

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

Section 1: Overview

Date: 11/15/2022

Life Stages Present:

Winter-run Chinook salmon (juvenile)

Spring-run Chinook salmon (juvenile)

Advice to the Water Operations Management Team (WOMT):

No advice is warranted.

For the week beginning 11/15/22, D-1641 Delta Water Quality is controlling exports at the Central Valley Project (CVP) and the State Water Project (SWP). Combined exports on 11/15/22 are 2,300 cfs resulting in an Old and Middle River Index (OMRI) of -2,200 cfs and 28.7% of inflow diverted (14-day average). The Delta Cross Channel (DCC) gates are projected to remain closed on the weekdays and open on the weekends, which is consistent with D-1641 and the CVP Proposed Action. 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 (WR) Chinook salmon. Flows at Freeport have been low and DCC gates are still opening on the weekends leading to an elevated routing risk, but WR have not been seen in real-time monitoring sites in the Delta in the previous couple weeks indicating low presence and a low risk of exposure. WR are currently in the rearing stage as opposed to actively emigrating, which reduces the likelihood of entrainment into the central Delta; therefore, overall risk is low this week. SaMT estimates an overall low risk of juvenile natural-origin spring-run Chinook salmon (SR) entrainment into the central Delta. SR Chinook salmon eggs are hatching, and fry are starting to emerge. Young-of-Year (YOY) SR have not been seen in any real-time monitoring locations in the Delta; therefore, entrainment downstream of their spawning area and into the central Delta is unlikely this week.

SaMT estimates an overall low risk of entrainment of juvenile WR into the export facilities this week. Salvage of WR is unlikely due to low numbers of WR occupying the Delta as indicated by observations in the real-time monitoring stations and no salvage of WR yet this season. SaMT also estimates an overall low risk of juvenile SR into the export facilities due to no salvage of SR occurring so far this season and low numbers of SR observed in real-time monitoring locations. SaMT does not anticipate that COA 8.6.2 Early Season Natural Origin WR Discrete Daily Loss Threshold of 6 older juvenile Chinook salmon will be triggered this week. If any amount of salvage does occur, then the entrainment risk into the Delta will increase to medium because of the low number of loss associated with COA 8.6.2.

Risk Assessment:

Section 2-A: Operations and Fish Distribution Table

The COA 8.6.2 (Early Season Natural-Origin WR Discrete Daily Loss Threshold) is currently in effect with a daily loss threshold of 6 or more older juvenile Chinook salmon. COA 8.6.2 has not been triggered for WY 2023.

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 100% Last week 100%	Current 0% Last Week 0%	Current 0% Last Week 0%
Young-of-year spring-run Chinook salmon	Current 100% Last week 100%	Current 0% Last Week 0%	Current 0% Last Week 0%
Hatchery origin winter-run Chinook salmon	Current NA Last week NA	Current NA Last Week NA	Current NA Last Week NA

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: Low
- Routing Risk:
 - WR: Medium
 - SR: Medium
- Overall Entrainment Risk:
 - WR: Low
 - SR: Low
- 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. SaMT estimates WR presence in the Delta is low due to seasonal timing. Routing Risk has decreased to medium this week for WR based on drier hydrologic conditions. Routing Risk remains at medium rather than low due to low flows at Freeport and weekend DCC gate openings which increases the risk of WR entrainment into the central Delta. Although WR are still actively rearing, rather than migrating, juveniles can still be redistributed downstream with rain events, water temperatures and seasonal timing. However, the overall entrainment into the central Delta is still estimated to be low based on WR seasonal timing.
 - SR: Similar to previous week
 - Exposure Risk is estimated as low this week. SR are not estimated to be in the Delta this week due to seasonal timing. SR have not yet been seen many of the real-time monitoring locations in the Delta. Routing Risk is medium this week based on hydrologic conditions. Although the DCC gates are projected to open on the weekends and Freeport flows remain low, SR are not anticipated to be migrating downstream where

they would be affected by Delta operations. Therefore, the overall entrainment into the central Delta is low.

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: Low
- Reporting OMR/Export Risk:
 - Baseline OMR (-2,200 cfs)
 - WR: Low
 - SR: Low
 - Scenario 1 OMR: (-1,000 cfs)
 - WR: Low
 - SR: Low
 - Scenario 2 OMR: (-2,600 cfs)
 - WR: Low
 - SR: Low
- Overall Entrainment Risk:
 - WR: Low
 - SR: Low
- Change in risk of entrainment into the facilities (increased/decreased risk compared to last week):
 - WR: Similar to previous week
 - Reporting OMR/Export Risk is low this week due to OMRI expected to be more positive than expected at this time. Exposure Risk is low this week due to no WR salvage occurring for WY 2023. Exports have also decreased this week and WR are not expected to be near the export facilities at this time due to seasonal timing. Therefore, the overall entrainment risk into the export facilities is estimated to be low this week.
 - SR: Similar to previous week
 - Reporting OMR/Export Risk has decreased to low this week due to OMRI expected to be more positive than last week and exports expected to decrease. Exposure Risk is low this week. No SR have been observed at the export facilities for WY 2023. Therefore, the overall entrainment risk into the facilities is estimated to be low 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: Not Available (N/A) at this time. [1.17% of the natural-origin WR Juvenile Production Estimate (JPE)]
 - Current Annual Loss: N/A
 - 50% Threshold based on natural-origin WR JPE: N/A

- Risk of exceeding threshold: N/A
 - 75% Threshold based on natural-origin WR JPE: N/A
 - Risk of exceeding threshold: N/A
 - 100% Threshold based on natural-origin WR JPE: N/A
 - Risk of exceeding threshold: N/A
- Hatchery WR: N/A [0.12% of the Livingston Stone National Fish Hatchery (LSNFH) hatchery release JPE]
 - Current Annual Loss: N/A
 - 50% Threshold based on hatchery WR JPE: N/A
 - Risk of exceeding threshold: N/A
 - 75% Threshold based on hatchery WR JPE: N/A
 - Risk of exceeding threshold: N/A
 - 100% Threshold based on hatchery WR JPE: N/A
 - Risk of exceeding threshold: N/A

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 8.6.2 Early Season Natural-Origin WR Discrete Daily Loss Threshold:
 - November Monthly Daily Loss Threshold: 6 per day older juvenile Chinook salmon
 - Highest Daily Loss: 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.

8.6.2 Early-season Natural Winter-run Chinook Salmon Discrete Daily Loss Threshold. To minimize entrainment, salvage, and take of early-migrating natural CHNWR Permittee shall restrict south Delta exports for five consecutive days to achieve a five-day average OMR index no more negative than -5,000 cfs when daily loss of older juveniles (natural older juvenile Chinook salmon) and yearling CHNSR used as a surrogate for CHNWR) at the SWP and CVP salvage facilities exceeds the following thresholds:

- From November 1 – November 30: 6 older juvenile Chinook salmon*
- From December 1 – December 31: 26 older juvenile Chinook salmon*

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.

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, ii, iii:

- Antecedent Actions: (e.g., Actions such as integrated early winter pulse protection, etc.)
 - No additional actions.
- 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: Not applicable at this time.
 - Prisoners Point (PPT): [Prisoners Point - CDEC](#)
 - Number of days threshold exceeded: Not applicable until June.
 - Days exceeded: Not applicable at this time.
- Tidal Cycle: (*Spring/Neap. Note if tidal cycle has potential to affect south Delta hydrology or X2*)
 - At the end a neap cycle and will be entering into a spring cycle on 11/23/22. This will move the transitional zone around the DCC gates and Georgiana Slough which may affect juvenile WR and SR that are in the vicinity. This movement of the transitional zone has the potential to move fish into the interior Delta.
- Turbidity: Not discussed
- Salinity (X2): >81 km on 11/15/22
 - Hydraulic Footprint (*Provide brief description of hydrologic footprint and summary of relevant DSM2 results*): DSM2 results were not discussed during SaMT this week. A DSM2 presentation by Reclamation is rescheduled to 11/29/22 to explain how DSM2 results are interpreted.
- Outages:
 - SWP: None projected. Reduced counts on 11/10/22.
 - CVP: None projected
- Exports: 11/15/22 – 11/21/22
 - SWP: 500 to 1,000 cfs
 - CVP: 900 to 1,800 cfs
- Meteorological Forecast:
 - *“Dry weather with breezy north to east winds through Wednesday. Temperatures warming to near average by midweek.”*
 - [NOAA - National Weather Service Forecast](#)
- Weather/Storm Event Projection:
 - No storms projected in the upcoming week.
- DCC Gates position:
 - DCC gates are currently closing on the weekdays but opening on the weekends. DCC gates will open on 11/18/22 and close on 11/21/22. DCC gates are projected to remain on this schedule (closing on weekdays/opening on weekends) throughout November or until conditions improve.
- Sacramento River flow at Freeport: 7,800 cfs
 - Freeport flows may decrease to 6,000 cfs by the end of the week.
 - [Sacramento River Flows - CDEC](#)
- San Joaquin River flow at Vernalis: 630 cfs

- [San Joaquin River Flows - CDEC](#)
- [San Joaquin River Guidance Plots - CDEC](#)
- QWEST: +4,000 cfs
 - DCC gates are affecting QWEST. With the gates open, QWEST is +4,000 cfs, but with the DCC gates closed QWEST decreases in the -700 to -1,000 cfs range.
- Future export modifications: *Describe anticipated or potential changes to exports*
 - Not applicable at this time.

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

Date	Averaging Period	USGS gauges (cfs)	OMR Index (cfs)
11/12/22	Daily	-3,400	-2,600
11/12/22	5-day	-2,900	-2,500
11/12/22	14-day	-2,400	-1,800
11/14/22	Daily	Not Applicable	-2,600
11/14/22	5-day	Not Applicable	-2,600
11/14/22	14-day	Not Applicable	-2,000

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) 2022 is 5,927
 - Hatchery proportion was 10.8% of the total run (641 hatchery-origin WR)
 - Total number of in-river WR females: 2,663
 - Total number of WR redds: 2,607
 - WR adults contributing to BY 2022 had a pre-spawn mortality rate of 2.1%
- Redd distribution and fry emergence timing:
 - Juvenile WR are beginning to redistribute downstream in the upper Sacramento River. Many of the real-time monitoring stations were not trapping during the rain event that occurred last week due to heavy debris in the traps. Although SaMT did expect WR to be distributed downstream with the rain event, it was not captured in the real-time monitoring data.
 - CDFW conducted snorkel surveys on the upper Sacramento River and found many juvenile WR holding near Redding.
 - Estimated juvenile WR passage at RBDD for 11/4/22 is 132,775 fish, which represents 81.8% of historical passage. Average historic passage (2010-2021) as of 11/4/22 indicates 81.8% with one standard deviation of 16.4% have passed Red Bluff Diversion Dam.
- Juvenile Production Estimate (JPE):
 - Not Available at this time.
- Livingston Stone National Fish Hatchery releases:
 - Releases of juvenile WR have not occurred.
 - See Appendix 4
- Distribution of natural WR:
 - See Table 1
- Distribution of Livingston Stone National Fish Hatchery Sacramento River WR and Battle Creek WR:
 - No releases have occurred at this time.
 - [CalFishTrack - Central Valley Enhanced Acoustic Tagging Project](#)

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

- Adult escapement estimate:
 - SR carcass counts not available.
 - Adult SR have likely completed their spawning.
- Redd distribution and fry emergence timing:
 - SR eggs are incubating in the gravel. There have been very few detections of SR in the real-time monitoring stations on the Sacramento River
 - Yearling SR have been detected at Butte Creek RST and Mill and Deer Creek RST. These SR may be detected in real-time monitoring locations on the Sacramento River in the upcoming week; however, due to low flows on the Sacramento River and their yearling size, it is unlikely that the real-time monitoring stations will be able to capture them.
- Hatchery release (in-river and downstream):
 - See Appendix 4
- Distribution of natural SR:
 - See Table 1.
- Distribution of Feather River Fish Hatchery SR:
 - Not applicable at this time.

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*
 - Not applicable at this time.
 - [CalFishTrack - Central Valley Enhanced Acoustic Tagging Project](#)
- Trawls: See Appendix 1
 - Sacramento Trawl: No salmonids were caught this week.
 - Mossdale Trawl: No salmonids were caught this week.
 - Chipps Island Trawl: No salmonids were caught this week.
- Rotary Screw Traps:
 - Knights Landing, Tisdale and Lower Sacramento Rotary Screw Trap Data: No salmonids have been caught this week. Knights Landing Rotary Screw Trap has been inactive since 11/5/22 due to heavy debris in traps. Lower Sacramento Rotary Screw Trap has also experienced heavy debris in their traps and has been inactive since 11/9/22.
 - [Middle Sacramento River Salmon and Steelhead Monitoring](#)
 - Yuba River Rotary Screw Trap Data: 1 natural steelhead was caught on 11/9/22.
 - Redd Bluff Diversion Dam Rotary Screw Trap Data: Total passage estimates 132,775 juvenile WR have passed RBDD. Last updated on 11/4/22.
 - GCID Rotary Screw Trap Data: 4 natural WR were caught on 11/14/22.
 - [GCID RST Live Data](#)
 - Lower Feather River Rotary Screw Trap: No salmonids were caught this week.
 - [Middle Sacramento River Salmon and Steelhead Monitoring](#)
 - Butte Creek Rotary Screw Trap Data: 10 yearling SR were caught from 11/9/22 - 11/14/22.
 - [Butte Creek Monitoring Programs](#)
- Seines:
 - Sacramento River Beach Seines: No salmonids were caught this week.
- Carcass Survey Data:
 - Lower American River Carcass Survey Data:
 - [Middle Sacramento River Salmon and Steelhead Monitoring](#)
 - The American River Power Bypass proposal was accepted with modifications on 10/18/22. The power bypass began on 10/20/22 starting at 100 cfs power bypass and increasing each day after until 300 cfs with a target temperature of 62 °F. On 11/1/22, a full 500 cfs bypass occurred and will continue until a target temperature of 56 °F is reached or when the cold-water pool runs out. The mean daily average for the week of 11/7/22 – 11/10/22 was 57.4 °F.
 - Fall-run (FR) Carcass Surveys began on 10/24/22 on the Lower American River. A total of 49 carcasses were found during the carcass survey that took place between 11/7/22 – 11/10/22. Of those 49 carcasses, there were 19 female prespawn mortalities and 3 partial spawned female documented.
 - Redd surveys began on 10/24/22. A total of 52 redds were found for the redd survey that took place between 11/7/22 – 11/11/22.
- Additional hatchery release notifications: *List all relevant hatchery release notifications.*
 - No hatchery releases have occurred (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.*

- Feather River Eye Side Channel RST caught 1 hatchery steelhead on 11/8/22. No releases have been made in WY 2023 thus far; therefore, this hatchery fish is from a release from a previous WY.
- Anticipated emigration to continue into the Delta: WR are still rearing downstream of their spawning grounds. Hydrological and meteorological environmental cues could redistribute juveniles downstream, although seasonal timing indicate these fish would be rearing and not actively emigrating. Adult SR are nearing the end of spawning and eggs are still in gravel. No anticipation of SR emigrating into the Delta this week.
 - [SacPAS - Migration Timing and Conditions by Cohort](#)
 - [SacPAS - Salvage Timing](#)
- Routing and Survival Analysis:
 - Delta STARS Model: See Table 6 in Appendix 1
 - [CalFishTrack - Central Valley Enhanced Acoustic Tagging Project](#)
- Tillotson entrainment model or other entrainment models as they become available:
 - The entrainment tool estimates a median loss of 0 WR and maximum loss of 8 WR this week (SacPAS last updated on 11/15/2022).
 - [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*: Not applicable due to no salvage of salmonids for WY 2023 (See Appendix 2).
 - [USFWS - Fish Salvage Monitoring](#)

Appendix 1: SaMT Monitoring and Modeling Data

Table 3: Fish monitoring data for the 11/15/22 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, N/A= Not Available.

Location	GCID RST	Butte Creek RST	Tisdale RST	Knights Landing RST ¹	Lower Sac RST ²	Beach Seines	Sacramento Trawl
Sample Date	11/8/2 – 11/14/22	11/8/22 – 11/13/22	11/11/22 – 11/14/22	N/A	11/7/22 – 11/8/22	11/6/22 – 11/12/22	11/6/22 – 11/12/22
Chinook Adults	0	0	0	0	0	0	0
FR Chinook	0	0	0	0	0	0	8
SR Chinook	0	10 yearlings	0	0	0	0	0
WR Chinook	4 juveniles	0	0	0	0	0	0
LFR Chinook	0	0	0	0	0	0	0
Chinook (ad-clip)	0	0	0	0	0	0	0
Steelhead (wild)	0	0	0	0	0	0	0
Steelhead (ad-clip)	0	0	0	0	0	0	0
Green Sturgeon	0	0	0	0	0	0	0
Flows (avg. cfs)	751	113	4,190	N/A	N/A	N/A	N/A
W. Temp. (avg. °F/°C)	53.6°F	45.5°F	51.7°F	N/A	N/A	N/A	N/A
Turbidity (avg. NTU)	1.8	N/A	2.7	N/A	N/A	N/A	N/A

¹ Knights Landing RST was taken offline on 11/5/22 due to severe duckweed inundation.

² Lower Sacramento RST was taken offline 11/9/22 due to severe aquatic vegetation but began trapping again on 11/15/22.

Table 3 Continued: Fish monitoring data for the 11/15/22 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, N/A=Not Available.

Location	Chippis Is. Midwater Trawl	Mossdale Kodiak Trawl	Lower Feather RST	Feather at Herringer RST	Feather at Eye-Side RST	Yuba RST
Sample Date	11/6/22 – 11/12/22	11/6/22 – 11/12/22	11/1/22 – 11/7/22	N/A	11/7/22 – 11/10/22	11/7/22 – 11/13/22
Chinook Adults	0	0	0	N/A	N/A	0
FR Chinook	0	0	0	N/A	N/A	0
SR Chinook	0	0	0	N/A	N/A	0
WR Chinook	0	0	0	N/A	N/A	0
LFR Chinook	0	0	0	N/A	N/A	0
Chinook (ad-clip)	0	0	0	N/A	1	0
Steelhead (wild)	0	0	0	N/A	N/A	1
Steelhead (ad-clip)	0	0	0	N/A	N/A	0
Green Sturgeon	0	0	0	N/A	N/A	0
Flows (avg. cfs)	N/A	N/A	2,658	N/A	650	0
W. Temp. (avg. °F/°C)	N/A	N/A	52.2°F	N/A	53.4°F	N/A
Turbidity (avg. NTU)	N/A	N/A	2.7	N/A	1.3	N/A

Table 4: Delta sturgeon tagging and monitoring.

Date	Comments
11/15/22	<ul style="list-style-type: none"> No new GS or WS tagged this week. 2 juvenile GS were detected in the Sacramento River at Marsh Island

GS = green sturgeon, WS = white sturgeon

Table 5: CDFW adult monitoring surveys.

Location	American River Carcass Survey	Stanislaus River Carcass Survey
Sample Dates	11/7/22 – 11/10/22	11/7/22 – 11/10/22

Location	American River Carcass Survey	Stanislaus River Carcass Survey
Live Fish	Not Available	510
Redds	Not Available	254
Carcasses	49	7
Ad-clipped	8	7
Spawn Condition	Prespawn Mortality: 70% (19/27)	Not Available
Flows (avg. cfs)	1,300	200
Water Temp (avg. °F)	57.4	Not Available

Table 6: STARS Modeling.

<u>Date:</u> (11/15/22)	<u>DCC</u>	<u>Georgiana Slough/interior Delta</u>	<u>Sacramento River</u>	<u>Sutter and Steamboat Slough</u>	<u>Yolo Bypass</u>
Late Fall-Run Proportion of Entrainment	Not Available	0.31	0.44	0.24	Not Applicable
Late Fall-Run Survival	Not Available	0.16	0.47	0.35	Not Applicable
Winter-Run Proportion of Entrainment	Not Available	0.13	0.58	0.29	0
Winter-Run Survival	Not Available	0.05	0.23	0.30	Not Applicable

Appendix 2: Salvage Data

Table 7: SWP and CVP SaMT update (11/7/22 – 11/13/22). Trend is the current value compared to the previous week. Prepared by Kyle Griffiths on 11/14/22. These are preliminary results and are subject to revision.

Criteria	7-Nov	8-Nov	9-Nov	10-Nov	11-Nov	12-Nov	13-Nov	Trend	Weekly Summary
Wild older juvenile CHN Loss	0	0	0	0	0	0	0	→	0.00
Wild Steelhead Loss	0	0	0	0	0	0	0	→	0.00
SWP daily export (acre-feet)	2,015	1,915	3,205	2,958	1,874	2,226	1,895	↗	2,298
CVP daily export (acre-feet)	1,821	1,796	3,040	3,596	3,593	3,589	3,592	↗	3,004
SWP reduced counts	None	None	None	Yes	None	None	None	N/A	N/A
CVP reduced counts	None	None	None	None	None	None	None	N/A	N/A

Table 8: Chinook salmon weekly salvage and loss combined for both the SWP and the CVP fish collection facilities between 11/7/22 – 11/13/22. Race is determined by LAD on the date of capture. Hatchery origin fish are determined by the lack of adipose fin. Salvage is equal to the estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time. SWP loss is equal to salvage multiplied by 4.33. CVP loss is equal to salvage multiplied by 0.68. Prepared by Kyle Griffiths on 11/14/22. These are preliminary results and are subject to revision.

Category	Salvage	Loss	Trend
Wild winter-run	0	0	→
Wild spring-run	0	0	→
Wild late Fall-run	0	0	→
Wild fall-run	0	0	→
Weekly Total	0	0	Not Applicable
Hatchery winter-run	0	0	→
Hatchery spring-run	0	0	→
Hatchery late Fall-run	0	0	→
Hatchery fall-run	0	0	→
Weekly Total	0	0	Not Applicable

Table 9: Chinook salmon cumulative salvage and loss combined for both the SWP and the CVP fish collection facilities across WY 2023. Race is determined by LAD on the date of capture. Hatchery origin fish are determined by the lack of adipose fin. Salvage is equal to the estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time. SWP loss is equal to salvage multiplied by 4.33. CVP loss is equal to salvage multiplied by 0.68. Prepared by Kyle Griffiths on 11/14/22. These are preliminary results and are subject to revision.

Category	Cumulative Salvage	Cumulative Loss	Trend
Wild winter-run	0	0	→
Wild spring-run	0	0	→
Wild late Fall-run	0	0	→
Wild fall-run	0	0	→
Season Total	0	0	Not Applicable
Hatchery winter-run	0	0	→
Hatchery spring-run	0	0	→
Hatchery late Fall-run	0	0	→
Hatchery fall-run	0	0	→
Season Total	0	0	Not Applicable

Table 10: Steelhead weekly salvage and loss combined for both the SWP and the CVP fish collection facilities for 11/7/22 – 11/13/22. Hatchery origin fish are determined by the lack of adipose fin. Salvage is equal to the estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time. SWP loss is equal to salvage multiplied by 4.33. CVP loss is equal to salvage multiplied by 0.68. Prepared by Kyle Griffiths on 11/14/22. These are preliminary results and are subject to revision.

Category	Salvage	Loss	Trend
Wild steelhead	0	0	→
Hatchery steelhead	0	0	→
Weekly Total	0	0	Not Applicable

Table 11: Steelhead cumulative salvage and loss combined for both the SWP and the CVP fish collection facilities across WY 2023. Hatchery origin fish are determined by the lack of adipose fin. Salvage is equal to the estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time. SWP loss is equal to salvage multiplied by 4.33. CVP loss is equal to salvage multiplied by 0.68. Prepared by Kyle Griffiths on 11/14/22. These are preliminary results and are subject to revision.

Category	Cumulative Salvage	Cumulative Loss	Trend
Wild steelhead	0	0	→
Hatchery steelhead	0	0	→
Season Total	0	0	Not Applicable

Appendix 3: Relevant Actions

Table 12. Relevant WY 2023 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>	Not In effect	5% of the winter-run or spring-run population are present in the Delta	Winter-run = 0% estimated in the Delta Spring-run = 0% estimated in the Delta	Not Applicable	11/15/22	No Additional Comments
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 = N/A Hatchery CHNWR (loss = 0.12% of JPE) 50% of 0.12% of JPE = N/A	Current yearly WR loss (natural LAD) = N/A Current yearly WR loss (hatchery) = N/A	Not Applicable	11/15/22	Based on JPE (TBD)
Winter-run discrete daily loss (8.6.2)	Nov. 1 - Dec. 31	In effect	11/1-11/30: loss of 6/day unclipped older juv. Chinook salmon 12/1-12/31: loss of 26/day unclipped older juv. Chinook salmon	Max single daily loss from previous week = 0.00 fish (No older juveniles observed yet)	No change expected	11/15/22	No Additional Comments

<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>
Mid- and Late-season Natural WR Daily Loss Threshold defined as natural origin juvenile Chinook salmon (8.6.3)	Jan 1 – May 31	Not in effect	<p>January 1 – 31: 0.00635% of the CHNWR JPE</p> <p>February 1 – 28: 0.00991% of the CHNWR JPE</p> <p>March 1 – 31: 0.0146% of the CHNWR JPE</p> <p>April 1 – 30: 0.00507% of the CHNWR JPE</p> <p>May 1 – 31: 0.0077% of the CHNWR JPE</p>	Not Applicable	Not Applicable	11/15/22	No Additional Comments

<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	Not in effect	<p>Coleman National Fish Hatchery (CNFH)</p> <p>Group 1: 0.25% of total in-river CWT fall-run release (total of 7 CWT #s)</p> <p>Group 2: 0.25% of total in-river CWT fall-run release (total of 7 CWT #s)</p> <p>Group 3: 0.25% of total in-river CWT fall-run release (total of 10 CWT #s)</p> <p>Group 4: 0.25% of total in-river CWT fall-run release (total of 4 CWT #s)</p> <p>Feather River Fish Hatchery (FRFH)</p> <p>Group 1: 0.25% of total in-river CWT spring-run release (total of 2 CWT #s)</p>	Not Applicable	Not Applicable	11/15/22	No Additional Comments

<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>
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	Not Applicable	Not Applicable	11/15/22	No Additional Comments

