



— BUREAU OF —  
RECLAMATION

# Weekly Assessment of CVP and SWP Delta Operations on ESA-listed Species

December 05, 2023

## Executive Summary

### Operational Conditions

See Weekly Fish and Water Operation Outlook document for December 5 - December 11.

### Winter-run Chinook Salmon

No loss of natural winter-run Chinook Salmon (by length at date, LAD) has occurred in the past week at the State or Federal fish salvage facilities. Loss of natural winter-run Chinook Salmon at the Central Valley Project (CVP) and State Water Project (SWP) fish collection facilities may occur over the next week. 1-4% of juvenile natural winter-run Chinook Salmon from brood year (BY) 2023 are estimated to be present in the Delta.

### Spring-run Chinook Salmon

No loss of natural spring-run Chinook Salmon (by length at date, LAD) has occurred in the past week at the State or Federal fish salvage facilities. 0-1% of juvenile natural spring-run Chinook Salmon was estimated in the Delta. CV spring-run Chinook Salmon adults have nearly completed spawning and eggs are in gravel.

### Central Valley Steelhead

Loss of natural California CV (CCV) steelhead has not occurred in the past week at the Federal or State fish salvage facilities. Loss of Central Valley steelhead at the Central Valley Project (CVP) and State Water Project (SWP) fish collection facilities is unlikely to occur over the next week. 0% of CCV steelhead were estimated in the Delta.

### DCC gates recommendation

The DCC gates were closed for the OMR Season on 11/27/2023.

## Delta Smelt

Based on distribution patterns over the past decade and low detections in this water year, Delta Smelt are unlikely to be prevalent in the Central and South Delta. Limited detection data from the past month supports Delta Smelt presence in the lower Sacramento River. The last Delta Smelt observations were on 10/24/2023 and 11/15/2023 in the lower Sacramento River. The likelihood of Delta Smelt entrainment is low due to seasonal timing. The Integrated Early Winter Pulse Protection (IEWPP) period began on 12/1/2023. “First Flush” conditions that would trigger IEWPP regulations are not anticipated this week.

## Monitoring Teams summary

There were no non-consensus issues to report from the Salmon Monitoring Team or Smelt Monitoring Team.

## Operational and Regulatory Conditions

See current Weekly Fish and Water Operation Outlook document.

## Biology, Distribution, and Evaluation Winter-run Chinook salmon, Spring-run Chinook salmon, Central Valley Steelhead

### Population Status

#### *Winter-run Chinook Salmon*

- Delta Life Stages:
  - Juveniles, Adults
- Brood Year 2023 Productivity:
  - Natural winter-run Chinook salmon: Juvenile production estimate (JPE) calculations have not been established for brood year (BY) 2023 winter-run Chinook salmon. The agencies in the winter-run Chinook salmon JPE project work team (WR JPE PWT) will meet this month to begin formulating a recommendation for the JPE.
  - Mean cumulative weekly passage of winter-run Chinook salmon through 12/2/2023 at Red Bluff Diversion Dam (RBDD) for the last 20 years of passage data is 91.6% (one SD of 7.6%). By 12/2/2023, 840,311 winter-run Chinook salmon were estimated to have passed RBDD compared to the cumulative passage last year of 160,875 winter-run Chinook salmon.
  - Hatchery winter-run Chinook salmon: No hatchery winter-run Chinook salmon have been released in WY 2023.

### ***Spring-run Chinook Salmon***

- Delta Life Stages:
  - Young-of-year (YOY) and Yearlings
- Brood Year 2023 Productivity:
  - Natural spring-run Chinook salmon: No JPE has been established for spring-run Chinook salmon.
  - Hatchery spring-run Chinook salmon surrogates associated with the Proposed Action (PA 4.10.5.10.2 Additional Real-Time OMR Restrictions and Performance Objectives):
    - No hatchery spring-run surrogate Chinook salmon have been released in WY 2023.

### ***Central Valley Steelhead***

- Delta Life Stages:
  - Spawning Adults, Kelts, Juveniles
- Brood Year 2023 Productivity:
  - Spawner abundance: There is limited information about the adult steelhead population. It is estimated to be small, contributing to the limited productivity of the population.
  - Natural steelhead: No JPE has been established for steelhead. Data are limited.
  - Hatchery steelhead: Reclamation's Proposed Action has no hatchery steelhead triggers.

### **Distribution**

#### ***Winter-run Chinook Salmon***

##### **Current Distribution:**

- For Winter-run Chinook Salmon observations reported to SaMT since previous meeting, see Table 1.
- For SaMT distribution estimates, see Table 2.
- As of 12/4/2023, no Winter run Chinook Salmon have been identified at the CVP or SWP facilities.

## Historical Trends

- For historical winter-run Chinook salmon trends in salvage, see Table 3.
- Loss of natural winter-run Chinook salmon at the CVP and SWP fish collection facilities could possibly occur over the next week based on hydrology. If historic trends in salvage were to continue, winter-run Chinook salmon loss is expected to remain the same over the next week.

## Forecasted Distribution within Central Valley and Delta regions

- The STARS model projects route-specific proportion of entrainment, survival, and travel times (Table 5). This model does not estimate entrainment into the lower Sacramento River sloughs (i.e., Three-Mile Slough).

## *Spring-run Chinook salmon*

### Current Distribution

- For Spring-run Chinook salmon observations reported to SaMT since previous meeting, see Table 1.
- For SaMT distribution estimates, see Table 2.

### Historical Trends

- For historical spring-run Chinook salmon trends in salvage, see Table 3. If historic trends in salvage were to continue YOY spring-run Chinook salmon loss is unlikely to increase over the next week.

## Forecasted Distribution within Central Valley and Delta regions

- YOY spring-run Chinook are migrating through the Delta.

## *Central Valley Steelhead*

### Current Distribution

- For CCV Steelhead observations reported to SaMT since previous meeting, see Table 1.
- For SaMT distribution estimates, see Table 2.

### Historical Trends

- For historical CCV steelhead trends in salvage, see Table 2. If historic trends in salvage were to continue, juvenile CCV steelhead loss may occur over the next week.

## Forecasted Distribution within Central Valley and Delta regions

- The entrainment tool estimates of CCV steelhead loss to be low (Table 6, Fig. 1).

Table 1. Fish observation reported since the previous SaMT meeting. NAs represent no data reported. See Operations Outlook for notes on interruptions in any surveys.

Locations	Reporting Period	SR Chinook	WR Chinook	LFR Chinook	Steelhead (Wild)	Green Sturgeon
GCID RST	N/A	N/A	N/A	N/A	N/A	N/A
Butte Creek RST	11/28-12/4	2	0	0	0	0
Tisdale RST	11/27-12/3	1	2	0	0	0
Knights Landing RST	11/28-12/4	1	0	0	0	0
Lower Sacramento RST	11/28/12/4	0	0	0	0	0
Beach Seines	11/27-12/4	0	0	0	0	0
Sac. Trawl	11/27-12/4	0	0	0	0	0
Chippis Island Midwater Trawl	11/27-12/1	0	0	1	0	0
Mossdale Kodiak Trawl	11/27-12/1	0	0	0	0	0
EDSM	11/27-12/4	0	0	0	0	0
Feather River Herring RST	N/A	N/A	N/A	N/A	N/A	N/A
Feather River Eye Side RST	N/A	N/A	N/A	N/A	N/A	N/A
Lower Feather River	11/28-12/4	0	0	0	0	0

Table 2. Salmonid distribution estimates

Location	Yet to Enter Delta (%)	In the Delta (%)	Exited Delta past Chipps Island (%)
Young-of-year (YOY) winter-run Chinook salmon	Current: 96-99% Last Week: 96-99%	Current: 1-4% Last Week: 1-4%	Current: 0% Last Week: 0%
YOY spring-run Chinook salmon	Current: 99-100% Last Week: 100%	Current: 0-1% Last Week: 0%	Current: 0% Last Week: 0%
YOY hatchery winter-run Chinook salmon	Current: NA Last Week: NA	Current: NA Last Week: NA	Current: NA Last Week: NA
Natural origin steelhead	Current: 100% Last Week: 100%	Current: 0% Last Week: 0%	Current: 0% Last Week: 0%

Table 3. Historic migration and salvage patterns. Last updated 12/4/2023.

Species	Red Bluff Diversion Dam	Tisdale Rst	Knights Landing Rst	SacTrawl Sherwood Catch Index	Chippis Island Trawl Catch Index	Salvage
Chinook, Winter-run, Unclipped	90.3%(84.8%, 95.9%) BY: 2013 - 2022	32.1%(10.5%, 53.6%) BY: 2013 - 2022	38.2%(13.3%, 63.1%) BY: 2013 - 2022	11.1%(-8.1%, 30.2%) BY: 2013 - 2022	1.4%(-1.8%, 4.7%) BY: 2013 - 2022	0.0%(0.0%, 0.0%) WY: 2014 - 2023
Chinook, Spring-run, Unclipped	6.8%(2.8%, 10.7%) BY: 2013 - 2022	0.8%(-0.1%, 1.7%) BY: 2013 - 2022	3.1%(-2.8%, 9.1%) BY: 2013 - 2022	0.0%(-0.0%, 0.1%) BY: 2013 - 2022	0.0%(0.0%, 0.0%) BY: 2013 - 2022	0.0%(0.0%, 0.0%) WY: 2014 - 2023
Steelhead, Unclipped (January-December)	N/A	N/A	N/A	N/A	N/A	N/A
Steelhead, Unclipped (December-March)	N/A	N/A	N/A	N/A	N/A	0.0%(0.0%, 0.0%) WY: 2014 - 2023
Steelhead, Unclipped (April-June)	N/A	N/A	N/A	N/A	N/A	N/A

Table 4. Mean daily flow and percent change (Wilkins Slough, Deer Creek, Mill Creek; cfs from CDEC) and temperature and percent change (Knights Landing; °F from RST).

Date	Mill Creek (MLM): mean daily flow (cfs)	Mill Creek (MLM): percent change	Mill Creek (MLM): Alert	Deer Creek (DCV): mean daily flow (cfs)	Deer Creek (DCV): percent change	Deer Creek (DCV): Alert	Wilkins Slough (WLK): mean daily flow (cfs)	Knights Landing RST: water temperature (f)	Alert Triggered
12/3/2023	136.5	20.7%	Flow>95cfs	132.2	19.9%	Flow>95cfs	4,149.9	N/A	N/A
12/2/2023	113.1	1.0%	Flow>95cfs	110.2	1.3%	Flow>95cfs	4,072.9	N/A	N/A
12/1/2023	112.0	1.4%	Flow>95cfs	108.8	1.3%	Flow>95cfs	4,145.2	N/A	N/A

Date	Mill Creek (MLM): mean daily flow (cfs)	Mill Creek (MLM): percent change	Mill Creek (MLM): Alert	Deer Creek (DCV): mean daily flow (cfs)	Deer Creek (DCV): percent change	Deer Creek (DCV): Alert	Wilkins Slough (WLK): mean daily flow (cfs)	Knights Landing RST: water temperature (f)	Alert Triggered
11/30/2023	110.5	0.5%	Flow>95cfs	107.5	0.8%	Flow>95cfs	4,187.3	N/A	N/A
11/29/2023	109.9	-0.3%	Flow>95cfs	106.6	-0.2%	Flow>95cfs	4,195.8	N/A	N/A
11/28/2023	110.2	-0.0%	Flow>95cfs	106.8	-0.2%	Flow>95cfs	4,140.0	N/A	N/A
11/27/2023	110.2	-0.8%	Flow>95cfs	107.0	-0.6%	Flow>95cfs	4,143.9	N/A	N/A

Table 5. STARS model simulations for route-specific entrainment, travel times, and survival. Travel time is calculated in days.

Stock	Date	Route	Median Travel Time	Survival	Routing Probability
Winter Chinook	2023-12-02	Overall	6.75	0.26	N/A
Winter Chinook	2023-12-02	Sacramento River	6.30	0.28	0.58
Winter Chinook	2023-12-02	Yolo Bypass	9.75	0.49	0.00
Winter Chinook	2023-12-02	Sutter Slough	6.44	0.27	0.14
Winter Chinook	2023-12-02	Steamboat Slough	6.10	0.35	0.15
Winter Chinook	2023-12-02	Interior Delta	9.69	0.07	0.13
Late-fall Chinook	2023-12-02	Overall	12.98	0.38	N/A
Late-fall Chinook	2023-12-02	Delta Cross Channel	N/A	N/A	0.00
Late-fall Chinook	2023-12-02	Georgiana Slough	17.49	0.17	0.29
Late-fall Chinook	2023-12-02	Sacramento River	11.09	0.51	0.45
Late-fall Chinook	2023-12-02	Sutter and Steamboat Slough	11.70	0.39	0.25

The entrainment tool estimates a median and maximum loss of winter-run Chinook Salmon and juvenile CCV Steelhead each week (Table 6a).

Table 6a-b. WY 2023 loss and salvage predictor data: Environmental details, current and forecast. Model results from 12/04/2023.

a) WY 2023 loss and salvage predictor data: Predicted weekly loss of winter-run Chinook salmon and steelhead at CVP and SWP facilities.

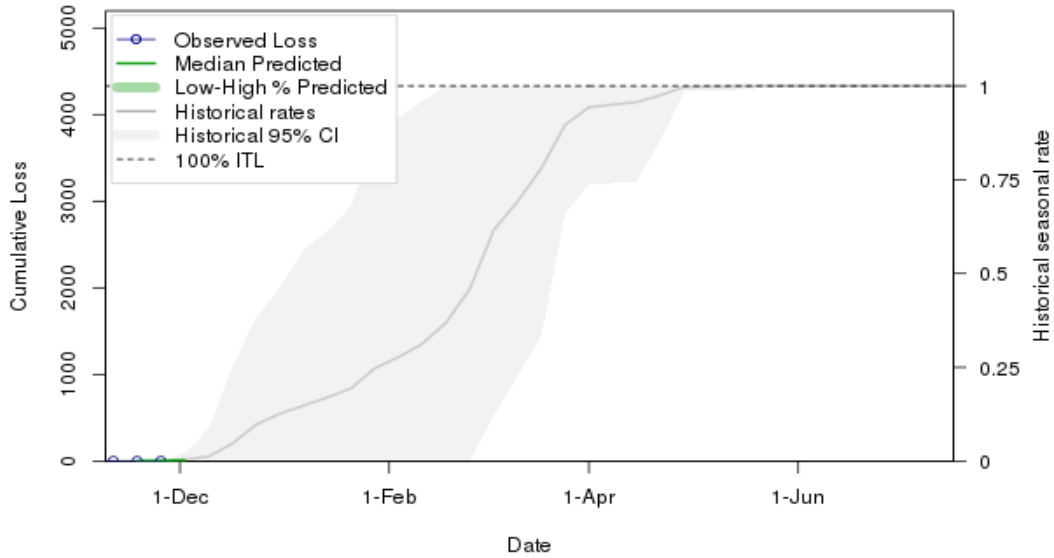
Parameter	Modeled Current Week	Modeled Next Week
Predicted Steelhead, Median %	0	0
Predicted Steelhead, High %	17	17
Predicted Chinook Winter Run, Median %	0	0
Predicted Chinook Winter Run, High %	0	0

b) Environmental details, current and forecast.

Parameter	Data	Forecast
Temperature (Mallard Island, C)	13	13
Precipitation (5-d running sum, inches)	0	0
Old and Middle River Flows (cfs)	-4253	-4253
Sacramento River Flow (Freeport, cfs)	8563	8563
DCC Gates	closed	closed
San Joaquin River Flow (Vernalis, cfs)	1294	1294
Export	4454	4454



**Winter Run Loss 2023-12-02 Water Year: 2024 & WY.week 9**



**Steelhead Loss 2023-12-02 Water Year: 2024 & WY.week 9**

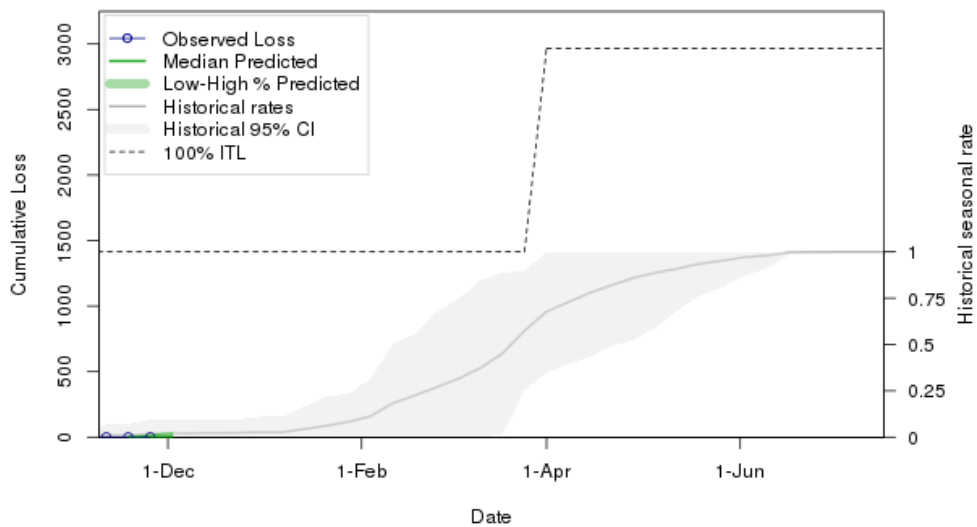


Figure 1. Predicted weekly loss of steelhead and winter-run Chinook salmon at the CVP and SWP facilities

Figure 1 is two-line graphs of the predicted weekly loss of steelhead and winter-run Chinook salmon for water year 2024 beginning on December 1, 2023. The first line graph shows the cumulative loss of winter-run Chinook salmon comparing the predicted loss of over 2% and the observed loss of 0%. The second line graph shows the cumulative loss

of Steelhead salmon comparing the predicted loss of about 2% and the observed loss of about 0%.

## Evaluation

1. After January 1, are more than 5% of juveniles from one or more salmonid species present in the Delta?

This question is not applicable until 1/1/2023. Greater than 5% of juvenile winter-run Chinook salmon are not present in the Delta. No greater than 5% of juveniles from all other salmonid species are estimated to be present in the Delta.

2. Does the operational outlook's ranges impact fish movement and change the potential distribution of fish?

Potential effects within the 7 days (near-term) in the operations outlook.

This question is not applicable until 1/1/2023.

Potential effects longer than the 7 days (longer-term) in the operations outlook.

Not applicable, see response above to (2) (i).

3. What is the likelihood of increased loss exceeding the next annual loss threshold (50%, 75% or 90% of threshold) resulting in OMR management actions based on population distribution, abundance, and behavior of fish in the Delta?

### Winter-run Chinook salmon

Total juvenile natural winter-run Chinook salmon (LAD) loss is 0 fish (as of 12/5/2023). No loss of juvenile winter-run Chinook salmon has occurred in the past week at the CVP and SWP fish salvage facilities. JPE calculations have not been established for brood year (BY) 2023 winter-run Chinook salmon.

### Spring-run Chinook salmon

Total juvenile spring-run Chinook salmon (LAD) loss is 0 fish (as of 12/5/2023). No loss of juvenile spring-run Chinook salmon has occurred in the past week at the CVP and SWP fish salvage facilities.

### Central Valley Steelhead

Total natural juvenile steelhead loss (through December 5) is 1 fish (as of 12/05/2023). No loss of natural juvenile has occurred in the past week at the CVP and SWP fish salvage facilities. The agencies in the SaMT assessed the likelihood of exceeding the next annual loss threshold and believe that loss occurring in the next week is unlikely to lead to exceedance of the 50% single-year loss threshold.

4. If an annual loss threshold has been exceeded, do continued OMR restrictions benefit fish movement and survival based on real-time information?

#### Winter-run Chinook salmon

The annual loss threshold for winter-run Chinook salmon has not been calculated in WY 2024.

#### Spring-run Chinook salmon

The annual loss threshold for spring-run Chinook salmon has not been calculated in WY 2024.

#### Central Valley Steelhead

The annual loss threshold for steelhead (December 1 – March 31) has not been exceeded in WY 2024.

5. If OMR is more negative than -5,000 cfs, are there changes in spawning, rearing, foraging, sheltering, or migration behavior beyond those anticipated to occur under OMR management at -5,000 cfs?

Expected OMR flows are -7,000 to -3,000 cfs for the next week, this question is not applicable until 1/1/2024.

## Biology Distribution and Evaluation of Green Sturgeon

### Population Status

- Delta Life Stages:
  - Adults and Juveniles

### Distribution

#### *Current Distribution*

- Adults: Most abundant during spring spawning migration period of March through May, and post spawning out-migration periods May through June; October through January depending on first winter storm event resulting in significant Sacramento River flow increases. Adult presence year-round to a lesser extent mainly in San Pablo Bay.
- Juveniles: Age-1 through Age-3 juveniles present year-round and widely distributed. Juveniles tagged with acoustic tags in the main channel Sacramento River near Sherman Island detected in the Sacramento River as far upstream as the Cache Slough complex, in the San Joaquin River at the Antioch Bridge, in Threemile, Horseshoe Bend, and Montezuma Sloughs. Seasonal abundance at the primary sampling site (near Sherman

Island) appears to be highest during summer in based on capture and telemetry data. Residence time at the primary sampling site for individual fish ranges from one day to over one year but telemetry data show outmigration from the primary sampling site to the Pacific Ocean ranges from 27 to 552 days. Recent capture data shows diurnal depth preference in the main channel of the Sacramento River. No recent documentation of shallow water habitat presence or foraging.

### ***Historical Trends***

- Juvenile and adult green sturgeon are historically present in the San Joaquin and Sacramento rivers and Delta.

### ***Forecasted Distribution within Central Valley and Delta regions***

- Juvenile and adult green sturgeon are likely present in the San Joaquin and Sacramento rivers and Delta during the next week.

## **Evaluation**

1. Is there likely to be salvage that may exceed the annual loss limit?

Green sturgeon salvage is 0 fish (as of 12/5/2023). The agencies in the SaMT assessed the likelihood of salvage occurring in the next week is unlikely to occur.

## **Biology, Distribution, and Evaluation of Delta Smelt**

### **Population Status**

- Delta Smelt Life Stages:
  - Juveniles, Subadults, Adults
- Brood Year 2023:
- Abundance estimate:
  - The most recent non-zero abundance estimate for Delta Smelt is from November 17, 2023, and was 1,293 (95% CI: 179 to 4,674).
- Biological Conditions:
  - Adult, subadult and juvenile Delta Smelt are expected to be present in the Low Salinity Zone and Sacramento Deep Water Shipping Channel and have been most recently detected in the lower Sacramento River. The Smelt Monitoring Team discussed the most recent monitoring data (TABLE 6) and considered published literature and professional judgement on the historical trends in regional distribution.

## Distribution

### *Current Distribution*

- Real time detection data are currently limited to EDSM and Chipps Island Trawl. Fall Midwater Trawl Survey and Bay Study provide data as available.
- One adult and two juvenile Delta Smelt have been detected by surveys in the lower Sacramento River between 10/5/2023-11/15/2023.
- No Delta Smelt have been detected in salvage at the SWP and CVP this water year.
- Larval sampling at the Skinner Fish Facility (SFF) and the Tracy Fish Collection Facility (TFCF) has not yet been initiated this year.
- COA 8.5.2: Spawning has not yet begun.

Table 7. Summary of newly reported detections of Delta Smelt by Region and Salvage Facilities since the last assessment. Regions are those defined by EDSM sampling. Delta Smelt >58mm FL are considered adults. Subadult fish are considered by the SMT to be fish from the previous year’s cohort based on size and timing of collection. Young of year are considered juveniles and larvae.

Life Stage	North	South	West	Far West	Salvage
Adult	0	0	0	0	0
Subadult	0	0	0	0	0
Larvae/Juvenile	0	0	0	0	0

Table 8. Summary of recent Delta Smelt detections reported since last assessment and the total detections for the current water year. Notes reflect latest information on reported detections or completion of survey for the water year and include both larval and adult detections. Total Fish counts do not distinguish between hatchery origin and wild Delta Smelt. Table indicates new detections and previously reported detections that have undergone preliminary ID, QA/QC, and genetic confirmation. Numbers are updated as QA/QC and genetic confirmation become available.

Sampling Method	Frequency	New Detections	Preliminary Detections	QA/QC Detections	Genetically Confirmed to Date	Total WY2024	Notes
EDSM	Weekly	0	N/A	3	N/A	3	Phase 1 began 12/4/2023

Sampling Method	Frequency	New Detections	Preliminary Detections	QA/QC Detections	Genetically Confirmed to Date	Total WY2024	Notes
SKT	Monthly	0	N/A	N/A	N/A	0	Begins: not occurring this year
SLS	Biweekly	0	N/A	N/A	N/A	0	Begins: 12/11/2023
20-mm	Biweekly	0	N/A	N/A	N/A	0	Begins: 3/18/2024
Summer Townet	Biweekly	0	N/A	N/A	N/A	0	Begins:
Bay Study	Monthly	0	N/A	N/A	N/A	0	Ongoing
FMWT	Monthly	0	N/A	N/A	N/A	0	Ongoing
Chipps Island Trawl	Weekly	0	N/A	N/A	N/A	0	Ongoing
FCCL Brood Stock Collections	Weekly	0	N/A	N/A	N/A	0	Begins: 11/27/2023
LEPS	As available	0	N/A	N/A	N/A	0	Begins: 1/3/2024 (depending on LFS catch)
FRP	Daily	0	N/A	N/A	N/A	0	Ongoing
Tracy Fish Collection Facility (CVP)	Daily	0	N/A	N/A	N/A	0	Ongoing
Skinner Fish Facility (SWP)	Daily	0	N/A	N/A	N/A	0	Ongoing
Total	N/A	N/A	N/A	N/A	N/A	3	Sum of all Delta Smelt observed during the water year

### ***Cultured Delta Smelt Experimental Releases***

- Experimental releases completed in Water Year 2024 include:
  - Release 1: 14,104 fish released at Sacramento River at Rio Vista (truck release)
- Other experimental releases for Water Year 2024 are planned for:
  - Release 2: 12/13-12/14/2023
  - Release 3: 12/20-12/21/2023
  - Release 4: 1/10/2024
  - Release 5: 1/24-1/25/2024
  - Release 6: 1/31-2/1/2024
- See additional details at: [SacPAS: Central Valley Prediction & Assessment of Salmon](#)

Table 9. Weekly summary of the origin of Delta Smelt. These identifications are considered tentative and additional genetic testing will confirm the identity of individuals. Individuals with no tags are provided alive to the FCCL as potential additions to the FCCL Broodstock.

Date	Survey	Stratum/Station	Total Caught	Ad. Clipped	VIE	No Tag
N/A	N/A	N/A	N/A	N/A	N/A	N/A

### ***Historical Trends***

- Upstream migration for Delta Smelt occurs between September and December and in response to “first flush” conditions (Sommer et al. 2011, Grimaldo et al. 2009). Migration typically ranges one to four weeks after flow and turbidity increases, based on salvage data (Sommer et al. 2011).
- Historically, detections of ripe Delta Smelt began in January and peaked in February and March and the majority of Delta Smelt spawning occurs within a temperature range of 9-18°C (Damon et al. 2016).
- Based on historical monitoring data from the past few years (<https://github.com/Delta-Stewardship-Council/deltafish>), first detection of larvae in the Central and South Delta has typically occurred by mid to late March. ([https://www.cbr.washington.edu/sacramento/tmp/hrtsalvage\\_1676407207\\_694.html](https://www.cbr.washington.edu/sacramento/tmp/hrtsalvage_1676407207_694.html)).
- Salvage data as presented on SacPas indicates that adult Delta Smelt salvage in recent years has reached the 50<sup>th</sup> percentile at the end of February – beginning of March.



- Historically, the highest peak in salvage is in May and the second highest is in June (Grimaldo et al 2009).

**Forecasted Distribution within Central Valley and Delta regions**

- Predicting the distribution of Delta Smelt is currently difficult because detection data is limited to a few wild individuals and historic patterns may not be representative of the low population levels.
- The SMT uses turbidity as a surrogate for Delta Smelt presence and in making assessments of the likelihood of entrainment for larval Delta Smelt after spawning begins.
- The potential of experimentally released Delta Smelt to distribute from their release site is unknown at this time and SMT cannot predict their distribution beyond the original release site and subsequent recaptures. There is a high degree of uncertainty regarding the response of cultured fish to environmental cues typically applied to wild Delta Smelt.

**Abiotic Conditions**

**Turbidity**

- Chance of precipitation Wednesday through Thursday. Southeast winds shifting to southwest from 7-11 mph in Antioch; northeast winds shifting to West from 5-7 mph in Stockton.
- Turbidity is below 12 FNU at OBI and at other stations in the central and south Delta. Turbidity is likely to remain stable this week.

Table 10. Relevant Environmental Factors to the current management actions for Delta Smelt.

Date Reported	FPT 3-day Running Average Flow (cfs)	FPT 3-day Running Average Turbidity (FNU)
12/04/2023	9451.4	3.75

**X2 Conditions**

- As of 12/04/2023, X2 is estimated to be >81 km.

**Other Environmental Conditions**

- The Fish and Water Operation Outlook OMR Index values are expected to range between -3,000 to -7,000 cfs this week.
- QWEST will range from -800 to -3000 cfs throughout the week.

- Real time tracking of environmental conditions, relevant thresholds and Delta Smelt catch data are updated daily at:  
[http://www.cbr.washington.edu/sacramento/workgroups/delta\\_smelt.html](http://www.cbr.washington.edu/sacramento/workgroups/delta_smelt.html).

## Evaluation

### USBR and DWR Proposed Operations:

- Monthly Delta Outflow and Rio Vista flow for November greater than 4,500 cfs; E/I ratio not to exceed 0.65.

1. Between December 1 and January 31, has any first flush condition been exceeded?

The predicted amount of precipitation for this week is unlikely to create “First Flush” conditions and trigger IEWPP regulations this week. However, conditions will be monitored throughout the rest of the week.

2. Do DSM have a high risk of migration and dispersal into areas at high risk of future entrainment? (December 1- January 31)

Based on distribution patterns over the past decade and recent detection data, Delta Smelt are unlikely to be prevalent in the South Delta. No Delta Smelt have been detected in the South Delta and none have been detected since 11/15/2023. Experimental release of hatchery Delta Smelt occurred recently at Rio Vista, which is outside of the South Delta. Information regarding their behavior post-release is limited and catch will be monitored.

3. Has a spent female been collected?

This question is not applicable until Turbidity Bridge Avoidance begins.

4. If OMR of -2000 cfs does not reduce OBI turbidity below 12NTU/FNU, what OMR target is deemed protective between -2000 and -5000 cfs?

This question is not applicable until Turbidity Bridge Avoidance begins.

5. If OBI is 12 NTU/FNU, what do other station locations show?

This question is not applicable until Turbidity Bridge Avoidance begins.

6. If OBI is 12 NTU/FNU, is a turbidity bridge avoidance action not warranted? What is the supporting information?

This question is not applicable until Turbidity Bridge Avoidance begins.

7. After March 15 and if QWEST is negative, are larval or juvenile DSM within the entrainment zone of the CVP and SWP pumps based on surveys?

This question is not applicable until after March 15.

8. Based on real-time spatial distribution of Delta Smelt and currently available turbidity information, should OMR be managed to no more negative than -3,500?

This question is not applicable until March 15.

9. What do hydrodynamic models, informed by EDSM or other relevant data, suggest the estimated percentage of larval and juvenile DSM that could be entrained may be?

This question is not applicable until March 15.

## Delta Smelt References

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