

Smelt Working Group
May 16, 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 1600 cfs for the week (potentially resulting in daily average OMR flows of approximately -2000 cfs) need to be modified for the protection of Delta Smelt adults and larvae.

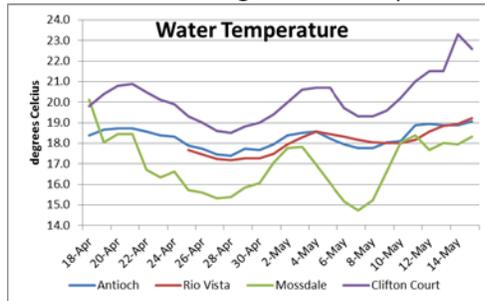
The Working Group is following guidance for entrainment protections from Action 3 (juvenile Delta Smelt). The Working Group will continue to monitor Delta Smelt survey and salvage data and Delta conditions, and will meet again on Monday, May 23, 2016 at 10 am.

Reported Data

1. Current environmental data

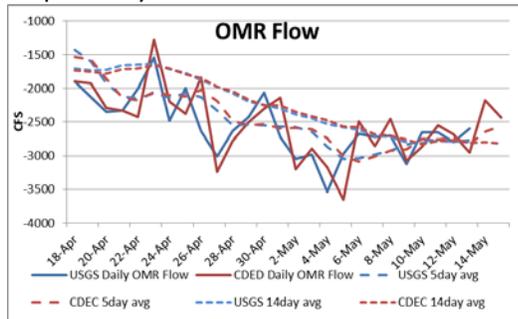
a. Temperature

The 3-station average water temperature for May 15 was 18.9°C.



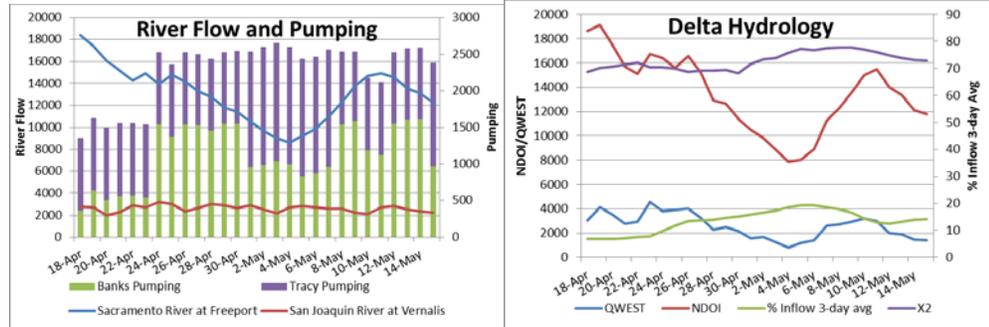
b. OMR flow

USGS OMR 5-day, and 14-day average flows on May 13 were -2760 and -2800 cfs, respectively. The corresponding 5-day and 14-day OMR index values were -2770 and -2820 cfs. The daily OMR index value for May 15 was -2780 cfs. The CDEC OMR daily, 5-day, and 14-day average flows for May 15 were -2436, -2559, and -2818 cfs, respectively.



c. River flows and pumping

Sacramento River at Freeport flow for May 15 was 12,253 cfs. San Joaquin River at Vernalis river flow for May 15 was 2244 cfs. X2 is at 72.9km. Combined exports are 2600 cfs today.



2. Delta fish monitoring

The CDFW 2015 FMWT indices are:

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 #5 was in the field the week of May 2. No adult Delta Smelt adults were collected. Juvenile Delta Smelt were collected at three stations; 3 in Montezuma Slough and 23 in the Sacramento deep water ship channel. This is the final SKT survey of the year.

20-mm Survey #5 was in the field last week. Sample processing is 9% complete. Samples taken from the south and central Delta, and some stations on the Sacramento River system, were shortened to 2 ½ minutes (normal survey 10 minutes) due to clogging of the nets by algae. So far, a total of 2 juvenile Delta Smelt were collected, both from Miner Slough. 20-mm Survey #6 is in the field next week.

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

3. Modeling

No new PTM runs were distributed to the group this morning for discussion.

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 28, combined with the previous salvage, represents 3% 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.

A series of salvage facility outages occurred at the CVP's Tracy Fish Collection Facility last week one short (70 minutes) outage for scheduled power system maintenance and two longer (>2 hrs each) outages occurred over the weekend due to secondary screen problems. These two weekend outages resulted in two missed salvage samples.

5. Expected Project Operations

Jones pumping plant is pumping 1600 cfs today and will reduce to 800 cfs tomorrow. The daily average intake to Clifton Court (CC) is 1000 cfs today and will reduce to 800 cfs tomorrow. Combined pumping is 2600 cfs today and 1600 cfs tomorrow. Pumping is constrained to comply with the SWRCB D-1641 monthly outflow standard for May.

6. Delta Conditions Team

The DCT team met on Friday, May 13. A brief update of the discussion was provided to the Working Group by FWS.

7. Assessment of Risk:

BiOp Background

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

Entrainment risk of adult Delta Smelt is considered to be low, and was not evaluated.

The Working Group assumes spawning occurred 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 #5 [week of May 9], and SKT #5 [week of May 2]) do not show a strong presence of Delta Smelt in the central and south Delta. However, four juvenile Delta Smelt were salvaged on April 15 as well as on April 28, indicating a presence of juvenile Delta Smelt in the south Delta. Members stressed the concern with very low abundance and associated challenges in survey detection, and that zero detection at a station does not indicate Delta Smelt are not present.

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 and April 28 is evidence of this. Members assume there are some number of fish in the south and central Delta. Even with detections in the 20-mm Survey #5 showing no detections in the south and central Delta (although algae fouling of gear reduced count times to $\frac{1}{4}$), members stressed their concern that the very low population abundance (as evidenced by SKT 5 having zero detections of adults) 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.

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.

Last week, members indicated that should 20 mm Survey #5 reports no catches in the central and southern Delta, then a lower percentage of this year's cohort from the lower San Joaquin River may be present in this area. However, with the greatly reduced tow times in the south and central Delta, chances of detections were further reduced from an already low likelihood. Members agreed that due to the lack of new survey information from last week, the risk assessment for each of the flow bins would remain the same as last week.

Members discussed what environmental or survey information would be necessary to reduce the risk of entrainment. Although increasing water temperatures was mentioned, no clear list was produced, and the Working Group will develop this idea further in future meetings.

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

Advice Framework OMR Level Risk Ranking and Discussion—**Young of Year 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: four salvaged April 28, 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 May 23.
- OMR flow of -2000 to -3500 cfs: There is a *medium* risk of entrainment under this flow range.
 - Risk Factors: lowest annual indices on record, low likelihood of detection

- Salvage: four salvaged April 28, 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 May 23.
- 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 28, 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 23

The Working Group will continue to monitor conditions and smelt distribution and will meet again on Monday, May 23, 2016.

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

Advice for week of May 16, 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 May 9-May 15. 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. No adult Longfin Smelt were collected by the Bay Study during May in the Delta, Suisun or San Pablo bays. 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 fifth 20-mm Survey was conducted the week of May 9 and only a few samples processed; no Longfin Smelt larvae were detected at the few south Delta stations processed (Table 1). 20-mm Survey tow durations were shortened to 2.5 min (25% of normal tow times) to allow effective sampling during a filamentous algae bloom. This reduction will During the fourth 20-mm Survey, conducted during the week of April 25 and mostly processed, no larvae were detected among the 12 criteria stations (Table 2, 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. The Bay Study collected 14 young of the year Longfin Smelt in the first half of their May survey: 1 at station 429 (Suisun Bay), 5 in at station 427 (Carquinez Strait) and 7 in San Pablo Bay. May sampling is continuing today in central San Francisco Bay.

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

Current conditions: The Sacramento River flow were 12,203 cfs on May 15 and the San Joaquin River at Vernalis was 2,244 cfs. Also on May 15, Qwest was +1,429 cfs. On May 16, combined State and federal exports were at about 2,600 cfs, but will drop to 1600 on May 17 and remain at that level through the week.

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. Qwest remains slightly positive. There is very little 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, #5. Sample processing is incomplete.

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length	
2016	5	323		0	Not Yet Processed	0				Suisun Bay & West
2016	5	340		0	Not Yet Processed	0				
2016	5	342		0	Not Yet Processed	0				
2016	5	343		0	Not Yet Processed	0				
2016	5	344		0	Not Yet Processed	0				
2016	5	345		0	Not Yet Processed	0				
2016	5	346		0	Not Yet Processed	0				
2016	5	405		0	Not Yet Processed	0				
2016	5	411		0	Not Yet Processed	0				
2016	5	412		0	Not Yet Processed	0				
2016	5	501		0	Not Yet Processed	0				
2016	5	504		0	Not Yet Processed	0				
2016	5	519		0	Not Yet Processed	0				
2016	5	602		0	Not Yet Processed	0				
2016	5	606		0	Not Yet Processed	0				
2016	5	609		0	Not Yet Processed	0				
2016	5	610		0	Not Yet Processed	0				
2016	5	508		0	Not Yet Processed	0				Confluence
2016	5	513		0	Not Yet Processed	0				
2016	5	520		0	Not Yet Processed	0				
2016	5	801		0	Not Yet Processed	0				
2016	5	804		0	Not Yet Processed	0				Sac. River System
2016	5	703		0	Not Yet Processed	0				
2016	5	704		0	Not Yet Processed	0				
2016	5	705		0	Not Yet Processed	0				
2016	5	706		0	Not Yet Processed	0				
2016	5	707		0	Not Yet Processed	0				
2016	5	711		0	Not Yet Processed	0				
2016	5	716		0	Not Yet Processed	0				
2016	5	718		0	Not Yet Processed	0				
2016	5	719		0	Not Yet Processed	0				
2016	5	720		0	Not Yet Processed	0				
2016	5	723		0	Not Yet Processed	0				
2016	5	724		0	Not Yet Processed	0				
2016	5	726		0	Not Yet Processed	0				Central & South Delta
2016	5	809		0	Not Yet Processed	0				
2016	5	812		0	Not Yet Processed	0				
2016	5	815		0	Not Yet Processed	0				
2016	5	901		0	Not Yet Processed	0				
2016	5	902		0	Not Yet Processed	0				
2016	5	906		0	Not Yet Processed	0				
2016	5	910	10-May-16	3	No Longfin Catch	0				
2016	5	912	10-May-16	3	No Longfin Catch	0				
2016	5	914	10-May-16	3	No Longfin Catch	0				
2016	5	915*	10-May-16	2	No Longfin Catch	0				
2016	5	918*	10-May-16	2	No Longfin Catch	0				
2016	5	919		0	Not Yet Processed	0				

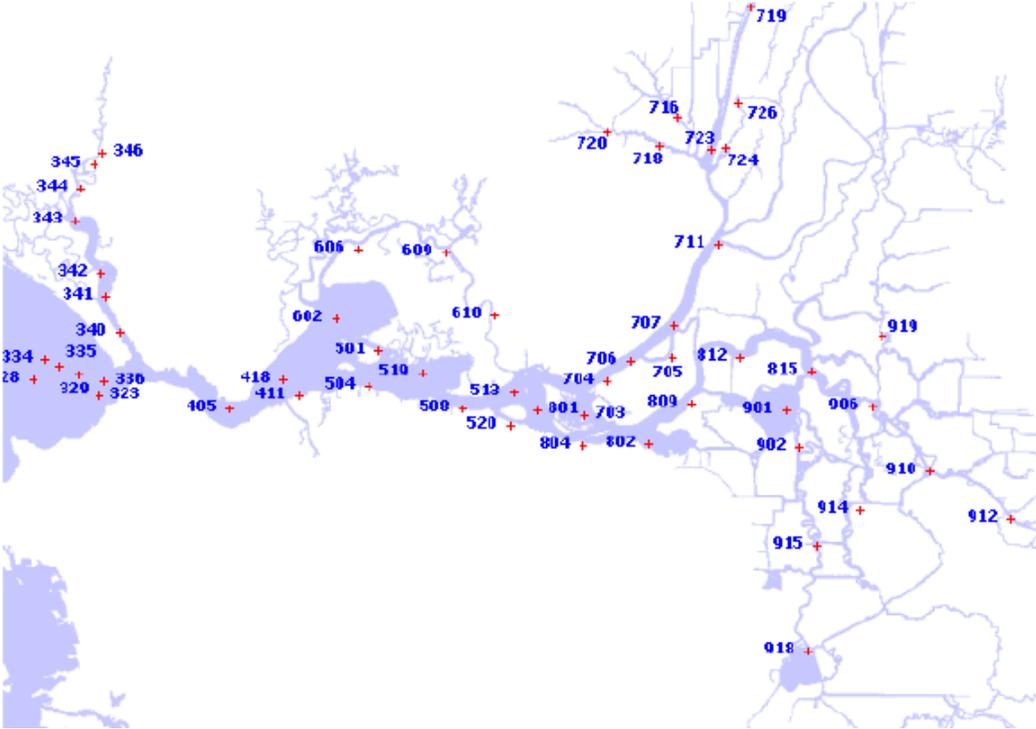
*Reduced tow time
Processing is complete through 5/13/2016

Table 2. Longfin Smelt catch by station in the 20-mm Survey, #4. Sample processing is almost complete.

Year	Survey	Station	Date	# Tows Processed	Species	Total Catch	Min Length	Max Length	Avg Length
2016	4	323	27-Apr-16	3	No Longfin Catch	0			
2016	4	340	27-Apr-16	3	No Longfin Catch	0			
2016	4	342	27-Apr-16	3	No Longfin Catch	0			
2016	4	343	27-Apr-16	3	No Longfin Catch	0			
2016	4	344	27-Apr-16	3	Longfin Smelt	24	15	30	22.33
2016	4	345	27-Apr-16	3	Longfin Smelt	20	17	26	20.65
2016	4	346	27-Apr-16	3	Longfin Smelt	23	17	27	21.28
2016	4	405	26-Apr-16	1	No Longfin Catch	0			
2016	4	411	26-Apr-16	3	Longfin Smelt	1	25	25	25.00
2016	4	418	26-Apr-16	3	No Longfin Catch	0			
2016	4	501	26-Apr-16	3	Longfin Smelt	22	16	32	25.86
2016	4	504	26-Apr-16	3	Longfin Smelt	59	14	31	22.63
2016	4	519	26-Apr-16	3	Longfin Smelt	3	12	27	17.67
2016	4	602	26-Apr-16	3	Longfin Smelt	13	14	32	22.77
2016	4	606	26-Apr-16	3	Longfin Smelt	7	16	26	19.43
2016	4	608	26-Apr-16	3	Longfin Smelt	2	16	22	19.00
2016	4	610	26-Apr-16	3	No Longfin Catch	0			
2016	4	508	26-Apr-16	3	Longfin Smelt	99	12	33	25.04
2016	4	513	26-Apr-16	3	Longfin Smelt	48	14	27	20.69
2016	4	520	26-Apr-16	3	Longfin Smelt	81	13	26	18.44
2016	4	801	26-Apr-16	3	Longfin Smelt	22	12	24	16.41
2016	4	804	26-Apr-16	3	No Longfin Catch	0			
2016	4	703	26-Apr-16	3	No Longfin Catch	0			
2016	4	704	26-Apr-16	3	Longfin Smelt	1	18	18	18.00
2016	4	706	26-Apr-16	3	No Longfin Catch	0			
2016	4	708	26-Apr-16	3	No Longfin Catch	0			
2016	4	707	26-Apr-16	3	No Longfin Catch	0			
2016	4	711	26-Apr-16	3	No Longfin Catch	0			
2016	4	716	27-Apr-16	3	No Longfin Catch	0			
2016	4	718	27-Apr-16	3	No Longfin Catch	0			
2016	4	719	27-Apr-16	3	No Longfin Catch	0			
2016	4	720	27-Apr-16	3	No Longfin Catch	0			
2016	4	723	27-Apr-16	3	No Longfin Catch	0			
2016	4	724	27-Apr-16	3	No Longfin Catch	0			
2016	4	726	27-Apr-16	3	No Longfin Catch	0			
2016	4	809	26-Apr-16	3	No Longfin Catch	0			
2016	4	812	26-Apr-16	3	No Longfin Catch	0			
2016	4	815	26-Apr-16	3	No Longfin Catch	0			
2016	4	901	25-Apr-16	3	No Longfin Catch	0			
2016	4	902	25-Apr-16	3	No Longfin Catch	0			
2016	4	906	25-Apr-16	3	No Longfin Catch	0			
2016	4	910	25-Apr-16	3	No Longfin Catch	0			
2016	4	912	25-Apr-16	3	No Longfin Catch	0			
2016	4	914	25-Apr-16	3	No Longfin Catch	0			
2016	4	915	25-Apr-16	3	No Longfin Catch	0			
2016	4	918	25-Apr-16	3	No Longfin Catch	0			
2016	4	919	26-Apr-16	3	No Longfin Catch	0			

*Reduced tow time
Processing is complete through 5/13/2016

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



SWG Weekly Salvage Update
Reporting Period: May 9-15, 2016
Prepared by Bob Fujimura on May 16, 2016: 9:00
Preliminary Results -Subject to Revision

Species/Life Stage	Daily Salvage							Trend	
	9-May	10-May	11-May	12-May	13-May	14-May	15-May		
Juvenile Delta Smelt									
SWP	0	0	0	0	0	0	0		0
CVP	0	0	0	0	0	0	0		0
TOTAL	0	0	0	0	0	0	0	→	0.0
CUM TAKE	8	8	8	8	8	8	8		
% of 2016 CL	3%	3%	3%	3%	3%	3%	3%		0
Juvenile Longfin Smelt									
SWP	0	0	0	0	0	0	0		0
CVP	0	0	0	0	0	0	0		0
TOTAL	0	0	0	0	0	0	0	→	0
SWP daily export	3,144	2,355	2,235	3,060	3,172	3,181	1,916	↘	2,723
CVP daily export	1,893	1,959	1,958	1,957	1,955	1,953	2,831	↗	2,072
SWP reduced counts	0%	0%	0%	0%	0%	0%	0%	→	0%
CVP reduced counts	0%	0%	0%	0%	0%	8%	8%	↗	2%
SWP larval samples	100%	100%	100%	100%	100%	100%	100%	→	100%
CVP larval samples	100%	100%	100%	100%	NA	NA	NA	→	100%
DS larvae present - SWP	N	N	N	NA	NA	NA	NA	→	
DS larvae present - CVP	N	N	N	N	NA	NA	NA	→	
LFS larvae present - SWP	N	N	N	NA	NA	NA	NA	→	
LFS larvae present - CVP	N	N	N	N	NA	NA	NA	→	

= missed count collection
 = fish salvage facility outage occurred

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
 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