



Salmon Monitoring Team (SaMT) Weekly Meeting

Teams call: 2/6/24 at 9:00 a.m.

Objective

Provide information to the Water Operations Management Team (WOMT), the U.S. Bureau of Reclamation (Reclamation) and California Department of Water Resources (DWR) on measures to reduce adverse effects from Delta operations of the Central Valley Project (CVP) and the State Water Project (SWP) on salmonids and green sturgeon. Final versions of the Proposed Action Assessment, and Fish and Water Operations Outlook will be posted to [Reclamation's Delta Monitoring Work Group](#) webpage, while final version of the Meeting Notes will be posted to Reclamation's [Salmon Monitoring Team](#) webpage. Meeting participants include representatives from: California Department of Fish and Wildlife (CDFW), DWR, National Marine Fisheries Service (NMFS), State Water Resources Control Board (SWRCB), Reclamation, and the U.S. Fish and Wildlife Service (USFWS).

Agenda Items

1. Introductions
2. Housekeeping
3. Updates on Water Operations and Biological Conditions
4. Open Discussion on Species Status
5. Live-edit Assessments (Proposed Action Assessment and ITP Risk Assessment)
6. Additional Considerations/Other Topics
7. Next Meeting

Agenda Item 2. Housekeeping

- N/A

Agenda Item 3. Updates on Water Operations and Biological Conditions

- The Fish and Water Operations Outlook document was reviewed. Please refer to the Operations Outlook, PA Assessment, and ITP Risk Assessment documents. All flows and releases, unless otherwise noted, are reported as approximated daily averages.
- Feather River releases are scheduled to decrease from 9,000 cfs to 7,000 cfs on 2/6/24 and will likely decrease further through the week. Releases peaked at 12,000 cfs on 2/1/24.

- Sacramento River flows at Freeport are 57,700 cfs and reaching close to maximum levels. As the storm water moves through the area, flows may decrease to as low as 30,000 cfs.
- San Joaquin River flows are expected to increase to its maximum level of 7,000 cfs.
- OMRI is targeted at -5,000 cfs on 2/6/24. Beginning on 2/7/24, operations will target an OMRI no more negative than -3,500 cfs for a 7-day average.
- Net Delta Outflow Index is approximately 66,000 cfs and may increase up to 80,000 cfs as water from the Yolo Bypass and the Fremont Weir travel through the region.
- QWEST was approximately +15,000cfs on 2/5/24 and is expected to decrease through the week to approximately +6,000 cfs.
- Rio Vista flows were approximately 50,700 cfs on 2/5/24 and are expected to increase to 62,000 cfs before decreasing as storm flows move through the region.
- Discussion Questions
 - Is X2 normally influenced by wind, and how much impact does it have on X2? [CDFW]
 - The impact can be pretty significant, especially with a large, low-pressure system moving through the region. However, the effect is not always consistent with each weather event. The tidal anomaly in some locations can measure up to two feet, which is definitely significant. [DWR, USBR]
 - For details on salvage that occurred in the past week please refer to the Operations Outlook, PA Assessment, and ITP Risk Assessment documents. Additionally, all salvage information can be found online at <https://filelib.wildlife.ca.gov/Public/salvage/>.

Actions Currently in Effect

- The Interim Operations Plan (IOP) is currently in effect resulting from a court order issued on 2/28/2023 and in effect until 3/31/2024 or until the Court issues a ruling on the 2024 IOP. Reclamation shall adopt the following provisions of the SWP ITP:
 - 8.5.2 Larval and Juvenile Delta Smelt Protection
 - 8.6.1 Winter-run Single-year Loss Threshold
 - 8.6.2 Early-season Natural Winter-run Chinook Salmon Discrete Daily Loss Threshold

- 8.6.3 Mid- and Late-season Natural Winter-run Chinook Salmon Daily Loss Threshold¹
- 8.6.4 Daily Spring-run Chinook Salmon Hatchery Surrogate Loss Threshold
- 8.7 OMR Flexibility During Delta Excess Conditions
- 8.8 End of OMR Management
- **Delta Cross Channel (DCC) Gate operations (PA 4.10.5.3):** See Outlook and Assessment for more information.
- **ITP Winter-run Single-year Loss Threshold (COA 8.6.1):** DWR will operate Banks Pumping Plant consistent with Condition of Approval 8.6.1 of the ITP. These values are based on the juvenile production estimate (JPE). The final JPE for brood year 2023 natural-origin winter-run Chinook salmon has been estimated at 234,896. The below thresholds are based on the final JPE.
 - The ITP natural-origin Winter-run Single-year Loss Threshold for this year is loss of unclipped length-at-date (LAD) winter-run Chinook salmon from the CVP and SWP greater than or equal to 1.17% of the winter-run Chinook salmon JPE (loss \geq 2,748.28). If 50% of the threshold is exceeded (loss \geq 1,374.14), the required response is to reduce SWP exports by its proportional share, according to the coordinated operations agreement (COA), that would be required to reach a 14-day average OMR of -3,500 cfs. If 75% of this threshold is exceeded (loss \geq 2,061.21), the required response is to reduce SWP exports by its proportional share, according to the COA, that would be required to reach a 14-day average OMR of -2,000 cfs.
 - The ITP hatchery-origin Chinook salmon Single-year Loss Threshold for this year is loss of clipped LAD winter-run Chinook salmon from the CVP and SWP greater than or equal to 0.12% of the winter-run Chinook salmon hatchery-origin JPE (loss \geq 232.30). If 50% of the threshold is exceeded (loss \geq 116.15), the required response is to reduce SWP exports by its proportional share, according to the coordinated operations agreement (COA), that would be required to reach a 14-day average OMR of -3,500 cfs. If 75% of this threshold is exceeded (loss \geq 174.23), the required response is to reduce SWP exports by its proportional share, according to the COA, that would be required to reach a 14-day average OMR of -2,000 cfs.
- **ITP Mid- and Late-season Natural Winter-run Chinook Salmon Daily Loss Threshold (COA 8.6.3):** From 2/1/24 – 2/29/24, DWR will operate Banks Pumping

¹ The SWP ITP was amended for WY 2024 on 12/22/2023 which modifies the winter-run daily loss threshold calculations for COA 8.6.3. and furthermore, lowers the daily loss thresholds that were originally agreed upon in the 2023 IOP extension. Because this new amendment was not part of the original 2023 IOP Extension agreed to by Reclamation and the State and ordered by the Court on 2/28/2023, it is not included in the current operation of the 2023 IOP Extension. Operating the CVP to this new amendment would be inconsistent with the current court order; therefore, CVP will operate to COA 8.6.3, excluding the 12/22/2023 amendment but including WY 2023 SWP ITP amendment that was signed on 1/20/23, in to maintain operations under the 2023 IOP Extension.

Plant consistent with Condition of Approval 8.6.3 of the ITP. The ITP Daily Loss Threshold for January is loss of older juvenile Chinook salmon from CVP and SWP greater than 0.00124% for January and greater than 0.00231% for February of the winter-run Chinook salmon JPE. If the threshold is exceeded (loss > 5.43), the required response is to reduce SWP exports by its proportional share, according to the COA, that would be required to reach an OMR of no more negative than -3,500 cfs for five consecutive days. DWR shall restrict exports in response to the initial LAD identification of natural older juvenile Chinook salmon and the thresholds described above. If genetic analysis of an individual natural older juvenile Chinook salmon observed in salvage at the SWP or CVP indicates that it is not a winter-run, that individual shall not count toward the daily loss threshold and continued export restrictions under this COA are not required if the daily loss threshold has consequently not been met.

Weekly Fish and Water Operations Outlook, Current Operations

- SaMT reviewed and updated the Outlook document. The updated Outlook document will be distributed to the SaMT via email by close of business (COB) 2/7/24.
- SaMT discussed Fish Monitoring Gear Efficiency/Disruptions as addressed within the Operations Outlook and updated accordingly.

SaMT Estimates of Fish Distribution

- SaMT estimates of the current distribution of listed Chinook salmon and CCV steelhead, as a percentage of each population, are based on recent monitoring data and historical migration timing patterns. Estimates this week are based on YOY winter-run and YOY spring-run as well as natural origin steelhead at the real-time monitoring locations. These estimates are reported in the final Assessment document, available on the [Delta Monitoring Workgroup](#) webpage.

Location	Yet to Enter Delta	In the Delta	Exited the Delta past Chipps Island
Young-of-year (YOY) winter-run Chinook salmon	Current: 25-39% Last week: 30-44%	Current: 60-70% Last week: 55-65%	Current: 1-5% Last week: 1-5%
YOY spring-run Chinook salmon	Current: 60-75% Last week: 65-80%	Current: 25-40% Last week: 20-35%	Current: 0% Last week: 0%
*YOY hatchery winter-run Chinook salmon	Current: 100% Last week: 100%	Current: 0% Last week: 0%	Current: 0% Last week: 0%
Natural-origin steelhead	Current: 65-84% Last week: 75-84%	Current: 15-30% Last week: 15-20%	Current: 1-5% Last week: 1-5%

Rationale for distribution

- Wild winter-run Chinook Salmon
 - One wild winter-run Chinook salmon was observed at Tisdale RST,1 at the Beach Seines, and 4 at the Sacramento Trawl, and 3 at Chipps Island. Knights Landing and Lower Sacramento RSTs were not trapping last week due to the high flows. Since winter-run were observed at monitoring locations upstream and within the Delta and since LAD winter-run have been observed in salvage in high numbers over the previous week, SaMT estimates that an additional 5% of the wild winter-

run Chinook salmon population have migrated into the Delta. After discussion, SaMT members decided to keep the range of fish that have exited the Delta past Chipps Island to 1-5%, due to the higher JPE for WY 2024 and historical data on SacPAS (23-year average) estimating only 5.6% have exited at this time.

- Wild spring-run Chinook Salmon
 - Five wild spring-run Chinook salmon were observed at the Lower Feather RST, 3 at Tisdale RST, and 7 at the Beach Seines. Knights Landing and Lower Sacramento RSTs were not trapping last week due to the high flows. SaMT estimates that the Lower Sacramento RST would have likely continued to catch SR if they had been trapping due to the catch of SR the day prior to pulling the traps out of the water and the storm events that occurred the previous week. SaMT estimated the range of fish within the Delta increased by 5% this week. The spring-run population this year is estimated to be low. Many LAD fall-run have already been observed in salvage and in the RST's; therefore, SaMT estimates that observations in real-time monitoring sites may be low this year for SR.
- Hatchery winter-run Chinook Salmon
 - There have been no acoustically-tagged hatchery winter-run observed as of 2/6/24.
- Natural-origin Steelhead
 - A couple Steelhead were seen at Knights Landing in the lower Sacramento River and Sacramento Trawls, and quite a few were observed in salvage. Looking at historical data, 22% are typically seen past Knights Landing by early February. Recommendations made to keep the range of 1-5% for fish that have exited the Delta past Chipps Island and expand the range of fish in the Delta by 5-10% to a total of 15-30% due to high flows and the number of Steelhead observed in salvage.

Delta Entry Map

- Adam Nanninga, USFWS, shared a map of sampling locations. Nanninga shared the following details about the map:
 - The sampling locations on the lower Sacramento River extend from Colusa down to Elkhorn.
 - Each sampling location features a code, e.g. SR143W (Sacramento River mile #143, west side of the river)
 - USFWS proposed:
 - Using Knights Landing for the rotary screw trap (RST)
 - Using Knights Landing and any location south of there for Beach Seines

- Discovery Park is approximately at the start of the Delta, but USFWS recommends further discussion for identifying a Delta entry point
- The approximate distance from Colusa to Discovery Park is 83 miles
- USFWS to not include the stretch of the Sacramento River from Colusa to Reel's Beach as Delta entry points.
- Discussion
 - NMFS shared that Knights Landing is used because it's the most consistent upstream location entering into the Delta. If Discovery Park is used, what's the recommended trapping frequency?
 - USFWS clarified that all sites trap on a weekly basis, with the exception of Oct/Nov/Dec at 3 days per week for the Sacramento Seine, i.e., Elkhorn, Verona, Discovery Park, and American River sites, plus a few more sites in the Sacramento River.

Agenda Item 4. Open Discussion on Species Status

Salvage Update for 1/29/24 – 2/4/24

- Salvage and loss totals are detailed in the Salvage update shared via email. Please refer to the email for specific figures.
- Additional fish from the Coleman experimental releases on 12/18/23 were observed as well as tagged fish from the San Joaquin River Restoration program.
- One white sturgeon was collected on 1/30/24 at the SWP Facility.
- Several wild winter-run LAD older juvenile Chinook salmon were observed during the reporting period. As samples are genetically analyzed, data will be updated or edited as necessary.
- The facilities collected smaller young-of-year fall-run fish.
- 111 wild Steelhead were salvaged, bringing the seasonal loss total to 306.44 fish.
- One hatchery-origin Steelhead was detected.
- No reduced counts or outages occurred during the reporting period.
- Discussion Questions
 - Were the wild spring-run Chinook salmon the same as those for which we received genetic data? [CDFW]
 - We may not yet have received genetic results yet for those fish this week. So far, I've only seen two older juvenile LAD classified as spring-runs in the genetic identification reports. [CDFW]
 - DWR confirmed they have only processed older juveniles this season. They have been reaching the Trigger level each day and are unable to

analyze additional unclipped fish at this time. At some point, data on all unclipped samples will be shared.

Agenda Item 5. Live edit Assessments

Proposed Action Assessment

- SaMT reviewed and updated the current week's Proposed Action Assessment document. The updated Proposed Action Assessment will be distributed to the SaMT via email by COB 2/7/24. The final assessment will be posted to [Reclamation's Delta Monitoring Workgroup](#) webpage.

ITP Risk Assessment

- The draft ITP Risk Assessment will be distributed on 2/6/24 with comments due COB Thursday (2/8/24). Past ITP Risk Assessments can be found at [CDFW's Water Project Operations](#) webpage.

Agenda Item 6. Additional Considerations/Other Topics

Fish and Water Operations Outlook Table Discussion

- During the Weekly Water Operations Meeting, SMT proposed dividing up a portion of the Outlook tables for further detailed discussion. It was decided that specific tables will be reviewed by SMT and others by SaMT.
 - CDFW noted that Tables 3a and 3b have Delta Smelt triggers. Farida Islam, DWR, cannot attend SMT meetings but can continue to provide data for Vernalis and Rio Vista. Other individuals sometimes provide updates at the meeting.

SHERLOCK for Rapid Genetic Chinook Run Assignment: Pilot Testing at Salvage

- Melinda Baerwald, DWR, presented on SHERLOCK as a refresher to SaMT. Baerwald also presented on SHERLOCK to SaMT during WY 2023.
- Details of her presentation included:
 - Chinook run-type assignment
 - The LAD method can be problematic due to low accuracy rates
 - Genetic analysis often results in a different, more accurate run-type assignment than the LAD method
 - Genetic testing methods
 - GT-seq genetic protocol
 - Obtained through fin clip collection method
 - 2-3 days' timeline for rapid screening
 - Results: population assignment, sex, ESU
 - SHERLOCK genetic protocol

- Obtained through fin clip and rapid DNA extraction
- Timeline ranges from 2 hours to 1 day; at lab and eventually at salvage
- Results: ESU assignment only
- SHERLOCK flow chart for ESU assignment
 - Analysis starts by using adult migration timing loci which allow to distinguish between early, i.e., winter or spring, migration from a late migration, i.e., fall or late-fall
 - If the sample results in fall/early fall, analysis is complete
 - Winter and spring-run samples require additional steps to determine, especially if the sample comes back positive for both assays
- SHERLOCK advantages and limitations
 - Advantages
 - Accuracy
 - Sensitivity
 - Rapid results
 - Inexpensive
 - Resource needs are low
 - Limits
 - Doesn't distinguish between fall and late-fall
 - Doesn't target many loci, therefore no population assignment or indication of the tributary of origin
 - Current uncertainty on how to classify heterozygotes
- SHERLOCK Pilot Study at SWP and CVP Facilities
 - Study initiated in January 2023
 - Purposes are to assess SHERLOCK concordance with current GT-seq and LAD approaches and to identify logistical issues with methods and seek process improvements
 - As of January 2024, the study is in the middle of the following stages:
 - Implementation of the pilot study
 - Laboratory processing at West Sacramento
 - Rapid processing of WR-LAD; provided weekly

- Processing of non-WR-LAD; provided every 1-2 months
- Comparing SHERLOCK results to GT-seq
 - Collect GT-seq data from CFS for comparison
- Reporting
 - Year 1 Report
- Note: 100% agreement is not expected across genetic testing methods
- Current and upcoming work
 - Current: Adult phenotype study exploring the concordance between genetic methods and phenotype
 - Future study: Processing at salvage
- Discussion Questions
 - Usually think of ‘phenotype’ as related to physical appearance, but this indicates run, timing, etc. [CDFW]
 - In this case, we’re identifying genotype, which will sometimes be referred to as ‘phenotype’. The phenotype in this case is adult migration timing; this can also be called an ‘ecotype’. [DWR]

Winter-run Chinook Salmon Machine Learning Tool

- CDFW provided an update on the latest model run from the Winter-run Chinook Salmon Machine Learning Model. CDFW shared a few figures from 1/12/24 – 2/2/24 that showed a decrease probability of low presence and an increase in high presence. This was mostly due to seasonal timing and flows and temperatures at Red Bluff from 6 months ago, which was shown in the SHAP plot. CDFW expects to see either a decrease in absence or an increase in low presence and/or an increase in high presence this upcoming week at the salvage facilities. Combined export levels of 4,000 cfs are contributing to this expectation. If that level increases to 10,000 cfs, the low presence will decrease and the high presence will increase, resulting in a greater number of fish in salvage.

Agenda Item 7. Next Meeting

- The next SaMT meeting will be held on Tuesday, 2/13/24 on Microsoft Teams.
- Action Items
 - Adam Nanninga, USFWS, to share the Sampling Locations Map with SaMT members.