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

1. Executive Summary

a. Operations anticipated during the week

See Weekly Fish and Water Operation Outlook document for January 12 – January 18

b. Winter-run Chinook Salmon summary

No loss of natural winter-run Chinook salmon (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. 20-55% of juvenile natural winter-run Chinook salmon from brood year (BY) 20 are estimated to be present in the Delta. This percentage is likely to increase due to anticipated light precipitation this week and the maturation of juveniles for this time of year. In addition, releases of hatchery late fall-run Chinook salmon may encourage movement of fish downstream in conjunction with hatchery fish movements. Adult winter-run Chinook salmon are entering the Delta based on historical information.

c. Spring-run Chinook salmon summary

No loss of natural Central Valley (CV) YOY spring-run Chinook salmon has occurred in the past week at the State and Federal fish salvage facilities. Loss of Central Valley spring-run Chinook salmon at the CVP and SWP fish collection facilities is unlikely to occur over the next week. 11-14% of spring-run Chinook salmon are estimated to be in the Delta. This percentage is likely to increase due to anticipated precipitation this week. There is a low likelihood that juvenile natural spring-run Chinook salmon from BY 20 near the DCC gates based on regional monitoring data. YOY spring-run Chinook salmon are emerging and beginning to move downstream. Yearling spring-run are being detected in the Butte Creek rotary screw trap (RST) and the fyke trap at Parrot Phelan Dam and flow conditions are suitable based on tributary flows in Mill and Deer creeks to stimulate the movement in Sacramento River tributaries. Yearling spring-run Chinook salmon were released on 12/3/2020 from the SCARF facility. The production release of late fall-run Chinook salmon occurred on 1/4/21, with the first group of spring-run Chinook salmon surrogates released four days later on 1/8/2021 from the Coleman National Fish Hatchery (NFH) facility in Battle Creek.

d. **Central Valley Steelhead summary**

No loss of natural California CV (CCV) steelhead occurred through 1/10/2021 at the State and Federal fish salvage facilities. Loss of CCV steelhead at the Central Valley Project (CVP) and State Water Project (SWP) fish collection facilities is unlikely to occur over the next week. 10-16% of juvenile CCV Steelhead are estimated to be present in the Delta. This percentage is likely to increase due to anticipated precipitation this week. Approximately 415,000 hatchery fish were released at Red Bluff since middle of December and an additional 216,500 were scheduled to be released between 12/28/2020 and 12/29/2020. This is expected to stimulate natural origin fish movement as well. Early spawning of adult steelhead is likely occurring in the tributaries.

e. Green Sturgeon summary

No loss of green sturgeon has occurred in the past week at the State and Federal fish salvage facilities. Loss of green sturgeon at the Central Valley Project (CVP) and State Water Project (SWP) fish collection facilities is unlikely to occur over the next week. Green sturgeon are more likely to be salvaged during the summer although salvage may occur at any time of year.

f. Delta Smelt summary

Based on distribution patterns over the past decade and one recent detection , Delta Smelt are unlikely to be prevalent in the South Delta. Limited detection data support Delta Smelt being present in Suisun Marsh, west of the Sacramento-San Joaquin confluence, and in the Sacramento Deep Water Ship Channel. High X2 position could mean the average distribution of Delta Smelt extends further upstream of the confluence which is supported by historical Spring Kodiak Trawl data. Precipitation is not anticipated, and changes to the Freeport flows and turbidity are not expected to reach "First Flush" conditions within the next seven days. The likelihood of Delta Smelt adult entrainment is slightly elevated relative to the previous seven days due seasonal timing. The overall probability of Delta Smelt moving into the south Delta is low. The projected OMR Index limits are at a level that is sufficiently protective and low turbidity create an overall low likelihood of entrainment. On 1/6/2021 a 51 mm, juvenile Delta Smelt with no expression was collected in the Sacramento Deep Water Ship Channel. This individual may be a freshwater resident and not representative of the migratory life history pattern in Delta Smelt.

g. 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. The SMT members would likely to bring to the attention of the WOMT membership that EDSM sampling may be reduced by efforts to support the collection of Delta Smelt broodstock for the refuge population.

2. Operational and Regulatory Conditions

See Weekly Fish and Water Operation Outlook document for January 12 – January 18.

3. 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 2020 Productivity:**
  - Natural winter-run Chinook salmon: Preliminary interim juvenile production estimate (JPE) calculations were established for brood year (BY) 2020 winter-run Chinook salmon. The preliminary estimate for total natural production entering the Delta (JPE) is 312,792 winter-run Chinook salmon individuals. The agencies in the SaMT have previously discussed the thiamine vitamin deficiency that is being observed again in broodstock at the Livingston Stone NFH similar to last year's observations. Last year the thiamine deficiency appeared to negatively affect survival of juvenile fish as they migrate downstream towards the Delta. Observed winter-run Chinook salmon at Red Bluff Diversion dam (RBDD) is greater than recent years (BY 2014 –

2018) with the exception of BY 2019. By 12/31/2020, 1,915,004 winter-run Chinook salmon were estimated to have passed RBDD compared to a cumulative passage of 3,777,656 winter-run Chinook salmon RBDD on 12/31/2019.
    - Hatchery winter-run Chinook salmon: No hatchery winter-run Chinook salmon have been released in WY 2021. Preliminary estimate for the hatchery JPE released into the Sacramento River is 97,588 fish.

Spring-run Chinook salmon

- **Delta Life Stages:**
    - Young-of-year (YOY) and Yearlings
    - First hatchery releases of yearling spring-run Chinook salmon from the SCARF facility occurred on 12/3/2020
    - First hatchery releases of yearling spring-run Chinook salmon surrogates from Coleman NFH facility occurred on 1/8/2021.
- **Brood Year 2020 Productivity:**
    - Natural spring-run Chinook salmon: No JPE has been established for spring-run Chinook salmon. Approximately 19.9% of the juvenile spring-run sized Chinook salmon population for BY 20 is expected to have passed passing Red Bluff Diversion dam as of 1/10 (see Ops Outlook) based on historical data.
    - Hatchery spring-run Chinook salmon surrogates: No hatchery spring-run surrogates Chinook salmon have been released in WY 2021.
    - The agencies in the SaMT discussed the thiamine vitamin deficiency that is also currently being observed again in winter-run Chinook salmon broodstock at the Livingston Stone NFH similar to last year's observations. 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. The Feather River Fish Hatchery is currently experiencing issues with infertile males. It is unlikely that they will meet their production goals. On the Feather River, a larger than historical number of spring-run adults that entered the system and were tagged appear to be spawning in-river instead of returning to the hatchery. This is one reason that low returns are being observed at the hatcheries.

Central Valley Steelhead

- **Delta Life Stages**:
    - Spawning Adults, Kelts, Juveniles
- **Brood Year 2020 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.
    - Approximately 415,000 steelhead from Coleman NFH were released at Red Bluff in the first half of December, part of the CCV Steelhead DPS.
    - Approximately 216,500 steelhead from Coleman NFH were released into the Sacramento River from December 28-29, which are part of the CCV Steelhead DPS.

DISTRIBUTION

Winter-run Chinook Salmon

- **Current Distribution:**

- On 1/12/2021, SaMT estimated 20-55% of juvenile winter-run Chinook salmon were present in the Delta (Table 1). In October, the Glenn Colusa Irrigation District (GCID) RSTs observed 583 winter-run Chinook salmon juveniles (by length at date criteria) in their daily catches. In November, the GCID RSTs observed 138 winter-run Chinook salmon juveniles (by length at date criteria) in daily catches. In December, the GCID RSTs have observed 246 winter-run Chinook salmon juveniles (by length at date criteria) in daily catches. In January (through 1/11/2021), the GCID RSTs have observed 16 winter-run Chinook salmon juveniles (by length at date criteria) in daily catches. Since few winter-run Chinook salmon have been observed in RST monitoring locations farther downstream (1 at Tisdale 1/4/2021 – 1/10/2021; 1 at Knights Landing 1/4/2021 – 1/11/2021), the fish appear to still be holding in the middle reaches of the Sacramento River.
- Catch indices are calculated daily for juvenile winter-run Chinook salmon observed in RSTs at Knights Landing (Knights Landing Catch Index, KLCI) and Sacramento Trawl and Beach Seine (Sacramento Seine Catch Index, SCI Trawl and SCI Beach Seine) monitoring locations (Table 2). No catch indices for juvenile salmonid migration were triggered during the past week.
- Mean daily flow and percent change (Wilkins Slough (WLK), Deer Creek (DCV), Mill Creek (MLM); cfs from CDEC) and temperature and percent change (Knights Landing RST (KL); °F from RST) are monitored as alerts for juvenile salmonid migration (Table 3). Mill Creek and Deer Creek alerts for juvenile salmonid migration were triggered 7 of the 7 days during the past week.

- **Historic Trends**
  - Based on historical trends in salvage, 14.6% of winter-run Chinook salmon should have been observed in salvage by this time of the water year (Table 4). If historic trends in salvage were to continue winter-run Chinook salmon loss is expected to remain the same over the next week. Hatchery winter-run Chinook salmon have not been released into the Sacramento River in WY 2021.
- **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 are likely to increase with precipitation events and increasing river flows and turbidity. However, the agencies in the SaMT do not believe that significant precipitation events are likely to occur over the next week (see Ops Outlook). Nevertheless, based on the time of year, and the maturation of juvenile fish, downstream migration is expected to continue even without substantial 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 12/1/20 and are expected to remain closed through mid-May 2021. There may be a need to open the DCC gates to meet D-1641 water quality standards (see Operations Outlook document).
  - Anticipated precipitation light to moderate this week in the norther Sacramento Valley and should stimulate fish movement.

<u>Spring-run Chinook salmon</u>

- **Current Distribution**
  - On 1/12/2021 SaMT estimated 11-14% of juvenile CV spring-run Chinook salmon were present in the Delta (Table 1). Mill Creek and Deer Creek flows were recorded higher than 95 cfs seven

times over the past week (1/4/2021 – 1/10/2021; Table 3). This is indicative that yearling spring-run Chinook salmon may begin to move out of tributaries into the mainstem Sacramento River, yearling spring-run Chinook salmon have also been detected in the Butte Creek monitoring locations. No unmarked spring-run Chinook salmon were observed at the Knights Landing RST or Tisdale RST in the past week.
    - No juvenile young-of-year CV spring-run Chinook salmon (LAD) have been observed near the DCC gates. Yearling CV spring run Chinook salmon may be migrating downstream based on increased flows in the Sacramento River tributaries and have been observed at the Butte Creek monitoring locations. Historical monitoring data does not detect YOY spring-run Chinook salmon in the Delta at this time. Mill Creek and Deer Creek flows were greater than 95 cfs seven days during the past week indicating that downstream migration of yearling spring-run Chinook salmon may occur soon.
- **Historical Trends**
    - Based on historical trends in salvage, 0% of spring-run Chinook salmon should have been observed in salvage by this time of the water year (Table 4). If historic trends in salvage were to continue spring-run Chinook salmon loss is expected to remain the same over the next week. Spring-run surrogate Chinook salmon were released into the Sacramento River at Battle Creek 1/8/2021. Release Group 2 and Release Group 3 may be held at Coleman NFH facility through 2/12/2021.
- **Forecasted Distribution within Central Valley and Delta regions**
    - Movement of juvenile spring-run Chinook salmon into the lower reaches of the Sacramento River and upper Delta are likely to occur with precipitation events and increasing river flows and turbidity (see Weekly Fish and Water Operation Outlook document).
    - Anticipated precipitation light to moderate this week in the northern Sacramento Valley and should stimulate fish movement.

<u>Central Valley Steelhead</u>

- **Current Distribution**
    - On 1/12/2021 SaMT estimated 10-16% of juvenile CCV steelhead were present in the Delta (Table 1).
- **Historical Trends**
    - Based on historical trends in salvage, 4.5% of juvenile CCV steelhead should have been observed in salvage by this time of the water year. If historic trends in salvage were to continue juvenile CCV steelhead loss is expected to remain the same over the next week.
- **Forecasted Distribution within Central Valley and Delta regions**
    - No juvenile Central Valley steelhead have been observed near the DCC gates in regional monitoring efforts and historical monitoring data does not detect juvenile steelhead in the Delta at this time. One wild steelhead was observed at Knights Landing this past week (6 hatchery steelhead were also observed). SaMT estimated that 10-16% of the population of CCV steelhead may be present in the Delta at this time. Closure of the DCC gates would reduce exposure and possible entrainment of juvenile CCV steelhead into the interior Delta via the DCC gates.
    - Anticipated precipitation light to moderate this week in the northern Sacramento Valley should stimulate fish movement.

TABLE 1. Distribution estimates

Location	Yet to Enter Delta	In the Delta	Exited the Delta (Past Chipps Island)
Young-of-year (YOY) winter-run Chinook salmon	45-80%	20-55%	0%
YOY spring-run Chinook salmon	86-89%	11-14%	0%
YOY hatchery winter-run Chinook salmon	N/A	N/A	N/A
Natural origin steelhead	84-90%	10-16%	0%

TABLE 2. Catch indices for juvenile winter-run Chinook salmon observed in RSTs at Knights Landing (Knights Landing Catch Index, KLCI) and Sacramento Trawl and Beach Seine (Sacramento Seine Catch Index, SCI Trawl and SCI Beach Seine) monitoring locations

Date	KLCI Winter Chinook	KLCI Older Chinook	SCI Trawl	SCI Beach Seines	Trigger Exceeded: Catch Index ≥ 5	Trigger Exceeded: Catch Index $3 < X \leq 5$
2021-01-10	1.33	1.33	0			
2021-01-09 [1]						
2021-01-08	0	0	0			
2021-01-07 [2]	0	0	0	0		
2021-01-06	0	0				
2021-01-05	0	0	0			
2021-01-04	0	0	0			

[1] One ad-clipped winter-run Chinook salmon captured (Coleman NFH hatchery late-fall run Chinook salmon?) and five ad-clipped juvenile steelhead captured

[2] One ad-clipped winter-run Chinook salmon captured (Coleman NFH hatchery late-fall run Chinook salmon?)

TABLE 3. Mean daily flow and percent change (Wilkins Slough (WLK), Deer Creek (DCV), Mill Creek (MLM); cfs from CDEC) and temperature and percent change (Knights Landing RST (KL); °F from RST)

Date	MLM mean daily flow (cfs)	MLM flow % change	MLM Alert	DCV mean daily flow (cfs)	DCV flow % change	DCV Alert	WLK mean daily flow (cfs)	KL water temp (°F)	WLK-KNL: Alert
1/10/2021	116.1	-5.9%	Flow>95 cfs	117.2	-7.2%	Flow>95 cfs	4866.1		
1/9/2021	123.4	-1.1%	Flow>95 cfs	126.3	-4.2%	Flow>95 cfs	4951.6	47.8	
1/8/2021	124.8	-4.7%	Flow>95 cfs	131.8	-9.7%	Flow>95 cfs	5244.8	48.3	
1/7/2021	130.9	-12.8%	Flow>95 cfs	146.0	-18.4%	Flow>95 cfs	5742.1	49.3	
1/6/2021	150.2	-43.4%	Flow>95 cfs	179.0	-40.0%	Flow>95 cfs	5095.6	49.7	

Date	MLM mean daily flow (cfs)	MLM flow % change	MLM Alert	DCV mean daily flow (cfs)	DCV flow % change	DCV Alert	WLK mean daily flow (cfs)	KL water temp (°F)	WLK-KNL: Alert
1/5/2021	265.6	101.3%	Flow>95 cfs Change> 50%	298.4	126.9%	Flow>95 cfs Change> 50%	4505.5	49.7	
1/4/2021	131.9	23.7%	Flow>95 cfs	131.5	28.6%	Flow>95 cfs	4396.1	49.5	

TABLE 4. Historic migration and salvage patterns.

Date (1/10)	Red Bluff Diversion Dam	Tisdale RST	Knights Landing RST	Sac Trawl (Sherwood) Catch Index	Chipps Island Trawl Catch Index	Salvage
Chinook, Winter-run, Unclipped	96.9% (94.7%,99.1%) BY: 2011 - 2019	70.0% (41.3%,98.6%) BY: 2011 - 2019	65.0% (35.6%,94.3%) BY: 2011 - 2019	35.4% (5.4%,65.5%) BY: 2011 - 2019	2.4% (-1.3%,6.1%) BY: 2011 - 2019	14.6% (0.6%,28.6%)
Chinook, Spring-run, Unclipped	19.9% (4.9%,34.8%) BY: 2011 - 2019	33.8% (1.2%,66.3%) BY: 2011 - 2019	22.4% (-2.9%,47.6%) BY: 2011 - 2019	4.2% (-3.7%,12.2%) BY: 2011 - 2019	0.0% (0.0%,0.0%) BY: 2011 - 2019	0.0% (-0.0%,0.0%)
Steelhead, Unclipped (Dec – March)						4.5% (-2.9%,11.9%)

TABLE 5. STARS model output

Date (1/10)	DCC	Georgiana Slough	Sacramento River	Sutter and Steamboat
Proportion of Entrainment	NA	31%	44%	25%
Survival	NA	16%	49%	36%
Travel Time	NA	18.6 d	11.4 d	11.9 d

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 Chinook salmon, spring-run Chinook salmon, and steelhead may be present in the Delta.
2. **Does the operational outlook's ranges impact fish movement and change the potential distribution of fish?**
   i. **Potential effects within the 7 days (near-term) in the operations outlook.**

It appears that there is an increased risk of salmonids being exposed to export facilities and OMR flow is expected to remain at or below -5,000 cfs this upcoming week. The SaMT anticipates an increased number of salmonids entering the Delta currently due to hatchery steelhead and yearling spring-run Chinook salmon surrogate releases.

ii. **Potential effects longer than the 7 days (longer-term) in the operations outlook.** The members of SaMT are not confident in projecting beyond 7 days due to uncertainty regarding weather forecasting. However, if current trends were to continue then it is anticipated that more fish may appear at export facilities as fish begin to outmigrate based on historical trends.

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?**
   Reduced exports at the facilities reduces risk of entraining ESA-listed species.
   Winter-run Chinook salmon
   Total juvenile winter-run Chinook salmon (LAD) loss is 0 fish (as of 1/10/2021). 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 1/10/2021). The first group of yearling spring-run surrogate Chinook salmon hatchery fish were released 1/8/2021 in Battle Creek.
   Central Valley Steelhead
   Total juvenile steelhead loss is 0 fish (as of 1/10/2021). The first steelhead of the season was salvaged 1/11/2021 but 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 2021.
   Spring-run Chinook salmon
   The annual loss threshold for spring-run Chinook salmon has not been exceeded in WY 2021.
   Central Valley Steelhead
   The annual loss threshold for steelhead (December 1 – March 31) has not been exceeded in WY 2021.
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?**
   OMR index levels in the upcoming week are not anticipated to be more negative than -5,000 cfs.

Green Sturgeon

POPULATION STATUS

- **Delta Life Stages:**
  - Adults and Juveniles
- **Juvenile Abundance:**
  - No empirical estimates of the juvenile population (ages 0 – 3) in the Delta are available. Information about their rearing and distribution patterns within the Delta is limited. In 2019, 73 larval green sturgeon and six juvenile green sturgeon were observed at the Red Bluff Diversion

Dam fish monitoring RSTs in the upper Sacramento River. In WY 2019, no green sturgeon were observed at the Delta fish salvage facilities. In WY 2020, two green were caught at the Delta fish salvage facilities (salvage = 8).

DISTRIBUTION

- **Current Distribution**
    - Juvenile and adult green present in the San Joaquin and Sacramento rivers and Delta during the next week. Acoustically tagged green sturgeon have been detected and remain in the vicinity of Sherman Island.

- **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?**
   Currently, green sturgeon salvage is 0 fish (as of 1/3/2021). No salvage of green sturgeon has occurred in the past week at the CVP and SWP fish salvage facilities. The agencies in the SaMT assessed the likelihood of salvage occurring in the next week is unlikely to occur.

Delta Smelt

POPULATION STATUS

- **Delta Smelt Life Stages:**
    - Adult
- **Brood Year 2020:**
    - **Abundance estimate**: The most recent population abundance estimate for Delta Smelt was 1,057. This estimate was calculated from the sampling between 1/04/2021-1/8/2021. On 1/6/2021 a 51 mm, juvenile Delta Smelt with no expression was collected in the Sacramento Deep Water Ship Channel by EDSM. Prior to this EDSM last collected a juvenile Delta Smelt (57mm) on 11/9/2020 in the Suisun Marsh stratum.
    - **Biological Conditions**: The Smelt Monitoring Team discussed the most recent monitoring data (Table 4) and considered professional opinion on the historical trends in regional distribution. Based on those discussions, the agency participants on SMT estimate Delta Smelt subadult/adults should be holding in the Suisun Marsh and west of the Sacramento-San Joaquin confluence in anticipation of migration. They are also present in the Sacramento Deep Water Ship Channel.

DISTRIBUTION

- **Current Distribution**

- Real time detection data is currently limited to EDSM sampling and SLS. Since there is only one recent detection, the Smelt Monitoring Team's capacity to estimate where Delta Smelt are within the Delta is limited. .
- The last Delta Smelt detection was a juvenile Delta Smelt (51mm) on 1/6/2020 in the Sacramento Deep Water Ship Channel with no expression. While categorized as juvenile based on size, given the time of year and location, there is a high probability this individual is a freshwater resident and pre-spawn adult.
- Larval sampling is not being conducted at the state or federal salvage facilities.

TABLE 6. Summary of recently reported detections of Delta Smelt by Region and Salvage Facilities between 1/5/2021 and 1/12/2021. Start and End dates reflect period of time between updates to SMT. Regional categories are determined from EDSM sampling. Delta Smelt >58mm FL are considered adults.

Life Stage	North	South	West	Far West	Salvage
Adult	0	0	0	0	0
Larvae/Juvenile	1	0	0	0	0

TABLE 7. 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.

Sampling Method	New Detections	WY2021	Notes
EDSM	1	1	Phase 1 begins 11/30/20 Last Detection: 1/6/2021
SKT	0		SKT. 01/5-8/2021
SLS	0	0	Survey 1: 1/11-13/2021 Survey 2 begins : 1/25/2021
20-mm	0	0	Begins: March
Bay Study	0	0	Ended 12/9/2020 only sampled SJR. See Attachment A
FMWT	0	0	Ended 12/15/2020
Chipps Island Trawl	0	0	5 day per week sampling began 12/7/2020 Ends: mid-May. See Attachment A

- **Historical Trends**
  - Based on Sommer et al. (2011), the centroid of Delta Smelt distribution is anticipated to be near X2 which is currently estimated to be at 94 km which indicates Delta Smelt could be upstream of the Sacramento-San Joaquin confluence. km which indicates Delta Smelt could be upstream of the Sacramento-San Joaquin confluence.
  - The recent Delta Smelt detection in the Deep Water ship channel is upstream of the confluence, but may be a freshwater resident and not representative of the migratory life history patterns in Delta Smelt (Hobbs 2019).

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

- **Forecasted Distribution within Central Valley and Delta regions**
    - Delta Smelt distribution is not expected to change in the next seven days since first flush conditions that would trigger migration are not anticipated. However, predicting the distribution is currently difficult because detection data is limited to one individual and historic patterns may not be representative of the low population levels of Delta Smelt.

ABIOTIC CONDITIONS

- **Turbidity**
    - Precipitation is not anticipated in the next seven days, and changes in Freeport flows and turbidity (Table 8) that would create "First Flush" conditions are not expected by the agency representatives of the SMT. The Delta Turbidity Conditions Report shows turbidity conditions in the Delta remain stable with low turbidity continuing in the south Delta.

TABLE 8. Relevant Environmental Factors to the current management actions for Delta Smelt.

Date Reported	FPT 3 Day Running Avg. of Daily Flows (cfs)	FPT 3 Day Running Avg. of Turbidity (FNU)
1/11/2020	8567	5.86

- **X2 Conditions**
    - X2 is estimated to be greater than 10 km upstream of the confluence of San Joaquin and Sacramento Rivers.

- **Other Environmental Conditions**
    - The Smelt Monitoring Team expects environmental conditions for the next seven days to remain stable with continued seasonally decreasing temperatures.
    - The Fish and Water Operation Outlook OMR Index values are expected to range between –1,000 to –3,500 cfs between 1/12/2021 and 1/19/2021. .
    - 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?**

   The running 3-day average flows and running 3-day average turbidity at Freeport (Table 8) have not exceeded the triggers for "First Flush" conditions. Based on the forecasted weekend storm's predicted amount of rain, "First Flush" conditions are not expected in the next seven days.

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 one recent detection , Delta Smelt are unlikely to be prevalent in the South Delta. The detection on 11/9/2020 supported Delta Smelt being present in Suisun Marsh and west of the Sacramento-San Joaquin confluence. The most recent detection on 1/6/2021 supports a presence of the species in the Sacramento Deep Water Ship Channel, but may be a freshwater resident and not representative of the migratory life history. Based on Sommer et al. (2011), the centroid of Delta Smelt distribution is anticipated to be near X2, which is currently estimated to be at 94 km which indicates Delta Smelt distribution could be upstream of the Sacramento-San Joaquin confluence. Since "First Flush" conditions are not expected to be met within the next seven days, it is unlikely that Delta Smelt will migrate into areas with a high risk of entrainment. The range of OMR is expected to be1,000 to –3,500 cfs and QWEST is expected to be

near zero . As the season progresses, the risk that Delta Smelt may migrate even if "First Flush" conditions are not met will increase.

Sommer, T., Mejia, F. H, Nobriga, M. L, Feyrer, F., & Grimaldo, L. (2011). The Spawning Migration of Delta Smelt in the Upper San Francisco Estuary. *San Francisco Estuary and Watershed Science*, 9(2). doi:https://doi.org/10.15447/sfews.2014v9iss2art2 Retrieved from https://escholarship.org/uc/item/86m0g5sz

3. **Has a spent female been collected?**
   This question is not applicable until Turbidity Bridge Avoidance begins.

4. **If OMR of -2000 does not reduce OBI turbidity below 12NTU/FNU, what OMR target is deemed protective between -2000 and -5000?**
   This question is not applicable until Turbidity Bridge Avoidance begins.

5. **If OBI is 12NTU, what do other station locations show?**
   This question is not applicable until Turbidity Bridge Avoidance begins.

6. **If OBI is 12NTU, 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, what is the OMR level between -3,500 and -5,000 cfs that manages weekly entrainment in the context of annual larval and juvenile entrainment levels?**
   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.

Attachment A: Monitoring Disruptions

Fish Monitoring Gear Efficiency/Disruptions: COVID-19 or air quality impacts.

Monitoring Survey	Status (as of 1/10/2021)
Delta	
SWP regular counts, CWT reading, and larval sampling	Ongoing (possible delay in processing CWT fish)
CVP regular counts, CWT reading, and larval sampling	Ongoing (possible delay in processing CWT fish)
Smelt Larval Survey	Ongoing
20mm Survey	Begins in March
Spring Kodiak Trawl	Begins 1/5/2021
Bay Study	Currently off water due to boat issues.

Monitoring Survey	Status (as of 1/10/2021)
DJFMP- Chipps and Sacramento Trawls	Chipps Island trawl ongoing 5 days a week, resumed 12/27/2020; Sacramento Trawls ongoing, sampling 5 days a week
DJFMP- Seines	Suspended with the exception of the seine locations that inform the SCI. Additional site to collect Chinook salmon DNA for DWR (not included in SCI numbers).
EDSM	EDSM sampling may be reduced to support DSM broodstock collections. Awaiting the decision as of 1/12/2021
EMP	December surveys canceled; January discrete survey canceled
Mossdale	Next sampling date scheduled TBD
USGS Flow monitoring	Continuous monitoring continues
Sacramento River	
Red Bluff Diversion Dam screw trap	Ongoing
Knights Landing screw trap	Ongoing through modified staffing
Tisdale screw trap	Ongoing through modified staffing
Redd dewatering and stranding surveys	Ongoing
Sacramento Carcass and Redd Surveys	Continuing
Feather River	
Feather River screw trap	Suspended indefinitely
San Joaquin River	
SJRRP CDFW Field Monitoring	Suspended indefinitely
SJRRP USFWS and USBR Field Monitoring	Ongoing since 8/31