



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

January 3, 2023

Executive Summary

Operational Conditions

See Weekly Fish and Water Operation Outlook document for –January 2- January 8

Winter-run Chinook Salmon

Loss of natural winter-run Chinook Salmon (by length at date, LAD) has occurred in the past week at the State and Federal fish salvage facilities (WY 2023 total loss = 35.22 fish, as of 1/2/2023). Loss of natural winter-run Chinook Salmon at the Central Valley Project (CVP) and State Water Project (SWP) fish collection facilities is likely to occur over the next week. 25-40% 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. Loss of spring-run Chinook salmon at the CVP and SWP fish collection facilities may occur over the next week. 5-15% 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

Loss of natural California Central Valley (CCV) steelhead has occurred in the past week at the State and Federal fish salvage facilities (WY 2023 December-March total loss has not been calculated as of 1/3/2023). Loss of Central Valley steelhead at the CVP and SWP fish collection facilities may occur over the next week. 1-5% 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 1/2/2023). 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 support Delta Smelt presence in the lower Sacramento River. The last Delta Smelt observations were on December 14, 2022, in the lower Sacramento River. One of these detections was from the November 30 Delta Smelt release. First Flush conditions were met on 12/31/2022, triggering Integrated Early Winter Pulse Protection (IEWPP), which began on 1/3/2023. Delta Smelt are likely migrating upstream in response to increased flow and turbidity conditions. The implementation of IEWPP is expected to reduce the chance that migrating Delta Smelt will move into areas with a high likelihood of entrainment, thus the likelihood of Delta Smelt entrainment remains low hydrologically. However, the presence of a turbidity bridge increases the likelihood that they could move into the South Delta and presents an increased risk of entrainment. Overall risk remains low.

Delta Cross Channel Gates

The DCC gates were closed on 11/28/2022 to meet LTO Proposed Action and are expected to remain closed until May. DCC gates may only be opened to maintain water quality under D-1641 between November and January.

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: Draft Juvenile production estimate (JPE) calculations have 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) have provided a draft JPE recommendation to the fish agencies. The estimated BY 2022 interim JPE is 44,690 natural origin juvenile winter run Chinook salmon. A final JPE will be determined mid-January.
 - Mean cumulative weekly passage of winter-run Chinook salmon through 12/16/2022 at Red Bluff Diversion Dam (RBDD) for the last 20 years of passage data is 95.5% (one SD of 3.7%). By 12/16/2022, 190,237 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.
 - Approximately 66,735 late-fall Chinook salmon from Coleman National Fish Hatchery were released at Battle Creek on 12/23/2022. This group is 100% marked with adipose-fin clip and CWT and have an estimated average fork length of 145mm.
 - There has been loss this water year of fish associated with the surrogate release groups.

- 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 Winter-run Chinook Salmon observations reported to SaMT since previous meeting, see Table 1.
- For SaMT distribution estimates, see Table 2.
- Through 1/02/23, the Glenn Colusa Irrigation District (GCID) rotary screw traps (RSTs) have observed winter-run Chinook Salmon juveniles (by length at date criteria) in their daily catches.
- Tisdale RST has observed winter-run length-at-date (LAD) Chinook Salmon to date this season.
- The winter-run Chinook as determined by LAD on 12/18/2022 was genetically identified as a Spring-run Chinook. Genetic identification is not used for calculating loss.
- There is uncertainty in the identification of some untagged salmonids potentially due to either tag loss or poor-quality adipose clipping from hatchery releases made in the South Delta. Confirmation of origin of these fish will be through genetic identification.

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 is likely to occur over the next week based on life history and detections in real-time monitoring locations in the Delta. If historic trends in salvage were to continue, winter-run Chinook salmon loss is expected to increase 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 continue over the next week.
- 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 Spring-run Chinook salmon observations reported to SaMT since previous meeting, see Table 1.
- For SaMT distribution estimates, see Table 2.
- Spring-run LAD Chinook Salmon have been observed in the Delta (beach seines).

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 have begun to migrate into mainstem Sacramento River.

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.
- Loss occurred in the past week however loss has not been calculated.

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

- CCV Steelhead were observed at Butte Creek RST.
- 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. 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	12/23-12/26	0	3	0	0	0
Butte Creek RST	12/21-12/23,12/27	27	0	0	4	0
Tisdale RST	12/20-1/2	27	4	0	0	0
Knights Landing RST	12/27-1/1	1	0	0	0	0
Lower Sacramento RST	12/26-12/29	1	0	0	0	0
Beach Seines	12/25-12/31	8	5	0	0	0
Sac. Trawl	12/25-12/31	0	0	0	0	0
Chipps Island Midwater Trawl	12/25-12/31	0	0	4	0	0
Mossdale Kodiak Trawl	12/25-12/31	0	0	0	0	0
EDSM	12/24-12/30	0	0	0	0	0
Feather River Herringer RST	12/21-1/2	0	N/A	0	0	0
Feather River Eye Side RST	12/21-12/29	9	N/A	0	0	0
Lower Feather River	N/A	N/A	N/A	N/A	N/A	N/A

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: 59-75% Last Week: 75-90 %	Current: 25-40% Last Week: 10-25%	Current: 0-1% Last Week: 0 %
YOY spring-run Chinook salmon	Current: 85-95 % Last Week: 90-99 %	Current: 5-15 % Last Week: 1-10 %	Current: 0 % Last Week: 0 %
YOY hatchery winter-run Chinook salmon	Current: N/A Last Week: N/A	Current: N/A Last Week: N/A	Current: N/A Last Week: N/A
Natural origin steelhead	Current: 95-99% Last Week: 95-99%	Current: 1-5% Last Week: 1-5%	Current: 0% Last Week: 0%

Table 3. 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	96.4% (94.1%,98.7%) BY: 2013 - 2021	65.9% (41.6%,90.2%) BY: 2013 - 2021	65.8% (38.7%,93.0%) BY: 2013 - 2021	33.6% (4.2%,62.9%) BY: 2013 - 2021	4.9% (-2.8%,12.6%) BY: 2013 - 2021	11.2% (0.5%,21.9%) WY: 2013 - 2022
Chinook, Spring-run, Unclipped	13.0% (3.6%,22.5%) BY: 2013 - 2021	14.7% (0.2%,29.1%) BY: 2013 - 2021	21.1% (0.4%,41.7%) BY: 2013 - 2021	4.6% (-3.4%,12.7%) BY: 2013 - 2021	0.0% (0.0%,0.0%) BY: 2013 - 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	2.9% (-1.3%,7.0%) 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 4. 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
2023-01-03	N/A	N/A	N/A	N/A	N/A	N/A
2023-01-02	N/A	N/A	N/A	N/A	N/A	N/A
2023-01-01	0.0	0.0	N/A	N/A	N/A	N/A
2022-12-31	0.0	0.0	N/A	N/A	N/A	N/A
2022-12-30	0.0	0.0	N/A	N/A	N/A	N/A
2022-12-29	0.0	0.0	N/A	N/A	N/A	N/A
2022-12-28	0.0	0.0	N/A	N/A	N/A	N/A
2022-12-27	0.0	0.0	N/A	N/A	N/A	N/A
2022-12-26	0.0	0.0	N/A	N/A	N/A	KNLOlder 3.6 KNLWinter 3.6

Table 5. 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 temp. (f)	Alert Triggered
1/1/2023	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12/31/2022	1746.3	13.4%	Flow>95cfs	1953.3	76.8%	Flow>95cfs Change>50%	17182.5	N/A	N/A
12/30/2022	1539.9	236.1%	Flow>95cfs Change>50%	1104.7	139.5%	Flow>95cfs Change>50%	12459.7	N/A	N/A
12/29/2022	458.2	-26.1%	Flow>95cfs	461.2	-26.9%	Flow>95cfs	13763.5	N/A	N/A
12/28/2022	619.8	-4.6%	Flow>95cfs	630.8	12.3%	Flow>95cfs	6644.4	N/A	N/A
12/27/2022	649.7	355.8%	Flow>95cfs Change>50%	561.6	339.5%	Flow>95cfs Change>50%	4102.4	41.4	N/A

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
12/26/2022	142.5	9.8%	Flow>95cfs	127.8	6.2%	Flow>95cfs	3685.5	N/A	N/A

Table 6. 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	2022-12-31	Overall	4.68	0.64	N/A
Winter Chinook	2022-12-31	Sacramento River	4.316	0.69	0.65
Winter Chinook	2022-12-31	Yolo Bypass	7.77	0.61	0.00
Winter Chinook	2022-12-31	Sutter Slough	4.89	0.55	0.12
Winter Chinook	2022-12-31	Steamboat Slough	4.24	0.69	0.10
Winter Chinook	2022-12-31	Interior Delta	6.99	0.45	0.11
Late-fall Chinook	2022-12-31	Overall	5.68	0.47	N/A
Late-fall Chinook	2022-12-31	Delta Cross Channel	NA	NA	0.00
Late-fall Chinook	2022-12-31	Georgiana Slough	8.50	0.19	0.31
Late-fall Chinook	2022-12-31	Sacramento River	4.87	0.69	0.43
Late-fall Chinook	2022-12-31	Sutter and Steamboat Slough	5.51	0.64	0.30

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

Table 7a-b. WY 2023 loss and salvage predictor data: Environmental details, current and forecast.

a) WY 2022 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	16
Predicted Chinook Winter Run, Median %	7	0
Predicted Chinook Winter Run, High %	48	13

b) Environmental details, current and forecast.

Parameter	Data	Forecast
Temperature (Mallard Island, C)	9.1	20
Precipitation (5-d running sum, inches)	0.32	0
Old and Middle River Flows (cfs)	-4652	-3039
Sacramento River Flow (Freeport, cfs)	11813	6993
DCC Gates	closed	closed
San Joaquin River Flow (Vernalis, cfs)	4714	262
Export	4714	1887

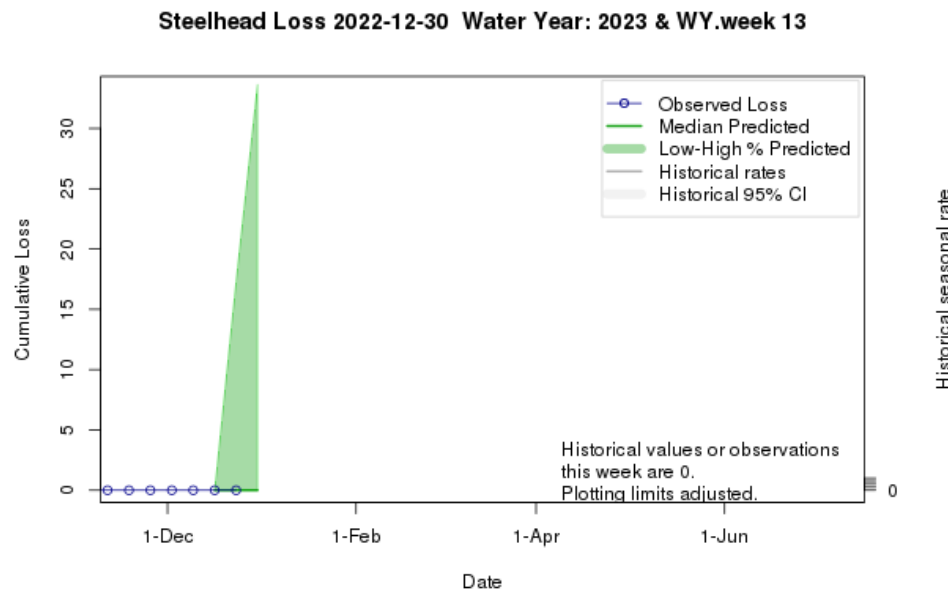
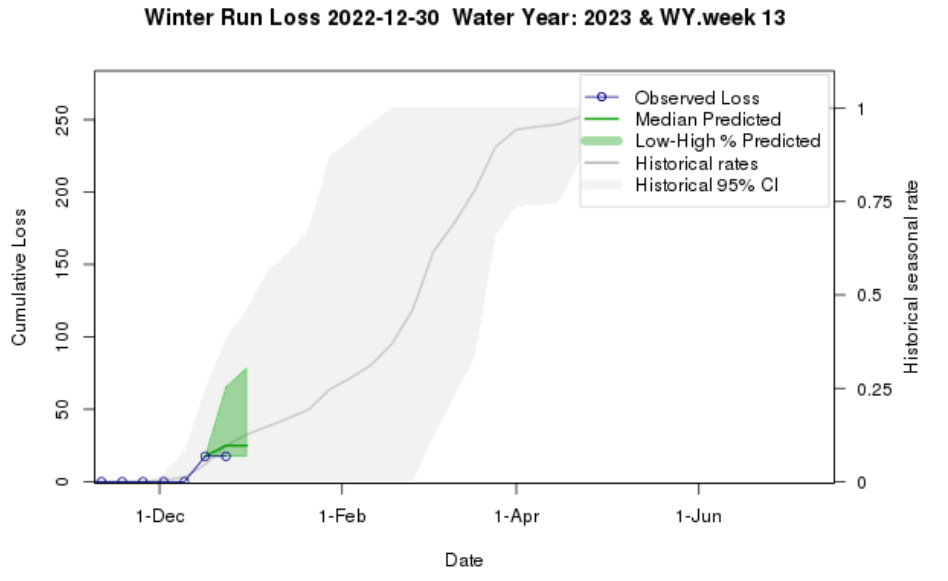


Figure 1. Predicted weekly loss of steelhead and winter-run Chinook salmon at the CVP and SWP facilities

Evaluation

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

Greater than 5% of juvenile winter-run and spring-run Chinook salmon are present in the Delta. No greater than 5% of Central Valley Steelhead juveniles 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.

OMR flow is expected to remain more positive than -2,000 cfs until 1/17/23
OMR flows more positive than -5,000 cfs are hypothesized to have minimal impact on movement and distribution of salmonids in the South Delta.

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 35.22 fish (as of 01/02/2023). Loss of juvenile winter-run Chinook salmon has occurred in the past week at the CVP and SWP fish salvage facilities. Interim JPE calculations have 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 natural juvenile spring-run Chinook salmon (LAD) loss is 0 fish (as of 01/02//2023). No loss of natural 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 not available as of 1/3/2023. 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 -1,800 to -2,200 cfs for the next week. OMR flows will remain more positive than -2,000 cfs for the next fourteen days. Under OMR flows more negative than -5,000 cfs the SaMT expects impacts to rearing, foraging, sheltering, or migration of salmonids present in the south Delta. Salmonid presence in the south Delta is difficult to assess because of limited observations and there is uncertainty in how much of the population might be impacted.

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 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 1/3/2023). 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:
 - Adults and subadults
- Brood Year 2022:
- Abundance estimate:

- The abundance estimate as of December 30, 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 based on the most recent survey detections. Delta Smelt are likely migrating in response to increases in turbidity and flow from “first flush” conditions, which were met on 12/31/2022 (Sommer et al. 2011). 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, Chipps Island Trawl and SLS; Bay Study and SKT 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 two adults on 12/14 in the lower Sacramento River.
- Experimental release of hatchery Delta Smelt occurred on November 30 at Rio Vista. One fish from the experimental release was caught on 12/14.
- 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 1/3/2023 (Table 7).

Table 8. Summary of newly reported detections of Delta Smelt by Region and Salvage Facilities between 12/28/2022 and 1/3/2023. 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 9. 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 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 Preliminary Detections	Preliminary to Date	QA/QC to Date	Genetically Confirmed to Date	Total WY2023	Notes
EDSM	Weekly	0	N/A	2	N/A	2	Phase 1 began 12/5/22
SKT	Monthly	0	N/A	N/A	N/A	0	Begins: 1/9/23
SLS	Biweekly	0	N/A	N/A	N/A	0	Ongoing
20-mm	Biweekly	0	N/A	N/A	N/A	0	Begins: 3/13/23
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	Complete
Chippis Island Trawl	Weekly	0	N/A	N/A	N/A	0	Ongoing
FCCL Brood Stock Collections	Weekly	N/A	N/A	2	N/A	2	Ongoing
LEPS	As available	0	N/A	N/A	N/A	0	Ongoing
TFCF	Daily	0	N/A	N/A	N/A	0	Ongoing
FRP	Daily	0	N/A	N/A	N/A	0	Ongoing
Skinner Fish Facility	Daily	0	N/A	N/A	N/A	0	Ongoing

Sampling Method	Frequency	New Preliminary Detections	Preliminary to Date	QA/QC to Date	Genetically Confirmed to Date	Total WY2023	Notes
Total	N/A	N/A	N/A	N/A	N/A	4	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 10. 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).
- 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 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 were triggered on December 31. Precipitation predicted later this week of up to 2-5” in the Delta, with greater precipitation further north. Precipitation along with high winds (SE 16-26 mph with gusts as high as 44 mph) are likely to continue to increase turbidity.
- Turbidity is greater than 12 FNU at OBI and at other central and south Delta stations.
- South Delta Turbidity is expected to increase in response to this week’s rain and strong winds.

Table 11. 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)	OBI Daily Average Turbidity (FNU)
1/2/2023	54,506	133.9	15.92

X2 Conditions

- As of 1/3/2023, the X2 estimation was 65.3km.
- When X2 is above 81 km, the SMT uses the X2_EC_Graph.xlsx 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 -1800 to -2200 cfs from 1/3/2023 to 1/10/2023.
- QWEST is estimated to be between 2500-7000cfs this 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.

Evaluation

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

First flush conditions based on running 3-day average flow and running 3-day average turbidity at Freeport were met on December 31, 2022, triggering IEWPP regulations. The CVP and SWP reduced exports beginning on 1/3/2023 and will continue for 14 consecutive days, through 1/16/2023.

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 but are likely to have begun migrating upriver. “First flush” conditions were met and IEWPP is being implemented. The presence of a turbidity bridge presents an increased risk of entrainment, although the risk is partially offset by low OMR values. Overall risk remains low.

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 above 12 FNU (Average of 15.92 FNU on 1/2/2023). The daily average turbidities on 1/2/2023 at Prisoners Point (42.17 NTU), Holland Cut (not reported) and Victoria Canal (39.98 NTU) may increase 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

- Damon, L. J., S. B. Slater, R. D. Baxter, and R. W. Fujimura. 2016. Fecundity and reproductive potential of wild female Delta smelt in the upper San Francisco Estuary, California. *California Fish and Game* 102(4):188–210.
- Hobbs, J. A., Lewis, L. S., Willmes, M., Denney, C., & Bush, E. (2019). Complex life histories discovered in a critically endangered fish. *Scientific Reports*, 9(1). <https://doi.org/10.1038/s41598-019-52273-8>
- Grimaldo, L. F., T. Sommer, N. Van Ark, G. Jones, E. Holland, P. B. Moyle, B. Herbold & P. Smith (2009) Factors Affecting Fish Entrainment into Massive Water Diversions in a Tidal Freshwater Estuary: Can Fish Losses be Managed? *North American Journal of Fisheries Management*, 29:5, 1253-1270, DOI: 10.1577/M08-062.1
- Polansky, L., Newman, K.B., Nobriga, M.L. et al. Spatiotemporal Models of an Estuarine Fish Species to Identify Patterns and Factors Impacting Their Distribution and Abundance. *Estuaries and Coasts* 41, 572–581 (2018). <https://doi.org/10.1007/s12237-017-0277-3>
- Sommer, T., F. Mejia, M. Nobriga, and L. Grimaldo. 2011. The Spawning Migration of Delta Smelt in the Upper San Francisco Estuary. *San Francisco Estuary and Watershed Science* 9(2).