

Memorandum

Date: November 22nd, 2023

To: Erin Chappell
Regional Manager
Bay Delta Region

From: Taylor Rohlin
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Subject: 2023 Fall Midwater Trawl September-November fish abundance and distribution

The midseason abundance indices reported here are the sum of the first three (September-November) of the four planned monthly abundance indices that will comprise the annual FMWT abundance indices.

The Fall Midwater Trawl (FMWT) reports on the relative abundance and distribution of upper-estuary pelagic species including but not limited to Delta Smelt (*Hypomesus transpacificus*), Longfin Smelt (*Spirinchus thaleichthys*), age-0 Striped Bass (*Morone saxatilis*), Threadfin Shad (*Dorosoma petenense*), American Shad (*Alosa sapidissima*), and Splittail (*Pogonichthys macrolepidotus*). This first memo will only include information pertaining to Delta Smelt and Longfin Smelt. The FMWT samples 130 stations (see: [FMWT station map](#)) each month from September to December, and those stations range from San Pablo Bay upstream to Stockton on the San Joaquin River, to near Hood on the Sacramento River, and into Cache Slough and through the Sacramento River Deep Water Ship Channel (SRDWSC).

FMWT catch from a subset of stations (100 'index stations', which have been used since the inception of the FMWT) is used to calculate abundance indices (Figure 1). FMWT equipment and methods have remained consistent, which allows the comparison of abundance index trends. Monthly and annual abundance indices are calculated using catch data from index stations grouped into 14 regions. Monthly abundance indices are calculated by averaging catch per tow for index stations in each region, multiplying each regional average by its respective weighting factor (i.e., a scalar based on water volume) for each region, and summing those products for all 14 regions (White and Baxter 2022). The midseason abundance indices reported here are the sum of the first three (September-November) of the four planned monthly abundance indices that will comprise the annual FMWT abundance indices. Non-index stations have been added overtime to provide additional abundance and distribution data. In 2023, 8 non-index stations were added in upstream areas with 3 located in Napa River, 3 in Montezuma Slough, and 2 in the Cache Slough Complex (Figure 1).

In 2023, the monthly FMWT surveys were conducted Sept. 5-20, Oct. 2-17, and Nov. 1-15. During each of the three months, 130 fish trawls were conducted with an additional 36 zooplankton tows. Here we report catch from index (n=100) and non-index (n=30) stations, species distributions by region, and midseason abundance indices. A map of species distribution by station is also publicly available online: ([FMWT Species Distribution Map](#)). Additional information on prior year indices, methods, and catch data can be found on our webpage: [Fall Midwater Trawl \(ca.gov\)](#).

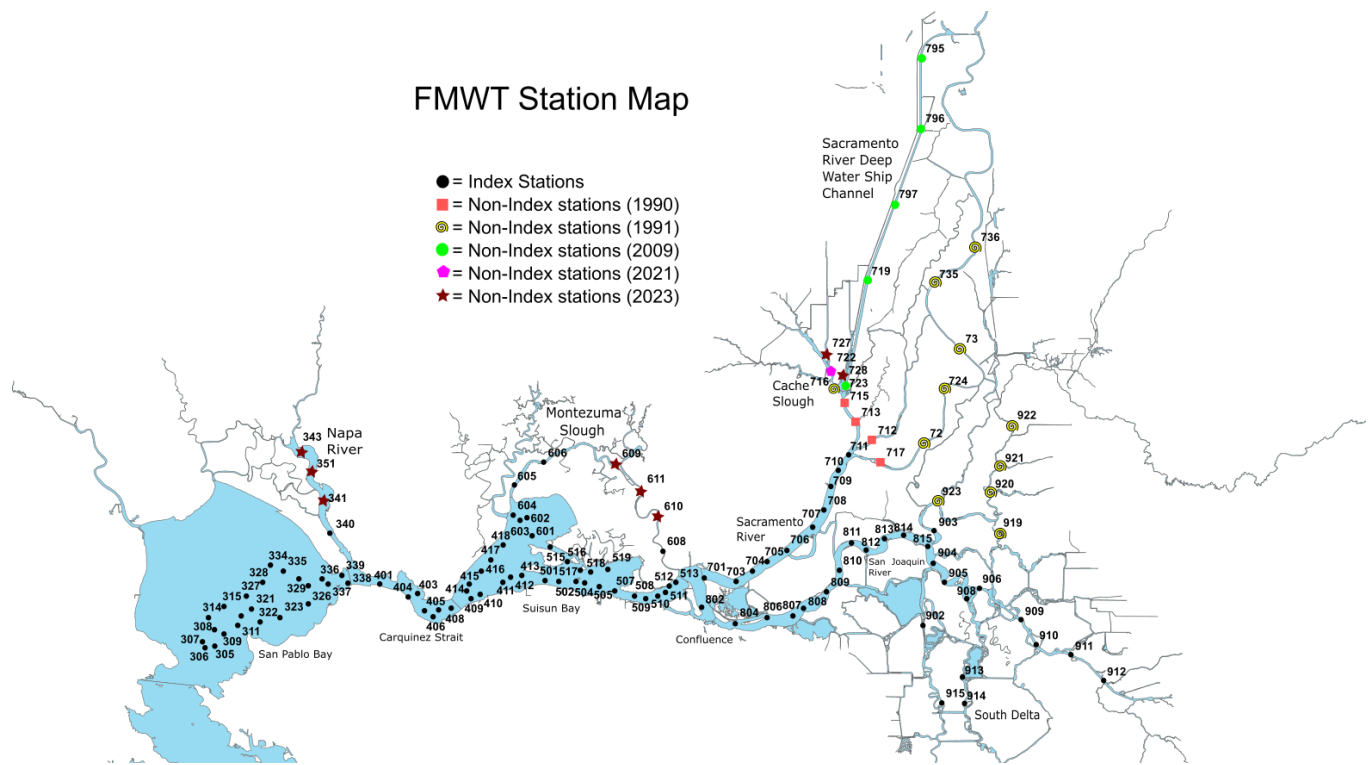


Figure 1. Map of CDFW Fall Midwater Trawl Survey monthly sampling sites among index and non-index stations in the upper San Francisco Estuary, California, USA.

Delta Smelt (*Hypomesus transpacificus*)

No Delta Smelt were collected at any stations from September through November. The 2023 September-November index (0) is tied with 2016 and 2018-2022 as the lowest index in FMWT history. The absence of Delta Smelt catch in the FMWT is consistent among other surveys in the estuary. For example, the Enhanced Delta Smelt Monitoring (EDSM) survey of the U.S. Fish and Wildlife Service (USFWS) caught only 5 Delta Smelt among 10 sampling weeks (between 9/4 and 11/10) comprised of 1,360 tows (U.S. Fish and Wildlife Service 2023).

Longfin Smelt (*Spirinchus thaleichthys*)

The 2023 Longfin Smelt September-November index is **288** and an 11% decrease from the previous year (the 2022 September-November index was 321; [FMWT Indices \(ca.gov\)](#)). Four Longfin Smelt were collected at index stations in September for an index of 6. In October, 52 were collected for an index of 79. In November, 77 were collected for an index of 203 (Table 2). Four Longfin Smelt were collected at non-index stations during the three-monthly surveys.

The majority (>97%) of Longfin Smelt caught thus far have been age-0 (Table 4). Cutoff lengths for age classes were assigned as described in Baxter (1999). Longfin Smelt catch was highest in September at Suisun Bay, highest in October at Suisun Bay, and highest in November at San Pablo Bay (Table 3). The Longfin Smelt index includes all ages.

Table 1. Longfin Smelt monthly catch among regions during the 2023 Fall Midwater Trawl survey sampling at index and non-index stations.

Month	Type	Region	Catch
September	Index	Suisun Bay	4
October	Index	San Pablo Bay	10
October	Index	Carquinez Strait	1
October	Index	Suisun Bay	41
November	Index	San Pablo Bay	58
November	Index	Carquinez Strait	2
November	Index	Suisun Bay	12
November	Index	Lower Sacramento	5
November	Non-Index	Montezuma Slough	4
Total			137

Table 2. Longfin Smelt monthly indices generated during the 2023 Fall Midwater Trawl season while sampling at index stations September through November. Note, the final December survey was not sampled at the time of this report.

Month	Index
September	6
October	79
November	203
Total Indices:	288

Table 3. Monthly percent of Longfin Smelt index, based on region, during the 2023 Fall Midwater Trawl season.

Month	Region	Percent of Index
September	Suisun Bay	100
October	San Pablo Bay	33
October	Carquinez Strait	3
October	Suisun Bay	64
November	San Pablo Bay	88
November	Carquinez Strait	2
November	Suisun Bay	7
November	Lower Sacramento River	3

Table 4. Longfin Smelt total monthly catch by age class and fork length ranges in millimeters during the 2023 Fall Midwater Trawl season. No age-2+ fish were captured on survey so far.

Month	Age-0 Catch	Age-0 FL mm	Age-1 Catch	Age-1 FL mm
September	4	50-54	0	NA
October	50	43-81	2	97-103
November	79	48-75	2	92-100

References

Baxter, R. 1999. Osmeridae. Pages 179-216 in Orsi, J. editor. Report on the 1980-1995 fish, shrimp, and crab sampling in the San Francisco Estuary, California. Interagency Ecological Program for the Sacramento-San Joaquin Estuary. IEP Technical Report 63. Department of Water Resources, Sacramento, California.

U.S. Fish and Wildlife Service. 2023. Enhanced Delta Smelt Monitoring. Lodi, CA Report No.: 2023 Phase 3 Sampling Preliminary Analysis.

White JR, Baxter RD. 2022. Incorporating expanded sampling into an alternative abundance index for the Fall Midwater Trawl survey. California Fish and Wildlife Journal. 108(4):1–16. doi:[10.51492/cfwj.108.21](https://doi.org/10.51492/cfwj.108.21).