

Memorandum

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Subject: 2013 Index of Delta Smelt Relative Abundance from the Spring Kodiak Trawl

The SKT index (Figure 1) is calculated each year once the accuracy of the data has been verified. It is calculated using all adult delta smelt catch data from the 39 “core” stations that are sampled during each of the first 4 delta-wide surveys conducted in each year. This year’s index is 21.0, a large drop from last year (2012 is the highest on record), but comparable with previous years back to 2005.

Year	Index
2002	N/A
2003	80.6
2004	97.3
2005	51.2
2006	18.2
2007	32.5
2008	24.1
2009	44.6
2010	27.4
2011	20.0
2012	147.3
2013	21.0

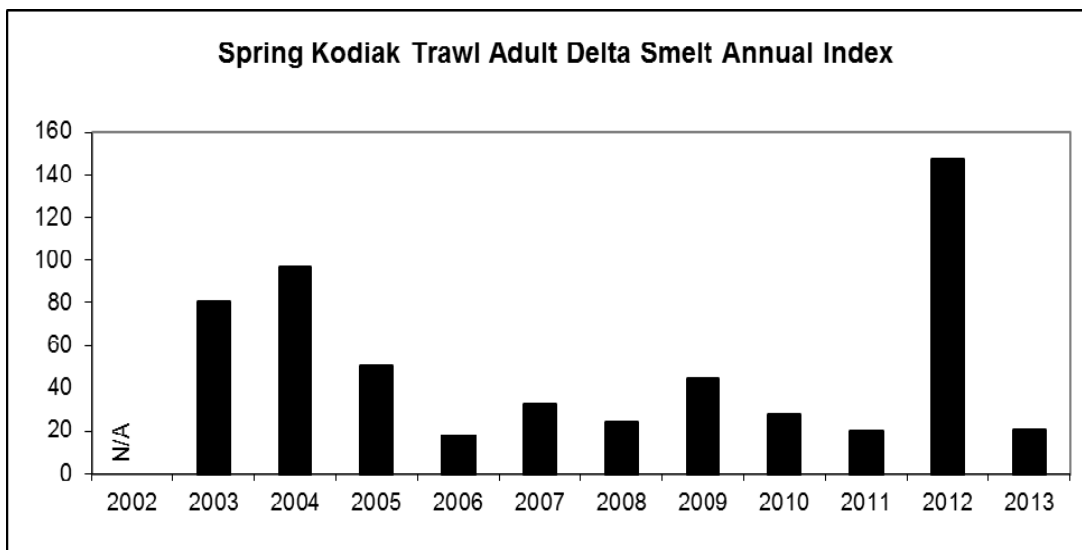


Figure 1. The SKT delta smelt index over the period of record, 2002 - 2013.

The following is a summary of the methods used to calculate the SKT index.

All adult delta smelt catch data from the 39 “core” stations that are sampled during each of the first 4 delta-wide surveys conducted in a given sampling year are used. For each survey, stations are grouped into 3 distinct regions based on geographic location, and a regional mean catch per 10,000 cubic meters (i.e., CPUE) is calculated. Table 1 shows how the regional means were calculated for 2013, Survey1.

Table 1. 2013 Spring Kodiak Trawl: Delta-wide Survey # 1 (regional groupings of core stations).

Region	Station	CPUE	Regional Mean
Confluence and West	340	0	3.0
	405	0	
	411	0	
	418	0	
	501	0	
	504	0	
	508	0	
	513	1.2	
	519	3.8	
	520	0	
	602	3.8	
	606	33.8	
	609	2.5	
	610	0	
801	0		

Region	Station	CPUE	Regional Mean
Sacramento River System	704	0	1.81
	706	0	
	707	4.01	
	711	0	
	712	0	
	713	0	
	715	7.03	
	716	3.42	
	724	0	

Region	Station	CPUE	Regional Mean
San Joaquin River System	804	0	1.45
	809	16.52	
	812	3.60	
	815	0	
	902	0	
	906	0	
	910	0	
	912	0	
	914	0	
	915	0	
	919	1.69	
	920	0	
	921	0	
	922	0	
923	0		

The regional means are then summed to create a survey index, and survey indices are summed to calculate the annual index. The equation is as follows:

$$Annual\ Index = \sum_{surveys} \left(\sum_{regions} \left(\overline{CPUE}_{(region)} \right) \right)$$

Only delta-wide survey numbers 1 through 4 are considered for the index calculation; 4 was the maximum number of surveys conducted in 2 out of the 10 years the index is calculated for. There were only 3 delta-wide surveys conducted in 2002, so no index is calculated for SKT's inaugural year. The 39 "core" stations (Table 1) are defined as the stations sampled during the delta-wide surveys of 2002. Additional routine-sampling locations were added in later years but are not considered "core" stations, and thus not included in the calculation.

While there are no caveats to report regarding this index of abundance, it should be noted that the intention of the SKT Survey is to describe the status of gonadal maturation and identify specific spatial and temporal spawning events of delta smelt specifically. We believe the SKT sampling methodologies are such that it is reasonable to calculate an abundance index from the SKT data. Additionally, a comparison of the FMWT and SKT delta smelt indices reveal highly-consistent ($R^2 = 0.96$) inter-annual changes in proportional magnitude of abundance.

cc: Region 3 Bay-Delta
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