BUREAU OF RECLAMATION

Assessment for CVP and SWP Delta Operations on ESA and CESA-listed Species

May 19, 2025

Executive Summary

Operational Conditions

Section 3.13.3.4.1 of the Proposed Action and Section 8.1.4. of the Incidental Take Permit provide that during Old and Middle River (OMR) Management, the California Department of Water Resources, in coordination with Reclamation, shall provide State Water Project (SWP) and Central Valley Project (CVP) operational outlooks and assessments on a weekly basis to Water Operations Management Team (WOMT).

- The steelhead annual and weekly distributed loss thresholds have not been exceeded.
- As of May 18, 7-day average Qwest was 2,888 cfs. Modeling shows the zone of influence by exports of -5,000 is restricted to the South Delta.

Section 3.7.2.5 of the Proposed Action provide that from May 21 – June 15 DCC gates will close for a total of 14 days. If opened, Reclamation and DWR, through SaMT, will prepare a plan that considers relevant information.

- DCC gates will be opened on May 23 and closed again on May 27.
- Current and historic rotary screw trap and delta fish monitoring information indicate that all winter-run and most CCV steelhead have exited the delta past Chipps Island
- Telemetry data of hatchery winter-run and steelhead indicate that none have recently routed towards the DCC gates.
- Overall, entrainment risk for winter-run and steelhead into the Interior Delta through the DCC gates is low.

Natural Winter-run Chinook Salmon

No loss of winter-run in the past week. Additional loss of natural winter-run and exceedances of thresholds and incidental take limit is unlikely over the next week based on historical data.

Central Valley Steelhead

No loss of natural-origin steelhead has occurred in the past week. Over the next week, loss of limited steelhead is likely, based on historical data, and unlikely to exceed the annual or weekly distributed loss threshold. The steelhead incidental take limit will not be exceeded by any loss that may occur.

Operational and Regulatory Conditions

See current Weekly Fish and Water Operation Outlook document.

Table 1. Historic migration and salvage patterns for salmon and steelhead. Average percentage and 95% confidence intervals in parentheses. Last updated 5/19/2025.

Species	Red Bluff RST	Knights Landing RST	Sac Trawl Catch	Chipps Island Trawl	Salvage
Chinook, LAD Winter-run, Unclipped	100% (100%,100%) BY: 2015 - 2023	100% (100%,100%) BY: 2015 - 2023	100% (100%,100%) BY: 2015 - 2023	100% (100%,100%) BY: 2015 - 2023	100% (100%,100%) WY: 2015 – 2024
Steelhead, Unclipped (January-December)	27% (12%,41%) BY: 2015 - 2024	83% (63%,100%) BY: 2015 - 2024	90% (81%,98%) BY: 2015 - 2024	89% (80%,97%) BY: 2015 - 2024	N/A
Chinook, DNA Winter-run, Unclipped (Water Year)	N/A	N/A	N/A	N/A	100% (100%,100%) WY: 2020 – 2024
Steelhead, Unclipped (Water Year)	N/A	N/A	N/A	N/A	92% (85%,99%) WY: 2015 - 2024

Biology, Distribution, and Evaluation of Central Valley Steelhead

- Delta Life Stages
    - Juveniles, Adults
- Brood Year 2025 Information
    - Adult steelhead are migrating through the Bay-Delta.

- Brood Year 2024 Information
    - Catch of steelhead at Red Bluff Diversion Dam has slowed. Mean cumulative weekly passage of steelhead during calendar year 2025 through April 20 at Red Bluff Diversion Dam (RBDD) for the last 20 years of passage data is 27%. A majority of this brood year passed RBDD in 2024.
    - Delta entry sampling (i.e. Knights Landing RST, Sacramento Trawl) have observed no steelhead in the past week suggesting that few steelhead are still migrating into the Delta. Historically, on average 90% of steelhead have been captured at the delta entry Sacramento Trawl and over 88%, on average, have been captured exiting the delta at Chipps Island as of May 19 (see Table 1).
    - Historically, on average 92% of steelhead have been lost at the facilities by May 19 (Table 1). If historical loss trends continue during water year 2025, cumulative loss of juvenile steelhead is expected to continue at a low rate, but not reach the annual loss threshold (Figure 2).
    - Cumulative loss of juvenile steelhead has peaked, based on historical trends, and has been low this water year (Figures 5 & 6). Overall, seasonal loss (n=589) has been less than predicted for steelhead (Figure 4) and is 19.6% of the steelhead annual loss threshold. In the last 7 days, 0 steelhead have been salvaged leading to a weekly 7-day running loss of 0 as of May 18 (Table 2).

Delta Hydrodynamics

Based on forecasted Sacramento and San Joaquin River inflows in the weekly fish and water operations outlook, the Delta hydrodynamics continues to approximate those in a MedMed and MedLo category (USBR 2024). In the MedMed condition, when the modeled proportion of the total DSM2 channel length experiencing medium hydrologic influence at -5,000 and -3,500 is measured, we see the proportion of channel length experiencing hydrologic influence is approximately twice as large at -5,000 from 164,174 feet to 337,165 feet. (USBR 2024 Figure I.3-121). In the MedLo condition, when the modeled proportion of the total DSM2 channel length experiencing medium hydrologic influence at -5,000 and -3,500 is measured, we see the proportion of channel length experiencing hydrologic influence is approximately twice as large at -5,000 from 138,590 feet to 337,919 feet. (USBR 2024 Figure I.3-121).

When this is considered spatially under the MedMed and MedLo conditions, areas that reflect medium and high hydrologic alteration (0.0-0.75 proportional overlap of estimated velocities) at DSM2 nodes are similar, stable and remain close to Railroad Cut at -5,000 and -3,500 OMR flows (USBR 2024 Figure I.3-107). At OMR values of -5,000 this zone of influence is similar under both hydrodynamic conditions and extends past the Head of Middle River compared to not including Grant Line Canal at -3,500. This zone of influence does not reach Head of Older River under OMR conditions of -3,500 or -5,000.

Evaluation

In the past week, no natural-origin steelhead or winter-run Chinook Salmon loss was observed. Natural-origin steelhead loss is likely to continue at a reduced rate and winter-run loss is unlikely based on historic trends, modeling, and this year's observations (Table 1, Figures 2, 3, 4, 5). Median predicted loss is expected to occur at similar rates in the –5000 OMRI scenario than the more positive OMRI scenarios (Figures 6; Table 3a, 3b) using the Tillotson et. al. model (2022) with a high amount of uncertainty in the predictions.

The STARS model estimates of steelhead through-Delta survival across all routes. This model used acoustically tagged later fall Chinook released during the winter and early spring. From May 1 to May 18, the STARS model estimated overall survival between a probability of 0.49 (80% credible interval (CI): 0.38-0.58) and 0.43 (80% CI: 0.33-0.53; Figure 7).

Hydrodynamics in the Delta suggest the export footprint does not extend into the Interior Delta and remains south of Frank's Tract. These conditions suggest a small risk on entrainment for migrating juvenile steelhead from the Sacramento River and San Joaquin rivers.

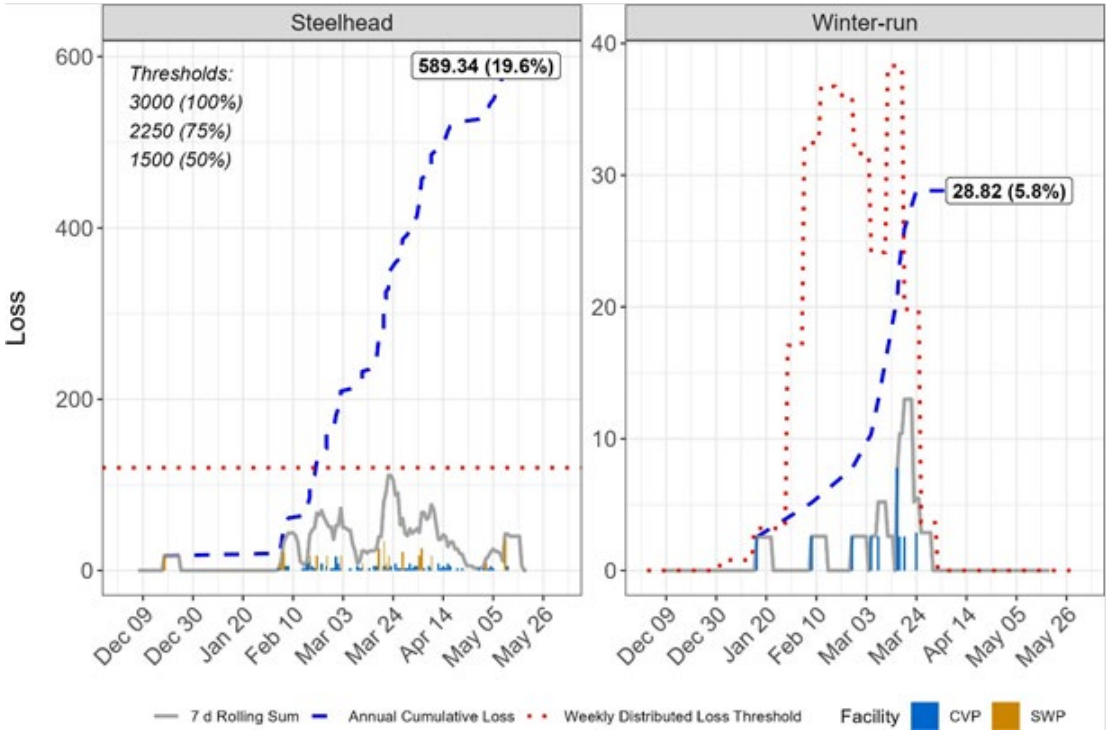

Figure 1. WY 2025 Loss for Steelhead and Winter-run Chinook Salmon

Figure 1 is two line graphs for cumulative steelhead and natural winter-run loss. Blue dashed lines represent cumulative loss, solid grey lines represent 7 day rolling sum of loss, and dotted red lines represent relevant thresholds.

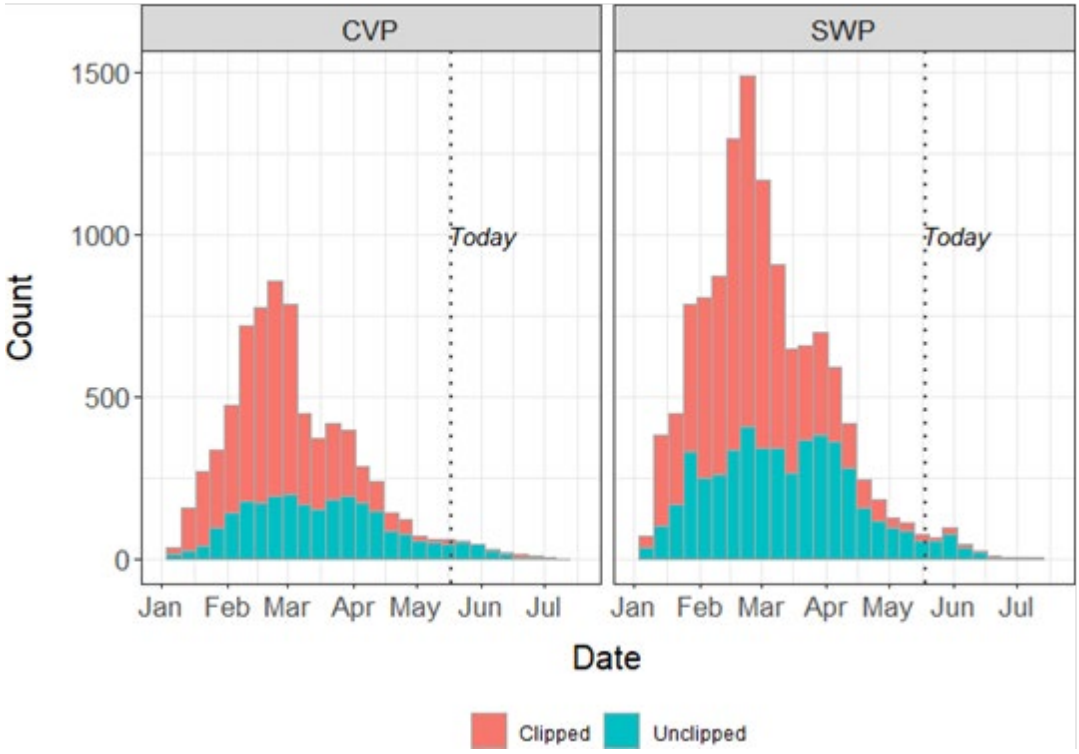

Figure 2. Distribution of and hatchery steelhead (bottom; 1994-2024) salvaged at the Central Valley Project (CVP) and State water Project (SWP). Vertical dotted line represents the most current date (May 12).

Figure 2 is two bar graphs representing Count over Months. Clipped steelhead are depicted in orange, and unclipped steelhead are depicted in turquoise.

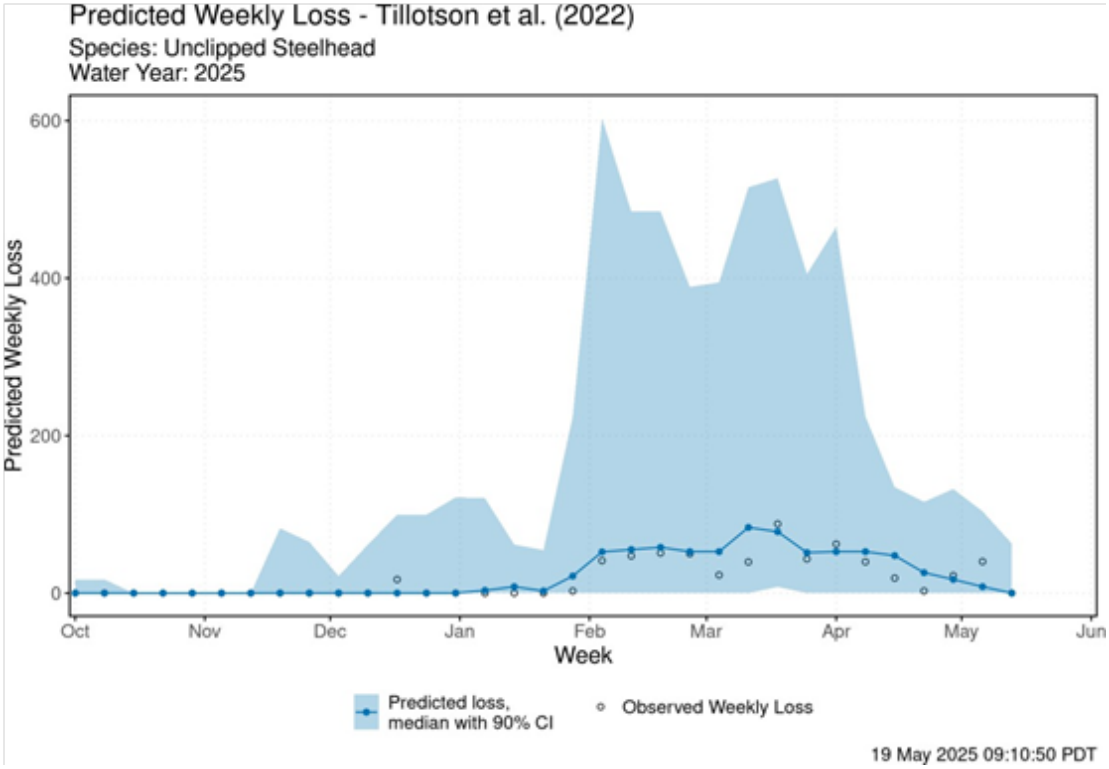

Figure 3. Predicted Weekly Loss – Tillotson et al. (2022)

Figure 3 is a line graph depicting predicted steelhead loss through the OMR management period using the Tillotson et al. (2022) model.

Table 2. Summary of daily loss of winter-run and steelhead to inform weekly distributed loss thresholds. Steelhead weekly distributed loss thresholds are triggered when 7-day rolling sum of estimated loss 120 fish.

Date	Steelhead Daily Salvage	Steelhead 7-day rolling sum loss	Steelhead Daily Trigger
May 13	0	40	No
May 14	0	40	No
May 15	0	40	No
May 16	0	40	No
May 17	0	5	No
May 18	0	0	No
May 19	0	0	No

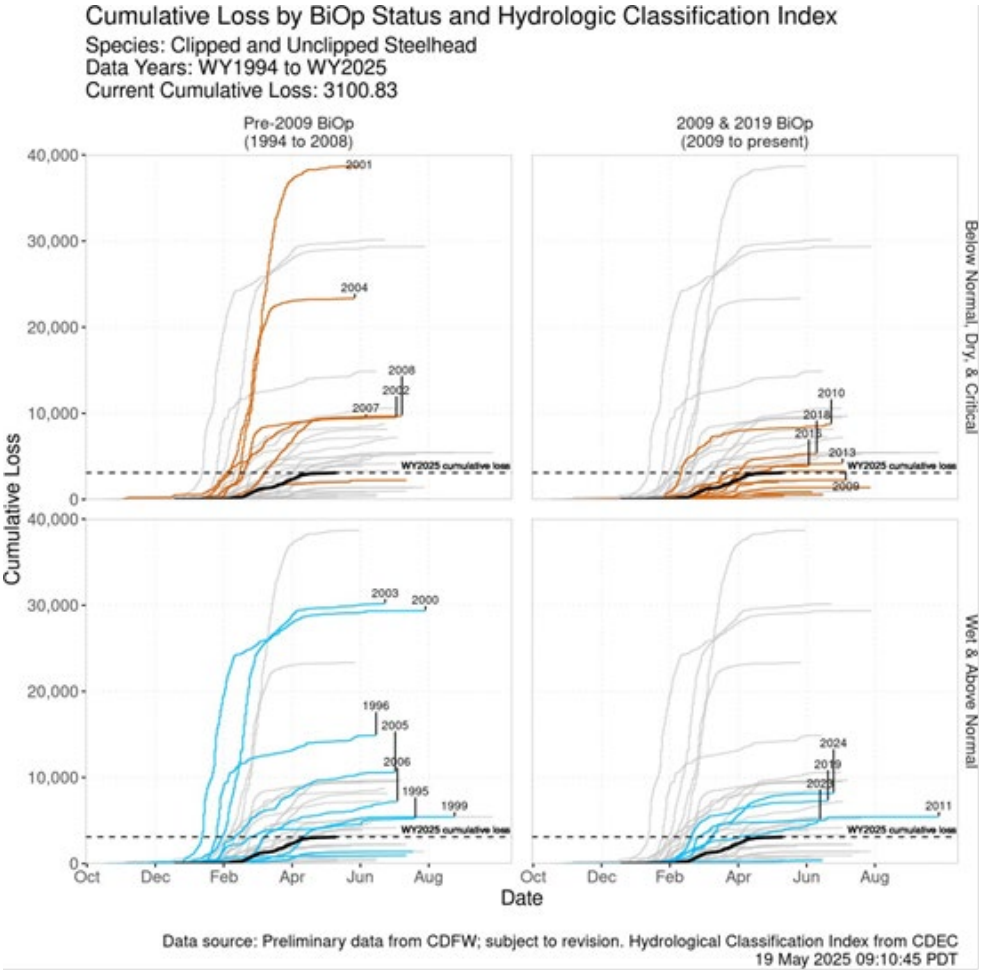

Figure 4. Cumulative Loss by BiOp Status and Hydrologic Classification Index (HCI)

Figure 4 depicts four line graphs. Each quadrant of the faceted plot includes grey lines for historical years, colored lines (blue for wet years, red for dry years) for years within the BiOp status and HCI type, a black line for the current year, and a dashed horizontal line indicating the current cumulative loss maximum.

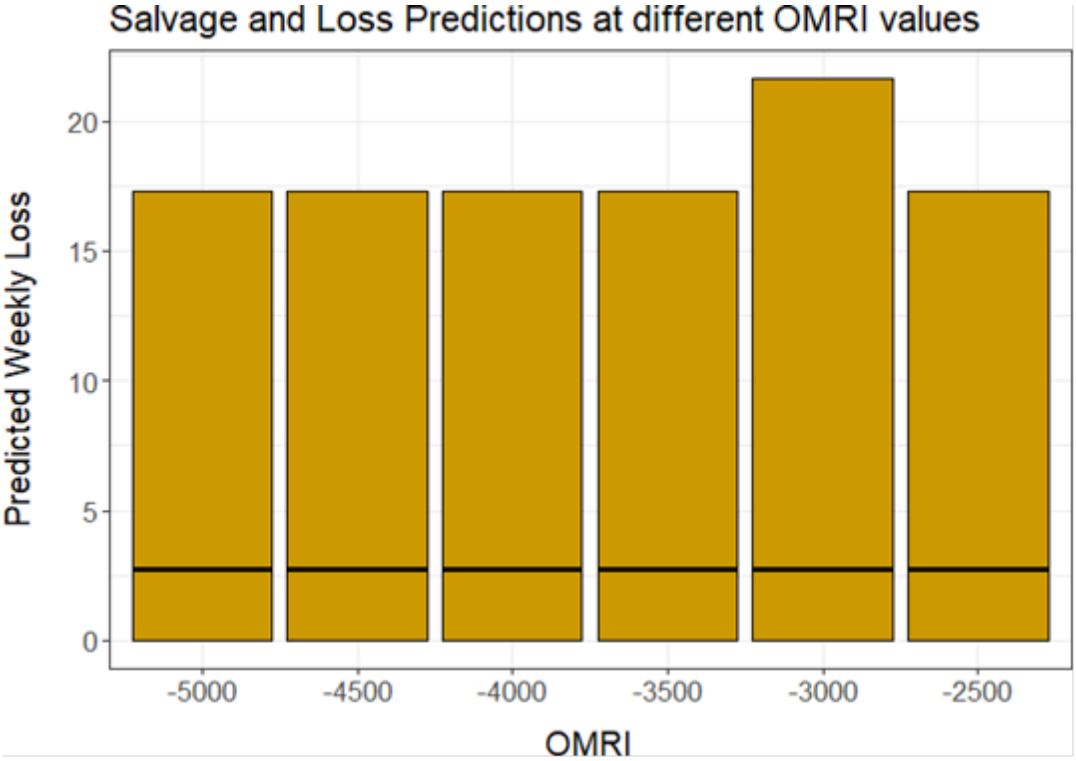

Figure 5. Salvage and Loss Predictions at Different OMRI Values

Figure 5 is a bar graph depicting predicted weekly loss of Central Valley steelhead at different OMRI values using the Tillotson et al model (2022). Bar extents represent 25th and 75th percentile of predicted weekly loss and a horizontal solid line represents median predicted weekly loss. Updated 5/12/25. Winter-run model predictions for upper and lower percentiles and median are zero for all OMRI scenarios.

Table 3a. WY 2025 loss and salvage predictor data: Predicted weekly loss of Central Valley steelhead at CVP and SWP facilities. Updated 5/19/25.

Output	Modeled Current Week	Projected -5000 OMRI
Predicted Chinook Winter Run, Median	0	0
Predicted Chinook Winter Run, High	0	7
Predicted CCV Steelhead, Median	11	4
Predicted CCV Steelhead, High	76	63

Table 3b. Environmental and operational details for current, projected -5000, and -3500 scenarios. Only OMR flows were changed to evaluate potential changes in loss.

Parameter	Current Condition	Projected -5000
Temperature (Mallard Island, C)	18.2	18.2
Precipitation (5-d running sum, inches)	0	0
Old and Middle River Flows (cfs)	-2599	-5000
Sacramento River Flow (Freeport, cfs)	16209	16209
DCC Gates	closed	closed
San Joaquin River Flow (Vernalis, cfs)	2035	2035
Export	1403	1403

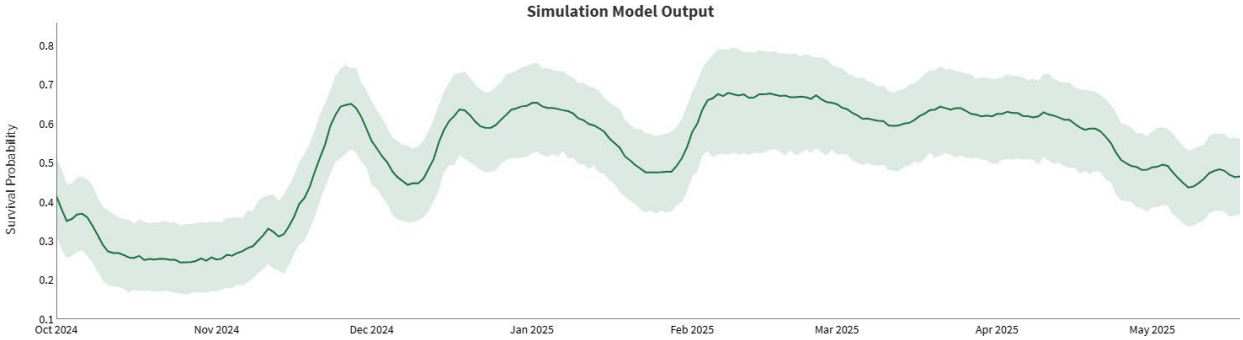

Figure 6. Simulation Model Output

Figure 6 is a line graph depicting temporal variation in overall survival estimates for outmigrating juvenile late fall run Chinook Salmon in the Delta with 80% credible intervals (shaded region) from October 1 to May 18.

References

U.S. Bureau of Reclamation. 2024. Attachment 1.5 Survival, Travel Time, and Routing Simulation Model. Environmental Impact Statement for the Long-term Operation of Central Valley Project and State Water Project. 33 p.

Attachment A: Relevant Proposed Action and Incidental Take Permit Sections

3.7.4.5.5 Steelhead Annual Threshold

In each year, Reclamation and DWR will manage exports to reduce loss at the CVP and SWP salvage facilities. To support survival and decrease entrainment loss, Reclamation and DWR will manage OMR to avoid exceeding the following annual loss threshold at CVP and SWP salvage facilities through the weekly distributed loss threshold described below.

- Unclipped juvenile California Central Valley steelhead loss = 3,000

Annual loss of unclipped juvenile CCV steelhead at the CVP and SWP salvage facilities will be counted cumulatively for each Brood Year, starting July 1st of the calendar year through June 30th of the following calendar year. Loss will be calculated for the South Delta Export Facilities using CDFW's steelhead loss multiplier until a loss method for steelhead (see Section 3.11.1 is approved by CDFW and NMFS. This loss threshold will be used until a new loss threshold is developed through the steelhead JPE Special Study (See Section 3.11.1).

3.7.4.5.6 Steelhead Weekly Distributed Loss Threshold

To minimize the potential for a disproportionate impact of entrainment of steelhead present in the Delta on any single week, Reclamation and DWR will manage OMR based on a weekly distributed loss threshold. The weekly loss threshold is the annual loss threshold distributed over the period of observed steelhead salvage between January 1 and June 30 using the 7-day weekly periods identified in the weekly distributed loss table for winter-run Chinook salmon, extended through June 30. DWR and Reclamation will reduce exports to achieve a 7-day average OMR value no more negative than -3,500 cfs for seven consecutive days when the 7-day rolling sum of steelhead salvage, calculated daily, exceeds the weekly loss threshold of 120 fish.