEWD unpublished data). Based on historical and recent flow regimes, fall-run can only be expected to opportunistically use the basin during years of high rainfall and associated freshets with migration typically not able to begin until substantial precipitation occurs in December. Although the overall contribution of fall-run in the Calaveras River to the fall-run population is unknown, it is expected to be minimal due to limited migration opportunities and low numbers of adults and juveniles observed.

Within all the reaches of the Lower Calaveras River and its tributaries there are numerous man-made structures that form the infrastructure for managing the water supply operations of the District for agricultural and municipal purposes. Within the CHCP plan area, there are 194 small, privately owned diversions (SEWD unpublished data); one relatively large diversion (i.e., Bellota Diversion Facility) owned by SEWD; and 99 other man-made structures (24 owned and maintained by SEWD; seven privately owned but maintained by SEWD; and 68 additional structures; DWR 2007) located throughout the lower Calaveras River migration corridor. These structures can inhibit or prevent salmonid passage and may result in injury or mortality dependent on time of year, location, structure type, and flow conditions. Small diversions may have an impact on juvenile salmonids, however, the extent of their entrainment is unknown. The larger structures such as the Bellota Diversion Facility and weir may inhibit upstream adult migration if not enough flow is available during the time of their migration.

The Project Area is in close proximity to row crops, orchards, and savannah grassland. Croplands and orchards provide foraging habitat for sensitive wildlife species, including Swainson's hawk (*Buteo swainsoni*) and burrowing owls (*Athene cunicularia*). Various species have been observed during previous field surveys near the Project Area (unpublished data) including ground squirrel, black-tailed jackrabbit, and alligator lizard. The presence of ground squirrel and other medium-sized mammal burrows indicates that burrowing owl may

occur adjacent to the Project Area. Nearby large trees provide good roosting and nesting habitat for Swainson's hawk. Nearby row crops, orchards, and savannah grassland may provide foraging habitat for special status birds, such as burrowing owl, loggerhead shrike, greater sandhill crane, and Swainson's hawk. The Project Area provides habitat for a diversity of plant and wildlife species; however, continual vegetation removal activities associated with SEWD operations have disturbed portions of the various habitats and reduced their quality.

Migratory birds within the Project Area are protected by the Migratory Bird Treaty Act (MBTA; Title 16, United States Code, § 703-712), which was implemented through various treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. The law was enacted in 1918 and was last amended in 1989. Pursuant to the MBTA, taking, killing, or possessing migratory birds is unlawful. Bird species protected by the MBTA that were observed near the Project Area on January 3, 2006 (unpublished data) include; Canada goose (*Branta Canadensis*), mallard (*Anas platyrhynchos*), great blue heron (*Ardea herodias*), great egret (*Casmerodius albus*), American kestrel (*Falco sparverius*), American coot (*Fulica americana*), killdeer (*Charadrius vociferous*), great yellowlegs (*Tringa melanoleuca*), mourning dove (*Zenaida macroura*), burrowing owl (*Athene cunicularia*), Say's phoebe (*Sayornis saya*), loggerhead shrike (*Lanius ludovicianus*), American crow (*Corvus brachyrhynchos*), American pipit (*Anthus rubescens*), savannah sparrow (*Passerculus sandwichensis*), white-crowned sparrow (*Zonotrichia leucophrys*), golden-crowned sparrow (*Zonotrichia atricapilla*), red-winged blackbird (*Agelaius phoeniceus*), western meadowlark (*Sturnella neglecta*), Brewer's blackbird (*Euphagus cyanocephalus*), and house finch (*Carpodacus mexicanus*).

4.6 Hazardous & Toxic Materials

During operations and maintenance activities, the District use and store limited amounts of materials considered to be hazardous, including those associated with maintenance vehicles and equipment (i.e., petroleum products such as diesel fuel, oil, and unleaded gasoline) and with weed control (i.e., pesticides). The District has hazardous materials spill plans for using these products. No evidence of hazardous wastes, pesticides, herbicides and fertilizer, solid waste, drums and containers, underground or aboveground storage tanks have been observed at Project Area sites. Surrounding land uses include agriculture, open space, residential, commercial, and recreation. The Cortese List of hazardous materials sites prepared pursuant to Government Code Section 65962.5 by the California Department of Toxic Substances Control, provides information about the location of hazardous materials release sites throughout the state. A review of the Cortese List determined that there are at least two hazardous waste sites known to have utilized hazardous materials that would have the potential to expose people to health hazards associated with soils, groundwater and/or surface water contamination are located within the vicinity of the project.

The *McCormick & Baxter Superfund Site (M & B Superfund Site).* The McCormick & Baxter Creosoting Co. located in an industrial area near the Port of Stockton at 1214 W. Washington Street, Stockton, Ca 95203, San Joaquin County is a 29-acre former wood-preserving facility. Approximately 105,000 people live and work within 4 miles of the site. The site is bordered on the north by Old Mormon Slough, which is connected to the Stockton Deepwater Channel. Past uses that caused contamination have involved the manufacturing of lumber wood

products. Potential media affected included groundwater (uses other than drinking water), sediments, soil, and surface water. Project clean-up is being funded jointly with state and federal funds with oversight by the RWQCB.

The American Moulding And Millwork (AMMC) Site located at 2801 North West Lane, Stockton, CA 95204, San Joaquin County was listed on the 1989 Bond Expenditure Plan (BEP). Subsequent investigations have evaluated the potential areas of concern on the 60-acre site relating to the releases of hazardous substances to soils and groundwater. Site investigations have shown concentrations of pentachlorophenol (PCP), volatile organic compounds (VOCs), heavy metals and dioxins. UST investigations and soil removal activities were conducted under San Joaquin County Environmental Health Department (SJCEHD) oversight and the RWQCB. In July 2004, AMMC entered into a Voluntary Cleanup Agreement with DTSC to oversee the characterization and cleanup of the site. A Voluntary Cleanup Agreement was completed and signed for the site to address specific areas of investigation associated with previous activities. Clean-up oversight activities are being handled by the SJCEHD - Site Mitigation and Brownfield Reuse Program.

4.7 Hydrology and Water Quality

The Project Area includes the lower Calaveras River via the Old Calaveras River channel and Mormon Slough/Stockton Diverting Canal routes, Potter Creek, Mosher Slough/Creek, and Bear Creek. The width of the CHCP area is the bankfull channel and adjacent riparian zone. The CHCP area's upstream boundary is the New Hogan Dam for the Calaveras River, and the headwaters for Potter Creek, Mosher Slough/Creek, and Bear Creek. The CHCP area's downstream boundary is defined as the confluence of the Calaveras River where it enters the San Joaquin Delta; the terminus of Potter Creek where it enters Mormon Slough, and the terminus of Mosher Slough/Creek and Bear Creek where they enter the San Joaquin Delta. The CHCP area also includes New Hogan Reservoir, where the District impounds the waters of the Calaveras River and release them when needed for beneficial use.

Underlying the Project Area is a vast underground water basin, or aquifer, that extends north and south through the Central Valley. The thickness of the alluvial aquifer ranges from around 100 feet on the eastern end of San Joaquin County to over 3,000 feet on the southwestern end; the thickness underlying the Stockton area is approximately 1,000 feet. Over the last 20 to 30 years, pumping for municipal, industrial and agricultural uses in eastern San Joaquin County has exceeded the basin's sustainable yield and caused groundwater elevations to decline by 40 to 60 feet. This situation has reduced the groundwater's long-term reliability as a water source. It has also allowed for saltwater to intrude into the groundwater basin diminishing its quality and usefulness for agricultural and domestic uses in the region.

Groundwater resources in Calaveras County are highly variable with respect to quantity, dependability, depth, and quality. Groundwater resources range from high potential in the east-central portion of the county, to moderate potential east of Highway 49 and west of Valley Springs. Low potential areas are found in the eastern uplands and the foothill valleys west of Highway 49. Pockets of very low yield groundwater or mineralized groundwater are found in roughly a north-south line extending from Pardee Reservoir to New Melones Reservoir.

Stream Flows. The lower Calaveras River in the Project Area is highly regulated with most of the water derived from upland sources stored in the New Hogan Reservoir. Calaveras River streamflow is diverted at Bellota and carried by Mormon Slough west to Stockton Diverting Canal, which rejoins the Lower Calaveras River west of SR 99.

Flows resulting from release at New Hogan Dam during the flood control season are determined by the USACE. Releases occur when the water level rises above the top of the water supply pool and into the flood control pool. During the flood control season, the USACE operates the reservoir based on the USACE Water Control Plan, which includes a Flood Control Diagram and portions of a Water Control Manual. In 2002, the USACE consulted with NMFS under Section 7 of the ESA. NMFS issued a Biological Opinion (NMFS 2002) for flood control operations; therefore, the USACE's operations are not included as part of the District's covered activities and incidental take permit request.

During the winter and spring months, the impoundment of water in New Hogan Reservoir by USACE for flood control and conservation storage has resulted in changes to the natural hydrograph. The reservoir can go up to 165,000 AF of flood control storage space during the flood season. Like other impoundments, the magnitude and duration of peak flow events have been reduced, which can affect the ability of adult and juvenile salmonids to migrate as often and as quickly as under historical flow conditions. Due to the extreme flashiness of the rain-driven system, the USACE needs to maintain a relatively large flood encroachment space throughout much of the flood control season so precipitation events during December through March often trigger the need for flood control releases. Although flows occur year-round between New Hogan and Bellota (Reaches 1-4), flows can recede to very low or non-existent levels in both Mormon Slough and the Old Calaveras River channel (Reaches 5-7) between flood control releases and/or storm events.

The Old Calaveras River Headworks Facility (Headworks Facility) consists of four buried culverts at the channel invert equipped with slide gates to control the flow of water into the Old Calaveras River channel. During periods when the Podesta Reservoir, a privately owned off stream facility located approximately one mile downstream of the Headworks Facility, (not included as part of the District's covered activities) is spilling or when there are flood control releases from New Hogan, the Headworks Facility slide gates are closed to prevent flooding in the Old Calaveras River channel. These slide gates are opened during the irrigation season to provide water for agricultural diverters along the channel, and during periods when natural inflows are available between November and June for groundwater recharge. Flows diverted for groundwater recharge are limited to approximately 15 cfs in order to conserve water by preventing flows in the Old Calaveras River channel from reaching the confluence with the main stream.

Water Supply. The Calaveras River, a tributary to the Sacramento-San Joaquin Delta, serves as an important source of water for agricultural and municipal uses in San Joaquin county. To augment existing supplies, SEWD currently conducts groundwater recharge operations in the Old Calaveras River channel, as well as in the Mormon Slough, Mosher Creek, Potter Creek, Bear Creek and other designated recharge sites whenever conditions allow. This program was developed in response to studies that have indicated long-term groundwater pumping in excess

of natural replenishment in eastern San Joaquin County has lowered groundwater levels, allowing the intrusion of saline water into portions of the aquifer. Saline intrusion is expected to continue, if groundwater overdraft persists, causing an irretrievable loss of the groundwater resource and economic losses to urban and agricultural areas dependent on the groundwater.

Surface water is provided via a river system that has been modified by impoundments and diversion channels. The New Hogan Reservoir provides flood control along the Calaveras River and helps to meet the needs of the District as water supplier. Water is delivered to the Old Calaveras River channel via the Headworks; Mosher Creek via a small headworks control structure; Potter Creek via Potter Creek intake pumps or outlets from the Bellota or Peters Pipeline; and Mormon Slough via Bellota Weir slide gates. When water supplies are exceptionally low, these channels are mostly dry and agricultural customers, who typically rely on diverting water from the river, resort to pumping groundwater to meet their irrigation demands. Agricultural users pump approximately 120,000 AF of groundwater and municipal users pump approximately 25,000 AF to urban uses, annually. Additionally, SEWD delivers approximately 50,000 AF of surface water to agricultural users and 50-57,000 AF to urban users on an annual basis.

Potential for flooding. There are three basic types of potential flood hazards associated with the Project Area: stream-side overbank flows; areas of flat terrain with slow surface drainage; and inundation due to structural dam failure. Flooding may occur in the project area from heavy rainfall with saturated soils, levee failure, dam failure, and localized drainage problems.

Most of the Calaveras River and associated floodplain in the Project Area are within the 500-year floodplain as identified by FEMA. Much of the Project Area is subject to 100-year flood events (e.g., a flood level that may be expected to occur once every 100 years or to have a 1% chance of occurring in any given year) that could result in overbank flow of the Calaveras River and Mormon Slough. Flood potential can also be affected by land development and associated alteration of natural vegetative cover. Areas of concentrated development can contribute significantly to increased runoff as a result of the increase in impervious surface areas. Removal of natural vegetation without new groundcover planting can have similar effects. Large-scale alteration of vegetation as a result of wildland fires can also increase flood potential.

Existing flood protection in the Project Area is provided by a system of levees along stream channels designed to contain and convey 100-year flood flows within the channels of the Mormon Slough and Old Calaveras River channel.

Water Quality. The Calaveras River is listed on the Environmental Protection Agency 303(d) list (October 3, 2017) for impaired waterbodies. Here is a summary of that listing:

1. Toxicity (unknown source) - Lower Calaveras River from below Bellota Weir to the Stockton Diverting Canal
2. Chlorpyrifos and Diazinon (agriculture), Pathogens (urban runoff/storm sewers), Mercury (agricultural return flows, atmospheric deposition, highway/road/bridge runoff, industrial point sources, municipal point sources, natural sources, resource extraction, urban runoff/storm sewers), Organic Enrichment/Low Dissolved Oxygen

(source unknown) – Lower Calaveras River from the Stockton Diverting Canal to the San Joaquin River

Total Maximum Daily Loads (TMDLs) were approved for Chlorpyrifos and Diazinon in 2007, and for Pathogens in 2008, while TMDLs for the other constituents are still required.

The Central Valley Regional Water Quality Control Board approved a new General Order for the San Joaquin County and Delta Watershed area on March 12, 2014. The new General Order requires anyone who farms and has the potential to discharge to surface waters or groundwater to either belong to a third party water quality coalition **or** apply for an individual permit. The San Joaquin County and Delta Water Quality Coalition is the third party for San Joaquin County, Calaveras County, the Delta portions of Alameda and Contra Costa Counties, portions of Stanislaus County north of the Stanislaus River, and a small portion of Amador County that drains into the Mokelumne River. This coalition is working within the farmed areas surrounding the lower Calaveras River to address agricultural runoff issues such as chlorpyrifos, diazinon, mercury and others (sjdeltawatershed.org).

Drainage and Run off. Existing drainage patterns throughout the lower Calaveras River Basin are described above in the overview section. Increased non-Project development and associated increase in impervious surfaces in areas adjacent to the Project have the potential to increase runoff entering creeks that constitute the Project Area.

Dam Failure Inundation. In the extremely unlikely event of structural dam failure of New Hogan Reservoir or Bellota Headworks Facility, the inundation areas of these impounded water supplies will closely follow stream courses and then broaden and inundate significant areas adjacent to the Calaveras River, Mormon Slough, and its tributaries once they reach the flat lands located in the lower reaches of the Project Area. To minimize the potential for such a catastrophic event, dam owners are required to submit inundation maps to the California Office of Emergency Services for those dams whose total failure would cause loss of life or personal injury. This act also requires local jurisdictions to adopt emergency procedures for the evacuation and control of populated areas such dams including a description of the dams, direction of floodwaters, responsibilities and actions of individual jurisdictions, and evacuation plans (Public Health and Safety – San Joaquin General Plan). The New Hogan Reservoir Dam, Bellota Headworks Facility, and McGurk Earth Dam are in compliance with these requirements.

4.8 Recreation

Water impoundments and water releases are regulated at New Hogan Dam to accommodate multiple competing functions including water quality and reservoir aquatic habitat protection, groundwater recharge, flood protection, agricultural and municipal needs, as well as recreation. Current recreation activities within the project area include, but are not limited to, fishing on upper reaches, trail activities on levees in lower reaches (where there is residential development) and some extreme sports kayaking in the more natural reaches upstream of Bellota. There are no designated staging areas for any of these activities – still alterations in

water releases and variations in water impoundments can affect recreation potential and the recreation experience of those participating.

Regional Recreation Facilities. New Hogan Reservoir is one of six major reservoirs in Calaveras County and is currently the only developed public recreation area within the study area. The New Hogan Dam was completed by USACE in 1964 and is located 28 miles northeast of Stockton along the Calaveras River. The New Hogan Project is operated for flood control; municipal and industrial water supply; irrigation; and recreation purposes. This new dam provides the reservoir with a storage capacity of 317,000 AF at gross pool, with up to 165,000 acre feet of flood control storage space during the flood season and a minimum pool (inactive pool) of 14,900 acre-feet for sediment storage, reservoir aquatic habitat, and general recreation (Tetra Tech 2001).

The recreation amenities associated with the reservoir are currently owned and managed by the USACE. The reservoir provides multiple recreation uses including swimming, camping, picnicking, water skiing, boat and shore fishing, hiking and general sight-seeing. Minimal pool requirements established for sediment storage, fish and wildlife, and general recreation have implications for the project area. There are no other developed local, state or Federal recreation facilities on the Calaveras River.

Local Community Parks. The City of Stockton operates and maintains a total of 63 parks that range in size from 2 acres to 64 acres. Of that total, there are 44 neighborhood parks and 19 community parks (City of Stockton 2010). Additionally, there are several planned parks and designated park sites, predominantly concentrated in the northern portion of Stockton where a relatively greater amount of new residential development is occurring.

Trails. The "River of Skulls" hiking trail located just below New Hogan Dam (Reach 1- New Hogan Dam to Canyon) provides sanctioned access to the river. This trail, which is managed by the USACE as part of the New Hogan Reservoir regional recreation facility is the only developed recreational amenity within the project area. However, the Project Area downstream of Bellota (i.e., Reach 6-Mormon Slough/Stockton Diverting Canal; and Reach 7-Junction of Old Calaveras River/ Stockton Diverting Canal to Confluence) is characterized by wide channels with steep contoured banks and levee maintenance roads that parallel the channels. In these lowermost reaches, the lower Calaveras River and Stockton Diverting Canal serve as an informal trail system for equestrian and hikers where residential development abuts the outer edges of the levees (San Joaquin County 1992); however, these levees are not designated as trail routes on either the City of Stockton or the San Joaquin County General Plan.

Shoreline Fishing. There are several sites along the banks of the Lower Calaveras River that are frequented by local fishermen, though the only site with a staging area and developed trail access to the river is located just below the New Hogan Dam (Reach 1- New Hogan Dam to Canyon). This site is managed by the USACE as part of the New Hogan Reservoir regional recreation area. Reach 4- Shelton Road to Bellota (RM 24 to RM 29.3) is characterized by relatively low gradient with a broad floodplain and appears to be the most heavily fished reach of the river as indicated by the banks, which are eroded apparently from the high foot traffic of anglers. Reach 2-Canyon to Jenny Lind (RM 34.6 to RM 41.3) also appears to support significant numbers of fish but the potential for fishing is low because the area is primarily

within private property and the majority of the reach is inaccessible except via kayak under a limited range of flow conditions.

4.9 Transportation

Access to Project Area sites by maintenance vehicles and vehicles transporting materials (e.g., boulders, gravel, concrete culverts for instream structure improvements) and construction equipment (e.g., backhoes) is via a small portion of local, mostly rural roads and the remainder is via levees roads.

5.0 Environmental Consequences

This chapter analyzes the direct, indirect, and cumulative environmental effects of the Proposed Action (i.e., issuing the ITP and implementation of the CHCP) and the No Action Alternative on various environmental resources (e.g., air quality, biological). Direct effects are those that are caused by the Proposed Action and occur at the same time and place. Indirect effects are those that are caused by the Proposed Action and are occurring later in time or farther removed in distance, but still reasonably foreseeable. Cumulative effects are the incremental effects of the action when added to other past, present, and reasonably foreseeable future actions (e.g., global climate change) regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor, but collectively significant actions taking place over time.

Effects were analyzed qualitatively and are based on the review of relevant references cited, federal land maps, and on best professional judgment. For discussion purposes, the terms "effects" and "impacts" are considered synonymous with each other and with "consequences," and consequences may be positive or negative.

This section presents the environmental consequences resulting from implementation of the Proposed Action and the No Action Alternative. Requirements of both CEQA and NEPA Guidelines are addressed herein including use of CEQA's Environmental Checklist Form (Appendix A of the CHCP), as presented in Appendix G of the State CEQA Guidelines.

For the purpose of identifying significance under CEQA, the analysis herein is based on CEQA's Environmental Checklist Form. This EA/IS uses the following CEQA terminology to denote the significance of environmental impacts of the Proposed Action and No Action Alternatives for the purposes of CEQA only:

- An impact is **significant** if it would cause a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project. Levels of significance can vary by project alternative, based on the setting and nature of the change in the existing physical condition.
- An impact would be **less than significant** if it would not result in a substantial or potentially substantial adverse change in the physical environment. This impact level does not require mitigation, even if applicable measures are available, under CEQA.

Also, if an impact is deemed beneficial, it is designated as a "less than significant impact" in the CEQA Environmental Checklist.

- An impact would be **less than significant with mitigation incorporated** if it would be a potentially significant or significant impact, but with mitigation, the impact is reduced to a less than significant impact.
- **No impact** indicates the project would not have any direct or indirect impacts on the environment, or the consequences are undetectable and/or not applicable.

For the proposed alternative, NMFS provides impact-by-impact conclusions in this EA to more fully demonstrate the significance or insignificance of the individual impacts of that alternative in the NEPA context. When discussing NEPA significance, NMFS does not use the CEQA definitions above but instead considers the significance as explained in the federal statute, regulations, and NOAA's NEPA implementing procedures (e.g., requiring consideration of the context and intensity of the impact). To ensure that the conclusions under NEPA are distinct from the CEQA determinations, NEPA conclusions will be identified, where appropriate, as "**low impact**" (i.e., the impact would be slight, but detectable), "**no significant impact**" (i.e., the impact would be negligible and at the lower levels of detection), or "**no impact**" (i.e., the impact would be undetectable). If a FONSI is appropriate for this project, any final determination of project significance will be made in that document.

Section 5.1 describes those environmental resources that were dismissed from further detailed analysis because no effects were identified during development of the CEQA Checklist (Appendix C of the CHCP). Direct and indirect effects of Alternative 1 (No Action Alternative) and Alternative 2 (Proposed Action) are addressed in Sections 5.2 and 5.3, respectively. Cumulative effects of the Proposed Action are addressed in Section 5.4. A summary of the potential environmental effects of the Proposed (Preferred) alternative is provided in Table 7.

Table 7. Summary of environmental effects of the No Action and Proposed Alternatives.

Environmental Issue	No Action Summary of Findings	Proposed Action Summary of Findings
Agricultural Resources	Under the No Action Alternative, the District would operate and maintain its facilities to deliver water supplies in a similar pattern and frequency as current water deliveries. Water deliveries are expected to be beneficial by reducing use of groundwater by agricultural users in an already critically over-drafted groundwater basin. Under the No Action Alternative, current environmental conditions would persist. Therefore, activities would have, under CEQA, a less than significant impact to agricultural resources and under NEPA, no significant impact to agricultural resources.	Under the Proposed Action, environmental conditions related to water deliveries, crop production types and procedures during the irrigation season would be similar to those experienced under the No Action Alternative and reflected in the current environmental conditions described above. Under the Proposed Action, installation of fish screens at individual private agricultural diversions could be an economic burden to agricultural customers if public assistance funds are not available to install fish screens. However, with the implementation of the ITP, there would be minimal economic impacts to agricultural customers, as further described in section 5.3.1. For these reasons and as articulated more specifically in the fuller discussion below, the Proposed Action would have, under CEQA, a less than significant impact and under NEPA, no significant impact to agricultural resources.

Environmental Issue	No Action Summary of Findings	Proposed Action Summary of Findings
Air Quality	Under the No Action alternative, use of vehicles and heavy equipment during some activities may result in minor emissions of diesel and gasoline engine combustion products and of earthen dust. Because of the short duration and periodic nature of these activities, and with the implementation of BMP AIR-1, health risks from vehicle/equipment emissions of diesel particulate would be minimal. Therefore, activities would have, under CEQA, a less than significant impact, and under NEPA, no significant impact to air quality resources.	Under the Proposed Action, environmental conditions are expected to be similar to that of the No Action Alternative and reflected in the current environmental conditions described above, except there would be a greater use of construction vehicles to build the additional facilities associated with the fish passage facilities and other fish-friendly structural components (e.g., the facility improvements at the Bellota Diversion Facility and the Old Calaveras River Headworks Facility). These effects are expected to be minor because they would be limited by the implementation of best management practices (BMP AIR-1). The effects of the Proposed Action on air quality are expected to have, under CEQA, a less than significant impact and under NEPA, no significant impact to air quality resources.
Cultural & Historical Resources	Under the No Action Alternative, construction and maintenance activities have the potential to disturb archeological sites but it is not anticipated that activities would cause changes to current conditions related to prehistoric or historic archaeological sites. During construction and maintenance activities, the District would utilize cultural resources BMPs (BMP CULT-1a, CULT-1b, and CULT-2) to ensure that impacts to prehistoric or historical archeological sites are minimized. Therefore, activities would have, under CEQA, a less than significant impact and under NEPA, no significant impact to cultural and historical resources.	Under the Proposed Action, environmental conditions are expected to be similar to those described under the No Action Alternative, except there would be additional earthmoving activities to construct and improve facilities under the Proposed Action. Nevertheless, the impacts are still expected to be minor and few, and the District would continue to utilize BMPs as used under the No Action Alternative. For these reasons and as articulated more specifically in the fuller discussion below, these activities would have, under CEQA, a less than significant impact and under NEPA, no significant impact to cultural and historical resources.
Geology, Soils, and Seismicity	Under the No Action Alternative, construction, operations, maintenance, and earthmoving activities have the potential to result in soil erosion but it is not anticipated that activities would cause changes to current conditions related to geology, soils, and seismicity therefore, activities would have, under CEQA, a less than significant impact and under NEPA, no significant impact to geology, soils, and seismicity resources.	Under the Proposed Action, environmental conditions are expected to be similar to that of the No Action Alternative, except there would be additional construction activities that would result in soil erosion. These effects are expected to be minor and temporary in nature. For these reasons and with the implementation of BMP GEO-1, the effects of the proposed action on geology, soils, and seismicity are expected to be less than significant under CEQA and under NEPA, no significant impact to geology, soils, and seismicity resources.

Environmental Issue	No Action Summary of Findings	Proposed Action Summary of Findings
Biological Resources (including wetlands & special status species)	Under the No Action Alternative, construction, operations, and maintenance activities have the potential for short-term discharges of sediments and pollutants impacting fish and their habitats. Many CS currently voluntarily implemented to protect salmonids are anticipated to cease under the No Action Alternative. The use of erosion control methods and conducting instream work when fish are not present would help reduce impacts to a minimal level. Therefore, activities would have, under CEQA, a less than significant impact, and under NEPA, a low impact to biological resources.	Under the Proposed Action, environmental conditions are expected to be similar to those described under the No Action Alternative, except there would be 1) a beneficial impact for salmonids and their habitat as a result of fish passage improvements and implementation of all CS and 2) potential temporary impacts to special status species during construction of fish passage facilities. These temporary impacts are expected to be minor and would likely occur when fish species are least likely present during construction activities, and BMPs would be incorporated to minimize water quality impacts. For these reasons, the effects of the proposed action on biological resources expected to be less than significant under CEQA and under NEPA, no significant impact to biological resources.
Hazardous & Toxic Materials	Under the No Action Alternative, short-term discharge of materials may occur during construction, operations, and maintenance activities but would not cause changes to current conditions related to hazardous and toxic materials; therefore, with the implementation of BMP HAZ-1, activities would have, under CEQA, a less than significant impact and under NEPA, no significant impact to hazardous and toxic materials.	Under the Proposed Action, environmental conditions are expected to be similar to that of the No Action Alternative, which includes implementation of BMP HAZ-1, except that additional construction activities would occur related to execution of additional conservation strategies. These effects are expected to be minor and temporary in nature. For these reasons and as articulated more specifically in the fuller discussion below, the effects of the proposed action related to hazardous and toxic materials are expected to be less than significant under CEQA and under NEPA, no significant impact to hazardous and toxic materials.
Hydrology & Water Quality	Under the No Action Alternative there would be no changes in hydrology and short-term discharge of sediments and pollutants that occur during construction, operation, and maintenance activities would not cause changes to current conditions related to hydrology and water quality. In addition, with the implementation of BMP HYDRO 1 and, 2, these impacts would be minimized. Therefore, activities would have, under CEQA, a less than significant impact, and under NEPA, no significant impact to hydrology and water quality resources.	Under the Proposed Action, the likelihood of temporary impacts to water quality is increased from the benchmark due to the proposed construction activities, operation and maintenance related to implementing additional conservation strategies. However, with the continued implementation of BMP HYDRO 1, 2, and 3 (and because the impacts are expected to be temporary and minor in nature), the activities would not, when compared to the benchmark, adversely change current conditions related to hydrology and water quality; therefore, activities would have, under CEQA, a less than significant impact and under NEPA, no significant impact to hydrology and water quality resources.

Environmental Issue	No Action Summary of Findings	Proposed Action Summary of Findings
Recreation	Under the No Action Alternative, construction and maintenance activities may temporarily render levees impassible for trail use for short periods of time interfering with recreational trail use. With implementation of BMP REC-1, the activities would not adversely change current conditions related to recreation. Therefore, activities would have, under CEQA, a less than significant impact, and under NEPA, no significant impact to recreation resources.	Under the Proposed Action, with the continued implementation of BMP REC-1, the activities would not, when compared to the benchmark, adversely change current conditions relation to recreation except that it may occur more frequently due to construction, operations, and maintenance activities. These effects are expected to be minor and temporary in nature. For these reasons the effects of the Proposed Action on recreation are expected to be less than significant under CEQA and under NEPA, no significant impact to recreation resources.
Transportation	Under the No Action Alternative, short-term traffic delays may occur during construction activities, but with implementation of BMP TRANS-1, the impacts to transportation from these activities would be minimal. Therefore, activities would have, under CEQA, a less than significant impact, and under NEPA, no significant impact to transportation resources.	Under the Proposed Action, environmental conditions are expected to be similar to that of the No Action Alternative, except that vehicle use may be more frequent due to construction, operations, and maintenance activities. These effects are expected to be minor and temporary in nature. For these reasons and with the implementation of BMP TRANS-1, the effects of the Proposed Action on transportation are expected to be less than significant under CEQA and under NEPA, no significant impact to transportation resources.

5.1 Environmental Issues Dismissed from Detailed Analysis

The environmental issues below were dismissed from further detailed analysis because they would not be affected by the Proposed Action (Appendix C of the CHCP).

5.1.1 Aesthetics

The Proposed Action would take place within river channels that are enclosed by levees and are not within view of nearby residences or within view of a scenic vista. Activities would be nearly indistinguishable from existing conditions since all modifications would occur at existing structures within the river channels and alignment of river channels would not be altered. Structural modifications would be visually and aesthetically compatible with their surroundings and designed and constructed in a manner that is consistent with the current use and character of existing structures. Therefore, there would be no impact to views surrounding the Lower Calaveras Creek and Mormon Slough, to scenic resources, to the visual character or quality of the site and its surroundings, and to views as a result of increased light or glare; a detailed aesthetic analysis for the Project is not warranted.

5.1.2 Land Use Planning

SEWD's Long Range Organizational Plans contains watershed-related goals, which include "restor[ing], protect[ing], and enhanc[ing] water quality and associated aquatic resources and water supplies within the Calaveras River" (Tetra Tech 2001). These goals are consistent with the CHCP. Activities under the Proposed Action are confined to, and would retain the existing

alignment of the lower Calaveras River and associated creeks. As such, the Proposed Action does not have the potential to divide an established community or conflict with any applicable land use plan, habitat conservation plan, or natural community conservation plan. Therefore, there would be no impact to land use and a detailed land use and planning analysis for the Proposed Action is not warranted.

5.1.3 Mineral Resources

Although there are several mining sites in the lower Calaveras River watershed (i.e., Teichert Aggregates mines the tailings at Jenny Lind and South Gulch for concrete aggregate and sand and gravel products, and the Ford Company operates a rock and gravel quarry at a previous borrow pit for New Hogan Dam that is less than a mile downstream of the dam), the District does not lease any of its lands for mining. Nor does it maintain any database for mining and mineral right holders in the project area.
The Proposed Action would not result in the loss of availability of concrete aggregate, sand or gravel. Nor would it result in changes to any designated mining areas on any local general plans. The District does not have contracts with parties for instream mineral rights (e.g., sand and gravel mining permits) that would be affected by or could affect any of the activities identified in the CHCP. Therefore, there would be no impact on mineral resources and a detailed mineral resource analysis for the Proposed Action is not warranted.

5.1.4 Noise

Construction and maintenance activities under the Proposed Action would take place at instream structures that are generally located in sparsely populated areas and are at least 250 feet away from the nearest residential or business facilities. While a temporary increase in noise is expected to be generated by equipment, vehicles, and personnel during construction activities, this impact would be temporary in nature and would be limited to typical construction equipment (e.g., backhoe, bulldozer, grader, loader, scraper, truck) noise levels which range from 80-89 dBA 50 feet from source (FTA 2006). Based on basic sound level drop-off rate of 6.0 dBA per doubling of distance, noise levels at 300 feet would range from 65-74 dBA. Construction at sites within San Joaquin County would only be conducted from Mondays - Saturdays between 6:00 a.m. and 9:00 p.m., and noise associated with temporary construction activities during this timeframe is specifically exempt from San Joaquin County noise standards (Title 9, Section 9-1025.9 of the San Joaquin County Code). In addition, instream structures are not located within an airport land use plan area, or, where such a plan has not been adopted, within two miles of a public airport or public use airport and do not expose people residing or working in the project area to excessive noise levels. They are also not located near a private airstrip and do not expose people residing or working in the project area to excessive noise levels. Therefore, there would be no impact associated with noise and a detailed noise analysis for the Proposed Action is not warranted.

5.1.5 Population Growth and Housing

The Proposed Action is aimed at improving in-stream habitat conditions for salmonids in the lower Calaveras River basin during different times of the year and for different life stages. The

Proposed Action would not affect the District's provision of water to over 300,000 residential and business customers. The Proposed Action would not directly or indirectly increase population growth and would not displace housing units or people. The quantity of the District's current water diversion and water rights pertaining to diversions would remain unchanged. Therefore, there would be no impact to population or housing and a detailed population and housing analysis for the Proposed Action is not warranted.

5.1.6 Public Health and Hazards

While the Project Area is subject to flood inundation and fire hazard, the Proposed Action would not introduce any new activity that would affect public health, induce new hazards, or add demand or affect response time of any public health provider. Therefore, there would be no impact to public health and hazards and a detailed public health and hazards analysis for the Proposed Action is not warranted.

5.1.7 Public Service and Utilities

The Proposed Action is confined to the existing lower Calaveras River and associated tributaries. The Project would not construct any new, or make physical alterations to, governmental facilities (fire, police, school, park, or other public facilities) nor would it create the need for new or physically altered government facilities. Therefore, there would be no impact to government facilities and a detailed public services analysis for the Proposed Action is not warranted.

5.1.8 Socioeconomics

The Proposed Action is confined to water delivery and habitat restoration activities in the existing lower Calaveras River and associated tributaries. Due to the types of activities and geographic area involved, there would be no impacts to economic activity, low-income populations, population growth rates, availability of housing, public services, or general social conditions. Therefore, there would be no impact to socioeconomics and a detailed socioeconomic analysis for the Proposed Action is not warranted.

5.1.9 Environmental Justice

Executive Order 12898 (February 11, 1994) mandates Federal agencies to identify and address disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. The Proposed Action is confined to water delivery and habitat restoration activities in the existing lower Calaveras River and associated tributaries, which have no impact to low-income, minorities, or subsistence populations in the Project area. Therefore, there would be no impact to environmental justice.

5.1.10 Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in property or rights held in trust by the United States for Indian tribes or individuals. Trust status originates from rights imparted by treaties, statutes, or executive orders. The Proposed Action would not affect ITAs because none exist within the study area and a detailed ITA analysis for the Proposed Action is not warranted.

5.2 Effects from No Action Alternative

The District's existing activities are ongoing. Under the No Action Alternative, the District would continue to rely on water supplies from the New Hogan Project, and would continue to engage in water storage, release, and withdrawal, and maintenance activities. The District could continue to voluntarily implement conservation strategies (implemented since 2006 or earlier) under the No Action Alternative. However, the District has been voluntarily implementing these strategies under the assumption that an ITP would be issued; thus, for the purpose of impact analyses, it is assumed that none of the conservation strategies identified under the Proposed Alternative (with the exception of CS4, CS8, and CS13) would be implemented.

Other than foregoing benefits of fish passage improvements and other conservation strategies, and the associated increases in construction, operation, and maintenance activities, the No Action Alternative would have essentially the same impacts as the Proposed Alternative on the physical environment.

5.2.1 Agricultural Resources

Under the No Action Alternative, the District would operate and maintain its facilities to deliver water supplies in a similar pattern and frequency as current water deliveries. Since water deliveries would be essentially the same as current conditions, crop production types and procedures during the irrigation season are expected to remain similar to current conditions. As it is currently being done, water deliveries are expected to be beneficial by reducing use and reliance of groundwater by agricultural users in an already critically over-drafted groundwater basin, which can lead to subsidence if the reduction of groundwater is not implemented. Therefore, there would be less than significant impacts on agricultural resources under the No Action Alternative.

Summary. Implementation of the No Action Alternative would result in a less than significant/no significant impact to agricultural resources in the Project Area, because the No Action Alternative would not cause an adverse change to current conditions related to any farmland but would be beneficial by continuing to reduce use of groundwater by agricultural users in an already critically over-drafted groundwater basin. In light of the state legislature's approval of the Sustainable Groundwater Management Act in 2014, continuing to rely solely on groundwater for agricultural use may be suspect. When the groundwater basin is overdrafted and the water level is lowered, saline deposits intrude into the basin, causing serious water quality deterioration and the destruction of the groundwater basin.

5.2.2 Air Quality

Under the No Action Alternative, the District's operation and maintenance of facilities would require the use of vehicles, and maintenance may also require the use of construction equipment to operate the Old Calaveras Headworks Facility (OM2), install/remove flashboards (OM3 and OM4), maintain privately owned diversions (OM5), and to maintain instream structures (OM6). Vehicles and construction equipment would be used in a manner similar to what occurs under current conditions and would be temporary and short in nature. Therefore, while Project sites are located within a non-attainment area for federal ozone and PM, $PM_{2.5}$ and PM_{10} standards, limited emissions would have no effect on compliance with the applicable air quality plan under the No Action Alternative.

Limited air pollutant emissions associated with the No Action Alternative would occur over short durations, such as fugitive dust from repairing/replacing earthen dams and equipment exhaust associated with heavy equipment for the seasonal installation/removal of flashboard dams. No new, long-term regional emissions would result from implementation of the No Action Alternative. Due to the small disturbance areas, moist soils, brief and periodic nature of the work, and the District's adherence to BMPs below (BMP AIR-1), emissions from maintenance activities would be negligible. Because of the short duration and periodic nature of these activities, health risks from vehicle/equipment emissions of diesel particulate would be minimized to minor levels; furthermore, such minimization would be to the maximum extent practicable under the No Action Alternative.

Serpentinite and ultramafic rocks have been commonly used for unpaved gravel roads, landscaping, fill projects and other improvement projects in some localities. Asbestos may be released to the atmosphere due to vehicular traffic on unpaved roads and during grading for various construction projects. These activities may have the effect of releasing potentially harmful asbestos into the air. Natural weathering and erosion processes can act on asbestos-bearing rock and make it easier for asbestos fibers to become airborne if such rock is disturbed. (Governor's Office of Planning and Research State Clearinghouse, Memorandum, October 26, 2000). The New Hogan Dam area includes an ultramafic rock unit that is more likely to contain naturally occurring asbestos. However, no activities are proposed in the New Hogan Dam area and Project areas do not contain known deposits. Therefore, there would be no impact associated with asbestos under the No Action Alternative.

Only a few instream structures where maintenance is conducted (< 5) are within the vicinity of residential areas and none are near schools or hospitals. Due to small disturbance areas, moist soils, brief nature of the work and adherence to BMPs below, emissions from construction and maintenance activities would be negligible. Therefore, there would be no impact associated with air pollutants to sensitive receptors under the No Action Alternative.

The No Action Alternative would not create objectionable odors affecting a substantial number of people or subject people to objectionable odors. Therefore, there would be no impact associated with objectionable odors under the No Action Alternative.

BMP AIR-1—Fugitive Dust and Hauling Materials.

Compliance with San Joaquin Valley Air Pollution Control District (SJVAPCD) Rules and Regulations during construction and maintenance activities would reduce air quality impacts from fugitive dust emissions from construction, grading and quarrying operation and hauling of loose materials to a less than significant/no significant impact. These regulations include the following BMPs:

- Cover all trucks hauling soil, sand, and other loose materials.
- Apply water three times daily, or apply (non-toxic) soil stabilizers on all unpaved access roads, parking areas and staging areas at construction sites.

Summary. Implementation of the No Action Alternative would result in a less than significant/no significant impact to air quality in the Project Area, because the No Action Alternative would not cause an adverse change to current conditions related to any air quality resources. Due to small disturbance areas, moist soils, the brief and periodic nature of the work, and management practices described above (implementation of BMP AIR-1), construction, operation, and maintenance activities would have minor, short-term effects on vehicle emissions, fugitive dust, and equipment exhaust. In addition, health risks from vehicle/equipment emissions of diesel particulate matter would be minimal.

5.2.3 Cultural and Historical Resources

Under the No Action Alternative, SEWD's installation/removal of flashboard dams (OM3 and OM4), SEWD's Old Calaveras Headworks Facility (OM2), privately owned diversion facilities (OM5), or maintenance of instream structures (OM6) might require earthmoving procedures. Future ground disturbance associated with structures maintained by SEWD would happen in a manner similar to past structure maintenance and would primarily occur in previously disturbed areas. No cultural or historical resources have previously been found in areas maintained by SEWD during earthmoving activities so the likelihood of finding any during future maintenance activities is low; nonetheless, earthmoving in these areas would have the potential to impact:

- Prehistoric archaeological resources.
- Historic-period archaeological resources in the project area, which could include settlements/homesteads, transportation-related resources, mining-related resources, cemeteries, and river crossings. In addition, any equipment, infrastructure, or facilities related to water resource management, such as fish ladders, dams, or gauging stations, over 50 years of age are considered historic-period resources and need to be addressed at the project-level when encountered.
- Paleontological resources.

During construction and maintenance activities, the District would utilize cultural resources BMPs (BMP CULT-1a and CULT-1b) to ensure that impacts to prehistoric and historic

archaeological sites and paleontological resources are minimized to the maximum extent practicable under the No Action Alternative.

No human remains or formal cemeteries were identified in areas maintained by SEWD (LSA 2010). Although there is a low likelihood of finding human remains during maintenance and construction activities in areas maintained by SEWD, there is a potential that human remains associated with settlements/homesteads within the vicinity but not interred in cemeteries could be uncovered during excavation. During construction and maintenance activities, the District would utilize cultural resources BMPs (BMP CULT-2) to ensure that impacts to any human remains encountered are minimized to the maximum extent practicable under the No Action Alternative.

BMP CULT-1a—Historic/Archaeological/Paleontological Resources.

Before construction or maintenance, all construction personnel would be instructed on the protection of cultural resources. The District would instruct workers that cultural resources might be present at a Project site. Workers would be trained to stop work near any discovery and notify SEWD's General Manager (GM) of their discovery. The GM would stop work to confirm whether the resource could be avoided and would consult with a qualified archeologist for an on-site evaluation.

BMP CULT-1b—Historic/Archaeological/Paleontological Resources.

Known significant cultural resources would be fenced and a minimum distance would be maintained for work disturbances.

BMP CULT-2—Human Remains.

Should human remains be discovered, work shall cease immediately, and the county coroner's office and the Native American Heritage Commission would be notified and consulted with regarding actions to be taken.

Summary. Implementation of the No Action Alternative would result in a less than significant/no significant impact to cultural resources in the Project Area, because the No Action Alternative would not cause an adverse change to current conditions related to any historic, archeological or paleontological resources. Maintenance activities may disturb historic, archeological or paleontological resources, but implementation of BMPs would minimize any impacts (including the magnitude of impact, which would be minimized by BMP CULT-2). Furthermore, since the areas that would be maintained by the District has already been disturbed or maintained in the past, the number of new cultural resources that would be encountered during the ongoing activities under this alternative are expected to be few, if any.

5.2.4 Geology, Soils, and Seismicity

Under the No Action Alternative, SEWD Old Calaveras River Headworks Facility Operations (OM2), SEWD Bellota Diversion Facility Operations (OM3), SEWD's installation/removal of

flashboard dams (OM4 and OM5) and maintenance of instream structures (OM6) might require earthmoving procedures. The earthmoving procedures may have an impact on geology and soils, which may require loosening and moving large amounts of soil and sediment from one area to another in order to construct the above projects. In addition, these activities have the potential to result in soil erosion. However, during construction, operation, and maintenance activities, the District would utilize BMP GEO-1 described below to minimize (such that any effects would be minor) or avoid impacts to soils; furthermore, such minimization would be to the maximum extent practicable under the No Action Alternative.

Expansive soils (e.g., soil prone to large volume changes (swelling and shrinking) that are directly related to changes in water content) can be unstable, but these soil conditions are generally not present in the Project Area. Risk of soil instability due to the presence of expansive soils would not be increased as a result of any No Action Alternative activities. Therefore, there would be no impact to expansive soils under the No Action Alternative.

The Project Area is not located within a delineated Alquist-Priolo Earthquake Fault Zone but is located in a Seismic Risk Zone 3 where earthquakes pose a lesser risk than in locations within Zone 4 (i.e., San Francisco Bay Area). The Project Area is located within a zone where the predicted peak horizontal ground acceleration exceeded at a 10% probability in 50 years is 10-20% g, where "g" is the acceleration of gravity. In comparison, areas along the nearby very active San Andreas Fault line are greater than 60%. Although the probability for exceeding large ground motions is low, existing instream structures under the No Action Alternative could be damaged during seismic shaking. There is a low potential for associated landslides, debris flows, swelling or collapsible soils, or other damaging geologic hazards resulting from damage at these instream structures and these structures are not located in areas where persons would be exposed to risks from damage (i.e., structures are located within stream channels primarily between levees, not in residential or public gathering areas). Because seismic events capable of damage are highly improbable, would be of short-duration, and would not result in increased risks of hazards to people, potential impacts do not cross a threshold of environmental significance.

BMP GEO-1—Soil Erosion.

To avoid or minimize impacts related to increased erosion and sedimentation, erosion control plans for construction activities would be developed that, at a minimum, contain the following BMPs:

- Supervisory construction personnel would be informed of environmental concerns, pertinent laws and regulations, and final rehabilitation specifications and design.
- Environmental protection measures would be enforced in the field during construction.
- Interception ditches would be provided to direct water away from the tops of cut-and-fill slopes.
- Small sediment catch basins or traps would be provided to prevent sediment from being transported away from the construction of the facilities. The locations and sizes of these basins would be designed to minimize impacts to riparian and wetlands areas. Types of

sediment traps to be considered include filter berms, straw-bale barriers, filter inlets, vegetative filter strips, and culvert risers.

- Disturbed soils would be re-vegetated and stabilized. Reseeding and mulching work would be performed following completion of the project. If erosion control practices were not installed 1 year after completion, exposed soils could require additional treatment following seasonal rains and subsequent erosion.
- Non-noxious weed competition would be discouraged and noxious weeds would be controlled.
- Details regarding seed material, fertilizer, and mulching would be provided. The seed material would include native plant species and be approved by a re-vegetation specialist or erosion control specialist. Special emphasis would be given to native plant assemblages characteristic of the site prior to construction.

Summary. Implementation of the No Action Alternative would result in a less than significant/no significant impact to geology, soils, and seismicity in the Project Area historic, because the No Action Alternative would not cause an adverse change to current conditions related to any geologic features and soils. Some soil erosion may be associated with construction and maintenance activities under the No Action Alternative, but implementation of BMPs would minimize these impacts. With sediment control practices in place, impacts to soil erosion would be unlikely to exceed acceptable levels, and impacts would be short in duration and minimal overall.

5.2.5 Biological Resources

Under the No Action Alternative, the District would operate and maintain their facilities to deliver water supplies in a similar pattern and frequency as current water deliveries (OM1, OM2, OM3, OM4, and OM5). Potential impacts to biological resources could occur as a result of earthmoving procedures for construction at SEWD's Old Calaveras Headworks Facility (OM2), SEWD's installation/removal of flashboard dams (OM3 and OM4), maintenance of privately owned diversions (OM5), and maintenance of instream structures (OM6).

However, the No Action Alternative activities would be located within an area where the *San Joaquin County Multi-Species Habitat Conservation and Open Space Plan* (SJMSCP; SJCOG 2000), a 50-year Plan, has considered potential impacts and authorized incidental take of special status non-salmonid (but not salmonid) species from construction and maintenance activities at instream structures. This previously approved plan's BMPs are the model that the District currently follows for biological resources. Therefore, during future construction and maintenance activities, it is expected that the District would continue to utilize BMPs described below (BMP BIO-1 to BMP BIO-6) that are similar to the provisions of this existing plan to minimize or avoid impacts to special status non-salmonid species. For these reasons, habitat conditions for the non-salmonid special status species that have the potential to inhabit near or in the CHCP plan area are expected to be consistent with conditions over the past several decades.

For special status salmonid species, habitat conditions could change under the No Action Alternative due to anticipated cessation of many of the conservation strategies the District has

voluntarily implemented to date. If an ITP is not issued, it is expected that conservation strategies aimed to ensure instream flow, improve fish passage, and reduce entrainment (CS1, CS2, CS3, CS5, CS7, CS11), would not be implemented to protect salmonids. Such impacts would include upstream and downstream migration impediments for both adult and juvenile salmonids as a result of lack of sufficient flow and entrainment into the Old Calaveras River channel. Additionally, lack of fish friendly flood control releases could result in fish stranding events and impediments to upstream migration necessary to attract adult migrants into the spawning reaches.

Construction activities would not be anticipated to impact special status salmonid species because activities would take place when salmonids are unlikely to occur in the Project Area, such as during periods of low water flow or elevated water temperatures and outside of the spawning and migration period for steelhead and Chinook salmon. Construction activities would not occur in spawning habitat areas. Streambed disturbance would be temporary in nature, impact a relatively small area of the stream, and not change the rearing and migration habitat functions for these fish.

For purposes of this EA, potential effects to salmonids in terms of incidental take are summarized in Table 8. During construction and maintenance activities, the District would utilize BMPs described below (BMP BIO-1 to BMP BIO-5) to minimize or avoid impacts to biological resources to the maximum extent practicable under the No Action Alternative.

No Action Alternative activities would not be located within areas where local policies or ordinances protecting biological resources (e.g., a tree preservation policy or ordinance) are established. Therefore, there would be no impact to local policies or ordinances under the No Action Alternative.

Table 8. Potential Effects to Steelhead and Salmon from No Action Alternative Activities.

Activity	Potential Effects
OM1. New Hogan Reservoir Water Impoundment and Non-Flood Control Operations	Incidental take could occur due to surface water impoundment into New Hogan with no minimal flow releases into the river or no flows reaching areas downstream of Bellota whenever salmonids are present, which could result in fish strandings or dewatered redds. See Chapter 7 of the CHCP for more details.
OM2. SEWD Old Calaveras River Headworks Facility Operations	Incidental take could occur due to entrainment of downstream migrating fish into the Old Calaveras River channel or due to impeding or blocking of upstream migration from the Old Calaveras River channel into the mainstem of the Lower Calaveras River upstream of Bellota.
OM3. SEWD Bellota Diversion Facility Operations	Incidental take could occur due to entrainment into the unscreened Bellota diversion or due to migration delays or blockage at the Bellota weir.
OM4. Artificial Instream Structures and SEWD Small Instream Dam Operation	Incidental take could occur due to migration delays or blockage from flashboard dams.
OM5. Privately Owned Diversion Facilities Operated within the District's Service Areas	Incidental take could occur due to entrainment into unscreened diversions.

Activity	Potential Effects
OM6. SEWD Channel Maintenance	Incidental take could occur due to fish being injured or killed by heavy equipment operation. In addition, turbidity could increase for short periods of time just downstream of maintenance sites.
OM7. Fisheries Monitoring Program	Take could occur during trapping and handling, but mortality is expected to be less than five percent of fish captured and released.

BMP BIO-1—Special-Status Non-Salmonid Species—Pre-Construction Surveys.

Pre-construction surveys for special-status non-salmonid species would be conducted prior to disturbing riparian vegetation according to SJMSCP (SJCOG 2000) protocols. If special-status non-salmonids are identified, the District would confer with a qualified biologist to quantify and determine impacts and prescribe feasible incidental take minimization measures.

BMP BIO-2—Special-Status Non-Salmonid Species—Avoidance Timing.

Timing of construction would be coordinated with those periods specified by the SJMSCP (SJCOG 2000) for special-status non-salmonid species determined to potentially be within the vicinity of a Project site.

BMP BIO-3—Disturbance of Riparian and Wetland Habitats.

To the extent possible, impacts to areas of riparian vegetation and wetlands would be avoided. Incidental take minimization measures and compensation requirements would be implemented according to SJMSCP (SJCOG 2000) protocols.

BMP BIO-4—Salmonids—Direct Loss during Construction and Maintenance.

Construction and maintenance activities would be scheduled for periods when fish do not have access to Project Areas (i.e., during periods when flood control releases and freshets are not projected to occur) according to SEWD and CDFW MOU for routine maintenance (see Attachment C-3 of the HCP). Provisions would be made to allow migrating salmonids to bypass work areas in the channel in the event that unanticipated flood control releases or freshets occur.

BMP BIO-5—Salmonids—Increased Turbidity Impacts.

The District would monitor water turbidity levels during instream construction activities according to a Central Valley Water Board Section 401 water quality permit. Monitoring would ensure that increases in turbidity over background conditions would not exceed levels specified by the Central Valley Water Board. Section 401 permits require preparation and implementation of an erosion control plan and/or a stormwater pollution prevention plan (SWPPP). At a minimum, the plan would contain the following types of BMPs:

- Complete re-vegetation and stabilization of disturbed soils in the project footprint, including stream banks.
- Placement of interceptor ditches to direct water away from the tops of cut-and-fill slopes.
- Implementation of Central Valley Water Board-approved BMPs for sediment catch basins or traps to prevent sediment from being transported away from construction sites. These would be designed to minimize impacts to riparian, wetland, and open-water areas. Traps to be considered could include filter berms, straw-bale barriers, filter inlets, vegetative filter strips, culvert risers, coir and straw logs, and other erosion control BMPs as approved by the Central Valley Water Board.
- Provisions of the erosion control plan and SWPPP (if required) would be included in conditions of the Streambed Alteration Agreement pursuant to Sections 1600-1606 of the Fish and Game Code.

BMP BIO 6 —Special Status Non-Salmonids and Salmonid Species—Explosive Impacts.

- Avoid impacts to aquatic species by excluding, moving, or frightening individuals away from area prior to blasting. Must be undertaken using proper handling techniques and strategies that would avoid or minimize stress.
- Implement sediment and erosion controls to mitigate erosion of exposed soils to adjacent waterbody (e.g., erosion control fencing, fabrics, straw, straw bales, settling ponds).

Summary. Implementation of the No Action Alternative would result in a less than significant CEQA impact to biological resources in the Project Area, because the No Action Alternative would not cause an adverse change to current conditions related to any biological resources. Under NEPA, the No Action Alternative would result in low impact due to some of the conservation strategies not being implemented, as described above. Construction, operations, and maintenance activities have the potential for short-term discharges of sediments and pollutants, and possibility of direct loss of special status non-salmonid and salmonid individuals within the Project site vicinity. The implementation of BMPs would minimize these impacts such that they would be minor (furthermore, this minimization would be to the maximum extent practicable) through the use of erosion control, conducting construction and maintenance activities during the time period when special status fish species are not present in the work area, and returning stream habitat to its original condition where possible.

5.2.6 Hazardous & Toxic Materials

Under the No Action Alternative, SEWD's Old Calaveras Headworks Facility (OM2), SEWD's installation/removal of flashboard dams (OM3 and OM4), maintenance of privately owned diversions (OM4), and maintenance of instream structures (OM6) might require earthmoving procedures. Ground disturbance would be conducted in a manner similar to what occurs under current conditions and would not represent new sources of pollutants within the action area. Nor would the No Action Alternative induce significant changes in relation to the use or transport of hazardous materials. These activities may include use of small quantities of commercially-available hazardous materials such as ordinary equipment fuels and fluids (e.g.,

gas and diesel fuel) that would typically be used by vehicles and equipment. Petroleum products such as diesel fuel, oil, and unleaded gasoline are the primary hazardous materials associated with equipment that may be used within the Project sites. There is a low potential that a release of hazardous material may occur during these activities. However, the District would utilize construction BMPs (identified below) during the implementation of operational and maintenance activities to minimize or avoid impacts from hazardous and toxic materials. The BMPs would ensure that handling of materials during periodic construction and maintenance activities as described for OM2, OM3, OM4, OM5, and OM6 would not create a hazard to the public or the environment.

Project sites would not be located within one-quarter mile of an existing or proposed school. Therefore, there would be no impact from hazardous and toxic materials within the vicinity of schools under the No Action Alternative.

There are only two hazardous waste sites in the local area known to have utilized hazardous materials that would have the potential expose people to potential health hazards associated with soils, groundwater and/or surface water contamination. Both the American Moulding and Millwork McCormick & Baxter Superfund Sites are outside of the Project boundary and pose no threat to surface or groundwater or persons in the vicinity of the Project Area. Therefore, there would be no impacts from hazardous and toxic materials associated within pre-existing hazardous waste sites under the No Action Alternative.

Project sites would not be located within areas that may affect public airport, public use airport, or private airstrips. Therefore, there would be no impacts from hazardous and toxic materials within the vicinity of airports under the No Action Alternative.

Vehicles and equipment would access Project sites via levee roads and would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. Therefore, there would be no impacts from hazardous and toxic materials to implementation of these plans under the No Action Alternative.

Project sites would be located primarily in rural areas that could be susceptible to wildfires. Maintenance SEWD's Old Calaveras Headworks Facility (OM2), installation/removal of flashboard dams (OM3 and OM4), privately owned diversions (OM5), and maintenance of instream structures (OM6) would occur at existing instream structures and there would be little additional exposure to wildfire as a result. Therefore, there would be no impact associated with wildfires under the No Action Alternative.

<u>BMP HAZ-1—Potential Spills of Hazardous Materials.</u>

The District would develop and implement a Hazardous Materials Management Plan that includes specific information describing: 1) how the District intends to safely transport and store fuels, oils, and conduct fueling and equipment maintenance operations; and 2) procedures requiring work crews to have on hand at all times adequate absorbent materials and containment booms to handle a spill equivalent to the largest container of fuels or oil in their

possession in the event of a release of a hazardous material into water or onto land. The plan would contain, at a minimum, the following BMPs:

- Hazardous materials will not be drained onto the ground, into streams, or into drainage areas.
- All construction waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials, will be removed to a disposal facility authorized to accept such materials.
- Waters or soils contaminated with construction material will be disposed of in a suitable location to prevent discharge to surface waters.
- Vehicles will be inspected and maintained to reduce the potential for leaks or spills of oils, grease, or hydraulic fluids.
- Hazardous materials will not be stored at the Project site.
- No vehicles will be refueled at Project sites.

Summary. Implementation of the No Action Alternative would result in a less than significant/no significant impact to hazardous and toxic materials in the Project Area, because the No Action Alternative would not cause an adverse change to current conditions related to any hazardous and toxic materials. Construction and maintenance activities would have the potential for short-term, minimal quantity discharges of hazardous and toxic materials within Project site vicinities, but implementation of BMPs would minimize these impacts.

5.2.7 Hydrology and Water Quality

Under the No Action Alternative, SEWD's Old Calaveras Headworks Facility (OM2), SEWD's installation/removal of flashboard dams (OM3 and OM4), privately owned diversions (OM5), and maintenance of instream structures (OM6) might require earthmoving procedures. Ground disturbance would be conducted in a manner similar to what occurs under current conditions. These activities have the potential to temporarily discharge sediments and pollutants into surface waters including sediment removal and re-construction of the McGurk Earth Dam, which is typically conducted in conjunction with the installation of flashboards at the Bellota Weir in the spring (on or about April 15) and flashboard dam removal in the fall (on or about October 15). The flashboard dam installation and removal processes can each take up to two weeks. Also, periodic instream maintenance activities have the potential to discharge sediments and pollutants into surface waters during the use of heavy equipment. However, these activities typically occur when the channels are already dry (either naturally or due to flow blockage by installation of uppermost flashboard dam or closure of slide gates) and no flow changes are necessary except as noted for the installation and removal of the Bellota Weir. The District would utilize BMPs (identified below) during the implementation of construction and maintenance activities to minimize or avoid impacts to water quality. BMPs would ensure that discharge of sediments and pollutants during periodic construction and maintenance (OM2, OM3, OM4, OM5, and OM6) would not violate any water quality standards under the No Action Alternative.

Under the No Action Alternative, the District would operate and maintain its facilities to deliver water supplies in a similar pattern and frequency as current water deliveries. The No

Action Alternative would not alter the total amount of water allotted to the two SEWD and CCWD; only the allocation between SEWD and CCWD would change as CCWD built up to full use of its 43.5% entitlement. However, if— as a result of allocation redistribution—flows are reduced during the irrigation season so that agricultural customers, who typically rely on diverting water from the river, resort to pumping groundwater to meet their irrigation demands, this action may result in potentially significant impacts to groundwater resources. Without the introduction of supplemental water supplies and a more aggressive program for groundwater management, groundwater pumping would continue to decrease water levels in the San Joaquin Ground Water Basin and apply more pressure on the Calaveras River surface water system, which could have an impact on groundwater supplies and recharge. A Conjunctive Use Program is under development (see Section 5.5), whose purpose would be to augment the existing insufficient groundwater recharge supply by obtaining water from local streams for water protection and overdraft correction. Groundwater augmentation would be considered a beneficial effect, as the groundwater basin is currently critically over-drafted.

Activities under the No Action Alternative would not alter the stream course or alignment of any river or creek channels that comprise the Project Area. The No Action Alternative would not add any impervious land areas along the stream bank that could affect existing storm runoff volumes. Therefore, there would be no impact associated with erosion from drainage pattern alterations under the No Action Alternative.

Activities under the No Action Alternative would not alter any existing dam inundation areas or require alteration of the existing emergency procedure plans. The No Action Alternative would be contained within the existing creek alignment and would not substantially alter the existing drainage patterns, alter the course of the lower Calaveras River (via both the Old Calaveras River channel and Mormon Slough/Stockton Diverting Canal routes), or increase the rate or amount of surface runoff in a manner that would result in flooding. Therefore, there would be no impact to flooding under the No Action Alternative.

Activities under the No Action Alternative would not place housing in the 100-year flood hazard area. Instream structures are pre-existing and are designed to minimize impedance of flood flows. Therefore, there would be no impact to structures or flood flows within the flood hazard area under the No Action Alternative Alterative.

Activities under the No Action Alternative would not affect the integrity of levees within the Project vicinity. Therefore, there would be no impact to levees under the No Action Alternative Alterative.

Activities under the No Action Alternative would not contribute to inundation by seiche, tsunami, or mudflow. Therefore, there would be no impact associated with inundation under the No Action Alternative.

<u>BMP HYDRO 1—Water Quality associated with Construction and Instream Structure Maintenance.</u>

Standard procedures (prescribed in the general National Pollution Discharge Elimination System (NPDES) dewatering permit issued by the RWQCB, the general NPDES permit for

Construction Activities issued by the RWQCB, and the Area-wide Urban Stormwater Runoff Permit for San Joaquin County issued by the RWQCB) to minimize potential disturbance to surface waters are implemented, which include the following BMPs:

- All equipment maintenance would be conducted at a SEWD maintenance yard designated for such purposes. This maintenance area would include appropriate protection from soil contamination through the use of impervious barriers.
- All storage areas for oils, solvents, coolants, wastes, and other miscellaneous fluids used to operate the District's equipment would be covered and protected with secondary containment structures such as lined troughs to prevent leakage from drums, barrels, cans, or other primary structures.
- Disposal containers for oils, solvents, hydraulic fluids, coolants, and other filter and chemical wastes from maintenance activities should be located outside of the project area, within a designated maintenance facility. Disposal of these wastes shall be conducted in accordance with California Administrative Code Title 22 regulations.
- Grading activities will implement erosion and sediment control measures.
- SEWD will prepare a construction SWPPP and implement appropriate measures.

BMP HYDRO 2—General Increased Turbidity.

If applicable (i.e., there is flowing water during construction activities), the District would monitor turbidity levels upstream and downstream of the point of construction activities, as required by the California Regional Water Quality Control Board – Central Valley Region (RWQCB). Measurements would be taken up to four times daily when construction activities potentially have the greatest water quality impact. If turbidity increases exceeded 20 percent, actions would be implemented immediately to reduce and maintain turbidity below the 20 percent level. Actions could include use of suspended silt curtains, cessation of construction activities, or reduction of construction activities until turbidity standards are achieved.

Summary. Implementation of the No Action Alternative would result in a less than significant/no significant impact to hydrology or water quality in the Project Area, because the No Action Alternative would not cause an adverse change to current conditions related to hydrologic resources. Construction, operations, and maintenance activities would have short-term effects on discharge of pollutants and sediments, but implementation of BMPs would minimize these impacts. Implementation of new monitoring should improve water quality conditions overall as maintenance activities would cease if the thresholds described above are exceeded. The monitoring would ensure that any water quality exceedances experienced are of short-duration thus minimizing the impact to aquatic resources.

5.2.8 Recreation

New Hogan Reservoir water impoundment and non-flood control operations (OM1) and water deliveries (OM2 to OM5) may affect flow patterns, which may in turn impact recreational visitor experiences including fishing and trail and interpretive educational uses. However, there would be no recreational facilities associated with the No Action Alternative and no designated public recreation areas within the Project Area except the area directly below New Hogan Dam,

which is managed by the USACE as part of the larger New Hogan Reservoir Recreation Area. Nor would No Action Alternative activities influence any expansion of this recreational facility or construction of new recreational facilities. Therefore, there would be no impact to recreational facilities under the No Action Alternative.

Construction and maintenance of instream structures (e.g., flashboard dams, low flow crossings) could temporarily render levees impassable for trail use for short periods of time interfering with recreational trail use. However, with the exception of Reach 1, existing trail use is an unsanctioned activity. Implementation of BMP REC-1 would minimize impacts associated with trail closures to the maximum extent practicable.

BMP REC-1—Trail Closure.

While trail use is primarily informal and unsanctioned, adequate signage indicating schedule of activities requiring closure of recreational trails will reduce temporary conflicts between recreational users and work crews conducting maintenance and construction activities.

Summary. Implementation of the No Action Alternative would result in a less than significant/no significant impact to recreation in the Project Area. The No Action Alternative would not cause an adverse change to current conditions related to recreational resources. Recreational use in the project area is low. Closure of recreational trails may occur during construction and maintenance activities but would be short-term in nature and affect few recreationalists.

5.2.9 Transportation

Vehicle use for activities under the No Action Alternative would not differ largely from the periodic installation/removal and maintenance activities that have been part of the traffic load for many years and continuation of these activities would not cause an increase in traffic. Regional traffic trips would remain similar. There may be short-term traffic impacts during construction activities that could result in delays on the local roadway system due to haul trucks and construction equipment accessing the Project Area. The District would utilize BMPs (BMP TRANS-1) to minimize these impacts to traffic to the maximum extent practicable.

Activities under the No Action Alternative would not exceed the level-of-service standard established by the San Joaquin County Congestion Management Plan (SJCCMP). Therefore, there would be no impact associated with SJCCMP compliance from the No Action Alternative.

Activities under the No Action Alternative would not result in a change in air traffic patterns. Therefore, there would be no impact to air traffic from the No Action Alternative.

Activities under the No Action Alternative would not increase the risk of transportation hazards or change uses of roadways or cause incompatible uses to occur. Therefore, there would be no impact associated with transportation hazards from the No Action Alternative.

No Action Alternative maintenance and construction activities would be associated with levee roads, so these activities would not result in inadequate emergency vehicle access to service areas or inadequate parking capacity. Therefore, there would be no impact to emergency access or parking capacity from the No Action Alternative.

Activities under the No Action Alternative would not cause conflicts with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks). Therefore, there would be no impact to alternative transportation from the No Action Alternative.

BMP TRANS-1 – Construction Vehicle Traffic.

Preparation of a haul route access plan will minimize potential conflicts between construction activities and general traffic and will reduce these short-term impacts to a less than significant level.

Summary. Implementation of the No Action Alternative would result in less than significant/no significant impacts to transportation in the Project Area, because the No Action Alternative would not cause an adverse change to current conditions related to transportation resources. Infrequent, short-term traffic delays may occur during construction activities due to the transport of construction equipment and materials. The proposed construction activities would be located in rural areas with low traffic levels, so the potential number of people impacted would be low. Planning of haul routes to and from the river construction site could largely prevent traffic delays.

5.3 Effects from Proposed Action

5.3.1 Agricultural Resources

Similar to the No Action Alternative, the District would operate and maintain their facilities to deliver water supplies in a similar pattern and frequency under the Proposed Action as under current water deliveries. Since water deliveries would be essentially the same, crop production types and procedures during the irrigation season are expected to remain similar to current conditions. As currently being done, water deliveries would be expected to be beneficial by reducing use of groundwater by agricultural users in an already critically over-drafted groundwater basin. However, under the Proposed Action, installation of fish screens at individual private agricultural diversions (CS14) could be an economic burden to agricultural customers if there are no public assistance funds available for screen installation. To ensure that the Proposed Action would not directly or indirectly result in conversion of farmland (including prime farmland, unique farmland, or farmland of statewide importance) to non-agricultural use as a result of overburdening agricultural customers with capital expenditures, the CHCP calls for several provisions:

- Conducting a stakeholder workshop within six months of the ITP issuance to educate private diverters regarding fish entrainment issues and how to obtain funding for screening individual diversions.
- Helping landowners locate and apply for funding opportunities that will allow cost-effective placement of screens at their facilities, including a capital amortization program to help landowners offset some of their construction costs.
- Implementing a stakeholder educational program via periodic workshops, annual newsletters and a regularly updated website to ensure that local landowners understand: 1) basin fishery issues; 2) their role in providing good fishery conditions; and 3) the potential adaptations to agricultural operations needed to conserve fish (e.g., delay of flashboard dam installation and water diversions if it is determined that watering of certain crops can be initiated later in the spring).
- Providing advisory assistance to the landowners to ensure that they understand the ESA issues and requirements necessary for installing a screen at their diversion structure.
- Through the AMP process, identify and prioritize diversion facilities for screening, and develop an implementation schedule for individual facilities.

The intention of these provisions is to allow for the implementation of CS14 for the protection of fish species in the Calaveras River, while preventing conversion of farmland to non-agricultural use and not inducing changes to current crop production types and procedures or the timing/volume of water supplied during the irrigation season. With implementation of these CHCP provisions, there would be minimal economic effect to agricultural customers because of the focus on capital amortization, grants, funding through state and federal screening programs and other financial assistance programs to accomplish the needed screening at high priority sites. Therefore, there would be less than significant/no significant impacts to agricultural resources under the Proposed Action.

Summary. Implementation of the Proposed Action (i.e., issuance of an ITP and implementation of the proposed CHCP) would result in a less than significant/no significant impact to agricultural resources in the Project Area. The purpose of the CHCP is to reduce potential "incidental take" of listed fish while continuing to provide approximately 50,000 acre feet of surface water annually to the District's agricultural service area. None of the elements of the CHCP's conservation strategies or monitoring activities would cause physical changes that would result in the conversion of farmland to non-agricultural uses or induce changes in crop production types and procedures or the timing/volume of water supplied during the irrigation season. Agricultural diversion fish screening measures may impose some economic burden to agricultural customers; however, provisions in the CHCP reduce the possibility of overburdening agricultural customers with capital expenditures to an insignificant level. Considering the context and intensity of such effects, these impacts are not considered significant.

5.3.2 Air Quality

Similar to the No Action Alternative, the Proposed Action would not substantially increase vehicle emissions, except there would be a greater use of construction vehicles to build additional facilities associated with the fish passage facilities and other fish-friendly structural

components (e.g., the facility improvements at the Bellota Diversion Facility and the Old Calaveras River Headworks Facility). Under the Proposed Action, use of vehicles or construction equipment during implementation of short-duration construction and maintenance activities for both ongoing maintenance (OM2, OM3, OM4, OM5, OM6) and conservation strategies (CS7, CS8 to CS11, CS14, and CS16) would be similar to what has occurred under existing conditions. Therefore, while the Proposed Action sites would be located within a non-attainment area for federal ozone and PM, $PM_{2.5}$ and PM_{10} standards, limited vehicle emissions associated with construction and maintenance activities would have no impact on compliance with the applicable air quality plan under the Proposed Action Alternative.

Air pollutant emissions would not differ greatly from those generated during periodic construction and maintenance activities that have been part of the regional area for many years and continuation of these activities, as well as implementation of BMPs as described under the No Action Alternative (BMP AIR-1), would minimize impacts associated with air pollutant emissions such that they would be considered minor; furthermore, such minimization would be to the maximum extent practicable under the Proposed Action Alternative.

In the context of existing practices, the small disturbance areas, moist soils, and brief nature of the work, emissions from construction and maintenance activities would be negligible. Therefore, there would be no impact associated with air pollutants to sensitive receptors under the Proposed Action Alternative.

Summary. Implementation of the Proposed Action (i.e., issuance of an ITP and implementation of the proposed CHCP) would result in a less than significant/no significant impact to air quality in the Project Area. Similar to the No Action Alternative, construction and maintenance activities associated with conservation strategies would have short-term and minimal effects on vehicle emissions, fugitive dust, and equipment exhaust during the construction period. These effects would be somewhat greater than in the No Action Alternative due to the large construction activity proposed at Bellota for fish passage and diversion screening, however, implementation of BMPs would minimize these impacts such that they would be minor; furthermore, such minimization would be to the maximum extent practicable. Taking into account the context and intensity of such effects, these impacts are not considered significant.

5.3.3 Cultural and Historical Resources

Similar to the No Action Alternative, under the Proposed Action, construction and maintenance related activities might require earthmoving procedures (OM2, OM3, OM4, OM5, OM6). The District would utilize cultural resources BMPs (BMP CULT-1a, CULT-1b, and CULT-2) as described under the No Action Alternative to ensure that impacts to prehistoric and historic archaeological sites, paleontological resources, and any human remains encountered are minor.

Under the Proposed Action, conservation strategies (CS7, CS8 to CS11, CS14, and CS16) would be implemented, which may involve additional earthmoving activities. Similar to the No Action Alternative, earthmoving procedures would have the potential to impact:

- Prehistoric archaeological resources.
- Historic-period archaeological resources in the project area, which could include settlements/homesteads, transportation-related resources, mining-related resources, cemeteries, and river crossings. In addition, any equipment, infrastructure, or facilities related to water resource management, such as fish ladders, dams, or gauging stations, over 50 years of age are considered historic-period resources and need to be addressed at the project-level when encountered.
- Paleontological resources.

During construction and maintenance activities, historic, archeological or paleontological resources may be disturbed, however, the District would continue to utilize cultural resources BMPs as described under the No Action Alternative (BMP CULT-1a and CULT-1b) to ensure that impacts to prehistoric and historic archaeological sites, and paleontological resources would be minor; furthermore, such minimization would be to the maximum extent practicable.

During construction and maintenance activities, the District would also continue to utilize cultural resources BMPs as described under the No Action Alternative (BMP CULT-2) to ensure that the impact to any human remains encountered would be minor; furthermore, such minimization would be to the maximum extent practicable.

Summary. Implementation of the Proposed Action (i.e., issuance of an ITP and implementation of the proposed CHCP) would result in less than significant/no significant impact to cultural and historical resources in the Project Area. Similar to the No Action Alternative, construction and maintenance activities may temporarily disturb archeological and paleontological sites. However, implementation of BMPs would minimize these impacts such that they would be minor. Furthermore, since the areas that would be maintained by the District has already been encountered here, the number of new cultural resources that would be encountered during the ongoing activities under this alternative are expected to be few, if any.

5.3.4 Geology, Soils, and Seismicity

Similar to the No Action Alternative, the Proposed Action involves modification of existing instream structures (e.g., flashboard dams, low flow crossings) that would be located within a seismically active area, but modifications would not increase seismic hazards to levels significantly above No Action Alternative conditions. However, under the Proposed Action, there would be more frequent earthmoving activities such as loosening and removing soil and sediment from one area to another, as a result of implementation of C6, CS8, CS11, and CS15.

Summary. Implementation of the Proposed Action (i.e., issuance of an ITP and implementation of the proposed CHCP) would result in a less than significant/no significant impacts to geology, soils, and seismicity in the Project Area. Similar to the No Action Alternative, there may be some soil erosion associated with construction and maintenance activities under the Proposed Action; however, implementation of BMPs would minimize these impacts such that they would be both minor and minimized to the maximum extent practicable. With sediment control practices in place, impacts to soil erosion would be unlikely to exceed acceptable levels, and impacts to aquatic resources would be short in duration and

minimal overall. Considering the context and intensity of such effects, these impacts are not considered significant.

5.3.5 Biological Resources

Implementation of the Proposed Action's conservation strategies and monitoring activities summarized in Table 2 are intended to minimize incidental take of salmonids associated with the No Action Alternative operations and maintenance (Table 8) to the maximum extent practicable. As a result, several beneficial effects would be expected, including:

1) protection of important salmonid spawning, incubation, and rearing habitats above Bellota;
2) improved access into/out of the 18-mile spawning and rearing reach between Bellota and New Hogan Dam;
3) minimized entrainment at diversion structures;
4) adequate water quality conditions for salmonids downstream of Project sites during construction and maintenance activities;
5) minimized mortalities during fisheries investigations; and
6) improved fisheries habitat through the placement of diversion screens and the construction of fish passage improvements.

Although conservation strategies are intended to minimize incidental take of salmonids, construction, operations, and maintenance activities under the Proposed Action may impact special status species (non-salmonids and salmonids) similar to the No Action Alternative within the vicinity of Project sites. Under both alternatives, SEWD's installation/removal of flashboard dams (OM3 and OM54 or maintenance of instream structures (OM6) might require earthmoving procedures. In addition, under the Proposed Action Alternative, the construction activities at Bellota Dam for fish passage (CS7) would involve additional earthmoving activities. These activities may impact special status salmon and non-salmonid species and disturb their habitats within the vicinity of the Project.

For salmonid species, similar to the No Action Alternative, individual fish may be temporarily disturbed during construction activities impacting feeding or refugia seeking behavior. Construction activities would take place when salmonids are unlikely to occur in the project area such as during periods of low water flow or elevated water temperatures and outside of the spawning and migration period for steelhead and Chinook salmon. Construction activities would not occur in spawning habitat areas. Streambed disturbance would be temporary in nature, impact a relatively small area of the stream, and not change the rearing and migration habitat functions for these fish. For purposes of this EA/IS, potential effects to salmonids in terms of incidental take are summarized in Table 8. During construction, operations, and maintenance activities, the District would continue to utilize BMPs as described under the No Action Alternative (BMP BIO-1 to BMP BIO-6) to minimize or avoid impacts to biological resources to the maximum extent practicable under the Proposed Action Alternative.

Proposed Action activities would not be located within areas where local policies or ordinances protecting biological resources (e.g., a tree preservation policy or ordinance) are established.

Therefore, there would be no impact to local policies or ordinances under the Proposed Action Alternative.

Similar to the No Action Alternative, the District would continue to utilize BMPs described under the No Action Alternative (BMP BIO-1 to BMP BIO-3) that are consistent with provisions of the SJMSCP (SJCOG 2000) to minimize or avoid adverse effects to special status non-salmonid species. Therefore, there would be no effect on the ability to implement an existing habitat conservation plan under the Proposed Action Alternative.

Summary. Implementation of the Proposed Action (i.e., issuance of an ITP and implementation of the proposed CHCP) would result in a less than significant/no significant impact to special status species in the Project Area. Under the Proposed Action, environmental conditions would be similar as described under the No Action Alternative, except there would be 1) a beneficial impact for salmonids and their habitat as a result of fish passage improvements and implementation of all CS and 2) potential temporary impacts to special status species during construction of fish passage facilities. Construction, operations, and maintenance activities would have the potential for short-term discharges of sediments and pollutants, and possibility of direct loss of special status non-salmonid and salmonid individuals within the Project site vicinity. Similar to the No Action Alternative (as described above), construction and maintenance activities may temporarily disturb special status species; however, the implementation of BMPs would minimize these impacts to the maximum extent practicable through the use of erosion control, conducting construction and maintenance activities during the time period when special status fish species would not be present in the work area, and returning stream and riparian habitats to their original condition.

5.3.6 Hazardous & Toxic Materials

Similar to the No Action Alternative, construction and maintenance activities under the Proposed Action may include use of small quantities of commercially-available hazardous materials such as ordinary equipment fuels and fluids (e.g., gas and diesel fuel) that would typically be used by construction and maintenance vehicles. The Proposed Action would not induce significant changes in relation to the use or transport of hazardous materials during performance of future fisheries improvements and periodic maintenance activities. Similar to the No Action Alternative, there would be a low potential that a release of hazardous material might occur during these activities. However, the District would continue to utilize BMPs as described under the No Action Alternative (BMP HAZ-1) during the implementation of operational and maintenance activities to minimize or avoid impacts from hazardous and toxic materials to the maximum extent practicable. BMPs would ensure that handling of materials during periodic construction and maintenance activities would not create a hazard to the public or the environment.

Similar to the No Action Alternative, Project sites would be located primarily in rural areas that could be susceptible to wildfires. Construction and maintenance would occur at existing instream structures and, as a result, there would be little additional exposure to wildfire. Therefore, there would be no impact associated with wildfires under the Proposed Action Alternative.

Summary. Implementation of the Proposed Action would result in a less than significant/no significant impact to hazardous and toxic materials in the Project Area. Similar to the No Action Alternative, construction and maintenance activities have the potential for short-term, minimal quantity discharges of hazardous and toxic materials within Project site vicinities, but implementation of BMPs would minimize these impacts to the maximum extent practicable.

5.3.7 Hydrology and Water Quality

Under the Proposed Action, construction, operation, and maintenance activities might require earthmoving procedures for SEWD's installation/removal of flashboard dams, and maintenance of instream structures. Similar to the No Action Alternative, construction, operation, and maintenance activities would have the potential to temporarily discharge sediments and pollutants into surface waters. Similar to the No Action Alternative, the District would continue to utilize BMPs described under the No Action Alternative (BMP HYDRO-1, and BMP HYDRO-2) during the implementation of construction and maintenance activities to minimize or avoid impacts to water quality to the maximum extent practicable. BMPs would ensure that discharge of sediments and pollutants during periodic construction and maintenance would not violate any water quality standards under the Proposed Action Alternative.

During the installation/removal of the flashboard dams, the District would continue to implement its water deliveries for their customers during irrigation season (mid-April to mid-October) as it is currently being done. Minimum water flows would not be impacted by SEWD's installation/removal of flashboard dams, and maintenance of instream structures. There may be minor turbidity changes to the water during the removal of flashboards as sediment may build up over the irrigation season behind the flashboards dams and wash downstream as each flashboard dam is being pulled up. However, the removal of flashboard dams would occur before adult salmon and steelhead come up the river to spawn in the upper reaches of the Calaveras River and would not likely be impacted by the turbidity. Additionally, the sediment would quickly dissipate and settle in the river.

The Proposed Action Alternative would not represent a significant change to the District's water supply deliveries or amount of water allotted to SEWD despite implementing minimum flows for salmonids (CS1), fall storage management (CS2), and flood control release coordination (CS3). These activities would not require more water to be diverted or significantly change flow from the river in a manner that would impact aquatic resources. Similar to the No Action Alternative, there would only be a potential for impacts on groundwater resources if allocation redistributions result in shifts of surface water withdrawals to groundwater withdrawals by agricultural customers. Groundwater augmentation through a Conjunctive Use Program under development (see Section 5.5) would minimize these impacts and be considered a beneficial effect.

Summary. Implementation of the Proposed Action would result in a less than significant/no significant impact to hydrology or water quality in the Project Area. Similar to the No Action Alternative, construction and maintenance activities would have short-term effects on

discharge of pollutants and sediments, but implementation of BMPs would minimize these impacts such that they are minor and minimize to the maximum extent practicable. Implementation of new monitoring should improve water quality conditions overall as maintenance activities would cease if the thresholds described above are exceeded. The monitoring would ensure that any water quality exceedances experienced are of short-duration thus minimizing the impact to aquatic resources.

5.3.8 Recreation

Under the Proposed Action, flow management may impact recreational visitor experiences similar to the No Action Alternative. There would be no new recreational facilities associated with the Proposed Action, and activities would not lead to expansion of an existing non-Project recreational facility or construction of new facilities. Therefore, there would be no impact to recreational facilities under the Proposed Action Alternative.

Construction and maintenance at pre-existing instream structures (e.g., flashboard dams, low flow crossings) could temporarily render levees impassible for trail use for short periods of time in a manner similar to the No Action Alternative interfering with recreational trail use. However, the District's continued implementation of BMPs as described under the No Action Alternative (BMP REC-1) would minimize impacts associated with trail closures to the maximum extent practicable.

Summary. Implementation of the Proposed Action would result in a less than significant/no significant impact to recreation in the Project Area. Recreational use in the Project area is low. Similar to the No Action Alternative, closure of recreational trails may occur during construction and maintenance activities but would be short-term in nature and affect few recreationalists.

5.3.9 Transportation

Vehicle use and regional traffic trips for activities under the Proposed Action Alternative would not differ largely from usage during No Action Alternative; construction and maintenance activities and continuation of these similar activities would not cause an increase in traffic.

Similar to the No Action Alternative, there may be short-term traffic impacts during construction activities that could result in delays on the local roadway system due to haul trucks and construction equipment accessing the Project Area. The District would continue to utilize BMPs as described under the No Action Alternative (BMP TRANS-1) to minimize these impacts to traffic to the maximum extent practicable.

Similar to the No Action Alternative, activities under the Proposed Action Alternative would not result in exceedance of the level-of-service standard established by the SJCCMP. Therefore, there would be no impact associated with SJCCMP compliance from the Proposed Action Alternative.

Similar to the No Action Alternative, activities under the Proposed Action would not result in a change in air traffic patterns. Therefore, there would be no impact to air traffic from the Proposed Action Alternative.

Similar to the No Action Alternative, activities under the Proposed Action would not increase the risk of transportation hazards or change uses of roadways or cause incompatible uses to occur. Therefore, there would be no impact associated with transportation hazards from the Proposed Action Alternative.

Similar to the No Action Alternative, maintenance and construction activities under the Proposed Action would be associated with levee roads so these activities would not result in inadequate emergency vehicle access to service areas or inadequate parking capacity. Therefore, there would be no impact to emergency access or parking capacity from the Proposed Action Alternative.

Similar to the No Action Alternative, activities under the Proposed Action would not cause conflicts with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks). Therefore, there would be no impact to alternative transportation from the Proposed Action Alternative.

Summary. Implementation of the Proposed Action would result in a less than significant/no significant impact to transportation in the Project Area. Similar to the No Action Alternative, short-term traffic delays may occur during construction activities, due to the transport of construction equipment and materials. The proposed construction activities would be located in rural areas with low traffic levels; thus, the potential number of people impacted would be low. Planning of haul routes to and from the river construction sites could largely prevent traffic delays.

5.4 Climate Change

Climate change is defined as any significant change in climate metrics, including temperature, precipitation, and wind patterns, over a period of time (U.S. EPA Glossary of Climate Change Terms, http://www.epa.gov/climatechange/glossary.html#C). The effects of climate change most people refer to today stems from "global warming," a relatively recent phenomenon of rising average temperatures across the globe. The temperature increase is thought to be due in large part to the human-induced increase in greenhouses gas emissions released into the atmosphere as a result of combustion. Common greenhouse gases (GHG) such as carbon dioxide, methane, and nitrous oxide trap radiant heat from the earth causing the average temperature to rise. Climate change research in reports from the United Nations Intergovernmental Panel on Climate Change (IPCC) (www.ipcc.ch), U.S. Climate Change Science Program's Science Synthesis and Assessment Products, and the U.S. Global Change Research Program, conclude that earth's climate is already changing. This change is expected to accelerate and human GHG emissions, primarily carbon dioxide emissions (CO_2), are the main source of accelerated climate change. This rise in temperature changes the climate worldwide and have already and will continue to cause or increase the severity of droughts, flooding, wildfires, and food and water shortages (USDA Forest Service guidance).

The alternatives would not be expected to affect climate change. The purpose of the Proposed Action is to protect and conserve the California Central Valley steelhead and multiple runs of Chinook salmon that opportunistically utilize the Calaveras River and to allow take of listed species, as provided for under Section 10(a)(1)(B) of the ESA. The implementation of the CHCP's Conservation Program includes management and enhancement actions that might require the occasional use of construction vehicles. The contribution of GHG emissions from these actions is expected to be minimal and those associated with instream structural improvement actions have previously been evaluated in the *Lower Calaveras River Anadromous Fish Barrier Removal Project* (FISHBIO 2009).

According to EPA (1997):

> based on projections given by the Intergovernmental Panel on Climate Change and results from the United Kingdom Hadley Centre's climate model (HadCM2), a model that accounts for both greenhouse gases and aerosols, by 2100 temperatures in California could increase by about 5°F (with a range of 2-9°F) in the winter and summer and slightly less in the spring and fall. Appreciable increases in precipitation are projected: 20-30% (with a range of 10-50%) in spring and fall, with somewhat larger increases in winter. Little change is projected for summer. The amount of precipitation on extreme wet days most likely would increase, especially in the winter and fall, and there could be a decrease in the number of long dry spells and an increase in the number of long wet spells.

Climate change in the Central Valley is anticipated to increase the amount of precipitation that falls as rain instead of snow, which poses potential problems for most tributaries because they are snow-melt driven. Under current conditions, snow-melt reservoir storage results in suitable cold-water conditions downstream of dams for extended periods through the summer and early fall. But, as snow-melt storage is replaced by warmer water from rain runoff, the period for suitable cold-water conditions downstream of existing dams is anticipated to be reduced. Without a cold-water pool developed from melting snow pack filling reservoirs in the spring and early summer, temperatures downstream of these reservoirs may rise above thermal tolerances for any juvenile and adult salmonids that may be present in late summer and fall.

However, unlike the majority of snow-fed tributaries, the Calaveras River is already a rainfall-dominated system, so projected increases in precipitation may result in benefits to salmonids through creating increased winter and spring migration opportunities. On the other hand, climate change is also expected to increase ambient air temperatures that have a potential to affect over-summer rearing water temperatures for any salmonids that may be present, possibly negating the potential benefits of increased flows. Any impacts to California Central Valley steelhead or Chinook salmon in the Calaveras River associated with climate change would occur with or without implementation of the Proposed Action. Lastly, the adaptive management process under the CHCP would help to ensure that individual actions and projects would be modified as necessary in order to maximize their success and beneficial impacts towards the Covered Species.

5.5 Cumulative Impacts

Cumulative impacts are those that result from incremental impacts of the project when added to other past, present, and reasonably foreseeable actions within the study area. Cumulative impacts can result from individually minor, but collectively significant actions that take place over a period of time. The following projects or activities may contribute to cumulative impacts.

Caltrans Routine Maintenance Activities: Caltrans proposes to perform routine maintenance activities in Alpine, Amador, Calaveras, and San Joaquin counties. These activities include minor vegetation and sediment removal in the vicinity of Caltrans' bridges, culverts and channels for the sole purpose of maintaining flows. These impacts will be temporary and minor and will not result in adverse impacts to the Covered Species or other biological resources. Caltrans would implement BMPs to reduce and minimize any water quality impacts to the river and mitigate any removal or disturbance to vegetation (e.g. riparian planting plan). Therefore, these cumulative impacts would be negligible.

Levee Maintenance and Repair: Minor levee maintenance activities are ongoing in parts of the Project Area involving bank stability measures and vegetation control. No major levee repairs are occurring now. These activities, although ongoing, are minor and infrequent. Minor levee maintenance would be conducted outside of the water; however, BMPs would be implemented to minimize erosion and sediment and minimize impacts to water quality. Vegetation control would be minor as short grasses would be maintained on the levees and not result in adverse impacts to the habitat.

South Stockton Master Water Plan Update and Reservoir: Infrastructure improvements are planned to serve demands for future build-out of the South Stockton service area and to minimize additional groundwater pumping by providing surface water through a pipeline from the Stockton East Water District Drinking Water Treatment Plant, via the South Stockton Aqueduct project. This project would not contribute to cumulative impacts.

USACE Flood Operations at New Hogan Dam: The USACE flood control operations at New Hogan Dam can impact habitat conditions within the lower Calaveras River. Mormon Slough and the Stockton Diverting Canal are part of the flood operation infrastructure. Requirements of the 2002 NMFS Biological Opinion involved ramping rates for flood releases, coordination with SEWD regarding pattern of flow releases to benefit fish and spawning and side channel restoration below New Hogan Dam. These actions have been implemented and will have long-term beneficial cumulative impacts within the project area.

Farmington Groundwater Recharge Program: This Program would ultimately recharge up to 35,000 AF/year of water by implementing conjunctive management strategies for the utilization of available water resources. When surface water supplies are abundant, the Program's objective is to recharge the groundwater basin through in-lieu irrigation and partnerships with growers who rotate direct recharge activities with other land uses. Construction in the recharge cell areas would result in the cumulative loss of upland habitat consisting of non-native grasses and forbs which provide marginal nesting and foraging habitat

for rodents, songbirds and raptors. Constructing the recharge basins would add to emissions impacting air quality; these impacts would be short term and with the implementation of BMPs, impacts would be minimal. The recharge program would not affect instream flow conditions on the Calaveras River and so would not contribute to cumulative impacts to fisheries. The Program would provide beneficial cumulative impacts for groundwater quality and quantity in the region.

SEWD conducts ongoing assessments to identify any potential projects planned within waterways in its service boundaries since new project activities may influence SEWD's ability to fulfill its legal responsibilities to reduce and control the critical overdraft of the basin. No other operations-related projects are foreseeable within the study area with the exception of a possible SEWD's Water Supply Enhancement Project (WSEP) that is being processed to address the critical groundwater overdraft in the basin. The WSEP involves the diversion of surplus/flood flows on the Calaveras River and Littlejohn and Rock Creeks. Movement and delivery of water within the Calaveras River watershed under a potential future WSEP is unlikely to impact, or may benefit, water delivered for agricultural purposes; however, it could have adverse impacts on biological resources. Depending on how the program is implemented, new diversions that may occur at, or downstream of, Bellota could affect flows and water temperatures in migration routes downstream of Bellota resulting in impacts to anadromous fish migration.

Adverse cumulative impacts are not anticipated to occur as a result of the No Action or the Proposed Action when considering the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, which are described above. The District's operations have limited adverse individual impacts. The cumulative impact for the Proposed Action is considered to be beneficial to the Calaveras River environment as a whole.

6.0 Summary of Effects

In summary, the Proposed Action (issuance of an ITP and implementation of the CHCP) is likely to result in many beneficial effects including improvements to salmonid populations and their habitat in the basin. Additionally, the adaptive management process under the CHCP would help to ensure that individual actions and projects would be modified as necessary in order to maximize their success and beneficial impacts towards the Covered Species. The No Action Alternative (no issuance of an ITP and no implementation of the CHCP) would, in general, be a continuation of current conditions and have no effects for most resources, although it is anticipated many of the conservation strategies that have been voluntarily implemented by the District would cease, causing low impacts to salmonid species.

7.0 Agencies, Persons and References Consulted

CCWD
CDFW
City of Stockton
County of Calaveras
County of San Joaquin

FISHBIO
NMFS
SEWD
USFWS

8.0 References Consulted

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9.0 NMFS' Response to Public Comments

Item	Comment Letter Agency/Reviewer	Comment	NMFS' Response
1	California Sportfishing Protection Alliance	The draft EA/IS incorrectly assumes that, since the Bureau of Reclamation (Bureau), Stockton East Water District (SEWD) and Calaveras County Water District (CCWD) entered into a water supply contract for the entire yield of New Hogan Reservoir, SEWD is not required to provide flows to support fisheries and public trust resources downstream of Bellota, other than to manage the timing of flood control releases.	Currently, the Calaveras River does not have a minimum instream flow requirement in any section of the river below New Hogan Dam. The Calaveras River Habitat Conservation Plan provides dedicated instream flows to support salmon and steelhead rearing, spawning, and migration life stages in two ways: 1) Year-round minimum instream flow requirement of 20 cfs dedicated to the lower Calaveras River, equivalent to a minimum discharge of almost 14,500 acre-feet per year; and 2) Water released from New Hogan when storage exceeds 152,000 acre-feet on October 15, designed to assist in adult salmon and steelhead migration opportunities in and out of the spawning areas above Bellota. This release is independent of any other flood control releases that may occur throughout the year.

Item	Comment Letter Agency/Reviewer	Comment	NMFS' Response
2	California Sportfishing Protection Alliance	...the May 18, 2018 Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region, Sacramento River Basin and San Joaquin River Basin identifies the existing identified beneficial uses of the Calaveras River from New Hogan Reservoir to the Delta as warm and cold freshwater habitat, warm and cold migration, warm and cold spawning and wildlife habitat.1 Yet the draft EA/IS ignores these federally protected identified beneficial uses and fails to discuss and analyze how the HCP will ensure these uses will be protected below Bellota. This is compounded by the fact that the HCP proposes to exclude salmonids from the Old Calaveras River and fails to include any flow requirements below Bellota other than the management of the timing of flood control releases.	The HCP Conservation Strategies are designed to improve conditions for cold freshwater habitat, and coldwater migration and spawning through the HCP Biological Goals focusing on anadromous fish and their habitats. Further analyses of the HCP impacts to salmon and steelhead critical habitats can be found in Section 2.5.2 Effects to Critical Habitat in the Calaveras River Incidental Take Permit Biological Opinion. The Biological Resources section of this EA describes wildlife species and habitats within the HCP area and any temporary impacts that may occur to those resources as part of the HCP implementation. Many impacts and/or protections related to wildlife and plants in the area are already addressed through the existing San Joaquin County Multi-Species Habitat Conservation and Open Space Plan. The HCP describes multiple issues with salmonids using the Old Calaveras River channel, including stranding and entrainment under current conditions. See section 6.2 SEWD Old Calaveras River Headworks Facility Operations and 7.2 Conservation Strategies for SEWD Old Calaveras River Headworks Facility Operations of the HCP for further explanation. There have been substantial salmonid migration corridor restoration efforts along Mormon Slough and the Stockton Diverting Canal, which make this migration route a more viable option for successful salmonid migration at this time.

Item	Comment Letter Agency/Reviewer	Comment	NMFS' Response
3	California Sportfishing Protection Alliance	Water rights in California are subject to the California Water Code and authority of the State Water Resources Control Board (State Water Board). California Water Code § 85023 state, "The longstanding constitutional principle of reasonable use and the public trust doctrine shall be the foundation of state water management policy…" However, the words "reasonable use" and "public trust" do not appear in either the draft EA/IS or the HCP.	NEPA itself is a public disclosure of the effects any major federal action, in this case, NMFS' issuance of an incidental take permit associated with a HCP on the human environment. The human environment includes several resources as outlined in the draft EA; these resources are considered part of the public trust. The fact that the specific words public trust do not appear in the draft EA does not assume that NMFS did take this into consideration or assess.
4	California Sportfishing Protection Alliance	Pursuant to California Water Code § 85086(c)(1), the State Water Board conducted a proceeding and issued a report titled Development of Flow Criteria for the Sacramento-San Joaquin Delta Ecosystem on August 3, 2010. The report states: "The Cosumnes and Mokelumne rivers, and smaller streams such as the Calaveras River, Bear Creek, Dry Creek, Stockton Diversion Channel, French Camp Slough, Marsh Creek, and Morrison Creek are all tributary to the Delta. Flows should generally be provided from tributaries in proportion to their contribution to unimpaired flow."	We evaluated a year-round flow schedule in the HCP that was proposed by SEWD. Section 7.1 Conservation Strategies for New Hogan Reservoir Water Impoundment and Non-flood Control Operations of the HCP provides further information and section 3.3.1 of the EA that discusses the rationale and ecosystem benefit.

Item	Comment Letter Agency/Reviewer	Comment	NMFS' Response
5	California Sportfishing Protection Alliance	Pursuant to California Water Code § 85084.5, the California Department of Fish and Wildlife (CDFW), in consultation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service (NMFS), conducted a peer-reviewed proceeding and issued a report titled Quantifiable Biological Objectives and Flow Criteria for Aquatic and Terrestrial Species of Concern Dependent on the Delta on November 23, 2010. The report states: "Juvenile salmonids emigrate downstream on the San Joaquin River during the winter and spring. Salmonids from the Calaveras River basin and the Mokelumne River basin also use the lower San Joaquin River as a migration corridor. It is therefore necessary to provide adequate flows in these eastside streams (e.g., the flows suggested in Fleenor et al., 2010)."	Storage management flows released during the fall/winter periods help to facilitate adult migration into the reaches above the Bellota Weir and subsequent freshet events in the winter/spring provide opportunities for juveniles to outmigrate. These flows should contribute to flows in the lower San Joaquin River to improve salmonid migration. Migration opportunities are only at their minimum in more dry years, when the Calaveras, without the reservoir, would be dry much like the nearby Cosumnes River. See Biological Flow Objective section of the EA.
6	California Sportfishing Protection Alliance	On December 12, 2018, the State Water Board approved Phase 1 of an updated Water Quality Control Plan for the San Francisco Bay–Sacramento San Joaquin Delta Estuary.4 Phase 1 addressed flows upstream of Vernalis on the San Joaquin River. Phase 2 will address eastside tributary and Sacramento River flows and Delta outflow. The adopted Phase 1 amendments established a target of 40% of unimpaired flow, with an allowed adaptive range between 30% and 50% from each of the Stanislaus, Tuolumne and Merced Rivers from February through June.	Commented noted, however, the above statement does not pertain to the subject of this EA. See Biological Flow Objective section of the EA.

Item	Comment Letter Agency/Reviewer	Comment	NMFS' Response
7	California Sportfishing Protection Alliance	The draft EA/IS is deficient in failing to acknowledge, analyze and discuss reasonable use, public trust doctrine, California Water Code requirements, and multiple relevant proceedings on required instream flows. It is also deficient in failing to acknowledge that SEWD, as operator of New Hogan Dam, will be required to provide flows protective of fisheries and other public trust resources from New Hogan Dam to the Delta. SEWD and NMFS should withdraw the draft EA/IS and should prepare and circulate a draft EIS/EIR that corrects these deficiencies.	The 20 cfs minimum flow commitment is protective of the fishery from New Hogan to Bellota, allowing juvenile salmonids to rear in cool waters year-round. Freshet events and storage management releases allow these fish to then migrate during key life history events. See Biological Flow Objective section of the EA.
8	California Sportfishing Protection Alliance	California Fish & Game Code § 5900(a) states: "Dam" includes any "artificial obstruction." This definition applies to New Hogan Dam as well as the myriad flashboard dams, diversion dams and low flow crossings in the lower Calaveras River watershed. The draft EA/IS fails to disclose, analyze and discuss the requirements of these Fish & Game Code sections and their applicability to structures in Calaveras River, including those in the mainstem between Bellota and New Hogan Dam, Old Calaveras River, Mosher Slough/Creek, Mormon Slough, the Stockton Diverting Canal and Potter Creek. SEWD and NMFS should withdraw the draft EA/IS and should prepare and circulate a draft EIS/EIR that corrects this deficiency.	See section 3.3.1 in Rationale and Ecosystem Benefits that provides an explanation of water impoundment in the Calaveras River. These dams, diversions, and structures that may impede fish passage are addressed in the EA and its evaluation of fish passage.

Item	Comment Letter Agency/Reviewer	Comment	NMFS' Response
9	California Sportfishing Protection Alliance	The HCP also acknowledges that nine years after the critical habitat designation, NMFS issued its July 2014 Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-Run Chinook Salmon and Central Valley Spring-Run Chinook Salmon and the Distinct Population Segment of California Central Valley Steelhead.6 For the Calaveras River, the Recovery Plan recommends: "Develop and implement longterm [sic] year-round instream flow schedules and water temperature requirements that are protective of all steelhead life stages, including providing flows for upstream and downstream fish passage."7 However, the draft EA/IS fails to analyze or discuss how designated critical habitat downstream of Bellota is protected. Specifically the EA/IS fails to analyze or discuss how upstream and downstream fish passage is provided given the absence of any flow requirements below Bellota in the draft HCP other than the management of the timing of flood control releases. SEWD and NMFS should withdraw the draft EA/IS and should prepare and circulate a draft EIS/EIR that corrects this deficiency.	As part of the HCP development, SEWD analyzed the impacts to water storage in New Hogan from implementation of a year-round flow schedule in Mormon Slough, a flood conveyance channel. This analysis indicated negative consequences to water storage, which wouldn't support salmonid habitat conditions in the Calaveras River long-term. For further explanation, see section 10.3 Alternative 3: Artificial adult O. mykiss and Chinook migration flows in the HCP. The effects of the proposed flow schedule on steelhead critical habitat are analyzed in the section 2.5.2 of the Biological Opinion.

Item	Comment Letter Agency/Reviewer	Comment	NMFS' Response
10	California Sportfishing Protection Alliance	The degraded state of the Calaveras River has been highly controversial. In December of 2005, CSPA, Watershed Enforcers, San Joaquin Audubon Society and Committee to Save the Mokelumne filed a Public Trust, Waste and Unreasonable Use and Method of Diversion Complaint with the State Water Board. The State Water Board conducted a site inspection in October 2006 and placed the complaint in abeyance pending completion of an HCP. Given the failure of the draft EA/IS to acknowledge or discuss the issues raised in the complaint and degree of controversy surrounding the degraded condition of the Calaveras River, SEWD and NMFS should withdraw the draft EA/IS and should prepare and circulate a draft EIS/EIR.	See HCP Chapter 7 - Conservation Program - for a description of the Biological Goals related to flow, fish passage, avoid/minimize fish entrainment, water quality, and avoid direct injury/mortality, as well as the subsequent Conservation Strategies proposed to accomplish those goals.
11	California Sportfishing Protection Alliance	The draft EA/IS does not evaluate sufficient alternatives. Both NEPA and CEQA require the analysis of reasonable alternatives to the Proposed Action (NEPA) or the Proposed Project (CEQA). The draft EA/IS evaluates only two alternatives: the No Action Alternative and the Proposed Action/Proposed Project.	Several alternatives were considered in the planning stages and are described in the HCP Chapter 10 - Analysis of Alternatives to the District's Covered Activities. None of these were reasonable alternatives. NMFS spent extensive time working with the applicant to develop a reasonable alternative, which was analyzed in the EA along with the No Action alternative.

Item	Comment Letter Agency/Reviewer	Comment	NMFS' Response
12	California Sportfishing Protection Alliance	The HCP explains that NMFS and SEWD considered several alternatives to covered actions under the HCP, explaining: "The HCP Handbook suggests that alternatives to the proposed activities be explored to assure agencies and the public that all reasonable choices were considered. Several alternatives were considered but dismissed."	Again, Several alternatives were considered in the planning stages and are described in the HCP Chapter 10 - Analysis of Alternatives to the District's Covered Activities. None of these were reasonable alternatives. NMFS spent extensive time working with the applicant to develop a reasonable alternative, which was analyzed in the EA along with the No Action alternative. In addition, in the early development stages of the HCP, we coordinated and considered input from multiple agencies that were previously involved with Calaveras River Technical Review Group (including the U.S. Fish and Wildlife Service and the California Department of Fish and Wildlife) to develop the proposed activities and conservation strategies described in the HCP.
13	California Sportfishing Protection Alliance	The HCP proposes to partly mitigate for the blockage of downstream passage at flashboard dams by notching them. The HCP dismisses post-April 15 annual flashboard installation because it would interfere with the irrigation uses that the Calaveras River serves. It is arguable that an alternative would not rise to the level of a reasonable alternative under NEPA or CEQA.	The flashboard dam notches allow outmigrating fish the opportunity to move between dammed areas. A study will be conducted to determine the efficacy of the notches regarding facilitating outmigration. That data will be presented to and evaluated by NMFS and the District, and operations may be altered as a result of this analysis during the adaptive management process.
14	California Sportfishing Protection Alliance	Moving the SEWD intake downstream from the existing intake at Bellota, thus increasing the length of the permanently waterer stream channel, would not solve the greater problem of lack of connectivity between the San Joaquin River and the Calaveras River upstream of Bellota Weir. The limited benefit of such an alternative makes it unreasonable.	SEWD is not proposing in the HCP to move the Bellota intake downstream and thus NMFS did not consider the Bellota intake relocation downstream as an alternative.

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15	California Sportfishing Protection Alliance	Upstream and downstream migration flows released from storage are feasible alternatives that are reasonable. It would likely to make sense to analyze upstream and downstream migration flows under a single NEPA/CEQA alternative. It is not reasonable to devote zero stored water to a fisheries HCP, particularly in a watershed where storage is about double average annual runoff, and where additional future diversions for groundwater recharge are explicitly planned. (See Section VI below). The arguments in the HCP against the pejoratively labelled "artificial" migration flows are unpersuasive, particularly because the analysis that purports to support these arguments limits evaluation to limited arbitrarily selected flow volumes. SEWD and NMFS should withdraw the draft EA/IS and should prepare and circulate a draft EIS/EIR with an alternative (or alternatives) that includes both upstream and downstream migration flows, and that evaluates a range of options for such flows.	As part of the HCP development, SEWD analyzed the impacts to water storage in New Hogan from implementation of additional migration flows in Mormon Slough, a flood conveyance channel. This analysis indicated negative consequences to water storage, which wouldn't support salmonid habitat conditions in the Calaveras River long-term. For further explanation, see section 10.3 Alternative 3: Artificial adult O. mykiss and Chinook migration flows in the HCP.

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16	California Sportfishing Protection Alliance	The draft EA/IS unlawfully accepts degraded conditions as a baseline and finds effects less than significant because it compares the Proposed Action/Proposed Project only to the degraded baseline. The draft EA/IS finds that there are no significant impacts of the Proposed Action/ Proposed Project because the draft EA/IS limits the evaluation of the Proposed Action/Proposed Project to the incremental changes from the No Action Alternative. This incremental analysis ignores the degraded baseline condition, whose details both the HCP and the draft EA/IS document extensively. Thus, the draft EA/IS finds that there are likely no significant impacts of the Proposed Action/ Proposed Project, and justifies the selection of an EA/IS as the appropriate level of environmental review rather than the more rigorous review of an EIS/EIR.	Under NEPA, we analyze the "affected environment", which is a concise description of the *existing* resource conditions and trends. We disclose the effects of the No-Action Alternative in the future accounting for trends and other factors such as climate change, habitat degradation, recovery, or harvest and compare those effects to the Preferred Alternative (proposed action). The consideration of the affected environment under NEPA is different than consideration of the environmental baseline under the Endangered Species Act (ESA). Under the ESA, regulations define the environmental baseline as “the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process” (50 CFR §402.02). The degraded environmental baseline of the Calaveras River is considered in the Biological Opinion jeopardy analysis along with the effects of SEWD’s ongoing operations and proposed conservation strategy.

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17	California Sportfishing Protection Alliance	The HCP describes as many as 194 unscreened diversions in the lower Calaveras River watershed that the HCP does not propose any specific measures to screen. In addition to its large facilities at the head of Old Calaveras River Channel and Bellota Weir, SEWD owns and/or operates forty-three smaller diversion structures in the Calaveras River watershed between New Hogan Dam and the San Joaquin River. The HCP specifically promises that SEWD will make fish passage improvements at five of them. The ongoing operation of the remaining thirty-eight structures that SEWD proposes to continue under protection of an 50-year Incidental Take Permit issued in response to the HCP is in itself a significant impact that requires an EIS/EIR	The HCP describes the goal for screening in Biological Objective AE5: Prioritize diversion structures and establish a recommended screening schedule within the first two years of the ITP and subsequently help implement fish screens at privately owned diversions until the priority list is exhausted, thereby preventing entrainment of salmonids into priority unscreened diversions. SEWD proposes a tiered priority process to correcting fish passage sites: "SEWD is committed to implementing the replacement or retrofitting of all Tier 1 structures in Mormon Slough/SDC owned and operated by Stockton East Water District (i.e., five). Additional structures in Mormon Slough/SDC identified during the AMP process (Chapter 9) may also be improved as agreed upon by the Governing Board during the course of the ITP".

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18	California Sportfishing Protection Alliance	Attributing ongoing project impacts to the "baseline" and excluding those impacts from evaluation as to their significance is arbitrary in failing to account for the impact of continued operations of the existing dams and operations. The same is true for the analysis under the ESA. The evaluation of take cannot simply consider whether the Proposed Action will make the existing situation better or worse. It must consider the cumulative effects of past, present and future actions, and account for ongoing actions in the analysis. See American Rivers v. Federal Energy Regulatory Commission, 895, F.3d 32, (2018) at 47 and 55.	As mentioned in our response to comment #17, under NEPA, we analyze the "affected environment". which is a concise description of the existing resource conditions and trends and we disclose the effects of the No-Action Alternative in the future accounting for trends and other factors such as climate change, habitat degradation, recovery, or harvest and compare those effects to the Preferred Alternative (proposed action). The consideration of the affected environment under NEPA is different than consideration of the environmental baseline under the Endangered Species Act (ESA). Under the ESA, regulations define the environmental baseline as "the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation in process" (50 CFR §402.02). The degraded environmental baseline of the Calaveras River is considered in the Biological Opinion jeopardy analysis along with the effects of SEWD's ongoing operations and proposed conservation strategy.
19	California Sportfishing Protection Alliance	In addition to physical obstruction of fish passage by SEWD facilities, there are additional significant impacts of the Proposed Action/Proposed Project for which an ITP will be issued and that thus require issuance of an EIS/EIR.	Issuing take does not equate to "significant" and does not require an EIS. Under the HCP, SEWD facilities and operations will be mitigated through the conservation measures and providing fish passage. Under NEPA, "An EA may demonstrate that a proposed action would have effects that are significant but could be reduced or avoided through mitigation. (NOAA 2017)".

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20	California Sportfishing Protection Alliance	An indicator of the ongoing impact of SEWD's operations on salmonids in the Calaveras River is the limited number of years salmon spawn in the river. The HCP notes: Chinook salmon are only present in years when there are early flow events (i.e., November-December) that provide access into the spawning reach upstream of Bellota. Since monitoring began in 2002, there have only been three such years (2005, 2006, and 2011) and juvenile monitoring from 2012 is not yet complete so estimates are not available. Table 15 in the HCP provides some sense of impacts to juvenile Chinook salmon. Substantial numbers migrated downstream in May and June.18 Because of lack of flood flows in the very dry spring of 2007, these late downstream migrant were likely entrained into a diversion or stranded in Mormon Slough or the Stockton Diversion Channel. Similar numbers of downstream salmon migrants show up in May and June of the dry year 2012.	Conservation strategies 7.1 through 7.5 in HCP are designed to improve juvenile migration conditions such as flow, fish passage, and entrainment.

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21	California Sportfishing Protection Alliance	The HCP will provide no additional flows to reduce take or to mitigate the loss of these fish. Rather, as discussed below, the frequency of flows that would aid migration into and out of the spawning and rearing reaches of the lower Calaveras River will likely be reduced by additional development for groundwater recharge and other consumptive uses over the 50-year period of the HCP. SEWD and NMFS should withdraw the draft EA/IS and should prepare and circulate a draft EIS/EIR that analyzes the significant present and long-term future impact of limiting migration flows for salmonids into and out of the Calaveras River. The draft EIS/EIR must also present the necessary information to support this analysis.	Watershed conditions will change over the 50-year term, however, the HCP biological goals and objectives will remain the same and SEWD is required to meet those goals, which may include may include modified or new conservation alternatives to achieve these goals. Further, increased groundwater availability via recharge efforts is expected to reduce the use of surface water by the SEWD in the future.

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22	California Sportfishing Protection Alliance	One of the main conservation measures of the HCP is the construction of new headworks from the Calaveras River to the Old Calaveras River channel. These headworks will block "entrainment" of salmonids into the Old Calaveras River channel. The HCP and draft EA/IS describe the exclusion of salmonids from the Old Calaveras River channel solely as a benefit. The draft EA/IS does not disclose that constructing the headworks is a substantial choice to permanently eliminate salmonid rearing habitat. This habitat is superior to Mormon Slough and the Stockton Diverting Channel, into which the Calaveras River has been routed for solely for flood-control and water supply. The impact of permanently eliminating this habitat is not disclosed in the draft EA/IS. The impact is likely significant, and thus warrants analysis in an EIS/EIR.	Salmonids currently entrained into the Old Calaveras River channel through the existing headworks may experience adverse effects such as thermal stress; increased susceptibility to predation; entrainment into small, unscreened irrigation diversions; temporary migration delays or blockage; reduced spawning success; or stranding and associated mortality. Juvenile salmonids are currently being directed away from being entrained into the Old Calaveras River channel and there is no volitional adult salmonid passage in the Old Calaveras River channel.

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23	California Sportfishing Protection Alliance	The draft EA/IS fails to disclose or address the fact that the Calaveras River is identified as legally impaired, pursuant to the federal Clean Water Act, and incapable of meeting identified beneficial uses because of a number of pollutants. The October 3, 2017 California 303(d) list identifies the Calaveras River from Bellota Weir to Stockton Diverting Canal is impaired because of toxicity (source unknown) and the reach from the Stockton Diverting Canal to the San Joaquin River is impaired because of chlorpyrifos (agriculture), diazinon (agriculture), indicator bacteria (urban runoff/storm sewers), mercury (numerous sources) and organic enrichment/low dissolved oxygen (source unknown). Water quantity and water quality are flip sides of the same coin. Increased flow serves to dilute constituent concentration and decreases in flow increase constituent concentration. The absence of a reasonable flow regime below Bellota (other than timing of flood control releases) likely exacerbates water quality and the bioavailability of pollutants. The only water quality mitigation that the draft EA/IS only proposes is mitigation for water quality impacts from construction.22 SEWD and NMFS should withdraw the draft EA/IS and should prepare and circulate a draft EIS/EIR that includes an analysis of the Project's impacts to the array of pollutants identified as impairing the beneficial uses of the Calaveras River.	Thank you for your input regarding the water quality status of the Calaveras River. We have updated EA Section 4.7 Hydrology and Water Quality with the recent information from the EPA 303d listing. As noted in the EA, the water quality issues in the lower Calaveras River are influenced by many sources that are beyond the control the SEWD. The HCP focuses on water quality impacts directly caused by SEWD ongoing operations, maintenance, and construction activities.

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24	California Sportfishing Protection Alliance	The draft EA/IS states that it does not analyze socioeconomic impacts because "[t]here are no low-income, minority, or subsistence populations in the Project Area. Therefore, there would be no impact to socioeconomics and a detailed socioeconomic analysis for the Proposed Action is not warranted." Likewise, draft EA/IS states that it does not analyze environmental justice impacts because "[t]here are no low-income, minority, or subsistence populations in the Project Area. Therefore, there would be no impact to environmental justice."	Thank you for your input regarding socioeconomics and environmental justice. We have updated sections 5.1.8 and 5.1.9 for edits to the EA regarding socioeconomics and environmental justice.
25	California Sportfishing Protection Alliance	The draft EA/IS fails to disclose reasonably foreseeable increases in future diversions, and proposes no mitigation for even further reduction in magnitude, timing and duration of flood flows.	EA Section 5.5 - Cumulative Impacts - describes and acknowledges some future potential SEWD projects related to groundwater recharge and conjunctive use. These future activities were not defined in enough detail at the time of development of the HCP to include those as covered activities. They could potentially be added to the HCP at a later date. Regardless, SEWD is committed in the HCP to meeting the biological goals as described in HCP Chapter 7 - Conservation Program.
26	California Sportfishing Protection Alliance	The draft EA/IS does not acknowledge or discuss the public trust and fails to include a public trust analysis.	EA Section 5.0 - Environmental Consequences - analyzes the effects of the proposed project on public trust resources, such as hydrology and water quality and biological resources. Section 10 of the Endangered Species Act seeks to balance the needs of an endangered or threatened species with the needs of landowners/operators/etc. so that development and related activities may continue in a way that will not harm the species any further.

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27	U.S. Fish and Wildlife Service (FWS)	Received comments on the HCP document regarding efforts to adaptively manage fall pulse flows and notes the importance of Calaveras River water for anadromous fish species.	Thank you for your input. NMFS looks forward to working and coordinating with FWS to conserve anadromous fish in the Calaveras River.
28	Calaveras County Water District (CCWD)	Received comments on the HCP document regarding conservation strategies 1 and 2, and the inclusion of CCWD in the adaptive management process.	Thank you for your input and concerns regarding CCWD's participation in the adaptive management process. NMFS looks forward to working with the Calaveras County Water District during the implementation and adaptive management of the HCP to conserve anadromous fish in the Calaveras River.