

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

Section 1: Overview

Date: 10/20/2020

Life Stages Present:

Winter-run Chinook Salmon (juvenile)

Spring-run Chinook Salmon (juvenile)

Advice to WOMT:

None.

Risk Assessment:

Risk of entrainment to juvenile winter-run Chinook salmon into the interior Delta and at the facilities is similar to last week and considered to be low this week. Cumulative catch of juvenile winter-run Chinook salmon at GCID has been 721 while 323 length-at-date juvenile winter-run Chinook salmon have been observed over the last week (10/13/20 to 10/20/20). A single individual juvenile winter-run Chinook salmon was observed in the monitoring stations as far downstream as the Knights Landing rotary screw traps. This information along with seasonal timing and RBDD historical passage trends, indicates a majority of the population occupies the reaches between RBDD and Tisdale. SaMT still estimates that the majority of the population of juvenile winter-run Chinook salmon (99-100%) are yet to enter the Delta. Risk to juvenile winter-run Chinook salmon entrainment into the interior Delta may increase over the weekend due to the Delta Cross Channel gates opening Saturday morning, but based on the current distribution, risk remains in the low category. USBR indicated that DCC gate closure may occur next week.

22 length at date juvenile spring-run Chinook salmon have been observed at GCID, but no other spring-run Chinook salmon have been observed in the monitoring this past week. In consideration of the seasonal timing, SaMT continues to estimate 0% of the juvenile spring-run Chinook salmon population are currently present in the Delta. SaMT did not assess risk to juvenile spring-run Chinook salmon this week.

This risk assessment does not address effects to adult fall-run Chinook salmon based on DCC gate operations. Additionally, no juvenile Chinook salmon have been observed in salvage this past week. Currently the controlling factor for exports is Delta outflow.

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:
 - Winter-run Chinook Salmon: Low
 - Spring-run Chinook Salmon: Not applicable since 0% are estimated to be in the Delta
- Routing Risk:
 - Winter-run Chinook Salmon: Low
 - Spring-run Chinook Salmon: Not applicable since 0% are estimated to be in the Delta

- Overall Entrainment Risk:
 - Winter-run Chinook Salmon: Low
 - Spring-run Chinook Salmon: Not applicable since 0% are estimated to be in the Delta
- Change in risk of entrainment into the Central Delta (Increased/decreased risk compared to last week):
 - Winter-run Chinook Salmon: Similar to last week based on DCC gate operations, hydrology, operations, and distribution this week compared to last.
 - Spring-run Chinook Salmon: Not applicable since 0% are estimated to be in the Delta

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:
 - Winter-run Chinook Salmon: Low
 - Spring-run Chinook Salmon: Not applicable since 0% are estimated to be in the Delta
- Reporting OMR/Export Risk: (Number and range of OMR bins will vary based on anticipated hydrology and operations)
 - OMR (-2,000 cfs)
 - Winter-run Chinook Salmon: Low
 - Spring-run Chinook Salmon: Not applicable since 0% are estimated to be in the Delta
 - OMR (-4,000 cfs)
 - Winter-run Chinook Salmon: Low
 - Spring-run Chinook Salmon: Not applicable since 0% are estimated to be in the 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 winter-run Chinook salmon:
 - Current Annual Loss: Not applicable. Conditions of Approval not in effect this month.
 - 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.
 - Hatchery winter-run Chinook salmon:
 - Current Annual Loss: Not applicable. Releases have not 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: Currently not applicable for the month of October.
 - Daily loss thresholds hit and subsequent loss and associated operations:
 - Natural origin winter-run Chinook salmon:
 - Monthly daily loss threshold: Currently not applicable for the month of October.
 - Highest daily loss: Currently not applicable for the month of October.
 - Hatchery origin spring-run Chinook salmon:
 - Highest daily loss: Currently not applicable. Releases have not occurred.
 - Hatchery origin spring-run Chinook salmon surrogates:
 - Highest daily loss: Currently not applicable. Releases have not 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.

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.

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 will close on 10/20 at 1600 hours and will remain closed until the morning of 10/24 at 1000 hours in response to a Mokelumne River pulse flow (1,340 AF) released 10/20 through 10/22.
- Current Controlling Factor(s):
 - SWP: Delta outflow
 - CVP: Delta outflow
- Water Temperature:
 - Mossdale: 65.6°F on 10/19
 - Number of days threshold exceeded: Not applicable until June.
 - Prisoners Point: 69.3°F on 10/19
 - 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)*
 - Was not discussed during the call.
- 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
 - CVP: None
- Exports
 - SWP: 300 cfs
 - CVP: 3,400 cfs
- Meteorological Forecast: *Precipitation, wind, air temperature. Are conditions (i.e. flow, turbidity, water temp) expected to change?*
 - Dry weather and breezy northerly flow will continue this week with periods of stronger winds resulting in elevated fire weather conditions. Cooler temperatures by the weekend with potentially another strong north to east wind event Sunday into Monday.
- Storm Event Projection: None

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

- DCC Gates position: Closed (10/20/2020 – 10/24/2020)
- Sacramento River flow at Freeport: 6,500 – 8,500 cfs
- San Joaquin River flow at Vernalis: 800 – 2,500 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: 300 – 800 cfs
 - Tracy: 2,400 – 3,400 cfs

Table 1: Comparison of OMR and OMR Index

Date	Averaging Period	USGS gauges (cfs)	Index
	Daily		
	5-day		
	14-day		
	Daily		Gauge data and index values were not

Date	Averaging Period	USGS gauges (cfs)	Index
	5-day		discussed during the SaMT call, but a range of OMR Index values was provided in the outlook: -3,000 to -5,000 cfs
	14-day		

Section 4: Distribution and Biology

8.1.5.1.B Assessment of biological information for winter-run Chinook salmon and spring-run Chinook salmon.

Section 4-A: Winter-run Chinook salmon population status 8.1.5.1.B i

- Adult escapement estimate: Not available
- Redd distribution and fry emergence timing: Eggs are currently in the gravel and BY2020 total passage through 10/6/2020 is 923,402. Average historic passage (2005-2019) as of 10/18/2020 indicates 69% have passed Red Bluff Diversion Dam.
- Juvenile production estimate: Not available
- Livingston Stone National Fish Hatchery release: Not applicable. Releases have not occurred.
- Distribution of natural winter-run Chinook salmon:
 - % of juveniles upstream of the Delta: 99-100%
 - % of juveniles in Delta: 0-1%
 - % of juveniles past Chipps Island: 0%
- Distribution of Livingston Stone National Fish Hatchery winter-run Chinook salmon:
 - % 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 winter-run Chinook salmon:
 - % 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:
 - Change in routing risk of entrainment into the central Delta: (*comparison to previous week*) Still low and similar to last week based on DCC gate operations, hydrology, and distribution from last week to this week.

Section 4-B: Spring-run Chinook salmon population status 8.1.5.1.B ii

- Adult escapement estimate: Not available
- Redd distribution and fry emergence timing: Adult spring-run Chinook salmon are spawning and eggs are currently in gravel.
- Hatchery release (in-river and downstream): No hatchery releases at this time.
- Distribution of natural spring-run Chinook salmon:
 - % of juveniles upstream of the Delta: 100%
 - % of juveniles in Delta: 0%
 - % of juveniles past Chipps Island: 0%
- Distribution of Feather River Fish Hatchery spring-run Chinook salmon:
 - % 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:
 - Change in routing risk of entrainment into the central Delta (*comparison to previous week*) Not applicable. SaMT estimates 100% of the juvenile spring-run Chinook salmon population remains upstream of the Delta.

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 winter-run and spring-run Chinook salmon: 0-1% of winter-run Chinook salmon estimated to be present in the Delta. 0% 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: 22 spring-run, 323 winter-run, and 16 late fall-run (10/13/2020 – 10/20/2020).
 - Knights Landing: 1 winter-run (10/13/2020 – 10/19/2020)
- 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 winter-run and spring-run Chinook salmon estimated to be in the lower Sacramento River and northern Delta: 0-1% of winter-run Chinook salmon estimated to be present in the Delta. 0% of spring-run Chinook salmon estimated to be present in the 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:
 - Fish are distributing downstream of their spawning grounds, potentially waiting for environmental cues to trigger movement into the Delta.
- Flows in the Sacramento River predicted with upcoming storm events:
 - No storms predicted.
- DCC gate position: Closed until 10/24 at 1000 hours.
- 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 effecting routing into central and interior Delta: None
- Routing analysis: STARS analysis was ran 10/20/2020 and indicates the following routing probabilities at the following junctions into different routes through the Delta. 0.07% at the Delta Cross Channel, 27% at Georgiana Slough, 24% at Sutter and Steamboat Slough, and 40% would remain in the

Sacramento River. These results are reflective of the latest DCC gate change order and are not reflective of conditions once the gates are open Saturday (10/24/20) morning.

- 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)*
- Tillotson entrainment model or other entrainment models as they become available
- 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.