

GUIDANCE DOCUMENT

Entrainment Management

June 3, 2026

I. PURPOSE

This document provides implementation guidance on Entrainment Management pursuant to the December 4, 2025 Record of Decision on the Long-term Operation of the Central Valley Project (CVP) and State Water Project (SWP) (LTO). The U.S. Bureau of Reclamation's (Reclamation) and Department of Water Resources' (DWR) LTO Operations Plan - Action 5, the U.S. Fish and Wildlife Service's (USFWS) and National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service's (NMFS) Biological Opinions Incidental Take Statements (ITS) and the California Department of Fish and Wildlife's (CDFW) Incidental Take Permit (ITP) are included. The scope of guidance includes the schedule, processes, and deliverables of different agency and interested party teams. The primary deliverables are notes from meetings, a weekly summary of the hydrologic, operational, and temperature data related to Old and Middle River (OMR) management; weekly real-time assessments of potential actions for entrainment management; and documentation of the operations decisions.

II. ENTRAINMENT MANAGEMENT

Section II and III provide the applicable verbatim language for OMR Management from the LTO including Reclamation's Action 5, 2025 USFWS ITS, 2024 NMFS ITS, and CDFW ITP.

1. Action 5 Operations Plan: [Action 5 Record of Decision Attachment 1 Exhibit 1 Operation Plan](#)
 - a. Entrainment Management, Section 5.3: pages 5.7 - 5.12
 - b. Governance, Section 11: pages 11.1 - 11.7
2. NMFS Incidental Take Statement: [Endangered Species Act Section 7\(a\)\(2\) Programmatic Biological Opinion for the Reinitiation of Consultation on the Long-Term Operation of the Central Valley Project and State Water Project | NOAA Fisheries](#)
 - a. Amount or Extent of Incidental Take – CVP and SWP Pumping Facilities, Section 11.3.5.3, pages 898 – 900
 - b. Terms and Conditions, Section 11.6 number 5, pages 907- 910
3. USFWS Amended Incidental Take Statement: [Attachment 8 of the 2025 Record of Decision Action 5 Record of Decision Attachments 2-9](#)
 - a. Amount or Extent of Take, pages 2 – 19
 - b. For review of the Effects Analysis, please see the following sections of the USFWS Biological Opinion: Section 8 for Delta Smelt and Section 10 for Longfin Smelt: [11.8.24 lto-final-biological-opinion.pdf](#)
4. CDFW Incidental Take Permit: Amended ITP from December 2025 (Attachment 1)
 - a. Minimization Measures, Section 8, pages 62 - 100

Action 5 (Pages 5-7 – 5-12)

5.3 Entrainment Management

Entrainment management addresses the entrainment stressor on adult, larval and juvenile Delta smelt; adult, larval and juvenile longfin smelt; winter-run Chinook salmon juveniles, spring-run Chinook salmon juveniles, steelhead juveniles, and green sturgeon. During entrainment management, Reclamation and DWR would operate export facilities to an Old and Middle River Flow Index (OMRI) using the Hutton (2008) equation. OMRI provides a surrogate for how export pumping at Jones and Banks pumping plants influences hydrodynamics in the south Delta. The flow at Jersey Point (JPF) provides a surrogate for high flows that reduce the risk of entrainment regardless of OMRI. Reclamation and DWR would compute JPF based on San Joaquin River Inflow at Vernalis, Cosumnes River Inflow, Mokelumne River Inflow, Calaveras River Inflow, Flow from Sacramento River through DCC, Flow from Sacramento River through Georgiana Slough, 65% of in-Delta precipitation, -65% of in-Delta diversions, and -Export Pumping at (Banks + Jones).

5.3.1 Start of Entrainment Management

Entrainment management starts when fish populations are in the Delta and likely to experience entrainment. Reclamation and DWR would operate to OMRI no more negative than -5,000 cfs until the end of entrainment management after one of the following conditions occur:

- First Flush Conditions: From December 1 through the last day of February, Reclamation and DWR would reduce CVP and SWP exports once to maintain an average OMRI no more negative than -2,000 cfs for 14 days when:
 - Three-day running average of daily flow at Freeport is greater than, or equal to, 25,000 cfs, AND
 - Three-day running average of daily turbidity at Freeport is greater than, or equal to, 50 Formazin Nephelometric Units (FNU).
- Longfin Smelt Adult: After December 1, if cumulative water year salvage of age 1+ Longfin smelt exceeds 5% of the fall mid water trawl index plus one fish.
- Winter-Run Chinook Salmon: After January 1, when the first winter-run Chinook salvage occurs (hatchery winter-run Chinook salmon or genetically verified wild winter-run Chinook salmon).

Reclamation, through Governance, may prepare an assessment to initiate the First Flush Action early if real-time monitoring of abiotic and biotic factors and salvage prediction models indicates the conditions of First Flush are imminent (i.e., within two to three days) and/or increased entrainment of adult Delta smelt to the south Delta is likely (i.e., turbidity bridge). Reclamation, through Governance, may prepare an assessment to postpone the First Flush Action or reduce the magnitude or duration if real-time monitoring of abiotic and biotic factors and salvage prediction models indicate the First Flush Action is not warranted to avoid exceeding incidental take of listed species.

A First Flush Action reduces the rapid upstream migration of adult Delta smelt into the south Delta where they may be subject to an increased risk of subsequent entrainment into export facilities and their progeny may experience poor habitat conditions. The onset of winter adult Delta smelt entrainment often coincides with the first accumulation of turbid waters, which are typically

correlated with elevated Freeport flows (Grimaldo et al. 2009, Grimaldo et al. 2021). An OMR no more negative than -2,000 cfs approximates hydrodynamics where the zone of influence of exports on turbidity remains outside the central Delta and a 14-day period duration causes this hydrodynamic change to occur for the approximate period of a spring-neap tide. After the initial upstream migration, Delta smelt are thought to shelter in proximity of spawning habitats (Polansky et al 2018, Sommer et al 2011).

Adult longfin smelt have limited historical presence in the South Delta (Merz et al. 2013, their Figure 4) and are observed at CVP/SWP fish collection facilities as early as December with a peak in January. Historically, cumulative salvage was lower when operating to an OMRI less negative than -5,000 and further decreased after smaller population abundances were observed after the Pelagic Organism Decline (TBI 2007, their Figure 13; Smith et al 2019). No model exists to evaluate appropriate thresholds for adult entrainment impacts of the longfin smelt population, thus entrainment management for longfin smelt is initiated if greater than 5% of the population abundance estimate (e.g., index, other method) has been salvaged.

The winter-run Chinook salmon population has limited historical presence in the South Delta. Salvage has been observed as early as December, but more typically in January, with a peak in March once an OMRI less negative than -5,000 cfs starts. No model is available to evaluate appropriate threshold for juvenile entrainment impacts on the winter-run Chinook salmon population, thus entrainment management for winter-run Chinook salmon is initiated once the first genetically identified winter-run Chinook salmon is found at the CVP or SWP fish collection facilities.

5.3.2 Real-Time Assessment Thresholds

Reclamation and DWR may operate to a more restrictive OMRI to further manage entrainment under the following thresholds:

- Longfin Smelt Adults: If JPF is < 0 cfs, an assessment indicates annual loss is on a trajectory to exceed 5% of the adult population abundance, and reduced exports will reduce entrainment into the South Delta, Reclamation and DWR would reduce CVP and SWP exports to maintain an average OMRI no more negative than -3,500 cfs for at least 7 days and prepare a subsequent assessment.
- Longfin Smelt Larvae and Juveniles: If JPF is < 0 cfs and a population model demonstrates a need to reduce entrainment to avoid population decline, Reclamation and DWR would reduce average OMRI no more negative than -3,500 cfs for at least 7 days and prepare a subsequent assessment.
- Delta Smelt Adults: If JPF is < 0 cfs, daily average turbidity is ≥ 12 FNU in the OMR corridor, and average water temperatures at Jersey Point or Rio Vista have not exceeded 53.6°F (12°C) consecutively for 3 days, Reclamation and DWR would make a one-time action to reduce reducing CVP and SWP exports to maintain an average OMRI no more negative than -3,500 cfs for at least 7 days.
- Delta Smelt Larvae and Juveniles: After the onset of spawning, if JPF is < 0 cfs, turbidity is ≥ 12 FNU in the south Delta, and Particle Tracking Model (PTM) modeling indicates that the action would avoid $\geq 5\%$ entrainment of the Delta smelt population at facilities after 30 days, Reclamation and DWR would reduce CVP and SWP exports to maintain an average OMRI no more negative than -3,500 cfs for at least seven days and prepare a subsequent assessment.

- Winter-Run Chinook Salmon Juveniles: If an assessment indicates annual salvage loss is on a trajectory to exceed 1% of the Juvenile Production Estimate (JPE) entering the Delta and a reduction in export pumping would materially increase through-Delta survival, Reclamation and DWR will reduce CVP and SWP exports to maintain an average OMRI no more negative than -3,500 cfs for at least seven days and prepare a subsequent assessment.

The annual salvage loss as a proportion of the winter-run Chinook salmon JPE shall be separately tracked by:

- Genetically confirmed unclipped winter-run Chinook salmon; and
- Releases from Livingston Stone National Fish Hatchery.
- If a Chinook salmon cannot be genotyped, it shall be identified based on Length-At-Date.
- Spring-Run Chinook Salmon Juveniles: If an assessment indicates annual salvage loss is on a trajectory to exceed 1% of the JPE entering the Delta and a reduction in export pumping would materially increase through-Delta survival, Reclamation and DWR will reduce CVP and SWP exports to maintain an average OMRI no more negative than -3,500 cfs for seven days and prepare a subsequent assessment.

The annual salvage loss as a proportion of the spring-run Chinook salmon JPE shall be tracked by surrogates:

- Yearling: Coleman Late-Fall Chinook Production Release
- Young of Year: Feather River Hatchery Spring-Run Production Releases
- Steelhead Juveniles: If an assessment indicates annual loss is on a trajectory to exceed 1% of the JPE entering the Delta and a reduction in export pumping would materially increase through-Delta survival, Reclamation and DWR will reduce CVP and SWP exports to maintain an average OMRI no more negative than -3,500 cfs for seven days and a subsequent assessment.

The annual salvage loss as a proportion of the steelhead JPE shall be estimated by the tracked by surrogates of hatchery steelhead released as part of normal hatchery practices.

- Sacramento River Origin: Coleman, Nimbus, and Feather River hatcheries Production Releases
- San Joaquin Origin: Mokelumne River Hatchery Production Releases

The JPE for each release group of salmonids entering the Delta shall be determined by the historical average survival from release sites to Delta entry, or when available, by observed survival to Delta entry provided by real-time acoustic receiver arrays. Reclamation and DWR, through Governance, may modify survival estimates based on year-specific conditions.

Reclamation, through Governance, would prepare assessments at least weekly. Assessments would track salvage loss, including loss of species that do not trigger additional actions, and evaluate scenarios of OMRI no more negative than -5,000 cfs and -3,500 cfs for estimates of trajectories and through-Delta survival. Assessments would consider the source of turbidity and how that may change the survival and recruitment of species.

When JPF are greater than zero, Delta hydrodynamics reflect conditions unfavorable for entrainment of adult, larval, and juvenile Longfin smelt into the South Delta. In addition to negative

values of JPF, observations of proportional population loss should demonstrate potential impacts. No model exists to evaluate appropriate thresholds for adult longfin smelt entrainment impacts, thus entrainment reduction action for longfin smelt occurs when the loss trajectory is likely to exceed 5% of the adult population abundance. No model exists to evaluate appropriate thresholds for larval/juvenile entrainment impacts of the longfin smelt population, thus entrainment reduction action for longfin smelt will be appropriate scaled when a population model demonstrates a need to reduce entrainment to avoid population decline

When JPF are greater than zero, Delta hydrodynamics reflect net flow conditions unfavorable for entrainment of adult, larval, and juvenile Delta smelt into the South Delta. Survival and migration of adults already in the South Delta is influenced by turbidity; and when turbidity is high, reducing OMR negative flows can reduce entrainment of larval and juvenile Delta smelt (Smith et al 2021). This entrainment reduction action for adult Delta smelt is in place until 53.6°F (12°C) occurs for three days, which are temperatures indicative of spawning (Damon et al 2016). This entrainment reduction action for larval and juvenile Delta smelt occurs when the additional condition of PTM modeling demonstrating more than 5% of particles injected in the Central Delta being entrained at the facilities, which is indicative of South Delta hydrodynamic alteration due to exports.

Delta juvenile salmonid survival is driven by inflows and temperatures (Hance et al. 2021, Nobriga et al 2021, Wang et al 2024), and the role of exports on through-Delta survival may reflect a compensatory or additive mortality source for these populations. No model is available to evaluate appropriate thresholds for juvenile entrainment impacts of winter-run and spring-run Chinook salmon and Central Valley steelhead population, thus entrainment management for these species is initiated if an assessment indicates the trajectory is that greater than 1% of the JPE entering the Delta will be lost and a reduction will increase through-Delta survival.

5.3.3 Stormflex

From the start of OMRI management season until the larval and juvenile Delta Smelt Protection Action is triggered, Reclamation and DWR may operate to OMRI no more negative than -6,500 cfs to capture peak flows during storm-related events when:

- A measurable precipitation event has occurred in the Central Valley;
- Reclamation and DWR determine that the net Delta outflow index indicates a higher level of outflow available for diversion due to peak storm flows;
- The Delta is in excess conditions as defined in COA;
- JPF is greater than +1,500 cfs; AND
- A real-time assessment threshold is unlikely to be exceeded.

Reclamation and DWR would use the assessment process to evaluate stormflex by including an additional OMR scenario up to -6,500 cfs OMRI. If the assessment indicates that no real-time thresholds for the upcoming week are likely to be exceeded, Reclamation and DWR may operate to the more negative OMR and will update the assessment no less than weekly.

5.3.4 End of Entrainment Management

Entrainment management ends when water temperatures in the Delta no longer provide hospitable conditions indicative of listed fish presence.

- Smelts: June 30 or after 3 consecutive days of daily mean water temperature at Clifton Court Forebay (CLC) $\geq 77.0^{\circ}\text{F}$ (25°C).
- Salmonids: June 30 or after 7 days of daily mean water temperature in June $\geq 72^{\circ}\text{F}$ (22.2°C) at Mossdale and at Prisoner's Point (does not have to be consecutive).

Inhospitable south Delta and San Joaquin River conditions reflect temperature known to be lethal for Delta smelt and salmonids. For salmonids, water temperature above the 75.2°F reflect the upper incipient lethal temperature (UILT) for juveniles (Brett 1952, Brett et al. 1982, Myrick and Cech 2004). For Delta smelt, their critical thermal maximum is 77°F and low abundance has been noted at this temperature (Swanson et al 2000, Nobriga et al. 2008).

2025 USFWS ITS Amendment (pages 2-18)

Amount or Extent of Take

Surrogate Approach

In accordance with 50 CFR 402.14(i)(1)(i), a surrogate may be used to express the amount or extent of anticipated incidental take if the BiOp or ITS describes the causal link between the surrogate and anticipated take, explains why it is not practical to express the amount or extent of anticipated take or to monitor take-related impacts in terms of individuals, and sets a clear standard for determining when the level of anticipated take has been exceeded.

Surrogates are used for this ITS because, as described throughout this BiOp, it is impossible to accurately quantify and monitor the amount or number of individuals that are expected to be incidentally taken as a result of the PA. Large fractions of the incidental take of delta smelt and longfin smelt are not detected, for instance when individuals are eaten by predators in route to the Skinner and Tracy fish facilities, or when they die from predation or other food web-related mechanisms in the low-salinity zone when the projects change Delta outflow. Therefore, using detection in monitoring programs like fish salvage or IEP trawl surveys to quantify the specific anticipated level of incidental take is not a reliable measure. Other relevant factors include the variability associated with the effects of the PA, the relatively low population size of these species, difficulty in detecting individuals entrained or impinged (of delta smelt and longfin smelt), annual variations in the timing of various parts of the species' life cycles, sheer amount and dispersed nature of the habitat (for croplands utilized by giant garter snake), and variation in how individual animals utilize habitat within the Action Area.

Therefore, the Service is using the ecological conditions associated with take described below as the incidental take surrogates for individual delta smelt, longfin smelt, and giant garter snake.

In the BiOp, the Service has determined that incidental take is reasonably certain to occur as follows:

Delta Smelt and Longfin Smelt

The Service anticipates that the PA will result in the incidental take of individual delta smelt and longfin smelt due to hydrodynamic changes caused by the operation of the CVP and SWP. This includes effects from Delta outflow, the Banks and Jones pumping plants, the Skinner and Tracy fish facilities, and other CVP or SWP water diversion and water distribution systems in the Delta and Suisun Marsh. Regarding the CVP and SWP export of

water from the Delta, the Service anticipates take in the form of kill or harm of all delta smelt and longfin smelt within the South Delta affected by water operations and other areas of the Delta where habitat quality is affected by Delta outflow.

Incidental take associated with this action is expected in the following forms: mortality and harm of delta smelt and longfin smelt adults, juveniles, and larvae. It is difficult to determine the number of individuals that could be injured or killed (including harm as a result of significant habitat modification) because free-swimming aquatic animals are difficult to observe in large water bodies and because delta smelt and longfin smelt are relatively rare. The methods used to track these species' status and trends can do so but have considerable statistical uncertainty when it comes to estimates of particular sources of loss like entrainment (Smith 2019; Smith et al. 2020) or flow-related survival (Polansky et al. 2021; Kimmerer and Gross 2022). The Service anticipates injury and mortality of individual delta smelt and longfin smelt will occur as a result of entrainment and whenever habitat conditions do not support the successful completion of the species' full life cycles.

Take from South Delta Entrainment

The OMR index is an indicator for how export pumping at Banks and Jones Pumping Plants influence hydrodynamics in the South Delta. The Service has determined for the purposes of this BiOp that delta smelt and longfin smelt that enter the Old and Middle river corridors are entrained whether or not they survive long enough to reach the Banks and Jones pumping plants or other South Delta facilities including the fish collection facilities, Clifton Court Forebay, agricultural barriers, and the Rock Slough intake. Adult delta smelt and longfin smelt have substantial capacity to control their distribution in the Bay-Delta. Thus, some adult delta smelt and longfin smelt may 'entrain' themselves during their winter dispersal by cueing on hydrodynamics resulting from the export of water by Banks and Jones Pumping Plants while moving up the San Joaquin River (Gross et al. 2021). Delta smelt and longfin smelt larvae have some ability to control their distribution but less than older, more competently swimming life stages, making them more vulnerable to tidal currents and the net displacement (or flow) of water over multiple tidal cycles. Delta smelt and longfin smelt are attracted to turbidity in open-water habitats. The hydrodynamic conditions indexed by net negative flow in Old and Middle rivers can affect the dispersal of turbidity into and through the South Delta. During winter dispersal and spring spawning, when turbidity of more than 12 FNU is present in Old and Middle rivers, adult delta smelt may be more likely to move into these channels, become entrained, and become subject to the reduced quality habitat in the channels, adjoining canals, and associated flooded islands (e.g., Mildred Island) due to operations, or be injured or killed as a result of entering the export facilities. Adult longfin smelt are proportionally less likely than delta smelt to migrate far enough into the South Delta to be entrained. Additionally, entrained adult delta smelt and longfin smelt may spawn in areas where their progeny will be lost to the population due to some unquantifiable combination of predation loss associated with submerged vegetation or eventual transport to the CVP and SWP facilities. The number of longfin smelt subject to these forms of take is likely to be relatively low given that most individuals spawn in the low-salinity zone.

The conditions in the South Delta that result from net negative flows and elevated turbidity cue movement of adult delta smelt and longfin smelt into the area and can be causally linked to the level of incidental take of individuals and some of their offspring due to entrainment caused by operations. These conditions encompass all areas influenced by the hydrodynamic

effects of export pumping at Banks and Jones Pumping Plants, including the other South Delta facilities that do not factor into the OMR index calculation.

As described in the 2025 Operation Plan Section 5.3, the flow at Jersey Point (JPF) provides an indicator of net flows at that location on the San Joaquin River that modify the risk of delta smelt and longfin smelt entrainment regardless of the OMR index. Given a specific OMR index value like -5000 cfs, when the JPF is positive, predicted entrainment from many locations in the Delta is lower than when JPF is negative. The daily JPF net flow is estimated based on San Joaquin River Inflow at Vernalis, Consumnes River Inflow, Mokelumne River Inflow, Calaveras River Inflow, Sacramento River flow passing through the DCC and Georgiana Slough, 65% of in-Delta precipitation, -65% of in-Delta diversions, and -Export Pumping at (Banks + Jones).

Proposed OMR protective measures minimize, but do not eliminate, the likelihood of entrainment. The following thresholds are directly related to the specific ecological conditions in the South Delta that reflect the conditions commensurate with the level of incidental take through entrainment that is anticipated in this BiOp.

The incidental take of delta smelt and longfin smelt will be exceeded if:

- The 14-day average OMR index is more negative than -5,000 cfs and if one of the following measures has been triggered: First Flush Conditions, Longfin Smelt Adult, or Winter-Run Chinook Salmon (per 2025 Operation Plan Section 5.3.1), through the date that the 3-day average water temperature at Clifton Court Forebay is 77°F (25°C) or June 30, whichever occurs first;
- OR the 14-day average OMR index is more negative than -2,000 cfs for any of the 14 consecutive days (or other magnitude or duration determined through Governance) of the First Flush Action, if triggered (per 2025 Operation Plan Section 5.3.1);
- OR the 14-day average OMR index is more negative than -6,500 cfs during a storm flex operation as described in 2025 Operation Plan Section 5.3.3;
- OR the average OMR index is more negative than -3,500 for any of the 7 days after JPF is < 0 cfs and an assessment indicates adult longfin smelt salvage is on a trajectory to exceed 5% of estimated population abundance and reduced exports will reduce entrainment into the South Delta (per 2025 Operation Plan Section 5.3.2);
- OR the average OMR index is more negative than -3,500 for any of the 7 days after JPF is < 0 cfs and a longfin smelt population model demonstrates a need to reduce entrainment to avoid population decline (per 2025 Operation Plan Section 5.3.2);
- OR the average OMR index is more negative than -3,500 cfs for any of the 7 days after JPF is < 0 cfs, daily average turbidity is ≥ 12 FNU in the OMR corridor, and average water temperatures at Jersey Point or Rio Vista have not exceeded 53.6°F (12°C) consecutively for 3 days (per 2025 Operation Plan Section 5.3.2);
- OR the average OMR index is more negative than -3,500 cfs for any of the 7 days after the onset of delta smelt larval and juvenile spawning, when JPF is < 0 cfs, turbidity is ≥ 12 FNU in the south Delta, and particle tracking modeling indicates that the action would avoid $\geq 5\%$ entrainment of the Delta smelt population at facilities after 30 days;

- The conditions identified as commensurate with the anticipated level of incidental take will be maintained unless postponed or offramped in accordance with Governance procedures described in the 2025 Operation Plan Section 11. If postponed or offramped, the conditions that result will be the ecological condition commensurate with the level of incidental take through entrainment. If the thresholds described above or other thresholds resulting from the Governance procedures described in the PA are met, the amount or extent of the anticipated level of incidental take will be considered exceeded and reinitiation will be required pursuant to 50 CFR 402.16.

Take from North Delta SWP Diversions

The operation of the Barker Slough Pumping Plant can result in predicted entrainment from within Barker and Lindsey sloughs but the hydraulic draw of water from outside of Lindsey Slough is too small or too slow to result in likely fish entrainment. The hydrodynamic conditions created by the Barker Slough Pumping Plant are therefore anticipated to entrain all larval delta smelt and longfin smelt that were spawned only in Barker and Lindsey sloughs. The Service anticipates that incidental take of delta smelt and longfin smelt larvae will occur at the Barker Slough Pumping Plant (BSPP). Incidental take is expected to be low to zero for post-larval life stages since BSPP has positive barrier fish screens making injury or death of adult and juvenile delta smelt and longfin smelt unlikely. However, a small number of larval delta smelt and longfin smelt may be killed through impingement, entrainment, or sediment and aquatic weed removal.

Hydrodynamic conditions related to the rate of diversion at the BSPP influence the likelihood of delta smelt and longfin smelt being drawn into the BSPP. As the diversion rate increases, the likelihood of entrainment into BSPP instead of local agricultural diversions increases. Therefore, the diversion of water at BSPP can be causally linked to the level of incidental take of delta smelt and longfin smelt due to entrainment, impingement, or during sediment and aquatic weed removal caused by operations of the BSPP. The following thresholds are directly related to the conditions associated with water diversion at BSPP that are commensurate with the maximum level of incidental take anticipated in this BiOp.

The incidental take of longfin smelt will be exceeded if pumping at Barker Slough Pumping Plant exceeds a 7-day average diversion rate of 100 cfs in a Critical or Dry year from January 1 through March 31 (per 2025 Operation Plan Section 5.4).

The incidental take of delta smelt will be exceeded if:

- pumping at Barker Slough Pumping Plant exceeds a 7-day average diversion rate of 100 cfs in a Critical or Dry year from May 1 through June 30 once a 20-mm Survey catch trigger has been met or exceeded (per 2025 Operation Plan Section 5.4);
- OR pumping at Barker Slough Pumping Plant exceeds a 7-day average diversion rate of 60 cfs in a Critical or Dry year from March 1 through April 30 once a 20-mm Survey catch trigger has been met or exceeded (per 2025 Operation Plan Section 5.4).

If the thresholds described above are met, the amount or extent of the anticipated level of incidental take will be considered exceeded and reinitiation will be required pursuant to 50 CFR 402.16.

It is anticipated that the PA will increase the use of Suisun Marsh by delta smelt via the Summer and Fall Suisun Marsh Salinity Control Gate Operation Action, but delta smelt and longfin smelt frequently reside in the larger sloughs of Suisun Marsh and less frequently reside in the marsh's smaller sloughs. The Roaring River Distribution System (RRDS) and the Morrow Island Distribution System (MIDS) are used to deliver fresh water flowing into Montezuma and Suisun sloughs to adjacent wetlands and to drain water off of these wetlands. The use of these distribution systems entrains fish. Thus, the Service anticipates that incidental take of delta smelt and longfin smelt larvae will occur at the RRDS and take of delta smelt and longfin smelt larvae, juveniles, and adults will occur at the MIDS, which is unscreened. Incidental take for both species is expected to be low. The RRDS intake has positive barrier fish screens which limit fish loss and the approach velocity toward these screens is generally low. Therefore, the presence of the screen and approach velocities maintained can be causally linked to incidental take from operation of the RRDS. The MIDS is unscreened, and because of that approach velocities vary more than at RRDS. The diversion of water into MIDS and the distribution of that water onto adjacent wetlands can be causally linked to take of delta smelt and longfin smelt due to entrainment and subsequent stranding into canals and shallow wetlands where the chance of survival is much lower. The RRDS has not been considered a major source of fish loss since it was screened and the MIDS is likewise not known to be a major source of smelt entrainment. There has been no proposed change to the use of either RRDS or MIDS which have been in operation since 1979 or 1980.

The following specific ecological conditions reflect the conditions commensurate with the level of incidental take through operation of RRDS and MIDS that is anticipated in this BiOp.

- Approach velocity at the screens is limited to 0.2 ft/second except during mid-September – mid-October, when RRDS diversion rates are controlled to maintain a maximum approach velocity of 0.7 ft/second for fall flood up operations.
- a. There will be no change to the general timing and quantities of water diverted into and through MIDS.

If the conditions described above are not maintained, the amount or extent of the anticipated level of incidental take will be considered exceeded and reinitiation will be required pursuant to 50 CFR 402.16.

Take from Far-field Effects of Operations

There will be areas outside of the influence of entrainment in the range of delta smelt and longfin smelt that will be affected by reduced habitat quality resulting from operations of the CVP and SWP. The ecological conditions resulting from the hydrodynamic effects of the operations and diversion of freshwater flows include reduced size and extent of low-salinity habitat in the spring and summer. Implementation of the Summer and Fall Suisun Marsh Salinity Control Gate Operation Action, which includes operations of the SMSCG in the summer and maintaining X2 at 80 km in the fall (per BA Section 3.7.6), will result in an ecological condition that includes improved habitat quality and quantity in the area of low-salinity habitat. Additional studies as proposed under adaptive management for the Summer-Fall Habitat Action will be implemented and may result in operational changes that maintain or improve the habitat conditions in low-salinity habitat that would be expected from implementing the Summer-Fall Habitat Action as described in BA section 3.7.6. Injury

and mortality of sub-adult delta smelt and longfin smelt are anticipated to be minimized by these measures as described in the PA. Although some longfin smelt are likely to reside near the low-salinity zone in the summer and fall, many are expected to reside more seaward given their increased tolerance to salinity as compared to delta smelt. Therefore, the number of longfin smelt subject to injury or mortality from reduced habitat quality and quantity is expected to be relatively low.

If the SMSCG are not operated as described in the 2025 Operation Plan Section 5.10, the amount or extent of the anticipated level of incidental take will be exceeded and reinitiation will be required pursuant to 50 CFR 402.16.

[...]

1. Effect of the take

In the accompanying biological opinion, the Service determined that the level of anticipated take is not likely to result in jeopardy to the delta smelt, longfin smelt DPS, northwestern pond turtle, and giant garter snake.

2. Reasonable and Prudent Measures

The Service has determined that the following reasonable and prudent measures are necessary and appropriate for the delta smelt, longfin smelt, northwestern pond turtle, and giant garter snake:

- 1) Reclamation and DWR shall minimize the impact of incidental take of delta smelt and longfin smelt from operations of the CVP and SWP.
- 2) Reclamation and DWR shall minimize the impact of the of incidental take of delta smelt from operations of the Bay-Delta Division.
- 3) [...]
- 4) [...]
- 5) Reclamation and DWR shall monitor and report the amount and extent of take of delta smelt, longfin smelt, and northwestern pond turtle to the Service. Reclamation shall monitor and report the amount and extent of take of giant garter snake to the Service.

3. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, Reclamation and DWR shall comply with the following terms and conditions, which implement the reasonable and prudent measures described above and include required reporting/monitoring requirements. These terms and conditions are nondiscretionary.

The following terms and conditions implement reasonable and prudent measure 1:

- a. Reclamation and DWR shall implement the proposed operational measures as described in the PA.
- b. Reclamation shall document and report operational decisions to the Service prior to implementation that are determined through the Governance process in the 2025 Operation Plan. The documentation shall include any assessments prepared, supporting data, environmental and biological rationale, and a description of the timeframe and the OMR index that would occur.

- c. DWR, in coordination with Reclamation, the Service, NMFS, and CDFW shall develop a Standard Operating Procedures document for the operation of diversions into the Roaring River Distribution System. This document shall demonstrate how RRDS is operated to maintain specified approach velocities. This document shall be finalized before the 2025 fall flood up season.

The following terms and conditions implement reasonable and prudent measure 2:

- a. Reclamation shall continue to support development of the Delta Smelt Supplementation Program. This support includes:
 - i. Assisting the Service in development of a Hatchery and Genetic Management Plan (HGMP) that will provide a detailed overview of the Delta Smelt Supplementation Program's operational components for each stock captively reared at a facility. Final review and approval of the initial HGMP will be completed by the Service. The HGMP is intended to be a "living document" that will guide sound hatchery management activities for delta smelt supplementation ensuring the well-being and caretaking of the captive delta smelt broodstock. The HGMP will document the actions being taken such as husbandry techniques, fish health, nutrition, spawning methods, behavior, handling, and transport and release strategies. Revisions to the HGMP will be coordinated with the Service and informed by the Culture and Supplementation of Smelt (CASS) group to review program success and critical actions that require undertaking including: production numbers, genetically sound management, revealing new information from monitoring and research that lead to improving hatchery practices, review of previous propagation efforts, direction of the program into new locations and/or continued releases in current planting areas, and other monitoring results. Effort will be put into rebuilding the natural population through the broodstock collections and taking a safeguard against extinction approach to build population numbers, genetically link broodstock to the wild population, and guard against catastrophic failure.
 - ii. Minimizing impacts to delta smelt during the capture, transport, spawning, rearing, and release phases of the broodstock development process.
 - iii. Continuing to support studies that evaluate post-release survival and recruitment which are critical to understanding the success of the Delta Smelt Supplementation program to offset loss of individuals from operations of the SWP and CVP.
 - iv. Working with the Service to identify and design compliance and effectiveness monitoring tools, which may include life cycle models and the more traditional in-water monitoring methodologies, to evaluate the Delta Smelt Supplementation Program accomplishments that are expected to occur.
 - v. Preparing reports in collaboration with the Service, and other CASS members, on an annual frequency regarding Delta Smelt Supplementation Program evaluations, upcoming activities, accomplishments, lessons learned, and areas to adaptively manage to further achieve the goals and objectives of the program. All final reports shall be provided in electronic format to the Service.
 - vi. In a coordinated manner with the Service, securing additional infrastructure (space, tanks, laboratory supplies and equipment, etc.) as necessary, to ensure the

broodstock program can be maintained securely and successfully to meet production targets identified in the PA.

- a. Reclamation and DWR shall report to the Service annually on the status of the construction, protection, and management of the 8,000 acres of tidal habitat restoration projects implemented in the Delta to reduce the food availability stressor for the benefitted listed fishes, including delta smelt.

[...]

The following terms and conditions implement reasonable and prudent measure 5:

- a. Reclamation will provide a report annually to the Service which describes implementation of real-time operations of Old and Middle River Management/Seasonal Operations. This report shall include information on environmental conditions, flows, temperature, salinity, turbidity, fish and other biotic monitoring, species distribution, delta smelt and longfin smelt salvage, fish genetic identification, fish condition, and other parameters as agreed to in coordination with the Service. This report will describe implementation and/or non-implementation of the proposed OMR protection measures. If any measures were not implemented as described in the PA, a description of why the measure was modified or not implemented will be provided in the report.
- b. Reclamation and DWR shall report to the Service on the results of the planning, structured decision making, and implementation of the Summer and Fall Suisun Marsh Salinity Control Gate Operation Action. This reporting shall include details regarding how and if the SMSCG were operated. This report shall be submitted to the Service annually no later than July 31 of the following year.
- c. For all lands subject to cropland idling/shifting due to water reductions caused by implementation of the Shasta Framework, Reclamation will request from the Sacramento River Settlement Contractors information about acreages and locations that were fallowed as a result of water reductions. If this information is provided, Reclamation will submit the information to the Service.

Reporting Requirements

In order to monitor whether the amount or extent of incidental take anticipated from implementation of the PA is approached or exceeded, Reclamation shall adhere to the following reporting requirements. Should the anticipated amount or extent of incidental take be exceeded Reclamation must reinitiate formal consultation in accordance with 50 CFR 402.16.

1. Comply with reporting requirements included in the above Terms and Conditions.
2. The Service must be notified within 24 hours of the finding of any injured or dead delta smelt, longfin smelt, northwestern pond turtle, or giant garter snake or any unanticipated damage to its habitat associated with the PA. Notification will be made to the contact below and must include the date, time, and precise location of the individual/incident clearly indicated on a U.S. Geological Survey 7.5 minute quadrangle or other maps at a finer scale, as requested by the Service, and any other pertinent information. When an injured or dead individual is found, Reclamation (for delta smelt, longfin smelt, northwestern pond turtle or giant garter snake) and DWR (for delta smelt, longfin smelt, or northwestern pond turtle) shall follow the steps outlined in the Disposition of Individuals Taken section below.

3. Sightings of any listed or sensitive animal species shall be reported to the Service and CNDDDB (<https://www.wildlife.ca.gov/Data/BIOS>)

2024 NMFS ITS (pages 898 – 900; 907 - 910)

Section 11.3.5.3 Central Valley Project and State Water Project Pumping Facilities

The operation of CVP and SWP pumping facilities is reasonably expected to result in the take of listed SR winter-run Chinook salmon, CV spring-run Chinook salmon, CCV steelhead and green sturgeon in the forms of injury, harm, or mortality. Routine periodic biological sampling is done during salvage operations at pumping facilities to monitor for the presence of listed fish, providing a direct measure of the take of species at the pumping facilities. Diversions also result in altered routes and entrainment into the Central Delta that are expected to result in increased migration time, exposure to predation, and impingement of fish, resulting in reduced survival. Therefore, the individual listed fish in the periodic samples not only represent those fish taken at the facilities, but also provide a surrogate for the take of other individuals of each listed species that are entrained or whose migration route has been altered by a CVP or SWP diversion. We anticipate the following amount and extent of incidental take related to the export facilities, as shown in Table 184:

Table 184. Annual amount and extent of anticipated incidental take of listed species at the Bay-Delta pumping facilities. Note that the amount and extent of incidental take differ from the operational loss thresholds in the proposed action because they are based on an analysis of anticipated take rather than loss levels that trigger operational actions.

Species	Measurement	Maximum Annual Quantity	Rationale
Sacramento River (SR) winter-run Chinook salmon	Loss of natural genetic SR winter-run Chinook salmon.	0.56% of the natural winter-run juvenile production estimate (JPE) in any single year or 0.36% on a 3-year rolling average of the JPE.	Data period is Water Years (WY) 2010–2022, since quality-controlled genetic data from WY 2023–2024 is not available. ¹
SR winter-run Chinook salmon	Loss of hatchery SR winter-run Chinook salmon - Sacramento River.	1.0% of the estimated hatchery JPE (fish surviving to the Delta) from Livingston Stone National Fish Hatchery released into the Upper Sacramento River in a single year or 0.8% of the JPE on a 3-year rolling average.	Upper limit of anticipated amount and extent of take based on the JPE.
SR winter-run Chinook salmon	Loss of hatchery SR winter-run Chinook salmon - Battle Creek	1.0% of the estimated hatchery JPE (fish surviving to the Delta) from Livingston Stone National Fish Hatchery released into Battle Creek in a single year or 0.8% of the JPE on a 3-year rolling average.	Upper limit of anticipated amount and extent of take based on the JPE.

Species	Measurement	Maximum Annual Quantity	Rationale
Central Valley (CV) spring-run Chinook salmon - yearlings	Loss of CV spring-run Chinook salmon surrogates as described in the proposed action	0.5% of the estimated number of each surrogate release group	Double the operational loss threshold of 0.25% for each surrogate release group.
California Central Valley (CCV) steelhead (naturally produced)	Loss of unclipped CCV steelhead	5,294 juveniles in any single year or 2,319 juveniles as a 3-year rolling average for a period of up to 5 years after the ROD, after which we expect an alternative amount and extent of take is expected that scales incidental take to population size based on a JPE or other similar mechanism. If there is a delay in the JPE schedule, Reclamation may request an extension past the 5-year mark.	Data period is WY 2010–2024. ¹
Southern Distinct Population Segment (sDPS) of North American green sturgeon	Salvage of sDPS green sturgeon	14 green sturgeon in a single year, or 5 on a 3-year rolling average	Data period is WY 2010–2024. ²

1. The 1-year incidental take limit is based on the maximum single-year loss observed within the specified historical dataset. The 3-year incidental take limit is based on the maximum three-consecutive-year average loss observed within the specified historical dataset. For genetic Sacramento River winter-run Chinook salmon, maximum loss is based on a percentage of the juvenile production estimate, where in NMFS' 2019 Opinion, we used length at date.
2. The 1-year incidental take limit is based on the maximum single-year salvage observed within the specified historical dataset. The 3-year incidental take limit is based on the maximum three-consecutive-year average salvage observed within the specified historical dataset.

11.4. Effect of the Take

In the opinion, NMFS determined that the amount or extent of anticipated incidental take, coupled with other effects of the proposed action, is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

11.5. Reasonable and Prudent Measures

“Reasonable and prudent measures” refer to those actions the Director considers necessary or appropriate to minimize the impact of the incidental take on the species (50 CFR 402.02). NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of SR winter-run Chinook salmon, CV spring-run Chinook salmon, CCV steelhead, sDPS green sturgeon, and SRKW's:

1. [...]
2. [...]
3. [...]
4. [...]
5. Reclamation and DWR shall minimize the impact of the amount or extent of incidental take of listed species during operations of the Bay-Delta Division.
6. [...]
7. Reclamation and DWR shall monitor and report the amount and extent of take to NMFS by preparing and providing NMFS with plans and reports describing how impacts of the incidental take on listed species in the action area would be monitored and documented.
8. Reclamation and DWR shall develop conservation measures for CCV steelhead including actions that accelerate steelhead science, develop population-based approaches to minimize entrainment, and minimize entrainment of CCV steelhead into the South and Central Delta and export facilities.
9. Reclamation and DWR shall, to the extent feasible and practicable, coordinate implementation of spring pulse flows through SHOT and WOMT to help improve spring out-migration conditions and CV spring-run Chinook salmon survival.

11.6. Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the ESA, the federal action agency must comply (or must ensure that any applicant complies) with the following terms and conditions.

Reclamation and DWR have a continuing duty to monitor the impacts of incidental take and must report the progress of the action and its impact on the species as specified in this incidental take statement (50 CFR 402.14). If the entity to whom a term and condition is directed does not comply with the following terms and conditions, protective coverage for the proposed action would likely lapse. Reclamation and DWR must ensure compliance by their contractor(s) with the following terms and conditions, which implement the reasonable and prudent measures described above.

[...]

5. The following terms and conditions implement reasonable and prudent measure 5 for the Bay-Delta Division:
 - a. Reclamation and DWR shall monitor the salvage and loss of SR winter-run Chinook salmon, CV spring-run Chinook salmon, CV fall-run Chinook salmon, CV late fall-run Chinook salmon, sDPS green sturgeon, and CCV steelhead associated with the operation of the CVP's Jones and SWP's Harvey Banks pumping facilities.
 - i. Reclamation and DWR shall monitor and calculate salvage and loss for SR winter-run Chinook salmon, CV spring-run Chinook salmon, CV fall-run Chinook salmon, CV late fall-run Chinook salmon, CCV steelhead, and salvage of sDPS green sturgeon at the Tracy Fish Collection Facility and Skinner Delta Fish Protective Facility.
 - a. Reclamation and DWR shall prepare and submit to NMFS daily reports from October 1 through June 30 of each water year (or provide data online) regarding the observations of both salmonids and sDPS green sturgeon in the fish salvage facilities. Daily salvage sheets and all necessary operational information needed to

calculate salvage and loss shall be provided to NMFS (to a list of recipients updated each water year) or made available online. If, during the period from July 1 to September 30, salmonids and/or sDPS green sturgeon are observed in salvage, Reclamation and/or DWR shall notify NMFS through electronic mail and include the daily salvage sheets and operational information or direct NMFS to where this information is available online.

- b. During the October through June period of each water year, DWR and Reclamation shall prepare and submit to NMFS, the Delta operations for salmonids and sturgeon, and other relevant technical teams' weekly reports summarizing salvage and loss over the previous week and for the water year to date (or provide data online).
 - c. No later than December 31 of each year, Reclamation and DWR shall submit to NMFS an annual report summarizing salvage and loss over the previous water year (October 1 to September 30).
- ii. Reclamation and DWR shall undertake tissue sampling programs from natural-origin salmonids and CWT samples from adipose fin-clipped juvenile SR winter-run Chinook salmon, CV spring-run Chinook salmon, and CV late-fall run Chinook salmon at the Tracy Fish Collection Facility and Skinner Delta Fish Protective Facility for genetic analysis or tag removal/reading pursuant to appropriate sampling protocols and statistical power analyses.
 - a. Reclamation and DWR shall submit incidental take reports from Tracy Fish Collection Facility and Skinner Delta Fish Protective Facility by December 31 of each year, to include the genetic results of the tissue samples.
 - b. To advance the scientific understanding of CCV steelhead and to use that information to reduce loss of natural origin CCV steelhead from both the San Joaquin and Sacramento river basins, Reclamation and DWR shall, in coordination with NMFS and the SWFSC, subsample steelhead from Tracy Fish Collection Facility and Skinner Delta Fish Protective Facility for determining basin of origin and managing future surrogate methods for managing entrainment and loss. The coordination with NMFS and the SWFSC will focus on developing specific subsampling protocols and coordinating protocols with other steelhead science efforts connected with CVP and SWP operations.
 - b. On an annual basis, Reclamation and DWR shall discuss and confirm through WOMT the operational protocol for determining when the CVP and SWP export facilities would forgo water diversion volume pursuant to the pre-adoption period of the Delta VAs. This should include the date by which the water year type will be determined, on which exceedance forecast the water year type determination will be based, and a proposed schedule to achieve the total volume of forgone exports.
 - i. This accounting protocol shall be discussed through WOMT coordination, and, once developed, Reclamation and DWR shall report out through WOMT the accounting of the volume of water contributing to the forgone export.
 - c. Reclamation shall implement the following term and condition related to Delta Cross Channel gate operations:
 - i. In order to streamline the decision process for implementing Delta Cross Channel gate closures based on the Knights Landing Catch Index and the

Sacramento Catch indices (both of which use juvenile captures), Reclamation shall follow normal rounding rule to the tenth. The catch indices shall be 3.0 fish per day and 5.0 fish per day.

[...]

2025 CDFW ITP Amendment (Pages 67 - 84)

8.2. Early OMR Management.

8.2.1. Natural-origin Winter-run Chinook Salmon Early Season Weekly Loss Thresholds. To minimize entrainment and loss of early-migrating natural-origin CHNWR, Permittee shall, in coordination with Reclamation, adjust south Delta exports to achieve a 7-day average of the OMR index no more negative than -5,000 cfs for seven consecutive days, when the genetically verified 7-day rolling sum of CHNWR loss, calculated daily, exceeds the following thresholds (see calculation details and survival variables in Attachments 2 and 6):

- a. From November 1 through November 30: Product of November Multiplier and the Red Bluff Diversion Dam juvenile CHNWR brood year passage total at the end of the second biweekly period in October, whereby the November Multiplier is:

$$\text{November Multiplier} = 0.0011 \times 0.25 \times \text{Survival}_{\text{Fry-to-Smolt}} \times \text{Survival}_{\text{Smolt}}$$

- b. From December 1 through December 31: Product of December Multiplier and the Red Bluff Diversion Dam juvenile CHNWR brood year passage total estimated at the end of the second biweekly period in November, whereby the December Multiplier is:

$$\text{December Multiplier} = 0.0021 \times 0.25 \times \text{Survival}_{\text{Fry-to-Smolt}} \times \text{Survival}_{\text{Smolt}}$$

If the 7-day rolling sum of CHNWR loss, calculated daily, is exceeded during a period of reduced exports, Permittee shall, in coordination with Reclamation, continue to adjust south Delta exports to achieve a 7-day average of the OMR index no more negative than -5,000 cfs, until seven days after the most recent exceedance. Loss shall be calculated for the south Delta export facilities using the 2018 CDFW loss equation (Attachment 8).⁴³

Permittee shall, in coordination with Reclamation, initially adjust exports in response to meeting the thresholds above based on length-at-date identification of natural-origin older juvenile Chinook Salmon.⁴⁴ ⁴⁵ If genetic analysis of natural-origin juvenile Chinook Salmon observed in salvage at the SWP or CVP subsequently indicates that any given Chinook Salmon is not a genetically confirmed CHNWR, that fish will not count toward the loss threshold exceedance, and continued export adjustments pursuant to the OMR limit may not be required. While a new, more rapid genetic method, SHERLOCK,⁴⁶ undergoes field testing, both it and the current genetic method, GT-seq,⁴⁷ shall be used to determine the final identification. In the event that SHERLOCK and GT-seq provide different run assignments, the results from the GT-seq method shall be used to determine the final run assignment for the purposes of implementing Condition of Approval 8.2.1. If a fish is not genetically identifiable or if genetic identification is pending, then the Delta model length-at-date

⁴³ California Department of Fish and Wildlife (2018). Chinook Salmon loss estimation for Skinner Delta Fish Protective Facility and Tracy Fish Collection Facility. California Department of Fish and Wildlife.

⁴⁴ Older juvenile Chinook Salmon is defined as any Chinook Salmon measured above the minimum length for CHNWR, according to the Delta Model length-at-date criteria used to assign individuals to run (USFWS 1997).

⁴⁵ U.S. Fish and Wildlife Service (1997). Juvenile length ranges of the four runs of Central Valley Chinook substituting the "Delta Model" winter-run Chinook length ranges for the "Fisher Model" winter Chinook length ranges. U.S. Fish and Wildlife Service. April 7, 1997.

⁴⁶ Baerwald, M.R., E.C. Funk, A.M. Goodbla, M.A. Campbell, T. Thompson, M.H. Meek, and A.D. Schreier (2023). Rapid CRISPR-Cas13a genetic identification enables new opportunities for listed Chinook Salmon management. *Molecular Ecology Resources*: 1-13.

⁴⁷ Campbell, N.R., S.A. Harmon, and S.R. Narum (2014). Genotyping-in-thousands by sequencing (GT-seq): A cost effective SNP genotyping method based on custom amplicon sequencing. *Molecular Ecology Resources* **15**: 855-867.

criteria⁴⁸ shall be used to classify the race of the juvenile Chinook Salmon in salvage for the purposes of implementing Condition of Approval 8.2.1.

8.3. Onset of OMR Management. The OMR Management season starts: (1) any time after December 1 after an Adult Longfin Smelt Entrainment Protection Action is implemented (Condition of Approval 8.3.3), (2) if Condition of Approval 8.3.1 is triggered (i.e., immediately following completion of the First Flush Action), or (3) any time after December 20 if the turbidity threshold in Condition of Approval 8.3.2 is reached. If neither Condition of Approval 8.3.1, nor Condition of Approval 8.3.2, nor Condition of Approval 8.3.3 initiates OMR Management season, the OMR Management season starts automatically on January 1. From the onset of OMR Management Permittee shall, in coordination with Reclamation, adjust south Delta exports to maintain the OMR index on a 14-day running average no more negative than -5,000 cfs until the end of the OMR Management (Condition of Approval 8.6) except during Storm Flex operations (Condition of Approval 8.5), or if a more positive OMR index or different averaging period is required.

8.3.1. First Flush Action. To minimize SWP and CVP influence on the movement of DS and subsequent entrainment and salvage of adult DS, Permittee shall, in coordination with Reclamation, adjust south Delta exports for 14 consecutive days, anytime between December 1 and the last day of February, to maintain a 14-day average of the OMR index no more negative than -2,000 cfs within three days of when the following criteria are met:

- a. Three-day running average of daily flow at Freeport is $\geq 25,000$ cfs, and
- b. Three-day running average of daily turbidity at Freeport is ≥ 50 Formazin Nephelometric Units (FNU).

These criteria shall use data from the CDEC Sacramento River at Freeport station (FPT). The First Flush Action may only be initiated once each water year. The First Flush Action is exempt from the High Flow Offramp as described in Condition of Approval 8.3.2.

Permittee may prepare an assessment and submit it to the CDFW Director for review and decision-making. The assessment may evaluate initiating the First Flush Action early if real-time monitoring of abiotic and biotic factors and salvage prediction models indicate the First Flush Action is likely to be triggered (i.e., within two to three days) and DS salvage is possible and/or adjusting the required OMR flow between -2,000 and -5,000 cfs while maintaining an equal level of protection for Covered Species. Permittee shall implement the -2,000 cfs OMR index as required by this Condition of Approval unless, based on Permittee's assessment and any other information available to CDFW, CDFW's Director determines that an OMR index more negative than -2,000 cfs and no more negative than -5,000 cfs will provide an equal level of protection for Covered Species. Permittee shall implement the CDFW Director's decision for any remaining duration of this action. CDFW may prepare an assessment of the level of protection provided by alternative OMR flows to inform CDFW Director review and decision-making.

Readings at individual turbidity sensors or localized groups of turbidity sensors can generate spurious results in real time. To avoid triggering an OMR flow action during a sensor error or a localized turbidity spike that might be caused by local flows or a wind-driven event, Permittee and Reclamation will consider and review data from other locations. In the event that the 3-day running

⁴⁸ U.S. Fish and Wildlife Service (1997). Juvenile length ranges of the four runs of Central Valley Chinook substituting the "Delta Model" winter run Chinook length ranges for the "Fisher Model" winter Chinook length ranges. U.S. Fish and Wildlife Service. April 7, 1997.

average of daily turbidity at Freeport is ≥ 50 FNU, and Permittee and Reclamation believe that a First Flush Action is not warranted based on additional data sources, Permittee may, in coordination with Reclamation, provide the additional data to SMT and request they convene to confirm criteria will be met because of increased precipitation rather than sensor error or localized turbidity spike. If it is determined through WOMT that there is a sensor error or a localized turbidity spike, Permittee may, in coordination with Reclamation, take no additional action with CDFW approval and provide the supporting information to CDFW and USFWS within 24 hours.

8.3.2. Adult Delta Smelt Entrainment Protection Action. If, after a First Flush Action (Condition of Approval 8.3.1) or after December 20, whichever occurs first, the daily average turbidity remains at 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 SWP and CVP export facilities, Permittee shall, in coordination with Reclamation, adjust south Delta exports to achieve a 5-day average of the OMR index that is no more negative than -3,500 cfs until the daily average turbidity in at least one of the three turbidity sensors is less than 12 FNU for two consecutive days, thereby indicating a break in the continuous bridge of turbidity. The three turbidity sensors applicable to this Condition of Approval are Old River at Franks Tract near Terminous (OSJ), Holland Cut (HOL), and Old River at Bacon Island (OBI).

If the three turbidity sensors remain over 12 FNU at the end of a High Flow Offramp (below) or any time when the three turbidity sensors reach 12 NTU, then Permittee may prepare an assessment and submit it to the CDFW Director for review and decision-making to 1) adjust the required OMR flow between -3,500 and -5,000 cfs while maintaining an equal level of protection for Covered Species and/or 2) determine if another Adult Delta Smelt Entrainment Protection Action is warranted based on continued entrainment risk following the period of elevated flows and whether DS distribution has shifted downstream, as informed by available quantitative tools and real-time data. Permittee shall implement the -3,500 cfs OMR index as required by this Condition of Approval unless, based on Permittee's assessment and any other information available to CDFW, CDFW's Director determines that an OMR index more negative than -3,500 cfs and no more negative than -5,000 cfs will provide an equal level of protection for Covered Species. Permittee shall implement the CDFW Director's decision for any remaining duration of this action. CDFW may prepare an assessment of the level of protection provided by alternative OMR flows to inform CDFW Director review and decision-making.

The Adult Delta Smelt Entrainment Protection Action may be offramped when the daily average San Joaquin River flows at Vernalis are greater than 10,000 cfs. While offramped, the OMR index will be managed to no more negative than -5,000 cfs on a 14-day average. The Adult Delta Smelt Entrainment Protection Action shall be immediately reinstated when the daily average San Joaquin River flows at Vernalis drop below 8,000 cfs.

If the three turbidity sensors remain over 12 FNU at the end of a High Flow Offramp or any time after five consecutive days, then Permittee may, in coordination with Reclamation, through WOMT, prepare an assessment to determine if another Adult Delta Smelt Entrainment Protection Action is warranted. Any evaluation shall be based on continued entrainment risk following the period of elevated flows and whether DS distribution has shifted downstream, as informed by available quantitative tools and real-time data.

The Adult Delta Smelt Entrainment Protection Action ends when the 3-day continuous average water temperatures at Jersey Point or Rio Vista reach 53.6°F.

8.3.3. Adult Longfin Smelt Entrainment Protection Action. To minimize entrainment and salvage of adult LFS, Permittee shall, in coordination with Reclamation, adjust south Delta exports if cumulative water year salvage of LFS with fork length ≥ 60 mm at the SWP and CVP salvage facilities exceeds the salvage threshold calculated using the following formula:

$$\text{Salvage threshold} = (\text{Age 1} + \text{LFS Index}/20) + 1$$

The Age 1 + LFS Index is calculated using age 1+ fish captured in the midwater trawl from the full San Francisco Bay Study sampling area.⁴⁹ The Age 1 + LFS Index is additive for the months of August, September, October, November, and December. If December data are not available at the start of this action period, then the August to November threshold shall be used until the December data are available and the complete Age 1 + LFS Index is calculated.

If the above salvage threshold is exceeded between December 1 and the end of February, then Permittee, in coordination with Reclamation, shall adjust south Delta exports to achieve one of the following requirements depending on when the salvage threshold was exceeded:

- From December 1 to the start of the OMR Management season, Permittee, in coordination with Reclamation, shall adjust south Delta exports to achieve an OMR index no more negative than -5,000 cfs on a 7-day average for seven consecutive days and then, initiate OMR Management season. During the 7-day period, Permittee may request that WOMET convene and determine if initiation of OMR Management season is warranted. If WOMET determines initiating OMR Management season is not warranted, OMR Management season does not begin at the conclusion of the 7-day period. If salvage of LFS ≥ 60 mm continues following the 7-day period when the OMR index is no more negative than -5,000 cfs, then Permittee and Reclamation, through WOMET, may prepare an assessment to determine if additional Longfin Smelt Entrainment Protection Action is warranted based on continued entrainment risk, as informed by available quantitative tools and real-time data. WOMET may determine if OMR Management season should be initiated. If WOMET does not meet, then Permittee shall, in coordination with Reclamation, initiate OMR Management season.
- From the start of the OMR Management season to the end of February, if OMR Management was initiated by a different Condition of Approval, Permittee shall, in coordination with Reclamation, adjust south Delta exports to achieve an OMR index no more negative than -3,500 cfs on a 7-day average for seven consecutive days. If there is additional salvage of LFS ≥ 60 mm following the 7-day period when the OMR index is no more negative than -3,500 cfs, then Permittee shall, in coordination with Reclamation, through WOMET, prepare an assessment to determine if additional Longfin Smelt Entrainment Protection Action is warranted based on continued entrainment risk, as informed by available quantitative tools and real-time data.

8.4. Additional Real-time OMR Management.

8.4.1. Larval and Juvenile Delta Smelt Protection Action. To minimize entrainment and salvage of larval and juvenile DS, the Larval and Juvenile Delta Smelt Protection Action starts upon the end of the Adult Delta Smelt Entrainment Protection Action (Condition of Approval 8.3.2). Permittee shall, in coordination with Reclamation, adjust south Delta exports to achieve a 7-day average of the OMR index no more negative than -5,000 cfs when the average Secchi disk depth in the most recent survey is > 1 meter. The Secchi disk depth shall be calculated as the average measurement from all

⁴⁹ Baxter, R. D. (1999). Osmeridae. Report on the 1980-1995 fish, shrimp and crab sampling in the San Francisco Estuary. J. Orsi, Interagency Ecological Program for the Sacramento-San Joaquin Estuary **63**: 179-216.

sampled stations on the San Joaquin River upstream of Jersey Point and stations south of the lower San Joaquin River. If the average Secchi disk depth in the most recent survey is < 1 meter, Permittee shall, in coordination with Reclamation, adjust south Delta exports to achieve a 7-day average of the OMR index no more negative than -3,500 cfs until the average Secchi disk depth has increased to > 1 meter. Permittee may submit an assessment to the CDFW Director for review and decision-making that evaluates whether operation to an OMR between -3,500 and -5,000 cfs during a Larval and Juvenile Delta Smelt Protection Action would maintain an equal level of protection for Covered Species. Permittee shall implement the -3,500 cfs OMR index as required by this Condition of Approval unless, based on Permittee's assessment and any other information available to CDFW, CDFW's Director determines that an OMR index more negative than -3,500 cfs and no more negative than -5,000 cfs will provide an equal level of protection for Covered Species. Permittee shall implement the CDFW Director's decision for any remaining duration of this action. CDFW may prepare an assessment of the level of protection provided by alternative OMR flows to inform CDFW Director review and decision-making.

Permittee shall, in coordination with Reclamation, operate to the appropriate OMR index given the latest average Secchi disk depth and CDFW Director decision-making until the end of OMR Management (Condition of Approval 8.6).

When the daily average Sacramento River flows at Rio Vista^{50, 51} are > 55,000 cfs, or the daily average San Joaquin River flows at Vernalis are > 8,000 cfs, then the Larval and Juvenile Delta Smelt Protection Action is offramped. While offramped, Permittee shall, in coordination with Reclamation, manage south Delta exports to achieve an OMR index no more negative than -5,000 cfs on a 14-day average. Permittee shall, in coordination with Reclamation, immediately reinstate the Larval and Juvenile Delta Smelt Protection Action when either the daily average Sacramento River flows at Rio Vista is < 40,000 cfs or the daily average San Joaquin River flows at Vernalis is < 5,000 cfs.

8.4.2. Larval and Juvenile Longfin Smelt Protection Action. From January 1 through the end of OMR Management (Condition of Approval 8.6), if:

- The seven-day average QWEST^{52, 53} is < +1,500 cfs, and
- Larval and juvenile LFS catch in the most recent Smelt Larval Survey (SLS) or 20-mm Survey at stations 809 and 812 exceeds the catch threshold set by the age 1+ LFS Index (see Table 3 for catch thresholds)

Permittee, in coordination with Reclamation, shall adjust south Delta exports to achieve a 7-day average of the OMR index no more negative than -3,500 cfs for seven days to minimize entrainment and salvage of larval and juvenile LFS. Permittee, in coordination with Reclamation, through WOMT, may prepare an assessment to determine if the 7-day action can be adjusted or offramped based on larval and juvenile LFS entrainment risk, as informed by available quantitative tools and

⁵⁰ Rio Vista flows shall be calculated using DWR (2019; Dayflow) and reported in the daily Delta Hydrologic Conditions Report provided by Permittee via email.

⁵¹ California Department of Water Resources (2019). Dayflow: An estimate of daily average Delta outflow; Dayflow documentation 1997 through present. California Department of Water Resources, Sacramento, CA. August 2019.

⁵² QWEST shall be calculated using DWR (2019; Dayflow) and reported in the daily Delta Hydrologic Conditions Report provided by Permittee via email.

⁵³ California Department of Water Resources (2019). Dayflow: An estimate of daily average Delta outflow; Dayflow documentation 1997 through present. California Department of Water Resources, Sacramento, CA. August 2019.

real-time data. If offramped, the Larval and Juvenile Longfin Smelt Protection Action shall later be retriggered if conditions warrant.

When the daily average Sacramento River flows at Rio Vista^{54, 55} are > 55,000 cfs, or the daily average San Joaquin River flows at Vernalis are > 8,000 cfs, then the Larval and Juvenile Longfin Smelt Protection Action is offramped. While offramped, Permittee shall, in coordination with Reclamation, adjust south Delta exports to achieve an OMR index no more negative than -5,000 cfs on a 14-day average. Permittee shall, in coordination with Reclamation, immediately reinstate the Larval and Juvenile Longfin Smelt Protection Action when either the daily average Sacramento River flows at Rio Vista is < 40,000 cfs or the daily average San Joaquin River flows at Vernalis is < 5,000 cfs.

If the water year cumulative juvenile LFS salvage at the SWP and CVP salvage facilities exceeds 50% of the average annual salvage observed from 2009 through the water year preceding the current water year, then Permittee shall, in coordination with Reclamation, adjust south Delta exports to achieve a 7-day average of the OMR index of -3,500 cfs for 14 days.

If the water year cumulative juvenile LFS salvage at the SWP and CVP salvage facilities exceeds 75% of the average annual salvage observed from 2009 through the water year preceding the current water year, then Permittee shall, in coordination with Reclamation, adjust south Delta exports to achieve a 7-day average of the OMR index of -2,500 cfs for 14 days. If salvage of larval and juvenile LFS continues following the 14-day period where the OMR index is no more negative than -2,500 cfs, then WOMET may request Permittee and Reclamation to prepare a risk assessment through the SMT on an appropriate OMR index through the end of OMR Management (Condition of Approval 8.6). Consideration of the inclusion of LFS abundance metrics in these salvage triggers will be addressed under the AMP (Attachment 4).

Table 3. Age 1+ LFS Index and associated catch threshold.

Age 1+ LFS Index	Catch Threshold at Stations 809 and 812
0-149	10
150-299	20
300-499	30
500-999	40
≥1000	50

8.4.3. Winter-run Chinook Salmon Annual Loss Thresholds. To minimize entrainment and loss of juvenile CHNWR, Permittee shall, in coordination with Reclamation, adjust south Delta exports to manage the OMR index to avoid exceeding the following annual loss thresholds:

- Natural-origin CHNWR Loss Threshold: 0.5% of JPE
- Hatchery-origin CHNWR Loss Threshold: 0.12% of JPE

⁵⁴ Rio Vista flows shall be calculated using DWR (2019; Dayflow) and reported in the daily Delta Hydrologic Conditions Report provided by Permittee via email.

⁵⁵ California Department of Water Resources (2019). Dayflow: An estimate of daily average Delta outflow; Dayflow documentation 1997 through present. California Department of Water Resources, Sacramento, CA. August 2019.

JPEs and annual loss thresholds will be calculated for natural-origin CHNWR, for hatchery-origin CHNWR from Livingston Stone National Fish Hatchery (LSNFH) released into the Sacramento River near Redding, and for LSNFH hatchery-origin CHNWR released into Battle Creek.

The JPE for natural and hatchery-origin CHNWR is calculated by the JPE Subteam annually, consistent with Attachment 2, and is described in the yearly recommendation letter produced by the JPE Subteam and transmitted to NMFS and CDFW. NMFS and CDFW issues an Annual JPE Letter, with the JPE Subteam recommendation included as an enclosure to the letter, to Permittee and Reclamation. Hatchery releases of CHNWR are tracked individually, and Permittee shall sum cumulative loss, confirmed by coded wire tag (CWT), across release groups with the same JPE and annual loss threshold. Permittee shall calculate loss for the south Delta export facilities using the 2018 CDFW loss equation (Attachment 8).

Permittee shall count annual loss of natural and hatchery-origin CHNWR at the SWP and CVP salvage facilities for each brood year, starting July 1 of the calendar year through June 30 of the following calendar year. If cumulative loss of either natural or hatchery-origin CHNWR in a brood year exceeds 50% of the annual loss thresholds, then Permittee shall, in coordination with Reclamation, adjust south Delta exports to achieve a 7-day average of the OMR index no more negative than -3,500 cfs for seven consecutive days. If a CHNWR is salvaged during the 7-day action, the action will be extended for another seven days. At the conclusion of the action, Permittee, in coordination with Reclamation shall revert to the weekly distributed loss threshold until the 75% threshold is reached or throughout the end of the OMR Management season (Condition of Approval 8.6).

If:

- The cumulative loss of either natural or hatchery-origin CHNWR in a brood year exceeds 75% of the annual loss thresholds, and
- The Winter-Run Chinook Salmon Machine Learning Model and associated OMR Conversion Tool predict that a change in the OMR index to -2,500 cfs will shift the model output to a classification of CHNWR absence with a minimum probability of absence prediction of 0.559 for 1 of 30 sub-models for any of the seven most recent prediction days. These prediction values are calculated based on historical detections of length-at-date CHNWR and will be updated once genetic analysis of CHNWR is fully adopted (Condition of Approval 7.9.2).

Then, Permittee shall, in coordination with Reclamation, adjust south Delta exports to maintain a 7-day average of the OMR index no more negative than the -2,500 cfs for seven consecutive days.

Once 75% of the annual loss threshold is exceeded, each CHNWR observed in salvage shall trigger another operation to a 7-day average OMR index no more negative than -2,500 cfs for seven consecutive days, if the Winter-Run Chinook Salmon Machine Learning Model and associated OMR Conversion Tool predict that a change in the OMR index to -2,500 cfs will shift the model output to a classification of CHNWR absence with a minimum probability of absence prediction of 0.559 for 1 of 30 sub-models for any of the seven most recent prediction days.

After May 1, Permittee, in coordination with Reclamation, through WOMT, may prepare an assessment to determine if the action is still warranted pending relevant biological and hydrological information.

If the cumulative loss of either natural or hatchery-origin CHNWR in a brood year exceeds 100% of the annual loss thresholds, then Permittee shall, in coordination with Reclamation, immediately convene SaMT to review recent fish distribution information and operations and provide advice regarding future planned SWP and CVP operations to minimize subsequent loss during that year. The SaMT shall report the results of this review and advice to WOMET (Condition of Approval 8.1.4). Operational decisions shall be made following the process described in Condition of Approval 8.1.5.

If either annual loss threshold is exceeded, Permittee shall, in coordination with Reclamation, also convene an independent panel to review SWP and CVP operations and the annual loss thresholds prior to November 1. The purpose of the independent panel is to review the actions and decisions contributing to the loss trajectory that led to an exceedance of an annual loss threshold, and make recommendations on modifications to SWP and CVP operations, or additional actions to be conducted to stay within the annual loss thresholds in subsequent years. Permittee shall convene such a panel within six months of the issuance of this ITP to review actions and conditions in water year 2024.

Permittee shall, in coordination with Reclamation, restrict south Delta exports in response to meeting the above thresholds based on the initial length-at-date identification of natural-origin older juvenile Chinook Salmon and the thresholds described above. If genetic analysis of natural-origin older juvenile Chinook Salmon observed in salvage at the SWP or CVP subsequently confirms that any given Chinook Salmon is not genetically identified as a CHNWR, that fish will not count towards the loss threshold exceedance, and continued export restrictions pursuant to the OMR index limit may not be required. While the new rapid genetic method, SHERLOCK, undergoes field testing, both it and the current GT-seq method shall be used to determine the final identification. In the event that SHERLOCK and GT-seq provide different run assignments, the results from the GT-seq method shall be used to determine the final run assignment for the purposes of implementing Condition of Approval 8.4.3. If a fish is not genetically identifiable or if genetic identification is pending, then the Delta model length-at-date criteria shall be used to classify the race of the juvenile Chinook Salmon in salvage for the purposes of implementing Condition of Approval 8.4.3.

8.4.4. Natural-origin Winter-run Chinook Salmon Weekly Distributed Loss Thresholds. To minimize the potential for a disproportionate impact of entrainment and loss on any single week of natural-origin juvenile CHNWR present in the Delta, Permittee shall, in coordination with Reclamation, manage the OMR index based on a natural-origin CHNWR weekly distributed loss threshold. The natural-origin CHNWR weekly loss threshold is a product of the weekly percentage of natural-origin CHNWR present in the Delta, scaled to 100% (Table 4, Column E), and 50% of the natural-origin CHNWR annual loss threshold (Condition of Approval 8.4.3).

If the weekly distributed loss threshold is exceeded on any single day by the 7-day rolling sum of natural-origin CHNWR loss, then Permittee shall, in coordination with Reclamation, adjust south Delta exports to achieve a 7-day average of the OMR index no more negative than -3,500 cfs for seven consecutive days until seven days after the most recent exceedance. Permittee shall calculate loss for the south Delta export facilities using the 2018 CDFW loss equation (Attachment 8).

If the natural-origin CHNWR JPE is not available at the start of OMR Management season (Condition of Approval 8.3), then the Red Bluff Diversion Dam brood year total from the most recent bi-weekly period shall be used and applied as described for early season management

(Condition of Approval 8.2.1) to the annual loss threshold until the final natural-origin CHNWR JPE is available. The CHNWR JPE surrogate is calculated using the following formula:

$$\text{Natural-origin CHNWR JPE Surrogate} = \text{Red Bluff Diversion Dam juvenile CHNWR brood year passage total estimated from the most recent biweekly period} \times \text{Survival}_{\text{Fry-to-Smolt}} \times \text{Survival}_{\text{Smolt}}$$

Permittee shall, in coordination with Reclamation, adjust south Delta exports in response to meeting the below natural-origin CHNWR weekly thresholds based on the initial length-at-date identification of natural-origin older juvenile Chinook Salmon and the thresholds described below. If genetic analysis of natural-origin older juvenile Chinook Salmon observed in salvage at the SWP or CVP subsequently confirms that any given Chinook Salmon is not genetically identified as a CHNWR, that fish will not count towards the loss threshold exceedance, and continued export restrictions pursuant to the OMR index limit may not be required. While the new rapid genetic method, SHERLOCK, undergoes field testing, both it and the current GT-seq method shall be used to determine the final identification. In the event that SHERLOCK and GT-seq provide different run assignments, the results from the GT-seq method shall be used to determine the final run assignment for purposes of implementing Condition of Approval 8.4.4. If a fish is not genetically identifiable or if genetic identification is pending, then the length-at-date identification shall be used to classify the race of the juvenile Chinook Salmon in salvage for the purposes of implementing Condition of Approval 8.4.4.

Weekly thresholds shall be based on historical distribution (Table 4, Column E) of genetically identified CHNWR from water years 2017 through 2021 and will change every week (e.g., January 1-7, January 8-15). After the conclusion of the OMR Management season each summer, Permittee and Reclamation, through SaMT, shall compare weekly Delta entry and exit information to determine if the presence data were distributed similarly to the historical distribution data. The results of this review will be utilized as a part of the AMP to implement the Winter-run Old and Middle River Flows Management Adaptive Management Action (Attachment 4 and Condition of Approval 7.9.2).

Table 4. Historical (Water Years 2017 – 2021) presence of natural-origin CHNWR entering the Delta (Column B), exiting the Delta (Column C), present in the Delta (Column D = Column B - Column C), and present in the Delta scaled to 100% (Column E) for each week of OMR Management (Column A).

Week (Dates)	Historical Cumulative Percent Entering the Delta (Sherwood Harbor)	Historical Cumulative Percent Exiting the Delta (Chippis Island)	Historical Percent Present in the Delta	Historical Percent Present in the Delta (Scaled to 100%)
(A)	(B)	(C)	(D)	(E)
Week 1 (1/1-1/7)	2.47%	1.65%	0.82%	0.32%
Week 2 (1/8-1/14)	2.47%	1.65%	0.82%	0.32%
Week 3 (1/15-1/21)	4.94%	1.65%	3.29%	1.30%
Week 4 (1/22-1/28)	4.94%	1.65%	3.29%	1.30%
Week 5 (1/29-2/4)	19.75%	2.20%	17.55%	6.91%
Week 6 (2/5-2/11)	38.27%	4.95%	33.32%	13.13%
Week 7 (2/12-2/18)	43.21%	5.49%	37.72%	14.86%
Week 8 (2/19-2/25)	46.91%	9.89%	37.02%	14.59%
Week 9 (2/26-3/4) ^a	50.62%	18.13%	32.49%	12.80%
Week 10 (3/5-3/11)	55.56%	30.77%	24.79%	9.77%
Week 11 (3/12-3/18)	77.78%	38.46%	39.32%	15.49%
Week 12 (3/19-3/25)	85.19%	64.84%	20.35%	8.02%
Week 13 (3/26-4/1)	93.83%	90.11%	3.72%	1.47%
Week 14 (4/2-4/8)	98.77%	99.45%	0.00%	0.00%
Week 15 through end of OMR Management (4/9-6/30)	100.00%	100.00%	0.00%	0.00%

Notes: Data from genetically identified natural-origin CHNWR entering the Delta (Sherwood Harbor Trawl) and exiting the Delta (Chippis Island Trawl) are used to estimate the percentage of natural-origin CHNWR present in the Delta each week. Presence prior to January 1 each year is included in the first week of presence.

^a Week 9 (2/26-3/4) includes eight days in leap years.

8.4.5. Spring-run Chinook Salmon Protection Action and Surrogate Annual Loss Thresholds. To minimize entrainment and loss of juvenile CHNSR, Permittee shall, in coordination with Reclamation, restrict exports based on the presence of hatchery-origin CHNSR and associated yearling late fall-run and young-of-year fall-run Chinook Salmon surrogate groups at the SWP and CVP salvage facilities. Permittee shall, in coordination with CDFW, Reclamation, USFWS, and NMFS through the SaMT, select CHNSR yearling and young-of-year surrogate groups. Yearling CHNSR surrogates shall be selected from late-fall Chinook Salmon in-river release groups from the Coleman National Fish Hatchery. Young-of-year CHNSR and associated surrogate groups shall be selected from fall- and spring-run Chinook Salmon in-river release groups from the Feather River Fish Hatchery and Coleman National Fish Hatchery.

From November 1 through the end of OMR Management (Condition of Approval 8.6) each water year:

- (1) If a cumulative loss threshold for a surrogate release group is exceeded in November or December, Permittee shall, in coordination with Reclamation, adjust south Delta exports to achieve a 7-day average of the OMR index no more negative than -5,000 cfs for seven consecutive days; and
- (2) If a cumulative loss threshold for a surrogate release group is exceeded after the onset of OMR Management (Condition of Approval 8.3), or on or after January 1 through the end of OMR Management or June 30, whichever comes first, Permittee shall, in coordination with Reclamation, adjust south Delta exports to achieve a 7-day average of the OMR index no more negative than -3,500 cfs for seven consecutive days.

The cumulative loss threshold for CWT CHNSR surrogate groups at the SWP and CVP salvage facilities is greater than 0.25% for each release group:

- 2025 Yearling CHNSR surrogates: WOMT, with input from SaMT, shall select three in-river releases of late fall-run Chinook Salmon from Coleman National Fish Hatchery from November through February to use as yearling CHNSR surrogates. Input from SaMT may include a proposal with several alternatives. If three in-river releases appropriately distributed from November through February are not achievable in a given year because of hatchery limitations, then an alternative plan shall be developed to ensure the adequate characterization and minimization of natural-origin yearling CHNSR can still be achieved that year. This plan shall be subject to CDFW approval.
- 2026 Young-of-year CHNSR surrogates: WOMT, with input from SaMT, shall select six in-river releases comprised of CHNSR and fall-run Chinook Salmon from the Feather River Fish Hatchery and fall-run Chinook Salmon from the Coleman National Fish Hatchery from March through May to use as young-of-year CHNSR surrogates. Input from SaMT may include a proposal with several alternatives. If six in-river releases appropriately distributed from March through May are not achievable in a given year because of hatchery limitations, then an alternative plan shall be developed to ensure the adequate characterization and minimization of natural-origin young-of-year CHNSR can still be achieved that year. This plan shall be subject to CDFW approval.

Loss shall be calculated for the south Delta export facilities using the 2018 CDFW loss equation (Attachment 8). The surrogate methods are intended to be an interim measure that may be replaced

with a measure as described in Condition of Approval 7.9.3 and the AMP (Attachment 4) for natural-origin and hatchery-origin CHNSR.

Permittee shall, in coordination with Reclamation and SaMT, use real-time monitoring data, relevant tools, and new science gained through ongoing efforts to develop a CHNSR JPE and LCM to inform weekly risk assessments (October through June) for natural-origin juvenile CHNSR. If the risk assessment or WOMT representatives identifies a more positive OMR flow may be needed to minimize take of natural-origin juvenile CHNSR, WOMT may consider a more positive OMR flow requirement.

8.4.6. Improve Salmon Entrainment Forecasting During Real-time OMR Management. By 2028, Permittee shall, in coordination with CDFW, Reclamation, and NMFS, use best available science and information gained from the application of the Winter-run Chinook Salmon Machine Learning Model (Condition of Approval 7.9.2), new data (e.g., SR JPE monitoring, Winter-run Action Plan), population information, non-physical barrier effectiveness, and other tools to develop a CHNWR minimization measure for SWP and CVP export facilities that relies on improved forecasts of entrainment risk, while providing the same or better levels of protection as Conditions of Approval 8.2.1, 8.4.3, and 8.4.4 of this ITP. Permittee shall consult with CDFW regarding the need for an amendment to the ITP (Condition of Approval 5) to modify or replace Conditions of Approval 8.2.1, 8.4.3, and 8.4.4 with CHNWR minimization actions that do not solely rely on salvage, based on results from this effort and the AMP (Attachment 4).

In 2026, consistent with Condition of Approval 7.9.3 to this ITP, Permittee shall, in coordination with CDFW, Reclamation, and NMFS, use best available science and information gained from the development of the initial CHNSR JPE to develop a new minimization measure for SWP and CVP export facilities that relies on improved forecasts of entrainment risk, while providing the same level of protection as Condition of Approval 8.4.5 of this ITP. Permittee shall consult with CDFW regarding the need for an amendment to the ITP (Condition of Approval 5) to modify or replace Condition of Approval 8.4.5 with CHNSR minimization actions that do not solely rely on salvage, based on results from this effort and the AMP (Attachment 4).

8.4.7. White Sturgeon Entrainment Protection Action. To minimize entrainment and salvage of WS, Permittee shall convene WSMT the following business day if the following conditions are observed:

- Young of year WS have been detected in at least one of the following north or central Delta survey stations in the last 90 days: 20-mm Survey stations 705, 707, 711, or 716, or Bay Study Survey stations 751, 760, or 761; and
- The mean total exports over the last 90 days are greater than, or equal to, the exports defined by the following equation:

$$\text{Exports}_{90\text{-day average}} = 14,296.76 + -0.41 \text{Vernalis Flow}_{90\text{-day average}}$$

Upon convening, WSMT will review all available information to develop an assessment of the risk of further entrainment and salvage of WS including:

- Data from new and ongoing science and monitoring;
- Biological modeling and data analysis;
- Hydrologic data, SWP and CVP exports and operations, and hydrologic model outputs; and
- Available information to estimate residence time in CCF.

Within WSMT, Permittee and CDFW shall jointly develop the risk assessment and supporting documentation to inform discussions and considerations of operational actions in WOMT. Input from all Permittee and CDFW WSMT members shall be included in the risk assessment, and any potential differences shall be noted and elevated as described in Conditions of Approval 8.1.3, 8.1.4, 8.1.5, and 8.1.6.3. If a risk assessment conducted by the WSMT, or Permittee or CDFW WOMT representatives, determines that an action is needed to minimize take of WS, operational decisions shall be made following the process described in Condition of Approval 8.1.5. The WSMT shall convene as necessary throughout the water year.

8.4.8. Evaluate and Develop Alternative White Sturgeon Entrainment Minimization During Real-time OMR Management. By 2027, Permittee shall, in coordination with CDFW, use best available science and information gained from the WS Science Program (Condition of Approval 7.10.1) to develop an alternative approach to minimizing WS entrainment and salvage at the SWP and CVP export facilities that refines Condition of Approval 8.4.7 based on new knowledge and understanding of WS. This alternative approach shall incorporate estimates of WS loss in CCF as informed by the WS Science Plan (Condition of Approval 7.10.1). Permittee shall consult with CDFW regarding the need for an amendment to the ITP (Condition of Approval 5) to modify or replace Condition of Approval 8.4.7 with WS minimization actions that do not solely rely on salvage, based on results from the WS Science Plan (Condition of Approval 7.10.1) and the AMP (Attachment 4).

8.5. Storm Flex. During OMR Management, Permittee may, in coordination with Reclamation, through WOMT, prepare an assessment to evaluate operating to a daily average OMR index no more negative than -6,250 cfs, to capture peak flows during storm-related events. Such operations may be requested to occur between the start of OMR Management, and either the Larval and Juvenile Delta Smelt Protection Action onramp (Condition of Approval 8.4.1) or the last day of February, whichever occurs first, to capture peak flows during storm-related events when:

1. The Delta is in excess conditions as defined in the COA; and
2. QWEST^{56, 57} is greater than +1,500 cfs; and
3. X2 is < 81 km; and
4. The daily average turbidity at OSJ, HOL, and OBI sensors are < 12 FNU at each station; and
5. A measurable precipitation event has occurred in the Central Valley; and
6. Permittee, in coordination with Reclamation, determines that the net Delta outflow index indicates a higher level of outflow available for diversion due to peak storm flows; and
7. None of the following Conditions or Approval are controlling SWP and CVP operations: Conditions of Approval 8.2.1, 8.3.1, 8.3.2, 8.3.3, 8.4.2, 8.4.3, 8.4.4, 8.4.5, and 8.4.7; and
8. Cumulative loss at the SWP and CVP export facilities of yearling Coleman National Fish Hatchery late fall-run Chinook Salmon (as yearling CHNSR surrogates under Condition of Approval 8.4.5) is less than 0.5% within any of the release groups.

⁵⁶ QWEST shall be calculated using DWR (2019; Dayflow) and reported in the daily Delta Hydrologic Conditions Report provided by Permittee via email.

⁵⁷ California Department of Water Resources (2019). Dayflow: An estimate of daily average Delta outflow; Dayflow documentation 1997 through present. California Department of Water Resources, Sacramento, CA. August 2019.

If the criteria above are met, WOMT shall decide whether to request that Permittee and Reclamation use estimates of the real-time distribution of Covered Species from SMT, SaMT, and WSMT, as well as particle tracking modeling and prediction tool outputs to assess potential Covered Species entrainment risk differences under OMR index scenarios of -5,000 and -6,250 cfs. If the assessment indicates that no additional Conditions of Approval for the upcoming week are likely to be triggered, Permittee may, in coordination with Reclamation, bring a request back to WOMT for approval to operate to an OMR index no more negative than -6,250 cfs. Permittee, in coordination with Reclamation, shall update the assessment no less than weekly.

If, during approved operations of Storm Flex, conditions indicate a Condition of Approval is likely to be triggered, Permittee shall, in coordination with Reclamation, adjust south Delta exports to achieve a 14-day average of the OMR index no more negative than -5,000 cfs, unless a further reduction in exports is required by another Condition of Approval. If a Condition of Approval is triggered, Permittee shall, in coordination with Reclamation, cease Storm Flex operations and implement the controlling Condition of Approval within 48 hours. WOMT shall re-evaluate Storm Flex decisions weekly.

8.6. End of OMR Management. Permittee shall, in coordination with Reclamation, meet the requirements included in Conditions of Approval 8.2.1, 8.3, 8.3.1, 8.3.2, 8.3.3, 8.4.1, 8.4.2, 8.4.3, 8.4.4, 8.4.5, and 8.4.7 to ensure that entrainment and take of Covered Species is minimized during OMR Management through June 30, or until the following species-specific thresholds occur:

- DS and LFS:
 - Daily mean water temperature at CCF (CDEC station CLC) is $\geq 25^{\circ}\text{C}$ for three consecutive days.
- CHNWR and CHNSR:
 - Daily mean water temperature at Mossdale (CDEC station MSD) is $> 22.2^{\circ}\text{C}$ for seven days (does not have to be consecutive) in June; and
 - Daily mean water temperature at Prisoner's Point (CDEC station PPT) is $> 22.2^{\circ}\text{C}$ for seven days (does not have to be consecutive) in June.

III. GOVERNANCE

11. Governance (Action 5, Pages 11-1 - 11-9)

Governance establishes how Reclamation and DWR may provide information and seek input during their independent responsibility and authority to comply with environmental laws while meeting the needs of communities to achieve a reasonable balance among competing demands for use of CVP and SWP water, including environmental, water supply and power generation. The scope of Governance includes:

Notifications: Weekly Assessments, Fish and Water Outlook Meetings, Water Temperature Threshold Exceedance.

Seasonal Actions: Planning pulse flows, variable hydrographs, and specific tributary actions.

Seasonal reports as a technical record of decisions and outcomes from monitoring

Annual Report: compliance responsibilities including commitments in the proposed action and terms and conditions of incidental take statements.

Other Federal, State, and Local Agencies (collectively the “Agencies”), interested parties, and/or the interested public do not share the mission requirements of Reclamation and DWR. Reclamation and DWR are required to use the best scientific and commercial data available and therefore, benefit from input from these parties on seasonal actions and scientific information for reporting. Carefully considered roles and responsibilities, coordination forums, scientific standards, and decision-making processes balance incorporating individual biological expertise with the need to respect Reclamation’s and DWR’s environmental, water supply, and power authorities. The regulatory processes by which NMFS and USFWS may imposed additional limitations on the operations of the CVP and SWP are separate from implementation of a biological opinion and would occur through consultation, when required.

Adaptive management within the context of Reclamation and DWR activities generally is associated with investments in science and other activities for the environment that occur in the future and do not require consultation and permitting as part of the immediate need to operate the CVP and SWP, therefore; adaptive management and its associated Governance is not included in the Action 5 section 7 consultation purposes for the Long-Term Operation of the CVP and SWP. Reclamation is not requesting incidental take coverage for adaptive management for Action 5.

11.1 Roles and Responsibilities

Reclamation has the delegated responsibility assigned by the U.S. Congress, through the Secretary of the Interior, for the operation of the CVP and meeting its environmental, water supply, and power generation project purposes. Reclamation is responsible for the operation of the CVP and for compliance with the ESA and cannot cede its obligation to another agency. DWR, as an applicant, and in consideration of section 7 coverage for the Delta facilities of the SWP, is responsible for operation consistent with terms and conditions of Biological Opinions adopted in the Record of Decision. The SRS Contractors, in consideration of section 7 coverage for the operation of their diversions along the Sacramento River, is responsible for actions identified under the Shasta Framework components, consistent with terms and conditions of Biological Opinions adopted in the Record of Decision. The Sites Joint Powers Authority, as an applicant for the Sites, and in consideration of section 7 coverage for the operation of Sites, is responsible for the Sites Framework Programmatic components, and terms and conditions adopted in the Record of Decision.

Section 7 of the ESA requires Reclamation to consult with USFWS and NMFS where Reclamation has discretionary Federal involvement or control over an action. Specifically, Reclamation, in consultation with the USFWS and NMFS under Section 7 of the ESA, is responsible for ensuring that any action authorized, funded, or carried out by Reclamation is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species. In fulfilling this requirement, Reclamation shall use the best scientific and commercial data available.

Reclamation determines whether and how to proceed with its proposed action in light of USFWS’ and NMFS’ biological opinion, even though the terms and conditions of incidental take statements are non-discretionary. If a reasonable and prudent alternative (RPA) is issued by NMFS and/or USFWS as part of their biological opinions, Reclamation may choose not to implement USFWS’ or NMFS’ reasonable and prudent alternative; instead, Reclamation can choose to develop a new proposed action. Reclamation would then request section 7 consultation on that new proposed action. While Reclamation is consulting, Reclamation cannot make an irretrievable or irreversible commitment of resources that would preclude an RPA. If challenged in court during reinitiation, the standard for review for Reclamation will be whether Reclamation’s decision was arbitrary and capricious under the Administrative Procedures Act.

Reclamation is responsible for notifying USFWS and NMFS on acceptance of a biological opinion and will provide that for the LTO via a ROD, operating in compliance with the exemption granted by the incidental take statement, and reinitiating consultation if any of the four triggers for reinitiation are exceeded.

The Regional Director of Reclamation's California-Great Basin Region makes decisions on the operation of the CVP and the Long-Term Operation Plan. The Director of DWR makes decisions as an Applicant under section 7 for consultation items specific to the SWP.

Figure 10 shows engagement with local, state, and federal agencies and interested parties through forums that support an Operations Group. These forums allow for soliciting input on the seasonal water operation needs between Reclamation's Bay-Delta Office (BDO) and Central Valley Operations Office (CVO) and DWR's Division of Integrated Science and Engineering (DISE) and Operations Control Office (OCO). Reclamation and DWR always plan for a potential drought. Each drought develops in a unique manner that requires different tradeoffs. The Drought Response Year (DRY) team supports a drought toolkit for potential actions.

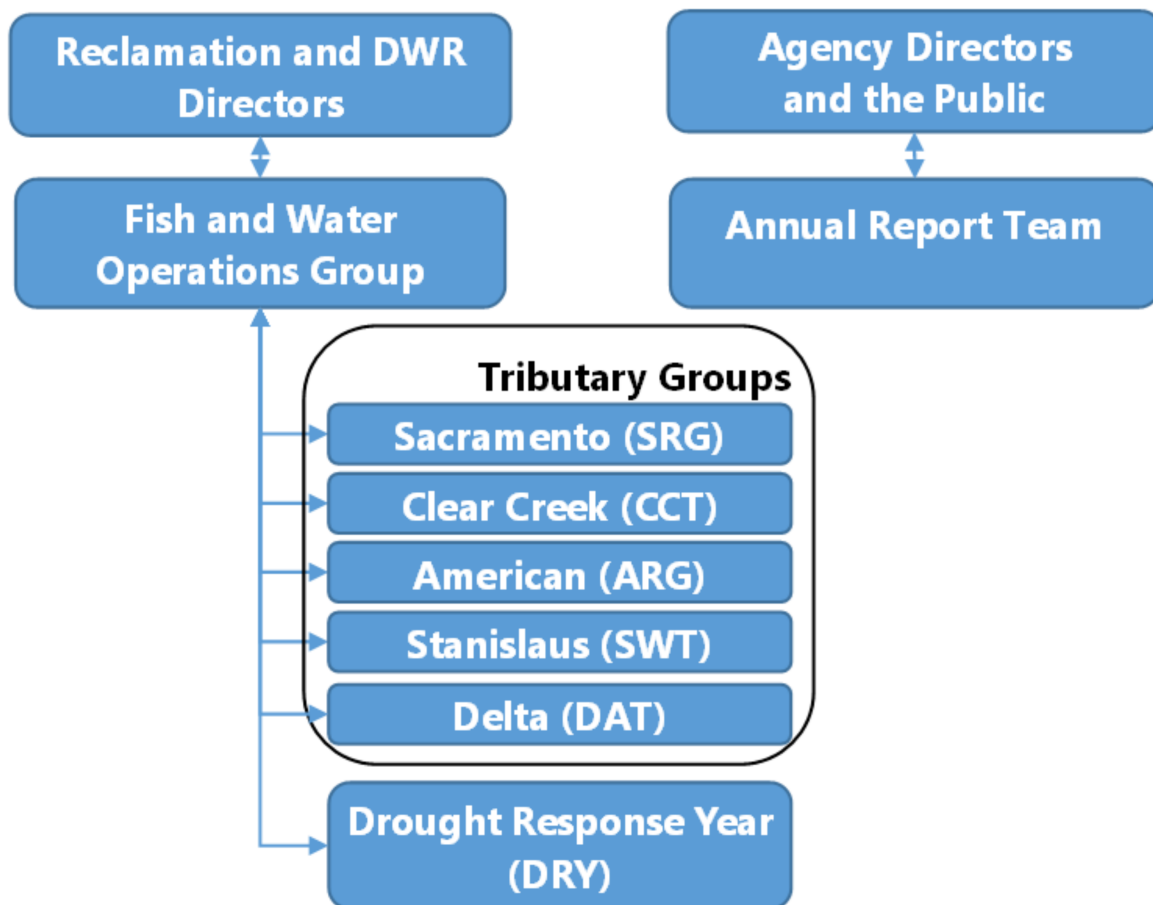


Figure 10. Engagement Forums for the Operation of the CVP and SWP

An annual report team, inclusive of all the agencies and interested parties, supports engagement on compliance with commitments in the proposed action and compliance with the terms of incidental take statements. The Annual Report provides the Agency Directors and the Public an opportunity to review prior actions and provide input based on regulatory authorities.

The proposed Governance relies on decision making among the action agencies and technical input on specific actions as described below. The directors of NMFS and USFWS would address reinitiation of consultation through a separate process specific to reinitiation, if needed, and as described by 50 CFR 402.16.

11.2 Forums for Input

Reclamation and DWR are responsible for the operation of CVP and SWP facilities in compliance with NEPA, ESA, and applicable laws under this Proposed Action. Certain responsibilities are assigned to applicants and local water agencies. Reclamation and applicants benefit from the incorporation of input from agencies and interested parties. Forums are established for the purpose of sharing operational plans via notifications, gathering scientific and commercial data to inform the operation of the CVP and SWP, and for reporting the outcomes of operations. Forums do not make decisions nor seek consensus.

Participants in these forums follow group norms and expectations. These include following the Guidance Documents, providing scientific expertise and timely input on assessments, and preparing their Fish and Water Operations Group (FWOG) member, when needed. To the extent practical, meetings are scheduled in advance, materials are all accessible online, and all participants are provided an opportunity for input during the meeting. All participants at these meetings are expected to have reviewed preliminary documents, evaluated available data, and prepared additional materials for meeting. All participants are expected to raise critical issues as soon as possible and, to the extent practical, discuss the uncertainties, ambiguities, issues with the appropriate parties ahead of any meeting.

[...]

11.2.4 Delta Actions Team

The Delta Actions Team (DAT) is comprised of agency representatives and interested parties. Unless impracticable, monitoring information on species and conditions will be made available through open and accessible tools. The DAT will receive notifications on decisions related to:

- Suisun Marsh Salinity Control Gate
- Delta Smelt Supplementation
- The DAT may provide input on the following Actions:
 - Suisun Marsh Salinity Control Gate
 - Weekly Assessments
- The DAT may provide input on the following Delta annual Seasonal Reports:
 - Delta Smelt Summer and Fall Habitat Seasonal Report
 - Entrainment Management Seasonal Report

11.3 Scientific Standards

The development of seasonal and real-time operations is expected to follow the Daubert standards for whether the action:

- Can be or has been tested,
- Uses science subjected to publication and peer review,
- Has a known potential error rate,
- Has maintained standards controlling application, and
- Has widespread acceptance within a relevant scientific community.

The Services have jointly published a policy on Information Standards Under the ESA [59 FR 34271 (July 1, 1994)] (see copy in Appendix A). This policy calls for Service biologists to gather, review, and evaluate information prior to preparing biological opinions, incidental take statements, and biological assessments and to ensure that any information used by the Services to implement the ESA is reliable, credible, and represents the best scientific and commercial data available.

NMFS, in its 2009, 2019, and 2024 Biological Opinions, described an approach for it to ensure stressor effect evaluation is based on the best available information. This weight of evidence framework was based on independent projects in the Central Valley including the Delta Regional Ecosystem Restoration Implementation Program and Sacramento River Science Partnership. The constructed scale for characterizing the analytical method and statistical power of data used in describing stressor effects are as follows:

High: Supported by multiple scientific and technical publications, especially if conducted on the species within the area of effect, quantitative data, and/or modeled results; high power in interpretation of analytical results

Low: One study, or unpublished data, or scientific hypotheses that have been articulated but not tested; low power in interpretation of analytical result Reclamation would additionally weigh publication in national and international journals higher than local or regional journals.

Reclamation, Departmental, and OMB policies govern scientific integrity. These procedures were established to maintain a practice and culture of scientific integrity. These include a code of conduct, requirements for use and dissemination of scientific information, and assignment of responsibilities. The policy and code of conduct set the expectation for honest investigation, open discussion, refined understanding, commitment to evidence, appropriate scientific dissent and peer review. Open communication plays a valuable role in building public trust and understanding of Reclamation's and other federal agencies work. Scientific activities are advanced through well-documented protocol in a systematic manner, and loss of scientific integrity may occur when falsification, fabrication, or plagiarism interferes with the proposal, performance, or review of these activities. These policies apply to outside parties who provide services and interact with Reclamation and other federal agencies under written agreements.

3.14 Governance (CDFW ITP, Pages 30 – 32)

SWP and CVP Governance identifies ongoing engagement by participating state (Permittee and CDFW) and federal (Reclamation, USFWS, and NMFS) agencies (collectively the Agencies), interested parties, and/or the public following issuance of this ITP and completion of Biological Opinions by USFWS and NMFS and issuance of the associated ROD by Reclamation. Governance

describes the systemwide organization of technical groups, group membership, activities that are subject to governance, and decision-making approaches and protocols. Although SWP and CVP Governance applies to the coordinated operation of the SWP and CVP, and associated effects, Permittee will participate fully in the SWP and CVP Governance process, but Permittee will make decisions regarding SWP operations and facilities consistent with its authorities, the requirements of this ITP, and the decision-making processes identified in this document (Condition of Approval 8.1.5). In specific situations, the CDFW Director may require Permittee to implement CDFW's operational decision and Permittee will implement the decision required by CDFW (Condition of Approval 8.1.5).

The purposes of SWP and CVP Governance are to:

- Identify the roles and responsibilities of the agencies that are part of real-time operations;
- Establish that the agencies will work together in good faith;
- Identify the governance principles agreed to by the participating agencies;
- Identify operations that are subject to Governance;
- Identify the implementation teams that are part of Governance, and processes for technical collaboration and elevating issues for resolution;
- Incorporate learning and adopt new technologies from monitoring, adaptive management, and ongoing science;
- Describe relationships between technical and policy groups; and
- Describe reporting and outreach.

The Agencies are committed to communicate each organization's respective interests and recognize the intent to work together in a good-faith effort to resolve issues through the groups described in this ITP. Every member is committed to identifying potential issues and communicating these issues to the relevant technical or policy team as soon as possible. Representatives who participate on technical and policy teams are clear about their ability to represent agency decisions. Representatives who participate on technical and policy teams are empowered to represent their agency and make decisions appropriate for that level. Each representative is representing the science, policy, and management based on the best of their ability and current knowledge. Representatives will be aware and clear about their role with other members and come with the understanding of their authority as it relates to their agency. Representatives will either be able to make decisions on other parts of the system or have an avenue for doing that quickly.

SWP and CVP Governance is framed around the following principles:

Collaboration—The leading principle of SWP and CVP Governance is collaborative, science-based decision making. SWP and CVP Governance is structured to seek consensus across scientific, technical and policy levels, with elevation and decision-making processes in place when consensus cannot be reached.

Effectiveness—It is workable and efficient. Effectiveness considers what information is available and when. Effective SWP and CVP Governance recognizes that there is more uncertainty early in the year and that uncertainty may change as the year progresses.

Accountability—Operational, regulatory, proactive, and addresses long-term planning.

Inclusiveness—Collaborative and cooperative. The elevation and decision-making structure maintains accountability at all levels.

Transparency—The processes are not opaque. They are open for others to see and understand through implementation of a communication plan.

Communication—There is awareness and clarity about roles. If a participants identify a potential issue, they will communicate it.

SWP and CVP Governance is structured such that a five-agency Directors Group oversees the ongoing authorities of each respective agency and serves as the final decision-making body for operational matters within the parameters established in this Project and regulatory authorizations (see Condition of Approval 8.1.5). Actions or decisions necessitating reinitiation of consultation or new or amended authorization under CESA would be handled through standard regulatory processes and are not subject to this Governance structure (see Condition of Approval 5, and Section IX., Amendment). The Directors Group directly interfaces with two management and policy level groups (Shasta Operations Team [SHOT] and WOMT), whose state and federal agency representatives discuss the actions described in the Project or Proposed Action when implementation may have biological effects, system conditions or water supply impacts, or tradeoffs. These policy groups work with numerous technical groups that coordinate, discuss, and provide input on seasonal and real-time operations for specific regions or watersheds. The AMSC will work in parallel with the SHOT and WOMT to evaluate identified Adaptive Management Actions, and potentially recommend changes to the Project or Proposed Action to the Directors Group. Attachment 4 describes the more specific governance structure for the AMP.

3.14.1. Chartering Teams

Teams and groups involved in planning and providing input regarding water operations are described in Conditions of Approval 8.1.1, 8.1.2, 8.1.3, 8.1.4, 8.1.5, 8.1.6, 8.1.6.1, 8.1.6.2, and 8.1.6.3. Team membership, roles, and processes will be further described in team charters (see Condition of Approval 8.1.6.4).

3.14.2. Delta Real-time Operations Teams

For Delta water operations there are four main agency coordination forums that will meet regularly to discuss seasonal and real-time operations. These include WOMT, SMT, SaMT, and WSMT. WOMT is a policy-level group that discusses the operations actions in the Delta (SWP and CVP facilities and operations), American River Division of the CVP, and Stanislaus/East Side Division of the CVP (see Condition of Approval 8.1.4). The SMT is a technical group that discusses Delta operations and DS and LFS protections (see Conditions of Approval 8.1.1 and 8.1.6.1). The SaMT is a technical group that discusses Delta operations and CHNWR, CHNSR, and steelhead protections (see Conditions of Approval 8.1.2 and 8.1.6.2). The WSMT is a technical group that discusses Delta operations and WS protections (see Conditions of Approval 8.1.3 and 8.1.6.3). WOMT will coordinate regularly with SHOT and other work groups as appropriate. Delta governance will use a collaborative approach to planning and decision-making (see Condition of Approval 8.1.5).

[...]

8.1 Minimization Measures (CDFW ITP, Pages 62 – 67)

8.1. Real-time Operations, Monitoring, and Technical Teams. Permittee shall monitor and manage Project operations in response to risk assessments conducted by collaborative real-time

operations monitoring teams that include representatives from Permittee, CDFW, Reclamation, USFWS, NMFS, and the State Water Board.

8.1.1. Smelt Monitoring Team. The purpose of SMT is to meet and review hydrologic, SWP and CVP operational, fishery, and water quality data, and provide opportunities for engagement and discussion among biologists and operators on relevant information and issues associated with the Project and risk assessments. SMT shall include representatives from Permittee, CDFW, Reclamation, USFWS, NMFS, and the State Water Board. Permittee shall make all raw data and modeling utilized as part of SMT available to CDFW within ten days of a request.

8.1.2. Salmon Monitoring Team. The purpose of SaMT is to meet and review hydrologic, SWP and CVP operational, fishery, and water quality data, and provide opportunities for engagement and discussion among biologists and operators on relevant information and issues associated with the Project and risk assessments. SaMT shall include representatives from Permittee, CDFW, Reclamation, USFWS, NMFS, and the State Water Board. Permittee shall make all raw data and modeling utilized as part of SaMT available to CDFW within ten days of a request.

8.1.3. White Sturgeon Monitoring Team. The purpose of WSMT is to meet and review hydrologic, SWP and CVP operational, fishery, and water quality data, and provide opportunities for engagement and discussion among biologists and operators on relevant information and issues associated with the Project and risk assessments. WSMT shall include representatives from Permittee and CDFW. Permittee shall make all raw data and modeling utilized as part of WSMT available to CDFW within ten days of a request.

8.1.4. Water Operations Management Team. WOMT will coordinate on overall SWP and CVP operations to oversee the implementation of various real-time provisions for the Project. The purpose of WOMT is to discuss and resolve SWP and CVP operational questions and technical issues, as requested or elevated from technical teams, and to elevate unresolved operational issues to the Directors of Permittee, Reclamation, CDFW, USFWS, and NMFS. WOMT will develop a charter to describe membership and process. WOMT will coordinate with SHOT as needed on operational issues and decisions that have implications for both of their respective purviews, including but not limited to Drought Toolkit implementation and the HRL asset management.

WOMT will meet weekly during the OMR flow management season (October–June), and otherwise as needed. Any agency can request a WOMT meeting outside of the OMR season for discussion or elevation items. For OMR Management, Permittee shall, in coordination with Reclamation, provide SWP and CVP operational outlooks and assessments on a weekly basis to WOMT, SMT, SaMT, and WSMT. Permittee shall provide WOMT the opportunity to review and discuss any applicable drought and dry year actions from the Drought Toolkit or other relevant drought planning documents. For all other assessments or elevation issues, supporting materials will be provided to WOMT by designated representatives of the applicable technical teams.

8.1.5. Collaborative Approach to Real-time Decision Making. Beginning no later than October 1 through the end of OMR Management (Condition of Approval 8.6), SMT, SaMT, and WSMT shall meet as described in Conditions of Approval 8.3.1, 8.4.2, 8.4.3, 8.4.4, 8.4.5, 8.4.7, and 8.5 or more often as required, to consider survey data, salvage data, and other pertinent biotic and abiotic factors and provide input on risk assessments as described in Conditions of Approval 8.1.6.1, 8.1.6.2, and 8.1.6.3.

SMT, SaMT, and WSMT shall share and discuss all available biological, abiotic, and operational information to inform discussions in the WOMT as required by Conditions of Approval 8.3.1, 8.4.2,

8.4.3, 8.4.4, 8.4.5, 8.4.7, and 8.5. SMT, SaMT, and WSMT shall communicate the information shared and perspectives to WOMT as described in Conditions of Approval 8.3.1, 8.4.2, 8.4.3, 8.4.4, 8.4.5, 8.4.7, and 8.5. Permittee and CDFW SMT, SaMT, and WSMT staff may conclude different operations are warranted, in which case the difference shall be noted and elevated as described in this Condition of Approval and Condition of Approval 8.1.6. WOMT shall then confer and attempt to reach a resolution and agreed-upon Project operations. If a resolution is reached, Permittee shall operate consistent with the decision regarding Project operations from WOMT.

If WOMT does not reach a resolution, the Director of DWR, in coordination with the Regional Director of Reclamation as appropriate (proposing agency or agencies), shall confer with CDFW, USFWS, and NMFS Directors/Regional Administrators to determine if there is an alternative action that will be mutually agreeable. If consensus is reached, Permittee shall implement the alternative action. If the Directors do not reach a resolution on operations, Permittee shall meet and confer with Reclamation to prioritize alignment between the SWP and CVP operations, in consideration of operational and regulatory constraints affecting either project, and shall identify their recommended action within two days, providing a written explanation of the nature of the dispute. Any Director may request a follow-up Directors' meeting if necessary.

Within two days after receiving the recommended action for SWP from Permittee, the CDFW Director may disagree with the action requested by DWR and require Permittee to implement an operational decision provided by CDFW in writing. Permittee shall implement CDFW's operational decision.

Once a decision has been resolved following any of the procedures described above, Permittee shall designate a representative or representatives to communicate the decision to regulatory and operating agencies, as well as other interested parties that have expressed interest in the decision.

8.1.6. Real-time Information Sharing Process. Permittee shall provide scheduling, SWP and CVP operations forecast, and relevant hydrologic monitoring and modeling information on Monday of each week to SMT, SaMT, and WSMT agency staff. SMT, SaMT, and WSMT shall convene as required by Conditions of Approval 8.3.1, 8.4.2, 8.4.3, 8.4.4, 8.4.5, 8.4.7, and 8.5, or as needed, for technical conversation prior to WOMT meeting and shall discuss all relevant data, including data that becomes available after the Monday distribution. All information intended for discussions in WOMT shall be provided and discussed in SMT, SaMT, and WSMT prior to discussion in WOMT.

8.1.6.1. Smelt Monitoring Team Role. Agency team leads: (1) notify their agency's WOMT representative(s) if a Reclamation Proposed Action or ITP identified threshold or protective action is or will be met; (2) provide input on any risk assessment prepared by Reclamation and Permittee as required by Conditions of Approval 8.3.1, 8.4.2, and 8.5; and (3) discuss and document differing perspectives (i.e., non-consensus) on the relevant assessments and Conditions of Approval. If there is an operational issue that SMT cannot resolve, the agency representatives will compose an email to WOMT summarizing the elevation topic and any supporting information and recommendations. Each of the agency representatives are individually responsible for communicating the issues and any background information to their WOMT representative.

8.1.6.2. Salmon Monitoring Team Role. Agency team leads: (1) notify their agency's WOMT representative(s) if a Reclamation Proposed Action or ITP identified threshold or protective action is or will be met; (2) provide input on any risk assessment prepared by Reclamation and Permittee as required by Conditions of Approval 8.4.3, 8.4.4, 8.4.5, and 8.5; and (3) discuss and document differing perspectives (i.e., non-consensus) on the relevant assessments and Conditions of Approval. If there is an operational issue that SaMT cannot resolve, the agency representatives will compose an

email to WOMT summarizing the elevation topic and any supporting information and recommendations. Each of the agency representatives are individually responsible for communicating the issues and any background information to their WOMT representative.

8.1.6.3. White Sturgeon Monitoring Team Role. Agency team leads: (1) notify their agency's WOMT representative(s) if a trigger in Condition of Approval 8.4.7 is or will be met; (2) provide input on the risk assessment and advice developed to document the technical discussion; and (3) discuss and document differing perspectives (i.e., non-consensus). If there is an operational issue that WSMT cannot resolve, the agency representatives will compose an email to WOMT summarizing the elevation topic and any supporting information and recommendations as required by Condition of Approval 8.4.7. Each of the agency representatives are individually responsible for communicating the issues and any background information to their WOMT representative.

8.1.6.4. Chartering Real-Time Operations Teams. Permittee shall, in collaboration with Reclamation, develop charters for the SMT, SaMT, WSMT, and WOMT. Team membership, roles, and processes shall be described in team charters.

Some teams may already have charters in place which will continue to be followed until they are reviewed and replaced in the future. These charters may be supplemented by guidance documents which further elaborate roles, responsibilities, and processes for the SMT, SaMT, WSMT, and WOMT. Permittee shall update these guidance documents as needed by mutual agreement. Drafts of all team charters and guidance documents shall be submitted to CDFW for review. After CDFW comments are incorporated, final team charters and guidance documents shall be subject to CDFW approval.

8.1.7. OMR Action Response Timing. Unless a more immediate response is required by a Condition of Approval in this ITP, Permittee shall adjust exports within three days of an event that requires an OMR index, to enable efficient power scheduling. Once an OMR action is triggered as a result of Conditions of Approval of this ITP, Permittee shall not increase exports, except as has been scheduled prior to the trigger's occurrence and with prior notice to WOMT, in a manner that would make projected OMR more negative. Permittee shall conduct export reductions to meet the requirements of the Conditions of Approval using the normal scheduling procedure. Combined projected exports, export scheduling, and OMR will be discussed at WOMT each week. The intent of this Condition of Approval is that combined project south Delta exports will not increase the risk to protected fish species after an OMR trigger is met.

8.1.8. OMR Index Calculation. Permittee shall calculate the OMR flow index that will be used to determine export limitations, as described in the sections below, using the equation provided in Hutton (2008).⁴² Permittee shall provide CDFW with the variables used to calculate OMR index changes as related to implementing Conditions of Approval of this ITP upon the request of CDFW.

8.1.9. OMR Averaging Period. Permittee shall ensure the required average of the OMR Index is met by the last day of the averaging period included in any Condition of Approval that requires an action for a specified number of days, after initiating operational changes in response to the OMR trigger.

IV. OPERATIONAL CLARIFICATIONS

Reclamation provided five operational clarifications on Action 5.

- 1) Reclamation and DWR concur that daily Clifton Court intake amounts should be used in the JPF equation (rather than Banks) as it accurately portrays how much water the State is removing from the Delta. Banks pumping removes water from Clifton Court Forebay which does not always match the amount of water Clifton Court Forebay takes in from the Delta.

- 2) Reclamation uses a daily JPF when determining real-time assessment thresholds due to the power scheduling time that USBR needs to plan for when making export changes. A daily JPF also provides a faster export change rather than an average JPF that may have a lag effect (such as a 7- or 14-day average JPF).
- 3) Reclamation makes adjustments to Tracy pumping on a 3-day period due to the power schedule that requires prior notification, planning, and coordination.
- 4) Reclamation and DWR operate to the OMRI limit using a 14-day average component that takes into account the tidal cycle.
- 5) Reclamation and DWR coordinate daily on operations. While the state and federal facilities may operate under different criteria in certain circumstances, DAT and FAWOG will be informed of those decisions.

V. DELIVERABLES

Fish and Water Operations Outlook

Information on upcoming water operations, related environmental and fish conditions, and the relevant actions for protecting fish species supports the Delta monitoring teams, and the Fish and Water Operations Group/Water Operations Management Team.

Weekly Assessment of CVP and SWP Operations

To evaluate the week's anticipated operational range, the monitoring teams will provide a technical analysis to keep CVP and SWP operations within the effects analyzed in the Biological Opinions and Incidental Take Permit, to meet performance measures for salmon and steelhead; actions to manage environmental surrogates for Delta Smelt; and actions for storm-related flexibility.

VI. PROCESS

Reclamation and/or DWR will convene and facilitate the teams and workgroup, to include:

- meeting scheduling and coordination,
- agenda development and distribution,
- coordinate preparation of presentation materials,
- provide fish and water operations document,
- provide assessment,
- take notes, and
- post notes and reports (including annual reports) online

WEEKLY SCHEDULE

Day	FAWOG	WOMT
Monday	Weekly Real-Time Assessment	Weekly Real-Time Assessment

Day	FAWOG	WOMT
Tuesday	Delta Action Team	1. Smelt Monitoring Team 2. Salmon Monitoring Team 3. Delta Monitoring Workgroup
Wednesday	Fish and Water Operations Group	Water Operations Management Team
Thursday	--	Optional Directors Meeting
Friday	Operations Outlook	Operations Outlook

FISH AND WATER OPERATIONS OUTLOOK

These outlooks will include:

- Water Project Operational Intent for Week (SWP and CVP)
- Biological Context
- Forecasted Weather
- Anticipated weekly operational ranges by tributary
- Salmonid Current Loss and Delta and Longfin Smelt Abiotic Conditions
- Relevant Water Year 2026 Fish Criteria and Status for Listed Fish under the SWP Long-Term Incidental Take Permit
- Fish monitoring gear efficiency and disruptions

WEEKLY REAL-TIME ASSESSMENT

Reclamation and DWR will draft a weekly assessment reviewing species status and evaluating the anticipated operations effects. Please see *Delta Real-Time Modeling Summary* (Attachment 2) for further information on the modeling tools, data, and methods the weekly real-time assessment summary utilize.

The assessments will include:

- Life stages
- Cohort status
- Historical distribution
- Monitoring observations
- Modeling
- Evaluation of range of operations, if any

Reclamation and DWR will consider information from the DAT and provide a final assessment to FAWOG/WOMT Tuesday afternoon for discussion at the Wednesday FAWOG/WOMT.

DELTA ACTIONS TEAM

The Delta Actions Team (DAT) is comprised of agency representatives and interested parties. Unless impracticable, monitoring information on species and conditions will be made available through open and accessible tools. The DAT will receive notifications on decisions related to:

- Suisun Marsh Salinity Control Gate
- Delta Smelt Supplementation

The DAT may provide input on the following Actions:

- Suisun Marsh Salinity Control Gate
- Weekly Assessments

The DAT may provide input on the following Delta annual Seasonal Reports:

- Delta Smelt Summer and Fall Habitat Seasonal Report
- Entrainment Management Seasonal Report

FISH AND WATER OPERATIONS GROUP

The FWOG is comprised of agency and interested party management representatives. The purpose of this group is to provide a comprehensive look across the CVP and SWP and to check the work and resolve performance and conduct matters by tributary groups. Unless impracticable, monitoring information on species and conditions will be made available through open and accessible tools. The members of the

FWOG will receive notifications on:

- Weekly Fish and Water Outlook

The members of the FWOG may provide input on the following Actions:

- Weekly Assessments
- Monitoring Program

The members of the FWOG should oversee technical teams that provide review and ensure input on seasonal and annual reports.

SMELT AND SALMONID MONITORING TEAMS

The Smelt and Salmonid Monitoring Teams (SMT and SaMT, respectively) includes participants from Reclamation, USFWS, NMFS, DWR, CDFW, and the State Water Board. The SMT and SaMT review hydrologic, operational, fishery, and water quality data, and provide opportunities for engagement and discussion among biologists and operators on relevant information and issues associated with the Proposed Action and risk assessments. Agency team leads: (1) notify their agency's WOMT representative(s) if a Proposed Action/ITP identified trigger/threshold is or will be met; (2) provide input on any assessment prepared by Reclamation and DWR; and (3) discuss and document differing perspectives (i.e., non-consensus) on the relevant assessments.

WATER OPERATIONS MANAGEMENT TEAM

A WOMT will coordinate on overall water operations to oversee the implementation of various real-time provisions for the Delta and the tributaries. The purpose of WOMT is to discuss and resolve operational questions and technical issues, as requested or elevated from Delta and tributary technical teams, and to elevate unresolved operational issues to the Directors Group. The team will develop a charter to describe membership and process. The WOMT will coordinate with the SHOT as needed on operational issues and decisions that have implications for both of their respective purviews, including but not limited to Drought Toolkit implementation and Voluntary Agreement asset management. WOMT will meet weekly during the Old and Middle River Flow Management season (October through June), and otherwise as needed. Any agency can request a WOMT meeting outside of the OMR season for discussion or elevation items. For OMR management, Reclamation will provide operational outlooks and Proposed Action assessments on a weekly basis to WOMT, the SMT and the SaMT. WOMT will be provided the opportunity to review and discuss any applicable drought and dry year actions from the Drought Toolkit or other relevant drought planning documents. For all other assessments or elevation issues, supporting materials will be provided to WOMT by designated representatives of the applicable technical teams.

UPDATES TO GUIDANCE DOCUMENT

It is expected that as this guidance is being implemented there will be necessary revisions to the document to provide further clarification and refinement. Reclamation and DWR, with technical assistance from the agencies and interested parties commit to reviewing this implementation guidance following each OMR management season, at a minimum, to identify and incorporate any necessary revisions.

BOX 1: DELTA ACTION TEAM AGENDA

Participants

Weekly Operations Update

- Relevant Actions
- Operations- previous and current
- Relevant environmental and fish conditions- current

Proposed Action Assessments

- Salmonids
- Smelts

ITP Assessments

Open Discussion

Next Meeting

Materials

- Fish and Water Operations Outlook
- Reclamation Assessments

BOX 2: SMELT AND SALMONID MONITORING TEAM AGENDA

Participants

Weekly Operations Update

- Relevant Actions
- Operations- previous and current
- Relevant environmental and fish conditions- current

Assessments for ITP

- Salmonids
- Smelts

Open Discussion

Next Meeting

BOX 3: WEEKLY REAL-TIME ASSESSMENT

This section provides an example outline for the Proposed Action Assessment. The information and modeling tools identified in below are not intended to be exhaustive, nor does it preclude any agency or interested party from utilizing other information and modeling tools to inform the Assessments.

A. Proposed Action Assessment

Assessment for Delta Operations on Salmonids

Executive Summary

- Seasonal loss for salmonids, single-year incidental take limits for salmonids, species present in the Delta

Natural Winter-run Chinook

- JPE
- Current status (delta entry timing, Red Bluff Diversion Dam passage estimate, monitoring)
- Annual Loss
- STARS

Hatchery Winter-run Chinook

- Hatchery Releases
- JPE
- Annual Loss

Natural Origin Central Valley Steelhead

- Current Status (Delta entry timing, monitoring)
- Annual Loss

Hatchery-origin Central Valley Steelhead

- Surrogate Releases

Spring-run Chinook

- Current status (delta entry timing, Red Bluff Diversion Dam passage estimate, monitoring)

Spring-run Surrogates

- Releases
- Annual Loss

Evaluation

- What is the probability of exceeding natural or hatchery winter-run Chinook salmon loss thresholds in the upcoming week?

- What is the probability of exceeding spring-run Chinook salmon surrogate yearling loss thresholds in the upcoming week?
- What is the probability of exceeding natural or hatchery steelhead loss thresholds in the upcoming week?

Weekly Assessment for Delta Operations on ESA and CESA-listed Osmerids

Executive Summary

- Detections, salvage, relevant environmental conditions (i.e. turbidity)

Operational and Regulatory Conditions

Delta smelt

Biological

- Life stages, abundance estimates, releases, detections, salvage

Environmental

- First Flush

Real-time Assessment Thresholds

Adult

Larval/Juvenile

Evaluation

Evaluation questions will change based on the entrainment management actions that are relevant. Example evaluation questions are included below.

First flush:

1. Between December 1 and the last day of February, has any first flush condition been exceeded?
 - a. If no, does real-time monitoring of abiotic and biotic factors and/or salvage prediction models indicate the conditions of First Flush are imminent (within 2-3 days) and/or if increased entrainment of adult Delta smelt to the south Delta is likely (i.e. turbidity bridge conditions)?
 - b. If yes, does real-time monitoring of abiotic and biotic factors and/or salvage prediction models indicate First Flush should be postponed or modified (duration or magnitude) due to increased likelihood of incidental take of listed species due to this action?

Entrainment Management:

1. After the start of entrainment management, is JPF < 0 and is daily average turbidity ≥ 12 FNU in the OMR corridor (stations OBI, HOL, and OSJ)?
2. Has the average water temperature at Jersey Point or Rio Vista not exceeded 53.6°F (12°C) for 3 consecutive days and/or has this action already been taken during WY 2026?
3. What is the evidence for the onset of Delta smelt spawning?

4. After the onset of spawning, have the following conditions occurred: $\geq 5\%$ entrainment of the Delta smelt population at facilities after 30 days?

Longfin smelt

Biological

- Life stages, detections, salvage

Real-time Assessment Thresholds

- Start of Entrainment Management (Adult)
- Adult longfin smelt
- Larval/Juvenile

Evaluation

Evaluation questions will change based on the entrainment management actions that are relevant. Example evaluation questions are included below.

Start of Entrainment Management:

1. After December 1, has cumulative water year salvage of Age 1+ longfin smelt exceeded 5% of the fall midwater trawl index plus one fish?

Entrainment Management:

If $JPF < 0$, what is the trajectory of annual loss of adult longfin smelt and is it likely to exceed 5% of the adult population estimate? Is South Delta entrainment expected to decrease due to a reduction in export pumping?

1. For larval and juvenile longfin smelt, if $JPF < 0$ cfs, do particle tracking models show a moderate to high difference in particle fates across different OMRI scenarios? Does Zone of Influence modeling show moderate to high changes in hydrodynamic footprint across different OMRI scenarios? Are these effects anticipated to cause a population decline?
2. Is there additional information or other analyses that should be considered in this evaluation?

End of smelt Entrainment Management:

1. Have either of the following conditions been met: June 30 or 3 consecutive days of daily mean water temperature at Clifton Court Forebay $\geq 77.0^{\circ}\text{F}$ (25°C)?

BOX 4: FISH AND WATER OPERATIONS OUTLOOK

- Water Project Operational Intent for Week
- Biological Context
- Forecasted Weather
- Anticipated weekly operational ranges by tributary and related environmental and fish conditions
- Current Loss for Salmonids and Abiotic Conditions for Delta and Longfin Smelt
- Relevant Water Year Fish Criteria and Status for Listed Fish under the SWP Long-Term Incidental Take Permit
- Fish monitoring gear efficiency and disruptions