

## SMELT WORKING GROUP

Monday, March 9, 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.

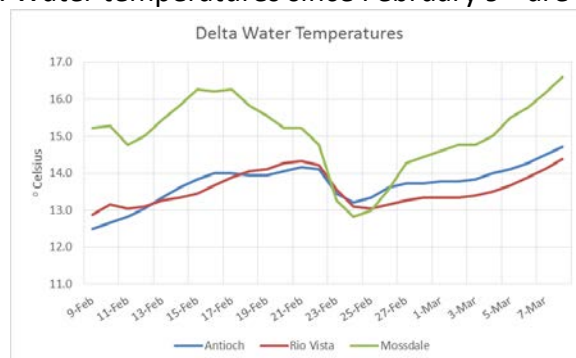
These relative risk levels are based upon a review of Delta Smelt relative abundance and distribution data, Delta Smelt salvage data, and Delta conditions data, including turbidity. The Working Group is following guidance for entrainment protections from both Action 2 (adult Delta Smelt) and Action 3 (juvenile Delta Smelt). The risk values provided for this week refer only to adult fish. The Service will report back to the Working Group next week with additional guidance for how to evaluate larval entrainment within the framework we have been using for adult delta smelt.

The Working Group will continue to monitor Delta Smelt survey and salvage data and Delta conditions and will meet again Monday, March 16, 2015 at 10 am.

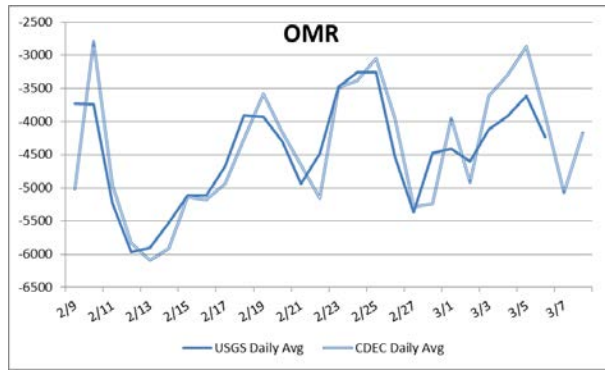
### Reported Data:

#### 1. Current environmental data:

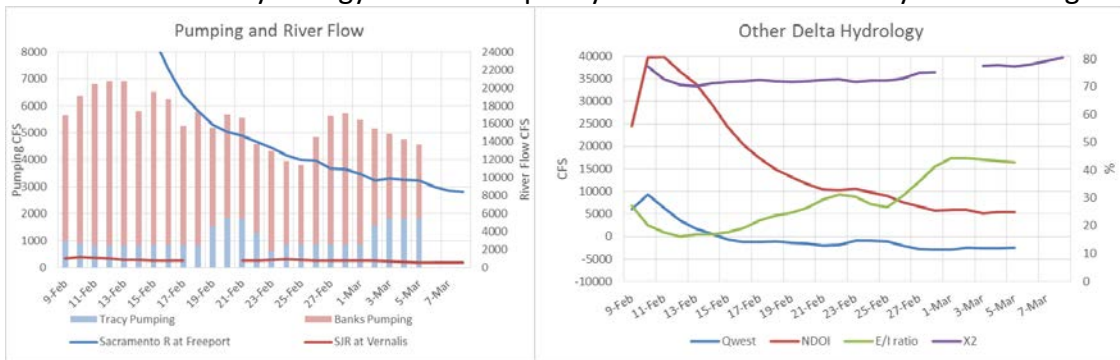
- Since February 3, it has been warm enough for Delta Smelt to spawn throughout much, or all of, the Delta. Water temperatures since February 9<sup>th</sup> are as follows:



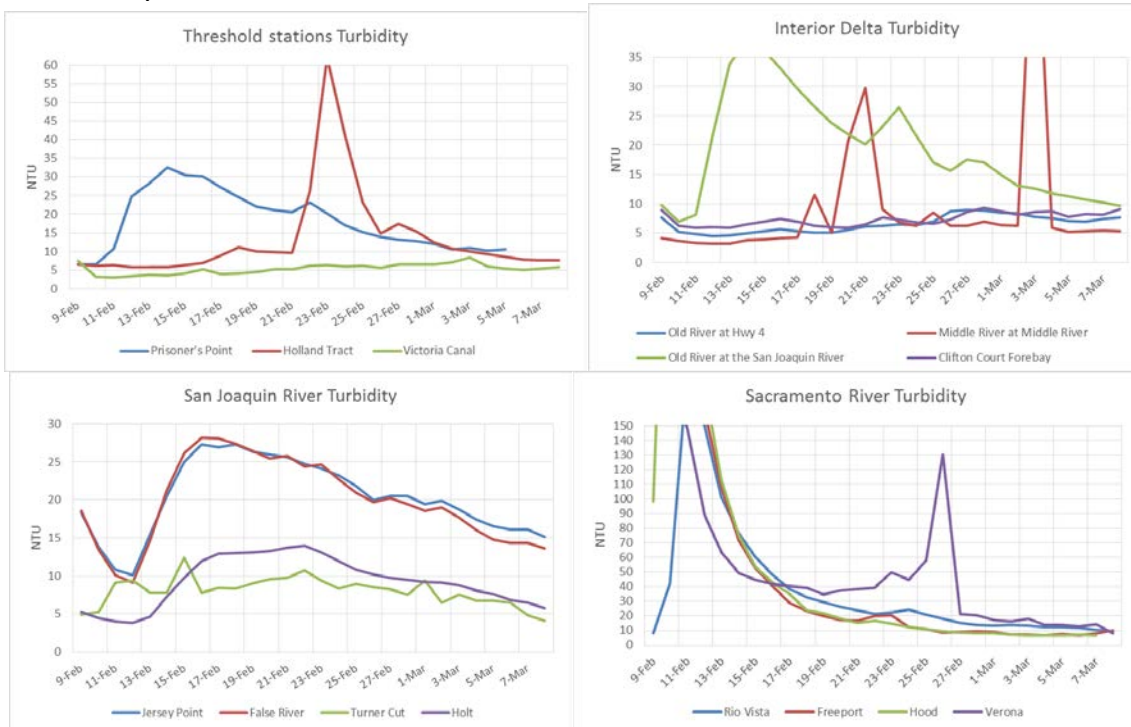
- OMR Flow: USGS tidally-averaged daily, 5-day, and 14-day average OMR flow for March 6 was -4230, -4096, and -4191 cfs, respectively. CDEC daily, 5-day average, and 14-day average OMR flow as of March 8 was -4165, -3861, and -4012 cfs, respectively.



- River Flows: Sacramento River inflow is 8437 cfs and San Joaquin River is 573 cfs. X2 calculation from CDEC for March 8 is 80.52 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 reported fall index since the beginning of this survey in 1967, and approximately one half of the previous lowest indices of 17 (2009) and 18 (2013).

SLS #5 was in the field March 2 through 4. Processing is ongoing. So far, 81 Longfin Smelt ranging in size from 5 to 14 mm have been reported. One Delta Smelt larva was collected from the Sacramento Deepwater Shipping Channel. SLS #6 starts on March 23. No updated catch information was available on remaining station samples from SLS Survey #4 at the time of the call.

Spring Kodiak Survey #3 is in the field this week.

20 mm Survey #1 begins March 16.

The Service's Early Warning Survey decreased sampling to once per week for each site beginning last week. Results for last week are as follows:

3-2 (Jersey Point): 2 Delta Smelt (north lane)

3-3 (Prisoner's Point): no catch

### **3. Salvage:**

No salvage of Delta Smelt has occurred since February 21. The estimated cumulative seasonal total (CVP and SWP combined) for adult Delta Smelt salvage is still 68. No adult Longfin Smelt have been observed in salvage counts during WY 2015. Both the SWP and CVP operated their fish facilities with normal 30 minute counts this past week. Both facilities have started larval fish monitoring although the frequency of larval fish samples at the CVP has been reduced due to heavy debris load in the salvage collections. No larval Delta Smelt have been reported. One 14 mm Longfin Smelt larva was observed at the CVP on February 27 and one larval Longfin Smelt was observed at the SWP on March 3.

The Service provided an update on their inquiry with Reclamation concerning uncertainties expressed during last week's call over how fish mortalities are handled in salvage fish counts in the salvage at the CVP. Service and Reclamation staff was to look into this issue and report back to the group. Reclamation provided the Service with a statement regarding salvage operations, indicating that all Delta Smelt (whether live or dead) are counted and reported. Initial contact has been made by the Service to state and federal representatives to schedule a meeting in the next two weeks to discuss salvage facility sampling protocols at both Skinner and Tracy.

### **4. Expected Project Operations:**

Combined SWP/CVP exports today are approximately 4200 cfs. Operators indicated that they expect the OMR flow to be between -3000 and -4000 cfs for the week. It was reported that combined exports currently are restricted by the E:I ratio.

### **5. Delta Conditions Team:**

There was no official advice for the Working Group or Delta Operations for Salmonids and Sturgeon team.

## 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.” 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 structure the discussion of entrainment risk 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) and early warning level (78 fish) at the January 12 SWG meeting. The January 9, 2015 reinitiation memo regarding these updated levels 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. The 3-station average water temperature as of March 8 was 15.2°C

Turbidity values have decreased across the system. Values in the southern Delta as of March 8 are well below the threshold values in the BiOp.

Early Warning Survey has reduced sampling to one day per week for each site. Last week, Jersey Point sampling caught two Delta Smelt, while Prisoner's Point had no catch.

Some members stated that should salvage of adults continue to be zero, we should consider lowering the adult risk value next week for the highest flow range.

The Working Group discussed risk to larval Delta Smelt. Most members indicated the desire for additional survey data regarding larvae in the system prior to making any assignment for level of risk for larvae. Some members indicated a desire to create a separate assessment of risk for larvae for this week, due to the presence of a Delta Smelt larva in last week's SLS and ripe adults caught in the lower San Joaquin River during the past few weeks. In previous meetings, the Working Group stated with some degree of confidence that spawning was taking place in the lower San Joaquin River. The Working Group therefore expects larvae to be present in the central Delta soon if they are not beginning to hatch already. Given the low abundance of spawners and low flows this winter, some members indicated they expect a low probability of detecting larval Delta Smelt in the central Delta, and especially the southern Delta, given the assumed low larval densities and water transit times in the Old and Middle River corridors. The Working Group does not expect detections of larval Delta Smelt in this week's SKT (net mesh is much too large) or next week's 20 mm survey (net mesh is smaller, but not small enough to reliably retain early larval stages). However, this week's SKT may detect spent females which would indicate where larvae are likely to occur. The next most likely opportunity for survey data that can provide comprehensive spatial information on the distribution of larval delta smelt may be SLS #6, which starts March 23 and will not have samples fully processed until April. The possibility of implementing quantitative sampling to better evaluate the risk of entrainment of larval Delta Smelt at the SWP and CVP was also mentioned.

The low sensitivity of adult salvage as an index of entrainment risk for the SWP was reiterated again although the importance of this bias factor was reduced when CVP exports increased and SWP exports decreased last week. At the March 2 SWG meeting, some members expressed their opinion that adult salvage may have become an unsuitable parameter in assessing risk to the species, since overall population numbers appear to be so low that salvage events have become very rare. Low adult salvage may also be reflected by the Projects' management of OMR flows, which restricts the zone of influence of the export pumps. The low sampling sensitivity of salvage could be particularly challenging given the record low FMWT index in 2014 and the lack of a more sensitive entrainment metric.

The Working Group discussed the potential for PTM runs to be generated for future discussion of larval entrainment risk. No modeling runs were requested at this time. At this time, members agreed it was unlikely the bulk of larval Delta Smelt have hatched in the system.

The above discussion points are reflected in the entrainment risk descriptions below:

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 index on record, confirmed Delta Smelt presence in central Delta based upon field studies; proportional distribution in the San Joaquin River appears higher than in other recent years (based on SKT results).
  - 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 field studies; proportional distribution in the San Joaquin River appears higher than in other recent years (based on SKT results).
  - Salvage: No reported Delta Smelt salvage since February 21
  - Unknowns: proportion of population remaining in the lower San Joaquin River (it has been a month since the last SKT full system snapshot of smelt distribution)
  - Persistence of risk: level of risk for this flow range would be anticipated to remain low this week as long as the current hydrology and operational conditions persist. An increase in catch of Delta Smelt at Prisoner's Point or salvage would indicate an increase of relative risk for this flow range.
- OMR flow of -3500 to -5000 cfs: There is a medium risk of entrainment under this flow range:
  - Risk factors: lowest annual index on record, confirmed Delta Smelt presence in central Delta based upon field studies; proportional distribution in the San Joaquin River appears higher than in other recent years (based on SKT results).
  - Salvage: No reported Delta Smelt salvage since February 21
  - Unknowns: proportion of population remaining in the lower San Joaquin River
  - Persistence of risk: level of risk for this flow range would be anticipated to remain medium this week as long as the current hydrology and operational conditions persist. An increase in catch of Delta Smelt at Prisoner's Point or salvage would indicate an increase of relative risk for this flow range. Conversely, continued lack of adult salvage could potentially indicate a decrease the risk for this flow range in the coming weeks as the salvage "season" typically comes to an end during the month of March.

The Working Group will continue to monitor conditions and smelt distribution and will meet again on Monday, March 16, 2015.

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

### **Advice for week of March 9, 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. No Longfin Smelt larvae were detected at the criteria station 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 WOMET 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 20mm 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 March 8, 2015, no age-1 or adult Longfin Smelt have been salvaged for the water year. The 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. The first larvae of the season have been collected at each of the facilities: 1 larva at the CVP on February 27 and 1 larva SWP on March 3. There is no criterion for larvae in salvage. No advice is warranted based on this criterion.

2. Early March sampling by Bay Study detected no age-1 or adult 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 February the USFWS detected four adult Longfin Smelt at Jersey Point, compared to two adult Longfin Smelt at that location in January; none have been caught at 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. During mid- to late February, Chipps Island trawling caught modest numbers of Longfin Smelt (19 and 16 for Feb 15-21 and 22-28), indicating the spawning run continues. Current distribution information does not indicate advice is warranted based on this criterion.

3 & 4. The fifth Smelt Larva Survey (SLS) completed sampling at all stations, but some sample processing remains. Catch per station remains low and Longfin Smelt larvae were detected at 3 of the 12 criteria stations at densities of 3 larvae or less per tow; thus, neither criterion was met for concern (Table 1, Figure 1). Catches are not sufficient to reach concern levels based on density or distribution.

5. SLS 5 did not detect larvae at station 716, the criterion station. At station 723 a single larvae was detected. The lack of larvae at 716 removes the trigger criterion for North Bay Aqueduct operations and the single larva at 723 suggests the risk to larvae in the vicinity is low. The water year remains critical, based on the February 1, 2015 Bulletin 120 Water Supply Forecast of the water year type for the Sacramento River. In addition to a Dry or Critical water year type, concern also requires the presence of Longfin Smelt larvae at the criteria, station 716. During SLS 4, a single larva was detected at station 716 and none at 723, so criteria remain in effect. SLS 3 sampling collected four larvae at station 716 and two more at 723 indicating presence but not substantial numbers. NBA has been exporting less than 30 cfs daily through February, except for a 3-day period near the end of the month; exports ceased entirely March 4 and 5. This level is well below the 50 cfs ceiling established for this component of the Longfin Smelt Incidental Take Permit. Based on no larvae collected at 716, few collected nearby 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, declined to 10,444 on the March 1<sup>st</sup>, and is now about 8,500 cfs. X2 has been slowly moving upstream and is about 85 as of March 8<sup>th</sup>. Combined State and federal exports are currently targeting an E:I ratio of 35%. OMR has been more negative than -4,000, but is expected to range between -4,000 and -3,000 in the upcoming week. Qwest was -2418 on March 5 and is expected to be closer to -2,300 today.

#### **Summary of Risk:**

Risk of entrainment remains low in both the south Delta and Barker Slough. This results from both low densities of larvae and moderate to low exports. Although this could change with an influx of adult Longfin Smelt in the south Delta or with substantial hatching in either region, spawning and hatching have likely peaked by now. Risks of additional adult influx continue to diminish. Larva densities appeared to decrease through mid-March resulting in lower risk of entrainment to those close to export facilities.

The limited number of Longfin Smelt larvae detected in the central and south Delta in SLSs 3-5, 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 -4,000 to -3000 cfs and only weakly negative Qwest, provide some risk for fish that do move into or hatch into the central Delta. The overall risk of entrainment remains low. Less than half the spawning season remains. Recently X2 shifted back into the Delta.



Table 1. Longfin Smelt catches by station in Smelt Larva Survey 5, 2015. Sample processing is incomplete.

Year	Survey #	SLS Station	Sample Status	Species	Smelt Catch
2015	5	340	Not yet processed		
2015	5	342	Not yet processed		
2015	5	343	Not yet processed		
2015	5	344	Not yet processed		
2015	5	345	Not yet processed		
2015	5	346	Not yet processed		
2015	5	347	Not yet processed		
2015	5	348	Not yet processed		
2015	5	349	Not yet processed		
2015	5	405	Processed	Longfin Smelt	2
2015	5	411	Processed	Longfin Smelt	7
2015	5	418	Not yet processed		
2015	5	501	Not yet processed		
2015	5	504	Processed	Longfin Smelt	2
2015	5	508	Processed	Longfin Smelt	5
2015	5	513	Processed	Longfin Smelt	1
2015	5	519	Processed	Longfin Smelt	4
2015	5	520	Processed	Longfin Smelt	6
2015	5	602	Processed	Longfin Smelt	7
2015	5	606	Processed	Longfin Smelt	13
2015	5	609	Not yet processed		
2015	5	610	Not yet processed		
2015	5	703	Processed	Longfin Smelt	6
2015	5	704	Processed	Longfin Smelt	3
2015	5	705	Processed	Longfin Smelt	5
2015	5	706	Processed	Longfin Smelt	3
2015	5	707	Processed	Longfin Smelt	4
2015	5	711	Processed		No Smelt Catch
2015	5	716	Processed		No Smelt Catch
2015	5	723	Processed	Longfin Smelt	1
2015	5	801	Processed	Longfin Smelt	2
2015	5	804	Processed	Longfin Smelt	5
2015	5	809	Processed	Longfin Smelt	1
2015	5	812	Processed	Longfin Smelt	3
2015	5	815	Processed		No Smelt Catch
2015	5	901	Processed		No Smelt Catch
2015	5	902	Processed		No Smelt Catch
2015	5	906	Processed		No Smelt Catch
2015	5	910	Processed		No Smelt Catch
2015	5	912	Processed		No Smelt Catch
2015	5	914	Processed	Longfin Smelt	1
2015	5	915	Processed		No Smelt Catch
2015	5	918	Processed		No Smelt Catch
2015	5	919	Processed		No Smelt Catch

SWP ITP Criteria Stations

Processing complete through 3/8/2015

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

