

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

Section 1: Overview

Date: 4/5/2022

Life Stages Present:

Winter-run Chinook salmon (juvenile)

Spring-run Chinook salmon (juvenile)

Spring-run Chinook salmon (adult)

Winter-run Chinook salmon (adult)

Advice to the Water Operations Management Team (WOMT):

No advice is warranted.

For the week beginning April 5, 2022, D-1641 Delta Outflow/San Joaquin River inflow to export (I:E ratio) is controlling exports at the Central Valley Project (CVP) and the State Water Project (SWP). Combined exports on 4/5/2022 are 1,500 cfs resulting in an Old and Middle River Index (OMRI) of -1,400 cfs and 13.6% of inflow diverted (14-day average). The Delta Cross Channel (DCC) gates remain closed for seasonal requirement consistent with D-1641 and the CVP Proposed Action. The SWP is exporting this week and no outages are planned.

The distribution of the juvenile natural origin winter-run (WR) Chinook salmon population estimated to be in the Delta in conjunction with flows forecasted at Freeport and STARS entrainment modeling into the interior Delta, result in an overall risk of entrainment into the central and south Delta from the Sacramento River similar to the previous week and estimated to remain medium. Based on monitoring data, hydrological conditions, and seasonal timing, the Salmon Monitoring Team (SaMT) estimates an overall medium risk of entrainment into the interior Delta from the Sacramento River for young-of-year (YOY) spring-run (SR) Chinook salmon which is similar to the previous week.

SaMT considers the overall entrainment risk of WR into the salvage facilities to stay similar to last week and estimated to be medium. SaMT anticipates the possibility of COA 8.6.3 (Mid and Late Season Natural WR Chinook Salmon Daily Loss Threshold) to be triggered for the month of April due to the trigger being so low (loss >6.34). Although exports have decreased and OMRI values are more positive than we would expect, SaMT considers the potential for SR entrainment into the export facilities to be medium this week due to the anticipated movement of SR downstream.

Risk Assessment:

COA 8.6.4 (Daily SR Hatchery Surrogate Loss Threshold) is in effect until OMR management season ends (COA 8.3.2 Salmonid Presence). The first hatchery surrogate release of SR Chinook salmon from the Feather River Fish Hatchery (FRFH) occurred on 3/30/2022. This release totaled 1,458,758 SR of which 729,199 SR were marked with an adipose fin clip and CWT. An additional Coleman National Fish Hatchery (CNFH) hatchery surrogate group was released on 3/31/2022 – 4/1/2022 which totaled 4,218,454 fall-run (FR) of which 1,058,439 FR were marked with an adipose fin clip and CWT. SaMT does not anticipate salvage of the three release groups from CNFH or the FRFH to exceed the COA 8.6.4 threshold.

Due to ongoing drought conditions, Nimbus Fish Hatchery FR Chinook salmon releases are likely to be released in the Bay and will not meet the needs for ITP Condition 8.6.4. To satisfy ITP Condition 8.6.4, CDFW and DWR agreed to substitute two FR Chinook salmon release groups from Coleman National Fish Hatchery in place of FR releases from Nimbus Fish Hatchery.

Table 1: Current Fish Distribution

| Location | Yet to Enter Delta | In the Delta | Exited the Delta |
|---|------------------------------------|------------------------------------|------------------------------------|
| Young-of-year winter-run Chinook salmon* | Current 1-5% Last week 1-5% | Current 65-79% Last Week 75-84% | Current 20-30% Last Week 15-20% |
| Young-of-year spring-run Chinook salmon | Current 10-20% Last week 10-25% | Current 70-89% Last Week 75-90% | Current 1-10% Last Week 0% |
| Hatchery origin winter-run Chinook salmon | Current 65-79% Last week 67-79% | Current 16-23% Last Week 16-23% | Current 5-12% Last Week 5-10% |

*WR were seen in the Chipps Island Trawl this week. This distribution estimate is based on both historical trends and observations seen in recent monitoring.

Risk Assessment:

Section 1-A: Sacramento River and Confluence

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

- Exposure Risk:
 - WR: High
 - SR: High
- Routing Risk:
 - WR: Low
 - SR: Medium
- Overall Entrainment Risk:
 - WR: Medium
 - SR: Medium
- Change in risk of entrainment into the central Delta (increased/decreased risk compared to last week):
 - WR: Similar to the previous week
 - Exposure Risk remains similar to the previous week with the majority of WR still estimated to have reached the Delta. Routing Risk has decreased for WR due to the STARS model predicting an entrainment of 14% into the interior Delta this week and a low percentage of WR yet to enter the Delta. Freeport flows have slightly increased

from last week but continues to remain low. Therefore, overall risk of entrainment of WR into the central Delta remains similar to the previous week and is considered medium.

- SR: Similar to the previous week
 - Exposure and Routing Risk remain similar to the previous week with the majority of SR estimated to have reached the Delta, low Freeport flows, entrainment into Georgiana at 30%, and an anticipated pulse of SR entering the Delta in the upcoming week. Therefore, the overall entrainment into the central Delta remains similar to the previous week and is considered medium.

Section 1-B: 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: Medium
 - SR: Medium
- Reporting OMR/Export Risk:
 - Baseline OMR (-1,400 cfs)
 - WR: Low
 - SR: Low
 - Scenario 1 OMR: (-1,000 cfs)
 - WR: Low
 - SR: Low
 - Scenario 2 OMR: (-1,500 cfs)
 - WR: Low
 - SR: Low
- Overall Entrainment Risk:
 - WR: Medium
 - SR: Medium
- Change in risk of entrainment into the facilities (increased/decreased risk compared to last week):
 - WR: Similar to the previous week
 - Reporting OMR/Export Risk and Exposure Risk are similar this week to the previous week. Exports are decreasing and OMRI values are becoming more positive; however, due to the low daily loss threshold (loss >6.34) and salvaging 1 natural WR on 3/29/2022, the overall entrainment risk into the facilities remains medium.
 - SR: Similar to the previous week
 - Reporting OMR/Export Risk and Exposure Risk are similar this week. No SR have been caught in salvage for WY 2022; however, due to a hatchery release of SR on the Feather River on 3/31/2022, it is anticipated that this may trigger natural SR to move downstream and potentially be caught in the salvage facilities. Therefore, the overall entrainment risk into the facilities remains medium.

Section 1-C: 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 occurred over the past week.
 - Define risk of hitting a threshold, 50%, or 75%, or 100%, and likelihood of exceeding a threshold:
 - Natural origin WR: 1,462.94 [1.17% of the 125,038 natural-origin WR Juvenile Production Estimate (JPE)]
 - Current Annual Loss: 37.95
 - 50% Threshold based on natural WR JPE: 731.47
 - Risk of exceeding threshold: Low
 - 75% Threshold based on natural WR JPE: 1,097.21
 - Risk of exceeding threshold: Low
 - 100% Threshold based on natural WR JPE: 1,462.94
 - Risk of exceeding threshold: Low
 - Hatchery WR: 181.85 [0.12% of the 151,544 Livingston Stone National Fish Hatchery (LSNFH) hatchery release JPE]
 - Current Annual Loss: 6.71
 - 50% Threshold based on hatchery WR JPE: 90.93
 - Risk of exceeding threshold: Low
 - 75% Threshold based on hatchery WR JPE: 136.39
 - Risk of exceeding threshold: Low
 - 100% Threshold based on hatchery WR JPE: 181.85
 - Risk of exceeding threshold: Low

Section 1-D: 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 8.6.3: Mid and Late Season Natural WR Chinook Salmon Daily Loss Threshold
 - January 1 - January 31: $0.0000635 * 125,038 = 7.94$
 - February 1 - February 28: $0.0000991 * 125,038 = 12.39$
 - March 1 – March 31: $0.000146 * 125,038 = 18.26$
 - April 1 – April 30: $0.0000507 * 125,038 = 6.34$
 - May 1 – May 31: $0.000077 * 125,038 = 9.63$
 - Highest daily loss: 17.39
 - Risk of exceeding threshold: Low
 - COA 8.6.4 Daily SR Hatchery Surrogate Loss Threshold
 - Hatchery Origin Young-of-Year SR Surrogates (0.25% of total in-river FR releases for each release group from CNFH):
 - Group 1 Loss Threshold: 1,799.60
 - Highest Daily Loss: 0
 - Risk of exceeding threshold: Low
 - Group 2 Loss Threshold: 1,873.42

- Highest Daily Loss: 0
- Risk of exceeding threshold: Low
- Group 3 Loss Threshold: 2,646.10
 - Highest Daily Loss: 0
 - Risk of exceeding threshold: Low
- Hatchery Origin Young-of-Year SR Surrogates (0.25% of total in-river spring-run releases for each release group from the FRFH)
 - Group 1 Loss Threshold: 1,823.00
 - Highest Daily Loss: 0
 - Risk of exceeding threshold: Low

Section 2: 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.

8.3.2 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.

8.6.1 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. 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 % of the CHNWR JPE*
- February 1 – February 28: 0.00991 % of the CHNWR JPE*
- March 1 – March 31: 0.0146 % of the CHNWR JPE*
- April 1 – April 30: 0.00507 % of the CHNWR JPE*
- May 1 – May 31: 0.0077 % of the CHNWR JPE*

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

If none of the restrictions listed above apply, Permittee may increase south Delta exports but shall manage Project operations to achieve a five-day average OMR index no more negative than -6,250 cfs. The decision to

operate under this Condition of Approval shall be made following the process described in Condition of Approval 8.1.4 (Collaborative Real Time Risk Assessment), and SWP OMR flex is subject to approval by CDFW.

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

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

Section 3: Hydrology and Operations

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

Section 3-A: Water Operations, Water Operations Outlook, and Projected Conditions C 8.1.5.1 A. i, iii, iii:

- Antecedent Actions:
- Water Temperature:
 - Mossdale (MSD): <https://cdec.water.ca.gov/dynamicapp/QueryDaily?s=MSD>
 - Number of days threshold exceeded: Not applicable until June.
 - Prisoners Point (PPT): <https://cdec.water.ca.gov/dynamicapp/QueryDaily?s=PPT&end=2021-01-20>
 - Number of days threshold exceeded: Not applicable until June.
- Tidal Cycle: *(Spring/Neap. Note if tidal cycle has potential to affect south Delta hydrology or X2)*
 - End of a spring tide and going into a neap tide at the end of the week.
- Turbidity: Not discussed
- Salinity (X2): 81 km on 4/5/2022
- Hydraulic Footprint *(Provide brief description of hydrologic footprint and summary of relevant DSM2 results)*: DSM2 results were discussed during SaMT and a model interpretation is provided this week.
 - North Delta into Interior and Central Delta
Channels 49 (San Joaquin River at Sherman Island) and (Sacramento River at Sherman Island)
This week there was a single scenario modeled. There is no change to fish behavior with a lack of a 2nd (or 3rd) model to compare a baseline scenario to. Thus, the SaMT agreed discussing changed to fish behavior due to modeled conditions was not appropriate.
 - San Joaquin River and Central Delta into South Delta
Channel 6 (San Joaquin River at Head of Old River) and 21 (San Joaquin River upstream of Turner Cut)
This week there was a single scenario modeled. There is no change to fish behavior with a lack of a 2nd (or 3rd) model to compare a baseline scenario to. Thus, the SaMT agreed discussing changed to fish behavior due to modeled conditions was not appropriate.
 - South Delta into Facilities
Channels 148 (Middle River) and 94 (Old River)
This week there was a single scenario modeled. There is no change to fish behavior with a lack of a 2nd (or 3rd) model to compare a baseline scenario to. Thus, the SaMT agreed discussing changed to fish behavior due to modeled conditions was not appropriate.
- Outages:
 - SWP: None projected
 - CVP: None projected
- Exports – range: 4/5/2022 – 4/11/2022
 - SWP: 0 to 600 cfs
 - CVP: 800 to 950 cfs
- Meteorological Forecast: *“Breezy winds today into Wednesday. Significant warming trend through Friday with record or near record high temperatures Wednesday through Friday. Breezy winds with elevated fire weather concerns return Saturday into Sunday. Much cooler temperatures early next week.”* https://www.wrh.noaa.gov/total_forecast/getprod.php?new&prod=XXXAFDSTO&wfo=sto
- Storm Event Projection:

- Expected periods of breezy winds and cooler temperatures Saturday through Tuesday with unsettled conditions. Any extended period of breezy conditions could bring elevated fire weather concerns. Local northerly wind gusts of 20-30 kts in the Valley and the Delta today and tomorrow. Easterly wind gusts 15-25 kts over Sierra ridgetops after Wednesday.
- DCC Gates position: Closed on 11/30/2021 per D-1641 seasonal closure.
- Sacramento River flow at Freeport: <https://cdec.water.ca.gov/dynamicapp/QueryDaily?s=FPT>
- San Joaquin River flow at Vernalis:
 - https://cdec.water.ca.gov/jsplot/jspPlotServlet.jsp?sensor_no=1689&end=&geom=&interval=&cookies=
 - https://cdec.water.ca.gov/guidance_plots/VNS_gp.html
- QWEST: 800 cfs
 - QWEST was 3,000 on 4/2/2022 but has been decreasing since the storm has passed and is anticipated to reach 0 by the end of the week.

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

| Date | Averaging Period | USGS gauges (cfs) | Index (cfs) |
|----------|------------------|-------------------|-------------|
| 4/2/2022 | Daily | -2,100 | -1,300 |
| 4/2/2022 | 5-day | -2,800 | -2,400 |
| 4/2/2022 | 14-day | -2,500 | -1,800 |
| 4/4/2022 | Daily | Not Applicable | -1,300 |
| 4/4/2022 | 5-day | Not Applicable | -1,300 |
| 4/4/2022 | 14-day | Not Applicable | -1,800 |

Section 4: Distribution and Biology

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

Section 4-A: WR Population Status 8.1.5.1.B i

- Adult escapement estimate:
 - Estimated spawning escapement for WR adults contributing to brood year (BY) 2021 is 10,269.
- Redd distribution and fry emergence timing:
 - WR fry presence is drawing to a close for BY 2021. Estimated juvenile WR passage at RBDD for 3/25/2022 is 572,297 fish, which represents 99.8% of historical passage.
- Juvenile production:
 - https://www.fws.gov/redbluff/rbdd_biweekly_final.html *
 - *This link is temporarily down due to maintenance and will have a new website address soon.
- Livingston Stone National Fish Hatchery releases:
 - See Table 4
- Distribution of natural WR:
 - See Table 1
- Distribution of Livingston Stone National Fish Hatchery Sacramento River WR and Battle Creek WR:
 - A release of 123,975 BY 2021 WR occurred on 2/9/2022 and a release of 396,310 BY 2021 WR occurred on 3/2/2022 in the Sacramento River at Caldwell Park Boat Ramp. A subset of 569 total fish were acoustically tagged and many of them have been detected at Butte City Bridge, downstream of the confluence at Tower Bridge in the Sacramento River, and Benicia Bridge. https://oceanview.pfeg.noaa.gov/CalFishTrack/pageLSWR_2022.html

Section 4-B: SR Population Status 8.1.5.1.B ii

- Adult escapement estimate: Not available.
- Redd distribution and fry emergence timing:
 - Juvenile SR fry are present and migrating downstream to rear.
 - Total SR juvenile passage for BY 2021 is 170,501 fish as of 3/25/2022 at RBDD.
- Hatchery release (in-river and downstream):
 - See Table 4
- Distribution of natural SR:
 - See Table 1.
- Distribution of Feather River Fish Hatchery SR:
 - On 3/30/2022, a release 1,458,758 BY 2021 SR were released into the Feather River at Boyd's Pump and Gridley Boat Ramp. 50% of these SR were ad-clipped and coded wired tagged and tracked as a surrogate release group for the SWP's ITP COA 8.6.4 SR Hatchery Surrogate Loss Threshold.

Section 4-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*
 - <https://oceanview.pfeg.noaa.gov/CalFishTrack/>
- Trawls:
 - Sacramento Trawl:
https://www.fws.gov/lodi/juvenile_fish_monitoring_program/djfm/?dir=Sacramento%20trawls%20CHN-POD%20species%202012-Present
 - Mossdale Trawl:
https://www.fws.gov/lodi/juvenile_fish_monitoring_program/djfm/?dir=Mossdale%20trawls%20CHN-POD%20species%202012-Present

- Chipps Island Trawl:
 - https://www.fws.gov/lodi/juvenile_fish_monitoring_program/djfm/?dir=Beach%20seines%20CHN-POD%20species%202012-Present
- Rotary Screw Traps:
 - Knights Landing, Tisdale and Lower Sacramento Rotary Screw Trap Data:
 - <https://www.calfish.org/ProgramsData/ConservationandManagement/CentralValleyMonitoring/SacramentoValleyTributaryMonitoring/MiddleSacramentoRiverSalmonandSteelheadMonitoring.aspx>
 - Redd Bluff Diversion Dam Rotary Screw Trap Data:
 - https://www.fws.gov/redbluff/RBDD%20JSM%20Biweekly/2021/rbdd_ismp_2021.html
 - Feather River Rotary Screw Trap Data for Butte Creek:
 - <https://www.calfish.org/ProgramsData/ConservationandManagement/CentralValleyMonitoring/SacramentoValleyTributaryMonitoring/ButteCreek.aspx>
- Seines:
 - Sacramento River Beach Seines:
 - https://www.fws.gov/lodi/juvenile_fish_monitoring_program/djfm/?dir=Beach%20seines%20CHN-POD%20species%202012-Present
- Carcass Survey Data:
 - Lower American River Carcass Survey Data:
 - <https://www.calfish.org/ProgramsData/ConservationandManagement/CentralValleyMonitoring/SacramentoValleyTributaryMonitoring/MiddleSacramentoRiverSalmonandSteelheadMonitoring.aspx>
- Additional hatchery release notifications: *List all relevant hatchery release notifications.*
 - See Table 4 Hatchery Release Data WY 2022
- 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.*
 - None
- Anticipated emigration to continue into the Delta:
 - http://www.cbr.washington.edu/sacramento/data/query_hrt.html and http://www.cbr.washington.edu/sacramento/data/query_salvage_hrt.html
- Routing and Survival Analysis:

- Delta STARS Model: <https://oceanview.pfeg.noaa.gov/shiny/FED/CalFishTrack/>

| <u>Date:</u> (4/3/2022) | <u>DCC</u> | <u>Georgiana Slough</u> | <u>Sacramento River</u> | <u>Sutter and Steamboat Slough</u> | <u>Yolo Bypass</u> |
|---|------------|-----------------------------|-----------------------------|--|------------------------|
| Late Fall-Run Proportion of Entrainment | N/A | 0.30 | 0.45 | 0.25 | N/A |
| Late Fall-Run Survival | N/A | 0.16 | 0.50 | 0.38 | N/A |
| Winter-Run Proportion of Entrainment | N/A | 0.13 | 0.58 | 0.29 | N/A |
| Winter-Run Survival | N/A | 0.01 | 0.04 | 0.14 | N/A |

- The STARS Model has been recently updated to include a separate category for WR Chinook salmon entrainment, which includes a new covariate (Yolo Bypass) and has been included in the table above.
- Tillotson entrainment model or other entrainment models as they become available: The entrainment tool estimates a median loss of 0 WR and a maximum loss of 3 WR during this week (SacPas last updated on 4/5/2022). <http://www.cbr.washington.edu/sacramento/lossandsalvage/>
- Salvage trends in relation to OMRI: *Provide overview of salvage data and insert salvage table as attachment at end of document:* <https://apps.wildlife.ca.gov/Salvage>

Table 3. Relevant Water Year 2022 Criteria and Status for Listed Chinook Salmon under the SWP Long-Term Incidental Take Permit.

| <u>Action</u> | <u>Timeframe</u> | <u>Current Action Status</u> | <u>Threshold(s)</u> | <u>Current Relevant Data</u> | <u>Weekly Trend</u> | <u>Last Updated</u> | <u>Comments</u> |
|--|---|-------------------------------------|--|---|--|---------------------|-----------------------------------|
| Onset of OMR Mgmt. Salmonid Presence (8.3.2) | Jan. 1 - Jun. 30 <i>(when ≥ 5% of winter-run or spring-run are in the Delta)</i> | In effect | 5% of the winter-run or spring-run population are present in the Delta | Winter-run = 65-79% estimated in the Delta; Spring-run = 70-89% estimated in the Delta | Possible increase in presence of WR and SR | 4/5/22 | Based on 4/5/22 SaMT discussion |
| Winter-run yearly loss (8.6.1) | Nov. 1 - Jun. 30 | In effect WY 2022 loss = 1462.94 | Natural CHNWR (loss = 1.17% of JPE) 50% of 1.17% of JPE = 731.47 Hatchery CHNWR (loss = 0.12% of JPE) 50% of 0.12% of JPE = 90.93 | Current yearly WR loss (natural LAD) = 37.95 Current yearly WR loss (hatchery) = 6.71 | Possible salvage of both natural and hatchery WR | 4/5/22 | Based on salvage data from 4/5/22 |
| 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 juv. Chinook salmon 12/1-12/31: loss of 26/day unclipped older juv. Chinook salmon | NA | NA | 1/17/22 | NA |

| <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 | 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> | <p>January 1 – 31: 0.000635 * 125,038 = 7.94</p> <p>February 1 – 29: 0.0000991 * 125,038 = 12.39</p> <p>March 1 – 31: 0.000146 * 125,038 = 18.26</p> <p><u>April 1 – 30:</u> <u>0.0000507 *</u> <u>125,038 = 6.34</u></p> <p>May 1 – 31: 0.000077 * 125,038 = 9.63</p> | Possible additional salvage of older juvenile Chinook salmon | 4/5/22 | Based on salvage data from 4/5/22 |

| <u>Action</u> | <u>Timeframe</u> | <u>Current Action Status</u> | <u>Threshold(s)</u> | <u>Current Relevant Data</u> | <u>Weekly Trend</u> | <u>Last Updated</u> | <u>Comments</u> |
|---|------------------|------------------------------|---|---|--|---------------------|-----------------|
| Spring-run surrogate protection (8.6.4) | Feb. 1 - Jun. 30 | In effect | <p>Coleman National Fish Hatchery (CNFH) Group 1: 0.25% of total in-river CWT fall-run release (total of 7 CWT #s) Group 2: 0.25% of total in-river CWT fall-run release (total of 7 CWT #s) Group 3: 0.25% of total in-river CWT fall-run release (total of 10 CWT #s)</p> <p>Feather River Fish Hatchery (FRFH) Group 1: 0.25% of total in-river CWT spring-run release (total of 2 CWT #s)</p> | <p>CNFH Group 1: 0.0025 * 719,838 = 1,799.60</p> <p>CNFH Group 2: 0.0025 * 749,368 = 1,873.42</p> <p>CNFH Group 3: 0.0025 * 1,058,439 = 2,646.10</p> <p>FRFH Group 1: 0.0025 * 729,199 = 1,823.00</p> | <p>CNFH Group 1 release occurred on 3/15/2022</p> <p>CNFH Group 2 release occurred on 3/18/2022</p> <p>CNFH Group 3 release occurred on 3/31/2022 – 4/1/2022</p> <p>FRFH Group 1 release occurred on 3/30/2022</p> | 4/5/22 | NA |

Table 4. Hatchery salmon release data for Brood Year 2021 and Water Year 2022.

| Release Date | Hatchery | Race | CWT | Marked Release Number | Total Release | Percent Marked | Release Location | Mark | Agency | Release Type |
|-------------------|----------|-----------|----------|-----------------------|---------------|----------------|--|-------------------------------|--------|--------------------------|
| 11/8/2021 | CNFH | Late Fall | 05 64 65 | 78,056 | 78,056 | 100% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 11/8/2021 | CNFH | Late Fall | 05 64 66 | 82,154 | 82,154 | 100% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 11/8/2021 | CNFH | Late Fall | 05 64 73 | 75,923 | 75,923 | 100% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 12/7/2021 | SCARF | Spring | 06-80-02 | 3,476 | 3,476 | 100% | San Joaquin at Highway 140 | CWT, Ad-Clip and PIT | CDFW | SJRRP |
| 12/7/2021 | SCARF | Spring | 06-19-67 | 236 | 236 | 100% | San Joaquin at Highway 140 | CWT, Ad-Clip and PIT | CDFW | SJRRP |
| 12/7/2021 | SCARF | Spring | 06-18-10 | 61 | 61 | 100% | San Joaquin at Highway 140 | CWT and Ad-Clip | CDFW | SJRRP |
| 12/11/2021 | CNFH | Late Fall | 05 64 67 | 44,503 | 44,503 | 100% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 12/11/2021 | CNFH | Late Fall | 05 64 69 | 75,848 | 75,848 | 100% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 12/11/2021 | CNFH | Late Fall | 05 64 75 | 64,458 | 64,458 | 100% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 12/11/2021 | CNHF | Late Fall | 05 64 72 | 75,798 | 75,798 | 100% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 12/11/2021 | CNFH | Late Fall | 05 64 74 | 72,120 | 72,120 | 100% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 12/11/2021 | CNFH | Late Fall | 05 64 76 | 69,274 | 69,274 | 100% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 12/11/2021 | CNFH | Late Fall | 05 64 77 | 73,907 | 73,907 | 100% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 12/11/2021 | CNFH | Late Fall | 05 64 78 | 78,103 | 78,103 | 100% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| *12/15/2021 | CNFH | Late Fall | 05 64 68 | 84,343 | 84,343 | 100% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Experimental |
| 12/17/2021 | CNFH | Fall | NA | 0 | 615,426 | 0% | Sacramento River at Balls Ferry Boat Ramp | No Mark | USFWS | Experimental |
| *12/22/2021 | CNFH | Late Fall | 05 64 70 | 82,626 | 82,626 | 100% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Experimental |
| 12/30/2021 | CNFH | Fall | NA | 0 | 635,998 | 0% | Sacramento River at Balls Ferry Boat Ramp | No Mark | USFWS | Experimental |
| *1/6/2022 | CNFH | Late Fall | 05 64 71 | 77,325 | 77,325 | 100% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Experimental |
| 1/11/2022 | CNFH | Fall | NA | 0 | 607,605 | 0% | Sacramento River at Balls Ferry Boat Ramp | No Mark | USFWS | Experimental |
| 2/2/2022-2/3/2022 | CNFH | Winter | 05 65 96 | 200 | 200 | 100% | Sacramento River at Sycamore Grove Boat Launch | CWT, Ad-Clip, and left-pelvic | USFWS | Experimental (Jumpstart) |
| 2/9/2022 | LSNFH | Winter | 05 58 58 | 75,078 | 75,078 | 100% | Sacramento River at Caldwell Park Boat Ramp | CWT and Ad-Clip | USFWS | Production |
| 2/9/2022 | LSNFH | Winter | 05 65 10 | 48,897 | 48,897 | 100% | Sacramento River at Caldwell Park Boat Ramp | CWT and Ad-Clip | USFWS | Production |
| 2/14/2022 | SCARF | Spring | 06 15 55 | 57,478 | 57,478 | 100% | San Joaquin River at Highway 140 | CWT and Ad-Clip | CDFW | SJRRP |

| | | | | | | | | | | |
|-----------------------|-------|--------|----------|---------|---------|------|--|-------------------------------|-------|--------------------------|
| 2/23/2022-2/24/2022 | CNFH | Winter | 05 65 96 | 200 | 200 | 100% | Sacramento River at Sycamore Grove Boat Launch | CWT, Ad-Clip, and left-pelvic | USFWS | Experimental (Jumpstart) |
| 3/2/2022 | LSNFH | Winter | 05 61 77 | 31,099 | 31,099 | 100% | Sacramento River at Caldwell Park Boat Ramp | CWT and Ad-Clip | USFWS | Production |
| 3/2/2022 | LSNFH | Winter | 05 61 78 | 42,996 | 42,996 | 100% | Sacramento River at Caldwell Park Boat Ramp | CWT and Ad-Clip | USFWS | Production |
| 3/2/2022 | LSNFH | Winter | 05 61 79 | 47,780 | 47,780 | 100% | Sacramento River at Caldwell Park Boat Ramp | CWT and Ad-Clip | USFWS | Production |
| 3/2/2022 | LSNFH | Winter | 05 65 07 | 48,138 | 48,138 | 100% | Sacramento River at Caldwell Park Boat Ramp | CWT and Ad-Clip | USFWS | Production |
| 3/2/2022 | LSNFH | Winter | 05 65 08 | 47,247 | 47,247 | 100% | Sacramento River at Caldwell Park Boat Ramp | CWT and Ad-Clip | USFWS | Production |
| 3/2/2022 | LSNFH | Winter | 05 65 09 | 47,656 | 47,656 | 100% | Sacramento River at Caldwell Park Boat Ramp | CWT and Ad-Clip | USFWS | Production |
| 3/2/2022 | LSNFH | Winter | 05 65 11 | 47,532 | 47,532 | 100% | Sacramento River at Caldwell Park Boat Ramp | CWT and Ad-Clip | USFWS | Production |
| 3/2/2022 | LSNFH | Winter | 05 65 12 | 46,553 | 46,553 | 100% | Sacramento River at Caldwell Park Boat Ramp | CWT and Ad-Clip | USFWS | Production |
| 3/2/2022 | LSNFH | Winter | 05 65 13 | 37,309 | 37,309 | 100% | Sacramento River at Caldwell Park Boat Ramp | CWT and Ad-Clip | USFWS | Production |
| 3/15/2022 | CNFH | Fall | 05 65 99 | 102,861 | 407,249 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/15/2022 | CNFH | Fall | 05 66 01 | 101,412 | 402,453 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/15/2022 | CNFH | Fall | 05 66 02 | 106,433 | 424,193 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/15/2022 | CNFH | Fall | 05 66 03 | 84,458 | 335,925 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/15/2022 | CNFH | Fall | 05 66 04 | 121,538 | 486,152 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/15/2022 | CNFH | Fall | 05 66 05 | 105,540 | 421,213 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/15/2022 | CNFH | Fall | 05 66 06 | 97,596 | 388,199 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/16/2022 – 3/17/2022 | CNFH | Winter | 05 65 96 | 51,376 | 51,376 | 100% | North Fork Battle Creek, Manton, CA | CWT, Ad-Clip and left pelvic | USFWS | Jumpstart |
| 3/16/2022 – 3/17/2022 | CNFH | Winter | 05 65 97 | 8,661 | 8,661 | 100% | North Fork Battle Creek, Manton, CA | CWT, Ad-Clip and left pelvic | USFWS | Jumpstart |
| 3/16/2022 – 3/17/2022 | CNFH | Winter | 05 65 91 | 43,852 | 43,852 | 100% | North Fork Battle Creek, Manton, CA | CWT, Ad-Clip and left pelvic | USFWS | Jumpstart |
| 3/16/2022 – 3/17/2022 | CNFH | Winter | 05 65 98 | 10,568 | 10,568 | 100% | North Fork Battle Creek, Manton, CA | CWT, Ad-Clip and left pelvic | USFWS | Jumpstart |
| 3/16/2022 – 3/17/2022 | CNFH | Winter | 05 65 32 | 22,501 | 22,501 | 100% | North Fork Battle Creek, Manton, CA | CWT, Ad-Clip and left pelvic | USFWS | Jumpstart |
| 3/18/2022 | CNFH | Fall | 05 66 07 | 111,556 | 444,578 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |

| | | | | | | | | | | |
|----------------------|-------|--------|----------|---------|---------|------|----------------------------------|-----------------|-------|------------|
| 3/18/2022 | CNFH | Fall | 05 66 08 | 105,374 | 418,847 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/18/2022 | CNFH | Fall | 05 66 09 | 95,292 | 378,318 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/18/2022 | CNFH | Fall | 05 66 10 | 112,035 | 445,793 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/18/2022 | CNFH | Fall | 05 66 11 | 105,316 | 418,354 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/18/2022 | CNFH | Fall | 05 66 12 | 113,114 | 449,852 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/18/2022 | CNFH | Fall | 05 66 13 | 106,681 | 426,724 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/18/2022 | SCARF | Spring | 06 22 06 | 20,598 | 20,598 | 100% | San Joaquin River at Highway 140 | CWT and Ad-Clip | CDFW | SJRRP |
| 3/30/2022 | FRFH | Spring | 06 28 63 | 370,628 | 741,256 | 50% | Boyd's Pump Launch Ramp | CWT and Ad-Clip | CDFW | Production |
| 3/30/2022 | FRFH | Spring | 06 28 64 | 358,571 | 717,502 | 50% | Gridley Boat Ramp | CWT and Ad-Clip | CDFW | Production |
| 3/31/2022 – 4/1/2022 | CNFH | Fall | 05-66-14 | 105,309 | 419,595 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/31/2022 – 4/1/2022 | CNFH | Fall | 05-66-15 | 97,363 | 386,529 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/31/2022 – 4/1/2022 | CNFH | Fall | 05-66-16 | 111,532 | 443,071 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/31/2022 – 4/1/2022 | CNFH | Fall | 05-66-17 | 97,234 | 387,178 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/31/2022 – 4/1/2022 | CNFH | Fall | 05-66-18 | 102,618 | 406,999 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/31/2022 – 4/1/2022 | CNFH | Fall | 05-66-19 | 99,140 | 394,112 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/31/2022 – 4/1/2022 | CNFH | Fall | 05-66-20 | 104,313 | 417,250 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/31/2022 – 4/1/2022 | CNFH | Fall | 05-66-21 | 118,925 | 475,701 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/31/2022 – 4/1/2022 | CNFH | Fall | 05-66-22 | 112,706 | 450,824 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |
| 3/31/2022 – 4/1/2022 | CNFH | Fall | 05-66-23 | 109,299 | 437,195 | 25% | Battle Creek at CNFH | CWT and Ad-Clip | USFWS | Production |

*These releases are hatchery yearling spring-run Chinook salmon surrogates that are tracked for COA 8.7 OMR Flexibility During Delta Excess Conditions.

Table 5. Hatchery steelhead release data for Brood Year 2021 and Water Year 2022.

| Release Date | Hatchery | CWT | Marked Release Number | Total Release | Percent Marked | Release Location | Mark | Agency | Release Type |
|---------------------|----------|----------|-----------------------|---------------|----------------|---|----------------------------------|--------|--------------|
| 12/11/2021 | CNFH | N/A | 610,911 | 610,911 | 100% | Battle Creek at CNFH | Ad-Clip | USFWS | Production |
| 1/31/2022-2/4/2022 | NIM | N/A | 424,000 | 424,000 | 100% | Lower American River at Sunrise Boat Ramp | Ad-Clip | CDFW | Production |
| 1/31/2022-2/1/2022 | MOK | 06-15-29 | 57,065 | 57,065 | 100% | Mokelumne River at Feist Ranch | CWT and Ad-Clip | CDFW | Production |
| 2/4/2022-2/11/2022 | FRFH | N/A | 495,000 | 495,000 | 100% | Boyd's Pump | Ad-Clip | CDFW | Production |
| 2/28/2022 | MOK | N/A | 60,000 | 60,000 | 100% | Mokelumne River at Feist Ranch | Ad-Clip | CDFW | Production |
| 4/4/2022 – 4/5/2022 | MOK | N/A | 50,000 | 50,000 | 100% | Mokelumne River at Feist Ranch | Ad-Clip and Right Maxillary Clip | CDFW | Production |

Table 6. COA 8.6.4 Young-of-Year Spring-run Chinook Salmon Hatchery Surrogate Summary Table, WY 2022.

| | | | | | | | |
|-----------------------------|----|----|----|----|----|----|---|
| Nimbus Fish Hatchery | NA | NA | NA | NA | NA | NA | It is possible that either or both of these groups will be released in the Bay. See CNFH Groups 3 and 4 above as substitute groups. |
|-----------------------------|----|----|----|----|----|----|---|