

2017 Southern District Trawl Survey Summary

Joshua Mumm

September 25th, 2017

The 2017 Southern District large-mesh bottom trawl survey was conducted between August 29th and September 6th. A total of 39 successful 0.5 nmi tows were completed, including 38 core stations and 1 ancillary station (station 139). 1,481 male and 1,350 female Tanner crab were captured.

The recruit class size definitions for male Tanner crab in Cook Inlet were revised in 2017, coinciding with a reduction in the legal size limit from 140 mm (5.5 in) to 114 mm (4.5 in) (Table 1). The new 2017 size class definitions are anticipated to be the focus from this point on, however for historical comparison the entire time series of survey data (1990 to 2017) were analyzed using both sets of recruit classes herein.

Using the new legal size (114 mm), 137 legal males were captured in the 2017 survey. Mean legal male CPUE was 10.12 crab/nmi (CV = 3.22) and ranged from 0 to 186. The estimated abundance of legal males using the new legal size was 124,965 crabs (95% CI = 132,244). When the new size limits were retroactively applied to the historical survey data, the 2017 legal abundance estimate was the 2nd lowest on record, surpassing only 2012 (Table 2; Figure 2).

Using the old legal size (140 mm), 8 legal males were captured in the 2017 survey. When analyzed using the old size categories, the 2017 survey produced the lowest legal male abundance estimate on record, 7,078 crab (+/- 8,329) (Table 3; Figure 3).

Male Tanners, especially large males were concentrated in the trench north of Gull Island and Anisom Point (Figures 4 and 5).

Legal male Dungeness crab CPUE in the 2017 survey was greater than in 2009 to 2013, but less than all but 2 years prior to 2009 (Table 4).

Pollock, tomcod and especially sablefish were all more abundant in this year's survey than in any previous year (Figure 7). Sablefish CPUE this year was more than two times greater than any other year. Despite field impressions, tomcod CPUE was only slightly greater than in 2008.

Table 1: Male Tanner crab carapace width (mm) by recruit category for the Southern District trawl surveys.

Recruit category	pre-2017	2017
Prerecruit-4	< 70	< 66
Prerecruit-3	70-91	66-79
Prerecruit-2	92-114	80-95
Prerecruit-1	115-139	96-113
Recruit	140-165	114-134
Postrecruit	> 165	> 134

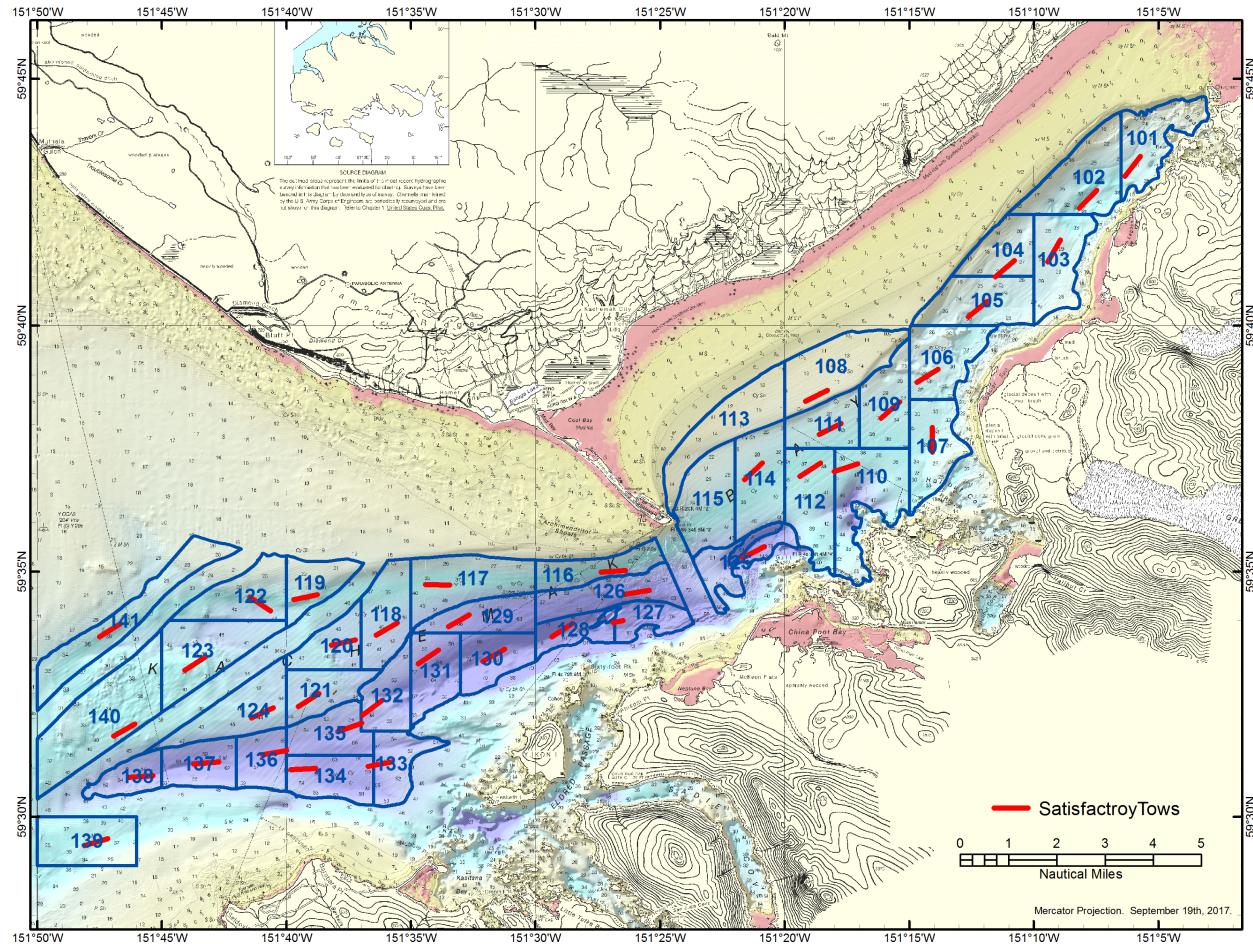


Figure 1: 2017 Southern District large-mesh trawl survey grid and tow paths.

Table 2: Male Tanner crab abundance estimates using the 2017 size class definitions from trawl surveys in the Southern District, 1990-2017. Parenthetical size limits are carapace width in millimeters.

Year	Tows	Pre-Recruits				Legal Males		Total Males	
		Pre-4 (<66)	Pre-3 (66-79)	Pre-2 (80-95)	Pre-1 (96-113)	Abund. (>114)	95% CI	Abund.	95% CI
1990	14	434,468	336,711	556,501	493,498	893,456	674,240	2,714,634	1,145,882
1991	15	252,510	131,374	273,576	685,422	1,379,426	453,670	2,722,308	879,693
1992	15	209,831	71,948	134,688	381,086	1,978,010	1,054,687	2,775,565	1,097,301
1993	16	558,464	59,025	73,378	107,855	848,810	363,005	1,647,532	430,628
1994	16	260,137	127,473	161,944	101,303	356,246	156,693	1,007,104	451,486
1995	16	300,509	198,207	301,598	484,296	811,734	807,143	2,096,344	1,299,465
1996	16	176,841	32,054	49,592	454,902	742,974	595,718	1,456,364	1,174,485
1997	16	134,484	87,749	107,042	244,548	478,055	211,981	1,051,879	323,965
1998	16	320,868	16,134	9,216	20,131	403,196	347,716	771,087	373,615
1999	16	713,951	699,162	830,294	518,904	312,049	239,298	3,074,360	2,743,906
2000	16	446,734	231,376	345,433	316,831	480,494	261,368	1,820,868	754,144
2001	16	1,508,596	470,833	344,754	255,343	504,698	318,804	3,084,224	1,995,590
2002	14	1,673,386	908,731	838,260	369,526	311,822	244,971	4,101,726	2,098,934
2003	16	884,933	861,700	806,086	553,965	358,230	201,368	3,464,914	1,726,501
2004	16	635,416	355,266	1,041,375	723,209	868,018	460,041	3,623,284	1,875,763
2005	15	986,832	174,394	87,049	155,515	405,890	452,079	1,809,679	1,083,062
2006	17	970,276	133,238	113,845	191,802	456,127	583,967	1,865,289	1,828,893
2007	16	326,276	38,953	100,798	116,841	561,046	909,757	1,143,914	1,252,423
2008	16	528,442	87,852	187,970	125,792	351,461	425,347	1,281,516	787,437
2009	15	818,177	439,944	547,114	636,899	752,945	548,314	3,195,079	2,338,396
2010	-	-	-	-	No_Survey	-	-	-	-
2011	37	4,005,798	190,619	78,819	32,032	139,263	121,689	4,447,159	1,983,355
2012	37	1,527,582	2,375,372	721,862	123,414	80,920	55,218	4,829,149	1,796,356
2013	37	778,423	390,244	716,835	1,098,146	192,637	105,523	3,179,046	975,058
2014	-	-	-	-	No_Survey	-	-	-	-
2015	-	-	-	-	No_Survey	-	-	-	-
2016	-	-	-	-	No_Survey	-	-	-	-
2017	38	180,159	369,070	274,479	187,270	124,965	132,255	1,135,943	806,870

Table 3: Male Tanner crab abundance estimates using the pre-2017 size class definitions from trawl surveys in the Southern District, 1990-2017. Parenthetical size limits are carapace width in millimeters.

Year	Tows	Pre-Recruits				Legal Males		Total Males	
		Pre-4 (<70)	Pre-3 (70-91)	Pre-2 (92-114)	Pre-1 (115-139)	Abund. (>140)	95% CI	Abund.	95% CI
1990	14	496,674	722,894	613,950	492,692	388,422	403,617	2,714,634	1,145,882
1991	15	293,894	277,640	802,800	848,159	499,815	226,608	2,722,308	879,693
1992	15	237,159	125,034	455,057	902,459	1,055,855	734,287	2,775,565	1,097,301
1993	16	578,321	89,958	135,248	325,507	518,498	254,074	1,647,532	430,628
1994	16	312,332	210,142	132,840	158,590	193,199	106,304	1,007,104	451,486
1995	16	356,090	389,839	565,725	506,325	278,365	296,245	2,096,344	1,299,465
1996	16	186,397	44,644	522,916	601,084	101,322	69,836	1,456,364	1,174,485
1997	16	171,929	123,219	287,722	325,897	143,111	80,729	1,051,879	323,965
1998	16	325,474	19,208	24,005	195,049	205,808	190,004	771,087	373,615
1999	16	911,483	1,160,291	697,642	200,663	104,282	91,894	3,074,360	2,743,906
2000	16	513,366	453,588	390,984	380,557	82,374	72,974	1,820,868	754,144
2001	16	1,619,958	655,741	319,106	392,469	96,951	61,266	3,084,224	1,995,590
2002	14	2,027,607	1,275,475	499,598	211,036	88,010	69,895	4,101,726	2,098,934
2003	16	1,228,442	1,188,614	710,246	288,894	48,717	52,980	3,464,914	1,726,501
2004	16	671,544	1,119,199	1,037,689	683,921	110,930	75,834	3,623,284	1,875,763
2005	15	1,043,700	185,975	186,987	347,339	45,676	41,786	1,809,679	1,083,062
2006	17	1,029,633	154,678	230,111	226,338	224,530	286,932	1,865,289	1,828,893
2007	16	339,466	92,716	176,167	373,061	162,504	238,989	1,143,914	1,252,423
2008	16	552,269	224,880	159,200	239,726	105,440	130,955	1,281,516	787,437
2009	15	1,000,556	643,343	852,512	554,785	143,882	141,993	3,195,079	2,338,396
2010	-	-	-	-	No_Survey	-	-	-	-
2011	37	4,109,517	159,347	40,208	94,797	42,660	40,810	4,447,159	1,983,355
2012	37	2,031,199	2,532,088	188,265	57,085	20,512	20,105	4,829,149	1,796,356
2013	37	925,729	680,678	1,390,554	141,245	38,077	34,026	3,179,046	975,058
2014	-	-	-	-	No_Survey	-	-	-	-
2015	-	-	-	-	No_Survey	-	-	-	-
2016	-	-	-	-	No_Survey	-	-	-	-
2017	38	234,313	553,408	230,471	110,673	7,078	8,329	1,135,943	806,870

Table 4: Female Tanner crab abundance estimates from trawl surveys in the Southern District, 1990-2017.

Year	Tows	Juvenile		Mature		Total Females	
		Juvenile	95% CI	Abund.	95% CI	Abund.	95% CI
1990	14	986,132	435,566	437,762	471,302	1,423,894	597,299
1991	15	485,795	350,909	848,952	827,100	1,334,746	1,092,684
1992	15	287,743	188,991	748,755	908,911	1,036,498	914,538
1993	16	568,171	323,143	578,012	610,110	1,146,183	594,572
1994	16	643,345	524,200	384,757	329,104	1,028,103	697,829
1995	16	675,120	424,282	863,188	805,917	1,538,308	945,949
1996	16	223,512	145,814	506,237	533,304	729,750	589,474
1997	16	188,883	91,602	305,560	316,959	494,443	345,855
1998	16	399,268	303,830	78,481	155,168	477,749	320,493
1999	16	1,237,351	1,087,752	566,811	595,051	1,804,162	1,377,638
2000	16	692,520	549,354	250,751	301,589	943,271	592,957
2001	16	2,161,815	2,321,558	447,251	437,516	2,609,066	2,353,086
2002	14	2,750,107	1,524,651	435,209	410,903	3,185,316	1,718,798
2003	16	1,315,229	976,196	244,512	134,582	1,559,741	1,081,698
2004	16	1,244,052	618,088	1,888,886	2,164,265	3,132,939	2,526,689
2005	15	985,618	829,221	224,362	356,513	1,209,980	840,474
2006	17	937,529	1,319,050	29,068	36,427	966,597	1,325,638
2007	16	603,481	604,255	1,509,612	3,184,135	2,113,093	3,767,243
2008	16	575,419	341,259	230,828	310,804	806,247	404,396
2009	15	1,416,060	1,161,372	1,530,501	1,167,925	2,946,561	2,007,361
2010	-	-	-	No Survey	-	-	-
2011	37	4,089,701	2,235,938	248,151	177,539	4,337,851	2,231,297
2012	37	4,637,663	2,188,235	662,344	451,927	5,300,007	2,527,127
2013	37	1,175,307	465,649	1,957,902	1,353,766	3,133,209	1,541,356
2014	-	-	-	No Survey	-	-	-
2015	-	-	-	No Survey	-	-	-
2016	-	-	-	No Survey	-	-	-
2017	38	837,256	727,616	299,072	302,103	1,136,328	1,019,282

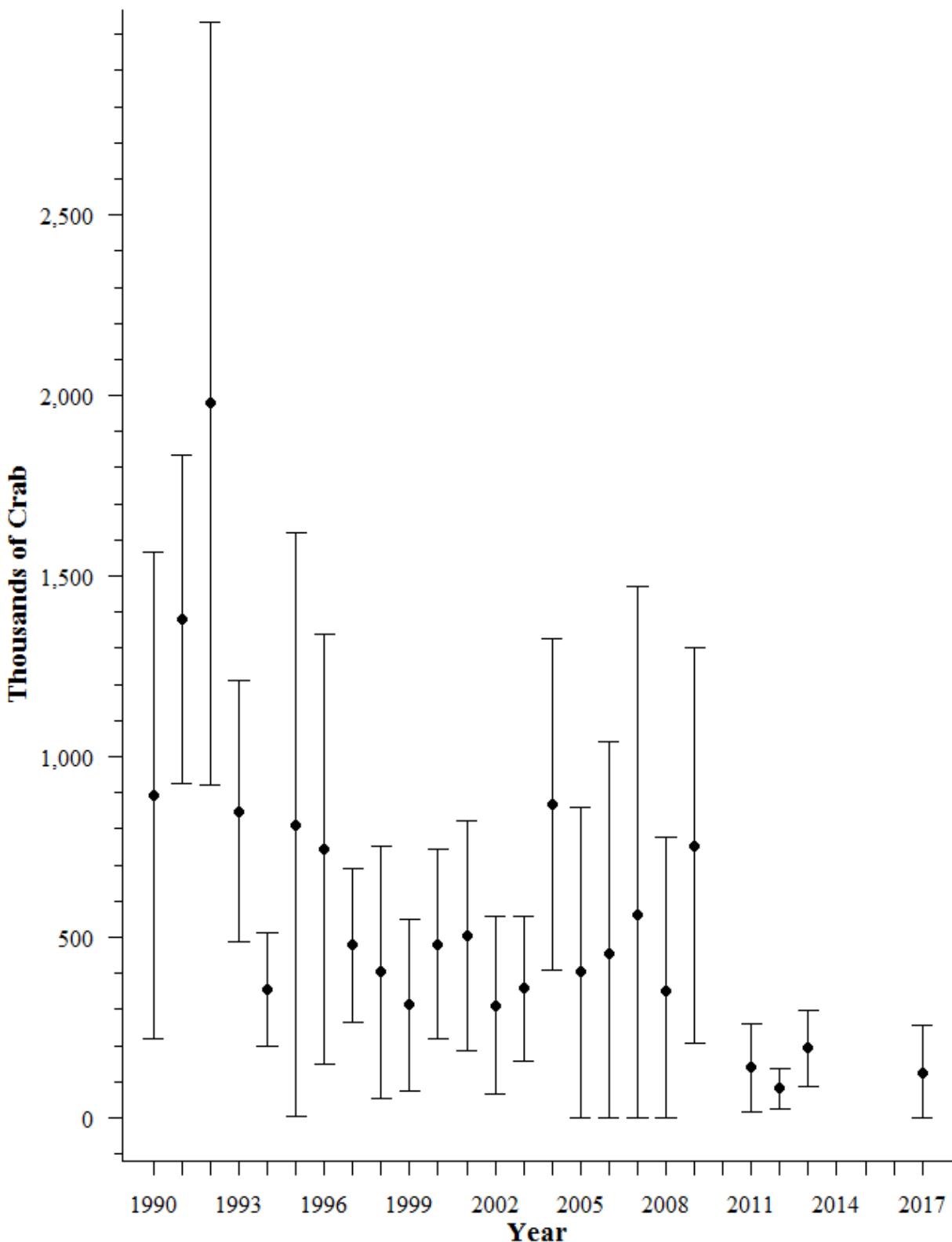


Figure 2: Legal male Tanner crab abundance estimates and 95% confidence intervals using the 2017 legal size (114 mm) from trawl surveys in the Southern District, 1990-2017.

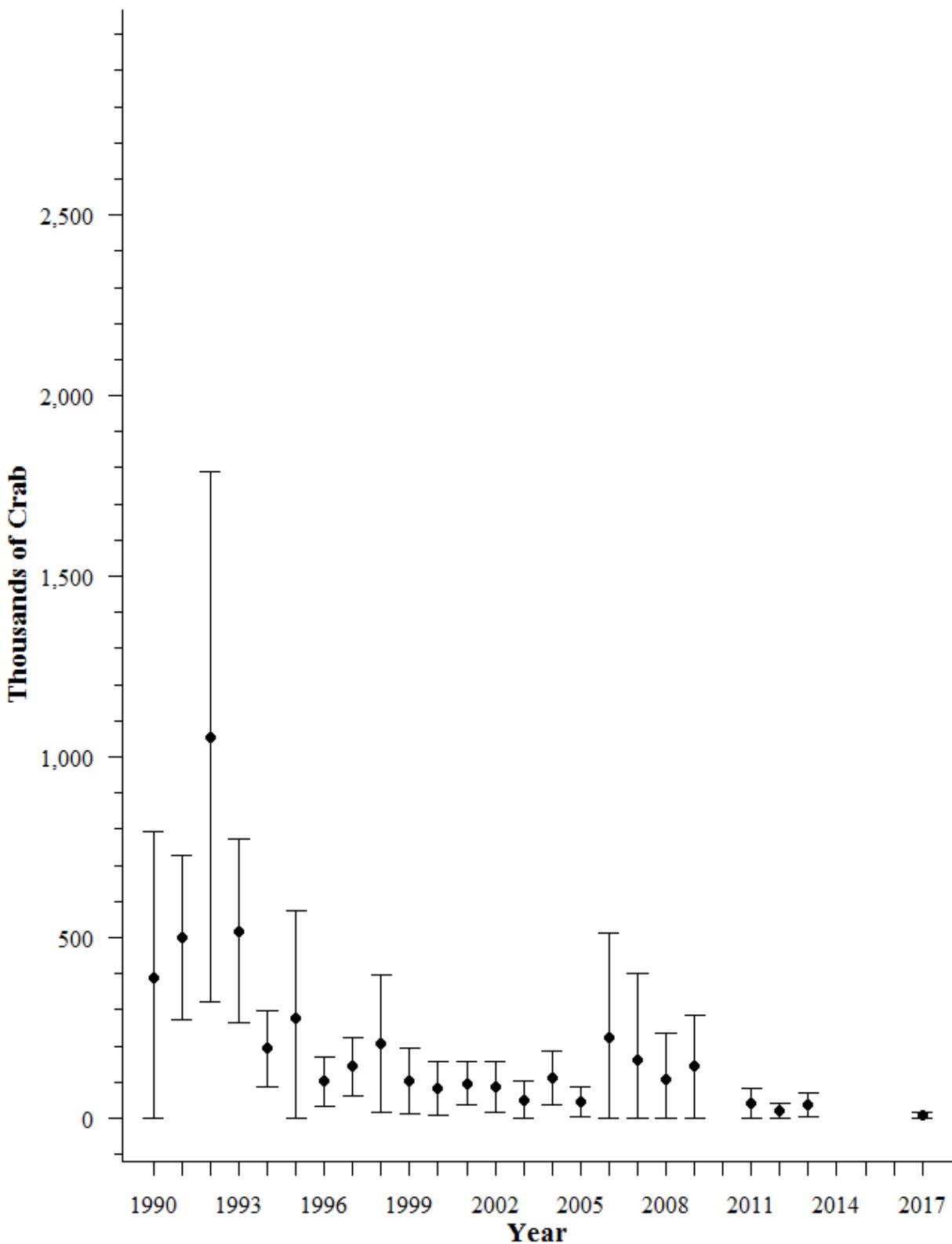


Figure 3: Legal male Tanner crab abundance estimates and 95% confidence intervals using the pre-2017 legal size (140 mm) from trawl surveys in the Southern District, 1990-2017.

Table 5: Number of Tanner crab by 2017 recruit caught in the 2017 Southern District trawl survey.

Station	Males						Females			
	Sublegal				Legal		Total	Juvenile	Mature	Total
	Pre-4	Pre-3	Pre-2	Pre-1	Recruit	Post-Rec.				
101	17.0	31.0	9.0	2.0	0.0	0.0	59.0	31.0	1.0	32.0
102	10.0	68.0	26.0	3.0	0.0	0.0	107.0	22.0	0.0	22.0
103	10.0	10.0	0.0	0.0	0.0	0.0	20.0	4.0	0.0	4.0
104	1.0	1.0	0.0	0.0	0.0	0.0	2.0	3.0	0.0	3.0
105	3.0	1.0	1.0	0.0	0.0	0.0	5.0	5.0	0.0	5.0
106	1.0	5.0	2.0	0.0	0.0	0.0	8.0	2.0	0.0	2.0
107	12.0	11.0	3.0	2.0	0.0	0.0	28.0	13.0	2.0	15.0
108	5.0	0.0	1.0	0.0	0.0	0.0	6.0	12.0	0.0	12.0
109	4.0	6.0	0.0	0.0	0.0	0.0	10.0	5.0	0.0	5.0
110	4.0	3.0	1.0	0.0	0.0	0.0	8.0	4.0	0.0	4.0
111	8.0	0.0	0.0	0.0	0.0	0.0	8.0	5.0	3.0	8.0
112	1.0	2.0	1.0	0.0	0.0	0.0	4.0	0.0	1.0	1.0
114	2.0	0.0	0.0	0.0	0.0	0.0	2.0	2.0	1.0	3.0
116	4.0	1.0	6.0	1.0	0.0	0.0	12.0	6.0	7.0	13.0
117	2.0	1.0	1.0	2.0	2.0	0.0	8.0	4.0	1.0	5.0
118	3.0	0.0	0.0	0.0	0.0	0.0	3.0	2.0	0.0	2.0
119	53.0	99.0	14.0	0.0	1.0	0.0	167.0	99.0	5.0	104.0
120	21.0	0.0	0.0	0.0	0.0	0.0	21.0	23.0	0.0	23.0
121	1.0	1.0	0.0	0.0	0.0	0.0	2.0	2.0	1.0	3.0
122	7.0	0.0	0.0	0.0	0.0	0.0	7.0	8.0	0.0	8.0
123	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
124	1.0	0.0	1.0	2.0	3.0	4.0	11.0	0.0	10.0	10.0
125	9.9	59.3	62.6	102.2	33.0	0.0	267.0	111.0	17.0	128.0
126	5.0	15.0	35.0	5.0	1.0	0.0	61.0	65.0	72.0	137.0
127	2.0	49.5	47.5	43.5	33.6	4.0	180.0	191.8	76.2	268.0
128	15.6	129.6	134.8	49.3	20.7	0.0	350.0	289.7	123.3	413.0
129	27.0	0.0	0.0	0.0	0.0	0.0	27.0	30.0	0.0	30.0
130	9.0	1.0	3.0	11.0	17.0	5.0	46.0	24.0	17.0	41.0
131	16.0	0.0	0.0	0.0	0.0	0.0	16.0	16.0	0.0	16.0
132	11.0	0.0	0.0	0.0	1.0	0.0	12.0	11.0	0.0	11.0
133	0.0	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	1.0
134	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.0	6.0
135	4.0	0.0	0.0	0.0	0.0	0.0	4.0	5.0	0.0	5.0
136	0.0	0.0	3.0	1.0	10.0	1.0	15.0	0.0	4.0	4.0
137	3.0	0.0	0.0	0.0	0.0	0.0	3.0	4.0	0.0	4.0
138	1.0	0.0	0.0	0.0	0.0	0.0	1.0	1.0	0.0	1.0
139	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
140	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
141	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	1.0

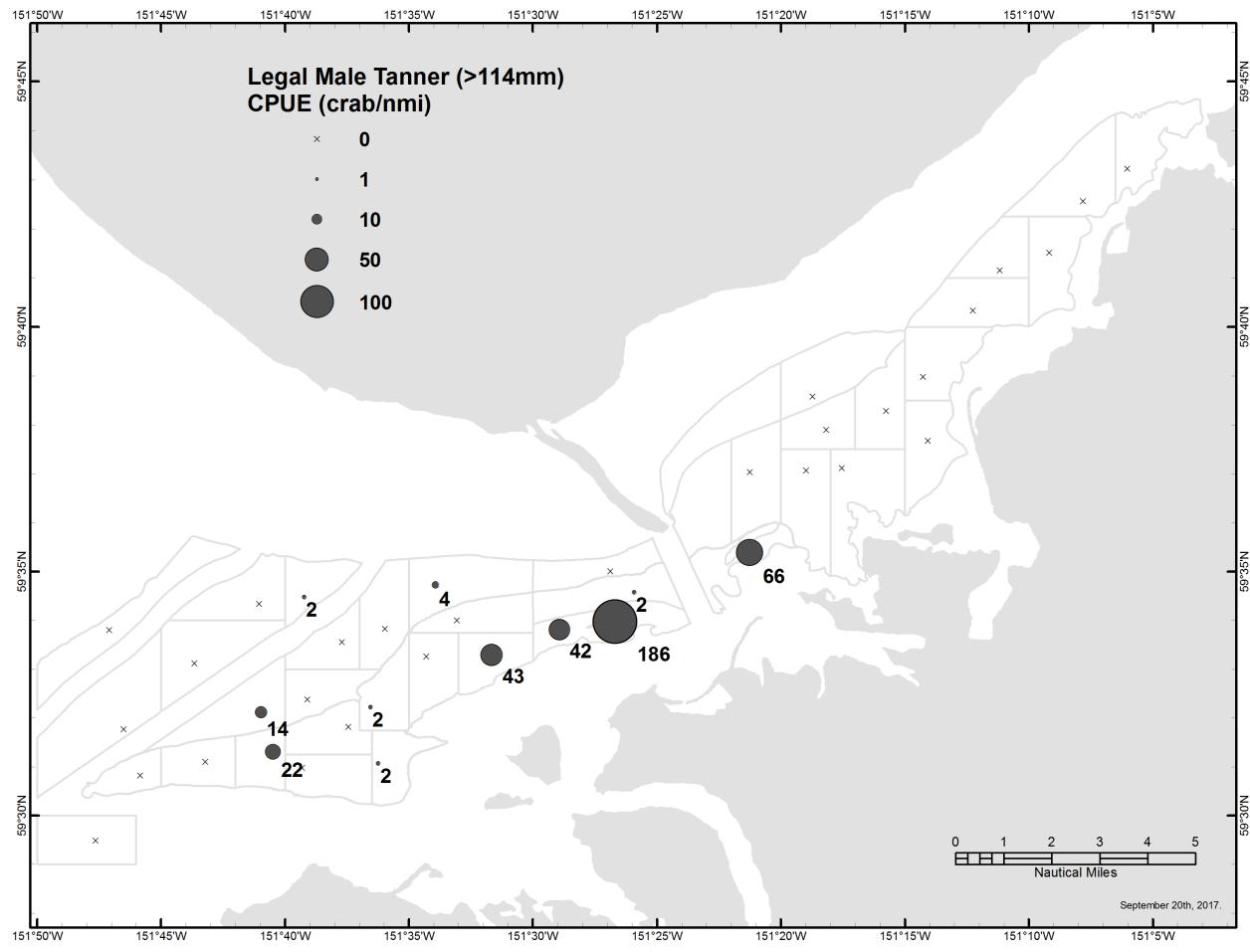


Figure 4: Legal male Tanner crab CPUE (crab/nmi) using the new legal size (114 mm) in the 2017 Southern District trawl survey.

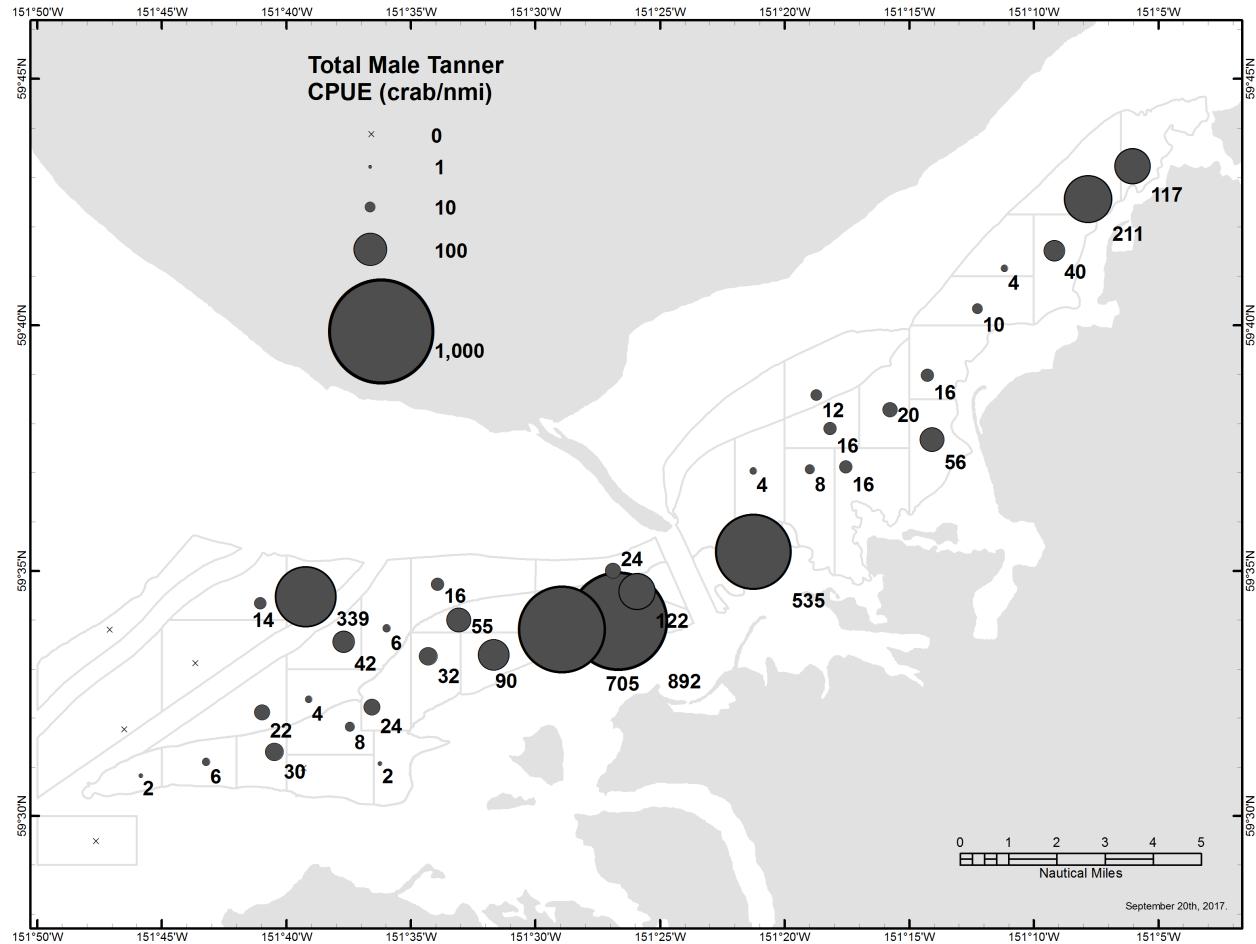


Figure 5: Total male Tanner crab CPUE (crab/nmi) in the 2017 Southern District trawl survey.

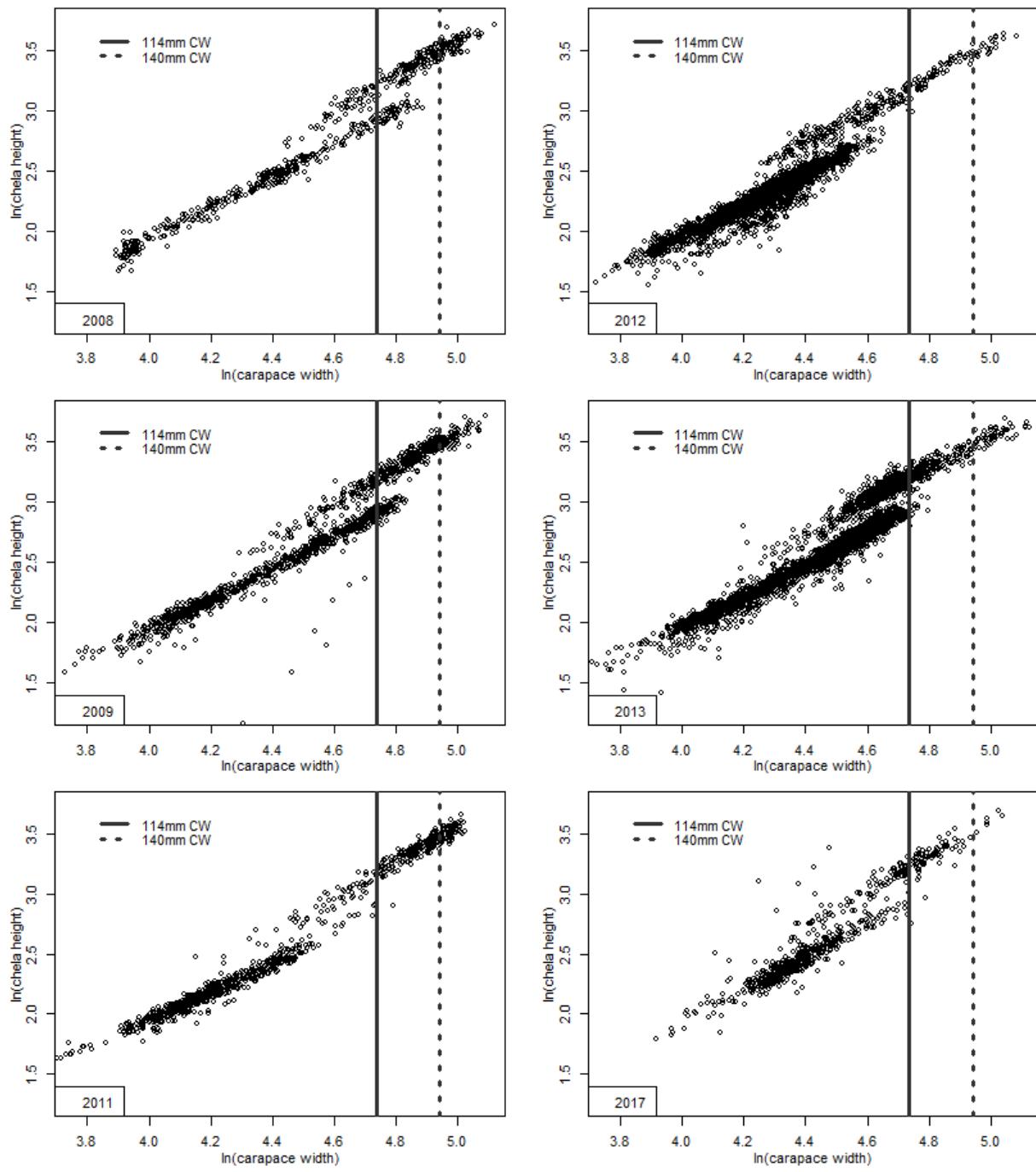


Figure 6: Chela height vs carapace width of male Tanner crab captured in the Southern District trawl survey, 2008-2017.

Table 6: Dungeness crab CPUE (crab/nmi) in the Southern District trawl survey, 1990 to 2017.

Year	Tows	Males				Females			
		Sublegal		Legal		Total			
		CPUE	SD	CPUE	SD	CPUE	SD		
1990	14	21.93	36.14	0.35	0.83	22.28	36.74	40.25	74.57
1991	15	12	17.05	2.83	4.86	14.83	21.66	23.63	39.31
1992	15	9.62	15.07	4.35	6.99	13.97	21.73	35.13	54.41
1993	16	4.21	8.89	4.85	8.12	9.06	16.59	26.69	87.5
1994	16	0.73	1.4	1.51	3.21	2.24	4.42	6.05	15.68
1995	16	9.06	23.48	0.54	1.03	9.6	23.65	6.05	8.58
1996	16	7.51	15.74	3.48	6.05	10.99	21.55	22.88	40.23
1997	16	1.54	3.29	0.55	1.31	2.1	3.7	5.3	11.16
1998	16	0.32	0.62	0.19	0.4	0.51	0.82	0.76	1.51
1999	16	0.38	0.88	0.62	2.01	1	2.73	1.48	2.97
2000	16	0.31	0.6	0.12	0.34	0.44	0.73	1.12	2.27
2001	16	33.17	84.55	0.31	0.6	33.48	84.95	41.34	134.83
2002	14	5.43	13.33	0.91	2.12	6.34	14.49	24.7	66.42
2003	16	11.54	20.29	0.56	1.08	12.1	21.15	17.28	38.52
2004	16	3.45	6.52	0.88	2.28	4.32	8.69	5.38	13.34
2005	15	2.45	3.5	0.86	1.48	3.31	4.37	2.69	7.8
2006	17	53.05	169.52	3.08	6.69	56.12	175.78	25.93	46.34
2007	16	7.97	11.82	1.07	1.86	9.04	12.75	27.22	57.72
2008	16	8.28	9.66	0.89	2.09	9.17	11.41	15.7	18.82
2009	15	0.73	1.79	0	0	0.73	1.79	0.2	0.56
2010	-	No Survey	-	-	-	-	-	-	-
2011	37	0.05	0.31	0.04	0.27	0.1	0.41	0.1	0.42
2012	37	0.25	0.9	0	0	0.25	0.9	0.06	0.35
2013	37	0.33	1.25	0	0	0.33	1.25	0.17	0.76
2014	-	No Survey	-	-	-	-	-	-	-
2015	-	No Survey	-	-	-	-	-	-	-
2016	-	No Survey	-	-	-	-	-	-	-
2017	38	10.58	26.63	0.21	1.02	10.79	26.92	18.64	49.13

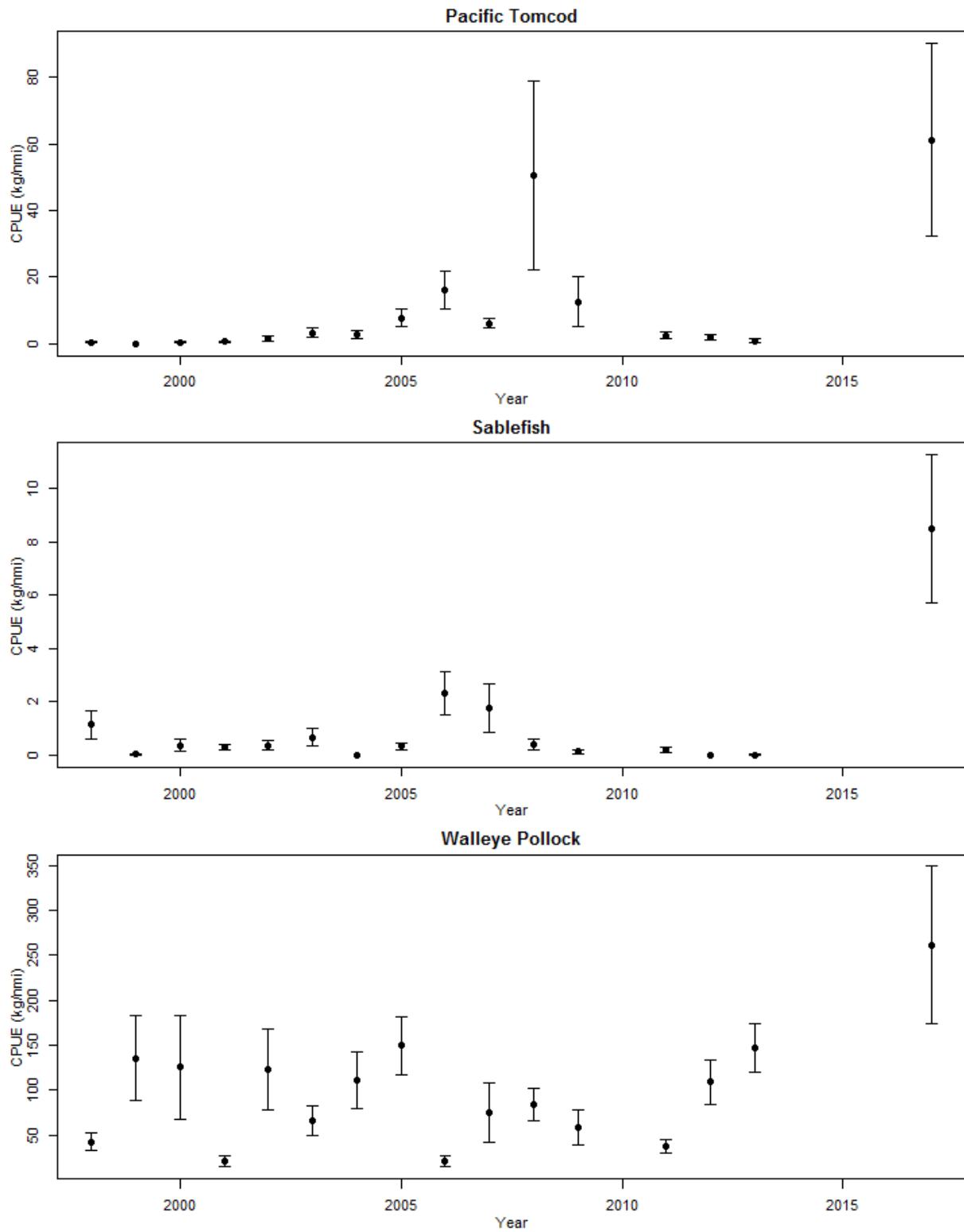


Figure 7: Tomcod, sablefish, and pollock CPUE (kg/nmi) in the Southern District trawl survey, 1998-2017. Error bars are standard errors.