State of California
Department of Fish and Wildlife

Memorandum

Date: January 6, 2026

To: Erin Chappell
Regional Manager
Bay Delta Region

From: Margaret Johnson
Environmental Scientist
Bay Delta Region

Subject: Fall Midwater Trawl 2025 Annual Fish Abundance and Distribution Summary

Executive Summary

The 2025 Fall Midwater Trawl (FMWT) recorded an increase in Longfin Smelt catch from the previous year, with most catch occurring late season in November and December as fish moved upstream through San Pablo Bay and Suisun Bay. American Shad catches were also higher than in 2024, with the highest numbers observed in September in Suisun Bay as age-0 fish moved downstream from upriver areas. In contrast, age-0 Striped Bass and Threadfin Shad catches declined from the previous year and were most frequently detected in Suisun Bay and the Sacramento River Deep Water Ship Channel (SRDWSC), respectively. Two Splittail and eight Wakasagi were collected in the SRDWSC (non-index stations). No Delta Smelt was detected during the 2025 FMWT season. Overall, the 2025 indices show continued declines in several pelagic fishes, while both Longfin Smelt and the non-native American Shad showed slight increases from the previous year.

Season Overview

The California Department of Fish and Wildlife (CDFW) has conducted the Fall Midwater Trawl Survey (FMWT) to index the fall abundance of pelagic fishes annually since 1967 (except 1974 and 1979). FMWT equipment and methods have remained consistent since the survey's inception, allowing the indices to be compared across time. These relative abundance indices are not intended to approximate population sizes; however, indices reflect general patterns in population change (Polansky et al. 2019).

Presently, the FMWT conducts 4 monthly surveys from September through December and calculates a monthly abundance index for each survey. The annual abundance index, for each pelagic species, is the sum of the monthly survey indices. 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). Sampling regions 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). During each monthly survey, one 12-minute oblique midwater trawl tow is conducted at each of 100 index stations used for index calculation and at an additional 30 non-index stations that provide enhanced distribution information (Fig. 1). All fish are identified and counted at each station.

The 2025 sampling season began September 2 and was completed on December 12. All 130 fish tows were conducted each month, except for October, when station 328 was dropped due to vessel issues. Here we report catch from index and non-index stations, species distributions by region, and annual abundance indices for seven pelagic fish species; Delta Smelt (native), Striped Bass (introduced), Longfin Smelt (native), American Shad (introduced), Threadfin Shad (introduced), Splittail (native), and Wakasagi (introduced). An interactive map of select species distribution by station is also publicly available online: (FMWT Species Distribution Map).

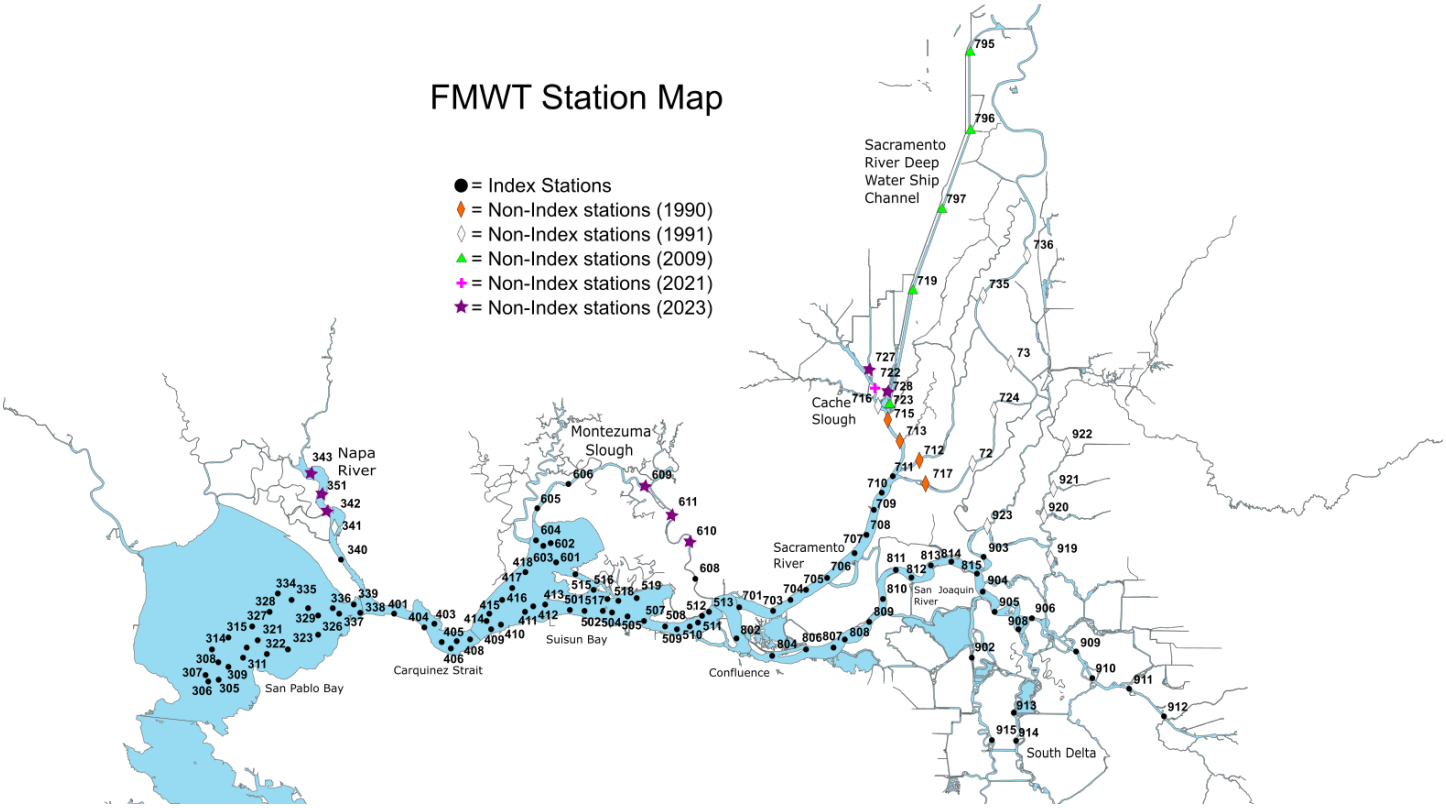

Figure 1. Map of CDFW Fall Midwater Trawl Survey monthly sampling sites among index and non-index stations in the upper San Francisco Estuary, California, USA.

Delta Smelt (*Hypomesus transpacificus*)

The 2025 abundance index was 0 and continues the trend of no catch in the FMWT since 2017 (Fig. 2). No Delta Smelt were collected from any stations during our survey months of September-December. The Enhanced Delta Smelt Monitoring (EDSM) survey of the U.S. Fish and Wildlife Service (USFWS) caught 41 possible Delta Smelt among 10 sampling weeks (between 10/6 and 12/12) comprised of 1,288 tows (U.S. Fish and Wildlife Service 2025). The USFWS Delta Smelt Supplementation effort released approximately 67,583 cultured adult fish on November 4-5 and approximately 71,160 more fish on December 2-3 at Belden's Landing in Suisun Marsh (http://www.cbr.washington.edu/sacramento/workgroups/delta_smelt.html). While FMWT did not catch any Delta Smelt, it does not mean there were no smelt present, but the numbers are very low and below the effective detection threshold by most sampling methods.

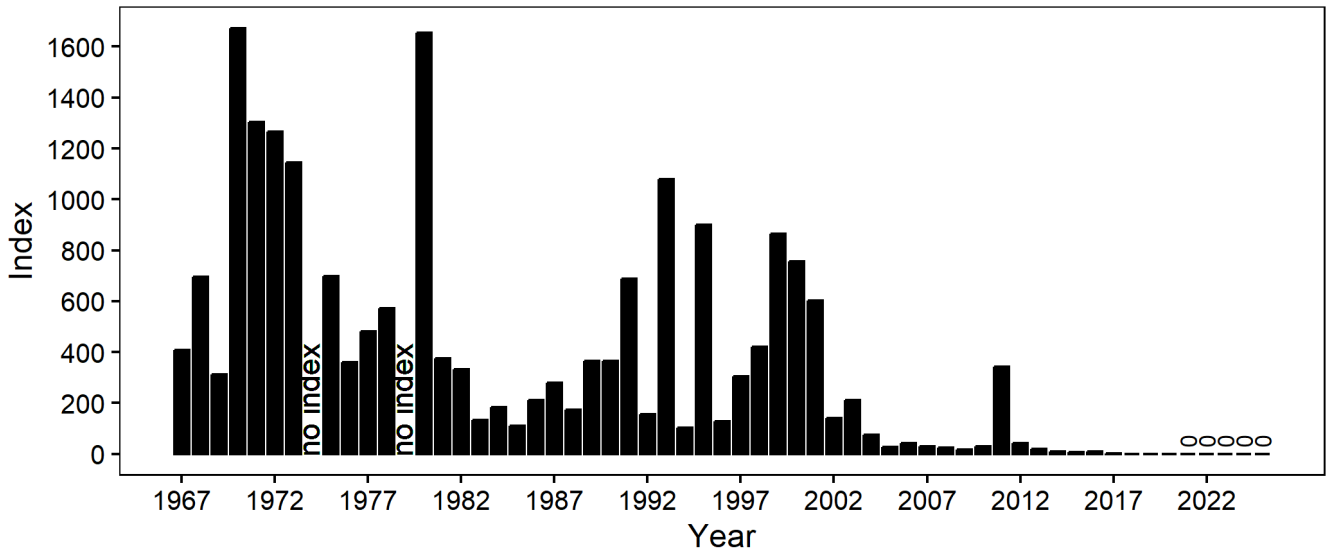

Figure 2. FMWT Delta Smelt annual abundance indices (all ages), 1967-2025. Index values for the past 5 years are shown in detail.

Age-0 Striped Bass (*Morone saxatilis*)

The 2025 abundance index was 40, representing a 71% decrease from last year's index (Fig. 3).

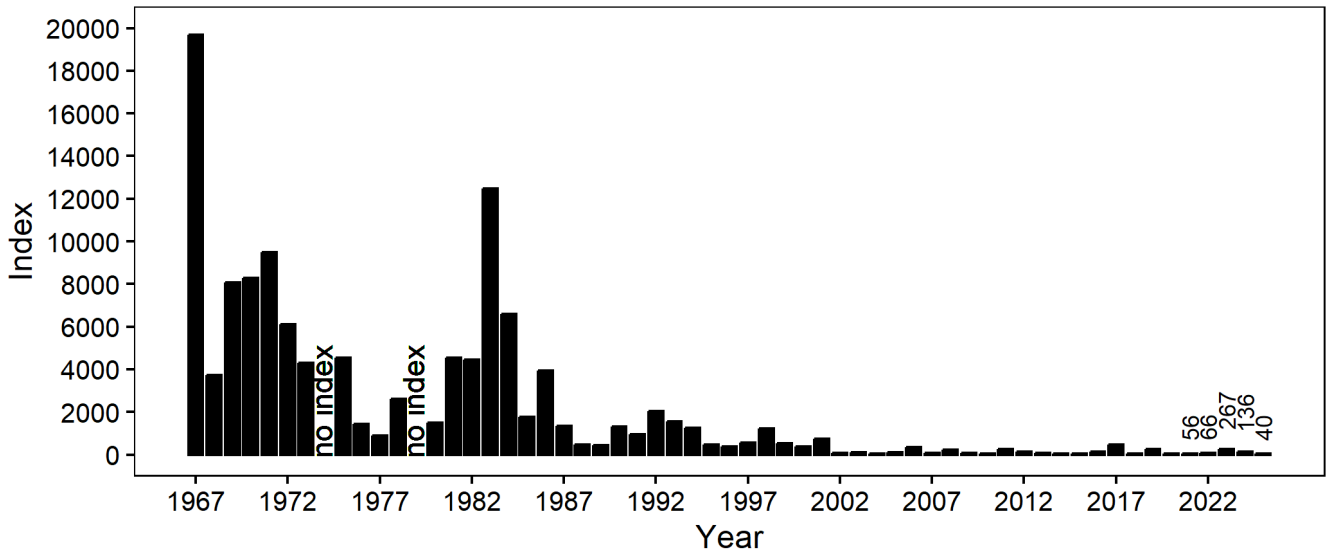

Figure 3. FMWT age-0 Striped Bass annual abundance indices, 1967-2025. Index values for the past 5 years are shown in detail.

Striped Bass were collected every month during September-December. A total of 37 age-0 Striped Bass were collected at index stations and 7 from non-index stations. Monthly catch was highest in November, with catch being highest in Suisun Bay among months (Table 1).

Table 1. Age-0 Striped Bass catch among regions during the 2025 Fall Midwater Trawl survey sampling at index and non-index stations. SRDWSC = Sacramento River Deepwater Shipping Channel.

Month	*Type*	*Region*	*Catch*
September	Index	Lower Sacramento River	1
September	Index	Montezuma Slough	2
September	Index	Suisun Bay	4
September	Non-Index	Mokelumne River	1
September	Non-Index	Montezuma Slough	2
October	Index	Suisun Bay	5
November	Index	Carquinez Strait	1
November	Index	Lower Sacramento River	1
November	Index	Montezuma Slough	1
November	Index	Suisun Bay	15
November	Non-Index	Upper Sacramento River	2
December	Index	Carquinez Strait	1
December	Index	Suisun Bay	6
December	Non-Index	Montezuma Slough	1
December	Non-Index	Upper Sacramento River	1
Total			**44**

Longfin Smelt (*Spirinchus thaleichthys*)

The 2025 abundance index was 275, representing a 57% increase from last year's index (Fig. 4).

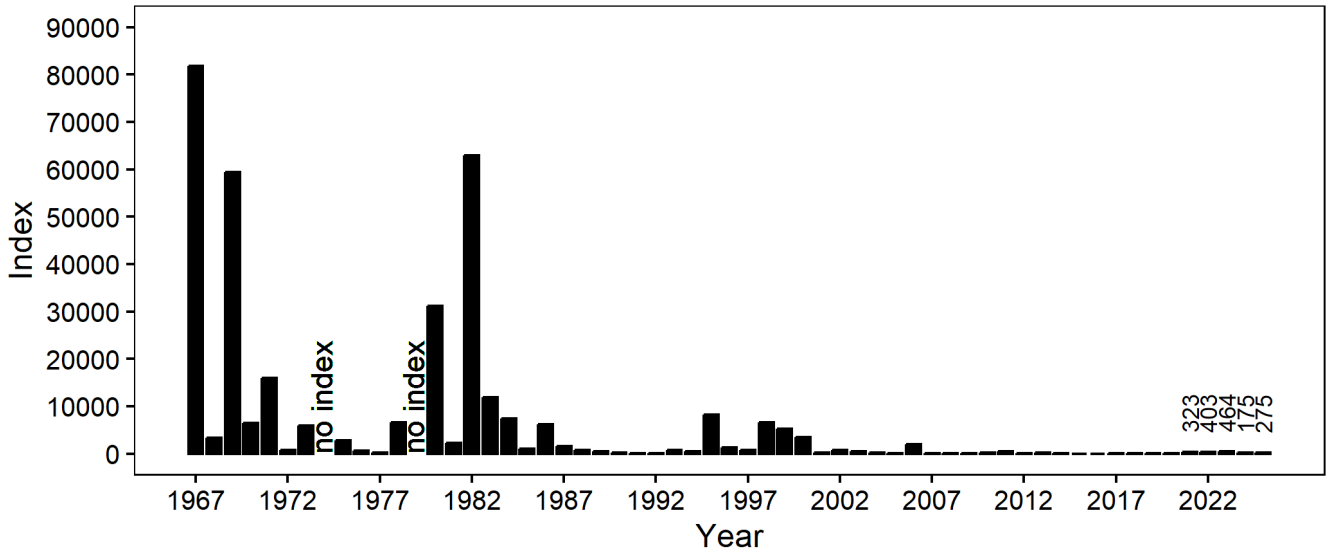

Figure 4. FMWT Longfin Smelt annual abundance indices, 1967-2025. Index values for the past 5 years are shown in detail.

A total of 124 Longfin Smelt were collected at index stations and 9 from non-index stations. Monthly catch was highest in December, with catch being highest in San Pablo Bay among months (Table 2). Higher catch is usually expected in December as Longfin Smelt adults return to the estuary from the ocean to spawn as water temperatures drop in the late fall or winter. The majority (81%) of Longfin Smelt caught have been age-0 but catch of age-1 fish increased with each month (Table 3). The FMWT only measures the first 50 individuals of any fish species caught during a tow. The adjusted length frequency adjusts for the fish not measured by calculating the ratio of total catch to the number of fish measured multiplied by the length frequency.

Table 2. Longfin Smelt catch among regions during the 2025 Fall Midwater Trawl survey sampling at index and non-index stations.

Month	*Type*	*Region*	*Catch*
October	Index	Montezuma Slough	2
October	Index	Suisun Bay	2
October	Non-Index	Napa River	1
November	Index	Lower Sacramento River	1
November	Index	Montezuma Slough	2
November	Index	San Pablo Bay	37
November	Index	Suisun Bay	20
December	Index	Carquinez Strait	1
December	Index	Lower Sacramento River	1
December	Index	Lower San Joaquin River	1

Month	*Type*	*Region*	*Catch*
December	Index	Montezuma Slough	6
December	Index	San Pablo Bay	29
December	Index	Suisun Bay	22
December	Non-Index	Montezuma Slough	5
December	Non-Index	Napa River	3
Total			**133**

Table 3. Longfin Smelt catch per station, fork length (mm), frequency, and age class data during the 2025 Fall Midwater Trawl survey sampling at all stations.

Month	*Station*	*Catch*	*Fork Length*	*Adjusted Length Frequency*	*Age Class*
October	341	1	61	1	age-0
October	504	1	61	1	age-0
October	519	1	61	1	age-0
October	606	2	52	1	age-0
October	606	2	60	1	age-0
November	307	2	56	1	age-0
November	307	2	57	1	age-0
November	311	1	60	1	age-0
November	314	6	52	1	age-0
November	314	6	57	1	age-0
November	314	6	59	1	age-0
November	314	6	61	1	age-0
November	314	6	62	1	age-0
November	314	6	100	1	age-1+
November	315	3	66	1	age-0
November	315	3	68	1	age-0
November	315	3	104	1	age-1+
November	321	6	54	1	age-0
November	321	6	59	1	age-0
November	321	6	61	1	age-0
November	321	6	61	1	age-0
November	321	6	65	1	age-0
November	321	6	67	1	age-0
November	322	1	57	1	age-0
November	325	3	58	1	age-0
November	325	3	68	1	age-0
November	325	3	92	1	age-1+
November	327	10	50	1	age-0

Month	*Station*	*Catch*	*Fork Length*	*Adjusted Length Frequency*	*Age Class*
November	327	10	55	1	age-0
November	327	10	55	1	age-0
November	327	10	56	1	age-0
November	327	10	57	1	age-0
November	327	10	59	1	age-0
November	327	10	60	1	age-0
November	327	10	60	1	age-0
November	327	10	61	1	age-0
November	327	10	63	1	age-0
November	328	1	71	1	age-0
November	337	1	100	1	age-1+
November	339	3	49	1	age-0
November	339	3	56	1	age-0
November	339	3	73	1	age-0
November	414	2	60	1	age-0
November	414	2	63	1	age-0
November	415	2	65	1	age-0
November	415	2	115	1	age-1+
November	416	1	52	1	age-0
November	417	2	61	1	age-0
November	417	2	76	1	age-0
November	418	1	63	1	age-0
November	501	1	65	1	age-0
November	508	1	60	1	age-0
November	517	3	61	1	age-0
November	517	3	66	1	age-0
November	517	3	71	1	age-0
November	519	1	95	1	age-1+
November	602	2	59	1	age-0

Month	*Station*	*Catch*	*Fork Length*	*Adjusted Length Frequency*	*Age Class*
November	602	2	68	1	age-0
November	604	4	57	1	age-0
November	604	4	63	1	age-0
November	604	4	76	1	age-0
November	604	4	103	1	age-1+
November	605	1	75	1	age-0
November	606	1	60	1	age-0
November	703	1	66	1	age-0
December	308	1	77	1	age-0
December	315	2	61	1	age-0
December	315	2	64	1	age-0
December	321	4	59	1	age-0
December	321	4	62	1	age-0
December	321	4	70	1	age-0
December	321	4	74	1	age-0
December	323	1	56	1	age-0
December	327	11	57	1	age-0
December	327	11	57	1	age-0
December	327	11	62	1	age-0
December	327	11	62	1	age-0
December	327	11	64	1	age-0
December	327	11	65	1	age-0
December	327	11	65	1	age-0
December	327	11	68	1	age-0
December	327	11	69	1	age-0
December	327	11	72	1	age-0
December	327	11	94	1	age-1+
December	328	1	62	1	age-0
December	329	1	63	1	age-0

Month	*Station*	*Catch*	*Fork Length*	*Adjusted Length Frequency*	*Age Class*
December	335	8	62	1	age-0
December	335	8	63	1	age-0
December	335	8	64	1	age-0
December	335	8	67	1	age-0
December	335	8	68	1	age-0
December	335	8	74	1	age-0
December	335	8	76	1	age-0
December	335	8	108	1	age-1+
December	340	1	61	1	age-0
December	342	2	65	1	age-0
December	342	2	104	1	age-1+
December	343	1	77	1	age-0
December	409	1	68	1	age-0
December	410	1	62	1	age-0
December	414	1	65	1	age-0
December	416	2	103	1	age-1+
December	416	2	104	1	age-1+
December	417	1	62	1	age-0
December	418	1	63	1	age-0
December	502	2	74	1	age-0
December	502	2	95	1	age-1+
December	503	1	67	1	age-0
December	505	5	96	1	age-1+
December	505	5	96	1	age-1+
December	505	5	97	1	age-1+
December	505	5	112	1	age-1+
December	505	5	121	1	age-1+
December	508	1	110	1	age-1+
December	509	1	119	1	age-1+

Month	*Station*	*Catch*	*Fork Length*	*Adjusted Length Frequency*	*Age Class*
December	515	1	70	1	age-0
December	518	1	68	1	age-0
December	519	1	69	1	age-0
December	602	1	60	1	age-0
December	604	1	65	1	age-0
December	605	4	56	1	age-0
December	605	4	64	1	age-0
December	605	4	97	1	age-1+
December	605	4	103	1	age-1+
December	606	2	64	1	age-0
December	606	2	73	1	age-0
December	609	5	56	1	age-0
December	609	5	60	1	age-0
December	609	5	65	1	age-0
December	609	5	97	1	age-1+
December	609	5	104	1	age-1+
December	704	1	77	1	age-0
December	808	1	97	1	age-1+

Threadfin Shad (*Dorosoma petenense*)

The 2025 abundance index was 41, representing a 93% decrease from last year's index (Fig. 5).

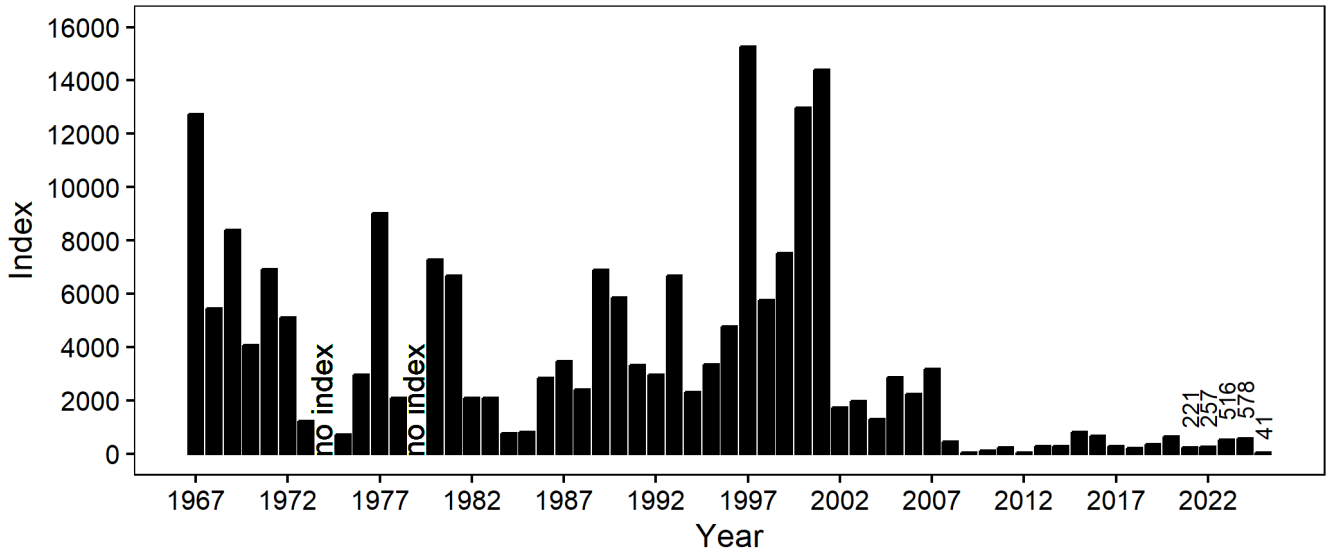

Figure 5. FMWT Threadfin Shad annual abundance indices, 1967-2025. Index values for the past 5 years are shown in detail.

A total of 29 Threadfin Shad were collected at index stations and 1267 from non-index stations. The greatest monthly catch was in September, with catch generally being highest in SRDWSC among months (Table 4).

Table 4. Threadfin Shad catch among regions during the 2025 Fall Midwater Trawl survey sampling at index and non-index stations. SRDWSC = Sacramento River Deepwater Shipping Channel.

Month	*Type*	*Region*	*Catch*
September	Index	Lower Sacramento River	1
September	Non-Index	Mokelumne River	415
September	Non-Index	Montezuma Slough	1
September	Non-Index	SRDWSC	499
October	Index	Lower San Joaquin River	1
October	Index	Suisun Bay	1
October	Non-Index	Mokelumne River	1
October	Non-Index	Montezuma Slough	49
October	Non-Index	SRDWSC	45
November	Index	Lower Sacramento River	1
November	Index	Lower San Joaquin River	2
November	Index	Montezuma Slough	1
November	Index	Suisun Bay	1

Month	*Type*	*Region*	*Catch*
November	Non-Index	Montezuma Slough	11
November	Non-Index	SRDWSC	114
December	Index	Carquinez Strait	6
December	Index	Lower Sacramento River	9
December	Index	South Delta	1
December	Index	Suisun Bay	5
December	Non-Index	Montezuma Slough	43
December	Non-Index	SRDWSC	89
Total			**1,296**

American Shad (*Alosa sapidissima*)

The 2025 abundance index was 1697, representing a 27% increase from last year's index (Fig. 6). Abundance indices have fluctuated substantially during the period 2021-2025, ranging from a low of 398 to a high of 2421.

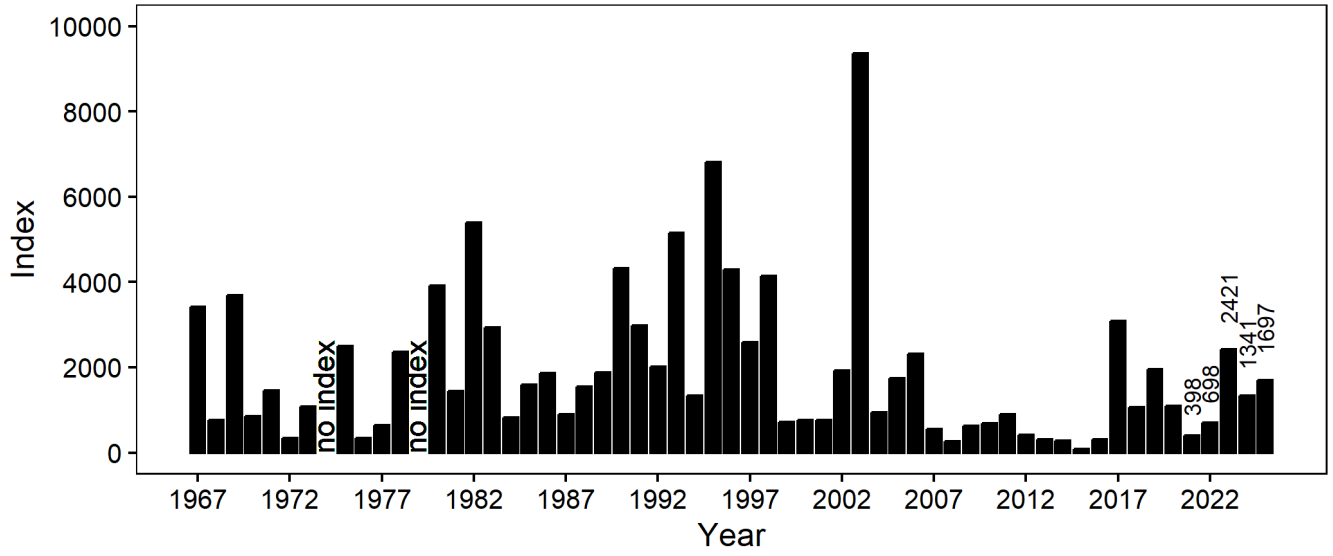

Figure 6. FMWT American Shad annual abundance indices, 1967-2025. Index values for the past 5 years are shown in detail.

A total of 1151 American Shad were collected at index stations and 349 from non-index stations. Suisun Bay yielded the highest American Shad catch among all regions, with peak catches occurring in September (Table 5).

Table 5. American Shad catch among regions during the 2025 Fall Midwater Trawl survey sampling at index and non-index stations. SRDWSC = Sacramento River Deepwater Shipping Channel.

Month	*Type*	*Region*	*Catch*
September	Index	Carquinez Strait	1
September	Index	Lower Sacramento River	112
September	Index	Lower San Joaquin River	6
September	Index	Montezuma Slough	24
September	Index	San Pablo Bay	11
September	Index	South Delta	6
September	Index	Suisun Bay	268
September	Non-Index	Cache Slough	8
September	Non-Index	Mokelumne River	57
September	Non-Index	Montezuma Slough	40
September	Non-Index	SRDWSC	43
October	Index	Lower Sacramento River	13
October	Index	Lower San Joaquin River	2
October	Index	Montezuma Slough	30
October	Index	San Pablo Bay	15
October	Index	Suisun Bay	45
October	Non-Index	Mokelumne River	2
October	Non-Index	Montezuma Slough	13
October	Non-Index	SRDWSC	31
October	Non-Index	Upper Sacramento River	21
November	Index	Lower Sacramento River	41
November	Index	Lower San Joaquin River	13
November	Index	Montezuma Slough	13
November	Index	San Pablo Bay	14
November	Index	Suisun Bay	120
November	Non-Index	Mokelumne River	1
November	Non-Index	Montezuma Slough	23
November	Non-Index	SRDWSC	31

Month	*Type*	*Region*	*Catch*
December	Index	Carquinez Strait	67
December	Index	Lower Sacramento River	15
December	Index	Lower San Joaquin River	25
December	Index	Montezuma Slough	30
December	Index	San Pablo Bay	154
December	Index	South Delta	1
December	Index	Suisun Bay	125
December	Non-Index	Montezuma Slough	17
December	Non-Index	Napa River	14
December	Non-Index	SRDWSC	48
Total			**1,500**

Splittail (*Pogonichthys macrolepidotus*)

The 2025 Splittail abundance index was 0 which shows a continuing trend of very little to no catch of Splittail in FMWT (Fig. 7). Two Splittail were caught in December at non-Index stations in the SRDWSC. During most years, FMWT data probably does not accurately reflect trends in age-0 Splittail abundance, as the index is low or zero except in relatively wet years, such as 2011, when age-0 fish tend to be abundant. FMWT operates in water >2 m deep, whereas Splittail, particularly age-0 fish, appear to primarily inhabit water <2 m deep (Sommer et al. 1997; Moyle et al. 2004). However, FMWT does effectively detect strong year classes, such as the one in 1998 and the most recent one in 2011.

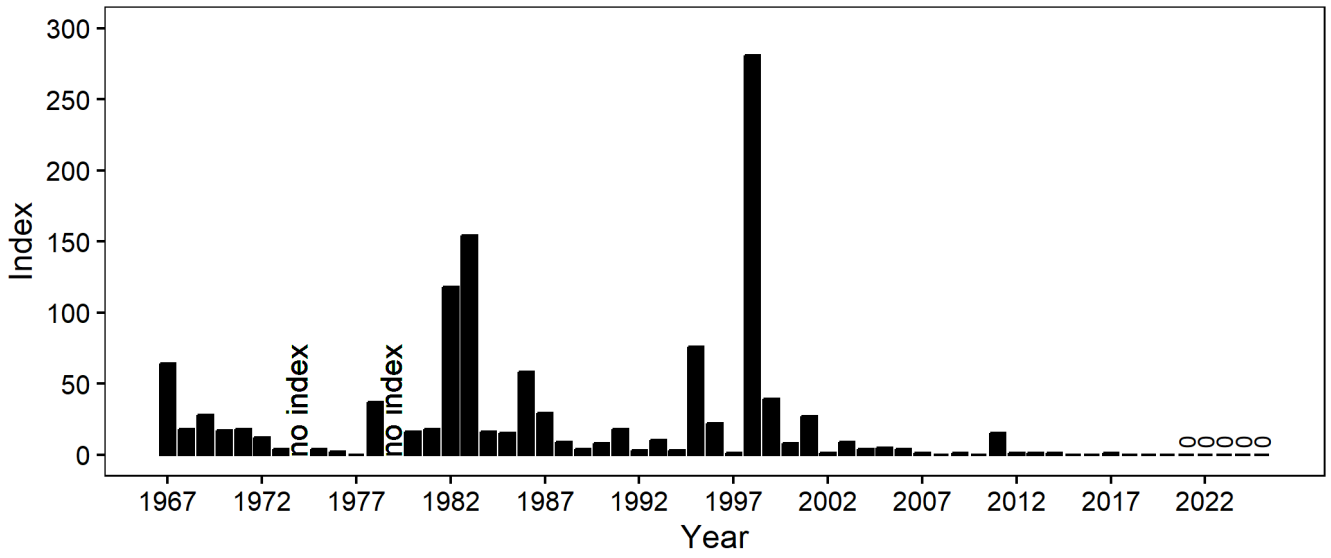

Figure 7. FMWT Splittail annual abundance indices, 1967-2025. Index values for the past 5 years are shown in detail.

Table 6. Splittail catch among regions during the 2025 Fall Midwater Trawl survey sampling at index and non-index stations. SRDWSC = Sacramento River Deepwater Shipping Channel.

Month	*Type*	*Region*	*Catch*
December	Non-Index	SRDWSC	2
Total			**2**

Wakasagi (*Hypomesus nipponensis*)

Wakasagi were first introduced to northern California reservoirs by California Fish & Game in 1959 to provide forage for rainbow trout and other salmonids. It is believed they were present in the San Francisco Estuary as early as 1974, but they were not detected in the Estuary until 1990 by other surveys (Moyle 2002). The first detection of Wakasagi by the FMWT survey was in 1995. The 2025 abundance index was 0 because Wakasagi were only caught at non-index stations (Fig. 8).

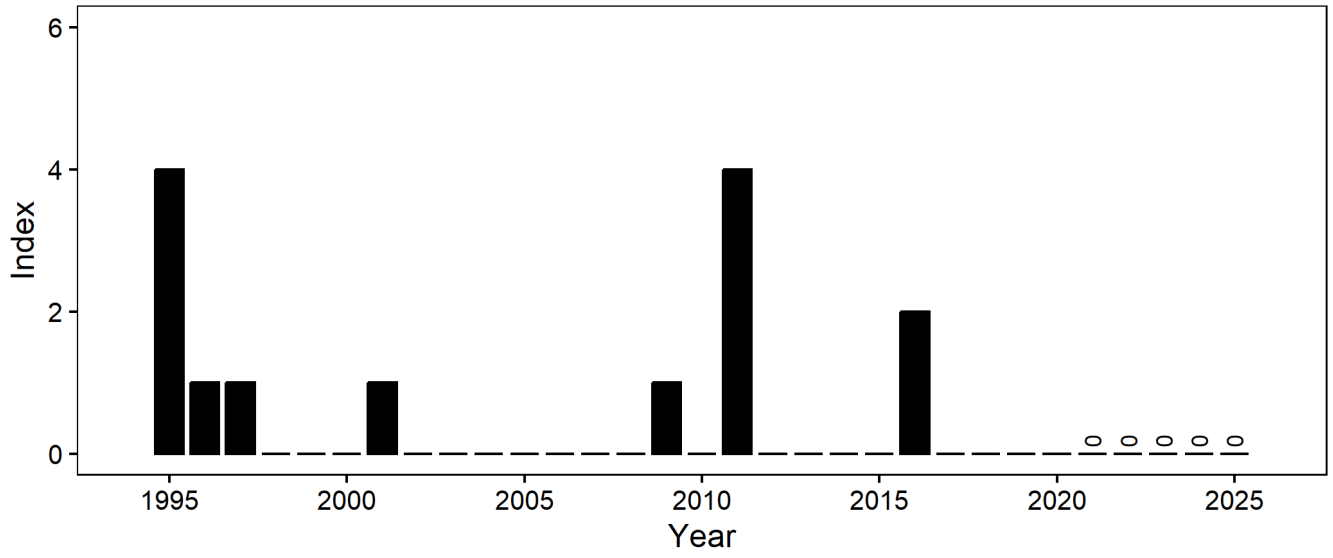

Figure 8. FMWT Wakasagi annual abundance indices, 1995-2025. Index values for the past 5 years are shown in detail.

A total of 0 Wakasagi were collected at index stations and 8 from non-index stations, all in the SRDWSC (Table 7). Monthly catch was highest in October, although overall numbers remained low (Table 7). Little is known about the life history of the California population of Wakasagi compared to the Japanese populations (Davis et al. 2022). Wakasagi in the SF Estuary have yet to become abundant, despite broad temperature (2-29°C) and salinity (0-29 ppt) tolerances (Moyle 2002). FMWT tends to catch this species in the freshwater areas of the north Delta, catch is infrequent and in higher numbers during wet water years.

Table 7. Wakasagi catch among regions during the 2025 Fall Midwater Trawl survey sampling at index and non-index stations. SRDWSC = Sacramento River Deepwater Shipping Channel.

Month	*Type*	*Region*	*Catch*
September	Non-Index	SRDWSC	3
October	Non-Index	SRDWSC	4
November	Non-Index	SRDWSC	1

Month	*Type*	*Region*	*Catch*
Total			**8**

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