State of California
Department of Fish and Wildlife

M e m o r a n d u m

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Subject: 2015 Index of Delta Smelt Relative Abundance from the Spring Kodiak Trawl

The Spring Kodiak Trawl (SKT) has operated annually since 2002 to track the distribution, relative abundance, and spawning condition of adult Delta Smelt throughout most of its historic range. The study consists of a Delta-wide survey each month (January-May) and sometimes includes supplemental collections. Information from SKT is considered in near-real-time by water management stakeholders, because the information speaks to risk of Delta Smelt entrainment in the South Delta.

Although the SKT was not originally intended to index the Delta Smelt population's seasonal abundance, the SKT's methods were standardized by 2004 and an index from the SKT data was first developed in 2012. The SKT Delta Smelt index is calculated using the first four Delta-wide surveys and is designed to use all of the 39 core stations sampled each survey[1]. These stations are grouped into three distinct regions based on geographic location (Table 1) and a regional mean catch per 10,000 cubic meters (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 equation is as follows:

$$SKT\ Index = \sum_{surveys}\left(\sum_{regions}\left(\overline{CPUE_{(region)}}\right)\right)$$

The 2015 SKT index is 13.8 and is the lowest on record (Figure 1[2]). This finding was expected because the Delta Smelt population was at record-low abundance at the end of 2014[3]. Low relative abundance of spawning stock and poor environmental conditions mean that larval recruitment will likely be extremely low in 2015.

[1] Foul weather and boat breakdowns during a Delta-wide survey sometimes prevent sampling at one or more core stations. A complete listing of stations that were not sampled during a given survey and year are listed in Table 2 and should be considered when comparing indices among years.

[2] We have slightly-revised the indices for previous years. The previous time series and the present time series are highly correlated with an R-squared value of 0.99 and a slope of 0.91.

[3] See the 2014 Fall Midwater Trawl Survey memo available here: http://www.dfg.ca.gov/delta/data/fmwt/bibliography.asp

Table 1. The CDFW's Spring Kodiak Trawl core station regional groupings and Delta Smelt catch-per-unit-effort for the 2015 Delta-wide Survey #1.

Region	Station	CPUE	Regional Mean
Confluence and West	340	0	1.10
	405	0	
	411	0	
	418	0	
	501	0	
	504	0	
	508	1.74	
	513	1.46	
	519	0	
	520	0	
	602	0	
	606	1.50	
	609	5.96	
	610	4.30	
	801	1.59	

Region	Station	CPUE	Regional Mean
Sacramento River System	704	0	1.19
	706	8.31	
	707	0	
	711		
	712	0	
	713	0	
	715	0	
	716	0	
	724		

Region	Station	CPUE	Regional Mean
San Joaquin River System	804	0	0.53
	809	7.95	
	812	0	
	815	0	
	902	0	
	906	0	
	910	0	
	912	0	
	914	0	
	915	0	
	919	0	
	920	0	
	921	0	
	922	0	
	923	0	

Year	Index
2002	N/A
2003	N/A
2004	99.7
2005	52.9
2006	18.2
2007	32.5
2008	24.1
2009	43.8
2010	27.4
2011	18.8
2012	130.2
2013	20.4
2014	30.1
2015	13.8

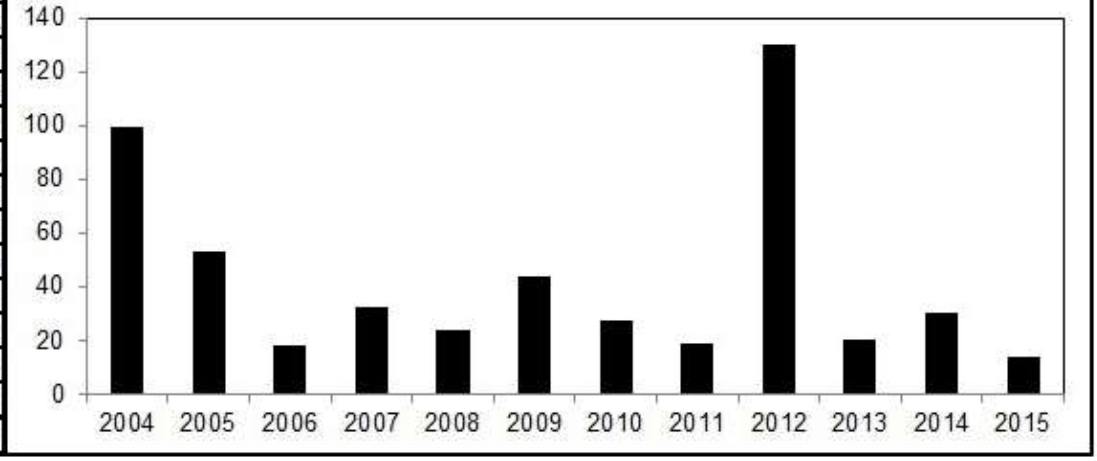

Figure 1. The CDFW's Spring Kodiak Trawl Delta Smelt index over the period of record, 2004-2015.

Table 2. Core stations not sampled during CDFW's Spring Kodiak Trawl Delta-wide surveys, 2004-2015.

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