Smelt Monitoring Team
Wednesday, April 1, 2020
11:00 AM – 12:00 PM

1. **Introductions**

2. **Relevant Actions and Triggers:**

   Currently under larval and juvenile Delta Smelt protection:

   "Reclamation and DWR to manage exports to limit entrainment to be protective of larval and juvenile Delta Smelt on or after March 15 of each year, if QWEST is negative, and larval or juvenile Delta Smelt are within the entrainment zone of the pumps based on real time sampling of spawning adults or young of life stages…

   Reclamation coordinated with the Service on the Life Cycle Model entrainment module and proposes to operationalize results through the management of OMR reverse flows. When the secchi depth in the south Delta is less than one meter as determined by the weekly assessments based on EDSM and other available data, Reclamation will operate to OMR no more negative than 3,350 cfs. When the secchi depth in the south Delta is greater than 1 meter, Reclamation and DWR will operate to OMR no more negative than -5,000 cfs."

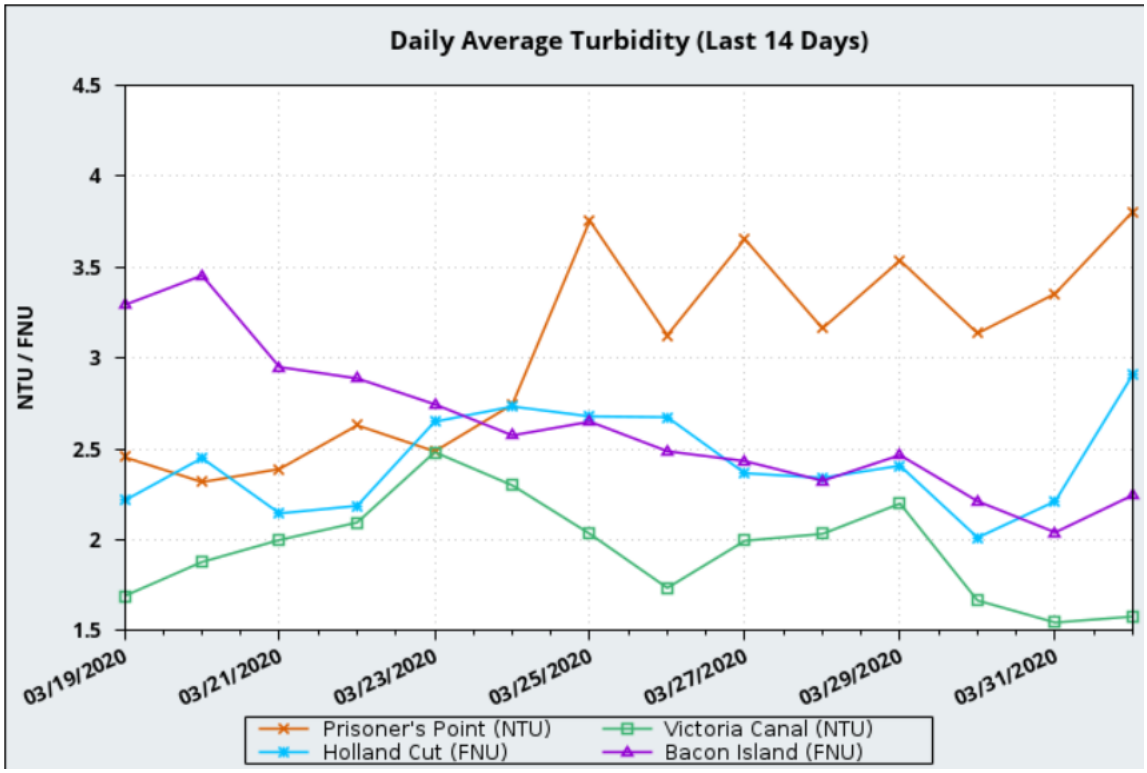
3. **Operations**

Tributary/Division	**Projected Intended Operations and Ranges for week**
Clear Creek	Whiskeytown Release: 200 cfs
Sacramento River	Shasta Storage: 3.59 MAF Shasta Release: 5,000 cfs
Feather River	Oroville Storage: 2.29 MAF Oroville Release to Feather: 1,750 cfs

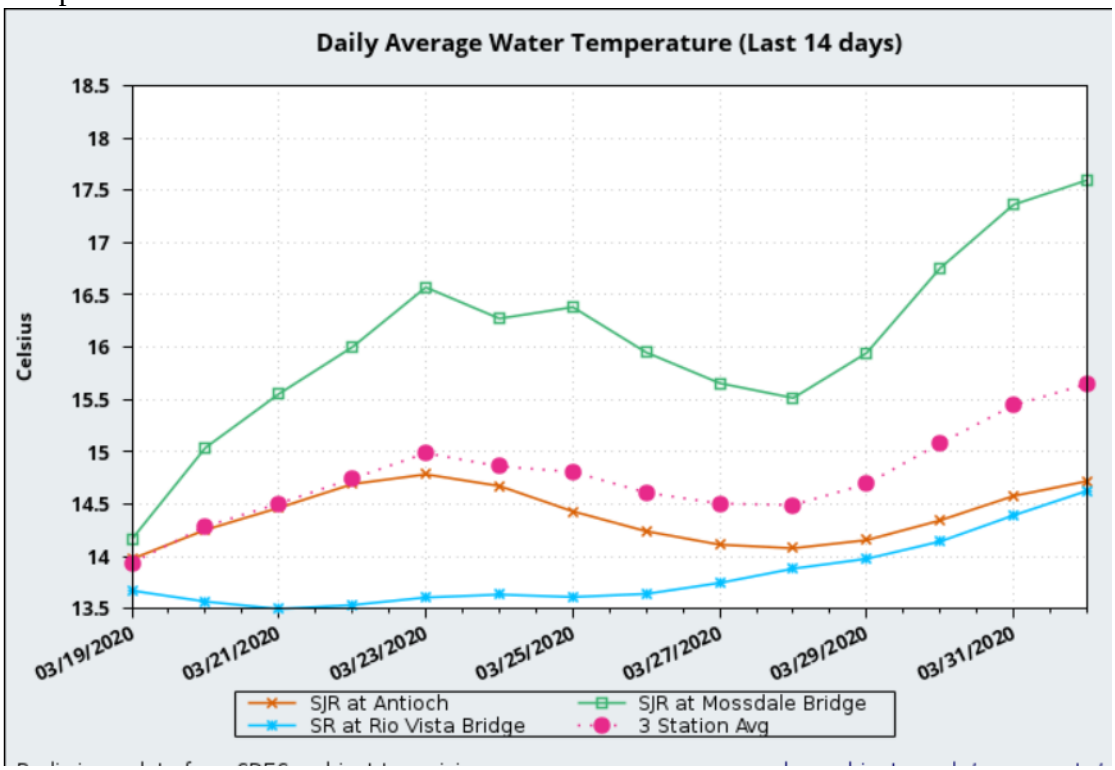
American River	Folsom Storage: .47 MAF Nimbus Release to American: 1,500 cfs (a decrease to 1,000 cfs is possible)
Stanislaus River	New Melones Storage: 1.89 MAF Goodwin Release to Stanislaus: 200 cfs
Delta	Freeport: 10,000 to 12,500 cfs Vernalis: 1,400 to 1,700 cfs Delta Outflow index: 7,000 to 9,500 cfs Exports JPP: 1,800 to 4,000 cfs CC: 500 to 800 cfs Expected OMR Index Values: -2,000 to -3,500 cfs Maximum Allowable OMR: -5,000 cfs X2 position: 77 to >81 km QWEST: +500 cfs to -1,500 cfs DCC: Closed

Review of Environmental Conditions:

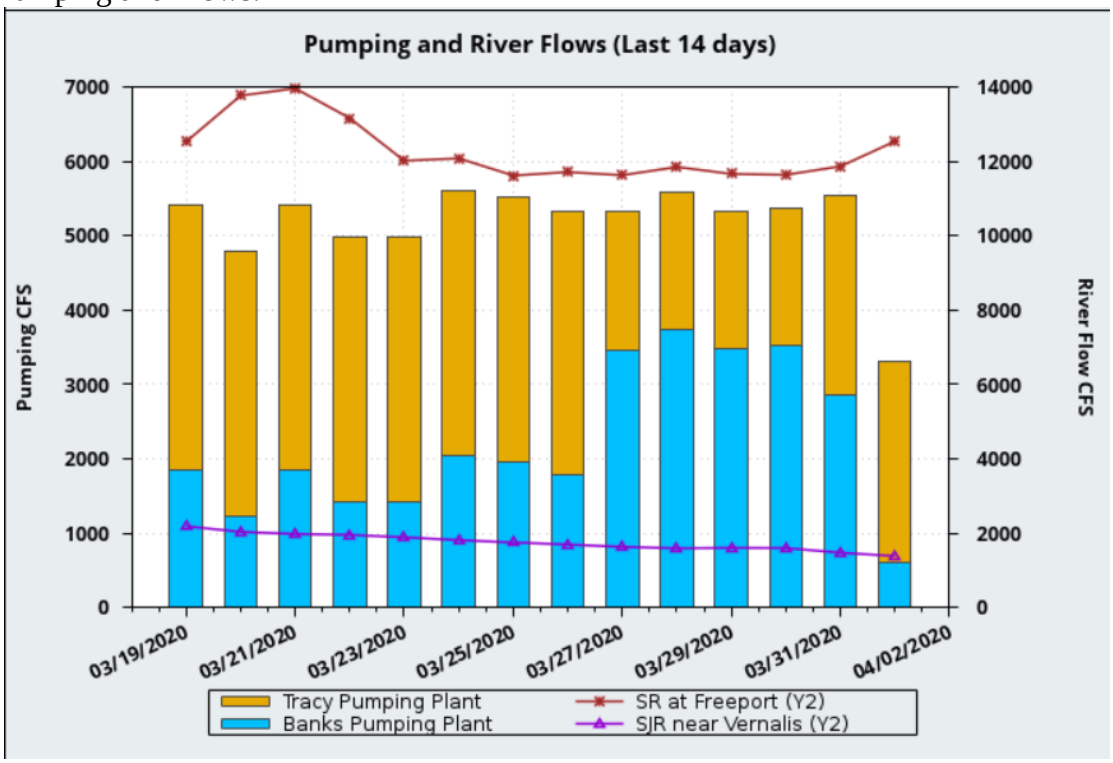
Turbidity:



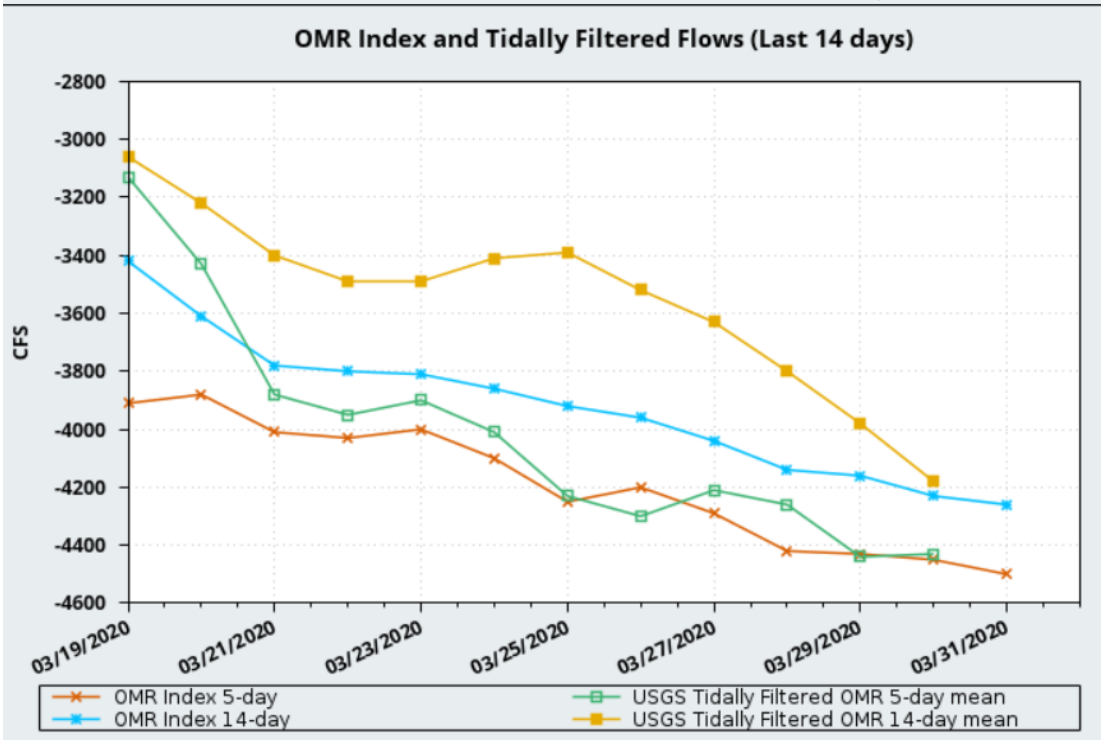
Temperature:



Pumping and Flows:



OMR Flows:



On March 31: the three station average temperature was 15.4 C. X2 position was 78 km. Turbidity at OBI was 3.0 NTU. QWEST is -1,991 cfs. Weather forecast for the week is mostly clear with increasing temperatures. A rain event is probable over the weekend.

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:

-SLS #6 is complete with processing still occurring. 8 Delta smelt at station 508, 7 at station 513, and 4 at 405. Large percentage of fish still have yolk sacs connected. All fish were between 5-7mm. This is the final SLS survey for the year.

-20-mm #1: All Central and South Delta high priority samples collected at the 12 south and central Delta stations have been processed for Delta Smelt. No Delta Smelt were detected. All samples are being processed for listed fish species and are about halfway complete, so far no Delta Smelt have been detected. Currently, CDFW is assessing whether 20-mm #2 will be postponed or cancelled given Covid concerns.

-SKT survey will be suspended for the season. April and May SKT surveys are effectively cancelled.

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: Finished sampling for Kodiak trawling. No Delta Smelt sampled. No abundance estimate provided. Sampling is modified for covid social distancing. Larval sampling for phase 2 starting this week. Sampling in Sacramento DWSC and Suisun Bay today.

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/lodi/juvenile_fish_monitoring_program/jfmp_index.htm.

B. Salvage Monitoring:

- No delta smelt salvaged last week.

-Federal facility salvaged 24 Longfin smelt; 12 on the 24th (28-31mm), 8 on the 25th (23-25mm), and 4 (20mm) on the 28th of March 2020. Clearly, these are young-of-the-year being taken along with smaller individuals who are larvae. Longfin Smelt larvae under 20mm (13-19mm) were seen on the 27th, 28th, and 29th and 30th at federal facility.

Evaluation:

A. **Is OBI turbidity likely to exceed 12NTU during the next week? What conditions are likely to create this turbidity event?**

Group consensus: will not reach 12 NTU and conditions are unlikely to cause spike in turbidity

Discussion:

- It is pretty unlikely that turbidity will exceed 12 NTU; don't think this storm is large or windy enough to drive a spike from Franks Tract.

o Agree, also wind forecasts say it will come from S/SW; no northern winds to pick up turbidity.

Q: I thought we weren't monitoring turbidity for the current protective action?

o We're not but 12 NTU is still a surrogate for adult individuals.

o It looks like 12 NTU thresholds sunsets today (4/1) in the new ITP.

- We will look into this with managers at USBR. [ACTION ITEM]

B. After March 15 and if QWEST is negative, are larval or juvenile Delta Smelt within the entrainment zone of the CVP and SWP pumps based on surveys?

- *Survey results: Consensus:* SLS#6 detected Delta Smelt in the Western Delta and Carquinez which is not near entrainment zone. Moreover, the SLS showed that longfin smelt are in entrainment zone and being actively entrained to the pumps.

Discussion:

o Q: Were south and central Delta samples processed for SLS survey 6?

-Yes all the samples from the south and central delta were fully processed and no delta smelt were detected.

The questions asks if the surveys suggest there are Delta smelt in the entrainment zone. They do not. However, because population numbers are so low, the lack of survey evidence does not mean they aren't there.

C. 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?

-*Group Consensus:* The group needs more information regarding the LCM to answer this question.

Discussion:

-I'm not sure how that LCM has been operationalized; there is a disconnect between conditions and life cycle we're assessing. We need to do a lot more work to link the LCM to real time operations.

Should we schedule a call to go over LCM?

o YES. We will try to arrange dates that LCM experts are available and make sure management is there too. [ACTION ITEM]

-I have heard experts say they can explain the LCM results but goalposts have to be set by Reclamation and DWR consistent with their proposed action, i.e. we need defined thresholds against which to evaluate results from the LCM.

o I don't think this question can be answered by the group at this time.

o I've been working on tools to take the LCM and operationalize it in context of smelt monitoring group.

§ Trying to confirm what we report, how it goes into LCM to be melded, and what comes out and how we use it.

-Agree, it is important that we have a stepwise way of working through this information to support assessment; going to try to get that out in a draft email to get feedback to move that forward.

- We need to focus models not just on how exports influence entrainment, but also water quality and habitat quality for delta smelt. I know it goes beyond what we are required to do in this group, but we need to understand how export levels impact the overall sustainability of the species.

o We need to look at effects on habitat in addition to individual fish themselves.

D. 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?

Group Consensus: We looked at PTM models for 3 key injection sites. The PTM runs showed 2-3% of particles from the closest detection point (Site 809) arrives at the CVP or SWP after 21 days. The two scenarios modeled don't show a significant difference. However, low numbers of Delta Smelt can also give false negatives at the 3 injections sites.

Discussion:

o Site 809 showed 2-3% particles arrives at CVP or SWP after 21 days (for that site, the two scenarios didn't show a significant difference).

-But those numbers do not include those that would be entrained in Old River Corridor at Old Bacon Island?

· Those numbers are just the CVP and SWP facilities but, the percentages are also not high for the OMR corridor (~5%?)

· In the higher pumping scenario, 1% of particles arrive for all those sites (except Old River which is 3%).

o Also keep in mind that this is station 809 in SJ (closest detection of delta smelt was closer to Chipps). It is not likely that larval delta smelt will be entrained but given low population density there is a high chance of false negatives. Even with a cautious eye, there is not a high likelihood of entrained DS larvae. With the caveat that lack of detections in the south and central Delta does not mean absence.

-Agree, probably not at elevated risk based on survey data. However, we know that these surveys are at the detection limits because of low population level, therefore we have limited information to determine if risk is elevated.
o: From a statistical point of view entrainment may be negligible, but biologically, even a 1% population decline is too much for a species already in decline. Given so many unknowns, any negative impact on species is unacceptable if the goal is ensuring sustainability.
- To circle back on Secchi depths --- we recognize we are at a time when we have surveys that are off the water due to safety concerns. We need to think about how to draw a line between the language in your action and how it connects to the information we have, i.e. how to use Secchi information to make decisions.
- Station 901 shows a much higher risk of entrainment in the particle tracking -- especially for longfin but also delta smelt if they were present but not detected. If we base this assessment just on detections and station 809, this could lead to an optimistic assessment of reduced entrainment risk for delta smelt.

8. Additional Considerations

- There are Delta Smelt criteria in the ITP that were not discussed. There is also a salvage trigger for larval and adult smelt, which hasn't been met at this time. We will need to mesh the ITP into this discussion going forward.

-A PTM request was made. Sites will be determined via email.

9. Next Meeting:

April 7, 2020 at 11:00am

Weekly Advice for Longfin Smelt

Overview

Longfin Smelt larvae and juveniles within the south and central Delta are at high risk of entrainment, however, OMR restrictions beyond those already in place may not benefit the species.

The period for Barker Slough advice ended on March 31.

Basis for Advice

The 2020 Incidental Take Permit for Long-Term Operation of the State Water Project in the Sacramento-San Joaquin Delta 2081-2019-066-00 (ITP) states that advice to Water Operations Management Team (WOMT) shall be based the following Conditions of Approval:

Adults

December 1 through February 28

8.3.3 Adult Longfin Smelt Entrainment Protection. After December 1, if an Integrated Early Warning Pulse Protection (Condition of Approval 8.3.1) has not yet initiated, Permittee shall reduce south Delta exports to maintain a 14-day average OMR index no more negative than -5000 cfs and initiate OMR management (Condition of Approval 8.3) if:

- Cumulative combined LFS expanded salvage (total estimated LFS counts at CVP and SWP salvage facilities) beginning December 1 through February 28 exceeds the most recent FMWT index divided by 10, OR
- Real-time monitoring of abiotic and biotic factors indicates a high risk of LFS movement into areas at high risk of future entrainment as determined by DWR and CDFW Smelt Monitoring Team staff.

When evaluating the possibility of LFS movement into the areas that may be subject to an elevated risk of entrainment, the SMT shall evaluate catch of LFS with fork length ≥60 mm by the Chipps Island Trawl as an early warning indicator for LFS migration movement into the Delta, in addition to other available survey and abiotic data.

8.4.1 OMR Management for Adult Longfin Smelt. From the onset of OMR Management (Condition of Approval 8.3) through February 28, the SMT shall conduct weekly, or more often as needed, risk assessments and decide whether to recommend an OMR flow requirement between -5000 cfs and -1250 cfs to minimize entrainment and take of adult LFS. The SMT may provide advice to restrict south Delta exports for seven consecutive days to achieve a seven-day average OMR index within three risk categories:

- Low risk: OMR between -4000 cfs to -5000 cfs
- Medium risk: OMR between -2500 cfs to -4000 cfs
- High risk: OMR between -1250 cfs to -2500 cfs

The team shall provide its advice to WOMT (Condition of Approval 8.3.1) and operational decisions shall be made following the process described in Condition of Approval 8.1.4

Larvae and Juveniles

8.4.2 Larval and Juvenile Longfin Smelt Entrainment Protection. From January 1 through June 30, when a single Smelt Larva Survey (SLS) or 20 mm Survey (20 mm) sampling period exceeds one of the following thresholds:

- LFS larvae or juveniles found in four or more of the 12 SLS or 20 mm station in the central Delta and south Delta (Stations 809, 812, 815, 901, 902, 906, 910, 912, 914, 915, 918, 919), or
- LFS catch per tow exceeds five LFS larvae or juveniles in two or more of the 12 stations in the central Delta and south Delta (Stations 809, 812, 815, 901, 902, 906, 910, 912, 914, 915, 918, 919).

Permittee shall restrict south Delta exports for seven consecutive days to maintain a seven-day average OMR index no more negative than -5000 cfs. Permittee shall also immediately convene the SMT to conduct a risk assessment (see Condition of Approval 8.5.1.2) to assess the risk of larval and juvenile LFS entrainment into south Delta export facilities, determine if an OMR flow restriction is warranted, and recommend an OMR flow limit between -1250 cfs and -5000 cfs. The SMT risk assessment and operational advice shall be reviewed by WOMT (Condition of Approval 8.1.3) via the Collaborative Real-time Decision-making process (Condition of Approval 8.1.4). Permittee shall operate to the export restriction and OMR flow target approved through Conditions of Approval 8.1.3 and 8.1.4. Each week the SMT shall convene to conduct a new risk assessment and determine whether to maintain, or offramp from, export restrictions based on the risk to LFS, or until the DS and LFS off-ramp has been met as described in Condition of Approval 8.8 (End of OMR Management).

From January 1 through June 30, DWR and CDFW SMT staff shall conduct weekly, or more often as needed, risk assessments (see Condition of Approval 8.5.1.2) to assess the risk of larval and juvenile LFS entrainment into the South Delta Export Facilities. As part of the risk assessment the SMT shall provide advice on the appropriate OMR flow targets to minimize LFS entrainment or risk of entrainment, or both. The SMT shall provide its advice to WOMT (Condition of Approval 8.1.3) and use the Collaborative Approach to Real-time Risk Assessment process described in Condition of Approval 8.1.4 to determine if OMR flow restriction is warranted and determine the OMR flow limit between -1250 and -5000 cfs. The OMR flow limit shall be in place until the next risk assessment conducted by the SMT determines that it is no longer necessary to minimize take or related impacts to LFS, or until the DS and LFS off-ramp has been met as described in the Condition of Approval 8.8 (End of OMR Management).

High Flow Off-Ramp

8.4.3 High Flow Off-Ramp from Longfin Smelt OMR Restrictions. OMR management for adult, juvenile, or larval LFS as described in Conditions of Approval 8.4.1 and 8.4.2 are not required, or would cease if previously required, when river flows are (a) greater than 55,000 cfs in the Sacramento River at Rio Vista or (b) greater than 8,000 cfs in the San Joaquin River at Vernalis. If flows subsequently drop below

40,000 cfs in the Sacramento River at Rio Vista or below 5,000 cfs in the San Joaquin River at Vernalis, the OMR limit previously required as a part of Conditions of Approval 8.4.2 and 8.4.2 shall resume.

Barker Slough

8.12 Barker Slough Pumping Plant Longfin Smelt Protection. Permittee shall operate the BSPP to protect larval LFS from January 15 through March 31 of dry and critical water years. If the water year type changes after January 1 to below normal, above normal or wet, this action will be suspended. If the water year type changes after January to dry or critical, Permittee shall operate according to this Condition of Approval.

From January 15 through March 31 of dry and critical water years, Permittee shall reduce the maximum seven-day average diversion rate as BSPP to less than 60 cfs when larval LFS are detected at Station 716. In addition, in its weekly meetings from January 15 through March 31, the SMT shall review LFS abundance and distribution survey data and other pertinent abiotic and biotic factors that influence the entrainment risk of larval LFS at the BSPP. When recommended by the SMT, and as approved through the decision-making process described in Conditions of Approval 8.1.3 and 8.1.4, Permittee shall reduce the maximum seven-day average diversion rate at BSPP according to the advice provided by the SMT.

Discussion of Criteria

Adults

The period relevant to adult Longfin Smelt protections ended on February 28th.

8.3.3 Adult Longfin Smelt Entrainment Protection. No Longfin Smelt were salvaged from December 1 through February 28 of Water Year 2020. The most recent FMWT index is 44.

8.4.1 OMR Management for Adult Longfin Smelt. Not applicable

Larvae and Juveniles

8.4.2 Larval and Juvenile Longfin Smelt Entrainment Protection

SLS 6: (March 16 through 18) LFS larvae or juveniles were collected at 6 of the 12 relevant stations (809, 812, 815, 901, 902, 906). Catch per tow was greater than 5 at 3 of the 12 relevant stations (809, 812 and 901). See attachment “2020_SLS_Sur6_Smelt Catch_03302020.pdf” and the SLS webpage for reported catch and more information.

20 mm 1: (March 16 through 18) LFS larvae or juveniles were collected at 4 of the 12 relevant stations (809, 812, 815, 901). Average catch per tow was greater than 5 at 2 of the relevant stations (809 and 812). See attachment “2020_20mm_Sur1_SmeltCatch_03302020.pdf” and the 20-mm webpage for reported catch and more information.

Salvage: 24 Juvenile LFS were salvaged at the federal facility from March 24 through 28. Larvae were detected at the federal facility on the March 27, 28, 29 and 30. Data from state salvage operations was not available at the time of the call.

High Flow Off-Ramp

8.4.3 High Flow Off-Ramp from Longfin Smelt OMR Restrictions. Flow in the Sacramento and San Joaquin Rivers remained below the off-ramp thresholds of 55,000 cfs for the Sacramento River at Rio Vista and 8,000 cfs for the San Joaquin River at Vernalis

Barker Slough

8.12 Barker Slough Pumping Plant Longfin Smelt Protection. The period relevant to Barker Slough Operations for the Longfin Smelt protection ended March 31.

Current Conditions

AS of March 30, 2020

Sacramento River flow at Freeport = 11750 cfs. San Joaquin River flow at Vernalis = 1480 cfs. X2 = 79 km. Qwest was approximately -2000 cfs and is expected to approach 0 cfs later this week. Daily average OMR Index = -2700 cfs and is expected to become more negative when CVP increases exports on Friday.

Summary of Risk

Review of PTM runs showed that particles injected into central Delta stations 815 and 901 were entrained past Bacon Island and into CVP and SWP export facilities at similar rates, though entrainment was higher under the -3000 cfs to -4000 cfs OMR scenario compared to the -2000 cfs OMR scenario. Recent salvage of juvenile LFS is a departure from other recent years. Juvenile LFS have not been recorded at either salvage facility since 2015. A request was made to develop a framework for assessing PTM runs to determine acceptable levels of particle entrainment, and to determine acceptable levels of LFS loss. See attachment “PTM Forecast 3_24_2020.pdf” for PTM results. LFS larvae and juveniles south of Bacon Island will likely be entrained and lost to the population. Low turbidity throughout the region is expected to result in increased predation.

LFS juveniles and larvae are in the south and central Delta were at high risk of entrainment, however, further OMR restrictions may not benefit the species. Pulse flows, which may begin as early as April 10, have the potential to provide hydrology that is conducive to downstream transport of young of year LFS.

No advice was warranted for Barker Slough Pumping Plant Operations.

Attachments

Note: Attachments are imbedded PDFs. Double click images on following pages to open.

2020_SLS_Sur6_Smelt Catch_03302020.pdf

2020_20mm_Sur1_SmeltCatch_03302020.pdf

PTM Forecast 3_24_2020.pdf

Table 1. Longfin Smelt catch per station from 2020 Smelt Larva Survey, Survey 6, which was in the field 3/16/2020 - 3/18/2020. Longfin Smelt incidental take permit criteria stations are highlighted in blue (Barker Slough Pumping Plant) and yellow (South Delta exports).

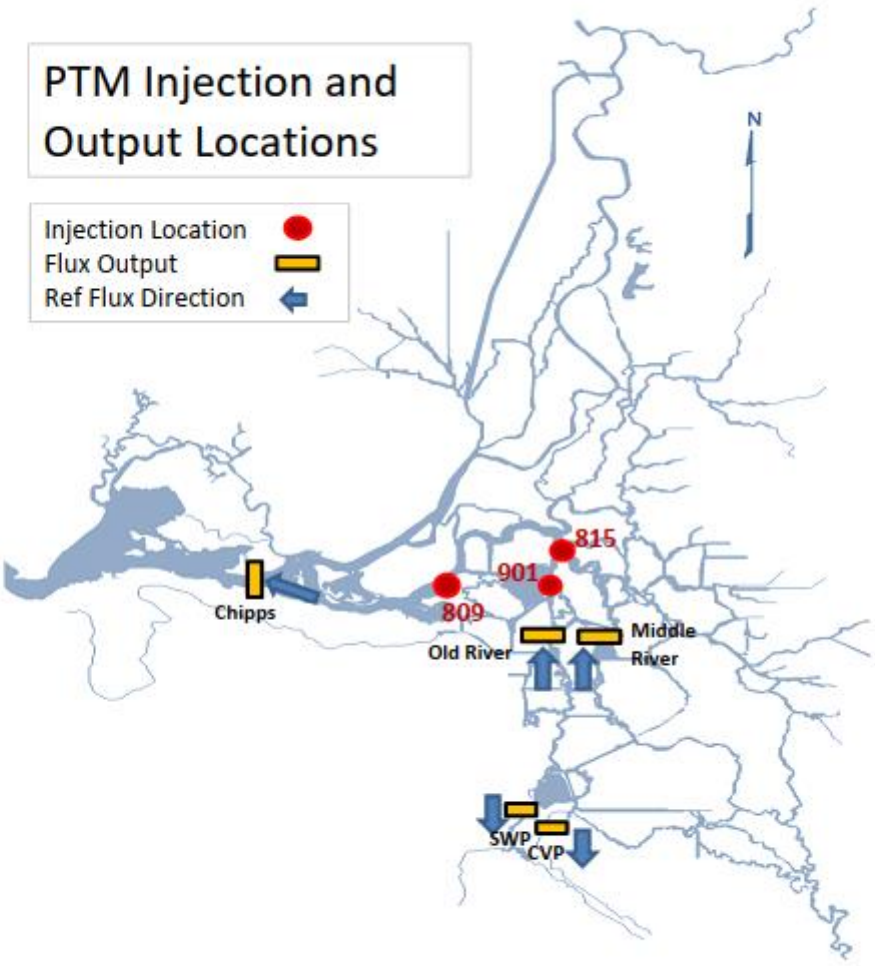
Study Year	Survey #	SLS Station	Turbidity	Sample Status	Species	Smelt Catch	MinOfLength	MaxOfLength	AvgOfLength	
2020		405		Not yet processed						
2020		411		Not yet processed						
2020	6	418	17.7	Processed		No Smelt Catch				
2020		501		Not yet processed						
2020		504		Not yet processed						
2020	6	508	16.9	Processed	Longfin Smelt	12	7	12	7.916667	
2020	6	508	16.9	Processed	Delta Smelt	8	5	6	5.75	
2020	6	513	14.8	Processed	Longfin Smelt	1	7	7	7	
2020	6	513	14.8	Processed	Delta Smelt	7	6	7	6.142857	
2020	6	519	23.7	Processed	Longfin Smelt	8	6	10	7.5	
2020		520		Not yet processed						
2020		602		Not yet processed						
2020		606		Not yet processed						
2020		609		Not yet processed						
2020		610		Not yet processed						
2020	6	703	13.2	Processed	Longfin Smelt	58	6	13	8.5	
2020		704		Not yet processed						
2020		705		Not yet processed						
2020		706		Not yet processed						
2020		707		Not yet processed						Barker ITP
2020		711		Not yet processed						
2020	6	716	3.5	Processed	Longfin Smelt	1	7	7	7	
2020	6	723	3.7	Processed		No Smelt Catch				
2020	6	801	15.3	Processed	Longfin Smelt	15	6	11	7.1	
2020	6	804	9	Processed	Longfin Smelt	14	6	14	8.9	
2020	6	809	6.5	Processed	Longfin Smelt	6	8	12	9.3	SWP ITP Criteria Stations
2020	6	812	5.1	Processed	Longfin Smelt	7	8	12	10.1	
2020	6	815	3.3	Processed	Longfin Smelt	4	11	13	11.8	
2020	6	901	7.7	Processed	Longfin Smelt	14	9	13	10.5	
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	2.8	Processed		No Smelt Catch				
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				

Table 1. Delta Smelt and Longfin Smelt catch per station from 2020 20-mm Survey 1, which was in the field 3/16/2020 – 3/18/2020. These data are preliminary and subject to change.

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length	
2020	1	328			Not Sampled					San Pablo Bay
2020	1	329			Not Sampled					
2020	1	334			Not Sampled					
2020	1	335			Not Sampled					
2020	1	336			Not Sampled					
2020	1	323		0	Not Yet Processed					
2020	1	340		0	Not Yet Processed					Suisun Bay & West
2020	1	342		0	Not Yet Processed					
2020	1	343		0	Not Yet Processed					
2020	1	344		0	Not Yet Processed					
2020	1	345		0	Not Yet Processed					
2020	1	346		0	Not Yet Processed					
2020	1	405		0	Not Yet Processed					
2020	1	411		0	Not Yet Processed					
2020	1	418		0	Not Yet Processed					
2020	1	501		0	Not Yet Processed					
2020	1	504		0	Not Yet Processed					
2020	1	519		0	Not Yet Processed					
2020	1	602		0	Not Yet Processed					
2020	1	606		0	Not Yet Processed					
2020	1	609		0	Not Yet Processed					
2020	1	610		0	Not Yet Processed					
2020	1	508		0	Not Yet Processed					Confluence
2020	1	513	16-Mar-20	3	Longfin Smelt	1	8	8	8.00	
2020	1	520		0	Not Yet Processed					
2020	1	801	17-Mar-20	3	Longfin Smelt	32	6	11	8.34	
2020	1	804	17-Mar-20	3	Longfin Smelt	21	8	14	11.43	
2020	1	703		0	Not Yet Processed					Sac. River System
2020	1	704		0	Not Yet Processed					
2020	1	705		0	Not Yet Processed					
2020	1	706	16-Mar-20	1	Longfin Smelt	7	7	20	10.43	
2020	1	707		0	Not Yet Processed					
2020	1	711		0	Not Yet Processed					
2020	1	716	18-Mar-20	3	No Smelt Catch	0				
2020	1	718		0	Not Yet Processed					
2020	1	719		0	Not Yet Processed					
2020	1	720		0	Not Yet Processed					
2020	1	723		0	Not Yet Processed					
2020	1	724		0	Not Yet Processed					
2020	1	726		0	Not Yet Processed					
2020	1	809	17-Mar-20	3	Longfin Smelt	16	9	13	11.56	Central & South Delta
2020	1	812	17-Mar-20	3	Longfin Smelt	6	9	11	10.17	
2020	1	815	17-Mar-20	3	Longfin Smelt	3	10	12	11.33	
2020	1	901*	16-Mar-20	3	Longfin Smelt	4	8	12	11.00	
2020	1	902	16-Mar-20	3	No Smelt Catch	0				
2020	1	906	17-Mar-20	3	No Smelt Catch	0				
2020	1	910	16-Mar-20	3	No Smelt Catch	0				
2020	1	912	16-Mar-20	3	No Smelt Catch	0				
2020	1	914	16-Mar-20	3	No Smelt Catch	0				
2020	1	915	16-Mar-20	3	No Smelt Catch	0				
2020	1	918			Not Sampled					
2020	1	919	17-Mar-20	3	No Smelt Catch	0				

Processing is complete through

* Indicates reduced tow time


PTM Injection and Output Locations
Injection Location
Flux Output
Ref Flux Direction
N
815
901
809
Chipps
Old River
Middle River
SWP
CVP