



IEP NEWSLETTER

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2011 Smelt Larva Survey

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The Department of Fish and Game (DFG) successfully completed the 2011 field season of the Smelt Larva Survey (SLS) in late March. Initiated in 2009, the SLS monitors the distribution and relative abundance of larval longfin smelt (*Spirinchus thaleichthys*) in near real-time. These data are used to assess the vulnerability of larva to entrainment at Delta water diversions. Longfin smelt are the focus of this program following their 2009 listing as threatened under the California Endangered Species Act.

From January 18 to March 23, 2011, DFG conducted 5 bi-weekly Delta-wide surveys consisting of a single sample (one 10-minute stepped oblique tow) taken at 35 locations (Figure 1). The towed net (length = 3.35 m, mouth area = 0.37 m², mesh size = 505 μm) was mounted to a rigid steel frame. Skis were attached to the frame to prevent the frame and net from digging into the substrate during deployment. Once a tow is complete, all larval fish were preserved in 10% buffered formalin and returned to our Stockton laboratory for identification to the lowest possible taxon. A full description of methods and protocol are available through this author.

A total of 62,455 fish representing 18 species (Table 1) were collected during the 2011 field season. Pacific herring (*Clupea pallasii*), prickly sculpin (*Cottus asper*), and longfin smelt - which comprised 97.9%

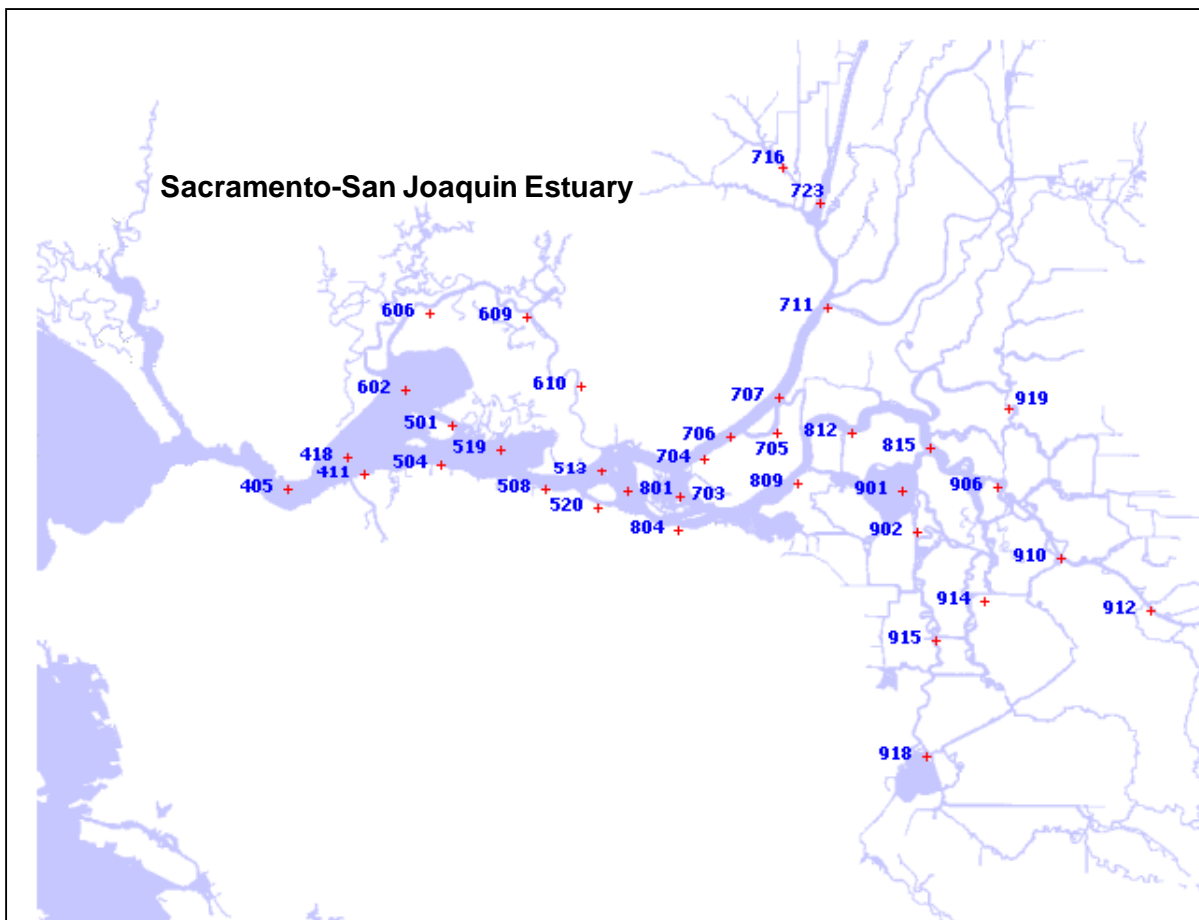


Figure 1 Station locations sampled by the Department of Fish and Game's Smelt Larva Survey, 2011, in the upper Sacramento-San Joaquin Estuary

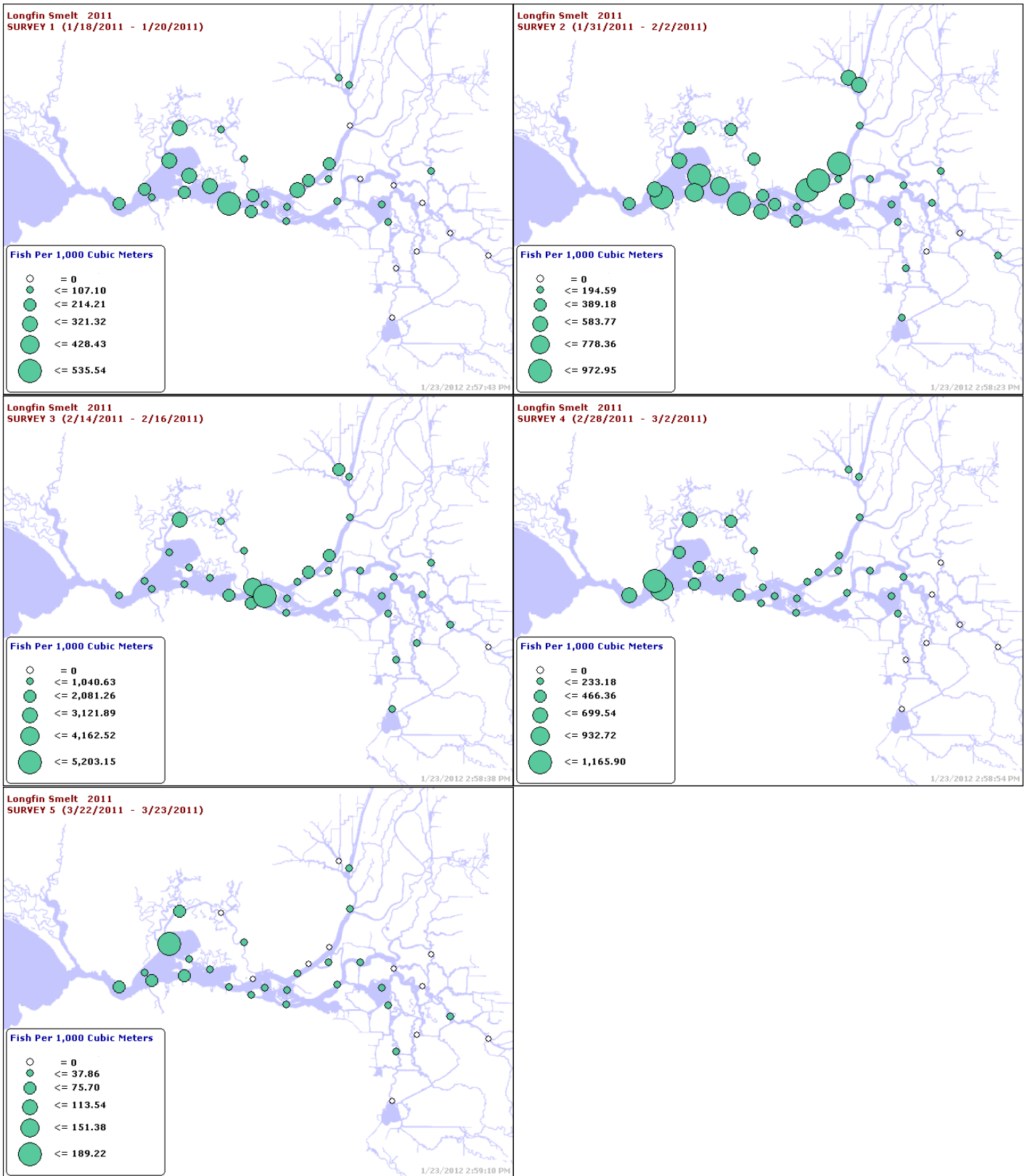


Figure 2 Distribution and catch per unit effort of longfin smelt collected by the Department of Fish and Game's Smelt Larva Survey, 2011, in the upper Sacramento-San Joaquin Estuary. Bubble plots are taken from the Smelt Larva Survey web-page (<http://www.dfg.ca.gov/delta/projects.asp?ProjectID=SLS>).

of total catch - were the most-abundant and most-widely distributed species encountered. Yellowfin gobies (*Acanthogobius flavimanus*) were the fourth most-abundant and the remaining 14 species comprised less than 1% of total catch (Table 1).

Longfin smelt showed broad distributions throughout each survey and were collected in 82.9% (n = 145) of all the samples taken (Figure 2). The highest densities of longfin smelt occurred at or downstream of the Sacramento-San Joaquin confluence in every survey. Average longfin lengths (Figure 3) suggest that older (i.e., larger) larvae occurred at or downstream of the confluence more than they occurred upstream of the confluence— an indication of downstream transport.

Table 1 Total species caught from the Department of Fish and Game’s Smelt Larva Survey, 2011

| Common Name | n | % of Catch |
|--------------------------|--------|------------|
| Pacific herring | 40,594 | 65.00% |
| prickly sculpin | 11,439 | 18.32% |
| longfin smelt | 9,099 | 14.57% |
| yellowfin goby | 1,267 | 2.03% |
| threespine stickleback | 10 | <0.02% |
| bigscale logperch | 9 | <0.01% |
| bay goby | 8 | <0.01% |
| delta smelt | 5 | <0.01% |
| wakasagi | 5 | <0.01% |
| Pacific staghorn sculpin | 4 | <0.01% |
| white croaker | 4 | <0.01% |
| Sacramento sucker | 3 | <0.01% |
| shimofuri goby | 2 | <0.01% |
| white catfish | 2 | <0.01% |
| splittail | 1 | <0.01% |
| threadfin shad | 1 | <0.01% |
| inland silverside | 1 | <0.01% |
| centrarchids (unid) | 1 | <0.01% |

The SLS is a useful tool for resource management. The bi-weekly catch reports allow the Smelt Working Group (SWG) to determine the distribution and abundance of longfin smelt larvae and assess their entrainment risk. These catch reports provided the SWG basis for Old and Middle River (OMR) flow recommendations made to the Water Operations Management Team (WOMT) and DFG’s Director, as required by Condition 5.2 of the California Endangered Species Act Incidental Take Permit No.

2081-2009-001-03 (SWP – ITP), which states: “To protect larval and juvenile longfin smelt during the January through June period, the SWG or DFG SWG personnel shall provide OMR flow advice to the WOMT and to the Director weekly.” Further, “When a single Smelt Larva Survey (SLS) or 20 mm Survey (20 mm) sampling period results in : 1) longfin smelt larvae or juveniles found in 8 or more of the 12 SLS or 20 mm stations in the south Delta (Stations 809, 812, 815, 901, 902, 906, 910, 912, 914, 915, 918, 919) or, 2) catch per tow exceeds 15 longfin smelt larvae or juveniles in 4 or more of the 12 survey stations listed above, OMR flow advice shall be warranted.” However, the SWP - ITP was written to allow favorable flow conditions in the Sacramento or San Joaquin rivers to act in place of restrictive OMR flow advice: “When river flows are: 1) greater than 55,000 cfs in the Sacramento River at Rio Vista; or 2) greater than 8,000 cfs in the San Joaquin River at Vernalis, the Condition [5.2] would not trigger or would be relaxed if triggered previously” (available at <http://www.dfg.ca.gov/delta/data/longfinsmelt/documents/ITP-Longfin-1a.pdf>).

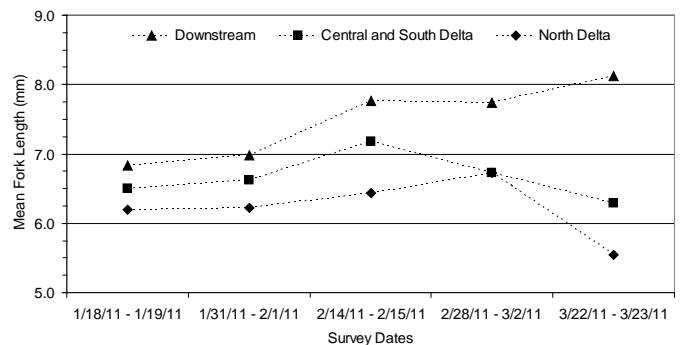


Figure 3 Mean fork lengths of longfin smelt collected in the Department of Fish and Game’s Smelt Larva Survey, 2011. Fork lengths are grouped by survey number for three distinct geographic regions. Downstream refers to stations west of Decker Island on the Sacramento River and west of Jersey Point on the San Joaquin River. Central and South Delta refers to stations within the Central and South Delta. North Delta refers to stations upstream of Decker Island on the Sacramento River.

In 2011, distributional criteria (i.e., detection of larvae in 8 of 12 south delta stations) for longfin smelt were met in 2 of the 5 surveys conducted. In both of these cases, flow on the Sacramento River far exceeded the threshold that relieves the mandate of OMR flow advice to WOMET (Table 2). These favorable flows that persisted throughout the 2011 SLS field season presumably flushed longfin larvae downstream, reduced the overall risk of entrainment at the state and federal water export facilities, and ultimately resulted in no resource management actions based on SLS results.

Table 2 State Water Project's Incidental Take Permit for longfin smelt (SWP – ITP) management actions based on the Department of Fish and Game's Smelt Larva Survey, 2011

| <i>Survey</i> | <i>Distribution / Abundance Criteria</i> | <i>Action / Advice</i> | <i>Basis</i> |
|---------------|--|------------------------|-----------------------------------|
| 1 | Not Met | None | N/A |
| 2 | Distribution Criteria Met | None | Sacramento River flow >55,000 cfs |
| 3 | Distribution Criteria Met | None | Sacramento River flow >55,000 cfs |
| 4 | Not Met | None | N/A |
| 5 | Not Met | None | N/A |

The 2012 SLS is scheduled to begin in early January and conclude in March or April (depending on water year type). Existing SLS data are available through our FTP site (<ftp://ftp.delta.dfg.ca.gov/Delta%20Smelt/>), and fish distribution maps are available on our project web-page (<http://www.dfg.ca.gov/delta/projects.asp?ProjectID=SLS>).

2010 Bay Study Fishes Annual Status and Trends Report for the San Francisco Estuary

Maxfield Fish, Jennifer Messineo, and Kathryn Hieb (CDFG)¹

Introduction

This 2010 Status and Trends fishes report includes data from the San Francisco Bay Study (Bay Study), one of the Interagency Ecological Program's (IEP's) long-term fish monitoring surveys. Results for the upper estuary pelagic species collected by the Towntnet Survey, the Fall Midwater Trawl, and the Delta Smelt 20-mm Survey were reported in the Spring 2011 IEP Newsletter (Contreras et al. 2011). The most recent abundance indices, long-term abundance trends, and distributional information are presented here for other common species in the estuary and some less-common species of interest, such as the surfperches. Presented first are the upper estuary demersal fishes, followed by the marine pelagic fishes, surfperches, and marine demersal fishes. Within each section, species are presented phylogenetically.

Methods

The Bay Study has sampled from South San Francisco Bay to the western delta monthly with an otter trawl and midwater trawl since 1980. There are some data gaps, most significantly: limited midwater trawl sampling in 1994, no winter sampling from 1989 to 1997, and limited sampling at stations in and near the confluence of the Sacramento and San Joaquin rivers in 2007 and 2008 to reduce delta smelt take. Abundance indices are routinely calculated for 35+ fishes and several species of crabs and caridean shrimp. Only the fishes are included in this report; the crabs and shrimp are subjects of separate annual reports, with the 2010 Crab Status and Trends report also in this issue (see page 11). Of the 52 stations cur-

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U.S. Army Corps of Engineers*

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