

Smelt Working Group
March 12, 2018

Meeting Summary

The Working Group reviewed current Delta conditions, survey data, current water project operations, and forecasted weather. Current weather conditions are partly cloudy and relatively warm, with a storm event forecasted for tomorrow with cooler temperatures for the rest of the week. The 3-station average water temperature (Antioch, Rio Vista Bridge, and Mossdale) has remained above 12°C since March 8, which is the temperature indicative of spawning identified in the Biological Opinion and a trigger for the start of Action 3. One male pre-spawning adult Delta Smelt was salvaged at the Central Valley Project (CVP) fish facility on March 9, which represents the first Delta Smelt salvage of the water year. OMR indices are currently at approximately -3,500 cfs and expected to be more negative and held at -4,600 cfs by tomorrow. Based on Delta conditions, water export levels, and the recently salvaged Delta Smelt, the SWG concluded that Delta Smelt entrainment risk would be high for OMR flows of more negative than -4,600 cfs, medium to high for OMR flows of -3,500 to -4,600 cfs, and low at OMR flows of more positive than -3,500 cfs.

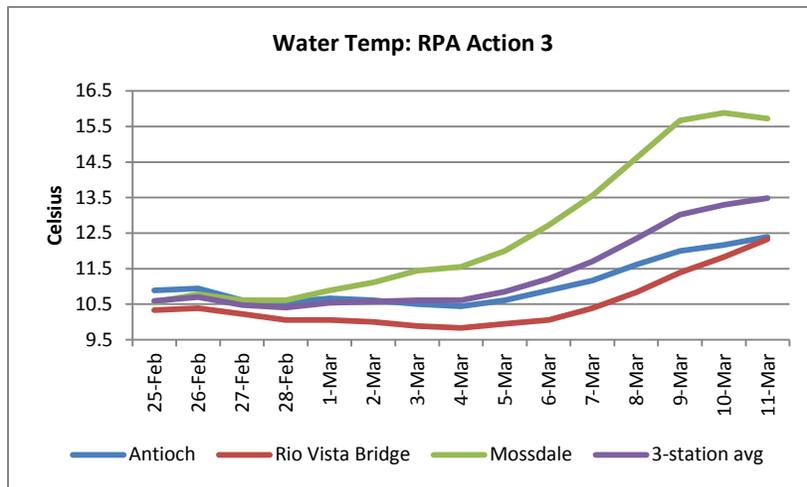
Even though field surveys have not shown any evidence of Delta Smelt spawning, the Working Group believes that implementing Action 3 (larval Delta Smelt) would be appropriate to protect adult Delta Smelt as protection of adults signifies protection of their potential offspring. The Working Group will continue to monitor Delta Smelt survey and salvage data, Delta conditions, and this week’s forecasted precipitation. If another fish is salvaged, then the group will meet the following morning. If no additional fish are salvaged, then the group will meet again next Monday, March 19 at 1000 hours.

Reported Data

1. **Current environmental data**

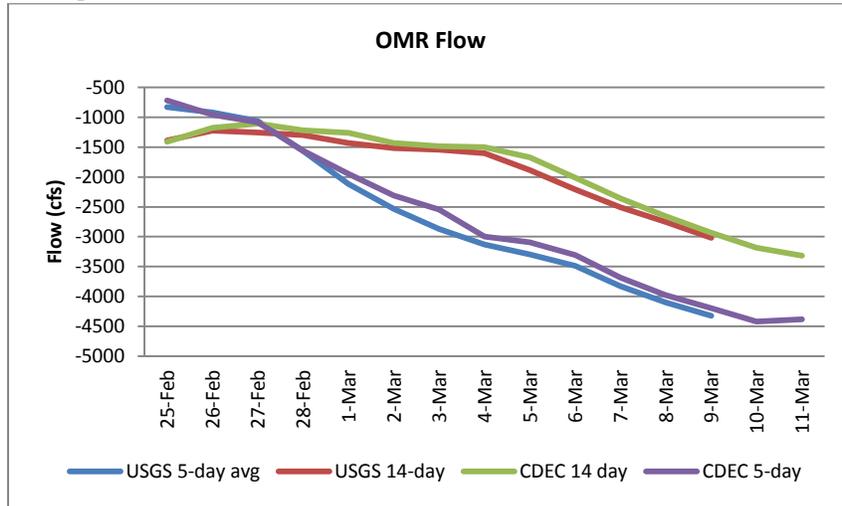
a. **Temperature**

Daily averages of the 3 Delta Stations (Antioch, Rio Vista Bridge, and Mossdale) was 13.5°C as of March 11.



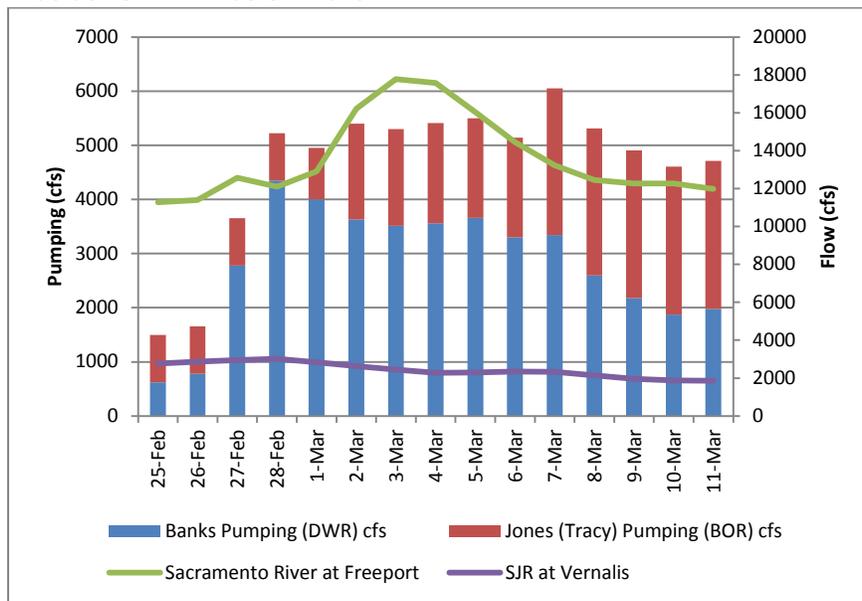
b. OMR flow

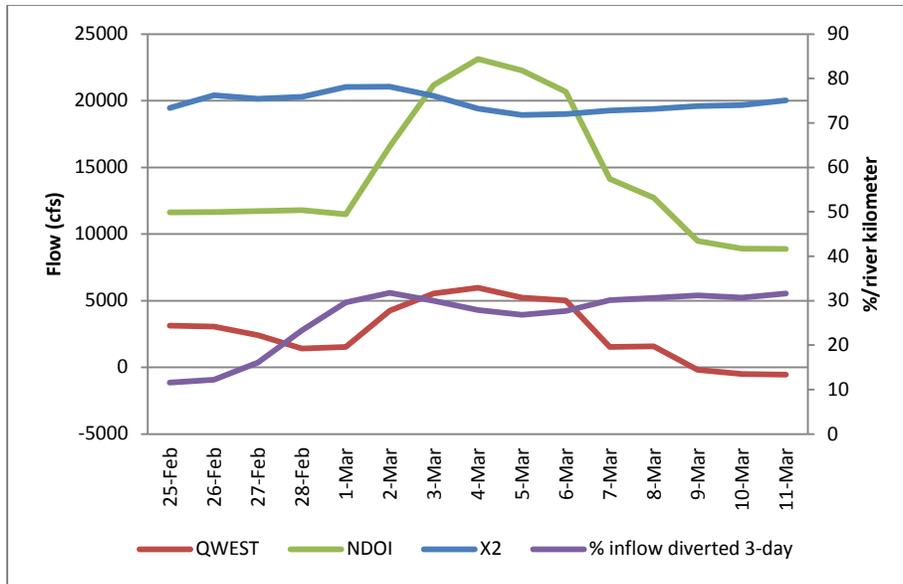
The CDEC daily average OMR flow for March 11 was -3,634 cfs. USGS daily average OMR flow for March 9 was -4,060 cfs.



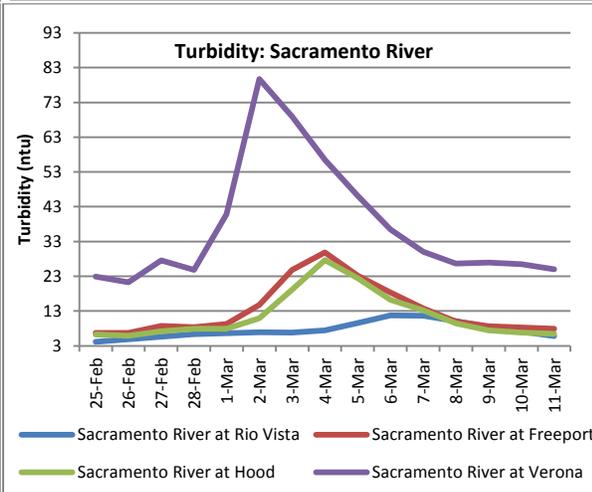
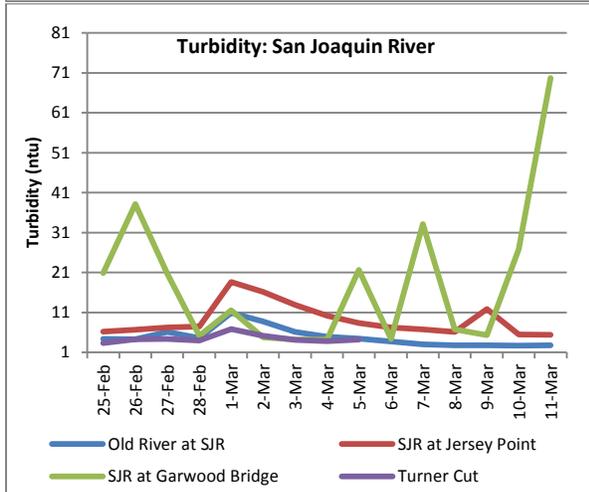
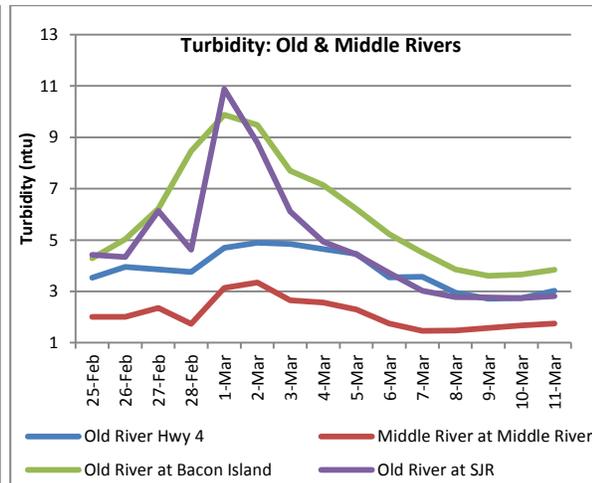
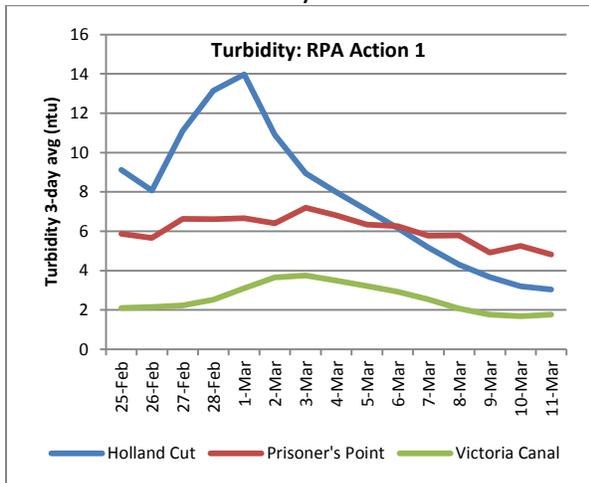
c. River flows and pumping

Sacramento River at Freeport flow for March 11 was approximately 11,988 cfs. San Joaquin River at Vernalis flow for March 11 was approximately 1,859 cfs. X2 was at 75.11 km as of March 11.





d. Turbidity



2. Delta fish monitoring

Smelt Larva Survey (SLS) #5 was out in the field two weeks ago, and 89% of the samples have been processed. Of the processed samples, 354 larval Longfin Smelt and no larval Delta Smelt have been detected. Longfin Smelt catches have been concentrated in the Suisun Marsh stations. Spring Kodiak Trawl (SKT) #3 was out in the field sampling last week, and caught one pre-spawning male adult Delta Smelt.

Enhanced Delta Smelt Monitoring (EDSM) was in the field last week and will be in the field this week. Last week, no Delta Smelt and 2 adult Longfin Smelt were detected. Complete EDSM catch reports are publicly available [here](#).

3. Modeling

No modeling or PTMs were performed over the past few weeks, and there were no new modeling requests.

4. Salvage

No adult or juvenile stages of Longfin Smelt have been observed in salvage so far this season (WY 2018). Last Friday on March 9, one adult male pre-spawning Delta Smelt was salvaged at the CVP, which was the first Delta Smelt salvaged for the water year. As field surveys have not observed any spawning adult Delta Smelt or larval Delta Smelt, the group consensus is that the fish salvage facilities do not yet need to initiate larvae sampling until gravid or post-spawn fish are observed in the field.

5. Expected Project Operations

Combined pumping for the Banks and Tracy pumping facilities on March 11 was 4,712 cfs, and Net Delta Outflow on March 11 was 8,879 cfs. Pumping is currently restricted by NMFS RPA Action IV.2.3, which requires an average net OMR flow of no less negative than -3,500 cfs for a minimum of 5 consecutive days. This restriction is scheduled to end today, and pumping will then be restricted by SWRCB D-1641's Export/Inflow (E/I) ratio of 35%, which provides protection for fish and wildlife. Exports are scheduled to increase by tomorrow, and OMR indices will decrease to approximately -4,600 cfs at which time, Delta flow conditions are expected to reach the 35% E/I limit.

Ambient temperatures are anticipated to be cooler for the rest of the week. Precipitation is forecasted throughout the week starting tomorrow.

6. Delta Conditions Team

The DCT met last week and did not have any recommendations for the SWG this week.

7. Biological Opinion Background:

RPA Component 1, Action 2 states, "An action implemented using an adaptive process to tailor protection to changing environmental conditions after Action 1. As in Action 1, the intent is to protect pre-spawning adults from entrainment and, to the extent possible, from adverse hydrodynamic conditions."

“The range of net daily OMR flows will be no more negative than - 1,250 to -5,000 cfs. Depending on extant conditions (and the general guidelines below) specific 4 OMR flows within this range are recommended by the Working Group from the onset of Action 2 through its termination...”

The timing of Action 2 is immediately after Action 1. Before this date (in time for operators to implement the flow requirement) the SWG will recommend specific requirement OMR flows based on salvage and on physical and biological data on an ongoing basis. If Action 1 is not implemented, the SWG may recommend a start date for the implementation of Action 2 to protect adult Delta Smelt. (BiOp page 352).

RPA Component 2, Action 3: “The objective of this RPA component (which corresponds to Action 3 in Attachment B), is to improve flow conditions in the Central and South Delta so that larval and juvenile Delta Smelt can successfully rear in the Central Delta and move downstream when appropriate” (page 282).

8. Assessment of Risk Discussion

Delta Smelt Detections

So far, SLS #5 has not detected any larval Delta Smelt, and EDSM did not detect any Delta Smelt last week. SKT #3 detected one adult male pre-spawning Delta Smelt last week in the Deepwater Shipping Channel, which is not in close proximity to the pumping facilities. The CVP salvaged the first Delta Smelt for this water year (WY 2018) last Friday, which was a pre-spawning adult male.

Longfin Smelt Detections

So far, SLS #5 has detected 354 larval Longfin Smelt mostly concentrated at the Suisun Marsh stations. Last week, EDSM detected 2 adult Longfin Smelt in Suisun Marsh, which is not in close proximity to the pumping facilities. One of the Longfin Smelt was expressing eggs. No fish salvaged as yet this season (WY 2018).

Delta Smelt distribution discussion

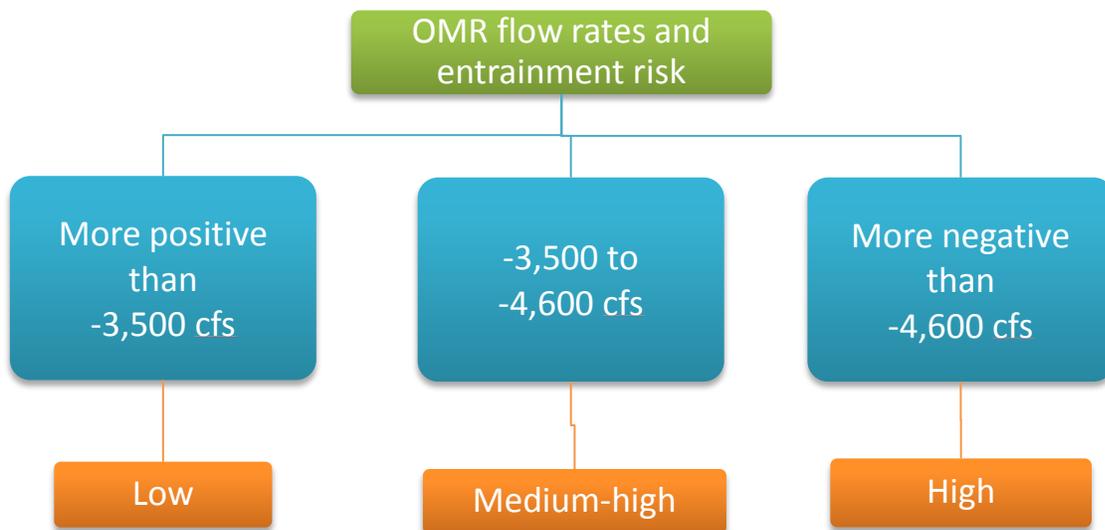
None of this year’s field surveys have shown the presence of Delta Smelt in the San Joaquin River, South Delta, or near the entrainment risk areas. The fish that was salvaged this past Friday at the CVP was the first detection of a Delta Smelt in the entrainment zone. Turbidity levels in the South and Central Delta have remained low, but one group member mentioned that the three days preceding the salvage event, OMR indices had jumped from -3,000 cfs to over -5,400 cfs, which could have resulted in entrainment. The group consensus is that the fish was unlikely an outlier as Delta Smelt typically travel in groups, and there could be more Delta Smelt in the entrainment risk area. However, as no Delta Smelt were salvaged on the following days (Saturday and Sunday), there is also the possibility that the group of Delta Smelt may no longer be detectable.

One group member asked how a single Delta Smelt could have ended up in salvage when none of the field surveys have detected any fish at or near the entrainment risk areas. The response was that no detections does not mean that the fish are not present, and that the detection in salvage may indicate that the fish are in so low abundance that they could be beyond field gear detection. Another group member mentioned that predation is likely higher in the South Delta compared to the North and Central Delta particularly with lower turbidity levels, and any Delta Smelt that move into the South Delta is more vulnerable to predation and entrainment than to survey gear, which could be a reason why they have not been detected. One group member theorized that this potential fringe cluster of Delta Smelt may have moved eastward and into the OMR corridor as a result of last month's warm temperature trend. Another group member stated that in response to higher temperatures this past week, the fish could be moving up the Delta in preparation for spawning as part of their ecology.

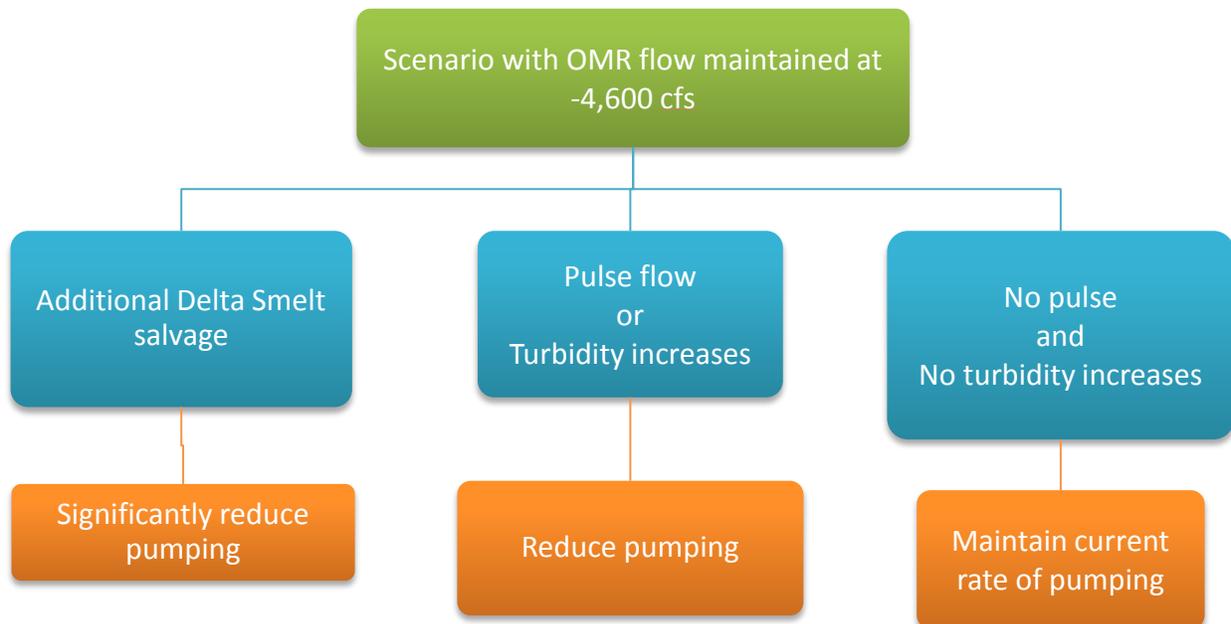
Delta Smelt risk discussion for incidental take

Several group members addressed concern over the salvage of this one fish as turbidity was relatively low and OMR was not very negative. One group member mentioned that OMR indices at -5,000 with low turbidity may no longer be protective of Delta Smelt, and that the chances of another Delta Smelt ending up in salvage may be high under these conditions. Another group member noted that it is extremely late for the first Delta Smelt to be salvaged as the final adult fish is historically salvaged in early April. And as the temperature further increases, the window for salvage would close sooner. Because adults are in so low abundance, it is challenging to differentiate whether detections represent meaningful patterns or minor stochastic events, which could still be very consequential to the population, particularly at low population sizes. Regardless, the presence of Delta Smelt in the South Delta can be considered confirmed.

The upcoming storm is not forecasted to include high winds that could lead to turbidity spikes and may not result in substantial runoff due to cooling temperatures, so the group determined that the most feasible way to assess risk of entrainment is to look at OMR flow indices. As the incidental take limit (ITL) for this year is 16 fish (4 actual fish with typical expansion rates), 25% of the ITL has been met, and the group concluded that more positive OMR flows would be the best method of reducing the likelihood of exceeding the year's IT by reducing entrainment risk. The group consensus was that if OMR values remain unchanged starting tomorrow at -4,600 cfs, entrainment risk would be medium to high especially since the cluster of fish may still be present in the OMR corridor. The group also agreed that risk would be medium to high if OMR indices are between -3,500 to -4,600 cfs. One group member provided justification for this value as OMR range had changed up to 80% in the 3 days preceding last week's salvage. Entrainment risk would be low if OMR were more positive than -3,500 cfs.



The group also formulated a general scenario chart assuming the OMR index is held at -4,600 cfs. In the event that the storm event does not result in pulse flows, increased turbidity, or any additional Delta Smelt salvage, then pumping can be maintained at -4,600 cfs. However, if the storm does result in pulse flows or elevated turbidity levels, then pumping should be reduced. And if a fish is salvaged, then pumping should be significantly reduced regardless of turbidity levels and pulse flows.



Delta Smelt population and abundance risk discussion

One group member asked if last week's salvage would pose a risk to the Delta Smelt population as a whole. Several group members responded that a few fish being salvaged would be unlikely to pose a serious risk to the overall population as it may be a cluster of fish, and most of the fish have been detected in Suisun Marsh, Sacramento River, and the Deepwater Shipping Channel. However, another group member stated that if turbidity levels and river flows rise as a result of the storm, there could be additional upstream movement of fish as they near the spawning condition, which would then possibly put a larger part of the population at risk. Regardless, there is no data to indicate that a substantial portion of the overall population has been entrained into the South Delta.

Conditions in the Delta are currently relatively warm with precipitation forecasted starting tomorrow with cooling temperatures. River flows will likely increase later in the week as a result of the storm, and OMR indices will likely be held at around -4,600 cfs to meet the 35% E/I requirement. As one adult Delta Smelt was salvaged last week even under generally favorable environmental conditions, the group consensus is that additional salvage is possible if OMR levels remain unchanged. OMR flows of more positive than -3,500 would be appropriate to reduce the likelihood of any further incidental take. As the spawning season nears and may already be occurring, the fish may be moving upriver and a cluster is likely present at or near the OMR corridor.

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

Advice for week of March 12, 2018:

The Smelt Working Group has no advice for protection of Longfin Smelt.

No advice for Barker Slough operation. Current water year type for the Sacramento River is dry ([as of March 1](#)), and triggers concern for Barker Slough; however, no larvae were detected at the criterion station, so there is little risk of entrainment (see Basis for advice #5 below).

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:

1. Adult Salvage – total adult (≥ 80 mm) Longfin Smelt salvage (SWP+CVP) for December through February > 5 times the Fall Midwater Trawl Longfin Smelt annual abundance index.
2. Adult abundance, distribution or other information indicates that OMR flow advice is warranted.
3. Larva distribution in the Smelt Larva Survey 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; see Figure 1).
4. Larva catch per tow exceeds 15 Longfin Smelt larvae or juveniles in 4 or more of the 12 survey stations listed.
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. As of March 11, 2018, no Longfin Smelt have been salvaged for the water year. See current conditions discussion below. The 2017 Fall Midwater Trawl Survey annual abundance index for Longfin Smelt is 141, so the salvage threshold is 705. Advice is not warranted based on this criterion.
2. No new survey information of large juveniles and adults. Bay Study sampled the upper estuary the week of February 20 and detected only two Longfin Smelt within the Delta, both in the Sacramento River adjacent to Sherman Lake. The lack of detection of Longfin Smelt in the central or south Delta makes advice unwarranted.
- 3 & 4. The fifth Smelt Larva Survey (SLS) of 2018 detected no Longfin Smelt larvae at central or south Delta criteria stations (Figure 1, http://www.dfg.ca.gov/delta/data/sls/CPUE_Map.asp). Based on these criteria, no advice is warranted.

5. The Criteria for Barker Slough were initiated with the March 1 revision of the Sacramento Valley Index classifying 2018 as a “dry” year (<http://cdec.water.ca.gov/cgi-progs/iodir/WSI>). However, SLS survey 5 collected no Longfin Smelt larvae at the [criterion station 716](#), so no advice is warranted.

Current conditions: For March 11, Sacramento River at Freeport was 11,400 cfs and the San Joaquin was about 1,860 cfs. Clifton Court exports were about 1,900 cfs and expected to increase to 3,000 cfs on March 13. Tracy exports were about 1,700 cfs. The OMR index was about -3,500 cfs and expected decrease -4,600 cfs once OMR restrictions due to the NMFS winter-run salmon are lifted. Qwest was -1,650 cfs. This would lead to modest entrainment into the south Delta if Longfin Smelt larvae were present.

No Longfin Smelt larvae were detected at SLS stations from the central or south Delta ([Figure 1](#)). Current, export levels pose little risk of entrainment. Although the Sacramento Valley Index re-classified water year 2018 as a “dry” year, initiating Barker Slough protections, no larvae were detected at the criteria station 716.

During the last sampling week (week of February 20), Bay Study detected two adult Longfin Smelt in the lower Sacramento River, but none in the lower San Joaquin River.

No Longfin Smelt have been salvaged this water year.

Summary of Risk: Risk of entrainment is low due to no Longfin Smelt larvae, juveniles or adults detected in the central or south Delta, and no salvage. Hydraulic conditions are as benign as can be expected for this time of year (weakly negative Qwest and OMR less negative than -5,000 cfs). Current hydrodynamic conditions are expected to be slightly less favorable through the upcoming week: current rains are expected to change increase inflow into Sacramento River and water operations will increase based on E/I ration. Therefore, OMR will remain less than -5,000 cfs similar to the previous week and prior to the NMFS temporary export restrictions.

Figure 1. Map of Longfin Smelt Larva catch densities by station in the Smelt Larva Survey, #5. Sample processing is incomplete as of March 9, 2018.

