BUREAU OF RECLAMATION

Long-Term Operation

# Appendix F – Potential Common Components

## Central Valley Project, California

### Interior Region 10 – California-Great Basin

# Mission Statements

The Department of the Interior (DOI) conserves and manages the Nation's natural resources and cultural heritage for the benefit and enjoyment of the American people, provides scientific and other information about natural resources and natural hazards to address societal challenges and create opportunities for the American people, and honors the Nation's trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities to help them prosper.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Long-Term Operation

# Appendix F – Potential Common Components

## Central Valley Project, California

### Interior Region 10 – California-Great Basin

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# 1. Introduction

This common component appendix provides the structure for action alternatives for the Public Draft Environmental Impact Statement (EIS), describes the initial actions anticipated to remain identical for each action alternative, and identifies components that are anticipated to vary among the alternatives.

Appendix D used conceptual models for the linkages between changes in flows and stressors on listed species to identify the potential adverse effects from the seasonal operation of the Central Valley Project (CVP) and State Water Project (SWP). Appendix E used exploratory modeling to refine seasonal operations for the multiple purposes of fish, water supply, and power generation. The effects of seasonal operations may vary in magnitude, based on alternatives, but are anticipated to trend in similar directions across alternatives. This appendix describes the seasonal operation of the CVP and SWP in general and identifies minimization and compensation measures as well as actions to address conditions in the baseline. This appendix additionally highlights the authorizing legislation and requirements under the regulations, contracts, and agreements described by Appendix A. This appendix identifies ongoing programs in the baseline that mitigate the effects of the operation of the CVP for which Reclamation is not consulting or reinitiating consultation as part of this Proposed Action.

Initial alternatives provide a snapshot during the formulation of action alternatives to perform analysis and inform next steps. Outreach and coordination will continue between federal and state agencies and with interested parties. The identified components may be refined. New components may be added. Currently proposed components may be removed. Further evaluation may identify options for components currently identified as common and/or eliminate options for components currently identified as variable.

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# 2. Background

Reclamation operates the CVP for the congressionally authorized purposes of (1) river regulation, improvement of navigation, and flood control; (2) irrigation and domestic uses, and fish and wildlife mitigation, protection, and restoration; and (3) power, and fish and wildlife enhancement. DWR operates the SWP for the primary purpose of water supply deliveries and flood control, and the SWP provides additional benefits including power generation and environmental stewardship. Public Law 99-546 authorized the 1986 Coordinated Operation Agreement (COA), which sets procedures for sharing joint responsibilities for meeting Delta standards and other legal uses of water. Reclamation and DWR amended the COA in 2018. Operation of the CVP and SWP also provide recreation and water quality benefits.

The proposed action includes the operation of CVP facilities in the Sacramento, American, Stanislaus, and San Joaquin River Basins, Clear Creek Basin, and CVP and SWP facilities in the Delta and Suisun Marsh (Figure 1), in conformance with statute, regulation, contracts, and agreements.

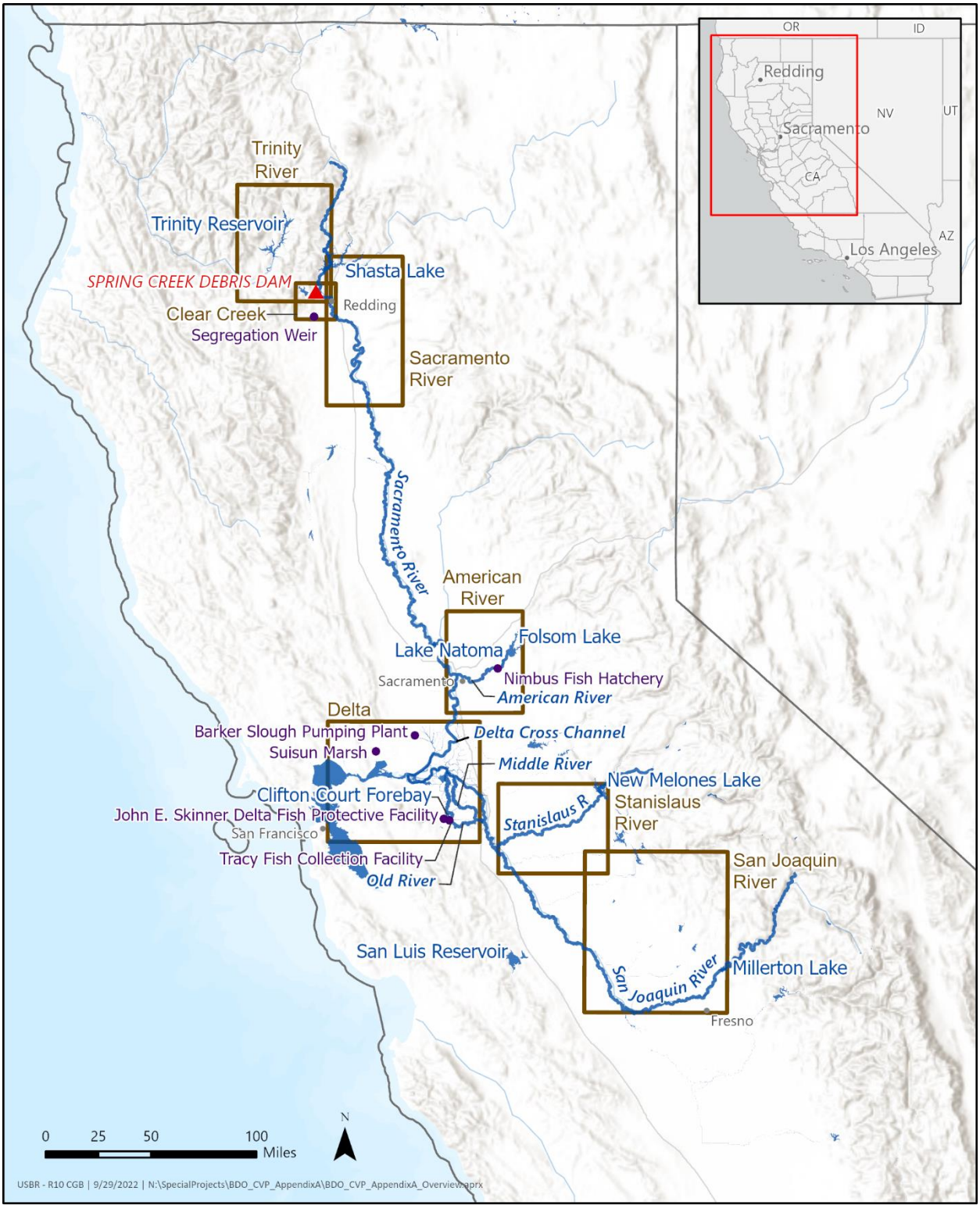


Figure 1. Overview of the Proposed Action and Map of the CVP

Reclamation plans the operation of the CVP by projecting monthly, on a 12-month lookahead cycle, an "operations outlook" for how available water resources can best meet regulatory

requirements and water supply purposes, including considerations for health and safety, wildlife refuges, senior water rights, water quality, fishery needs, other environmental requirements, and water service contracts. In most years, the combination of storage and runoff into CVP reservoirs and the Central Valley, after meeting statutory and regulatory requirements, is not enough to meet CVP water service contractor demands and shortages occur. The water available for delivery to CVP water service contractors is determined by an administrative process, referred to as "Allocations," that considers storage, forecasted inflow, system accretions and depletions, facility limitations, and project requirements under the operations outlook. The estimate of available water supply in the north of Delta system, along with expected controlling regulations throughout the year, determine the north of Delta allocations. The estimate of upstream water supply, previously stored water south of the Delta (in San Luis Reservoir), and the potential conveyance capability through the Delta determine south-of-Delta allocations. The Municipal and Industrial (M&I) Water Shortage Policy allocates between M&I versus agricultural uses.

No later than February 15, Reclamation determines for Central Valley Project Improvement Act (CVPIA) wildlife refuges and senior water right holders under Refuge Water Supply Agreements, Sacramento River Settlement Contracts, the San Joaquin River Exchange Contract, and San Joaquin River Settlement Contracts, shortages during a "Critical Year" as described by those contracts and agreements. Depending upon hydrologic conditions, the determination may be updated.

On or about February 20 of each year, Reclamation provides an initial declaration of the water made available under water service contracts, an "Initial Allocation." Water service contracts generally run from March through February. Beginning in February, Reclamation prepares forecasts of water year runoff using precipitation to date, runoff to date, and snow water content accumulation. Reclamation typically updates forecasts of runoff and operations plans at least monthly through May. If the water initially anticipated to be available is no longer likely to be available, Reclamation provides a reduced allocation and notifies the water service contractors that less water will be available for delivery. An approach generally based on a 90% forecast is intended to minimize the frequency of drier or warmer conditions than forecasted and avoid situations where a previous allocation for fisheries and agriculture cannot be supported. Reclamation may execute temporary contracts, not to exceed 1 year, for delivery of an unusually large water supply not otherwise storable or infrequent and otherwise unmanaged flood flows. Reclamation may make water available under the water service contracts in addition to the allocation consistent with legal obligations. Under the Accelerated Water Transfer Program, Reclamation may transfer water within counties, watersheds, or other areas of origin without showing it as having been consumptively used or irretrievably lost. Actions to make water available are described in the Seasonal Operations sections for each CVP and SWP facility in this appendix and modelled to identify changes in river flows.

DWR similarly plans the operations of the SWP by projecting monthly on a 12-month look-ahead cycle. The initial allocation for SWP deliveries is made by December 1 of each year with a conservative assumption of future precipitation to avoid over-allocating water before the hydrologic conditions are well defined for the year. As the water year unfolds, Central Valley hydrology and water supply delivery estimates (Table A Deliveries) are updated using measured/known information and conservative forecasts of future hydrology. DWR may deliver water that is surplus to Table A (Article 21 water). Article 21 water delivered early in the

calendar year may be reclassified as Table A later in the year depending on final allocations, hydrology, and contractor requests. Reclassification does not affect the amount of water carried over in San Luis Reservoir, nor does it alter pumping volumes or schedules. Feather River Service Area contracts provide the terms for DWR to avoid interference with claimed senior water rights on the Feather River.

Following the 1995 Bay-Delta Accord, Reclamation and DWR operate the CVP and SWP to meet certain water quality control plan requirements for Delta outflow and salinity under State Water Resources Control Board (State Water Board) Decision 1641 (D-1641). The responsibilities of DWR and Reclamation for senior water rights on the Sacramento River, Feather River, and in the Delta, as well as other regulatory requirements are allocated by the 2018 COA. The Fish and Wildlife Coordination Act, and the CVPIA, among others, authorize Reclamation to operate in part for fish and wildlife project purposes, undertake projects for habitat restoration and facility improvements, and to improve scientific understanding through developing models and supporting data.

Action alternatives are organized as follows:

- **Governance**: Requirements for additional consultations and concurrence, collaboration through technical assistance, reporting, and adaptive management.
- **Watersheds**: Facilities and the proposed operation for fish and wildlife, water supply, and power generation including proposed conservation measures to promote the recovery of federally listed species and/or to avoid, minimize and/or compensate for adverse effects. Actions fall into one of the following categories:
    - Seasonal Operation: Actions on major reservoirs, dams, and diversions to store water when it does not interfere with downstream requirements, release water to augment flows otherwise in the system, divert water for beneficial uses, and route water through gates and barriers.
    - Real-Time Operational Conservation Measures: Operational actions to address stressors on listed species, for example,
        - Ramping Rates: Limitations on the rate of reduction of flows.
        - Minimum Instream Flows: Releases necessary for the minimal preservation of instream habitat.
        - Pulse Flows: Short duration periods of increased releases to support fish migration.
        - Temperature Management: Withdrawal and blending of water from different lake elevations to preserve cold water in reservoirs while meeting downstream requirements.
        - Redd Maintenance: Elevated or sustained flows to maintain inundation over salmonid redds.

    - Habitat Restoration and Facility Improvement Conservation Measures: Construction actions to restore spawning and rearing habitat, improve facilities to operate more flexibly for environmental requirements, and/or to modify structures to reduce effects on listed species.
    - Hatchery Supplementation Conservation Measures: Actions to support refugial populations and supplement wild populations to assist in conservation and recovery of species.
    - Facility Specific Operations and Maintenance: Actions to operate and maintain facilities that may result in the take of listed species and are not addressed in facility-specific consultations.
- **Status and Trend Monitoring**: Evaluation of performance to assess effectiveness of the Proposed Action.
- **Special Studies**: Efforts to address uncertainties that impact a reasonable balance among competing demands for water, including the requirements of fish and wildlife, water supply, and power generation.
- **Drought Contingency**: Actions to plan for dry conditions that may occur during operations and facilitate a response to then current conditions.

Contemporaneous programs are ongoing activities with existing environmental compliance, agreements, and/or contracts with severable utility. Reclamation is not consulting or reinitiating consultation on these activities in the Proposed Action. These activities in the baseline may mitigate the effects of the operation of the CVP, some of which have been described in previous consultations and implemented.

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# 3. Governance

Governance and adaptive management depend, in part, on the alternative(s). Regardless of governance, Reclamation and DWR are responsible for the operation of the CVP and SWP in compliance with the Endangered Species Act (ESA). Where real-time decision making is anticipated in a common component, a placeholder term, “Governance,” is used. If another party implements ESA compliance on behalf of Reclamation or DWR, that party will be identified in subsequent alternative formulation steps.

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# 4. Sacramento River

Reclamation operates and maintains the Shasta Division of the CVP for flood control and navigation, agricultural and M&I water supplies, fish and wildlife, hydroelectric power generation, Sacramento River water quality, and Delta water quality. Facilities include the Shasta Dam and Power Plant, Keswick Dam and Power Plant, and a Temperature Control Device (TCD) on the Upstream face of Shasta Dam. Flood control operations are based on regulating criteria developed by the U.S. Army Corps of Engineers (USACE) pursuant to the provisions of the Flood Control Act of 1944. Flood control requirements reserve up to 1.3 million acre-feet (MAF) of space (flood control pool) behind Shasta Dam, leaving 3.2 MAF of space (conservation pool) for storage management during the winter flood season. Reclamation generally maintains flows of 5,000 cubic feet per second (cfs) at Wilkins Slough and these flows may be reduced in drought years.

Major facilities in the Sacramento Division of the CVP include the Red Bluff Pumping Plant, Tehama-Colusa Canal, and Corning Canal. Agricultural deliveries provide for the irrigation of over 150,000 acres of land in Tehama, Glenn, Colusa, and Yolo Counties. The Red Bluff Pumping Plant is the intake for the Tehama-Colusa Canal and the Corning Canal. Water is diverted from the Sacramento River approximately 2 miles southeast of Red Bluff through the 2,500 cfs, screened Red Bluff Pumping Plant. In 2011, Reclamation permanently welded the Red Bluff Diversion Dam gates in the open position.

Imports from the Trinity River Basin (Trinity Division) are delivered to the Sacramento River for downstream needs via two pathways: they're released from Whiskeytown Reservoir to Clear Creek and join the Sacramento River at the mouth of Clear Creek south of Redding, or they're delivered to Keswick Reservoir through the Spring Creek Tunnel and Power Plant where water mixes with releases from Shasta Reservoir and is released from Keswick Dam.

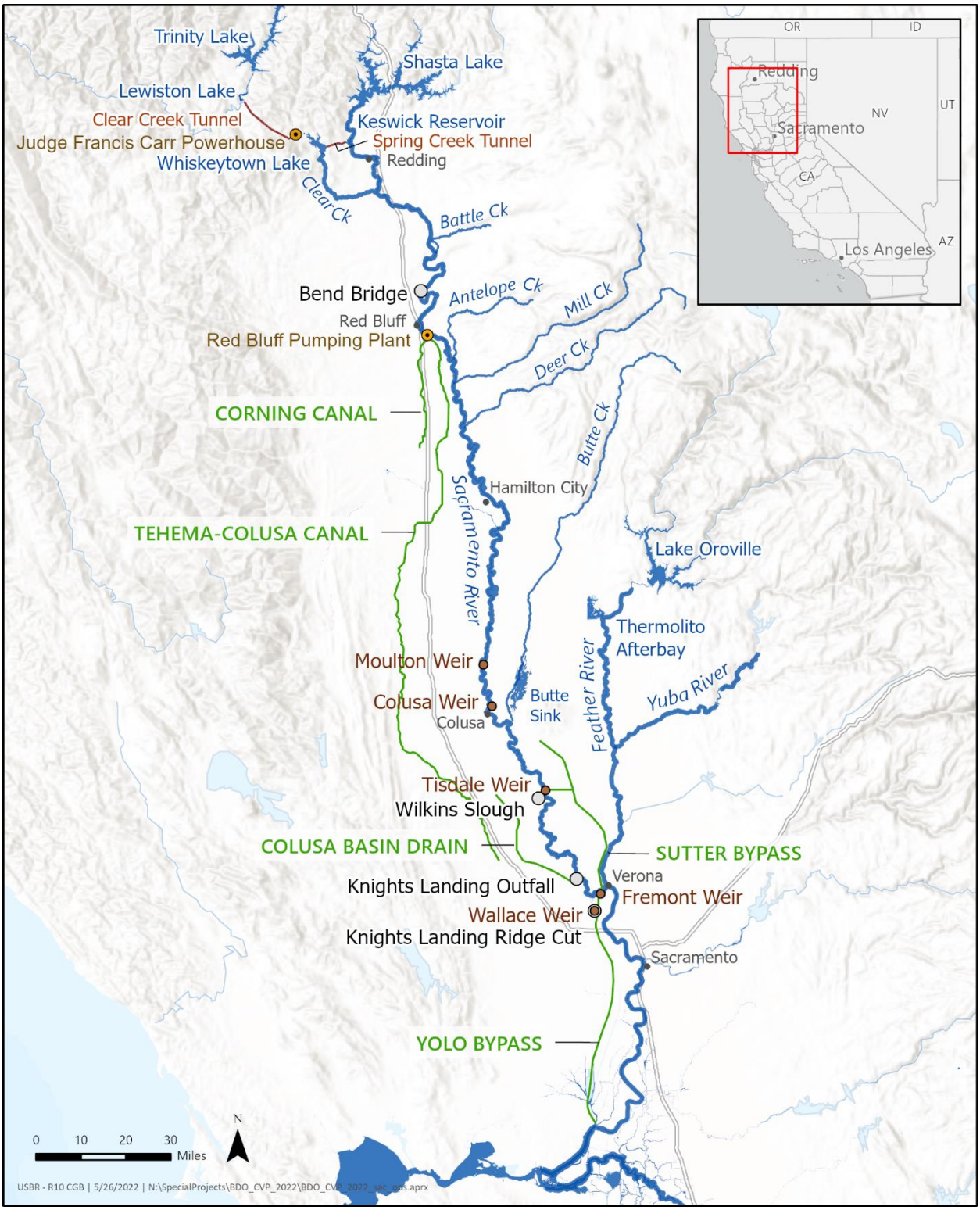


Figure 2. Sacramento River Facilities in the Shasta and Sacramento Divisions of the CVP

Statutory, regulatory, and contractual requirements include:

- Section 7 of the Flood Control Act of 1944
- Public Law 74-392 CVP Re-Authorization Act
- Public Law 81-839 Sacramento Valley Canals
- Central Valley Project Improvement Act (CVPIA)
- State Water Board Decision 990
- State Water Board Water Rights Order 90-5
- State Water Board Water Rights Order 91-1
- State Water Board D-1641
- Settlement Contracts
- Exchange Contract
- Water Service Contracts

Contemporaneous programs not submitted for consultation or reinitiation include:

- Battle Creek Restoration Program and Battle Creek Reintroduction Plan for Winter-run Chinook Salmon (California Department of Fish and Wildlife 2016)
- CVPIA Small Fish Screen Program (Bureau of Reclamation 2022a)
- Livingston Stone National Fish Hatchery (U.S. Fish and Wildlife Service 2022)
- Bureau of Reclamation (2022). Draft Shasta Temperature Control Device Performance Evaluation. Report in preparation.
- Water Temperature Modeling Platform (Bureau of Reclamation 2022)

## 4.1 Seasonal Operations

Reclamation operates Shasta Dam in the winter primarily for flood control and minimum flows in the Sacramento River and in the Delta. With flashboards installed on top of the drum gates that raise the elevation to 1,067 feet, the maximum capacity of Shasta Reservoir is considered to be 4.552 MAF. For the flood season, USACE provides a flood control diagram that specifies a top of conservation pool storage by date. Flood operational criteria target flow rates below 100,000 cfs at Bend Bridge for the protection of downstream populations; therefore, reservoir elevations may temporarily exceed the top of the conservation pool and encroach into flood space in order to limit downstream flows. When not releasing for flood control, Reclamation seeks to store inflows to Shasta Reservoir and releases minimum flows. State Water Board Water Rights Order 90-5 provides a target for minimum releases from Keswick Reservoir from September through February, the 1937 Act includes consideration for navigation at Wilkins

Slough, and State Water Board D-1641 provides flow standards in the Delta. Reclamation may make releases above the minimum to maintain fall-run Chinook salmon redds in wetter hydrologic year types when storage levels are higher in Shasta Reservoir.

In the spring, when not operating for flood control, Reclamation seeks to minimize releases and store inflow to optimize the filling of CVP reservoirs by the end of the flood control season (end of May). Higher storage improves the ability to meet downstream temperature requirements and increases the ability to make releases later in the year for water supply. If Reclamation was maintaining fall-run Chinook salmon redds, after they emerge (generally in February), Reclamation reduces releases to minimum flows. Accretions (flows from non-project creeks into the Sacramento River below Shasta Dam) help to meet both instream demands and Delta outflow requirements to reduce the need for additional releases from Shasta Reservoir. Wetter years with high accretions may allow Reclamation to operate in the spring mostly for flood control. Drier years with lower accretions may require Reclamation to make releases from Shasta Reservoir beyond the needs of flood control. Toward the end of spring, instream diversion demands increase on the mainstem Sacramento River. Reclamation operates to flow objectives at Wilkins Slough to support diversion by Sacramento River Settlement Contractors with a prior entitlement to water in the Sacramento River and for deliveries to water service contractors at Red Bluff Pumping Plant.

Delta salinity and outflow requirements may necessitate additional releases from Shasta Reservoir. When system-wide demands requires augmenting flows in the system, Reclamation coordinates imports from the Trinity Basin, releases by DWR from Oroville Reservoir, and releases from Folsom Reservoir. Each reservoir has factors to consider including instream requirements, amounts in storage, forecasted inflow, and refill potential. The 2018 COA describes the CVP portion of Delta outflow requirements. Reclamation balances releases for the CVP portion of Delta outflow requirements between Shasta and Folsom Reservoirs to maximize storage in each reservoir and minimize negative impacts between CVP tributaries. Generally, after first adjusting exports, Reclamation draws on Folsom while releases from Shasta Reservoir travel down the Sacramento River. Once releases from Shasta Reservoir arrive in the Delta (about 5 days' travel time), releases from Folsom Reservoir can be reduced to balance the demands on each reservoir. When Reclamation can export water from the Delta during periods of excess flow, Reclamation can store more water in San Luis Reservoir south of the Delta. Maximizing exports in the spring reduces the reliance on stored water later in the year for meeting late season demands.

Summer operational considerations include releases for temperature control, instream diversion demands, Delta outflows, Delta salinity, and exports. In-river temperatures downstream of Keswick Dam can be controlled via two methods. The first is thermal mass, by changing release volume or shifting releases between Trinity imports and Shasta Reservoir, and the second is selective withdrawal of colder water through the TCD (or a power bypass as a last resort). Determination of which method to use is made daily as operators balance releases from multiple reservoirs to meet downstream needs. Releases in the summer meet both temperature objectives and support water supply deliveries. Occasionally, in very wet years, high storage levels through the summer may result in a need to release higher than normal flows in early fall to meet flood control requirements for the next year. Consideration of fall conditions may also warrant measures for drought protection and rebalancing of storage between reservoirs.

In the fall, Reclamation's objective is to reduce Keswick Dam releases and rebuild storage in Shasta Reservoir. Reclamation balances fall operations based on highly variable objectives: temperature control (dependent on winter-run Chinook salmon emergence timing), maintenance of winter-run redds (dependent on spawning depths), instream diversion demands on the mainstem of the Sacramento River between Keswick Dam and Wilkins Slough (dependent on seasonal planting and wildlife refuges), minimizing fall-run Chinook salmon redd dewatering (dependent on late-summer flows and fall spawning timing), and stabilizing releases through fall-run Chinook salmon egg and alevin incubation (fall-run Chinook salmon spawning location and emergence timing). The remaining coldwater pool in Shasta Reservoir is usually limited in the fall at the end of the temperature management season. Releases from Shasta Reservoir cannot be too low early in the fall, as some winter-run Chinook salmon eggs and alevin are still incubating, significant instream diversion demands (e.g., rice decomposition) remain on the mainstem of the Sacramento River between Keswick Dam and Wilkins Slough and, depending on conditions, State Water Board Delta requirements may require upstream reservoir releases or Delta outflow as needed for Delta smelt habitat. If early fall flows drop substantially after fall-run Chinook salmon spawning and redds construction at high river stages, their reds may be dewatered when flows are later reduced to rebuild storage.

## 4.2 Ramping Rates

Ramping rates address the stranding risk stressor. Ramping rates for Keswick Dam are identified in State Water Board Water Rights Order 90-5. The release rate (ramping) from Keswick Dam from September through February shall not decrease more than the following rates to minimize stranding of salmon.

- Releases shall not be decreased more than 15% in a 12-hour period.
- Releases shall not be decreased more than 2.5% in a 1-hour period.

In addition to the requirements under State Water Board Water Rights Order 90-5, ramping rates for Keswick Dam between July 1 and March 31 would be reduced between sunset and sunrise:

- Keswick Dam releases >6,000 cfs, reductions in releases may not exceed 15% per night, and no more than 2.5% per hour.
- Keswick Dam releases 4,000 cfs to 5,999 cfs reductions in releases may not exceed 200 cfs per night, or 100 cfs per hour.
- Keswick Dam releases between 3,250 cfs and 3,999 cfs; reductions in releases may not exceed 100 cfs per night.

Reclamation may vary these release requirements for flood control operations.

This is a continuation of the 2019 Proposed Action, which continued the 2009 National Marine Fisheries Service (NMFS) Reasonable and Prudent Alternative. Ramping rates were initially proposed in State Water Board Water Rights Order 90-5. The 2004 NMFS Biological Opinion

added the additional stipulations relative to Keswick Dam releases and specified restrictions at night.

## 4.3 Minimum Instream Flows

Minimum instream flows address adult stranding and juvenile habitat stressors. Reclamation will target Keswick releases of at least 3,250 cfs for minimum instream flows.

Condition 2 of State Water Board Water Rights Order 90-5 requires a release of 3,250 cfs from September through February, except during critical dry years or during emergencies.

## 4.4 Spring Pulse Flows

This is a variable component analyzed in Appendix J.

## 4.5 Water Temperature Management

This is a variable component analyzed in Appendix L.

## 4.6 Fall and Winter Instream Flows

In October, Reclamation will reduce Shasta Reservoir releases to rebuild storage in Shasta while considering maintenance of fall-run Chinook salmon redds. Reclamation will consider winter-run Chinook salmon redds remaining in the river and may delay reducing Shasta Reservoir releases. Reclamation will target December through February releases for minimum instream flows from Keswick Dam based on Shasta Reservoir end-of-September storage as shown in Table 1 to maintain fall-run Chinook salmon redds.

Table 1. Keswick Dam December through February Minimum Instream Flows

| Shasta Reservoir End-of-September Storage (MAF) | Keswick Release (cfs) |
|---|---|
| ≤ 2.2 | 3,250 |
| ≤ 2.8 | 4,000 |
| ≤ 3.2 | 4,500 |
| > 3.2 | 5,000 |

cfs = cubic feet per second; MAF = million acre-feet.

Reclamation may make higher Keswick Dam releases when necessary to maintain flood conservation space in Shasta Reservoir prior to December. When fall hydrology is dry (generally defined as below 90% exceedance of historical hydrology), Reclamation may, through Governance, develop a plan to reduce releases below those described in Table 1 to contribute to

potential end-of-April storage for the following year. Reclamation may make lower releases below those described in Table 1 if, through Governance, Reclamation targets an end-of-September storage that would require more than minimum releases of 3,250 cfs.

The Keswick Dam releases in Table 1 were determined based on historic performance to accomplish improved refill capabilities for Shasta Reservoir to build coldwater pool for the following year. This approach to selecting fall and winter minimum instream flows allows Reclamation to build and conserve storage for supporting coldwater pool management and summer demands while maintaining flows for fall-run Chinook salmon redds. Reclamation, through Governance, may substitute year-specific risk management for historic performance on end-of-September storage, in which case the releases from Keswick Dam should also be modified. The release of lower minimum flows in the fall and winter period directly increases the likelihood and magnitude of the flood control releases in the winter and spring months. In those flood control release years, higher instream flows support fall-run Chinook salmon redds without compromising next year storage.

## 4.7 Rice Decomposition Smoothing

Contractors propose to work to synchronize their diversions to lower peak rice decomposition demand. Rice decomposition smoothing supports fall-run Chinook salmon. With lower October and November flows, fall-run Chinook are less likely to spawn in shallow areas that would be subject to dewatering during winter base flows. These early reductions balance the potential for dewatering of late spawning winter-run Chinook salmon. Reclamation will release flows based on Sacramento Valley CVP contractors and Sacramento River Settlement Contractors coordinated rice decomposition smoothing diversion schedule. Sacramento River Settlement Contractors will synchronize their diversions to lower peak rice decomposition demand.

Starting in August, Reclamation and the Sacramento River Settlement Contractors, through Governance, will develop a delivery schedule based on dewatering risk and redd locations. The delivery schedule will be updated as conditions warrant.

## 4.8 Tributary Habitat Restoration

This is a variable component analyzed in Appendix O.

## 4.9 Winter-Run Chinook Salmon Conservation Hatchery Intervention

Conservation hatchery intervention addresses water temperature, dissolved oxygen, and thiamine stressors. Reclamation, through Governance, may increase production at the Livingston-Stone National Fish Hatchery during drought conditions to maintain populations when environmental conditions exceed species tolerances downstream of Keswick.

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# 5. Clear Creek

As a component of the Trinity Division of the CVP, Reclamation operates and maintains Whiskeytown Dam on Clear Creek, with a capacity of 241,100 acre-feet, for irrigation and other beneficial uses, hydroelectric power generation, fish and wildlife, recreation, and upper Sacramento River temperature control and water rights requirements. Whiskeytown Lake provides reregulation of trans-basin imports from the Trinity River. Diversions from Lewiston Lake on the Trinity River through the Judge Francis Carr Powerhouse and the runoff from the Clear Creek drainage area flow into Whiskeytown Lake. Water from Whiskeytown Lake flows is released into Clear Creek, diverted through the Muletown Conduit, or through the Spring Creek Tunnel and Spring Creek Powerplant into Keswick Reservoir. Whiskeytown Lake has two temperature curtains to pass cold water through the bottom layer and limit warming from Judge Francis Carr Powerhouse to the Spring Creek Powerplant.

Reclamation operates and maintains Spring Creek Debris Dam on Spring Creek, with a capacity of 5,870 acre-feet, for hydroelectric power generation and upper Sacramento River temperature control and water rights requirements. Spring Creek Debris Dam controls debris and contaminated runoff resulting from old mine tailings on Spring Creek, which would otherwise enter the Spring Creek Powerplant tailrace. Water from Spring Creek Debris Dam and Spring Creek Powerplant discharges into Keswick Reservoir.

Statutory, Regulatory, and Contractual Requirements

- Public Law 84-386 Trinity River Division
- Section 3406(b)(12) of CVPIA
- Instream Flow Preservation Agreement 2000 (Contract No. 00-WC-1719-B8)
- April 15, 2002, State Water Board permit, minimum flows
- 1980 Memorandum of Understanding (MOU) with California Department of Fish and Wildlife (CDFW) and State Water Board (Spring Creek Debris Dam)

There are no contemporaneous programs to highlight.

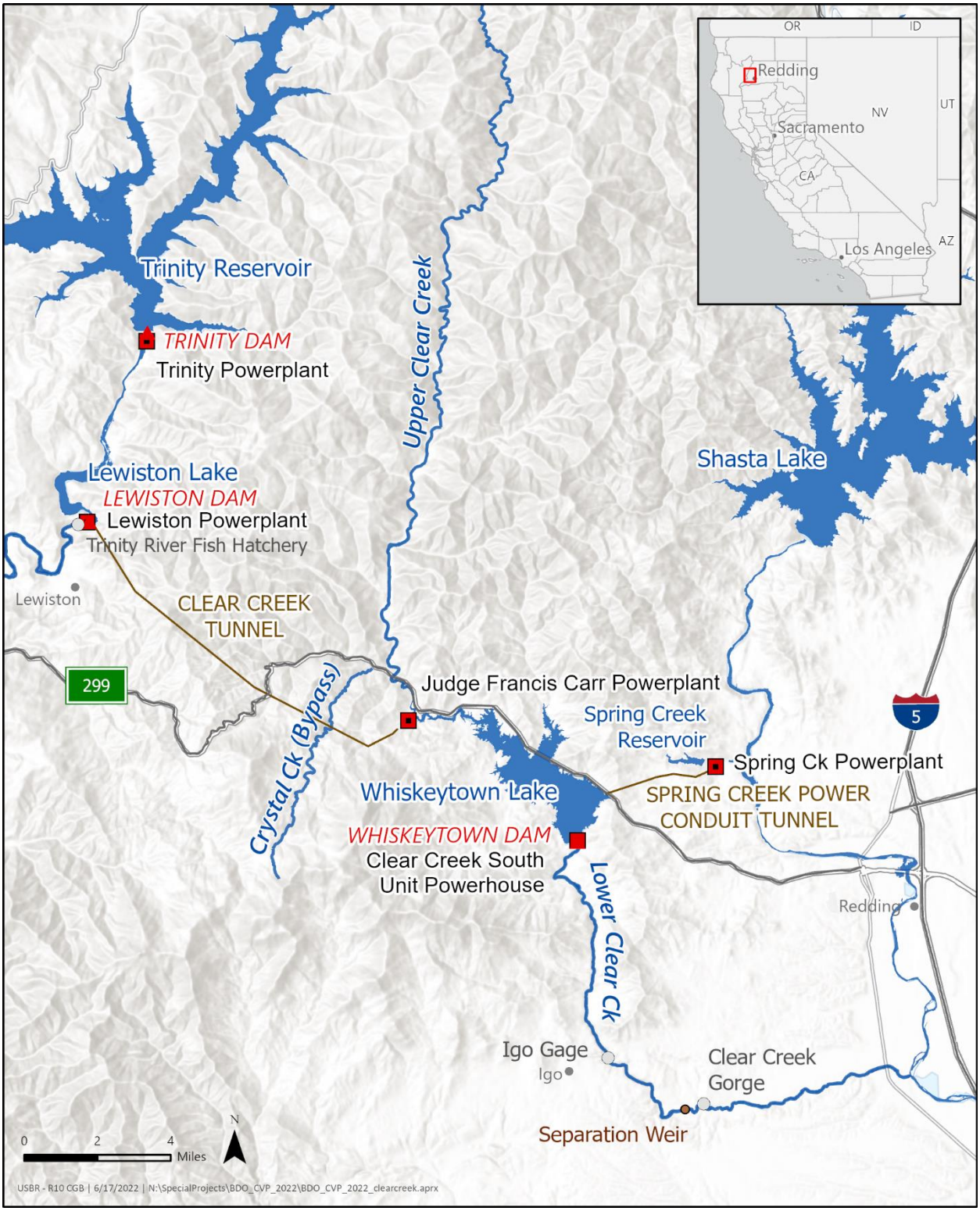


Figure 3. Clear Creek Facilities in the Trinity Division of the CVP

## 5.1 Seasonal Operations

In the winter and spring, Whiskeytown Lake is operated to regulate flows for flood management. Starting in November, Reclamation will draw down Whiskeytown Lake by approximately 35 thousand acre-feet (TAF) to create flood management space, generally refilling in April or May. USACE does not regulate Whiskeytown Lake for flood control. Operations at Whiskeytown Lake during flood conditions are complicated by its operational relationship with the Trinity River, Sacramento River, and upper Clear Creek. On occasion, imports of Trinity River water to Whiskeytown Reservoir may be suspended to avoid aggravating high flow conditions in the Sacramento Basin. Heavy rainfall events occasionally result in uncontrolled gloryhole spillway discharges to Clear Creek, through the Whiskeytown Gloryhole.

During the summer and early fall, Reclamation operates to provide lake elevations as full as practical for recreation. Whiskeytown Lake is a major recreational destination with recreational facilities administered by the National Park Service. Summer and fall imports help maintain Whiskeytown Lake elevations, provide cool water for releases to Clear Creek for temperature control objectives, decrease residence time in Lewiston Lake for Trinity River temperature control, and help maintain temperature objectives in the Sacramento River by supplying water to Keswick Reservoir.

## 5.2 Ramping Rates

Ramping rates address the stranding risk stressor. Reclamation will limit down ramping rates to 25 cfs per hour.

Reclamation, through Governance, may develop a faster down ramping rates on a case-by-case basis. Flow actions will include measures to mitigate for juvenile stranding risk (e.g., nighttime down ramping, slow down-ramping rates). These measures will be contained within the allotted water volumes for minimum instream flows and pulse flows.

Down ramping rates are limited by Whiskeytown Dam infrastructure. Flow reductions (down ramping) can potentially induce stranding of juvenile salmonids on Clear Creek.

## 5.3 Minimum Instream Flows (Seasonally Variable Hydrograph)

Minimum instream flows address habitat stressors. Reclamation will release water through Whiskeytown Dam to provide intra-annual variation to emulate natural processes. Flows will have a 200 cfs average annual flow that oscillates over a 1-year period, with releases transitioning from 300 cfs in the winter, down to 100 cfs in the summer, and back to 300 cfs by the following winter (, ). In critical years, Reclamation will target 150 cfs based on available water from Trinity Reservoir and attempt to maintain above 100 cfs.

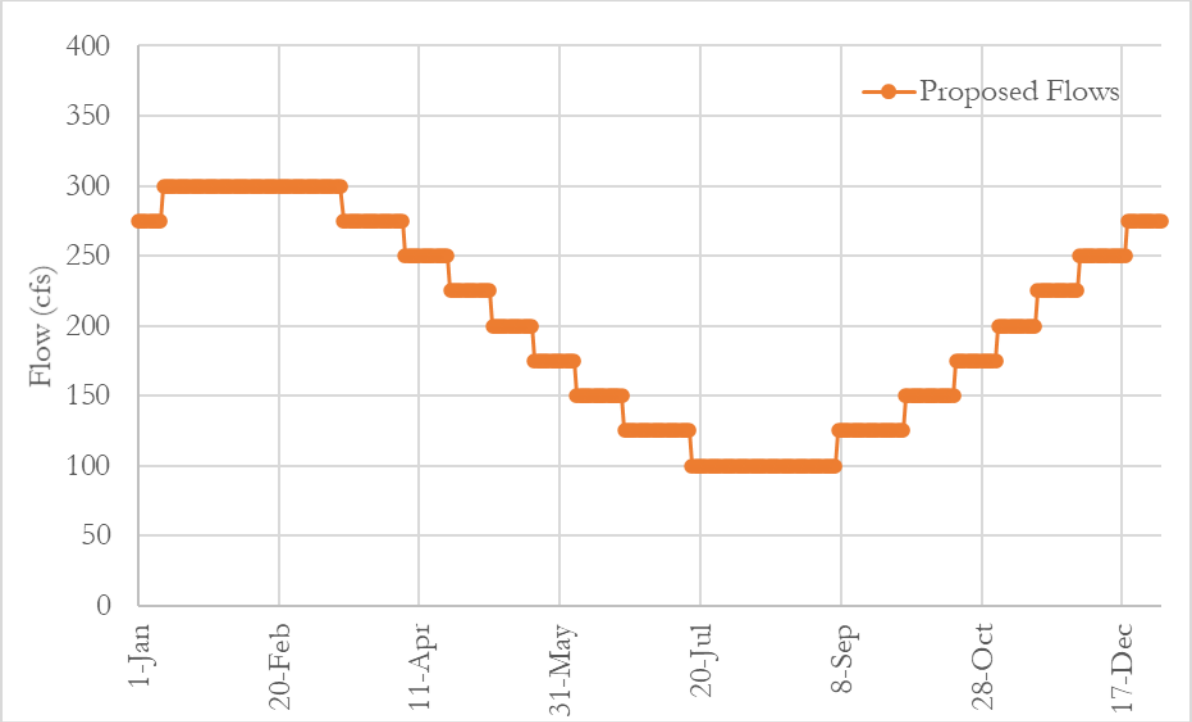


Figure 4. Proposed Annual Clear Creek Flows

Table 2. Proposed Annual Clear Creek Flows Changes

| Date | From (cfs) | To (cfs) |
|---|---|---|
| January 10 | 275 | 300 |
| March 15 | 300 | 275 |
| April 6 | 275 | 250 |
| April 22 | 250 | 225 |
| May 7 | 225 | 200 |
| May 22 | 200 | 175 |
| June 6 | 175 | 150 |
| June 23 | 150 | 125 |
| July 17 | 125 | 100 |
| September 7 | 100 | 125 |
| October 1 | 125 | 150 |
| October 23 | 150 | 175 |
| November 3 | 175 | 200 |
| November 17 | 200 | 225 |
| December 2 | 225 | 250 |
| December 19 | 250 | 275 |

cfs = cubic feet per second.

Reclamation, through Governance, will schedule the hydrograph to maximize multi-species benefits. An annual schedule will be developed by February 1 and updated through May on a case-by-case basis. The flow schedule is dependent, at times, upon agreement by Redding Electric Utility for use of their facilities.

The seasonally variable hydrograph emulates a more natural flow regime, which is expected to better support natural anadromous fish production. Minimum flows per the Instream Flow Preservation Agreement (2000) are shown below:

| Period | Normal Year | Critical Year |
|---|---|---|
| January – October | 50 cfs | 50 cfs |
| November – December | 100 cfs | 70 cfs |

cfs = cfs = cubic feet per second.

## 5.4 Pulse Flows

Pulse flows address the stressors on migration cues. Except in years with significant uncontrolled spill, Reclamation will release up to 10,000 acre-feet from Whiskeytown Dam for channel maintenance, spring attraction flows, and to meet other physical and biological objectives. In critical years, Reclamation will release up to 5,000 acre-feet.

Reclamation, through Governance, will develop pulse flows schedules, which include measures (e.g., nighttime down ramping, slow down ramping rates, etc.) to mitigate for potential risks (e.g., potential juvenile fish stranding). The pulse flows are not to exceed safe outlet works capacity of Whiskeytown Dam, currently 840 cfs, and to be scheduled on or after February 1.

Over the past decade, these pulse flows have typically been scheduled for May and June, which correspond to the peak migration timing of spring-run Chinook salmon into Clear Creek. Pulses intended to promote geomorphic activities will be most effective if coordinated with natural precipitation events and will likely require quick implementation if a predicted storm is truly eminent. Managed spring attraction pulse flows released from Whiskeytown Dam have been shown to cause spring-run Chinook salmon to enter Clear Creek from the Sacramento River (Bottaro and Chamberlain, 2019).

## 5.5 Water Temperature Management

Water temperature management addresses adult water temperature and egg incubation stressors. Reclamation will target Whiskeytown Dam releases to not exceed the mean daily temperatures at Igo gauge:

- 61° F from June 1 through August 15.
- 60° F from August 16 through September 15.

- 56° from Sept 15 through Nov 15.

Water temperature management on Clear Creek is implemented through changes in guard gate configurations and flow manipulations. In dry, critical, or transfer curtailment years, Reclamation may not be able to meet these temperatures and will operate Whiskeytown Dam as close to these temperatures as practicable.

Additional flows may be required to meet temperature objectives. Reclamation will determine if additional water is available for temperature management and notify the members of Governance. If temperature exceedances are encountered (i.e., 2 consecutive days of mean daily temp exceedance), then Reclamation may add 25 cfs to the seasonally variable hydrograph. If additional water is not available, Reclamation may, through Governance, reshape the remaining seasonally variable hydrograph to make this water available. Reshaping will consider maintaining spring-run Chinook salmon redds.

Within Clear Creek, spring-run Chinook salmon hold from May through September and benefit from stable and cool water temperatures. Spring-run Chinook salmon spawning typically occurs in September. Eggs benefit from stable and cool water during their incubation. All other anadromous salmonids within Clear Creek spawn from October through March and have similar egg incubation water temperature requirements. Meeting temperature targets in Clear Creek requires sufficient cold water in Whiskeytown Reservoir. Cold water within Whiskeytown Reservoir is dependent on trans-basin deliveries from the Trinity River imported through the Carr tunnel. When deliveries are high, cool water is generally available throughout the year for Clear Creek. When deliveries are curtailed, reservoir temperatures can rise above preferred levels. This leads to difficulties in managing summer and fall temperatures in Clear Creek. Additional water releases increase flow rate and thermal mass, reducing water warming below Whiskeytown Dam.

## 5.6 Spawning and Rearing Habitat Restoration

This is a variable component analyzed in Appendix O.

## 5.7 Spring Creek Debris Dam

Operation of Spring Creek Debris Dam controls debris and contaminated runoff from Iron Mountain before it enters the Spring Creek Powerplant tailrace and then Keswick Reservoir. Water from Spring Creek Debris Dam and Spring Creek Powerplant discharge into Keswick Reservoir. In January 1980, Reclamation, CDFW, and State Water Board executed a memorandum of understanding (MOU) to implement actions that protect the Sacramento River system from heavy metal pollution from Spring Creek and adjacent watersheds. Reclamation, CDFW, State Water Board, and EPA have developed interim operations and are revising the 1980 MOU. Reclamation proposes to use the water quality criteria from the 1980 MOU and operate as described below, noting this operation is dependent on the water treatment provided by EPA at Iron Mountain Mine.

When Spring Creek Reservoir is less than elevation 795 feet and above elevation 720 feet, Reclamation proposes to make controlled undiluted releases into Keswick Reservoir. These undiluted releases occur throughout the year, typically December through June and less frequently in other months. During situations when storm events are occurring and Spring Creek Reservoir is above elevation 795 feet, water must be released through the spillway. If a spillway release is required, it generally occurs January through April, coinciding with large flood management releases from Keswick Dam and may include up to 50% increase in the objective concentrations of copper and zinc. During any significant storm event, Spring Creek Debris Dam releases may target a dilution ratio with Keswick Dam releases to achieve an acceptable water quality below Keswick Dam. Reclamation does not plan to operate Spring Creek Reservoir below elevation 720 feet to avoid potentially significant degraded water quality from exposed soils; however, Reclamation would provide a minimum dilution flow of 250 cfs from Spring Creek Powerplant and increased water quality monitoring until above the reservoir elevation of 720 feet. Any time dilution flows are required to minimize the build-up of toxic metals in the Spring Creek arm of Keswick Reservoir, Reclamation proposes to coordinate releases from Spring Creek Powerplant to keep the metals in circulation within the Keswick Reservoir.

## 5.8 Segregation Weir

The segregation weir addresses competition, introgression, and broodstock removal stressors. In late August through early November, a segregation weir will be placed on Clear Creek based on channel cross-section suitability and the distribution of adult spring-run Chinook salmon holding locations, typically between the Clear Creek Gorge Cascade and Clear Creek Road Bridge. Placement of the weir would occur before fall-run Chinook Salmon enter Clear Creek to avoid hybridization with spawning spring-run Chinook salmon and redd superimposition. Removal of the weir would occur after the peak of fall-run Chinook salmon spawning, when the risk of redd superimposition is very low.

The weir location and timing protect most of the spring-run Chinook salmon utilizing Clear Creek, while minimizing effects to other salmonids. Adult spring-run Chinook salmon that do not migrate above the segregation weir by the time it is installed, will be subject to poor water quality (e.g., high water temperatures) and more likely to experience pre-spawn mortality, genetic introgression with fall-run, or loss of redd integrity due to superimposition from fall-run Chinook salmon redd construction.

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# 6. American River

Reclamation operates and maintains American River Division of the CVP for flood control, M&I and agricultural water supplies, hydroelectric power generation, fish and wildlife protection, recreation, and Delta water quality. Facilities include Folsom Dam, its reservoir (977 TAF capacity), power plant, temperature control shutters on the power plant, TCD, and the Joint Federal Project auxiliary spillway, as well as the Nimbus Dam, Lake Natoma, Nimbus Power Plant, and Folsom South Canal. The CVP additionally delivers water to the Freeport Regional Water Project Intake. Releases from Folsom Dam are re-regulated approximately 7 miles downstream by Nimbus Dam. Nimbus Dam creates Lake Natoma, which serves as a forebay for diversions to the Folsom South Canal and the Nimbus Fish Hatchery. Water diverted to the fish hatchery returns to the American River through four outfalls approximately 0.5 mile downstream of Nimbus Dam. Releases from Nimbus Dam to the American River pass through the Nimbus Power Plant, or the spillway gates at flows in excess of 5,000 cfs.

Folsom Reservoir is the main storage and flood control reservoir on the American River. Numerous other smaller non-CVP and SWP reservoirs in the upper basin provide hydroelectric generation and water supply without specific flood control responsibilities. The total upstream reservoir storage above Folsom Reservoir is approximately 820 TAF, and these reservoirs are operated primarily for hydropower production. Ninety percent of this upstream storage is contained by five reservoirs: French Meadows (136 TAF); Hell Hole (208 TAF); Loon Lake (76 TAF); Union Valley (271 TAF); and Ice House (46 TAF). Reclamation coordinates with the operators of these reservoirs to aid in planning for Folsom Reservoir operations.

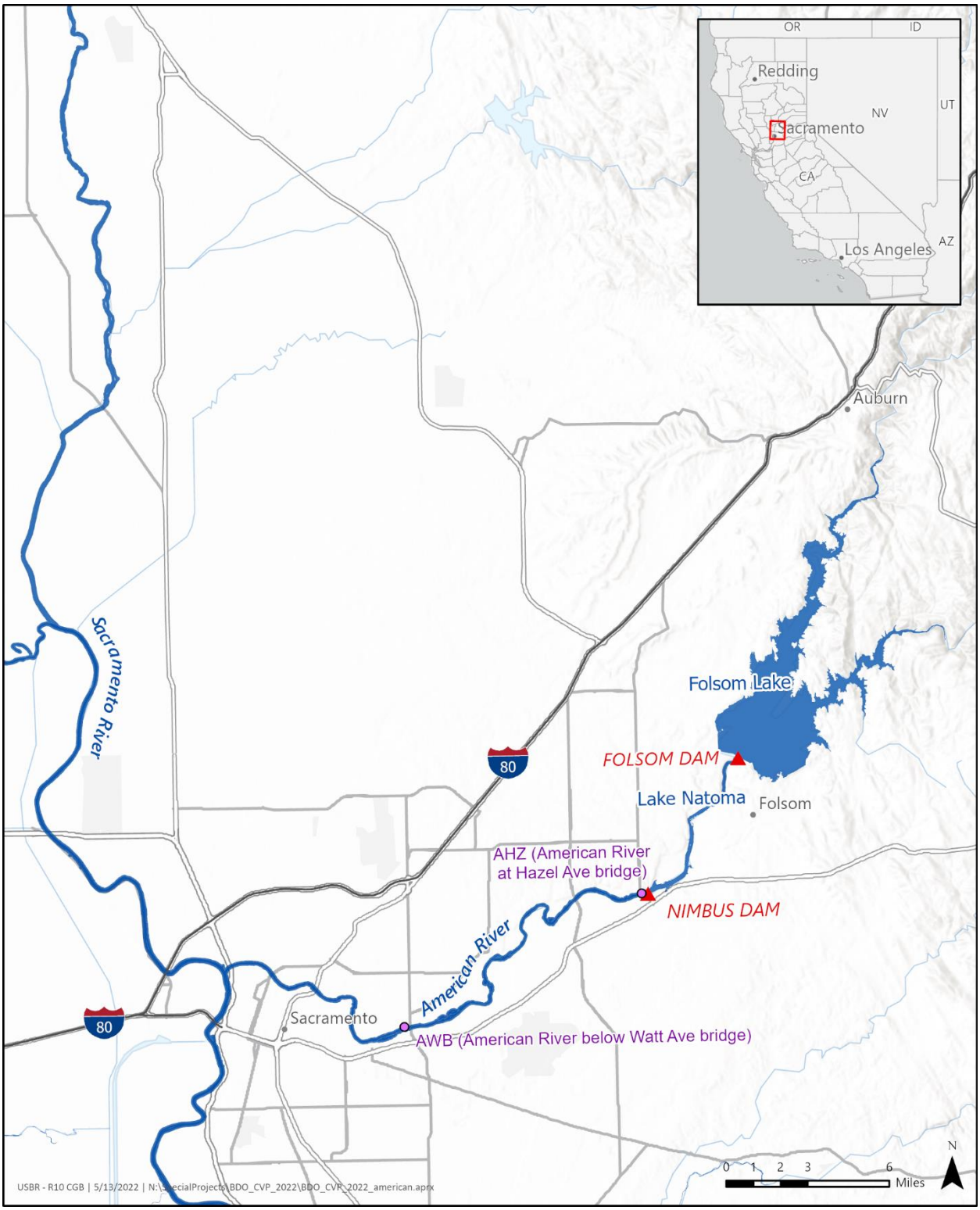


Figure 5. American River Facilities in the American River Division of the CVP

Statutory, Regulatory, and Contractual Requirements:

- Public Law 81-356 American River Development Act of October 14, 1949, ch. 690, 63 Stat. 852
- Public Law 89-161 Auburn-Folsom South Unit - Act of September 2, 1965, 79 Stat. 615
- Freeport Regional Water Authority Intake
- State Water Board D-893
- State Water Board D-1641
- Water Control Manual for Folsom Dam and Lake (June 12, 2019) and its October 16, 2018, NMFS Biological Opinion
- Water Forum MOU March 29, 2021

There are no contemporaneous programs to highlight.

## 6.1 Seasonal Operations

Reclamation operates Folsom Reservoir in the winter primarily for flood control and minimum flows in the American River and Delta. Flood control may drive operations in wetter years. The USACE 2017 *Water Control Manual: Folsom Dam and Lake* provides operational rules for dam safety and flood risk management. Flood operation criteria target flow rates below downstream channel capacities (approximately 115,000 cfs). During non-flood control operations, Reclamation stores Folsom Reservoir inflows that exceed releases for minimum instream flows and Delta water quality requirements. Reclamation seeks consistent steady releases to minimize potential redd dewatering, redd scouring, and juvenile stranding for steelhead and fall-run Chinook salmon, but Delta outflow requirements may require varying releases.

In the spring, flood control operations are common. When not operating to flood control requirements, Reclamation seeks to maximize capture of the spring runoff to fill as close to full as possible. Fishery needs require minimum instream flows developed through an American River Minimum Flow Schedule, which in some years includes a pulse flow to cue juvenile salmonids to emigrate. Reclamation also operates for water supply and Delta outflow requirements. As the closest reservoir to the Delta, increased releases from Folsom are frequently called on to address Delta water quality requirements under State Water Board D-1641. When releases from upstream reservoirs arrive, Folsom releases can be reduced and system-wide reservoirs balanced.

When developing the operational forecast, Reclamation targets an end-of-September Folsom storage of at least 300 TAF. In some years, operational constraints may result in an end-of-September storage of less than 300 TAF. The objective of considering storage in the forecasting process is to provide releases of salmonid-suitable temperatures to the lower American River and reliable deliveries (using the existing water supply intakes and conveyance systems) to American River water agencies dependent on deliveries or releases from Folsom Reservoir. In September,

storage is typically at its lowest. Winter precipitation events are uncertain from October through December when planning for the spring and summer temperature management. This potentially presents a higher risk of the reservoir not having sufficient carryover storage by the end of December if winter meteorological forecasts are not fulfilled. Reclamation is implementing a pilot program that considers an end-of-the-calendar-year (end-of-December) planning minimum of 300 TAF (Water Forum MOU, March 2021).

In the summer, Reclamation typically releases flows above the minimum instream flow requirements for instream temperature control, Delta outflow, and exports. Reclamation manages water temperatures through release volume and shutter elevations in consideration of projected meteorological conditions. Reclamation balances the need to access Folsom Reservoir coldwater pool for instream temperature control during the summer for steelhead and the need to preserve water for use during the fall for fall-run Chinook salmon.

In the fall, operations focus on temperature control management. Limited coldwater pool and limited storage require balancing releases and shutter operations to maximize the ability to maintain suitable temperatures for fall-run Chinook salmon spawning and for rearing steelhead. If reservoir inflows are greater than the release needs, Reclamation stores the water. Reclamation will ramp down to the revised minimum flows from Folsom Reservoir as soon as possible in the fall and maintain these flows through spawning and egg emergence, where possible, to minimize redd dewatering and juvenile stranding.

## 6.2 Ramping Rates

Ramping rates address the stranding stressor. Reclamation will ramp down releases in the American River below Nimbus Dam as shown in .

Table 3. American River Ramping Rates

| Lower American River Daily Rate of Change (cfs) | Amount of Decrease in 24 Hours (cfs) | Maximum Change per Step (cfs) |
|---|---|---|
| 20,000 to 16,000 | 4,000 | 1,350 |
| 16,000 to 13,000 | 3,000 | 1,000 |
| 13,000 to 11,000 | 2,000 | 700 |
| 11,000 to 9,500 | 1,500 | 500 |
| 9,500 to 8,300 | 1,200 | 400 |
| 8,300 to 7,300 | 1,000 | 350 |
| 7,300 to 6,400 | 900 | 300 |
| 6,400 to 5,650 | 750 | 250 |
| 5,650 to 5,000 | 650 | 250 |
| <5,000 | 500 | 100 |

Ramping may vary from these requirements during flood control, or if needed for facility operational concerns. Reclamation, through Governance, may develop a faster down ramping rate on a case-by-case basis to implement temporary flow reductions for critical monitoring or maintenance needs.

## 6.3 Minimum Instream Flows (Minimum Release Requirement)

This is a variable component analyzed in Appendix M.

## 6.4 Spring Pulse Flow

This is a variable component analyzed in Appendix M.

## 6.5 Redd Dewatering

The redd dewatering protective adjustment (RDPA) supports fall-run Chinook salmon and address the steelhead stranding and dewatering stressor. In January, the minimum release requirement (MRR) can only decrease and cannot be less than 70% of the December MRR. In February, the MRR cannot be less than 70% of the December MRR.

Based on the January MRR, Table 4 shows the minimum flow for steelhead redds through May. If the February MRR is higher than January, the February MRR is used through May.

Table 4. Steelhead Redd Dewatering Protective Adjustment-based MRR for February through May

| January or February MRR (cfs) | Steelhead Redd MRR through May (cfs) |
|---|---|
| ≤700 | 500 |
| 800 | 520 |
| 900 | 580 |
| 1,000 | 640 |
| 1,100 | 710 |
| 1,200 | 780 |
| 1,300 | 840 |
| 1,400 | 950 |
| 1,500 | 1,030 |
| 1,600 | 1,100 |
| 1,700 | 1,180 |
| 1,800 | 1,250 |

cfs= cubic feet per second; MMR = minimum release requirement.

Reclamation, through Governance, will schedule MRR releases consistent with the implementation of RDPAs to limit potential redd dewatering January through May. Values between those in the table would be linearly interpolated. The maximum MRR in January through May is 1,750 cfs, but 1,800 cfs is included in the table for interpolation.

The purpose of RDPAs is to protect fall-run Chinook salmon redds in January and February and steelhead redds during February through May from changes due to the MRR. Releases can be above the MRR in the fall and winter, the period during which MRR does not control operations.

The fall-run Chinook salmon RDPAs affect winter MRRs in two ways: (1) a restriction on increases in MRR for January, and (2) a restriction on decreases in MRR for January and February. In recognition of the uncertainty of the January Sacramento River Index (SRI) forecast, increases are precluded in MRR from December to January. Fall-run Chinook salmon redds are constructed in October through December, and the fall-run Chinook salmon fry emerge through February. Rather than have a condition in which a January-forecasted SRI resulted in an increase in MRR, only to see a decrease in MRR with the February Bulletin 120 water supply forecast, only reductions are allowed in the January MRR from the December MRR. To avoid large decreases, the January or February MRR could not be less than 70% of the December MRR. The MRR is the larger of the forecast RDPA for fall-run Chinook salmon or steelhead.

## 6.6 Water Temperature Management

This is a variable component analyzed in Appendix M.

## 6.7 Spawning and Rearing Habitat Restoration

This is a variable component analyzed in Appendix O.

# 7. Delta

Reclamation operates and maintains the Delta Division of the CVP for M&I and agricultural water supplies, hydroelectric power generation, fish and wildlife protection, recreation, and Delta water quality. The major CVP features are the Delta Cross Channel, Contra Costa Canal and Rock Slough Intake facilities, Tracy Fish Collection Facility, and C. W. "Bill" Jones Pumping Plant (Jones Pumping Plant). The Jones Pumping Plant, located about 5 miles north of Tracy, has six fixed-speed pumps. It has a permitted diversion capacity of 4,600 cfs. The Jones Pumping Plant discharges into the head of the Delta-Mendota Canal (DMC).

Reclamation operates and maintains the San Luis Unit of the Delta Division for M&I and agricultural water supplies, hydroelectric power generation, fish and wildlife protection, recreation, and water quality. The major joint CVP and SWP features are the O'Neill Forebay, San Luis Reservoir, Bernice Frederic Sisk Dam, O'Neill Pumping-Generating Plant, William R. Gianelli Pumping-Generating Plant, San Luis Canal, Dos Amigos Pumping Plant, and Los Banos and Little Panoche Detention Dams and Reservoirs. The major CVP only facilities include the Coalinga Canal and Pleasant Valley Pumping Plant.

Reclamation operates the San Felipe Division for M&I and agricultural water supplies, fish and wildlife protection, and recreation. The major CVP features are the Pachecho Pumping Plant, Tunnel, and Conduit.

The main SWP Delta features are the Barker Slough Pumping Plant, Suisun Marsh facilities (including the Suisun Marsh Salinity Control Gate, Roaring River Distribution System, Morrow Island Distribution System, Goodyear Slough Outfall Gates), Clifton Court Forebay, and John E. Skinner Delta Fish Protective Facility, and Harvey O. Banks Pumping Plant (Banks Pumping Plant). The Barker Slough Pumping Plant diverts water from Barker Slough into the North Bay Aqueduct for delivery to the Solano County Water Agency and the Napa County Flood Control and Water Conservation District. The Suisun Marsh Control Gates (SMSCG) are located on Montezuma Slough about 2 miles downstream from the confluence of the Sacramento and San Joaquin Rivers, near Collinsville. The objective of SMCG operation is to decrease the salinity of the water in Montezuma Slough. The gates control salinity by restricting the flow of higher salinity water from Grizzly Bay into Montezuma Slough during incoming tides and retaining lower salinity Sacramento River water from the previous ebb tide. Operation of the gates in this fashion lowers salinity in Suisun Marsh channels and results in a net movement of water from east to west through Suisun Marsh.

The SWP Banks Pumping Plant, located near the Jones Pumping Plant, has 11 variable speed pumps. Pumping is limited to a maximum permitted capacity of 10,300 cfs per day. The Banks Pumping Plant discharges into the California Aqueduct.

The Delta-Mendota Canal/California Aqueduct, with a capacity of 900 cfs, is used to move water between the California Aqueduct and the Delta-Mendota Canal. This structure was built to help

both federal and state water projects more effectively move water from the Delta into the San Luis Reservoir.

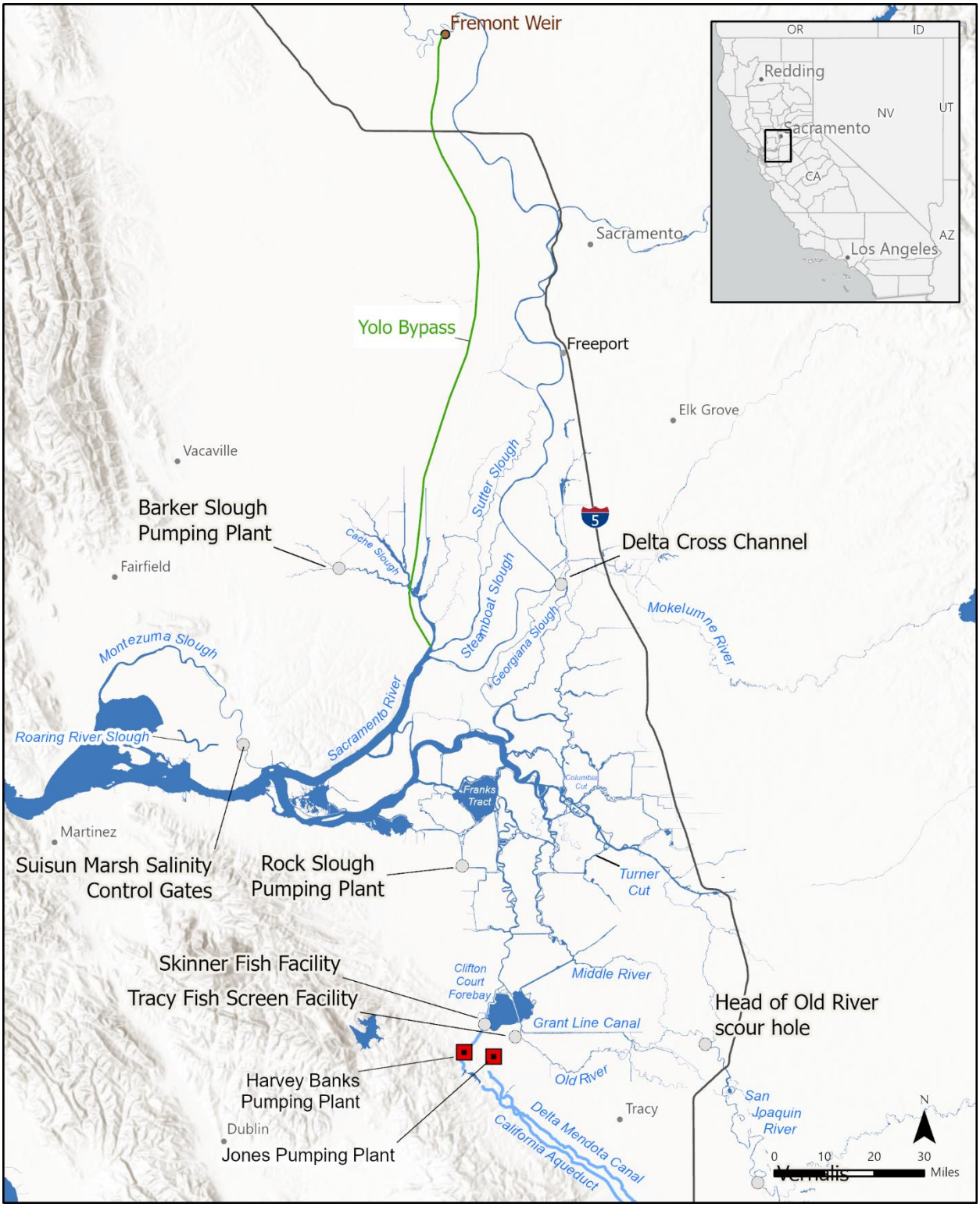


Figure 6. Map of the Delta Division

Statutory, Regulatory, and Contractual Requirements

- Public Law 74-392 CVP Re-Authorization Act
- State Water Board D-1641
- 2018 COA
- 1986 Settlement Agreement with South Delta Water Agency (Clifton Court Forebay gate operations)
- October 13, 1981, USACE Public Notice #5820A (Clifton Court inflow criteria)
- DWR's Division of Safety of Dams criteria (Clifton Court Forebay storage)
- USACE permit number 199900715
- DWR/CDFW Agreement (Skinner Delta Fish Protective Facility)
- USACE permit numbers SPK-200100121, SPK-20000696 (Temporary Barriers)

Contemporaneous Programs

- Agricultural Barrier Construction (USACE)
- Barker Slough Pumping Plant Fish Screen
- Contra Costa Los Vaqueros Expansion – Phase 1
- Contra Costa Rock Slough Fish Screen
- Delta Cross Channel Gate Improvements
- Georgiana Slough Non-Physical Barrier
- Head of Old River – Scour Hole Predation Reduction
- San Luis Dam Raise and Reservoir Expansion Project Construction
- Skinner Delta Fish Protective Facility Improvement Program
- Suisun Marsh Preservation Agreement
- Tracy Fish Collection Facility Improvement Program

## 7.1 Seasonal Operations

In the winter and spring, Reclamation and DWR typically export excess, unregulated, unstored water. Delta water quality and actions to minimize entrainment of listed fish into the south Delta and at the Jones and Banks Pumping Plants limit the export of excess water. Exports during the winter and spring reduce the reliance on conveying previously stored water in the summer and fall for south-of-Delta water supply needs. In dry conditions, Reclamation and DWR may need

to release water from upstream reservoirs above minimum flow to meet Delta water quality requirements, primarily outflow.

During the summer, the CVP and SWP convey previously stored water through the Delta for export at the Jones Pumping Plant, Banks Pumping Plant, and other Delta facilities. Delta concerns during the summer typically focus on maintaining salinity and meeting outflow objectives while maximizing exports with the available water supply. Shasta Reservoir releases are made for water temperature control and meeting obligations for navigation at Wilkins Slough. Folsom Dam similarly makes releases for temperature control. These flows become available for export after outflow, salinity, and in-Delta needs have been met.

In the fall, releases from upstream reservoirs generally decrease to conserve water in storage for the next year. On occasion, releases to reduce storage for flood conservation pool or redd protection may occur and result in additional flows into the Delta. Upstream and in-Delta demands decrease and accretions within the system increase. When water is available and not required for salinity and Delta outflow requirements, late summer and fall provide an opportunity to export water and start filling San Luis Reservoir for the next water year. Water supply needs include peak demands from CVPIA wildlife refuges. Dry conditions in the fall leave little opportunity for exports.

The Banks Pumping Plant pumps water directly from storage in the Clifton Court Forebay. The Clifton Court Forebay radial gates are closed during critical periods of the ebb and flood tidal cycle to protect water levels experienced by local agricultural water diverters in the south Delta. During July through September, the maximum daily diversion limit from the Delta into the Clifton Court Forebay is increased from 6,990 cfs to 7,490 cfs, and the maximum averaged diversion limit over any 3 days is increased from 6,680 cfs to 7,180 cfs. Further, Banks Pumping Plant will pump 195,000 acre-feet to the CVP in accordance with the 2018 COA Addendum.

## 7.2 Delta Cross Channel Closures

The Delta Cross Channel closures address the outmigration cues and entrainment risk stressor for salmon, sturgeon, and steelhead. Reclamation will open the Delta Cross Channel to improve the movement of water from the Sacramento River to the export facilities at the Jones and Banks Pumping Plants; improve water quality in the central and south Delta; and reduce salinity intrusion rates in the west Delta. Reclamation will close the Delta Cross Channel during the late fall, winter, and spring to reduce straying of Mokelumne River fall-run Chinook salmon, protect outmigrating salmonids from entering the interior Delta, facilitate the State Water Board D-1641 Rio Vista flow objectives for fish passage, and reduce potential scouring and flooding that might occur in the channels on the downstream side of the gates when Sacramento River flows exceed 20,000 cfs on a sustained basis. Delta Cross Channel closure will occur as follows:

**October 1 – November 30, Catch Index Closure**: If State Water Board D-1641 water quality criteria is met, Reclamation will close the Delta Cross Channel gates based on the Knights Landing Catch Index and Sacramento Catch Index as described in .

Table 5. Delta Cross Channel Action Triggers and Responses, October 1–November 30

| Knights Landing Catch Index or Sacramento Catch Index | Action Response within 48 Hours |
|---|---|
| ≥ 3.0 | Close the Delta Cross Channel gates for 3 days |
| ≥ 5.0 | Close the Delta Cross Channel gates for at least 3 days and until the catch index is less than 3 fish per day at both the Knights Landing and Sacramento monitoring sites for 2 consecutive days |

Observations of daily increases in catch indices are typically associated with increased flows at Wilkins Slough and tributaries to the upper Sacramento River, cooler water temperatures at these locations, and entry of migrating juvenile winter-run and spring-run Chinook salmon (Del Rosario et al. 2013; White and Low 2006).

**October 1 – November 30, Lower Mokelumne River Fall Closure:** If the East Bay Municipal Utility District releases Lower Mokelumne River attraction flows, water quality modeling shows concern level criteria are not likely to be exceeded for 14 days, and there is no observed deterioration of interior Delta water quality, then Reclamation may close the Delta Cross Channel gates for up to 5 days.

Table 6. Water Quality Criteria (Simulated 14-Day Average Electrical Conductivity)

| Station | Water Quality Level (µmhos/cm) |
|---|---|
| Jersey Point | 1,800 |
| Bethel Island | 1,000 |
| Holland Cut | 800 |
| Bacon Island | 700 |

µmhos/cm = micromhos per centimeter.

Closure of the Delta Cross Channel when adult fall-run Chinook salmon attraction flows pass through the Lower Mokelumne River can reduce straying of Chinook salmon between the Mokelumne and American Rivers and increase the abundance of fall-run Chinook salmon returning to the Mokelumne River and its hatchery.

**December 1 – January 31**: Reclamation will close the Delta Cross Channel, except to avoid exceeding a State Water Board D-1641 water quality criteria. If drought conditions are observed (i.e., fall inflow conditions are less than 90% of historical flows) Reclamation and DWR, through Governance, may prepare an assessment on opening the Delta Cross Channel for up to 5 days for up to two events within this period to avoid D-1641 water quality exceedances. The assessment will consider relevant monitoring information including: the upstream rotary screw traps, Delta juvenile fish monitoring surveys, Rio Vista flow standards, acoustic telemetered fish monitoring information, and DSM2 modeling. During these potential Delta Cross Channel openings, the

CVP and SWP will export at levels that do not contribute to impaired water quality, subject to public health and safety.

**February 1 – May 20:** Reclamation will keep the Delta Cross Channel closed. State Water Board D-1641 requires the Delta Cross Channel be closed.

**May 21 – June 15**: Reclamation will close the Delta Cross Channel for a total of 14 days. Reclamation and DWR, through Governance, will prepare a plan that considers relevant monitoring information including: the upstream rotary screw traps, Delta juvenile fish monitoring surveys, Rio Vista flow standards, acoustic telemetered fish monitoring information, and DSM2 modeling. Reclamation typically schedules the Delta Cross Channel closures on weekdays and keeps it open on weekends to accommodate recreational interests. State Water Board D-1641 requires the Delta Cross Channel to be closed for a total of 14 days after consultation with the USFWS, CDFW, and NMFS.

### 7.2.1 Maintenance and Repair

The September 24, 1971, Reclamation Designers Operating Criteria requires Reclamation to undertake routine maintenance and repair of the Delta Cross Channel to continue reliable operation. [1] Certain routine maintenance and repair require cycling of the Delta Cross Channel (i.e., open and close the gates several times in a row). Routine maintenance and repair will require cycling of one or both gates approximately twice per year for 1 day each. To avoid and minimize effects, Reclamation to the extent practicable will:

- Perform cycling when federally listed fish are not likely present (mid-June through September).
- Perform cycling during daylight hours.
- Minimize the duration of the time Delta Cross Channel is open during cycling.

Reclamation is required to maintain the Delta Cross Channel and may not have discretion over when the maintenance must occur.

## 7.3 Old and Middle River Reverse Flow Management

This is a variable component analyzed in Appendix I.

## 7.4 Spring Delta Outflow

This is a variable component analyzed in Appendix J.

[1] Bureau of Reclamation. September 24, 1971. Reclamation Designers Operating Criteria.

## 7.5 Delta Smelt Summer and Fall Habitat

This is a variable component analyzed in Appendix K.

## 7.6 Tracy Fish Collection Facility

The Tracy Fish Collection Facility addresses the entrainment stressor. Reclamation will operate the Tracy Fish Collection Facility to screen fish from Jones Pumping Plant. When south Delta hydraulic conditions allow and conditions are within the original design criteria for the Tracy Fish Collection Facility, the secondary channel is operated to achieve water approach velocities for striped bass of approximately 1 to 2.5 feet per second from June 1 through October 31 and for salmon of approximately 3 feet per second from November 1 through May 31.

Salvage of fish at the Tracy Fish Collection Facility occurs 24 hours per day, 365 days per year. Fish are salvaged in flow-through holding tanks, monitored by a 30-minute fish count every 120 minutes, and transported to release sites near the confluence of the Sacramento and San Joaquin Rivers. Tracy Fish Collection Facility personnel monitor for the presence of spent female Delta smelt to determine when to start monitoring for sub-20-mm larval Delta smelt. Larval Delta smelt sampling commences upon detection of a spent female at Tracy Fish Collection Facility or Skinner Delta Fish Protective Facility or when temperature trigger of 12°C at nearby California Data Exchange Center stations is met. The standard operating procedures for the Tracy Fish Collection Facility are included as Attachment XX.

Salvage and operations data necessary to calculate loss are distributed daily by 10 a.m. to CDFW, NMFS, and USFWS. Salvage and loss are reported daily from October 1 to June 30. Loss is calculated per CDFW (2013) (Attachment XX, Chinook Salmon Loss Estimation for Skinner Delta Fish Protective Facility.) The Tracy Fish Collection Facility operates under the procedures included in the facilities standard operating procedures. An annual salvage and loss report for the previous water year is provided by December 31.

### 7.6.1 Maintenance and Repair

Reclamation will provide the fish agencies notification of salvage disruption (salvage outage) due to planned facility maintenance at least 24 hours in advance. To minimize and avoid salvage disruptions, Reclamation conducts most planned outages during shutdowns of Jones Pumping Plant, typically in the spring and continuing into the summer and fall months. For unplanned facility maintenance, notice will be provided as soon as practicable. Reclamation will minimize the duration of the time exports occur during a salvage outage.

Reclamation is required to maintain the Tracy Fish Collection Facility and may not have discretion over when the maintenance must occur.

## 7.7 John E. Skinner Delta Fish Protective Facility

John E. Skinner Delta Fish Protective Facility (Skinner Delta Fish Protective Facility) addresses the entrainment stressor. DWR will operate the facility to screen fish from Banks Pumping Plant. Salvage of fish occurs at the Skinner Delta Fish Protective Facility whenever Banks Pumping Plant is pumping. Fish are salvaged in flow-through holding tanks, monitored by a 30-minute fish count every 120 minutes, and transported by truck to release sites. DWR personnel also monitor for the presence of spent female and larval Delta smelt and longfin smelt using the same methods employed at the Tracy Fish Collection Facility. The standard operating procedures for the Skinner Delta Fish Protective Facility are included as Attachment XX.

Salvage and pertinent operational data are distributed daily by 10 a.m. to the CDFW Fish Facilities Unit, which reviews the raw data for errors and imports it into their salvage database. Salvage data are further distributed and considered official once posted to the CDFW salvage database and website. Salvage and loss are reported daily between October 1 and June 30. Loss is calculated per CDFW (2013) (see Attachment XX Chinook Salmon loss estimation for Skinner Delta Fish Protective Facility and Tracy Fish Collection Facility. Protocol. ftp://ftp.dfg.ca.gov/salvage/). An annual salvage and loss report for the previous water year is provided by December 31.

### 7.7.1 Maintenance and Repair

DWR will provide Reclamation and the fish agencies notice of salvage disruptions due to planned facility maintenance (planned outages) at least 24 hours in advance. To minimize and avoid salvage disruptions, DWR conducts most planned outages during full shutdowns of Banks Pumping Plant, frequently in the spring. Further, the modular design of the Skinner Delta Fish Protective Facility in conjunction with total export capacity reductions is used to avoid salvage disruptions for maintenance and repair activities. For unplanned facility maintenance, notice will be provided as soon as practicable. In the event of an unplanned outage (e.g., power disruption) extending beyond 1 hour, DWR will stop pumping and may continue to operate the Clifton Court Forebay radial gates.

## 7.8 Tidal Habitat Restoration

This is a variable component analyzed in Appendix P.

## 7.9 Delta Smelt Supplementation

Delta smelt supplementation addresses the Allee effect in the baseline status of wild Delta smelt. Reclamation and DWR will collaborate with USFWS and CDFW on the development of a program to conduct supplementation of the wild Delta smelt population with propagated fish consistent with USFWS' Supplementation Strategy (USFWS 2020). Reclamation and DWR will support production up to a minimum of 125,000 fish by water year 2024, a minimum of 150,000 fish by water year 2025, and a minimum of 200,000 fish by water year 2026, if feasible, that are at least 200 days post-hatch or equivalent as informed by CDFW and USFWS.

The USFWS and CDFW may update the Supplementation Strategy in coordination with Reclamation and DWR. The Supplementation Strategy currently uses the UC Davis Fish Conservation and Culture Laboratory (FCCL). In water year 2022, the FCCL raised 55,733 fish that were released into the wild as part of experimental releases. Experimental releases are currently planned through water year 2024, targeting a total of 125,000 fish. USFWS ran a simulation using an updated version of the life cycle model described by Smith et al. (2021) to estimate the probability that different release levels would result in wild Delta smelt populations high enough to support FCCL's broodstock collection efforts. Results indicate that an annual release of 150,000–175,000 fish is needed to have a greater than 50% chance of meeting the collection target. USFWS and CDFW will update the Supplementation Strategy to incorporate these findings.

The Supplementation Strategy also identifies a need for additional facilities and evaluation of new approaches to maintain these fish, support supplementation, improve transportation and release of fish, maximize genetic diversity, and minimize domestication effects. An existing Master Plan for a Delta Smelt Conservation Facility Fish Technology Center (USFWS 2018) is currently being revisited and further developed to a 35% design-level plan, with completion expected August 2023. Additional facilities would require a subsequent set of environmental compliance for their construction and eventual operation. Reclamation and DWR will collaborate with USFWS for the additional development of this planning effort, incorporation into the Supplementation Strategy, and the construction and operational needs of facilities capable of meeting production of 400,000–500,000 fish by water year 2030.

## 7.10 Water Transfers

Water transfers assist California urban areas, agricultural water users, and others in meeting their future water needs. Reclamation and DWR will operate the CVP and SWP to facilitate transfers through providing water in streams for delivery to alternative diversion points, conveying water across the Delta for export, or storing water for delivery at a future time.

Seasonal operations describe deliveries up to contract totals. Transfers between CVP contractors within counties, watersheds, or other areas of origin do not require demonstration of that water being consumptively used or irretrievably lost to beneficial use. Transfers not meeting these requirements (e.g., Out-of-Basin), follow the *Draft Technical Information for Preparing Water Transfer Proposals* (Water Transfers White Paper). Updated in 2019, the paper provides detailed information on establishing transfers and how complete a particular transfer and document it in a way to prevent harm to other legal users of water. The following is a brief summary from the Water Transfer White Paper on making water available for transfer, which is not a part of this Proposed Action:

- Cropland Idling/Crop Shifting Transfers: Water from idling cropland or growing lower-water-use crops. Seller reduces surface water diversion from their normal operations.
- Groundwater Substitution Transfers: Water from reducing surface water diversions and replacing that like amount water with groundwater pumping.

- Reservoir Storage Release: Water from seller releasing stored water from their reservoir in excess of what would be released annually under their normal operations (e.g., reservoir storage targets, historical operation patterns, instream flow requirement, conveyance losses, refill criteria, and other downstream obligations).

Reclamation and DWR will provide a transfer window across the Delta from July 1 through November 30. Real-time operations may restrict transfers within the transfer window so that Reclamation and DWR can meet other authorized project purposes, for example, when pumping capacity is needed for CVP or SWP water. Maximum transfers are shown in .

Table 7. Proposed Annual North to South (out of basin) Water Transfer Volume

| Water Year Type | Maximum Transfer Amount North to South (TAF) |
|---|---|
| Critical | Up to 600 |
| Dry (following critical) | Up to 600 |
| Dry (following dry) | Up to 600 |
| All other years | Up to 360 |

TAF = thousand acre-feet.

In general, a water transfer involves an agreement between a willing seller and a willing buyer to use available infrastructure capacity to convey water between the parties. To make water available for transfer, the willing seller must take an action to reduce the consumptive use of water (such as idle cropland or pump groundwater in lieu of using surface water) or release additional water from reservoir storage. This water is then conveyed to the buyers' service area for beneficial use.

Reclamation and DWR frequently transfer project and non-project water supplies through CVP and SWP facilities, including in-basin and out of basin transfers. The quantity and timing vary on the exact transfer and can be similar to existing conditions or require operational changes to both releases and pumping.

Contemporaneous programs not submitted for consultation or reinitiation include:

- Long Term Transfer Program for South-of-Delta Transfers
- Long Term San Joaquin River Exchange Contractor Transfers
- Non-Project Transfers

## 7.11 Agricultural Barriers

Agricultural barriers maintain water levels for south Delta agricultural diverters. DWR will install three agricultural barriers in the south Delta in conjunction with the SWP and CVP. Upon completion of installation, DWR will operate the barriers tidally depending on stage conditions, except one culvert at Grant Line Canal and Old River near Tracy . Remaining open culverts

allow fish passage until the mean daily water temperature at Mossdale reaches 22°C or June 1 if water level maintenance is needed. The remaining culverts would remain open beyond June 1 if water level maintenance is not a concern and the mean daily water temperature at Mossdale is not above 22°C.

Beginning as early as March 1, DWR may install barriers in Old River near Tracy 0.5 mile upstream of the Tracy Fish Collection Facility; in Middle River 0.5 mile upstream of the junction with Victoria Canal; and in Grant Line Canal, about 400 feet upstream of the Tracy Boulevard Bridge. The Old River near Tracy Barrier has been installed since 1991, the Middle River Barrier since 1987, and the Grant Line Canal Barrier since 1996. The barriers were not installed in 1998, and only the Middle River Barrier was installed in 2017 due to high flows. All barriers will be removed by November 30 each year.

These operations protocols provide for passage of steelhead as long as possible when their temporal occurrence is highest in the south Delta, while also aligning barrier operations with the need for water level protection.

## 7.12 Barker Slough Pumping Plant

DWR will operate the Barker Slough Pumping Plant to an annual maximum diversion of 125 TAF and a maximum daily diversion rate of 175 cfs. The Barker Slough Pumping Plant is a SWP screened diversion that pumps water through the North Bay Aqueduct, an underground pipeline to Cordelia Forebay outside of Vallejo. The North Bay Aqueduct serves Napa County, Vallejo, Benicia, and Travis Air Force Base.

### 7.12.1 Maximum Spring Diversions

Barker Slough Pumping Plant maximum spring diversions addresses the entrainment risk and transport direction stressor for Delta smelt. Diversions will be reduced when larval Delta smelt protections are in place.

From March 1 to April 30 of dry and critical water years, if catch of larval Delta smelt (length less than 25 mm) in 20-mm Survey at station 718 exceeds 14% of the total catch of larval Delta smelt across the north Delta (20-mm Survey stations 716, 718, 719, 720, 723, 724, and 726), then DWR proposes to operate to a maximum 7-day average diversion rate at Barker Slough Pumping Plant less than 60 cfs. From May 1 to June 30 of dry and critical water years, if catch of larval Delta smelt (length less than 25 mm) in 20-mm Survey at station 716 exceeds 5% of the total catch of larval Delta smelt across the north Delta (20-mm Survey stations 716, 718, 719, 720, 723, 724, and 726), then DWR proposes to operate to a maximum 7-day average diversion rate at Barker Slough Pumping Plant less than 100 cfs. If the water year type changes after March 1 to below normal, above normal, or wet, this action will be no longer in effect. If the water year type changes after March 1 to dry or critical, DWR proposes to operate according to the measures stated above.

Delta smelt are attracted to the favorable habitat conditions in the north Delta and have been found to inhabit this area year-round. Future Delta smelt supplementation efforts are also expected to occur, wholly or in part, in the north Delta. The operation of the Barker Slough

Pumping Plant in combination with other diversions and losses can result in the net negative flow of water from the north Delta into Barker Slough, and these hydrodynamic conditions can lead to the entrainment of larval Delta smelt. Cumulative Barker Slough Pumping Plant diversions for the March to June period, at design capacity, are limited to 42 TAF. The incidental take of larval Delta smelt at the Barker Slough Pumping Plant is expected to be low due to (1) generally low diversion rates during periods when larval Delta smelt presence is expected to be greatest (March and April) and (2) Barker Slough Pumping Plant utilizing a positive barrier fish screen making the injury or death of adult and juvenile Delta smelt unlikely. However, a small number of larval Delta smelt may be entrained into Barker Slough during Barker Slough Pumping Plant operations.

### 7.12.2 Maintenance

Fish screen cleaning, sediment removal, and aquatic weed removal at the Barker Slough Pumping Plant is needed to maintain operation of the Barker Slough Pumping Plant. Raising and cleaning of the fish screens is necessary to prevent excessive head loss and minimize localized approach velocities. Sediment removal from the trap and concrete apron in front of the facility is necessary to prevent accumulation and clogging of the screens and facility. Removal of aquatic weeds is necessary to avoid blocking flow and causing water levels to drop in the pump wells behind the screens, triggering automatic shutoffs to protect the pumps from cavitation. Attachment XX provides the operating manual for Barker Slough Pumping Plant maintenance.

## 7.13 Clifton Court Forebay Weed Management

Aquatic weed management is needed to prevent potential damage to SWP equipment through cavitation at the pumps and excessive weight on the fish protection louver array that could cause the structure to collapse. Excessive weed mats entrained into the fish holding tanks and collection baskets in Skinner Fish Protection Facility reduce the efficiency of fish salvage, affect the ability of staff to conduct fish counts, and smother fish. Dense stands of aquatic weeds additionally provide cover for predators that prey on listed species within the Clifton Court Forebay. Algal blooms degrade drinking water quality through production of taste and odor compounds or algal toxins. DWR will apply herbicides and algaecides or will use mechanical harvesters on an as-needed basis to control aquatic weeds and algal blooms in the Clifton Court Forebay. Attachment XX provides the operating manual for Clifton Court Forebay Weed Management.

## 7.14 Suisun Marsh Preservation Agreement

The Suisun Marsh Preservation Agreement (SMPA) mitigates the effects on Suisun Marsh channel water salinity from SWP and CVP operations and other upstream diversions. Reclamation and DWR will implement the SMPA.

The Suisun Marsh Salinity Control Gates (SMSCG) are located on Montezuma Slough about 2 miles downstream from the confluence of the Sacramento and San Joaquin Rivers, near Collinsville. Tidal operations of the gates (closed during flood tide and opened during ebb tide)

control salinity in the marsh by restricting the flow of higher-salinity water from Grizzly Bay into Montezuma Slough during flood tides and retaining lower salinity Sacramento River water from the ebb tides.F From October through May, DWR will operate the SMSCG to meet water quality standards in the SMPA and State Water Board D-1641. In September when the 7-day running average mean daily high tide salinity at any compliance station or the S-35 Control Station is 17.0 milliSiemens per centimeter (mS/cm) or greater, DWR will operate the SMSCG. The running averages for September 1–6 of each year are determined using salinity data from the last 6 days of the preceding August. The SMSCG boat lock portion of the gate will be held partially open when flashboards are in place and during SMSCG operation to allow for continuous salmonid and green sturgeon passage opportunity. The boat lock gates may be closed temporarily to stabilize flows to facilitate safe passage of watercraft through the facility and for required maintenance activities.

The Roaring River Distribution System (RRDS) was constructed to provide lower salinity water to 5,000 acres of private and 3,000 acres of CDFW-managed wetlands on Simmons, Hammond, Van Sickle, Wheeler, and Grizzly Islands. The RRDS includes a 40-acre intake pond that supplies water to Roaring River Slough, 16 miles of interior levees, along water diversion gates supply water to landowner ponds. Water is diverted through a bank of eight 60-inch-diameter culverts equipped with fish screens into the Hammond Pond on high tides to raise the water surface elevation in RRDS above the adjacent managed wetlands. The intake to the RRDS is screened to prevent entrainment of fish larger than approximately 25 mm. Since the listing of Delta smelt in 2009, RRDS diversion rates have been controlled to maintain a maximum approach velocity of 0.2 feet per second at the intake fish screen except for a 5-week contiguous period (5-week flood-up window) when RRDS diversion rate will be controlled to maintain a maximum approach velocity of 0.7 feet per second for fall flood-up operations. The dates of the 5-week flood-up window may change annually due to waterfowl season dates changing each year and corresponding flood-up needs but will occur during the months of September through November.

The Morrow Island Distribution System allows Reclamation and DWR to provide water to the ownerships managed wetlands so that lands may be managed according to approved local management plans. The system was constructed primarily to channel drainage water from the adjacent managed wetlands for discharge into Suisun Slough and Grizzly Bay. This approach increases circulation and reduces salinity in Goodyear Slough. The Morrow Island Distribution System is used year-round, but most intensively from September through June. When managed wetlands are filling and circulating, water is tidally diverted from Goodyear Slough just south of Pierce Harbor.

The SMPA is an agreement among DWR, Reclamation, CDFW, and Suisun Resource Conservation District and has been operating since the 1980s. A separate consultation covers maintenance of Suisun Marsh facilities, wetland management, and tidal marsh restoration actions within Suisun Marsh.

## 7.15 San Luis Dam Raise and Reservoir Expansion

Upon completion of construction, Reclamation and DWR will operate Delta facilities with an expanded San Luis Reservoir. The raising of B.F. Sisk Dam, also known as San Luis Dam, supports an increase reservoir storage capacity of 130 TAF.

Reclamation and DWR completed a final EIS/Environmental Impact Report in September 2019 for the addition of shear keys and downstream stability berms to provide seismic stability for the embankment during a large earthquake and to raise the dam crest by 12 feet. Reclamation consulted with the USFWS on construction and deferred operational effects of an expanded San Luis Reservoir to the consultation of the long-term operation of the CVP and SWP.

# 8. Stanislaus River

Reclamation operates and maintains the Eastside Division of the CVP for flood control, agricultural water supplies, hydroelectric power generation, fish and wildlife protection, recreation, and Stanislaus River water quality. Facilities include the New Melones Dam and Reservoir (2.4 MAF capacity), and power plant.

The Tri-Dam Project, a partnership between the Oakdale Irrigation District and South San Joaquin Irrigation District, consists of Donnells and Beardsley Dams, located upstream of New Melones Reservoir on the middle fork Stanislaus River, and Tulloch Dam and Powerplant, located approximately 6 miles downstream of New Melones Dam on the mainstem Stanislaus River. Releases from Donnells and Beardsley Dams affect inflows to New Melones Reservoir. The main water diversion point on the Stanislaus River is Goodwin Dam, impassable barrier for fish migration approximately 2 miles downstream of Tulloch Dam. Reclamation, Stockton East Water District, and the Central San Joaquin Water Conservation District have separate agreements for coordinating operation of New Melones Reservoir and delivery water to CVP water service contractors.

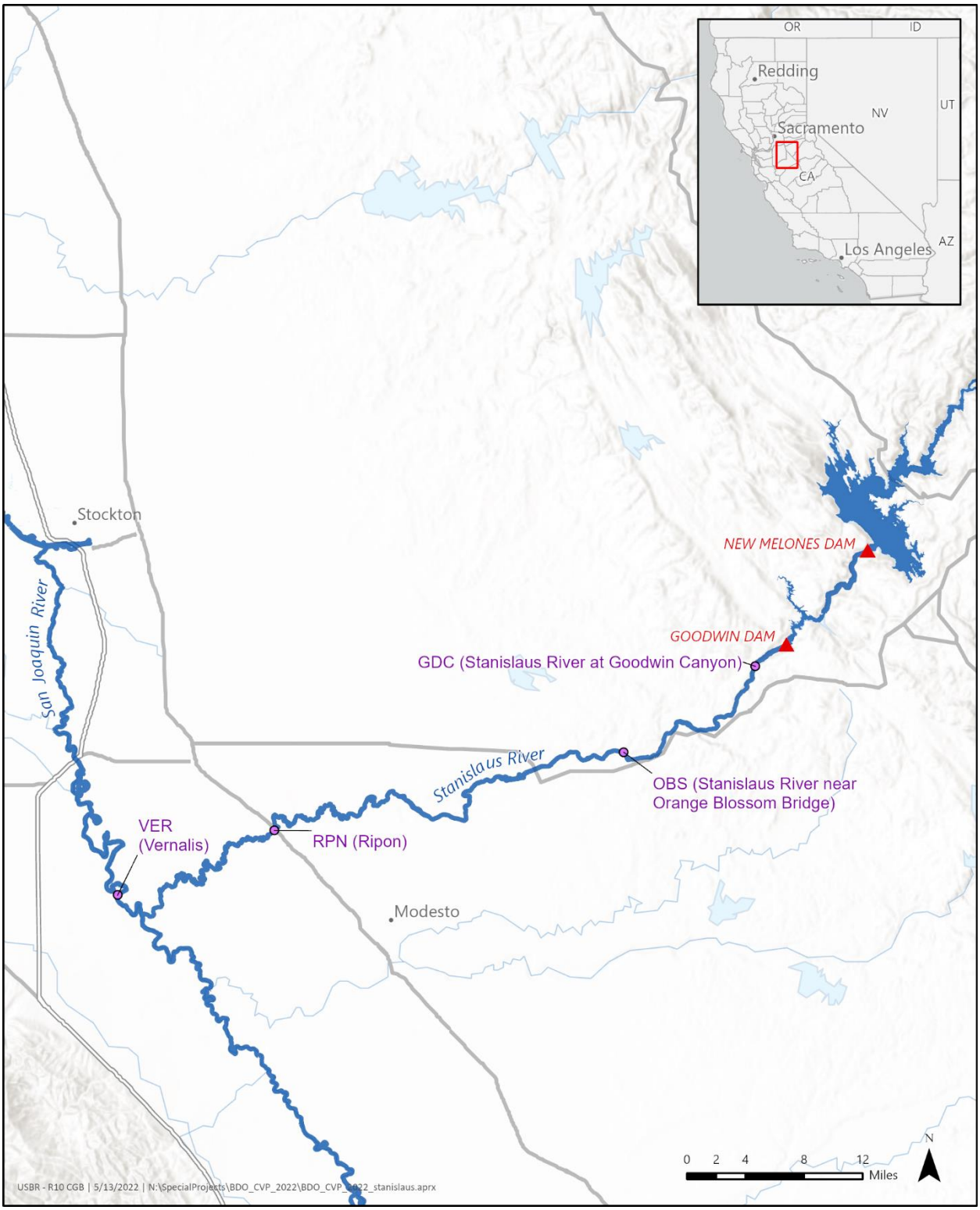


Figure 7. Map of the Stanislaus River and Eastside Division

## 8.1 Statutory and Regulatory Requirements

- Public Law 87-874 Flood Control Act of 1962
- Minimum flow standards below Goodwin Dam: “Interim Instream Flows and Fishery Studies in the Stanislaus River Below New Melones Reservoir” (1987 Agreement between Reclamation and CDFG)
- Minimum Dissolved Oxygen standards: State Water Board D-1422
- State Water Board D-1641, D-1422, D-1616, Bay-Delta Plan flow objectives and subsequent assignment of responsibility
- 1992 CVPIA 3406(b)(2)
- Agreements and Contracts
- 1988 Agreement and Stipulation with Oakdale Irrigation District and South San Joaquin Irrigation District
- Water Service Contracts

There are no contemporaneous programs to highlight.

## 8.2 Seasonal Operations

In the winter and spring, in high storage, high inflow conditions, Reclamation will operate for flood control in accordance with the USACE Standard Operation and Maintenance Manual for the Lower San Joaquin River Levees Lower San Joaquin River and Tributaries Project, California (April 1959). Operating to flood control constraints is relatively infrequent because New Melones is a larger reservoir relative to its annual inflow. However, Tulloch Lake, downstream of New Melones Reservoir, is subject to high local inflows, and may be in flood control operations for brief periods when New Melones Reservoir is not. During these periods, releases from Tulloch Lake may be used to meet flow objectives, schedules, or requirements on the lower Stanislaus River below Goodwin Dam.

The inter-agency team did not reach a common description of seasonal operations. During the summer, Reclamation is required to maintain applicable dissolved oxygen standards on the lower Stanislaus River for species protection. Reclamation operates to a 7.0 milligrams per liter (mg/L) dissolved oxygen requirement at Ripon from June 1 to September 30.

## 8.3 Ramping Rates

Ramping rates address the stranding risk stressor. Reclamation will coordinate releases on the Stanislaus River as shown in .

Table 8. Goodwin Dam Ramping Rates

| Goodwin Release Range (cfs) | Standard Rate of Increase (cfs per 2 hours) | Standard Rate of Decrease (cfs per 2 hours) | C and D Water Year Type Rate of Increase (cfs per 2 hours) | C and D Water Year Type Rate of Decrease (cfs per 2 hours) |
|---|---|---|---|---|
| At or above 4,500 | 25 | 250 | No change | No change |
| 2,000 to 4,499 | 500 | 250 | No change | No change |
| 500 to 1,999 | 250 | 100 | 500 | 200 |
| 300 to 499 | 100 | 50 | 200 | 100 |

C = critical; cfs = cubic feet per second; D = dry.

Reclamation, through the Stanislaus Working Team, may develop a faster down ramping rate on a case-by-case basis to implement temporary flow reductions for critical monitoring or maintenance needs.

Faster ramping rates in critical and dry water year types provide more flexibility for shaping flow volumes of water for the purposes of improving biological benefits. Consideration for ramping rates that promote recruitment of native riparian vegetation on floodplain surfaces should be implemented when instream flow budgets are sufficient.

## 8.4 Minimum Instream Flows (Stepped Release Plan)

This is a variable component addressed in Appendix N. The 2019 New Melones Stepped Release Plan includes minimum releases, winter instability flows, spring pulse flows, and fall pulse flows that depend upon minimum instream flows.

## 8.5 Winter Instability Flows

This is a variable component addressed in Appendix N.

## 8.6 Spring Pulse Flows

This is a variable component addressed in Appendix N.

## 8.7 Fall Pulse Flows

This is a variable component addressed in Appendix N.

## 8.8 Spawning and Rearing Habitat Restoration

This is a variable component analyzed in Appendix O.

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# 9. San Joaquin River

Reclamation operates the Friant Division for flood control, irrigation, M&I, and fish and wildlife purposes. Friant Dam provides flood control on the San Joaquin River, downstream releases to meet senior water rights requirements above Gravelly Ford, Restoration Flow releases under Title X of Public Law 111-11, and conservation storage as well as diversion into the Madera and Friant-Kern Canals for water supply. A minimum of 5 cfs is required to pass the last holding contract diversion located about 40 miles downstream of Friant Dam near Gravelly Ford.

The Friant Division facilities include Friant Dam, Millerton Reservoir, and the Friant-Kern and Madera Canals. Water is delivered to about 1 million acres of agricultural land in Fresno, Kern, Madera, and Tulare Counties in the San Joaquin Valley via the Friant-Kern Canal south into Tulare Lake Basin and via the Madera Canal north to Madera and Chowchilla Irrigation Districts.

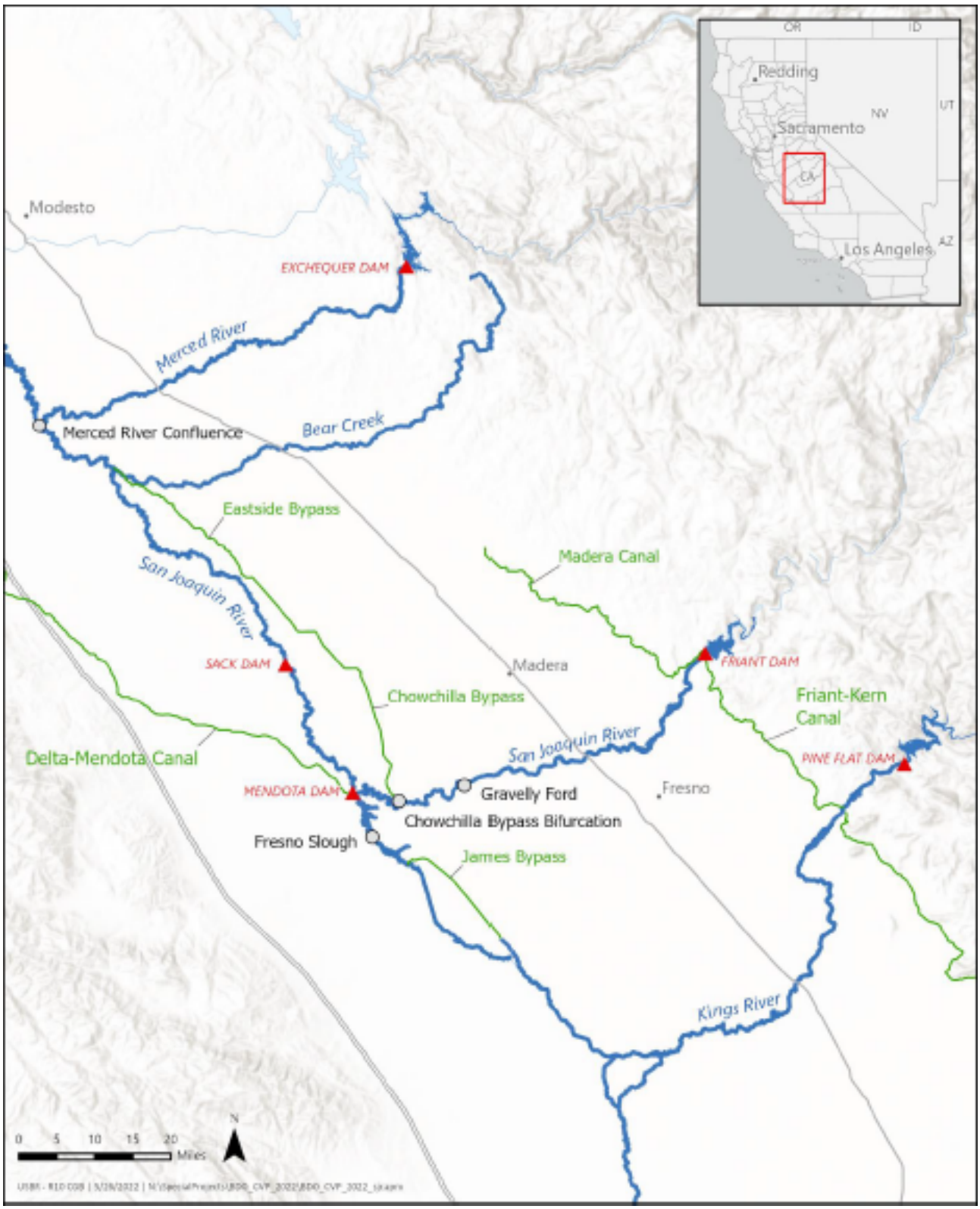


Table 8. Map of the Friant Division and San Joaquin River

## 9.1 Statutory, Regulatory, and Contractual Requirements

- Public Law 74-392 CVP Re-Authorization Act
- Public Law 111-11 (San Joaquin River Restoration Settlement Act)
- State Water Board D-1641
- 1995 Bay Delta Water Quality Control Plan (Bay-Delta Plan)
- USACE Public Notice 5820A Amended

## 9.2 Contemporaneous Programs

- San Joaquin River Restoration Program

Reclamation would operate the Friant Division consistent with the San Joaquin River Restoration Program Record of Decision.

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# 10. Monitoring

Under development. Monitoring depends, in part, on the Alternative(s)

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# 11. Special Studies

Special studies address areas of scientific uncertainty that impede the reasonable balance among competing demands for water, including the requirements of fish and wildlife, agricultural, municipal and industrial, and power contractors. While special studies do not avoid, reduce, or mitigate adverse effects on listed species, they may provide regulatory certainty for permitting incidental take by informing the effectiveness of measures to avoid, minimize, or mitigate incidental take over time. Studies are incorporated into this Proposed Action for the following reasons:

1. The study design is complete, implementation is needed to permit the LTO, and success is not reliant on requiring flexibility to make future changes.

2. Incidental take is required: This consultation could seek the necessary incidental or direct take coverage.

3. The new information may reveal effects of the Proposed Action in a manner or to an extent not previously considered: Analysis could consider a broader potential range and/or different confidence in likelihood.

4. The new information may warrant a modification to the Proposed Action that was not considered: Analysis could consider a broader potential range and/or different confidence in likelihood.

The criteria for identification of a special study in the Proposed Action balances uncertainty and flexibility. Reclamation would not rely on uncertain outcomes from a study but may require direct or incidental take. Requiring modifications to this Proposed Action to change special studies may impose unnecessary administrative delays or risk an unnecessary need for reinitiation of consultation.

## 11.1 Steelhead Juvenile Production Estimate

Beginning in the fall of 2025 and based upon feedback and recommendations from independent review, Reclamation and DWR will propose an expanded Steelhead Juvenile Production Estimate (JPE) framework for the San Joaquin and Sacramento River Basins. If permitted by NMFS, Reclamation and DWR will expand the JPE framework to remaining CVP or SWP tributaries. In 2028, based on data generated from the San Joaquin and Sacramento River Basins, JPE, and feedback from an independent review of progress after 2025, Reclamation and DWR will update the JPE framework. The JPE framework includes the following subcomponents:

- **Steelhead Telemetry Research:** Steelhead telemetry research on routing and survival of hatchery- and wild-origin steelhead through the San Francisco Bay-Delta will provide information on how CVP and SWP operations impact steelhead routing and survival

through different routes, the facilities, and to Chipps Island. In addition, the steelhead telemetry research may enable through Delta survival estimates for juvenile steelhead tagged in the Stanislaus River or Clear Creek as part of the life-cycle monitoring and juvenile production estimate (JPE) development in these tributaries.

- **Steelhead Lifecycle Monitoring:** Reclamation will maintain the infrastructure supporting the Stanislaus River steelhead life cycle monitoring program and develop infrastructure that will support a life cycle monitoring program in Clear Creek. In addition, Reclamation and DWR will support genetic and age-structure monitoring of juvenile steelhead collected at state and federal salvage facilities to facilitate identification of brood year and natal origin. The goal of this research and monitoring in the San Joaquin and Sacramento Rivers is to provide the data necessary to develop a basin-specific steelhead JPE. In addition, the goal of this research and monitoring is to provide the basis for evaluating how actions related to stream flow enhancement, habitat restoration, and/or water export restrictions affect biological outcomes including juvenile and adult population abundance, age structure, growth and smoltification rates, and anadromy and adaptive potential in Sacramento- and San Joaquin-origin steelhead.
- **Steelhead JPE:** A steelhead JPE for tributaries with CVP facilities will focus on the annual production of outmigrating juvenile steelhead. Data used in the JPE will inform the status and trends of Sacramento and San Joaquin basin steelhead and may also help inform actions that will increase steelhead abundance and improve steelhead survival through the Delta. Reclamation and DWR, in coordination with FWS, NMFS, and CDFW, will create or use an existing technical team to use the Southern Sierra Nevada Diversity Group Steelhead Science Plan, which describes the JPE framework, to identify infrastructure and monitoring needs in tributaries with CVP or SWP facilities and a method for expanding the JPE framework from the tributary to basin levels.

Reclamation and DWR anticipate participation by agency technical teams and technical interested party representatives on the JPE framework.

## 11.2 Spring-Run Juvenile Production Estimate

Beginning in 2025, Reclamation and DWR will propose a Spring-Run Chinook salmon Juvenile Production Estimate (JPE) framework for CVP and SWP tributaries and the Delta. The JPE framework will incorporate independent review and consider updated entrainment minimization measures, including updating hatchery surrogate measures.

DWR and CDFW developed a Spring-Run Science Plan for the SWP, Attachment XX. DWR established a Spring-Run JPE Core Team that includes members from DWR, CDFW, NMFS, Reclamation, USFWS, State Water Contractors, and MWD. The purpose of the team is to coordinate all aspects of implementing the JPE framework, including species monitoring, special studies, reporting, and outreach.

Reclamation and the USFWS started Structured Decision Making for Chinook salmon in 2013, which includes CDFW, DWR, and NMFS representatives. The Science Integration Team (SIT) is open to participation by water agencies, nongovernmental organizations, academia, private

consultants, and the public. Through this open process, the SIT have developed decision support models for the spring-run lifecycle.

The JPE framework will include the following subcomponents:

- **Monitoring for the JPE**: Reclamation and DWR will support the monitoring identified by the Spring-Run JPE Core Team as follows:
    - Reclamation will monitor Clear Creek to support the spring-run JPE consistent with the Spring-Run JPE Core Team structured decision making.
    - DWR will monitor the Feather River to support the spring-run JPE consistent with the Spring-Run JPE Core Team structured decision making and coordinate monitoring on non-project tributaries, if required.
    - Reclamation and DWR will monitor the mainstem Sacramento River and Delta, including the CVP and SWP salvage facilities.
- **Spring-Run JPE Model**: Reclamation and DWR will support the development of the JPE Model.
- **Spring-Run Lifecycle Model**: Reclamation and DWR, with USFWS support, will participate in and propose updates to the SIT spring-run Chinook salmon models to improve the lifecycle models developed by the SIT. The members of the SIT used formal Structured Decision Making, which includes value of information techniques, to identify parameters significant to spring-run Chinook salmon.

Implementation depends upon consultation under the ESA and completion of the National Environmental Policy Act (NEPA) environmental review process. DWR would expand the team to include representatives from the diverse CVP interests including tributary, in-Delta, and export water agency interests and revise the governance of the Spring-Run JPE Core Team for compliance with the Federal Advisory Committee Act.

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# 12. Drought

Under development. Reclamation anticipates an updated Drought Toolkit[2]

[2] https://www.usbr.gov/mp/bdo/docs/droughttoolkit-latest.pdf

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