

Background

On August 2, 2016, the Bureau of Reclamation (Reclamation) and the California Department of Water Resources (DWR) jointly requested the Reinitiation of Consultation on the Coordinated Long-Term Operation of the Central Valley Project (CVP) and State Water Project (SWP) (Project). The Service accepted the reinitiation request on August 3, 2016, and the National Marine Fisheries Service (NMFS) accepted the reinitiation request on August 17, 2016.

The reasons stated in Reclamation's August 2, 2016 request for reinitiation of consultation included "new information related to multiple years of drought and recent data demonstrating low Delta smelt populations, and new information available and expected to become available as a result of ongoing work through collaborative science processes." On August 3, 2016, the Service agreed with the request citing "multiple dry years and new information. We recognize that this new information is demonstrating the increasingly imperiled state of the Delta Smelt and its designated critical habitat, and that emerging science shows the importance of outflows to all life stages of Delta Smelt and to maintaining the primary constituent elements of designated critical habitat."

On January 31, 2019, Reclamation transmitted the ROC BA to the Service. As stated in the BA, the purpose of this action is "...to continue the coordinated long-term operation of the CVP and SWP to maximize water supply delivery and optimize power generation consistent with applicable laws, contractual obligations, and agreements; and to increase operational flexibility by focusing on nonoperational measures to avoid significant adverse effects."

Consultation Approach

The purpose of this section 7 consultation is to evaluate the effects of the ROC PA on listed species and designated critical habitat. After reviewing the ROC PA with site specific and programmatic actions as proposed by Reclamation, the Service has determined that ROC presents a mixed programmatic action, as defined in 50 CFR 402.02. The Service's consultation includes a mix of standard consultation (which includes an Incidental Take Statement [ITS]) and programmatic consultation (which can include an ITS if a proposed action is reasonably certain to cause incidental take of a listed species or defer the ITS to a later time associated with subsequent Federal actions when take has been identified as reasonably certain to occur). An analysis and conclusion of whether or not the entire ROC action as described in the PA is likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of their critical habitat is included in this BiOp. It is recognized that subsequent site-specific actions authorized, funded, or carried out under the programmatic actions addressed in this BiOp will be subject to subsequent section 7 consultation and incidental take statements, as appropriate. Changes to the site-specific actions in the standard consultation of this BiOp may require reinitiation.

Some of the project elements are described at a site-specific level with no future Federal action required. For other project elements, the PA describes activities in on-going programs, some of which can tier to or append to existing programmatic consultations, and other activities which will require subsequent consultations prior to implementation. This BiOp uses a framework programmatic approach to discuss the process for future project-specific consultations. The remainder of the project elements not addressed programmatically are addressed as a standard, project-level consultation because they are not subject to future Federal approvals. For framework programmatic actions, an incidental take statement is not required at the program (framework) level for those actions falling within the definition of framework programmatic action (50 CFR 402.02). Therefore, this BiOp contains an ITS for those standard, site-specific consultation elements for which incidental take is reasonably certain to occur.

Programmatic portions of the PA will require separate section 7 consultations as part of the subsequent approval. These portions of the PA are not authorized to commence until these separate consultations are completed.

Framework Programmatic

For components of the PA that are defined as programmatic, this BiOp provides a framework for future, site-specific actions that are subject to section 7 consultations and incidental take statements. Subsequent consultations associated with these programmatic actions will develop the necessary site-specific information to inform an assessment of where, when, and how listed species are likely to be affected. Many of these programmatic components are part of larger programs that have existing programmatic consultations or previously analyzed activities within these programs that have stand-alone consultations. Future components of the BA, such as tidal marsh restoration, will be developed and implemented in a manner that is consistent within on-going planning efforts and the framework established within the existing programmatic consultations and stand-alone consultations. Measures will be included to minimize adverse effects to listed species consistent or better than existing consultations within the programs. For example, future tidal marsh restoration projects intended to enhance foodweb for delta smelt to offset effects of the CVP and SWP will be developed within the existing Fishery Agency Strategy Team (FAST) process. A restoration project within the Suisun Marsh will be appended to the Suisun Marsh Plan Programmatic Biological Opinion and will adhere to the process and conservation measures of that consultation. An Anadromous Fish Restoration Program (AFRP) project will continue to utilize the existing planning and consultation process. Species under the Service's jurisdiction that may be affected by programmatic components of the PA and are intending to utilize existing programmatic consultations or subsequent consultation consistent with the framework in this BiOp are listed below in Table 1.

Table 1: Consultation Approach for Programmatic Components of the Proposed Action

Programmatic Component of the Proposed Action	Existing Programmatic	Subsequent Consultation to this BiOp
Upper Sacramento Spawning and Rearing Habitat Restoration	Upper Sacramento River AFHRP Programmatic	Not necessary if utilizing the existing programmatic
American River Spawning and Rearing Habitat Restoration	American River AFHRP Programmatic	Not necessary if utilizing the existing programmatic
Small Screen Program	Installation of Small Fish Screens Programmatic Biological Opinion	Not necessary if utilizing the existing programmatic
Stanislaus River Spawning and Rearing Habitat Restoration	None	Reclamation will complete subsequent consultation when more details are developed for implementation of this study
Lower San Joaquin River Habitat Restoration	San Joaquin River Restoration Program	Not necessary if utilizing the existing programmatic
Sacramento Deepwater Ship Channel Food Study	None	Reclamation will complete subsequent consultation when more details are developed for implementation of this study

<p>North Delta Food Subsidies/Colusa Basin Drain Study</p>	<p>None</p>	<p>Reclamation will complete subsequent consultation when more details are developed for implementation of this study</p>
<p>Suisun Marsh Roaring River Distribution System Food Subsidies Study</p>	<p>None</p>	<p>Reclamation will complete subsequent consultation when more details are developed for implementation of this study</p>
<p>Tidal Habitat Restoration (Complete 8,000 acres from 2008 BiOp)</p>	<p>Suisun Marsh Plan Programmatic Biological Opinion</p>	<p>For areas outside Suisun Marsh Plan Programmatic action area, Reclamation will ensure that subsequent consultation will occur when more details are developed through the existing FAST process</p>
<p>Predator Hot Spot Removal in the Bay-Delta</p>	<p>None</p>	<p>Reclamation will complete subsequent consultation when more details are developed for this activity</p>
<p>Delta Fish Species Conservation Hatchery</p>	<p>None</p>	<p>Reclamation will complete subsequent consultation when more details are developed for this activity</p>

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Description of the Proposed Action

Reclamation and DWR propose to store, divert, and convey water in accordance with existing water contracts and agreements, including water service and repayment contracts, settlement contracts, exchange contracts, and refuge deliveries, consistent with water rights and applicable laws and regulations. Operations are in accordance with the Coordinated Operations Agreement (COA) between Reclamation and DWR. Chapter 4 of the BA describes in more detail how these two agencies work together to carry out storage, diversion, and conveyance of water through the CVP and SWP. Reclamation has proposed the term of this consultation to be through the year 2030.

Table 4-6 of the BA includes all components of the PA that affect listed species and critical habitat under the jurisdiction of both the Service and NMFS. Table 2 below is a summary of this table from the BA, but removes components that only affect NMFS species and/or critical habitat and are therefore not relevant to this biological opinion. Table 2 includes only those components of the PA which affect or are proposed to minimize the effect to Service listed species and critical habitat. Therefore, the effects analysis of this biological opinion only addresses effects of the PA components in Table 2.

There are several components of the PA that have already been addressed in previous consultations. There are also components of the PA that Reclamation is not authorizing, funding, or carrying out as part of this consultation “due to other legal authority”. These were included in the PA because they are factors in long-term operations of the CVP and SWP. These components are listed in Section 4.10 of the BA, but are not included in Table 2 below. Components of the PA that have already been analyzed in previous consultations are included in the environmental baseline as federal actions that have already undergone consultation that contribute to the current condition of the species and critical habitat in the action area pursuant to the section 7 of the ESA. Those components will be addressed in the jeopardy and adverse modification analyses in this biological opinion pursuant to the *Analytical Framework for the Jeopardy Determination* and the *Analytical Framework for the Adverse Modification Determination*.

The PA includes avoidance and minimization measures (Appendix E of the BA) that will be implemented as necessary and appropriate for components of the PA. For the components addressed programmatically, a determination of which measures will be implemented will be made during the subsequent consultations. The Implementation Approach for each of the PA components are included in Table 2 below and described in Section 4.12 of the BA. All of these sections are hereby incorporated by reference from the BA into this biological opinion.

Table 2: Components of the Proposed Action

Project Component	Standard or Programmatic Consultation	Implementation Approach	Species that may be affected (NLAA and LAA)
CVP/SWP Wide			
Divert and store water consistent with obligations under water rights and decisions by the State Water Resources Control Board	Standard	Core	Delta smelt, Western yellow-billed cuckoo, valley elderberry longhorn beetle
Related Action			
Shasta Critical Determinations and Allocations to Water Service and Water Repayment Contractors			
Upper Sacramento			
<p>Seasonal Operations Reclamation proposes to operate Shasta according to general seasonal objectives (see BA for details). Winter operations will focus on flood control and maintaining minimum flows while building storage. Operations in the spring are focused on meeting instream demands along with Delta requirements such as outflow. During the summer, operational considerations include flows required for Delta outflows, instream demands, and temperature control. Fall operations are dominated by temperature control and provision of fish spawning habitat.</p>	Standard	Core	Western yellow-billed cuckoo, valley elderberry longhorn beetle
<p>Spring Pulse Flows Reclamation would release spring pulse flows when the projected total May 1 Shasta Reservoir storage indicates a likelihood of sufficient cold water to support summer cold water pool management. Total storage provides a surrogate for the likely cold water pool and would inform the decision in addition to monthly winter reservoir temperature measurements and climate forecasts. Reclamation would evaluate the projected May 1 Shasta Reservoir storage at the time of the February forecast to determine whether a spring pulse would be allowed in March, and would evaluate the projected May 1 Shasta Reservoir storage at the time of the March</p>	Standard	Scheduling	Western yellow-billed cuckoo, valley elderberry longhorn beetle

<p>forecast to determine whether a spring pulse would be allowed in April. If Shasta Reservoir total storage on May 1 is projected to be sufficient for cold water pool management (e.g., greater than 4 MAF), Reclamation could make a spring pulse release of up to 150 TAF in coordination with the Upper Sacramento scheduling team. Reclamation would not make a spring pulse release if the release would cause Reclamation to drop into a Tier 4 Shasta summer cold water pool management (i.e., the additional flow releases would decrease cold water pool such that summer Shasta temperature management drops in Tier 4) or interfere with the ability to meet other anticipated demands on the reservoir. Appendix C provides for an interagency and stakeholder group to determine the timing, duration, and frequency of the spring pulse within the 150 TAF volume.</p>			
<p>Operation of a Shasta Dam Raise Reclamation proposed to enlarge Shasta Dam and Reservoir by raising the dam crest 18.5 feet under a separate biological opinion for construction. Reclamation would operate a raised Shasta Dam consistent with the operations described in this proposed action.</p>	Standard	Core	Western yellow-billed cuckoo, valley elderberry longhorn beetle
<p>Rice Decomposition Smoothing Following the emergence of Winter-Run Chinook Salmon and prior to the majority of Fall-Run Chinook Salmon spawning, upstream Sacramento Valley CVP contractors and the Sacramento River Settlement Contractors propose to work to synchronize their diversions in late October to early November to lower peak rice decomposition demand. Reductions during this time will decrease the chance of dewatering early Fall-Run Chinook Salmon redds.</p>	Standard	Core	Giant garter snake
<p>Salmonid Spawning and Rearing Habitat Restoration Reclamation proposes to create additional spawning habitat by injecting approximately 15,000 – 40,000 tons of gravel annually into Sacramento River to 2030. An additional 40-60 acres of side channel and floodplain habitat would be created by 2030. Refer to the BA for specific restoration sites.</p>	Programmatic	Collaborative Planning	Western yellow-billed cuckoo, valley elderberry longhorn beetle
<p>American River</p>			
<p>Seasonal Operations Reclamation proposes to operate the American River Division according to general seasonal objectives (see BA for details). Winter operations will focus on flood control and maintaining minimum flows while building storage. Reclamation proposes to not reduce flows more than 500 cfs/day and not more than 100 cfs per hour except if necessary for flood control operations. Reclamation will minimize releases above 4,000 cfs during sensitive life stages (e.g, eggs, incubation, rearing) of salmonids and Steelhead to the extent feasible. Operations in the spring are focused on flood control and meeting Delta requirements. During the summer, operational considerations include flows required for Delta outflows, instream demands, and temperature control.</p>	Standard	Core	valley elderberry longhorn beetle, Western yellow-billed cuckoo

<p>Related Action</p>			
<p>2017 Flow Management Standard Releases and “Planning Minimum” Reclamation proposes to utilize a “planning minimum” forecast to preserve storage and build cold water pool while making adjustments to limit redd dewatering. This action includes a spring pulse flow from March 15- April 15 if no such flow event has occurred from February 1- March 1.</p>			
<p>Salmonid Spawning and Rearing Habitat Restoration Pursuant to CVPIA 3406(b)(13), Reclamation proposes to implement the Cordova Creek Phase II and Carmichael Creek Restoration projects, and increase woody material in the American River. Reclamation also proposes to conduct gravel and large cobble augmentation and floodplain work at: Paradise Beach, Howe Ave, Howe Avenue to Watt Avenue, William Pond Outlet, Upper River Bend, Ancil Hoffman, Sacramento Bar—North, El Manto, Sacramento Bar—South, Lower Sunrise, Sunrise, Upper Sunrise, Lower Sailor Bar, Nimbus main channel and side channel, Discovery Park, and Sunrise Stranding Reduction. Reclamation proposes to continue maintenance activities at Nimbus Basin, Lower Sailor Bar, Upper Sunrise, Lower Sunrise, Upper Sailor Bar, and River Bend restoration sites.</p>	<p>Programmatic</p>	<p>Collaborative Planning</p>	<p>valley elderberry longhorn beetle, Western yellow-billed cuckoo</p>
<p>Stanislaus</p>			
<p>Seasonal Operations Reclamation proposes to meet water rights, contracts, and agreements that are specific to the East Side Division and Stanislaus River. Senior water right holders (OID and SSJID) will receive annual water deliveries consistent with the 1988 Agreement and Stipulation, and water will be made available to CVP contractors in accordance with their contracts and applicable shortage provisions. Seasonal operations will vary according to water year type and follow the Stepped Release Plan, described below. Additionally, during the summer, Reclamation is required to maintain applicable dissolved oxygen standards on the lower Stanislaus River for species protection. Reclamation currently operates to a 7.0 mg/L dissolved oxygen requirement at Ripon from June 1 to September 30. Reclamation proposes to move the compliance location to Orange Blossom Bridge.</p>	<p>Standard</p>	<p>Core</p>	<p>Western yellow-billed cuckoo, least Bell’s vireo, valley elderberry longhorn beetle</p>
<p>Related action</p>			
<p>Stanislaus Stepped Release Plan Reclamation proposes to operate New Melones Reservoir in accordance with a New Melones Stepped Release Plan that varies by hydrologic condition/water year type. Annual release volumes range from 184.3 TAF to 476.3 TAF from critical year types up to wet year types, respectively (see BA for details). The Stanislaus Watershed Team will provide input on shaping the flows.</p>			

<p>Salmonid Spawning and Rearing Habitat Restoration Reclamation will continue to carry out CVPIA(b)(13) program goals of placing 4,500 tons of gravel annually in the Stanislaus River and construct 50 acres of rearing habitat by 2030.</p>	<p>Programmatic</p>	<p>Collaborative Planning</p>	<p>Western yellow-billed cuckoo, least Bell's vireo, valley elderberry longhorn beetle</p>
<p>San Joaquin</p>			
<p>Lower SJR Habitat Reclamation may work with private landowners to create a bottom-up, locally driven regional partnership to define and implement a large-scale floodplain habitat restoration effort in the Lower San Joaquin River. The resulting restoration could include thousands of acres of interconnected (or closely spaced) floodplain areas with coordinated and/or collaborative funding and management. Such a large scale effort along this corridor would require significant support from a variety of stakeholders, which could be facilitated through a regional partnership.</p>	<p>Programmatic</p>	<p>Collaborative Planning</p>	<p>Riparian brush rabbit, riparian woodrat, Western yellow-billed cuckoo, valley elderberry longhorn beetle</p>
<p>Bay-Delta</p>			
<p>Seasonal Operations Reclamation proposes to operate facilities in the Delta according to general seasonal objectives (see BA for details). Winter and spring pumping operations generally maximize exports of excess, unregulated, unstored water to help meet project demands later in the season and for Delta water quality. Summer is generally a period of higher export potential. During the summer the CVP and SWP typically operate to convey previously stored water across the Delta for exporting at the Project pumps or other Delta Facilities. Fall Delta operations typically begin as demands decrease, accretions increase within the system, and reservoir releases are decreasing to start conserving water. Exports are typically maximized to export available water in the system and may decrease if the fall remains dry. As precipitation begins to fall within the Sacramento and San Joaquin Basins, the reservoirs focus on building storage and managing for flood control.</p>	<p>Standard</p>	<p>Core</p>	<p>Delta smelt, delta smelt critical habitat</p>
<p>Minimum Export Rate Water rights, contracts, and agreements specific to the Delta include D-1641, COA and other related agreements pertaining to CVP and SWP operations and Delta watershed users. In order to meet health and safety needs, critical refuge supplies, and obligations to senior water rights holders, the combined CVP and SWP export rates at Jones Pumping Plant and Banks Pumping Plant will not be required to drop below 1,500 cfs. Reclamation and DWR propose to use the Sacramento River, San Joaquin River, and Delta channels to transport water to export pumping plants located in the south Delta.</p>	<p>Standard</p>	<p>Core</p>	<p>Delta smelt, delta smelt critical habitat</p>
<p>Delta Cross Channel Operations Reclamation operates the DCC in the open position to (1) improve the movement of water from the Sacramento River to the export facilities at the Banks and Jones Pumping Plants; (2) improve</p>	<p>Standard</p>	<p>Core</p>	<p>Delta smelt, delta smelt critical habitat</p>

<p>water quality in the central and southern Delta; and (3) reduce salinity intrusion rates in the western Delta. Reclamation will operate the DCC gates to reduce juvenile salmonid entrainment risk from Oct 1 to May 20. A Fish monitoring group will be consulted and Reclamation will form a risk assessment to determine whether or not to open the DCC. Whenever flows in the Sacramento River at Sacramento reach 20,000 to 25,000 cfs (on a sustained basis), the gates are closed to reduce potential scouring and flooding that might occur in the channels on the downstream side of the gates. From October 1 to November 30, if the Knights Landing Catch Index or Sacramento Catch Index are greater than three fish per day Reclamation proposes to operate in accordance with Table 4-10 and Table 4-11 in the BA to determine whether to close the DCC gates and for how long. From December 1 to January 31, the DCC gates will be closed, unless Reclamation determines that it can avoid D-1641 water quality exceedances by opening the DCC gates for up to 5 days for up to two events within this period. From May 21 to June 15, Reclamation will close the DCC gates for 14 days during this period, consistent with D-1641. During a critical year following a dry or critical year, if there is a conflict between water quality and species between December 1 to January 31, Reclamation and DWR propose to coordinate with USFWS and NMFS.</p>			
<p>Agricultural Barriers DWR proposes to continue to install three agricultural barriers at the Old River at Tracy, Middle River, and Grant Line Canal each year when necessary. The barriers are installed between April to July and removed in November. Barriers would include at least one culvert open to allow for fish migration when water temperatures are less than 22°C.</p>	Standard	Core	Delta smelt, delta smelt critical habitat
<p>Contra Costa Water District Rock Slough Operations CCWD intake and Los Vaqueros Reservoir operations are under biological opinions separate from ROC LTO. Reclamation is requesting incidental take coverage for all diversions at the Rock Slough intake (350 cfs capacity).</p>	Standard	Core	Delta smelt, delta smelt critical habitat
<p>North Bay Aqueduct The North Bay Aqueduct and Barker Slough Pumping Plant will continue to operate under applicable regulatory requirements.</p>	Standard	Core	Delta smelt, delta smelt critical habitat
<p>Water Transfers Water transfers would occur from July through November in total annual volumes up to those described in Table 4-12 of the BA, up to 600 TAF for Critical and Dry (following Critical and Dry years), and up to 360 TAF in all other years.</p>	Standard	Core	Delta smelt, delta smelt critical habitat
<p>Clifton Court Aquatic Weed Removal DWR will apply herbicides or will use mechanical harvesters on an as-needed basis to control aquatic weeds and algal blooms in CCF. DWR will apply herbicides after CCF temperatures are above 25 degrees Celsius or after June 28. during smelt and</p>	Standard	Core	Delta smelt

<p>salmonid protection periods under conditions specified in the BA. Mechanical harvest will occur as needed.</p>			
<p>OMR Management Reclamation proposes a real-time decision process to manage OMR flow starting at -5000 cfs unless specified. The management of OMR, in combination with other environmental variables, can minimize or avoid the entrainment of fish in the south Delta and at CVP and SWP salvage facilities. Reclamation and DWR propose to operate to an OMR index computed using an equation. An OMR index allows for short-term operation. The onset of OMR management may be triggered by the following: (1) Integrated Early Winter Pulse Protection (“First Flush” Turbidity Event): As it relates to delta smelt, the Integrated Early Winter Pulse Protection action is intended to minimize Project influence on migration (or dispersal) that occurs coincident with “First Flush” conditions in the Delta. When the running 3-day average of the daily flows at Freeport is greater than 25,000 cfs and the running 3-day average of the daily turbidity at Freeport is 50 NTU or greater for the period from December 1 through January 31, Reclamation and DWR propose to reduce exports for 14 consecutive days so that the 14-day averaged OMR index for the period shall not be more negative than -3,500 cfs. This “First Flush” action may only be initiated once during the December through January period. The action will not be required if: 1) the Freeport flow and turbidity conditions are met after January 31, or 2) water temperature reaches 12 degrees Celsius based on a three station daily mean at Honker Bay, Antioch, and Rio Vista, or 3) when ripe or spent delta smelt are collected in a monitoring survey or salvage. (2) Salmonids: After January 1, if more than 5 percent of any one or more salmonid species (wild young-of-year Winter-Run, wild young-of-year Spring-Run, or wild Central Valley Steelhead) are estimated to be present in the Delta as determined by their appropriate monitoring working group based on available real-time data, historical information, and modeling. Additional Real-Time OMR Restrictions: Reclamation and DWR shall manage to a more positive OMR than -5,000 cfs based on the following conditions: (1) Turbidity Bridge Avoidance (“South Delta Turbidity”): In years when a “First Flush” occurs, once delta smelt have dispersed, there is not evidence that large, population-scale movements continue. This action begins after the completion of the Integrated Early Winter Pulse Protection (above) or February 1, whichever comes first. The purpose of this action is to avoid the formation of a continuous turbidity bridge from the San Joaquin River shipping channel to the fish facilities, which historically has been associated with elevated salvage of delta smelt. Reclamation and DWR propose to manage exports in order to maintain daily average turbidity in Old River at Bacon Island (OBI) at a level of less than 12 NTU. If turbidity does not exceed 12 NTU at OBI, then there will be no explicit limit on OMR flow for the purposes</p>	<p>Standard</p>	<p>Core</p>	<p>Delta smelt, delta smelt critical habitat</p>

<p>of protecting delta smelt. If daily average turbidity at OBI cannot be maintained less than 12 NTU, the 3-day averaged OMR index shall not be more negative than -5000 cfs, until the 3-day average turbidity at OBI drops below 12 NTU. The OBI site shall be redundantly telemetered to avoid data gaps. The action is to be taken from February 1-March 31 even if the Integrated Early Winter Pulse Protection action has not occurred earlier in the water year. The action will no longer be required on or after April 1.</p> <p>(2) Larval and Juvenile Delta Smelt: When Q-West is negative and larval or juvenile smelt are within the entrainment zone of the pumps based on real-time sampling, Reclamation and/or DWR propose to run hydrodynamic models informed by the EDSM, 20 mm or other relevant survey data to estimate the percentage of larval and juvenile smelt that could be entrained, and operate to avoid no greater than 10 percent loss of modeled larval and juvenile cohort Delta Smelt (Typically this would come into effect beginning the middle of March).</p> <p>(3) Wild Central Valley Steelhead Protection: Reclamation and DWR would operate to OMR of -2,500 cfs for 5 days whenever more than 5 percent of Steelhead are present in the Delta and the natural-origin Steelhead loss trigger exceeds 10 Steelhead per TAF. The timing of this action is intended to provide protections to San Joaquin origin Central Valley Steelhead, but the loss-density trigger is based on loss of all Steelhead since there is currently no protocol to distinguish San Joaquin-basin and Sacramento-basin Steelhead in salvage. Reclamation would use the current loss equation for Steelhead or a surrogate. This action will no longer be required after May 31.</p> <p>(4) Salvage or Loss Thresholds: Reclamation and DWR propose a cumulative annual salvage or loss threshold equal to 1 percent of the abundance estimate based on EDSM for adult Delta Smelt; loss equal to 1 percent of the Winter-Run Chinook Salmon JPE (genetically confirmed) or 2 percent of the Winter-Run Chinook Salmon JPE (based on length-at-date); loss equal to 1 percent of the Spring-Run Chinook Salmon JPE (or 0.5 percent of Spring-Run surrogates); salvage equal to 3,000 juvenile Central Valley Steelhead, and salvage equal to 100 juvenile Green Sturgeon. Reclamation and DWR propose to operate as described below:</p> <p>(a) Restrict OMR to a 14-day moving average OMR index of -3,500 when a species-specific cumulative salvage or loss threshold exceeds 50 percent of the threshold. The restriction will persist until the species-specific offramp is met.</p> <p>(b) Restrict OMR to a 14-day moving average OMR index of -2,500 cfs (or more positive if determined by Reclamation) when cumulative salvage or loss threshold for any of the above species exceeds 75 percent of the threshold. The restriction will persist until the species-specific offramp is met.</p> <p>Species specific OMR restrictions will end when the individual species-specific off ramp from “End of OMR management criteria,” are met. OMR criteria may control operations until June 30, or when both of the following have occurred, whichever is</p>			
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earlier: (1) Delta smelt: when the daily mean water temperature at CCF reaches 25°C for 3 consecutive days. (2) Salmonids: when more than 95 percent of salmonids have migrated past Chipps Island, as determined by their monitoring working group, OR after daily average water temperatures at Mossdale exceed 72°F for 7 days during June (the 7 days do not have to be consecutive).

Storm-Related OMR Flexibility: If Reclamation and DWR are not implementing additional real-time OMR restrictions, consistent with other applicable legal requirements, Reclamation and DWR may operate to a more negative OMR up to a maximum (otherwise-permitted) export rate at Banks and Jones Pumping Plants of 14,900 cfs (which could result in a range of OMR values) to capture peak flows during storm-related events. Reclamation and DWR will continue to monitor fish in real-time and will operate in accordance with “Additional Real-time OMR Restrictions,” above.

Under the following conditions, Reclamation and DWR would not cause OMR to be more negative for capturing peak flows from storm-related events.

- Additional real-time OMR restrictions, above, are triggered, then Reclamation would operate in accordance with those additional real-time OMR restrictions and would not cause OMR to be more negative for capturing peak flows from storm-related events.
- Actual cumulative expanded salvage of Delta Smelt is greater than 50% of the average smelt index over the prior three years of non-zero FMWT surveys and a Cumulative Salvage Index of 7.98 during December 1 – January 20 or cumulative expanded salvage of Delta Smelt is greater than or equal to 75% of the average smelt index calculated described above.
- Predicted adult or juvenile Delta Smelt salvage would exceed 50% during December 1 – January 20 or cumulative expanded salvage is greater than or equal to 75% as determined above, based on the data sources in the Secretarial Memo dated January 17, 2019.
- Measured cumulative loss to date since October 1 for winter-run Chinook salmon (based on length-at-date criteria) is greater than the percentage below of a loss threshold calculated as 2% of the JPE:

- o January 1 – 15 2%
- o January 16 – 31 4%
- o February 1 – 14 6%
- o February 15 – 28 9%
- o March 1 – 15 21%

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- o March 16 – 31 26%
- o April 1 – End of OMR 30%

- Predicted cumulative loss for winter-run Chinook salmon is greater than 30% of the loss threshold described above in “Additional Real-Time OMR Restrictions” [1 percent of the Winter-Run Chinook Salmon JPE (genetically confirmed) or 2 percent of the Winter-Run Chinook Salmon JPE (based on length-

<p>at-date)] or salvage for steelhead is greater than 50% of the salvage threshold described above in “Additional Real-Time OMR Restrictions”.</p> <ul style="list-style-type: none"> • Changes in spawning, rearing, foraging, sheltering, or migration behavior beyond those described in the forthcoming biological opinion for this project. <p>Reclamation and DWR may confer with the Directors of NMFS, USFWS, and CDFW if they desire to operate to a more negative OMR than what is specified in “Additional Real-Time OMR Restrictions”. Upon mutual agreement, the Directors of NMFS and USFWS may authorize Reclamation to operate to a more negative OMR than the “Additional Real-Time OMR Restrictions”, but no more negative than -5000 cfs. The Director of CDFW may authorize DWR to operate to a more negative OMR. than the “Additional Real-Time OMR Restrictions”, but no more negative than -5000 cfs.</p>			
<p>Tracy Fish Collection Facility</p> <p>Reclamation proposes to continue to screen fish from Jones Pumping Plant with the TFCF. The TFCF uses behavioral barriers consisting of primary louvers and four traveling screens in the secondary channel, to guide entrained fish into holding tanks before transport by truck to release sites within the Delta. Hauling trucks used to transport salvaged fish to release sites inject oxygen and contain an eight parts per thousand salt solution to reduce stress. The CVP uses two release sites, one on the Sacramento River near Horseshoe Bend and the other on the San Joaquin River immediately upstream of the Antioch Bridge. Reclamation will also install a carbon dioxide injection device for predator removal in the secondary channel. Section 4.10.5.12.1 contains additional details about louver cleaning and fish salvage and hauling procedures.</p>	Standard	Core	Delta smelt
<p>Skinner Fish Facility</p> <p>DWR proposes to continue to screen fish from Banks Pumping Plant with the Skinner Fish Facility. The Skinner Fish Facility has behavioral barriers to keep fish away from the pumps that lift water into the California Aqueduct. Large fish and debris are directed away from the facility by a 388-foot-long trash rack. Smaller fish are diverted from the intake channel into bypasses by a series of behavioral barriers (metal louvers), while the main flow of water continues through the louvers and toward the pumps. These fish pass through a secondary system of louvers or screens and pipes into seven holding tanks, where a subsample is counted and recorded. The salvaged fish are then returned to the Delta in oxygenated tank trucks.</p>	Standard	Core	Delta smelt
Operations			
Summer-Fall Delta Smelt Habitat	Standard	Collaborative Planning	Delta smelt, delta smelt critical habitat

<p>Reclamation and DWR propose to use structured decision making to identify and use a variety of actions to achieve the environmental and biological goals below, as described further in Appendix C. The Delta Smelt Habitat Action shall take actions to meet these environmental and biological goals in the summer and fall (June through October) of below normal, above normal, and wet water years according to the Sacramento Valley Index. The Delta Smelt Habitat Action may improve Delta Smelt habitat while contributing to the recruitment of Delta Smelt, providing enhancement of food supply and expansion of low salinity habitat. The environmental and biological goals of the Delta Smelt Habitat Action are to: Maintain a 14-day average low salinity habitat of between 0 ppt to 6 ppt in Suisun Marsh and Grizzly Bay based on data from Belden’s Landing (or other station(s) and averaging periods, as appropriate) from June to October of below normal, above normal, and wet year years, when water temperatures are suitable; manage the low salinity zone to overlap with turbid water (12 NTU) and available food supplies; establish contiguous low salinity habitat from Cache Slough Complex to the Suisun Marsh; and contribute to the recruitment of Delta Smelt. The current conceptual model is that Delta Smelt habitat should include low salinity conditions of 0-6 ppt, turbidity of approximately 12 NTU, temperatures below 25°C, food availability, and littoral or open water physical habitats (FLaSH Synthesis, pp. 15-23). The goal of the Delta Smelt Habitat Action is to provide these habitat components in the same geographic area through a range of actions to improve water quality and food supplies. These actions include, but are not limited to:</p> <ul style="list-style-type: none"> • Suisun Marsh Salinity Control Gate (SMSCG) operations for up to 60 days (not necessarily consecutive); • Delta outflow up to the quantity that would have been required to meet a 2 ppt isohaline at 80 km from the Golden Gate Bridge in above normal and wet water years in September and October; • Enhancement actions, e.g., those included in the Delta Smelt Resiliency Plan to enhance food supply, the North Delta food-web project, Sacramento River Deepwater Ship Channel lock reoperation, and Roaring River distribution system reoperation. <p>In below normal, above normal, and wet water year types, actions would focus on non-flow measures, such as operation of the SMSCG for up to 60 days (not necessarily consecutive) in the summer and fall. In below normal years, initial actions would include operating the SMSCG in the summer with no additional Delta outflow augmentation above that which is necessary to comply with D-1641. In above normal and wet years, initial actions would include operation of the SMSCG in the summer and fall. In addition, if necessary and helpful to meet the environmental and biological goals described above, Delta outflow may be augmented in above normal and wet years up to the flow volume that would have supported a 2 ppt isohaline at 80 kilometers from the Golden Gate Bridge in September and October. The water cost of operating the SMSCG in above normal years would be subtracted from the Delta outflow augmentation flow volume.</p>			
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<p>Clifton Court Predator Management DWR plans to continue implementation of projects to reduce mortality of ESA listed fish species in response to the National Marine Fisheries Service (NMFS) letter dated April 9, 2015, requiring that DWR immediately implement interim measures to improve predator control until an acceptable alternative can be implemented. These interim measures that could be implemented include: (a) electro-shocking and relocating predators; (b) controlling aquatic weeds; (c) developing a fishing incentives or reward program for predators; and (d) operational changes when listed species are present.</p>	<p>Standard</p>	<p>Core</p>	<p>Delta smelt</p>
<p>Sacramento Deepwater Ship Channel Food Study Repair or replace the West Sacramento lock system to hydraulically reconnect the ship channel with the mainstem of the Sacramento River and possibly increase food production by flushing food into the north Delta for delta smelt.</p>	<p>Programmatic</p>	<p>Collaborative Planning</p>	<p>Delta smelt, delta smelt critical habitat</p>
<p>North Delta Food Subsidies/Colusa Basin Drain Study DWR, Reclamation, and water users propose to increase food entering the north Delta through flushing nutrients from the Colusa Basin into the Yolo Bypass and north Delta. DWR, Reclamation, and water users would work with partners to flush agricultural drainage (i.e., nutrients) from the Colusa Basin Drain through Knight’s Landing Ridge Cut and the Tule Canal to Cache Slough, improving the aquatic foodweb in the north Delta for fish species. Reclamation would work with DWR and partners to augment flow in the Yolo Bypass in July and/or September by closing Knights Landing Outfall Gates and routing water from Colusa Basin into Yolo Bypass to promote fish food production.</p>	<p>Programmatic</p>	<p>Collaborative Planning</p>	<p>Delta smelt, delta smelt critical habitat, least Bell’s vireo, valley elderberry longhorn beetle</p>
<p>Suisun Marsh Roaring River Distribution System Food Subsidies Study Water users propose to add fish food to Suisun Marsh through coordinating managed wetland flood and drain operations in Suisun Marsh, Roaring River Distribution System food production, and reoperation of the Suisun Marsh Salinity Control Gates.</p>	<p>Programmatic</p>	<p>Collaborative Planning</p>	<p>Delta smelt, delta smelt critical habitat</p>
<p>Habitat Restoration</p>			
<p>Intertidal and Associated Subtidal Habitat Restoration (Complete 8,000 acres from 2008 Service BiOp) By 2030, completing the remaining tidal habitat restoration in the Delta of the 8,000 acres. Reclamation and/or DWR would monitor, operate, and maintain the tidal habitat restoration, including obtaining permanent land rights. Consistent with the current regulatory process, future separate consultations would address the effects to listed species from habitat restoration.</p>	<p>Programmatic</p>	<p>Collaborative Planning</p>	<p>Delta smelt, delta smelt critical habitat, salt marsh harvest mouse, California clapper rail, giant garter snake, valley elderberry longhorn beetle, soft bird’s beak, soft bird’s beak critical habitat, Suisun thistle, Suisun thistle critical habitat, vernal pool species, California least tern, least Bell’s vireo,</p>

			Western yellow-billed cuckoo
<p>Predator Hot Spot Removal Reclamation would coordinate with water users to remove predator hot spots in the Bay-Delta. This includes minimizing lighting at fish screens and bridges, and possibly removing abandoned structures.</p>	Programmatic	Collaborative Planning	Delta smelt
Fish Intervention			
<p>Reintroduction efforts from Fish Conservation and Culture Laboratory Reclamation proposes to start supplementation efforts to develop necessary information to begin a supplementation program, focus on capturing existing genetic diversity and expansion of FCCL to produce maximum numbers of Delta Smelt.</p>	Standard	Collaborative Planning	Delta smelt
<p>Delta Fish Species Conservation Hatchery Reclamation proposes to partner with DWR to construct and operate a conservation hatchery for Delta Smelt. The conservation hatchery would breed and propagate a stock of fish with equivalent genetic resources of the native stock and at sufficient quantities to effectively augment the existing wild population, so that they can be returned to the wild to reproduce naturally in their native habitat.</p>	Programmatic	Collaborative Planning	Delta smelt

Action Area

The action area is defined as all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action (50 CFR 402.02). The action area for this biological opinion is based on the descriptions of the components of the PA as described in the BA, including some for which the locations and extent of effects are not yet known. These components are addressed programmatically, and will either rely on existing consultations or will be subject to subsequent consultation. This definition of the action area is based on our current understanding of the extent of activities proposed by Reclamation. This encompasses areas in which effects to FWS-jurisdictional species and critical habitat may occur, and excludes areas in the action area in the BA in which only effects to NMFS-jurisdictional species and critical habitat may occur.

The action area encompasses the following reservoirs, rivers, and the land between the levees adjacent to the rivers: (1) Sacramento River from Shasta Lake downstream to and including the Sacramento–San Joaquin Delta; (2) Clear Creek from Whiskeytown Reservoir to its confluence with the Sacramento River; (3) Feather River from the FERC boundary downstream to its confluence with the Sacramento River; (4) American River from Folsom Reservoir downstream to its confluence with the Sacramento River; (5) Stanislaus River from New Melones Reservoir to its confluence with the San Joaquin River; (6) San Joaquin River from Friant Dam

downstream to and including the Sacramento–San Joaquin Delta; and (7) San Francisco Bay and Suisun Marsh.

Analytical Framework for the Jeopardy Determination

Section 7(a)(2) of the Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. “Jeopardize the continued existence of” means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this BiOp considers the effects of the proposed Federal action, and any cumulative effects, on the range-wide survival and recovery of the listed species. It relies on four components: (1) the *Status of the Species*, which describes the range-wide condition of the species, the factors responsible for that condition, and its survival and recovery needs, (2) the *Environmental Baseline*, which analyzes the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species, (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the species, and (4) the *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the species.

The Action Area for this consultation encompasses the entire range of delta smelt. Therefore, we did not include a separate rangewide status of species in this biological opinion because the *Status of the Species within the Action Area* section below fully addresses the rangewide status.

Analytical Framework for the Adverse Modification Determination

Section 7(a)(2) of the Act requires that Federal agencies insure that any action they authorize, fund, or carry out is not likely to destroy or to adversely modify designated critical habitat. A final rule revising the regulatory definition of “destruction or adverse modification” was published on February 11, 2016 (81 FR 7214). The final rule became effective on March 14, 2016. The revised definition states:

“Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat for the conservation of a listed species. Such alterations may include, but are not limited to, those that alter the physical or biological features essential to the conservation of a species or that preclude or significantly delay development of such features.”

The destruction or adverse modification analysis in this BiOp relies on four components: (1) the *Status of Critical Habitat*, which describes the range-wide condition of the critical habitat in terms of the key components (*i.e.*, essential habitat features, primary constituent elements, or physical and biological features) that provide for the conservation of the listed species, the

factors responsible for that condition, and the intended value of the critical habitat overall for the conservation/recovery of the listed species, (2) the *Environmental Baseline*, which analyzes the condition of the critical habitat in the action area, the factors responsible for that condition, and the value of the critical habitat in the action area for the conservation/recovery of the listed species, (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated and interdependent activities on the key components of critical habitat that provide for the conservation of the listed species, and how those impacts are likely to influence the conservation value of the affected critical habitat, and (4) *Cumulative Effects*, which evaluate the effects of future non-Federal activities that are reasonably certain to occur in the action area on the key components of critical habitat that provide for the conservation of the listed species and how those impacts are likely to influence the conservation value of the affected critical habitat.

The Action Area for this consultation encompasses all of the designated critical habitat for delta smelt. Therefore, we did not include a separate section to address the status of the entire designation earlier in this biological opinion because the *Status of the Critical Habitat within the Action Area* sections below fully addresses the designation-wide status.

For purposes of making the destruction or adverse modification determination, the Service evaluates if the effects of the proposed Federal action, taken together with cumulative effects, are likely to impair or preclude the capacity of critical habitat in the action area to serve its intended conservation function to an extent that appreciably diminishes the range-wide value of critical habitat for the conservation of the listed species. The key to making that finding is understanding the value (*i.e.*, the role) of the critical habitat in the action area for the conservation/recovery of the listed species based on the *Environmental Baseline* analysis.