

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

Section 1: Overview

Date: 3/19/2024

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):

No advice to WOMT this week. See Section 4-A for the discussion on technical assistance to WOMT from SaMT on the evaluation of steelhead loss with the OMRI target of no more negative than -500 cfs.

For the week beginning 3/12/24, the Proposed Action Section 4.10.5.10.2 Steelhead 100% Annual Loss Threshold restricts Old and Middle River Index (OMRI) to -500 cfs and is controlling exports at the State Water Project (SWP) and Central Valley Project (CVP). Combined exports on 3/12/24 are 3,100 cfs resulting in an OMRI of -600 cfs and 4.0% of inflow diverted (14-day average). The Delta Cross Channel (DCC) gates closed on 11/27/23 and will 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 hydrological events predicted in the upcoming week, 65-79% of WR estimated in the Delta and alternative entrainment routes such as Threemile Slough and Georgiana Slough, SaMT estimates WR entrainment into the central Delta at medium risk this week. SaMT 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 (55-70%) 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 due to WR movement into the Delta and salvage events in the previous week. WR have been observed in salvage throughout the week; therefore, SaMT estimates that additional WR are likely near the export facilities. Seasonal timing and a potential decrease in OMRI to -1,500 cfs are contributing factors for the medium entrainment risk this week. Although weekly LAD WR salvage decreased by nearly half from the previous week's total salvage, OMRI may become more negative than -500 cfs which is likely to also increase LAD WR salvage. SaMT also estimates an overall high risk of entrainment for SR into the export facilities. Length-at-date (LAD) 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, especially with an OMRI more negative than -500 cfs; therefore, entrainment risk is estimated as medium this week.

Salvage of LAD WR decreased since the projects began targeting an OMRI of no more negative than -500 cfs on 3/11/24. For instance, from 3/11/24-3/17/24, total weekly loss of LAD WR decreased to 336.83. Below are total loss estimates for the last 4 weeks, including the previous week’s loss as well:

- 2/19/24-2/25/24: 710.85
- 2/26/24-3/3/24: 294.65**
- 3/4/24-3/10/24: 627.93
- 3/11/24-3/17/24: 336.83

**From 2/27/24 – 3/4/24, DWR decreased pumping at the SWP and therefore total combined exports for this timeframe decreased to ~6,000 cfs, which may have led to the decreased salvage of LAD winter-run Chinook salmon for this week (Figure 2).

Section 2: Risk Assessment

Section 2-A: Operations and Fish Distribution Table

The WY 2023 Interim Operations Agreement (IOP) was extended into WY 2024 until the WY 2024 IOP is finalized. Due to the ITP amendment on 12/22/23 of COA 8.6.3 Mid- and Late-season Natural Winter-run Chinook Salmon Daily Loss Threshold, Reclamation will not be adhering to the WY 2024 COA 8.6.3 SWP ITP amendment but rather will operate to the WY 2023 COA 8.6.3 SWP ITP amendment.

The 75% Annual Loss Threshold in COA 8.6.1 for LAD WR was exceeded on 3/7/24. This limits OMRI to -2,500 cfs on a 14-day average through the end of OMR Management. After 14 days of operations to maintain an OMR index no more negative than -2,500 cfs, Permittee may convene the Salmon Monitoring Team to conduct a risk assessment 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 100% annual loss threshold. However, since the Proposed Action Section 4.10.5.10.2 Steelhead 100% Annual Loss Threshold is currently controlling (limiting OMRI to -500 cfs), recommendations to continue at an OMRI of -2,500 cfs for WR have not been provided to WOMT since it is currently not a controlling factor. Section 2-D of this SaMT ITP Risk Assessment includes discussions on the LAD WR Annual Loss Threshold exceedances.

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 65-79% Last Week 70-84% | Current 20-30% Last Week 15-25% |
| Young-of-year spring-run Chinook salmon | Current 29-40% Last week 33-49% | Current 55-70% Last Week 50-65% | Current 1-5% Last Week 1-2% |
| Hatchery origin winter-run Chinook salmon | Current 79-85% Last week 90-95% | Current 10-20% Last Week 5-10% | Current 1-5% Last Week 0% |

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: High
 - 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 high this week due to WR presence in the Delta at 65-79%. WR are actively migrating downstream and being observed in real-time monitoring sites in the Delta, as well as in the CVP and SWP export facilities. Routing Risk is estimated as low for WR this week. Freeport flows are at 48,400 cfs, the DCC gates are closed for the season and although routing is estimated at 19% 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 medium this week. SR are beginning to actively migrate into the Delta according to real-time monitoring stations (55-70%). Routing Risk is estimated as low this week. Freeport flows are at 48,400 cfs and DCC gates are closed. Although the STARS model predicts routing at 19% 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 and alternate migration routes that may entrain SR into the south 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: (-400 cfs)
 - WR: Low
 - SR: Low
 - Scenario 2 OMRI: (-1600 cfs)
 - WR: Medium
 - SR: Medium
- Overall Entrainment Risk:
 - WR: Medium
 - SR: Medium
- 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 high due to seasonal timing and recent salvage events. Reporting OMRI/Export Risk this week is estimated as low/medium. Although an OMRI of -1,600 cfs is more positive than the 75% loss threshold of -2,500 cfs, WR still continue to be salvaged at OMRI of -500 cfs; therefore, decreasing OMRI to anything more negative than -500 cfs increases the risk of entraining more WR into the facilities. A decrease in loss was observed over the previous week which is likely due to the export facilities operating to an OMRI of -500 cfs. If projects continue to operate to no more negative than -500 cfs then it is likely that loss of WR will continue to remain lower than the previous few weeks and therefore be less likely to exceed the 100% Annual Loss Threshold. However, export facilities may operate to a more negative OMRI of -1,500 cfs, which is likely to increase entrainment of WR into the facilities and exceed the 100% Annual Loss Threshold. Therefore, the overall entrainment risk is estimated as medium this week for WR.
- SR: Similar to previous week
 - Exposure Risk is high this week due to multiple young-of-year SR was observed in salvage 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 this week has decreased to low. 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. If OMRI is no more negative than -500 cfs, it is likely to decrease salvage of SR. However, export facilities may operate to a more negative OMRI of -1,500 cfs, which is likely to increase entrainment of WR into the facilities. Therefore, the overall entrainment risk into the facilities is estimated as medium 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: 2,645.01 (with salvage data up to 3/18/24)
 - 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.
 - Currently, DWR and Reclamation are operating to an OMRI of -2,500 cfs through 3/21/24. After 3/21/24, if DWR and Reclamation would like to operate to a more negative or more positive OMRI the -2,500 cfs, then SaMT will meet to conduct a risk assessment. If that risk assessment determines that risk of entrainment and take of LAD WR is no longer present then the proposed OMRI will be decided on by SaMT and will be sent to WOMT for a final determination.
 - 100% Annual Loss Threshold based on natural-origin WR JPE: 2,748.28
 - Risk of exceeding threshold: High
 - The high risk associated with exceeding the 100% Annual Loss Threshold for LAD WR is based on salvage trends in the previous week. Specifically, a total loss of 348.20 LAD WR were salvaged from 3/11/24 – 3/18/24. If loss continues at the same rate at which was observed last week, then the 100% Loss Threshold is likely to be exceeded by next week.
 - On 3/11/24, DWR and Reclamation began operating to an OMRI no more negative than -500 cfs in order to decrease steelhead loss and avoid hitting the NMFS Incidental Take Limit. Loss has decreased by nearly half from the previous weeks loss estimates. Below are total loss estimates for the previous 2 weeks:
 - 3/4/24-3/10/24: 627.93
 - 3/11/24-3/18/24: 348.20
 - The high risk associated with exceeding the 100% Annual Loss Threshold for LAD WR is also based on historical LAD WR data from 1993-2022 that shows LAD WR peak salvage occurs in March (Figure 1). Due to this, SaMT estimates that loss of LAD WR will continue throughout this week; therefore, risk of entrainment and loss of LAD WR is likely this week.
 - If the 100% Annual Loss Threshold is exceeded in the upcoming week, SaMT will meet immediately following the exceedance and provide advice regarding future planned operations to minimize subsequent loss this WY.
- 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

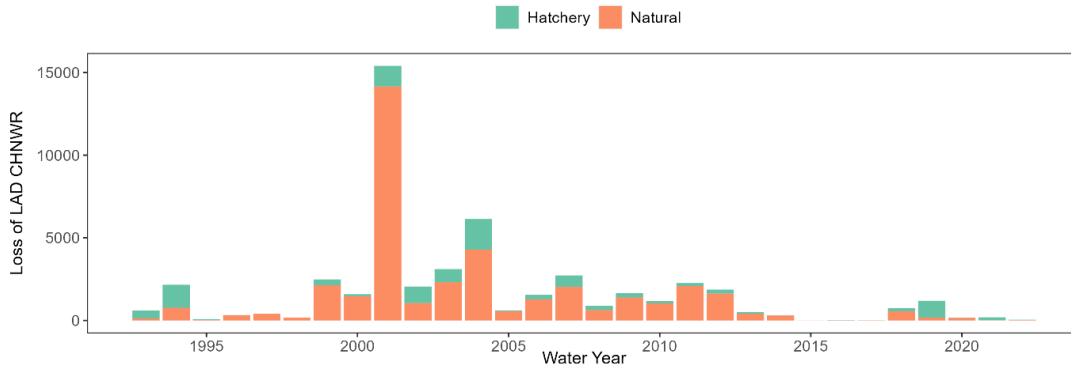


Figure 1. Juvenile hatchery-origin and natural-origin LAD CHNWR monthly loss, March, Water Years 1993-2022. Loss was combined for CVP and SWP export facilities.

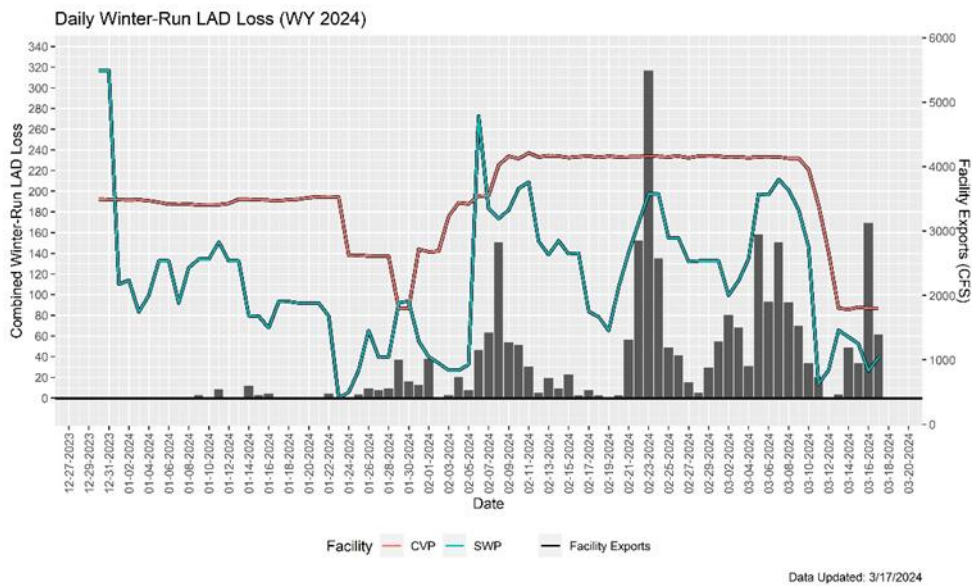


Figure 2. Comparison of exports at the CVP (represented by a red line) and SWP (represented by a blue line) and loss of LAD WR through 3/18/24.

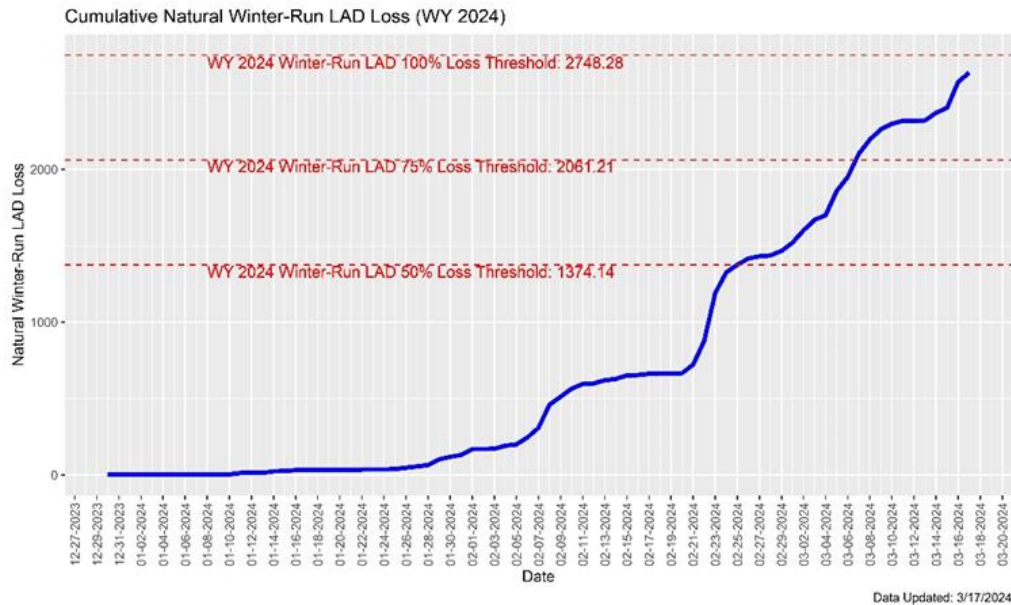


Figure 3. Cumulative Loss of LAD WR for WY 2024 with the 50%, 75% and 100% Annual Loss Thresholds through 3/18/24.

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 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: N/A
 - Highest Daily Loss: N/A
 - Risk of Exceeding Threshold: N/A
 - 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 March: 169.43
 - Highest Genetic WR Daily Loss for February: 21.78
 - 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 peakstorm 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 8.5.2 Larval and Juvenile Delta Smelt Protection offramped on 3/18/24 due to the subsequent SLS survey's Secchi under 1 meter.
 - Proposed Action Section 4.10.5.10.2 Steelhead 50%, 75%, and 100% Annual Loss Thresholds were exceeded on 2/11/24, 2/22/24, and 2/23/24, respectively, with operations targeting an OMRI 14-day average of no more negative than -500 cfs beginning 3/11/24. The current average loss of California Central Valley natural-origin steelhead (CCV steelhead) was 15.33 per day over the last week while targeting an OMR of -500 cfs with a total loss of 2,733.15. This is a substantial decrease from the previous week which has an average loss per day of 62.95. At this rate, to remain under the Incidental Take Limit, loss would need to be at or below an average of 1.92 fish per day.
 - Since 3/11/24, the CVP and SWP have been operating to OMRI of no more negative than -500 cfs. Weekly loss of natural-origin steelhead has decreased significantly since 3/11/24. Since 3/11/24, loss of natural-origin steelhead totaled 139.03 (salvage data through 3/17/24), which is a decrease from the past 3 weeks:
 - 2/19/24-2/25/24: 1650.16
 - 2/26/24-3/3/24: 530.81
 - 3/4/24-3/10/24: 723.80
 - 3/11/24-3/17/24: 139.03
 - Continued OMRI no more negative than -500 cfs is likely to continue to show lower steelhead loss in the upcoming week.
 - Last week, the Tillotson Model results at OMRI of -500 cfs predicted a median daily loss of 23.43 per day, which was higher than what was observed over the previous week when a no more negative than -500 cfs OMRI was targeted.
 - According to the Tillotson Model runs, a more positive OMR flow than -500 cfs would decrease loss of CCV steelhead. Tillotson Model results at an OMRI of -500 cfs predicts an average loss of 9.33 per day. At an export level of 1,500 cfs (OMRI +900 cfs), the Tillotson Model predicts a median loss of 8.20 per day.
 - CVP and SWP may target an OMRI no more negative than -1,500 cfs. SaMT acknowledges that this would likely result in an increase in loss per day, based on the Tillotson Model, which would not be beneficial to the steelhead population, increasing the likelihood of exceeding the ITL sooner.
- 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 and entering into a spring cycle with a full moon on 3/25/24.
- Turbidity: Not discussed
- Salinity (X2): <56 km on 3/19/24
- Outages:
 - SWP: None projected
 - CVP: None projected
- Exports: 3/19/24 – 3/25/24
 - SWP: 400 to 1,500 cfs
 - CVP: 1,800 to 3,600 cfs
- Meteorological Forecast:
 - “Dry and warm weather will continue until Friday. Widespread rain, high elevation snow, and cooler weather return as we move into the weekend.”
 - [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: 48,400 cfs
 - [Sacramento River Flows - CDEC](#)
- San Joaquin River flow at Vernalis: 5,300 cfs
 - [San Joaquin River Flows - CDEC](#)
 - [San Joaquin River Guidance Plots - CDEC](#)
- QWEST: +11,500 cfs
- Future export modifications: *Describe anticipated or potential changes to exports:*
 - Exports are anticipated to remain similar or slightly increase this week. However, the SWP and CVP will operate to a 7-day average OMRI of -3,500 cfs for the SWP’s ITP COA 8.5.2 through 3/18/24, a 14-day OMRI of -2,500 for the SWP’s ITP COA 8.6.1 75% Annual Loss Threshold Exceedance through 6/30/24¹, and the Proposed Action’s Section 4.10.5.10.2 for the 75% annual loss threshold exceedance of steelhead that requires a 14-day average OMRI of -2,500 cfs through 3/31/24².
 - Exports may increase due to Reclamation and DWR proposing to operate to an OMRI of -1,500 cfs for the upcoming week. Due to the PA’s Section 4.10.5.10.2 100% annual loss threshold being exceeded for steelhead, an OMRI of -500 cfs was approved by the Directors beginning 3/11/24. SaMT reassessed steelhead loss this week and agreed that due to a decrease in

¹ After 14 days of operations to maintain an OMR index no more negative than -2,500 cfs, Permittee may convene SaMT to conduct a risk assessment and determine whether the risk of entrainment and loss of natural and hatchery CHNWR is no longer present. Risks shall be measured against the potential to exceed the next single-year loss threshold.

² If, during real-time operations, Reclamation and DWR exceed the single-year loss threshold, Reclamation and DWR would immediately seek technical assistance from USFWS and NMFS, as appropriate, on the coordinated operation of the CVP and SWP for the remainder of the OMR management period.

salvage that occurred during the targeted OMRI of -500 cfs timeframe, and the decreased salvage that is predicted from on OMRI of -500 cfs from the Tillotson Model run, an OMRI more negative than -500 cfs would likely result in an increase in loss per day, based on the Tillotson Model, which would not be beneficial to the steelhead population.

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

| Date | Averaging Period | USGS gauges (cfs) | OMR Index (cfs) |
|---------|------------------|-------------------|-----------------|
| 3/16/24 | Daily | -1,000 | -500 |
| 3/16/24 | 5-day | -700 | -500 |
| 3/16/24 | 14-day | -1,800 | -1,600 |
| 3/18/24 | Daily | Not Applicable | -300 |
| 3/18/24 | 5-day | Not Applicable | -400 |
| 3/18/24 | 14-day | Not Applicable | -1,300 |

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 3/10/24 is 1,107,209 fish, which represents 99.3% of historical passage. Average historic passage (7/1/2002-6/30/2023) as of 3/10/24 indicates 99.3% with one standard deviation of 1.1% 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.calfishtrack.noaa.gov)

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

- Adult escapement estimate:
 - SR carcass counts not available.
 - An adult SR contributing to BY 2024 may have been seen upstream at the VAKI Riverwatcher at Butte Creek. Field crews believe it may have been a late spawning adult fall-run Chinook salmon but have not been able to confirm.
- 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 Fish Hatchery SR:
 - The first release of SR 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.

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: WR and SR were caught between 3/10/24 – 3/15/24.
 - Mossdale Trawl: WR and SR were caught between 3/11/24 – 3/15/24.
 - Chippis Island Trawl: WR and SR were caught between 3/10/24 – 3/15/24.
- Rotary Screw Traps:
 - Knights Landing RST Data: SR were caught between 3/12/24 – 3/18/24.
 - [Middle Sacramento River Salmon and Steelhead Monitoring](#)
 - Tisdale RST Data: WR and SR were caught between 3/13/24 – 3/17/24.
 - [Middle Sacramento River Salmon and Steelhead Monitoring](#)
 - Lower Sacramento RST Data: Data was not received prior to the SaMT meeting.
 - [Middle Sacramento River Salmon and Steelhead Monitoring](#)
 - Lower Feather RST Data: SR were caught between 3/9/24 – 3/15/24.
 - Yuba River RST Data: Data was not received prior to the SaMT meeting.
 - Red Bluff Diversion Dam RST Data: Total passage estimates 1,107,209 juvenile WR have passed RBDD. Last updated on 3/10/24.
 - Butte Creek RST Data: SR were caught between 3/5/24 – 3/11/24.
 - [Butte Creek Monitoring Programs](#)
- Seines:
 - Sacramento River Beach Seines: SR were caught between 3/11/24 – 3/15/24.
- 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.noaa.gov/calfishtrack)
- Anticipated emigration to continue into the Delta:
 - WR are moving into the Delta in high numbers according to real-time monitoring stations and observations in salvage, which is likely due to current hydrology in the Sacramento River and seasonal timing. WR are also beginning to exit the Delta according to Chipps Island trawls.
 - Young-of-year SR have also begun 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 small numbers. Both WR and SR are likely to have increased movement throughout this week due to the rain events that have occurred.
 - [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 303 WR and a maximum loss of 729 WR this week (SacPAS last updated on 3/19/24).
 - [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 over the previous week. SaMT expects continued salvage over the upcoming week due to salvage in the previous week.
 - [USFWS - Fish Salvage Monitoring](#)

Appendix 1: SaMT Monitoring and Modeling Data

Table 3. Fish monitoring data for the 3/19/24 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 ¹ | Knights Landing RST | Lower Sac RST | Beach Seines | Sacramento Trawl |
|----------------------|-----------------|--------------------------|---------------------|---------------|-----------------|----------------------|
| Sample Date | 3/5/24-3/11/24 | 3/13/24-3/17/24 | 3/12/24-3/18/24 | N/A | 3/11/24-3/15/24 | 3/10-3/12, 3/14-3/15 |
| Chinook Adults | 0 | 0 | 0 | N/A | 0 | 0 |
| FR Chinook | 0 | 5 | 13 | N/A | 287 | 58 |
| SR Chinook | 6 | 5 | 6 | N/A | 6 | 2 |
| WR Chinook | 0 | 1 | 0 | N/A | 0 | 1 |
| LFR Chinook | 0 | 0 | 0 | N/A | 0 | 0 |
| Chinook (ad-clip) | 0 | 5 SR 7 WR | 5 SR 12 WR | N/A | 0 | 6 |
| Steelhead (wild) | 3 | 0 | 2 | N/A | 0 | 0 |
| Steelhead (ad-clip) | 0 | 0 | 1 | N/A | 0 | 2 |
| Green Sturgeon | 0 | 0 | 0 | N/A | 0 | 0 |
| Flows (avg. cfs) | 999 | 25,417 | 23,008 | N/A | - | - |
| W. Temp. (avg. °C) | 8.3 | 11.0 | 11.1 | N/A | 12.1 | 11.3 |
| Turbidity (avg. NTU) | 2.5 | 20.2 | 20.3 | N/A | 21.0 | 31.6 |

¹ Tisdale traps pulled on 3/17/24 due to weir launch ramp accessibility. Traps reset on 3/18/24.

Table 3 Continued. Fish monitoring data for the 3/19/24 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 ¹ | Mossdale Kodiak Trawl | EDSM | Feather at Herringer RST | Feather at Eye-Side RST | Lower Feather River RST ² | Yuba River RST |
|----------------------|---|-----------------------|-----------|--------------------------|-------------------------|--------------------------------------|----------------|
| Sample Date | 3/10-3/12, 3/14-3/15 | 3/11, 3/13, 3/15 | 3/11-3/14 | N/A | N/A | 3/9/24-3/15/24 | N/A |
| Chinook Adults | 0 | 0 | 0 | N/A | N/A | 0 | N/A |
| FR Chinook | 0 | 3 | 31 | N/A | N/A | 1,971 | N/A |
| SR Chinook | 1 | 1 | 0 | N/A | N/A | 1 | N/A |
| WR Chinook | 2 | 1 | 2 | N/A | N/A | 0 | N/A |
| LFR Chinook | 0 | 0 | 0 | N/A | N/A | 0 | N/A |
| Chinook (ad-clip) | 3 | 2 | 0 | N/A | N/A | 0 | N/A |
| Steelhead (wild) | 1 | 0 | 1 | N/A | N/A | 0 | N/A |
| Steelhead (ad-clip) | 7 | 0 | 3 | N/A | N/A | 1 | N/A |
| Green Sturgeon | 0 | 0 | 0 | N/A | N/A | 0 | N/A |
| Flows (avg. cfs) | - | - | - | N/A | N/A | 14,427 | N/A |
| W. Temp. (avg. °F/C) | 11.9 | 13.3 | - | N/A | N/A | 10.6 | N/A |
| Turbidity (avg. NTU) | 38.6 | 25.2 | - | N/A | N/A | 4.3 | N/A |

¹ One white sturgeon was observed at Chippis Island Trawl on 3/10/24.

² Lower Feather River trap cone effort at 50% on 3/14/24 and 3/15/24.

Table 4. Delta sturgeon tagging and monitoring.

| Date | Comments |
|---------|---|
| 3/18/24 | <ul style="list-style-type: none"> 1 juvenile white sturgeon located/ tagged near Sacramento River north of Marsh Island on 10/24/23 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

| Date: (3/16/24) | <u>DCC</u> | <u>Georgiana Slough</u> | <u>Sacramento River</u> | <u>Sutter and Steamboat Slough</u> | <u>Yolo Bypass</u> |
|---|------------|-----------------------------|-----------------------------|--|------------------------|
| Late Fall-Run Routing Probabilities | N/A | 0.19 | 0.47 | 0.34 | N/A |
| Late Fall-Run Route Specific Survival | N/A | 0.36 | 0.71 | 0.70 | N/A |
| Winter-Run Routing Probabilities | N/A | 0.11 | 0.65 | 0.13/0.11 | N/A |
| Winter-Run Route Specific Survival | N/A | 0.49 | 0.75 | 0.63/0.74 | N/A |

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 = 65-79% estimated in the Delta Spring-run = 55-70% estimated in the Delta | N/A | 3/19/24 | 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) = 2,645.01 (updated with 3/18/24 salvage data) Current yearly WR loss (hatchery) = 4.33 | LAD natural-origin WR are likely to be observed in salvage in the upcoming week. | 3/19/24 | LAD natural-origin WR have been observed in salvage over the previous week in high numbers. The 75% Annual Loss Threshold was exceeded on 3/7/24. |

| <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 | 3/19/24 | 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) <u>March: 0.0000372 * 234,896 = 8.7381312 (8.74)</u> April: 0.0000226 * 234,896 = 5.3086496 (5.31) May: 0 * 234,896 = 0 (0) | Salvage of older juvenile Chinook salmon is likely to occur this upcoming week. | 3/19/24 | LAD WR have been observed in salvage in high numbers over the previous week. Genetic WR have also 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> | FRH Group 1: $0.0025 * 699,854 = 1,749.64$ | FRH Group 1 release occurred on 3/15/24 | 3/19/24 | The first release group is expected to be released on 3/14/24 out of the Feather River Fish Hatchery. |

| | | | | | | | |
|---|-------------------------|----------------------|---|---|--|-----------------------|------------|
| <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>3/19/24</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 | 3/19/24 | 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 |

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 |

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

