



— BUREAU OF —  
RECLAMATION

Record of Decision

# **Long-Term Operation of the Central Valley Project and State Water Project**

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## **Mission Statements**

The U.S. Department of the Interior protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated Island Communities.

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.

## Record of Decision

# Long-Term Operation of the Central Valley Project and State Water Project

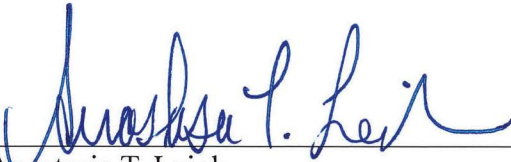
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# 1. Introduction

From the towering peak of Mount Shasta in the north, to the sun-kissed beaches of San Diego in the south, the Central Valley Project (CVP) and the State Water Project (SWP) play a vital role in California's water supply. Together, these projects deliver water to more than 30 million people, irrigate over 4 million acres of some of the nation's most fertile and productive agricultural lands, and generate up to 4 million surplus megawatt-hours of carbon-neutral energy each year to support California's renewable energy goals. The long-term operation of the CVP and SWP goes beyond mere resource management—it is a balancing act that carefully integrates human needs with environmental stewardship. Through responsible protections for native fish and wildlife species, the Long-Term Operation of the CVP and SWP helps maintain a sustainable future for California's diverse ecosystems. This Record of Decision, developed under the framework of the National Environmental Policy Act (NEPA), represents a significant milestone in ensuring the continued responsible operation of these critical water systems.

A record of decision provides a summary of the submitted alternatives, information, and analyses in the final environmental impact statement (§ 1502.17(b)), together with other relevant material in the record (§ 1505.2(b)). The Bureau of Reclamation (Reclamation) last signed a Record of Decision for the Long-Term Operation of the CVP and SWP on February 18, 2020 (the 2020 ROD). The 2020 ROD implemented the proposed action consulted upon with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) that resulted in the two October 21, 2019, Biological Opinions on the Long-Term Operation of the CVP and the SWP (collectively, “2019 Biological Opinions”). The 2019 Biological Opinions and 2020 ROD were challenged by various parties, including agencies of the State of California and environmental non-governmental organizations. Various public water agencies joined as Defendant Intervenors. In March 2022, the 2019 Biological Opinions and 2020 ROD were voluntarily remanded without vacatur back to the agencies, and the litigation stayed under an Interim Operations Plan.

On January 20, 2021, President Biden issued “Executive Order 13990 on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis”, directing the Department of Interior to review all existing regulations, orders, guidance documents, policies, and any other similar agency actions (agency actions) promulgated, issued, or adopted between January 20, 2017, and January 20, 2021, that are or may be inconsistent with, or present obstacles to, the policy set forth in section 1 of the order. This included the 2019 Biological Opinions. On May 4, 2021, the directors of Reclamation, USFWS, and NMFS executed a memo determining the 2019 Biological Opinions could best be reviewed through a process underway with the State of California to voluntarily reconcile measures provided for in the Biological Opinions with the State of California's Incidental Take Permit for Long-Term Operations of the SWP, dated March 31, 2020. On September 30, 2021, after extensive discussions with California Department of Water Resources (DWR), California Department of Fish and Wildlife (CDFW), NMFS, and USFWS, Reclamation requested reinitiation of consultation pursuant to Section 7 of the Endangered Species Act (ESA), based on anticipated modifications to the proposed action in the 2019 Biological Opinions that may cause effects on ESA-listed species or designated critical habitat not analyzed in the 2019 Biological Opinions.



The study area (Figure 1) includes CVP service areas and CVP dams, power plants, diversions, canals, gates, and related federal facilities located on Clear Creek, the Trinity, Sacramento, American, Stanislaus, and San Joaquin rivers, and in the Sacramento–San Joaquin Delta (Delta). The study area includes SWP service areas downstream of the Feather River and SWP facilities in the Delta, Cache Slough Complex, and Suisun Marsh.



Figure 1. Study Area Map

## 2. Purpose and Need

The purpose of the action being considered in this Record of Decision is to continue the operation of the CVP and the SWP, for authorized purposes, in a manner that:

- Meets requirements under federal Reclamation law; other federal laws and regulations; and State of California water rights, permits, and licenses pursuant to Section 8 of the Reclamation Act;
- Satisfies Reclamation contractual obligations and agreements; and
- Implements authorized CVP fish and wildlife project purposes and meets federal trust responsibilities to Tribes, including those in the Central Valley Project Improvement Act (CVPIA).

Operation of the CVP and SWP is needed to meet multiple authorized purposes: river regulation, improvement of navigation and flood control; irrigation and domestic uses and fish and wildlife mitigation, protection, and restoration; power generation; and fish and wildlife enhancement. Operation of the CVP and SWP also provides recreation and water quality benefits.

## 3. Decision

Reclamation's decision is to implement Alternative 2 – Multi-Agency Consensus Proposal (Preferred Alternative) as described in the Final EIS and analyzed in the 2024 USFWS and 2024 NMFS Biological Opinions, which includes both project-specific and programmatic elements.

Reclamation reviewed a range of reasonable alternatives in the EIS; the results of the physical, environmental, economic, and human resources impact analyses, and comments submitted by federal, state, and local agencies, interested parties, and the public.

Alternative 2 best meets the Purpose and Need, while balancing the ability to achieve the project objectives, comply with the requirements of the ESA and other applicable laws, and meet the goals of E.O. 13990. Alternative 2 establishes a new framework for Shasta Reservoir operation, increasing the protections for coldwater pool across multiple years of drought. By implementing this new approach to Shasta Reservoir operations, Alternative 2 reduces temperature dependent mortality of winter-run Chinook salmon. Alternative 2 voluntarily reconciles Delta operating criteria for the CVP with Delta operational requirements of the SWP for a more coordinated operation. The reduction to water supply directly resulting from new export restrictions and the new Shasta Reservoir proposed operation in Alternative 2 is five percent or less. Alternative 2 includes an adaptive management program to collaboratively develop the science for potential future revisions to operation of the CVP and SWP with the federal and state fishery agencies and interested parties.

## 4. Statutory Background

The CVP is operated consistent with federal Reclamation laws, rules, regulations, promulgations, and policies. Section 2 of the Rivers and Harbors Act of August 26, 1937, transferred construction of the CVP from the Secretary of War to the Secretary of the Interior. Congress added the following Divisions and Units for inclusion as a part of, or for integrated operation with, the CVP: (1) American River Basin Development, Act of October 14, 1949; (2) Sacramento Valley Canals, Act of September 26, 1950; (3) Trinity River Division, Act of August 12, 1955; (4) San Luis Unit, Act of June 3, 1960; (5) New Melones Project, Act of October 23, 1962; (6) Auburn – Folsom South Unit, Act of September 2, 1965; and, (7) San Felipe Division, Act of August 27, 1967.

The purposes of the CVP were modified by statute several times, including by the Waterfowl Management Act of August 27, 1954, which first added fish and wildlife as a purpose. In 1992, Congress passed the CVPIA, Title 34, P.L.102-575. Section 3406(a) made protection of fish and wildlife a co-equal purpose with irrigation and municipal and industrial uses. Congress directed Reclamation to operate the CVP for the following purposes: *first, for river regulation, improvement of navigation, and flood control; second, for irrigation and domestic uses and fish and wildlife mitigation, protection and restoration purposes and, third, for power and fish and wildlife enhancement*. The CVPIA also directs Reclamation to meet applicable federal and state law obligations, including the ESA (CVPIA § 3406(b)). The CVPIA included fish and wildlife restoration activities with operational measures, water deliveries to wildlife refuges, habitat restoration, and facility improvements.

In 1960, California voters approved construction of the SWP through the Burns-Porter Act. (Water Code Sec. 12930-12944). Recognizing the need for criteria for the coordinated operation of the CVP and SWP, Reclamation and DWR entered into an initial Coordinated Operations Agreement (COA) in 1960, followed by a more comprehensive and detailed agreement in 1986, authorized by P.L. 99-546. Reclamation and DWR coordinate operations pursuant to the 1986 COA, as amended in 2018, which provides the operational framework to guide operations of Project facilities and features to meet requirements and water management goals for the CVP and SWP.

Section 8 of the Reclamation Act of 1902 states: “[n]othing in this Act shall be construed as affecting or intended to affect or to in any way interfere with the laws of any State or Territory relating to the control, appropriation, use, or distribution of water used in irrigation, or any vested right acquired thereunder” and directs the Secretary of the Interior to proceed in conformity with such laws. In 1999, the State Water Resources Control Board (State Water Board) issued Water Right Decision 1641 (D-1641), which amended the water right license and permits for the SWP and CVP to require the Projects to meet certain objectives in the Bay-Delta Water Quality Control Plan. Reclamation operates Shasta and Keswick Dams in coordination with other CVP and SWP facilities to meet those objectives, including Delta water quality and flow objectives to improve fisheries conditions, which includes releases for salinity objectives. In 2018, the State Water Board issued a framework document for potential amendments to the Bay-Delta Water Quality Control Plan.

On November 12, 2024, the D.C. Circuit Court issued a decision in *Marin Audubon Society v. Federal Aviation Administration*, No. 23-1067 (D.C. Cir. Nov. 12, 2024). To the extent that a court may conclude that the Council on Environmental Quality (CEQ) regulations implementing NEPA are not judicially enforceable or binding on this agency action, Reclamation has nonetheless elected to follow those regulations at 40 C.F.R. Parts 1500-1508, in addition to Reclamation's procedures/regulations implementing NEPA at (43 CFR Part 46), and the Departmental Manual (DM) Chapter 516, to meet the agency's obligations under NEPA, 42 U.S.C. §§ 4321 et seq.

## 5. Alternatives Considered

A record of decision must identify alternatives considered in reaching a decision and specify the alternative or alternatives considered environmentally preferable.

The 2020 ROD included numerous Reclamation and partner programs and projects with independent utility to address habitat, hatchery, and harvest effects on species and proceed simultaneously with state and local efforts. These programs beneficially affect species and address some of the impacts inherent in the long-term operations of the CVP and SWP. These independent related actions with their independent NEPA and section 7 consultations, where warranted, are part of the affected environment in the study area but are not part of the operation of the CVP and SWP. The scope of this Long-Term Operation of the CVP and Delta facilities of the SWP addressed in this ROD covers alternative actions to:

1. Store water in CVP reservoirs and reduce downstream flows;
2. Release water from CVP reservoirs and increase downstream flows;
3. Blend water released from CVP reservoirs through temperature control devices to use the coldwater pool at beneficial times;
4. Route water at CVP and Delta SWP facilities to move flow down different paths; and
5. Divert water at CVP and Delta SWP facilities for beneficial uses.

Because of the ongoing and long-term operation of the CVP and SWP, some of the independent related actions discussed above rectify, reduce and compensate for impacts associated with operation of these facilities; however, the independent related actions do not influence the alternatives considered for operations in this ROD.

### 5.1 No Action Alternative

Under the No Action Alternative, Reclamation would operate the CVP consistent with the 2020 Record of Decision implementing the Proposed Action consulted upon for the 2019 Biological Opinions. DWR would operate the SWP consistent with the 2019 Proposed Action and the CDFW's 2020 Incidental Take Permit for the SWP.

## 5.2 Action Alternatives

Reclamation underwent a robust alternatives formulation process with interested parties including an initial alternatives report in September 2022 and direct coordination with environmental Non-Governmental Organizations. Alternatives considered by Reclamation in reaching its decision include:

- **Alternative 1 – Water Quality Control Plans, e.g. D-1641, 90-5:** Reclamation and DWR would operate to water right terms and conditions, including obligations for water quality control plan objectives for the Bay-Delta, water quality and minimum flows on CVP tributaries, and water right settlements. The needs of listed fish would rely upon habitat restoration and facility improvements completed since the 2008 and 2009 Biological Opinions.
- **Alternative 2 – Multi-Agency Consensus Proposal:** Reclamation and DWR would operate to actions developed with CDFW, DWR, NMFS, and USFWS. It includes a new framework for Shasta Reservoir operation for more protections for cold water pool across multiple years of drought, reconciles operating criteria for the CVP and the SWP in the Delta, and proposes an adaptive management program to collaboratively develop the science for potential revisions to operation of the CVP and SWP with interested parties.
- **Alternative 3 – Modified Natural Hydrograph:** Reclamation and DWR would operate to increased Delta outflow up to 65% of unimpaired inflow and to carryover storage requirements to protect coldwater pool in upstream reservoirs, in addition to other measures. This alternative was developed in coordination with members of the NGO community and meets downstream requirements in the following priority order: (1) meeting D-1641; (2) releasing for minimum flow requirements; (3) diverting for human health and safety; (4) meeting carryover storage requirements; (5) meeting established Delta Outflow requirements by limiting water service, settlement and exchange contractors diversions; (6) meeting established Delta operational requirements; (7) delivering water for wildlife refuges; and (8) diverting water for CVP and SWP water service contractors.
- **Alternative 4 – Risk Informed Operation:** Reclamation and DWR would operate to modified Shasta and Folsom Dam operations for a different balance between water made available for diversion and storage to protect against subsequent dry years. This alternative builds off the 2020 ROD selected alternative with real-time analytics and machine learning to support water deliveries in the Delta while limiting effects on listed species. It scales Delta operations based on effects on listed fish populations.

Additional information on alternatives and detailed descriptions are included as Chapter 3 and Appendix E in the EIS.

## 5.3 Environmentally Preferable Alternative

Section 1505.2(b) of the CEQ 2022 Regulations requires the NEPA lead agency to identify the environmentally preferable alternative or alternatives in a Record of Decision. The environmentally preferable alternative will best promote the national environmental policy expressed in section 101 of NEPA by maximizing environmental benefits, such as addressing climate change-related effects or disproportionate and adverse effects on communities with environmental justice concerns; protecting, preserving, or enhancing historic, cultural, Tribal, and natural resources, including rights of Tribal Nations that have been reserved through treaties, statutes, or Executive Orders; or causing the least damage to the biological and physical environment. 40 CFR 1502.14. NEPA's Section 101 includes, "it is the continuing policy of the Federal Government, in cooperation with State and local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans. 42 U.S.C. 4331(a)". In choosing the environmentally preferred alternative, Reclamation considered impacts to all resource areas and ranked each alternative based on impact conclusions for the significant resource areas and elements of resource areas (Attachment 1).

Alternative 2 (Multi-Agency Consensus) is the environmentally preferred alternative. The collaboration with the State of California and Sacramento River Settlement Contractors provides the most confidence that adaptive management can reduce conflict and respond to changing climates and species conditions. As such, Alternative 2 is most likely to "fulfill the social, economic, and other requirements of present and future generations of Americans."

Alternative 3 (Modified Natural Hydrograph) performs best for the aquatic environment for both listed salmonids and smelt by reducing temperature dependent mortality the most and increasing smelt population over time, followed by Alternative 2 which significantly improves water temperatures for listed salmonids and is neutral on listed smelts. Alternative 4 follows Alternative 3 and 2, showcasing smaller improvements on water temperatures and reduced Delta outflow. Following Alternative 4 is the No Action Alternative. Finally, Alternative 1 would result in substantial adverse impacts to listed aquatic species. All the alternatives have similar impacts to terrestrial species.

Although Alternative 3 provides the highest benefit to listed aquatic species, this alternative would cause significant impacts to surface water supplies. Alternative 1 performs best for surface water and groundwater supply, followed by the No Action Alternative, Alternative 4, Alternative 2, and Alternative 3.

Alternative 3 performs best for power generation. The No Action Alternative, Alternative 2 and Alternative 4 perform similarly. Alternative 1 performs the worst of all the alternatives for power generation. However, differences in power generation are less than 2% and consumption of CVP power may be offset by other power consuming actions for water supply by local entities.

Alternative 1 performs best for regional economics due to lower water supply costs for M&I and agricultural users. Alternative 4, Alternative 2, and the No Action Alternative perform similarly. Alternative 3 performs the worst of the alternatives by increasing water supply costs. Differences across alternatives for economic changes related to fisheries, recreation, and hydropower were relatively minor.

A similar trend emerges for environmental justice, where Alternative 1 performs best due to lower water supply costs for M&I and agricultural users, which impacts job availability and labor income for minority and low-income populations. Alternative 4, Alternative 2, and the No Action Alternative perform similarly. Alternative 3 performs the worst of the alternatives by increasing water supply costs. No construction work is required under Alternatives 1 through 4; therefore, no adverse health effects to minority and low-income populations are anticipated.

For Public Health Resources, Alternative 1 performs the best because it increases irrigated land over the long-term average which reduces the potential for public health effects caused by Valley Fever. Alternative 4 performs second best because it would only decrease irrigated acres in the San Joaquin River region. Alternatives 2 and 3 perform the least well because both would result in fewer irrigated acres north and south of the Delta. Therefore, the No Action Alternative and Alternative 1 would not result in increased potential for Valley Fever, while Alternatives 4, 2, and 3 may result in increased occurrence of Valley Fever if the decreased irrigated acreage is converted to fallowed land. Potential public exposure to cyanotoxins may occur under the conditions of the No Action Alternative. The action alternatives would not increase potential public exposure to cyanotoxins compared to the No Action Alternative.

For the remaining resource areas, the alternatives perform similarly with individual alternatives impacting different resource areas differently to some degree.

## **6. Key Considerations**

NEPA allows for a discussion of preferences among alternatives based on relevant factors, including economic and technical considerations and agency statutory missions. 40 CFR 1505.2(b). The following sections identify and discuss such factors, including essential considerations of national policy that Reclamation balanced in making its decision and how those considerations result in this decision.

### **6.1 Listed Species Protections**

The ROD implements the action developed in coordination with NMFS and USFWS in response to Executive Order 13990. Native species face numerous stressors in addition to the operation of the Projects. The CVP and SWP operate to meet project purposes in response to hydrology and under a system of water rights whereby the Projects are junior to many water users. Reclamation has limited discretion to adjust operations due to contractual obligations and water quality objectives. After satisfying water right requirements, Reclamation and DWR can operate for

project purposes including deliveries for water service contractors and subject to protections for listed species. The additional species benefits under Alternative 3 require actions by third parties. Alternative 2 reasonably minimizes impacts on species while balancing other competing needs. Additional restrictions on the operation of the CVP and SWP likely provide limited benefit to listed species and would be costly to water supply. Specific considerations are described in the subsections below.

#### **6.1.1 Operation of Shasta Reservoir through Multiple Years of Drought**

The Decision implements the Shasta Framework in Alternative 2, which includes actions by the Sacramento River Settlement Contractors to address the effects of multiple years of drought on water temperature management for winter-run Chinook salmon during egg incubation. Actions by the Sacramento River Settlement Contractors would reduce diversions by 500 TAF in the worst of critical years and leave more water in Shasta Reservoir in case the next year is dry.

#### **6.1.2 Certainty of Delta Actions triggers**

The actions in the Delta increase the certainty of restrictions on exports by establishing thresholds for actions upon detection of listed species in salvage or environmental surrogates. The reactive certainty of triggers under Alternative 2 was preferred over proactive measures under the No Action Alternative or Alternative 4. Thresholds simplify regulatory oversight and reduce the reliance on technical teams in real-time. These actions were developed through a multiagency process that included NMFS and USFWS.

#### **6.1.3 Delta Smelt Supplementation**

The Decision includes actions under Reclamation and DWR control within the Delta to minimize effects to Delta smelt due to exports. These include limiting exports to limit Old and Middle River (OMR) reverse flows in the south Delta based on flow and turbidity. The Decision recognizes many stressors on Delta smelt, many of which are not under Reclamation and DWR's control. The preferred alternative additionally includes details developed on supplementation of Delta Smelt to address impacts to survival due to insufficient numbers of fish (Allee effect). In addition to hatchery supplementation, completion of tidal habitat restoration included in the 2008 USFWS Biological Opinion to support a CESA consistency determination should contribute to Delta smelt populations. Incorporation of the Healthy Rivers and Landscapes Program will increase Delta outflow that may address ecosystem drivers on Delta smelt populations.

#### **6.1.4 Longfin Smelt**

The literature (Kimmerer, et. Al, 2022) found entrainment stressors do not drive the status of longfin smelt populations; however, the preferred alternative includes salvage thresholds to further limit potential effects. The completion of tidal habitat restoration and other related actions may contribute to longfin smelt populations. The preferred alternative includes a Longfin Science Plan. Part of the plan will develop lifecycle models to better assess effects of operations amongst other stressors. Incorporation of the Healthy Rivers and Landscapes Program will increase Delta outflow that may address ecosystem drivers on longfin smelt populations.



## **6.2 Water Service and Repayment Contracts**

The decision considers impacts to water supply from the updated environmental requirements of storage for cold water across multiple years of drought, Delta outflow as an environmental surrogate for ecosystem processes, and minimization of entrainment due to exports at Jones and Banks pumping plants.

The Shasta Framework established three “bins” with an “A” and a “B” based on end of April and end of September storage in Shasta Reservoir. Each bin includes biological objectives. “A” and “B” describe actions to take to preserve storage. Storages consider the value of water in the current year, the risk of spill, and the risk of insufficient cold water if the next year is dry. In Bin 1, actions are unlikely to impact water supply. In Bin 2, actions reduce water available for CVP water service and repayment contracts from Shasta Reservoir. In Bin 3 years, Reclamation would not release water from Shasta for repayment and water service contracts. In Bin 3B years, Sacramento River Settlement Contractors would voluntarily reduce diversions from the 75% under their contracts to 50% of contract totals to preserve water in Shasta Reservoir. Bin 3B is anticipated to preserve sufficient cold water to protect winter-run Chinook salmon egg incubation across most multi-year droughts.

Delta outflow provides a broad metric of ecosystem processes incorporating hydrology, storage, and diversions. The decision considers objectives for the Healthy Rivers and Landscapes Program (formerly called “Voluntary Agreements”) alternative to unimpaired flow for updating the Bay-Delta Water Quality Control Plan. Reclamation and DWR’s role in Voluntary Agreements is to operate the CVP and SWP to maximize the benefits of the water made available by local water agencies. Voluntary Agreements provide a clear path for implementation and include a separate program of habitat restoration to improve the physical landscape.

The decision includes an Adaptive Management Plan for adopting new science including science-based salvage thresholds related to population dynamics. Adaptive management provides a path for identifying actions that work for both water supply and species. The Adaptive Management Plan includes habitat restoration effectiveness related elements to potentially take advantage of investments over the past few years.

## **6.3 Fall-Run Chinook Salmon**

Fall-run Chinook salmon form the backbone of California’s salmon fishing industry. Federal and state hatcheries produce large numbers of fry and smolts for commercial and sport harvest in addition to natural production. Operation of the CVP and SWP may impact fall-run Chinook salmon through water temperature management, redd dewatering, migratory conditions, and entrainment at the export facilities. This ROD includes coordination with Sacramento River Settlement Contractors to reduce inundation of spawning areas that would later be dewatered. The ROD includes pulse flows in the spring that, while targeting non-project spring-run chinook salmon, occur at similar times as the fall migration period. OMR no more negative than -5,000 cfs is likely to avoid route selection and entrainment impacts. Additionally, a mitigation measure for a fall-run cohort report will gather and share information that may support improvements to the fishery.

## **6.4 Power Generation**

The decision supports power generation as a project purpose consistent with the priorities in the CVPIA. The CVP Power Initiative, established by Reclamation's Commissioner in 2019, addresses powerplant bypasses for species protection and requires that Reclamation use the best available information and science to weigh the biological benefits against the economic and environmental impacts of a powerplant bypass operation.

## **6.5 Reconcile with SWP Operating Criteria in the Delta**

The decision voluntarily reconciles operating criteria for the CVP with the DWR's requirements for the SWP in the Delta by adopting measures developed in coordination with the California departments of Water Resources and Fish and Wildlife. Consistent criteria promote coordination between the Projects, particularly in providing protections for species.

## **6.6 Governance, Adaptive Management Program, and Winter-Run Action Plan**

The preferred and selected alternative is unique in that Reclamation agreed to consult upon an alternative reach through consensus between agencies. The decision includes ongoing engagement through a multi-agency governance structure with a Shasta Operations Team (SHOT), Water Operations Management Team (WOMT), and Adaptive Management Steering Committee (AMSC) supported by various technical forums to continue shared decision making.

The decision includes an Adaptive Management Program (Attachment 2) supported by the state and federal fish agencies with measures to rely upon the decision analysis tools for natural resources known as Structured Decision Making. The adaptive management approach can provide a transparent and documented scientific basis for continuing, modifying, or implementing an alternative action. Adaptation is an integral part of the action consulted upon.

The decision includes participation in the Winter-Run Action Plan. The Winter-Run Action Plan includes actions by other parties and Reclamation activities with independent utility and separate environmental compliance and permitting.

## **6.7 Healthy River and Landscapes Program**

The decision includes the operation of CVP and Delta facilities of the SWP under the Healthy Rivers and Landscapes (HRL) Program, formerly "Voluntary Agreements" consistent with provisions included in the *Memorandum of Understanding Advancing a Term Sheet for the Voluntary Agreements to Update and Implement the Bay-Delta Water Quality Control Plan, and Other Related Actions*, dated March 29, 2022 (Voluntary Agreements Parties 2022), and as further developed by the VA parties as part of the State Water Resources Control Board's (SWRCB's) ongoing process to update the Bay-Delta Water Quality Control Plan. HRL provides

an alternative to unimpaired flows for the State Water Resources Control Board update to the Bay-Delta Water Quality Control Plan. HRL is supported by the water agencies that would contribute water and funding for quicker implementation than a regulatory process. HRL includes habitat restoration needed for flows to interact with the landscape in a manner that drives ecosystem processes.

The EIS describes Reclamation Early Implementation of export reductions for up to two years, with a shorter duration possible if the SWRCB adopts the Healthy Rivers and Landscapes Program sooner. If the Board does not adopt the Healthy Rivers and Landscapes Program within two years, then the EIS describes an operation without VAs.

The EIS uses reliable information and tools to represent Reclamation's understanding of proposed system operations and related performance under the different phases representing the VAs. All phases (described above) are considered in the assessment of Alternative 2 to demonstrate the range of potential impacts (both beneficial and adverse) that could occur due to implementation of VAs. Throughout the resource sections of the EIS, as well as in their corresponding appendices, the impacts of each phase of Alternative 2 are evaluated and discussed. This evaluation includes impacts to aquatic species.

## **6.8 Authority to Implement**

Alternatives are not rendered infeasible simply due to their potential to result in environmental impacts; NEPA is a procedural statute that requires only that an agency take a "hard look" at the consequences of its actions. Appendix E of the EIS presents the full spectrum of individual components considered during the formulation of the alternatives evaluated in the EIS. Appendix E of the EIS also presents the screening exercise that was completed by Reclamation to support the narrowing and refinement of these components to formulate the alternatives evaluated in the EIS, which included feasibility considerations.

Concerns were raised by commenters on the EIS about the legality of Alternatives 2, 3, and 4, including that they are potentially inconsistent with Reclamation's statutory authorities, regulations and contracts. Reclamation may consider potentially reasonable alternatives beyond its own jurisdiction and consider the jurisdictions of other agencies (federal and otherwise) when determining what reasonable alternatives should be considered. NEPA is intended to facilitate public engagement in decisions that affect the quality of the human environment, including developing appropriate "alternatives to recommended courses of action in any proposal that involves unresolved conflicts concerning alternative uses of available resources" 40 C.F.R. § 1501.2(b)(3). CEQ has explained that reasonable alternatives may include alternatives that are "outside the agency's jurisdiction because the agency concludes that they are useful for the agency decision maker and the public to make an informed decision." 87 Fed. Reg. 23470. The range of alternatives considered in the EIS are feasible and Reclamation intends to implement the alternative selected in the ROD consistent with its legal obligations.

Reclamation reviewed Alternative 2 and determined it has sufficient authority to implement the actions, subject to appropriations. Actions by third parties, specifically SRSC and DWR, were developed in collaboration with those parties.

Reclamation did not select Alternative 3, in part, because of the need for actions by third parties, which is outside of Reclamation's control. These include reductions in diversions by senior water right holders not voluntarily agreed to, curtailments by the State Water Resources Control Board, and out of scope actions by the State Water Project at Oroville Dam and Reservoir on the Feather River. Although no clear line exists, Alternative 3 significantly impacts water supply and does not achieve a reasonable balance among competing demands for use of CVP water.

Alternative 4 provided some environmental benefits, however, more environmental benefits were realized under other alternatives; therefore, no additional consideration of authorities was necessary for Alternative 4.

## **6.9 Environmental Justice**

The decision includes environmental justice considerations. The CVP serves some of the poorest counties in the nation. The U.S. Census Bureau defines geographical areas with more than 20% of the population below the poverty level as "poverty areas"; thus, Humboldt, Trinity, and Fresno counties are defined as "poverty areas" and are subject to environmental justice evaluations. Environmental justice also includes considerations of minority populations. As presented in Chapter 17, minority populations accounted for 50% or more of the total county population in 24 counties in the project area including in the Sacramento Valley, San Joaquin Valley, San Francisco Bay, Central Coast, and South Coast regions. Environmental justice concerns that were evaluated include potential disproportionate economic and health effects on these populations. Economic impacts could occur if changes in operations were to result in changes to water supply deliveries and associated water costs that would subsequently affect labor income and/or job availability within the regions.

Delta communities have expressed ongoing concerns regarding increased frequency of Cyanobacterial Harmful Algal Blooms (CHABs) in the Delta and Reclamation considered this health concern in the Public Health and Safety chapter and appendix. Changes in irrigated agricultural land may also change the frequency of occurrence of Valley fever.

## **6.10 Climate Change**

Climate change analyses were conducted to establish how valley floor and rim watershed hydrology may change under future conditions. Reclamation updated the climate change approach for the EIS by incorporating realized and near-term future warming into the main analyses. Simulations use a hydrologic scenario representative of a 2022±15 Median Climate. The scenario modified historical climate to present conditions and made an additional adjustment using climate change projections for the period spanning 2008 through 2037. The non-linear nature of climate change represents conditions up through the early 2030s, is a reasonable projection for operation rules, and is consistent with the timing in the binned approach to adaptive management and development schedules for new analysis tools.

Climate analyses incorporate two principal improvements over previous methods. First, historical hydrology is detrended to account for the warming that occurred prior to 2021. This approach uses the monthly climatology from 1991-2020 as a reference period to adjust historical hydrology for the entire period of record (1921-2022). The intent was to modify historical climate trends to represent existing conditions. Second, future climate change scenarios were developed using the quantile mapping based on 40 climate model projections that were credibility representative of California climate over the historical reanalysis period. The selection of climate model projections considered performance after downscaling. A full description of modeling improvements, methods and results can be found in Appendix F.

The analysis of all four action alternatives and the No Action Alternative in the EIS included climate change assumptions. Reclamation's decision includes climate sensitivity scenarios for 2022±15 Wet-Warm, 2022±15 Hot-Dry, and 2040±15 Median Climates.

## **7. Mitigation Measures**

Mitigation measures are provided to avoid, minimize, rectify, reduce, or compensate for adverse effects of the action alternatives. Mitigation measures are not required to be implemented under NEPA but must be identified and analyzed. This decision includes reasonable means to avoid or minimize environmental harm consistent with the purpose and need of the action. The monitoring and enforcement program for enforceable mitigation requirements or commitments are included as Attachments 3 to this ROD. Attachment 3 includes a discussion of monitoring programs, the time frame for implementation, and the monitoring parties, as well as a description of enforcement programs where applicable.

Appendix D in the EIS includes a detailed description of mitigation measures identified for fish and aquatic resources. Attachment 4 to this ROD includes the avoidance and minimization measures that are built in as part of the preferred and selected alternative. These measures include water temperature and storage management, minimum instream flows, ramping rates, pulse flows, fall and winter baseflows, rice decomposition smoothing, OMR management, increased Delta outflow, salinity management, a drought plan and toolkit, flow and non-flow measures from the Voluntary Agreements, rebalancing between CVP reservoirs, water supply reductions and allocations to conserve storage, modifying water transfers, coordinating on refuge needs to conserve storage, adjustments of minimum release requirements for redd dewatering purposes, Delta Cross Channel gates closures, pumping plant operations specific to timing and fish screening, Delta smelt supplementation and monitoring of listed species. Mitigation measures in the preferred and selected alternative may be modified through adaptive management.

Under the EIS and in this ROD, Reclamation committed the following additional measures:

- **Mitigation Measure AQUA-4: Fall-run Chinook Salmon Brood Year Assessment:** To assess the condition of fall-run Chinook salmon populations on CVP tributaries, a fall-run Chinook salmon brood year assessment for the previous year's cohort and the cohort of returning adults that hatched three years prior will be completed. The brood year assessment will be based on the best available science each year and teams may consider using indicators similar to the *Annual Winter-run Chinook Brood Year Assessment* that is part of Alternative 2. Information will be reviewed by technical teams coordinating specific divisions or watersheds and attached to the Long-Term Operations Annual Report by Reclamation.
- **Mitigation Measure BIO-4: Flow Criteria and Real-time Group Considerations for Bank Swallow:** Develop flow criteria that avoid impacts of high water flows by limiting frequency and duration of peak flows over 14,000 cfs (Sacramento River) or rapid draw-downs to nesting bank swallow habitat during the breeding season (April 1 through August 31); this measure takes into consideration including downstream tributary flows when timing water releases (Bank Swallow Technical Advisory Committee 2013).
- **Mitigation Measure EJ-1: Increasing Participation with Tribal, Minority, and Low-Income Populations:** During any ongoing coordination regarding long-term operations, Reclamation will, consistent with the Bipartisan Permitting Reform Implementation Rule, 89 Fed. Reg. 35,442 (May 1, 2024); U.S. Department of Interior Equity Action Plan (April 14, 2022); and Reclamation's Manual, Directives and Standard on Public Involvement in Bureau of Reclamation Activities (updated July 28, 2023):
  - Treat Indigenous Knowledge as high-quality information.
  - Consider the ability of affected persons and agencies to access electronic media and the primary language of affected persons when conducting research.

Support priority actions in the DOI Equity Action Plan, Action 4, related to increasing opportunities to access public lands and prioritizing access to recreation areas and services in urban communities.

- Strive to reach and involve minority, low-income, reluctant or unknown publics who may be affected, using minority or special media, translated materials, or other means, as appropriate.

Reclamation will identify opportunities to gather Tribal Indigenous Knowledge for consideration in future Reclamation projects. Additionally, Reclamation will identify opportunities to include tribal interests and low-income/minority advocacy groups in affected communities to review and provide input on compliance documentation. For projects occurring in areas with a high proportion of Spanish speaking residents, Reclamation will continue to provide materials and resources in Spanish for a higher likelihood of participation from the affected population.

- **Mitigation Measure EJ-2: Reduce Effects of Employment Loss:** To assist in offsetting job losses in the agricultural sector, Reclamation will develop internship program(s) and advertise in affected communities near the Reclamation offices.
- **Mitigation Measure EJ-3: Increasing Participation with Trinity River Parties:** Reclamation will hold a public meeting in Trinity County to hear from local interests on Trinity River-specific alternatives and potential impacts.
- **Mitigation Measure WS-1: Coordination with Byron Bethany Irrigation District:** DWR will coordinate with Byron Bethany Irrigation District prior to herbicide treatments.
- **Mitigation Measure WS-2: Coordination with Contra Costa Water District:** Reclamation will coordinate with Contra Costa Water District (CCWD) to avoid creating new or additional restrictions on CCWD's ability to fill Los Vaqueros Reservoir, beyond the restrictions that are imposed under the then current CCWD Biological Opinions and Incidental Take Permits, so that with implementation of the selected alternative, CCWD will have opportunities to fill Los Vaqueros Reservoir that are at least comparable to the current opportunities.

Attachment 5 presents the rationale for mitigation measures considered in the EIS but not adopted in this Record of Decision.

In addition to mitigation associated with the Alternatives discussed in this EIS, there are independent but related programs and activities that address some of the impacts inherent in the long-term operations of the CVP and SWP. Examples include habitat restoration, facility improvements, hatcheries, and water conservation grants. The scope and complexity of agency actions in the Central Valley involve multiple activities with ongoing effects on federally listed species that are implemented separately from the long-term operation. These "independent related actions" with their independent NEPA and section 7 consultations, where warranted, are part of the affected environment but are not part of the operation of the CVP and SWP to store, release, divert, route, and blend water. Nevertheless, because of the ongoing and long-term operation of the CVP and SWP, some of these actions rectify and reduce and compensate impacts associated with operation of these facilities.

## 8. Public Review

Reclamation started monthly meetings to inform interested parties on the progress of the project in March of 2022. Reclamation held 21 interested party meetings with water users in parallel with 21 interested party meetings with representatives from the NGO community covering the same topics. Due to the complicated nature of water operations modeling, separate outreach meetings specific to CalSim results were held beginning in February 2022. Reclamation held 17 modeling meetings with partner agencies, in parallel with 17 meetings for water users, and 17 meetings for representatives from the NGO community covering the same topics. In June 2022, Reclamation held its first quarterly "Water Infrastructure Improvement for the Nation (WIIN)

Act” meeting, which were open to the public. To date, Reclamation has held 11 of these meetings.

In addition, the distribution lists for the project are continually updated to reflect the most current contact information provided by the public and interested parties so that they may receive timely notifications regarding project milestones.

## **8.1 Scoping Report**

Reclamation held public scoping meetings to obtain public and stakeholder input on the Notice of Intent (NOI) and to comply with NEPA requirements. Reclamation held six virtual public scoping meetings for interested parties between March 8 and March 17, 2022. The Public Scoping Report is included in the EIS as Appendix AE.

## **8.2 Peer Review of Aquatic Effects**

Reclamation engaged the Delta Stewardship Council’s Delta Science Program to review the aquatic effects sections of the Biological Assessment consistent with the Office of Management and Budget (OMB) directive, Final Information Quality Bulletin for Peer Review, dated December 16, 2004. Results and response are posted at <https://deltacouncil.ca.gov/delta-science-program/long-term-operations-for-the-central-valley-project-and-state-water-project-fish-and-aquatic-effects-analysis-review-panel>.

## **8.3 Comments on the Public Draft EIS**

In compliance with 40 C.F.R. Section 1506.10(a), the Draft EIS was filed with the Environmental Protection Agency; the Environmental Protection Agency then published the Notice of Availability in the *Federal Register* on July 26, 2024, and notifications regarding the availability of the Draft EIS for review were distributed to the project email list. Reclamation also issued a press release announcing the availability of the Draft EIS for review and comment. The Draft EIS was made available on Reclamation’s Long-Term Operation (LTO) website.<sup>1</sup>

Three in-person and three virtual public meetings were held to solicit public comments on the Draft EIS

6. Los Banos Community Center’s Grand Room (In-person) – Wednesday, August 7, 2024, 6–8 p.m.
7. Redding Veterans Memorial Hall (In-person) – Tuesday, August 13, 2024, 6–8 p.m.
8. Virtual via Zoom – Thursday, August 15, 2024, 12–2 p.m.
9. Sacramento Capitol Event Center (In-person) – Tuesday, August 20, 2024, 6–8 p.m.

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<sup>1</sup> The project website is at [https://www.usbr.gov/mp/nepa/nepa\\_project\\_details.php?Project\\_ID=54661](https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=54661).



10. Virtual via Zoom – Thursday, August 22, 2024, 6–8 p.m.

11. Virtual via Zoom – Thursday, September 5, 2024, 3–5 p.m.

The public meeting locations were based on the best opportunities to reach those potentially interested in the Draft EIS. Meeting locations were selected from venues throughout the CVP service area that were accessible and had capacity for at least 100 meeting attendees. Spanish translation services were made available to attendees at the Los Banos meeting and the second virtual meeting, and a virtual audio presentation of the informational posters presented at the in-person public meetings was provided for those unable to attend. At the public meetings, handouts were provided in Spanish, including project information, comment cards, and meeting agendas. Paired with the three virtual meetings accessible across the state and beyond, these meetings meet the spirit of the regulation to consider the ability of affected entities to access electronic media and ensure accessible options.

The CEQ’s NEPA Implementing Regulations require a minimum of 45 days for public review and comment on an EIS (40 C.F.R. § 1506.11[d]). Reclamation circulated the Draft EIS for public review for 45 days (July 26, 2024, to September 9, 2024). The duration of the comment period therefore complied with NEPA requirements. Over the course of developing the EIS, Reclamation staff and management remained available throughout the environmental review process to coordinate with interested parties and the public.

Reclamation divided comments into 1,077 individual blocks and documented responses in Appendix AD, *Response to Comments* to the EIS.

## **8.4 Comments on the Final EIS**

Reclamation noticed the Final EIS on November 15, 2024, and received four comment letters during the cooling off period (Attachment 6). Although Reclamation is not required to respond to comments on an EIS, Reclamation considered the comments in the decision. Similar comments were received and addressed during the public comment period as provided in Appendix AD. None of the comments raised new information.

One commenter cited the State Water Resources Control Board’s Water Quality Control Plan and identified inadequacies with the Staff Report, including comments by other agencies on the staff report. This decision represents a consensus between state and federal agencies. Commenters had the opportunity to comment on Reclamation’s Public Draft EIS. Reclamation responded to comments received on the Public Draft EIS.

One commenter raised concerns on the adequacy of Reclamation and DWR implementing the draft Bay-Delta Plan. Comments on the Public Draft EIS related to the Bay-Delta Plan were responded to in the EIS as Standard Response 10.

One commenter requested more information on Temporary Urgency Change Petition (TUCPs). Comments on the Public Draft EIS related to TUCPs were responded to in the EIS as Standard Response 10. The State Water Resources Control Board approves TUCPs pursuant to California Water Code, typically in response to scarce water resources conditions during drought.

Commenters expressed concerns on the level of analysis and adequacy of compliance for actions including, Water Transfers, Trinity River operations, and the Delta Conveyance Project. Comments on the Public Draft EIS were responded to in the EIS in standard responses one, four, and eight. Some components of these actions have additional environmental compliance separate from the LTO. Appendix Z of the EIS addresses the Delta Conveyance Project operations programmatically.

Commenters expressed concerns on the adequacy of analyses for the following resource areas: cyanobacteria harmful algal blooms (water quality), terrestrial, environmental justice (including disadvantaged communities), air quality, groundwater, aquatic (including temperature dependent mortality), and water supply. Comments on the Public Draft EIS were responded to in the EIS as Standard Response five. Analysis is appropriate and meets the standards for documents of this scope and magnitude. Reclamation used reliable data and scientific information resources throughout the EIS including a wide range of relevant data, literature, and tools and multiple lines of evidence where different analytical approaches might strengthen or inform conclusions.

Commenters provided new alternatives and components of alternatives and expressed concerns that the EIS did not include a reasonable range of alternatives. The LTO underwent a robust alternatives formulation approach. Alternatives were developed based on the purpose and need with some proposed components and alternatives having independent utility and effects. Comments on the Public Draft EIS were responded to in the EIS as Standard Response four. Reclamation undertook a multiyear process to develop and select an appropriate range of alternatives to be analyzed that fully comply with all applicable legal requirements. This process is described in Appendix E.

One commenter identified the need to analyze conflicts between projects and state policies and laws, CESA, Delta Reform Act, Public Trust Doctrine, CA Reasonable Use Doctrine. Comments on the Public Draft EIS were responded to in the EIS as Standard Response 2. The decision is made pursuant to federal law and is consistent with applicable state laws and policies.

One commenter identified a need to analyze consistency with water service and repayment contracts. Comments on the Public Draft EIS were responded to in the EIS as Standard Response 4. Actions in the decision are within Reclamation's authority to implement and are consistent with the contracts.

## **9. Permitting and Compliance**

The following sections describe Reclamation's findings required by other Environmental Laws and Regulation, and Executive Orders.

### **9.1 Clean Water Act**

Reclamation will operate in compliance with all applicable state and Federal laws including those which regulate water quality such as D-1641 and its associated salinity standards. Additionally, coordination with the SWRCB will be ongoing regarding the update to the Bay

Delta Water Quality Control Plan. The Delta Cross Channel would be operated to manage water quality and prevent exceedance of water quality thresholds.

## **9.2 Endangered Species Act**

Section 7(a)(2) of the Endangered Species Act (ESA) requires federal agencies to consult with the USFWS and NMFS, depending on the species at issue, to ensure that their actions do not jeopardize the continued existence of species listed as threatened or endangered under the ESA or destroy or adversely modify their critical habitat. On June 2023, Reclamation submitted to USFWS and NMFS a qualitative Biological Assessment on aquatic resources to receive input on its approach, exploratory modeling, environmental baseline dissection and extensive lines of evidence used to assess effects of the long-term operation of the CVP and SWP. On November 9, 2023, Reclamation submitted its quantitative Biological Assessment to USFWS and NMFS and requested formal Section 7 consultation. Reclamation has continued to closely coordinate with NMFS and USFWS during their sufficiency review providing requested information to facilitate development of the biological opinions. The 2024 biological opinions will take effect upon signing of this Record of Decision. Reclamation must ensure sufficient environmental coverage to comply with the associated incidental take statements and reasonable and prudent measures.

### **9.2.1 U.S. Fish and Wildlife Service Biological Opinion**

The USFWS provided a final Biological Opinion on November 8, 2024, concluding the proposed action is not likely to jeopardize threatened or endangered species or destroy or adversely modify their designated critical habitat. Reclamation reviewed incidental take statement and Reasonable and Prudent Measures (RPM) that add minor modifications to the Preferred Alternative.

- RPM 1 requires Reclamation and DWR to impose a charter on the collaboratively developed and multi-agency Water Operations Management Team. Elements required for the charter include changes to the facilitation structure; however, the rotating facilitation was designed to ensure each agency carefully considers the requirements imposed upon the group because each agency will be responsible for implementing requirements during their turn.

Changes to WOMT would need to meet the need to consider imposition of requirements.

- RPM 2 requires support in the development of a Delta Smelt Supplementation Program and to ensure that the legacy tidal habitat restoration projects from the 2008 Biological Opinion are constructed, protected, and managed by the year 2026.
- RPM 3 requires northwestern pond turtle observations and carcasses are reported, that turtles are moved out of harm's way, and posted speed limits observed.
- RPM 4 requires monitoring the giant garter snake response to crop idling/shifting comparable to ongoing research and to provide monitoring results and detections annually.

Reclamation is pursuing an agreement with the Sacramento River Settlement Contractors. This measure will be addressed by that agreement, the water transfer program, and/or successors.

- RPM 5 requires specific information be incorporated into the Old and Middle River seasonal report, Summer-Fall Habitat Action seasonal report and the annual compliance report. Concerning the water reductions from the Shasta Framework, USFWS requires Reclamation to request acreage and location data for fallowing from Sacramento River Settlement Contractors, for which will then be submitted to the USFWS.
- RPM 5 modified the collaboratively developed adaptive management program to add a 90-day review period to determine if effects are within those already analyzed or if reinitiation has been triggered.

The effect of this RPM may be to delay actions by one or more years and reduce collaboration by limiting the time available for data processing, synthesis, and discussion within the multi-agency teams. These challenges may be minimized if the Service participates in the steering committee and technical teams to raise issues within the collaborative team rather than after the multi-agency effort concludes.

### **9.2.2 National Marine Fisheries Service Biological Opinion**

NMFS provided a final Biological Opinion on December 6, 2024, concluding the Proposed Action is not likely to jeopardize threatened or endangered species or destroy or adversely modify their critical habitat. Reclamation reviewed incidental take statement and Reasonable and Prudent Measures that add minor modifications to the Preferred Alternative subsequent to collaborative processes.

- For the Sacramento River, reasonable and prudent measure 1, NMFS has required additional coordination and consideration of technical assistance; hindcast reporting; independent reviews; and to review and updating of the WRAP actions and to make recommendations for their implementation or non-implementation.
- For Clear Creek, reasonable and prudent measure 2, NMFS has required annual update reports; consideration of federally listed species information regarding operational adjustments; notifications; operational adjustments to protect federally listed fish if exceedance of temperature requirements is proactively determined; coordination on flow release schedules; continued implementation of the segregation weir.
- For American River, reasonable and prudent measure 3, NMFS has required install a dissolved oxygen gage and monitor; conduct stranding monitoring and rescue if Adaptive Management changes ramping rates.
- For Stanislaus River, reasonable and prudent measure 4, NMFS has required reporting, coordination on decisions affecting the application of the Minimum Instream Flow seasonal flow volumes based on priorities, coordination on monitoring, and data and summary statistics submittals.

- For the Bay-Delta, reasonable and prudent measure 5, NMFS has required monitoring, calculation and reporting of salvage and loss at fish protection facilities, development of a protocol with WOMT for Voluntary Agreement pre-adoption period volumes, and additional aquatic weed action notifications and reports.
- For Killer Whales, reasonable and prudent measure 6, NMFS has required monitoring and reporting on the change in freshwater survival and subsequent availability of adult listed and non-listed Chinook salmon.
- In reasonable and prudent measure 7, NMFS has required monitoring the amount and extent of incidental take through the continued use of programs and processes and to coordinate with the Interagency Ecological Program Biotelemetry Project Work Team.
- In reasonable and prudent measure 8, NMFS has required development of conservation measures for steelhead, including a prescribed schedule for accelerate steelhead science to develop population-based approaches to minimize entrainment.
- In reasonable and prudent measure 9, NMFS has unilaterally modified the scope of WOMT to require the use WOMT as a forum for coordinating on pulse flows in the Central Valley, with a goal of aligning the timing to improve in-river flow conditions that improve the survival of out-migrating salmon.

Operations of the CVP's Trinity Division will continue to be implemented pursuant to the NMFS' October 12, 2000, *Biological Opinion for the Trinity River Mainstem Fishery Restoration EIS and Its Effects on Southern Oregon/Northern California Coast Coho Salmon, Sacramento River Winter-run Chinook Salmon, Central Valley Spring-run Chinook Salmon, and Central Valley Steelhead*. Future Trinity Reservoir operations that affect federally listed species in CVP's Trinity River Division are expected to be addressed in additional consultation, anticipated to occur in 2025.

### **9.3 Executive Order 13990**

On January 20, 2021, President Biden issued "Executive Order 13990 on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis," directing the Department of Interior to review all existing regulations, orders, guidance documents, policies, and any other similar agency actions (agency actions) promulgated, issued, or adopted between January 20, 2017, and January 20, 2021 that conflict with national objectives to improve public health and the environment; ensure access to clean air and water; limit exposure to dangerous chemicals and pesticides; hold polluters accountable, including those who disproportionately harm communities of color and low-income communities; reduce greenhouse gas emissions; bolster resilience to the impacts of climate change; restore and expand our national treasures and monuments; and prioritize both environmental justice and employment.

The Proposed Action Long-Term Operation of the CVP and the SWP EIS satisfies the requirements issued under Executive Order 13990.

## 9.4 Executive Order 12898 (Environmental Justice)

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by President William J. Clinton in 1994. Its purpose is to focus federal attention on the environmental and human health effects of federal actions on minority and low-income populations with the goal of achieving environmental protection for all communities.

E.O. 12898 directs federal agencies to:

- identify and address the disproportionately high and adverse human health or environmental effects of their actions on minority and low-income populations, to the greatest extent practicable and permitted by law;
- develop a strategy for implementing environmental justice;
- promote nondiscrimination in federal programs that affect human health and the environment, as well as provide minority and low-income communities access to public information and public participation.

In addition, the E.O. established an Interagency Working Group (IWG) on environmental justice chaired by the EPA Administrator and comprised of the heads of 11 departments or agencies and several White House offices.

Reclamation has identified and developed measures to address environmental justice.

## 9.5 Indian Trust Assets

Reclamation adhered to the requirements for Indian Trust Assets (ITA) in the development of the EIS. Multiple federally recognized tribes are located in the vicinity of the project area on the Trinity, Sacramento, American, and San Joaquin rivers. Based on the analysis conducted, there are no anticipated impacts to ITAs as a result of erosion, degradation of water quality, or impacts to fishing rights as a result of Alternative 2. Consistent with the aquatics analysis, Alternative 2 is expected to improve water temperatures for salmonid populations while other parameters important for salmonid populations are not expected to vary significantly from the No Action Alternative.

## 9.6 Magnuson-Stevens Fishery Conservation and Management Act

On October 31, 2024, Reclamation transmitted to NMFS an Essential Fish Habitat (EFH) assessment on the Long-Term Operation of the CVP and SWP, and requested EFH consultation under the Magnuson-Stevens Fishery Conservation and Management Act, as amended (16 U.S.C. 1801 et seq.) for Pacific Coast Salmon (Sacramento River winter-run Chinook salmon,

Central Valley spring-run Chinook salmon, fall-run Chinook salmon, and late fall-run Chinook salmon), Coastal Pelagic Species (Northern anchovy), and Pacific Coast Groundfish (starry flounder). Reclamation concluded there may be minimal effects to Pacific Coast Salmon, and effects to Coastal Pelagic Species and Pacific Coast Groundfish are not anticipated to increase.

The EFH consultation is ongoing. NMFS is expected to provide recommendations, at which point, Reclamation will evaluate the recommendations and determine which recommendations to implement, if any, based on existing environmental compliance, the adequacy of existing conservation mechanisms, feasibility, authorities and existing requirements.

## **9.7 National Historical Preservation Act**

Reclamation is responsible for complying with Title 54 U.S.C. § 306108, commonly known as Section 106 of the National Historic Preservation Act (NHPA). Project-level activities under the action alternatives will not result in changes to peak flows or reservoir levels compared to the No Action Alternative. As a result, in accordance with 36 C.F.R. § 800.3(a)(1), project level actions have no potential to cause effects on historic properties and do not require further consideration under Section 106 of the NHPA.

## **9.8 Water Infrastructure Improvements for the Nation Act**

Section 4004 of the WIIN Act, to further cooperation with State and local agencies to resolve water resource issues in concert with conservation of endangered species, includes provisions for inclusion of public water agencies that contract for delivery of water from the CVP or the SWP in any consultation or reconsultation on the operation of the CVP and SWP. Provisions and Reclamation's compliance were met as follows.

- Routine and continuing opportunities to discuss and submit information during development of any biological assessment – Reclamation hosted monthly meetings on the consultation and preparation of the EIS. Reclamation additionally solicited input through Knowledge Base Papers on specific topics. Reclamation additionally hosted separate monthly meetings on modeling during the period of model parameterization.
- Informed on the schedule for preparation of a biological assessment – Reclamation covered schedule in the monthly meetings.
- Informed on the schedule for preparation of the biological opinion – NMFS and FWS provided schedules at Biological Opinion specific meetings.
- Receive a copy of any draft biological opinion and have the opportunity to review that document and provide comment for due consideration: NMFS and USFWS provided draft sections of biological opinions related to aquatic species.

No reasonable and prudent alternatives were developed requiring conferring or additional analyses.

The WIIN Act additionally provides for input from the Collaborative Adaptive Management Team (CAMT) and Collaborative Science and Adaptive Management Program (CSAMP). Reclamation provided regular updates consistent with the scope identified by CAMT and CSAMP.

The WIIN Act additionally requires a quarterly stakeholder meeting. Reclamation held 11 quarterly meetings and NMFS and USFWS held supplemental WIIN Act meetings specific to Biological Opinions.

## 10. Conclusion

This Record of Decision certifies that Reclamation considered the alternatives, information, analyses, and objections submitted by State, Tribal, and local governments and public commenters in developing the Final Environmental Impact Statement for the Long-Term Operation of the CVP and SWP (Bureau of Reclamation 2024).

Alternative 2 best meets the purpose and need and is also the Environmentally Preferable Alternative. Alternative 1 minimally meets the purpose and need in that Reclamation would operate the CVP to meet the legal requirements associated with its water rights, including existing fish protections, but would not release additional flows for fish and wildlife purposes. Alternative 3 partially meets the purpose and need in that it provides the most flow benefits for fish species but decreases water diversions and does not satisfy some contractual obligations and agreements. Alternative 4 meets the purpose and need and incorporates innovation in science, but lacks the partnership with federal fish agencies, State of California, and Sacramento River Settlement Contractors. The No Action Alternative includes more water supply and flexible operations but does not address actions by third parties to reduce temperature dependent mortality during multiple years of extreme drought and does not reconcile the operation of the CVP in the Delta with the operation of the SWP. Some actions contained in alternatives 3 and 4 may be considered and evaluated through adaptive management or parallel processes in the future outside of the scope of this effort.

This Record of Decision concludes the response to E.O. 13990 by adopting the Proposed Action consulted upon for 2024 Biological Opinions and the terms and conditions of those new Biological Opinions.



# Attachment 1. Environmentally Preferred Alternative Rankings

Table 1-1. Environmentally Preferred Alternative Rankings

| Resource Area                | Significantly<br>Preferable |       | Preferable |              | Neutral      |              | Not<br>Preferable |              | Significantly<br>Not<br>Preferable | Comment                                  |
|------------------------------|-----------------------------|-------|------------|--------------|--------------|--------------|-------------------|--------------|------------------------------------|--|
| <b>Aquatics</b>              | <b>Alt.3</b>                |       |            | <b>Alt.2</b> | <b>Alt.4</b> | <b>NAA</b>   |                   |              | <b>Alt.1</b>                       |  |
| Delta smelt                  | Alt.3                       |       |            | Alt.4        | Alt.2        | NAA          |                   |              | Alt.1                              |  |
| Longfin smelt                | Alt.3                       |       |            | Alt.4        | Alt.2        | NAA          |                   |              | Alt.1                              |  |
| Winter-run Chinook<br>salmon |                             | Alt.3 | Alt.2      |              | Alt.4        | NAA          |                   |              | Alt.1                              |  |
| Spring-Run Chinook<br>salmon |                             |       | Alt.3      | Alt.2        | Alt.4        | NAA          |                   |              | Alt.1                              |  |
| Fall-run Chinook<br>salmon   |                             |       | Alt.3      | Alt.2        | Alt.4        | NAA          |                   |              | Alt.1                              |  |
| Steelhead                    | Alt.3                       |       |            | Alt.2        | Alt.4        | NAA          |                   |              | Alt.1                              |  |
| Green Sturgeon               |                             |       | Alt.3      | Alt.2        | NAA          | Alt.4        | Alt.1             |              |                                    | Varied beneficial/<br>adverse impacts    |
| Predation                    |                             |       | Alt.4      | Alt.2        | NAA          | Alt.3        | Alt.1             |              |                                    | Preferrable<br>minimizes<br>predation    |
| <b>Terrestrial</b>           |                             |       |            | <b>Alt.2</b> | <b>NAA</b>   | <b>Alt.1</b> | <b>Alt.4</b>      | <b>Alt.3</b> |                                    | This includes<br>habitat changes         |
| Giant garter snake           |                             |       |            | Alt.1        | NAA          | Alt.2        | Alt.3             | Alt.4        |                                    |  |
| Bank swallow                 |                             |       | Alt.1      |              | NAA          | Alt.4        | Alt.3             | Alt.2        |                                    |  |
| Pond turtle                  |                             |       |            | Alt.2        | NAA          | Alt.4        | Alt.3             |              | Alt.1                              | All alts (except Alt.<br>1) are the same |
| Yellow-legged frog           |                             |       |            | Alt.2        | NAA          | Alt.4        | Alt.3             |              | Alt.1                              | All alts (except Alt.<br>1) are the same |

| Resource Area                | Significantly<br>Preferable |            | Preferable   |              | Neutral      |              | Not<br>Preferable |              | Significantly<br>Not<br>Preferable | Comment                      |
|------------------------------|-----------------------------|------------|--------------|--------------|--------------|--------------|-------------------|--------------|------------------------------------|------------------------------|
| <b>Surface Water Supply</b>  | <b>Alt.1</b>                | <b>NAA</b> |              |              | <b>Alt.4</b> | <b>Alt.2</b> |                   |              | <b>Alt.3</b>                       |                              |
| SRSC                         | Alt.1                       | NAA        |              | Alt.4        |              | <b>Alt.2</b> |                   | Alt.3        |                                    |                              |
| NOD CVP                      | Alt.1                       | NAA        |              | Alt.4        | Alt.2        |              |                   |              | Alt.3                              |                              |
| SOD CVP                      | Alt.1                       | NAA        |              | Alt.4        | Alt.2        |              |                   |              | Alt.3                              |                              |
| CVPIA Refuges                |                             |            |              | Alt.1        | NAA          | Alt.2        | Alt.4             |              | Alt.3                              |                              |
| NOD SWP                      |                             |            |              | Alt.1        | NAA          | Alt.2        | Alt.4             |              | Alt.3                              |                              |
| SOD SWP                      | Alt.1                       |            | Alt.4        | Alt.2        | NAA          |              |                   |              | Alt.3                              |                              |
| <b>Ground Water Supply</b>   |                             |            | <b>Alt.1</b> |              | <b>NAA</b>   | <b>Alt.2</b> | <b>Alt.4</b>      |              | <b>Alt.3</b>                       |                              |
| <b>Water Quality</b>         |                             |            | <b>NAA</b>   | <b>Alt.2</b> |              | <b>Alt.4</b> | <b>Alt.1</b>      | <b>Alt.3</b> |                                    |                              |
| Salinity                     |                             | Alt.3      |              | Alt.2        | NAA          |              | Alt.4             |              | Alt.1                              | More salinity is undesirable |
| Mercury                      |                             |            | NAA          | Alt.2        | Alt.1        | Alt.4        |                   |              | Alt.3                              |                              |
| CHABs                        |                             |            | NAA          | Alt.1        | Alt.2        | Alt.4        |                   | Alt.3        |                                    |                              |
| <b>Power</b>                 | <b>Alt.3</b>                |            | <b>Alt.2</b> | <b>Alt.4</b> | <b>NAA</b>   | <b>Alt.1</b> |                   |              |                                    |                              |
| <b>Economics</b>             | <b>Alt.1</b>                |            | <b>Alt.4</b> |              | <b>NAA</b>   |              | <b>Alt.2</b>      |              | <b>Alt.3</b>                       |                              |
| M&I                          | <b>Alt.1</b>                |            | <b>Alt.2</b> |              | <b>Alt.4</b> |              | <b>NAA</b>        |              | <b>Alt.3</b>                       |                              |
| Agricultural                 | <b>Alt.1</b>                |            | <b>Alt.4</b> |              | <b>NAA</b>   |              | <b>Alt.2</b>      |              | <b>Alt.3</b>                       |                              |
| Fishing                      |                             |            |              |              |              |              |                   |              |                                    | All ranked neutral           |
| <b>Environmental Justice</b> | <b>Alt.1</b>                |            | <b>Alt.4</b> |              | <b>NAA</b>   |              | <b>Alt.2</b>      |              | <b>Alt.3</b>                       |                              |
| <b>Federal Tribes</b>        | <b>Alt.3</b>                |            |              | <b>Alt.2</b> | <b>Alt.4</b> | <b>NAA</b>   |                   |              | <b>Alt.1</b>                       |                              |

Significantly Preferable: alternative clearly ranks more favorably for the resource area.

Preferable: alternative ranks better for the resource area.

Neutral: no clear distinction between alternatives. May be excluded where no clear preference.

Not Preferable: alternative ranks worse for the resource area.

Significantly Not Preferable: alternative clearly ranks less favorably for the resource.

## **Attachment 2. Adaptive Management Program**

## **Long Term Operations of the State Water Project and the Central Valley Project – Adaptive Management Program**

### **1. Introduction**

Adaptive management is a science and decision analytic-based approach to evaluate and improve management actions, with the aim to reduce uncertainty over time and increase the likelihood of achieving and maintaining a desired management objective. Decision analysis tools can be used to determine which uncertainties are important for management decisions, and which scientific approaches should be deployed to address those uncertainties considered necessary to inform subsequent decisions. When correctly designed and executed, adaptive management provides a means to evaluate management actions or programs (collectively “actions”) and allows for evidence-based adjustments to the actions defined, to improve their effectiveness in achieving management objectives, if warranted. The adaptive management approach can provide a scientific basis for continuing or modifying an action or allow for an alternative action to be evaluated and implemented, if determined.

The Department of Water Resources (DWR), the Department of Fish and Wildlife (CDFW), Bureau of Reclamation (Reclamation), U.S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NMFS) (collectively, “the Implementing Entities”) intend to utilize adaptive management to inform the long-term operations of the State Water Project (SWP) and the Central Valley Project (CVP) and related activities described as a part of this Adaptive Management Program (Program).

The Implementing Entities anticipate that it may be necessary to undertake additional monitoring and research that builds on existing efforts in order to carry out this Program. The Implementing Entities will establish an Adaptive Management Steering Committee (AMSC) that will serve as the primary decision group for implementation of this Program. Members of the AMSC will include one designated sub-Director representative<sup>1</sup> and one designated alternate each from DWR, CDFW, Reclamation, USFWS, and NMFS. The AMSC’s role in implementing this Program is described in Section 4a.

The Implementing Entities intend to use the AMSC to provide direction and guidance for work under this AMP through Adaptive Management Technical Teams (AMTs), coordinate each agencies participation, and assign existing work groups to the extent possible (for example the Delta Coordination Group (DCG)) to serve as AMTs, only creating new work groups if needed. Appendix A describes the role of adaptive management, as envisioned by this Program, to inform the long-term operations of the SWP and CVP. The AMSC will utilize AMTs and outside experts (as needed) to develop adaptive management plans or work plans to implement Adaptive Management Actions (AMAs) identified in this Program (Appendix B) and track required monitoring, data collection, research, and publications that inform future decisions (see Section 4b).

The Program will utilize a suite of decision support tools tailored to each action with consideration of each AMA’s management objective, timeline, stage of development (i.e., initiating a new AMAs or continuing an existing longer-term effort), the anticipated application and or incorporation of information gained. The AMSC and its AMTs agree to use the fundamental components of Structured Decision Making (SDM) for AMAs identified in the Program including independent, floating facilitators to assist with problem framing, objective development, and information synthesis. Floating facilitators are intended to serve as independent, neutral facilitators of the entire AMP. Their role is to facilitate each

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<sup>1</sup> “Designated Sub-Director Representative” means the official representative designated by the director of an Implementing Entity to act on her or his behalf.

individual AMT, ensuring the AMTs follow guidance and sideboards provided by the AMSC, fostering cross communication among AMTs when helpful, and working closely with assigned leads of each AMT. In addition to working directly with AMTs they will also facilitate the AMSC, foster communication between AMTs and the AMSC as needed to inform discussions and decision making, and assist in communicating guidance and sideboards from the AMSC to individual AMTs. Given the scope of the AMP, it is likely that a team of independent facilitators will be needed to serve these roles.

Appendix B provides an initial list of AMAs and expectations for monitoring and science activities to be implemented by the AMTs. Roles and responsibilities of the AMSC and AMTs are described in Sections 4a and 4b of this document. Independent science reviews may be used to evaluate progress towards reducing uncertainty and utilizing the best available science for informing CVP and SWP management (see Section 7c). Appendix B also sorts AMAs into Bins (1-3) based on the timeframe of their evaluation and the level of SDM tools anticipated to be needed for evaluation and decision making. AMAs to be included in Bin 1 will be managed adaptively based on present conditions, such as hydrology or annual species status, and will require quick decision-making relative to full SDM. Consultation and ITP amendment inquiries will be conducted, but reinitiation of consultation or an ITP amendment is not expected to be required to refine the approach to implementation after each evaluation. Bin 2 will apply to those AMAs that are iterated or linked over time whereby actions taken early on may result in learning that improves management within the next 3-8 years. The evaluation may trigger re-initiation of consultation or an ITP amendment for the actions, or not, depending on scope and scale of recommended change. Bin 3 will include AMAs for which agencies evaluate data over longer periods of implementation, on the order of 10-15 years. These AMAs require a full SDM process whereby qualified and independent facilitators will guide a structured decision-making process. It is anticipated that Bin 3 AMAs will require substantial time to plan, evaluate, and implement to facilitate learning opportunities for future action management.

The use of decision support tools will help the AMSC make transparent, evidence-based decisions by comparing the expected outcomes of alternative actions with regard to meeting management objectives, identifying key sources of uncertainty affecting the ability to predict action outcomes, and highlighting tradeoffs between competing management objectives. There are additional studies that may be at different stages of development and do not provide for the shared consideration of alternatives but warrant the sharing of information and the use of components of SDM.

Working through the collaborative process outlined in this Program, the Implementing Entities commit to reach consensus within the AMSC to the maximum extent possible, while still retaining individual agency discretion to make decisions (as appropriate). Should the AMSC not come to consensus, the Implementing Entities would follow the governance process identified in the associated Biological Opinion and ITP. The Implementing Entities seek to use the potential flexibility provided by an adaptive management approach to ensure the specific management objectives identified for each action are met, maintained, and/or improved upon. The full implementation of an independently facilitated AMP is an approach that the Implementing Entities believe best balances positive outcomes for species listed under the federal Endangered Species Act (ESA) and the California Endangered Species Act (CESA) with operation of the CVP and SWP.

Nothing in this Program is intended to modify each Implementing Entity's roles, authorities, or obligations under statute or regulation. Each Implementing Entity retains discretion to make decisions as appropriate within its authority after considering the available information and considering the input of the other Implementing Entities through the AMSC.

## 2. Purpose and Intent

Scientific uncertainty will always exist regarding Central Valley rivers and Bay-Delta ecosystems, including the needs of the listed species, the effects of coordinated CVP and SWP operations on those species and their habitats, and the efficacy of actions intended to minimize or mitigate those effects. Further, even when scientific certainty is relatively high, the real-world need for trade-offs will increase the complexity of implementing decisions. This Program is being implemented to help reduce important scientific uncertainty where it exists, and to enhance application of decision tools to support decision making related to the long-term operations of the CVP and SWP.

Adaptive management is a structured, iterative process for decision making when confronted with uncertainty. It emphasizes learning through management where knowledge is incomplete and provides a process for building knowledge through monitoring and science, reducing uncertainty, and improving management over time in a goal-oriented and structured way. Key components of adaptive management are establishing clear and measurable objectives, identifying action goals, and determining management options for best achieving those desired goals.

The broad purposes of this Program are: 1) to promote collaborative, participatory, accountable, relevant, innovative, and transparent science and documentation of the decision process, 2) guide (by identifying, prioritizing, and funding) the development and implementation of scientific investigations and monitoring for CVP and SWP management actions necessary to evaluate if management objectives are being achieved, 3) incorporate new information into decision support tools to gain insights to management decisions, actions, and constraints, and 4) maximize the effectiveness of an action toward achieving the management objectives for the operation of the CVP and SWP while considering potential tradeoffs.

This Program creates a structure whereby participants in science workgroups (i.e., AMTs) working with floating, independent facilitators to implement scientific investigations and monitoring that will best reduce important uncertainties specific to each AMA (Appendix B). The science-based decision products of the AMTs are rolled up by the floating, independent facilitators and presented to the steering committee (i.e., AMSC) for consideration by each agency. The members of the AMSC can then make informed resource management decisions such as whether to propose changes to an existing AMA determine whether particular lines of inquiry are no longer able to generate further insight, and other kinds of decisions that can be expected to typify an adaptive response to a set of recurring actions. Decisions regarding potential changes to regulatory approaches will be handled separately, as described in Section 5 of this document.

The intents of this Program are to:

- a. Describe the steps required to implement the adaptive management process (see Appendix A) and explain how the process links to the operations of the CVP and SWP.
- b. Describe how adaptive management for ongoing engagement on the operations of the CVP and SWP will be utilized for specific actions (see Appendix B).

- c. Inform future consultation and permitting processes for the CVP and SWP through the science produced by the Program, which can be thought of as adaptive management of more involved decisions occurring over longer time scales.
- d. If necessary and agreed upon by the Implementing Entities, develop and implement new AMAs.
- e. Describe the decision-making and governance structure that will be used to implement the adaptive management process including how adaptive changes will be made to the AMAs with consideration of how these changes will be coordinated and reflected in corresponding state and federal authorizations.
- f. Describe the structure for communication among the Implementing Entities and the broader stakeholder community regarding implementation of this Program.
- g. Describe the role of the AMSC in tracking, on an annual basis, funding for this Program.

### 3. Scope of Adaptive Management Program

#### a. Actions

The CVP and SWP have been operated for decades. Scientific research and monitoring of the projects' ecological impacts has been extensive, and these impacts are thoroughly discussed and described. Operational approaches have varied over time, in part guided by the accumulation of ecological data and improved understanding of the projects' impacts on species and their habitats. However, constraints on successfully reducing impacts to listed species caused by operations of the projects under varying climatic conditions are also understood and documented, yet difficult to achieve while maintaining project objectives. The initial adaptive decision space proposed in this Program involves the application of decision analysis and scientific inquiry into topic areas where the Implementing Entities believe that further understanding might improve one or more aspects of CVP and SWP operations. Decision support tools will be used to facilitate evaluation of effects of components of the AMAs identified (Appendix B) and inform Implementing Entities about whether and how best to adapt those AMAs, if needed. The AMAs to be evaluated include, but are not limited to, the following:

- Winter-run Chinook Salmon OMR Management
- Spring-run Chinook Salmon OMR Management
- Larval and Juvenile Delta Smelt OMR Management
- Larval and Juvenile Longfin Smelt OMR Management
- Summer-Fall Habitat Action for Delta Smelt
- Tidal Habitat Restoration Effectiveness for Smelt Fishes
- Tributary Habitat Restoration Effectiveness for Salmonid Fishes
- Shasta Spring Pulse Flow Studies
- Winter-run Chinook Salmon Through Delta Survival and Salvage Thresholds
- Longfin Smelt Science Plan Actions
- Delta Smelt Supplementation
- Steelhead JPE
- Alternative Salmonid Loss Estimation Pilot Study

- Shasta Cold Water Pool Management
- Georgiana Slough Migratory Barrier Effectiveness for Salmonid Fishes
- Spring Outflow
- Clear Creek

#### b. Compliance and Effectiveness Monitoring

Compliance and effectiveness monitoring programs will include the elements as described in Appendix B, unless the AMSC, through its adaptive management process, recommends a modification, DWR and Reclamation request modifications, and the regulatory agencies accept those modifications. Such modifications may be subject to independent review (see Section 7). Changes to the compliance and effectiveness monitoring (Section 3.10 of the Proposed Action) may require ESA consultation and may require amendments to the relevant CESA authorization before being implemented (see Section 5).

### 4. Program Structure, Roles, and Responsibilities

#### a. Adaptive Management Steering Committee (AMSC)

The Implementing Entities will establish the AMSC to implement the Program. The Implementing Entities through the AMSC are responsible for support, coordination, and implementation of the Program. The Program will address important uncertainties and trade-offs (policy and ecological) associated with adaptively managing actions identified in Appendix B. AMSC decisions will be informed by AMTs dedicated to each individual AMA identified in Appendix B. The agencies comprising the AMSC will hire a team of floating independent facilitators to help each AMT identify management objectives and goals, identify and synthesize information areas related to those objectives, determine critical uncertainties affecting management decisions, define additional information needs to reduce critical uncertainties, and integrate products of the various AMTs in a way that clarifies what decisions need to be made, what trade-offs may need to be considered, and how confidently the outcomes of those decisions can be predicted.

#### i. Purpose and Function

The purpose of the AMSC is to provide guidance and direction for the Program and ensure effective and efficient implementation of all AMAs. Specifically, the AMSC will:

- Provide recommendations to Agency Directors based on recent science, including the need to re-initiate consultation and request an ITP amendment.
- Elevate issues for resolution to Agency Directors, as needed, including disputes and results of adaptive management processes conducted through AMTs and the AMSC.
- Serve as primary management level review of AMA implementation. All considerations involving a regulatory change under CESA or ESA do not fall under the purview of the AMSC, see Section 5.
- Provide direction and guidance for action-specific AMTs including articulation of management objectives, dispute resolution, and coordinating participation by each agency.



- Request annual presentations from each AMT to track the status of AMA implementation and look ahead to next steps.
- Review AMT suggestions for identified areas of uncertainty, needed data improvements, proposals for enhanced monitoring or focused research, as appropriate, to assure they are effectively supporting the information needs of the members of the AMSC.
- Request proposals from AMTs to conduct new data collection or conduct focused research to reduce uncertainty or fill data gaps relevant to components of identified AMAs.
- Discuss recommendations from AMTs based on the decision-making process.
- Form and direct AMTs as necessary. Existing teams and workgroups will be used to the maximum extent practicable.
- Assure that all AMSC and AMT activities are conducted in a transparent manner. To allow time for coordination with interested parties meeting schedules will allow for at least 30-day review and consideration of relevant documentation prior to any decision making regarding potential changes to an action in the ITP or PA by the AMSC.
- Post meeting notes, AMT presentations, documentation of decisions, and rationale to support decisions on a publicly available website.
- Identify the need for independent review of specific adaptive management plans and results.
- Set the course for scope and facilitation of reviews, identify the appropriate group to conduct independent reviews, and develop any draft charges for independent review.
- Conduct outreach to the broader stakeholder community regarding implementation of the Program.
- Review annual AMP budget annually to assess potential gaps in funding relevant to overall implementation.

## ii. Membership

The AMSC will include one designated sub-Director level representative and one designated alternate each from each of the Implementing Entities. Upon unanimous approval, the members of the AMSC may invite additional staff from any of the Implementing Entities or consultants engaged by one or more of the Implementing Entities to provide technical assistance or other support for specific topics. AMSC meetings will be organized and facilitated by a floating, independent facilitator (or team of facilitators) agreed upon by all Implementing Entities to ensure continuity across meetings and efficient use of time.

## b. Adaptive Management Technical Teams (AMTs)

AMTs will be dedicated to each AMA identified in Appendix B. AMTs are charged with identifying uncertainty, building knowledge, and implementing each AMA.

### i. Purpose and Function

The purpose of individual AMTs is to convene scientific technical staff from each of the Implementing Entities and interested parties in working groups to plan, implement, and assess each of the actions identified in Appendix B. AMTs formed by the AMSC will have at least one designated team leader from an Implementing Entity and will report to the members of the AMSC on progress in addressing uncertainty associated with each AMA identified in Appendix B (see Appendix A for additional details regarding required reporting). The AMTs will design and implement monitoring and science plans to gather data necessary to build knowledge and decrease uncertainties and conduct the analysis and synthesis of the information gained. The AMTs will evaluate whether actions identified in Appendix B are achieving their intended management goal, and identify potential adaptive management changes based on the science if objectives and or those goals are not being achieved, to be considered by the members of the AMSC for implementation in the future. Generally, each AMT will:

- Utilize decision support tools to define relevant uncertainty, develop action alternatives, estimate expected consequences of the alternatives, and evaluate trade-offs and preferences when making choices between alternative courses of action. Depending on the scope and timeline of each AMA, and the level of SDM tools used by the AMA, these could include:
  - Development of performance metrics for each AMSC-defined management objective to allow evaluation of ongoing and proposed actions relative ability to achieve those objectives.
  - Development of potential alternative actions and synthesis of existing information to evaluate expected action performance.
  - Identification of uncertainties in expected action performance that are most influential in decision tradeoffs.
  - Development of monitoring and science plans to reduce uncertainty around management action outcomes.
  - For AMAs in Bin 1, develop experimental actions supported by monitoring and science, and review outcomes of experimental actions and revise experimental actions as appropriate.
- As requested by the AMSC, prepare necessary documentation for independent reviews, and participate in post-review dialogue.
- Provide data to support the members of the AMSC to track Adaptive Management Program implementation.
- Track other monitoring and research relevant to the subject of the AMA.
- Assure transparency in the implementation and investigation of the AMA.
- Prepare annual presentations of AMA implementation status to the AMSC and subsequently post presentations on a publicly available website.

The scope and responsibilities of each AMT, and timelines for deliverables, are described in more detail for each AMA in Appendix B. The descriptions in Appendix B may be refined using decision support tools by each AMT and documented in a work plan describing the monitoring and or science that the AMTs plan to conduct, which will be submitted to the AMSC for review and approval.

## ii. Membership

Membership in individual AMTs will be open to technical staff from each of the Implementing Entities. AMTs will also be open to tribes, consultants, stakeholders, other local, State or federal agencies, or academic researchers, as described in the individual team charter.

#### c. Decision-making

The Implementing Entities commit to working collaboratively through the AMSC and AMTs to reach consensus on adaptive management changes (including decisions not to make changes) to the maximum extent feasible, and to elevate any disputes over decisions to the Directors for each Implementing Entity. In the event that resolution of the dispute cannot be reached by the AMSC, review of the issue in dispute may occur through the presentation of alternative viewpoints as part of an annual review, or a separate independent science review. Decision support tools, including structured decision making, as described in Appendices A and B, will be used to provide a rational and organized framework for evaluating management objectives relative to each action's goal, as well as any alternative decisions.

Nothing in this Program is intended to modify each Implementing Entity's roles, authorities, or obligations under statute or regulation. Each Implementing Entity retains discretion to make decisions as appropriate within its authority after considering the available information and considering the input of the other Implementing Entities through the AMSC.

### 5. Link between AMP and Regulatory Processes

#### a. Federal Endangered Species Act

The Code of Federal Regulations at 50 CFR § 402.16 describe the process for reinitiating ESA section 7 consultation. Specifically, reinitiation is required and shall be requested by the Federal action agency (in this case, Reclamation) or by the USFWS or NMFS (depending on which species are involved) if any one or more of several criteria are met. Although, there is no regulatory mechanism to modify ESA section 7 biological opinions absent reinitiating the section 7 consultation, there are options to improve understanding or modify an action without reinitiating the section 7 consultation so long as doing so does not meet a reinitiation trigger. Specifically, new information or a change in the proposed action would require reinitiation of consultation if:

1. new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; or
2. the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion or written concurrence.

Therefore, the additional objectives of this Program, as it pertains to ESA section 7 consultation, are to:

1. identify the areas of potential action uncertainty and the range of effects to species that may occur as the AMP is implemented such that the potential range of effects of the action may be considered during consultation; reinitiation will be required if that range of anticipated effects is exceeded; and

2. provide the mechanism for regular inquiries and evaluation to determine if reinitiation is required as the AMP is implemented.

In the event that a change is required to the Incidental Take Statement (ITS), and the change is fully consistent with the analysis in the biological opinion, the Services can revise the ITS without reinitiating the consultation. Examples include where new information allows for a more specific take surrogate, reduction in the amount or extent of take (which would include surrogates), or for clarification of the terms and conditions. Under these scenarios, the Services would issue a new ITS to the Federal action agency.

- b. California Endangered Species Act

Title 14 of the California Code of Regulations (CCR), section 783.6, subdivision (c) describes general criteria and information pertaining to minor and major amendments to ITPs. If permittee (in this case, DWR) submits a request for changes to an ITP that do not significantly modify the scope or nature of the project or any of the minimization, mitigation, or monitoring conditions of the ITP, as determined by the CDFW, a minor amendment may be processed. However, if a permittee is seeking changes that will significantly modify the scope or nature of the project, or if those changes trigger additional review under the California Environmental Quality Act, as determined by CDFW, the amendment would be processed as a major amendment. CDFW reviews major amendment requests according to processes set out for initial permit applications, including submittal of an application and supporting information, although the amendment application may rely on and supplement the information from the initial application. Approval of both minor and major amendments to ITPs are subject to CDFW finding that the ITP issuance criteria in CCR title 14, section 783.4 continue to be met.

6. Funding

Funding is anticipated from a variety of sources including CDFW, DWR FWS, NMFS, and Reclamation. Federal funding is subject to appropriations. CDFW cannot fund DWR permit obligations but may allocate staff time to provide technical assistance and engage in implementation of this program.

It is expected that the Adaptive Management Plan will require substantial resources to support the required evaluations and independent review. The specific level of support remains to be determined and will likely vary depending on the Adaptive Management Actions conducted each year.

7. Relationship of the Adaptive Management Program to Other Processes

- a. Real-time Operations

The adaptive management and decision-making processes described here do not directly apply to real-time operations; where individual real-time operation decisions must be made on a daily, weekly, or monthly time scale. However, real-time operational criteria may be changed over time through the adaptive management process based on new information. Such a change may require an ESA reinitiation of consultation inquiry and an ITP amendment (See Section 5, Link between AMP and Regulatory Processes).

- b. Voluntary Agreements

The Voluntary Agreements are a package of flow and non-flow measures proposed by a diverse range of interests for adoption by the SWRCB as an approach to implement the Bay-Delta Water Quality Control Plan (Bay-Delta Plan). The Voluntary Agreements would state commitments of water, funding, and other measures to implement Bay-Delta Plan water quality objectives related to protection of native fishes, including the Covered Species. The Voluntary Agreements offer a watershed-wide approach that includes new flows, habitat restoration in the Delta and Suisun Marsh as well as tributary systems, and a governance and science program that would use a structured decision-making approach to guide adaptive management. Voluntary Agreements include commitments to fund and undertake new science (monitoring and research) to address hypotheses related to the efficacy of flow and habitat restoration actions, including increases in Delta outflow in March – June to benefit Covered Species. As information is gained through the VA Science Program pertaining to actions contained in the AMP, it may be used to inform AMT discussions and recommendations and may be considered in decision-making processes of the AMSC.

The Voluntary Agreements are subject to ongoing discussion and have neither been finalized nor adopted by the State Water Resources Control Board.

#### c. Independent Peer Review

Independent peer review can play an important role in guiding the evaluation and response stages of the adaptive management cycle by providing unbiased, transparent reviews of the science and advice for the processes used to guide management decisions. The AMSC will oversee the use of independent peer review processes on an as-needed basis for individual adaptive management actions. The need for independent peer review may rise from a lack of consensus on the relevant science and its application to the management action, from a need for additional expertise on a specific subject matter, or when specific management actions have reached a milestone in terms of the volume of available information. In the latter situation, independent review is advisable for informing key management decisions.

Independent review may consist of letter reviews without associated formal meetings, or panel reviews in which reviewers have a public opportunity receive information from the members of the AMSC or relevant AMT in a meeting. The members of the AMSC may initiate an independent review for any adaptive management action if there is a consensus on the need for the review. The members of the AMSC can request the services of an impartial organization to facilitate the peer review process (e.g., the Delta Science Program, National Academy of Sciences, or similar organizations). In the interest of transparency, materials and recommendations from panel or letter reviews will be available publicly on agency websites. The AMSC members will encourage and support the development of peer-reviewed publications in scientific journals. Article publications, along with reports and datasets, may inform the evaluation of the adaptive management actions.

## **Attachments**

**Appendix A:** Adaptive Management Program Framework and Implementation

**Appendix B:** Adaptive Management Actions and Programs



Adaptive management is a structured, iterative process for decision making when confronted with uncertainty. It emphasizes learning through management where knowledge is incomplete and provides a process for building knowledge through monitoring and science, reducing uncertainty, and improving management over time in a goal-oriented and structured way. Key components of adaptive management are establishing clear and measurable objectives, identifying action goals, and determining management options for best achieving those desired goals.

Decision support tools can be used within the adaptive management framework to identify the uncertainties that are most influential in a decision-making process (management), which in turn can guide the scientific approaches deployed to reduce those uncertainties and allow better informed subsequent decisions. When correctly designed and executed, adaptive management provides a means to develop and evaluate the expected outcomes of proposed management actions, to compare actual outcomes of actions to those expectations, and to make evidence-based adjustments to future actions to improve their effectiveness if warranted. The adaptive management approach can provide a transparent and documented scientific basis for continuing, modifying, or implementing an alternative action.

The Department of Water Resources (DWR), the Department of Fish and Wildlife (CDFW), Bureau of Reclamation (Reclamation), U.S. Fish and Wildlife Service (USFWS), and National Marine Fisheries Service (NMFS) (collectively, “the Implementing Entities”) intend to utilize adaptive management to inform the long-term operations of the State Water Project (SWP) and the Central Valley Project (CVP) and related activities described herein. The Implementing Entities will approach adaptive management in an open, participatory framework. The Implementing Entities will establish the Adaptive Management Steering Committee (AMSC) to coordinate through individual Adaptive Management Teams (AMT) responsible for evaluating each Adaptive Management Action, utilizing decision support tools such as structured decision making.

Working through the collaborative process outlined in this document, the Implementing Entities commit to reach consensus within the AMSC to the maximum extent possible, while still retaining individual agency discretion to make decisions (as appropriate). To that end, the Implementing Entities seek to use the potential flexibility provided by an adaptive management approach in a way that balances gaining knowledge to improve future management decisions while taking actions in the face of uncertainty to improve the operation of the CVP and SWP for their project purposes.

The Adaptive Management Program is described in Attachment A and B of the document. Appendix A to the AMP describes the steps required to implement the adaptive management process and explains how the process links to the operations of the SWP and CVP. Appendix B to the AMP includes a list of actions and programs in the Proposed Action (listed below), and additional details regarding the timeframe of evaluation of each action and the AMT responsible for implementing them:

- Winter-run Chinook Salmon OMR Management
- Spring-run Chinook Salmon OMR Management
- Summer-Fall Habitat Action for Delta Smelt
- Tidal Habitat Restoration Effectiveness for Smelt Fishes
- Tributary Habitat Restoration Effectiveness for Salmonid Fishes
- Shasta Spring Pulse Flow Studies
- Winter-run Chinook Salmon Through Delta Survival Targets
- Longfin Smelt Science Plan Actions

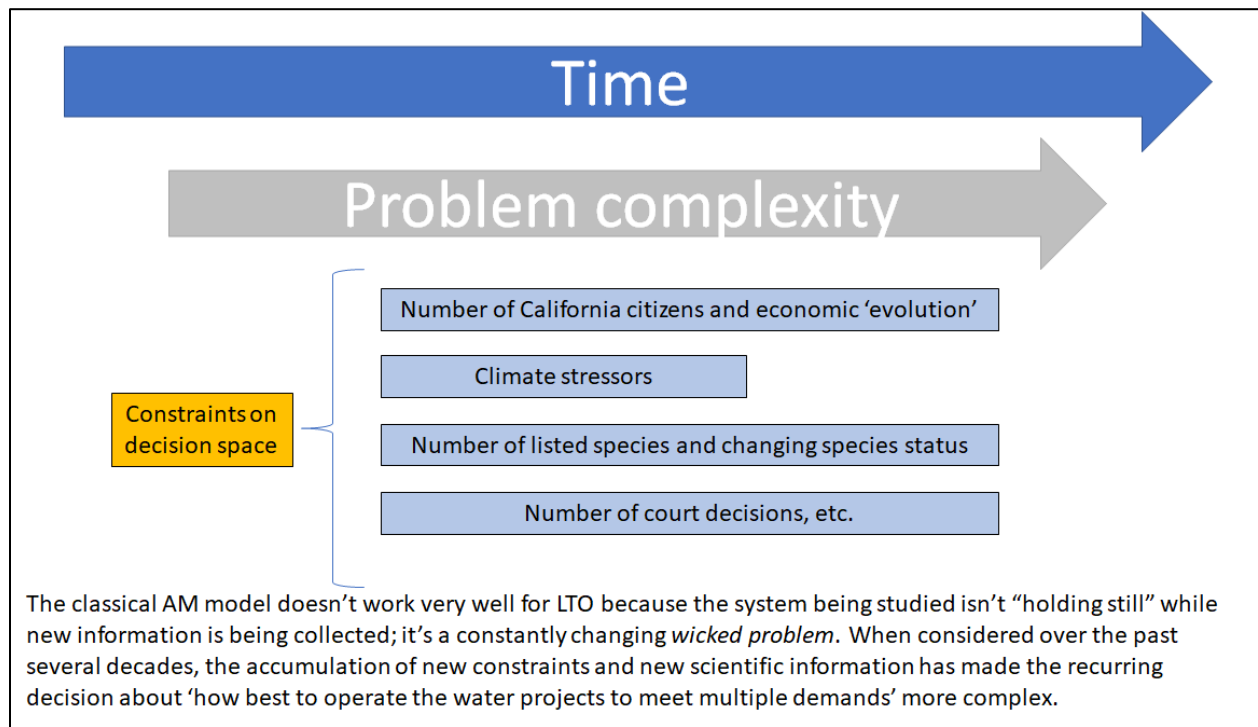
- Delta Smelt Supplementation
- Steelhead JPE
- Alternative Salmonid Loss Estimation Pilot Study
- Shasta Cold Water Pool Management
- Georgiana Slough Migratory Barrier Effectiveness for Salmonid Fishes
- Spring Outflow
- Clear Creek



## Appendix A: Adaptive Management Program Framework and Implementation

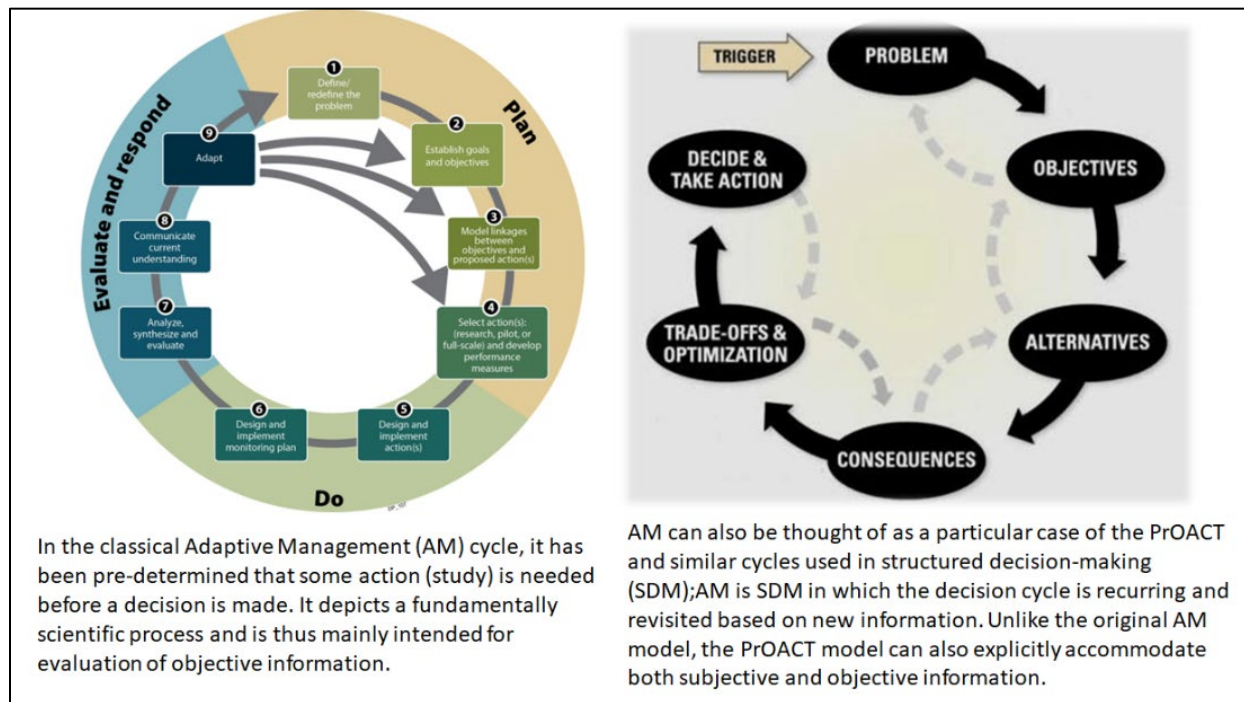
### 1 Overview

In the broadest sense, the set of decisions that collectively answer the question what is the ‘best’ way to operate the Central Valley Project (CVP) and State Water Project (SWP) (hereafter, Projects) is a complex series of recurring decisions based on an ever-changing knowledge base and set of socio-ecological circumstances. The decisions about how best to operate the Projects have increased in complexity over time due to a growing number of constraints on the decision space (Figure A.1). The accumulation of constraints is one ‘certainty’ in ‘wicked problems’, which are problems that morph over time and change in response to intervention (Rittel and Webber 1973; Luoma et al. 2015).



**Figure A.1. Conceptual diagram of the increasing complexity of water operations consultations over time as constraints on decision space have increased.**

The classical adaptive management (AM) model posed by Walters and Hilborn (1978) suggests that applying the scientific method to complex natural resource management problems is an objective way to navigate complex problems, and as such, AM has frequently been suggested as a best management practice for Project operations. However, AM as originally described does not work well in the management of systems experiencing constant change, i.e., systems that are of themselves wicked problems (DeFries and Nagendra 2017). Rather, wicked problems require a more nuanced version of ‘adaptive management’ that is better integrated in decision theory or structured decision-making (SDM; Figure B.2).



**Figure A.2. Comparison of adaptive management as described by DSP (2013; derived from Walters and Hilborn (1978) and the ProACT cycle, a variant of the general approach to structured decision-making.**

The reason that SDM is needed for wicked problems is that they often do not “hold still” long enough to robustly apply scientific methods. Further, wicked problems involve subjective values dimensions that cannot be ignored. The “values” can be things like different agency perspectives on the relative importance of the objectives, or socio-political constraints on decision space (Figure A.1). SDM is a set of tools that has been developed to transparently combine objective and subjective information to make the best decision that can be made with the information available at the time. The repeated use of SDM applied to a wicked problem does not stop the problem from changing over time, but it can allow necessary adaptation as the problem develops new dimensions.

Endangered species consultations on the operation of the Projects involve navigation of an evolving social-ecological system with multiple, often competing objectives. Consultations under both ESA and CESA have been a facet of Project operations since the 1990s and are one of the drivers increasing decision complexity (Figure A.1). A conceptual model of CVP and SWP ESA/CESA consultations as a recurring decision is shown in Figure A.3. The conceptual model is superimposed on the ProACT cycle, which is a predominant SDM framework. This is not done to imply that historical consultations have proceeded using decision analysis techniques, but rather to show how the process still has to move through the steps of a decision-analytic cycle. Here we use the word ‘cycle’ to describe each time a major new consultation has occurred. Several things have acted as drivers of a new consultation cycle; these are shown in yellow. In the broadest sense, the problem and the objectives do not change from cycle to cycle, but they do imply a decision involving multiple competing objectives. The Biological Assessment prepared by the US Bureau of Reclamation (Reclamation) and the incidental take permit (ITP) application prepared by the Department of Water Resources (DWR) constitute a negotiated alternative (collectively, proposed action); these documents and the resulting biological opinions issued

by the US Fish and Wildlife Service and National Marine Fisheries Service (BiOps) and ITP issued by CDFW (LTO ITP) provide the analysis of the alternative; the decision is the new BiOps and LTO ITP.

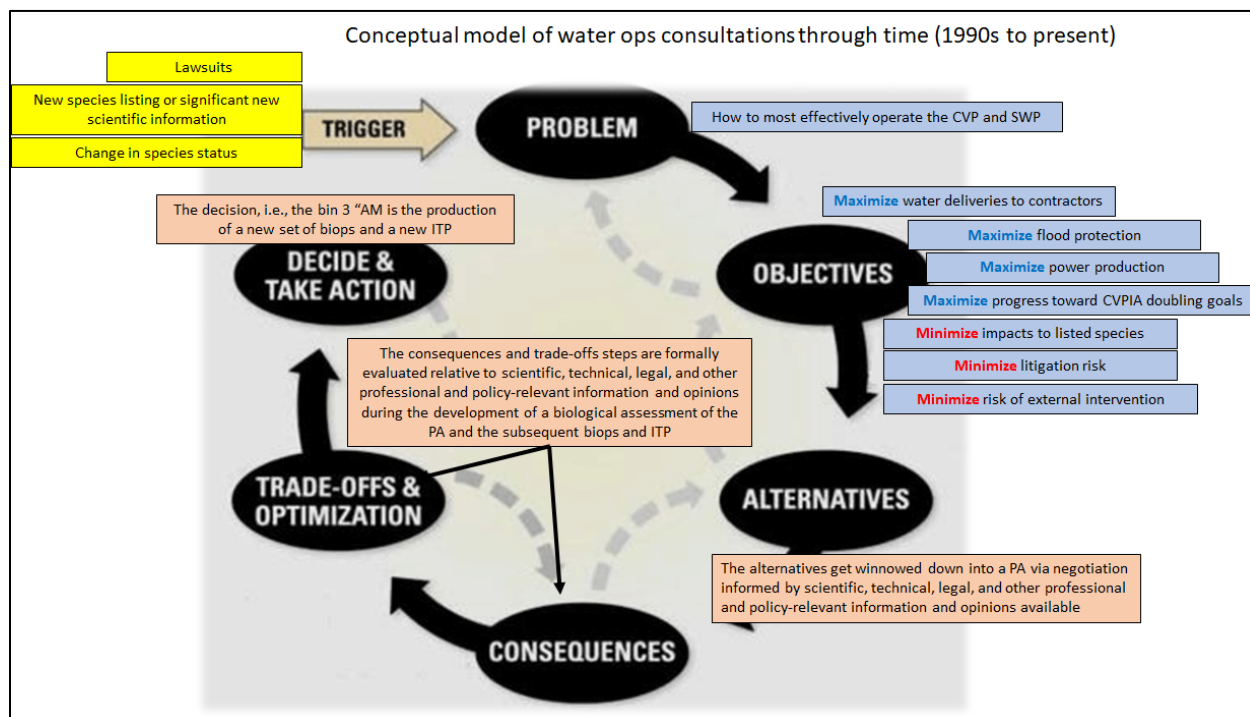
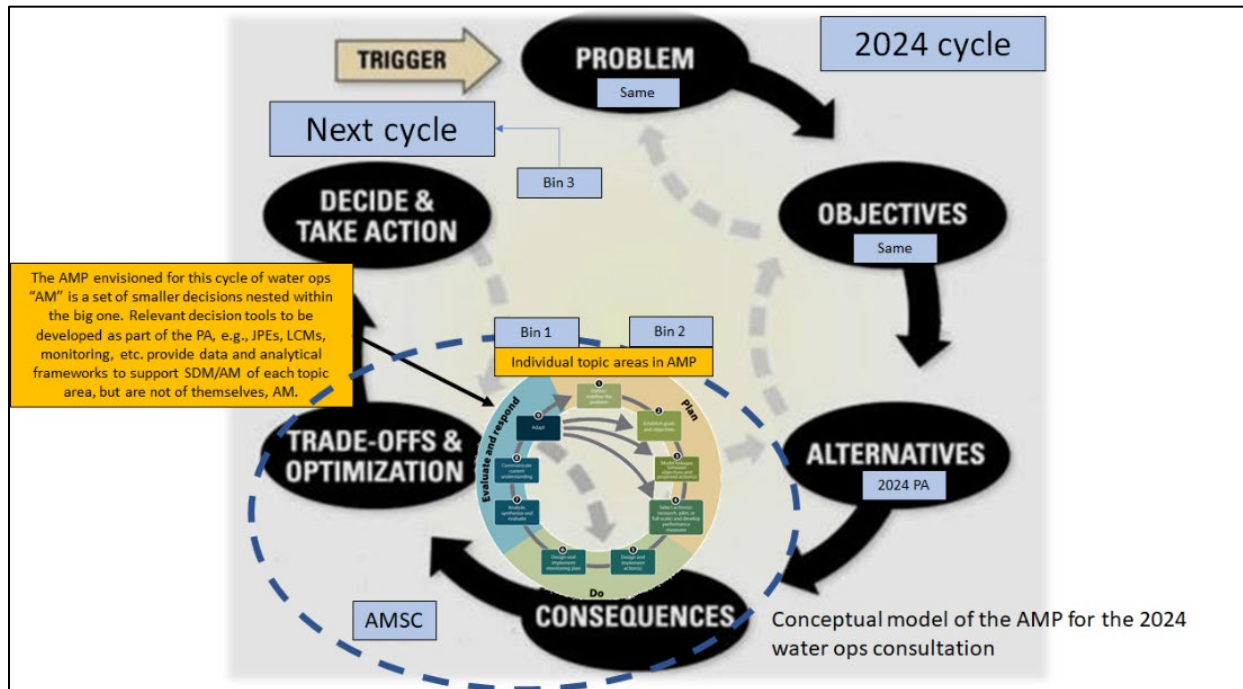


Figure A.3. Conceptual model of ESA/CESA water operations consultations as a recurring decision.



**Figure A.4. Conceptual model of the Adaptive Management Program described in this appendix within the current consultation cycle. Refer to Figure A.3 for additional details.**

The adaptive management framework envisioned for this cycle of water project consultations involves ongoing scientific re-evaluation of multiple topic areas that sit within the 'consequences' and 'trade-offs/optimization' steps of the current PA decision cycle (Figure A.4). The framework or 'Adaptive Management Program' (AMP) will be used for two major purposes. The first is to provide a potential path to modify water operations rules without a full new cycle (e.g. new full reinitiation of consultation or ITP development) if the existing and proposed studies, tools, and monitoring are developed and their use supports a change. The evaluation of changes that could be conducted within the current cycle are called Bin 1 and Bin 2 pathways and they are differentiated depending on their implementation timeline (see Appendix B). Bin 1 pathways may result in modifications within 3 years of issuance, while Bin 2 pathways may result in modifications but are not expected in fewer than 3 years of issuance. Bin 3 pathways are longer-term, and considerations are not expected to be complete within a single consultation cycle because they involve either or both long data evaluation timelines or substantial changes to authorized levels of listed species take. Topics in the Bin 3 category are included because they require continued data collection and analysis to inform their evaluation in the next consultation cycle.

## 2 AMP Framework and Implementation

The AMP will be used to evaluate and adapt the operations, actions, and related activities identified in Section 3a of the AMP and Appendix B. This evaluation will include addressing areas of known uncertainty, improving scientific understanding by filling data gaps, and weighing whether new information should be incorporated into the relevant ESA and CESA authorizations. To do so, an Adaptive Management Steering Committee (AMSC) will oversee efforts to monitor and evaluate existing

operations and related activities through existing technical teams (to the maximum extent practicable), make decisions at that level, and suggest to the Directors whether modifications or alternative actions may be warranted. The AMSC will utilize a structured decision-making process to assess the relative benefits or impacts of proposed operational changes and activities for listed species compared to what is being implemented at the time. Any proposed changes to project operations or related activities through adaptive management should provide equivalent or increased conservation benefits to the listed species.

Adaptive management typically utilizes a multi-step process. The following adaptive management framework includes elements from the Delta Plan (DSP 2013) and recommendations from the Delta Independent Science Board (2016). This framework is made up of three broad phases that are part of any scientific endeavor: (1) Plan; (2) Do; (3) Evaluate and respond. Within the phases are nine steps as represented in Figure A.2.

## **2.1 Phase 1: Plan**

The first phase of an adaptive management process is to plan. The suite of tools to be developed and general adaptive management topics are described in Appendix B. As approved by the AMSC, Adaptive Management Teams (AMTs) will develop their own plan for each activity identified in Appendix B. Annual Presentations prepared by each AMT, as described in Section 2.3.1, will include the compilation of the individual actions covered under that AMT.

The planning process begins by clearly defining the problem or question to be addressed (*Step 1*), identifying goals and objectives (*Step 2*), and identifying the model linkages between the goals, objectives, and proposed actions (*Step 3*). Models can be conceptual, statistical, physical, decision support, or simulation. The AMSC and its facilitator(s) will oversee steps 1 and 2, then the AMTs will take a lead role in step 3.

The proposed action, LTO ITP, and BiOps outline the problems to be addressed, the goals and objectives, and in some cases describe the conceptual linkage between the actions and the objectives. However, these steps should be formally evaluated by the AMSC and its facilitator(s) once the group is established. A list of the proposed tools to be developed as part of the AMP and the general topic areas addressed by this AMP are the subject of Appendix B; more detail about the goals, objectives, and rationale is in the text below and in the associated effects analyses of the proposed action, BiOps, and LTO ITP.

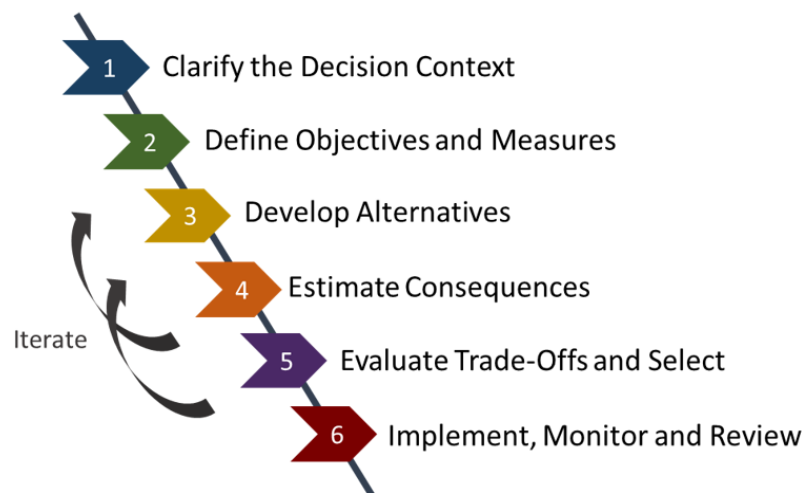
The first part of *Step 4* in the Adaptive Management cycle is to decide whether a change in an existing action(s) will be recommended based on the modeling results. The proposed action, BiOps, and LTO ITP are the starting point for AM actions. Future assessments may support keeping an action as is, or modifying it in some way. A key part of the AMP (coordinated through the AMSC) will be the development of performance metrics (response variables for each tool, study, monitoring program etc. associated with each adaptive management action) to guide the program (*Step 4*). Performance metrics would be measured utilizing a suite of activities including monitoring (long-term surveys; new measurements), experimental methods (e.g. fish enclosures), and modeling (e.g. 3-D modeling, life cycle modeling). Each operation and activity, and each adaptive management change must be accompanied

by a set of criteria that the implementing entities can use to determine whether the action is having the anticipated effects.

### 2.1.1 Structured Decision Making

The AMSC, and associated AMTs, will utilize decision-analytic tools or a structured decision-making process to define relevant uncertainty, develop action alternatives, estimate consequences and evaluate trade-offs and preferences when making choices between alternative courses of action (e.g., *Steps 1- 4* above). Structured decision-making processes can include consideration of value-based objectives and priorities as well as science-based objectives. These processes also document the basis for decisions in a transparent, organized and repeatable framework. Below provides more detailed information on examples of structured decision-making processes currently being used by technical teams and CSAMP.

Structured decision making (SDM) is a collection of practices rooted in decision theory that provides a rational, organized framework for evaluating alternatives against consistent and explicit quantifiable objectives, encourages clear articulation of anticipated effects, and transparent consideration of trade-offs and uncertainty (Figure A.5). SDM can take many forms, depending on which of the six typical steps receive greater relative emphasis. SDM can be used to help build consensus if the SDM process includes deliberation about trade-offs and this deliberation informs the development of new alternatives that better address the range of interests represented.



**Figure A.5. Six steps of a typical SDM process (Gregory et. al. 2012).**

1. Clarify the Context – The first step is to clearly establish the planning and decision-making context through answering questions such as: What decision needs to be made and who will make it? Who else needs to be involved or consulted? What is the scope and bounds of the process and the decision (e.g., what’s in and what’s out)? The initial structuring step lays out a road map for both the deliberations and the analysis that will follow.
2. Define Objectives and Measures – Objectives define the interests and values about the decision at hand. Measures define exactly what is meant by an objective and are used to estimate and report the predicted consequences of different alternatives for making a choice.

3. Develop Alternatives – Alternatives are the various actions or strategies that are under consideration. This step involves iteratively developing, comparing, and refining alternatives in the search for one(s) that offers the best balance across objectives.
4. Estimate Consequences – Consequences of the alternatives against each objective are estimated or characterized, including identifying uncertainties. Results are typically presented in a consequence table, which is a concise summary matrix illustrating the performance of each alternative with respect to each objective, as reported by the measures.
5. Evaluate Trade-offs and Preferences – Explicit choices must be made for preferred alternatives, based gains and losses for each objective. Each decision-maker is asked to make choices based on their own values and their understanding about the values of others. A variety of methods from the decision sciences are used to facilitate constructive deliberations about values and trade-offs and to ensure that tradeoff judgments are informed, thoughtful and transparent.
6. Decide, Monitor, and Learn – The focus at this stage of the process is on how to implement the decision in a way that reduces uncertainty, improves the quality of information for future decisions, and provides opportunities to revise and adapt based on what is learned. The SDM process should end with a formal transition into adaptive management and monitoring, and produce recommendations for the governance and oversight of monitoring programs, as well as triggers and mechanisms for review and amendment.

### *Example Applications of SDM*

SDM is being utilized by the Delta Coordination Group (DCG) for the Summer-Fall Action. During 2022, Reclamation and DWR developed an SDM approach for informing decisions regarding the Delta Smelt summer-fall habitat actions. This modeling approach utilized existing and new modeling, data, and expert opinion on the impacts of the summer-fall habitat actions to provide information on the physical and biological consequences associated with implementing the various actions compared to a baseline of these outcomes without the summer-fall habitat actions. Through this SDM process, Reclamation and DWR also developed a multiyear monitoring and science plan that includes additional science that might be helpful to further investigate the spatial and temporal distribution of abiotic and biotic factors known to influence Delta Smelt habitat, including its food supply and access to those prey, Delta Smelt abundance, survival, and viability during the summer-fall time period.

## **2.2 Phase 2: Do**

The 'Do' phase of adaptive management includes two steps that occur in parallel. The design and implementation of studies, monitoring, or modeling of actions as they are implemented with the explicit goal of improving the understanding of how strongly the action is affecting the vital rate or performance metric (*Step 5 and 6*).

Monitoring plans associated with each relevant operational or management action will include data management plans that describe the process for organizing and clearly documenting observations, including how data are collected; the methods, quality assurance, and calculations used; the temporal and spatial scales of the variables; and accurate site locations and characteristics. Monitoring must provide the data necessary to determine whether the performance metrics are responding to the management action(s). Monitoring plans may also include targeted research to better understand



observed results and further resolve key uncertainties. Results of monitoring and research must be clearly communicated so that the information gathered, and current understanding, is broadly understood.

## **2.2.1 Work Plan and Budget**

### **2.2.1.1 AMSC Annual Work Plan and Budget**

The planning and doing outlined in phases 1 and 2 will be described in an Annual Work Plan and Annual Budget prepared by the AMSC for the upcoming year. The Annual Work Plan will describe the proposed activities of the AMP. This plan will include 1) monitoring and research that are part of the proposed action or are otherwise required by the SWP ITP, BiOps, 2) needed facilitation services to coordinate and support implementation of the AMP, and 3) any additional monitoring and research that is planned, including any relevant monitoring and research that is part of the IEP annual work plan, as approved by the AMSC. The Annual Budget will set out projected expenditures and identify the sources of funding for those expenditures. If the Annual Work Plan describes activities that span multiple years, the budget for those activities will cover the entire period they will be implemented. The AMSC will ensure the Annual Budget accurately sets forth and makes adequate provision for the implementation of the BiOps and LTO ITP terms under which the CVP and SWP operate.

At a minimum, the Annual Work Plan and Annual Budget will contain the following information:

- A. A description of the planned actions under the AMP including their goals, objectives, and performance metrics.
- B. A description of the planned monitoring activities and the entities that will implement those activities.
- C. A description of the anticipated research to be undertaken and the entities that will conduct the studies.
- D. A budget reflecting the costs of implementing the planned actions.
- E. A description of the sources of funds that will be used to support the budget.

The AMSC will develop and approve the Annual Work Plan and Annual Budget with support from independent facilitators. The first Annual Work Plan and Annual Budget will be completed within the first year the AMSC begins convening, and annually thereafter. Upon approval, the Annual Work Plan will be posted on a public website.

### **2.2.1.2 Individual AMT Work Plans**

Within twelve months of their initial meeting, each AMT will develop a work plan that describes the timeline needed to gather and/or synthesize the needed information for its purpose, all reasonable hypotheses addressed for that action, and the timeline for incorporating information into individual SDM processes. The AMSC will review the work plans for each AMT, provide direction or edits as needed, and approve the final plan when they are satisfied with it. Thereafter, each AMT will provide a presentation to the AMSC at least annually to document progress toward addressing the relevant



hypotheses (see Section 2.3.1 below). The work of individual AMTs and associated annual presentations can cease if a team has achieved what it was tasked to do.

## **2.3 Phase 3: Evaluate and Respond**

The ‘evaluate and respond’ phase of adaptive management includes three key steps. Analysis, synthesis, and evaluation of the action(s) (*Step 7*) are critical for improving current understanding. Analysis and synthesis will incorporate information on how conditions have changed, expectedly and unexpectedly, as a result of implementing the action(s). Because measurable improvement in conditions for covered species might not occur on short timescales, evaluations will also examine whether actions taken prevented deterioration of conditions that may have occurred if no actions were taken or if the action is resulting in species responses trending in the desired direction. The evaluation will examine whether performance metrics indicate that one or more of the objectives have been met as a result of the implemented action(s). If an objective is not met, the potential reasons why it was not met will be identified. As each year’s data become available, recognizing that specific actions may not be required in that particular year or sequence of years, analyses should assess whether the probability of the desired outcome has changed and, if so, how this affects decisions about the action. Within the AMP it is anticipated that the AMTs will be primarily responsible for the “evaluation” step, while the AMSC will be primarily responsible for the “response” step.

Communication (*Step 8*) of current understanding gained through analysis, synthesis, and evaluation of implemented actions and monitoring will occur through a variety of channels including: 1) regular back and forth communication between the AMSC and AMTs via the floating facilitators, and when relevant, between the AMSC and the Directors, 2) annual presentations from each AMT to the AMSC, and 3) with interested parties external to the AMP by posting meeting notes on websites, giving presentations, preparing white paper reports, ensuring transparency of independent peer review materials and recommendations, and publication in peer reviewed scientific journals.

### **2.3.1 Annual Presentations by AMTs**

During each implementation year, each AMT will provide at least one presentation (Annual Presentation) to the AMSC. The Annual Presentation will provide an overview of the AMT activities carried out during the previous implementation year.

Each AMT Annual Presentation will include, among other things, the following types of information:

1. An assessment of the implementation and efficacy of studies, monitoring, and modeling of actions during the prior reporting period, including new information gained.
2. Identification of tasks that have not been implemented on schedule and an explanation for the deviation from schedule. For actions that are behind schedule, a suggested schedule or process for completing them will also be included.
3. Adaptive management changes to actions resulting from the SDM process and proposed by an AMT for consideration by the AMSC, including the scientific rationale for the action.

### 2.3.2 Adapt

When it is informed and equipped with new results and better understanding, the AMSC will re-examine the actions it has been evaluating (e.g., see Appendix B). It is possible that revisions may be suggested when current information suggests doing so (*Step 9*). Possible adaptations could include anything from staying the course, to making a minor modification that can be made without formal changes to the existing LTO ITP and BiOps, to considering reinitiation or an LTO ITP amendment as mechanisms to enable a new management action or paradigm to be implemented.

Decisions to adapt are anticipated to be needed at various time intervals depending on the action or environmental conditions which may delay implementation of certain actions in any particular year or series of years. Appendix B contains a description of the planned timeframe for each action that estimates when decisions regarding AMP actions may be ready to evaluate for potential changes. In general, one year's results, however anomalous, are seldom enough to demonstrate that an action should be subject to change as a part of the adaptive management process. Furthermore, when the analysis, synthesis, and evaluation of information learned from implementing an action over time indicates that no benefit accrues, resources should no longer be spent on that action no matter how popular the action might be.

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recommendations from the Delta Independent Science Board (2016)

## **Appendix B: Adaptive Management Actions and Programs**

### **A. Timeframe of implementation and evaluation of individual Adaptive Management Actions**

#### Bin 1: Evaluation occurs annually - biannually by technical teams.

Actions for which agencies evaluate recent data to determine how to proceed before the action is conducted again. Refinement of the approach is expected to occur regularly based on prior data and targeted research. There is an expectation that Bin 1 Adaptive Management Actions or Programs (collectively AMAs) have defined objectives and performance metrics with associated monitoring occurring during the implementation of the action. Consultation and incidental take permit (ITP) amendment inquiries will be conducted, but reinitiation of consultation or an ITP amendment is not expected to be required to refine the approach to implementation after each evaluation.

Bin 1 AMAs will require components of a Structured Decision Making (SDM) process to maintain an organized approach for agency collaboration and to ensure transparency in determinations. However, Bin 1 AMAs will be managed adaptively based on present conditions, such as hydrology or annual species status, and will require quick decision-making relative to full SDM. It is not anticipated that Bin 1 AMAs will require long-term action objectives or performance measures to be determined prior to implementation nor will they require identification or evaluation of long-term alternatives. Decision support tools such as utilization of an independent facilitator and Adaptive Management Technical Team (AMT) evaluation of near-term implementation alternatives and tradeoffs will guide the Adaptive Management Steering Committee (AMSC) annual or biannual implementation action decision.

#### Bin 2: Evaluation and potential refinement occurs within the timeframe of the Biological Opinions and ITP.

Actions for which agencies evaluate data from multiple years of implementation. There is an expectation that coordinated science and monitoring is occurring during implementation of these actions. The evaluation may trigger re-initiation of consultation or an ITP amendment for the actions, or not, depending on scope and scale of recommended change.

Bin 2 will apply to those AMAs that are iterated or linked over time whereby actions taken early on may result in learning that improves management within the next 3-8 years. It is anticipated that Bin 2 AMAs have existing AMTs and/or have some understanding of action objectives and performance measures and have already undergone some evaluation of alternatives and trade-offs. However, it is acknowledged that Bin 2 AMAs may need refinement once implementation has occurred to minimize uncertainties associated with known data gaps. Independent facilitators and AMTs will utilize decision support tools to assess monitoring data obtained, evaluate updated knowledge base against action objectives and performance measures, develop and evaluate new alternatives if warranted, and present action implementation trade-offs to the AMSC for consideration.

#### Bin 3: Evaluation and potential refinement occurs in a longer timeframe on the order of 10 – 15 years and may inform the next section 7 consultation and development of a new ITP.

Actions for which agencies evaluate data over longer periods of implementation, on the order of 10-15 years. There is no expectation of an ongoing evaluation to occur during the time period of the ITP or Biological Opinions (BiOps) for long-term operations of the State Water Project (SWP) and Central Valley Project (CVP). However, there is an expectation that science and monitoring is occurring during the timeframe of the ITP and BiOps to support evaluation and refinement during the development of a new ITP and BiOps.

Bin 3 AMAs may have complex objectives, unknown alternatives, significant uncertainty in outcomes, and or large data gaps. These AMAs require a full SDM process whereby qualified and independent facilitators will guide the AMSC and associated AMTs and utilize decision-analytic tools or a structured decision-making process to define relevant uncertainty, develop action alternatives, estimate expected consequences of the alternatives, and evaluate trade-offs and preferences when making choices between alternative courses of action. It is anticipated that Bin 3 AMAs will require substantial time to plan, evaluate, and implement to facilitate learning opportunities for future action management.

Some AMAs may have components that fall in different Bins. For example, some AMAs in Bins 1 and 2 may yield the development of a decision support tool for use in an AMA in Bin 3 during future consultation. Therefore, it is important all AMAs use components of structured decision-making and apply a consistent and coordinated approach to monitoring performance metrics identified so that results from various AMAs can be comprehensively evaluated when related.

## **B. Adaptive Management Actions**

### **1) Winter-run Old and Middle River Flows Management**

- a) *Brief Description:* Onramping and offramping Old and Middle River Flows (OMR) management for winter-run Chinook Salmon is currently informed by the Salmon Monitoring Team (SaMT). The SaMT is a technical advisory team made up of technical staff from the US Bureau of Reclamation (Reclamation), the Department of Water Resources (DWR), the National Marine Fisheries Service (NMFS), the California Department of Fish and Wildlife (CDFW), and the State Water Resources Control Board (SWRCB) that synthesizes recent field monitoring data and historical long-term monitoring data, along with expert opinion to inform the Water Operation Management Team (WOMT). Specifically, the SaMT will evaluate real-time data, including the Salmonid Distribution Table, and the weekly loss threshold table, which classifies the winter-run Chinook salmon population as the percent in the Delta. This information is used to implement the winter-run weekly loss thresholds and to minimize the effects of water operations on winter-run Chinook Salmon.

Proposed Action (PA) Sections 3.7.4.1 and 3.7.4.5.3 describe the use of winter-run Chinook Salmon weekly and annual loss thresholds to trigger actions aimed to minimize entrainment and loss of juvenile out-migrants. However, it is anticipated that the criteria associated with the Winter-Run Chinook Salmon Machine Learning Model will need to be reassessed using the genetics-based run-identification loss dataset currently available (Section 3.7.4.1) and a larger effort to develop a real-time assessment tool for the SaMT to recommend OMR management actions to minimize entrainment into the south Delta well before salvage events occur.

### **b) Assigned AM Bin: Bin 2**

- i. The development of a model explicitly predicting daily winter-run Chinook Salmon migration timing using historical long-term monitoring data and environmental variables is necessary to reduce uncertainty in the weekly Salmonid Distribution Table and the estimated percent of winter-run present in the Delta. This model needs to be made readily available as a transparent prediction tool that leverages recent biotic and abiotic

data to predict current and near-future migration timing and provided to the SaMT to inform their discussions prior to WOMT. This effort should be completed and implemented no later than 2026.

- ii. The explicit rate of winter-run Chinook Salmon juvenile out-migrant entrainment into the South Delta, the fate of individuals entrained due to OMR management, and the effects of the State Water Project (SWP) and Central Valley Project (CVP) south Delta water operations is a topic area in OMR management that has been studied in the past and merits further investigation. Loss associated with salvage events at the SWP and CVP facilities is currently used to trigger OMR management actions, but these detections in salvage occur days or even weeks after individuals were initially entrained into the South Delta and account for only a proportion of entrained individuals lost to the population. A new modeling framework is necessary for more effective real-time OMR management actions to be used to minimize winter-run Chinook Salmon entrainment into the South Delta. Specifically, the modeling framework should integrate a winter-run Chinook Salmon distribution model (e.g., Bin 2 item *i* above) with particle tracking model outcomes (potentially the individual-based ECO-PTM model developed by USGS and DWR) to estimate the proportion of the out-migrant population vulnerable to entrainment into the South Delta per day, the probability of entrainment into the South Delta given current hydrologic conditions, and the travel time to the water export facilities. Such a modeling framework should be converted into a real-time assessment tool for the SaMT to recommend OMR management actions to minimize entrainment into the South Delta well before salvage events occur.

- c) *Adaptive Management Technical Team:* The existing Winter-run Chinook Machine Learning Interagency Team will lead analysis and development of all winter-run Chinook salmon OMR management sub-actions in coordination with other interested agencies and stakeholders. Specific work pertaining to this action should be conducted by the current Winter-run Chinook Machine Learning Interagency Team. The team has welcomed input from a diverse array of agency and stakeholder representatives since its inception to provide critical guidance throughout model development and interpretation. This role would continue with the addition of SDM processes as needed.

- d) *Tools:* Winter-Run Chinook Salmon Machine Learning Model

## 2) Spring-run OMR Management

- 1) *Brief description:* Spring-run OMR Management, Science, and Monitoring: Section 3.9.2 of the Proposed Action describes an approach to minimize impacts of SWP and CVP operations in the South Delta on Sacramento River origin spring-run Chinook Salmon that relies on detection of hatchery-origin Chinook Salmon (spring-, fall-, and late fall-run) in salvage at the SWP and CVP facilities as surrogates for entrainment of natural-origin spring-run in the Central and South Delta. While implementing the Spring-run Hatchery Surrogate measure a parallel effort is ongoing to develop an annual Spring-run Juvenile Production Estimate (JPE) (PA Section 3.9.2). PA Section 3.9.2 describes the timeline for initial program development (interim monitoring, special studies, and development of the JPE database and model) and the intention to utilize independent peer reviews. The Spring-run JPE Core Team is also responsible for evaluating the

existing Spring-run Hatchery Surrogate measure (PA Section XX). Recommendations from these reviews will inform considerations for future reinitiation of consultation and ITP amendments with NMFS and CDFW. A subsequent independent peer review will be considered to continue to evaluate monitoring and special study data available through implementation of the Spring-run JPE as well as the initial Spring-run Lifecycle Model.

2) *Assigned AM Bin: Bin 2*

Development of an interim Spring-run JPE is ongoing and independent peer reviews of the Spring-run JPE program will be considered in the near-term. Additionally, the Spring-run JPE Core Team is tasked with reviewing the Spring-run Hatchery Surrogate measure (see Special Studies Section) in early 2025.

3) *Adaptive Management Technical Team:* The Spring-run JPE Core Team is responsible for implementing the Spring-run JPE program, and collaborating with the AMSC to charter independent peer review panels when initiated, and evaluating the Spring-run Hatchery Surrogate measure. After these reviews DWR and Reclamation will continue to convene the Spring-run JPE Core Team and subteams in coordination with CDFW, NMFS, and the US Fish and Wildlife Service (USFWS), and support implementation of the Spring-run JPE Science Plan, the Spring-run JPE Monitoring Plan, the Spring-run JPE Race ID Program Development Plan, the Spring-run JPE Data Management Strategy, and updates to those plans.

4) *Tools:* The Spring-run JPE and the Spring-run Lifecycle Model are key tools needed to reduce uncertainty regarding the timing and abundance of young-of-year and yearling life stages entering the Delta from the Sacramento River and assess impacts of a variety of stressors on spring-run Chinook Salmon.

3) **Larval and Juvenile Delta Smelt OMR Management**

- a. *Brief Description:* The Larval and Juvenile Delta Smelt Protection Action in Chapter 3 of the ITP Application describes an approach to minimize the impacts of the SWP and CVP operations in the south Delta on larval and juvenile Delta Smelt that relies on the collection of Secchi depth data by field surveys. While this metric of water clarity is based upon the best available science, it is anticipated that an evaluation of turbidity data from telemetered water quality stations across the south and central Delta could yield a trigger that would be more responsive to real-time conditions and would eliminate the need for field crews to conduct additional Secchi depth surveys when data is needed more frequently than biweekly. The turbidity-based trigger level will be as close as is feasible to matching the existing Secchi depth trigger of 1 meter, including using multiple turbidity stations to match the geographic scope of the 12 stations used for the Secchi depth trigger.

- b. *Assigned Adaptive Management Bin: Bin 2*

Development of a turbidity-based trigger to replace the Secchi depth trigger will be considered in the near term.

- c. *Adaptive Management Technical Team:* A team of technical staff from CDFW, USFWS, DWR, and Reclamation will convene to discuss analytical approaches to developing a turbidity-based trigger that provides the same level of minimization as the Secchi depth trigger.
- d. *Tools:* The Delta Smelt Life Cycle Model informed the development of the Secchi depth trigger and may be used to evaluate a turbidity-based trigger.

#### 4) Larval and Juvenile Longfin Smelt OMR Management

- a. *Brief Description:* The Larval and Juvenile Longfin Smelt Protection Action in Chapter 3 of the ITP Application describes an approach to minimize the impacts of the SWP and CVP operations in the south Delta on larval and juvenile Longfin Smelt that relies on paired real-time hydrologic and monitoring triggers. While these OMR management triggers are designed to provide entrainment minimization for larval and juvenile Longfin Smelt, the inclusion of new monitoring data and quantitative tools could provide further evaluation of environmental and monitoring data that could potentially yield an action that would be more responsive to real-time conditions and be more effective at minimizing entrainment.

- b. *Assigned Adaptive Management Bin:* **Bin 2**

Development of a new OMR management trigger will be considered in the near term.

- c. *Adaptive Management Technical Team:* A team of technical staff from CDFW, USFWS, DWR, and Reclamation will convene to discuss analytical approaches to analyzing water quality, hydrologic, and distribution data to inform the creation of a new trigger framework initiating OMR management.
- d. *Tools:* Available water quality, hydrologic, and fish monitoring datasets will be analyzed, as well as relevant flow and particle tracking models, as appropriate. New Longfin Smelt life cycle model tools will be utilized, as available.

#### 5) Summer-Fall Habitat Action for Delta Smelt

To study habitat effects on Delta Smelt survival and evaluate effectiveness of mitigation actions in improving habitat and food availability, DWR and Reclamation have proposed the Summer Fall-Habitat Action (SFHA). The SFHA includes, but is not limited to, the actions described below. The Delta Coordination Group (DCG) will a) develop a multi-year science and monitoring plan for the Summer-Fall Habitat Action including focused studies and b) conduct reviews of action plans and seasonal action results to inform future summer-fall actions or improvements to science and monitoring to inform uncertainties in evaluation. The DCG will utilize project-specific and technical teams for coordination on the adaptive management framework as described in the AMP. Specific adaptive management plans for the Summer-Fall Habitat Actions will be reviewed by the AMT (where applicable), and coordination with the AMT may differ for actions based on assignment of AM bins.

Fall X2

- a) *Brief Description:* To increase the amount of low-salinity zone habitat for Delta Smelt in wet and above normal hydrologic year types, DWR and Reclamation will maintain a 30-day average X2  $\leq$  80 km from September 1 through October 31.

In 2012, USFWS initiated the development of several life cycle modeling efforts to better understand the factors that affect Delta Smelt population growth rates. These efforts led to two published life cycle models. The results of these life cycle model variations support the hypothesis that Delta outflow in the summer has a stronger effect on Delta Smelt survival than Delta outflow in the fall. The best information currently available suggests that high summer flows help align habitat needs of Delta Smelt in the Suisun Marsh and Suisun Bay region, including turbidity and water temperature, while also increasing food subsidies, supporting Delta Smelt growth and survival. The same outcome is expected if flows are high enough in the fall, but the response of Delta Smelt is expected to be less, because ambient air temperatures cool into more appropriate ranges and the prey subsidy is reduced as prey populations seasonally senesce. These changes in fall habitat conditions are expected to occur part way through the September – November time period considered in the Delta Smelt lifecycle models. This newer information merits a robust synthesis effort to bring together available modeling tools, including the Delta Smelt lifecycle model, and monitoring data.

**b) Assigned AM Bin: Bin 1**

While science and monitoring in the summer and fall will occur each year (during implementation and non-implementation years), evaluation of the Fall X2 action will occur on a shorter timeframe, after multiple years of implementation since its inception in 2008. The AMT will work with described technical teams to develop a comprehensive synthesis of summer-fall habitat conditions to inform the development of an adaptive management plan. The AMT may recommend an independent workshop or review of the Fall X2 action following sufficient a robust evaluation and synthesis effort. The AMSC may also request that the AMT develop alternative X2 actions to implement during the summer-fall time period that provide equal or better benefits to Delta Smelt as the Fall X2 action originally developed in 2008.

- c) *Adaptive Management Technical Team:* The Delta Coordination Group (DCG), in collaboration with DCG technical teams (Science and Monitoring Workgroup and Hydrology and Operations Workgroup) will be responsible for developing adaptive management plans specific to the Fall X2 including describing AM objectives, hypotheses, and performance metrics for evaluation.

**Suisun Marsh Salinity Control Gate**

- a) *Brief Description:* To improve Delta Smelt habitat in Suisun Marsh and Grizzly Bay during summer-fall, Suisun Marsh Salinity Control Gates (SMSCG) will be operated as described in PA Section XX to maximize the number of days at Belden's Landing where the 3-day average of salinity is equal or less than 4 psu during Above Normal and Below Normal years and 6 psu in Dry years with the goal of maximizing the amount of suitable habitat available to Delta Smelt in Suisun Marsh and Grizzly Bay.

**b) Assigned AM Bin: Bin 3**

While science and monitoring will occur each year (during implementation and non-implementation years), evaluation of SMSCG operation efficacy will occur on a longer timeframe



after multiple years of implementation across a range of hydrologic conditions, within 10-15 years. The AMT will work with described technical teams to review monitoring plans and focused research as needed within the larger SDM process. They may recommend an independent workshop or review of the action following sufficient implementation and monitoring for a robust evaluation.

- c) *Adaptive Management Technical Team:* The Delta Coordination Group (DCG), in collaboration with DCG technical teams (Science and Monitoring Workgroup and Hydrology and Operations Workgroup) will be responsible for developing adaptive management plans specific to the SMSCG action including describing AM objectives, hypotheses, and performance metrics for evaluation.

#### Experimental Food Enhancement Actions

- a) *Brief Description:* Each year food subsidy measures to augment the SFHA will be considered. Food actions may include a number of implementation alternatives (e.g., water source, timing, intensity, etc.) which have been evaluated by the Delta Coordination Group (DCG) to inform future implementation plans. Food subsidy actions are hypothesized to increase localized prey availability for Delta Smelt in the North Delta and Suisun Marsh, resulting in opportunities for higher growth and survival of juvenile and sub-adult life stages. Food actions include North Delta Food Subsidy Action, Managed Wetland reoperation in Suisun Marsh, and Sacramento Deepwater Ship Channel Food Subsidy Action.
- b) *Assigned AM Bin: **Bin 2***  
Following multiple years of implementation, data collection, and results, the DCG may suggest convening an independent workshop or review panel within the timeframe of the consultation and ITP. Results will be included in seasonal reporting and adaptive management reviews to evaluate the science and monitoring, efficacy of actions, hypothetical alternative strategies and/or actions, and potential inclusion of food subsidy actions as potential permanent action elements of the SFHA, or if appropriate, termination of actions deemed ineffective by the AMSC.
- c) *Adaptive Management Technical Team:* Food subsidy action plans, monitoring plans, focused research and reports will be developed by the DCG, in collaboration with DCG technical teams (Science and Monitoring Workgroup and Hydrology and Operations Workgroup). Together, teams will be responsible for developing adaptive management plans specific to food actions including describing objectives, hypotheses, performance metrics for evaluation, and timeline.

#### 6) Tidal Habitat Restoration Effectiveness for Smelt Fishes

- a) *Brief Description:* DWR and Reclamation propose to carry forward habitat restoration acre targets identified from the 2008 and 2019 FWS Biological Opinions (8,000 acres) and the 2020 ITP (396.3 acres) to complete mitigation requirements for Delta Smelt and Longfin Smelt (per the 2020 ITP). DWR and Reclamation propose to meet the total acreage requirement (8,396.3 acres) through completion of habitat restoration projects. The projects identified in the PA are

in different phases of completion: 1) constructed (3,584 acres), 2), in construction (3,490 acres) or 3) planned (1,662 acres). All identified restoration projects are located in the northern arc of the upper estuary and are designed to enhance food production and rearing habitat for Delta Smelt and Longfin Smelt (per the 2020 ITP). DWR and Reclamation will complete its 8,396.3 acre restoration requirements by 2026.

*b) Assigned AM Bin: Bins 1 and 3*

**Bin 1:** Some actions involving treatment or clearing of invasive vegetation, use or presence of livestock, or other land management actions will be evaluated on an annual or biannual basis. These evaluations may inform revisions to site-specific Long-term Management Plans, which are required of DWR and Reclamation as part of the mitigation.

**Bin 3:** To understand the effectiveness of tidal wetland restoration for providing a food subsidy for pelagic areas to benefit Delta Smelt as well as juvenile rearing habitat for Chinook Salmon, monitoring occurring as part of the DWR-CDFW Fish Restoration Program will continue throughout the permitted period. Monitoring will allow assessment of the biotic and abiotic capacity of restored tidal wetlands to support listed fish species, the opportunity for fish to access wetland-derived resources, and actual use of those resources. Reference wetlands will continue to be monitored concurrently to account for dynamic regional conditions that also impact restored habitats. Following multiple years of monitoring and targeted studies to address specific uncertainties regarding effectiveness of tidal wetland restoration, such as the ability of restoration locations to provide food resources to Delta Smelt at critical times of the year, observations of Delta Smelt or juvenile Chinook Salmon occupying restoration sites or utilizing restored resources, and retrospective evaluation of the tidal marsh restoration site quality and or effectiveness relative to targets identified, the AMSC will provide guidance to the AMT in prioritizing data and information for synthesis work. Syntheses for understanding efficacy of tidal wetland restoration may regard food subsidy, effects of restoration on water quality, prevalence of invasive aquatic vegetation, utilization of restored habitat by Delta Smelt and listed salmonids, as well as evaluations of site design and local geomorphology on tidal wetland function as a food web subsidy. Based on the data resources and information available, the AMT may recommend that an independent workshop or peer review panel be convened to assist with evaluation and collecting lessons learned. Information gathered through syntheses, workshops, and/or independent review panels will be used to inform future tidal wetland restoration designs and future reinitiation of consultation for the SWP and CVP with USFWS and NMFS and ITP amendments for the SWP with CDFW.

*c) Adaptive Management Technical Teams:*

- i.* DWR and CDFW will lead evaluations of land management actions to inform and develop changes to site specific Long-term Management Plans based on information gained through evaluation of specific management practices and will coordinate accordingly with Reclamation, USFWS and NMFS on plan revisions.
- ii.* An inter-agency technical team composed of scientists from DWR, Reclamation, CDFW, USFWS, and state and federal water contracting entities, as well as any consultants contracted for focused research on specific uncertainties regarding tidal wetland restoration will be responsible for data analyses and synthesis work. This team will work with the AMSC to prioritize data analyses that are responsive to specific hypotheses

regarding tidal wetland restoration effectiveness as a food subsidy and juvenile salmon rearing habitat. At milestones for analysis and reporting of special studies or multi-year syntheses, the inter-agency technical team will present its findings to the Interagency Ecological Program's Tidal Wetland Project Work Team, which is an open and collaborative venue for exchange of scientific ideas and information.

7) Tributary Habitat Restoration Effectiveness for Salmonid Fishes

a) *Brief Description:* The Upper Sacramento River Anadromous Fish Habitat Restoration Project Monitoring Plan and Protocols (2017) are designed to determine the effectiveness of the Upper Sacramento River Anadromous Fish Habitat Restoration Project (referred to Project henceforth) in meeting identified objectives and to validate the linkage between restoration actions and the biologic response to those actions. This monitoring plan follows the framework for detecting biological responses to flow management described by Souchon et al. (2008). Monitoring methods structured as field protocols are described in the Plan and Protocols including control site selection, longitudinal profile and cross sections, juvenile habitat mapping protocols, snorkel survey protocols, seining, enclosure studies, invertebrate drift sampling, redd surveys, and stream temperatures.

b) *Assigned AM Bins: **Bin 1 and 3***

**Bin 1:** Some actions involving annual land management practices will be evaluated on an annual or biannual basis. These evaluations may inform revisions to site-specific Long-term Management Plans, which are required of DWR and Reclamation as part of the mitigation.

**Bin 3:** Monitoring and targeted studies to address specific uncertainties regarding effectiveness of tributary habitat restoration inform the Science Integration Team's decision support models. The AMT will review recommendations from decision support models to assess critical uncertainties to understand the effectiveness of tributary habitat restoration in providing spawning and refuge habitat to benefit Chinook Salmon, monitoring occurring as part of the Anadromous Fish Habitat Restoration Program throughout the permitted period.

c) *Adaptive Management Technical Team:* The existing CVPIA Upper Sacramento River Habitat Restoration Technical Team includes Reclamation, USFWS, NMFS, CDFW, consultants (e.g., Chico State University, PSMFC), and recipients of competitive funding for habitat restoration will be utilized as the AMT for this action.

8) Shasta Spring Pulse Studies

a) *Brief Description:* Reclamation will release up to 150 thousand acre feet (TAF) in pulse flow(s) each water year to benefit Chinook Salmon in the Sacramento River watershed. In 2021, a multi-year Upper Sacramento River Spring Pulse Flow Study Plan was developed by Reclamation in coordination with CDFW, USFWS, NMFS, SWRCB, UCSC, and SRSC. The timing, magnitude, duration, and frequency of the pulse flows will be evaluated and refined by the Sacramento River Group (SRG) on an annual basis and with the intent of maximizing multi-species benefits,

which may include coordinating timing of pulse flows with natural flow events and/or pulse flows in tributaries. The pulse flow schedule will be planned by the agencies and stakeholders in the SRG and implemented annually by Reclamation. Reclamation will reduce the volume of a pulse flow, not release a pulse flow, or apply the water to another purpose only if CDFW, NMFS, or USFWS determines that these alternatives will be more beneficial to fish species. CDFW or NMFS would consider reducing the volume of a pulse flow or not releasing a pulse flow if, for example:

- i. the releases would increase the forecasted winter-run Chinook Salmon mean annual temperature dependent mortality (TDM) by 10% or more, or
- ii. the 150 TAF pulse flow volume (regardless of when it is released) would decrease the forecasted end of April Shasta storage to below 2.2 MAF using the February 90% exceedance forecast.

*b) Assigned AM Bin: Bins 2 and 3*

**Bin 2:** Hindcast evaluation of action effectiveness that includes technical review of the functional elements of the pulse flow (i.e., timing, magnitude, duration, and frequency) as well as an evaluation of criteria used to support beneficial use decisions.

**Bin 3:** If Bin 2 evaluations indicate a set of triggers and or the timing and magnitude of spring pulse flows are beyond what was considered in the Proposed Action or review of conditions, triggers, and effects after multiple years of implementation across a range of hydrologic conditions determines there is new understanding and/or information that is significantly different from what was applied to the effects analysis at the time of ESA consultation initiation. Reviews will also provide an opportunity to consider refined understanding and potential applications to other tributaries, divisions, or systems.

*c) Adaptive Management Technical Team:*

Bin 2 responsibilities would be assigned to the SRG.

Bin 3 responsibilities would be assigned to the SRG, SHOT, and the AMSC.

9) Winter-run Chinook Salmon Through-Delta Survival and Salvage Thresholds

- a) Brief Description:* There is considerable uncertainty surrounding the implications of facility loss of juvenile Sacramento River winter-run Chinook Salmon at CVP and SWP facilities for through-Delta survival in the Central Valley Bay-Delta. Juvenile salmon through-Delta survival, as measured at Chipps Island (Delta exit), accounts for route-specific survival and migration routing through different migratory pathways. Field and modeling studies will address these uncertainties by conducting the following analyses: 1) an acoustic receiver network and associated real-time modeling of the data, 2) targeted acoustic telemetry studies (i.e., tag fish and release them in the Delta, 3) retrospective analyses of data to evaluate through-Delta survival due to LTO operations, 4) incorporation and consideration of any additional routing and survival data obtained, 5) evaluation of the sensitivity of winter-run Chinook Salmon population dynamics, relative to recovery and viability criteria, to through-Delta survival using lifecycle modeling, and 6) analyses of the relationship between loss at facilities and broader Delta

conditions using a combination of particle tracking models. Several lifecycle models, including simplified simulation-based approaches, the CVPIA SIT DSM, and the SWFSC Winter-run Chinook Salmon Lifecycle Model, may be considered to evaluate winter-run Chinook Salmon population responses to varying Delta conditions and identify a target Delta survival. We propose using multiple particle tracking models (e.g., PTM, ecoPTM, ePTM), with competing tradeoffs related to ease of implementation and assumptions about particle movement and mortality, to assess relationships between loss at facilities and Delta survival.

b) *Assigned AM Bin: Bin 2*

Studies will be completed to address uncertainties in the estimation of through-Delta survival. These newly generated modeling results will be used to propose and update decision support tools for juvenile Chinook Salmon related to outmigration survival and entrainment risk and may change the triggers for export reductions. This work may be of interest to independent review panels. New information and its application may inform future reinitiation of consultation and ITP amendments.

c) *Adaptive Management Technical Team:* This work has been of interest to the Science Integration Team (SIT), which has identified these studies as critical for reducing uncertainty in entrainment risk management. Field coordination and implementation of these studies has occurred through the Interagency Telemetry Advisory Group (ITAG) since 2018. Technical review may occur through the SIT and/or ITAG.

10) Longfin Smelt Science Plan Actions

a) *Brief Description:* The Special Studies Section of the Proposed Action describes the continued implementation of the Longfin Smelt Science Program and updating its science plan. The science plan is a roadmap for addressing substantial gaps in our understanding of the biology and ecology of Longfin Smelt, which include management activities needed to prevent further decline of the species within the San Francisco Estuary. To accomplish this, the Longfin Smelt Technical Team (LFSTT) will continue to develop and support the ongoing activities of the Longfin Smelt Science Program. These activities will address one or more of the seven Priority Areas of the science plan and are expected to produce valuable information for resource managers. These Priority Areas are: 1) continued development of the Longfin Smelt lifecycle model, 2) providing input and guidance for the Longfin Smelt culture program, 3) improved distribution monitoring, 4) improved larval entrainment monitoring, 5) improved understanding of spawning and rearing habitat, 6) understanding migration and movement behaviors, and 7) factors which affect abundance, growth, and survival. Findings from the scientific activities conducted within the program will inform considerations for future consultations and ITPs. However, if new information pertinent to real-time operations for Longfin Smelt entrainment or if LFSTT provides other information relevant to management actions for Longfin Smelt during the term of the BiOp or ITP, trigger re-initiation of consultation or an ITP amendment for the actions.

b) *Assigned AM Bin: Bin 2*

A Longfin Smelt Science Plan has been developed and implementation of high priority individual science actions has begun. Actions already underway include development of a Longfin Smelt

lifecycle model, establishing Longfin Smelt in culture, and improved distribution monitoring. The LFSTT has prioritized science actions to allow for sequenced implementation and completion over the course of the next eight years. As a result, actions will be ready for evaluation and be available to inform development of a subsequent permit/consultation.

- c) *Adaptive Management Technical Team:* The Longfin Smelt Technical Team (LFSTT) would be assigned all responsibilities for guiding implementation of each Longfin Smelt Science Action identified in the Longfin Smelt Science Plan. The LFSTT is co-lead by DWR and CDFW and includes representatives from USFWS, Reclamation, and the State/Federal Water Contractors.

#### 11) Delta Smelt Supplementation

- a) *Brief Description:* DWR and Reclamation propose to support continued experimental releases and 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 ensure production ramps 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 that are at least 200 days post-hatch (dph) or equivalent as informed by CDFW and USFWS. USFWS and CDFW, in coordination with Reclamation and DWR, will update the Supplementation Strategy to incorporate new findings from the program and update performance metrics used to guide production targets and methods development.

- b) *Assigned AM Bin:* **Bins 1 and 2**

**Bin 1:** A process to evaluate production targets to support supplementation will be developed and implemented no less than annually via the existing Culture and Supplementation of Smelt (CASS) Steering Committee. Outcomes of the review may include but are not limited to revisions of production numbers, timeline, release methods, monitoring, and genetic management strategies. These findings will be incorporated into the Supplementation Strategy and will serve as guidance for the program.

**Bin 2:** Additionally, an independent peer review of the program may be conducted on a 5-year basis at the discretion of the AMSC.

- c) *Adaptive Management Technical Team:* The CASS group was created in 2019 and is comprised of participants from Reclamation, DWR, CDFW, and USFWS. This body provides oversight in advancing science-based management activities to secure and stabilize the Delta Smelt population through a coordinated propagation and supplementation program. The CASS Steering Committee shall continue to provide guidance to its three working groups: 1) Captive Propagation Working Group, 2) Research Working Group, and 3) Regulatory Working Group. The CASS Steering Committee may be integrated into the AMSC following formation of the AMSC.

#### 12) Steelhead JPE

- a) *Brief description:* Reclamation proposes to develop a steelhead JPE for tributaries with CVP facilities that 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.

*b) Assigned AM Bin: Bin 2*

Reclamation and DWR propose to conduct the first four-year independent panel review (2024) from data generated from the Stanislaus River steelhead life-cycle monitoring program. Beginning Fall 2025 and based upon incorporated 2024 review panel feedback and recommendations, Reclamation and DWR will work with the technical team to consider implementing an expanded JPE framework to the San Joaquin and Sacramento basins. By Summer 2026, Reclamation and DWR will decide to address deficiencies in the JPE framework and/or expand the JPE framework to remaining CVP or SWP tributaries. Reclamation and DWR propose to conduct the second four-year independent panel review (2028) from data generated from the San Joaquin and Sacramento basins JPE.

*c) Adaptive Management Technical Team: Reclamation and DWR, in coordination with USFWS, NMFS, CDFW, and interested stakeholders will create or use an existing technical team should one be later identified to develop the steelhead JPE framework and incorporate feedback from the 2024 and 2028 panel reviews.*

13) Alternative Salmonid Loss Estimation Pilot Study

*a) Brief description: DWR, in coordination with Reclamation, has completed a draft updated Alternative Loss Equation (ALE-22) software tool for estimating winter-run and spring-run Chinook Salmon and Central Valley steelhead losses at the SWP and CVP export facilities. DWR, in coordination with Reclamation and the Alternative Loss Equation Technical Team (ALE-TT), a proposed new sub-team of the Central Valley Fish Facilities Review Team (CVFFRT), will further refine the parameters of this tool by developing an Alternative Loss Pilot Study Implementation Plan (ALPS-IP) to implement this tool in parallel with current loss estimation methods and incorporate SDM to prioritize the implementation of loss component studies and performance evaluation studies. The goal of this pilot study is to provide a more accurate estimates of salmonid loss, and loss parameters, at the SWP and CVP export facilities while understanding the utility of the new alternative method relative to the existing method.*

*b) Assigned AM Bin: Bin 2*

Within the first year of the effective date of the ROD or ITP, DWR, in collaboration with Reclamation, will convene the ALE-TT and conduct a knowledge transfer and methods workshop for the ALE-22 tool and prepare a draft ALPS-IP for ALE-TT review. Within the second year of the effective date of the ROD or ITP, DWR will submit the final draft ALPS-IP for both the ALE-TT and AMSC review. DWR will finalize the ALPS-IP once approved by the AMSC and establish priorities for implementation (e.g., loss parameter studies) using SDM within the ALE-TT. The ALE-TT may utilize an independent science panel review to further enhance the SDM prioritization process. In the third year of the effective date of the ROD or ITP, DWR will submit prioritized ALPS-IP recommendations, informed by the ALE-TT SDM process, to the AMSC for approval. The permittee shall then update the loss equation with refinement to the loss equation components as approved by CDFW.

c) *Adaptive Management Technical Team:*

- i. Knowledge transfer and methods workshop: DWR and Reclamation will convene the ALE-TT, with membership comprised of DWR, Reclamation, CDFW, USFWS, NMFS, and State/Federal Water Contractors representatives, as well as other interested stakeholders.
- ii. Review of the initial draft ALPS-IP: ALE-TT
- iii. Review of the final draft ALPS-IP: ALE-TT, AMSC, as well as input from the CVFFRT and Salmonid Monitoring Team (SaMT)
- iv. SDM Prioritization of ALPS-IP: ALE-TT, with support from an independent review panel if requested.

14) Shasta Cold Water Pool Management

a) *Brief Description:* Reclamation will operate Shasta Reservoir to build a cold-water pool and use the Temperature Control Device (TCD) on Shasta Dam to blend water from different reservoir strata to protect downstream winter-run Chinook Salmon returning adults and incubating eggs from temperature stressors. An annual operation of the Shasta TCD and the development of the temperature management plan will be developed as part of real-time operations. Shasta Reservoir cold water pool management will rely on an objectives-based management framework adapted from the multi-year drought sequence experienced in Victoria, Australia (Mount et al. 2016) that considers the available hydrology to “Protect,” “Maintain,” “Recover,” and “Enhance,” protected species, habitats, and water deliveries. An initial set of objectives and metrics will be further refined according to increased understanding of species needs, interannual hydrologic conditions (e.g., drought) and operational limitations.

b) *Assigned AM Bin: Bin 2*

Hindcast evaluation of action effectiveness that includes a review of the objectives and metrics used to guide annual temperature planning. Objective-based storage targets and temperature dependent mortality will be considered with regards to their ability to support species viability and water delivery performance.

c) *Adaptive Management Technical Team:* Evaluation of action effectiveness and objective-based criteria would be assigned to the SRG.

15) Georgiana Slough Salmonid Migratory Barrier Effectiveness for salmonid fishes

a) *Brief Description:* DWR in coordination with Reclamation will continue to seasonally install and operate a salmonid migratory barrier at Georgiana Slough each year to reduce entrainment into the Central and South Delta of emigrating juvenile salmonids. Operation of the salmonid migratory barrier should improve the seasonally averaged through-Delta survival probability to Chipps Island compared with survival probability if the salmonid barrier were not in operation. Barrier operations and monitoring details are defined in the Georgiana Slough Salmonid Migratory Barrier (GSSMB) Operations and Monitoring Plans developed by the GSSMB Coordination Group. To further maximize seasonal survival benefits to migrating salmonids, DWR and Reclamation will continue leading the GSSMB Coordination Group, with membership comprised of DWR, Reclamation, CDFW, USFWS, NMFS, and State/Federal Water Contractors representatives. DWR and Reclamation, working with the GSSMB Coordination Group, will



provide at least a triennial report and review and update, as necessary, the GSSMB Operations and Monitoring Plans.

b) *Assigned AM Bin: Bin 2*

Triennial report of GSSMB operations and monitoring that can be used to inform necessary changes/updates to the Operations and Monitoring Plans.

c) *Adaptive Management Technical Team:* Triennial report and updating the GSSMB Operations and Management Plan would be assigned to the GSSMB Coordination Group.

16) Spring Outflow

a) *Brief Description:* Reclamation and DWR will supplement Delta outflow during spring months per the terms of the Voluntary Agreements (VAs) as described in the March 2022 Voluntary Agreement Term Sheet, revised in November 2022. Actions that will support the additional Delta outflow include Reclamation and DWR south of Delta export modifications, Reclamation reoperating upstream reservoirs to advance and allow for scheduling of water made available by contractors in CVP watersheds and passing Delta inflow from water made available by VA Parties. In the latter case, spring flow pulses on VA tributary systems (Sacramento, American, Feather, Mokelumne, Yuba, and Tuolumne rivers and Putah Creek) are intended to benefit juvenile Chinook Salmon growth and survival in the tributaries while also contributing to increased Delta outflows. The increased Delta outflows are intended to benefit Chinook Salmon outmigration survival in the Delta and enhance habitat for native estuarine fishes, including Delta Smelt and Longfin Smelt. The amount of supplemental Delta outflows will vary by water year type, with 750 – 825 TAF provided in Dry, Below Normal, and Above Normal years, and approximately 150 TAF provided in Critical and Wet years. The supplemental flows will occur during the months of March through May and prioritized during the period of April 1 – May 31. The details of flow amounts by source and water year type are provided in Section XX the PA and in the November 2022 revision of the March 2022 Voluntary Agreement Term Sheet. Supplemental spring Delta outflows are proposed as part of a path of implementation for an updated SWRCB Bay-Delta Water Quality Control Plan. In advance of the SWRCB's decision regarding the VA proposal, the supplemental Delta outflows will occur as an early implementation action and continue if and when the SWRCB incorporates the VA actions into an updated Water Quality Control Plan. During implementation, supplemental spring flows will be managed by real-time operation groups to determine the source, schedule, and amount of water to ensure consistency with proposed flow levels as described in the Voluntary Agreement Term Sheet.

b) *Assigned AM Bin: Bin 3*

For a synthetic, multi-year evaluation of the performance of increased spring Delta outflows to inform the next reinitiation of consultation for long-term operations of the SWP and CVP and development of a California Endangered Species Act ITP.

c) *Adaptive Management Technical Team:* The Voluntary Agreement Science Committee (VASC) is facilitated by an independent third party and is comprised of scientists and science managers from DWR, Reclamation, CDFW, NMFS, USFWS, and the Public Water Agency organizations of the VA Parties, with staff from the SWRCB participating in an advisory capacity. The Voluntary Agreement Term Sheet includes provisions for a VA Science Program to support adaptive

management of VA actions, including increased spring flows on tributaries and Delta outflow. The VASC intends to use quantitative decision-support tools (e.g., lifecycle models for Chinook Salmon) and SDM processes to provide recommendations to the VA Program's decision-making body, the Systemwide Governance Committee. To support the VA program's adaptive management process, the VASC has developed a draft VA Science Plan, which contains hypotheses, metrics, and baselines for evaluating increased spring Delta outflows and pulse flows on tributaries. The draft VA Science Plan thus provides a framework for a multi-year evaluation of whether supplemental spring flows are performing according to expectations and will inform the SWRCB evaluation of the VA Program in Years 6 – 8 of the program, including how and whether the VA Program should continue after Year 8. The VASC will support adaptive management of spring outflows for the Biological Opinion by providing the multi-year, synthetic evaluation developed for the VA Program to the AMSC to inform future major reinitiation of consultation and ITP amendments.

#### 17) Clear Creek

*a) Brief Description:* A draft proposal from Reclamation for long term Clear Creek/Whiskeytown Reservoir operations includes a novel approach to exerting desirable intra-annual flow variability. A draft new flow regime would implement variable flows over the course of a year that would range from flow releases as low as 100 cfs in late summer, adapting flow needs during spring-run Chinook Salmon spawning/the onset of fall-run spawning in September/October, and (ultimately) slowly ramping up to 300 cfs in the winter when fry could benefit from seasonally inundated surfaces, then ramping back down to 100 cfs the following summer to start again. This flow variability will create a more natural seasonally variable hydrograph and is expected to provide opportunity for gravel augmentation or other restoration to target surface elevations and channel form for seasonal inundation to benefit salmon rearing. There are expected benefits and potential consequences from these changes. Continuation of existing, and some proposed, monitoring efforts including but not limited to RBFWO maintained temperature loggers, Potential Spawning Area Mapping (PSAM), Spawn Area Mapping (SAM), rotary screw trapping, spawning surveys, snorkel surveys, video weir, redd mapping, and proposed habitat monitoring will be important for evaluation of these management actions.

#### *b) Assigned AM Bin: **Bin 2***

An adaptive management and monitoring approach to the new flow regime and/or temperature criteria will be useful for determining if the flow variability indeed provides viable opportunity to contribute to restoring channel form and floodplain elevations to targeting rearing habitat and improved growth and survival for juvenile salmon, and for guiding adjustments to flow and temperature criteria if necessary. It is anticipated that adaptive management refinements would occur at approximately three-year intervals, although more frequent refinements may be necessary in the first few years of implementing the new flow regime.

*c) Adaptive Management Technical Team:* Field coordination and implementation of monitoring studies would occur through the existing Clear Creek Technical Team (CCTT) work team. The CCTT, with representatives from Reclamation, USFWS, NMFS, DWR, CDFW and others, provides Central Valley Operations with an annual pulse flow and temperature management proposal. This proposal details the CCTT's request for pulse flow releases from Whiskeytown Dam (e.g., flow schedule, ramping rates, peak flow) and water temperature management, as well as

background information on fish monitoring and proposal rationale. It is anticipated that the CCTT will continue to provide annual proposals and that they will include details on how best to implement the variable flow regime and meet water temperature criteria. Additionally, the CCTT is anticipated to review outcomes of the flow regime and make suggestions to improve future management actions for the benefit of fish and wildlife on Clear Creek. Additionally, the CCTT provides Reclamation with an annual summary of management activities on Clear Creek. These reports highlight the past water year's conditions, management actions and results, habitat restoration projects, fisheries monitoring data, and the CCTT's meeting discussions. It is anticipated that these annual summaries will continue to provide evaluations and potential refinements for future year's implementation of flow and temperature management.

# Attachment 3. Adopted Mitigation Monitoring and Enforcement

Table 3-1. CVP and SWP Wide Adopted Mitigation Monitoring and Enforcement

| Additional Mitigation Adopted   | Impact Addressed by Mitigation Measure  | Responsible Party | Verification                | Timing                              |
|---|---|-------------------|-----------------------------|-------------------------------------|
| <b>Mitigation Measure BIO-4: Flow Criteria and Real-time Group Considerations for Bank Swallow:</b> Develop flow criteria that avoid impacts of high water flows by limiting frequency and duration of peak flows over 14,000 cfs (Sacramento River) or rapid draw-downs to nesting bank swallow habitat during the breeding season (April 1 through August 31); this measure takes into consideration including downstream tributary flows when timing water releases (Bank Swallow Technical Advisory Committee 2013).  | Changes in flows compared with the No Action Alternative are expected to result in very minor effects on plants and wildlife along stream and reservoir banks but could result in adverse impacts on bank swallow colonies.   | Reclamation       | Seasonal and Annual Reports | Annually/<br>Seasonally<br>One-Time |
| <b>Mitigation Measure EJ-1: Increasing Participation with Tribal, Minority, and Low-Income Populations:</b> During any ongoing coordination regarding long-term operations of the CVP, Reclamation will, consistent with the Bipartisan Permitting Reform Implementation Rule, 89 Fed. Reg. 35,442 (May 1, 2024); U.S. Department of Interior Equity Action Plan (April 14, 2022); and Reclamation's Manual, Directives and Standard on Public Involvement in Bureau of Reclamation Activities (updated July 28, 2023): <ul style="list-style-type: none"> <li>• Treat Indigenous Knowledge as high-quality information.</li> <li>• Consider the ability of affected persons and agencies to access electronic media and the primary language of affected persons when conducting research.</li> <li>• Support priority actions in the DOE Equity Action Plan, Action 4, related to increasing opportunities to access public lands and prioritizing access to recreation areas and services in urban communities.</li> </ul> | <p>Potential disproportionately adverse impacts on minority and low-income populations in Trinity County from the loss of the tourism industry associated with lower Trinity Reservoir levels and agricultural and other jobs, reduced access to groundwater in the Sacramento and San Joaquin Valley and South Coast regions.</p> <p>Potential disproportionately adverse impacts on minority and low-income populations from access to groundwater and potential property damage from subsidence.</p> | Reclamation       | Meeting notes               | Ongoing                             |

| Additional Mitigation Adopted   | Impact Addressed by Mitigation Measure  | Responsible Party  | Verification              | Timing  |
|---|---|--------------------|---------------------------|---|
| <ul style="list-style-type: none"> <li>Strive to reach and involve minority, low-income, reluctant or unknown publics who may be affected, using minority or special media, translated materials, or other means, as appropriate.</li> </ul> <p>Reclamation will identify opportunities to gather Tribal Indigenous Knowledge for consideration in future Reclamation projects. Additionally, Reclamation will identify opportunities to include tribal interests and low-income/minority advocacy groups in affected communities to review and provide input on compliance documentation. For projects occurring in areas with a high proportion of Spanish speaking residents, Reclamation will continue to provide materials and resources in Spanish for a higher likelihood of participation from the affected population.</p> |   |                    |                           |   |
| <p><b>Mitigation Measure EJ-2: Reduce Effects of Employment Loss:</b> To assist in offsetting job losses in the agricultural sector, Reclamation will develop internship program(s) and advertise in affected communities near the Reclamation offices.</p>   | <p>Potential disproportionately adverse impacts on minority and low-income populations in Trinity County from the loss of the tourism industry associated with lower Trinity Reservoir levels and agricultural and other jobs, reduced access to groundwater in the Sacramento and San Joaquin Valley and South Coast regions</p> | <p>Reclamation</p> | <p>Advertisement copy</p> | <p>At least once a year</p>                     |
| <p><b>Mitigation Measure EJ-3: Increasing Participation with Trinity River Parties:</b> Reclamation will hold a public meeting in Trinity County to hear from local interests on Trinity River-specific alternatives and potential impacts.</p>   | <p>Potential disproportionately adverse impacts on minority and low-income populations in Trinity County from the loss of the tourism industry associated with lower Trinity Reservoir levels</p>   | <p>Reclamation</p> | <p>Meeting Notes</p>      | <p>One time after the analysis is completed</p> |

| Additional Mitigation Adopted   | Impact Addressed by Mitigation Measure                       | Responsible Party | Verification  | Timing                         |
|---|--|-------------------|---------------|--------------------------------|
| <b>Mitigation Measure WS-1: Coordination with Byron Bethany Irrigation District:</b> DWR will coordinate with Byron Bethany Irrigation District prior to herbicide treatments.  | Potential impacts to water supply from herbicide treatments  | DWR               | Annual Report | Prior to herbicide application |
| <b>Mitigation Measure WS-2: Coordination with Contra Costa Water District:</b> Reclamation will coordinate with Contra Costa Water District (CCWD) to avoid creating new or additional restrictions on CCWD's ability to fill Los Vaqueros Reservoir, beyond the restrictions that are imposed under the then current CCWD Biological Opinions and Incidental Take Permits, so that with implementation of the selected alternative, CCWD will have opportunities to fill Los Vaqueros Reservoir that are at least comparable to the current opportunities.   | Potential small reductions to water supply                   | Reclamation       | Annual Report | Ongoing                        |
| <b>Mitigation Measure AQUA-4: Fall-run Chinook Salmon Brood Year Assessment:</b> To assess the condition of fall-run Chinook salmon populations on CVP tributaries, a fall-run Chinook salmon brood year assessment for the previous year's cohort and the cohort of returning adults that hatched three years prior will be completed. The brood year assessment will be based on the best available science each year and teams may consider using indicators similar to the <i>Annual Winter-run Chinook Brood Year Assessment</i> that is part of Alternative 2. Information will be reviewed by technical teams coordinating specific divisions or watersheds and attached to the Long-Term Operations Annual Report by Reclamation. | Impacts to fall-run Chinook salmon from proposed operations. | Reclamation       | Annual Report | Annually                       |

# Attachment 4. Avoidance and Minimization Measures Included in Selected Alternative

Appendix D in the EIS includes a detailed description of mitigation measures identified for fish and aquatic resources. This Attachment summarizes the avoidance and minimization measures that are built in as part of the preferred and selected alternative. Mitigation measures in the preferred and selected alternative may be modified through adaptive management.

## Sacramento River Division

Table 4-1. Avoidance Measures in the Sacramento River Division

| Avoidance Measure  | Impact Category                                | Responsible Party | Verification               | Timing   |
|--|--|-------------------|----------------------------|----------|
| <b>Fall and Winter Base Flows for Shasta Refill and Redd Maintenance:</b> More storage required for Shasta Reservoir from December through February for higher release. Predictable storage management for Shasta Reservoir  | Water Supply, Fish and Aquatics                | Reclamation       | Seasonal and Annual Report | Annually |
| <b>Adult Migration and Holding Water Temperature Objectives:</b> Under a circumstance where conditions may cause water temperatures to rise to concerning levels prior to the final TMP, Reclamation will begin water temperature management as early as March 1 to target water temperatures of 58.0° F daily average at the Sacramento River above the Clear Creek Gage (CCR). | Water Quality, Fish and Aquatics               | Reclamation       | Seasonal and Annual Report | Annually |
| <b>Limitations in SRS Contractors Water Available Under Contract – Water temperature related impacts:</b> Sacramento River flows may decrease in the spring, summer, and fall of dry years as one approach to conserving storage in Shasta Reservoir.  | Water Supply, Water Quality, Fish and Aquatics | Reclamation       | Annual Report              | Annually |
| <b>Refuge Coordination for Instream Flow, Lake Levels, and Refuge Needs for salmonids and sturgeon:</b> Shasta Reservoir releases to refuges in the summer and fall may decrease during the driest of years to increase Shasta Reservoir storage.  | Water Supply, Fish and Aquatics, Terrestrial   | Reclamation       | Annual Report              | Annually |

| Avoidance Measure   | Impact Category                                   | Responsible Party               | Verification  | Timing   |
|---|---|---------------------------------|---------------|----------|
| <b>Annual Winter-Run Chinook Salmon Brood Year Assessment:</b> Based on the outcome of the broodyear assessment prepared by the Winter-run JPE sub-team, Reclamation, NMFS, USFWS and CDFW will convene appropriate technical staff to make recommendations if it is necessary to increase the production of winter-run Chinook salmon associated with the Integrated-Recovery Supplementation Program or take other actions to protect production of winter-run Chinook salmon at the LSNFH. | Fish and Aquatics                                 | Reclamation                     | Annual Report | Annually |
| <b>Adult Migration &amp; Holding Water Temperature Objectives – Managing water temperatures:</b> Under a circumstance where low flows combined with warm air temperatures and/or an intentional warmwater power bypass cause water temperatures to rise to concerning levels prior to the final Temperature Management Plan, Reclamation will begin temperature management as early as March 1st through May to target water temperatures of 58°F daily average at CCR.                       | Fish and Aquatics                                 | Reclamation                     | Annual Report | Annually |
| <b>SRS Contractors – Delaying or Shifting Spring Diversions, Shifting Timing of Delivery of Transfer Water, Rice Decomposition Smoothing:</b> Reclamation may request that the SRSC shift timing of delivery of transfer water to increase the amount of water in Shasta Reservoir through the water temperature management season  | Fish and Aquatics and Water quality               | Reclamation and SRS Contractors | Annual Report | Annually |
| <b>Minimum Instream Flows – Increased holding capacity for Shasta Reservoir storage:</b> In response to major storm events, Reclamation, after coordination through the SRG and SHOT, and also through adaptive management, may determine that lower flows achieve the same biological effects as the minimum flow of 3,250 cfs at Keswick Dam.   | Fish and Aquatics, Water Quality and Water Supply | Reclamation                     | Annual Report | Annually |
| <b>Flow and Non-Flow Measures from the Voluntary Agreements – Increased flow from increased spring releases for Sacramento salmonids:</b> Flow and non-flow measures may increase flows in the spring prior to the water temperature management season  | Fish and Aquatics and Water Quality               | Reclamation                     | Annual Report | Annually |
| <b>Wilkins Slough Minimum Flow Criteria Relief – Summer flows for salmonids and sturgeon:</b> Minimum flows are met under considerations for storage, fisheries, and water deliveries.  | Fish and Aquatics, Water Supply and Water Quality | Reclamation                     | Annual Report | Annually |



| Avoidance Measure  | Impact Category                     | Responsible Party | Verification  | Timing   |
|--|-------------------------------------|-------------------|---------------|----------|
| <b>Rebalancing between other CVP Reservoirs – Conserving Shasta Reservoir storage for salmonids and sturgeon:</b> Rebalancing between reservoirs can be used to conserve Shasta Reservoir storage and operate the TCD to temperature targets.  | Fish and Aquatics, Water Quality    | Reclamation       | Annual Report | Annually |
| <b>Limitations on CVP Allocations for EOS Storage – Water supply reductions in dry water years for salmonids and sturgeon:</b> The goal of reductions is to increase end of September storage for Shasta Reservoir.  | Fish and Aquatics and Water Quality | Reclamation       | Annual Report | Annually |
| <b>Modifications to Water Transfers – Shifting timing during typical irrigation season for salmonids and sturgeon:</b> Modifications to water transfers involve shifting the timing of delivery of transfer water during the typical irrigation season.  | Fish and Aquatics                   | Reclamation       | Annual Report | Annually |
| <b>Situation-Specific Adjustments to Delta Water Quality Standards – Water temperature related impacts for salmonids and sturgeon:</b> Sacramento River flows may decrease in dry years as one approach to conserving storage in Shasta Reservoir. Relaxation of Delta outflow and salinity requirements historically occur in the winter, spring, and summer.         | Fish and Aquatics                   | Reclamation       | Annual Report | Annually |
| <b>Egg Incubation and Emergence Water Temperature Objectives – Withdrawing and blending water within Shasta Reservoir for salmonids and sturgeon:</b> Water temperature management would target 53.5°F through operation of the Temperature Control Device on Shasta Dam, selectively withdrawing and blending water from different elevations within Shasta Reservoir | Fish and Aquatics                   | Reclamation       | Annual Report | Annually |
| <b>Drought Operations Priority Framework – Winter-run Chinook salmon spawning water temperatures for salmonids and sturgeon:</b> Reclamation will develop a Drought Emergency Plan that establishes system priorities and seeks to provide Winter-run Chinook salmon spawning water temperatures.  | Fish and Aquatics                   | Reclamation       | Annual Report | Annually |
| <b>Ramping Rates – Limiting how quickly releases are reduced for salmonids and sturgeon:</b> Changes in river elevation from reservoir releases can strand fishes.   | Fish and Aquatics                   | Reclamation       | Annual Report | Annually |

| Avoidance Measure   | Impact Category   | Responsible Party | Verification  | Timing   |
|---|-------------------|-------------------|---------------|----------|
| <b>Minimum Instream Flows – Temporary reductions in Reservoir releases for salmonids and sturgeon:</b> Minimum instream flows are temporary reductions in reservoir releases to preserve water storage. | Fish and Aquatics | Reclamation       | Annual Report | Annually |
| <b>Pulse Flows – Releases of water from Reservoirs for salmonids and sturgeon:</b> Pulse flows are spatiotemporally coordinated releases to benefit migration of fish.                                  | Fish and Aquatics | Reclamation       | Annual Report | Annually |

## Clear Creek

Table 4-2. Avoidance Measures in Clear Creek

| Avoidance Measure   | Impact                              | Responsible Party | Verification    | Timing   |
|---|-------------------------------------|-------------------|-----------------|----------|
| <b>Clear Creek Water Temperature Management – Whiskeytown Dam releases:</b> In dry, critical, or transfer curtailment years, Reclamation may not be able to meet water temperatures and will operate Whiskeytown Dam as close to these water temperatures as practical.                                   | Fish and Aquatics                   | Reclamation       | Seasonal Report | Annually |
| <b>Pulse Flows – Clear Creek water quality and dilution capability:</b> 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. | Water Quality and Fish and Aquatics | Reclamation       | Seasonal Report | Annually |
| <b>Ramping Rates – Limiting how quickly releases are reduced for salmonids:</b> Changes in river elevation from reservoir releases can strand fishes.   | Fish and Aquatics                   | Reclamation       | Seasonal Report | Annually |
| <b>Minimum Instream Flows – Temporary reductions in Reservoir releases for salmonids:</b> Minimum instream flows are temporary reductions in reservoir releases to preserve water storage.  | Fish and Aquatics                   | Reclamation       | Seasonal Report | Annually |
| <b>Pulse Flows – Releases of water from reservoirs for salmonids:</b> Pulse flows are spatiotemporally coordinated releases to benefit migration of fish.   | Fish and Aquatics                   | Reclamation       | Seasonal Report | Annually |

## American River

Table 4-3. Avoidance Measures in the American River

| Avoidance Measure  | Impact            | Responsible Party | Verification    | Timing   |
|--|-------------------|-------------------|-----------------|----------|
| <b>Redd Dewatering Protective Adjustment – Hydrology and potential dewatering impacts to fall-run Chinook salmon redds:</b> The measure may decrease stranding and dewatering by softening changes in the minimum release requirements.  | Fish and Aquatics | Reclamation       | Seasonal Report | Annually |
| <b>Folsom Reservoir Flow and Temperature Management:</b> Reclamation will implement the Automated Temperature Selection Procedure, which was developed in consultation with representatives of state and federal agencies and prioritizes water temperatures during the summer to support steelhead rearing over water temperatures in the fall to support fall-run Chinook salmon spawning. | Fish and Aquatics | Reclamation       | Seasonal Report | Annually |
| <b>Ramping Rates – Limiting how quickly releases are reduced for salmonids and sturgeon:</b> Changes in river elevation from reservoir releases can strand fishes.   | Fish and Aquatics | Reclamation       | Seasonal Report | Annually |
| <b>Minimum Instream Flows – Temporary reductions in Reservoir releases for salmonids and sturgeon:</b> Minimum instream flows are temporary reductions in reservoir releases to preserve water storage.  | Fish and Aquatics | Reclamation       | Seasonal Report | Annually |
| <b>Pulse Flows – Releases of water from reservoirs for salmonids and sturgeon:</b> Pulse flows are spatiotemporally coordinated releases to benefit migration of fish.   | Fish and Aquatics | Reclamation       | Seasonal Report | Annually |

## Stanislaus River

Table 4-4. Avoidance Measures in the Stanislaus River

| Avoidance Measure  | Impact            | Responsible Party | Verification    | Timing   |
|--|-------------------|-------------------|-----------------|----------|
| <b>Water Instability Flows – Water temperatures and rearing habitat:</b> The measure may decrease water temperatures and provide more rearing habitat in the winter at the consequence of reducing reservoir storage and potentially increasing water temperatures in subsequent months. | Fish and Aquatics | Reclamation       | Seasonal Report | Annually |
| <b>Ramping Rates – Limiting how quickly releases are reduced for salmonids:</b> Changes in river elevation from reservoir releases can strand fishes.  | Fish and Aquatics | Reclamation       | Seasonal Report | Annually |

## Delta

Table 4-5 Avoidance Measures in the Delta

| Avoidance Measures   | Impact            | Responsible Party   | Verification  | Timing   |
|--|-------------------|---------------------|---------------|----------|
| <b>DCG Gates Closures – Potential decrease of entrainment risk:</b> The measure may decrease entrainment risk by potentially aquatic species from being diverted into the interior Delta.  | Fish and Aquatics | Reclamation and DWR | Annual Report | Annually |
| <b>Baker Slough Pumping Plant – Delta and longfin smelt entrainment risk reduction:</b> The measure may benefit Delta smelt and longfin smelt through reduced entrainment risk.  | Fish and Aquatics | Reclamation and DWR | Annual Report | Annually |
| <b>Tracy Fish Collection Facility and Skinner Delta Fish Protective Facility – Fish screening from Jones Pumping Plant:</b> The measure may decrease entrainment risk by potentially preventing aquatic species from being entrained at the export facility. | Fish and Aquatics | Reclamation and DWR | Annual Report | Annually |
| <b>Old and Middle River Flow Management Start – Reduction of exports:</b> The measure may decrease entrainment risk by potentially preventing aquatic species from being entrained at the export facility.   | Fish and Aquatics | Reclamation and DWR | Annual Report | Annually |

| Avoidance Measures   | Impact                              | Responsible Party   | Verification                | Timing         |
|--|-------------------------------------|---------------------|-----------------------------|----------------|
| <b>Old and Middle River Management Real Time Operation – Manage diversion rates:</b> The measure may decrease entrainment risk by potentially preventing aquatic species from being entrained at the export facility.  | Fish and Aquatics                   | Reclamation and DWR | Annual Report               | Annually       |
| <b>Summer and Fall Delta Outflow and Habitat:</b> Maintain a 30-day average X2 $\leq 80$ km for September through October in above normal and wet years. The measure may decrease entrainment risk by increasing flows in the Delta and, thus, benefitting the migratory transport to the estuary and potentially preventing entrainment at the export facility. The measure may also benefit outmigration and food availability by increasing flow through the Delta. Relevant to water quality because it will enhance Delta outflows to maintain the location of X2, which addresses salt intrusion in the Delta. | Fish and Aquatics and Water Quality | Reclamation and DWR | Seasonal Report             | Relevant years |
| <b>Spring Delta Outflow – Supplement Delta outflow:</b> Reclamation and DWR will take actions intended to supplement Delta outflow per the terms of the Vas approved by the SWRCB and executed agreements by VA parties.   | Fish and Aquatics                   | Reclamation and DWR | Annual and Seasonal Reports | Annually       |
| <b>Delta Smelt Supplementation – Collaborate Governance:</b> The measure is expected to be generally beneficial to the Delta smelt population due to the increased releases into the Delta.  | Fish and Aquatics                   | Reclamation and DWR | Annual and Seasonal Reports | Annually       |
| <b>Flow and Non-Flow Measures from the Voluntary Agreements – Increased flow from increased spring releases for Bay-Delta salmonids and smelt:</b> Flow and non-flow measures may increase flows in the spring prior to the water temperature management season, at the cost of depleting the coldwater pool, to advance inflows to the Delta.   | Fish and Aquatics                   | Reclamation and DWR | Annual Report               | Annually       |
| <b>Wilkins Slough Minimum Flow Criteria Relief – Summer flows for salmonids, sturgeon, and smelt:</b> Minimum flows are met under considerations for storage, fisheries, and water deliveries.   | Fish and Aquatics                   | Reclamation and DWR | Annual Report               | Annually       |
| <b>Rebalancing between other CVP Reservoirs – Conserving Shasta Reservoir storage for salmonids, sturgeon, and smelt:</b> Rebalancing between reservoirs can be used to conserve Shasta Reservoir storage and operate the TCD to temperature targets.  | Fish and Aquatics                   | Reclamation         | Annual Report               | Annually       |

| Avoidance Measures   | Impact            | Responsible Party   | Verification            | Timing   |
|--|-------------------|---------------------|-------------------------|----------|
| <b>Limitations on CVP Allocations for EOS Storage – Water supply reductions in dry water years for salmonids, sturgeon, and smelt:</b> The goal of reductions is to increase end of September storage for Shasta Reservoir.  | Fish and Aquatics | Reclamation         | Annual Report           | Annually |
| <b>Modifications to Water Transfers – Shifting timing during typical irrigation season for salmonids, sturgeon, and smelt:</b> Modifications to water transfers involve shifting the timing of delivery of transfer water during the typical irrigation season.  | Fish and Aquatics | Reclamation         | Annual Report           | Annually |
| <b>Situation-Specific Adjustments to Delta Water Quality Standards – Water temperature related impacts for salmonids, sturgeon, and smelt:</b> Sacramento River flows may decrease in dry years as one approach to conserving storage in Shasta Reservoir. Relaxation of Delta outflow and salinity requirements historically occur in the winter, spring, and summer.   | Fish and Aquatics | Reclamation         | Annual Report           | Annually |
| <b>Egg Incubation and Emergence Water Temperature Objectives – Withdrawing and blending water within Shasta Reservoir for salmonids, sturgeon, and smelt:</b> Water temperature management would target 53.5°F through operation of the Temperature Control Device on Shasta Dam, selectively withdrawing and blending water from different elevations within Shasta Reservoir.  | Fish and Aquatics | Reclamation         | Seasonal Annual Reports | Annually |
| <b>Drought Operations Priority Framework – Winter-run Chinook salmon spawning water temperatures for salmonids, sturgeon, and smelt:</b> Reclamation will develop a Drought Emergency Plan that establishes system priorities and seeks to provide winter-run Chinook salmon spawning water temperatures.  | Fish and Aquatics | Reclamation         | Report                  | Annually |
| <b>Delta Smelt Adult Entrainment Protection Action (Turbidity Bridge) – Continuous bridge of turbidity:</b> If after a “First Flush” Action or after December 20, whichever occurs first, daily average turbidity remains or becomes elevated to 12 FNU or higher at each of three turbidity sensors in the OMR corridor creating a continuous bridge of turbidity from the lower San Joaquin River to the CVP and SWP export facilities, Reclamation and DWR will manage exports to achieve a five-day average OMR flow that is no more negative than -3,500 cfs until the daily average turbidity in at least one of the | Fish and Aquatics | Reclamation and DWR | Annual Report           | Annually |

| Avoidance Measures  | Impact            | Responsible Party | Verification                | Timing   |
|---|-------------------|-------------------|-----------------------------|----------|
| three turbidity sensors is less than 12 FNU for two consecutive days, thereby indicating a break in the continuous Turbidity Bridge.  |                   |                   |                             |          |
| <b>Minimum Instream Flows – Temporary reductions in reservoir releases for salmonids, sturgeon, and smelt:</b> Minimum instream flows are temporary reductions in reservoir releases to preserve water storage. | Fish and Aquatics | Reclamation       | Seasonal and Annual Reports | Annually |
| <b>Pulse Flows – Releases of water from reservoirs for salmonids, sturgeon, and smelt:</b> Pulse flows are spatiotemporally coordinated releases to benefit migration of fish.                                  | Fish and Aquatics | Reclamation       | Seasonal and Annual Reports | Annually |

## Attachment 5. Mitigation Measures Not Adopted

Table 5-1. Mitigation Measures not Adopted

| Mitigation/Avoidance Measure  | Impact              | Rationale   |
|---|---------------------|---|
| <b>AG-1: Diversify Water Portfolios – Water agencies diversifying their water portfolios:</b><br>Diversification could include the sustainable conjunctive use of groundwater and surface water, water transfers, water conservation and efficiency upgrades, and increased use of recycled water or water produced through desalination where available.   | Agricultural Lands  | We received input from the public and interested parties that this measure is not widely feasible and may not be effective. Moreover, this measure is outside of Reclamation's control. |
| <b>VIS-2: Develop a Visual Resource Monitoring and Mitigation Program for San Luis Reservoir:</b> A program will be developed and implemented to reduce, minimize, or eliminate adverse changes in visual resources along San Luis Reservoir, such as substantial exposure of typically inundated substrate.  | Visual Resources    | limited agency resources are to be used in a different capacity.  |
| <b>WQ-1: Develop a Water Quality Mitigation and Monitoring:</b> A program shall be developed and implemented to reduce, minimize, or eliminate increases in water quality constituents.   | Water Quality       | Reclamation meets its water quality requirements through D-1641.  |
| <b>Mitigation Measure BIO-3: Real-time Group Considerations for Foothill Yellow-legged Frog:</b> Reclamation will develop and implement field evaluations to inform real-time groups to minimize impacts to foothill yellow-legged frog and their aquatic habitat. Reclamation will coordinate with other monitoring efforts, as relevant, to reduce the data gap regarding known occupied and predicted occupied habitat of foothill yellow-legged frog in the action area and to identify comprehensive and consistent measures to improve the potential for conservation of these species and associated aquatic habitats. Field evaluations for foothill yellow-legged frog for all flow operations will inform real-time groups to minimize impacts to terrestrial biological resources for operational decisions and will be conducted in coordination with the various technical teams (e.g., SHOT) and the program will be developed in coordination with USFWS and CDFW.<br><br>The monitoring approach includes the following principles which would be incorporated into any future changes to monitoring programs addressed in a subsequent consultation: | Terrestrial Species | Foothill Yellow legged frog were not identified to be adversely affected in the 2024 ESA Section 7 consultation with USFWS.   |



| Mitigation/Avoidance Measure  | Impact              | Rationale  |
|---|---------------------|--|
| <ul style="list-style-type: none"> <li>Chapter 3: Incorporate an aquatic habitat and ecosystem monitoring enterprise for the long-term operations of the CVP and SWP to effectively measure physical conditions, water quality, and species abundance and distribution.</li> <li>Chapter 4: Provide robust synthesis of data to incorporate results and lessons learned.</li> </ul> <p>Species-specific conservation actions to assess the condition of foothill yellow-legged frog and viability of aquatic habitat in the action area are described below.</p> <p>Protocols for documenting occurrences of all life-stages of foothill yellow-legged frog (including monitoring intervals) and assessing their habitat will be developed by Reclamation, in conjunction with the USFWS and CDFW, based on the best available protocol for this species (e.g., Seldenrich and Pool 2002). This information will be used to document baseline levels for population monitoring. Surveys will include the following, as needed, to generate a robust synthesis of results for the monitoring program:</p> <ul style="list-style-type: none"> <li>Chapter 5: Stream reaches occupied by adult foothill yellow-legged frog and stream reaches used for breeding (e.g., based on presence of egg masses or tadpoles).</li> <li>Chapter 6: Unoccupied breeding habitat with the potential to support breeding populations (typically upstream or downstream of occupied habitat).</li> <li>Chapter 7: An assessment of riparian vegetation and stream substrate along occupied and unoccupied stream reaches.</li> <li>Chapter 8: Presence of non-native bullfrogs, crayfish, and non-native, predatory fish species.</li> <li>Chapter 9: Presence of other factors that could potentially affect breeding success.</li> </ul> |                     |  |
| <p><b>Mitigation Measure BIO-2: Northwestern Pond Turtle – Real-Time Group Considerations:</b></p> <p>Reclamation will develop and implement field evaluations to inform real-time groups to minimize impacts to northwestern pond turtle and their aquatic habitat. Reclamation will coordinate with other monitoring efforts, as relevant, to reduce the data gap regarding known occupied and predicted occupied habitat of northwestern pond turtle in the action area and to identify comprehensive and consistent measures to improve the potential for conservation of these species and associated aquatic habitats. Field evaluations for northwestern pond turtle for flow operations will inform real-time groups to minimize impacts to terrestrial biological resources for operational decisions and will be conducted in coordination with the various technical teams (e.g. SHOT) and the program will be developed in coordination with USFWS and CDFW.</p>  | Terrestrial Species | Not specifically related to the operations of the CVP and SWP. |

| Mitigation/Avoidance Measure  | Impact     | Rationale                    |
|---|------------|------------------------------|
| <p>The monitoring approach includes the following principles which would be incorporated into any future changes to monitoring programs addressed in a subsequent consultation:</p> <ul style="list-style-type: none"> <li>• Incorporate an aquatic habitat and ecosystem monitoring enterprise for the long-term operations of the CVP and SWP to effectively measure physical conditions, water quality, and species abundance and distribution.</li> <li>• Provide robust synthesis of data to incorporate results and lessons learned.</li> <li>• Protocols for monitoring northwestern pond turtle (including monitoring intervals) and assessing their habitat will be developed by Reclamation, in conjunction with the USFWS and CDFW, based on the best available scientific methods for this species (e.g., Bury et al. 2001; Oregon Department of Fish and Wildlife 2020). This information will be used to document baseline levels for population monitoring. Surveys will include the following, as needed, to generate a robust synthesis of results for the monitoring program:</li> <li>• Assess the quality of occupied and unoccupied (typically adjacent to occupied habitat) western pond turtle habitat in stream reaches.</li> <li>• Document the presence of basking sites that could be monitored repeatedly.</li> <li>• Assess the relative quality of adjacent upland nesting and overwintering habitat, particularly in areas where nesting has been documented in the past.</li> <li>• Evaluate the presence of factors that could affect breeding success (e.g., adjacent land use).</li> <li>• Document whether young turtles are present (as an indication of whether successful reproduction is occurring).</li> </ul> |            |                              |
| <p><b>Mitigation Measure REC-1: Update Public Information on Changing Recreation Conditions:</b> Reclamation will facilitate updates to widely available information (websites or other sources) to inform the public when adverse changes in average water elevation, river flows, or seasonal fluctuations occur to recreation resources, depending on different factors such as the type of recreation and intensity of the activity (e.g., advanced whitewater rafting versus less-advanced rafting)</p>  | Recreation | May already be occurring     |
| <p><b>Mitigation Measure AQUA-2: Delta Smelt Monitoring:</b> Reclamation will continue to monitor Delta smelt.</p>  | Aquatic    | Addressed by Proposed Action |
| <p><b>Mitigation Measure AQUA-3: Longfin Smelt Monitoring:</b> Reclamation will continue to monitor Longfin smelt.</p>  | Aquatic    | Addressed by Proposed Action |

## **Attachment 6. Comment Letters Received on Final EIS**

## Warner, Timothy J

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**From:** Gordon, Stephanie (Skophammer) <GORDON.STEPHANIES@EPA.GOV>  
**Sent:** Monday, December 16, 2024 1:58 PM  
**To:** Warner, Timothy J  
**Cc:** Riddle, Diane@Waterboards  
**Subject:** [EXTERNAL] FEIS Comments Long Term Operations  
**Attachments:** 2024-12-13\_EPA Comments\_Long Term Operations FEIS-signed.pdf

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Hello Tim Warner,  
Please find attached EPA's comments on the Final EIS for the Long Term Operations. EPA is submitting these comments because Section 309 of the Clean Air Act requires EPA to review and comment on the environmental impact of any proposed federal action subject to NEPA's environmental impact statement requirements. Thank you for your response to our comments on the Draft EIS.

Thank you,  
Stephanie

Stephanie Skophammer Gordon  
U.S. Environmental Protection Agency, Region 9  
Environmental Review Branch  
75 Hawthorne St.  
San Francisco, CA 94105  
(415) 972-3098  
Pronouns: she/her  
[gordon.stephanieS@epa.gov](mailto:gordon.stephanieS@epa.gov)  
Please do not mail me any hard copies.



## REGION 9

SAN FRANCISCO, CA 94105

December 13, 2024

Tim Warner  
U.S. Bureau of Reclamation  
Attention: Bay-Delta-Office  
801 I Street, Suite 140  
Sacramento, California 95814

Subject: EPA Comments on the Final Environmental Impact Statement for Long-Term Operations of the Central Valley Project and State Water Project, California (EIS No. 20240211)

Dear Tim Warner:

The U.S. Environmental Protection Agency has reviewed the Bureau of Reclamation's above-referenced document pursuant to the National Environmental Policy Act and our NEPA review authority under Section 309 of the Clean Air Act. The CAA Section 309 role is unique to EPA. It requires EPA to review and comment on the environmental impact of any proposed federal action subject to NEPA's environmental impact statement requirements and to make its comments public.

Reclamation has selected Alternative 2 Multi-Agency Consensus as the preferred alternative. It includes actions developed with California Department of Fish and Wildlife, Department of Water Resources, National Marine Fisheries Service, and US Fish and Wildlife Service to harmonize operational requirements of the Central Valley Project with California Endangered Species Act requirements for the State Water Project. Alternative 2 is analyzed in phases to accommodate voluntary flow contributions and State Water Resources Control Board decisions, including 1) operations with a Temporary Urgency Change Petition; 2) the full Voluntary Agreement alternative to the Bay-Delta Plan update; 3) early implementation of Delta export reductions; and 4) no additional winter and spring Delta outflow. NMFS, USFWS, and CDFW have all finalized their Endangered Species Act decision documents.

The EPA recognizes the need for improved water management in California and has been a cooperating agency on this project to ensure that federal decision making concerning new water operations appropriately considers environmental impacts, including cumulative impacts

associated with other proposed and planned water infrastructure projects and water quality control plans. In our comments on the Draft EIS, we identified several topics or resource areas that would benefit from additional information or analysis in the Final EIS, including project operations, scope of analysis, climate impacts, and surface water quality. We appreciate Reclamation's response to our comments provided in the Final EIS.

As noted in the Executive Summary, Preferred Alternative 2 accommodates operations with Temporary Urgency Change Petitions (TUCP). However, details regarding TUCPs (under what conditions they would occur, what criteria they would apply to, and what locations would be affected) are not described in the detailed descriptions of Alternative 2 within Chapter 3 or, as mentioned in the Response to Comments, Appendix G. EPA remains concerned that including TUCPs in planned operations is not appropriate given the infrequent and exceptional circumstances which are they are requested and approved. We recommend more transparent consideration be given to when and how TUCPs will be utilized by Reclamation in their Long-Term Operations of the CVP.

The EPA appreciates the opportunity to provide comments on this Final EIS. If you have any questions, please contact me at [donez.francisco@epa.gov](mailto:donez.francisco@epa.gov) or Stephanie Gordon at [gordon.stephanies@epa.gov](mailto:gordon.stephanies@epa.gov).

Sincerely,

**FRANCISCO  
DONEZ**

Digitally signed by  
FRANCISCO DONEZ  
Date: 2024.12.13 15:11:07  
-08'00'

Francisco Dóñez  
Manager  
Environmental Review Section 2

Cc: Diane Riddle, State Water Resources Control Board

## Warner, Timothy J

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**From:** John Buse <jbuse@biologicaldiversity.org>  
**Sent:** Monday, December 16, 2024 5:31 PM  
**To:** BDO Comments, BOR MPR  
**Subject:** [EXTERNAL] Comments on Final EIS for Long-Term Operations of CVP and SWP  
**Attachments:** 2024.12.16 FEIS Comments.pdf

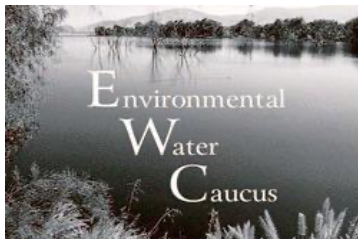
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Please see the attached comments on the subject Final EIS:

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John Buse  
Senior Counsel  
Center for Biological Diversity  
Phone: (323) 533-4416

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December 16, 2024  
U.S. Bureau of Reclamation California Great Basin Region  
Via email: sha-mpr-bdo@usbr.gov

Re: Comments on Bureau of Reclamation FEIS (EIS No. 20240211) on Long-Term Operations of the CVP and SWP

Dear U.S. Bureau of Reclamation:

By this letter, our public interest organizations comment, pursuant to the National Environmental Policy Act (NEPA), on the U.S. Bureau of Reclamation (Reclamation) Final Environmental Impact Statement (Final EIS) on Long-Term Operations (LTO) of the Central Valley Project (CVP) and State Water Project (SWP). The Final EIS was issued for public review on November 15, 2024. These comments are submitted by Sierra Club California, AquAlliance, Center for Biological Diversity, California Water Impact Network, Environmental Water Caucus, and Planning and Conservation League.

The Final EIS and Response to Comments (RTC) failed to address several specific comments from Sierra Club, et al.'s September 6, 2024 letter regarding the Draft EIS and inadequately responded to others. The Final EIS still contains myriad inadequacies, including the omission of relevant information regarding impacts on endangered and threatened species,



failure to include environmentally protective alternatives, and inadequate assessment of several reasonably foreseeable impacts. We urge Reclamation to revise or supplement the Final EIS to comply with NEPA.

**I. Information in the Staff Report Pertains to the EIS Because the Bay-Delta Plan Affects Long-Term Operation of the SWP and CVP.**

The Final EIS still omits critical information on impacts to endangered and threatened species and the environment from the State Water Resources Control Board (Water Board)’s Draft, *Staff Report/Substitute Environmental Document in Support of Potential Updates to the Water Quality Control Plan for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary for the Sacramento River and its Tributaries, Delta Eastside Tributaries, and Delta* (Staff Report), despite numerous comments urging Reclamation to include this information. Reclamation largely responds to this glaring omission by insisting that information on impacts in the Staff Report does not “pertain” to the Final EIS here. (*See e.g.* RTC at 224.) This is incorrect for several reasons.

First, as Reclamation is aware, the Long-Term Operation of the Projects and the Staff Report’s proposed amendments to the Bay-Delta Water Quality Control Plan (Bay-Delta Plan) are inextricably intertwined: The Long-Term Operation affects the Delta, and proposed Bay-Delta Plan amendments may very well constrain the Long-Term Operation of the Projects. This is because the State Water Board’s Decision 1641 (or D-1641) places responsibility for the Plan’s implementation on Reclamation and the California Department of Water Quality Resources (DWR):<sup>1</sup> The Bay-Delta Plan requires the SWP and CVP to meet certain water quality and flow objectives in the Delta to maintain desired salinity levels for in-Delta diversions (*e.g.*, water quality levels for in-Delta water supplies) and fish and wildlife, among other things. (*See* Cal. Water Code §13160.) The Bay-Delta Plan’s restrictions, as a result, frequently affect the

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<sup>1</sup> California Environmental Protection Agency, State Water Resources Control Board, “Revised Water Right Decision 1641,” March 15, 2000, at [https://www.waterboards.ca.gov/waterrights/board\\_decisions/adopted\\_orders/decisions/d1600\\_d1649/wrd1641\\_1999dec29.pdf](https://www.waterboards.ca.gov/waterrights/board_decisions/adopted_orders/decisions/d1600_d1649/wrd1641_1999dec29.pdf).

amount and timing of water available for pumping and export from the Delta, sometimes reducing Delta exports to CVP and SWP water users south of the Delta.<sup>2</sup>

In light of their intertwined nature, it is inconceivable that the Staff Report's information supporting the proposed Bay-Delta Plan amendments and information regarding impacts from the Voluntary Agreements would not "pertain" to the Long-Term Operation of the CVP and SWP, as Reclamation suggests. (*E.g.*, RTC at 224, 232, 234-35.) The Staff Report includes, for example, critical information on the Projects' impacts on the Delta, indicating that "[n]ative species in the Bay-Delta ecosystem are experiencing an ecological crisis" (Staff Report, Ch. 7.12, Hydrology and Water Quality, 7.12.1 Surface Water, p. 7.12.1-1) largely due to reductions in flow, diversions, and exports. And it proposed the proposed Plan amendments as an alternative, while also assessing the very alternative Reclamation assesses in its Final EIS Alternative 2: the Voluntary Agreements. Thus, considering the Projects' impacts on the Delta and its species, as described in the Staff Report, Reclamation needed to disclose and assess the Staff Report's information in its Final EIS for Long-Term Operation of the Projects.

Second, another theme from Reclamation's responses centers on its theory that it need not assess possible conflicts with its proposed Plan amendments in the Final EIS because the Water Board has not yet adopted the proposed Plan amendments. (RTC at 254-55.) But the CEQ NEPA regulations state otherwise: an EIS "shall include an analysis of . . . *possible* conflicts between the proposed action and the objectives of Federal, regional, State, Tribal, and local plans, policies, and controls for the area concerned[.]" (40 C.F.R. § 1502.16(a)(4) (emphases added).) While not yet adopted, the Staff Report undoubtedly describes "possible" conflicts between the proposed Plan amendments and the preferred alternative Reclamation chose here, as the Staff Report goes so far as to state: "Failing to take actions proposed by the proposed Plan amendments could result in the loss of Delta function beyond restoration of its original function and, therefore, *would result in a significant irreversible environmental change.*" (Staff Report, Ch. 7.23, Cumulative Impact Analysis, Growth-Inducing Impacts, and Significant Irreversible Environmental Changes, p. 7.23-69) (Emphasis added.) This needed further assessment in Reclamation's Final EIS.

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<sup>2</sup> See U.S. Department of the Interior (DOI), Bureau of Reclamation, Mid-Pacific Region, Long-Term Central Valley Project Operations Criteria and Plan, Sacramento, CA, May 22, 2008, pp. 2-6.

However, even without this explicit conflict, the fact that the Water Board has not yet adopted the proposed Plan amendments does not mean the Staff Report information supporting that amendment is irrelevant to Long-Term Operation of the Projects. NEPA requires an evaluation of “any reasonably foreseeable adverse environmental effects” of the proposed action “to the fullest extent possible.” (42 U.S.C. § 4332(2)(C).)<sup>3</sup> And the information in the Staff Report describes reasonably foreseeable impacts on species and habitat in the Delta from diversions, exports, and insufficient flow: all impacts partially resulting from the Projects’ operation, and which may continue to result should the Water Board not adopt the proposed Plan amendments.

Finally, Reclamation’s omission of information in the Staff Report in the Final EIS contradicts NEPA’s strong policy in favor of disclosure. NEPA requires disclosure “to the fullest extent possible.” (42 U.S.C. § 4332.) “One of the purposes of an EIS is to ensure full disclosure of the environmental consequences of a project.” *Columbia Basin Land Protection v. Schlesinger*, 643 F.2d 585, 594 (9th Cir. 1981.) The Supreme Court agreed with this sentiment in *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989), stating “The sweeping policy goals announced in § 101 of NEPA are thus realized through a set of ‘action-forcing’ procedures that require that agencies take a “‘hard look’ at environmental consequences,” [citation omitted], and that provide for broad dissemination of relevant environmental information.” (Emphasis added.) Thus, in omitting critical information in a readily available Staff Report, Reclamation unlawfully failed to adequately disclose relevant information in its Final EIS.

In sum, the public is entitled to a full and fair discussion of significant effects of diversions of freshwater for CVP and SWP operations on endangered and threatened fish species. Reclamation must prepare a supplemental Draft EIS that discloses and discusses the information provided by expert agencies and the new information in Staff Report. In particular, it is critical for a supplemental Draft EIS to also disclose and discuss the expert agencies’

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<sup>3</sup> The Long-Term Operation of the Projects and the proposed Plan amendment supported by the Staff Report may also be viewed as “connected actions” because the preferred alternative for the Projects’ Long-Term Operation cannot proceed if the Water Board adopts the proposed Plan amendments. (40 C.F.R. § 1501.3 (b)(2) (defining connected actions as those that “[c]annot or will not proceed unless other actions are taken previously or simultaneously.”).) Thus, the Staff Report’s assessment supporting the foreseeable proposed Plan amendment adoption should have been taken into account here.

information indicating that the Voluntary Agreements will not sufficiently protect the endangered and threatened fish species.

## **II. Reclamation Failed to Disclose Expert Agency Disagreement Regarding the Voluntary Agreements in the Final EIS.**

The Final EIS fails to disclose relevant information, including disagreements among expert agencies regarding the Voluntary Agreements' effectiveness, included in Alternative 2. This violates NEPA regulations, which mandate that "[a]t appropriate points in the draft statement, the agency *shall* discuss *all major points of view* on the environmental effects of the alternatives, including the proposed action." (40 C.F.R. § 1502.9(b)) (Emphasis added.) Courts have made plain this includes disagreements: Agencies must not only recite dissenting opinions; they must "analyze," "respond to," and "discuss" them. *Ctr. for Biological Diversity v. U.S. Forest Serv.*, 349 F.3d 1157, 1168 (9th Cir. 2003); *Seattle Audubon Soc'y v. Espy*, 998 F.2d 699, 704 (9th Cir. 1993) (finding that the Forest Service was required to address in the final environmental impact statement scientific criticisms opposing evidence upon which the final statement's management strategy rested); *Sierra Club v. Bosworth*, 199 F. Supp. 2d 971, 981 (N.D. Cal. 2002) (concluding that a reasoned discussion of major scientific objections must be disclosed in the final impact statement); *W. Watersheds Project v. Zinke*, 441 F. Supp. 3d 1042, 1087 (9th Cir. 2020) (NEPA's requirement that responsible opposing viewpoints are included in the final impact statement "reflects the paramount Congressional desire to internalize opposing viewpoints into the decision-making process to ensure that an agency is cognizant of all the environmental trade-offs that are implicit in a decision.") (citing *California v. Block*, 690 F.2d 753, 770-71 (9th Cir. 1982).) None of that was done here.

Specifically, Reclamation failed to respond to comments that it omitted information provided by EPA and the National Marine Fisheries Service (NMFS) describing the Voluntary Agreements' inadequacies and omitted these disagreements from assessment of Alternative 2 in the Final EIS. Sierra Club, et al.'s previous comments noted EPA's Staff Report, explaining that the Voluntary Agreements "do not provide flow to ensure year-round protection or protection in critical dry years" and that substantial funding has not been secured. (EPA Comment on Staff Report, pp. 6-7.) And commenters referenced NMFS's similarly expressed concern that (1) Voluntary Agreements' flow assets would not be deployed during critical water years when ESA-listed species are at highest risk of extinction; (2) the flow commitments in the Voluntary

Agreement Term Sheet are nonbinding and “would not provide a significant difference in average flow relative to the baseline (Alt1)”; and (3) the total flows that would be expected under the proposed Voluntary Agreements is much less (range of 1-43 percent, depending on location/source and water year type) than what would occur under the Proposed Plan Amendments alternative. (NMFS Comment, p. 5.)

Nevertheless, the Final EIS ignores these expert comments and instead supports the Voluntary Agreements option. In leaving out EPA and NMFS’s disagreements from its discussion of Alternative 2 (which includes the Voluntary Agreement alternative to the Bay-Delta Plan update), Reclamation’s Final EIS hides from the public that Reclamation plans to do the opposite of the Water Board and other expert agencies recommend, in violation of NEPA’s requirement for full disclosure.

This omission and inadequate assessment requires a supplemental Draft EIS. The public is entitled to a full and fair discussion of significant effects of diversions of freshwater for CVP and SWP operations on endangered and threatened fish species under Alternative 2. Reclamation must prepare a supplemental Draft EIS that discloses and discusses the information provided by expert agencies, specifically the information that the Voluntary Agreements will not protect the endangered and threatened fish species.

### **III. The Final EIS Still Fails to Disclose CDFW’s Comments on the Staff Report.**

The Final EIS also claims it did not need to include the California Department of Fish and Wildlife (CDFW) and NMFS’s Staff Report comments because the agencies did not explain *how* to consider their Staff Report comments in the context of the EIS for this project. (RTC at 234-35.) This too contorts Reclamation’s responsibilities under NEPA, which imparts a duty on Reclamation to disclose relevant information “to the fullest extent possible.” (42 U.S.C. § 4332.)

Undoubtedly the information NMFS and CDFW provided is relevant here, as it describes conditions in the Delta required to support endangered and threatened species. NMFS specifically noted, for example, “the important relationship between flow and the survival of juvenile Chinook salmon during their outmigration through the Sacramento River and Delta” and encouraged “unimpaired hydrologic flow regime to support all anadromous salmonid and sturgeon life history stages and the ecological function of critical and essential fish habitat” (NMFS Comment, p. 2): two critical factors Reclamation needed to consider in selecting its

preferred alternative for Long-Term Operation impacting the Delta. And CDFW explained that “[i]n recent years, the poor water quality conditions in the Sacramento River watershed and Bay-Delta, exacerbated by drought, have brought fish species listed under the protection of state and federal Endangered Species Acts to levels near extinction or extirpation.” (CDFW Comment, pp. 2-3.) These comments were relevant and critical to disclose, whether the agencies instructed Reclamation on how to consider them or not.

#### **IV. The Final EIS Unlawfully Excludes Analysis of Possible Conflicts Between LTO of the Projects and the Objectives of State and Federal Plans, Policies, and Controls for the Area Concerned.**

The Final EIS also lacks the required analysis of possible conflicts between the agency action and the objectives of state plans, policies, and controls. First, Reclamation failed to adequately respond to comments that it failed to analyze the California Endangered Species Act (CESA) for potential conflicts in the EIS. Instead, it merely pointed to Standard Response 2, which states only that DWR intends to seek a new Incidental Take Permit (ITP) from CDFW, which would provide CESA authorization for SWP operations regardless of whether there are changes to federal law during the term of the ITP. (RTC at 28.) But nowhere does the Final EIS assess consistency with CESA’s policy “favoring protection of a listed species over projects that might jeopardize them or their habitats,” (Fish & G. Code, § 2053); *Mountain Lion Foundation v. Fish and Game Com.* (1997) 16 Cal.4th 105, 125, nor Fish & Game Code section 2053, which declares it “the policy of the state that public agencies should not approve projects as proposed which would jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of those species, if there are reasonable and prudent alternatives available consistent with conserving the species or its habitat which would prevent jeopardy.” (Fish & G. Code, § 2053.) The Final EIS fails to even disclose, let alone analyze, the possible conflicts between the proposed action and CESA’s policies and controls.

Second, regarding Reclamation’s failure to assess the Project’s consistency with the Delta Reform Act, nowhere does the Response to Comments address this issue. Instead, Reclamation points to Chapters 4–22 regarding its general analysis of “potential environmental effects *related* to the Delta Reform Act.” (RTC at 257.) But what remains missing in the Final EIS is any assessment of *consistency* and potential conflict with the Delta Reform Act’s objectives,

including the established State policy “to reduce reliance on the Delta in meeting California’s future water supply needs through a statewide strategy of investing in improved water supplies, conservation, and water use efficiency,” (Water Code § 85021); the Act’s policy to “[r]estore the Delta ecosystem, including its fisheries and wildlife, as the heart of a healthy estuary and wetland ecosystem,” (Water Code § 85020(c); and the Act’s “coequal goals” of “providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem” in a manner that “protects *and enhances* the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place.” (Water Code § 85054) (Emphasis added.)

Third, the Final EIS lacks analysis of potential conflicts with the objectives of the Public Trust Doctrine, with Reclamation instead pointing to its general assessment of impacts on public trust resources. (RTC at 258.) This is inadequate. As the Delta Reform Act mandates, the Public Trust Doctrine remains “the foundation of state water management policy and are particularly important and applicable to the Delta.” (Water Code § 85023.) It encapsulates the state’s “affirmative duty to take the public trust into account in the planning and allocation of water resources, and to *protect public trust uses whenever feasible.*” *National Audubon Society v. Superior Court* (1983) 33 Cal.3d 419, 446 (Emphasis added.)

Reclamation further responds that “[a]nalyzing past allocation decisions is not within the scope of this EIS.” (RTC at 258.) But that is the duty the Public Trust Doctrine requires: “a duty of continuing supervision over the taking and use of the appropriated water. In exercising its sovereign power to allocate water resources in the public interest, *the state is not confined by past allocation decisions which may be incorrect in light of current knowledge or inconsistent with current needs.*” *National Audubon*, 33 Cal.3d 419, 447 (Emphasis added.) The Final EIS failed to even mention, let alone analyze, whether past water allocation decisions may be inconsistent with current needs and the duty to protect public trust resources. Consequently, the Final EIS failed again to analyze possible conflicts between the proposed action and California’s public trust doctrine.

Fourth, the Final EIS also fails to assess possible conflicts with the objectives of California’s reasonable use doctrine. Reclamation again insists it did not need to assess the reasonable use doctrine for potential conflicts because analyzing past allocation decisions is not within the scope of the Final EIS. (RTC at 260.) But again, NEPA regulations require assessment

of possible conflicts between state and federal objectives. Considering that the reasonable use doctrine is enshrined in the California Constitution and ubiquitous throughout the state water code, the EIR, at the very least, needed to disclose and analyze possible conflicts as a result of unreasonable use or unreasonable method of use of CVP and SWP exports.

And finally, Reclamation failed to disclose or assess consistency between the objectives of the Central Valley Project Improvement Act (CVPIA) and the Long-Term Operation of the Projects in the Final EIS, instead pointing to a sparse discussion of the CVPIA in Appendix C. (RTC at 261-62.) While Appendix C does mention the CVPIA and its objectives, nowhere does Reclamation disclose or discuss potential conflicts between the Project and the CVPIA's objectives, nor does Reclamation point to any such discussion in its Response to Comments.

#### **V. The Final EIS Unlawfully Omits Disclosure and Analysis of Water Transfers.**

Per USBR's own NEPA regulations, an EIS must include a description of the proposed action. 43 C.F.R. § 46.415(a)(2); *see also* 40 C.F.R. § 1502.14(b) [an EIS must "[d]evote substantial treatment to each alternative considered in detail including the proposed action . . ."]. The EIS's project description is deficient because it describes water transfers both as part, and as independent from, the proposed action. Specifically, the EIS at 3-15 states, "The actions taken by contractors to make water available for these water transfers (i.e., reducing consumptive use by crop idling and shifting, reservoir storage releases, or groundwater substitution) have separate environmental compliance and are not a component of this EIS. However, the specific timing and operations associated with the conveyance of the water to be transferred is a component to all alternatives analyzed in this EIS." (See also, EIS at 3-46, 3-67, 12-58.) Because the timing and operations associated with the conveyance of the transfer *is* admittedly part of this proposed action, the whole of the underlying water transfer projects must be considered as part of the whole of the current proposed action, since the timing and operation are essentially inextricable from the water transfer itself. CEQ regulations section 1502.4(a) states that "[p]roposals or parts of proposals which are related to each other closely enough to be, in effect, a single course of action shall be evaluated in a single impact statement." CEQ regulations section 1508.25(a)(1), meanwhile, directs agencies to study "connected actions" in "the same impact statement," and sets forth criteria for determining whether actions are "connected." Thus, the EIS also impermissibly piecemeals individual components of the water transfers it provides for. Nowhere



in its “Groundwater,” “Fish and Aquatic Resources,” or “Terrestrial Biological Resources” section does the EIS quantify or analyze the effects of these groundwater substitution water transfers, or crop idling water transfers. However, the effects of these projects are well known to the Bureau, and should be included in this EIR.<sup>4</sup> A lead agency violates NEPA by “failing to provide the public with ‘sufficient information to . . . generate meaningful comment’” (*Sierra Club v. Flowers*, 423 F.Supp.2d 1273, 1329 (S.D. Fla. 2006) quoting 33 C.F.R. § 325.3(a); 40 C.F.R. §§ 15001.(b), 1500.2, 1506.6.)

## **VI. The Final EIS Fails to Include the Required Range of Reasonable Alternatives.**

As explained in prior comments, despite state law objectives focused on reduced reliance on the Delta and conservation, the Final EIS again includes no alternative focused on reducing reliance on the Delta, no alternative focused on restoring the Delta ecosystem including its fisheries and wildlife, and no alternative requiring water conservation, recycling, and greater water use efficiency to reduce the claimed need for exports. This violates NEPA’s plain text, which *requires* federal agencies to “study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources.” (42 U.S.C. § 4332(2)(E); *see also Native Ecosystems Council v. U.S. Forest Serv.*, 428 F.3d 1233, 1245 (9th Cir. 2005) (“Any proposed federal action involving unresolved conflicts as to the proper use of resources triggers NEPA’s consideration of alternatives requirement, whether or not an EIS is also required.”))

NEPA requires an EIS to include a range of reasonable alternatives that meet the purpose and need of the proposed action. (42 U.S.C. § 4332[C][iii].) Courts have repeatedly held that “[t]he existence of a viable but unexamined alternative renders an [EA] inadequate.” *Western Watersheds Project v. Abbey*, 719 F.3d 1035, 1050 (9th Cir. 2013.) And in rejecting any alternatives, the agency must at the very least “briefly discuss the reasons” why alternatives “were eliminated from detailed study.” (40 C.F.R. § 1502.14); *Native Ecosystems Council*, 428 F.3d at 1245 (9th Cir. 2005) (applying § 1502.14 to EA analysis.)

Here, as described *supra* and in our previous comments, conflicts between state and federal objectives and plans do exist, and alternatives are available, yet Reclamation *still* failed to include the proposed Plan amendments as an alternative or the “high flow” alternative in its Final

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<sup>4</sup> See [https://www.usbr.gov/mp/nepa/nepa\\_project\\_details.php?Project\\_ID=18361](https://www.usbr.gov/mp/nepa/nepa_project_details.php?Project_ID=18361).

EIS. In refusing, Reclamation repeats the same refrain: “The SWRCB process is a separate process not suitable for inclusion as an alternative to operate the CVP.” (RTC at 247.) However, nowhere does the Final EIS explain why the proposed Plan amendments or high flow alternative from the Staff Report would not meet the agency action’s purpose. And Reclamation had no excuse: the Water Board identified the proposed Plan amendments set forth in section 7.1 of the Staff Report/SED (Staff Report, pp. 7.1-1 to 7.1-52) in September 2023—*10 months* before Reclamation issued the Draft EIS. There is no doubt Reclamation was aware of these alternatives, considering Reclamation submitted a January 19, 2024 comment letter on the Staff Report, disagreeing with the proposed Plan amendments.

The absence of the required range of reasonable alternatives in the Draft EIS also requires Reclamation to prepare and publish a supplemental Draft EIS. An alternative proposed by the expert Water Board and supported by the expert EPA, NNMFS, and CDFW calls for careful consideration and, at the very least, disclosure to the public. By failing to include or even *reference* the Water Board’s proposed Plan amendment alternative, Reclamation’s Final EIS again fails to “sharply define the issues for the decision maker and the public and provide a clear basis for choice among options” contrary to NEPA Regulation § 1502.14.

## **VII. The Final EIS Again Fails to Comply with NEPA in Analyzing Impacts on Endangered and Threatened Fish Species.**

The Response to Comments and Final EIS still dodge commenters’ core concern as to whether the diversions, including the Projects’ operations, may cause or contribute to the extinction of one or more of the endangered and threatened fish species. Tellingly, Reclamation does not even attempt to point to a specific section of its 18,000+ page analysis on this potential impact, instead referring to a generic description of mandatory EIS components, as well as all chapters 4-22 that evaluate impacts. None of this includes the critical, relevant assessment of impacts of diversions laid out in the Staff Report.

As described in prior comments, the Staff Report states the following regarding impacts of diversions on species:

- “Based on available information regarding several proposed water diversion and conveyance projects and pending water right applications that propose surface water diversions during the wet season, it is assumed that streamflows may be

reduced during the winter and spring under the no project alternative, which could result in potentially significant impacts on aquatic and terrestrial species and habitats in the Sacramento/Delta watershed.” (Ch. 7.24, Alternatives Analysis, p. 7.24-9); and

- Water exports and upstream diversions have combined to reduce the average annual Delta net outflow 33% from 1948 to 1968 and 48% from 1986 to 2005 compared with unimpaired conditions. (Ch. 2, p. 2-106.) Moreover, “Since the 1990s, there also has been a significant decline in spring outflow and a reduction in the variability of Delta outflow throughout the year (see Figure 2. 4-71 Chapter 2, Hydrology and Water Supply) due in part to water diversions as well as hydrology.” (Ch. 5, p. 5-27.)

These are impacts that Long-Term Operation of the Projects *will have*, and Reclamation’s comments on the Staff Report reveal that it knew of these impacts six months before preparing its Draft EIS. Yet the Final EIS once again fails to incorporate an adequate discussion of these important impacts.

California’s native inland fishes (including anadromous species) are experiencing rapid declines, and if present trends continue, many species are likely to go extinct within the next century (Moyle et al., 2011.) The Bay-Delta ecosystem and its inhabitants are particularly vulnerable. As stated in the Staff Report and discussed in previous comments, “Native species in the Bay-Delta ecosystem *are experiencing an ecological crisis*.” (Staff Report, Ch. 7.12, Hydrology and Water Quality, 7.12.1 Surface Water, p. 7.12.1-1.) Many threatened and endangered native fish species rely on adequate flows throughout the Sacramento River and the entire Delta watershed, including but not limited to Sacramento River winter-run Chinook salmon (federally and state endangered), Central Valley spring-run Chinook salmon (federally and state threatened), Central Valley steelhead (federally threatened), Delta smelt (federally threatened and state endangered), Bay-Delta longfin smelt (federally endangered), green sturgeon (federally threatened and a state species of special concern). It is not only possible, but *likely* that Project operations will push these sensitive species even closer to extinction. The impacts to threatened and endangered species must be thoroughly analyzed with the best available science, which the Final EIS entirely fails to accomplish.

Reclamation must prepare a supplemental Draft EIS to discuss the significance of adverse effects on endangered and threatened for species and the degree to which the diversions for the Projects' operations may adversely affect those species. Otherwise, Reclamation will remain in violation of NEPA.

#### **VIII. The Final EIS Again Omits Discussion of Irreversible and Irretrievable Commitments of Federal Resources Involved in the Proposed Action.**

The Final EIS again fails to include “any irreversible and irretrievable commitments of Federal resources which would be involved in the proposed agency action should it be implemented.” (42 U.S.C. §4332(v).) As explained in prior comments, the Water Board concluded in its Staff Report that “[f]ailing to take actions proposed by the proposed Plan amendments could result in the loss of Delta function beyond restoration of its original function and, therefore, would result in a significant irreversible environmental change.” (Staff Report, Ch. 7.23, p. 7.23-69.) But Reclamation dismissed this conclusion as irrelevant because the Water Board made it “pursuant to CEQA for the Draft WQCP amendment not on modifications to the long term operations of the CVP and SWP.” (RTC at 267.)

This response defies logic. As described *supra*, Reclamation and DWR implement the Bay-Delta Plan and are required to meet certain water quality and flow objectives, which often affect the amount and timing of water available to be pumped or exported from the Delta for the Projects. The proposed Bay-Delta Plan amendments thus affect Reclamation's operations, and Reclamation's operations affect the Delta. If the proposed Plan amendment is not adopted, the ongoing Project operations themselves could contribute to this “significant irreversible environmental change.” Reclamation needed to, at the very least, disclose and discuss this in the Final EIS.

#### **IX. The Final EIS Again Omits Assessment of Impacts on Public Health in Environmental Justice Communities.**

The Final EIS fails to adequately assess public health impacts and impacts on environmental justice communities that may result from cyanobacteria harmful algal blooms (CHABs). In its response to comments, Reclamation points to four cursory paragraphs in Chapter 21, Section 21.2.3. (RTC at 267-68.) But nowhere does that section discuss health impacts; rather, it only discusses the likelihood of CHABs.

Reclamation further responds by excusing itself from assessment by deeming a public health analysis too “speculative” since 1) it is unknown where the CHABs may occur, 2) several factors influence the potential for illness, and 3) there is a lack of comprehensive, routine monitoring for CHABs in the Delta. (RTC at 268.) None of these provide adequate excuses, as the “effects [of a proposed action] may be difficult to measure and may be determined ultimately to be too imprecise to influence the [action], but this is precisely the type of determination that only can be intelligently made after the preparation of at least an EA.” *Cal. Wilderness Coal. v. U.S. Dep’t of Energy*, 631 F.3d 1072, 1103 (9th Cir. 2011.) When an agency is uncertain about the possible environmental effects of a proposed action, the proper course is to complete assessment to the best of the agency’s ability, not to avoid environmental analysis altogether. At least some degree of “speculation . . . is implicit in NEPA,” but agencies may not “shirk their responsibilities under NEPA by labeling any and all discussion of future environmental effects as crystal ball inquiry.” *Selkirk Conservation All. v. Forsgren*, 336 F.3d 944, 962 (9th Cir. 2003); *Sierra Club v. FERC*, 867 F.3d 1357, 1374 (D.C. Cir. 2017) (“NEPA analysis necessarily involves some ‘reasonable forecasting,’ and . . . agencies may sometimes need to make educated assumptions about an uncertain future.”)

Here, some information was even readily available to Reclamation, as DWR’s Draft EIR on SWP Long-Term Operations, issued on May 29, 2024, admitted “CHABs . . . have the potential to harm human health or aquatic biota. CHABs are a widespread problem in water bodies worldwide.” (Draft EIR, Ch. 5, Surface Water Quality, p. 5-9.) And according to the Staff Report, “Harmful algal blooms (HABs) have become a regular occurrence in the Delta since 1999,” (Lehman et al. 2005, 2013; Kurobe et al. 2013), and “Delta communities have expressed significant ongoing concerns regarding proliferation of HABs in the Delta and requested that the Water Boards take actions to address these concerns. HABs are a component of the phytoplankton community with potentially severe impacts on fish and wildlife, as well as on human and pet health and safety.” (Staff Report, Ch. 5, Proposed Changes to the Bay-Delta Plan for the Sacramento/Delta, p. 5-60) (Emphasis added.) EPA also expressed concern in its comment letter. (EPA Comments, pp. 1-2.) Reclamation thus had no excuse for failing to provide any information to the public on potential public health impacts on environmental justice communities from CHABs, as NEPA regulations require. (40 C.F.R. § 1501.3(d)(vii).)

**X. The Final EIS Analysis of the Delta Conveyance Project Operation Remains Inadequate.**

The Final EIS still fails to include the requisite analysis of the Delta Conveyance Project. Reclamation's response to comments essentially admits it failed to assess the cumulative impacts of the Delta Conveyance Project along with preferred alternative 2B on threatened and endangered species. (RTC at 271-72.) And then it goes on to promise environmental analysis in the future: "Potential refinements, as well as environmental or regulatory changes that may occur during the planning and construction period prior to initial Delta Conveyance Project operations, will be considered in future project-level permitting consistent with NEPA and ESA"; "additional assessments relative to LTO of the CVP may be necessary"; and "the combined effect of modified ongoing operations of the SWP and the operation of the Delta Conveyance Project will need to be determined." (RTC at 271-72.)

NEPA requires more *at this stage*, not only in the future. (40 C.F.R. § 1502.15.) The Delta Conveyance Project is an approved project with reasonably foreseeable impacts and cumulative impacts on endangered and threatened species, public health, and environmental justice communities. It must be assessed in a revised or supplemental Draft EIS, specifically considering changes in the operation of existing SWP facilities as a result of implementation of Alternative 2B, not just Alternative 2 as Appendix Z currently does.

**XI. The Final EIS Continues to Exclude Numerous Terrestrial Biological Resources Without Explanation.**

The Final EIS still omits several special-status terrestrial species from full assessment without explanation. However, Reclamation responds it *did* assess impacts to all special-status terrestrial species listed in Appendix P, Terrestrial Biological Resources Technical Appendix, Section P.1.8; it just assessed some off the record: "While suitable habitat for these species have the potential to overlap with the project area and/or is present in some areas proposed for operational changes, the operational changes proposed under the alternatives were found not to have the potential for adverse effects on these species; therefore, no further evaluation was completed." (RTC at 275.) Then after making this off-the-record assessment, "[i]n circumstances where effects on the habitat would not differ from effects under the No Action Alternative, it was determined that there would be no potential effect on the species," and complete assessment was not included in the EIS (Final EIS, App. AD, p. 53.)

However, the numerous species included in Appendix P that were not fully assessed have diverse ecologies and habitat requirements. The Final EIS states that habitat information was provided in Appendix P, however this information includes only brief descriptions of habitat types and regions that are occupied by the included species. It does not provide any systematic geographic information on where these habitats occur, let alone any analysis determining whether and how different habitat types would be impacted by the Project, the No Project Alternative, or any other alternatives. The information provided is entirely insufficient to support the claims that so many terrestrial species would not be impacted by the Project.

This is impermissible under NEPA, which requires a “convincing statement of reasons to explain why [a] project’s impacts are insignificant.” *Bark v. United States Forest Serv.*, 958 F.3d 865, 869 (9th Cir. 2020.) This statement of reasons must be in the document itself, as “[a]n agency must defend its actions based on the reasons it gave when it acted. *Dep’t of Homeland Sec. v. Regents of the Univ. of Cal.*, 591 U.S. 1, 24 (2020.) In other words, the Final EIS needed an explanation for Reclamation’s failure to assess impacts to these terrestrial species, yet the Final EIS still fails to articulate one beyond these conclusory sentences in the Response to Comments.

Further, the Final EIS still excludes any consideration of impacts on species present in CVPIA refuges from its analysis of terrestrial biological resources. And Reclamation does not disagree. Its response to comments simply repeats its statement from the DEIS admitting that for the Sacramento River, “Potential reductions in water deliveries to CVPIA wildlife refuges in the Sacramento River watershed under the alternatives could also have impacts on the availability of aquatic habitat, however, Reclamation does not control the distribution of water to CVPIA wildlife refuges beyond initial water year allocations. Therefore, the changes or impacts described for terrestrial resources associated with CVPIA refuges are outside the scope of this alternatives analysis.” (Final EIS, App. AD, p. 54).

Again, NEPA requires more. Agencies must assess all reasonably foreseeable direct and indirect impacts, even *including* non-jurisdictional impacts, in an EIS. *Save Our Sonoran, Inc. v. Flowers*, 408 F.3d 1113, 1122 (9th Cir. 2005) (Defendants must consider impacts of entire subdivision before granting permit to fill waterways running through subdivision even if “permitting authority is limited” to some aspects only); *Ocean Advocs. v. U.S. Army Corps of Eng’rs*, 402 F.3d 846, 867-68 (9th Cir. 2005) (Corps must evaluate oil spill impacts, even when

it lacks authority to regulate the underlying activity or spills); *Standing Rock Sioux Tribe v. U.S. Army Corps of Eng'rs*, 985 F.3d 1032, 1049 (D.C. Cir. 2021) (same.) Throughout Reclamation's assessment, it admits, "The last remaining reproductive population of the giant garter snake in the San Joaquin Valley exists in CVPIA refuges. Reduced water deliveries to CVPIA wildlife refuges in the San Joaquin River under Alternative 3 would have impacts on the availability of aquatic habitat for giant garter snake and northwestern pond turtle." (Final EIS, App. P, p. 13-10). The Final EIS does include impacts of water allocations, which will necessarily affect distribution to CVPIA refuges. The Final EIS therefore needed to include the impacts to terrestrial biological resources in CVPIA refuges including giant garter snakes in its analysis of all alternatives and in all relevant watersheds.

Relatedly, beyond failing to adequately assess impacts on terrestrial species in its Final EIS, Reclamation again fails to include any alternative more protective of terrestrial species. Instead, Reclamation's response to comments points to its Standard Response 4, which also mentions no alternative more protective of terrestrial species. This is inadequate: The Final EIS should have considered at least one alternative that prioritizes the minimization of impacts to terrestrial biological resources.

## **XII. The Proposed Mitigation for Impacts to Terrestrial Biological Resources Remains Inadequate in the Final EIS.**

And furthermore, despite no alternatives offering additional protection for terrestrial species, the Final EIS still fails to include mitigation for all the species that will experience impacts. Rather, the Final EIS still proposes mitigation for only three species—bank swallow, foothill yellow-legged frog, and northwestern pond turtle—excluding numerous others. And the mitigation remains as inadequate as in the Draft EIS: The Final EIS continues to rely on vague and deferred plans to monitor the species with little detail.

Reclamation offered the generic excuse that "NEPA is a procedural requirement and does not require compensatory mitigation for potential impacts." (RTC at 278.) However, while NEPA does not *require* compensatory mitigation, it does require 1) an explanation supporting why Reclamation found only some terrestrial species would be impacted, and 2) a discussion of mitigation measures to offset those impacts, with "sufficient detail to ensure that environmental consequences have been fairly evaluated." *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 352 (1989); (*Okanogan Highlands Alliance v. Williams*, 236 F.3d 468,



477 (9th Cir. 2000) (upholding an EIS where “[e]ach mitigating process was evaluated separately and given an effectiveness rating.”) Reclamation’s final EIS failed to include this mandatory information.

### **XIII. Conclusion**

In sum, Reclamation has failed to adequately respond to comments and produce a legally sufficient Final EIS. To comply with NEPA, Reclamation must promptly revise its EIS or prepare a supplemental Draft EIS and recirculate it for public review and comment.

Sincerely,



*E. Robert Wright, Counsel  
Sierra Club California*

*/s/ Caty Wagner  
Water Campaign Manager  
Sierra Club California*



*Howard Penn, Executive Director  
Planning and Conservation League*



*Conner Everts, Facilitator  
Environmental Water Caucus*



*John Buse, Senior Counsel  
Center for Biological Diversity*

*Carolee Krieger, Executive Director  
California Water Impact Network*



*Barbara Vlamis, Executive Director  
AquAlliance*

**From:** [Whitman, Terri](#)  
**To:** [BDO Comments, BOR MPR](#)  
**Cc:** [O'Hanlon, Daniel](#); [Frink, Russell](#); [Woo Nazal, Andrey](#); [Scott Petersen](#); [Rebecca Akroyd](#); [Rebecca Harms](#); [afebbo@wwd.ca.gov](mailto:afebbo@wwd.ca.gov); [Jeff Payne](#)  
**Subject:** [EXTERNAL] SLDMWA and Westlands Comments on the Final EIS for the Long-Term Operations of the Central Valley Project  
**Date:** Monday, December 16, 2024 4:59:40 PM  
**Attachments:** [2024-12-16 FINAL SLDMWA Comments on FEIS with Exh. A.pdf](#)

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Dear Mr. Warner:

Please find attached comments from San Luis & Delta-Mendota Water Authority (“Water Authority”) and Westlands Water District (“Westlands”) in response to the U.S. Bureau of Reclamation’s (“Reclamation”) Final Environmental Impact Statement for the Long-Term Operations of the Central Valley Project, dated November 15, 2024 (“Final EIS”). Please let us know if you have any difficulties accessing the attached file.

**Terri Whitman**

*Assistant to Daniel J. O'Hanlon, Eric N. Robinson, Holly A. Roberson and Carson Graves*

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December 16, 2024

**VIA EMAIL**

U.S. Bureau of Reclamation, Bay-Delta Plan Office  
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Re: Final Environmental Impact Statement for the Long-Term Operations of the Central Valley Project

Dear Mr. Warner:

The San Luis & Delta-Mendota Water Authority ("Water Authority") and Westlands Water District ("Westlands") appreciate the opportunity to provide these comments in response to the U.S. Bureau of Reclamation's ("Reclamation") Final Environmental Impact Statement for the Long-Term Operations of the Central Valley Project, dated November 15, 2024 ("Final EIS"). As cooperating agencies, the Water Authority and Westlands have provided input throughout this National Environmental Policy Act ("NEPA") process, reflecting their roles as key stakeholders in Central Valley Project ("CVP") operations<sup>1</sup>.

The decisions Reclamation will memorialize in its forthcoming Record of Decision are of critical importance to California's future, affecting protected fish and wildlife species, millions of residents, and millions of acres of prime farmland. The Water Authority operates key CVP infrastructure, and most of its member agencies, including Westlands, depend on the CVP as the principal source of water for users within their service areas. A list of the Water Authority's member agencies is attached as Exhibit A.

We commend Reclamation staff for their efforts in preparing the Final EIS and responding to prior comments. In particular, we want to acknowledge the adaptive management approach outlined in the Final EIS. Despite these efforts, the Water Authority and Westlands remain concerned about several aspects of the Final EIS. Over the past 30 years, the Water Authority's member agencies, including Westlands, have faced a sharp decline in CVP water supply reliability, disproportionately impacting south-of-Delta contractors and economically disadvantaged communities. The preferred alternative, Alternative 2, imposes further reductions in water supply that disproportionately affect the Water Authority's member agencies and the communities they serve. This inequity alone provides ample justification for rejecting Alternative 2.

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<sup>1</sup> The Water Authority and Westlands provided comments on administrative versions of the Draft EIS, on October 16, 2023 and April 19, 2024. The Water Authority and Westlands also provided comments on the public Draft EIS, dated September 9, 2024. Many of these earlier comments are still applicable to the Final EIS and we hereby incorporate those comments and the attachments thereto by reference.

In summary, the Water Authority and Westlands provide the following key comments on the Final EIS: (1) the Water Authority and Westlands appreciate the analysis in the Final EIS that will enable implementation of the Healthy Rivers and Landscapes Program (“HRL Program”), but would like clarification on whether this analysis is also applicable to Alternative 1, Alternative 4, and the No Action Alternative; (2) the Fall X2 Measure should be eliminated from all alternatives because it is not supported by the best available science; (3) the potential future changes to Trinity River Division Operations should be included in the cumulative effects analysis because the impacts of changes to Long-Term Operations of the CVP cannot be fully analyzed without first accounting for potential changes to the operations of the Trinity River Division; (4) Reclamation must make clear in its Record of Decision that actions taken to harmonize CVP operations with the State Water Project (“SWP”) operations shall not reduce CVP deliveries in a manner that conflicts with contractual obligations; (5) considering the significant uncertainties in forecasting the effects of temperature changes, the discussion regarding temperature dependent mortality (“TDM”) estimates in Chapter 12 should include a more robust explanation of the inherent uncertainties associated with this modeling data; and (6) critical gaps in the Draft EIS that were identified in the Water Authority’s and Westlands’ earlier comments remain unaddressed, particularly those related to water supply, groundwater availability, economic and environmental justice impacts, and air quality – meaning that the Final EIS has not been revised to thoroughly evaluate all potential impacts in compliance with NEPA. These comments are explained in greater detail below.

## **1. The Healthy Rivers and Landscapes Program**

Alternative 2 of the Final EIS includes the implementation of the HRL Program, previously referred to as the “Voluntary Agreements.” The Water Authority and Westlands commend Reclamation’s inclusion of this program in the Final EIS and appreciate the analysis provided under Alternative 2 to enable the HRL Program’s implementation, contingent upon approval by the State Water Resources Control Board. While the analysis of the HRL Program is presented in connection with Alternative 2, the Water Authority and Westlands seek confirmation that this analysis is also applicable to Alternative 1, Alternative 4, and the No Action Alternative. If Reclamation adopts any of these alternatives, the Water Authority and Westlands request assurance that the existing analysis is sufficient to support the HRL Program’s implementation under those alternatives as well.

## **2. The Fall X2 Measure Should be Eliminated From All Alternatives**

Reclamation has modified Alternative 4 to remove the Fall X2 requirement in light of recent scientific findings, including the 2024 USFWS Biological Opinion, however, Reclamation’s preferred alternative, Alternative 2<sup>2</sup>, still retains the Fall X2 requirement. (Final EIS, Appendix AD, Table 4-80, pp. 9-10.) As discussed in the Water Authority’s and Westlands’ September 9, 2024 comment letters, advances in scientific knowledge since the Fall X2 was first implemented in 2008 have made clear that it does not achieve its intended purpose of benefiting the delta smelt but does impose substantial water supply costs. Since 2008, the Fall X2 measure has resulted in the redirection of millions of acre-feet of water that could have been beneficially used.

NEPA requires that agencies rigorously explore and objectively evaluate all reasonable alternatives, including those that reflect the best available science. (40 C.F.R. § 1502.14(a).) Both Polansky *et al.*

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<sup>2</sup> The Draft EIS identified Alternative 2B as the “preferred alternative,” however, Alternative 2B was eliminated from the Final EIS and replaced with Alternative 2. (Final EIS, Appendix AD, p. AD-30 [“The Final EIS incorporates the components of Alternative 2B into the updated modeling and analysis of Alternative 2. The Final EIS does not contain a separate Alternative 2B.”].)

(2024) and the 2024 USFWS Biological Opinion strongly support excluding the Fall X2 requirement. However, by retaining Fall X2 as part of the preferred alternative in the Final EIS, Reclamation has failed to adequately address the implications of recent scientific findings and is perpetuating reliance on outdated and unsupported habitat measures. A more-consistent approach to incorporating these new scientific understandings into the NEPA process would have been to exclude Fall X2 from all alternatives, including the preferred alternative. To that end, the Water Authority and Westlands strongly urge Reclamation to adopt Alternative 4, or – if it decides to adopt Alternative 2 – to do so without adopting the Fall X2 measures that it currently includes. By failing to fully incorporate recent scientific findings across all alternatives, let alone the preferred alternative, the Final EIS does not meet NEPA’s requirements for a thorough and informed analysis.

### **3. Potential Future Changes to Trinity River Division Operations Should Be Included in the Cumulative Effects Analysis in the Final EIS**

The Final EIS does not include the potential changes to the Trinity River Division (“TRD”) operations in its cumulative effects analysis. The Final EIS states that Reclamation intends to complete the NEPA and ESA processes for a decision on the potential for new TRD operations by the end of 2025, after conducting additional public outreach in the Trinity River watershed, and once the Trinity-specific NEPA effort is further developed. (Final EIS, Appendix AD, pp. AD-48-49.) This approach overlooks cumulative effects and systemic trade-offs, potentially leaving significant environmental and operational impacts of changes to TRD operations unaddressed.

An EIS must include an analysis of cumulative effects, defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions.” (40 C.F.R. § 1508.1(g)(3).) Courts have emphasized this requirement. (See *Oregon Natural Resources Council Fund v. Goodman*, 505 F.3d 884, 892-93 (9th Cir. 2007) (EIS inadequate for failing to adequately discuss the future impacts of foreseeable projects on listed species).) Reclamation’s proposed changes to TRD operations are a foreseeable project, which means that Reclamation’s decision to exclude evaluation of potential TRD modifications from its cumulative effects analysis fails to comply with NEPA’s requirements.

Reclamation has acknowledged that “the TRD is part of the CVP, and an analysis evaluating potential effects and tradeoffs between CVP divisions as a complete system will be necessary.” (Appendix AD, p. AD-48.) Nonetheless, Reclamation intends to complete its analysis of changes to Long-Term Operations of the CVP without also evaluating the impacts of forthcoming changes to the TRD. An integrated approach that evaluates the CVP as a complete system, including the TRD, would streamline the process and ensure a cohesive evaluation of environmental impacts and trade-offs. Conducting separate NEPA efforts for the Sacramento River/Delta operations and TRD operations risks not only redundancy but also conflicting conclusions that undermine the effectiveness and coherence of Reclamation’s decision-making. Given the acknowledged interdependencies between the TRD and operations in the Sacramento River/Delta, the impacts of changes to Long-Term Operations of the CVP cannot be fully analyzed without first accounting for potential changes to the operations of the TRD.

### **4. The Record of Decision Must Make Clear That the CVP Will Not Be Voluntarily Operated to Satisfy CESA Standards**

Reclamation’s responses to the Water Authority’s and Westlands’ comments acknowledge that the CVP is not subject to regulation under California Endangered Species Act (“CESA”). (Final EIS, Appendix AD, Table 4-80, pg. 4.) However, the description of Alternative 2 still suggests that Reclamation will operate

the CVP to conform to the standards and requirements of CESA and the determinations of the California Department of Fish and Wildlife (“CDFW”). The Final EIS states: “Alternative 2 consists of actions developed with CDFW, DWR, NMFS, and USFWS to harmonize operational requirements of CVP with CESA requirements for the SWP. It includes actions and approaches for the CVP and SWP identified by the state and federal fish agencies, in addition to the water supply and power generation objectives of Reclamation and DWR.” (Final EIS at 3-1.)

Reclamation states that it “may consider potentially reasonable alternatives beyond its own jurisdiction and the jurisdictions of other agencies (federal and otherwise) when determining what reasonable alternatives should be considered.” (Final EIS, Appendix AD, pp. AD-29-30.) Because CESA restrictions can materially differ from restrictions under the federal Endangered Species Act (“ESA”), Reclamation must make clear in its Record of Decision that actions taken to harmonize CVP operations with the SWP operations shall not reduce deliveries in a manner that conflicts with contractual obligations. (See *San Luis & Delta-Mendota Water Authority v. U.S. Dept. of the Interior*, No. 1:11-cv-00952 LJO GSA, E.D. Cal. 2015, 2015 WL 893365 [voluntary actions that reduce exports during “excess conditions” violate federal law].)

**5. Uncertainties With the TDM Models Used to Evaluate Shasta Operating Criteria Should Be Disclosed and the Final Action Should Include Flexibility to Refine Operating Criteria**

The Final EIS states the Anderson and Martin TDM models were used to estimate temperature-dependent egg mortality for Sacramento River Winter run chinook salmon under different alternatives. (Final EIS, Ch. 12, pp. 12-27-12-30; Appendix F, p. F.1-3-24.) Because existing estimates of TDM are based on observations of specific subsets of total redds, there are no direct estimates of TDM that can be used in quantitative modeling. In response to comments regarding the considerable uncertainty associated with these estimates, and the approach to modeling, Reclamation revised Appendix L2 and provided additional clarification regarding these modeling methods.

Considering the significant uncertainties in forecasting the effects of minor changes in temperature changes, the discussion regarding TDM estimates in Chapter 12 should include a more robust explanation of the inherent uncertainties associated with this modeling data. Furthermore, the final action that Reclamation adopts should include the necessary flexibility to refine Shasta operating criteria as it develops a better understanding of how minor changes in temperature affect TDM for listed salmon.

**6. The Final EIS Does Not Adequately Address Environmental Effects to South-of-Delta Communities and Resources**

The Water Authority and Westlands appreciate the monumental effort required for Reclamation to respond to comments in preparing the Final EIS. However, critical gaps identified in the Water Authority’s and Westlands’ earlier comments remain unaddressed, particularly those related to water supply, groundwater availability, economic and environmental justice impacts, and air quality. NEPA requires a thorough and balanced evaluation of all potential impacts associated with Reclamation’s proposed action to ensure informed decision-making, and the following comments outline areas within the Final EIS that have not been revised consistent with NEPA’s requirements.

**a. Groundwater Availability, SGMA Compliance, and Water Supply**

The Final EIS acknowledges that the Sustainable Groundwater Management Act (“SGMA”) will result in less groundwater being available for beneficial uses than under current conditions. (Appendix AD, Table

4-80, pp. 23-25; 64-65.) However, instead of adjusting its quantitative modeling to reflect these enforceable restrictions, Reclamation asserts that “effects of implementing SGMA are not effects of the alternatives.” (*Id.*) This approach is flawed. By omitting legally enforceable limits on groundwater extraction, the Final EIS fails to fully evaluate potential impacts on several resource categories.

The responses to comments note the difficulties for including specific actions for each GSP because a single management strategy does not exist. As a result, Reclamation acknowledges that its modeling “represents effects to groundwater that may be more substantial than when GSP provisions are fully enacted.” (Appendix AD, Table 4-80, p. 34.) The reasonable approach would be to assume some level of reduced groundwater supplies, even if it is not precise, instead of assuming there will be no reduction at all. Because NEPA requires that agencies use high-quality information and ensure scientific integrity in environmental reviews (40 C.F.R. § 1502.24), Reclamation’s decision to exclude existing groundwater use restrictions undermines the reliability of the analysis and leaves critical gaps in assessing how this resource—and interconnected resource categories—will be impacted.

The failure to evaluate groundwater has the most significant impact on the water supply and land use and agricultural resources categories in the Final EIS because the modeling currently assumes that groundwater will be available to meet certain existing demands. Furthermore, reduced surface water availability reduces groundwater recharge, which will likely exacerbate the effects of groundwater restrictions. Reclamation defers evaluation of these foreseeable impacts by asserting that decisions regarding groundwater restrictions are not caused by the alternatives. (Appendix AD, Table 4-80, p. 34 [“effects of implementing SGMA are not effects of the alternatives”].) Contrary to this assertion, groundwater restrictions under SGMA are already in place and there are conservative methods available to simulate potential impacts of reduced groundwater availability.

The need to quantify potential impacts of reduced groundwater availability is underscored by Reclamation’s decision to include assumptions regarding reduced groundwater availability in the economic analysis. This selective approach to evaluating reduced groundwater availability in one section but not in others is inconsistent with NEPA’s mandate to comprehensively evaluate environmental consequences, including a “quantified assessment” of significant impacts. (42 U.S.C. § 4332(2)(C); 40 C.F.R. § 1502.1; *Great Basin Res. Watch v. Bureau of Land Mgmt.*, 844 F.3d 1095, 1104-1106 (9th Cir. 2016).)

#### **b. Economic and Environmental Justice Impacts**

As highlighted in the Water Authority’s and Westlands’ September 9, 2024 comment letters, the Final EIS does not adequately analyze the indirect economic effects of reduced CVP deliveries south of the Delta. While the Final EIS considers direct impacts, such as job losses and increased water costs, it overlooks broader economic ripple effects, particularly on businesses dependent on agricultural workers. Reclamation’s response to this comment is that: “[p]rice effect revenue results would primarily result in changes to proprietor income and are not expected to result in substantial impacts on the regional economy.” (Appendix AD, Table 4-80, p. 28.) This response does not adequately explain why the potential economic effects identified in the Water Authority’s and Westlands comments are not potentially significant. Instead, it raises further questions: why would the changes primarily affect “proprietors” and not farms and farm workers? Why do changes to proprietor income not constitute a significant impact?

The questions above illustrate why the analysis in the Final EIS does not include the requisite “hard look” at all significant impacts associated with the proposed action, including indirect effects. (42 U.S.C. § 4332(2)(C); 40 C.F.R. § 1508.1(g); *Great Basin, supra*, at 1104-06.)

**c. Air Quality and Infrastructure Impacts**

The Water Authority and Westlands also raised concerns in their September 9, 2024 comment letters about the air quality impacts of increased fallowing south of the Delta. The Final EIS acknowledges that groundwater pumping is a primary driver of emissions, and was revised to state that an increase in fallowing would result in the potential for fugitive dust emissions, however, it does not propose any new mitigation measures. (Final EIS, Chapter 9, p. 9-7.) Alternatives 2 and 3 remain likely to exacerbate air quality issues by increasing fallowing in regions where such impacts are already acute. This Final EIS's failure to evaluate mitigation for this impact is inconsistent with NEPA's requirement to assess significant environmental impacts and consider mitigation measures when such effects are identified. (40 C.F.R. §§ 1502.14(f), 1502.16(a)(9).)

Additionally, Reclamation's responses to comments on the Draft EIS failed to address the Water Authority's and Westlands' concerns regarding modeled groundwater impacts related to subsidence in the Westside Subbasin. Reclamation's response acknowledges that the modeling results demonstrate significant declines in groundwater have the potential to cause subsidence but does not attempt to further evaluate the scale of that potential impact or whether mitigation is feasible. (Appendix AD, Table 4-80, p. 34.) A NEPA-compliant response would be to recognize that the projected groundwater decline—up to 200 feet—will likely lead to subsidence in this area, posing significant negative implications for critical infrastructure. Notably, approximately 85% of groundwater use in the Westside Subbasin is sourced from an aquifer located below the Corcoran Clay, which is susceptible to subsidence. Ignoring the substantial risk of subsidence resulting from such a dramatic decline in groundwater levels is inconsistent with the thoroughness required by NEPA.

**CONCLUSION**

In conclusion, the Water Authority and Westlands thank Reclamation for this opportunity to review and comment on the Final EIS. The Water Authority and Westlands urge Reclamation to reject Alternative 2, as described in the Final EIS, for the reasons set forth above and to be mindful that the forthcoming Record of Decision will be of critical importance to California's future, affecting protected fish and wildlife species, millions of residents, and millions of acres of prime farmland.

Respectfully submitted,



J. Scott Petersen, P.E.  
Director of Water Policy  
San Luis & Delta-Mendota Water Authority



Allison Febbo, General Manager  
Westlands Water District



**Exhibit A**  
**(Description of Water Authority and list of Member Agencies)**

The San Luis & Delta-Mendota Water Authority (“Water Authority”) is a public agency with its principal office located in Los Banos, California. It was formed in 1992 as a joint powers authority and has twenty-seven member agencies. Twenty-five of the Water Authority’s member agencies contract with the United States for the delivery of water from the federal Central Valley Project (“CVP”). Most of the Water Authority’s member agencies depend upon the CVP as the principal source of water they provide to users within their service areas. That water supply serves approximately 1.2 million acres of agricultural lands within areas of San Joaquin, Stanislaus, Merced, Fresno, Kings, San Benito, and Santa Clara Counties, a portion of the water supply for nearly 2 million people, including in urban areas within Santa Clara County referred to as the “Silicon Valley,” and millions of waterfowl that depend upon nearly 200,000 acres of managed wetlands and other critical habitat within the largest contiguous wetland in the western United States. The operations of the CVP are therefore of vital interest and importance to the Water Authority, its member agencies, and the people, farms, businesses, communities, and wildlife refuges they serve. As a result of their functions and responsibilities, the Water Authority and its member agencies have special expertise regarding many of the environmental issues related to the Draft EIR.

The individual member agencies of the Water Authority are:

- Banta-Carbona Irrigation District
- Broadview Water District
- Byron Bethany Irrigation District
- Central California Irrigation District
  - City of Tracy
- Columbia Canal Company (a Friend)
  - Del Puerto Water District
  - Eagle Field Water District
- Firebaugh Canal Water District
- Fresno Slough Water District
  - Grassland Water District
- Henry Miller Reclamation District #2131
  - James Irrigation District
  - Laguna Water District
- Mercy Springs Water District
- Oro Loma Water District
- Pacheco Water District
- Panoche Water District
- Patterson Irrigation District
- Pleasant Valley Water District
  - Reclamation District 1606
- San Benito County Water District
  - San Luis Water District
- Santa Clara Valley Water District (Valley Water)
  - Tranquillity Irrigation District
  - Turner Island Water District
- West Stanislaus Irrigation District
- Westlands Water District

**From:** [Thomas Cannon](#)  
**To:** [BDO Comments, BOR MPR](#)  
**Subject:** [EXTERNAL] Comments on FEIS LTO - attention: Tim Warner  
**Date:** Tuesday, December 10, 2024 10:14:39 AM  
**Attachments:** [FEIS Comments.docx](#)

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# FEIS Comments

To: Tim Warner, [sha-MPR-BDO@usbr.gov](mailto:sha-MPR-BDO@usbr.gov)

From: Thomas Cannon, 916-952-6576, [tccannon@comcast.net](mailto:tccannon@comcast.net)

## Executive Summary

### Alternatives

The alternatives described in the EIS other than the No-Action Alternative are not real alternatives with specific operations and infrastructure elements. For example: Alt 2 prioritizes storage and cold-water pool management. Each alternative should prioritize these objectives. Alternatives should not be defined by objectives but represent a specific operational and structural scheme/regime that may approach the objectives a different way or with a different degree of implementation. One alternative or alternative type could involve an array of structural fixes and no changes to the basic flow regime. Another may simply be strictly operational regime that focuses on varying degrees of implementation – some with dramatic effects and some with less dramatic effects, with each having different degrees of benefits and effects on other beneficial uses. Another alternative may involve new infrastructure. Another may involve hatcheries, Another may involve only salmon habitat improvements. A further example may involve only different ways to deliver water from storage (e.g. with or without new infrastructure – with a new Sites Reservoir). An environmentally preferred alternative may have a mixed or variable array of actions to address objectives.

### Preferred Alternative (Alt 2)

*Alternative 2 prioritizes storage of water in Shasta Reservoir for water temperature management during multiple years of drought and results in reduced temperature-dependent mortality during egg incubation. Alternative 2 would reduce deliveries for CVP water service and repayment contracts and Sacramento River Settlement (SRS) Contractors under specific drought conditions to increase storage in Shasta Reservoir. This increased storage would result in higher fall and winter releases in non-drought conditions. Higher fall and winter releases would improve juvenile Chinook salmon survival during migration down the Sacramento River. In drier years, Alternative 2 reduces fall and winter releases and reduces survival during migration. Loss of*

*juvenile winter-run Chinook salmon at the Delta fish collection facilities is generally similar to the No Action Alternative based on similar Old and Middle River (OMR) flows. Through-Delta survival is also generally similar to the No Action Alternative, based on Delta inflow, with increases in January, March, and April of critically dry water year types. (O-18)*

**Comment:** There are many factors regulated in Alt 2 (and all alts) with widely differing degrees of implementation. Criteria should be defined for each factor and varied based on conditions in the watershed over that year. Criteria should be developed for different scenarios. Factors should include those that affect Keswick, Red Bluff, Wilkins Slough, Freeport, Rio Vista, and Chipps Island flows, stages, and water temperatures. Objectives should be specified for each of these locations. Comparisons among scenarios and effects of factor range should be shown between actual (historical), no-action, and alternative scenarios/examples to show benefits/effects of differing criteria/objectives. The decision process for selecting preferred scenarios should be documented. The effects of scenarios on benefits/effects of beneficial uses and target natural resources should be compared. Differences among and within factor criteria are often insignificant and higher ranges should be considered.

*Alternative 3 prioritizes release of water for Delta outflow and reduces diversions to store water in Shasta Reservoir, which would generally decrease temperature-dependent mortality and improve juvenile Chinook salmon survival during migration down the Sacramento River. Delta inflow would generally increase and operations at the Delta fish collection facilities would generally decrease loss.*

**Comment:** There are many types of diversions if changed would have different responses in terms of Shasta and other system reservoir storage. Changes in demands on Shasta storage is a complex factor with widely varying effects on storage. Also, demands can be met in different ways. This is a complex process requiring a high degree of complex analyses and interpretation. Furthermore, Delta outflow is controlled by many factors involving different infrastructure. Criteria for outflow can be met in many different ways, some involving Shasta storage and some not. Loss of fish in the Delta is also a complex process with many factors involved.

*Real-time management under Alternative 4 aims to store more water in Shasta Reservoir to decrease temperature-dependent mortality during egg incubation. Increased fall flows due to real-time storage management would result in higher releases that would improve juvenile*

*Chinook salmon survival during migration down the Sacramento River. Through-Delta survival is generally similar to the No Action Alternative with similar Delta inflows, and operations at the Delta fish collection facilities increase loss.*

**Comment:** There are many ways to store more water in Shasta Reservoir and many more to alter the volume and need for the cold-water pool supply. How the multi-factor management would be accomplished is beyond comprehension – for example how would the choice among factors employed and degree of employment would be made in real time has not been described. Criteria/objectives for temperatures in spawning reach can be met with the array of factors used in each alternative. The “best” way to meet criteria should be defined in each alternative. Letting criteria vary among and within alternatives is not the way to evaluate alternatives. For example – TDM in Figure 0-19 can be minimized in every alternative, but in different ways with different costs/benefits or changes in infrastructure/operations.

#### *0.4.4.2 Spring-run Chinook Salmon*

*Under the No Action Alternative, Reclamation operates the Temperature Control Device (TCD) on Shasta Reservoir to manage water temperatures on the Sacramento River downstream of Keswick Reservoir to achieve fisheries objectives, including objectives for winter-run Chinook salmon, and suitable temperatures for spring-run Chinook salmon. Storage of water in Shasta Reservoir during the winter and spring reduces instream flows during the juvenile spring-run Chinook salmon migration period. Spring pulse flows help spring-run Chinook salmon juvenile outmigration, including spring-run Chinook salmon from non-project streams. Whiskeytown Reservoir summer and fall operations may adversely or beneficially impact spring-run Chinook salmon; potential adverse impacts include low flows and elevated water temperatures in Clear Creek, while potential beneficial impacts include coldwater releases to reduce thermal stress during holding, spawning, and egg incubation. Pulse flows in Clear Creek during the spring could attract spring-run Chinook salmon holding in the Sacramento mainstem, encouraging movement toward spawning habitat. In the Delta, export restrictions minimize the loss of juvenile salmon at the Delta fish collection facilities. Increased spring Delta inflow may improve survival for outmigrating salmonids. (O-22)*

**Comment:** These factors are among the many affecting spring run salmon. All alternatives address the effects or needs of the salmon. An infrastructure alternative should include upgrades/maintenance of the TCD to fix/improve its effectiveness. Winter pulse flows also improve the emigration of fry to the lower river floodplains and Bay/Delta nurseries. Whiskeytown releases to

**Clear Creek are also too warm in summer for holding spring run adults – should be addressed with operations/infrastructure improvements. Spring pulse flow to Clear Creek should be part of spring pulse flow to attract spring run spawners. Winter and spring pulse and base flows (river and Delta inflow/outflow) would benefit emigration of fry and subyearlings, respectively. Delta exports should be restricted during pulse flows. Winter-Spring flows are important for spring run migrants. Spring, summer, and fall conditions (flows and temperatures) are important in spring and winter run spawning reaches.**

#### *0.4.4.4 Delta Smelt*

*Alternative 3 may result in minor increases and minor decreases in suitable habitat depending on water year type and the application of a temperature threshold and would likely have minor beneficial to minor adverse impacts on juvenile Delta smelt summer and fall habitat. Under Alternative 3, depending on the water year type, there would be a substantially higher population growth rate when compared with the No Action Alternative. (O-26)*

**Comment: None of the alternatives addresses recovery of the species from its present state of virtual extinction. A specific alternative should address this need: maintaining outflow to allow the LSZ to remain in Suisun Bay yearround and for water temperatures to be less than 72°F in the LSZ yearround. Given their one-year life cycle, these conditions are necessary at a minimum in all water year types.**

#### *0.4.4.6 Green Sturgeon*

*Alternative 2 prioritizes storage of water in Shasta Reservoir for water temperature management during multiple years of drought and would reduce deliveries for CVP water service and repayment contracts and Sacramento River Settlement Contractors under specific drought conditions to increase storage in Shasta Reservoir. This increased storage would result in higher fall and winter releases in non-drought conditions. Alternative 2 relative to the No Action Alternative is expected to have negligible impacts and possible beneficial impacts on spawning habitat, minor adverse impacts on rearing and emigration, and beneficial impacts and adverse impacts on upstream migration and holding habitats dependent upon location, month, and/or water year type due to differences in flow. Alternative 2 relative to the No Action Alternative is expected to have beneficial impacts and minor adverse impacts on spawning and egg incubation, beneficial and adverse impacts on rearing and emigration, and negligible and adverse impacts on upstream migration and holding dependent upon location, month, and water year type due to differences in water temperature. Alternative 2 is expected to have negligible impacts on the loss of juveniles at facilities. (O-28)*

**Comment: None of the alternatives addresses recovery of the species from its present state of near extinction. A specific alternative should address this need: maintaining outflow and water temperatures in the lower Sacramento River from spring through fall in wetter years - to allow the lower Sacramento River to sustain early spring water temperatures at 60F, late spring water temperatures at 65F, and summer-fall water temperatures at 68F.**

#### *0.4.4.7 Fall-run Chinook Salmon*

*Adult fall-run Chinook salmon use the Sacramento River as a migration corridor and as spawning grounds between September and June. Release reductions from Shasta Reservoir early in the fall under the No Action Alternative may adversely impact the fall-run Chinook salmon population from low flows and elevated water temperatures leading to unsuccessful outmigration and redd dewatering. Similarly, in Clear Creek, low flows and elevated water temperatures may negatively impact fall-run Chinook salmon, and coldwater releases may be beneficial. In the lower American River, operations would ramp down to the revised minimum flows from Folsom Reservoir as soon as possible in the fall and maintain these flows through fall-run Chinook salmon spawning and egg emergence, where possible, to minimize redd dewatering and juvenile stranding. In the Stanislaus River, pulse flows may benefit migrating juveniles in the spring and adults in the fall. In the Delta, OMR management season may cause adverse or beneficial impacts for fall-run Chinook salmon in the Delta dependent on fish presence, distribution, and flows. (O-29)*

**Comment: None of the alternatives address recovery of the fall-run salmon from its present state of near extinction in the wild. A specific alternative should address this need: maintaining outflow and water temperatures in the lower Sacramento River from spring through fall in wetter years - to allow the upper Sacramento River to sustain summer-fall water temperatures below 56F, late spring water temperatures at 65F, and summer-fall water temperatures at 68F. Fall X2 and Rio Vista flows are prescribed to attract fall run from the Bay to and through the Delta and lower rivers to the spawning rivers in the Sacramento and San Joaquin valleys.**