

Smelt Working Group  
April 11, 2016

**Meeting Summary**

The Working Group agreed that given present distribution, current salvage, and Delta conditions, there was no indication that the projected combined exports of approximately 1500 cfs for the week (potentially resulting in daily average OMR flows of approximately -1800 cfs) need to be modified for the protection of Delta Smelt adults and larvae.

This entrainment risk assessment would change should exports levels increase from what was reported for the week (1500 cfs resulting in -1800 cfs OMR).

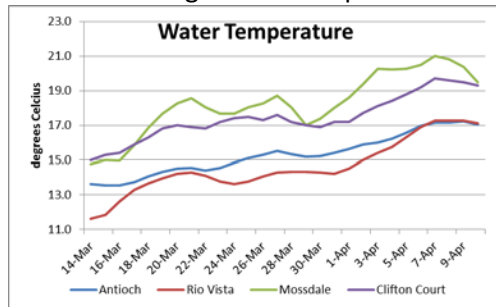
The Working Group is following guidance for entrainment protections from both Action 2 (adult Delta Smelt) and Action 3 (juvenile Delta Smelt). The Working Group will continue to monitor Delta Smelt survey and salvage data and Delta conditions, and will meet again on Monday, April 18, 2016 at 10 am.

**Reported Data**

1. Current environmental data

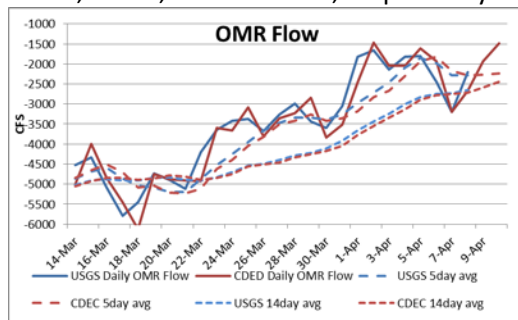
a. Temperature

3 station average water temperature is 17.9°C.



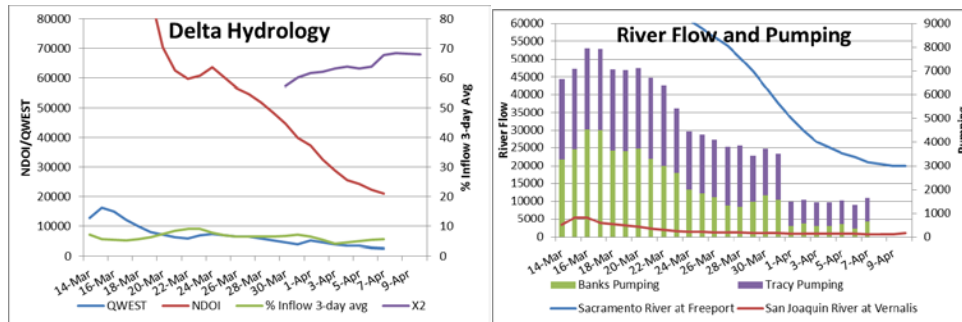
b. OMR flow

USGS OMR daily, 5-day, and 14-day average flows on April 8 are -2207, -2292, and -2649 cfs, respectively. The CDEC OMR daily, 5-day, and 14-day average flows for April 10 were -1489, -2244, and -2448 cfs, respectively.

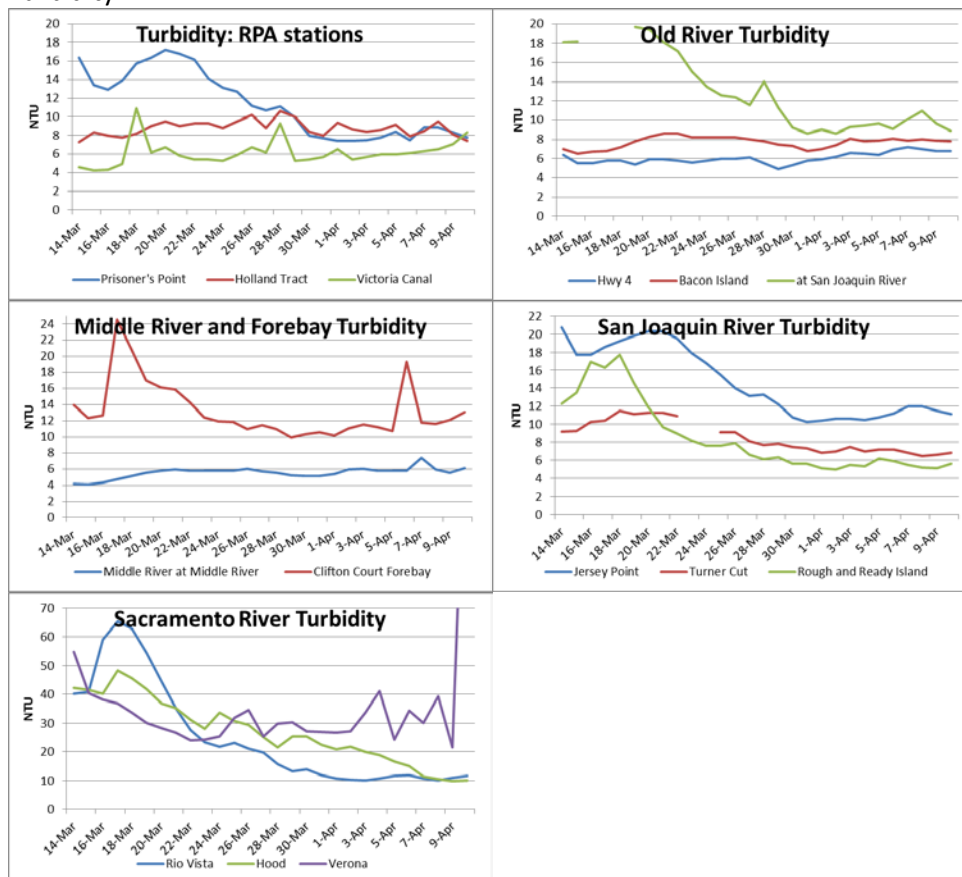


c. River Flows and pumping

Sacramento River at Freeport flow for April 10 was 20,131 cfs. San Joaquin River at Vernalis river flow for April 10 was 1126 cfs. X2 is at 68km. Combined exports are 1500 cfs today. Qwest for April 10 was 8911 cfs.



d. Turbidity



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 last week. A total of 13 Delta Smelt adults were collected, all from station 719. Sizes ranged from 65 to 78 mm.

20-mm Survey #2 was in the field the week of March 28 through April 1. Sample processing is nearly complete. Five larval Delta Smelt were detected in the north Delta and the lower

Sacramento River area. Sizes ranged from 12 to 22 mm. 20-mm Survey #3 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 for review this week.

### **4. Salvage**

No 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.

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 500 cfs. Combined pumping is 1500 cfs today. Pumping is constrained to 1500 cfs to comply with NMFS RPA IV.2.1.

### **6. Delta Conditions Team**

DCT met on April 8, 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 concluded that the current export and corresponding OMR flow levels for this week do not need to be reduced for the protection of Delta Smelt. Members expect Delta Smelt hatching to continue for some time in the Delta, and the central Delta in particular.

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 continued decline of catch in surveys this year. Delta Smelt catch data from the most recent field surveys (20-mm Survey #2 [03/28-04/01], and SKT #4 [04/04-04/07]) 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.

Last week, members indicated the possibility that many of the larvae in the system have not grown sufficiently yet to be detectable in survey and salvage efforts. Hatching is expected to continue in the lower San Joaquin River, and possibly Old River, over the next several weeks. One member suggested way to improve the detection of entrained larval Delta Smelt < 20 mm at SWP and CVP is to increase the sampling frequency of the larval monitoring (e.g., matching the sampling frequency of the regular salvage counts).

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 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: None so far this season, 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 at least through April 18.
- OMR flow of -2000 to -5000 cfs: There is a medium to high risk of entrainment under this flow range.

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, April 18, 2016.

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

### **Advice for week of April 11, 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 ( $\geq 80$  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 4-10. 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 ( $\geq 20$  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 was 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 second 20-mm Survey was conducted during the week of March 28 and is mostly processed (Table 1, Figure 1). Two larvae were detected among the 12 criteria stations at station 809 (Table 1, Figure 1). Neither the distribution (Basis for advice #3) nor the catch density (Basis for advice #4) criterion was achieved. Over all, catches of Longfin Smelt larvae remain very low.

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

**Current conditions:** The Sacramento River flow decreased to 20,131 cfs on April 10 and the San Joaquin River at Vernalis was 1,126 cfs. Also on April 10, Qwest was +8,027 cfs. Combined State and federal exports continue a combined 1,500 cfs (health and safety minima) since April 1 to comply with NMFS criteria.

There is no new adult distribution information.

20-mm Survey 2 results for almost all south and central Delta stations have been processed and only two larvae detected at station 809 (Table 1) and thus did not achieve either trigger criterion (Criteria 3 & 4 above). The Barker Slough criterion expired on March 31 for the water year.

No larval or juvenile Longfin Smelt were detected in sampling at the salvage facilities during the week of April 4-10. Beginning March 9 and 11, 10 young-of-the-year Longfin Smelt ( $\geq 20$  mm) have been salvaged this water year and a single larvae ( $< 20$  mm) was detected at the CVP on March 16. There is no young-of-the-year salvage target for advice. In contrast, the threshold salvage of adults for advice is 20 for this water year. No adults have been salvaged to date.

**Summary of Risk:** Risk of entrainment in the south Delta is very low due to a strongly positive Qwest, very low exports and few recent detections of larvae in central and south Delta criteria stations. Qwest will likely remain strongly positive into the near future. Beginning April 1, NMFS criteria limited south Delta exports to match San Joaquin River inflow. There is a decreasing likelihood of additional Longfin Smelt larvae hatching in the lower San Joaquin River, and larva numbers are likely to remain low (Table 1). We currently have no information indicating much or any spawning in the central or south Delta.

The Barker Slough concern period ended March 31.

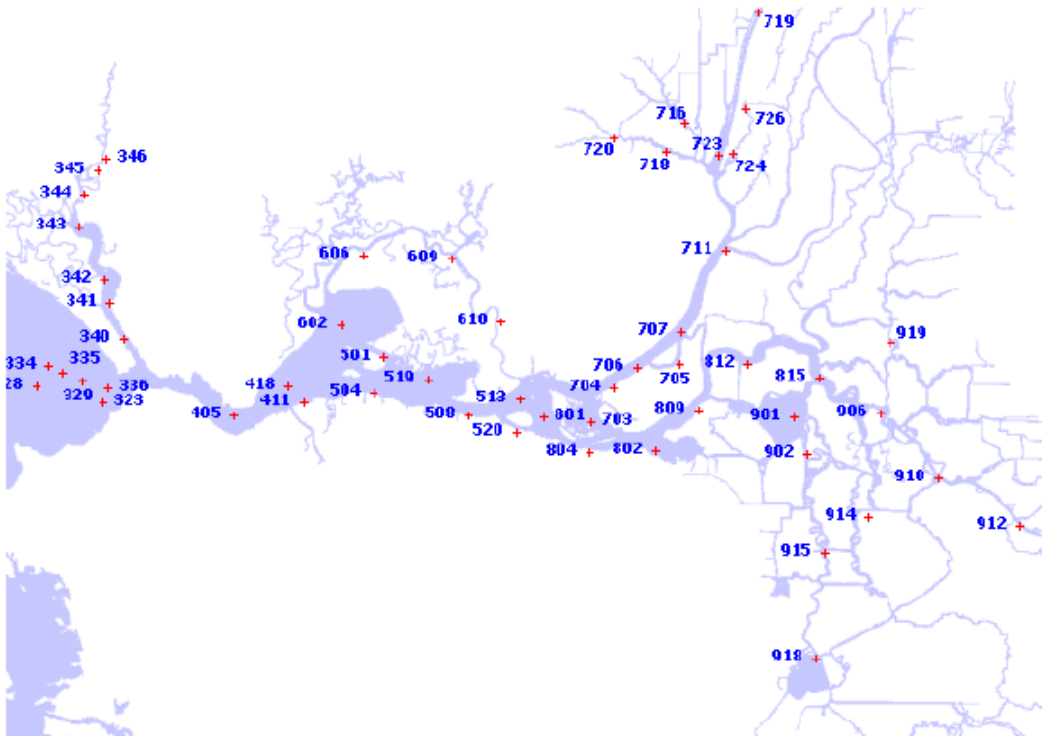
Table 1. Longfin Smelt catch by station in the 20-mm Survey, #2. Sample processing is almost complete.

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length	
2016	2	323	30-Mar-16	3	No Longfin Catch	0				Susan Bay & West
2016	2	340		0	Not Yet Processed	0				
2016	2	342		0	Not Yet Processed	0				
2016	2	343		0	Not Yet Processed	0				
2016	2	344		0	Not Yet Processed	0				
2016	2	345		0	Not Yet Processed	0				
2016	2	346		0	Not Yet Processed	0				
2016	2	405	31-Mar-16	3	No Longfin Catch	0				
2016	2	411	29-Mar-16	3	No Longfin Catch	0				
2016	2	418	31-Mar-16	3	No Longfin Catch	0				
2016	2	501	29-Mar-16	3	Longfin Smelt	3	16	23	20.67	
2016	2	504	29-Mar-16	3	No Longfin Catch	0				
2016	2	519	29-Mar-16	3	No Longfin Catch	0				
2016	2	602	31-Mar-16	3	No Longfin Catch	0				
2016	2	606	31-Mar-16	3	Longfin Smelt	23	18	29	23.30	
2016	2	609	31-Mar-16	3	Longfin Smelt	1	25	25	25.00	
2016	2	610	31-Mar-16	3	No Longfin Catch	0				
2016	2	508	29-Mar-16	3	No Longfin Catch	0				Confluence
2016	2	513	28-Mar-16	3	No Longfin Catch	0				
2016	2	520	29-Mar-16	3	No Longfin Catch	0				
2016	2	801	28-Mar-16	3	No Longfin Catch	0				
2016	2	804	29-Mar-16	3	No Longfin Catch	0				
2016	2	703	29-Mar-16	3	No Longfin Catch	0				Sac. River System
2016	2	704	28-Mar-16	3	No Longfin Catch	0				
2016	2	705	28-Mar-16	3	No Longfin Catch	0				
2016	2	706	28-Mar-16	3	No Longfin Catch	0				
2016	2	707	28-Mar-16	3	No Longfin Catch	0				
2016	2	711	28-Mar-16	3	No Longfin Catch	0				
2016	2	716	30-Mar-16	3	No Longfin Catch	0				
2016	2	718	30-Mar-16	3	No Longfin Catch	0				
2016	2	719	30-Mar-16	3	No Longfin Catch	0				
2016	2	720	30-Mar-16	3	No Longfin Catch	0				
2016	2	723	30-Mar-16	3	No Longfin Catch	0				
2016	2	724	30-Mar-16	1	No Longfin Catch	0				
2016	2	726	30-Mar-16	3	No Longfin Catch	0				
2016	2	809	29-Mar-16	3	Longfin Smelt	2	6	7	6.50	
2016	2	812	29-Mar-16	3	No Longfin Catch	0				
2016	2	815	29-Mar-16	3	No Longfin Catch	0				
2016	2	901	28-Mar-16	3	No Longfin Catch	0				Central & South Delta
2016	2	902	28-Mar-16	3	No Longfin Catch	0				
2016	2	906	29-Mar-16	3	No Longfin Catch	0				
2016	2	910	28-Mar-16	2	No Longfin Catch	0				
2016	2	912	28-Mar-16	3	No Longfin Catch	0				
2016	2	914	28-Mar-16	3	No Longfin Catch	0				
2016	2	915	28-Mar-16	3	No Longfin Catch	0				
2016	2	918	28-Mar-16	3	No Longfin Catch	0				
2016	2	919	29-Mar-16	3	No Longfin Catch	0				

Processing is complete through 4/8/2016



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



**SWG Weekly Salvage Update**  
**Reporting Period: April 4-10, 2016**  
*Prepared by Bob Fujimura on April 11, 2016: 9:00*  
**Preliminary Results -Subject to Revision**

Species/Life Stage	Daily Salvage							Trend	
	4-Apr	5-Apr	6-Apr	7-Apr	8-Apr	9-Apr	10-Apr		
<b>Juvenile Delta Smelt</b>									
SWP	0	0	0	0	0	0	0		0
CVP	0	0	0	0	0	0	0		0
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	→	0.0
CUM TAKE	0	0	0	0	0	0	0		
% of 2016 CL	0%	0%	0%	0%	0%	0%	0%		0
<b>Juvenile Longfin Smelt</b>									
SWP	0	0	0	0	0	0	0		0
CVP	0	0	0	0	0	0	0		0
<b>TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	→	0
<b>SWP daily export</b>	910	1,074	709	1,264	900	900	1,074	↘	976
<b>CVP daily export</b>	1,975	1,971	1,973	1,981	1,985	1,984	1,985	↘	1,979
<b>SWP reduced counts</b>	0%	0%	0%	0%	0%	0%	0%	→	0%
<b>CVP reduced counts</b>	0%	0%	0%	0%	0%	0%	0%	→	0%
<b>SWP larval samples</b>	100%	100%	0%	100%	100%	100%	100%	↘	86%
<b>CVP larval samples</b>	100%	100%	100%	100%	100%	100%	100%	→	100%
<b>DS larvae present - SWP</b>	N	N	NS	N	NA	NA	NA	→	
<b>DS larvae present - CVP</b>	N	N	N	N	N	N	N	→	
<b>LFS larvae present - SWP</b>	N	N	NS	N	NA	NA	NA	→	
<b>LFS larvae present - CVP</b>	N	N	N	N	N	N	N	→	

TOTAL = combine daily salvages for CVP+SWP; daily water export = AF; Trend = compared to previous week

NA = not available at the time of this report; NS = not sampled

Reduced counts = percentage of time that routine salvage sample time were less than 30 min per 2 hours of salvage and export operations

Larval samples = percentage of daily scheduled samples taken during periods of water export

Yellow highlighted dates indicate fish salvage facility outage occurred.

Larvae present = whether Delta Smelt (DS) or Longfin Smelt < 20 mm was observed from daily fish larva collections at the SWP or CVP fish facilities