

FINAL State Water Project Incidental Take Permit Risk Assessment for Winter-run and Spring-run Chinook Salmon

Section 1: Overview

Date: 4/16/2024

Life Stages Present:

Winter-run Chinook salmon (juveniles)

Winter-run Chinook salmon (adults)

Spring-run Chinook salmon (juveniles)

Spring-run Chinook salmon (adults)

Advice to the Water Operations Management Team (WOMT):

CDFW recommends continuing operating to a positive OMRI this week due to the decreased salvage of LAD WR that has been observed since operations targeted a positive OMRI over the previous week. The SWP ITP COA 8.6.1 states that any subsequent loss should be minimized after the 100% Annual Loss Threshold is exceeded. CDFW acknowledges that loss is likely to decrease due to seasonal timing of winter-run in the Delta; therefore, CDFW will recommend a less positive OMRI once risk of entraining LAD winter-run into the salvage facilities is no longer present. This recommendation is likely to also provide protections to steelhead and may decrease the likelihood of exceeding the steelhead 100% annual loss threshold and Incidental Take Limit.

For the week beginning 4/16/24, the SWP's ITP COA 8.17 Export Curtailments for Spring Outflow under the 2024 Interim Operations Plan (IOP) is controlling exports at the State Water Project (SWP) and Central Valley Project (CVP). Combined exports on 4/16/24 are 1,570 cfs resulting in an OMRI of +300 cfs and 3.3% of inflow diverted (14-day average). The Delta Cross Channel (DCC) gates closed on 11/27/23 and will likely remain closed for the OMR season. The SWP is exporting this week and no outages are planned.

SaMT estimates an overall medium risk of entrainment into the central Delta for juvenile natural-origin winter-run Chinook salmon (WR). Georgiana Slough is estimating low entrainment risk this week. However, due to the seasonal timing of WR, estimated numbers of WR currently in the Delta (Table 1) and alternative entrainment routes such as Threemile Slough that still are likely entraining juveniles even with the current hydrology, SaMT estimates WR entrainment into the central Delta at medium risk this week. SaMT also estimates an overall medium risk of juvenile natural-origin spring-run Chinook salmon (SR) entrainment into the central Delta. SR juveniles are estimated to be migrating downstream into the Delta in high numbers (45-65%) and although current hydrology is expected to decrease entrainment into Georgiana Slough, there are still other alternative routes, including Threemile Slough, that SR may be entrained into. Therefore, SaMT estimates SR entrainment into the central Delta at medium risk this week.

SaMT estimates an overall medium risk of entrainment of juvenile WR into the export facilities this week. Salvage of WR is likely to decrease this week due to WR movement into the Delta and OMRI remaining positive throughout the week. Length-at-date (LAD) WR have been observed in salvage in higher numbers than that of historical averages. SaMT estimates an overall high risk of entrainment for SR into the export facilities. Young-of-year SR have been observed in salvage in the previous week in higher numbers. SaMT estimates that it is likely to see additional young-of-year SR in salvage in the upcoming week; therefore, entrainment risk is estimated as high this week.

Section 2: Risk Assessment

Section 2-A: Operations and Fish Distribution Table

The WY 2024 Interim Operations Plan (IOP) was ordered on 4/1/24. Reclamation will operate to the COA's set forth in the WY 2024 IOP, including COA 8.6.3.

The CVP and SWP began operating to an average combined exports of 1,570 cfs beginning on 4/10/2024. Weekly loss of LAD winter-run decreased compared to the previous week when weekly average OMRI was -1,800 cfs, but seasonal timing may also be contributing to decreasing salvage. The CVP and SWP combined exports are likely to remain at a daily average of 1,570 cfs through this week. CVP will be conducting maintenance this week from 4/16/24-4/18/24, and during this timeframe, will be operating to a daily average of 1 unit (exports of 970 cfs). However, a 2 unit (exports of 1,800 cfs) operation will be conducted in the afternoon and a 0 unit operation (exports of 0 cfs) will be conducted in the morning, which then averages to a 1 unit operation. CDFW has concerns with how these large daily changes in exports will affect fish near the facility and anticipates that it may increase salvage since combined exports during the afternoon would mean a more negative OMRI during that timeframe. Below are data from the previous 2 weeks (including the most up to date week) that show salvage when OMRI was operating to a more negative OMRI in the previous week:

- 4/1/24-4/7/24: 360.55 (-1,800 cfs OMRI)
- 4/8/24-4/14/24: 86.81 (+30 cfs OMRI)

Historical LAD WR data from 1993-2022 shows LAD WR salvage in April (Figure 1). Due to LAD WR loss continuing into April, SaMT estimates that loss of LAD WR will continue throughout this week; therefore, loss of LAD WR is possible and entrainment into the SWP and CVP export facilities is likely.

Due to seasonal timing, loss of both LAD and genetic winter-run Chinook salmon are likely to begin decreasing at the salvage facilities throughout the month of April. Although loss can continue throughout April, it is likely to be lower than what was observed in March, according to historical loss estimates and based on seasonal timing. Nevertheless, so far this year in April, loss of LAD WR has totaled 447.36, which is the higher than LAD WR loss for all of April from WY 2010 to WY 2023, as well as the second highest total LAD WR loss for WY 2010 to WY 2023.

SaMT discussed genetic WR loss and how it is much lower than the LAD WR loss. Genetic results through 4/1/2024 indicate a loss of 130.05 winter-run Chinook salmon so far this year, which is the highest genetic loss observed in the previous four years as well as the sixth's highest genetic loss in the previous 14 years. CDFW noted that although the total genetic WR loss is much lower in comparison to the total LAD WR loss this water year, thresholds have not been established yet to analyze how the genetic loss is impacting the genetic winter-run population. Since the SWP's ITP COA 8.6.1 was only evaluated and analyzed using LAD WR, it is in CDFW's best interest to only provide the data on genetic WR rather than making assumptions on how the genetic WR population has been affected.

Table 1. Current Juvenile Fish Distribution. The SaMT group agreed to provide distribution estimates in five percent increments when feasible.

| Location | Yet to Enter Delta | In the Delta | Exited the Delta |
|---|------------------------------------|------------------------------------|------------------------------------|
| Young-of-year winter-run Chinook salmon | Current 1-5% Last week 1-5% | Current 30-44% Last Week 35-49% | Current 55-65% Last Week 50-60% |
| Young-of-year spring-run Chinook salmon | Current 10-20% Last week 10-20% | Current 45-65% Last Week 50-70% | Current 25-35% Last Week 20-30% |
| Hatchery origin winter-run Chinook salmon | Current 1-2% Last week 1-5% | Current 9-18% Last Week 35-49% | Current 80-90% Last Week 50-60% |

Section 2-B: Sacramento River and Confluence

Assessment of risk of entrainment into the central Delta for WR and SR in the Sacramento River: (8.1.5.1 C ii, iii, iv and 8.1.5.1 B iii)

- Exposure Risk:
 - WR: Medium
 - SR: High
- Routing Risk:
 - WR: Low
 - SR: Low
- Overall Entrainment Risk:
 - WR: Medium
 - SR: Medium
- Change in risk of entrainment into the central Delta (increased/decreased risk compared to last week):
 - WR: Similar to previous week
 - Exposure Risk is estimated as medium this week due to WR presence in the Delta at 30-44% and seasonal timing of WR outmigration. WR are actively migrating downstream and being observed in the CVP and SWP export facilities. Routing Risk is estimated as low for WR this week. Freeport flows are at 31,000 cfs, the DCC gates are closed for the season and although routing is estimated at 20% through Georgiana Slough, the Georgiana BAFF is assumed to decrease entrainment for juveniles. However, due to increased presence of WR in the Delta and alternate migration routes that may entrain WR into the south Delta, the overall entrainment risk into the central Delta is estimated to remain at medium this week.
 - SR: Similar to previous week
 - Exposure Risk is estimated as high this week. SR are beginning to actively migrate into the Delta in higher numbers, which have been observed in real-time monitoring stations in the Delta. Although there have been higher numbers of SR observed in the Delta and passing Chipps Island, SaMT agreed that most of these SR are likely to be the unclipped hatchery fall-run that were released a few weeks ago from Coleman National Fish Hatchery (CNFH). Routing Risk is estimated as low this week. Freeport flows are at 31,000 cfs and DCC gates are closed. Although the STARS model predicts routing at 20% through Georgiana Slough, the Georgiana BAFF is assumed to decrease routing into Georgiana Slough. However, due to SR presence in the Delta this week based on real-time monitoring estimates, alternate migration routes that may entrain SR into the south Delta, and seasonal timing of SR migration into the Delta, the overall entrainment into the central Delta is estimated remain at medium this week.

Section 2-C: Facilities Risk

Central Valley Project/State Water Project (CVP/SWP) facilities entrainment risk for WR and SR in the central Delta over the next week (8.1.5.1 D iii, iv, v)

- Exposure Risk:
 - WR: High
 - SR: High
- Reporting OMRI/Export Risk:
 - Baseline OMRI (+400 cfs)
 - WR: Low
 - SR: Low
 - Scenario 1 OMRI: (+900 cfs)
 - WR: Low
 - SR: Low
 - Scenario 2 OMRI: (+400 cfs)
 - WR: Low
 - SR: Low
- Overall Entrainment Risk:
 - WR: Medium
 - SR: High
- Change in risk of entrainment into the facilities (increased/decreased risk compared to last week):
 - WR: Similar to previous week
 - Exposure Risk is high this week due to high numbers of WR being observed in salvage over the previous week. The likelihood that additional WR will be observed at the export facilities in the upcoming week is possible due to previous salvage events; however, since OMRI is estimated to remain positive all week, WR loss is expected to decrease over the course of the week. Reporting OMRI/Export Risk this week is estimated as low. Due to OMRI is estimated to remain positive all week, WR loss is expected to decrease over the course of the week. Therefore, the overall entrainment risk has decrease to medium this week for WR.
 - SR: Similar to previous week
 - Exposure Risk is high this week due to increases in salvage of young-of-year SR over the previous week. SaMT estimates more may be observed in salvage in the upcoming week due to seasonal timing and recent salvage events. Reporting OMRI/Export Risk is estimated as low due to OMRI estimated to remain positive for the upcoming week. Real-time monitoring stations in the Delta have observed high numbers of young-of-year SR, which increases the likelihood of young-of-year SR entrainment into the export facilities this week. Therefore, the overall entrainment risk into the facilities is estimated as high this week.

Section 2-D: Annual Loss Threshold Risk

- Annual loss threshold risk and Alternative Actions (8.1.5.1. E I, ii, iii and 8.1.5.1 F I, ii)
 - Loss at the SWP and CVP facilities compared to the estimated remaining population in the Delta and upstream of the Delta: Salvage of California Endangered Species Act (CESA)-listed Chinook salmon has not occurred.
 - Define risk of hitting a threshold, 50%, or 75%, or 100%, and likelihood of exceeding a threshold:

- Natural-origin WR: 2,748.28 [1.17% of the natural-origin WR Juvenile Production Estimate (JPE)]
 - Current Annual Loss: 4,192.06 (with salvage data up to 4/14/24)
 - 50% Annual Loss Threshold based on natural-origin WR JPE: 1,374.14
 - Risk of exceeding threshold: *Not applicable since threshold has been exceeded.*
 - The 50% Annual Loss Threshold was exceeded on 2/25/24 which restricts OMRI to a 14-day moving average that is no more negative than -3,500 cfs through the end of OMR Management. However, after 14 days Permittee may convene SaMT to conduct a risk assessment and determine whether the risk of entrainment and take of natural and hatchery CHNWR is no longer present.
 - 75% Annual Loss Threshold based on natural-origin WR JPE: 2,061.21
 - Risk of exceeding threshold: *Not applicable since threshold has been exceeded.*
 - The 75% Annual Loss Threshold was exceeded on 3/7/24 which restricts OMRI to a 14-day moving average that is no more negative than -2,500 cfs through the end of OMR Management. However, after 14 days Permittee may convene SaMT to conduct a risk assessment and determine whether the risk of entrainment and take of natural and hatchery CHNWR is no longer present.
 - 100% Annual Loss Threshold based on natural-origin WR JPE: 2,748.28
 - Risk of exceeding threshold: *Not applicable since threshold has been exceeded.*
 - SaMT will continue to review recent fish distribution information and operations each week and provide advice regarding future planned Project operations to minimize subsequent loss during that year. Entrainment risk will be measured against the potential to exceed the 100% annual loss threshold. **SaMT shall use reported real-time salvage data along with qualitative and quantitative tools to inform risk assessments to determine if entrainment risk of WR is still present and to minimize subsequent loss of WR.**
- Hatchery WR: 232.30 [0.12% of the Livingston Stone National Fish Hatchery (LSNFH) hatchery release JPE]
 - Current Annual Loss: 4.33
 - 50% Threshold based on hatchery WR JPE: 116.15
 - Risk of exceeding threshold: Low
 - 75% Threshold based on hatchery WR JPE: 174.23
 - Risk of exceeding threshold: Low
 - 100% Threshold based on hatchery WR JPE: 232.30
 - Risk of exceeding threshold: Low

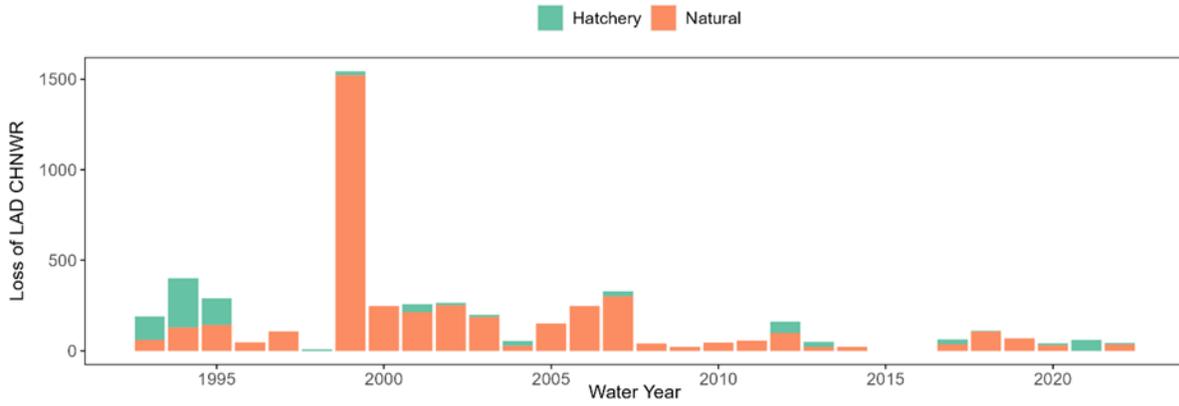
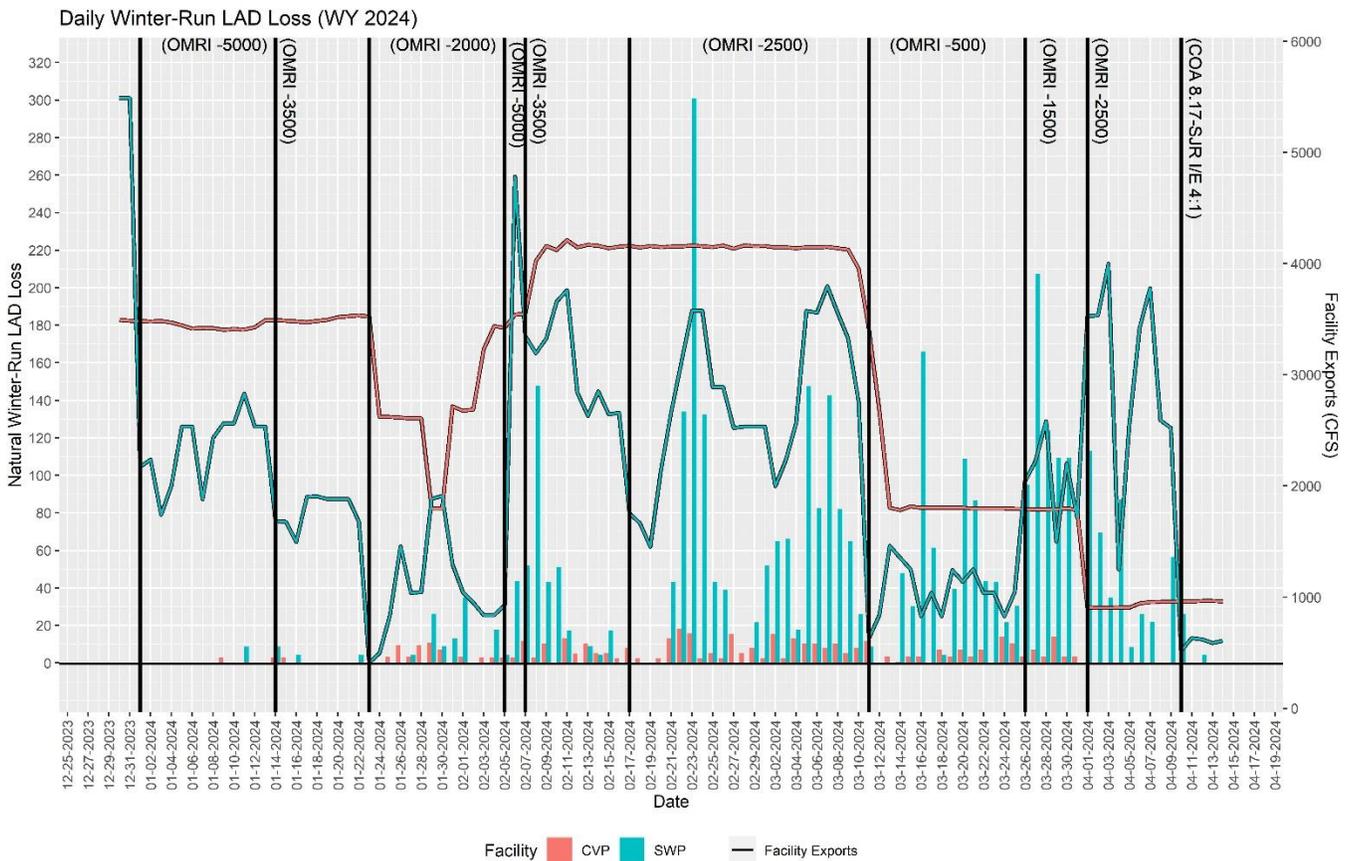


Figure 1. Juvenile hatchery-origin and natural-origin LAD CHNWR monthly loss, April, Water Years 1993-2022. Loss was combined for CVP and SWP export facilities.



Data Updated: 04/14/2024

Figure 2. Daily LAD natural-origin winter-run Chinook salmon (CVP=red bars and SWP=blue bars) with daily exports at both the CVP (red line) and SWP (blue line). Vertical black bars are approximate dates when OMRI controlling factors change.

Cumulative Natural Winter-Run LAD Loss (WY 2024)

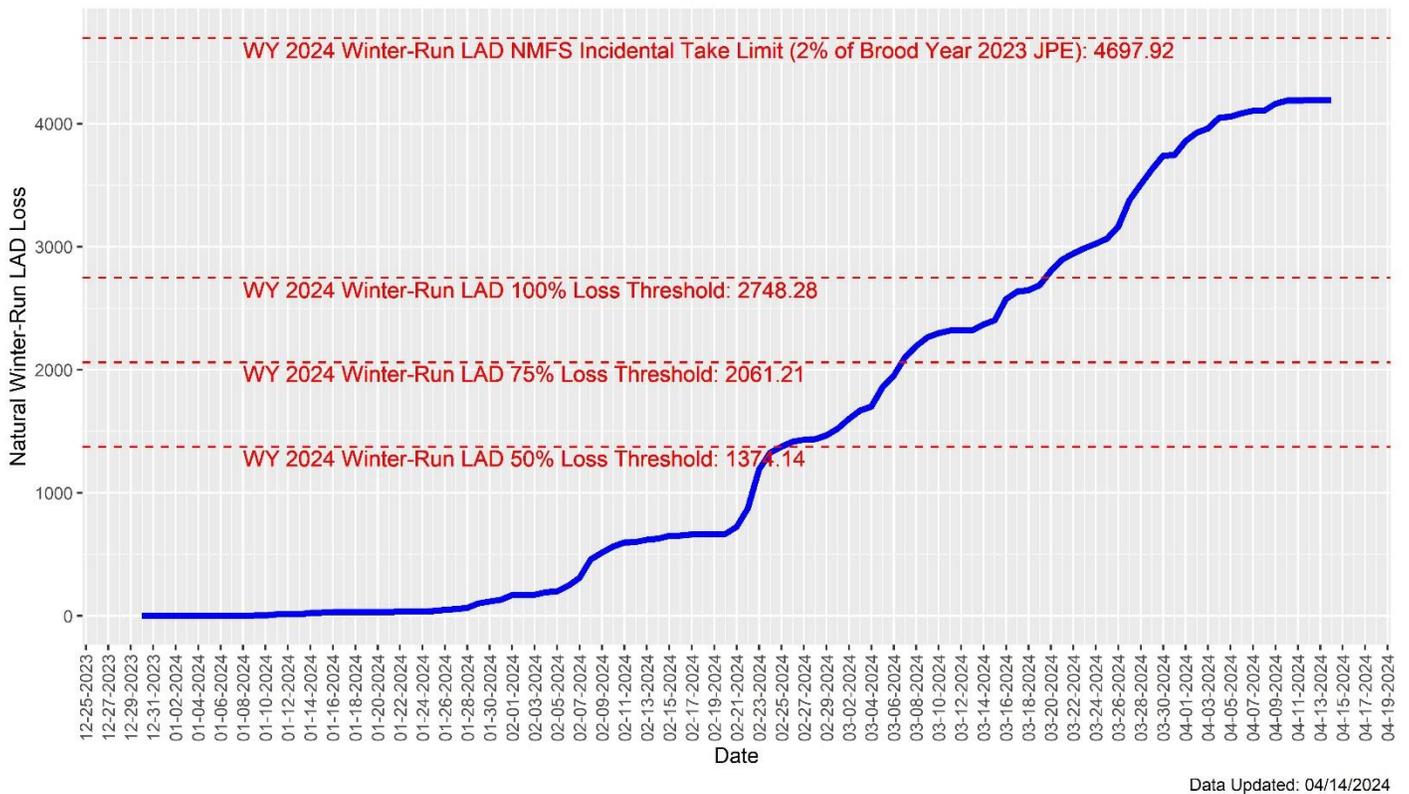


Figure 3. Cumulative Loss of LAD WR for WY 2024 with the 50%, 75% and 100% Annual Loss Thresholds through 4/7/24.

Section 2-E: Daily Loss Threshold Risk

- Daily loss threshold risk and Alternative Actions
 - Loss at the SWP and CVP facilities compared to estimated remaining population in Delta and upstream of the Delta:
 - Daily loss thresholds and subsequent loss and associated operations:
 - COA 8.6.4 Daily Spring-run Chinook Salmon Hatchery Surrogate Loss Threshold:
 - Hatchery Origin Young-of-Year SR Surrogates (0.25% of total in-river SR releases for each release group from Feather River Hatchery (FRH):
 - Group 1 Loss Threshold: 1,749.64
 - Highest Daily Loss: 0
 - Risk of Exceeding Threshold: Low
 - Group 2 Loss Threshold: 1,751.57
 - Highest Daily Loss: 0
 - Risk of Exceeding Threshold: Low
 - Risk of Exceeding Threshold: Low Hatchery Origin Young-of-Year SR Surrogates (0.25% of total in-river FR releases for each release group from Coleman National Fish Hatchery (CNFH):
 - Group 1 Loss Threshold: 1,780.44
 - Highest Daily Loss: 0
 - Risk of Exceeding Threshold: Low
- COA 8.6.3 Mid- and Late-season Natural Winter-run Chinook Salmon Daily Loss Threshold:
 - January 1 – January 31: $0.0000124 * 234,896 = 2.91$

- February 1 – February 28: $0.0000231 * 234,896 = 5.43$
- March 1 – March 31: $0.000372 * 234,896 = 8.74$
- April 1 – April 30: $0.0000226 * 234,896 = 5.31$
- May 1 – May 31: $0.0000226 * 0 = 0$
- Highest LAD Older Juvenile Daily Loss for April: 112.87
- Highest Genetic WR Daily Loss for April: 0
 - Risk of exceeding threshold: High

Section 3: Basis for Advice

The 2020 [Incidental Take Permit for Long-Term Operation of the State Water Project in the Sacramento-San Joaquin Delta 2081-2019-066-00](#) (SWP ITP) states that advice to Water Operations Management Team (WOMT) shall be consistent with the Project Description, COA in the ITP, and the applicable ESA authorizations. This week's advice is based on the following COAs which are currently applicable:

List relevant COA number and title based on species/life stage, time of year, etc.:

8.1.4 Collaborative Approach to Real-time Risk Assessment. Beginning no later than October 1 through the end of OMR Management (see Condition of Approval 8.8) the Smelt and Salmon Monitoring Teams shall meet weekly, or more often as required, to consider survey data, salvage data, and other pertinent biotic and abiotic factors and prepare risk assessments as described in Conditions of Approval 8.1.1, 8.1.2, 8.1.5.1 and 8.1.5.2.

The Smelt and Salmon Monitoring Teams shall prepare operations advice for the WOMT as required by Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, 8.6.4, 8.7, and 8.8, including advice on operations. The Smelt and Salmon Monitoring Teams shall each prepare risk assessments and operations advice. Within each team, staff jointly develop the risk assessment and supporting documentation to accompany operations advice (see Conditions of Approval 8.1.5.1 and 8.1.5.2). DWR and CDFW Smelt and Salmon Monitoring Team staff may conclude different operations advice is warranted, in which case the difference shall be noted and elevated as described in this Condition of Approval.

The Smelt and Salmon Monitoring Teams shall communicate their advice to WOMT. The 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 the WOMT does not reach a resolution, the CDFW Director may require Permittee to implement an operational recommendation provided by CDFW. CDFW will provide its operational decision to Permittee in writing. Permittee shall implement the operational decision required by CDFW. Permittee shall ensure that its proportional share (see Condition of Approval 8.10) of the OMR flow requirement as a part of the operational decision is satisfied.

8.1.5 Real-time Risk Assessments. The Smelt and Salmon Monitoring Teams (Conditions of Approval 8.1.1 and 8.1.2) shall prepare weekly risk assessments, or more often as required, and operations advice (as required by Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, 8.6.4, and 8.7) during their discussions and analyses. The Smelt and Salmon Monitoring Teams shall provide the risk assessments and pertinent supporting information to the WOMT (Condition of Approval 8.1.3) within one business day of each meeting.

8.6.1 Winter-run Single-year Loss Threshold. In each year, Permittee shall, in coordination with Reclamation, operate the Project to avoid exceeding the following single-year loss thresholds:

- *Natural WR (loss = 1.17% of natural WR JPE)*
- *Hatchery WR (loss = 0.12% of hatchery WR JPE)*

The loss threshold and loss tracking for hatchery WR does not include releases into Battle Creek.

Loss of WR at the CVP and SWP salvage facilities shall be calculated based on LAD criteria for run assignment.

Annual loss of natural and hatchery WR at the CVP and SWP salvage facilities shall be counted cumulatively beginning November 1 each calendar year through June 30 the following calendar year.

WR shall be identified based on the Delta Model LAD criteria. Loss shall be calculated for the South Delta Export Facilities using the 2018 CDFW loss equation (Attachment 6).

During the water year, if cumulative loss of natural or hatchery WR exceeds 50% of the annual loss threshold, Permittee shall restrict south Delta exports to maintain a 14-day average OMR index no more negative than -3,500 cfs through the end of OMR Management (see Condition of Approval 8.8). After 14 days of operations to maintain an OMR index no more negative than -3,500 cfs, Permittee may convene the Salmon Monitoring Team to conduct a risk assessment (Condition of Approval 8.1.5.1) and determine whether the risk of entrainment and loss of natural and hatchery WR is no longer present. Risks shall be measured against the potential to exceed the next single-year loss threshold. The results of this risk assessment and associated OMR advice shall be provided to WOMT according to Condition of Approval 8.1.3 and the decision-making process shall follow the process described in Condition of Approval 8.1.4.

The -3,500 cfs OMR flow operational criteria, adjusted and informed by this risk assessment, shall remain in effect until the end of OMR Management (Condition of Approval 8.8).

During the water year, if cumulative loss of natural or hatchery WR at the CVP and SWP salvage facilities exceeds 75% of the single-year loss threshold, Permittee shall restrict OMR to a 14-day moving average OMR flow index that is no more negative than -2,500 cfs through the end of OMR Management (Condition of Approval 8.7). After 14 days Permittee may convene the Salmon Monitoring Team to conduct a risk assessment (Condition of Approval 8.1.5.1) and determine whether the risk of entrainment and take of natural and hatchery WR is no longer present. The results of this risk assessment and associated OMR advice shall be provided to WOMT according to Condition of Approval 8.1.3 and the decision-making process shall follow the process described in Condition of Approval 8.1.4.

The -2,500 cfs OMR flow operational criteria adjusted and informed by this risk assessment shall remain in effect until the end of OMR Management (Condition of Approval 8.8).

During the water year, if natural or hatchery WR cumulative loss at the CVP and SWP salvage facilities exceeds the single-year loss threshold, Permittee shall immediately convene the Salmon Monitoring Team to review recent fish distribution information and operations and provide advice regarding future planned Project operations to minimize subsequent loss during that year. The Salmon Monitoring Team shall report the results of this review and advice to the WOMT (see Condition of Approval 8.1.3). Operational decisions shall be made following the process described in Condition of Approval 8.1.4 (Collaborative Real Time Risk Assessment).

If the single-year loss threshold is exceeded, Permittee and Reclamation shall also convene an independent panel to review Project operations and the single-year loss threshold prior to November 1, as described in Condition of Approval 8.2. The purpose of the independent panel is to review the actions and decisions contributing to the loss trajectory that lead to an exceedance of the single-year loss threshold, and make recommendations on modifications to Project implementation, or additional actions to be conducted to stay within the single-year loss threshold in subsequent years.

Permittee shall, in coordination with Reclamation, continue monitoring and reporting salvage at the CVP and SWP salvage facilities. Permittee and Reclamation shall continue the release and monitoring of yearling

Coleman National Fish Hatchery (NFH) late fall-run and yearling SR surrogates. The Salmon Monitoring Team shall use reported real-time salvage counts along with qualitative and quantitative tools to inform risk assessments (see Condition of Approval 8.1.5.1).

8.3.2 Salmonid Presence. After January 1 each year, if Conditions of Approval 8.3.1 or 8.3.3 have not already been triggered, the OMR Management season shall begin when the Salmon Monitoring Team first estimates that 5% of the CHNWR or CHNSR population is in the Delta whichever is sooner. Upon initiation of the OMR Management season, Permittee shall reduce exports to achieve, and shall maintain a 14-day average OMR index no more negative than -5,000 cfs, until the OMR Management season ends (see Condition of Approval 8.8). In the event that a salmon daily or single-year loss threshold is exceeded (Conditions of Approval 8.6.1, 8.6.2, 8.6.3, or 8.6.4) prior to the start of OMR Management season the requirements in those Conditions shall control operations.

8.6.3 Mid- and Late-season Natural Winter-run Chinook Salmon Daily Loss Threshold. The ITP is amended as follows (amended language in bold italics; deleted language in strikethrough): To minimize entrainment, salvage, and take of natural CHNWR during the peak and end of their migration through the Delta. Permittee shall restrict south Delta exports for five days to achieve a five-day average OMR index no more negative than -3,500 cfs when daily loss of natural older juveniles at the SWP and CVP salvage facilities exceeds the following thresholds based on the JPE reported in January of the same calendar year:

- January 1 – January 31: ~~0.00635~~ **0.00124**% of the CHNWR JPE*
- February 1 – February 28: ~~0.00991~~ **0.00231**% of the CHNWR JPE*
- March 1 – March 31: ~~0.0146~~ **0.00372**% of the CHNWR JPE*
- April 1 – April 30: ~~0.00507~~ **0.00226**% of the CHNWR JPE*
- May 1 – May 31: ~~0.0077~~ **>0**% of the CHNWR JPE*

All natural older juvenile Chinook salmon juveniles shall be identified based on the Delta Model length-at-date criteria. Loss shall be calculated for the South Delta Export Facilities using the equation provided in CDFW 2018 (Attachment 6). This Condition of Approval may be modified through the process described in Condition of Approval 8.6.6 and an amendment to this ITP.

For the time this Amendment is in effect, Permittee shall restrict exports in response to the initial length-at-date identification of natural older juvenile Chinook salmon and the thresholds described above. If genetic analysis of an individual natural older juvenile Chinook salmon observed in salvage at the SWP or CVP indicates that it is not CHNWR, that individual shall not count toward the daily loss threshold and continued export restrictions under this Condition of Approval are not required if the daily loss threshold has consequently not been met. All genetic analyses shall be conducted using CDFW-approved genetic methods.

8.6.4 Daily Spring-run Chinook Salmon Hatchery Surrogate Loss Threshold. To minimize entrainment of emigrating natural juvenile CHNSR from the Sacramento River and tributaries, including the Feather and Yuba rivers into the channels of the central Delta, south Delta, CCF, and the Banks Pumping Plant, Permittee shall restrict exports based on the presence of hatchery produced CHNSR surrogate groups at the CVP and SWP salvage facilities. CHNSR surrogate groups shall consist of all in-river fall- and spring-run surrogate release

groups of Chinook salmon from the Coleman National Fish Hatchery, Feather River Hatchery, and the Nimbus Fish Hatchery.

Each water year between February 1 and June 30 Permittee shall reduce south Delta exports for five consecutive days to achieve a five-day average OMR index no more negative than -3,500 cfs when:

- Feather River Hatchery coded wire tagged (CWT) CHNSR surrogates (includes both spring- and fall-run hatchery release groups) cumulative loss at the at the CVP and SWP salvage facilities is greater than 0.25% for each release group, OR
- Coleman National Fish Hatchery and Nimbus Fish Hatchery CWT fall-run release groups cumulative loss at the at the CVP and SWP salvage facilities is greater than 0.25% of the total in-river releases for each release group.

This Condition of Approval may be modified through the process described in Condition of Approval 8.6.6 and an amendment to this ITP.

8.7 OMR Flexibility During Delta Excess Conditions. Permittee may increase exports to capture peak flows in the Delta during storm-related events (hereafter OMR flex) when:

- The Delta is in excess conditions,²² AND
- QWEST is greater than 0, AND
- A measurable precipitation event has occurred in the Central Valley, AND
- Permittee, in coordination with Reclamation, determines that the Delta outflow index indicates a higher level of outflow available for diversion due to peak storm flows, AND
- None of the following Conditions of Approval are controlling Project operations: 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, and 8.6.4, AND
Risk assessments conducted by the Salmon and Smelt Monitoring Teams (Conditions of Approval 8.1.5.1 and 8.1.5.2) indicate that an OMR more negative than -5,000 cfs is not likely to trigger an additional real-time OMR restriction (Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, and 8.6.4), AND
- Cumulative salvage at the CVP and SWP facilities of yearling Coleman NFH late fall-run Chinook salmon (as yearling CHNSR surrogates) is less than 0.5% within any of the release groups, AND
- Risk assessments conducted by the Salmon and Smelt Monitoring Teams determines that no changes in spawning, rearing, foraging, sheltering, or migration behavior as a result of OMR Flex operations beyond those anticipated to occur through operations described in Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, and 8.6.4 are likely to occur.

If none of the restrictions listed above apply, Permittee may increase south Delta exports but shall manage Project operations to achieve a five-day average OMR index no more negative than -6,250 cfs. The decision to operate under this Condition of Approval shall be made following the process described in Condition of Approval 8.1.4 (Collaborative Real Time Risk Assessment), and SWP OMR flex is subject to approval by CDFW.

If, during OMR flex operations, any of the following conditions occurs, Permittee shall reduce south Delta exports to achieve a 14-day average OMR index no more negative than -5,000 cfs, unless a further reduction in exports is required by another Condition of Approval. The more positive OMR index shall be achieved within 48

hours of the occurrence of the condition, and the 14-day moving average shall apply from that point forward.

- *Risk assessments conducted by the Salmon and Smelt Monitoring Teams (Conditions of Approval 8.1.5.1 and 8.5.1.2) indicate that an OMR more negative than -5,000 cfs is likely to trigger an additional real-time OMR restriction (Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, and 8.6.4), OR*
- *Cumulative salvage at the CVP and SWP facilities of yearling Coleman NFH late fall-run Chinook salmon (as yearling CHNSR surrogates) exceeds 0.5% within any of the release groups, OR*
- *A risk assessment conducted by the Salmon or Smelt Monitoring Teams identifies changes in spawning, rearing, foraging, sheltering, or migration behavior as a result of OMR Flex operations beyond those anticipated to occur through operations described in Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, and 8.6.4, OR*
- *Operational restrictions described in Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, 8.6.4, and 8.17 are required.*

Section 4: Hydrology and Operations

Assessment of hydrologic, operational, and meteorological information. 8.1.5.1 A

Section 4-A: Water Operations, Water Operations Outlook, and Projected Conditions C 8.1.5.1 A. i, iii, iii:

- Antecedent Actions: (e.g., Actions such as integrated early winter pulse protection, etc.)
 - COA 8.17 Spring Outflow is controlling operations at the SWP for the week beginning 4/16/24. COA 8.17 states that in an above normal water year category, the ratio of Vernalis flow to CVP and SWP combined exports shall be 4 to 1, which is likely to limit exports to 1,500 cfs since Vernalis flow is currently around 4,500 cfs. COA 8.17 is also controlling operation at the CVP the week beginning 4/16/24 due to the 2024 IOP which states that Reclamation to reduce exports by 100 TAF in order to contribute to spring outflow. SWP and CVP are likely to both remain at health and safety for the next 2 weeks.
 - Steelhead 50% Annual Loss Threshold was exceeded on 4/9/24, which limits OMRI to -3,500 cfs through the end of OMR management season, which would end on June 15 for steelhead.
- Water Temperature (ITP COA 8.8 threshold: daily average water temperature exceeds 22.2°C for 7 non-consecutive days in June):
 - Mossdale (MSD): [Mossdale - CDEC](#)
 - Number of days threshold exceeded: Not applicable until June.
 - Days exceeded: N/A
 - Prisoners Point (PPT): [Prisoners Point - CDEC](#)
 - Number of days threshold exceeded: Not applicable until June.
 - Days exceeded: N/A
- Tidal Cycle: (*Spring/Neap. Note if tidal cycle has potential to affect south Delta hydrology or X2*)
 - Exiting a neap cycle with a first quarter moon on 4/15/24 and entering into a spring cycle with a full moon on 4/23/24.
- Turbidity: Not discussed
- Salinity (X2): 61 km on 4/16/24
- Outages:
 - SWP: None projected
 - CVP: The CVP will be conducting maintenance this week from 4/16/24-4/18/24, and during this timeframe, will be operating to a daily average of 1 unit (exports of 970 cfs). However, a 2 unit (exports of 1,800 cfs) operation will be conducted in the afternoon and a 0 unit operation (exports of 0 cfs) will be conducted in the morning, which then averages to a 1 unit operation.
- Exports: 4/16/24 – 4//24
 - SWP: 600 to 3,800 cfs
 - CVP: 0 to 1,800 cfs
- Meteorological Forecast:
 - *“Mostly clear and dry conditions prevail across interior Northern California this afternoon. A few passing high clouds are being observed in the northern Sacramento Valley, but otherwise sunny and mild conditions will continue throughout the remainder of the day. Afternoon high temperatures are expected to climb into the mid to upper 70s for the Valley, with cooler mid 50s to mid 60s for the higher elevations.”*
 - [NOAA - National Weather Service Forecast](#)
- Weather/Storm Event Projection:

- These rain events are not likely to trigger COA 8.7 OMR Flexibility During Delta Conditions. Even if the rain events were to trigger COA 8.7, controlling conditions are in place and would not allow for COA 8.7 to onramp.
- Under OMR flows more negative than -5,000 cfs, SaMT expects impacts to rearing, foraging, sheltering, or migration of salmonids present in the south Delta.
- DCC Gates position:
 - DCC gates closed on 11/27/23 and will remain closed for the OMR management season.
- Sacramento River flow at Freeport: 31,600 cfs
 - [Sacramento River Flows - CDEC](#)
- San Joaquin River flow at Vernalis: 5,700 cfs
 - [San Joaquin River Flows - CDEC](#)
 - [San Joaquin River Guidance Plots - CDEC](#)
- QWEST: +13,500 cfs
 - QWEST is likely to be in the range between +8,000 cfs and +13,500 cfs
- Future export modifications: *Describe anticipated or potential changes to exports:*
 - Exports will likely remain at a daily average of 1,570 cfs this week. The SWP and CVP are currently operating to COA 8.17 Export Curtailments for Spring Outflow. The CVP is operating to the 2024 IOP COA 8.17 which reduced the CVP exports by 100 TAF to contribute to spring outflow

Table 2. Comparison of USGS Tidally Filtered OMR and OMR Index data.

| Date | Averaging Period | USGS gauges (cfs) | OMR Index (cfs) |
|---------|------------------|-------------------|-----------------|
| 4/13/24 | Daily | +600 | +400 |
| 4/13/24 | 5-day | -1,100 | +100 |
| 4/13/24 | 14-day | -2,000 | -1,200 |
| 4/15/24 | Daily | Not Applicable | +800 |
| 4/15/24 | 5-day | Not Applicable | +500 |
| 4/15/24 | 14-day | Not Applicable | -800 |

Section 5: Distribution and Biology

8.1.5.1.B Assessment of biological information for WR and SR.

Section 5-A: WR Population Status 8.1.5.1.B i

- Adult escapement estimate:
 - Final spawning escapement for WR adults contributing to brood year (BY) 2023 is 2,427 adults.
 - Escapement estimate for adults contributing to BY 2023 was low at only 41% of the previous 20-year average.
- Redd distribution and fry emergence timing:
 - Juvenile WR are migrating downstream into the Delta.
 - Estimated juvenile WR passage at Red Bluff Diversion Dam for 3/24/24 is 1,110,528 fish, which represents 99.8% of historical passage. Average historic passage (7/1/2002-6/30/2023) as of 3/24/24 indicates 99.8% with one standard deviation of 0.2% have passed Red Bluff Diversion Dam.
- Juvenile Production Estimate (JPE):
 - WR JPE PWT distributed the Final JPE letter on 1/12/24.
- Livingston Stone National Fish Hatchery (LSNFH) releases:
 - On 12/28/23, LSNFH released 150,654 winter-run Chinook salmon into the Sacramento River.
 - On 1/19/24, LSNFH released 227,527 winter-run Chinook salmon into the Sacramento River.
 - On 2/16/24, LSNFH released 365,893 winter-run Chinook salmon into the Sacramento River. A subset of these fish were acoustically tagged and will be tracked through CalFishTrack and estimated in the fish distribution table (Table 1).
 - See Appendix 4
- Distribution of natural WR:
 - See Table 1
- Distribution of LSNFH Sacramento River WR and Battle Creek WR:
 - The fish released on 12/28/23 were not acoustically tagged; therefore, will not be found on CalFishTrack. LSNFH made an early release this year due to excess winter-run juveniles; therefore, the WR released on 12/28/23 were released prior to being acoustically tagged.
 - The fish released on 1/19/24 were also not released prior to being acoustically tagged.
 - CNFH released Battle Creek jumpstarters into North Fork Battle Creek on 3/4/24.
 - One fish from the release made on 12/28/24 was observed in at the SWP on 3/10/24.
 - [CalFishTrack \(noaa.gov\)](https://www.noaa.gov)

Section 5-B: SR Population Status 8.1.5.1.B ii

- Adult escapement estimate:
 - SR carcass counts not available.
 - A few adult SR contributing to BY 2024 have been observed upstream at the VAKI Riverwatcher at Butte Creek. Region 2 noted that it is late to just now be observing adults in Butte Creek.
- Redd distribution and fry emergence timing:
 - Based on the real-time monitoring stations in the Delta and at RBDD RST, SR fry are rearing and migrating into the Delta.
- Hatchery release (in-river and downstream):
 - Coleman National Fish Hatchery (CNFH) began releasing yearling spring-run Chinook salmon surrogates (late fall-run Chinook salmon) for COA 8.7 OMR Flexibility During Delta Excess Conditions. The first release occurred on 12/22/23, 4 days after the late fall-run production release. The second release occurred on 12/29/23. The third release occurred on 1/11/24.

- Loss from the first, second, and third release groups has occurred with loss for release group 1 totaling 36.83 fish, loss for release group 2 totaling 17.30 fish, and loss for release group three totaling 69.88 fish.
- See Appendix 2 and Appendix 3
- Distribution of natural SR:
 - See Table 1
- Distribution of Feather River, Coleman, and Nimbus Fish Hatchery SR surrogates:
 - The first release of SR surrogates for COA 8.6.4 was released on 3/15/24 from the Feather River Fish Hatchery. This release was a total of 699,854 CWT and adipose-clipped SR. These fish will be tracked for COA 8.6.4 in the SWP and CVP export facilities.
 - The second release of SR surrogates for COA 8.6.4 was released on 3/21/24 from the Coleman National Fish Hatchery. This release was a total of 712,177 CWT and adipose-clipped fall-run (FR). These fish will be tracked for COA 8.6.4 in the SWP and CVP export facilities.
 - The third release of SR surrogates for COA 8.6.4 was released on 3/29/24 from the Feather River Fish Hatchery. The release notification for these fish have not been sent out yet so the total number is currently unknown.

Section 5-C: Additional Data Sources to Assess Sensitivity to Entrainment into the Central and South Delta 8.1.5.1.C & D

- Acoustic telemetry: *Summary of acoustic telemetry tracking*
 - DWR acoustically tagged LFR for a study on the newly installed Georgiana BAFF. These fish are currently being tracked on CalFishTrack but additional data and information will be distributed to SaMT once the data becomes available.
 - [CalFishTrack \(noaa.gov\)](https://www.calfishtrack.noaa.gov)
- Trawls: See Appendix 1
 - Sacramento Trawl: SR were caught between 4/8/24 – 4/12/24.
 - Mossdale Trawl: SR were caught between 4/8/24 – 4/12/24.
 - Chipps Island Trawl: WR and SR were caught between 4/8/24 – 4/12/24.
- Rotary Screw Traps:
 - Knights Landing RST Data: SR were caught between 4/9/24 – 4/15/24.
 - [Middle Sacramento River Salmon and Steelhead Monitoring](#)
 - Tisdale RST Data: SR were caught between 4/8/24 – 4/14/24.
 - [Middle Sacramento River Salmon and Steelhead Monitoring](#)
 - Lower Sacramento RST Data: SR were caught between 4/6/24 – 4/12/24.
 - [Middle Sacramento River Salmon and Steelhead Monitoring](#)
 - Lower Feather RST Data: SR were caught between 4/9/24 – 4/15/24.
 - Yuba River RST Data: SR were caught between 4/8/24 – 4/14/24.
 - Red Bluff Diversion Dam RST Data: Total passage estimates 1,110,528 juvenile WR have passed RBDD. Last updated on 3/24/24.
 - Butte Creek RST Data: SR were caught between 4/8/24 – 4/14/24.
 - [Butte Creek Monitoring Programs](#)
- Seines:
 - Sacramento River Beach Seines: SR were caught between 4/8/24 – 4/12/24.
- Carcass Survey Data:
 - Lower American River Carcass Survey Data:
 - The American River Power Bypass proposal decreased river temperatures down to a weekly average below 56°F. The power bypass officially ended on 12/10/23.

- Fall-run Carcass Surveys began on 10/16/23 on the Lower American River and concluded on 1/24/24. Total number of fish observed was roughly 18,000 fish which is the highest carcass survey numbers since 2013.
- Additional hatchery release notifications: *List all relevant hatchery release notifications.*
 - See Appendix 4
- New monitoring (as required by Condition of Approval 7.5.1, 7.5.2, and 7.5.3): *Upstream monitoring results during transfer window, additional rotary screw trap monitoring updates, additional acoustic tag study results, genetic identification results, trap capture efficiency trial results, and pathology results if available and relevant.*
 - An acoustic tag study is being conducted near Georgiana Slough for the newly installed Georgiana BAFF. Late fall-run Chinook salmon have been tagged and released and can be tracked on CalFishTrack (link below). DWR will provide updates once data is collected.
 - An acoustic tag study is being conducted at Lighthouse Resort with steelhead from the Mokelumne Fish Hatchery to observe movements of steelhead at an OMRI of -500 cfs.
 - [CalFishTrack \(noaa.gov\)](https://www.calfishtrack.noaa.gov)
- Anticipated emigration to continue into the Delta:
 - WR are exiting the Delta according to real-time monitoring stations, which also corresponds with seasonal timing.
 - Young-of-year SR have also began emigrating into the Delta according to young-of-year SR observations in the real-time monitoring sites as well as being observed in salvage. Young-of-year SR have also been observed at Chipps Island in higher numbers this week, likely due to hatchery spring-run and fall-run releases. Both WR and SR are likely to have increased movement throughout this week due to seasonal timing.
 - [SacPAS - Migration Timing and Conditions by Cohort](#)
 - [SacPAS - Salvage Timing](#)
- Routing and Survival Analysis:
 - Delta STARS Model: See Table 6 in Appendix 1
 - [STARS Model](#)
- Tillotson entrainment model or other entrainment models as they become available:
 - The entrainment tool estimates a median of 36 WR and a maximum loss of 336 WR this week (SacPAS last updated on 4/15/24).
 - [SacPAS - Loss and Salvage Predictor](#)
- Salvage trends in relation to OMRI: *Provide overview of salvage data and insert salvage table as attachment at end of document:*
 - LAD WR have been observed in salvage in the previous week; however, LAD WR in salvage has decreased from the previous week, which is likely due to the SWP and CVP operating to health and safety of combined exports at 1,500 cfs. LAD WR are also not observed in higher numbers in April so due to seasonal timing it is likely that there will be a further decrease as May approaches.
 - [USFWS - Fish Salvage Monitoring](#)

Appendix 1: SaMT Monitoring and Modeling Data

Table 3. Fish monitoring data for the 4/16/24 SaMT meeting. The following table presents fish monitoring data summarized over the past week. Unless otherwise noted, reported sizes are fork length. FR = fall-run, WR = winter-run, SR = spring-run, LFR = late-fall-run.

| Location | Butte Creek RST | Tisdale RST | Knights Landing RST | Lower Sac RST ¹ | Beach Seines | Sacramento Trawl |
|----------------------|-----------------|--------------|---------------------|----------------------------|----------------|--------------------|
| Sample Date | 4/8-4/14 | 4/8-4/14 | 4/9-4/15 | 4/6-4/12 | 4/8-4/10, 4/12 | 4/8-4/9, 4/11-4/12 |
| Chinook Adults | | | | | | |
| FR Chinook | 0 | 25 | 28 | 89 | 62 | 32 |
| SR Chinook | 32 | 32 | 27 | 15 | 1 | 21 |
| WR Chinook | 0 | 0 | 0 | 0 | 0 | 0 |
| LFR Chinook | 0 | 0 | 0 | 0 | 1 | 0 |
| Chinook (ad-clip) | 0 | 2 FR 6 SR | 5 FR 10 SR | 5 FR 13 SR 1 WR | 4 | 34 |
| Steelhead (wild) | 5 | 0 | 0 | 0 | 0 | 0 |
| Steelhead (ad-clip) | 0 | 0 | 0 | 0 | 0 | 1 |
| Green Sturgeon | 0 | 0 | 0 | 0 | 0 | 0 |
| Flows (avg. cfs) | 606 | 13,696 | 14,466 | 27,952 | - | - |
| W. Temp. (avg. °C) | 9.7 | 14.5 | 14.9 | 12.9 | 14.6 | 14.3 |
| Turbidity (avg. NTU) | 1.3 | 17.9 | 21.2 | 9.2 | 25.5 | 21.2 |

¹ Lower Sac cones at 50% effort 4/6-4/10. Then at 100% effort.

Table 3 Continued. Fish monitoring data for the 4/16/24 SaMT meeting. The following table presents fish monitoring data summarized over the past week. Unless otherwise noted, reported sizes are fork length. FR = fall-run, WR = winter-run, SR = spring-run, LFR = late-fall-run.

| Location | Chippis Is. Midwater Trawl | Mossdale Kodiak Trawl ¹ | EDSM ² | Feather at Herringer RST | Feather at Eye-Side RST | Lower Feather River RST | Yuba River RST |
|----------------------|----------------------------|------------------------------------|-------------------|--------------------------|-------------------------|-------------------------|----------------|
| Sample Date | 4/8-4/9, 4/11-4/12 | 4/8-1/12 | N/A | 4/8-4/14 | 4/8-4/14 | 4/9-4/15 | 4/8-4/14 |
| Chinook Juveniles | | 64 | N/A | | | | |
| FR Chinook | 71 | - | N/A | 300 | 474 | 426 | 805 |
| SR Chinook | 297 | 77 | N/A | 4 | 0 | 1 | 22 |
| WR Chinook | 5 | - | N/A | 0 | 0 | 0 | 0 |
| LFR Chinook | 0 | - | N/A | 7 | 39 | 8 | 68 |
| Chinook (ad-clip) | 154 | 15 | N/A | 0 | 0 | 21 FR 17 SR | 0 |
| Steelhead (wild) | 0 | 5 | N/A | 1 | 47 | 0 | 7 |
| Steelhead (ad-clip) | 5 | - | N/A | 0 | 0 | 0 | 0 |
| Green Sturgeon | 0 | - | N/A | 0 | 0 | 0 | 0 |
| Flows (avg. cfs) | - | - | N/A | 7,571 | 750 | 10,327 | 3,163 |
| W. Temp. (avg. °F/C) | 14.7 | - | N/A | 10.4 | 11.9 | 13.0 | 10.3 |
| Turbidity (avg. NTU) | 26.3 | - | N/A | 3.4 | 2.3 | 3.3 | 1.7 |

¹ Mossdale trawl sampling being conducted and reported by CDFW (Region 4) between April and June. No trawling (NT) occurred on 4/1, 4/3, or 4/7.

² EDSM trawls will resume sampling in July, 20mm larval tows currently being sampled.

Table 4. Delta sturgeon tagging and monitoring.

| Date | Comments |
|---------|--|
| 4/12/24 | <ul style="list-style-type: none"> • 1 juvenile white sturgeon located/ tagged near Sacramento River north of Marsh Island on 10/24/23 • 1 white sturgeon was tagged on 3/8/24 • 4 adult white sturgeon were rescued from the Fremont Weir basin and released into the Sacramento River between 2/12/24-2/14/24 |

Table 5. CDFW adult monitoring surveys. N/A means Not Available due to Carcass Survey ending on 1/24/24.

| Location | American River Carcass Survey | Stanislaus River Carcass Survey |
|----------------------|-------------------------------|---------------------------------|
| Sample Dates | Not Sampling | Not Sampling |
| Live Fish | Not Available | N/A |
| Redds | N/A | N/A |
| Total Carcasses | N/A | N/A |
| Ad-clipped | N/A | N/A |
| Spawn Condition | Prespawn Mortality: N/A | Not Available |
| Flows (avg. cfs) | N/A | N/A |
| Water Temp (avg. °F) | N/A | Not Available |

Table 6. STARS Modeling

| <u>Date:</u> (4/15/24) | <u>DCC</u> | <u>Georgiana</u> <u>Slough</u> | <u>Sacramento</u> <u>River</u> | <u>Sutter and</u> <u>Steamboat</u> <u>Slough</u> | <u>Yolo</u> <u>Bypass</u> |
|---|------------|-----------------------------------|-----------------------------------|--|------------------------------|
| Late Fall-Run Routing Probabilities | 0 | 0.20 | 0.48 | 0.32 | N/A |
| Late Fall-Run Route Specific Survival | 0 | 0.30 | 0.66 | 0.62 | N/A |
| Winter-Run Routing Probabilities | N/A | 0.12 | 0.63 | 0.13/0.12 | 0 |
| Winter-Run Route Specific Survival | N/A | 0.27 | 0.52 | 0.45/0.49 | 0 |

Appendix 2: Relevant Actions

Table 7. Relevant WY 2024 Criteria and Status for Listed Chinook Salmon under the SWP Long-Term Incidental Take Permit.

| <u>Action</u> | <u>Timeframe</u> | <u>Current Action Status</u> | <u>Threshold(s)</u> | <u>Current Relevant Data</u> | <u>Weekly Trend</u> | <u>Last Updated</u> | <u>Comments</u> |
|--|---|------------------------------|---|---|--|---------------------|--|
| Onset of OMR Mgmt. Salmonid Presence (8.3.2) | Jan. 1 - Jun. 30 <i>(when ≥ 5% of winter-run or spring-run are in the Delta)</i> | In effect | ≥ 5% of the winter-run or spring-run population are present in the Delta | Winter-run = 30-44% estimated in the Delta Spring-run = 45-65% estimated in the Delta | N/A | 4/15/24 | N/A |
| Winter-run yearly loss (8.6.1) | Nov. 1 - Jun. 30 | In effect | Natural CHNWR (loss = 1.17% of JPE): <i>50% of 1.17% of JPE = 1,374.14</i> <i>75% of 1.17% of JPE = 2,061.21</i> Hatchery CHNWR (loss = 0.12% of JPE): <i>50% of 0.12% of JPE = 116.15</i> | Current yearly WR loss (natural LAD) = 4,192.06 (updated with 4/14/24 salvage data) Current yearly WR loss (hatchery) = 4.33 | LAD natural-origin WR may be observed in salvage in the upcoming week. | 4/15/24 | LAD natural-origin WR have been observed in salvage over the previous week. The 100% Annual Loss Threshold was exceeded on 3/20/24. |

| <u>Action</u> | <u>Timeframe</u> | <u>Current Action Status</u> | <u>Threshold(s)</u> | <u>Current Relevant Data</u> | <u>Weekly Trend</u> | <u>Last Updated</u> | <u>Comments</u> |
|--|------------------|------------------------------|--|---|--|---------------------|--|
| Winter-run discrete daily loss (8.6.2) | Nov. 1 - Dec. 31 | Not in effect | 11/1 – 11/30: loss of 6/day unclipped older juvenile Chinook salmon 12/1 – 12/31: loss of 26/day unclipped older juvenile Chinook salmon | N/A | N/A | 4/15/24 | N/A |
| Mid- and Late-season Natural WR Daily Loss Threshold defined as natural origin juvenile Chinook salmon (8.6.3) | Jan 1 – May 31 | In effect | January 1 – 31: 0.00124% of the CHNWR JPE February 1 – 28: 0.00231% of the CHNWR JPE March 1 – 31: 0.00372% of the CHNWR JPE April 1 – 30: 0.00226% of the CHNWR JPE May 1 – 31: 0% of the CHNWR JPE | January: 0.0000124*234,896 = 2.9127104 (2.91) February: 0.0000231 * 234,896 = 5.4260976 (5.43) March: 0.0000372 * 234,896 = 8.7381312 (8.74) <u>April: 0.0000226 * 234,896 = 5.3086496 (5.31)</u> May: 0 * 234,896 = 0 (0) | Salvage of older juvenile Chinook salmon may occur this upcoming week. | 4/15/24 | LAD WR have been observed in salvage over the previous week. |

| <u>Action</u> | <u>Timeframe</u> | <u>Current Action Status</u> | <u>Threshold(s)</u> | <u>Current Relevant Data</u> | <u>Weekly Trend</u> | <u>Last Updated</u> | <u>Comments</u> |
|---|------------------|------------------------------|---|---|---|---------------------|-----------------|
| Spring-run surrogate protection (8.6.4) | Feb. 1 - Jun. 30 | In effect | <p>Coleman National Fish Hatchery (CNFH) Group 1: 0.25% of total in-river CWT fall-run release</p> <p>Feather River Fish Hatchery (FRH) Group 1: 0.25% of total in-river CWT spring-run release</p> <p>Nimbus Fish Hatchery (NIM) Group 1: 0.25% of total in-river CWT fall-run release</p> | <p>FRH Group 1: $0.0025 * 699,854 = 1,749.64$</p> <p>FRH Group 2: $0.0025 * 700,626 = 1,751.57$</p> <p>CNFH Group 1: $0.0025 * 712,177 = 1,780.44$</p> | <p>FRH Group 1 release occurred on 3/15/24</p> <p>FRH Group 2 release occurred on 3/29/24</p> <p>CNFH Group 1 release occurred on 3/21/24</p> | 4/15/24 | N/A |

| | | | | | | | |
|---|-------------------------|----------------------|---|---|--|-----------------------|------------|
| <p>OMR Flexibility During Delta Excess Conditions (8.7)</p> | <p>Nov. 1 - Jun. 30</p> | <p>Not in effect</p> | <ul style="list-style-type: none"> •The Delta is in excess conditions, AND •QWEST is >0, AND •A measurable precipitation event has occurred, AND •DWR and Reclamation determines that the Delta outflow index indicates a higher level of outflow available for diversion due to peak storm flows, AND •None of the following COA's are controlling Project operations: 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, and 8.6.4, AND •Risk assessments indicate that an OMR more negative than - 5,000 cfs is unlikely to trigger an additional real-time OMR restriction •Cumulative salvage at the CVP and SWP facilities of yearling CNFH LFR (as yearling CHNSR surrogates) is | <p>COA 8.7 will not trigger this week due to the following:</p> <ul style="list-style-type: none"> •The Delta is in excess conditions with restrictions. •There has not been a measurable precipitation event •Risk assessments indicate that an OMR more negative than - 5,000 cfs is likely to trigger an additional real-time OMR restriction •Risk assessments determine that changes in spawning, rearing, foraging, sheltering, or migration behavior as a result of OMR Flex operations will occur. | <p>Current storm events are being monitored for COA 8.7.</p> | <p>4/15/24</p> | <p>N/A</p> |
|---|-------------------------|----------------------|---|---|--|-----------------------|------------|

| <u>Action</u> | <u>Timeframe</u> | <u>Current Action Status</u> | <u>Threshold(s)</u> | <u>Current Relevant Data</u> | <u>Weekly Trend</u> | <u>Last Updated</u> | <u>Comments</u> |
|-----------------------------|------------------|------------------------------|--|------------------------------|---------------------|---------------------|-----------------|
| | | | less than 0.5% within any of the release groups, AND <ul style="list-style-type: none"> •Risk assessments determine that no changes in spawning, rearing, foraging, sheltering, or migration behavior as a result of OMR Flex operations | | | | |
| End of OMR Management (8.8) | Jan – Jun. 30 | Not in effect | More than 95% of WR and SR have migrated past Chipps Island as determined by SaMT, AND Daily average water temperature at Mosssdale exceeds 22.2°C (71.96°F) for 7 non-consecutive days in June, AND Daily average water temperature at Prisoner’s Point exceeds 22.2°C (71.96°F) for 7 non-consecutive days in June | N/A | N/A | 4/15/24 | N/A |

Appendix 3: Hatchery Releases

Table 8. Hatchery salmon release data for BY 2023 and WY 2024.

| Release Date | Hatchery | Race | CWT | Marked Release Number | Total Release | Percent Marked | Release Location | Mark | Agency | Release Type |
|--------------|----------|-----------|----------|-----------------------|---------------|----------------|---|-----------------------|--------|--------------|
| 12/6/2023 | SCARF | Spring | 06-29-45 | 2,477 | 2,477 | 100% | San Joaquin River at Highway 140 | PIT, CWT, and Ad-Clip | CDFW | SJRRP |
| 12/6/2023 | SCARF | Spring | 06-29-46 | 1,060 | 1,060 | 100% | San Joaquin River at Highway 140 | PIT, CWT, and Ad-Clip | CDFW | SJRRP |
| 12/18/2023 | CNFH | Late Fall | 05-67-28 | 66,574 | 66,574 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 12/18/2023 | CNFH | Late Fall | 05-67-29 | 68,204 | 68,204 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 12/18/2023 | CNFH | Late Fall | 05-67-30 | 73,473 | 73,473 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 12/18/2023 | CNFH | Late Fall | 05-67-31 | 74,938 | 74,938 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 12/18/2023 | CNFH | Late Fall | 05-67-32 | 67,155 | 67,155 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 12/18/2023 | CNFH | Late Fall | 05-67-33 | 70,038 | 70,038 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 12/18/2023 | CNFH | Late Fall | 05-67-34 | 61,405 | 61,405 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 12/18/2023 | CNFH | Late Fall | 05-67-35 | 69,674 | 69,674 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 12/18/2023 | CNFH | Late Fall | 05-67-36 | 71,048 | 71,048 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 12/18/2023 | CNFH | Late Fall | 05-66-87 | 74,745 | 74,745 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 12/18/2023 | CNFH | Late Fall | 05-66-88 | 35,387 | 35,387 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 12/18/2023 | CNFH | Late Fall | 05-00-45 | 70,552 | 70,552 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 12/18/2023 | CNFH | Late Fall | 05-00-46 | 72,539 | 72,539 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 12/18/2023 | CNFH | Late Fall | 05-00-47 | 66,946 | 66,946 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 12/22/2023 | CNFH | Late Fall | 05-66-89 | 60,764 | 60,764 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Experimental |
| 12/28/2023 | LSNFH | Winter | 05-00-31 | 74,940 | 74,940 | 100% | Sacramento River at John F. Reginato River Access | CWT and Ad-clip | USFWS | Production |
| 12/28/2023 | LSNFH | Winter | 05-00-32 | 75,714 | 75,714 | 100% | Sacramento River at John F. Reginato River Access | CWT and Ad-clip | USFWS | Production |
| 12/29/2023 | CNFH | Late Fall | 05-66-90 | 71,049 | 71,049 | 100% | Sacramento River at John F. Reginato River Access | CWT and Ad-clip | USFWS | Experimental |
| 1/11/2024 | CNFH | Late Fall | 05-66-91 | 67,018 | 67,018 | 100% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Experimental |
| 1/19/2024 | LSNFH | Winter | 05-00-33 | 71,101 | 71,101 | 100% | Sacramento River at John F. Reginato River Access | CWT and Ad-clip | USFWS | Production |

| Release Date | Hatchery | Race | CWT | Marked Release Number | Total Release | Percent Marked | Release Location | Mark | Agency | Release Type |
|---------------|----------|-----------|----------|-----------------------|---------------|----------------|---|--|--------|--------------|
| 1/19/2024 | LSNFH | Winter | 05-00-34 | 77,433 | 77,433 | 100% | Sacramento River at John F. Reginato River Access | CWT and Ad-clip | USFWS | Production |
| 1/19/2024 | LSNFH | Winter | 05-00-35 | 78,993 | 78,993 | 100% | Sacramento River at John F. Reginato River Access | CWT and Ad-clip | USFWS | Production |
| 2/5/24-2/6/24 | MOK | Steelhead | 06-19-43 | 63,260 | 63,260 | 100% | New Hope Landing | Ad-clip | CDFW | Production |
| 2/12/24 | NIM | Fall | N/A | 0 | 1,198,682 | 0% | Lower American River at Nimbus Fish Hatchery | None | CDFW | Experimental |
| 2/14/24 | SCARF | Spring | 06-19-39 | 53,446 | 53,446 | 100% | San Joaquin River at Highway 140 | CWT and Ad-clip | CDFW | SJRRP |
| 2/16/24 | LSNFH | Winter | 05-00-36 | 79,092 | 79,092 | 100% | Sacramento River at John F. Reginato River Access | CWT and Ad-clip | USFWS | Production |
| 2/16/24 | LSNFH | Winter | 05-64-99 | 43,382 | 43,382 | 100% | Sacramento River at John F. Reginato River Access | CWT and Ad-clip | USFWS | Production |
| 2/16/24 | LSNFH | Winter | 05-65-01 | 51,003 | 51,003 | 100% | Sacramento River at John F. Reginato River Access | CWT and Ad-clip | USFWS | Production |
| 2/16/24 | LSNFH | Winter | 05-65-02 | 42,670 | 42,670 | 100% | Sacramento River at John F. Reginato River Access | CWT and Ad-clip | USFWS | Production |
| 2/16/24 | LSNFH | Winter | 05-65-03 | 46,419 | 46,419 | 100% | Sacramento River at John F. Reginato River Access | CWT and Ad-clip | USFWS | Production |
| 2/16/24 | LSNFH | Winter | 05-65-04 | 43,654 | 43,654 | 100% | Sacramento River at John F. Reginato River Access | CWT and Ad-clip | USFWS | Production |
| 2/16/24 | LSNFH | Winter | 05-67-24 | 22,605 | 22,605 | 100% | Sacramento River at John F. Reginato River Access | CWT and Ad-clip | USFWS | Production |
| 2/16/24 | LSNFH | Winter | 05-67-25 | 37,068 | 37,068 | 100% | Sacramento River at John F. Reginato River Access | CWT and Ad-clip | USFWS | Production |
| 2/20/24 | NIM | Fall | N/A | 0 | 1,192,290 | 0% | Lower American River at Nimbus Fish Hatchery | 100% PBT | CDFW | Experimental |
| 3/4/24 | CNFH | Winter | 05-66-33 | 47,937 | 47,937 | 100% | North Fork Battle Creek, Manton, CA | CWT, Ad-clip, and left pelvic fin clip | USFWS | Jumpstart |
| 3/11/24 | CNFH | Winter | 05-00-48 | 84,994 | 84,994 | 100% | North Fork Battle Creek, Manton, CA | CWT, Ad-clip, and left pelvic clip | USFWS | Jumpstart |

| Release Date | Hatchery | Race | CWT | Marked Release Number | Total Release | Percent Marked | Release Location | Mark | Agency | Release Type |
|--------------|----------|--------|----------|-----------------------|---------------|----------------|---|-----------------|--------|--------------|
| 3/13/24 | SCARF | Spring | 06-30-60 | 142,864 | 142,864 | 100% | San Joaquin River at Highway 140 | CWT and Ad-clip | CDFW | SJRRP |
| 3/15/24 | FRH | Spring | 06-00-78 | 349,309 | 349,309 | 100% | Feather River at Boyd's Pump Boat Ramp | CWT and Ad-clip | CDFW | Production |
| 3/15/24 | FRH | Spring | 06-00-80 | 350,545 | 350,545 | 100% | Feather River at Gridley Boat Launch | CWT and Ad-clip | CDFW | Production |
| 3/21/2024 | CNFH | Fall | 05-00-70 | 94,010 | 376,040 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 3/21/2024 | CNFH | Fall | 05-00-71 | 75,992 | 303,969 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 3/21/2024 | CNFH | Fall | 05-00-72 | 72,050 | 288,200 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 3/21/2024 | CNFH | Fall | 05-00-74 | 97,791 | 391,164 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 3/21/2024 | CNFH | Fall | 05-00-75 | 93,138 | 372,551 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 3/21/2024 | CNFH | Fall | 05-00-76 | 78,842 | 315,368 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 3/21/2024 | CNFH | Fall | 05-00-77 | 106,585 | 426,338 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 3/21/2024 | CNFH | Fall | 05-00-78 | 93,769 | 375,076 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 3/23/2024 | CNFH | Fall | 05-00-73 | 107,046 | 428,184 | 25% | Sacramento River at Butte City Boat Ramp | CWT and Ad-clip | USFWS | Production |
| 3/27/2024 | CNFH | Fall | 05-00-79 | 104,552 | 418,088 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 3/27/2024 | CNFH | Fall | 05-00-80 | 89,461 | 357,844 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 3/27/2024 | CNFH | Fall | 05-00-81 | 99,163 | 396,652 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 3/27/2024 | CNFH | Fall | 05-00-82 | 99,225 | 396,901 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 3/27/2024 | CNFH | Fall | 05-00-83 | 104,617 | 418,568 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 3/29/2024 | FRH | Spring | 05-00-81 | 350,055 | 350,055 | 100% | Feather River at Boyd's Pump Boat Ramp | CWT and Ad-clip | USFWS | Production |
| 3/29/2024 | FRH | Spring | 05-00-79 | 350,571 | 350,571 | 100% | Feather River at Gridley Boat Launch | CWT and Ad-clip | USFWS | Production |
| 4/11/2024 | MOK | Fall | 06-18-60 | 130,000 | 520,000 | 25% | San Joaquin River at Sherman Island Net Pen | CWT and Ad-clip | CDFW | Production |
| 4/12/2024 | MOK | Fall | 06-20-00 | 130,000 | 520,000 | 25% | San Joaquin River at Sherman Island Net Pen | CWT and Ad-clip | CDFW | Production |
| 4/12/2024 | CNFH | Fall | 05-00-83 | 103,854 | 415,416 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 4/12/2024 | CNFH | Fall | 05-00-84 | 90,927 | 363,709 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 4/12/2024 | CNFH | Fall | 05-00-85 | 100,113 | 400,450 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 4/12/2024 | CNFH | Fall | 05-00-86 | 91,994 | 367,975 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |

| Release Date | Hatchery | Race | CWT | Marked Release Number | Total Release | Percent Marked | Release Location | Mark | Agency | Release Type |
|---------------------|-----------------|-------------|------------|------------------------------|----------------------|-----------------------|-------------------------|-----------------|---------------|---------------------|
| 4/12/2024 | CNFH | Fall | 05-00-87 | 95,864 | 383,455 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 4/12/2024 | CNFH | Fall | 05-00-88 | 101,941 | 407,765 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |
| 4/12/2024 | CNFH | Fall | 05-00-89 | 105,748 | 422,990 | 25% | Battle Creek at CNFH | CWT and Ad-clip | USFWS | Production |

Table 9. Hatchery steelhead release data for BY 2023 and WY 2024.

| Release Date | Hatchery | CWT | Marked Release Number | Total Release | Percent Marked | Release Location | Mark | Agency | Release Type |
|-------------------------------------|----------|----------|-----------------------|---------------|----------------|---|-----------------|--------|--------------|
| 12/19/23 - 12/21/23 | CNFH | N/A | 142,402 | 142,402 | 100% | Sacramento River at Sycamore Grove | Ad-clip | USFWS | Production |
| 12/29/23- 1/5/24 | CNFH | N/A | 276,336 | 276,336 | 100% | Sacramento River at Sycamore Grove | Ad-clip | USFWS | Production |
| 1/31/2024 | NIM | N/A | 168,000 | 168,000 | 100% | Lower American River at Sunrise Boat Ramp | Ad-clip | CDFW | Production |
| 2/1/2024 | NIM | N/A | 173,000 | 173,000 | 100% | Lower American River at Sunrise Boat Ramp | Ad-clip | CDFW | Production |
| 2/2/2024 | NIM | N/A | 175,000 | 175,000 | 100% | Lower American River at Sunrise Boat Ramp | Ad-clip | CDFW | Production |
| 2/5/24- 2/6/24 | MOK | 06-19-43 | 63,260 | 63,260 | 100% | New Hope Landing | CWT and Ad-clip | CDFW | Production |
| 2/5/24- 2/9/24 and 2/12/24- 2/16/24 | FRFH | N/A | 445,000 | 445,000 | 100% | Feather River at Boyd's Pumping Boat Ramp | Ad-clip | CDFW | Production |
| 3/5/24- 3/6/24 | MOK | N/A | 75,000 | 75,000 | 100% | Mokelumne River at New Hope Landing | Ad-clip | CDFW | Production |
| 4/9/24- 4/10/24 | MOK | N/A | 75,000 | 75,000 | 100% | Mokelumne River at New Hope Landing | Ad-clip | CDFW | Production |

Table 10. COA 8.6.4 Young-of-Year Spring-run Chinook Salmon Hatchery Surrogate Summary Table, WY 2024.

