

# 2018 Southern District Trawl Survey Summary (DRAFT)

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The 2018 Southern District large-mesh bottom trawl survey was completed between September 4th and 9th. A total of 39 successful 0.5 nmi tows were completed, all in core stations. No ancillary stations were sampled this year. An estimated 12,568 male and 4,194 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). For historical comparison the entire time series of survey data (1990 to 2018) is summarized using both sets of recruit classes herein.

Using the new legal size (114 mm), 348 legal males were captured in the 2018 survey. Mean legal male CPUE was 18.06 crab/nmi (CV = 274%) and ranged from 0 to 249. The estimated abundance of legal males using the new legal size was 222,852 crabs (+/- 197,861 @ 95% CI), similar to the 4 most recent surveys and less than those prior to 2010 (Table 2; Figure 2).

Using the old legal size (140 mm), 8 legal males were captured in the 2018 survey. When analyzed using the old size categories, the 2017 survey produced the lowest legal male abundance estimate on record, 5,512 crab (+/- 7,993) (Table 3; Figure 3).

Legal male Tanners were found predominately in deep water west of the spit (Figures 4 and 5).

One very large Tanner haul was made at station 126. The tow caught approximately 10,437 male Tanners, more than any other tow in the survey's history, however none of those measured were legal (Table 5).

## List of Tables

|   |   |   |
|---|---|---|
| 1 | Male Tanner crab recruit class size definitions (carapace width in millimeters) used in the Southern District trawl surveys. . . . .  | 2 |
| 2 | Male Tanner crab abundance estimates using the 2017 size class definitions from trawl surveys in the Southern District, 1990-2018. Parenthetical size limits are carapace width in millimeters. . . . .     | 4 |
| 3 | Male Tanner crab abundance estimates using the pre-2017 size class definitions from trawl surveys in the Southern District, 1990-2018. Parenthetical size limits are carapace width in millimeters. . . . . | 5 |
| 4 | Female Tanner crab abundance estimates from trawl surveys in the Southern District, 1990-2018. . . . .  | 6 |
| 5 | Number of Tanner crab caught in the 2018 Southern District trawl survey categorized using the 2017 size classes. . . . .  | 9 |

## List of Figures

|   |  |    |
|---|--|----|
| 1 | 2018 Southern District large-mesh trawl survey grid and tow paths. . . . .   | 3  |
| 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, 1990-2018. . . . .     | 7  |
| 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, 1990-2018. . . . . | 8  |
| 4 | Legal male Tanner crab CPUE (crab/nmi) using the new legal size (114 mm) in the 2018 Southern District trawl survey. . . . .   | 10 |
| 5 | Total male Tanner crab CPUE (crab/nmi) in the 2018 Southern District trawl survey. . . . .   | 11 |
| 6 | Chela height vs carapace width of male Tanner crab captured in the Southern District trawl survey, 2009-2018. . . . .  | 12 |

Table 1: Male Tanner crab recruit class size definitions (carapace width in millimeters) used in the Southern District trawl surveys.

| Recruit category | pre-2017 | post-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     |

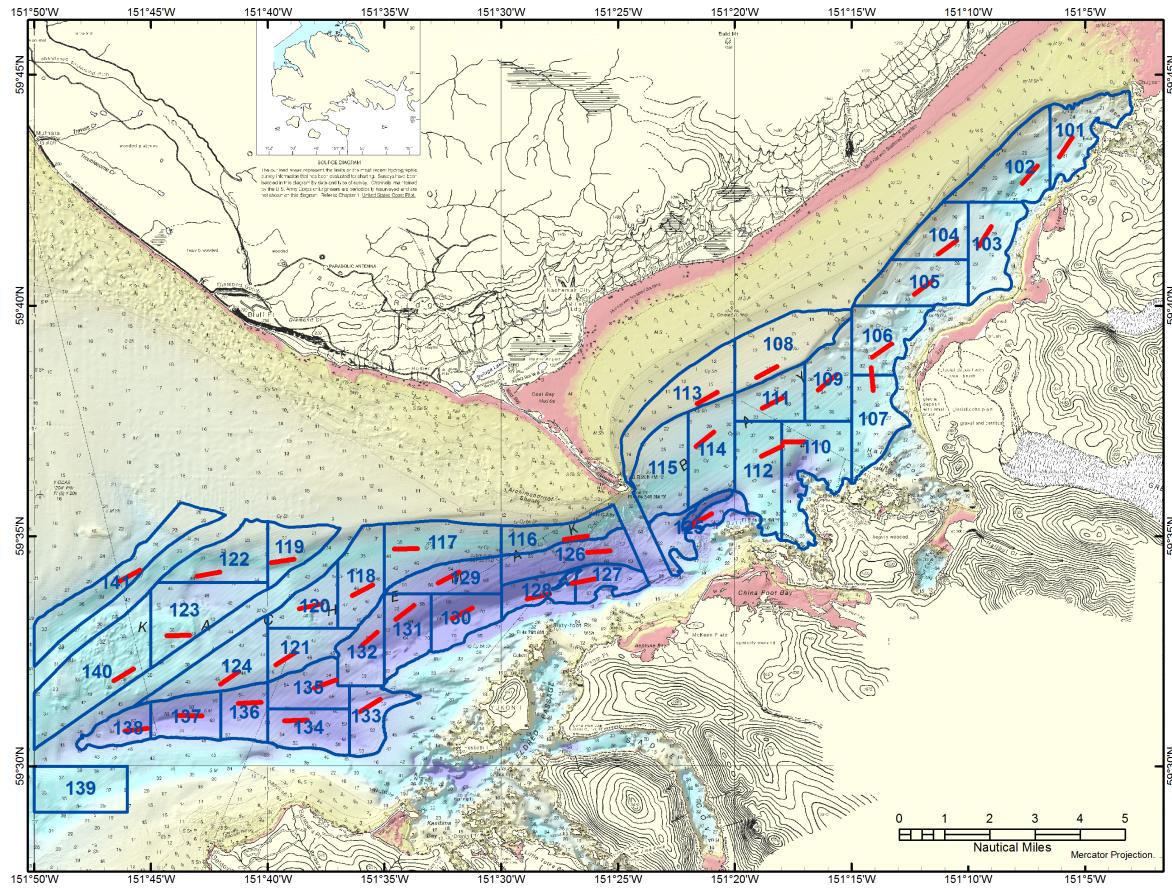


Figure 1: 2018 Southern District large-mesh trawl survey grid and tow paths.

Table 2: Male Tanner crab abundance estimates using the 2017 size class definitions from trawl surveys in the Southern District, 1990-2018. Parenthetical size limits are carapace width in millimeters.

| Year | Tows | Pre-Recruits   |                  |                  |                   | Legal Males      |           | Total Males |            |
|------|------|----------------|------------------|------------------|-------------------|------------------|-----------|-------------|------------|
|      |      | Pre-4<br>(<66) | Pre-3<br>(66-79) | Pre-2<br>(80-95) | Pre-1<br>(96-113) | Abund.<br>(>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           | 107,112          | 244,618           | 478,196          | 211,890   | 1,052,159   | 323,702    |
| 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   | 524,767        | 87,035           | 187,152          | 121,164           | 344,112          | 423,371   | 1,264,232   | 784,561    |
| 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           | 32,244            | 139,901          | 121,721   | 4,448,010   | 1,983,150  |
| 2012 | 37   | 1,528,350      | 2,375,884        | 722,118          | 123,414           | 81,945           | 55,527    | 4,831,710   | 1,795,663  |
| 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    |
| 2018 | 39   | 410,009        | 1,597,348        | 2,153,925        | 3,608,940         | 222,852          | 197,861   | 7,993,072   | 13,363,159 |

Table 3: Male Tanner crab abundance estimates using the pre-2017 size class definitions from trawl surveys in the Southern District, 1990-2018. Parenthetical size limits are carapace width in millimeters.

| Year | Tows | Pre-Recruits   |                  |                   |                    | Legal Males      |         |           | Total Males |  |
|------|------|----------------|------------------|-------------------|--------------------|------------------|---------|-----------|-------------|--|
|      |      | Pre-4<br>(<70) | Pre-3<br>(70-91) | Pre-2<br>(92-114) | Pre-1<br>(115-139) | Abund.<br>(>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          | 287,862           | 326,037            | 143,111          | 80,729  | 1,052,159 | 323,702     |  |
| 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   | 548,050        | 223,927          | 153,893           | 234,827            | 103,535          | 130,587 | 1,264,232 | 784,561     |  |
| 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          | 40,492            | 95,364             | 42,660           | 40,810  | 4,448,010 | 1,983,150   |  |
| 2012 | 37   | 2,032,095      | 2,532,729        | 188,265           | 57,213             | 21,408           | 20,993  | 4,831,710 | 1,795,663   |  |
| 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     |  |
| 2018 | 39   | 563,675        | 2,997,244        | 4,232,571         | 194,070            | 5,512            | 7,993   | 7,993,072 | 13,363,159  |  |

Table 4: Female Tanner crab abundance estimates from trawl surveys in the Southern District, 1990-2018.

| 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   | 567,254   | 339,559   | 229,603   | 310,934   | 796,856       | 403,518   |
| 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   | 4,089,772 | 2,235,923 | 248,923   | 177,514   | 4,338,695     | 2,231,119 |
| 2012 | 37   | 4,638,687 | 2,187,999 | 662,728   | 451,871   | 5,301,416     | 2,526,810 |
| 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 |
| 2018 | 39   | 1,670,219 | 2,891,931 | 1,014,869 | 955,411   | 2,685,088     | 3,020,649 |

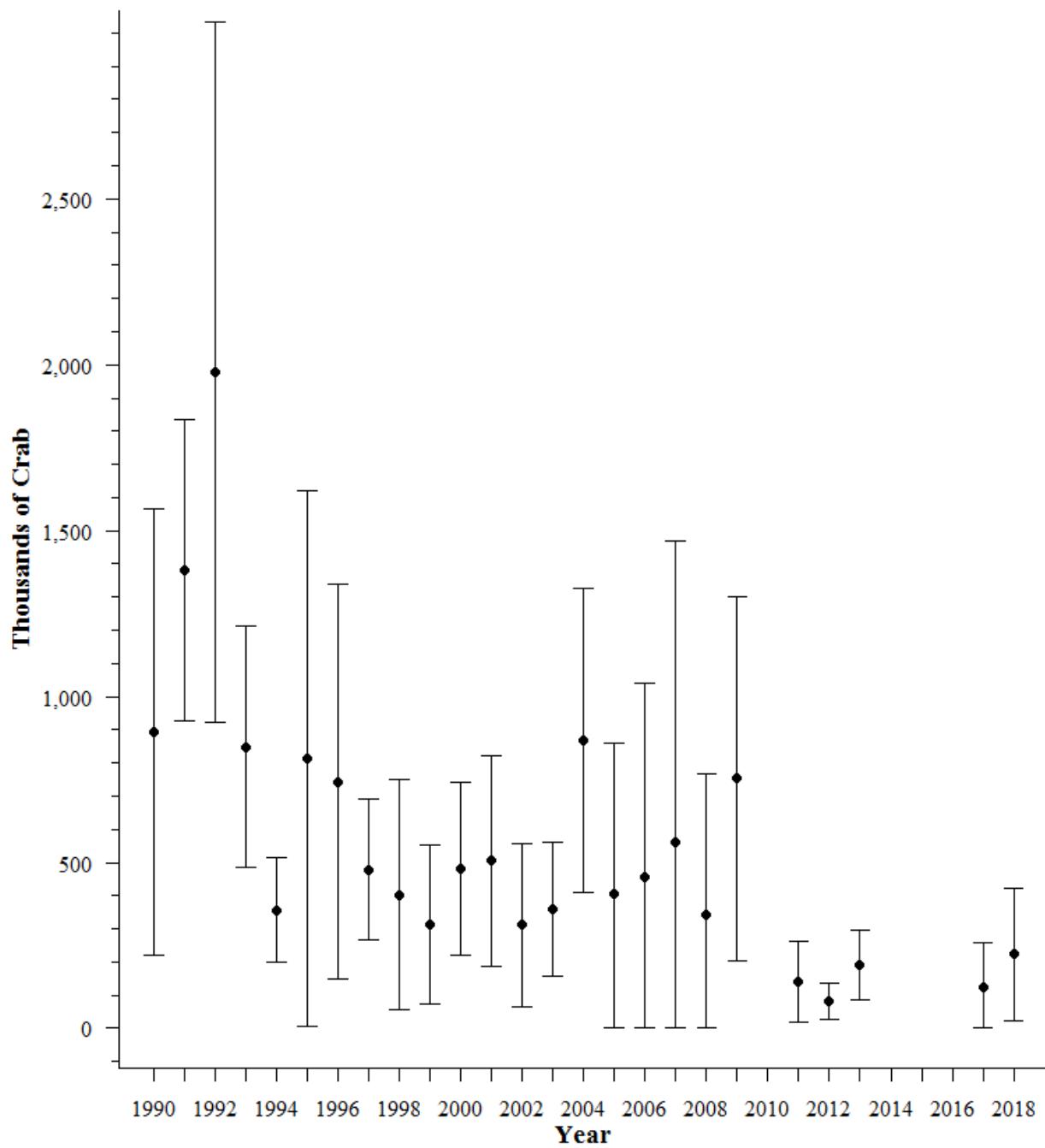


Figure 2: Legal male Tanner crab abundance estimates and 95% confidence intervals using the 2017 legal size (114 mm) from trawl surveys in the Southern District, 1990-2018.

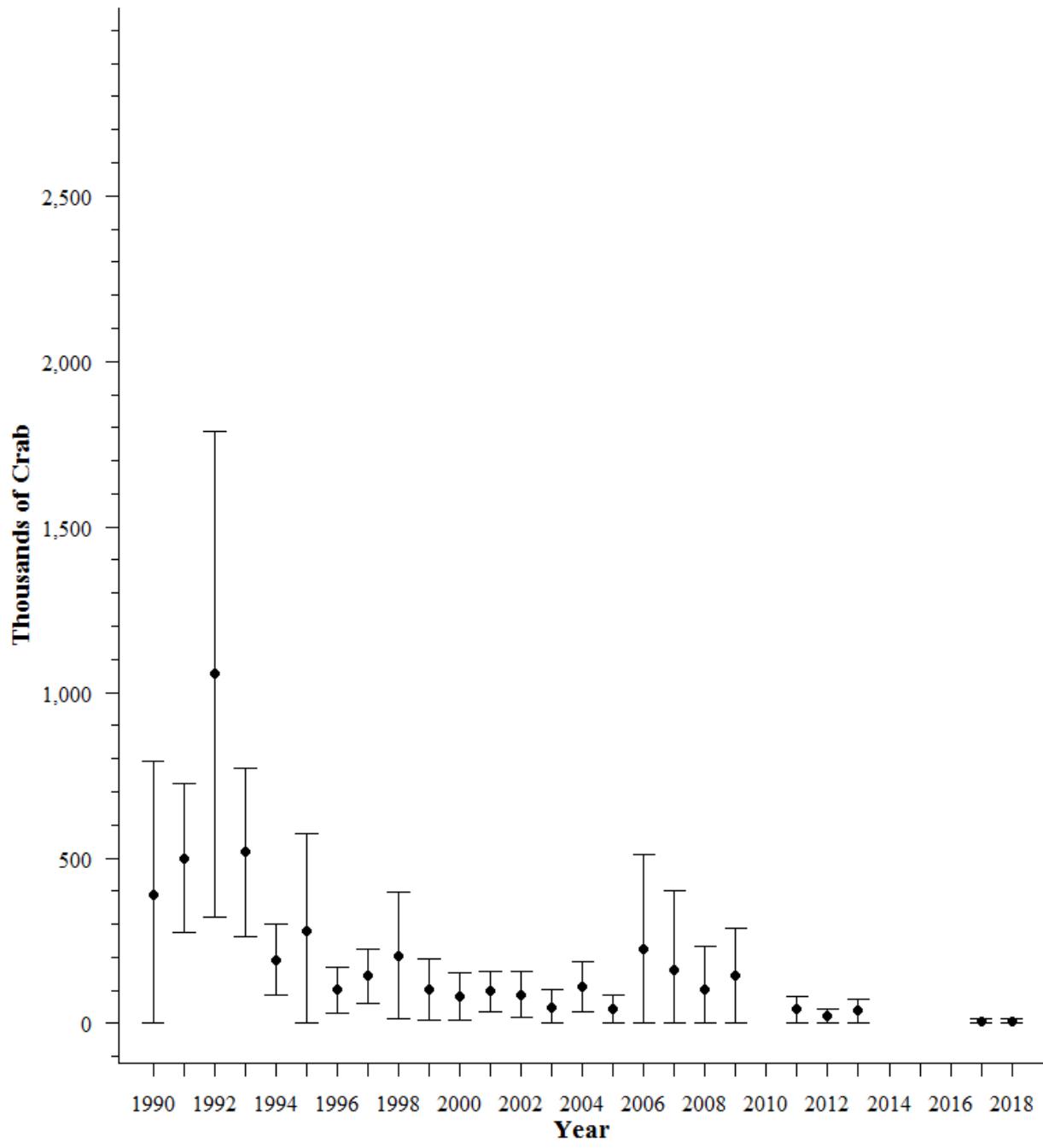


Figure 3: Legal male Tanner crab abundance estimates and 95% confidence intervals using the pre-2017 legal size (140 mm) from trawl surveys in the Southern District, 1990-2018.

Table 5: Number of Tanner crab caught in the 2018 Southern District trawl survey categorized using the 2017 size classes.

| Station | nmi | Males    |        |        |        |         |           | Females |          |        |
|---------|-----|----------|--------|--------|--------|---------|-----------|---------|----------|--------|
|         |     | Sublegal |        |        |        | Legal   |           | Total   | Juvenile | Mature |
|         |     | Pre-4    | Pre-3  | Pre-2  | Pre-1  | Recruit | Post-Rec. |         |          |        |
| 101     | 0.5 | 7.0      | 4.0    | 2.0    | 0.0    | 0.0     | 0.0       | 13.0    | 4.0      | 0.0    |
| 102     | 0.5 | 13.0     | 45.0   | 14.0   | 0.0    | 1.0     | 0.0       | 73.0    | 21.0     | 0.0    |
| 103     | 0.5 | 16.0     | 9.0    | 3.0    | 0.0    | 0.0     | 0.0       | 28.0    | 13.0     | 1.0    |
| 104     | 0.5 | 6.0      | 5.0    | 0.0    | 0.0    | 0.0     | 0.0       | 11.0    | 9.0      | 0.0    |
| 105     | 0.5 | 2.0      | 6.0    | 1.0    | 0.0    | 0.0     | 0.0       | 9.0     | 4.0      | 0.0    |
| 106     | 0.5 | 8.0      | 5.0    | 4.0    | 0.0    | 0.0     | 0.0       | 17.0    | 9.9      | 1.1    |
| 107     | 0.5 | 30.0     | 41.0   | 4.0    | 1.0    | 0.0     | 0.0       | 76.0    | 2.0      | 43.0   |
| 108     | 0.5 | 1.0      | 0.0    | 0.0    | 0.0    | 0.0     | 0.0       | 1.0     | 4.0      | 0.0    |
| 109     | 0.5 | 1.0      | 2.0    | 0.0    | 0.0    | 0.0     | 0.0       | 3.0     | 0.0      | 0.0    |
| 110     | 0.5 | 0.0      | 0.0    | 0.0    | 0.0    | 0.0     | 0.0       | 0.0     | 0.0      | 0.0    |
| 111     | 0.5 | 0.0      | 1.0    | 0.0    | 0.0    | 0.0     | 0.0       | 1.0     | 2.0      | 0.0    |
| 112     | 0.5 | 0.0      | 0.0    | 0.0    | 0.0    | 0.0     | 0.0       | 0.0     | 0.0      | 0.0    |
| 113     | 0.5 | 17.0     | 2.0    | 0.0    | 0.0    | 0.0     | 0.0       | 19.0    | 17.0     | 0.0    |
| 114     | 0.5 | 0.0      | 0.0    | 0.0    | 0.0    | 0.0     | 0.0       | 0.0     | 2.0      | 0.0    |
| 116     | 0.5 | 11.6     | 3.9    | 34.8   | 158.7  | 31.0    | 0.0       | 240.0   | 23.0     | 91.0   |
| 117     | 0.5 | 3.0      | 2.0    | 1.0    | 2.0    | 0.0     | 0.0       | 8.0     | 3.0      | 2.0    |
| 118     | 0.5 | 2.6      | 10.4   | 39.0   | 103.9  | 18.2    | 0.0       | 174.0   | 67.3     | 191.7  |
| 119     | 0.5 | 16.0     | 5.0    | 1.0    | 0.0    | 0.0     | 0.0       | 22.0    | 5.0      | 0.0    |
| 120     | 0.5 | 23.0     | 3.0    | 0.0    | 0.0    | 0.0     | 0.0       | 26.0    | 15.0     | 0.0    |
| 121     | 0.5 | 0.0      | 0.0    | 0.0    | 0.0    | 0.0     | 0.0       | 0.0     | 0.0      | 6.0    |
| 122     | 0.5 | 13.0     | 2.0    | 2.0    | 1.0    | 0.0     | 0.0       | 18.0    | 12.0     | 0.0    |
| 123     | 0.5 | 7.0      | 0.0    | 0.0    | 0.0    | 0.0     | 0.0       | 7.0     | 8.0      | 0.0    |
| 124     | 0.5 | 0.0      | 34.3   | 45.7   | 257.0  | 45.7    | 11.4      | 394.0   | 60.8     | 650.2  |
| 125     | 0.5 | 3.2      | 14.2   | 29.9   | 58.3   | 7.9     | 1.6       | 115.0   | 8.0      | 0.0    |
| 126     | 0.5 | 445.5    | 2291.0 | 3118.4 | 4582.1 | 0.0     | 0.0       | 10437.0 | 2259.0   | 0.0    |
| 127     | 0.5 | 0.0      | 0.0    | 19.6   | 117.8  | 58.9    | 15.7      | 212.0   | 15.0     | 27.0   |
| 128     | 0.5 | 0.0      | 17.7   | 44.2   | 283.2  | 97.3    | 26.5      | 469.0   | 8.0      | 193.0  |
| 129     | 0.5 | 2.0      | 1.0    | 3.0    | 22.0   | 4.0     | 0.0       | 32.0    | 6.0      | 20.0   |
| 130     | 0.5 | 1.0      | 0.0    | 5.2    | 50.1   | 14.6    | 0.0       | 71.0    | 3.1      | 218.9  |
| 131     | 0.5 | 5.0      | 2.0    | 4.0    | 16.0   | 3.0     | 2.0       | 32.0    | 5.0      | 46.0   |
| 132     | 0.4 | 0.0      | 1.0    | 2.0    | 9.0    | 3.0     | 1.0       | 16.0    | 0.0      | 14.0   |
| 133     | 0.5 | 1.0      | 0.0    | 0.0    | 0.0    | 0.0     | 0.0       | 1.0     | 1.0      | 0.0    |
| 134     | 0.5 | 0.0      | 0.0    | 0.0    | 0.0    | 0.0     | 0.0       | 0.0     | 0.0      | 0.0    |
| 135     | 0.5 | 0.0      | 0.0    | 0.0    | 1.0    | 0.0     | 1.0       | 2.0     | 1.0      | 1.0    |
| 136     | 0.5 | 3.0      | 6.0    | 10.0   | 8.0    | 3.0     | 0.0       | 30.0    | 27.0     | 55.0   |
| 137     | 0.5 | 4.0      | 0.0    | 2.0    | 0.0    | 1.0     | 0.0       | 7.0     | 10.0     | 5.0    |
| 138     | 0.5 | 1.0      | 0.0    | 0.0    | 0.0    | 0.0     | 0.0       | 1.0     | 2.0      | 0.0    |
| 140     | 0.5 | 0.0      | 0.0    | 0.0    | 0.0    | 0.0     | 0.0       | 0.0     | 1.0      | 0.0    |
| 141     | 0.5 | 3.0      | 0.0    | 0.0    | 0.0    | 0.0     | 0.0       | 3.0     | 0.0      | 0.0    |

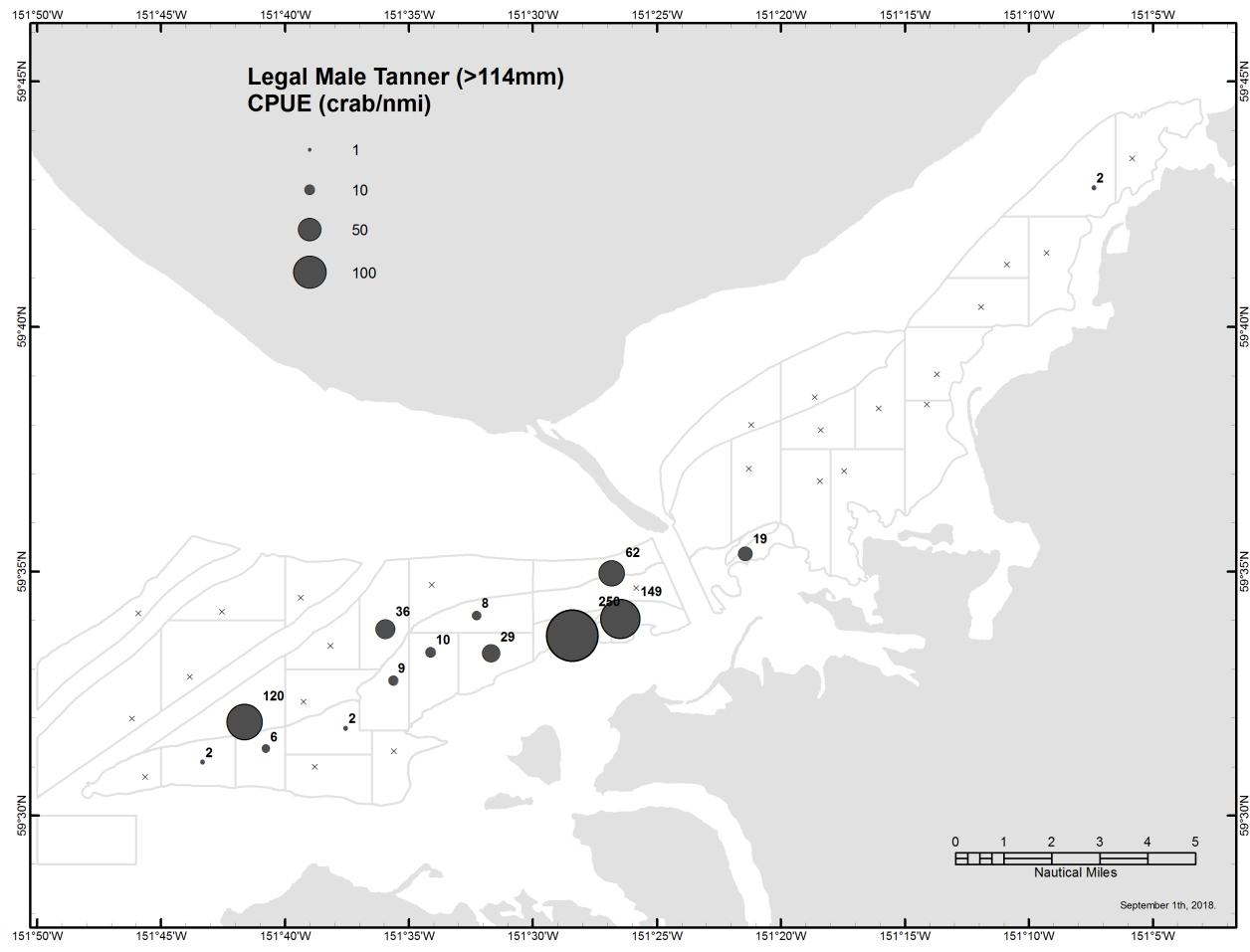


Figure 4: Legal male Tanner crab CPUE (crab/nmi) using the new legal size (114 mm) in the 2018 Southern District trawl survey.

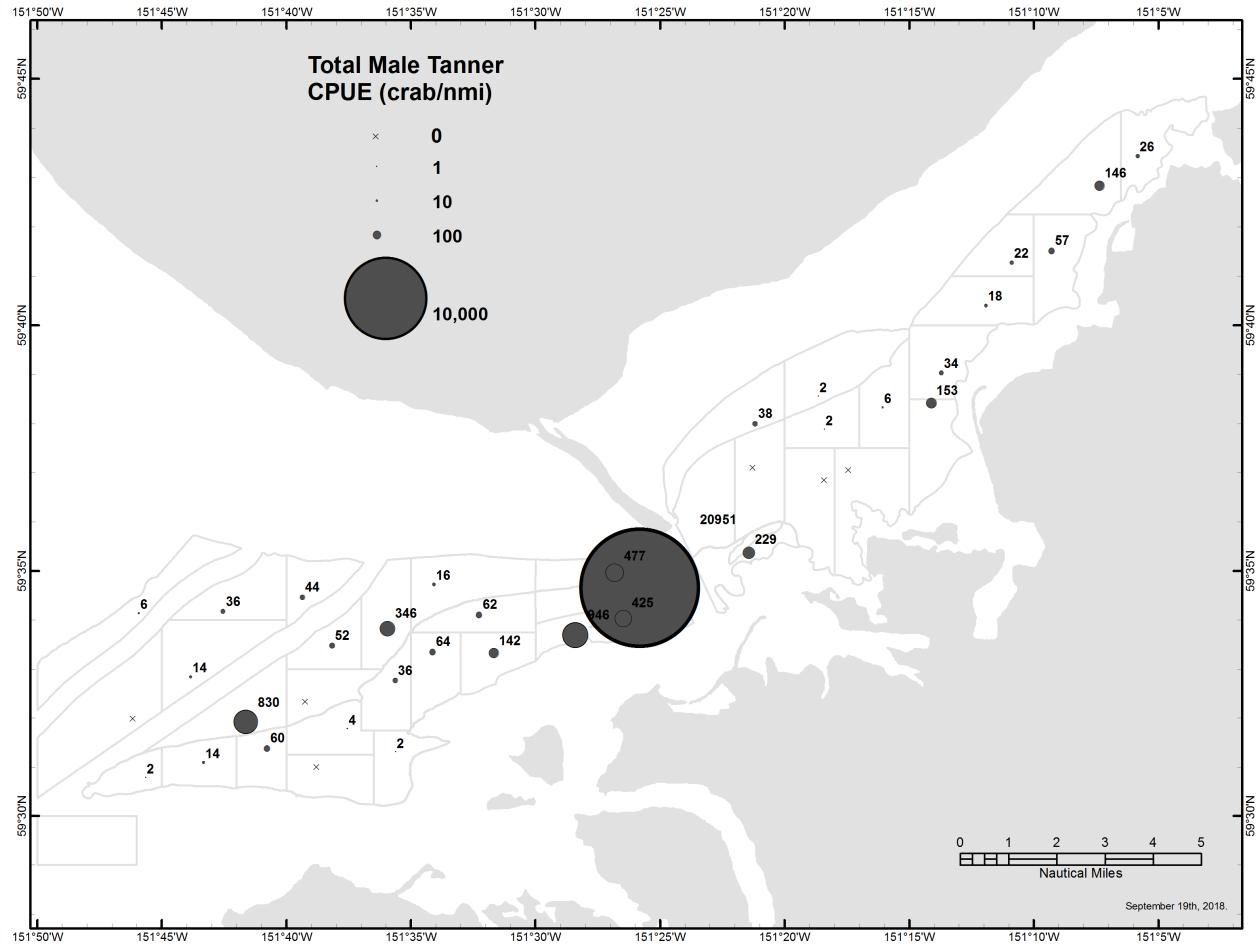


Figure 5: Total male Tanner crab CPUE (crab/nmi) in the 2018 Southern District trawl survey.

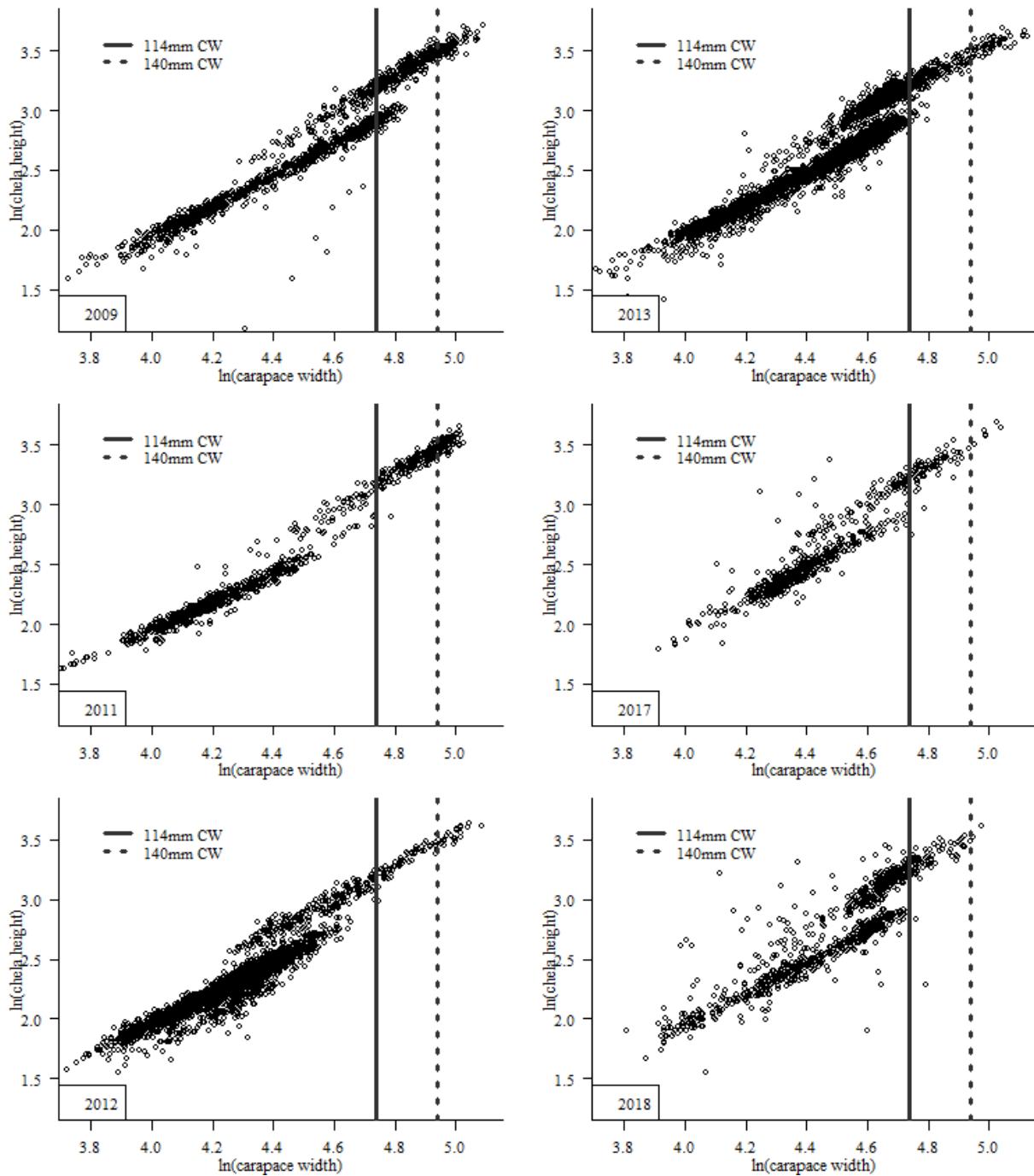


Figure 6: Chela height vs carapace width of male Tanner crab captured in the Southern District trawl survey, 2009-2018.