

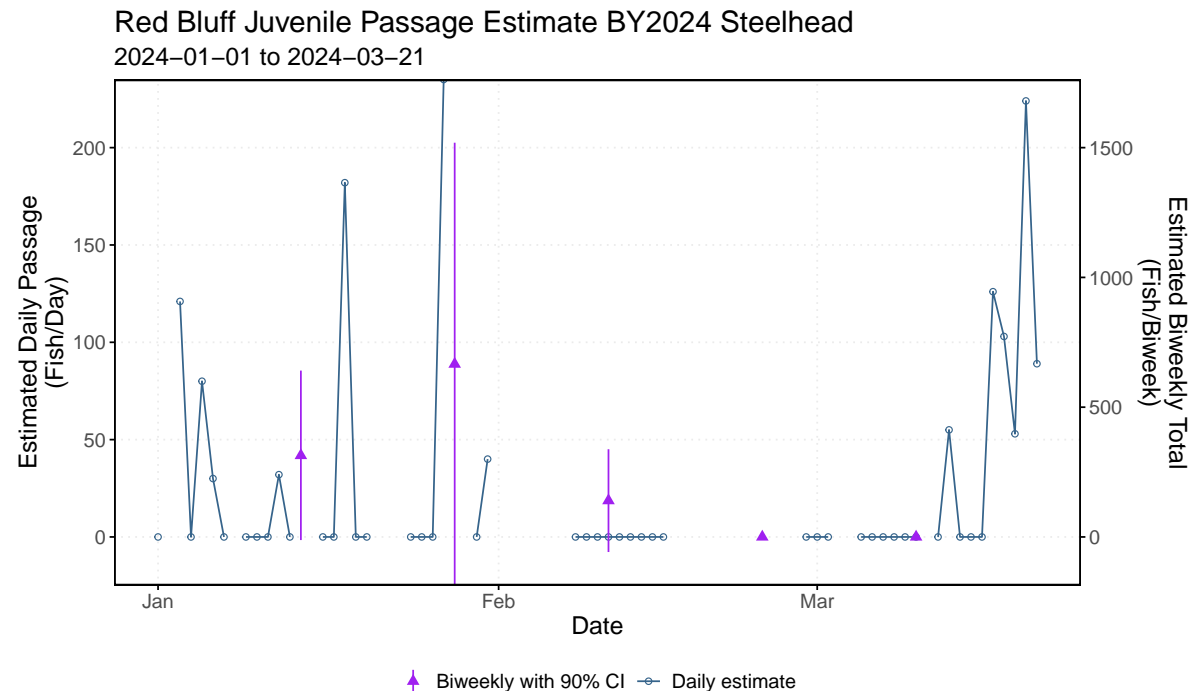
# Track-a-Cohort: Steelhead

2024-08-07

## Background

This document uses shared resources via [BDO github](#) from BOR to replicate figures requested and adjust underlying code to include dynamic data. See [Track a cohort\\_Steelhead.docx](#) for figures requested. Certain figures include a link to more interactive plot types using Shiny (in development) and all figures include a link to code in separate CBR developed [github repo](#).

## RBDD Juvenile Passage Estimates



Related links: [SacPAS Page](#), [GitHub Repo Code](#)

- Issues:
  - Remove from R code? If keeping:
  - Update biweekly shaded areas based on SI generated methods
  - Continue to match the same 0 line cutoff as on SacPAS or leave space to show points at 0 line?
  - Confirm Calendar Year or Water Year. Currently code only pulls current year based on today's date. To look at water year will need to adjust code to include query link.

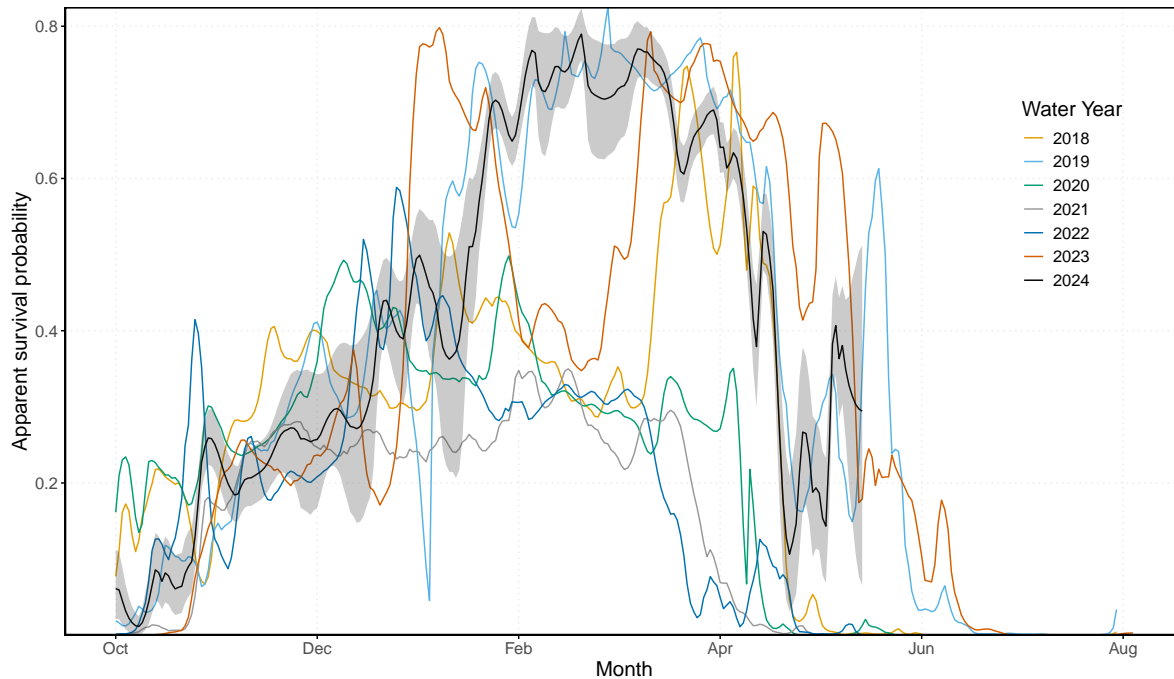
## Delta STARS Survival and Routing Probabilities

Note: Plots below use Winter-run Chinook as a surrogate for Steelhead

Overall Survival: Median survival of daily cohorts for all routes combined

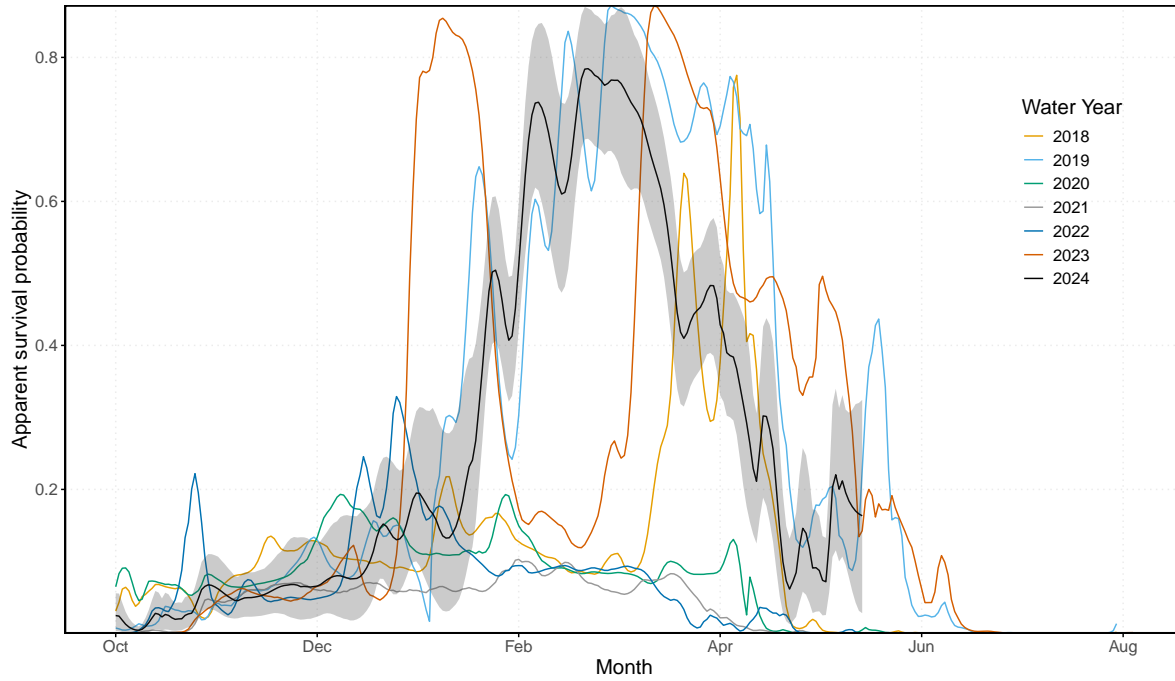
Delta STARS Model –

Predicted Natural Winter-run Chinook Daily Cohorts Passage, Knights Landing to Chipps Island



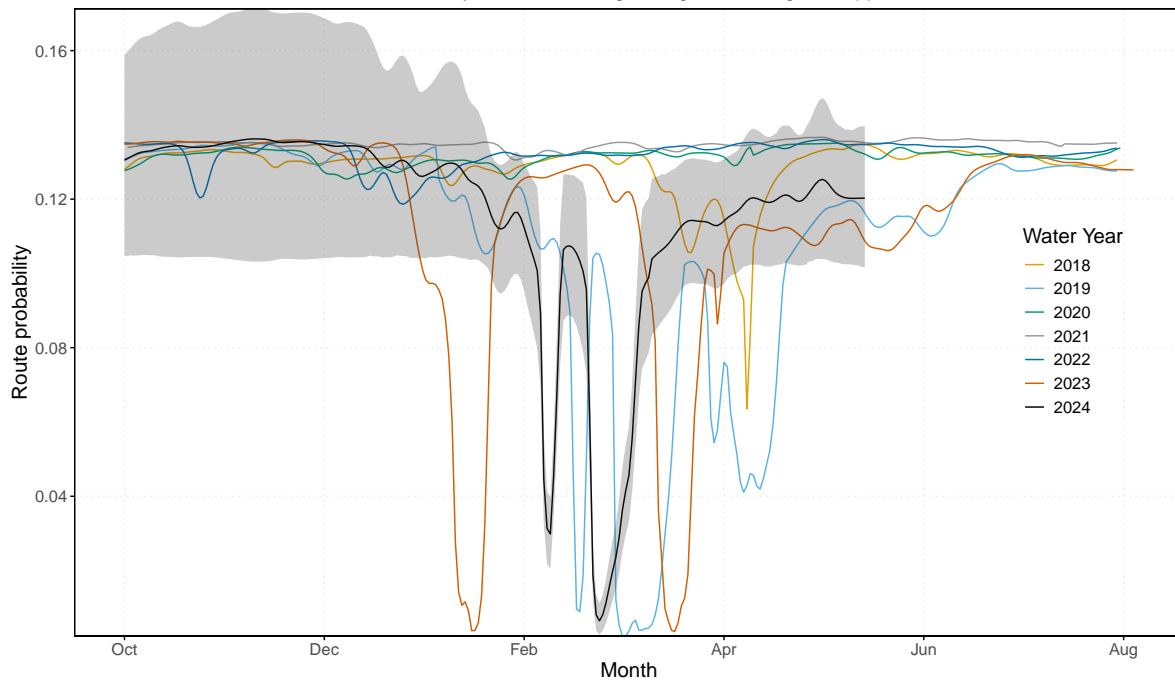
Data source: Delta STARS developed by USGS Quantitative Fisheries Ecology Section and deployed by SacPAS.

Interior Delta Route-specific Survival Probability: Median survival of daily cohorts using the Interior Delta STARS Model –  
Predicted Natural Winter-run Chinook Daily Cohorts Passage, Knights Landing to Chipps Island



Data source: Delta STARS developed by USGS Quantitative Fisheries Ecology Section and deployed by SacPAS.

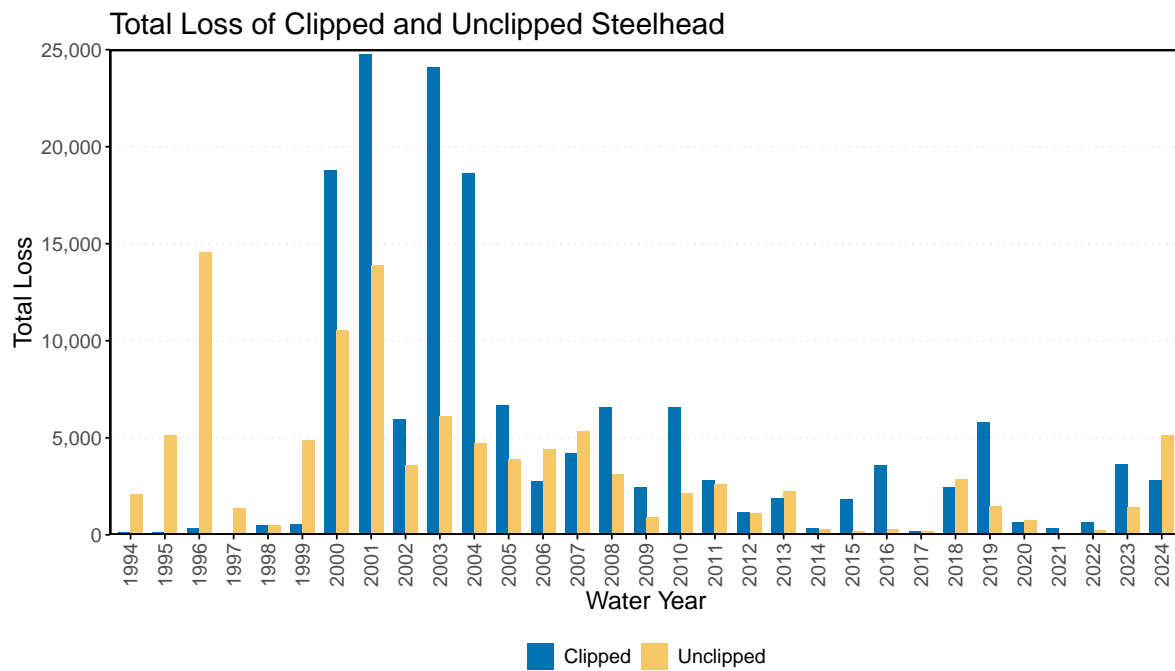
Interior Delta Route-specific Probability: Proportion of daily cohorts using the Interior Delta route  
Delta STARS Model –  
Predicted Natural Winter-run Chinook Daily Cohorts Passage, Knights Landing to Chipps Island



Data source: Delta STARS developed by USGS Quantitative Fisheries Ecology Section and deployed by SacPAS.

Related links: [Interactive Plot](#), [GitHub Repo Code](#), [STARS ShinyApp](#)

## Total Loss - Clipped and Unclipped Steelhead



Data sources: Preliminary data from CDFW; subject to revision.

Related links: [SacPAS Query](#), [GitHub Repo Code](#)

Issues:

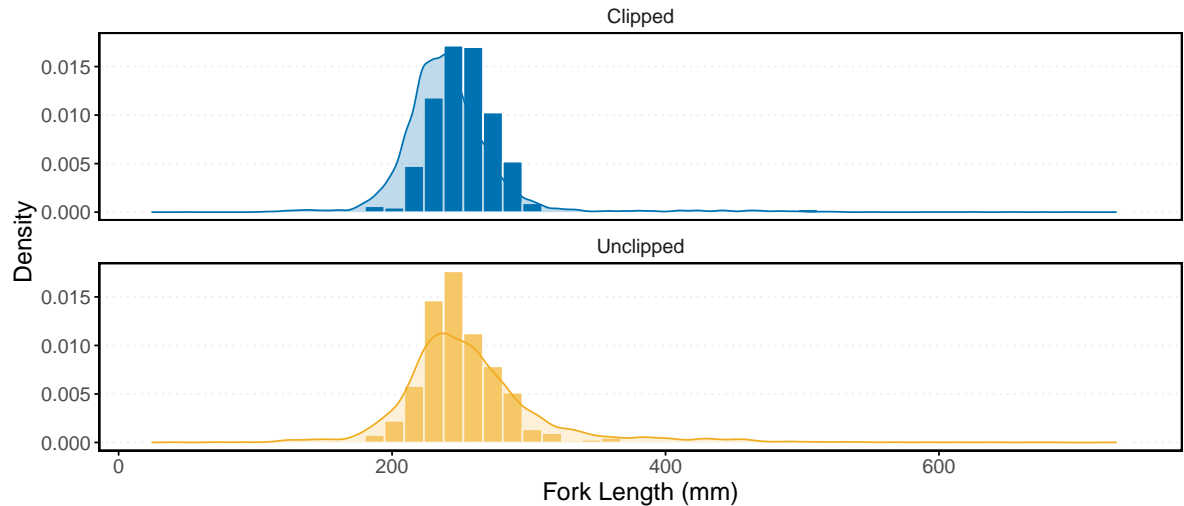
- Confirm data source footnote

## Size (Fork Length) Distribution of Steelhead Loss

### Current and Historical Size Distribution of Clipped and Unclipped Steelhead

Current Water Year: 2024

Historical Water Years: 1994 to 2023

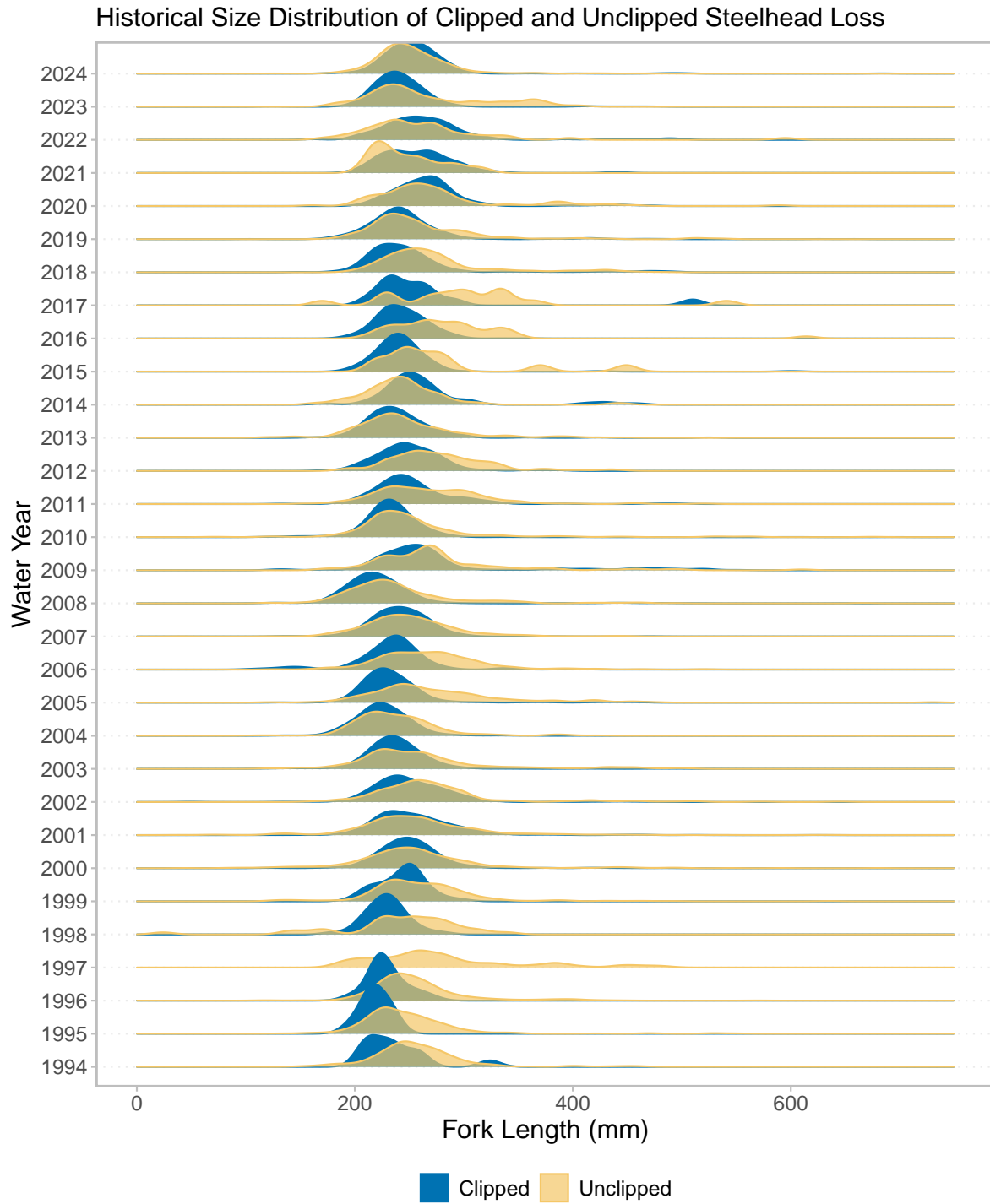


Histogram (WY2024): ■ Clipped ■ Unclipped    Density (WY1994–WY2023): ■ Clipped ■ Unclipped

Data sources: Preliminary data from CDFW; subject to revision.

Figure 1: Figure compares density plots that highlight historical (WY1994 to WY2023) size distribution and histogram of current year (WY2024) size distribution by rear type (yellow = unclipped; blue = clipped). Fork lengths below 750 mm were included in dataset.

Related links: [SacPAS Query](#), [GitHub Repo Code](#)



Data sources: Preliminary data from CDFW; subject to revision.

Related links: [SacPAS Query](#), [GitHub Repo Code](#)

## Cumulative Loss by BiOp Status and Hydrological Classification Index (HCI)

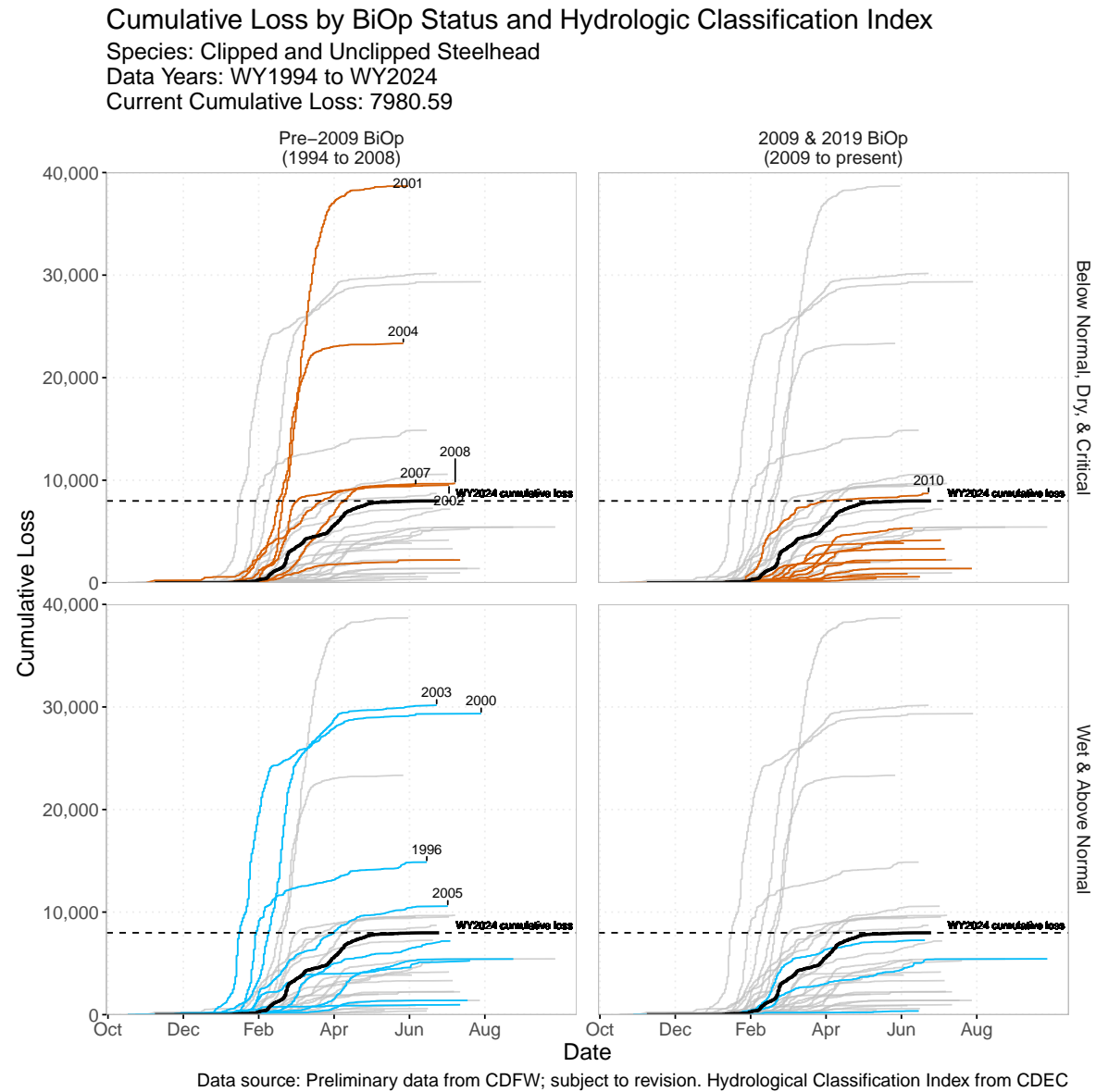


Figure 2: The figure shows cumulative loss by BiOp Status and Hydrological Classification Index (HCI). Each quadrant of the faceted plot includes grey lines for historical years, colored lines (blue for wet years, red for dry years) for years within the BiOp status and HCI type, a black line for the current year, and a dashed horizontal line indicating the current cumulative loss maximum.



Related links: [SacPAS Page](#), [GitHub Repo Code](#), [Interactive Plot - ShinyApp](#)

Issues:

- Confirm use of clipped and unclipped in dataset
- Add legend key
- Confirm data source footnote

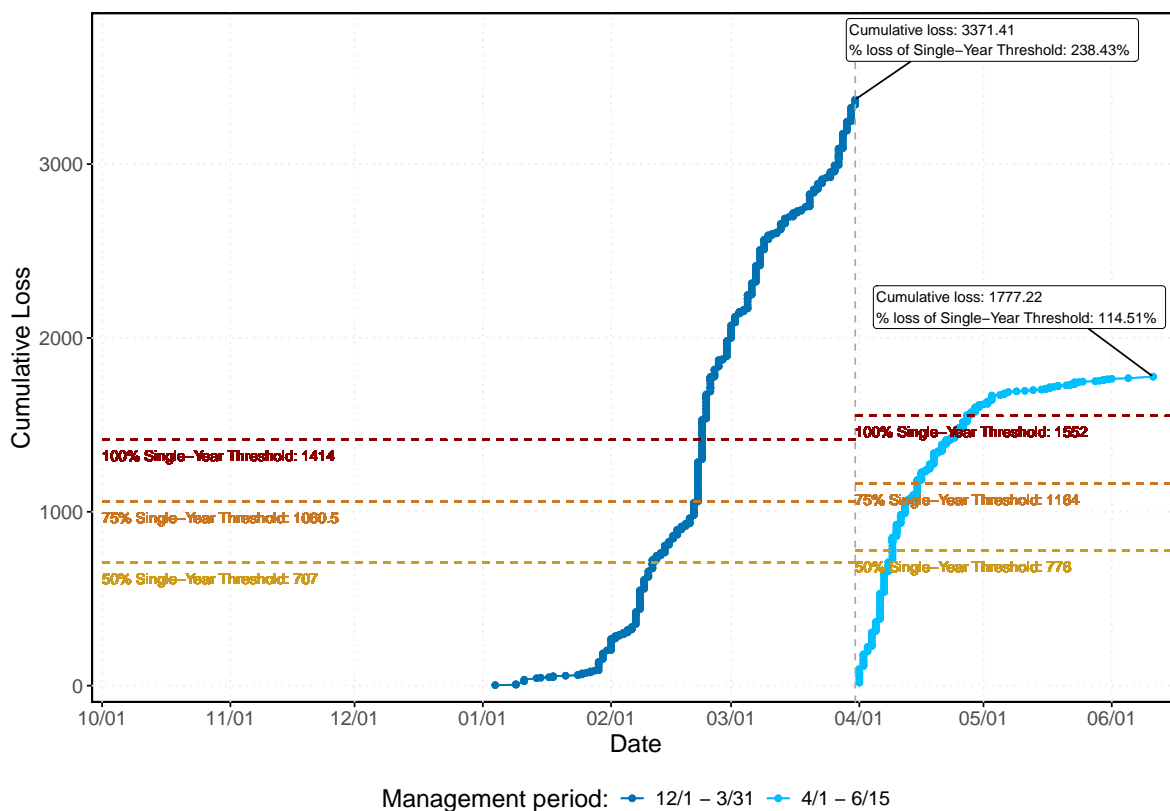
## Cumulative Loss with Single-Year Thresholds

### Cumulative Loss for WY2024 with Single-Year Thresholds

Species: Unclipped Steelhead

Cumulative loss 12/31–3/31: 3371.41

Cumulative loss 4/1–6/15: 1777.22



Related links: [SacPAS Page](#), [ShinyApp](#), [GitHub Repo Code](#), [Interactive Plot - ShinyApp](#)

- Issues:
  - Confirm Single-Year-Thresholds and update to generate automatically

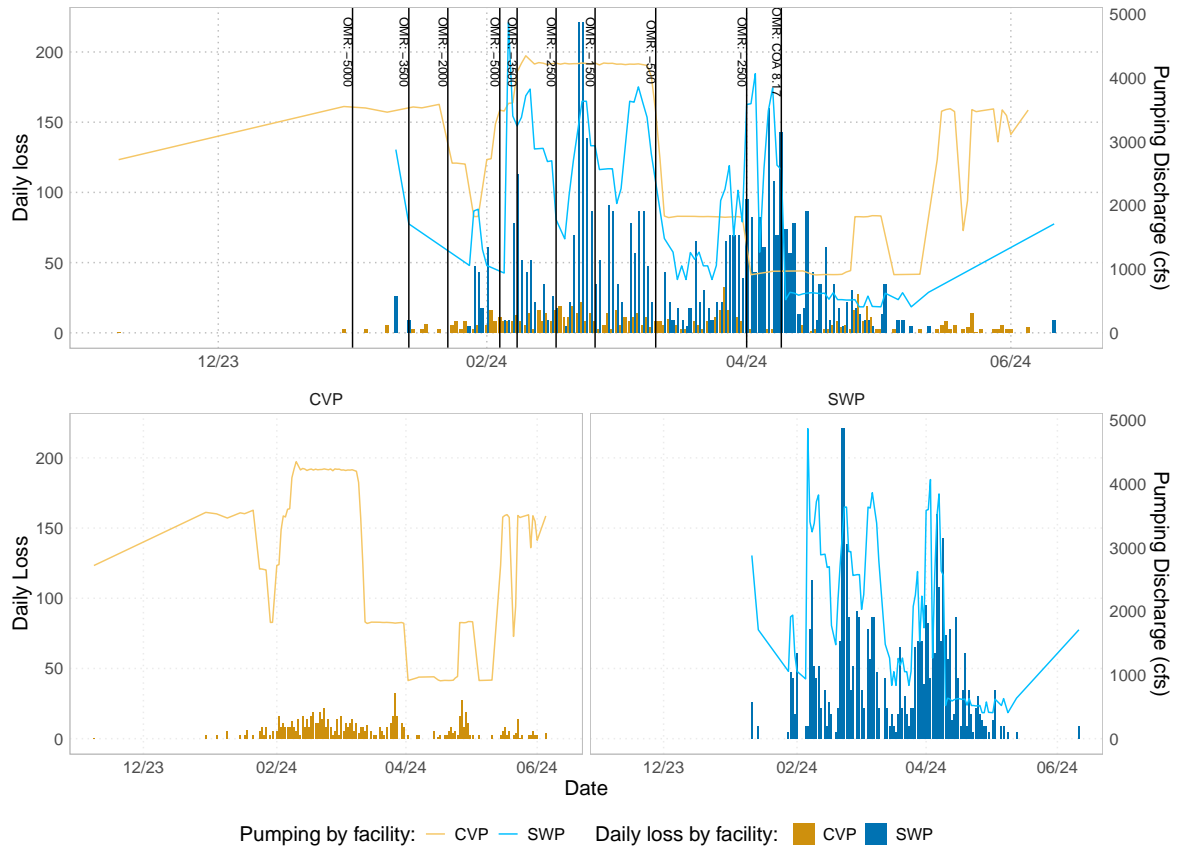
- \* Tillotson etl al. 2022: “Because less information is available on annual wild Central Valley Steelhead natal origin and abundance, the maximum ITL in a single year is fixed at a loss of 2,760 between December 1 and March 31, and a loss of 3,040 between April 1 and June 15 (NMFS 2019).”
- \* SacPAS: Single-Year Loss Thresholds (PA 4-69): In each year, typically January/February, Reclamation and DWR propose to avoid exceeding an annual loss threshold equal to 90% of the greatest annual loss that occurred in the historical record 2010-2018 for each of:
  - Natural Winter-Run Chinook Salmon (loss= 1.17% of JPE)
  - Natural Central Valley Steelhead from December through March (loss =1,414)
  - Natural Central Valley Steelhead from April through June 15 (loss = 1,552)
 (More information on 4-70)
- Confirm only including unclipped

## Daily Loss and Export by Pumping Facility

### Daily Loss and Export at CVP/SWP Facilities

Species: Clipped and Unclipped Steelhead  
Current Water Year: 2024

Comparison of facilities, CVP and SWP



Related links: [SacPAS Page](#), [Interactive Plot - ShinyApp](#), [GitHub Repo Code](#)

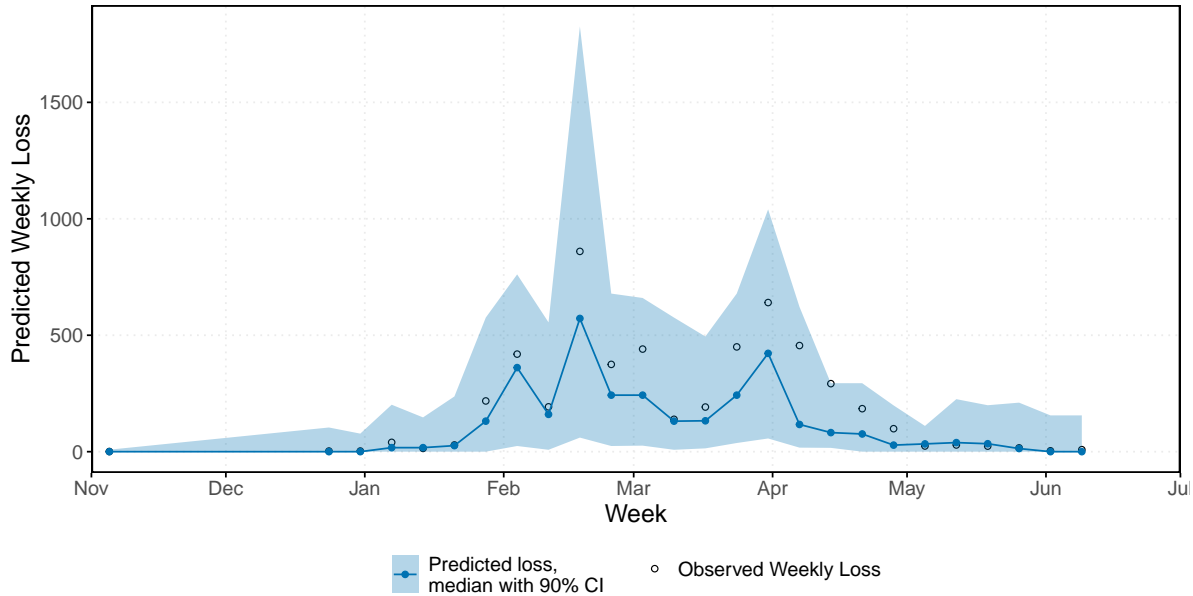
- Issues:
  - Confirm if OMRI vertical bars are designated by value or dates, is there a rule to be applied? Shared code is static values, but notes within [assessment pdf](#) states: “Vertical black bars are approximate dates when OMRI controlling factors change.”
  - Update ShinyApp

## Predicted Weekly Loss - Tillotson Model

### Predicted Weekly Loss – Tillotson et al. (2022)

Species: Unclipped Steelhead

Water Year: 2024



Related links: SacPAS Page, [SacPAS Tillotson Tool](#), GitHub Repo Code: [Tillotson model](#), [data wrangling and prediction output](#), [plot output](#)

- Issues:
  - Currently using BOR supplied code to run model, confirm same output with NB code.
    - \* Update: NB believes this is updated code and will look into comparing and update Loss and Salvage Predictor Tool as needed when time allows (Estimates time in August).
  - Confirm shared code is duplicate of the most up-to-date Tillotson code. If this is Tillotson code confirm with authors on use and confirm permissions to include model code in public facing repo. Alternatively, pull results from Loss and Salvage Predictor Tool.
    - \* JG or NB to reach out?
  - Confirm change in plot design

Table 1: Table of T  
origin Ste  
Middle Ri  
and SWP  
temperatu

Water year week	Date	Observed loss	OMR USGS tidally filtered	Export, SWP & CVP (CFS)	Av
6	11-05-23	0.68	-5124.29	4743.14	81
13	12-24-23	2.72	-7810.00	8251.57	16
14	12-31-23	2.72	-5632.86	5712.00	21
15	01-07-24	40.08	-5512.86	5986.71	16
16	01-14-24	14.28	-5300.00	5388.57	23
17	01-21-24	28.81	-2805.71	3931.57	40
18	01-28-24	217.83	-3189.57	3938.71	39
19	02-04-24	418.98	-4537.14	7296.14	61
20	02-11-24	192.57	-4202.86	6703.14	52
21	02-18-24	860.00	-3310.00	7049.71	65
22	02-25-24	374.82	-3432.86	6731.71	66
23	03-03-24	440.63	-3248.57	7551.43	62
24	03-10-24	139.03	-1377.86	3261.86	54
25	03-17-24	191.74	-2051.71	2893.57	42
26	03-24-24	449.92	-3552.14	3750.86	40
27	03-31-24	640.34	-2424.86	4132.71	39
28	04-07-24	455.76	-1043.00	2141.29	30
29	04-14-24	292.08	154.14	1532.43	31
30	04-21-24	184.66	-880.29	1806.29	31
31	04-28-24	98.70	-846.57	1936.43	24
32	05-05-24	24.37	-939.71	1469.00	29
33	05-12-24	28.81	-1188.14	3540.00	24
34	05-19-24	23.80	-1735.00	3211.57	21
35	05-26-24	16.32	-3665.71	4140.43	17
36	06-02-24	3.72	-5717.14	5548.43	15
37	06-09-24	8.66	-6012.86	5633.57	15

Related links: [SacPAS Page](#),[SacPAS Tillotson Tool](#), GitHub Repo Code: [Tillotson model](#),  
[data wrangling and prediction output](#), [Table configuration](#)

- Issues:

- See tillotson figure for issues