

## Memorandum

**Date:** December 16, 2021

**To:** Stephanie Fong  
Acting Regional Manager  
Bay Delta Region

**From:** James White  
Environmental Scientist

Bay Delta Region

**Subject: REVISION - 2021 Fall Midwater Trawl September-October fish abundance and distribution**

**REVISION NOTE: As per FMWT protocol, all osmerids (smelt) are retained in preservative to confirm species identity in the laboratory. Upon this secondary identification, the 6 fish caught at non-index stations in the SRDWSC in October originally identified as Longfin Smelt (*Spirinchus thaleichthys*) were Wakasagi (*Hypomesus nipponensis*). All other smelt species were reexamined, and their original identification was correct. This updated version of the memo corrects the Longfin Smelt catch below. No change to index calculation was warranted. No other changes were made.**

The Fall Midwater Trawl (FMWT) was initiated to determine the relative abundance and distribution of age-0 Striped Bass (*Morone saxatilis*) in the Estuary, but the data is used routinely for information on upper-estuary pelagic species including but not limited to Delta Smelt (*Hypomesus transpacificus*) and Longfin Smelt (*Spirinchus thaleichthys*). The FMWT samples 122 stations (Fig. 1) 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 (Fig. 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. The midseason abundance indices reported here are the sum of the first two (September-October) of the four planned monthly abundance indices that will comprise the annual FMWT abundance indices.

The September and October FMWT surveys were conducted Sept. 1-17 and Oct. 4-21. In September and October, 121 and 122 fish tows were conducted as well as 32 zooplankton tows, respectively. Here we report catch from index and non-index 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](#)).

## FMWT Station Map

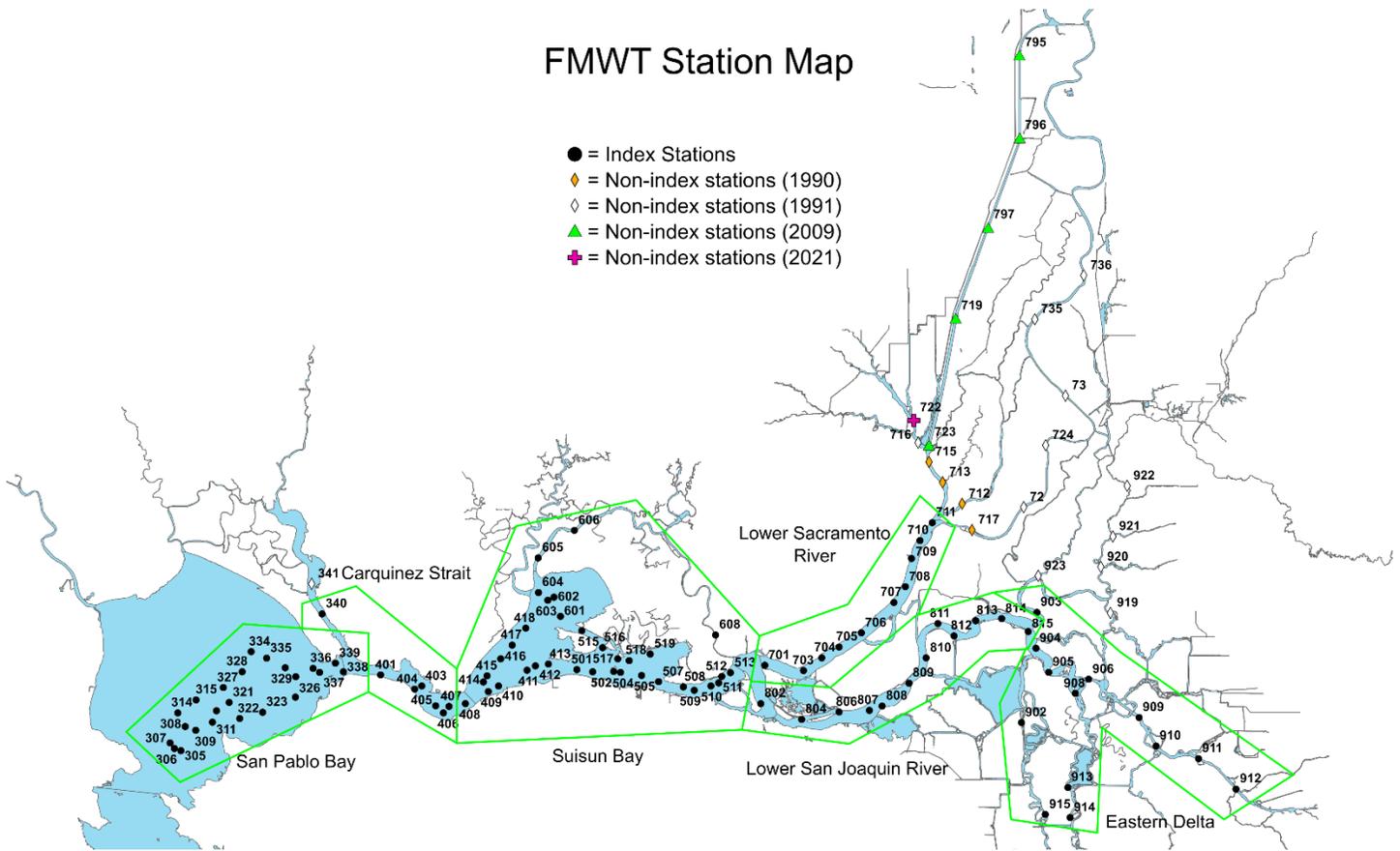


Figure 1. Map of CDFW Fall Midwater Trawl Survey monthly sampling sites among index and non-index stations in the upper San Francisco Estuary, California, USA. Polygons represent regional groupings of index stations.

## Delta Smelt (*Hypomesus transpacificus*)

No Delta Smelt were collected at index stations in September for an index of 0 and none were collected in October for an index of 0. The 2021 September-October index (0) is tied with 2016, 2018, 2019, and 2020 as the lowest index in FMWT history (Figure 2). Zero Delta Smelt were collected at non-index stations during September or October. An absence of Delta Smelt catch in the FMWT is consistent among other surveys in the estuary. The Enhanced Delta Smelt Monitoring (EDSM) survey of the U.S. Fish and Wildlife Service (USFWS) caught no Delta Smelt among 61 sampling days (between 9/1 & 10/28) comprised of 1126 tows (U.S. Fish and Wildlife Service 2021 Nov 10). USFWS Chipps Island Trawl survey also caught zero Delta Smelt across 15 days in September and October (between 9/21 & 10/21) over 250 tows (U.S. Fish and Wildlife Service 2021 Nov 11).

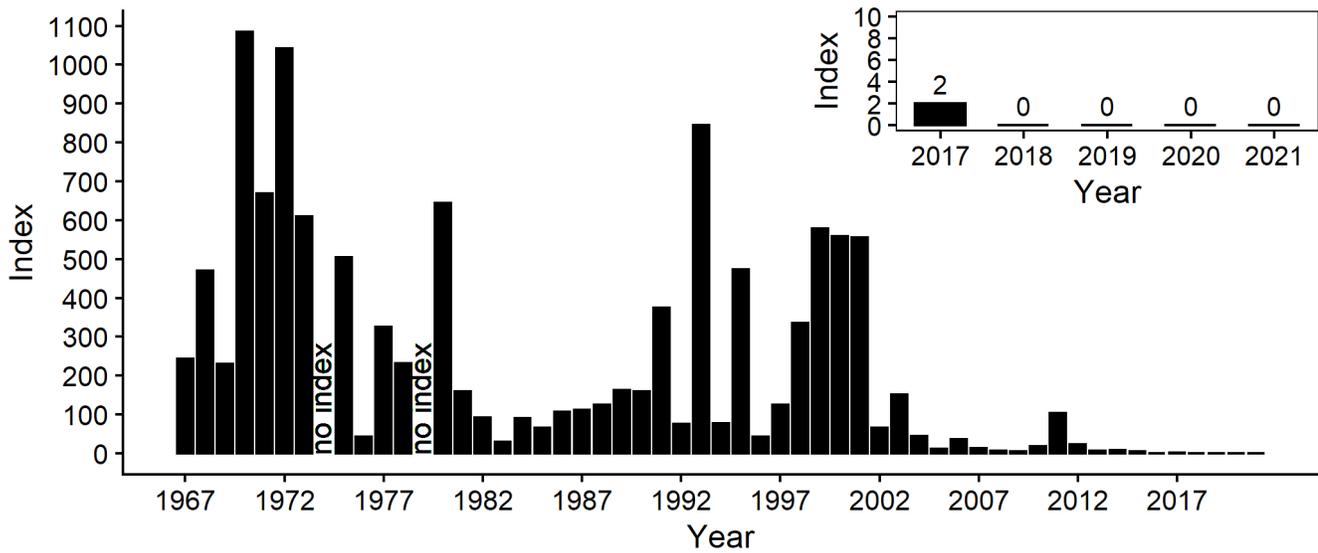


Figure 2. FMWT Delta Smelt September-October abundance indices, 1967-2021. Inset graph shows detailed view of previous 5 years.

### Age-0 Striped Bass (*Morone saxatilis*)

One age-0 Striped Bass was collected at index stations in September for an index of 1. In October, 8 bass were collected for an index of 10. The 2021 September-October index (11) is an 8% decrease from the previous year (Figure 3). No Striped Bass were collected at non-index stations during September or October.

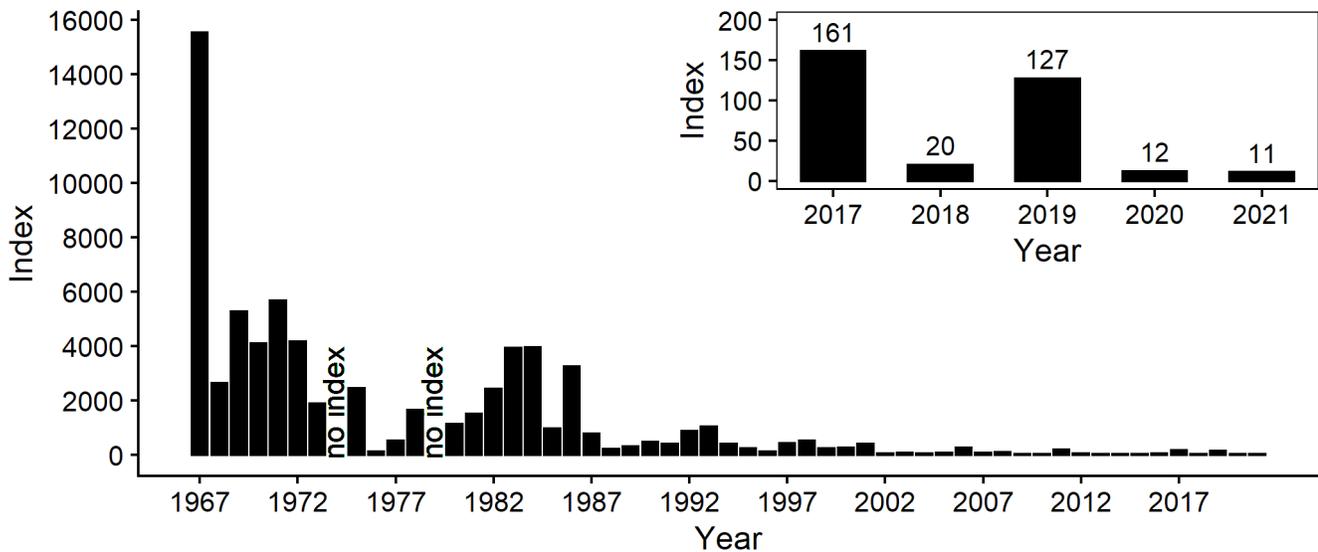


Figure 3. FMWT Age-0 Striped Bass September-October abundance indices, 1967-2021. Inset graph shows detailed view of previous 5 years.

The single Striped Bass caught in September was from the Lower Sacramento River and the 8 fish caught in October were from the Lower Sacramento River as well (Table 1).

Table 1: Age-0 Striped Bass catch among regions during the 2021 Fall Midwater Trawl survey sampling at index and non-index stations.

Month	Type	Region	Catch
September	Index	Lower Sacramento River	1
October	Index	Lower Sacramento River	8
<b>Total</b>			<b>9</b>

### Longfin Smelt (*Sprinchus thaleichthys*)

One Longfin Smelt was collected at index stations in September for an index of 1 and 6 were collected in October for an index of 12. The 2021 September-October index (13) is a 100% increase from the previous year (Figure 4). 0 Longfin Smelt were collected at non-index stations during September and October.

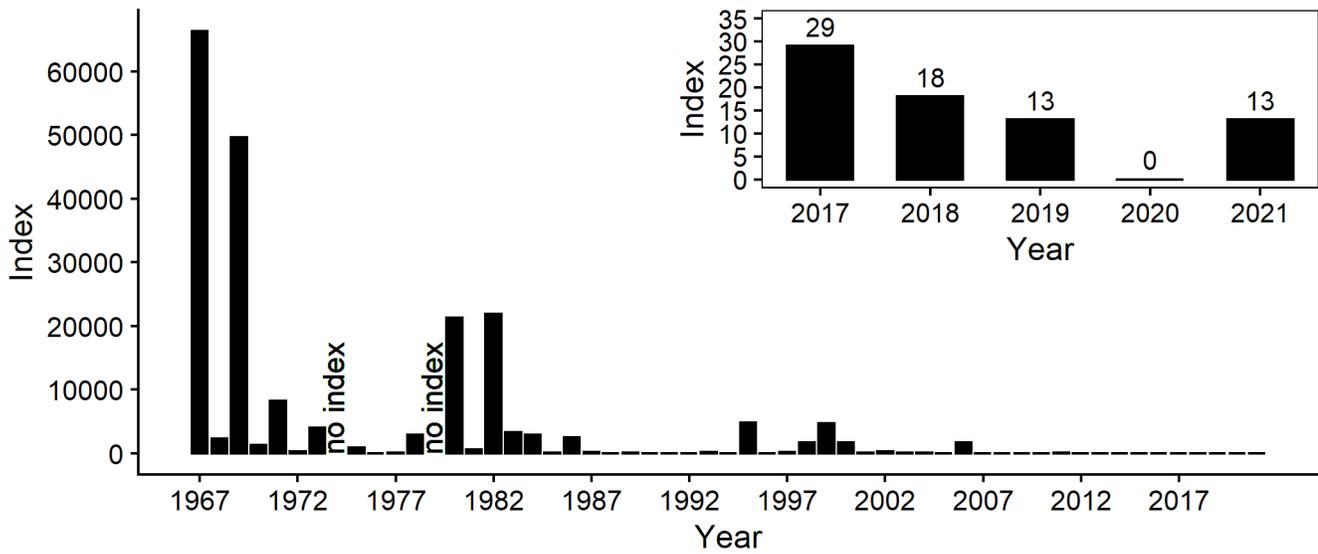


Figure 4. FMWT Longfin Smelt September-October abundance indices, 1967-2021. Inset graph shows detailed view of previous 5 years.

Longfin Smelt catch was highest in September at Suisun Bay. Catch was equal in October among San Pablo Bay, Suisun Bay, and the Lower Sacramento River (Table 2).

Table 2: Longfin Smelt catch among regions during the 2021 Fall Midwater Trawl survey sampling at index and non-index stations.

Month	Type	Region	Catch
September	Index	Suisun Bay	1
October	Index	Lower Sacramento River	2
October	Index	San Pablo Bay	2
October	Index	Suisun Bay	2
<b>Total</b>			<b>7</b>

### Threadfin Shad (*Dorosoma petenense*)

9 Threadfin Shad were collected at index stations in September for an index of 11 and 24 were collected in October for an index of 28. The 2021 September-October index (39) is a 19% decrease from the previous year (Figure 5). 8 Threadfin Shad were collected at non-index stations during September and 100 were collected in October.

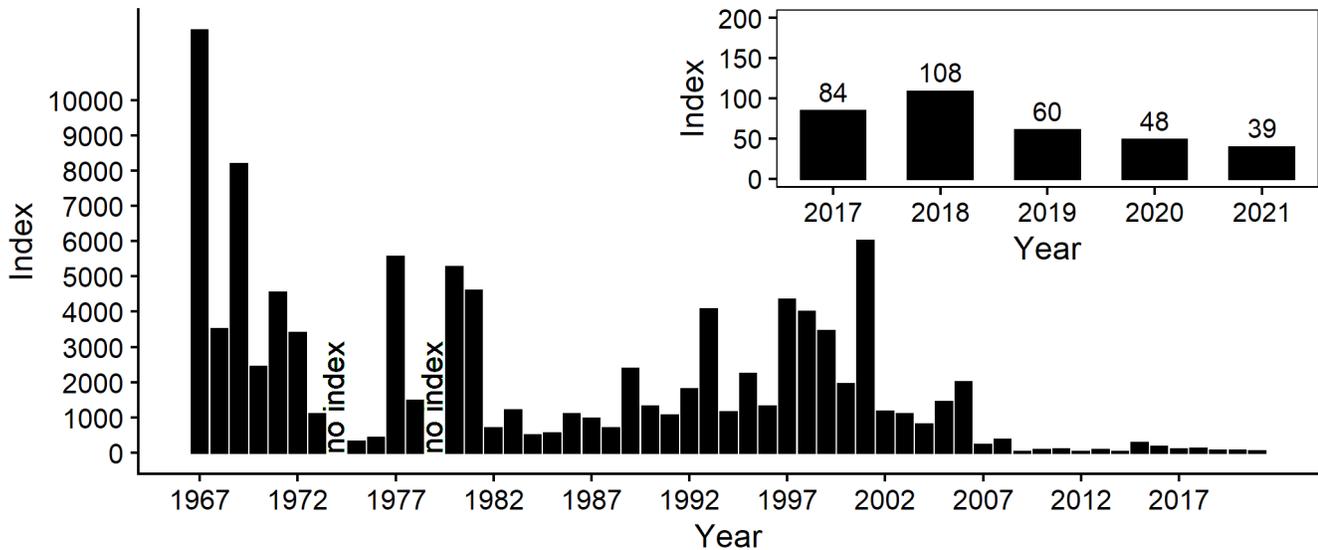


Figure 5. FMWT Threadfin Shad September-October abundance indices, 1967-2021. Inset graph shows detailed view of previous 5 years.

Threadfin Shad catch was highest in September at Lower Sacramento River, SRDWSC and highest in October at SRDWSC (Table 3).

Table 3: Threadfin Shad catch among regions during the 2021 Fall Midwater Trawl survey sampling at index and non-index stations. \*SRDWSC = Sacramento River Deepwater Shipping Channel.

<i>Month</i>	<i>Type</i>	<i>Region</i>	<i>Catch</i>
September	Index	Lower Sacramento River	8
September	Index	Lower San Joaquin River	1
September	Non-Index	SRDWSC	8
October	Index	Lower Sacramento River	5
October	Index	Lower San Joaquin River	17
October	Index	Suisun Bay	2
October	Non-Index	SRDWSC	100
<b>Total</b>			<b>141</b>

### American Shad (*Alosa sapidissima*)

19 American Shad were collected at index stations in September for an index of 24 and 79 were collected in October for an index of 103. The 2021 September-October index (127) is a 58% decrease from the previous year (Figure 6). 6 American Shad were collected at non-index stations during September and 50 were collected in October.

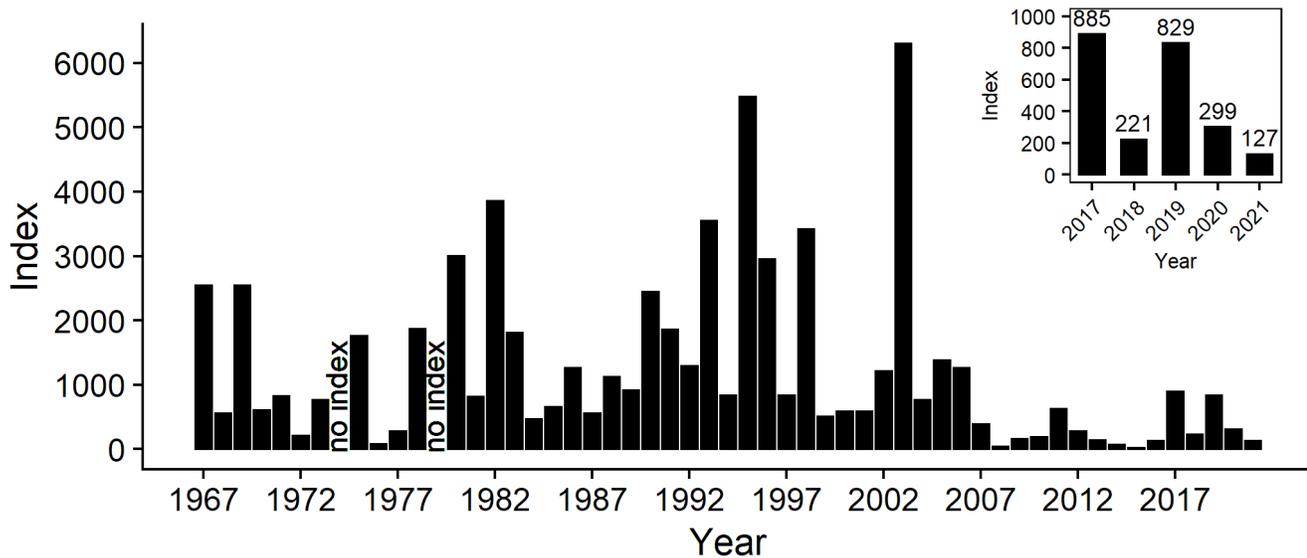


Figure 6. FMWT American Shad September-October abundance indices, 1967-2021. Inset graph shows detailed view of previous 5 years.

American Shad catch was highest in September at Suisun Bay and highest in October at SRDWSC (Table 4).

Table 4: American Shad catch among regions during the 2021 Fall Midwater Trawl survey sampling at index and non-index stations. \*SRDWSC = Sacramento River Deepwater Shipping Channel.

<i>Month</i>	<i>Type</i>	<i>Region</i>	<i>Catch</i>
September	Index	Carquinez Strait	1
September	Index	Lower Sacramento River	5
September	Index	Lower San Joaquin River	1
September	Index	Suisun Bay	12
September	Non-Index	SRDWSC	6
October	Index	Carquinez Strait	5
October	Index	Lower Sacramento River	43
October	Index	Lower San Joaquin River	18
October	Index	San Pablo Bay	3
October	Index	Suisun Bay	10
October	Non-Index	SRDWSC	50
<b>Total</b>			<b>154</b>

### **Splittail (*Pogonichthys macrolepidotus*)**

No Splittail were collected at index stations in September for an index of 0 and none were collected in October for an index of 0. The 2021 September-October index (0) continues the pattern of a zero index since 2011 (Figure 7). 0 Splittail were collected at non-index stations during September and 1 was collected in October.

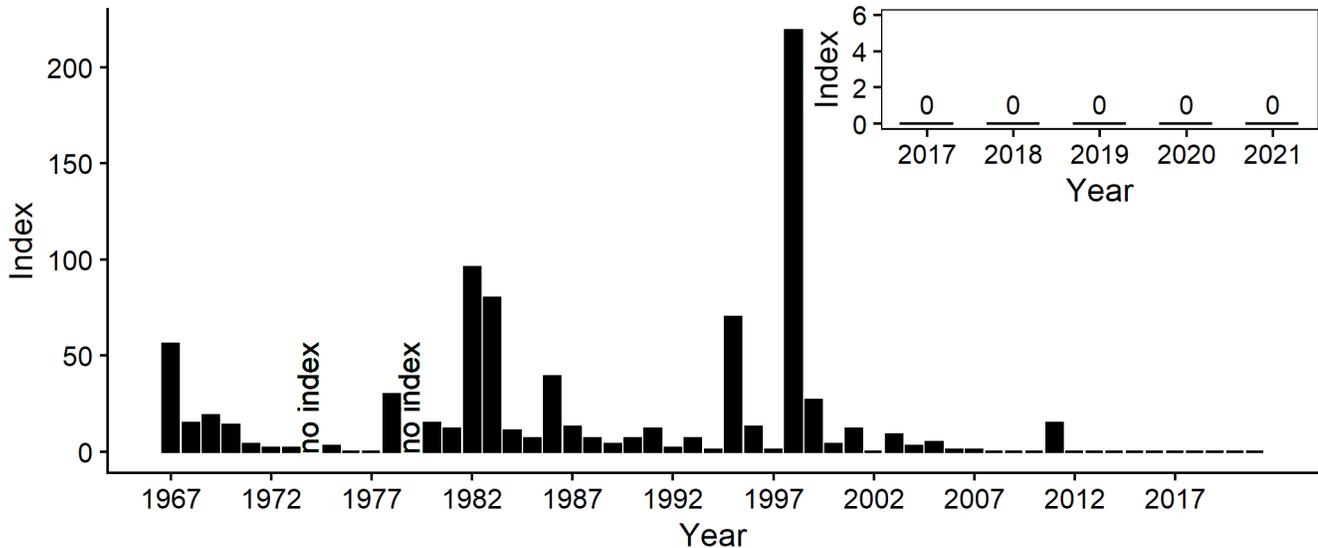


Figure 7. FMWT Splittail September-October abundance indices, 1967-2021. Inset graph shows detailed view of previous 5 years.

The single Splittail caught was in October in the SRDWSC.

## References

U.S. Fish and Wildlife Service. 2021 Nov 10. Enhanced Delta Smelt Monitoring Daily Report. [accessed 2021 Nov 11].

[https://www.fws.gov/lodi/juvenile\\_fish\\_monitoring\\_program/edsd/?dir=Enhanced%20Delta%20Smelt%20Monitoring%20Daily%20Report](https://www.fws.gov/lodi/juvenile_fish_monitoring_program/edsd/?dir=Enhanced%20Delta%20Smelt%20Monitoring%20Daily%20Report).

U.S. Fish and Wildlife Service. 2021 Nov 11. Chipps Island trawls CHN & POD species 2012-2021. [accessed 2021 Nov 11].

[https://www.fws.gov/lodi/juvenile\\_fish\\_monitoring\\_program/djfm/?dir=Chipps%20Island%20trawls%20CHN-POD%20species%202012-Present](https://www.fws.gov/lodi/juvenile_fish_monitoring_program/djfm/?dir=Chipps%20Island%20trawls%20CHN-POD%20species%202012-Present).