

Memorandum

Date: 10/21/2019

To: Gregg Erickson
Regional Manager
Bay Delta Region

From: Trishelle Tempel
Environmental Scientist
Bay Delta Region

Subject: The 2019 20-mm Survey Delta Smelt Index

The 2019 20-mm Survey Delta Smelt index of relative abundance was 0.1 (Figure 1) and was the lowest calculated index value on record. Total catch was slightly higher in 2019 (n=16, processing of non-index surveys is ongoing) than 2018¹ (n=13). Despite catching 16 Delta Smelt in 2019, only three fish were caught at index stations during the four surveys contributing to the index calculation².

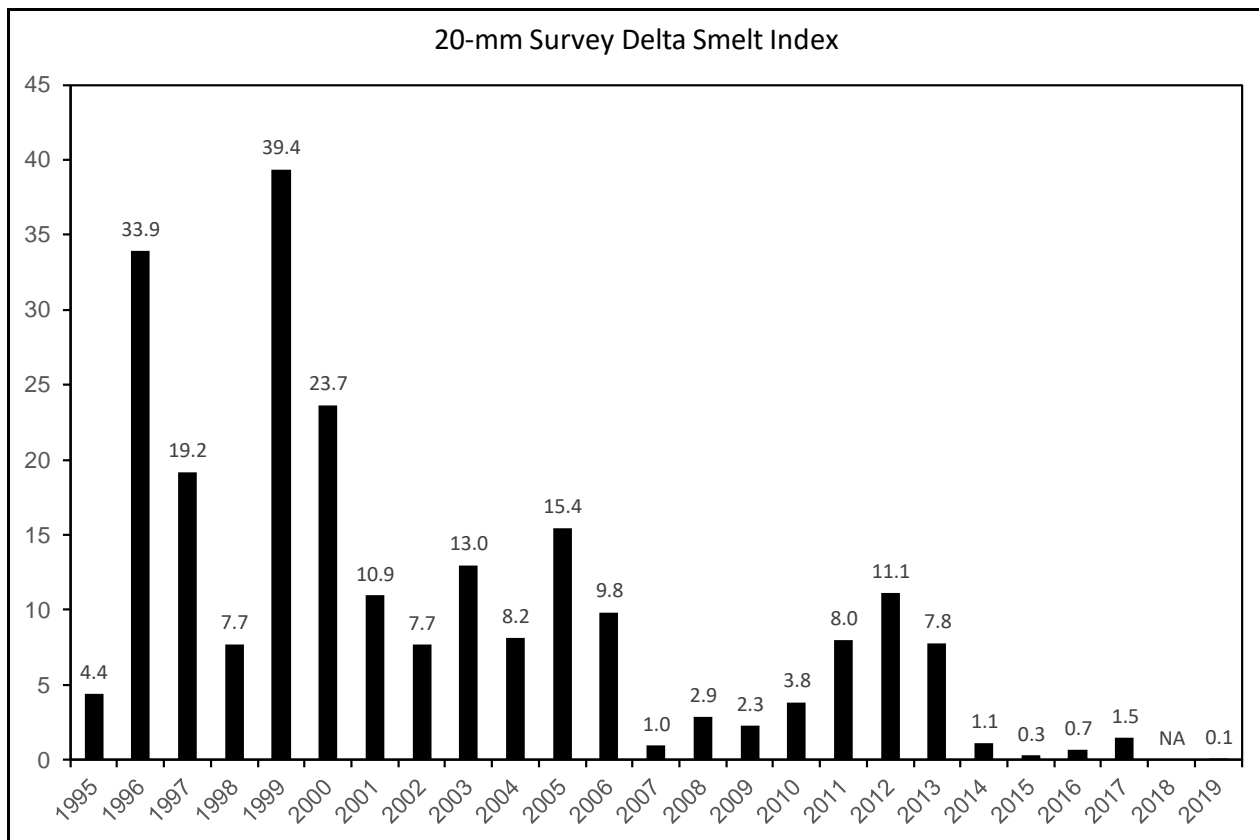


Figure 1. Delta Smelt index of abundance from CDFW's 20-mm Survey, 1995-2019. Delta Smelt catch in 2018 was insufficient to produce an index value.

¹ The 2018 index could not be calculated. For details, see *Memorandum: 2018 Index of Delta Smelt Abundance from the 20-mm Survey* and *Memorandum: 2018 20-mm Survey Delta Smelt Index of Relative Abundance Supplemental Documentation*, available here: <https://www.wildlife.ca.gov/Conservation/Delta/20mm-Survey/Bibliography>

² Additional information on index trends when non-index stations are incorporated into the calculation can be found in *Evaluation of Adding Index Stations in Calculating the 20-mm Survey Delta Smelt Abundance Index*, available here: <https://www.wildlife.ca.gov/Conservation/Delta/20mm-Survey/Bibliography>

Delta Smelt were broadly distributed in 2019, likely due to high freshwater outflows (Figure 2). Fish included in the index were collected in the Napa River (station 344), Montezuma Slough (station 609), and the Lower Sacramento River (station 704). An additional 8 Delta Smelt were collected during index surveys at non-index stations. They were collected in San Pablo Bay, Lindsey Slough, Miner Slough, and the Sacramento Deep Water Shipping Channel. To date, an additional 5 Delta Smelt have been identified from non-index surveys: 3 were collected in March (Stations 519, 520, and 719), and 2 were collected in June (Stations 719 and 726).

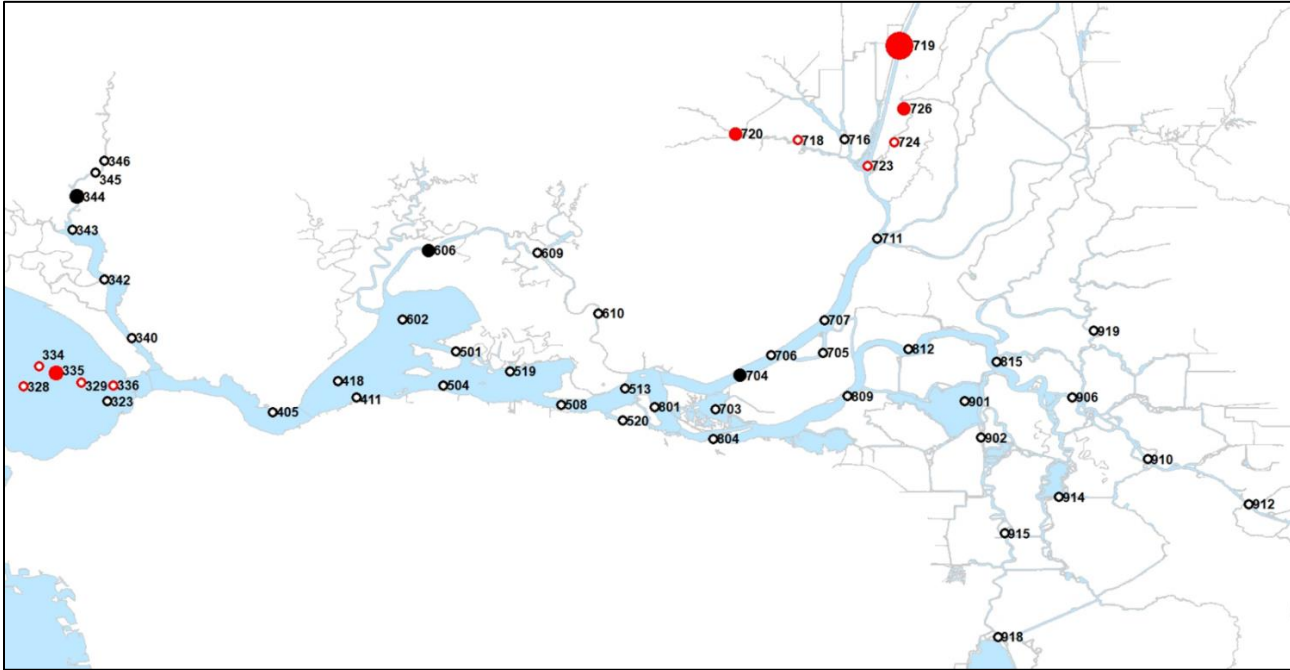


Figure 2. Map of the upper San Francisco Estuary showing the 2019 CDFW 20-mm Survey stations and associated Delta Smelt catch per unit effort (10,000 m³) for index surveys. Stations in black are index stations, stations in red are non-index stations.

Index Calculation

The annual 20-mm Survey monitors the distribution and relative abundance of post-larval and juvenile Delta Smelt throughout their historical range. Nine week-long surveys are conducted every other week from mid-March through early July. Each survey samples a total of 47 stations: 41 “index stations” which have been sampled since the inception of the survey and 6 “non-index stations” in the North Delta which were added to the sampling regime in 2008. When water flows are high, like they were in early 2019, an additional 5 non-index stations are sampled in San Pablo Bay. The 2019 index was calculated using Surveys 3 through 6, which occurred April 8th through May 23rd. All index and non-index stations were sampled during those surveys, except Station 901 during Survey 6.

To calculate the index, Delta Smelt catch at each station is standardized to a volume of 10,000 cubic meters (i.e., CPUE). The mean station CPUE is used to calculate the geometric mean of the four index surveys, which are summed to produce the annual index. The index surveys are comprised of the two surveys directly before and the two surveys directly after Delta Smelt mean fork length reaches 20 mm³. Since the index is calculated using a geometric mean, both abundance and distribution can affect the magnitude.

Additional information on prior year indices, methods, and 20-mm Survey data can be found on our webpage: <https://www.wildlife.ca.gov/Conservation/Delta/20mm-Survey>.

cc: Jim Hobbs
Environmental Program Manager
Bay Delta Region

Lauren Damon
Senior Environmental Scientist, Supervisor
Bay Delta Region

³ For a detailed description on calculating the annual index, see *Memorandum: 2013 Index of Delta Smelt Relative Abundance from the 20-mm Survey* here: <http://www.dfg.ca.gov/delta/data/20mm/bibliography.asp>