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

Section 1: Overview

Date: 5/7/2024

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 and NMFS recommend operating exports for the upcoming week to maximize the number of days that CVP exports will be curtailed for spring outflow. Increasing CVP exports now is likely to increase the number of days that the CVP exports will be curtailed and extend the 100 TAF spring outflow later into May. Spring-run Chinook salmon peak outmigration is likely to occur sometime in mid- to late-May, according to historical data in wet years, and winter-run Chinook salmon outmigration is likely to continue to decrease over the upcoming week due to seasonal timing and estimated OMRI values for the upcoming week. Although fall-run fish are not listed, the fall-run fishery has been officially closed this year; therefore, extending spring outflow later into May would also increase survival of fall-run that are out-migrating.

For the week beginning 5/7/24, 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 5/7/24 are 1,500 cfs resulting in an OMRI of +0 cfs and 4.2% of inflow diverted (14-day average). The Delta Cross Channel (DCC) gates closed on 11/27/23 and will likely remain closed for the season, per D-1641. The SWP is exporting this week and no outages are planned.

SaMT estimates an overall low 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. WR entrainment into the central Delta remains low based on seasonal timing and hydrology. SaMT estimates that SR juveniles are continuing to migrate downstream into the Delta (30-45%) and current hydrology is expected to decrease entrainment into Georgiana Slough. Seasonal timing suggests that SR outmigration typically occurs later in wetter water years so it is likely that SR through the central Delta will decrease in the upcoming week. Therefore, SaMT estimates SR entrainment into the central Delta at medium risk this week.

SaMT estimates an overall low risk of entrainment of juvenile WR into the export facilities this week. Salvage of WR is unlikely this week due to no salvage occurring in the previous week and OMRI remaining similar to the previous week in which no salvage occurred. 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 which is likely due to seasonal timing. 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

COA 8.17 Spring Outflow:

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. Reclamation will also operate to COA 8.17 by providing 100 TAF for spring outflow in the form of export curtailments. The biological rationale for curtailing exports at the CVP to 900 cfs in the beginning of April was to reduce salvage of listed fish species and therefore reduce the likelihood of exceeding the Proposed Action's incidental take limits for both steelhead and LAD winter-run, as well as decrease salvage of LAD WR for the SWP's ITP COA 8.6.1. Agencies agreed to curtail exports at the CVP to 900 cfs for 2 weeks then re-evaluate and potentially increase CVP exports above 900 cfs in order to conserve some of the 100 TAF so that it would last later into May to provide more benefits to spring-run Chinook salmon as well.

Historical data from WY 2010 through WY 2023 shows that in wet year types, spring-run tend to be observed in salvage later in the season in comparison to drier year types (Table 1). Historical data also shows that spring-run loss is also usually higher in May than it is in April, specifically in wet year types (Table 2). Since WR salvage is typically lower in April than it is in March, according to historical loss estimates, CDFW believes that increasing CVP exports to 1,800 cfs rather than maintaining CVP exports at 900 cfs may increase the likelihood of extending that export curtailment period, which would then provide benefits to spring-run outmigration and likely not cause additional salvage of WR. It is also important to note that the fall-run fishery was officially closed this season; therefore, providing protections for fall-run juveniles is also important even though they are not a state listed species. Providing spring outflow for a longer time period in May would also be beneficial to fall run that are out-migrating.

CDFW continues to note that operating to CVP exports of 900 cfs (1 unit at Jones) will likely use the 100 TAF more quickly than operating to CVP exports of 1,800 cfs (2 units at Jones). Last week, when CVP exports increased to 1,800 cfs and OMRI decreased, there were no increases in WR loss. Therefore, increasing exports up to 1,800 cfs at the CVP (which would decrease OMRI to -800 cfs) would be most beneficial to SR because it would provide spring outflow for longer into May when peak migration for SR is occurring.

CVP operators mentioned that roughly 78 TAF has been used so far from the 100 TAF for spring outflow per the 2024 IOP as of 5/6/24. CVP operations are heavily dependent on Vernalis flow for operating to the 100 TAF, and the assumption is that exports need to be curtailed until the 100 TAF is met, per the 2024 IOP. Therefore, since Vernalis flow decreased over the weekend, if CVP kept exports at 1,800 cfs, it would not have been controlled by the 100 TAF (but rather the -2,500 cfs OMRI) and therefore exports would not have been curtailed, which is why CVP decreased back down to 900 cfs last week. Due to Vernalis fluctuations this upcoming week, the CVP plan to operate between 900 cfs and 2,700 cfs, depending on Vernalis flows, to continue curtailments for the 100 TAF.

For WY 2024, SR loss totals 10,411.69, which is the fourth highest loss so far since WY 2010 (Table 1). SaMT notes that there have been increases in spring-run loss at the salvage facilities in the past couple weeks, which is most likely due to seasonal timing since exports have been near health and safety limits (combined exports between 1,500 cfs-2,400 cfs). Due to the wetter conditions this season and cool water temperatures, it is likely that spring-run will out-migrate later this year than in a year with drier and warmer hydrological conditions. SaMT therefore expects spring-run loss to continue at a similar trend through mid May to late May, based on

historical data (Table 1). Therefore, CDFW notes that extending spring outflow later into May would likely benefit the out-migrating spring-run juveniles.

Table 1. Historical loss of LAD natural-origin spring-run from WY 2010 to WY 2023. Wet years were highlighted in yellow. WY 2024 is spring-run loss data through 5/3/24.

Water Year	Total Loss	50% of Total Loss:	75% of Total Loss:	90% of Total Loss:	100% of Total Loss:	Water Year Type
2010	6,082.20	5/4/2010	5/16/2010	5/27/2010	6/5/2010	Below Normal
2011	52,504.32	**5/8/2011**	**5/16/2011**	**5/30/2011**	**6/24/2011**	**Wet**
2012	2,394.27	4/17/2012	4/21/2012	5/2/2012	6/8/2012	Below Normal
2013	2,495.92	4/22/2013	5/1/2013	5/11/2013	5/25/2013	Dry
2014	348.72	4/9/2014	4/19/2014	4/23/2014	5/10/2014	Critically Dry
2015	70.02	4/22/2015	4/23/2015	5/4/2015	5/18/2015	Critically Dry
2016	297.79	4/27/2016	5/2/2016	5/14/2016	5/19/2016	Below Normal
2017	72,011.18	**5/11/2017**	**5/15/2017**	**5/23/2017**	**6/29/2017**	**Wet**
2018	18,313.05	5/8/2018	5/19/2018	6/3/2018	5/23/2018	Below Normal
2019	6,100.44	**5/6/2019**	**5/19/2019**	**5/20/2019**	**6/25/2019**	**Wet**
2020	4,167.11	4/21/2020	4/24/2020	4/30/2020	5/26/2020	Dry
2021	517.99	4/27/2021	5/1/2021	5/4/2021	5/12/2021	Critically Dry
2022	552.55	4/28/2022	5/2/2022	5/12/2022	5/21/2022	Critically Dry
2023	10,191.83	**5/20/2023**	**5/29/2023**	**6/2/2023**	**7/1/2023**	**Wet**
2024	10,411.69 (partial)	-	-	-	-	Above Normal
Average Loss in Dry/Critically Dry Years		4/22	4/27	5/5	5/18	-
Average Loss in Below Normal Years		4/29	5/7	5/19	5/29	
Average Loss in Wet Years		**5/11**	**5/19**	**5/26**	**6/27**	**-**

Table 2. Percentage of LAD natural-origin spring-run loss per month for WY 2010 to WY 2023.

Water Year	February	March	April	May	June	July	Water Year Type
2010	0%	5.88%	37.82%	53.67%	2.63%	0%	Below Normal
2011	**0%**	**1.42%**	**30.20%**	**59.98%**	**8.35%**	**0%**	**Wet**
2012	0%	25.23%	63.80%	10.83%	0.13%	0%	Below Normal
2013	0%	13.27%	59.54%	27.19%	0%	0%	Dry
2014	0%	22.02%	74.39%	3.60%	0%	0%	Critically Dry
2015	0%	13.13%	75.14%	11.73%	0%	0%	Critically Dry
2016	3.48%	33.60%	31.50%	31.42%	0%	0%	Below Normal
2017	**0.05%**	**0.52%**	**22.17%**	**69.70%**	**7.57%**	**0%**	**Wet**
2018	0%	22.18%	63.12%	14.70%	0%	0%	Below Normal
2019	**0.27%**	**2.54%**	**30.52%**	**66.20%**	**0.47%**	**0%**	**Wet**
2020	0%	3.70%	86.57%	9.73%	0%	0%	Dry

2021	0%	0.63%	59.50%	39.87%	0%	0%	Critically Dry
2022	0%	0%	70.88%	29.12%	0%	0%	Dry
2023	**0%**	**0.25%**	**10.29%**	**73.52%**	**15.88%**	**0.06%**	**Wet**

COA 8.6.1 Annual Loss Threshold:

The CVP and SWP operated to combined exports of 2,400 cfs in the previous week, which decreased OMRI to -120 cfs but did not increase LAD WR entrainment. Below are data from the previous 5 weeks (including the most up to date week) that show loss 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)
- 4/15/24-4/21/24: 8.66 (+652 OMRI)
- 4/22/24-4/28/24: 0 (+106 OMRI)
- 4/29/24-5/5/24: 0 (-120 OMRI)

Historical LAD WR data from 1993-2022 shows LAD WR salvage in May (Figure 1). Due to the possibility of LAD WR loss occurring into May, SaMT estimates that loss of LAD WR is unlikely this week; therefore, loss and entrainment into the SWP and CVP export facilities may occur.

Due to seasonal timing, loss of LAD winter-run Chinook salmon is unlikely at the salvage facilities throughout the month of May. Although loss can continue throughout May, it is likely to be lower than what was observed in April, according to historical loss estimates and based on seasonal timing.

SaMT discussed genetic WR loss and how it is much lower in relation to 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.

CDFW recognizes that winter-run Chinook salmon are not observed in the Delta past April according to historical genetic data; however, historical genetic data at real time monitoring sites in the Delta are limited to select years with only select fish being sampled. Since observations of fish in real time monitoring stations are less likely to occur if there are low numbers of fish in the system and since May is typically nearing the end of juvenile migration for winter-run, winter-run observations in the Delta are expected to be low during this timeframe. Real-time monitoring sites also have limitations, including low capture efficiency and short sampling timeframes, which suggests that genetic winter-run are less likely to be observed in these monitoring sites when there are low numbers of them in the system. Therefore, if real-time monitoring stations have not observed genetic winter-run, it does not imply that winter-run are not continuing to rear and migrate through the Delta. This year specifically, there is more water in the system, which also means that there is more habitat for rearing. Due to all the fish that have been observed already this year in the salvage facilities, the above average water year that creates more habitat for rearing, and the distribution of winter-run in the Delta in Table 2, CDFW assumes that winter-run presence in the Delta will likely occur through May or until temperatures rise above the lethal limit for survival.

Table 3. *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 0-1% Last week 1-3%	Current 4-20% Last Week 7-24%	Current 80-95% Last Week 75-90%
Young-of-year spring-run Chinook salmon	Current 5-10% Last week 5-15%	Current 30-45% Last Week 30-50%	Current 50-60% Last Week 45-55%
Hatchery origin winter-run Chinook salmon	Current 0% Last week 0%	Current 0-1% Last Week 2-5%	Current 99-100% Last Week 95-98%

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: Low
  - SR: Medium
- Routing Risk:
  - WR: Low
  - SR: Low
- Overall Entrainment Risk:
  - WR: Low
  - 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 low this week due to WR presence in the Delta at 4-20% and seasonal timing of WR outmigration. Routing Risk is estimated as low for WR this week. Freeport flows are at 26,000 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. Due to increased presence of WR migrating out and seasonal timing of WR, the overall entrainment risk into the central Delta is estimated to remain low this week.
  - SR: Decreased from previous week
    - Exposure Risk is estimated as medium this week. SR are actively migrating into and through the Delta, which have been observed in real-time monitoring stations in the Delta. Routing Risk is estimated as low this week. Freeport flows are at 26,000 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. Most SR are likely to be past the entrainment routes in the Delta or already in the central Delta. Seasonal timing suggests that SR outmigration typically occurs later in wetter water years so it is likely that SR through the central Delta will decrease in the upcoming week. Therefore, the overall entrainment into the central Delta is estimated as 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: Low
    - SR: High
- Reporting OMRI/Export Risk:
    - Baseline OMRI (+0 cfs)
        - WR: Low
        - SR: Medium
    - Scenario 1 OMRI: (+800 cfs)
        - WR: Low
        - SR: Medium
    - Scenario 2 OMRI: (-1,800 cfs)
        - WR: Medium
        - SR: High
- Overall Entrainment Risk:
    - WR: Low
    - 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 low this week due to no WR being observed in salvage over the previous week. WR loss is not expected to increase over the course of the week due to seasonal timing and low observations of WR in salvage in the previous week. Reporting OMRI/Export Risk this week is estimated as low/medium depending on which operational scenario is targeted. Due to OMRI estimated to decrease to -1,800 cfs throughout the week, WR loss is possible, but still unlikely due to seasonal timing. Therefore, the overall entrainment risk has decreased to low risk 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 that more SR may be observed in salvage in the upcoming week due to seasonal timing and recent salvage events. Reporting OMRI/Export Risk is estimated as medium to high depending on which operational scenario is targeted. OMRI is estimated to become more negative in 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: 4,200.72 (with salvage data up to 4/21/24)
- 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

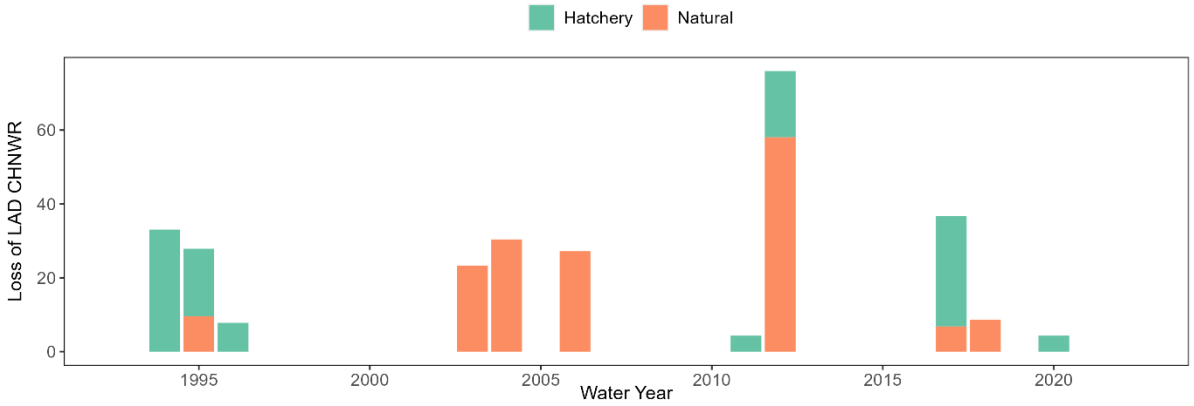

Figure 1. *Juvenile hatchery-origin and natural-origin LAD CHNWR monthly loss, May, Water Years 1993-2022. Loss was combined for CVP and SWP export facilities.*

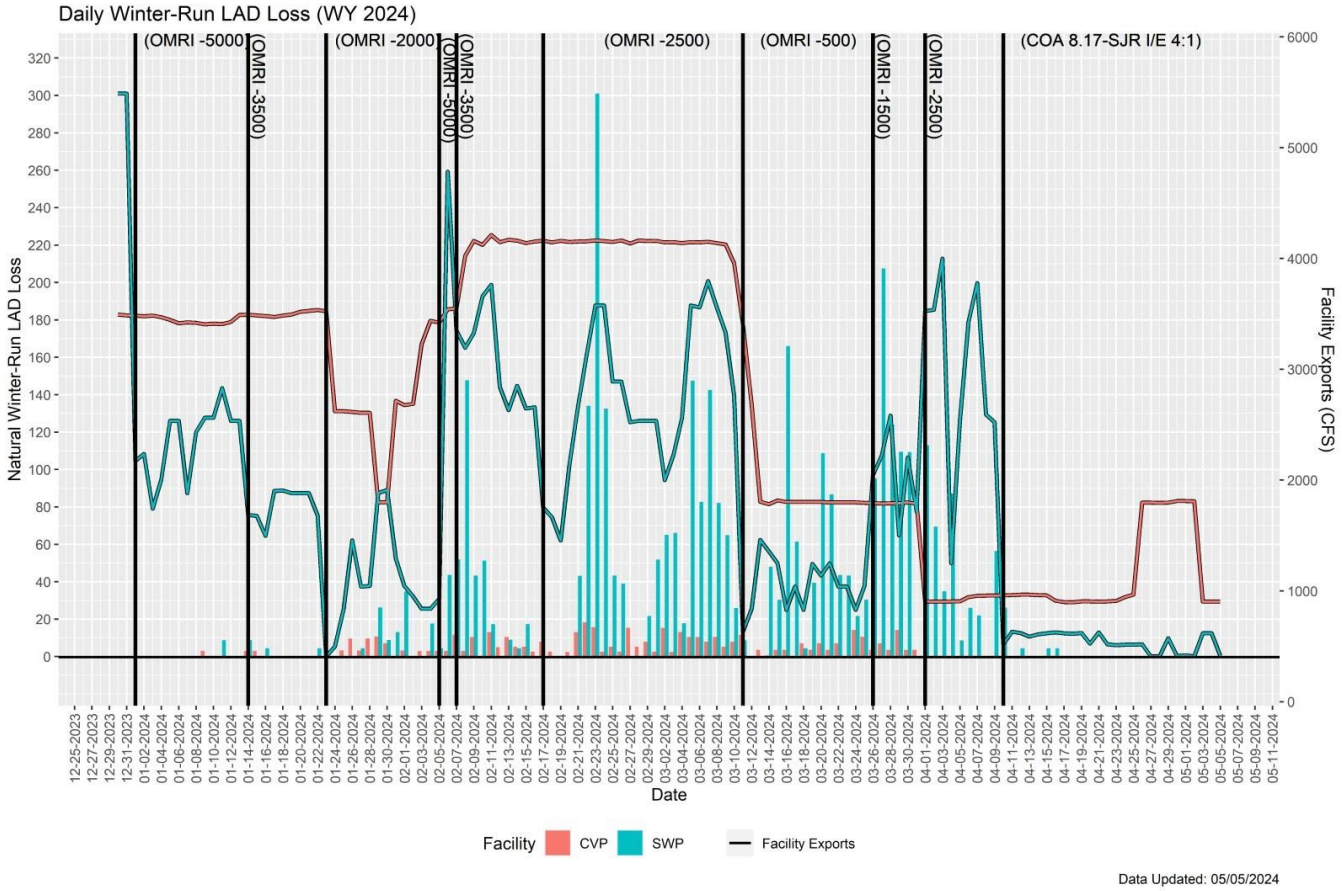

Figure 2. *Daily LAD natural-origin winter-run Chinook salmon (CVP=red bars and SWP=blue bars) with daily exports at both the CVP (red line) and SWP (blue line). Vertical black bars are approximate dates when OMRI controlling factors change. Chart, histogram showing daily winter-run loss in WY 2024.*

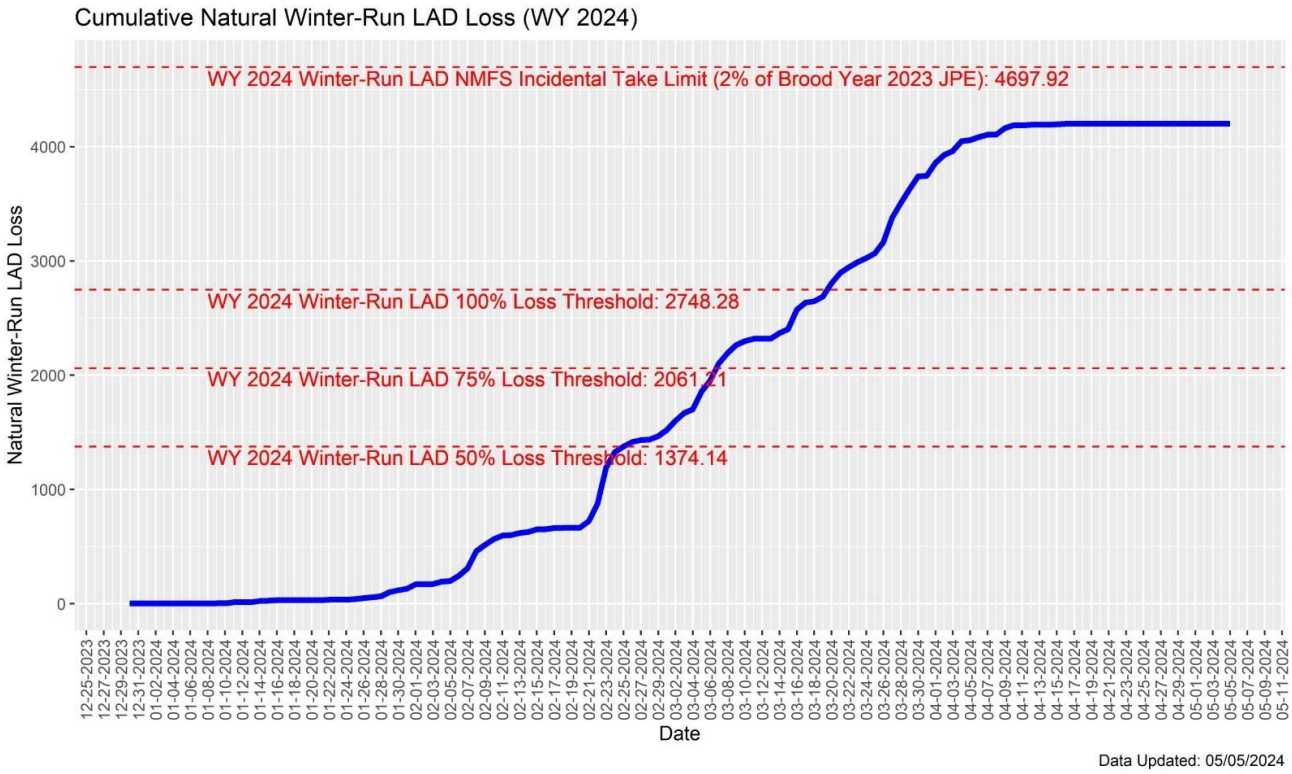

Figure 3. *Cumulative Loss of LAD WR for WY 2024 with the 50%, 75% and 100% Annual Loss Thresholds through 5/5/24.*

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:
            - <u>COA 8.6.4 Daily Spring-run Chinook Salmon Hatchery Surrogate Loss Threshold:</u>
                - 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
                    - Group 3 Loss Threshold: 1,400.76
                        - 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
                    - Group 2 Loss Threshold: 266.33
                        - 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 Nimbus Fish Hatchery (NIM):
        - Group 1 Loss Threshold: 525.88
            - 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 * 234,896 = 0
    - Highest LAD Older Juvenile Daily Loss for May: 0
    - Highest Genetic WR Daily Loss for May: 0
        - Risk of exceeding threshold: Low

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 8.17 Spring Outflow is controlling operations at the SWP for the week beginning 5/7/24. 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 5/7/24 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 remain at combined exports of 1,500 to 3,300 cfs for the next week.
    - Steelhead 75% Annual Loss Threshold was exceeded on 4/26/24, which limits OMRI to -2,500 cfs through the end of OMR management season, which would end on June 16 for steelhead. The steelhead 100% Annual Loss Threshold was also exceeded on 4/26/24.
- 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 spring cycle and entering into a neap cycle.
- Turbidity: Not discussed
- Salinity (X2): 64 km on 5/7/24
- Outages:
    - SWP: None projected
    - CVP: None projected
- Exports: 5/7/24 – 5/13/24
    - SWP: 600 cfs
    - CVP: 900 to 2,700 cfs
- Meteorological Forecast:
    - *"Gusty north to east winds through Thursday. Widespread valley highs in the 90s by late week into this 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 season, per D-1641.

- Sacramento River flow at Freeport: 26,300 cfs
    - Sacramento River Flows - CDEC
- San Joaquin River flow at Vernalis: 4,255 cfs
    - San Joaquin River Flows - CDEC
    - San Joaquin River Guidance Plots - CDEC
- QWEST: +9,000 cfs
    - QWEST is likely to be in the range between +7,000 cfs and +10,000 cfs
- Future export modifications: *Describe anticipated or potential changes to exports:*
    - Exports will likely remain at 900 cfs this week but may increase up to 2,700 cfs. 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 to contribute to spring outflow.

Table 4. *Comparison of USGS Tidally Filtered OMR and OMR Index data.*

Date	Averaging Period	USGS gauges (cfs)	OMR Index (cfs)
5/4/24	Daily	-1,300	+200
5/4/24	5-day	-900	-200
5/4/24	14-day	-800	0
5/6/24	Daily	Not Applicable	+200
5/6/24	5-day	Not Applicable	+100
5/6/24	14-day	Not Applicable	0

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 3).
  - See Appendix 4
- Distribution of natural WR:
  - See Table 3
- 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)

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

- Adult escapement estimate:
  - SR carcass counts not available.
  - 20 adult SR contributing to BY 2024 have been observed upstream at the VAKI Riverwatcher at 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) released 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 3
- Distribution of Feather River, Coleman, and Nimbus Fish Hatchery SR surrogates (See Table 12):
    - The first release of SR surrogates for COA 8.6.4 were 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 were 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 were released on 4/23/24 from the Feather River Fish Hatchery on 3/29/24. 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 fourth release of SR surrogates for COA 8.6.4 were released on 4/19/24 from the Nimbus Fish Hatchery. This release was a total of 210,351 CWT and adipose-clipped FR. These fish will be tracked for COA 8.6.4 in the SWP and CVP export facilities.
    - The fifth release of SR surrogates for COA 8.6.4 were released on 4/23/24 from the Feather River Fish Hatchery. This release was a total of 560,304 CWT and adipose-clipped SR. These fish will be tracked for COA 8.6.4 in the SWP and CVP export facilities.
    - The sixth and final release of SR surrogates for COA 8.6.4 were released on 5/1/24 from the Coleman National Fish Hatchery. This release was a total of 106,531 CWT and adipose-clipped FR. 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)
- Trawls: See Appendix 1
    - Sacramento Trawl: SR were caught between 4/30/24 – 5/3/24.
    - Mossdale Trawl: SR were caught between 4/30/24 – 5/4/24.
    - Chipps Island Trawl: SR were caught between 4/30/24 – 5/3/24.
- Rotary Screw Traps:
    - Knights Landing RST Data: SR were caught between 4/30/24 – 5/6/24.
        - Middle Sacramento River Salmon and Steelhead Monitoring
    - Tisdale RST Data: Data were not received prior to the meeting.
        - Middle Sacramento River Salmon and Steelhead Monitoring
    - Lower Sacramento RST Data: Data were not received prior to the meeting.
        - Middle Sacramento River Salmon and Steelhead Monitoring
    - Lower Feather RST Data: Data were not received prior to the meeting.
    - Yuba River RST Data: SR were caught between 4/40/24 – 5/6/24.
    - 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: Data were not received prior to the meeting.
        - Butte Creek Monitoring Programs
- Seines:
    - Sacramento River Beach Seines: SR were caught between 4/30/24 – 5/3/24.
- 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)
- Anticipated emigration to continue into the Delta:
    - WR are exiting the Delta and nearing the end of their out-migration season.
    - Young-of-year SR are emigrating into the Delta and exiting the Delta according to young-of-year SR observations in the real-time monitoring sites as well observation in salvage. SR are likely to have increased movement into the Delta 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 8 in Appendix 1
        - STARS Model
- Tillotson entrainment model or other entrainment models as they become available:
    - The entrainment tool estimates a median of 0 WR and a maximum loss of 18 WR this week (SacPAS last updated on 5/7/24).
    - 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 are usually not observed in high numbers in May so seasonal timing would indicate that they are less likely to be observed in salvage and real-time monitoring sites in May.
    - USFWS - Fish Salvage Monitoring

Appendix 1: SaMT Monitoring and Modeling Data

Table 5. *Fish monitoring data for the 5/7/24 SaMT meeting. Due to time constraints flows, water temperature, and turbidity were not calculated this week for any of the monitoring sites. 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	Beach Seines	Sacramento Trawl
Sample Date	N/A	N/A	4/30-5/6	N/A	4/30-5/3	4/30-5/3
Chinook Adults	N/A	N/A	0	N/A	0	0
FR Chinook	N/A	N/A	39	N/A	7	318
SR Chinook	N/A	N/A	10	N/A	1	17
WR Chinook	N/A	N/A	0	N/A	0	0
LFR Chinook	N/A	N/A	0	N/A	0	0
Chinook (ad-clip)	N/A	N/A	4 FR 1 SR	N/A	0	81
Steelhead (wild)	N/A	N/A	0	N/A	0	0
Steelhead (ad-clip)	N/A	N/A	0	N/A	0	0
Green Sturgeon	N/A	N/A	0	N/A	0	0
Flows (avg. cfs)	N/A	N/A	N/A	N/A	N/A	N/A
W. Temp. (avg. °C)	N/A	N/A	N/A	N/A	N/A	N/A
Turbidity (avg. NTU)	N/A	N/A	N/A	N/A	N/A	N/A

Table 5 Continued. *Fish monitoring data for the 5/7/24 SaMT meeting. Due to time constraints flows, water temperature, and turbidity were not calculated this week for any of the monitoring sites. 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	Chipps Is. Midwater Trawl	Mossdale Kodiak Trawl	Feather at Herringer RST	Feather at Eye-Side RST	Lower Feather River RST	Yuba River RST
Sample Date	4/30-5/3	4/30-5/4	4/30-5/6	4/30-5/6	N/A	4/30-5/6
Chinook Adults	0	0	0	0	N/A	0
FR Chinook	145	231	40	245	N/A	174
SR Chinook	78	213	0	0	N/A	3
WR Chinook	0	0	0	0	N/A	0
LFR Chinook	0	0	0	23	N/A	37
Chinook (ad-clip)	85	0	57	0	N/A	0
Steelhead (wild)	0	0	0	0	N/A	4
Steelhead (ad-clip)	1	0	0	4	N/A	0
Green Sturgeon	0	0	0	0	N/A	0
Flows (avg. cfs)	N/A	N/A	N/A	N/A	N/A	N/A
W. Temp. (avg. °F/C)	N/A	N/A	N/A	N/A	N/A	N/A
Turbidity (avg. NTU)	N/A	N/A	N/A	N/A	N/A	N/A

Table 6. *Delta sturgeon tagging and monitoring.*

Date	Comments
5/7/24	• 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 7. *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 8. *STARS Modeling*

Date: (5/6/24)	DCC	Georgiana Slough	Sacramento River	Sutter and Steamboat Slough	Yolo Bypass
Late Fall-Run Routing Probabilities	0	0.21	0.48	0.32	N/A
Late Fall-Run Route Specific Survival	0	0.29	0.66	0.59	N/A
Winter-Run Routing Probabilities	N/A	0.12	0.62	0.13/0.12	0
Winter-Run Route Specific Survival	N/A	0.14	0.29	0.27/0.25	0

Appendix 2: Relevant Actions

Table 9. *Relevant WY 2024 Criteria and Status for Listed Chinook Salmon under the SWP Long-Term Incidental Take Permit.*

Action	Timeframe	Current Action Status	Threshold(s)	Current Relevant Data	Weekly Trend	Last Updated	Comments
Onset of OMR Mgmt. Salmonid Presence (8.3.2)	Jan. 1 - Jun. 30 *(when ≥ 5% of winter-run or spring- run are in the Delta)*	In effect	≥ 5% of the winter-run or spring-run population are present in the Delta	Winter-run = 4-20% estimated in the Delta Spring-run = 30-45% estimated in the Delta	N/A	**5/7/24**	N/A
Winter-run yearly loss (8.6.1)	Nov. 1 - Jun. 30	In effect	Natural CHNWR (loss = 1.17% of JPE): *50% of 1.17% of JPE =* ***1,374.14*** *75% of 1.17% of JPE =* ***2,061.21*** Hatchery CHNWR (loss = 0.12% of JPE): *50% of 0.12% of JPE =* ***116.15***	Current yearly WR loss (natural LAD) = 4,200.72 (updated with 5/5/24 salvage data) Current yearly WR loss (hatchery) = 4.33	LAD natural-origin WR may be observed in salvage in the upcoming week.	**5/7/24**	N/A

Action	Timeframe	Current Action Status	Threshold(s)	Current Relevant Data	Weekly Trend	Last Updated	Comments
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	**5/7/24**	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**) April: 0.0000226 * 234,896 = 5.3086496 (**5.31**) May: 0 * 234,896 = 0 (**0**)	Salvage of older juvenile Chinook salmon may occur this upcoming week.	**5/7/24**	N/A

Action	Timeframe	Current Action Status	Threshold(s)	Current Relevant Data	Weekly Trend	Last Updated	Comments
Spring-run surrogate protection (8.6.4)	Feb. 1 - Jun. 30	In effect	Coleman National Fish Hatchery (CNFH) Group 1: 0.25% of total in-river CWT fall-run release Feather River Fish Hatchery (FRH) Group 1: 0.25% of total in-river CWT spring-run release Nimbus Fish Hatchery (NIM) Group 1: 0.25% of total in-river CWT fall-run release	FRH Group 1: 0.0025 * 699,854 = 1,749.64 FRH Group 2: 0.0025 * 700,626 = 1,751.57 FRH Group 3: 0.0025* 560,304= 1,400.76 CNFH Group 1: 0.0025 * 712,177 = 1,780.44 CNFH Group 2: 0.0025*106,531= 266.33 NIM Group 2: 0.0025 * 210.351 =525.88	FRH Group 1 release occurred on 3/15/24 FRH Group 2 release occurred on 3/29/24 FRH Group 3 release occurred on 4/23/24 CNFH Group 1 release occurred on 3/21/24 CNFH Group 2 release occurred on 5/1/24 NIM Group 1 release occurred on 4/19/24	**5/7/24**	N/A

OMR Flexibility During Delta Excess Conditions (8.7)	Nov. 1 - Jun. 30	Not in effect	•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	COA 8.7 will not trigger this week due to the following: •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.	Current storm events are being monitored for COA 8.7.	**5/7/24**	N/A

Action	Timeframe	Current Action Status	Threshold(s)	Current Relevant Data	Weekly Trend	Last Updated	Comments
			less than 0.5% within any of the release groups, AND •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 Mossdale 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	**5/7/24**	N/A

Appendix 3: Hatchery Releases

Table 10. 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
4/19/2024	NIM	Fall	06-15-00	210,351	841,000	25%	Lower American River at Sunrise Boat Ramp	CWT and Ad-clip	CDFW	Production
4/23/2024	FRH	Spring	06-06-79	98,880	98,880	100%	Feather River at Gridley Boat Launch	CWT and Ad-clip	CDFW	Production
4/23/2024	FRH	Spring	06-30-55	88,788	88,788	100%	Feather River at Gridley Boat Launch	CWT and Ad-clip	CDFW	Production
4/23/2024	FRH	Spring	06-30-53	22,329	22,329	100%	Feather River at Gridley Boat Launch	CWT and Ad-clip	CDFW	Production
4/23/2024	FRH	Spring	06-00-82	350,307	350,307	100%	Feather River at Boyd's Pump Boat Ramp	CWT and Ad-clip	CDFW	Production
4/23/2024	FRH	Fall	06-00-84	128,359	513,844	25%	Feather River at Gridley Boat Launch	CWT, Ad-Clip, and PBT	CDFW	Experimental
4/23/2024	FRH	Fall	06-30-46	10,707	42,828	25%	Feather River at Gridley Boat Launch	CWT, Ad-Clip, and PBT	CDFW	Experimental
4/24/2024	FRH	Fall	06-00-99	252,517	1,010,515	25%	Feather River at Boyd's Pump Boat Ramp	CWT and Ad-clip	CDFW	Production
4/25/2024	MOK	Fall	06-21-60	130,000	520,000	25%	San Joaquin River at Sherman Island Net Pen	CWT and Ad-clip	CDFW	Production
4/25/2024	FRH	Fall	06-00-85	132,670	530,680	25%	Feather River at Gridley Boat Launch	CWT and Ad-clip	CDFW	Production
4/25/2024	FRH	Fall	06-30-41	7,005	28,020	25%	Feather River at Gridley Boat Launch	CWT and Ad-clip	CDFW	Production
4/25/2024	FRH	Fall	06-20-83	1,911	7,644	25%	Feather River at Gridley Boat Launch	CWT and Ad-clip	CDFW	Production
4/26/2024	MOK	Fall	05-00-37	42,654	170,615	25%	San Francisco Bay at Marin Rod	CWT and Ad-clip	USFWS	Production
4/26/2024	MOK	Fall	05-66-74	9,544	38,174	25%	San Francisco Bay at Marin Rod	CWT and Ad-clip	USFWS	Production
4/27/2024	MOK	Fall	06-21-70	130,000	520,000	25%	San Joaquin River at Sherman Island Net Pen	CWT and Ad-clip	CDFW	Production
4/28/2024	MOK	Fall	06-21-80	130,000	520,000	25%	San Joaquin River at Sherman Island Net Pen	CWT and Ad-clip	CDFW	Production

Release Date	Hatchery	Race	CWT	Marked Release Number	Total Release	Percent Marked	Release Location	Mark	Agency	Release Type
4/29/2024	FRH	Fall	06-00-86	136,043	544,172	25%	Feather River at Gridley Boat Launch	CWT, Ad-Clip, and PBT	CDFW	Production
4/29/2024	FRH	Fall	06-15-66	11,375	45,500	25%	Feather River at Gridley Boat Launch	CWT, Ad-Clip, and PBT	CDFW	Production
5/1/2024	CNFH	Fall	05-00-90	106,531	426,124	25%	Sacramento River at Butte City Boat Ramp	CWT and Ad-clip	USFWS	Production

Table 11. 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 12. COA 8.6.4 Young-of-Year Spring-run Chinook Salmon Hatchery Surrogate Summary Table, WY 2024.

Hatchery	Release Group	Date	Race	Total Fish Released	CWT Fish	Tag Codes	Loss Threshold
Coleman National Fish Hatchery	Group 1	3/21/24	Fall	2,848,706	712,177	05-00-70 05-00-71 05-00-72 05-00-74 05-00-75 05-00-76 05-00-77 05-00-78	1,780.44
	Group 2	5/1/24	Fall	426,124	106,531	05-00-90	266.33
Feather River Fish Hatchery	Group 1	3/15/24	Spring	669,854	669,854	06-00-78 06-00-80	1,749.64
	Group 2	3/29/24	Spring	700,626	700,626	06-00-79 06-00-81	1,751.57
	Group 3	4/23/24	Spring	560,304	560,304	06-06-79 06-30-55 06-30-53 06-00-82	1,400.76
Nimbus Fish Hatchery	Group 1	4/19/24	Fall	841,000	210,351	06-15-00	525.88
	N/A	N/A	N/A	N/A	N/A	N/A	N/A