2017 Kachemak Bay Trawl Survey Summary (DRAFT)

Joshua Mumm

September 18, 2017

The 2017 Kachemak Bay large-mesh trawl survey was completed 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).

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 2017 definitions are intended to be the focus here and in the future. However, the entire time series of survey data (1990 to 2017) were analyzed using both sets of size limits herein, for historical comparative purposes.

The 2017 survey captured 1,481 male and 1,350 female Tanner crab. Of these males, 137 were legal using the 2017 revised legal limit and 8 were legal according to the historical legal definition. Mean legal male CPUE using the 2017 size limit was 10.12 crab/nmi (CV = 3.22) and ranged from 0 to 186. The estimated abundance of legal males using the 2017 legal size (>114mm) was 124,965 crabs (95% CI = 132,244) (Table 2; Figure 2).

When the revised size limits were retroactively applied to the historical survey data, the 2017 abundance estimate was the 2nd lowest, surpassing only 2012. When analyzed using the historical legal size (>140mm) the 2017 survey produced the lowest abundance estimate on record, less than half of the 2012 estimate (Table 3; Figure 3).

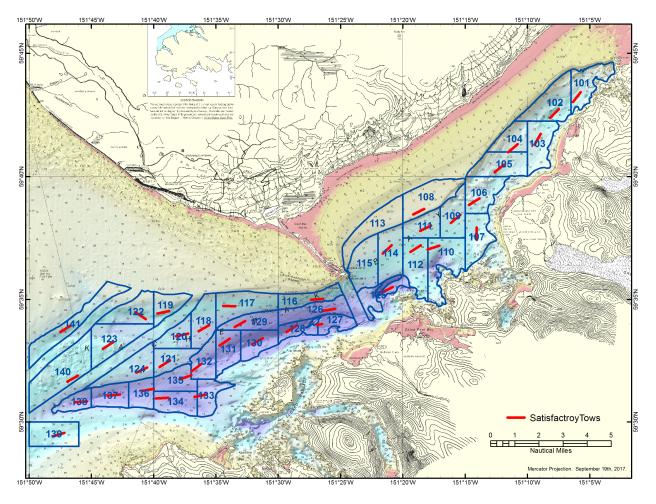


Figure 1: 2017 Kachemak Bay large-mesh trawl survey grid and tow paths.

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

() 0		0 0
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

Table 2: Male Tanner crab abundance estimates using the 2017 size class revisions from trawl surveys in the Southern District, 1990-2017. No survey

1990 14 434,468 1991 15 252,510 1992 15 209,831 1993 16 558,464 1994 16 260,137 1995 16 176,841 1997 16 176,841 1998 16 134,484 1999 16 134,484 1999 16 134,484 1999 16 134,484 2000 16 446,734 2001 16 1,508,596 2002 14 1,673,386 2003 16 635,416 2004 16 635,416 2005 15 986,832 2006 17 970,276 2008 16 528,442 2008 16 528,442 2009 16 528,442 2008 16 528,442	336,711 131,374 71,948 59,025 127,473 198,207 32,054 87,749	556,501 273,576 134,688	403 408	0 0 0			
15 16 16 16 16 16 17 17 17	131,374 71,948 59,025 127,473 198,207 32,054 87,749	$273,576 \\ 134,688 \\ 73,278$	001,001	893,456	674,240	2,714,634	1,145,882
15 16 16 16 16 17 17 17 17	71,948 59,025 127,473 198,207 32,054 87,749	134,688	685,422	1,379,426	453,670	2,722,308	879,693
16 16 16 16 16 17 17 17 17	59,025 127,473 198,207 32,054 87,749	79 970	381,086	1,978,010	1,054,687	2,775,565	1,097,301
16 16 16 16 16 17 17 17 17	127,473 198,207 32,054 87,749	0)0,01	107,855	848,810	363,005	1,647,532	430,628
16 16 16 16 16 17 17 17	198,207 32,054 87,749	161,944	101,303	356,246	156,693	1,007,104	451,486
16 16 16 16 16 17 17 16	32,054 $87,749$	301,598	484,296	811,734	807,143	2,096,344	1,299,465
16 16 16 16 17 17 16	87,749	49,592	454,902	742,974	595,718	1,456,364	1,174,485
16 16 16 16 16 17 17 17		107,042	244,548	478,055	211,981	1,051,879	323,965
16 16 16 17 17 16 16 16	16,134	9,216	20,131	403,196	347,716	771,087	373,615
16 16 16 16 17 17 17	699,162	830,294	518,904	312,049	239,298	3,074,360	2,743,906
16 14 16 16 15 17 16	231,376	345,433	316,831	480,494	261,368	1,820,868	754,144
14 16 16 15 17 16	470,833	344,754	255,343	504,698	318,804	3,084,224	1,995,590
16 15 17 16 16	908,731	838,260	369,526	311,822	244,971	4,101,726	2,098,934
16 15 17 16	861,700	806,086	553,965	358,230	201,368	3,464,914	1,726,501
15 17 16 16	355,266	1,041,375	723,209	868,018	460,041	3,623,284	1,875,763
17 16 16	174,394	87,049	155,515	405,890	452,079	1,809,679	1,083,062
16 16	133,238	113,845	191,802	456,127	583,967	1,865,289	1,828,893
16	38,953	100,798	116,841	561,046	909,757	1,143,914	1,252,423
<u>-</u>	87,852	187,970	125,792	351,461	425,347	1,281,516	787,437
711,010 010,111	439,944	547,114	636,899	752,945	548,314	3,195,079	2,338,396
2011 37 4,005,798	190,019	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
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. No survey was conducted in 2010 and 2014-2016

14 496,674 722,894 613,950 492,682 493,422 403,617 2.3 15 293,894 277,640 802,800 848,159 499,815 226,608 2 16 578,321 89,958 135,248 325,507 518,498 254,074 1 16 312,332 210,142 132,840 566,725 506,325 278,365 296,245 2 16 356,090 389,839 565,725 506,325 278,365 296,245 2 16 186,397 44,644 522,916 601,084 101,322 69,836 1 16 187,928 14,644 522,916 601,084 101,322 69,836 1 16 187,939 14,644 522,916 601,084 101,322 96,324 1 16 317,936 24,005 195,049 205,808 190,094 380,557 82,374 1 1 16 513,366 453,588 390,984	Vear	Tows	Vear Tows Pre-4 (<70mm) Pre-3 (70-0	Pre-3 (70-91mm)	Pre-2 (92-114mm)	Pre-1 (115-139mm)	[.ega] (>140mm)	Legal CI	Total	Total CI
14 200,044 1,24,894 601,390 455,057 498,159 205,422 400,618 15 293,894 277,640 802,800 488,159 1,055,855 734,287 16 578,321 89,958 135,248 325,507 518,498 254,074 16 312,332 210,142 132,840 188,590 106,394 106,394 16 312,332 210,142 522,916 601,084 101,322 296,608 16 186,397 44,644 522,916 601,084 101,322 69,245 16 171,929 123,219 287,722 325,897 143,111 80,729 16 171,929 123,219 24,005 195,049 205,808 190,004 16 171,929 1,160,291 697,642 200,663 104,382 91,894 16 1,619,958 655,741 319,106 320,469 96,311 72,974 16 1,619,968 655,741 11,936 103,469	1000		406 674	799 804	612.050	409 609	388 499	103 617	9 714 634	1 145 889
15 293,894 277,640 802,800 848,159 499,815 226,608 15 237,159 125,034 455,057 902,459 1,055,855 734,287 16 378,321 89,958 135,248 355,07 193,199 106,549 16 312,332 210,142 132,248 556,09 193,199 106,304 16 186,397 44,644 522,916 601,084 101,322 69,245 16 186,397 44,644 522,916 601,084 101,322 69,346 16 186,397 44,644 522,916 601,084 101,322 69,346 16 117,929 123,219 287,722 325,897 143,111 80,729 16 513,366 453,588 390,984 380,567 82,374 72,974 16 1,619,958 657,41 319,106 392,469 96,951 61,266 16 1,228,442 1,118,614 710,246 288,394 48,717	1990	14	430,074	122,034	013,350	492,092	300,422	409,017	2,714,034	1,140,002
15 237,159 125,034 455,057 902,459 1,055,855 734,287 234,074 16 578,321 89,988 135,248 325,507 518,498 254,074 16 312,332 210,142 132,840 158,590 193,199 106,304 16 186,997 44,644 522,916 601,084 101,322 69,245 16 171,929 123,219 24,005 325,877 143,111 80,729 16 911,483 1,160,291 697,642 206,663 104,282 91,894 16 911,483 1,160,291 697,642 206,663 104,282 91,894 16 911,483 1,160,291 697,642 206,663 104,282 91,894 16 1,1483 1,160,291 697,642 206,663 91,894 82,374 72,974 16 1,160,938 655,741 319,106 380,469 96,551 61,286 91,894 16 1,1043,700 188,967	1991	15	293,894	277,640	802,800	848,159	499,815	226,608	2,722,308	879,693
16 578,321 89,958 135,248 325,507 518,498 254,074 16 312,332 210,142 132,840 158,590 193,199 106,304 16 186,397 44,644 522,916 601,084 101,322 69,245 16 186,397 44,644 522,916 601,084 101,322 69,245 16 186,397 19,208 24,005 206,387 101,322 69,836 16 911,483 1,160,291 697,642 200,663 104,282 91,894 16 513,366 453,588 390,384 380,557 82,374 72,974 16 1,619,938 655,741 319,106 392,469 96,951 61,266 16 1,619,938 655,741 319,106 288,994 48,717 72,974 16 1,528,442 1,188,614 710,246 288,894 48,717 52,980 16 1,029,633 15,4678 1,037,689 683,931 48,717	1992	15	237,159	125,034	455,057	902,459	1,055,855	734,287	2,775,565	1,097,301
16 312,332 210,142 132,840 158,590 193,199 106,304 16 356,090 389,839 565,725 506,325 278,365 296,245 16 186,397 44,644 522,916 601,084 101,322 69,245 16 171,929 123,219 287,722 325,897 143,111 80,729 16 325,474 19,208 24,005 195,049 205,808 190,004 16 513,466 453,588 390,984 380,557 82,374 72,974 16 1,619,978 655,741 319,106 392,469 96,951 61,266 16 1,228,442 1,188,614 710,246 288,894 48,717 52,980 16 671,544 1,119,199 1,037,689 683,921 110,930 75,834 16 671,544 1,119,199 1,037,689 683,921 48,717 52,980 16 671,544 1,119,199 1,037,689 68,392 110,030 <td>1993</td> <td>16</td> <td>578,321</td> <td>89,928</td> <td>135,248</td> <td>325,507</td> <td>518,498</td> <td>254,074</td> <td>1,647,532</td> <td>430,628</td>	1993	16	578,321	89,928	135,248	325,507	518,498	254,074	1,647,532	430,628
16 356,090 389,839 565,725 506,325 278,365 296,245 2 16 186,397 44,644 522,916 601,084 101,322 69,836 16 186,397 44,644 522,916 601,084 101,322 69,836 16 171,929 123,219 24,005 195,049 205,88 190,004 16 513,366 453,588 390,984 380,557 82,374 72,974 16 1,619,988 655,741 319,084 380,557 88,010 61,895 14 2,027,607 1,275,475 499,598 211,036 88,010 69,895 16 1,228,442 1,119,199 1,037,689 88,991 48,717 52,980 16 671,544 1,119,199 1,037,689 88,991 110,930 75,834 17 1,029,633 154,678 1,86,987 347,339 45,676 41,786 18 339,466 92,716 176,4739 224,530	1994	16	312,332	210,142	132,840	158,590	193,199	106,304	1,007,104	451,486
16 186,397 44,644 522,916 601,084 101,322 69,836 16 171,929 123,219 287,722 325,897 143,111 80,729 16 325,474 19,208 24,005 195,049 205,808 190,004 16 911,483 1,160,291 697,642 200,663 104,282 91,894 30,004 16 513,366 453,588 390,984 380,557 82,374 72,974 17,294 16 1,619,958 655,741 319,106 392,469 96,951 61,366 16 1,619,958 655,741 319,106 288,894 48,717 52,980 16 1,228,442 1,118,461 1,037,689 88,010 69,895 41,786 16 1,228,442 1,119,199 1,037,689 347,339 45,676 41,786 17 1,029,633 154,678 236,111 226,338 224,530 286,932 18 1,002,563 643,343 852,512 <td>1995</td> <td>16</td> <td>356,090</td> <td>389,839</td> <td>565,725</td> <td>506,325</td> <td>278,365</td> <td>296,245</td> <td>2,096,344</td> <td>1,299,465</td>	1995	16	356,090	389,839	565,725	506,325	278,365	296,245	2,096,344	1,299,465
16 171,929 123,219 287,722 325,897 143,111 80,729 16 325,474 19,208 24,005 195,049 205,808 190,004 16 911,483 1,160,291 697,642 200,663 104,282 91,894 3 16 513,366 453,588 390,984 380,557 82,374 72,974 1 16 1,619,588 655,741 319,106 392,469 96,551 61,266 3 14 2,027,607 1,275,475 499,598 211,036 88,010 69,895 48,717 52,980	1996	16	186,397	44,644	522,916	601,084	101,322	69,836	1,456,364	1,174,485
16 325,474 19,208 24,005 195,049 205,808 190,004 16 911,483 1,160,291 697,642 200,663 104,282 91,894 3 16 513,366 453,588 390,984 380,557 82,374 72,974 1 16 1,619,958 655,741 319,106 392,469 96,951 61,266 3 14 2,027,607 1,275,475 499,598 211,036 88,010 69,895 4 48,717 52,980 52,980 1 1 1 1 1 1,037,699 683,921 110,930 75,834 52,980 1	1997	16	171,929	123,219	287,722	325,897	143,111	80,729	1,051,879	323,965
16 911,483 1,160,291 697,642 200,663 104,282 91,894 36 160,291 697,642 300,663 104,282 91,894 36 10,294 91,894 36,574 72,974 </td <td>1998</td> <td>16</td> <td>325,474</td> <td>19,208</td> <td>24,005</td> <td>195,049</td> <td>205,808</td> <td>190,004</td> <td>771,087</td> <td>373,615</td>	1998	16	325,474	19,208	24,005	195,049	205,808	190,004	771,087	373,615
16 513,366 453,588 390,984 380,557 82,374 72,974 1 16 1,619,958 655,741 319,106 392,469 96,951 61,266 3 14 2,027,607 1,275,475 499,598 211,036 88,010 69,895 4 16 671,544 1,188,614 710,246 288,894 48,717 52,980 3 15 1,043,700 185,975 186,987 347,339 45,676 41,786 1 17 1,029,633 154,678 230,111 226,338 224,530 286,932 1 16 552,269 92,716 176,167 373,061 162,504 238,989 1 16 552,269 224,880 159,200 239,726 105,440 130,955 1 15 1,000,556 643,343 852,512 554,785 141,993 3 141,993 3 37 2,031,199 2,532,088 1,88,265 57,085 20,51	1999	16	911,483	1,160,291	697,642	200,663	104,282	91,894	3,074,360	2,743,906
16 1,619,958 655,741 319,106 392,469 96,951 61,266 3 14 2,027,607 1,275,475 499,598 211,036 88,010 69,895 4 16 1,228,442 1,188,614 710,246 288,894 48,717 52,980 3 16 671,544 1,1119,199 1,037,689 683,921 110,930 75,834 3 15 1,029,633 154,678 230,111 226,338 224,530 286,932 3 17 1,029,633 154,678 230,111 226,338 224,530 286,932 3 16 339,466 92,716 176,167 373,061 162,504 238,989 1 16 552,269 224,880 159,200 239,726 105,440 130,955 141,993 3 15 1,000,556 643,343 852,512 554,785 143,882 141,993 3 37 2,031,199 2,532,088 1,88,265 57,085	2000	16	513,366	453,588	390,984	380,557	82,374	72,974	1,820,868	754,144
14 2,027,607 1,275,475 499,598 211,036 88,010 69,895 16 1,228,442 1,188,614 710,246 288,894 48,717 52,980 16 671,544 1,119,199 1,037,689 683,921 110,930 75,834 5 15 1,043,700 185,975 186,987 347,339 45,676 41,786 1 17 1,029,633 154,678 230,111 226,338 224,530 286,932 1 16 339,466 92,716 176,167 373,061 162,504 238,989 1 16 552,269 224,880 159,200 239,726 105,440 130,955 1 15 1,000,556 643,343 852,512 554,785 143,882 141,993 3 37 4,109,517 159,347 40,208 94,797 42,660 40,810 4 37 2,031,199 2,532,088 1,88,265 57,085 20,512 20,105 4 38 234,313 553,408 230,471 110,673 7,078 <td>2001</td> <td>16</td> <td>1,619,958</td> <td>655,741</td> <td>319,106</td> <td>392,469</td> <td>96,951</td> <td>61,266</td> <td>3,084,224</td> <td>1,995,590</td>	2001	16	1,619,958	655,741	319,106	392,469	96,951	61,266	3,084,224	1,995,590
16 1,228,442 1,188,614 710,246 288,894 48,717 52,980 3 16 671,544 1,119,199 1,037,689 683,921 110,930 75,834 3 15 1,043,700 185,975 186,987 347,339 45,676 41,786 1 17 1,029,633 154,678 230,111 226,338 224,530 286,932 1 16 339,466 92,716 176,167 373,061 162,504 238,989 1 16 552,269 224,880 159,200 239,726 105,440 130,955 1 15 1,000,556 643,343 852,512 554,785 143,882 141,993 3 37 4,109,517 159,347 40,208 94,797 42,660 40,810 4 37 2,031,199 2,532,088 188,265 57,085 38,077 34,026 3 38 234,313 553,408 230,471 110,673 7,078 8	2002	14	2,027,607	1,275,475	499,598	211,036	88,010	69,895	4,101,726	2,098,934
16 671,544 1,119,199 1,037,689 683,921 110,930 75,834 3 15 1,043,700 185,975 186,987 347,339 45,676 41,786 1 17 1,029,633 154,678 230,111 226,338 224,530 286,932 1 16 339,466 92,716 176,167 373,061 162,504 238,989 1 16 552,269 224,880 159,200 239,726 105,440 130,955 1 15 1,000,556 643,343 852,512 554,785 143,882 141,993 8 37 4,109,517 159,347 40,208 94,797 42,660 40,810 4 37 2,031,199 2,532,088 188,265 57,085 20,512 20,105 3 37 925,729 680,678 1,390,554 141,245 38,077 8,329 1 38 234,313 553,408 230,471 110,673 7,078 8,32	2003	16	1,228,442	1,188,614	710,246	288,894	48,717	52,980	3,464,914	1,726,501
15 1,043,700 185,975 186,987 347,339 45,676 41,786 1 17 1,029,633 154,678 230,111 226,338 224,530 286,932 1 16 339,466 92,716 176,167 373,061 162,504 238,989 1 16 552,269 224,880 159,200 239,726 105,440 130,955 1 15 1,000,556 643,343 852,512 554,785 143,882 141,993 8 37 4,109,517 159,347 40,208 94,797 42,660 40,810 4 37 2,031,199 2,532,088 188,265 57,085 20,512 20,105 4 37 925,729 680,678 1,390,554 141,245 38,077 34,026 3 38 234,313 553,408 230,471 110,673 7,078 8,329 1	2004	16	671,544	1,119,199	1,037,689	683,921	110,930	75,834	3,623,284	1,875,763
17 1,029,633 154,678 230,111 226,338 224,530 286,932 1 16 339,466 92,716 176,167 373,061 162,504 238,989 1 16 552,269 224,880 159,200 239,726 105,440 130,955 1 15 1,000,556 643,343 852,512 554,785 143,882 141,993 3 37 4,109,517 159,347 40,208 94,797 42,660 40,810 4 37 2,031,199 2,532,088 1,88,265 57,085 20,512 20,105 4 37 925,729 680,678 1,390,554 141,245 38,077 34,026 3 38 234,313 553,408 230,471 110,673 7,078 8,329 1	2005	15	1,043,700	185,975	186,987	347,339	45,676	41,786	1,809,679	1,083,062
16 339,466 92,716 176,167 373,061 162,504 238,989 1 16 552,269 224,880 159,200 239,726 105,440 130,955 1 15 1,000,556 643,343 852,512 554,785 143,882 141,993 3 37 4,109,517 159,347 40,208 94,797 42,660 40,810 4 37 2,031,199 2,532,088 188,265 57,085 20,512 20,105 4 37 925,729 680,678 1,390,554 141,245 38,077 34,026 3 38 234,313 553,408 230,471 110,673 7,078 8,329 1	2006	17	1,029,633	154,678	230,111	226,338	224,530	286,932	1,865,289	1,828,893
16 552,269 224,880 159,200 239,726 105,440 130,955 1 15 1,000,556 643,343 852,512 554,785 143,882 141,993 3 37 4,109,517 159,347 40,208 94,797 42,660 40,810 4 37 2,031,199 2,532,088 188,265 57,085 20,512 20,105 4 37 925,729 680,678 1,390,554 141,245 38,077 34,026 3 38 234,313 553,408 230,471 110,673 7,078 8,329 1	2007	16	339,466	92,716	176,167	373,061	162,504	238,989	1,143,914	1,252,423
15 1,000,556 643,343 852,512 554,785 143,882 141,993 141,993 37 4,109,517 159,347 40,208 94,797 42,660 40,810 40,810 37 2,031,199 2,532,088 188,265 57,085 20,512 20,105 37 925,729 680,678 1,390,554 141,245 38,077 34,026 38 234,313 553,408 230,471 110,673 7,078 8,329	2008	16	552,269	224,880	159,200	239,726	105,440	130,955	1,281,516	787,437
37 4,109,517 159,347 40,208 94,797 42,660 40,810 37 2,031,199 2,532,088 188,265 57,085 20,512 20,105 37 925,729 680,678 1,390,554 141,245 38,077 34,026 38 234,313 553,408 230,471 110,673 7,078 8,329	2009	15	1,000,556	643,343	852,512	554,785	143,882	141,993	3,195,079	2,338,396
37 2,031,199 2,532,088 188,265 57,085 20,512 20,105 37 925,729 680,678 1,390,554 141,245 38,077 34,026 38,027 38 234,313 553,408 230,471 110,673 7,078 8,329	2011	37	4,109,517	159,347	40,208	94,797	42,660	40,810	4,447,159	1,983,355
37 925,729 680,678 1,390,554 141,245 38,077 34,026 3 38 234,313 553,408 230,471 110,673 7,078 8,329	2012	37	2,031,199	2,532,088	188,265	57,085	20,512	20,105	4,829,149	1,796,356
38 234,313 553,408 230,471 110,673 7,078 8,329	2013	37	925,729	680,678	1,390,554	141,245	38,077	34,026	3,179,046	975,058
	2017	38	234,313	553,408	230,471	110,673	7,078	8,329	1,135,943	806,870

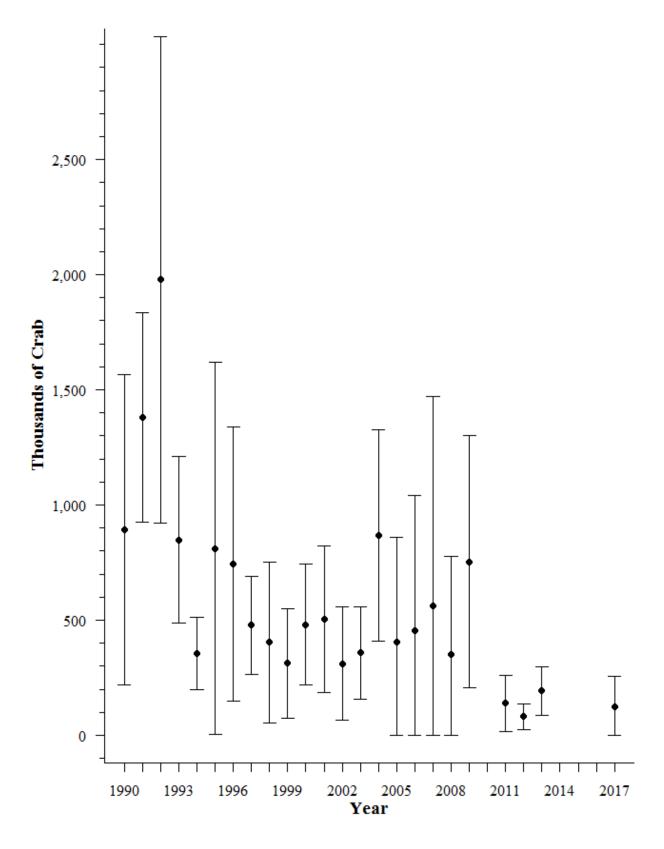


Figure 2: Legal male Tanner crab abundance estimates and 95% confidence intervals using the 2017 legal size (114 mm or 4.5 in) from trawl surveys in the Southern District, 1990-2017.

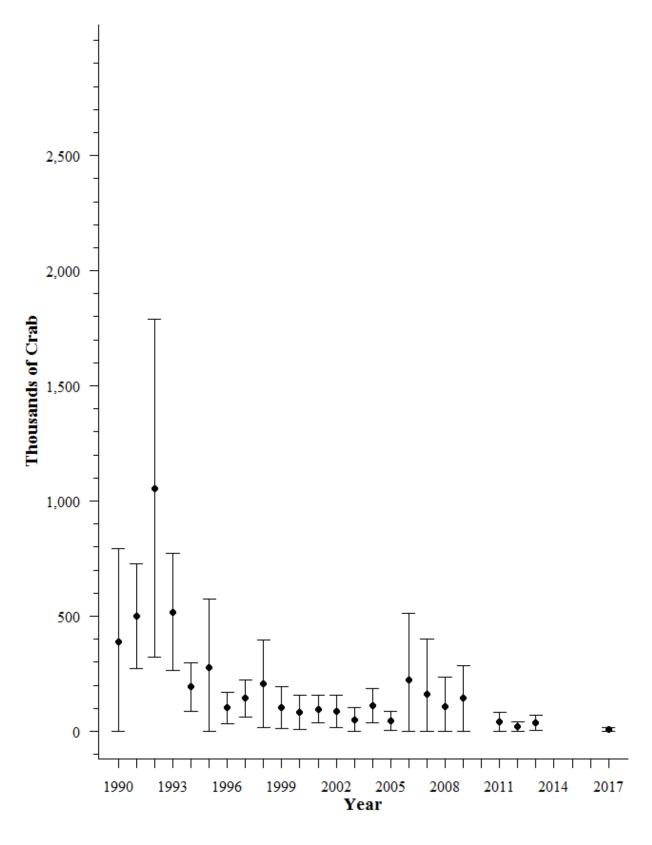


Figure 3: Legal male Tanner crab abundance estimates and 95% confidence intervals using the pre-2017 legal size (140 mm or 5.5 in) from trawl surveys in the Southern District, 1990-2017.