

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

Section 1: Overview

Date: 12/1/2020

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 continue to be 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. The Delta Cross Channel (DCC) gates are currently closed and will remain closed until late May 2021, per the Proposed Action (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 the Salmon Monitoring Team (SaMT) anticipates only a minimal risk of exceeding any juvenile winter-run Chinook salmon cumulative or daily loss thresholds due to the current estimated distributions of fish, trapping conditions, 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 in the next couple weeks 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 of juvenile winter-run Chinook salmon into the interior Delta is similar to last week and is still considered to be low for 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 is 1,025 fish with 24 LAD juvenile winter-run Chinook salmon observed over the last week (11/24/20 to 11/30/20). One juvenile winter-run Chinook salmon was observed at the Knights Landing monitoring station 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 to rearing fish, potentially providing additional upstream rearing areas. RBDD (river mile [RM] 243) and GCID (RM 205) continue to observe juvenile winter-run Chinook salmon, indicating ongoing passage at these locations, yet minimal to no catch has been observed at the downstream monitoring locations. However, SaMT members agree that current hydrological conditions (i.e., low turbidity and low flows) 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 juvenile winter-run Chinook salmon population (96-99%) has yet to enter the Delta. Reclamation stated that the DCC gates are currently closed and will remain closed through late May 2021, per the PA operations description for the DCC gates. 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 was estimated for 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. The high range of exports and a more negative OMR (-4,000 cfs) are forecasted to increase over the next week, which are expected to have an impact on fish routing at key channel junctions. However, the risk of entrainment at the facilities and exceeding a daily discrete loss threshold remains in the low category. This is 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 is still considered to be low for this week. Cumulative seasonal catch of LAD juvenile spring-run Chinook salmon at the GCID RST is 52 fish, with 6 juveniles observed over the past week (11/24/20 to 11/30/20). Beginning on 10/21/20, flows in Mill Creek have been 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 of juvenile spring-run Chinook salmon into the interior Delta this week is similar to that for juvenile winter-run Chinook salmon regarding DCC gate operations. Based on the current distribution 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 continues to remain 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. Based on fish distribution in the central and south Delta, the risk of entrainment at the facilities remains in the low category.

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 still anticipated to be due to Delta 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 for this week compared to last week. Currently, only 1-4% of the juvenile winter-run Chinook salmon population is estimated to be present in the Delta for this week. Therefore, exposure risk is estimated to be low. DCC gates are closed today (12/1/20) and are anticipated to remain closed until late May, 2021. 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 present 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. Currently, 0-1% of the young-of-year spring-run Chinook salmon population is estimated to be present in the Delta this week. DCC gates are closed today (12/1/20) and are anticipated to remain closed until late May, 2021. 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 present 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 (-1,500 cfs)
 - CHNWR: Low
 - CHNSR: Low
 - OMR (-4,000 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 (1-4% of the juvenile population are estimated to be present in the Delta this week). The high range of exports and more negative OMR (-4,000 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% are estimated to be present in the Delta this week). The high range of exports and more negative OMR (-4,000 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:
 - December monthly daily loss threshold: 26 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, COA in the ITP, and the applicable ESA authorizations. This week's advice is based on the following COAs which are currently applicable:

List relevant COA number and title based on species/life stage, time of year, etc.

8.1.4 Collaborative Approach to Real-time Risk Assessment. Beginning no later than October 1 through the end of OMR Management (see Condition of Approval 8.8) the Smelt and Salmon Monitoring Teams shall meet weekly, or more often as required, to consider survey data, salvage data, and other pertinent biotic and abiotic factors and prepare risk assessments as described in Conditions of Approval 8.1.1, 8.1.2, 8.1.5.1 and 8.1.5.2.

The Smelt and Salmon Monitoring Teams shall prepare operations advice for the WOMT as required by Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, 8.6.4, 8.7, and 8.8, including advice on operations. The Smelt and Salmon Monitoring Teams shall each prepare risk assessments and operations advice. Within each team, staff jointly develop the risk assessment and supporting documentation to accompany operations advice (see Conditions of Approval 8.1.5.1 and 8.1.5.2). DWR and CDFW Smelt and Salmon Monitoring Team staff may conclude different operations advice is warranted, in which case the difference shall be noted and elevated as described in this Condition of Approval.

The Smelt and Salmon Monitoring Teams shall communicate their advice to WOMT. The WOMT shall then confer and attempt to reach a resolution and agreed-upon Project operations. If a resolution is reached, Permittee shall operate consistent with the decision regarding Project operations from WOMT. If the WOMT does not reach a resolution, the CDFW Director may require Permittee to implement an operational recommendation provided by CDFW. CDFW will provide its operational decision to Permittee in writing. Permittee shall implement the operational decision required by CDFW. Permittee shall ensure that its proportional share (see Condition of Approval 8.10) of the OMR flow requirement as a part of the operational decision is satisfied.

8.1.5 Real-time Risk Assessments. The Smelt and Salmon Monitoring Teams (Conditions of Approval 8.1.1 and 8.1.2) shall prepare weekly risk assessments, or more often as required, and operations advice (as required by Conditions of Approval 8.3.1, 8.3.3, 8.4.1, 8.4.2, 8.5.1, 8.5.2, 8.6.1, 8.6.2, 8.6.3, 8.6.4, and 8.7) during their discussions and analyses. The Smelt and Salmon Monitoring Teams shall provide the risk assessments and pertinent supporting information to the WOMT (Condition of Approval 8.1.3) within one business day of each meeting.

8.6.1 Winter-run Single-year Loss Threshold. In each year, Permittee shall, in coordination with Reclamation, operate the Project to avoid exceeding the following single-year loss thresholds:

- Natural 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 LAD 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 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 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 LAD 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 were closed 12/1/20 and will remain closed until late May 2021 per the PA description of DCC operations.
- Current Controlling Factor(s):
 - SWP: Delta water quality
 - CVP: Delta water quality
- Water Temperature:
 - Mossdale: 49.8°F on 11/30/20
 - Number of days threshold exceeded: Not applicable until June.
 - Prisoners Point: 53.1°F on 11/30/20
 - 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)*
 - Not anticipated to have effects on water quality this upcoming week.
- Turbidity:
 - *8.3.1 Turbidity at FPT Dec 1 to Jan 31 (3-day running average)*
 - 2.76 FNU
- 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: 2,500 cfs
 - CVP: 1,000 cfs
- Meteorological Forecast: *Precipitation, wind, air temperature. Are conditions (i.e. flow, turbidity, water temp) expected to change?*
 - Continued dry conditions, with mild afternoons and cool nights. Forecast for extended period shows little change.
- Storm Event Projection:
 - None

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

- DCC Gates position: Closed 12/1/20 until late May 2021 per PA DCC gate operations.
- Sacramento River flow at Freeport: 7,500 – 9,500 cfs

- San Joaquin River flow at Vernalis: 800 – 1,000 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: 1,000 – 3,000 cfs
 - Tracy: 800 – 1,800 cfs

Table 1: Comparison of OMR guage and OMR Index

Date	Averaging Period	USGS gauges (cfs)	Index (cfs)
11/28/20	Daily	-4,000	-3,600
11/28/20	5-day	-3,600	-3,600
11/28/20	14-day	-3,500	-3,400
11/30/20	Daily	Not Applicable	-3,600
11/30/20	5-day	Not Applicable	-3,600
11/30/20	14-day	Not Applicable	-3,500

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 12/1/20 is 1,835,780 fish. Average historic passage (2010-2019) as of 12/1/20 indicates 92.5% with one standard deviation of 6.0% 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 impact the final supplemental goal.
- Distribution of natural CHNWR:
 - % of juveniles upstream of the Delta: 96-99%
 - % of juveniles in Delta: 1-4%
 - % 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:
 - See 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)

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 12/1/20 is 103,536 fish.
- Hatchery release (in-river and downstream): No hatchery releases at this time. CHNSR egg collection at the Feather River Hatchery 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 CHNSR 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:
 - See 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)

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: 1-4% 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: 24 CHNWR, 6 CHNSR (11/24/20 – 11/30/20)
 - Knights Landing: 1 CHNWR (11/29/20)
- 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: 1-4% 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:
 - No storm events are projected this upcoming week.

- DCC gate position: Closed 12/1/20 until late May 2021 per the PA description for DCC gate operations.
- 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.
- Routing analysis: STARS analysis was run 11/29/2020. The analysis indicates the following routing probabilities at the following junctions into different routes through the Delta. 0% at the Delta Cross Channel, 28% at Georgiana Slough, 25% at Sutter and Steamboat Slough, and 41% would remain in the Sacramento River. These results are reflective of the latest DCC gate change order and reflect the gate closure through late May.
- 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 December 8th. The objectives of the SaMT are to assess impacts of operations on salmonids and green sturgeon 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 12/1/20 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	11/24-11/30	11/24-11/29	11/24-11/30 ³	11/23, 11/25, 11/27	11/23, 11/25	11/23, 11/25	11/23, 11/25
Fall-run Chinook	0	0	0	0	0	0	0
Spring-run Chinook	6 juveniles	0	0	0	0	0	0
Winter-run Chinook	24 juveniles	0	1 (11/29)	0	0	0	0
Late Fall-run Chinook	0	0	0	0	0	0	0
Chinook (ad-clip)	0	0	0	0	0	0	0
Steelhead (wild)	0	0	0	0	0	0	0
Steelhead (ad-clip)	0	0	0	0	0	0	0
Green Sturgeon	0	0	0	0	0	0	0
Flows (avg. cfs)	341.5	4,371	4,300	Not Applicable	Not Applicable	Not Applicable	Not Applicable
W. Temp. (avg. °F)	52.5	50.6	50.5	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Turbidity (avg. NTU)	4.2	3.3	2.77	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Table 3: Delta Sturgeon Tagging and Monitoring

Date Range	Comments
11/24/2020 and 12/1/2020 ⁴	<ul style="list-style-type: none"> 1 juvenile GS tagged in the Sacramento River north of Sherman Lake. 19 juvenile GS, 1 juvenile WS, and 1 adult WS were detected north of Sherman Lake.

¹ GCID running at ½ cone all week.

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

³ From 11/24 to 11/28, both Knights Landing cones were raised for the Thanksgiving holiday.

⁴ Delta sturgeon tagging and monitoring data received after the call (12/2/2020).

Table 4: CDFW Adult Monitoring Surveys

Location	American River Carcass Survey	Stanislaus River Carcass Survey
Sample Dates	11/23/20-11/25/20	11/23/20-11/25/20
Live Fish	Not Available	385
Redds	Not Available	284
Carcasses	400	98
Ad-clipped	151	8
Spawn Condition	Prespawn Mortality: 16% (23/140)	Not Available
Flows (avg. cfs)	1,270	200
W. Temp (avg. °F)	56.0	Not Available

Appendix 2: Salvage Data

Table 5: SaMT Update. Reporting period is 11/23/20 through 11/29/20. Prepared by Geir Aasen on 11/30/20 at 1434 hours. These are preliminary results and are subject to revision.

Criteria	23-Nov	24-Nov	25-Nov	26-Nov	27-Nov	28-Nov	29-Nov	Trend ¹	Weekly Summary
Wild older juvenile CS Loss Density ²	0	0	0	0	0	0	0	→	0
Wild Steelhead Loss Density ⁶	0	0	0	0	0	0	0	→	0
SWP daily export (acre-feet)	5,518	6,615	6,104	5,886	5,112	6,088	6,343	↗	5,952
CVP daily export (acre-feet)	1,926	1,942	1,961	1,958	1,958	1,944	1,924	↘	1,945
SWP reduced counts ³	None	Not Applicable	Not Applicable						
CVP reduced counts ⁷	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 LAD on the date of capture. Hatchery origin fish are determined by the lack of adipose fin. Prepared by Geir Aasen on 11/30/20 at 1434 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 LAD on the date of capture. Hatchery origin fish are determined by the lack of adipose fin. Prepared by Geir Aasen on 11/30/20 at 1434 hours. These are preliminary results and are subject to revision.

Category	Salvage ⁸	Loss ⁹	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 11/30/20 at 1434 hours. These are preliminary results and are subject to revision.

Category	Salvage ⁸	Loss ⁹	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 11/30/20 at 1434 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.