

SMELT WORKING GROUP
Tuesday, February 17, 2015

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 each of the three OMR flow ranges is discussed and assessed. For the current week the risk of entrainment for each of flow ranges is characterized as follows:

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

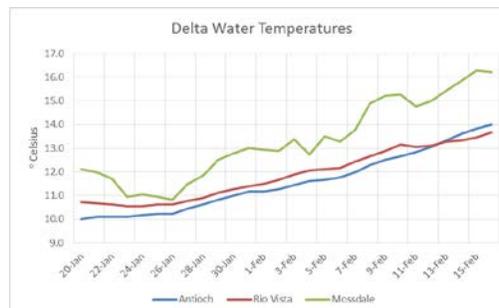
These flow ranges have the potential for a higher level of relative risk, if and when increased central Delta turbidity connects with the export facilities. These relative risk levels are based upon a review of Delta Smelt relative abundance and distribution data, Delta Smelt salvage data, and Delta conditions data, including turbidity. With increased Delta water temperatures (14.6°C, 3 station average), the Working Group has begun to refer to Action 3 (protection of juvenile Delta Smelt); however, the risk values provided refer only to adult fish because it is believed that few if any eggs spawned have begun hatching.

The Working Group will continue to monitor Delta Smelt survey and salvage data and Delta conditions and will meet again Monday, February 23, 2015 at 10 am.

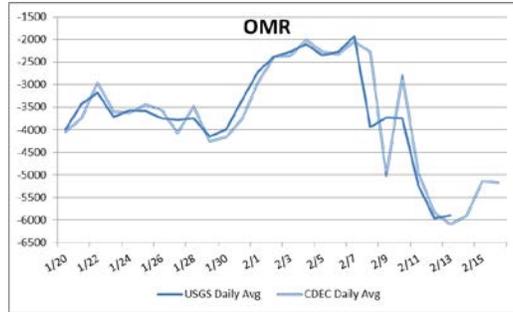
Reported Data:

1. Current environmental data:

- It is now warm enough for Delta Smelt to spawn throughout much, or all of, the Delta. Water temperatures are as follows:



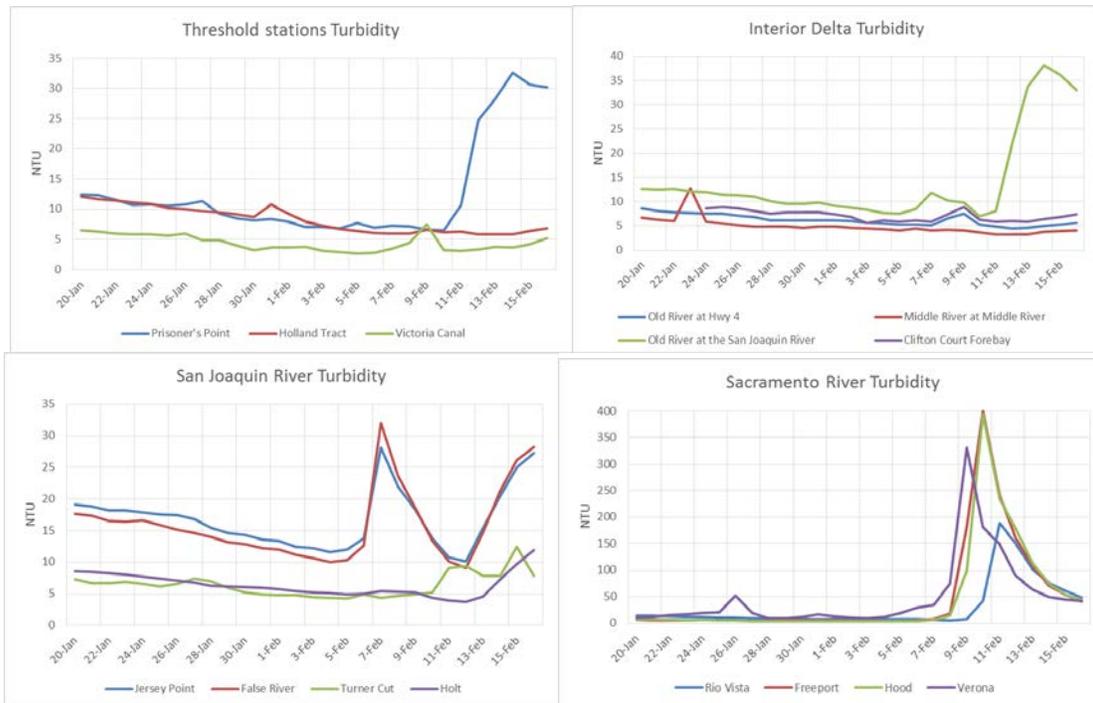
- OMR Flow: USGS tidally-averaged daily, 5-day, and 14-day average OMR flow for February 13 was -5900, -4914, and -3418 cfs, respectively. CDEC daily, 5-day average, and 14-day average OMR flow as of February 16 was -5180, -5631, and -3874 cfs, respectively.



- River Flows: Sacramento River inflow is 22,108 cfs and San Joaquin River is 800 cfs. X2 calculation from CDEC is 72.1 km. The graphs below show the most recent trends in Delta hydrology and water quality that were evaluated by the Working Group



- Turbidity:



2. Delta Fish Monitoring:

The 2014 Fall Midwater Trawl Annual Index for Delta Smelt 2014 is 9. This is the lowest fall index, and

approximately one half of the previous lowest indices of 17 (2009) and 18 (2013).

Smelt Larva Survey #3 was in the field February 2 through 4. Processing is ongoing. A total of 263 Longfin Smelt ranging in size from 5 to 14 mm have been reported from samples that have been processed so far. Larvae were detected throughout the system, but the greatest densities so far were downstream of the confluence. No young-of-the-year Delta Smelt have been observed in the samples processed so far. Two adult Delta Smelt were caught at station 706 in the Lower Sac River; 66 and 68 mm in size. SLS #4 starts today.

Spring Kodiak Survey #2 was in the field last week. Preliminary results indicate a total of 72 adult Delta Smelt were caught, 10 from station 809 (near Jersey Pt., one ripe female), one from 902 (Old R. south of Franks Tract), with the remaining catch at stations in the Sacramento River system and downstream.

The Service's Early Warning Survey increased sampling to daily beginning on February 2nd. An increase in catch at Jersey Point was observed February 6-10, with lower, but consistent catches since then. Results for the previous seven days are as follows:

2-9 (Prisoner's Point): no catch
2-10 (Jersey Point): 11 Delta Smelt (north lane)
2-11 (Jersey Point): 1 Delta Smelt (south lane)
2-12 (Prisoner's Point): 1 Delta Smelt (middle lane)
2-13 (Prisoner's Point): 3 Delta Smelt (north and south lanes-with eggs)
2-14 (Jersey Point): 5 Delta Smelt (middle and south lanes)
2-15 (Prisoner's Point): 1 Delta Smelt (south lane)
2-16 (Jersey Point): 5 Delta Smelt (all lanes, middle with eggs)

3. Salvage:

No Delta Smelt salvage has occurred since January 7. The estimated cumulative seasonal total for adult Delta Smelt salvage remains at 56. No Longfin Smelt have been observed in salvage counts during WY 2015. The SWP operated their fish facility with normal 30 min counts this past week except for February 9. The TFCF sporadically has used 10 min count times during the last week, with most counts at 30 minutes.

4. Expected Project Operations:

Combined SWP/CVP exports today are approximately 5700 cfs. Pumping may increase to 5800 cfs later in the week, depending upon the flow at Vernalis. Operators indicated that they are targeting an Index OMR value of -5000 cfs for today. The OMR target for the remainder of the week will be determined daily on the regional director's conference call at 8am.

5. Delta Conditions Team:

There was no official advice for the Working Group or Delta Operations for Salmonids and Sturgeon team. Turbidity modeling was circulated to the group prior to the call.

6. Assessment of Risk:

Background:

RPA Component 1: "Beginning in December of each year, the Service shall review data on flow,

turbidity, salvage, and other parameters that have historically predicted the timing of Delta Smelt migration into the Delta. On an ongoing basis, and consistent with the parameters outlined... [in the BO]...the SWG shall recommend to the Service OMR flows that are expected to minimize entrainment of adult Delta Smelt” (page 280).

RPA Component 1, Action 2: “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 OMR flows within this range are recommended by the Working Group from the onset of Action 2 through its termination...” (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).

“Upon completion of RPA Component 1 or when Delta water temperatures reach 12°C (based on a 3-station average of daily average water temperature at Mossdale, Antioch, and Rio Vista) or when a spent female delta smelt is detected in the trawls or at the salvage facilities, the projects shall operate to maintain OMR flows no more negative than -1,250 to -5000 cfs based on a 14-day running average with a simultaneous 5-day running average within 25 percent of the applicable 14-day OMR flow requirement. Depending on the extant conditions, the SWG shall make recommendations for the specific OMR flows within this range from the onset of implementing RPA Component 2 through its termination. The Service shall make the final determination regarding specific OMR flows. This action shall end June 30 or when the 3-day mean water temperature at Clifton Court Forebay reaches 25° C, whichever occurs earlier” (page 282).

Discussion:

The Working Group reviewed and discussed all relevant data from Delta flow and water quality monitoring, salvage, field surveys, and planned Project operations. On January 12, 2014, the Service introduced a proposed “Framework for Providing Advice to the Service” (advice framework). This proposed framework was updated based on specific SWG feedback and has been in use by SWG since January 12, 2015. Under the advice framework, the Working Group is to evaluate the risk of entrainment relative to three ranges of OMR flow (-1250 to -2000 cfs, -2000 to -3500 cfs, and -3500 to -5000 cfs). Specific guidelines were provided to the Working Group regarding how to discuss the risk of entrainment under each flow range. Refer to the January 12, 2015 notes to view the draft advice framework.

The Service presented its updated WY2015 adult Delta Smelt ITL (196 fish) at the January 12 SWG meeting. The January 9, 2015 reinitiation memo regarding this new limit has been posted to the Bay-Delta FWO website (<http://www.fws.gov/sfbaydelta/>).

Three station average water temperature surpassed 12°C as of February 3, 2015. The Working Group is now looking to Action 3 of the Biological Opinion as well as Action 2 in framing their advice to the

Service.

Turbidity has remained at lower levels in the southern Delta (circa 8 NTU), with higher turbidity in the Sacramento and lower San Joaquin Rivers. The Working Group noted the possibility that turbidity may disperse further into the southern Delta later this week. If this occurs, it should be detected by the continuous turbidity monitoring DWR is currently conducting to inform management action.

Catch at both Jersey Point and Prisoner's Point (Early Warning Survey) has been between one and five Delta Smelt since February 11. Some Delta Smelt were reported to have expressed eggs suggesting that spawning is occurring or is imminent. Trawls at both stations over the last four days have captured Delta Smelt in the south lane, which may be an indication of active movement into the south Delta or may simply reflect a change in catchability caused by the influx of turbid water from the north Delta. In either case these catches, along with catches at SKT station 902, are confirmation of Delta Smelt presence in or near the Old and Middle river channels reflecting a potential increase in the risk of entrainment. It remains to be seen if Delta Smelt that have moved farther into the south Delta can be detected by trawl surveys or at salvage facilities. The Working Group did not feel the recent distribution information alone warranted raising respective levels of risk for each flow range.

The entrainment risk advice provided below is based on current conditions. The Working Group agreed that there is potential for Delta Smelt to move with turbidity if turbidity associated with last week's storm moves further into the southern Delta. The level of risk the Working Group associated with each flow range is contingent upon several factors, which could change this week, and if they did, would increase the risk for each of the flow ranges. These factors include increases in turbidity above 10-12 NTU in the southern Delta, additional increases of Delta Smelt catch at Prisoner's Point or northern Old River, an increase in combined exports above that stated today, and salvage at either fish facility. One Working Group member considers the -3500 to -5000 cfs OMR flow range to represent a high risk of entrainment; one other considered it a low risk given other current conditions. Several members also indicated that should OMR flows become more negative than -5000 cfs, the risk for entrainment would be increased above that stated for the higher flow range below, and would not be conducive to minimizing entrainment.

The Working Group noted the expected increase in CVP pumping this week following a long period of low level pumping, and recommends robust monitoring of CVP Delta Smelt salvage. Salvage at the CVP at the higher level of pumping would be an indication of strong smelt presence in the southern Delta and possibly concerning levels of undetected entrainment at CCF. Salvage should be monitored closely. Should salvage occur, it would indicate a higher level of entrainment risk for the species. Members have also expected some salvage to have occurred by now and the group has expressed different explanations for the lack of salvage. These reasons include high pre-screen losses at one or both of the fish salvage facilities, reduced monitoring/salvage efficiencies at these facilities, high predation in the nearby South Delta channels, and low turbidity in the South Delta that discourages DS movement toward the pumps.

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

Advice Framework OMR Level Risk Ranking and Discussion

- 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 index on record, confirmed Delta Smelt presence in central

- Delta based upon Jersey Point and Prisoner's Point catch data; proportional distribution in the San Joaquin River appears higher than in other recent years.
- Salvage: geographic influence of the pumps is reduced to southern Delta under this flow range
 - Unknowns: N/A
 - Persistence of risk: N/A
- 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 index on record, confirmed Delta Smelt presence in central Delta based upon persistent Jersey Point and Prisoner's Point catches from the Early Warning Survey and from the January and February SKT survey, proportionately large catch results from Jersey Point as compared to stations in Sacramento River and further downstream.
 - Salvage: Observed salvage has been zero since January 8
 - Unknowns: unknown whether turbidity will increase for southern Delta for this week, potential increases in combined exports later this week, potential increase in negative OMR target.
 - Persistence of risk: level of risk for this flow range would be anticipated to remain the same this week as long as the current hydrology and operational conditions persist. An increase in catch of Delta Smelt at Prisoner's Point would indicate an increase of relative risk for this flow range, if these fish are moving into the southern Delta. Increases in turbidity for the southern Delta above threshold levels would indicate an increase in relative risk for this flow range. Detection of Delta Smelt at either salvage facility would indicate a risk for high levels of entrainment.
 - OMR flow of -3500 to -5000 cfs: There is a medium risk of entrainment under this flow range, with the potential for a high risk of entrainment, if turbidity disperses further into the southern Delta:
 - Risk factors: lowest annual index on record, persistent Delta Smelt presence in central Delta based upon Jersey Point and Prisoner's Point catch data, proportionately large catch results from Jersey Point as compared to stations in Sacramento River and further downstream.
 - Salvage: Observed salvage has been zero since January 8
 - Unknowns: unknown whether turbidity will increase for southern Delta for this week, potential increases in combined exports later this week, potential increase in negative OMR target
 - Persistence of risk: level of risk for this flow range would be anticipated to remain the same this week as long as the current hydrology and operational conditions persist. An increase in catch of Delta Smelt at Prisoner's Point or northern Old River would indicate an increase of relative risk for this flow range. Increases in turbidity for the southern Delta above threshold levels would indicate an increase in relative risk for this flow range. Detection of Delta Smelt at either salvage facility would indicate a risk for high levels of entrainment.

The Working Group will continue to monitor conditions and smelt distribution and will meet again on Monday, February 23, 2015.

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

Advice for week of February 17, 2015:

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

Barker Slough operations advice is not warranted at this time. The Smelt Work Group did not discuss the February 1 change in water year 2015 classified to “critical”; nonetheless, few Longfin Smelt larvae were detected at criteria stations and Barker Slough exports have been well below the potential limit of 50 cfs (see Basis for advice and Discussion of Criteria for #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. As of February 16, 2015, no Longfin Smelt has been salvaged for the water year. The interim Longfin Smelt adult salvage threshold for advice is > 80 (see criterion in #1 above), which is based on a combined September through December Fall Midwater Trawl Longfin Smelt index of 16. No advice is warranted based on this criterion.
2. No new information. Early February sampling by Bay Study detected no Longfin Smelt in the San Joaquin River and very few in the Sacramento River ($n=2$). Kodiak Trawl sampling tends to be inefficient for Longfin Smelt, but in January the USFWS detected two adult Longfin Smelt at Jersey Point; otherwise, none have been caught at Jersey Point or Prisoner’s Point. No other detections were made in the San Joaquin River or south Delta in January. In early January Bay Study detected Longfin Smelt adults in the Sacramento River at Rio Vista (station 761), a juvenile and adult in the Sacramento River at Sherman Lake (station 736), none in the San Joaquin River, and juveniles (<80 mm) and adults throughout Suisun Bay December. Previously, Fall Midwater Trawl sampled the Bay-Delta region during the first half of the month

and the supplemental Spring Kodiak Trawl survey during last week, and neither detected any Longfin Smelt in the central or south Delta. Late December catches by the Chipps Island trawl suggested that spawning movement into the western Delta happened. Current distribution information does not indicate advice is warranted based on this criterion.

3 & 4. New information consists of Suisun Bay and Napa River sample results (see Table 1). The third Smelt Larva Survey (SLS) completed sampling at all stations, but sample processing for only a couple stations remains. Longfin Smelt larvae were detected at 5 of the 12 criteria stations at densities of 3 or less per tow; thus, neither criterion was met for concern (Table 1, Figure 1). During survey 2, larvae were detected at only two stations in the central and south Delta: a single larva at station 906 on the San Joaquin River at Medford Island and three larvae at station 809, Jersey Point. In SLS 1, most larvae were distributed from the confluence downstream. Hatching for the season should be well underway. Catches are not yet sufficient to reach concern levels based on density or distribution.

5. No new information. Based on the February 1, 2015 Bulletin 120 Water Supply Forecast the water year type changed to “Critical” in the Sacramento River. This triggers one of the criteria for consideration regarding the operations of the North Bay Aqueduct (NBA). The second is the presence of Longfin Smelt larvae in the vicinity (i.e., station 716). SLS sampling collected four larvae at station 716 and two more at 723 indicating presence but not substantial numbers. NBA has been exporting about 30 cfs as a daily average in early February, but exports declined to about 20 cfs beginning February 12. This level is well below the 50 cfs ceiling established for this component of the Longfin Smelt Incidental Take Permit. Based on low larval densities and current export levels well below the potential limit of 50 cfs, no change in current operations is warranted based on this criterion.

Current conditions: Sacramento River flow peaked at a little over 36,000 cfs on February 13 and declined to a little over 22,000 on the 16th; flows continue to decline. X2 dropped to 72 km. Combined State and federal exports are currently targeting -5,000 OMR by pumping 5,600 to 5,700 cfs. Qwest was positive on February 7-14th, but has been slightly negative since, reaching -1,251 February 16. Projected OMR index will target -5,000, but this will have an increasingly negative influence on Qwest for a few days as the Delta fills.

Summary of Risk:

Risk of entrainment remains low in both the south Delta and Barker Slough, but this could change at any time with an influx of adult Longfin Smelt in the south Delta or with substantial hatching in either region. Risks of additional adult influx should diminish from this point forward, but larva densities could continue to increase through mid-March resulting in increased risk of entrainment to those close to export facilities.

The risk of adult entrainment decreases as X2 decreases. X2 remains at about 72 km currently.

The limited number of Longfin Smelt larvae detected in the central and south Delta in SLSs 1 - 3, the few adults collected in the San Joaquin River or central Delta fish surveys and the absence of adult Longfin Smelt in salvage samples to date suggests few fish have moved into the central or south Delta for spawning. Current conditions, particularly OMR targeted at -5,000 cfs and

only weakly negative Qwest (about 6,000 cfs), provide some risk for fish that do move into or hatch into the central Delta. The overall risk of entrainment remains low, but could increase if adult fish migrate into the central or south Delta or if larvae hatch in the region. Less than half the spawning season remains. Currently X2 is near Chipps Island, well outside the Delta. As X2 moves upstream subsequent spawners may move upstream as well, potentially placing them and their progeny closer to the export facilities.

Table 1. Longfin Smelt catches by station in Smelt Larva Survey 3, 2015. Sample processing is incomplete.

Year	Survey #	SLS Station	Sample Status	Species	Smelt Catch
2015	3	340	Processed		No Smelt Catch
2015	3	342	Processed	Longfin Smelt	1
2015	3	343	Processed		No Smelt Catch
2015	3	344	Processed	Longfin Smelt	1
2015	3	345	Processed		No Smelt Catch
2015	3	346	Processed	Longfin Smelt	3
2015	3	347	Processed		No Smelt Catch
2015	3	348	Not yet processed		
2015	3	349	Not yet processed		
2015	3	405	Processed		No Smelt Catch
2015	3	411	Processed	Longfin Smelt	8
2015	3	418	Processed		No Smelt Catch
2015	3	501	Processed	Longfin Smelt	5
2015	3	504	Processed	Longfin Smelt	4
2015	3	508	Processed	Longfin Smelt	30
2015	3	513	Processed	Longfin Smelt	27
2015	3	519	Processed	Longfin Smelt	20
2015	3	520	Processed	Longfin Smelt	19
2015	3	602	Processed	Longfin Smelt	1
2015	3	606	Processed	Longfin Smelt	19
2015	3	609	Processed	Longfin Smelt	14
2015	3	610	Processed	Longfin Smelt	2
2015	3	703	Processed	Longfin Smelt	7
2015	3	704	Processed	Longfin Smelt	18
2015	3	705	Processed	Longfin Smelt	12
2015	3	708	Processed	Longfin Smelt	20
2015	3	707	Processed	Longfin Smelt	17
2015	3	711	Processed		No Smelt Catch
2015	3	716	Processed	Longfin Smelt	4
2015	3	723	Processed	Longfin Smelt	2
2015	3	801	Processed	Longfin Smelt	14
2015	3	804	Processed	Longfin Smelt	4
2015	3	809	Processed	Longfin Smelt	2
2015	3	812	Processed	Longfin Smelt	3
2015	3	815	Processed		No Smelt Catch
2015	3	901	Processed	Longfin Smelt	2
2015	3	902	Processed		No Smelt Catch
2015	3	906	Processed		No Smelt Catch
2015	3	910	Processed		No Smelt Catch
2015	3	912	Processed		No Smelt Catch
2015	3	914	Processed	Longfin Smelt	2
2015	3	915	Processed	Longfin Smelt	1
2015	3	918	Processed		No Smelt Catch
2015	3	919	Processed		No Smelt Catch

SWP JTP: Criteria Stations

Processing is complete through 2/13/15 3:30 pm.

Figure 1. CDFW's Smelt Larva Survey station locations.

