

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

Section 1: Overview

Date: 11/24/2020

Life Stages Present:

Winter-run Chinook Salmon (juvenile)

Spring-run Chinook Salmon (juvenile)

Advice to WOMT:

No advice is warranted.

At this time, juvenile winter-run Chinook salmon are distributing downstream into the Sacramento River system, with most fish remaining upstream of Colusa. Few fish have been detected farther downstream as they migrate towards the Delta. By late November, juvenile spring-run Chinook salmon are emerging from the gravel and beginning to move downstream as fry. A small number of fish have been detected at monitoring stations within the Sacramento River and upper Delta regions. Based on current conditions, there is minimal risk of exceeding a federal Delta Cross Channel (DCC) gate trigger based on older juvenile Chinook salmon detections in the monitoring programs at Knights Landing, and the Sacramento trawl and regional beach seines. The DCC gates are currently closed (11/24/20) but will open on 11/25/20 and remain open through 11/30/20. The DCC gates are scheduled to be closed on 12/1/20 and will remain closed until late May 2021, per the PA operations description for the DCC gates. Condition of Approval (COA) 8.6.1 Winter-run Single-year Loss Threshold and 8.6.2 Early-season Natural Winter-run Chinook Salmon Discrete Daily Loss have been in effect since 11/1/2020 but SaMT anticipates only a minimal risk of exceeding any juvenile winter-run Chinook salmon cumulative or daily thresholds due to current estimated distribution of fish and forecasted weather conditions for the next week. However, current seasonal timing and the distribution of winter-run Chinook salmon indicates they are rearing and holding in the middle section of the Sacramento River, and any significant precipitation events could trigger a substantial redistribution of fish into the Delta which will require SaMT to monitor COAs 8.6.1 and 8.6.2 more closely.

Risk Assessment:

Overall risk of entrainment to juvenile winter-run Chinook salmon into the interior Delta is similar to last week and is still considered to be low this week based on minimal observations of fish in the Delta. Cumulative catch of length-at-date (LAD) juvenile winter-run Chinook salmon at GCID has been 999 fish with 43 LAD juvenile winter-run Chinook salmon observed over the last week (11/17/20 to 11/23/20). No juvenile winter-run Chinook salmon were observed in the downstream monitoring stations (Knights Landing and Sacramento area locations) over the last week. This information along with seasonal timing and RBDD historical passage trends, indicates most of the population occupies the reaches between RBDD and Colusa. In the reach between RBDD and Colusa, the river is more sinuous than the lower reaches of the Sacramento River and include a number of side channels that increase the overall edge habitat available potentially providing additional upstream rearing areas. RBDD [river mile (RM) 243] and GCID (RM 205) continue to see numbers of juvenile winter-run Chinook salmon in their counts, indicating ongoing passage at these locations, yet minimal to no catch has been

observed at the downstream monitoring locations. However, based on current hydrological conditions (i.e., low turbidity and low flows), SaMT members agree that this reduces the trap capture efficiencies of various downstream monitoring sites and therefore more fish may have distributed downstream than is estimated from the observations of catch from the downstream monitoring sites. SaMT estimates that most of the population of juvenile winter-run Chinook salmon population (97-99%) has yet to enter the Delta. Reclamation stated that the DCC gates are currently closed (11/24/20) but will open 11/25/20 and remain open through 11/30/20. The gates will close on 12/1/20 and remain closed through late May 2021, per the PA operations description for the DCC gates. Routing risk from the Sacramento River into the interior Delta through the DCC and Georgiana Slough based on forecasted conditions, operations, and the DCC gate opening is higher than last week but remains in the medium category this week. The open gates (11/25/20 through 11/30/20) provide an increased risk of routing into the Delta interior. This risk is also enhanced by the shift from a neap tidal condition to a spring tide condition with the full moon on 11/30/20. River flows measured at Freeport and Vernalis are forecasted to remain at levels similar to the previous week. The forecasted level of exports for this week is similar to last week's levels, resulting in the same risk of routing into the south Delta for fish already in the interior Delta as last week. Based on the current in-Delta distribution of juvenile winter-run Chinook salmon and seasonal timing, overall risk of entrainment into the interior Delta still remains low. Overall risk of entrainment at the facilities remains similar to last week and remains low. Although the high range of exports and more negative OMR (-4,500 cfs) are forecasted to increase over the next week which may have an impact on fish routing at key channel junctions, the risk of entrainment at the facilities and exceeding a daily discrete loss threshold remains in the low category based on the low numbers of fish believed to be in the central and southern Delta at this time.

Risk of entrainment to juvenile spring-run Chinook salmon into the interior Delta is similar to last week and considered to be low this week. Cumulative seasonal catch of LAD juvenile spring-run Chinook salmon at the GCID RST has been 50 fish, but no LAD spring-run Chinook salmon have been observed over the past week (11/17/20 to 11/23/20). Beginning on 10/21/20, flows in Mill Creek were greater than 95 cfs and flows in Deer Creek (11/18-11/21/20) were greater than 95 cfs, indicating river conditions that are consistent with downstream movement of yearling spring-run Chinook salmon out of the tributaries and into the mainstem upper Sacramento River. Monitoring in Butte Creek also indicates yearling spring-run Chinook salmon are moving downstream in this tributary towards the Sacramento River. SaMT estimates that most of the population of young-of-year juvenile spring-run Chinook salmon (99-100%) has yet to enter the Delta. Routing risk to juvenile spring-run Chinook salmon into the interior Delta this week is similar to juvenile winter-run Chinook salmon regarding DCC gate operations, but based on the current distribution and seasonal timing, risk remains in the low category. Overall risk of entrainment at the facilities remains similar to last week and remains low. The higher range of exports and more negative OMR forecasted will have similar effects upon juvenile spring-run Chinook salmon as described for juvenile winter-run Chinook salmon, and based on fish distribution in the central and south Delta, the risk of entrainment at the facilities and exceeding a daily discrete loss threshold remains in the low category.

There is minimal risk of exceeding a federal Delta Cross Channel (DCC) gate trigger this upcoming week based on lack of presence of older juvenile Chinook salmon in the lower Sacramento River and within the vicinity of the DCC gates. Additionally, no juvenile Chinook salmon have been observed in salvage this past week.

Currently the controlling factor for exports is water quality in the Delta. Controlling factors for exports for the upcoming week are anticipated to be water quality.

Section 1-A: Sacramento River and Confluence

Assessment of risk of entrainment into the central Delta and CVP/SWP facilities for CHNWR and CHNSR in the Sacramento River: (8.1.5.1 C ii, iii, iv and 8.1.5.1 B iii)

- Exposure Risk:
 - CHNWR: Low
 - CHNSR: Low
- Routing Risk:
 - CHNWR: Medium
 - CHNSR: Medium
- Overall Entrainment Risk:
 - CHNWR: Low
 - CHNSR: Low
- Change in risk of entrainment into the Central Delta (Increased/decreased risk compared to last week):
 - CHNWR: Exposure risk remains similar to last week based on similar hydrology and upstream distribution this week compared to last week. Currently, only 1-3% of the juvenile winter-run Chinook population has been estimated be present in the Delta this week. Therefore, exposure risk is estimated to be low. However, the DCC gates will be open from Wednesday (11/25/20) through Monday (11/30/20) which increases the risk of routing into the interior Delta. The open status of the gates also coincides with the full moon on Monday (11/30/20) with a concurrent increase in tidal effects from the spring neap tide at the DCC and Georgiana Slough junctions. Thus, the routing risk increases from the Sacramento River into the interior Delta based on forecasted conditions and operations, will remain in the medium category this week. Flows measured at Freeport and Vernalis are forecasted to remain at similar levels compared to the previous week. The forecasted level of exports increases the risk of routing into the south Delta towards the export facilities for fish already in the interior Delta. However, based on the current in-Delta distribution and seasonal timing, overall risk of entrainment into the interior Delta remains low.
 - CHNSR: Exposure risk remains similar to last week based on low numbers of juvenile CHNSR in the system and their distribution primarily upstream of Knights Landing, 0-1% of the young-of-year spring-run Chinook salmon population has been estimated to be present in the Delta this week. However, the DCC gates will be open from Wednesday (11/25/20) through Monday (11/30/20) which increases the risk of routing into the interior Delta. The open status of the gates also coincides with the full moon on Monday (11/30/20) with a concurrent increase in tidal effects from the spring tide at the DCC and Georgiana Slough junctions. Thus, the routing risk increases from the Sacramento River into the interior Delta based on forecasted conditions and operations. Flows measured at Freeport and Vernalis are forecasted to remain at similar levels compared to last week. The forecasted level of exports increases the risk of routing into the south Delta for fish already in the interior Delta. However, based on the current in-Delta distribution and seasonal timing, overall risk of entrainment into the interior Delta remains low.

Section 1-B: Facilities Risk

CVP/SWP facilities entrainment risk for CHNWR and CHNSR in the central Delta over the next week (8.1.5.1 D iii, iv, v)

- Exposure Risk:
 - CHNWR: Low
 - CHNSR: Low
- Reporting OMR/Export Risk: (Number and range of OMR bins will vary based on anticipated hydrology and operations)
 - OMR (-2,500 cfs)
 - CHNWR: Low
 - CHNSR: Low
 - OMR (-4,500 cfs)
 - CHNWR: Medium
 - CHNSR: Medium
- Overall Entrainment Risk:
 - CHNWR: Low
 - CHNSR: Low
- Change in risk of entrainment into the facilities (increased/decreased risk compared to last week):
 - CHNWR: Overall risk is similar to last week based on hydrology and upstream distribution of the juvenile winter-run Chinook salmon population this week compared to last (1-3% of the juvenile population has been estimated to be present in the Delta this week). The high range of exports and more negative OMR (-4,500 cfs) forecasted over the next week may have an impact on routing at key junctions. However, based on fish distribution in the central and south Delta, overall risk of entrainment at the facilities remains in the low category.
 - CHNSR: Overall risk is similar to last week based on low numbers of juvenile CHNSR in the system and distribution upstream of Knights Landing (0-1% have been estimated to occur in the Delta this week). The high range of exports and more negative OMR (-4,500 cfs) forecasted over the next week may have an impact on routing at key junctions. However, the overall risk of entrainment at the facilities remains in the low category based on fish distribution in the central and south Delta.

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)
 - Salvage loss at the SWP and CVP facilities compared to estimated remaining population in Delta and upstream of the Delta: No salvage of CESA listed Chinook salmon have been observed in salvage over the past week.
 - Define risk of hitting a threshold, 50%, or 75%, or 100%, and actions to minimize that happening:
 - Natural origin CHNWR:
 - Current Annual Loss: 0
 - 50% Threshold based on JPE:
 - Risk of exceeding threshold: Threshold has not yet been determined.
 - 75% Threshold based on JPE:
 - Risk of exceeding threshold: Threshold has not yet been determined.

- 100% Threshold based on JPE:
 - Risk of exceeding threshold: Threshold has not yet been determined.
- Hatchery CHNWR:
 - Current Annual Loss: Not applicable. Releases have not yet occurred.
 - 50% Threshold based on JPE:
 - Risk of exceeding threshold: Not applicable. Threshold has not yet been determined.
 - 75% Threshold based on JPE:
 - Risk of exceeding threshold: Not applicable. Threshold has not yet been determined.
 - 100% Threshold based on JPE:
 - Risk of exceeding threshold: Not applicable. Threshold has not yet been determined.

Section 1-D: Daily Loss Threshold Risk

- Daily loss threshold risk and Alternative Actions
 - Salvage loss at the SWP and CVP facilities compared to estimated remaining population in Delta and upstream of the Delta:
 - Daily loss thresholds hit and subsequent loss and associated operations:
 - Natural origin CHNWR:
 - November monthly daily loss threshold: 6 older juvenile Chinook salmon per day
 - Highest daily loss: 0
 - Hatchery origin CHNWR:
 - Highest daily loss: Currently not applicable. Releases have not yet occurred.
 - Hatchery origin CHNSR:
 - Highest daily loss: Currently not applicable. Releases have not yet occurred.
 - Hatchery origin CHNSR surrogates:
 - Highest daily loss: Currently not applicable. Releases have not yet occurred.

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](#) (ITP) states that advice to Water Operations Management Team (WOMT) shall be consistent with the Project Description, Conditions of Approval in the ITP, and the applicable ESA authorizations. This week's advice is based on the following Conditions of Approval which are currently applicable:

List relevant Condition of Approval 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 CHNWR (loss = 1.17% of JPE)*
- Hatchery CHNWR (loss = 0.12% of JPE)*

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

Loss of CHNWR at the at the CVP and SWP salvage facilities shall be calculated based on length-at-date criteria.

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

CHNWR shall be identified based on the Delta Model length-at-date 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 CHNWR 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 CHNWR 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 CHNWR at the 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 CHNWR 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 CHNWR cumulative loss at the 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 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 CHNSR 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).

8.6.2 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.

Discussion of Conditions of Approval

Provide sentence or two addressing criteria for each Condition of Approval listed in “Basis for Advice” section. Refer to data below where appropriate.

Per Conditions of Approval 8.1.4 and 8.1.5, SaMT has provided advice and accompanying risk assessment to WOMT.

Per Conditions of Approval 8.6.1 and 8.6.2, SaMT does not believe either condition is at risk of exceeding thresholds.

Section 3: Hydrology and Operations

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

Section 3-A: Water operations conditions 8.1.5.1 A. i, iii:

- Antecedent Actions: *(e.g. DCC gate closure and actions such as integrated early winter pulse protection, etc.)*
DCC gates are closed until 11/24/20. DCC gates will be open from 11/25/20 through 11/30/20 and then close on 12/1/20 and remain closed until late May.
- Current Controlling Factor(s):
 - SWP: Delta water quality
 - CVP: Delta water quality
- Water Temperature:
 - Mossdale: 52.7°F on 11/23/20
 - Number of days threshold exceeded: Not applicable until June.
 - Prisoners Point: 55.5°F on 11/23/20
 - 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)*
 - Full moon on 11/30/20. The most likely cause of export changes in the coming week would be to mitigate the effects on water quality of the coming spring tide.
- Turbidity:
 - 8.3.1 Turbidity at FPT Dec 1 to Jan 31
- Salinity: X2: > 81km
- Hydraulic Footprint *(Provide brief description of hydrologic footprint and summary of relevant DSM2 results):*
 - DSM2 runs did not occur this week and results were not provided to SaMT.

Section 3-B: Water Operations Outlook 8.1.5.1 A. ii:

- Outages:
 - SWP: None, no reported reductions in fish salvage counts
 - CVP: None, no reported reductions in fish salvage counts
- Exports
 - SWP: 3,000 cfs
 - CVP: 1,000 cfs
- Meteorological Forecast: *Precipitation, wind, air temperature. Are conditions (i.e. flow, turbidity, water temp) expected to change?*
 - Light showers possible over the mountains Tuesday (11/24/20) night and Wednesday (11/25/20), otherwise dry weather expected into next week. Mild days and cool nights will continue with breezy north to east winds today and again Thursday.
- Storm Event Projection:
 - A weak weather system is slated to move through northern California late Tuesday night through Wednesday. The mountains and foothills will see some light precipitation (generally under a quarter inch), but a few sprinkles cannot be ruled out elsewhere. An inch or two of snowfall accumulation will be possible across the peaks of the northern Sierra and southern

Cascade Range. Highs on Wednesday will be around 10-15 degrees cooler in the mountains, and about 5 degrees cooler across the Central Valley, compared to today.

Section 3-C: Projected Conditions 8.1.5.1 A. iii:

- DCC Gates position: Closed through 11/24/20, open 11/25/20-11/30/20, closed 12/1/20 until late May.
- Sacramento River flow at Freeport: 7,500 – 9,500 cfs
- San Joaquin River flow at Vernalis: 700 – 1,200 cfs
- Qwest: Not discussed.
- Old River at Bacon Island Turbidity: *Is turbidity at Bacon Island (OBI) expected to change due to precipitation, wind, operations, or other factors?* Not discussed.
- Freeport Turbidity: *Is turbidity at Freeport (FPT) expected to change due to precipitation, wind, operations, or other factors?* Not discussed.
- Expected changes in South Delta Exports:
 - CCF: 2,000 – 4,000 cfs
 - Tracy: 1,000 – 1,800 cfs

Table 1: Comparison of OMR and OMR Index

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
11/21/20	Daily	-3,400	-3,500
11/21/20	5-day	-3,200	-3,300
11/21/20	14-day	-2,800	-2,600
11/23/20	Daily	Not Applicable	-3,600
11/23/20	5-day	Not Applicable	-3,600
11/23/20	14-day	Not Applicable	-2,900

Section 4: Distribution and Biology

8.1.5.1.B Assessment of biological information for CHNWR and CHNSR.

Section 4-A: CHNWR population status 8.1.5.1.B i

- Adult escapement estimate: Not yet available, although the current preliminary estimate from carcass counts is 6,392 total adults and 3,904 female spawners.
- Redd distribution and fry emergence timing: BY2020 total passage at Red Bluff Diversion Dam through 11/17/20 is 1,759,210 fish. Average historic passage (2010-2019) as of 11/17/20 indicates 87.5% with one standard deviation of 8.9% have passed Red Bluff Diversion Dam.
- Juvenile production estimate: Not available
- Livingston Stone National Fish Hatchery release: Not applicable. Releases have not occurred. Preliminary information from the Livingston Stone National Fish Hatchery indicates issues potentially related to thiamine deficiency in returning adults may have impacted the final supplemental goal.
- Distribution of natural CHNWR:
 - % of juveniles upstream of the Delta: 97-99%
 - % of juveniles in Delta: 1-3%
 - % of juveniles past Chipps Island: 0%
- Distribution of Livingston Stone National Fish Hatchery CHNWR:
 - % of juveniles upstream of the Delta: Not applicable. Releases have not occurred.
 - % of juveniles in Delta: Not applicable. Releases have not occurred.
 - % of juveniles past Chipps Island: Not applicable. Releases have not occurred.
- Distribution of Battle Creek CHNWR:
 - % of juveniles upstream of the Delta: Not applicable.
 - % of juveniles in Delta: Not applicable.
 - % of juveniles past Chipps Island: Not applicable.
- Change in risk of entrainment into the central Delta:
 - Exposure risk remains similar to last week based on similar hydrology and upstream distribution this week compared to last week, 1-3% of the juvenile winter-run Chinook population has been estimated be present in the Delta this week. The DCC gates will be open from Wednesday (11/25/20) through Monday (11/30/20), which coincides with the full moon on Monday (11/30/20). The routing risk increases from the Sacramento River into the interior Delta based on forecasted conditions and the gate operations. However, the routing risk will still remain in the medium category this week. Flows measured at Freeport and Vernalis are forecasted to remain at similar levels compared to the previous week. The DCC gates will close on Tuesday (12/1/20) and remain closed until late May. The forecasted level of exports increases the risk of routing into the south Delta for fish already in the interior Delta. However, based on the current in-Delta distribution and seasonal timing, overall risk of entrainment into the interior Delta remains low.

Section 4-B: CHNSR population status 8.1.5.1.B ii

- Adult escapement estimate: Not available
- Redd distribution and fry emergence timing: Adult CHNSR are likely to have completed their spawning by mid-November. Egg incubation and fry emergence is currently occurring. BY2020 total passage at Red Bluff Diversion Dam through 11/17/20 is 81,726 fish.

- Hatchery release (in-river and downstream): No hatchery releases at this time. Spring-run Chinook salmon egg collection ended on 10/2/20. Preliminary information from the Feather River Hatchery indicates issues potentially related to thiamine deficiency in returning adults which may impact the final production goal. Reduced numbers of tagged spring-run adults returned to the hatchery this fall and remained in-river to spawn which may also contribute to the low production this year.
- Distribution of natural CHNSR:
 - % of juveniles upstream of the Delta: 99-100%
 - % of juveniles in Delta: 0-1%
 - % of juveniles past Chipps Island: 0%
- Distribution of Feather River Fish Hatchery CHNSR:
 - % of juveniles upstream of the Delta: Not applicable. Releases have not occurred.
 - % of juveniles in Delta: Not applicable. Releases have not occurred.
 - % of juveniles past Chipps Island: Not applicable. Releases have not occurred.
- Change in risk of entrainment into the central Delta:
 - Exposure risk remains similar to last week based on low numbers of juvenile CHNSR in the system and their distribution primarily upstream of Knights Landing, 0-1% of the young-of-year spring-run Chinook salmon population has been estimated to be present in the Delta this week. The DCC gates will be open from Wednesday (11/25/20) through Monday (11/30/20), which coincides with the full moon on Monday (11/30/20). The routing risk increases from the Sacramento River into the interior Delta based on forecasted conditions and the gate operations. However, the routing risk will still remain in the medium category this week. Flows measured at Freeport and Vernalis are forecasted to remain at similar levels as compared to last week. The DCC gates will close on Tuesday (12/1/20) and stay closed until mid-May. The forecasted level of exports increases the risk of routing into the south Delta for fish already in the interior Delta. However, based on the current in-Delta distribution and seasonal timing, overall risk of entrainment into the interior Delta remains low.

Section 4-C: Additional data sources to assess sensitivity to entrainment into the central and south Delta 8.1.5.1.C & D

- In-Delta distribution of CHNWR and CHNSR: 1-3% of CHNWR estimated to be present in the Delta. 0-1% of spring-run Chinook estimated to be present in the Delta.
- Acoustic telemetry: *Summary of acoustic telemetry tracking*
 - No results at this time.
- Trawls: *List all relevant trawl surveys and brief overview of data. Insert tables, PDFs or other information as attachment at end of document. Include interruptions to sampling or other relevant information (e.g. canceled surveys, dropped stations, etc.)*
 - No catch of CESA listed salmon.
- Rotary Screw Traps: *List all relevant rotary screw trap surveys and brief overview of data. Insert tables, PDFs or other information as attachment at end of document. Include interruptions to sampling or other relevant information (e.g. canceled surveys, dropped stations, etc.)*
 - GCID: 43 CHNWR (11/17/20 – 11/23/20)
- Seines: *List all relevant seine surveys and brief overview of data. Insert tables, PDFs or other information as attachment at end of document. Include interruptions to sampling or other relevant information (e.g. canceled surveys, dropped stations, etc.)*

- No catch of CESA listed salmon.
- Hatchery release notifications: *List all relevant hatchery release notifications*
 - No hatchery releases this past week.
- 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*
 - Not applicable at this time.
- Distribution of juvenile CHNWR and CHNSR estimated to be in the lower Sacramento River and northern Delta: 1-3% of CHNWR estimated to be present in the northern Delta. 0-1% of CHNSR estimated to be present in the northern Delta.
- Distribution of hatchery produced salmon indicated by real-time acoustic tracking of AT/CWT paired releases: Not applicable
- Anticipated emigration to continue into the Delta:
 - CHNWR and CHNSR are distributing and rearing downstream of their spawning grounds. Hydrological and meteorological environmental cues could trigger movement into the Delta.
- Flows in the Sacramento River predicted with upcoming storm events:
 - Minimal to no response in-river is anticipated based on amount of participation forecasted for this week.
- DCC gate position: Closed through 11/24/20, open 11/25/20-11/30/20, closed 12/1/20 until late May.
- Prediction of tidal interaction at Georgiana Slough (*Inflow to Delta from Sacramento River and the interaction of the muting of tidal effects around Georgiana Slough*): See routing analysis below.
- Precipitation in the forecast for the week and river flows affecting routing into central and interior Delta: Please see Section 3-B: Water Operations Outlook 8.1.5.1 A. ii: Storm Event Projection. Although a storm even is forecasted for this week, a significant response in river flow is not expected to occur.
- Routing analysis: STARS analysis was run 11/23/2020 and did not account for the latest DCC gate actions and were therefore not indicative of conditions for the upcoming week. The analysis indicates the following routing probabilities at the following junctions into different routes through the Delta. 0% at the Delta Cross Channel, 30% at Georgiana Slough, 25% at Sutter and Steamboat Slough, and 45% would remain in the Sacramento River. These results are not reflective of the latest DCC gate change order and do not reflect the gate opening scheduled for this Wednesday through Monday (11/25/20-11/30/20).
- Trend analysis: *Provide brief description of historic trends if relevant (e.g. salvage patterns, onset of spawning, etc.). Refer to data or publications as needed:* Not available
- Survival analysis (*e.g. Zeug and Cavallo CWT model*): Not available
- Tillotson entrainment model or other entrainment models as they become available: Not applicable
- Salvage trends in relation to OMRI: *Provide overview of salvage data and insert salvage table as attachment at end of document:* Not applicable as there has been no salvage of CESA listed salmon for water year 2021.
- Future export modifications: *Describe anticipated or potential changes to exports:* Not applicable at this time.

Notes:

The OMR guidance document and agenda are being updated and are expected to be finalized by November 19th. The objectives of the SaMT are to assess impacts of operations to winter-run and spring-run Chinook salmon and provide information to WOMT to reduce impacts. From the ITP perspective the SaMT assesses risk of entrainment in the central and south Delta as well as entrainment into the south Delta export facilities for winter-run and spring-run Chinook salmon. By the end of each SaMT call, clear advice to WOMT or a description of any disagreements will be drafted. This advice or description should be consistent with discussion during the SaMT call. SaMT members should expect to see the following weekly products: Operations Outlook, Reclamation Assessment, Meeting Notes, and ITP Risk Assessment for winter-run and spring-run Chinook salmon.

Appendix 1: SaMT Monitoring Program Data

Table 2: Fish Monitoring Data for 11/24/20 Meeting. The following table presents fish monitoring data summarized over the past week. Unless otherwise noted, reported sizes are fork length.

Location	GCID RST ¹	Tisdale RST	Knights Landing RST	Beach Seines	Sacramento Trawl ²	Chippis Is. Midwater Trawl ²	Mossdale Kodiak Trawl ²
Sample Date	11/17-11/23	11/17-11/23	11/17-11/23	11/16-11/20	11/16, 11/18, 11/20	11/16, 11/18, 11/20	11/16, 11/18, 11/20
Fall-run Chinook	0	0	0	0	0	0	0
Spring-run Chinook	0	0	0	0	0	0	0
Winter-run Chinook	43 juveniles	0	0	0	0	0	0
Late Fall-run Chinook	2 juveniles 2 smolts	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)	336	4,616	4,417	Not Applicable	Not Applicable	Not Applicable	Not Applicable
W. Temp. (avg. °F)	54.4	52.6	52.7	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Turbidity (avg. NTU)	5.3	4.1	3.7	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Table 3: Delta Sturgeon Tagging and Monitoring

Date Range	Comments
11/17/20 and 11/18/20	<ul style="list-style-type: none"> 1 juvenile WS and 2 juvenile GS tagged north of Sherman Lake 15 juvenile GS and 3 juvenile WS detected north of Sherman Lake. 1 juvenile WS detected at Montezuma Slough. 1 adult WS detected in the SJR.

¹ GCID running at ½ cone all week.

² DatCall data reported in the 11/15 to 11/21 DJFMP sampling summary.

Table 4: CDFW Adult Monitoring Surveys

Location	American River Carcass Survey	Stanislaus River Carcass Survey
Sample Dates	11/16/20-11/19/20	11/16/20-11/19/20
Live Fish	Not Available	519
Redds	Not Available	289
Carcasses	100	36
Ad-clipped	44	6
Spawn Condition	Prespawn Mortality: 23% (7/30)	Not Available
Flows (avg. cfs)	1,260	200
W. Temp (avg. °F)	56.5	Not Available

Appendix 2: Salvage Data

Table 5: SaMT Update. Reporting period is 11/16/20 through 11/22/20. Prepared by Geir Aasen on 11/23/20 at 1349 hours. These are preliminary results and are subject to revision.

Criteria	16-Nov	17-Nov	18-Nov	19-Nov	20-Nov	21-Nov	22-Nov	Trend ¹	Weekly Summary
Wild older juvenile CS Loss Density ²	0	0	0	0	0	0	0	→	0
Wild Steelhead Loss Density ⁴	0	0	0	0	0	0	0	→	0
SWP daily export (acre-feet)	1,867	2,972	4,052	4,132	3,854	3,430	5,152	↗	3,637
CVP daily export (acre-feet)	3,646	3,663	3,658	3,643	3,640	3,636	3,631	↗	3,645
SWP reduced counts ³	None	None	None	None	None	None	None	Not Applicable	Not Applicable
CVP reduced counts ⁵	None	None	None	None	None	None	None	Not Applicable	Not Applicable

¹ Trend is the current value compared to the previous week.

² Loss density equals number of fish lost divided by thousand acre-feet. Loss is equal to the estimated number of fish lost at the CVP and SWP Delta export facilities based on estimated salvage.

³ Reduced counts are the percentage of time that routine salvage sample times were less than 30 minutes per two hours of salvage and export operations.

Table 6: Chinook salmon weekly salvage and loss combined for both the SWP and the CVP fish collection facilities. Race is determined by size at date of capture. Hatchery origin fish are determined by the lack of adipose fin. Prepared by Geir Aasen on 11/23/20 at 1349 hours. These are preliminary results and are subject to revision.

Category	Salvage ¹	Loss ²	Trend
Wild winter-run	0	0	→
Wild spring-run	0	0	→
Wild late Fall-run	0	0	→
Wild fall-run	0	0	→
Hatchery winter-run	0	0	→
Hatchery spring-run	0	0	→
Hatchery late Fall-run	0	0	→
Hatchery fall-run	0	0	→
Total	0	0	Not Applicable

Table 7: Chinook salmon cumulative salvage and loss for Water Year 2021 combined for both the SWP and the CVP fish collection facilities. Race is determined by size at date of capture. Hatchery origin fish are determined by the lack of adipose fin. Prepared by Geir Aasen on 11/23/20 at 1349 hours. These are preliminary results and are subject to revision.

Category	Salvage ⁶	Loss ⁷	Trend
Wild winter-run	0	0	→
Wild spring-run	0	0	→
Wild late Fall-run	0	0	→
Wild fall-run	0	0	→
Hatchery winter-run	0	0	→
Hatchery spring-run	0	0	→
Hatchery late Fall-run	0	0	→
Hatchery fall-run	0	0	→
Total	0	0	Not Applicable

Table 8: Steelhead weekly salvage and loss combined for both the SWP and the CVP fish collection facilities. Hatchery origin fish are determined by the lack of adipose fin. Prepared by Geir Aasen on 11/23/20 at 1349 hours. These are preliminary results and are subject to revision.

Category	Salvage ⁶	Loss ⁷	Trend
Wild steelhead	0	0	→
Hatchery steelhead	0	0	→
Total	0	0	Not Applicable

¹ Salvage is equal to the estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time.

² State Water Project loss is equal to salvage multiplied by 4.33. Central Valley Project loss is equal to salvage multiplied by 0.68.

Table 9: Steelhead cumulative salvage and loss for Water Year 2021 combined for both the SWP and the CVP fish collection facilities. Hatchery origin fish are determined by the lack of adipose fin. Prepared by Geir Aasen on 11/23/20 at 1349 hours. These are preliminary results and are subject to revision.

Category	Salvage ¹	Loss ²	Trend
Wild steelhead	0	0	→
Hatchery steelhead	0	0	→
Total	0	0	Not Applicable

¹ Salvage is equal to the estimated number of fish collected by the CVP and SWP fish protective facilities per unit of time.

² State Water Project loss is equal to salvage multiplied by 4.33. Central Valley Project loss is equal to salvage multiplied by 0.68.