BUREAU OF RECLAMATION

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

January 10, 2023

Executive Summary

Operational Conditions

See Weekly Fish and Water Operation Outlook document for –January 10- January 16

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 = 39.1 fish, as of 1/9/2023). 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. 30-45% 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. 5-20% 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 1 - March 31 total loss = 22.76 fish, as of 1/9/2023). Loss of Central Valley steelhead at the CVP and SWP fish collection facilities may occur over the next week. 1-10% 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 1/9/2023). 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 recent detection data, distribution patterns over the past decade, and widespread turbidity in the Delta, Delta Smelt are likely distributed throughout the Delta. Limited detection data from the past month support Delta Smelt presence in the lower Sacramento River and the South Delta. The last Delta Smelt survey observations were on December 14, 2022, in the lower Sacramento River. A cultured adult Delta Smelt was salvaged at the CVP on 1/7/2023. Integrated Early Winter Pulse Protection (IEWPP) is active through 1/16/2023. 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 in response to hydrology. However, the presence of a turbidity bridge and expectation of elevated turbidity continuing through this week increases the likelihood that they could move into the South Delta. Combined with the occurrence of salvage this week, overall risk for entrainment is moderate. The Turbidity Bridge Avoidance period begins 1/17/2023 after the IEWPP ends and will be triggered if turbidity remains elevated.

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 12/31/2022 at Red Bluff Diversion Dam (RBDD) for the last 20 years of passage data is 97.0% (one SD of 3.1%). By 12/31/2022, 214,667 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. Lower rates of tagging success were confirmed for by hatchery staff for some releases. Confirmation of origin of these fish will be through genetic identification.
- No fish observed in salvage and genetically analyzed through 1/2/2023 has been genetically identified as Winter-run Chinook Salmon (see attachment A).

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	N/A	N/A	N/A	N/A	N/A	N/A
Butte Creek RST	N/A	N/A	N/A	N/A	N/A	N/A
Tisdale RST	1/3-1/8	29	16	0	1	0
Knights Landing RST	1/2-1/3	9	3	0	0	0
Lower Sacramento RST	N/A	N/A	N/A	N/A	N/A	N/A
Beach Seines	1/1-1/7	8	1	1	0	0
Sac. Trawl	1/1-1/7	0	0	0	1	0
Chipps Island Midwater Trawl	1/1-1/7	0	0	5	2	0
Mossdale Kodiak Trawl	1/1-1/7	0	0	0	0	0
EDSM	1/1-1/7	0	0	0	2	0
Feather River Herringer RST	1/2-1/8	0	N/A	0	0	0

Locations	Reporting Period	SR Chinook	WR Chinook	LFR Chinook	Steelhead (Wild)	Green Sturgeon
Feather River Eye Side RST	1/2-1/8	0	NA	0	0	0
Lower Feather River	1/3-1/4	2	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: 54-70% Last Week: 59-75%	Current: 30-45% Last Week: 25-40%	Current: 0-1% Last Week: 0-1%
YOY spring-run Chinook salmon	Current: 80-95 % Last Week: 85-95 %	Current: 5-20 % Last Week: 5-15 %	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: 88-98% Last Week: 95-99%	Current: 1-10% Last Week: 1-5%	Current: 1-2% Last Week: 0%

Table 3. Historic migration and salvage patterns. Last updated 01/09/2023.

Species	Red Bluff Diversion Dam	Tisdale Rst	Knights Landing Rst	SacTrawl Sherwood Catch Index	Chipps Island Trawl Catch Index	Salvage
Chinook, Winter-run, Unclipped	96.9%(94.6%,99.2%) BY: 2013 - 2021	66.3%(42.0%,90.6%) BY: 2013 - 2021	67.0%(40.1%,94.0%) BY: 2013 - 2021	34.4%(4.9%,63.9%) BY: 2013 - 2021	4.9%(-2.8%,12.6%) BY: 2013 - 2021	16.4%(0.4%,32.4%) WY: 2013 - 2022
Chinook, Spring-run, Unclipped	13.5%(3.6%,23.3%) BY: 2013 - 2021	15.3%(0.2%,30.4%) BY: 2013 - 2021	24.6%(2.2%,47.0%) BY: 2013 - 2021	4.9%(-3.3%,13.0%) 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	6.1%(-2.9%,15.1%) WY: 2013 - 2022

Species	Red Bluff Diversion Dam	Tisdale Rst	Knights Landing Rst	SacTrawl Sherwood Catch Index	Chipps Island Trawl Catch Index	Salvage
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. 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
1/8/2023	1,747.4	179.2%	Flow>95cfs Change>50%	2,166.8	146.9%	Flow>95cfs Change>50%	24,401.6	N/A	N/A
1/7/2023	625.8	-36.6%	Flow>95cfs	877.6	-40.0%	Flow>95cfs	25,198.9	N/A	N/A
1/6/2023	986.8	-53.2%	Flow>95cfs	1,463.0	-45.4%	Flow>95cfs	23,013.5	N/A	N/A
1/5/2023	2,109.6	426.6%	Flow>95cfs Change>50%	2,679.4	559.8%	Flow>95cfs Change>50%	14,064.8	N/A	N/A
1/4/2023	400.6	-0.5%	Flow>95cfs	406.1	-6.4%	Flow>95cfs	15,137.8	40.5	WLK>7500cfs and KNL<56.3F
1/3/2023	402.6	-14.1%	Flow>95cfs	433.6	-21.2%	Flow>95cfs	18,637.2	41.0	WLK>7500cfs and KNL<56.3F

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
1/2/2023	468.7	-36.2%	Flow>95cfs	550.0	-36.9%	Flow>95cfs	23,377.3	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	2023-01-08	Overall	3.57	0.81	N/A
Winter Chinook	2023-01-08	Sacramento River	3.02	0.82	0.67
Winter Chinook	2023-01-08	Yolo Bypass	7.58	0.73	0.07
Winter Chinook	2023-01-08	Sutter Slough	3.57	0.77	0.11
Winter Chinook	2023-01-08	Steamboat Slough	3.12	0.82	0.06
Winter Chinook	2023-01-08	Interior Delta	4.89	0.90	0.08
Late-fall Chinook	2023-01-08	Overall	2.09	0.67	N/A
Late-fall Chinook	2023-01-08	Delta Cross Channel	N/A	N/A	0.00
Late-fall Chinook	2023-01-08	Georgiana Slough	3.30	0.40	0.18
Late-fall Chinook	2023-01-08	Sacramento River	1.73	0.74	0.47
Late-fall Chinook	2023-01-08	Sutter and Steamboat Slough	2.12	0.74	0.35

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.

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 %	9	0
Predicted Steelhead, High %	108	39
Predicted Chinook Winter Run, Median %	18	0
Predicted Chinook Winter Run, High %	112	21

b) Environmental details, current and forecast.

Parameter	Data	Forecast
Temperature (Mallard Island, C)	9.5	20
Precipitation (5-d running sum, inches)	1.15	0
Old and Middle River Flows (cfs)	-3525	-3039
Sacramento River Flow (Freeport, cfs)	62984	6993
DCC Gates	closed	closed
San Joaquin River Flow (Vernalis, cfs)	6692	262
Export	6886	1887

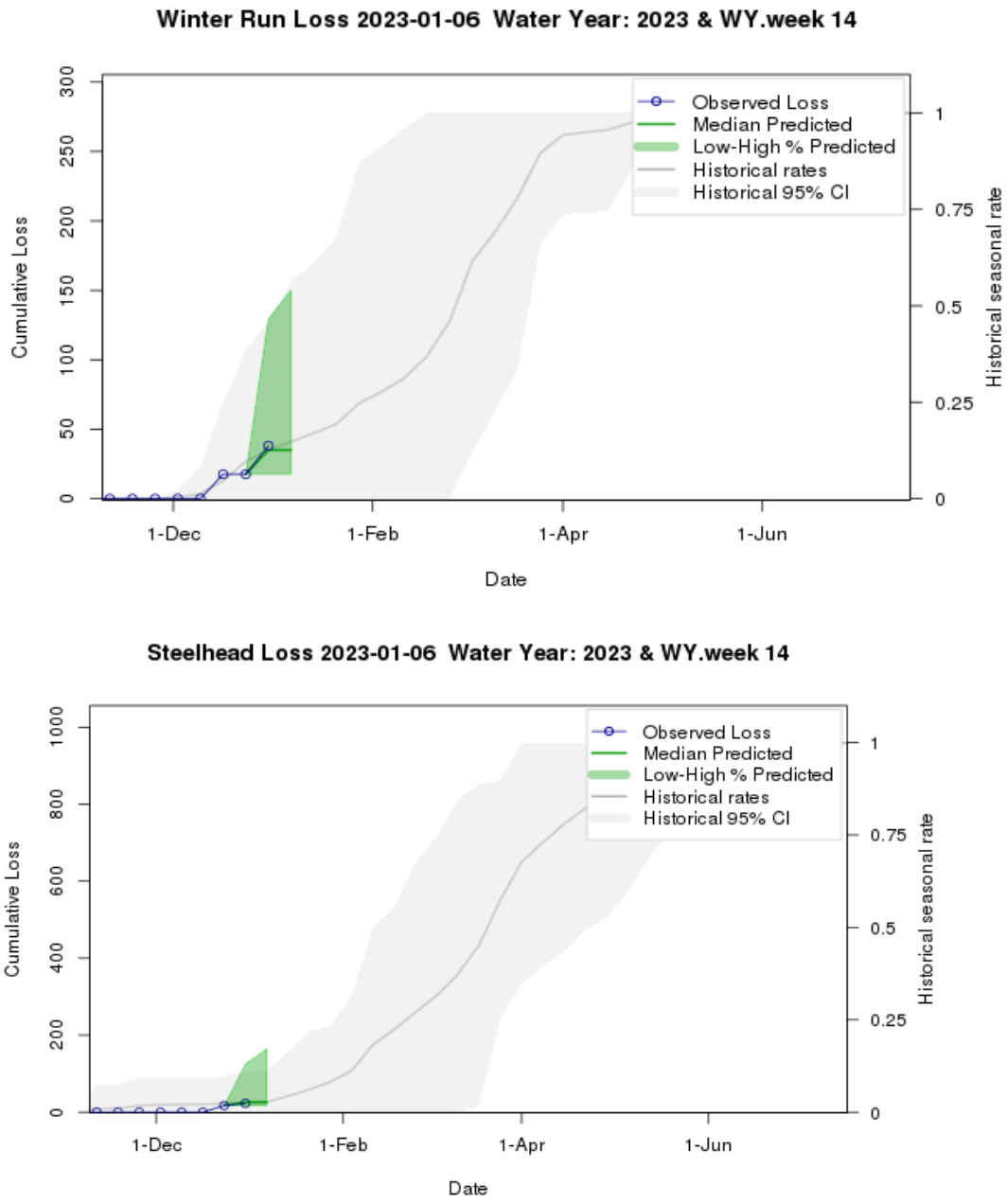

Figure 1. Predicted weekly loss of steelhead and winter-run Chinook salmon at the CVP and SWP facilities

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 all juvenile salmonids are 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 39.1 fish (as of 01/09/2023). 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 01/09/2023). 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 22.76 fish (as of 1/9/2023). 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 -1,600 to -2,500 cfs for the next week. OMR flows will remain more positive than –2,000 cfs until 1/16/2023. 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.
- A dead adult Green Sturgeon was collected from the trashrack at the SWP facility on 1/4/23. It measured 64.25 inches FL (ca. 1.63 m FL). A living adult Green Sturgeon was collected from the trashrack at the CVP facility at around 3:00 am on 1/7/2023. It was reported as around 5 feet long. The sturgeon is being held and monitored at the federal facility since it was injured, but not dead. Sturgeon found on the either trashrack do not count toward salvage. 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 1/9/2023). 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 January 9, 2023, 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. One cultured adult Delta Smelt was salvaged at the CVP on 1/7/2023. Delta Smelt are likely migrating and distributed widely in the Delta 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 12/14/22 in the lower Sacramento River and one cultured adult in CVP salvage on 1/7/23.
- Experimental release of hatchery Delta Smelt occurred on November 30 at Rio Vista. One fish from the experimental release was caught on 12/14/22.
- 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 7. 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	1
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 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	Began 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
Chipps 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

Sampling Method	Frequency	New Preliminary Detections	Preliminary to Date	QA/QC to Date	Genetically Confirmed to Date	Total WY2023	Notes
LEPS	As available	0	N/A	N/A	N/A	0	Ongoing
TFCF	Daily	0	N/A	1	N/A	1	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
Total	N/A	N/A	N/A	N/A	N/A	5	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 16 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
1/7/2023	TFCF	South Delta	1	N	Y	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. One cultured adult was detected in CVP salvage on 1/7/2023.
- 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

- Turbidity continues to be high in the Delta and is expected to remain high. Precipitation throughout the week is anticipated to be up to 2-5" in the Delta, with greater precipitation further north. High SW winds 23-28 mph with gusts as high as 45 mph today will be followed by SE winds 14-18 mph with gusts as high as 24 mph.
- Turbidity is greater than 12 FNU at OBI and at other central and south Delta stations.
- South Delta Turbidity is expected to remain high or increase in response to this week's rain and strong winds.

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)	OBI Daily Average Turbidity (FNU)
1/9/2023	78287	178.8	19.12

X2 Conditions

- As of 1/9/2023, the X2 estimation was less than 55 km (west of Martinez).
- 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 -1600 to -2500 cfs from 1/10/2023 to 1/17/2023.

- QWEST is estimated to be between 15,000cfs and 25,000 cfs 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 likely to have begun migrating upriver. Delta Smelt are likely present in the South Delta based on one cultured adult Delta Smelt that was salvaged at the CVP on 1/7/2023. IEWPP is being implemented through 1/16/2023. The presence of a turbidity bridge presents an increased risk of migration into areas at high risk of entrainment, although the risk is partially offset by low OMR values due to IEWPP. Due to the presence of the turbidity bridge and occurrence of salvage, overall risk is moderate.

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 19.1 FNU on 1/9/2023). The daily average turbidities on 1/9/2023 at Prisoners Point (41.4 NTU), Holland Cut (18.0 FNU) and Victoria Canal (39.9 NTU) may remain elevated or 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?

The Turbidity bridge avoidance action period is not currently in effect, but the period will go into effect at the end of IEWPP on 1/17/2023. Current conditions indicate that the turbidity bridge avoidance action is likely to be triggered on 1/17/2023 due to forecasted hydrologic conditions.

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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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).

Attachment A.

Table 11. Salmonid Genetic testing results for WY 2023 as of this assessment. Genetic identification of salmon is not used in calculating loss.

ID	Sample Date	FL	Julian	ots28	Sex id	Assig.	Pos Prob1	Group	Pos-Prob 2	Model	Facility	Original ID
C220098SWP	12/18/2022 13:00	137	172	late	female	Non-winter	1.000	Spring	1.000	Winter	SWP	C220098 SWP
C220099SWP	12/28/2022 5:00	154	181	late	male	Non-winter	1.000	Spring	0.607	Late Fall	SWP	C220099 SWP
C220180SWP	12/31/2022 3:00	180	184	late	male	Non-winter	1.000	Fall	1.000	Late Fall	SWP	C220180 SWP
C230082SWP	1/1/2023 10:00	150	185	late	male	Non-winter	1.000	Fall	0.982	Winter	SWP	C230082 SWP
C230083SWP	1/1/2023 11:00	113	185	late	female	Non-winter	1.000	Fall	0.988	Winter	SWP	C230083 SWP
C220127CVP	12/17/2022 22:00	185	171	late	male	Non-winter	1.000	Spring	1.000	Fall	CVP	C220127 CVP
C220128CVP	12/30/2022 23:59	163	184	late	female	Non-winter	1.000	Fall	0.981	Late Fall	CVP	C220128 CVP
C230082CVP	1/2/2023 14:00	212	187	early	male	Non-winter	1.000	Fall	0.988	Fall	CVP	C230082 CVP