

Smelt Monitoring Team
Tuesday, March 24, 2020
11:00 AM – 12:00 PM

1. Introductions

2. Relevant Actions and Triggers:

Currently under the Turbidity Bridge Avoidance measure which can be found on page 2 of the OMR guidance document and it states: “Reclamation and DWR shall manage to a more positive OMR than -5,000 cfs based on the following conditions: After the Integrated Early Winter Pulse Protection (above) or February 1 (whichever comes first) and until a ripe or spent female is detected or April 1 (whichever is first), Reclamation and DWR propose to manage exports in order to maintain daily average turbidity in Old River at Bacon Island (OBI) at a level of less than 12 NTU. The purpose of this action is to minimize the risk to adult Delta smelt in the Old and Middle River Corridor, where they are subject to higher entrainment risks.”

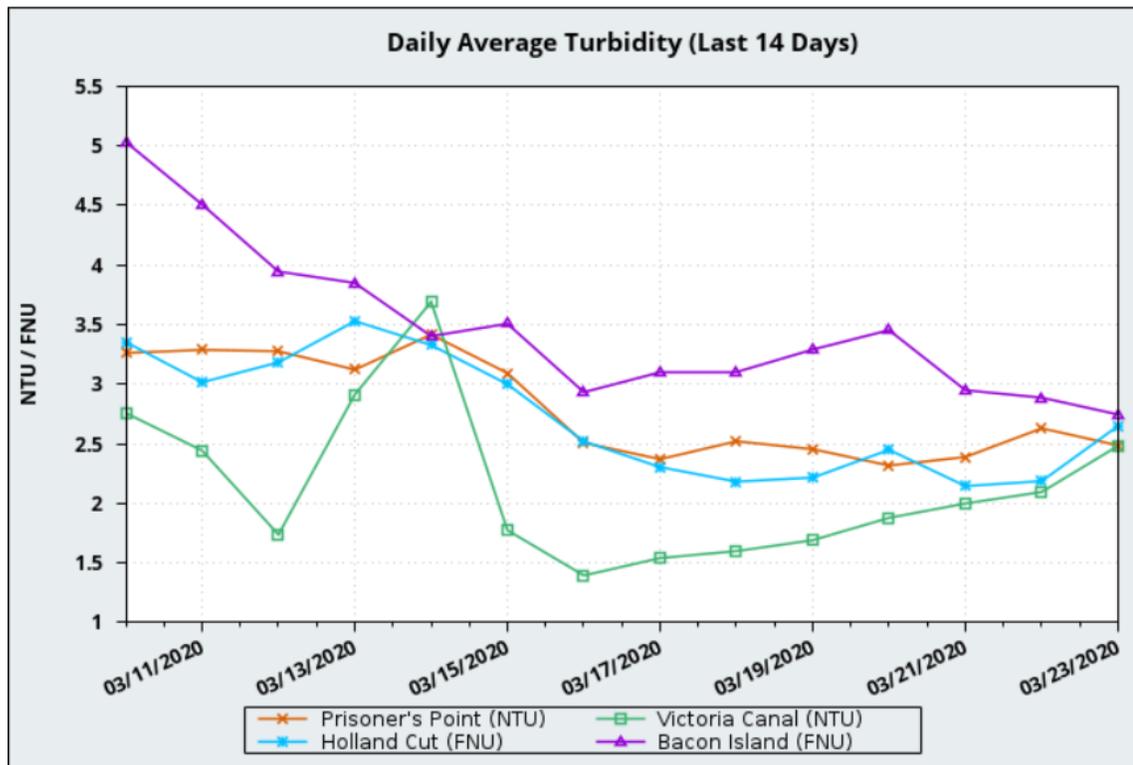
3. Operations

Tributary/Division	Projected Intended Operations and Ranges for week
Clear Creek	Whiskeytown Release: 275 cfs
Sacramento River	Shasta Storage: 3.56 MAF Shasta Release: 4,500 cfs (a decrease in releases to 4,000 cfs is possible)
Feather River	Oroville Storage: 2.26 MAF Oroville Release to Feather: 1,050 cfs to 1,750 cfs
American River	Folsom Storage: .46 MAF Nimbus Release to American: 1,500 cfs (a decrease to 1,000 cfs is possible)

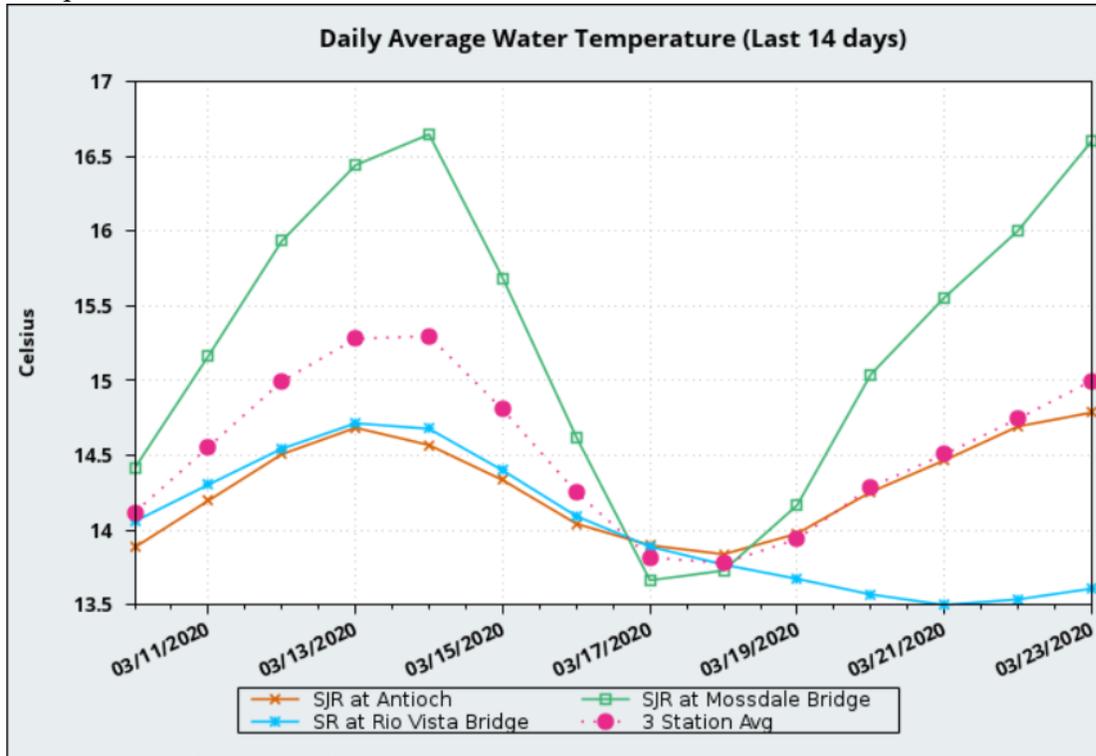
Stanislaus River	New Melones Storage: 1.89 MAF Goodwin Release to Stanislaus: 200 cfs
Delta	Freeport: 9,000 to 12,000 cfs Vernalis: 1,000 to 1,700 cfs Delta Outflow index: 7,000 to 10,000 cfs Barker Slough PP: 20-42cfs (per ITP Condition 5.3) Exports JPP: 1,800 to 3,600 cfs CC: 500 to 2,000 cfs Expected OMR Index Values: -3,000 to -4,700 cfs Maximum Allowable OMR: -5,000 cfs X2 position: 78 to >81 km QWEST: 0 cfs to -2,000 cfs DCC: Closed

Review of Environmental Conditions:

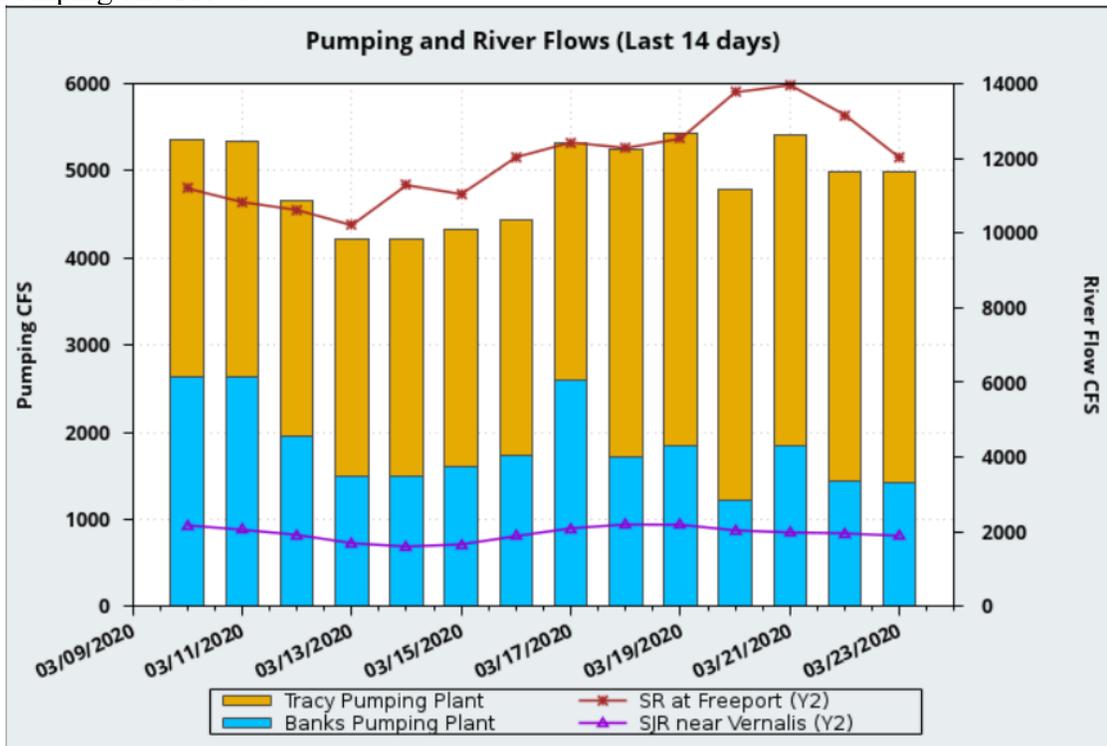
Turbidity:



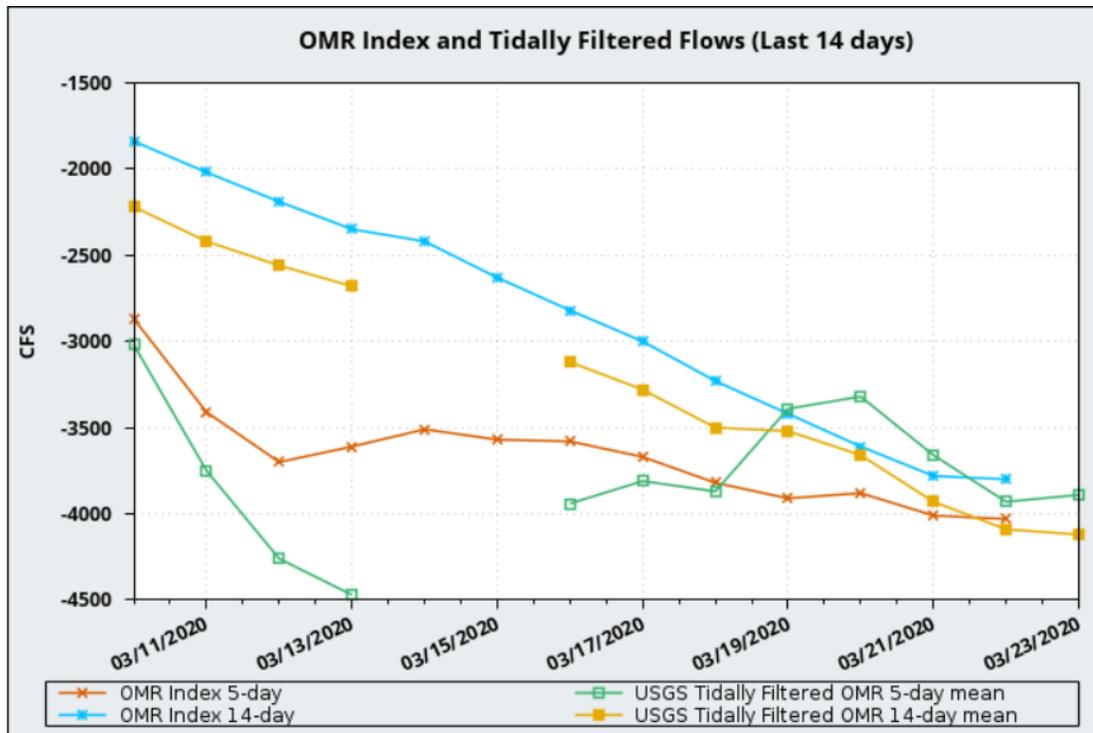
Temperature:



Pumping and Flows:



OMR Flows:



On March 23th: the three station average temperature was 15.0 C. X2 position was 79km. Turbidity at OBI was 2.75 NTU. QWEST is -845. Weather forecast for the week is mostly clear with increasing temperatures. A rain event is probable Tuesday.

The group does not view the turbidity in the western Delta nor the upper San Joaquin is going to reach the entrainment zone. Current turbidity levels in the central and south Delta remain low. However, the group will continue to monitor the incoming storm.

The data presented for conditions was accessed via SacPAS:

http://www.cbr.washington.edu/sacramento/data/delta_smelt.html

4. Fish Abundance, distribution, and lifestage:

A. Survey Updates:

SKT #3 concluded sampling and did not detect any delta smelt. Three adult longfin smelt were detected in the survey; 2 in Grizzly Bay and one in the lower Sacramento River.

-SLS #6 sampled 3/16 – 3/18. Samples from the survey are only partially processed. No Delta Smelt have been detected so far. Within the south Delta priority stations, 35 longfin smelt have been detected. This reflects an increase in total number of larval longfin smelt detected in the south Delta from last week.

-20-mm #1 was in the field 3/16 – 3/18. Surveyed all but one station. Currently there is not enough staff to process samples. Of the samples processed so far, 20 larval longfin smelt have been detected in the south and central Delta stations.

Note: Due to social distancing procedures real time data access will be limited as staff is reduced. CDFW is suspending all surveys until April 1, when they will reassess the situation.

-EDSM Week 17: Crews sampling in the Lower Sacramento River, Suisun Bay, and Lower San Joaquin strata today. One Delta Smelt (70mm, no expression) caught (3/16) in the Lower Sacramento Deep Water Ship Channel. The abundance estimate for last week was 842. EDSM 17 is still on the water. Sampling is to shift to larval next week. This will include stratified random sampling to generate abundance estimates for each week. The crew may be slower at sample processing due to social distancing measures.

It was noted by the group that EDSM is not sampling in the southern Delta for the next phase of larval sampling. This is a main source of secchi data.

Note: the daily and weekly EDSM reports on the USFWS Lodi website. Old file share system is being retired. Please use new links moving forward. These will be distributed to the group and are also on the Delta Juvenile Fish Monitoring Program website: https://www.fws.gov/loidi/juvenile_fish_monitoring_program/jfmp_index.htm.

B. Salvage Monitoring:

-No adult or juvenile Delta Smelt have been observed in salvage so far this season (WY 2020).

-A single juvenile longfin smelt was salvaged as part of the 1600 hour count in the federal facility on the 17th. It was measured at 21mm. The salvage was expanded to 4.

-The Federal facilities began larval sampling on 3/16.

-State facility started larval count yesterday. They are ID'ing samples in house and plan to try to produce a weekly report.

5. Evaluation:

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

-During WY2020, no first flush conditions were exceeded. The group agrees that under the 2019 parameters on Freeport turbidity and flow data no first flush conditions were seen.

- Do DSM have a high risk of migration and dispersal into areas at high risk of future entrainment? (this week compared to last)

- The group stated OMR is more negative and there is the potential for the incoming storm to kick up turbidity. As a result the group feels Delta Smelt are at higher risk this week than last week. The group agrees that risk has increased and we don't know due to delays in sample processing whether or not larval Delta Smelt are hatching within the central and south Delta. However, based on historical spawning time and current temperatures appropriate for spawning, it is expected that spawning has begun and will be ongoing. The group feels with limited data they should err on the side of caution and assume that spawning is ongoing.
 - Has a spent female been collected?
 - -A ripe female Delta Smelt (65mm, stage 4-ripe) was sampled on the lower Sacramento River (site 707) during Spring Kodiak Trawl. SKT sampled February 10th-14th. Because this detection occurred over a month ago, the group agrees that spawning is ongoing and this early detection of a ripe female corroborates this conclusion. Appropriate spawning temperatures have been recorded as of February 17, further supporting the group's assessment that spawning is ongoing and that protections for larval life stage delta smelt need to be considered.
 - If OMR of -2000 does not reduce OBI turbidity below 12 NTU, what OMR target is deemed protective between -2000 and -5000?

-As of March 22th, turbidity at OBI is 2.9 NTU. OMR is at -4,284. Since OBI remains below 12 NTU these flows are within the range. However, OBI turbidity needs to be observed daily as storm affected flows reach the Delta from the San Joaquin River. If OBI turbidity surpasses 12 NTU, OMR flows will need to become more positive than -5,000 to be protective. The group was asked which flows of -2000 and -5000 are appropriate for smelt protection and the group deemed -2000 to be more protective.

If OBI is 12 NTU, what do other station locations show?

- As of March 22th, turbidity at OBI is 2.9 NTU. OMR is at -4,284. Since OBI remains below 12 NTU these flows are within the range. However, OBI turbidity needs to be observed daily as storm affected flows reach the Delta from the San Joaquin River. The group feels the area near Sherman Island and throughout the OMR corridor is clear and is not concerned about the SJR turbidity. There is a potential for fish to be spawning in upper OMR corridor, which puts them at risk of entrainment. In the absence of fisheries data, a detection of larval longfin at salvage is notable because it suggests that larval life stage fish are being actively entrained to the facilities.
- If OBI is 12NTU, is a turbidity bridge avoidance action not warranted? What is the supporting information?

As of March 22th, turbidity at OBI is 2.9 NTU. OMR is at -4,284.

- If OBI is 12NTU, is a turbidity bridge avoidance action not warranted? What is the supporting information?

Not applicable, as turbidity is below 12NTU.

- 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?

Based on surveys no larval, juvenile, or adult Delta Smelt have been seen in the entrainment zone of the CVP and SWP pumps. Due to record-low abundance numbers, it is likely that delta smelt field detections will be low to none and may not be available as a confirmation of presence, but that does not mean delta smelt are not present in this area. Based on Reclamation's memo for OMR flow restrictions for delta smelt larval and juvenile entrainment dated March 13, Secchi depth data from the south Delta will be used to determine the need for OMR restrictions for larval entrainment protection. Currently, south Delta Secchi depth data available from EDSM survey data is greater than 1 meter in depth and do not meet criteria for the memo's OMR action. The group requested additional guidance from Reclamation on the Smelt Monitoring Team's role in interpreting and providing advice on this action.

- What is the OMR level to manage the annual larval entrainment based on DSM recruitment level from the FWS LCM? How does this information from the real-time spatial distribution of DSM operationalize the LCM?
- LCM still in development.
- 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?

In development

8. Additional Considerations

- The group reasserted that this is a transition period between the adult and larval life stage and that protections need to be considered for both at this time. Given that CDEC OMR readings had reached -5883 cfs last week and PTM results show a greater proportion of particles injected at Prisoners Point (20-30%) entrained under the -4000 cfs OMR scenario, the group feels that more positive OMR levels would be more protective for delta smelt larvae hatching in the south and central Delta.
- PTM model runs for a Central Delta location were completed. This showed that at an OMR of -3500 cfs to -4000 cfs approximately 9% of the particles entering the CVP and SWP after 30 days, and 15% entering the Old and Middle corridor after 30 days.

- A PTM request will be made this week, however due to Covid-19 staffing it may be limited in scope.
- The group requested additional guidance from Reclamation on the Smelt Monitoring Team's role in interpreting and providing advice on Reclamation's March 13 memo on larval and juvenile OMR entrainment protections.

9. Next Meeting:

April 1, 2020 at 11:00am

WEEKLY ADVICE FOR THE DEPARTMENT OF FISH AND WILDLIFE FOR LONGFIN SMELT

Advice for 24 March 2020

Flow advice for the protection of larval and juvenile Longfin Smelt (LFS) is warranted based on a review of available distribution and abundance data, and other pertinent biological factors. Restricting OMR to a 14-day average no more negative than -2000 cfs would substantially reduce the risk of entrainment into the south Delta export facilities. However, risk was not substantial enough to warrant the most restrictive OMR level identified for the high entrainment risk period (January through March) described in the incidental take permit. Results from Smelt Larva Survey 6 (SLS 6) show increased LFS density within the area associated with elevated risk of entrainment. Results from a Particle Tracking Model (PTM) show LFS in this area have a moderate probability of being entrained into the south Delta and export facilities under current hydrologic conditions. Additionally, one juvenile Longfin Smelt was reported in larval salvage sampling at the Central Valley Project on March 17th, indicating that salvage is occurring, and increased protections are needed.

Condition 5.3 of the 2009 Incidental Take Permit had previously triggered due to larval presence at SLS station 716. This condition is in effect from January 15th through March 31st of dry and critically dry years as defined by Water Board Decision 1641 for the Sacramento River. The export restriction is to remain in place until larvae are no longer detected at station 716, however, protective measures in place to protect staff during the COVID-19 pandemic has temporarily halted SLS and 20-mm Survey sample processing. Data needed to inform this condition will not be available prior to March 31st. CDFW personnel have determined that risk of entrainment into the Barker Slough Pumping Plant has decreased based on a review of SLS catch trends in recent years and current Barker Slough export levels. Further restrictions are not warranted.

Basis for Advice:

The 2009 State Water Project 2081 for Longfin Smelt states that advice to WOMT and the DFW Director shall be based on:

Condition 5.1 (December through February)

1. Cumulative Salvage Index (CSI). Advice would be warranted if the CSI is greater than 5. The CSI is the sum of LFS salvage at both facilities, December through February, divided by the FMWT LFS annual index. This is equivalent to salvage being greater than 5 times the FMWT index. The FMWT annual index is the sum of four monthly indices, September through December. To calculate the monthly indices the FMWT sampling area is divided into 14 regions. Average LFS catch per trawl is calculated for each region then multiplied by a region-specific weighting factor. The resulting products are then summed to produce the monthly index. Annual and monthly indices are reported online in the [table of FMWT abundance indices](#). The CSI can be approximated prior to completion of FMWT December sampling by comparing early December salvage to the sum of the available monthly indices multiplied by 5.
2. Adult abundance, distribution or other information indicates that OMR flow advice is warranted.

Condition 5.2 (January through June)

3. Larval distribution in the Smelt Larva Survey (SLS) or the 20mm Survey finds Longfin Smelt larvae present at 8 of 12 central and south Delta sampling stations in 1 survey (809, 812, 815, 901, 902, 906, 910, 912, 914, 915, 918, 919).
4. Larval catch per tow exceeds 15 Longfin Smelt larvae or juveniles in 4 or more of the 12 survey stations listed.

Condition 5.3 (January 15 through March 31 of dry and critically dry years)

5. During the period January 15 through March 31 of a dry or critically dry water year only, advice for Barker Slough pumping plant operations may be warranted if larval Longfin Smelt are detected at station 716 and other information indicates risk of entrainment.

Discussion of Criteria

1. One juvenile LFS (FL = 21mm) was collected at the federal salvage facility on 17 March 2020. The associated expanded salvage is 4. The FMWT index for 2019 is 44.
2. No Adult LFS have been detected near the export facilities. Enhanced Delta Smelt Monitoring (EDSM) collected 1 LFS (FL = 97 mm) in Suisun Marsh on 16 March 2020 March Spring Kodiak Trawl

collected 1 ripe, female LFS in the lower Sacramento River. March San Francisco Bay Study collected 1 LFS (FL = 110 mm) in the Lower San Joaquin River near Twitchell Island.

3. This criterion was not met. However, both the density and number of stations listed in the ITP at which larvae were detected are higher for SLS 6 when compared to previous SLS surveys conducted this year. Of the samples processed to date, SLS Survey 6 reported 35 LFS larvae at 6 of the 12 stations listed in the Incidental Take Permit, 17 were collected in the Lower San Joaquin River (Stations 809, 812 and 815), 14 were collected in Frank's Tract (Station 901), 2 were collected in Old River near Holland Cut (Station 902) and 2 were collected near Medford Island (Station 906). One of the 12 stations listed in the ITP has not been processed yet (station 910), see Table 1 below for catch summary. SLS 5 collected 537 LFS larvae, including 16 collected at 3 of the 12 stations listed in the ITP. During SLS 5, 96% of larval LFS catch occurred downstream of the confluence of the Sacramento and San Joaquin Rivers, 3% occurred in the Lower San Joaquin River, and less than 1% occurred in the Lower Sacramento River and North Delta. Data and more information is available on the [SLS web page](#).
4. This criterion was not met. See previous item for summary of larval LFS catch.
5. No new data is available. CDFW personnel have determined that risk of entrainment into the Barker Slough Pumping Plant has decreased based on a review of SLS catch trends in recent years and current Barker Slough export levels.

Current Conditions

As of 23 March 2020; Sacramento River flow at Freeport was approximately 12,200 cfs. San Joaquin River flow at Vernalis was approximately 1,900 cfs. Qwest = -900 cfs, X2 = 80 km. The OMR Index daily average was -4,000 cfs. Water temperature averaged across Rio Vista, Antioch and Mossdale was 15°C.

Summary of Risk

Smelt Larva Survey distribution data indicate that spawning and hatching has occurred in the south and central Delta. SLS 6 detected larval or juvenile LFS at 6 of the 12 stations listed in the Incidental Take Permit at a higher density than reported in previous surveys this year. Sample processing for one station, 910, has not been completed. This represents an increase in distribution and density of LFS in the area typically associated with elevated risk of entrainment. A Particle Tracking Model run showed that at an OMR ranging from -3500 cfs to -4000cfs, approximately 30% of the particles injected at station 815 were entrained further into the OMR corridor (~20%) or to the south Delta export facilities (~10%) with only a small portion being transported past Chipps Island (~2%). See plot "Forecast Case (-3500 to -4000 OMR D1641 Control) Particles inserted at Sampling Site 815 on March 18, 2020" in the attached file "PTM Forecast 3_18_2020.pdf." Entrainment of particles injected at station 815 was substantially reduced at an OMR of -1250 cfs. The detection of a juvenile LFS at the CVP fish salvage facility shortly after the initiation of larval sampling indicates that young of year LFS are present in the area and at high risk of entrainment. Furthermore, there is no substantial rainfall forecast that would facilitate downstream transport of larvae or juveniles in the entrainment zone. Restricting OMR would substantially reduce the risk of entrainment.

Table 1. Longfin Smelt catch per station from 2020 Smelt Larva Survey, Survey 5, which was in the field 3/2/2020 - 3/4/2020. Longfin Smelt incidental take permit criteria stations are highlighted in blue (Barker Slough Pumping Plant) and yellow (South Delta exports).

Study Year	Survey #	SLS Station	Turbidity	Sample Status	Species	Smelt Catch	MinOfLength	MaxOfLength	AvgOfLength
2020	6	405							
2020	6	411							
2020	6	418	17.7	Processed		No Smelt Catch			
2020	6	501							
2020	6	504							
2020	6	508							
2020	6	513							
2020	6	519	23.7	Processed	Longfin Smelt	8	6	7	
2020	6	520							
2020	6	602							
2020	6	606							
2020	6	609							
2020	6	610							
2020	6	703							
2020	6	704							
2020	6	705							
2020	6	706							
2020	6	707							
2020	6	711							
2020	6	718							
2020	6	723							
2020	6	801	15.3	Processed	Longfin Smelt	15	6	11	
2020	6	804	9	Processed	Longfin Smelt	14	6	14	
2020	6	809	6.5	Processed	Longfin Smelt	6	8	12	
2020	6	812	5.1	Processed	Longfin Smelt	7	8	12	
2020	6	815	3.3	Processed	Longfin Smelt	4	11	13	
2020	6	901	7.7	Processed	Longfin Smelt	14	9	13	
2020	6	902	4.5	Processed	Longfin Smelt	2	10	11	10.5
2020	6	906	2.8	Processed	Longfin Smelt	2	9	9	9.0
2020	6	910							
2020	6	912	2	Processed		No Smelt Catch			
2020	6	914	3.2	Processed		No Smelt Catch			
2020	6	915	5	Processed		No Smelt Catch			
2020	6	918	5.9	Processed		No Smelt Catch			
2020	6	919	1.7	Processed		No Smelt Catch			

Barker ITP

SWP ITP Criteria Stations

PTM Injection and Output Locations

- Injection Location ●
- Flux Output ▭
- Ref Flux Direction ←

