

Smelt Working Group
April 25, 2016

Meeting Summary

The Working Group described the risk of entrainment under the Service-provided advice framework. Under this framework the relative risk of entrainment for OMR flow ranges is discussed and assessed. For the current week, the risk of entrainment of larval and juvenile Delta Smelt for each of the flow ranges is characterized as follows:

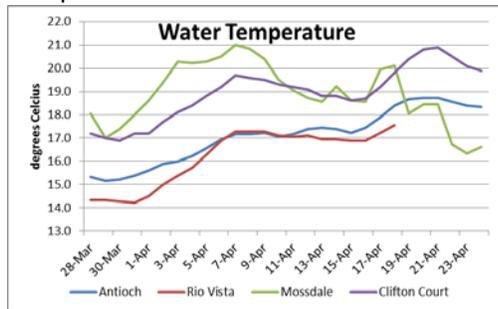
- -1250 to -2000 cfs has a low to medium risk of entrainment,
- -2000 to -3500 cfs has a medium to high risk of entrainment,
- -3500 to -5000 cfs has a high risk of entrainment.

The Working Group is following guidance for entrainment protections from both Action 2 (adult Delta Smelt) and Action 3 (juvenile Delta Smelt). The Working Group will continue to monitor Delta Smelt survey and salvage data and Delta conditions, and will meet again on Monday, May 2, 2016 at 10 am.

Reported Data

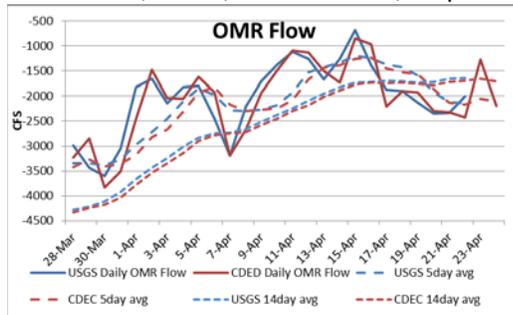
1. Current environmental data

a. Temperature



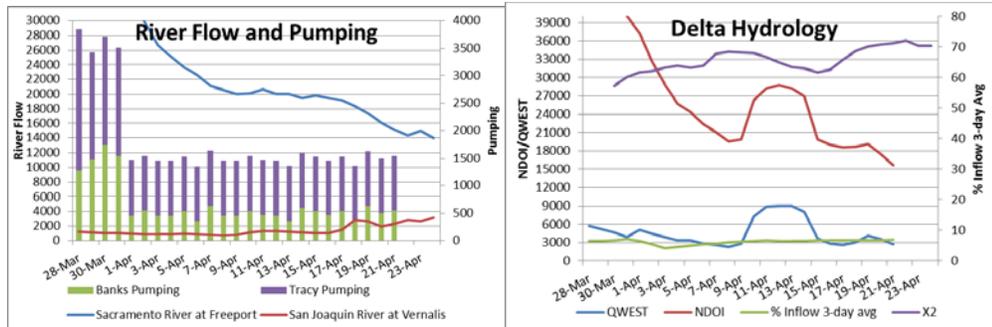
b. OMR flow

USGS OMR daily, 5-day, and 14-day average flows on April 22 are -2005, -2141, and -1645 cfs, respectively. The CDEC OMR daily, 5-day, and 14-day average flows for April 24 were -2192, -2100, and -1702 cfs, respectively.



c. River flows and pumping

Sacramento River at Freeport flow for April 24 was 13,950 cfs. San Joaquin River at Vernalis river flow for April 24 was 3191 cfs. X2 is at 70.5km. Combined exports are 2500 cfs today. Qwest for April 24 was 3815 cfs.



2. Delta fish monitoring

CDFW has released the 2015 FMWT indices:

The 2015 Delta Smelt annual FMWT index is 7.

The 2015 Longfin Smelt annual FMWT index is 4.

Both indices are the lowest on record (i.e. since 1967).

Spring Kodiak Trawl #4 was in the field the week of April 4. A total of 13 Delta Smelt adults were collected, all from station 719. Sizes ranged from 65 to 78 mm. SKT #5 is in the field the week of May 2.

20-mm Survey #3 was in the field the week of April 11 through 14. Sample processing is 80% complete. A total of 41 juvenile Delta Smelt were collected, ranging in size from 7 to 26 mm. A total of 36 fish were collected from station 719 and one at station 706, with the remaining fish collected in Suisun Bay or further downstream. 20-mm Survey #4 is in the field this week.

The Early Warning Survey began November 30 and ended on March 30.

3. Modeling

No PTM runs were distributed to the group.

4. Salvage

No adult Delta Smelt salvage has occurred since February 22. The cumulative season total of salvaged adult Delta Smelt is 12, which represents 29% of the concern level of the WY 2016 adult Delta Smelt incidental take. Four juvenile Delta Smelt were salvaged on April 15, which represents 2% of the concern level of the WY 2016 juvenile Delta Smelt incidental take.

No adult Longfin Smelt have been observed in salvage sampling at either the federal or state Delta facilities during the current water year. Two juvenile Longfin Smelt were salvaged on March 9 at the SWP; eight juvenile Longfin Smelt were salvaged on March 11 at the CVP. Combined salvage of >20 mm Longfin Smelt is ten for the season.

Larval sampling has been conducted since March 1st at both the SWP and CVP. No larval Delta Smelt has been detected in the samples processed so far this season. Larval Longfin Smelt were detected at the SWP on March 16.

5. Expected Project Operations

Jones pumping plant is pumping 1000 cfs today. The daily average intake to Clifton Court (CC) is 1500 cfs. Combined pumping is 2500 cfs today. Pumping is constrained to comply with both the NMFS RPA IV.2.1 and the April 19 Service Determination, which constrains OMR flow to no more negative than -2500 cfs.

6. Delta Conditions Team

DCT met on April 22, but no update was distributed to the SWG.

7. Assessment of Risk:

BiOp 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 specific OMR flows within this range are recommended by the Working Group from the onset of Action 2 through its termination...”

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).

The WY 2016 adult Delta Smelt incidental take (IT) is 56, as stated in the Service’s December 23, 2015 memo to the Bureau of Reclamation. The concern level is 42. The method to calculate the adult IT is described on p 386 of the 2008 BiOp, with the corrections described in both the February 22, 2013, and December 23, 2015 memos. The alternative approach that the Service presented to the 2015 independent review panel at the Long-term Operation Biological Opinions annual science review will be piloted this year.

The WY 2016 larval/juvenile Delta Smelt incidental take is 392, and the concern level is 261. The method to calculate the larval/juvenile IT is described on p 389, with revision provided in the February 22, 2013 Service memo to the Bureau of Reclamation.

2015 Delta Smelt abundance

The four primary 2015 annual abundance indices for all Delta Smelt life stages are the lowest on record.

	2014	2015
SKT	30.1	13.8
20-mm	1.1	0.3
TNS	0.5	0.0
FMWT	9	7

Discussion

As discussed in previous notes, the Working Group continues to conclude that overall risk of entrainment of adult Delta Smelt into the south Delta continues to be low.

The Working Group assumes spawning occurred, and may still be occurring, in the lower San Joaquin River, as well as potentially in the Old River corridor. The Working Group has continuing concerns regarding larvae in the Old River corridor as well as the lower San Joaquin River, given the decline of catch in surveys this year. Delta Smelt catch data from the most recent field surveys (20-mm Survey #3 [week of April 11], and SKT #4 [week of April 4]) do not show a strong presence of Delta Smelt in the central and south Delta; all Delta Smelt catch from these two surveys were collected in the Sacramento River system or further downstream. However, four juvenile Delta Smelt were salvaged on April 15, indicating a presence of juvenile Delta Smelt in the south Delta. The 5-day OMR flow for April 15 was -1198 cfs, which is more positive than is anticipated later in the week.

The SWG has stressed since early in the season, that Delta Smelt have been present not only in the lower San Joaquin, but also at times, in the south Delta. The confirmation of juvenile salvage on April 15 further indicates an elevated risk of entrainment. Members assume there are some number of fish in the south and central Delta. Even with detections in the 20-mm Survey #3 and the SKT #4 all in the Sacramento River system or downstream of the central Delta, members stressed their concern that the very low population abundance affects probability of detection, and, therefore, distribution cannot be determined with accuracy. Members indicated that a larger percentage of fish may be in the south and central Delta than would be assumed from field survey catch data.

Given the OMR flows that were occurring on and just prior to April 15 and the particle entrainment results from last week's modeling runs, members maintained last week's indication that OMR flows more negative than -2500 cfs had a high risk of entrainment associated with them.

The earlier life stages of Delta Smelt are at greater risk for entrainment, given that they behave more like a particle than older life stages. Older life stages have greater ability to control their position in the water column.

The above discussion points influenced and contributed to all three flow ranges described below:

Advice Framework OMR Level Risk Ranking and Discussion—**Larval Delta Smelt**

- OMR flow of -1250 to -2000 cfs: There is a *low to medium* risk of entrainment under this flow range. This is the most protective range for larval Delta Smelt.
 - Risk factors: lowest annual indices on record, low likelihood of detection.
 - Salvage: four salvaged April 15 (with a 5-day average OMR flow of -1198 cfs on that day), geographic influence of the pumps does not extend to central Delta under this OMR flow range
 - Unknowns: detection ability in salvage and trawl surveys has been severely reduced, given the record low abundance indexes.
 - Persistence of risk: expected to continue until at least May 2
- OMR flow of -2000 to -3500 cfs: There is a *medium to high* risk of entrainment under this flow range.
 - Risk Factors: lowest annual indices on record, low likelihood of detection
 - Salvage: four salvaged April 15, geographic influence of the pumps extends to the Old River corridor

- Unknowns: detection ability in salvage and trawl surveys has been severely reduced, given the record low abundance indexes.
- Persistence of Risk: expected to continue until at least May 2
- OMR flow of -3500 to -5000 cfs. There is a *high* risk of entrainment under this flow range.
 - Risk Factors: lowest annual indices on record, low likelihood of detection
 - Salvage: four salvaged April 15, geographic influence of the pumps extends to the lower San Joaquin River.
 - Unknowns: detection ability in salvage and trawl surveys has been severely reduced, given the record low abundance indexes.
 - Persistence of Risk: expected to continue until at least May 2

Advice Framework OMR Level Risk Ranking and Discussion—**Adult Delta Smelt**

- OMR flow of -1250 to -2000 cfs: There is a low risk of entrainment under this flow range. This is the most protective range for Delta Smelt.
 - Risk factors: lowest annual indices on record.
 - Salvage: None since February 22, geographic influence of the pumps does not extend to central Delta under this flow range
 - Unknowns: detection ability in salvage and trawl surveys has been severely reduced, given the record low abundance indexes; low Sacramento River catch densities (unable to assess percentage of population in the lower San Joaquin River).
 - Persistence of risk: expected to continue through remainder of the season
- OMR flow of -2000 to -3500 cfs: There is a low risk of entrainment under this flow range, given conditions listed below:
 - Risk factors: lowest annual indices on record.
 - Salvage: none since February 22, geographic influence of the pumps not likely to extend to central Delta under this flow range
 - Unknowns: detection ability in salvage and trawl surveys has been severely reduced, given the record low abundance indexes, low Sacramento River catch densities (unable to assess percentage of population in the lower San Joaquin River).
 - Persistence of risk: expected to continue through remainder of the season.
- OMR flow of -3500 to -5000 cfs: There is a medium risk of entrainment under this flow range. Some members indicated this flow range had a high risk of entrainment.
 - Risk factors: lowest annual indices on record, reduced turbidity in the south Delta (although elevated turbidity at Prisoner’s Point this morning coincided with the catch of a Delta Smelt at the same location).
 - Salvage: none since February 22, geographic influence of the pumps is likely to extend to central Delta under this flow range.
 - Unknowns: detection ability in salvage and trawl surveys has been severely reduced, given the record low abundance indexes, low Sacramento River catch densities (unable to assess percentage of population in the lower San Joaquin River).
 - Persistence of risk: expected to continue until spawning has completed

The Working Group will continue to monitor conditions and smelt distribution and will meet again on Monday, May 2, 2016.

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

Advice for week of April 25, 2016:

The Smelt Working Group does not have any advice for Longfin Smelt based on recent information.

The period of potential Barker Slough operations restriction is over for 2016 (see #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 20-mm 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. No Longfin Smelt were salvaged during the week of April 18-24. No Longfin Smelt have been salvaged since mid-March. On March 9, 2016, the first Longfin Smelt was salvaged for the water year, a young-of-the-year (≥ 20 mm); additional young-of-the-year were salvaged on March 11 for a total salvage of 10. Salvage of young-of-the-year does not count toward the adult salvage limit for advice. The **Longfin Smelt adult salvage threshold for advice is 20** based on a Fall Midwater Trawl abundance index of 4 for 2015 (see criterion in #1 above). No advice is warranted based on this criterion.

2. There is no new adult distribution information. No Bay Study sampling has been conducted in April to date and no sampling was conducted in February or March. January Bay Study sampling detected no Longfin Smelt in the lower San Joaquin or Sacramento rivers. December Bay Study sampling collected no Longfin Smelt in the San Joaquin River. The December Fall Midwater Trawl sampled the region and did not detect Longfin Smelt in the San Joaquin River or the south Delta. Distribution information does not indicate advice is warranted based on this criterion.

3 & 4. The third 20-mm Survey was conducted during the week of April 11 and is partially processed (Table 1, Figure 1). No larvae were detected among the 12 criteria stations (Table 1, Figure 1). Neither the distribution (Basis for advice #3) nor the catch density (Basis for advice #4) criterion was achieved. Catches of Longfin Smelt larvae remain low, but have recently increased somewhat in Suisun Bay stations.

5. The Barker Slough criterion terminated for the water year on March 31.

Current conditions: The Sacramento River flow were 13,950 cfs on April 24 and the San Joaquin River at Vernalis was 3,191 cfs. Also on April 24, Qwest was +3,815 cfs. Combined State and federal exports were at about 2,500 cfs and will remain steady in compliance with both NMFS modified criteria and USFWS determination and memo.

There is no new adult distribution information.

Summary of Risk: Risk of entrainment in the south Delta is very low due to consistent lack of detection in the central and south Delta criteria stations, recent consistently positive Qwest, and very low exports. Qwest declined rapidly April 15-16 and has remained positive between +2,700 and about +4,000 cfs (+3,815 on April 24), and will likely remain positive into the near future. There is a decreasing likelihood of additional Longfin Smelt larvae hatching in the lower San Joaquin River, and larva numbers are likely to remain at zero (Table 1). April usually marks the end of the hatching season.

The Barker Slough concern period ended March 31.

Table 1. Longfin Smelt catch by station in the 20-mm Survey, #3. Sample processing is incomplete.

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length	
2016	3	323	13-Apr-16	1	No Longfin Catch	0				Suisun Bay & West
2016	3	340	13-Apr-16	1	No Longfin Catch	0				
2016	3	342	13-Apr-16	1	No Longfin Catch	0				
2016	3	343	13-Apr-16	1	Longfin Smelt	6	8	24	13.67	
2016	3	344	13-Apr-16	1	Longfin Smelt	6	15	21	17.17	
2016	3	345	13-Apr-16	1	Longfin Smelt	4	12	19	15.25	
2016	3	346	13-Apr-16	1	Longfin Smelt	12	13	20	16.42	
2016	3	405	14-Apr-16	1	No Longfin Catch	0				
2016	3	411*	12-Apr-16	2	Longfin Smelt	9	7	21	13.67	
2016	3	418	14-Apr-16	1	No Longfin Catch	0				
2016	3	501	12-Apr-16	1	Longfin Smelt	11	13	27	18.36	
2016	3	504	12-Apr-16	3	Longfin Smelt	51	13	34	25.86	
2016	3	519	12-Apr-16	2	Longfin Smelt	3	16	20	17.67	
2016	3	602	14-Apr-16	2	Longfin Smelt	3	7	32	19.00	
2016	3	606	14-Apr-16	3	Longfin Smelt	10	12	22	18.40	
2016	3	609	14-Apr-16	3	No Longfin Catch	0				
2016	3	610	14-Apr-16	3	Longfin Smelt	2	17	19	18.00	
2016	3	508	12-Apr-16	3	Longfin Smelt	37	13	29	23.30	
2016	3	513	11-Apr-16	1	Longfin Smelt	82	8	23	17.08	
2016	3	520	12-Apr-16	3	Longfin Smelt	38	10	25	17.03	
2016	3	801	11-Apr-16	3	Longfin Smelt	16	12	20	16.50	
2016	3	804	12-Apr-16	3	No Longfin Catch	0				
2016	3	703	12-Apr-16	3	Longfin Smelt	3	13	18	15.00	
2016	3	704	11-Apr-16	3	Longfin Smelt	1	7	7	7.00	
2016	3	705	11-Apr-16	3	Longfin Smelt	2	12	15	13.50	
2016	3	706	11-Apr-16	3	No Longfin Catch	0				
2016	3	707	11-Apr-16	3	No Longfin Catch	0				
2016	3	711	11-Apr-16	3	No Longfin Catch	0				
2016	3	716	13-Apr-16	3	No Longfin Catch	0				
2016	3	718	13-Apr-16	2	No Longfin Catch	0				
2016	3	719	13-Apr-16	3	No Longfin Catch	0				
2016	3	720*	13-Apr-16	3	No Longfin Catch	0				
2016	3	723	13-Apr-16	3	No Longfin Catch	0				
2016	3	724		0	Not Sampled	0				
2016	3	726		0	Not Sampled	0				
2016	3	809	12-Apr-16	3	No Longfin Catch	0				
2016	3	812	12-Apr-16	3	No Longfin Catch	0				
2016	3	815	12-Apr-16	3	No Longfin Catch	0				
2016	3	901*	11-Apr-16	3	No Longfin Catch	0				
2016	3	902	11-Apr-16	3	No Longfin Catch	0				
2016	3	906	11-Apr-16	3	No Longfin Catch	0				
2016	3	910	11-Apr-16	3	No Longfin Catch	0				
2016	3	912	11-Apr-16	3	No Longfin Catch	0				
2016	3	914	11-Apr-16	3	No Longfin Catch	0				
2016	3	915*	11-Apr-16	3	No Longfin Catch	0				
2016	3	918	11-Apr-16	3	No Longfin Catch	0				
2016	3	919	12-Apr-16	3	No Longfin Catch	0				

*Reduced tow time
Processing is complete through 4/22/2016

Figure 1. DFW's Smelt Larva Survey/20-mm Survey station locations.

