

# Memorandum

**Date:** 07/20/2020

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**Subject:** 2020 Delta Smelt Relative Abundance Index from the Spring Kodiak Trawl

## *2020 Results*

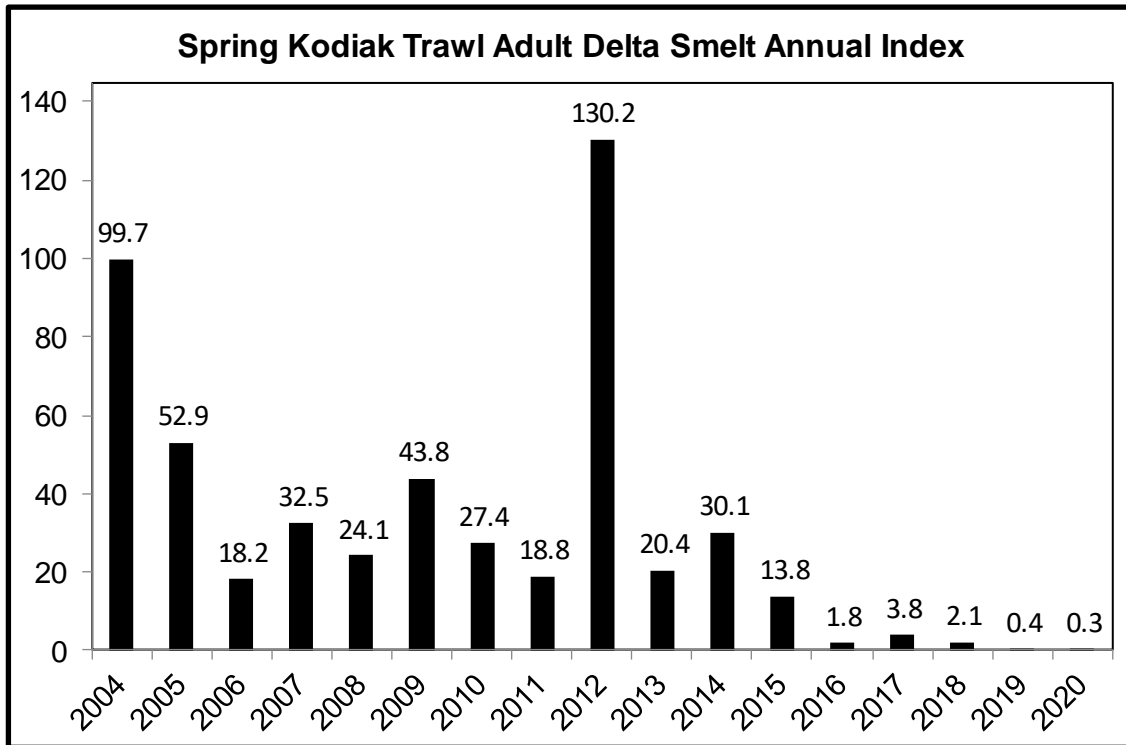
The 2020 Spring Kodiak Trawl (SKT) Delta Smelt index of relative abundance was 0.3 and the lowest index on record (Figure 1). The SKT index is calculated using 39 stations, each sampled monthly from January through April (156 sampling events). Due to the COVID-19 pandemic, SKT was unable to sample in April, bringing the total sampling events for the 2020 season down to 115. This reduction in sampling is unlikely to have affected the yearly index value. SKT has not caught a Delta Smelt at an index station in April since 2014, meaning that sampling in April has not impacted the index value for the last 5 years (Table 1). In 2020, only two Delta Smelt were caught, both were collected in the Sacramento River, one in January at Station 704, and one in February at Station 707 (Figure 2). This low index and associated catch was consistent with record low Delta Smelt relative abundance in proceeding 2019 surveys<sup>1</sup>, and the 2020 Enhanced Delta Smelt Monitoring (EDSM)<sup>2</sup>. From January through March, EDSM completed 1,834 sampling events and collected 7 Delta Smelt in the Sacramento River, the Sacramento Deep Water Ship Channel, Suisun Bay, and Suisun Marsh.

Since the SKT monitors the adult Delta Smelt spawning stock, this year's index indicates that the number of spawners was at a record low, which may limit larval recruitment and hinder the recovery of Delta Smelt in 2020.

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<sup>1</sup> See *Memorandum: 2019 20-mm Survey Delta Smelt Index*, available here: <https://www.wildlife.ca.gov/Conservation/Delta/20mm-Survey/Bibliography> and *Memorandum: Fall Midwater Trawl 2019 Annual Fish Abundance Summary*, available here: <https://www.wildlife.ca.gov/Conservation/Delta/Fall-Midwater-Trawl/Bibliography>

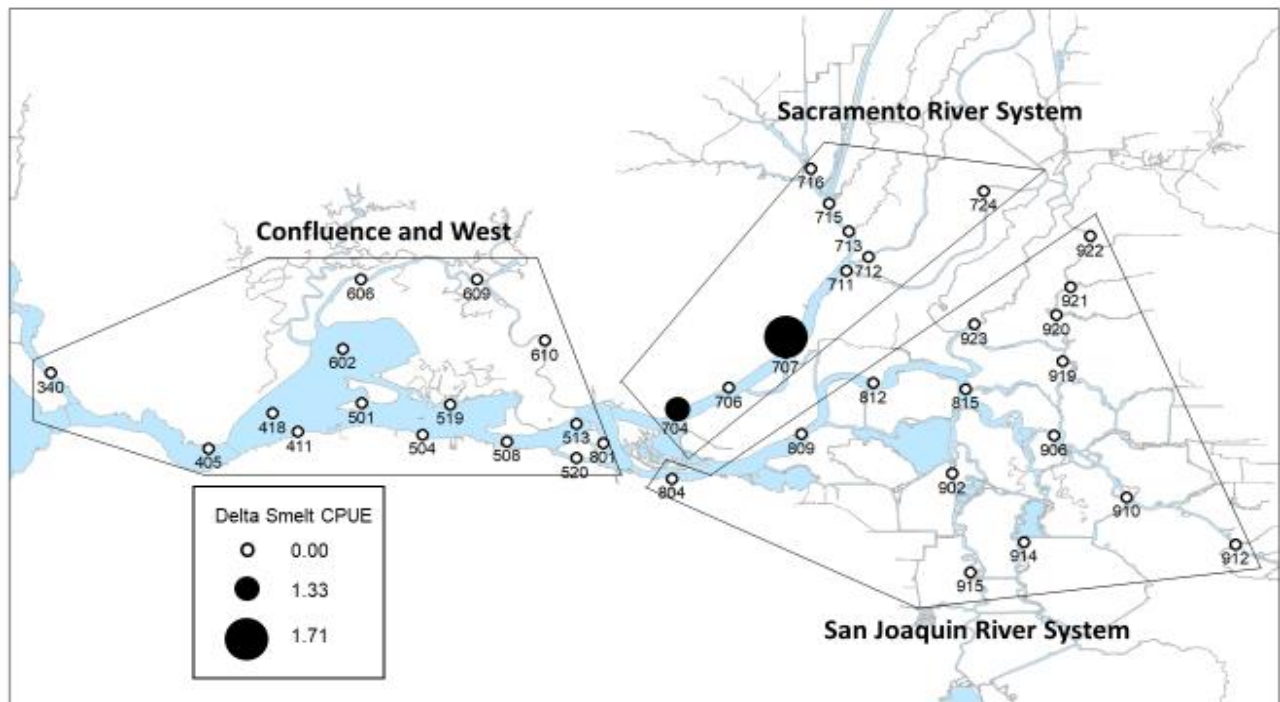
<sup>2</sup> See Delta Juvenile Fish Monitoring Program Enhanced Delta Smelt Monitoring, Monitoring Data [https://www.fws.gov/lodi/juvenile\\_fish\\_monitoring\\_program/jfmp\\_index.htm](https://www.fws.gov/lodi/juvenile_fish_monitoring_program/jfmp_index.htm)



**Figure 1. The CDFW's Spring Kodiak Trawl Delta Smelt index, 2004-2020.**

**Table 1. Annual comparison of the historic index calculation (incorporating data collected January through April) to a hypothetical reduced-sampling index calculation (incorporating data collected January through March).**

Year	Historic Index (Surveys 1-4)	Reduced-Sampling Index (Surveys 1-3)	Difference
2004	99.7	89.9	9.8
2005	52.9	51.0	1.9
2006	18.2	17.3	0.9
2007	32.5	30.1	2.3
2008	24.1	22.7	1.4
2009	43.8	42.2	1.6
2010	27.4	26.0	1.5
2011	18.8	17.6	1.2
2012	130.2	114.0	16.2
2013	20.4	18.4	2.0
2014	30.1	29.0	1.1
2015	13.8	13.8	0.0
2016	1.8	1.8	0.0
2017	3.8	3.8	0.0
2018	2.1	2.1	0.0
2019	0.4	0.4	0.0



**Figure 2. Map of the upper San Francisco Estuary showing the CDFW Spring Kodiak Trawl index stations and associated adult Delta Smelt catch per unit effort (10,000 m<sup>3</sup>) for all index surveys.**

### *Index Methods*

SKT operates annually to track the distribution, relative abundance, and spawning condition of adult Delta Smelt throughout its historic range in the upper San Francisco Estuary. The SKT is conducted monthly from January to May and was initiated in 2002. The methods were standardized in 2004 and a Delta Smelt index was first developed in 2012.

The SKT Delta Smelt index is calculated using only index surveys and index stations (Figure 2). Logistical issues sometimes prevent stations from being sampled (Table 2). In 2020, 1 index station was not sampled during Survey 1 because high flows made sampling unsafe. During survey 3 6 index stations were not sampled due to boat issues. Survey 4 was canceled due to the COVID-19 pandemic. To calculate the index, stations are grouped into 3 spatial regions and a mean catch per 10,000 cubic meters of water (i.e., CPUE) is calculated. The regional means are then summed to create an index for each survey, and survey indices are summed to calculate the SKT index. The SKT index allows for comparison across years to reflect trends in the population, but it is not an abundance estimate of the overall population.

**Table 2. Index stations not sampled during CDFW's Spring Kodiak Trawl by survey, 2004 to 2020.**

Survey	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1	724	724			922					724		711 724		724 922 923			
2	724 919 920 921 922 923		340	340								923	724			724	
3	724								724 610 609 606 602 519 504 501 418 411 405 340		724						704 920 921 922 923
4	724	724															All Stations