

Smelt Working Group  
December 21, 2015

**Meeting Summary**

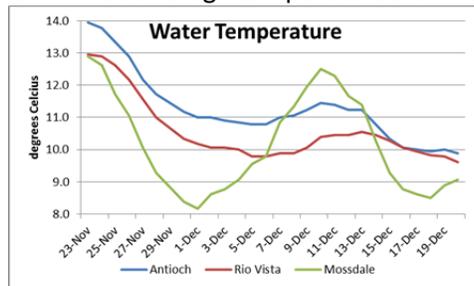
The Working Group reviewed current Delta Smelt distribution and salvage data, and current Delta conditions. The Working Group agreed that there was no need for a change in exports for the protection of Delta Smelt. Increased exports and resulting more negative OMRs are expected to coincide with increased levels of turbidity as the week progresses. If data indicate that Delta Smelt are beginning to move (e.g. increased catches from early warning survey; formation of a turbidity bridge), then entrainment risk may need to be assessed again. The Working Group is looking to part B of Action 1 and will be monitoring turbidity in south and central Delta and early warning Survey catch data from Jersey and Prisoner's Point.

**Reported Data**

1. Current environmental data

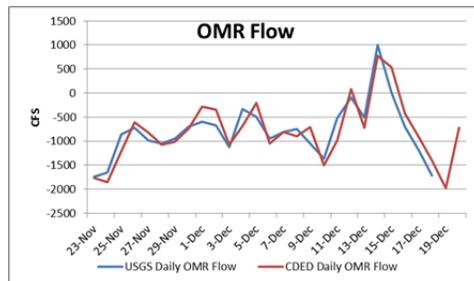
a. Temperature

Combined average temperatures for December 21 are 9.5°C



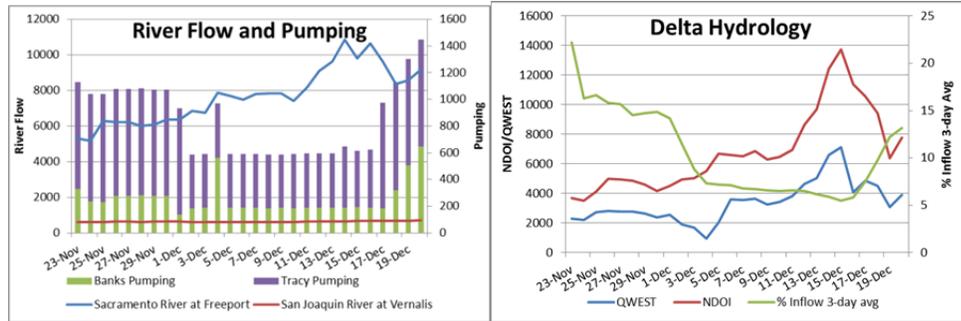
b. OMR flow

USGS OMR daily average flow for December 18 is -1721 cfs. CDEC OMR daily average flow for December 20 is -717 cfs.

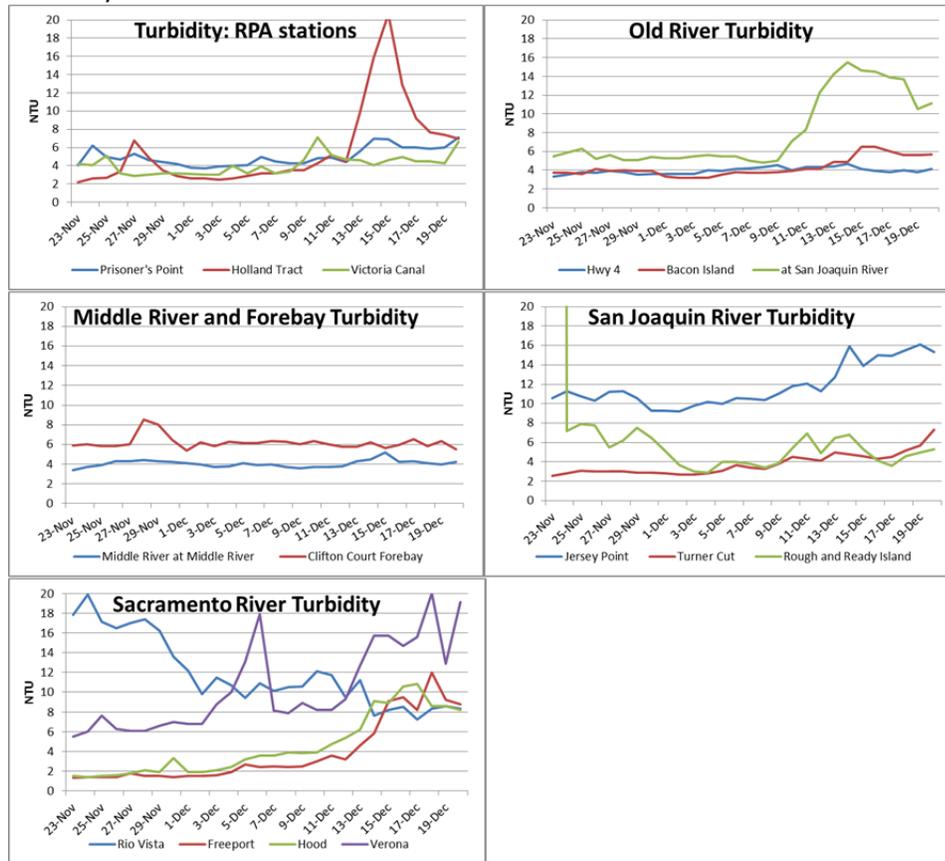


c. River Flows and pumping

Sacramento River at Freeport flow for December 20 was 9186 cfs. San Joaquin River at Vernalis river flow for December 20 was 696 cfs.



d. Turbidity



2. Delta fish monitoring

Fall Midwater Trawl (FMWT): The December FMWT was in the field the weeks of November 30 and December 7. Two Delta Smelt were detected; therefore, the annual Delta Smelt FMWT will be greater than 5 (Note; 5 is the Sept-Nov index). The annual index for 2015 may be released as early as today. The September through November Longfin Smelt index is 0.

The December Kodiak trawl survey was conducted last week. Two Delta Smelt were caught at station 606 (both 64mm, undetermined sex), but none at any other station; all 40 stations were sampled. The SKT #1 will be in the field January 11, 2016.

Smelt Larva Survey begins January 4, 2016.

The Early Warning Survey began November 30. Sampling is alternating between Jersey and Prisoner’s Point, with each being sampled once per week. Sampling on the Sacramento River began last week on December 18 at Sherwood Harbor, Sandy Beach, and station 707.

Early Warning Survey Results, December 12 through December 18

Date	Location	Delta Smelt Catch
12/12	N/A	
12/13	N/A	
12/14	Jersey Point	1
12/15	Prisoner’s Point	0
12/16	N/A	
12/17	N/A	
12/18	Sacramento River stations	22

**3. Salvage**

There has been no salvage of Delta Smelt or Longfin Smelt at either the federal or state Delta pumping facilities during the current water year.

**4. Expected Project Operations**

Jones pumping plant is pumping 1600 cfs today and 2600 cfs tomorrow. Clifton Court (CC) allotment is at 500 cfs today and 1600 cfs tomorrow. Combined pumping is anticipated to be 4200 cfs by tomorrow. Pumping rates may change later in the week, depending on changes in hydrology. Project operations currently are being controlled by water quality, which has improved from last week. Operators indicated the projected OMR Index for the week (based on a combined pumping of 5200 cfs on Friday) is expected to be approximately -4500 cfs.

DWR’s boat turbidity transect survey was not completed last week. There may be a request as soon as today to commence the turbidity transect survey by the Real Time Drought Operations Management Team.

X2 is upstream of the Three Mile Slough on the Sacramento River and at approximately Jersey Point on the San Joaquin River.

A storm is expected by tomorrow and also later in the week. Increased wind is expected throughout the Delta and resuspension of sediment is possible for some of the waterways in the Delta.

**5. Delta Conditions Team**

DCT met on December 18. Forecasted precipitation levels and river flows were not indicating the potential for a turbidity event.

**6. Assessment of Risk/Discussion**

RPA Component 1, Action 1, Part B: “High-entrainment risk period: Delta Smelt have historically been entrained when first flush conditions occur in late December. In order to prevent or minimize such entrainment, Action 1 shall be initiated on or after December 20 if the 3 day average turbidity at Prisoner’s Point, Holland Cut, and Victoria Canal exceeds 12 NTU, or if there are three days of Delta Smelt salvage at either facility or if the cumulative daily salvage count is

above the risk threshold based upon the ‘daily salvage index’ approach described in Attachment B. Action 1 shall require the Projects to maintain OMR flows no more negative than -2,000 cfs (14-day running average) with a simultaneous 5-day running average flow no more negative than -2,500 cfs to protect adult Delta Smelt for 14 days. However, the Working Group can recommend a delayed start or interruption based on other conditions such as delta inflow that may affect vulnerability to entrainment.” (BiOp page 281).

The Working Group reviewed Delta Smelt distribution and salvage data, and current Delta conditions and provided no recommendation as yet for an OMR flow level for either Delta Smelt or Longfin Smelt. However, the Working Group did provide the following individual advice and comments regarding Delta Smelt for the Service to consider:

BiOp Critical Habitat and RPA (Action 1)

The Reasonable and Prudent Alternative, as described on page 279 of the BiOp, provides four points that are necessary to ensure that water project operations do not appreciably reduce the likelihood of both the survival and recover of delta smelt. These are:

1. Preventing/reducing entrainment of delta smelt at Jones and Banks;
2. Providing adequate habitat conditions that will allow the adult delta smelt to successfully migrate and spawn in the Bay-Delta;
3. Providing adequate habitat conditions that will allow larvae and juvenile delta smelt to rear; and
4. Providing suitable habitat conditions that will allow successful recruitment of juvenile delta smelt to adulthood.

Actions 1 through 3 of the RPA are designed to protect Delta Smelt from entrainment. RPA Action 1 and Action 2 are specifically designed for entrainment protections of pre-spawning adult delta smelt during December to March by controlling OMR flows during vulnerable periods. The Working Group is currently looking to the guidance in the BiOp for Action 1 Part B (BiOp p 329).

The RPA addresses both the need for adequate habitat for prespawn adult Delta Smelt to survive and spawn successfully (point 2 of RPA, above), and also to reduce direct loss of the species by way of entrainment into the pumps (point 1 of RPA, above). The group did not make a recommendation based on Action 1, Part B at this time, and remains concerned about Delta Smelt’s ability to successfully spawn this year.

2015 Delta Smelt abundance indices

The 2015 annual abundance indices for all Delta Smelt life stages are the lowest on record, continuing the declining trend observed from 2014.

	<u>2014</u>	<u>2015</u>
<u>SKT</u>		<u>13.8</u>
<u>20-mm</u>		<u>0.3</u>
<u>TNS</u>		<u>0.0</u>
<u>FMWT</u>	<u>9</u>	<u>5-8*</u>

\*The Sept-Nov FMWT index is 5; though the final annual index has not been released it will be greater than 5, but is expected to be the lowest on record

### Early Warning Survey as an indicator of upstream movements and entrainment risk

The Working Group has previously submitted comments regarding the Early Warning Survey. The Working Group maintained their previous comments that the trawling occurring on the Sacramento River side is where the prespawn fish presently are located. Such position is independently confirmed when comparing the December catch at 40 SKT stations throughout the upper estuary (2 Delta Smelt) with the December 18 catch at lower Sacramento River at two sites (22 Delta Smelt). As a result, sampling at the Lower Sacramento River is a non-entrainment source of population loss which conflicts with the intended purpose of Action 1, Part B by disproportionately taking pre-spawning individuals from the population by sampling in an area where the species has historically been shown to occur based on the salinity field. It is recommended that Early Warning Survey be continued only in the San Joaquin River side as this area provides helpful information in water operations management with regard to assessing the risk of entrainment. In particular, members of the Working Group would consider elevated catch in the Jersey Point south lane trawl an indicator of increased Delta Smelt movement and increased risk of entrainment into interior Delta channels, as this location is more hydrologically linked to tidal flow into these channels. Similarly, catch at Prisoners Point would serve as an indicator that movement upstream had commenced.

### Salvage

Considering the low abundance and associated low detection probability of Delta Smelt in salvage, any level of salvage observed at either facility will be of great concern to the Working Group.

### Low Salinity Zone

The LSZ has been upstream of 81km for an extended period of time and at present, is located at approximately Jersey Point on the San Joaquin River and Decker Island on the Sacramento River, which overlaps the survey locations of the Early Warning Survey. Based on the life-history model of Delta Smelt in the 2008 USFWS BiOp (pages 145-147), the population of Delta Smelt follows the location of the LSZ, and therefore the Working Group postulates that some proportion of the population has been residing at Jersey Point and Decker Island since the summer. The Working Group expects to see some persistent presence of Delta Smelt at the Jersey and Decker Island survey locations as long as the LSZ remains there, and that catch in those locations may not indicate that fish have begun a spawning movement. The fish at these locations are prespawn adults, waiting for appropriate changes in hydrology before migrating to spawning locations. Additionally, the Working Group is concerned that since the LSZ is far upstream, the population will be at increased risk of entrainment during migration and spawning. In addition, the population currently is, and has been, experiencing severely diminished habitat quality and quantity due to the upstream location of the LSZ (BiOp page 191). The group expressed concern that a population which is already experiencing record low abundance and habitat loss may also be more vulnerable to entrainment based on proximity to export facilities.

### Turbidity

Delta Smelt abundance indices indicate that abundance is at a record low, and detection ability in salvage and surveys has been reduced. As the Working Group has stressed in previous meetings, sporadic, low catch in surveys from record low abundance makes using those survey results in assessing risk of entrainment very challenging. The Working Group has suggested monitoring turbidity as a proxy for location of Delta Smelt, based on a documented migration

response to turbidity (BiOp pages 146 and 347) and last water year's salvage events following a turbidity pulse that extended to the export facilities into the South Delta. The Working Group will be watching changes in turbidity closely at stations throughout the system, particularly during storm events such as those expected this week. The Working Group also noted that turbidity transect monitoring conducted by DWR in the South Delta last year was a helpful tool that could provide valuable information again this year.

Extension of highly turbid water from the San Joaquin into interior Delta channels in conjunction with indicators of Delta Smelt elevated activity or upstream movement would be considered a clear indicator of heightened risk of entrainment into the interior Delta and entrainment into the SWP and CVP intake facilities. Possible indicators of movement activity besides turbidity are previously discussed under "Salvage" and "Early Warning".

#### Comparison to last winter

The first salvage of Delta Smelt last season occurred in early January. Although hydrological conditions are presently different than this time last season, it emphasizes the upcoming start of the migration season. Given the exceedingly low abundance and sporadic catch in surveys, the Working Group is concerned there will be little, if any, catch in the early warning survey which would indicate the fish are moving. Also, weather conditions have been dynamic suggesting that higher entrainment risk conditions could develop quickly as the migration season approaches.

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

### **Advice for week of December 20, 2015:**

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

Barker Slough operations advice was not provided by the Smelt Work Group, because the meeting occurred prior to concern period beginning January 15 (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. As of December 20, 2015, no Longfin Smelt has been salvaged for the water year. There will be a Longfin Smelt adult salvage threshold for advice (see criterion in #1 above), because some Longfin Smelt were collected by the Fall Midwater Trawl Survey in December. No Longfin Smelt was collected from within the Delta in December (see Current Conditions below). No advice is warranted based on this criterion.

2. December Bay Study sampling collected no Longfin Smelt in the San Joaquin River, suggesting no recent proximity to the export pumps. 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. The December Spring Kodiak Trawl Survey did not detect Longfin Smelt in its survey area last week. Longfin Smelt has not been observed in repeated trawls in the lower Sacramento and San Joaquin River in the USFWS Early Warning Survey.

- 3 & 4. The first Smelt Larva Survey (SLS) of 2015 will be conducted beginning January 4th.

5. Criterion does not begin until January 15<sup>th</sup>.

**Current conditions:** As of December 21, the Sacramento River flow was low (9,217 cfs) as was the San Joaquin (697 cfs). Flows on the Sacramento River are expected to increase and peak at approximately 24,000 cfs by this Friday. X2 has been >81. Combined State and federal exports were increased 2,100 cfs for today and are being controlled by water quality. Export pumping are planned to increase to a combined total of 4,200 cfs by this Friday. The projected OMR index for the week was estimated at about -717 cfs yesterday but could decrease as low as -4,500 cfs later this week. Qwest was +3,906 on December 20. The today's storm last week is expected to produce a spike in outflow arriving this week.

In December, a few Longfin Smelt were collected by the Fall Midwater Trawl, one each in Carquinez Strait, Grizzly Bay and just upstream of Chipps Island. These were the first and only collections of Longfin Smelt by the Fall Midwater Trawl this year. A single Longfin Smelt was collected by the Bay Study in December in Carquinez Strait. No Longfin Smelt was collected in the San Joaquin River or south Delta by either survey. No Longfin Smelt was collected in the December Spring Kodiak Trawl Survey last week.

No Longfin Smelt has been salvaged this water year.

**Summary of Risk:** Risk of entrainment is still low due the apparent absence of Longfin Smelt in the lower San Joaquin River or south Delta despite a moderate increase in Delta exports.

The collection of no adult Longfin Smelt in the San Joaquin River or central Delta to date suggests few fish have moved into the central or south Delta for spawning. Current conditions, particularly the weak negative OMR and positive Qwest values, indicate low risk of entrainment for fish that do move into the central Delta although increases in Delta exports and predicted stronger negative OMR merits greater concerns about possible entrainment risk in the near future.