BUREAU OF RECLAMATION

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

**December 6, 2022**

## Executive Summary

### Operational Conditions

See Weekly Fish and Water Operation Outlook document for November 29 –December 5.

### 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 is unlikely to occur over the next week. 0-10% of juvenile natural winter-run Chinook Salmon from brood year (BY) 2022 are estimated to be present in the Delta. The Delta Cross Channel (DCC) gates closure for the season reduces exposure of winter-run Chinook Salmon juveniles that are present in the Sacramento River near the DCC gates into the interior 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% of juvenile natural spring-run Chinook Salmon from brood year (BY) 2022 are estimated to be present in the Delta. The DCC gates closure for the season reduces exposure of spring-run Chinook Salmon juveniles that are present in the Sacramento River near the DCC gates into the interior Delta.

### Central Valley Steelhead

No loss of natural California Central Valley (CCV) steelhead has occurred in the past week at the State and Federal 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 juvenile natural CCV Steelhead from brood year (BY) 2022 are estimated to be present in the Delta. DCC closure for the season reduces exposure to Central Valley steelhead juveniles that are potentially present in the Sacramento River near the DCC gates.

### Green Sturgeon

Loss of green sturgeon has not occurred in the past week at the State and Federal fish salvage facilities (WY 2023 total loss = 0 fish, as of 12/5/2022). Loss of green sturgeon is unlikely to occur over the next week due to their rare presence in the South Delta.

### 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 and the position of X2 in the Sacramento River support Delta Smelt presence in the lower Sacramento River. The last Delta Smelt observations were on November 3 & 7, 2022, in the lower Sacramento River. These detections may be an indication that DS are starting to stage downstream of X2 in preparation for seasonal migration into freshwater. The likelihood of Delta Smelt entrainment is low due to seasonal timing. The Integrated Early Winter Pulse Protection (IEWPP) period began on December 1, 2022. The precipitation from last week and the predicted amount of precipitation for this week are unlikely to cause "First Flush" conditions and trigger IEWPP regulations.

### DCC gates recommendation

The DCC gates were closed on 11/28/2022 to meet Rio Vista flows criteria. The DCC gate will remain closed unless an opening is needed to meet D-1641 requirements.

### Monitoring Teams summary

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

There were no non-consensus issues to report from the 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 2022 Productivity:
    - Natural winter-run Chinook salmon: Juvenile production estimate (JPE) calculations have not been established for brood year (BY) 2022 winter-run Chinook salmon. The agencies in the winter-run Chinook salmon JPE project work team (WR JPE PWT) will meet in December 2022 to begin formulating the JPE. Mean cumulative weekly passage of winter-run Chinook salmon through 12/2/2022 for the last 18 years of passage data is 92.7% (one SD of 5.8%). By

12/2/2022, 160,875 winter-run Chinook salmon were estimated to have passed RBDD compared to the cumulative passage last year of 572,568 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 2022 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):
    - Approximately 71,057 late-fall Chinook salmon from Coleman National Fish Hatchery were released at Battle Creek on 12/5/2022. This group is 100% marked with adipose-fin clip and CWT and have an estimated average fork length of 145mm. This is the first spring-run Chinook salmon surrogates release group associated with the Proposed Action. There has been no loss this water year of fish associated with the first surrogate release group.The agencies in the SaMT discussed the thiamine vitamin deficiency that was observed in winter run Chinook salmon broodstock at the Livingston Stone National Fish Hatchery (LSNFH) in BY 2021. Last year the thiamine deficiency appeared to negatively affect survival of juvenile fish as they migrate downstream towards the Delta. The thiamine deficiency issue is also likely impacting spring-run Chinook salmon. Although the egg take goals have been met at the Feather River Fish Hatchery, they are still experiencing fertility issues that are impacting production.

### Central Valley Steelhead

- Delta Life Stages:
    - Spawning Adults, Kelts, Juveniles
- Brood Year 2022 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 SaMT distribution estimates, see Table 1.
- Since 9/27/2022, the Glenn Colusa Irrigation District (GCID) rotary screw traps (RSTs) have observed 92 winter-run Chinook Salmon juveniles (by length at date criteria) in their daily catches. Catch of winter-run sized Chinook Salmon has declined since October.
- Tisdale Weir RST has only observed 3 winter-run sized Chinook Salmon to date this season (Table 2).
- Winter-run Chinook Salmon have not been observed in monitoring locations farther downstream (Knights Landing, Sacramento Trawls).

#### Historic 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 but is unlikely based on life history. 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

- Movement of winter-run Chinook salmon juveniles into the lower reaches of the Sacramento River and upper Delta may occur with precipitation events.
- 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). The DCC gates were closed 11/28/22 and are expected to remain closed through mid-May 2023. If little precipitation is forecasted there may be a need to open the DCC gates to meet D-1641 water quality standards

### Spring-run Chinook salmon

#### Current Distribution

- For SaMT distribution estimates, see Table 1.
- YOY spring-run are being observed in the Feather Riverrotary screw trap, Butte Creek, and Yuba River RSTs. Yearling spring-run Chinook salmon are also being observed at the Butte Creek RST.

#### 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

- Mill and Deer creek flows exceeded 95 cfs indicating yearling spring-run Chinook salmon may be beginning to migrate into mainstem Sacramento River.

### Central Valley Steelhead

#### Current Distribution

- For SaMT distribution estimates, see Table 1.
- Combined total loss of natural steelhead between December 1 and March 31 equals 0 fish as of 12/6/2022.

#### Historical Trends

- For historical CCV steelhead trends in salvage, see Table 3. If historic trends in salvage were to continue, juvenile CCV steelhead loss is not likely to increase over the next week.

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

- No natural steelhead were observed in key monitoring locations this past week.
- The entrainment tool estimates of CCV steelhead loss remain low (Table 6, Fig. 1)
- Closure of the DCC gates for the season will reduce exposure and possible entrainment of juvenile CCV steelhead from the Sacramento River into the interior Delta via the DCC gates.

Table 1. 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: 90-100 %<br>Last Week: 95-100 % | Current: 0-10%<br>Last Week: 0-5 % | Current: 0%<br>Last Week: 0 % |
| YOY spring-run Chinook salmon | Current: 100 %<br>Last Week:100 % | Current: 0 %<br>Last Week:0 % | Current: 0 %<br>Last Week: 0 % |
| YOY hatchery winter-run Chinook salmon | Current: NA<br>Last Week: NA | Current: NA<br>Last Week: NA | Current: NA<br>Last Week: NA |
| Natural origin steelhead | Current: 100%<br>Last Week: 100% | Current: 0%<br>Last Week: 0% | Current: 0%<br>Last Week: 0% |

Table 2. Historic migration and salvage patterns.

| Species | Red Bluff Diversion Dam | Tisdale Rst | Knights Landing Rst | SacTrawl Sherwood Catch Index | Chipps Island Trawl Catch Index | Salvage |
|---|---|---|---|---|---|---|
| Chinook, Winter-run, Unclipped | 91.9%(87.1%, 96.7%) BY: 2012 - 2021 | 39.7%(20.1 %,59.3%) BY: 2012 - 2021 | 42.5%(15.5%, 69.4%) BY: 2013 - 2021 | 20.8%(-5.7%,47.4%) BY: 2012 - 2021 | 1.4%(-1.8%,4.7%) BY: 2012 - 2021 | 0.0%(0.0%,0.0%) WY: 2013 - 2022 |
| Chinook, Spring-run, Unclipped | 10.1%(1.6%,1 8.6%) BY: 2012 - 2021 | 1.5%(-0.0%,3.0%) BY: 2012 - 2021 | 3.5%(-3.2%,10.2%) BY: 2013 - 2021 | 0.2%(-0.2%,0.5%) BY: 2012 - 2021 | 0.0%(0.0%,0.0 %) BY: 2012 - 2021 | 0.0%(0.0%,0.0%) WY: 2013 - 2022 |
| 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: 2013 - 2022 |
| Steelhead, Unclipped (April-June) | N/A | N/A | N/A | N/A | N/A | 0.0%(0.0%,0.0%) WY: 2013 - 2022 |

Table 3. Knight's Landing (KLCI) and Sacramento Seine and Trawl (SCI). No catch indices for juvenile salmonid migration were triggered during the past week.

| Date | Knights Landing RST: Winter Chinook: Catch Index | Knights Landing RST: Older Chinook: Catch Index | Sacramento Trawls: Older Chinook: Catch Index | Sacramento Beach Seines: Older Chinook: Catch Index | Alert: Catch Index > 5 | Alert: Catch Index 3 < X ≤ 5 |
|---|---|---|---|---|---|---|
| 2022-12-04 | N/A | N/A | N/A | N/A | N/A | N/A |
| 2022-12-03 | N/A | N/A | N/A | N/A | N/A | N/A |
| 2022-12-02 | N/A | N/A | N/A | N/A | N/A | N/A |
| 2022-12-01 | N/A | N/A | N/A | N/A | N/A | N/A |
| 2022-11-30 | 0 | 0.0 | N/A | N/A | N/A | N/A |
| 2022-11-29 | 0 | 0.0 | N/A | N/A | N/A | N/A |
| 2022-11-28 | 0 | 0.0 | N/A | N/A | N/A | N/A |
| 2022-11-27 | 0 | 0.7 | N/A | N/A | N/A | N/A |
| 2022-11-26 | 0 | 0.0 | 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): flow percent change | Mill Creek (MLM): Alert | Deer Creek (DCV): mean daily flow (cfs) | Deer Creek (DCV): flow percent change | Deer Creek (DCV): Alert | Wilkins Slough (WLK): mean daily flow (cfs) | Knights Landing RST: water temp. (f) | Alert Triggered |
|---|---|---|---|---|---|---|---|---|---|
| 12/4/2022 | 417.5 | 183.4% | Flow>95cfs Change>50 % | 362.2 | 208.5% | Flow>95cfs Change>50 % | 3,785.2 | N/A | N/A |
| 12/3/2022 | 147.3 | 10.2% | Flow>95cfs | 117.4 | -2.1% | Flow>95cfs | 3,491.0 | N/A | N/A |
| 12/2/2022 | 133.7 | -16.7% | Flow>95cfs | 120.0 | -22.0% | Flow>95cfs | 3,298.3 | N/A | N/A |
| 12/1/2022 | 160.5 | 66.7% | Flow>95cfs Change>50 % | 153.9 | 81.9% | Flow>95cfs Change>50 % | 3,195.1 | N/A | N/A |
| 11/30/2022 | 96.2 | -1.5% | Flow>95cfs | 84.6 | -0.5% | N/A | 3,160.4 | 42.1 | N/A |
| 11/29/2022 | 97.7 | -1.0% | Flow>95cfs | 85.0 | 0.2% | N/A | 3,174.6 | 42.4 | N/A |
| 11/28/2022 | 98.7 | -0.4% | Flow>95cfs | 84.9 | 0.8% | N/A | 3,167.4 | 42.5 | 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 | 2022-12-03 | Overall | 6.93 | 0.22 | N/A |
| Winter Chinook | 2022-12-03 | Sacramento River | 6.53 | 0.23 | 0.58 |
| Winter Chinook | 2022-12-03 | Yolo Bypass | 9.72 | 0.44 | 0.00 |
| Winter Chinook | 2022-12-03 | Sutter Slough | 6.56 | 0.23 | 0.14 |
| Winter Chinook | 2022-12-03 | Steamboat Slough | 6.21 | 0.30 | 0.15 |
| Winter Chinook | 2022-12-03 | Interior Delta | 9.80 | 0.06 | 0.13 |
| Late-fall Chinook | 2022-12-03 | Overall | 13.79 | 0.24 | N/A |
| Late-fall Chinook | 2022-12-03 | Delta Cross Channel | 21.15 | 0.10 | 0.22 |
| Late-fall Chinook | 2022-12-03 | Georgiana Slough | 19.58 | 0.14 | 0.19 |
| Late-fall Chinook | 2022-12-03 | Sacramento River | 10.11 | 0.34 | 0.34 |
| Late-fall Chinook | 2022-12-03 | Sutter and Steamboat Slough | 10.23 | 0.31 | 0.24 |

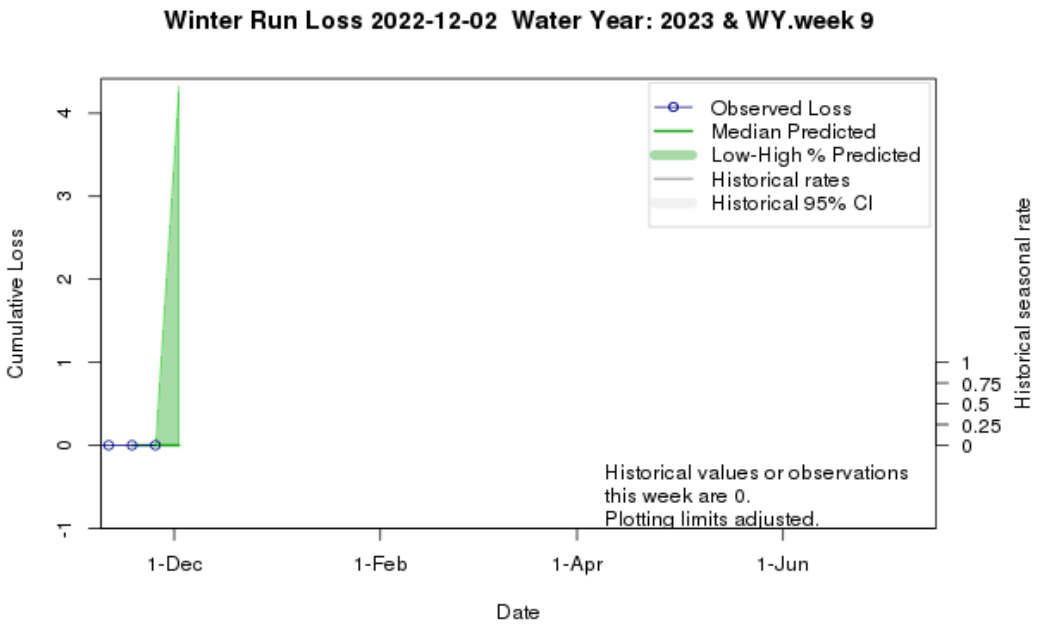
The entrainment tool estimates a median loss of 0 winter-run Chinook Salmon and a maximum loss of 3 winter-run Chinook Salmon, as well as a median loss of 0 juvenile CCV Steelhead and a maximum loss of 17 juvenile CCV Steelhead this week (SacPas last updated on 12/5/2022).

Table 6. WY 2023 loss and salvage predictor data: Environmental details, current and forecast.

| Parameter | Modeled Current Week | Modeled Next Week |
|---|---|---|
| Predicted Steelhead, Median % | 0 | 0 |
| Predicted Steelhead, High % | 0 | 16 |
| Predicted Chinook Winter Run, Median % | 0 | 0 |
| Predicted Chinook Winter Run, High % | 0 | 4 |

| Parameter | Data | Forecast |
|---|---|---|
| Temperature (Mallard Island, C) | 11.8 | 20 |
| Precipitation (5-d running sum, inches) | 0.19 | 0 |
| Old and Middle River Flows (cfs) | -1135 | -3039 |
| Sacramento River Flow (Freeport, cfs) | 6524 | 6993 |

| Parameter | Data | Forecast |
|---|---|---|
| DCC Gates | open | closed |
| San Joaquin River Flow (Vernalis, cfs) | 595 | 262 |
| Export | 1289 | 1887 |



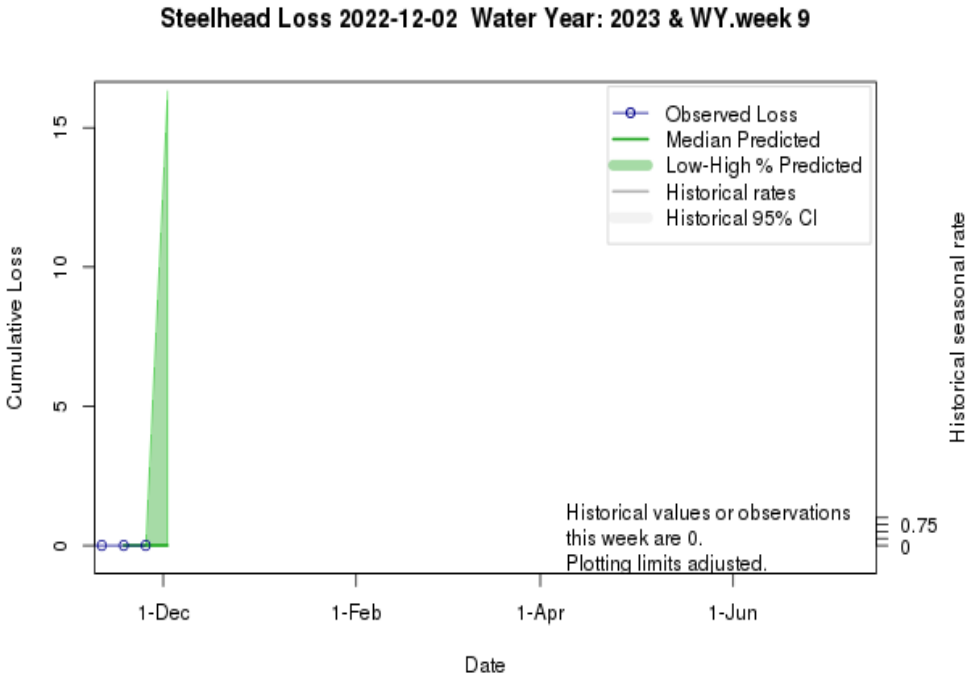




Figure 1. Predicted weekly loss of steelhead and winter-run Chinook salmon at the CVP and SWP facilities

## 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 may be 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. However, OMR flow is expected to remain at or more positive than -5,000 this upcoming week.

   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 12/6/2022). 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) 2022 winter-run Chinook salmon. 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.

   Spring-run Chinook salmon

   Total juvenile spring-run Chinook salmon (LAD) loss is 0 fish (as of 12/6/2021). No loss of juvenile spring-run Chinook salmon 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 believes that loss occurring in the next week is unlikely to lead to exceedance of the 50% single-year loss threshold.

Central Valley Steelhead

Total natural juvenile steelhead loss (December 1 through March 31) is 0 fish (as of 12/6/2022). 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 exceeded in WY 2023.

   Spring-run Chinook salmon

   The annual loss threshold for spring-run Chinook salmon has not been exceeded in WY 2023.

   Central Valley Steelhead

   The annual loss threshold for steelhead (December 1 – March 31) has not been exceeded in WY 2023.

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 -1,200 to –3,500 cfs for the next week, this question is not applicable until 1/1/2023.

# Biology Distribution and Evaluation of Green Sturgeon

## Population Status

- Delta Life Stages:
  - Adults and Juveniles
- Juvenile Abundance:

### 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 but likely.

#### 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 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 12/5/2022). 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:
    - Adults and subadults
- Brood Year 2022:

- Abundance estimate:
    - The abundance estimate as of December 2, 2022, was 0, and the latest non-zero abundance estimate from November 10, 2022, was 1,240 (95% CI: 172-4,483).
- Biological Conditions:
    - Adult and subadult Delta Smelt are expected to be present in the lower Sacramento River. The Smelt Monitoring Team discussed the most recent monitoring data (Table 4) and considered professional judgement on the historical trends in regional distribution.

## Distribution

### Current Distribution

- Real time detection data is currently limited to EDSM sampling and Chipps Island; Bay Study and FMWT provide data as available.
- Since there are few recent detections of Delta Smelt, the Smelt Monitoring Team's capacity to estimate where they are within the Delta is limited.
- The most recent Delta Smelt detections were on 11/3/2022 and 11/7/2022 in the lower Sacramento River.
- Delta Smelt may be beginning to stage downstream of X2 in preparation for seasonal migration into freshwater.
- Experimental release of hatchery Delta Smelt occurred last week at Rio Vista.
- Larval sampling at the Skinner Fish Facility (SFF) and the Tracy Fish Collection Facility (TFCF) will be initiated by the SMT in February.
- COA 8.5.2: No larval or juvenile Delta Smelt have been salvaged at the SFF or TFCF as of 12/6/2022 (Table 7).

Table 7. Summary of newly reported detections of Delta Smelt by Region and Salvage Facilities between 11/30/2022 and 12/6/2022. 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 may include preliminary data that may not have received full QA/QC, but any corrections will be made the following week.

| Sampling Method | Frequency | New Detections | WY2023 | Notes |
|---|---|---|---|---|
| EDSM | Weekly | 0 | 2 | Phase 1 began 12/5/22 |
| SKT | Monthly | 0 | 0 | Begins: 1/9/23 |
| SLS | Biweekly | 0 | 0 | Ongoing |
| 20-mm | Biweekly | 0 | 0 | Begins: 3/13/23 |
| Summer Townet | Biweekly | 0 | 0 | Begins: |
| Bay Study | Monthly | 0 | 0 | Ongoing |
| FMWT | Monthly | 0 | 0 | Ongoing |
| Chipps Island Trawl | Weekly | 0 | 0 | Ongoing |
| FCCL Brood Stock Collections | Weekly | 0 | 0 | N/A |
| LEPS | As available | 0 | 0 | N/A |
| TFCF | Daily | 0 | 0 | Ongoing |
| FRP | Daily | 0 | 0 | Ongoing |
| Total | N/A | N/A | 2 | Sum of all Delta Smelt observed during the OMR Management Season |

**Cultured Delta Smelt Experimental Releases**

- Experimental release of 13,140 fish occurred on November 30, 2022.
- Future releases are planned for the weeks of January 9 and January 23.
- A total of approximately 42,000 fish is expected to be released this water year.
- Details of Delta Smelt releases are available 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

- In December historical patterns observed the centroid of the population close to the X2 position (Sommer et al. 2011).
- Upstream migration for Delta Smelt occurs between September and December (Sommer et al. 2011).
- Delta Smelt detections in the Sacramento Deep Water Ship Channel indicate presence upstream of the confluence but may be freshwater residents and not representative of the migratory life history patterns in Delta Smelt (Hobbs 2019).
- Historically, the highest peak in salvage is in May and the second highest is in June (Grimaldo et al 2009; figure 5).

### Forecasted Distribution within Central Valley and Delta regions

- Predicting the distribution of subadult Delta Smelt is currently difficult because detection data is limited to a few individuals and historic patterns may not be representative of the low population levels. No detections have been in the central or south delta.
- 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.

## Abiotic Conditions

### Turbidity

- First Flush Conditions can be triggered between Dec. 1st and January 31st. Showers likely this week. Winds light today and tomorrow.
- As of 12/6/2022 turbidity has increased but continues to be less than 12 FNU at OBI and is stable at other central and south Delta stations.
- South Delta Turbidity may increase in the next seven days; if Integrated Early Winter Pulse Protection is triggered, then Delta Smelt distribution is not expected to be influenced and the likelihood of entraining Delta Smelt is expected to remain low.

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) |
|---|---|---|
| 12/5/2022 | 8872 | 4.27 |

### X2 Conditions

- As of 12/3/2022, the X2 estimation is 97.1km. The most recent SR X2 is 96.1 km, as of 12/5/2022.
- When X2 is above 81 km, the SMT uses the X2_EC_Graph.xlxs tool to estimate the position of X2 for both the Sacramento and San Joaquin Rivers and assumes the average of the two is representative of an approximate X2 position.

### Other Environmental Conditions

- The Fish and Water Operation Outlook OMR Index values are expected to range between -1200 to -3500 cfs from 12/6/2022 to 12/12/2022.
- QWEST is estimated to be at approximately 7000 cfs as of early 12/6/2022.
- 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.

## Evaluation

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

   Conditions have not been exceeded. There has been steady precipitation in the past week that may continue this week. This is not anticipated to cause “First Flush” conditions and trigger the Integrated Early Winter Pulse Protection. 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 November 7, 2022. Experimental release of hatchery Delta Smelt occurred last week at Rio Vista but is outside of the South Delta. However, information regarding their behavior post-release is limited. If Integrated Early Winter Pulse Protection is triggered this week, Delta Smelt are unlikely to migrate into areas with a higher likelihood of entrainment due to OMR Index Values.

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?

   OBI turbidity is currently below 12 FNU. The daily average turbidities on 12/5/2022 at Prisoners Point (2.74 NTU), Holland Cut (2.18 FNU) and Victoria Canal (1.92 NTU) are expected to remain stable over the next seven days.

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 March 15th.

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 15th.

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 15th.

## Delta Smelt References

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