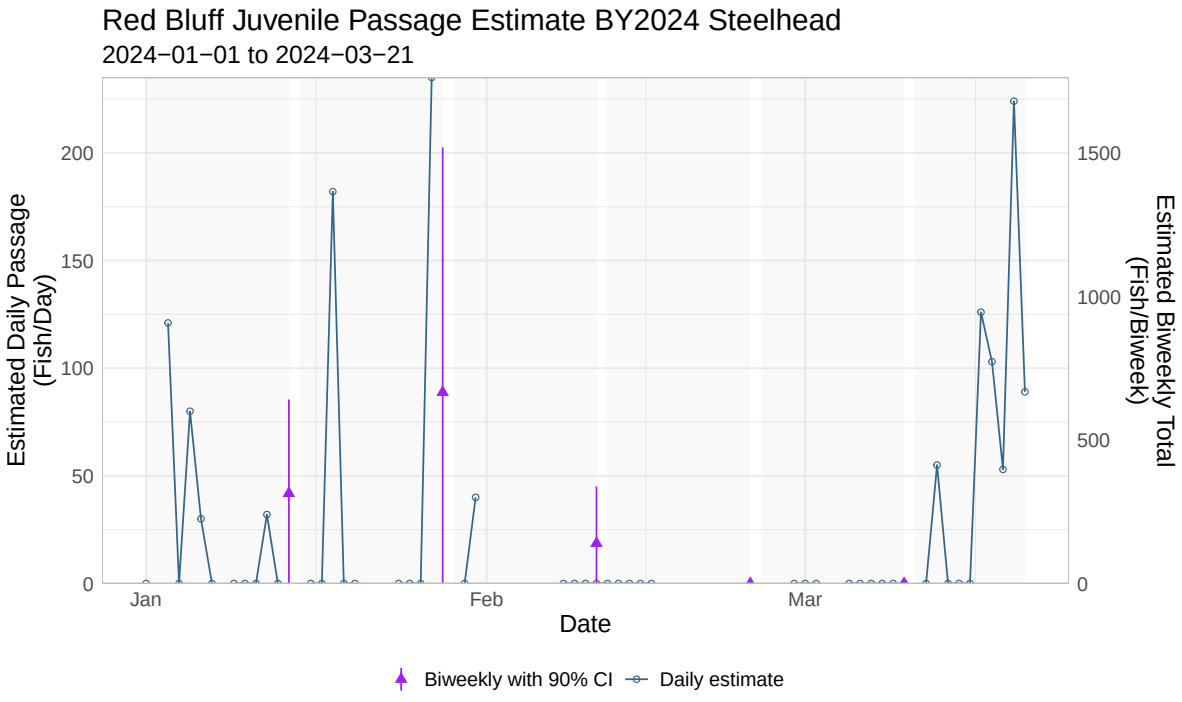
Track-a-Cohort: Steelhead

2024-08-06

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.

Figure 1. RBDD Juvenile Passage Estimates

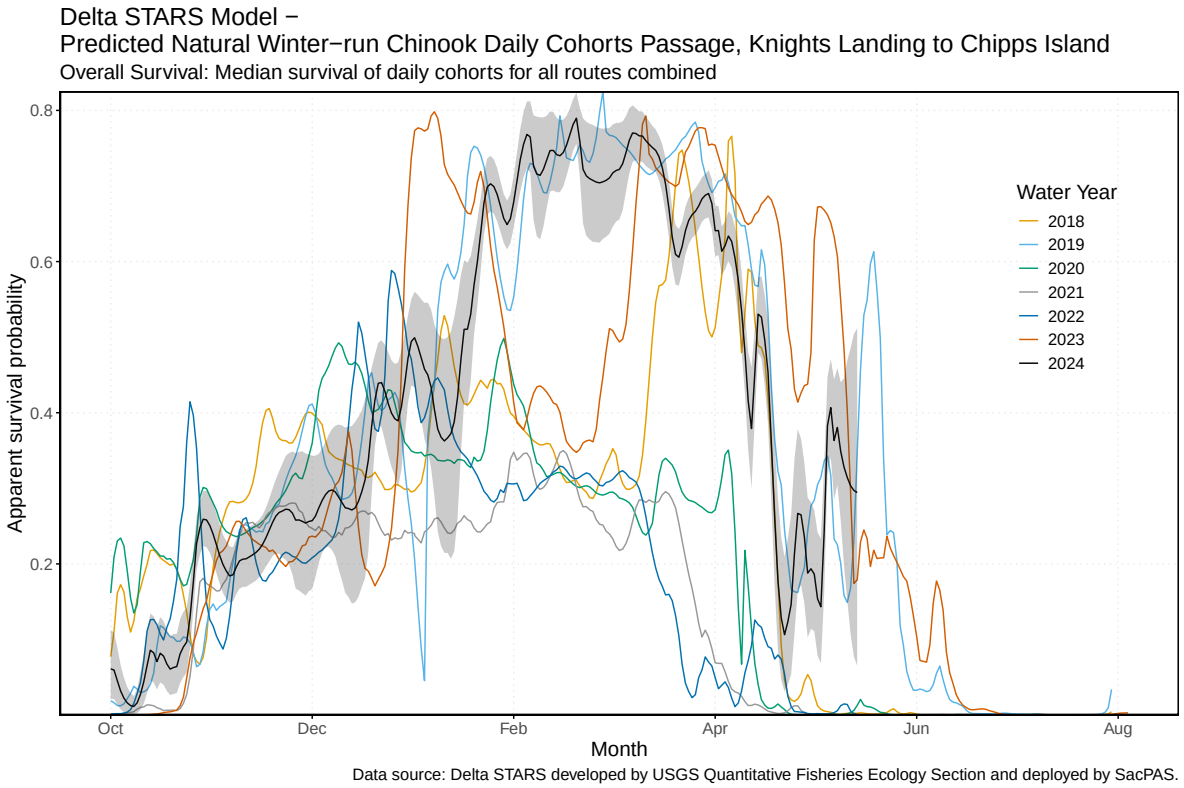


Related links: SacPAS Page, GitHub Repo Code

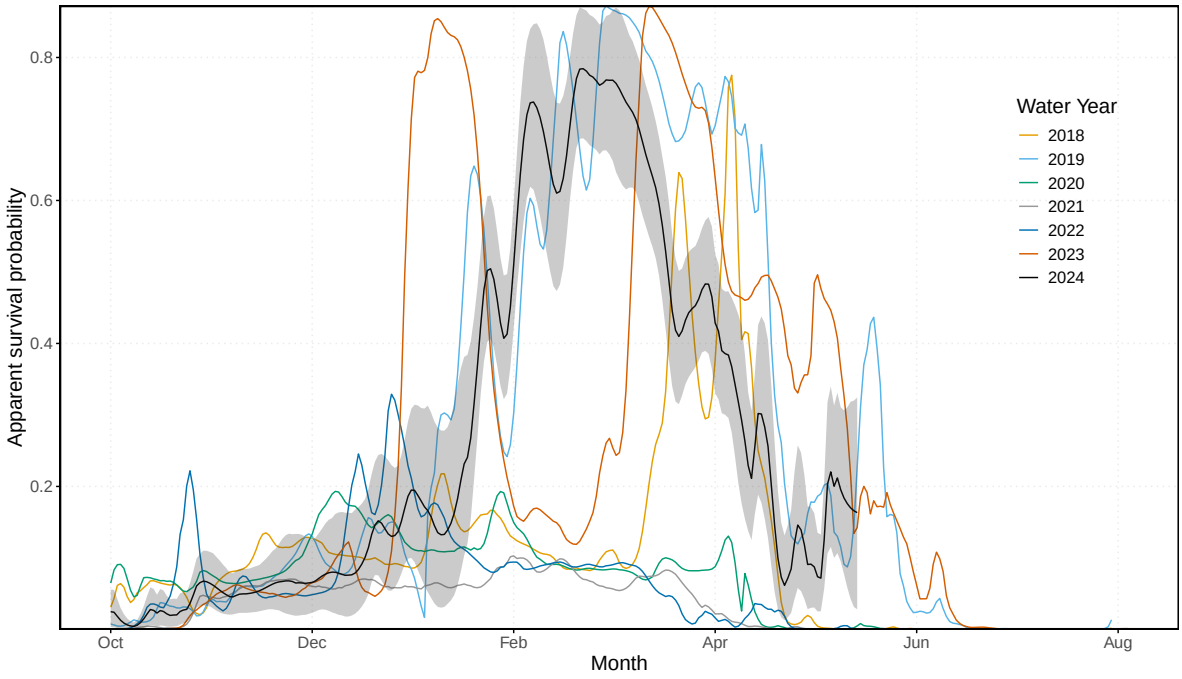
- Issues:
  - Update biweekly shaded areas based on SI generated methods
  - Continue to match the same 0 line cutoff as on SacPAS or leave space to show points at 0 line?
  - Confirm Calendar Year or Water Year. Currently code only pulls current year based on today's date. To look at water year will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

Figure 2. Survival and Routing Probabilites

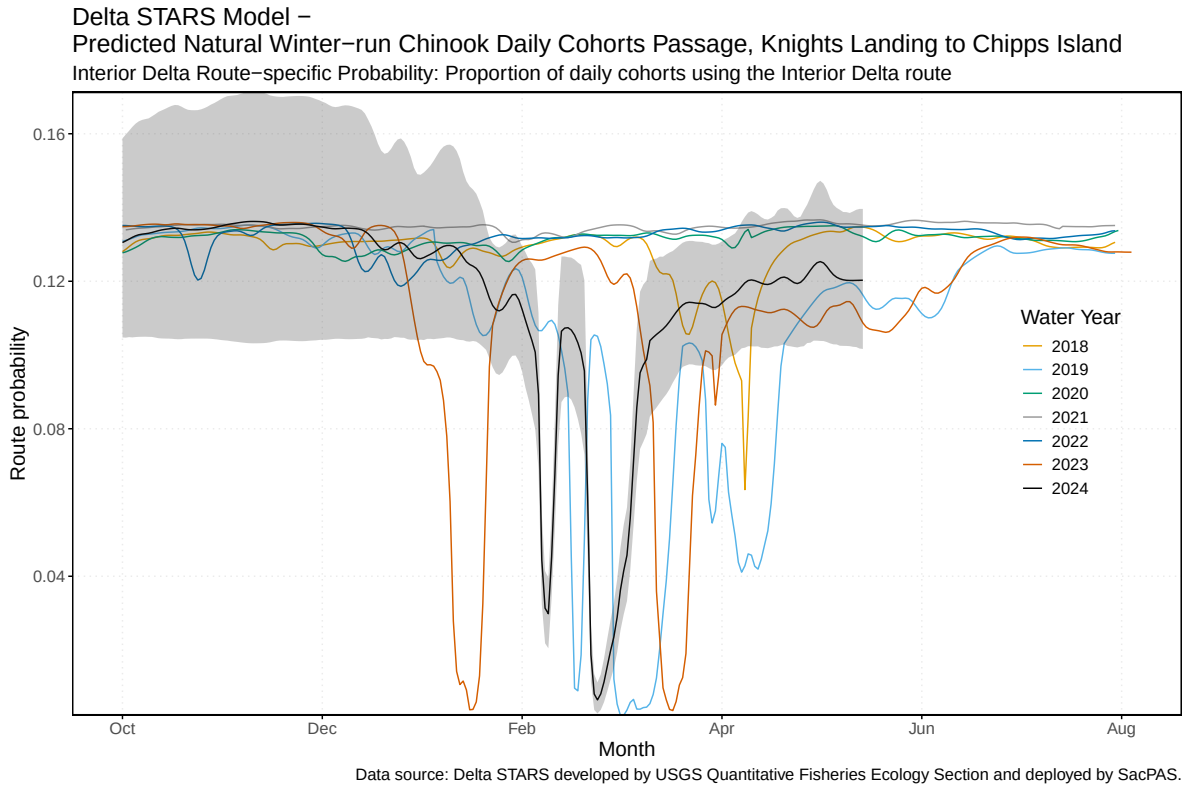
Note: Plots below use Winter-run Chinook as a surrogate for Steelhead



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



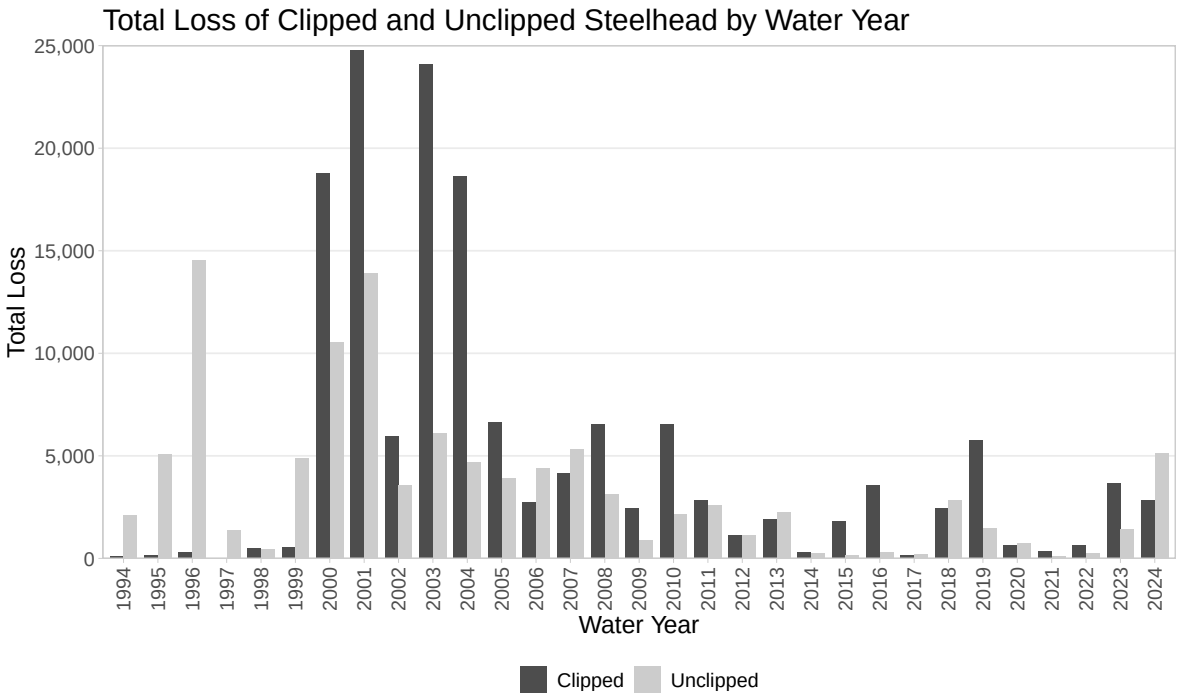
Data source: Delta STARS developed by USGS Quantitative Fisheries Ecology Section and deployed by SacPAS.



Related links: SacPAS Page, Interactive Plot, GitHub Repo Code, STARS ShinyApp

Figure 3. Comparison of Clipped and Unclipped Loss

Figure 3a. Total Loss of Clipped and Unclipped Steelhead



Related links: SacPAS Page, GitHub Repo Code

Figure 3b. Size Distribution of Loss

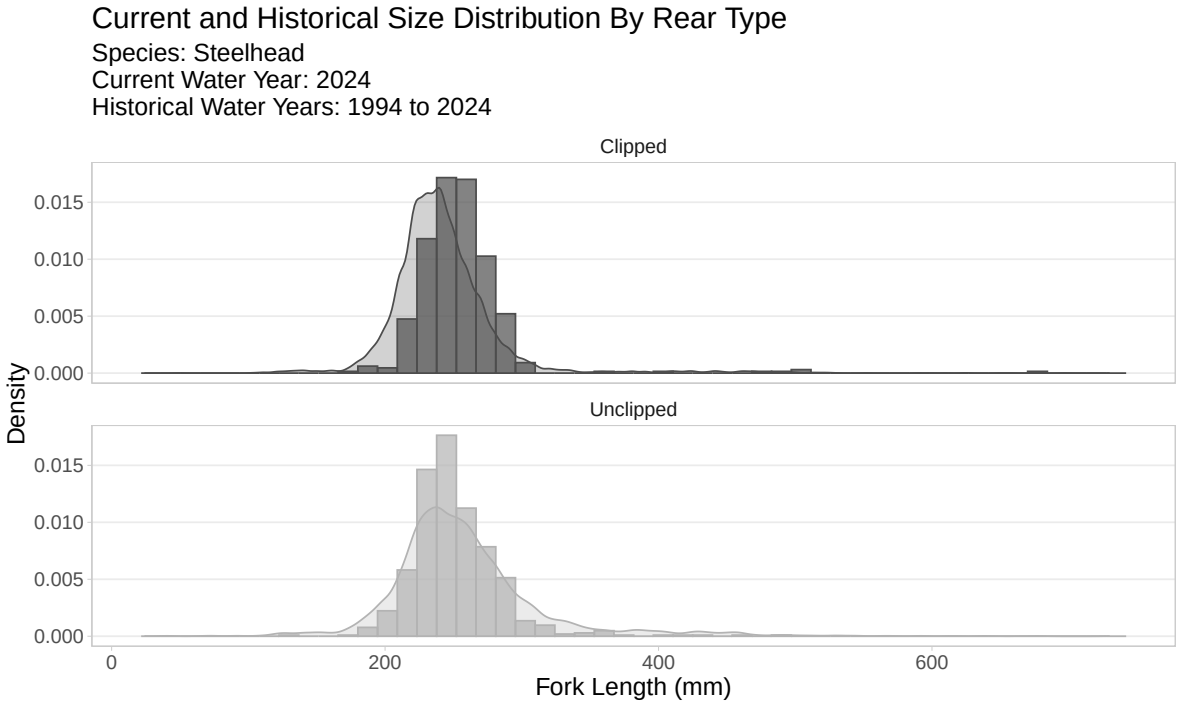
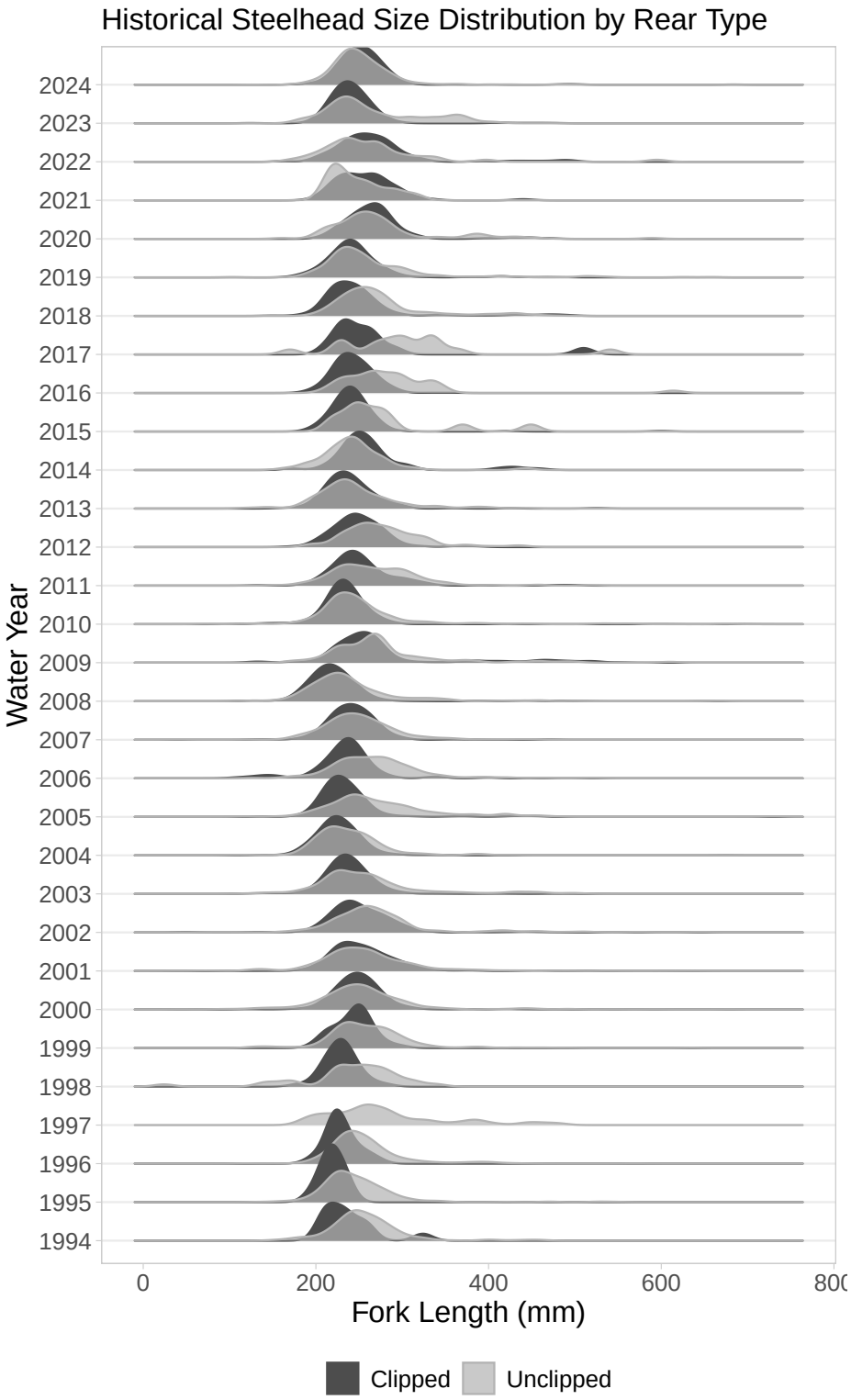


Figure 1: Figure compares density plots that highlight historical (WY1994 to WY2023) size distribution and histogram of current year (WY2024) size distribution by rear type (dark grey = unclipped; light grey = clipped). Fork lengths below 750 mm were included in dataset.

Related links: SacPAS Page, GitHub Repo Code

Figure 3c. Size Distribution of Steelhead Loss By Year



Related links: SacPAS Page, GitHub Repo Code

Figure 4. Cumulative Loss

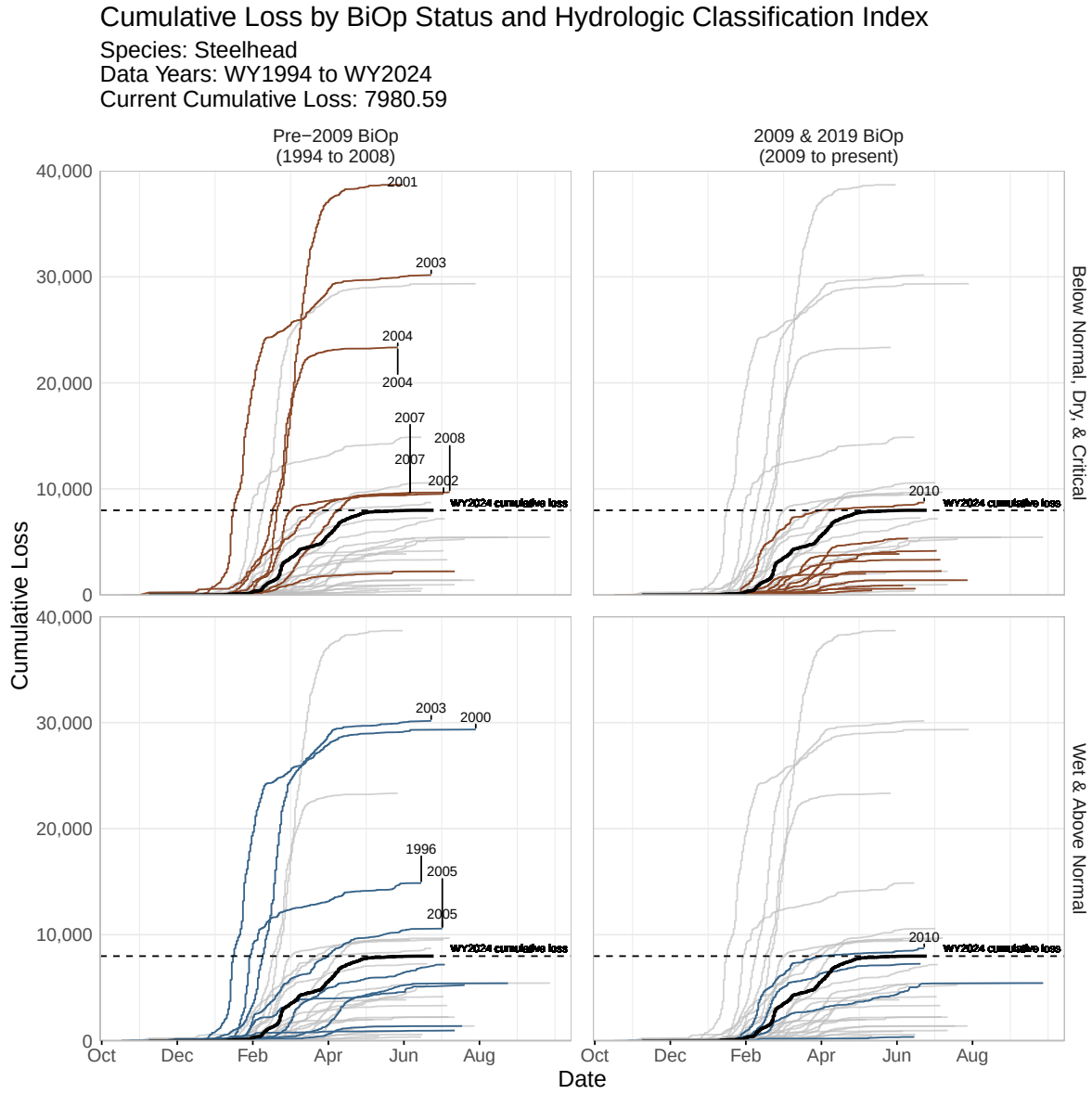
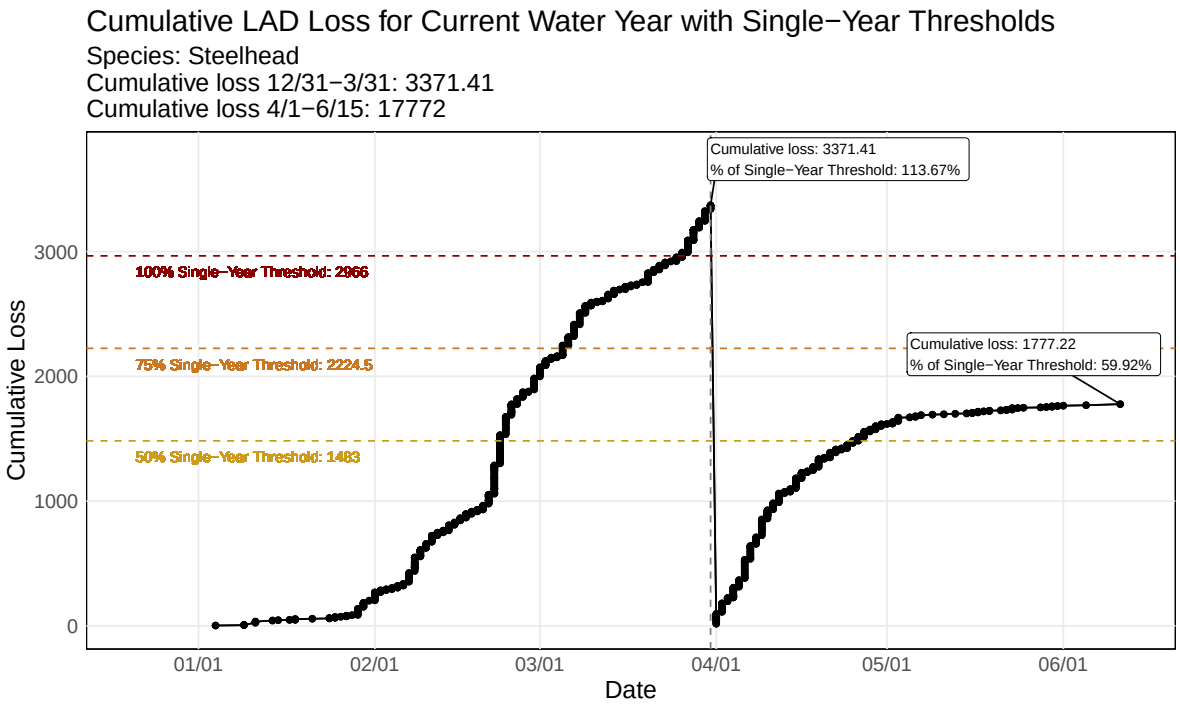


Figure 2: The figure shows cumulative loss by BiOp Status and Hydrological Classification Index (HCI). Each quadrant of the faceted plot includes grey lines for historical years, colored lines (blue for wet years, red for dry years) for years within the BiOp status and HCI type, a black line for the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

Related links: SacPAS Page, GitHub Repo Code, Interactive Plot - ShinyApp

Figure 5. Cumulative Loss with Single-Year Thresholds



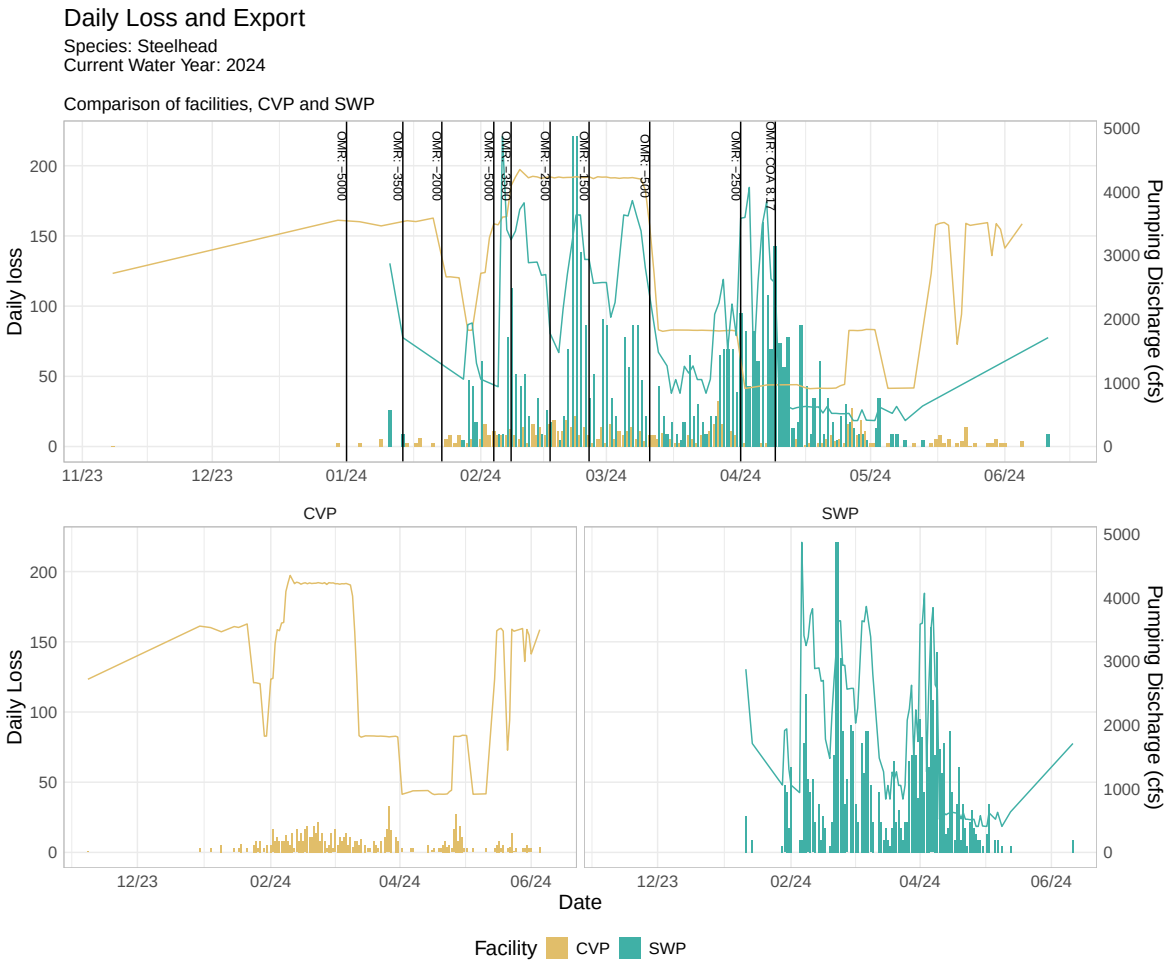
Related links: SacPAS Page, ShinyApp, GitHub Repo Code, Interactive Plot - ShinyApp

- 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

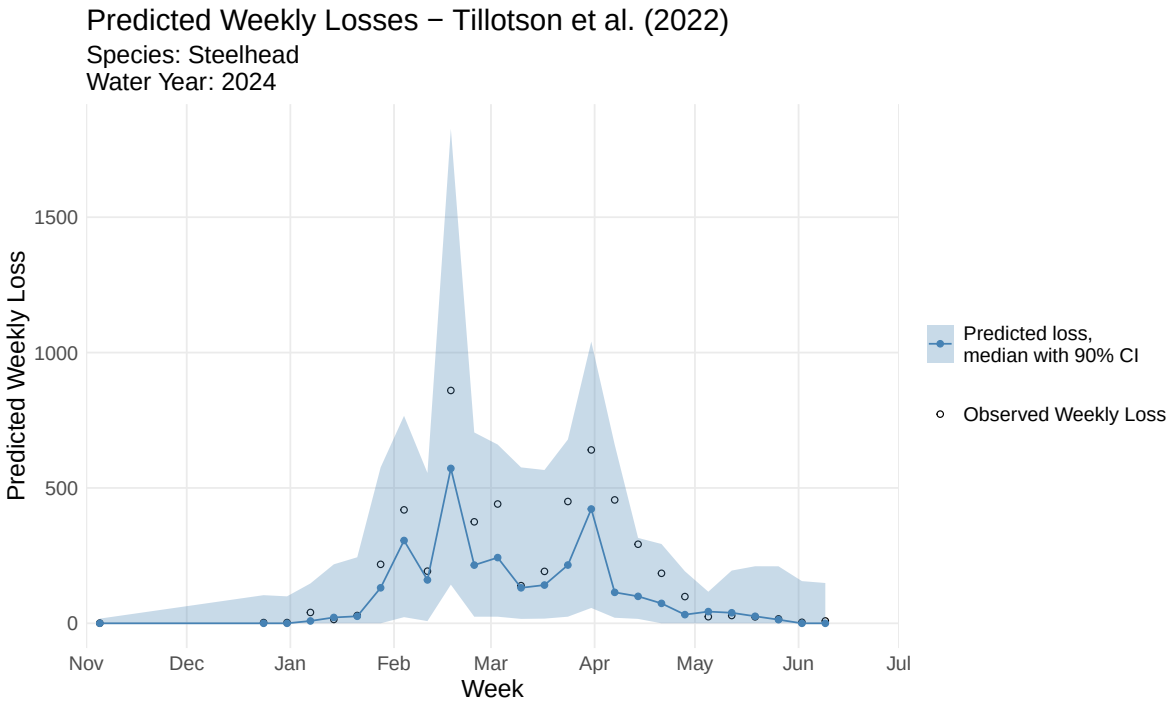
Figure 6. Daily Loss and Export by Pumping Facility



Related links: SacPAS Page, Interactive Plot - ShinyApp, GitHub Repo Code

- Issues:
  - Confirm OMRI is value wanted - different from tillotson model. Based on shared code and description in Assessment pdf's OMRI is used for management.
  - Confirm if OMR/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."

Figure 7. Predicted and Observed Weekly Loss - Tillotson Model



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. Model inputs and predictions - Tillotson Model

Table 1: Tillotson
Steelhead
dle Rivers
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 Figure 7 issues