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The 2018 Eastern Bering Sea Continental Shelf Trawl Survey: Results for Commercial Crab Species

By

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ABSTRACT

The eastern Bering Sea bottom trawl survey has been conducted annually since 1975 by the Resource Assessment and Conservation Engineering Division of the Alaska Fisheries Science Center, National Marine Fisheries Service. The purpose of this survey is to collect data on the distribution and abundance of crab, groundfish, and other benthic resources in the eastern Bering Sea. These data are used to estimate population abundances for the management of commercially important species in the region. This document includes the time series of results from 1975 to the present. In 2018, 375 total stations were sampled on the eastern Bering Sea shelf from 3 June to 31 July.

There was an overall increase in biomass and abundance in immature male red king crab and immature blue king crab, however, there was an overall decrease in biomass and abundance in mature red king crab male and blue king crab male. There was an overall decrease in mature and immature female red and blue king crab except for St. Matthew Island mature and immature female blue king crab and for Pribilof Islands mature red king crab, where there was an increase in biomass and abundance estimates. There were overall increases in immature, mature and legal male biomass and abundance in *Chionoecetes bairdi* and *C. opilio* crab, except for mature male *C. bairdi* and and legal male *C. bairdi* east of 166ºW. There were overall increases in immature female biomass and abundance estimates in *C. bairdi* and *C. opilio* crab. There was an increase in mature female biomass and abundance estimate in *C. opilio*, but and decrease for *C. bairdi* mature female biomass and abundance.

The biomass estimates, reported in metric tons (t) and pounds (lb) with 95% confidence intervals (± 1.96 SE) for legal-sized males of each commercial crab stock in the eastern Bering Sea, were as follows:

Commercial crab species	2018 legal or preferred-sized male biomass (±95% CI)	
	t*	lb**
Bristol Bay District red king crab (*Paralithodes camtschaticus*)	12,010 (3,442)	26,477,786 (7,587,623)
Pribilof District red king crab	827 (697)	1,823,073 (1,537,049)
Pribilof District blue king crab (*P. platypus*)	152 (170)	335,515 (375,669)
St. Matthew Is. Section blue king crab	1,358 (735)	2,994,371 (1,621,356)
Southern Tanner crab, east 166° W *(Chionoecetes bairdi*)	8,861 (2,600)	19,535,459 (5,732,611)
Southern Tanner crab, east 166° W ≥ 4.9 inches	7,355 (2,333)	16,214,185 (5,143,210)
Southern Tanner crab, west 166° W	21,572 (6,662)	47,557,501 (14,686,602)
Southern Tanner crab, west 166° W ≥ 4.9 inches	12,871 (4,589)	28,375,356 (10,117,159)
Snow crab, all districts *(Chionoecetes opilio)*	130,474 (43,554)	287,645,948 (96,020,107)
Snow crab, all districts ≥ 4.0 inches	27,018 (10,163)	59,565,184 (22,406,385)

*Estimates for preferred size classes are those with sizes listed in the left column.
**Biomass estimates in pounds were derived by converting the raw length data to pounds using regressions in Table 3 prior to calculating the area-swept estimates.

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INTRODUCTION

Survey History and Purpose

The eastern Bering Sea (EBS) bottom trawl survey has been conducted by scientists in the Resource Assessment and Conservation Engineering (RACE) Division of the Alaska Fisheries Science Center (AFSC), National Marine Fisheries Service (NMFS), since the early 1970s. Beginning in 1975, surveys were conducted annually, and were expanded beyond Bristol Bay to include the majority of the Bering Sea continental shelf with the original purpose of assessing potential resource impacts of offshore oil development (Pereyra et al. 1978). The annual collection of data on the distribution and abundance of crab and groundfish resources provides fishery-independent estimates of population abundances and biological data for the management of commercially important species in the EBS. The crab species that have historically been assessed during the survey due to their commercial importance include: red king crab (*Paralithodes camtschaticus*), blue king crab (*P. platypus*), southern Tanner crab (*Chionoecetes bairdi*), snow crab (*C. opilio*), and hair crab (*Erimacrus isenbeckii*). The common name for *C. bairdi* changed from Tanner crab to southern Tanner crab in 2005 (McLaughlin et al. 2005), but it will still be referred to as Tanner crab in this document.

Prior to 1988, the total number of stations varied and gradually increased until being standardized in 1988 (Fig. 1). Therefore, the pre-1988 estimates provided in this document for stocks that extend northwest of the Pribilof Islands are biased, as the entire stocks were not sampled. Since 1988, 376 standard stations have been included in the survey covering approximately 140,350 square nautical mile (nmi^2) area of the EBS, with station depths ranging from 20 to 200 m (Fig. 1). The annual EBS bottom trawl survey begins in the northeast section of Bristol Bay in early June, and between 4 and 6 stations are typically sampled each day from each of two vessels (Fig. 2). The standard survey is completed in late July or early August at the western edge of the survey grid, northwest of St. Matthew Island. In some years (i.e., 1999, 2000, 2006-2012, 2017) when the red king crab reproductive cycle is delayed due to colder water temperatures, a small portion of the inner Bristol Bay area is resampled after the conclusion of the standard survey (see Methods). Because station Z-04 (see Fig. 2) has a limited area within a trawlable depth range, tows were often completed at the northeast corner of station Z-04 (AZ-0504). We now exclude station Z-04 (AZ-0504) for crab population estimation. Consequently 375 stations are used for analysis of crab data, rather than 376 as listed in technical reports prior to 2015.

Eastern Bering Sea Crab Stock Assessment Process

Crabs included in the federal Bering Sea and Aleutian Islands (BSAI) King and Tanner Crab Fisheries Management Plan are managed by the Alaska Department of Fish and Game (ADF&G), with federal oversight by NMFS (NPFMC 2011). The annual stock assessment and fishery evaluation (SAFE) report prepared by the North Pacific Fishery Management Council provides current biological, ecosystem, and economic data associated with these commercial crab species. The NMFS determines the procedure for setting overfishing levels (OFL) and allowable biological catch (ABC), while ADF&G sets the annual total allowable catch (TAC) or

guideline harvest level (GHL) for each crab stock. Currently, the Council's Crab Plan Team (CPT) and the Scientific and Statistical Committee (SSC) review the assessment, biological, economic, and modeling data to recommend biological reference points associated with the status of crab stocks. Crab stock boundaries are defined by ADF&G management units for king crab and Tanner crab species (Fitch et al. 2012); however, the Pribilof Islands blue king crab stock boundary also includes a 180 nmi X 20 nmi (9 X 1 station) column on the east side of the management unit, which was added in 2013 to account for blue king crab survey and bycatch data. Red king crab are split into Bristol Bay and Pribilof Islands stocks and blue king crab are split into Pribilof Islands and St. Matthew Island stocks for management purposes, while Tanner and snow crab fisheries are considered single stocks but are split into separate management fishery units defined by the ADF&G Board of Fisheries using 166°W and 173°W as the boundary for each east and west unit, respectively.

This report summarizes the 2018 survey results for commercially important crab resources in the eastern Bering Sea. Note that area-swept estimates in this document are indices of abundance, and may not match the final modeled population estimates in the SAFE reports because the models include additional population dynamics information. The results of the 2018 standard EBS bottom trawl survey are presented for these crab stocks as defined by the management units. Details of the survey design and fishing gear specifications, in addition to the number and weights of the groundfish species sampled at each standard station during this survey, will be reported in a separate NOAA Technical Memorandum (e.g., Conner and Lauth 2017).

METHODS

Survey Area and Sampling Logistics

The 2018 standard survey was conducted onboard the chartered fishing vessels FV *Alaska Knight* and FV *Vesteraalen*, beginning 3 June in the northeast corner of Bristol Bay, moving westward, and finishing on 31 July. The vessels sampled in close proximity to each other for much of the survey (Fig. 2).

The survey stations are divided into multiple management units defined by ADF&G commercial registration areas and districts, and are further divided into strata with either standard or high station densities (Fig. 3). Standard-density strata have stations centered in 20 X 20 nmi (37.04 X 37.04 km) cells, while high-density strata include additional stations at the corners of the 20 X 20 nmi cells. To calculate the total area for each stock strata the area for each 20 X 20 nmi cell is assumed to be 401 nmi^2 due to the effects of a spherical projection of the flat grid surface in an area as large as the EBS.

The king crab Registration Area T in Bristol Bay (south of 58 °39 ′N and east of 168 °W) is 54,536 nmi^2 and consists of 136 stations. The king crab Registration Area Q in the Bering Sea is divided into the Northern District (north of 58° 39′ N) and the Pribilof District (south of 58° 39′ N and west of 168°W). The area for the St. Matthew Island Section of the Northern District is divided into two sampling strata: 1) a high-density 7,218 nmi^2 stratum with 28 stations (one of which is not trawlable but is included in the total area surveyed), and 2) a standard-density

11,629 nmi^2 stratum with 29 stations, for a total of 56 stations within the St. Matthew Island Section. The area of the Pribilof District is divided into two sampling strata: 1) a high-density 10,025 nmi^2 stratum with 41 total stations, and 2) a standard-density 14,436 nmi^2 stratum with 36 stations, for a total of 77 stations within the stock area. For Pribilof District blue king crab, the eastern stock boundary is 20 miles east of the Pribilof District and includes nine additional stations, as indicated in the 2013 Pribilof Islands Blue King Crab Rebuilding Plan (NPFMC 2014). High-density strata have more stations (standard, corner) per area than standard-density strata (Fig. 3).

The fishing gear used in 2018 was identical to that of previous EBS annual bottom trawl surveys since 1982 with both vessels fishing a standard 83-112 Eastern otter trawl employing an 83 ft (25.3 m) headrope and a 112 ft (34.1 m) footrope (Lauth and Nichol 2013). The codend mesh size is 8.9 cm stretched and the liner is 3.2 cm. The trawl nets on each vessel were removed from service and replaced with new nets every 20-30 consecutive tows (~5 days) to mitigate potential impacts from changes in net configuration due to fishing. Each tow was approximately 0.5 h in duration and 1.5 nmi (2.8 km) in length, and was conducted at a speed of 3 knots (1.54 m sec^{-1}) (see Results for details), in strict compliance with NMFS bottom trawl protocols established by the National Oceanic and Atmospheric Administration (Stauffer 2004).

Net mensuration equipment (Marport sensors) was used to monitor the net's fishing performance during each tow. A bottom contact sensor was attached to the center of the footrope to measure bottom contact of the net at 1-second intervals. The net mensuration system also included an acoustic sensor attached to the headrope, and two sensors attached to the port and starboard dandylines to measure net height and width during trawling operations. Data on bottom contact of the footrope, and GPS data were combined to calculate distance fished. Fishing power was assumed to be equal between the two vessels.

Surface and bottom water temperatures along with temperature-depth profiles were collected at 6-second intervals throughout the duration of each tow using a Sea-Bird SBE-39 bathythermograph continuous data recorder (Sea-Bird Electronics Inc., Bellevue, WA) attached to the headrope of the net. The temperature measurement range of the SBE-39 is -5 to 35 ± 0.002 °C with pressure sensors measuring to a maximum depth of 1,000 ± 1 m and are calibrated every year by Sea-Bird Electronics. Bottom depth was also derived from these data by adding the net height from the net mensuration system to the headrope depth recorded by the SBE-39.

Biological Data Collection

For each tow, all crab were removed from the catch, sorted by species and sex, and a total catch weight was obtained for each species. Tanner and snow crab hybrids are identified by a combination of characteristics including curve of the epistome margin, eye color, carapace shape, and space between or shape of the rostrum horns (Karinen and Hoopes 1971, Urban et al. 2002). A random subsample of the total catch occurred when an exceptionally large number (approximately > 300) of a species was caught in a tow. Subsamples varied in size and composition depending on the particular tow. The subsample may have occurred at the level of the entire catch or at the level of a particular size and sex category once the catch was sorted. The

total weights of the sampled crab and non-sampled crab were recorded and an expansion factor was calculated to determine the final number of each species in the catch.

Individual crab carapaces were measured (± 0.1 mm) to provide a size-frequency distribution of each sample. Crab sizes are reported as carapace width (CW) excluding spines for Tanner and snow crab, and carapace length (CL) for hair crab and all king crabs (Donaldson and Byersdorfer 2005). Since 2006, individual weights were measured for blue king crabs every year, red king crab and snow crab in odd years, and for Tanner crab in even years to add to the existing length-weight data and to monitor temporal variability in length-weight regressions. For every haul in 2018, length-weight data were collected on up to five Tanner crab per each of the following categories: 1) male crab, 2) ovigerous crab, and 3) non-ovigerous female crab. Because of their relative rarity, weight data were collected for all intact blue king crabs encountered that met the sampling requirements (i.e., whole, live crab without regenerating limbs). Weights were collected from representative size ranges throughout the spatial distribution of each species. Collections were regionally stratified and tally sheets ensured all size ranges were equally sampled within each region.

In the absence of specific age data, shell condition classification by length and sex is necessary for apportioning stock abundance and biomass for determination of stock status, analytical stock assessment, and for establishing annual management controls. Shell condition class serves as a semi-quantitative index of molt status and time in shell post-molt. For all EBS crab stocks, and particularly those which exhibit a terminal molt at maturity (i.e., *Chionoecetes* spp.), shell condition is a requisite for setting overfishing limits and harvest quotas. Carapace shell condition was assessed for each crab sampled and assigned to one of six classes according to specific criteria (0 = premolt or molting, 1 = soft and pliable, 2 = new hardshell both firm and clean, 3 = oldshell slightly worn, 4 = oldshell worn, 5 = very oldshell).

Clutch assessment is used to estimate spawning stock biomass and overall reproductive health and to monitor demographic changes in the mating population. All female crab abdomens were evaluated to determine reproductive condition based on the color of the eggs (0 = no eggs, 2 = purple, 3 = brown, 4 = orange, 5 = purple-brown, 6 = pink), the condition of the eggs (0 = no eggs, 1 = uneyed, 2 = eyed, 3 = dead, 4 = empty egg cases), and the size of the egg clutch (0 = immature, 1 = mature female no eggs, 2 = trace to 1/8, 3 = 1/4, 4 = 1/2, 5 = 3/4, 6 = full). Beginning with the 2017 survey, an additional egg condition code, 5 = hatching, was employed to denote females that were sampled while in the process of hatching their clutch.

For mature females, egg clutch and egg condition codes were used to identify the stage in the molt-mate cycle, with the presence of eyed embryos, hatching eggs, empty egg cases, or absence of eggs (barren, hereafter) in morphologically mature females signifying an incomplete cycle, while mature females brooding uneyed embryos indicated completion of the cycle. The ratio of females with eyed embryos, hatching eggs, empty egg cases, and/or old shell barren to uneyed embryos was derived as a measurement of the molt-mate cycle progression during the survey.

Understanding reproductive biology is critical for managing crab stocks in the Bering Sea. Spatiotemporal variability in reproductive potential including fecundity, sperm reserves, and reproductive condition likely influences fluctuations in population abundances. Yet, most stock

assessment models use spawning stock biomass (i.e., number and average weight of mature animals), but not embryo production, which can lead to different perceptions of productivity (Trippel 1999, Swiney et al. 2012). In recent years, egg clutches for red king crabs in Bristol Bay and *Chionoecetes* spp. throughout the eastern Bering Sea were collected during the survey to support process studies to assess female reproductive potential. Red king crab and snow crab fecundity varies interannually and spatially likely due to demographic variability in crab age as measured by size and shell condition (Rugolo et al. 2005, Swiney et al. 2012). Starting in 2012, mature female red king crab samples were collected (even years only) throughout their distribution to monitor fecundity changes over time. Future analyses will consider the correlations of reproductive potential with demographic and environmental patterns.

Maturity in male *Chionoecetes* spp. can be defined by morphometric characteristics of the chela where morphometrically immature and mature crab are separated into two morphometric groups based on the frequency distribution of the chela height (large claw or small claw) to carapace width ratio (Stevens et al. 1993, Tamone et al. 2007). To assess the difference between morphometric maturity and true functional maturity, additional special projects have been conducted in recent years. As standard sampling protocol, chela height and carapace width measurements were taken for male Tanner crabs during even years starting in 2008, while chela height and carapace width measurements for male snow crabs were taken in odd years starting in 2009. In 2018, chela height and carapace width measurements (± 0.1 mm) were collected from a subsample (typically < 15 crab per haul) of male Tanner and snow crab caught at each station.

Bitter crab syndrome is caused by a parasitic dinoflagellate, *Hematodinium* sp., and is found in Tanner and snow crab throughout Alaska waters (Meyers et al. 1996). The mortality rate of parasitized crabs is believed to be high, and symptoms include lethargy, pink carapace pigmentation, and white opaque hemolymph (Meyers and Burton 2009a). Meats of parasitized crabs are harmless to humans but are bitter tasting, making the crabs unmarketable. The prevalence of bitter crab syndrome fluctuates temporally and spatially between *Chionoecetes* spp. in the eastern Bering Sea (Meyers et al. 1996), and may be affected by changes in environmental conditions (Morado et al. 2010). Black mat syndrome is caused by a parasitic fungus, *Trichomaris invadens*, and was prevalent in the 1970s and 1980s throughout Alaska waters, primarily infecting Tanner crab, but does not pose human health concerns if infected Tanner crab meat is consumed (Meyers and Burton 2009b). Infected crabs have a dense, hard, black, tar-like covering over parts of the exoskeleton, which invades internal tissue causing destruction of the host (Meyers and Burton 2009b). Infections can prevent molting, cause blindness if eyestalks are infected, or result in mortality depending on the severity of the infection. Infected sub-legal crabs may fail to reach legal size or sexual maturity due to mortality or inhibited growth/molting. All crab carapaces were scanned for evidence of bitter crab syndrome and black mat fungus to understand its temporal and spatial variability. In addition, Tanner and snow crab blood samples were collected in each of three index sites, which was comprised of 10 stations per index site (20 crabs were attempted to be sampled per station). Samples were set aside for further testing by scientists in the Shellfish Assessment Program, Pathobiology group at the AFSC in Seattle, Washington.

Crab Biomass Estimates

Crab density (number nmi^{-2}) was estimated at each station for sublegal or legal males, as well as mature and immature males and females of each stock. Maturity and legal size classes were based on literature values and State of Alaska regulations (Table 1). The ADF&G definitions for legal size classes (CW in inches) include spines (ADF&G 2017), while CW measurements reported in this document exclude spines (Table 1). The area-swept by the trawl (nmi^2) was calculated as the product of the distance traveled while the net had bottom contact by the mean net width over the duration of the tow. Prior to 2009, data reported in this annual document used a fixed width of 15.2 m (0.008 nmi) in the area-swept calculation to maintain consistency with historical calculations of crab abundances. Since 2009, all population biomass estimates for the entire time series are calculated using the variable net width based on net mensuration data (Table 2). The effective width of the trawl typically ranges from 14.6 to 18.3 m when towing at a speed of 3 knots (Weinberg 2003; Fig. 4), and changes with the depth of the tow due to changes in scope of the trawl wire (Rose and Walters 1990). For 2018 and all historical data reported in this current document, crab densities were calculated using the mean net width recorded for the duration of each tow, and a mean net width-inverse scope regression relationship was calculated when net width values were not recorded during a tow (Rose and Walters 1990). From 1975 to 1981, the net width estimates used for the area-swept calculations were derived from a single width estimate calculated each year for a particular type of trawl used during the annual survey. From 1982 to 1987, the net width used in the area-swept calculations was estimated using the inverse relationship between net scope and net width developed by Rose and Walters (1990). From 1988 to 2018, the net width was estimated using the net mensuration system described above, which measures the height and width of the net throughout the duration of the tow (Table 2, Fig. 4). Distance traveled by the trawl was determined from ship GPS positions recorded at the beginning and end of each tow.

All reported historical data, and the current biomass estimates are calculated for the number of individual male and female crab at each 1 mm size category for each species, using the weight-size relationships developed by the AFSC's Kodiak Laboratory (Table 3). The size-weight relationships are described by the expression:

$$W = a\, L^{b} \quad ,$$

where W is the total weight in grams, L is either CL or CW in millimeters, a is the intercept in log scale and b is the slope. Parameters a and b for the size-weight relationships are estimated from a linear regression fitted to log-transformed size-weight data collected between 2000 and 2009.

The weights calculated at each 1 mm size category are summed within the legal male, sublegal male, mature and immature size categories for each species and sex caught at a station. The crab biomass within a district or section stratum was estimated by averaging crab densities from all stations within the defined district or section stratum, and multiplying by the total area of the district or section stratum specific to that stock. Total biomass was calculated using a stratified design based on management units (standard density, high density, ADF&G-defined districts, or section stratum). Population biomass estimates were calculated in each stratum and then summed

among strata. Variance of the total biomass estimate for each size class was calculated by summing the variance of each stratum. The 95% confidence intervals were calculated using the standard error of the total population multiplied by 1.96. All biomass estimates and confidence intervals (± 95%) reported in this document are reported in metric tons (t) except in the Abstract where both t and pounds (lb) are reported. Metric tons can be converted to lb by multiplying the biomass in t by 2,204.62 for comparison with ADF&G reported values of total allowable catch (TAC) and guideline harvest levels (GHL).

In years with colder than average bottom water temperatures (1999, 2000, 2006-2012, and 2017), a small number of standard Bristol Bay stations sampled at the beginning of the survey were resampled in mid-August to accurately assess the percentage of ovigerous red king crab females which had extruded a new clutch of uneyed embryos. Similar to earlier years, the average bottom temperatures at Bristol Bay station in June 2018 were warm relative to the long term average. Over ninety-seven percent of all ovigerous females had uneyed embryos indicating the completion of the annual reproductive cycle. As such, Bristol Bay stations were not resampled in 2018.

The population biomass estimates reported in this document are point estimates, and have substantial uncertainty due to the expanse of the area being sampled and the distributions of the resource. These point estimates are least precise for small crabs due to gear selectivity, and for females of some stocks due to crab behavior. For example, female blue king crab prefer rocky habitat, which is difficult to sample with bottom trawls. For consistent analyses, and due to a lack of available data, catchability is assumed to be near or equal to one for the indices developed in this document. The stock assessment models that incorporate these survey data consider catchability when estimating abundance and biomass.

Centers of Distribution

The centers of distribution for male and female crab from 1975 to 2018 were determined by averaging the latitude and longitude of each positive tow for a particular species. Latitude and longitude were weighted by the CPUE for each size and sex class. In cold years when Bristol Bay stations were resampled (discussed in more detail below), only tows from Leg 1 were included.

Recruitment

Population fluctuations are likely influenced by variations in recruitment strength. Thus, assessing temporal variability in abundances of new individuals reaching the minimum legal size is important to predict the following season's catches. The term "recruitment" can refer to various life history stages including newly settled juveniles, individuals reaching sexual maturity, or individuals reaching the legal size limit. For the purposes of this technical memorandum, "pre-recruits" are defined as mature male crabs in the size class that will likely enter the fishery (minimum legal size limit) the following year, also referred to as "P1" crabs by some stock assessment authors (Table 1). A time series of pre-recruit abundance estimates are provided as an index for future abundances of legal crab.

RESULTS

Survey Overview

The 2018 EBS bottom trawl survey consisted of 375 total bottom trawls conducted from 3 June to 31 July over an area of approximately 140,350 nmi^2, beginning in the southeast corner of Bristol Bay, moving east to west, and finally moving from the stations northwest of St. Matthew Island to the stations along the slope edge south to finish on 31 July. The latitude and longitude of the midpoint of each successful tow along with the duration (h), distance fished (km), bottom depth (m) and bottom temperatures (°C) are listed in the Appendix. The mean distance fished across all tows was 1.53 nmi (2.83 km, SD = 0.10 nmi) with a range of 0.70 to 1.72 nmi (1.29 to 3.19 km) and the mean tow duration was 30.9 minutes (SD = 1.72 min, range = 14.5 to 35.1 min). The fishing depth of the 83-112 Eastern otter trawl ranged from 19 to 202 m with a mean gear depth of 78.6 m (SD = 34.0 m). The mean net width per tow ranged from 14.0 to 19.2 m and the average mean net width for all 375 standard successful tows was 16.7 m (SD = 1.0 m). The 2018 net fishing performance (distance fished, tow duration, gear depth, net width) was consistent with previous years with the exception of 1975, when tow duration was 60 minutes and mean distance fished was 2.26 ± 0.18 nmi.

The bottom temperature at each station during the standard survey ranged from 1.6 °C to 7.7 °C (Fig. 5). A cold pool of water < 2°C extended onto the middle shelf between the 50 and 100 m isobaths northwest of St. Matthews Island, which was retracted relative to 2017. Warmer bottom temperatures were around the Pribilof Islands and in shallow waters north and east of Bristol Bay and around Nunivak Island. In 2018, the average bottom water temperature during the first survey leg (3 June to 20 June) was 4.6 °C (SD = 0.5), which was warmer during the same time period compared to 2017 (Table 8 and Fig. 6).

Population abundance and biomass of the seven commercial crab stocks sampled during this survey fluctuated dramatically from 1975 to 2018 (Figs. 8-12). Overall commercial crab mature male biomass decreased from approximately 300,000 t to below 100,000 t in the mid-1980s, increased to just below 500,000 t in the early 1990s due to increases in snow and Tanner crab, leveled out around 200,000 t between 2005 and 2015, but dropped to approximately 100,000 t in 2017 and 2018 (Fig. 7).

Six special projects were conducted in addition to the standard assessment survey to collect specific biological data from particular crab species (Table 4). Two of the projects originated from the AFSC: 1) collect Tanner and snow crab blood samples at three index sites each to monitor bitter crab syndrome, and 2) collect female snow crabs to assess annual versus biennial reproductive cycles. Three projects originated from ADF&G: 1) collect snow crab for research of genetics mating dynamics, 2) collect Tanner blood samples at eight sampling sites to evaluate fine scale population genomic structure, and 3) collect crab specimen for outreach activities. One project originated from the Institute of Marine Research, Norway: collect red king crab tissue for a genomics project.

Seven-hundred and thirty-three snow crab and 446 Tanner crab blood samples were collected from six index sites to monitor bitter crab syndrome. Approximately 650 snow crabs were collected for the annual versus biennial reproduction study. Chela heights were measured for maturity estimates; 2,432 male Tanner crab and 1,845 male snow crab chela heights were measured in 2018. One-hundred and fifty-three mature female snow crab were collected for a genetics mating dynamics project. Four-hundred and eighteen Tanner crab blood samples were collected from eight index sites to evaluate population genomic structure. Two-hundred and fifty-seven crab specimen were collected for outreach activities. Fifty red king crab tissues were collected for a genomics project. All collections were completed within the guidelines stipulated by the ADF&G collection permit for each project (CF-16-010(1), CF-17-076).

Bristol Bay District Red King Crab

Red king crab (*Paralithodes camtschaticus*) were caught at 66 of the 136 stations in the Bristol Bay management district in 2018. Similar to historical trends over the last 30 years, Bristol Bay red king crab were caught at an average depth of 55.5 m (SD = 13.3 m). The density of legal-sized male crab caught at a station ranged from 66 to 577 crab nmi^{-2} (see Appendix). Legal-sized male Bristol Bay red king crab were caught at 52 stations (Table 5; Fig 13), resulting in a total biomass estimate (± 95% CI) of 12,010 ± 3,442 t (Table 6) and a total abundance estimate (± 95% CI) of 3.8 ± 1.1 million crab (Table 7) in the Bristol Bay District. The majority of mature males were concentrated in the central and southern sections of Bristol Bay, and along the Alaska Peninsula (Figs. 14 and 16). The 2018 estimated biomass of legal-sized males is lower than last year, and lower than the 20-year average of 28,417 ± 4,532 t (Table 6).

Red king crab mature males were encountered at 56 of the 136 surveyed stations with no one station dominating in abundance (Figs. 14 and 16). One-hundred percent of the 155 mature males and 128 immature males caught were measured (Table 5). The estimated biomass of 13,226 ± 3,589 t for mature males is 82% of the total male biomass in 2018 with immature male red king crab estimated at 2,818 ± 1,309 t (Table 6). The majority of both size categories were located in the central and northern Bristol Bay District (Fig. 14).

In 2018, an overall decrease in male red king crabs was observed compared to 2017 population levels (Fig. 17). Thirty-five percent of legal-sized males were new hardshell crabs and 65% were oldshell and very oldshell crabs with the majority of oldshell males caught in central Bristol Bay (Fig. 18).

One of the sampling objectives of this multi-species bottom trawl survey is to assess the mature red king crab population when mature females are carrying newly extruded, uneyed embryos after completion of the molt-mate cycle (Otto 1986). Embryo development and larval hatching in female red king crab, followed by the molting and mating cycle, are delayed in years with cold bottom water temperatures (Chilton et al. 2010, Shirley et al. 1990, Stevens and Swiney 2007, Dew 2008). During years with colder than average bottom temperatures (1999, 2000, and 2006-2012, 2017), the ratio of eyed to uneyed embryos encountered in mature females on the survey in June was higher compared to warmer years (2001-2005, 2013-2016, 2018) (Table 8). The eyed to uneyed embryo ratio ranged from 6.68 to 0.63 in cold years, compared to 0.06 to 0.00 in the

warmer years. The ratio of eyed to uneyed embryos in mature females decreased dramatically when the Bristol Bay stations were resampled in cold years, ranging from 0.06 to < 0.01, and indicating that the majority of mature females completed the mating and molting cycle (Table 8).

The determination that the molting and mating cycle has been delayed is made when high numbers of oldshell mature females either brooding eyed embryos, which were fertilized from the previous season, or with pleopods exhibiting empty egg cases, are encountered during the first leg of the survey. To determine whether it is necessary to tow the Bristol Bay red king crab stations again, the reproductive condition of the mature female red king crab and the change in abundance of males and females between survey legs during cold years are assessed.

The relatively warm water temperatures in 2018 did not delay the molting and mating cycle in mature red king crab. Two-hundred and ninety-six of the 308 mature females sampled during the standard survey had extruded a new clutch of uneyed embryos, while 4 mature females had empty egg cases (Figs. 18a and 20). Average bottom temperature of Bristol Bay stations with mature female red king crab in June was 4.6º C in 2018, which is over one degree warmer than the same period in 2017 (Table 8). Consequently, Bristol Bay stations were not resampled in 2018.

The 2018 mature female red king crab biomass estimate of 12,282 ± 5,437 t (Table 6) and abundance estimate of 9.0 ± 4.0 million crabs (Table 7) is 87% of the total female abundance with immature female red king crab biomass estimated at 520 ± 333 t (Table 6). The majority of the mature female red king crab were caught in the central area of Bristol Bay and along the Alaska Peninsula (Figs. 15 and 18).

Spatial distributions of red king crabs have fluctuated since the beginning of the trawl survey. The centers of distribution for mature male and female red king crab shifted north and east of the southwest Bristol Bay region from 1980 to 1987 (Fig. 21). From 1988 to 1991, the mature female distribution slightly shifted south before returning to the northeastern distribution while males remained in the northeast. Loher and Armstrong (2005) hypothesized that the shift during the late 1970s and early 1980s was due to warmer bottom temperatures. Yet an alternative hypothesis suggests the disappearance of the southwestern portion of the population near the Unimak region during the late 1970s and early 1980s was caused by fishing effects (Dew and McConnaughey, 2005). In more recent years when the cold pool extended onto the Bristol Bay shelf area (from 2008 to 2012, and 2017), the distribution of mature females and males moved from the central area of Bristol Bay to the nearshore areas along the Alaska Peninsula supporting the temperature hypothesis (Chilton et al. 2010). This may be because females avoid water cold enough to delay embryogenesis during brooding (Stone et al. 1992). The centers of distribution for mature males and females in 2018 was approximately 10 nmi northwest relative to 2017 centers of distribution and 20 nmi north relative to the 2016 (Fig. 21).

The location of ovigerous females at larval release may impact post-larval settlement success and recruitment strength in subsequent years. Given the known current structure in Bristol Bay, larvae released from females located in southwestern Bristol Bay would have a higher likelihood of settling in inner Bristol Bay. A northward shift in adult spatial distribution may reduce larval supply along the Alaska Peninsula and in inner Bristol Bay which is likely more favorable for

juvenile survival than elsewhere in Bristol Bay (McMurray et al. 1984, Zheng and Kruse 2006). If this hypothesis is correct, reduced settlement success in warm years relative to cold years (Evans et al. 2012) may explain population trends over the past several decades. Year-class strength was high during the 1970s and early 1980s, but has been generally low since 1985 (Figs. 22 and 23). High abundances in the 1970s occurred when the spawning stock was located in southern Bristol Bay (Armstrong et al. 1993), while the low abundances starting in the mid-1980s may be caused by the warmer bottom temperatures and potentially related adult spatial shift. Despite relatively cold years in 2008-2012 and an extended cold pool, estimated population abundance has been low in recent years. A strong juvenile size group (40 mm to 50 mm CL size category) was observed in 2011 and could be associated with the colder temperatures in 2008-2012. The strong 2011 juvenile size class was not observed in 2012 or 2013, but relatively high abundances of females appeared in the 110-120 mm size class in 2014, which may be attributed to the strong juvenile size group seen in 2011 (Figs. 22 and 23). The 2018 mature male population abundance estimates were lower, where the pre-recruit population abundance estimates were higher compared to 2017. Mature female estimates were lower in 2018 compared to 2017, and still well below the previous 20-year average of 26.6 ± 3.5 million crabs (Fig. 19).

Pribilof District Red King Crab

Historically, red king crab were not abundant in the Pribilof District and landings were taken incidentally during the blue king crab fishery. The red king crab fishery first opened in 1993 while the fishery for blue king crab was closed. A combined fishery for both red and blue king crab occurred in the Pribilof District from 1995 through 1998, but due to low abundance of blue king crab, the combined fishery and the red king crab fishery have both remained closed since the 1998-1999 season (Gish 2006).

Red king crab were caught at 11 of the 77 stations in the Pribilof District in 2018, most of which were in the high-density sampling area (Figs. 24-26). Pribilof District red king crab were caught at an average depth of 66.4 m (SD = 3.7 m), which is slightly deeper than the long-term average (56.0 m). The density of legal-sized males caught at a station ranged from 72 to 325 crab nmi^{-2} (Appendix). Legal-sized male red king crab were caught at 7 of the 77 stations in the Pribilof District (Table 5, Fig. 24) with a biomass estimate (± 95% CI) of 827 ± 697 t (Table 9) and an abundance estimate (± 95% CI) of 0.2 ± 0.2 million crab (Table 10). Legal-size males represented 26% of the total male estimated biomass and were well below the average of 6,027 ± 2,518 t from the previous 10 years (Table 9).

Mature males were encountered at 8 of the 77 stations in the Pribilof District, most of which were in the high-density sampling area (Figs. 25 and 27). All of the 14 mature and 77 immature males caught were subsequently measured (Table 5). Two stations (IH2120 and I-20) accounted for 57% of all mature red king crab caught (Figs. 25 and 27). The biomass estimate of mature males was 929 ± 775 t, and represented 41% of the total male biomass (Table 9) with the remaining 59% represented by 1,325 ± 2,526 t of immature male red king crab (Table 5). Mature males were distributed around St. Paul Island in the nearshore shallow water stations, and to the north, south, and east of St. Paul Island (Fig. 25).

The 2018 size-frequency for red king crab males shows somewhat similar trends for newshell legal-sized males as compared to 2017 (Fig. 28). In 2018, 55% of the legal-sized males were new hardshell crabs, and were primarily distributed around St. Paul Island. Forty-five percent of the legal-sized males were in oldshell or very oldshell condition, and were distributed around St. Paul Island (Fig. 29).

The 2018 biomass estimate of mature red king crab females was 877 ± 1,500 t and abundance was 0.9 ± 1.7 million crab, representing 100% of the total female biomass collected during the survey (Tables 9 and 10). Female biomass estimates are imprecise due to the limited number of tows with positive crab catches (Fig. 26; Appendix), and 2018 estimates indicate mature female biomass was at 76% of the average over the last 10 years (Figs. 9 and 27). One-hundred percent of the mature females were new hardshell between 87.5 and 146 mm CL, and 31% of the mature females were carrying either 75% or 100% full clutches of uneyed embryos (Fig. 30). There were no immature females caught in 2018 (Fig. 26).

The centers of distribution for both males and females have moved outside a 40 nmi by 40 nmi region around St. Paul Island (Fig. 31). The center of the red king crab distribution moved to within 20 nmi of the northeast side of St. Paul Island as the population abundance increased in the 1980s, and remained in that region until the 1990s. Since then, the centers of distribution have been located closer to St. Paul Island. Centers of distribution in 2018 were located toward the northeast, and were further away from St. Paul Island compared to 2017.

Specific mechanisms for population fluctuations are unknown for Pribilof District red king crab. However, it is generally acknowledged that climate change impacts marine ecosystems, including Bering Sea crab and fish species. A climatic regime shift took place in the North Pacific Ocean during the winter of 1976-77, which was characterized by an abrupt transition from a negative to positive Aleutian Low Pressure Index (ALPI) and Pacific Decadal Oscillation (PDO) resulting in warmer air and sea surface temperatures relative to pre-1977 conditions. After the 1977 regime shift, a slight increase in Pribilof District red king crab occurred followed by a larger increase in the 1990s (Figs. 32 and 33). Male and female Pribilof red king crabs decreased in 2017, with a decrease in male pre-recruits as well (Fig. 12).

Pribilof District Blue King Crab (including total stock boundary)

Blue king crab (*Paralithodes platypus*) were caught at 6 of the 86 stations in the Pribilof stock boundary area in 2018, all in the high-density sampling area (Figs. 34-36). Pribilof District blue king crab were caught at an average depth of 70.0 m (SD = 4.4 m), which has been similar over the last 30 years. The 2018 biomass estimate (± 95% CI) of legal-sized males was 152 ± 170 t (Table 11, Fig. 34), and abundance was 0.1 ± 0.1 million crab (Table 12), representing 62% of the total male biomass and below the average of 581 ± 295 t for the previous 20 years (Tables 11-12 and Fig. 38).

Blue king crab mature males were caught at 3 of the 86 stations in the Pribilof stock boundary area, and all of the three mature males and six immature males caught were measured (Table 5;

Figs. 35 and 37). The mature males were also of legal size, so the abundance and biomass estimate are the same as for legal males. An additional 94 ± 99 t of immature male blue king crab was estimated within the Pribilof stock boundary area (Tables 5 and 11). Immature male blue king crab were captured to the north and east of St. Paul Island, where mature and legal-sized male crabs were distributed northeast and southeast of St. Paul Island (Figs. 34, 35 and 37). In 2018, all of the sampled legal-sized males were new hardshell shell condition (Fig. 39).

Six mature female blue king crab were caught in the Pribilof stock high-density sampling area, which extrapolated to a biomass estimate of 108 ± 154 t (Table 11) and an abundance estimate of 0.1 ± 0.1 million crab (Table 12), and represents 89% of the total female estimated biomass (Fig. 36). Estimates of female biomass are imprecise due to their preference for rocky habitat which is difficult to sample with bottom trawls. Blue king crab females are predominantly biennial spawners with only a portion of the female population carrying eyed embryos in a given year, while the remainder are in a non-embryo-bearing phase (Somerton and Macintosh 1985). Three of the 6 mature female blue king crab sampled in the Pribilof stock boundary area were brooding uneyed embryos and three mature had no eggs (Fig. 40). Two of the females with embryos had 75% full clutches (Fig. 40).

The centers of distribution for both males and female blue king crab are located within a 40 nmi by 40 nmi region east of St. Paul Island (Fig. 41). The center of the blue king crab distribution moved to within 20 nmi of the northeast side of St. Paul Island as the population abundance decreased in the 1980s before moving easterly in the 1990s. In 2018, the mature male and female centers of distribution were located approximately 30 nmi northeast of St. Paul Island.

Pribilof blue king crab production was higher in the late 1970s and early 1980s, and increased in the 1990s with female abundances at an all-time high in 1980 (Figs. 42 and 43). A pulse of male and female blue king crabs in the 55-60 mm CL size class was seen in 2005, yet this cohort was not observed at elevated abundances in subsequent years. Overall male and female blue king crab abundances have been extremely low in recent years with no evidence of increasing.

St. Matthew Island Section, Northern District Blue King Crab

The blue king crab fishery in the St. Matthew Island Section of the Northern District opened in 2009 after a 10-year rebuilding plan but was again closed due to ADF&G harvest regulations in 2013. In 2018, blue king crab were caught at 14 of the 56 total stations in the St. Matthew Island Section sampling strata; all 14 stations were in the high density area (Table 5, Figs. 44-46). St. Matthew Island blue king crab were caught at an average depth of 70.9 m (SD = 16.7 m), which is within the 30-year average depth (82.5 m; SD=29.9 m). Thirty-five legal-sized male blue king crab were caught in 2018 with a biomass estimate (± 95% CI) of 1,358 ± 735 t (Table 13, Fig. 44) and abundance estimate (± 95% CI) of 0.7 ± 0.3 million crab (Table 14) representing 66% of the total male estimated biomass which is below the average of 2,506 ± 627 t from the previous 20 years (Table 13).

Mature male blue king crab were caught at 12 of the 56 stations surveyed in the St. Matthew Island Section sampling strata, and all of the 47 mature and 58 immature males caught were

measured (Table 5, Figs. 45 and 47). The mature male biomass estimate in 2018 was 1,612 ± 879 t, representing 78% of the total male estimated biomass, while the immature male biomass was estimated at 434 ± 497 t (Table 13). Historically, one station (R-24) has greatly impacted population estimates for St. Matthew Island blue king crab, but this was not the case in 2018. In 2018, 6% of the mature males were caught at R-24, compared to 51% in 2017 (Figs. 45 and 47). Mature males were much more evenly distributed throughout the high density area, where the highest percentage of mature males caught at one station was 19% at station P-25. Fifty-five percent of the immature male blue king crab were caught at one station (Q-23) east of St. Matthew Island, while the remaining immature males were distributed within the 100 m isobath around St. Matthew Island. The majority of mature males were caught south of St. Matthew Island (Figs. 45 and 47).

Overall St. Matthew Island blue king crab mature male abundance decreased in 2018 compared to 2017 and 2016, while immature male abundance increased. (Table 8; Fig. 48). In 2018, 60% of the legal-sized males were new hardshell crabs, and the two stations with the highest catches were southwest (PO2625 and P-25) of St. Matthew Island (Fig. 44 and 49).

The 2018 mature female blue king crab biomass estimate was 316 ± 267 t and abundance was 0.6 ± 0.5 million crab (Tables 13 and 14). Forty-four percent of the immature female blue king crab were caught at one station (Q-23) east of St. Matthew Island (Fig. 46). Ninety-six percent of immature females were new hardshell crabs, the remaining 4% were of old hardshell condition (Fig. 50).

The centers of distribution for both males and female blue king crab are located within a 30 nmi by 30 nmi region around St. Matthew Island (Fig. 51). The center of the blue king crab distribution has moved randomly within this region without a clear pattern of neighboring years being proximal to each other. In 2018, the mature male and mature female centers of distribution were located approximately 20 nmi south of St. Matthew Island (Fig. 51).

NMFS survey abundance estimates for St. Matthew blue king crab do not exist prior to 1978. As such, production cannot be compared in terms of before vs. after the 1977 regime shift. Size distribution abundance estimates (Figs. 52 and 53) suggest that production of male crabs has been relatively stable in recent years. In 2018, the abundance of pre-recruit male crab in the 105-119 mm size class was similar to 2017, and below the previous 20-year average (Fig. 12). The high variability in population estimates suggests that trends should be interpreted with caution. It is important to highlight that recent fluctuations in population abundance estimates are primarily caused by catch numbers in one station (R-24).

Tanner Crab

In 2011, the ADF&G Board of Fish changed the legal-size limit of Tanner crab from ≥ 5.5 inches CW (138 mm, without spines) to ≥ 4.4 inches CW (110 mm, without spines) west of 166°W and ≥ 4.8 inches CW (120 mm, without spines) east of 166°W (Table 1). According to the regulatory harvest strategy of the State of Alaska (5 AAC 35.508), the annual TAC or GHL for Tanner crab in both areas is determined by the biomass estimate of males ≥ 125 mm CW.

The harvest strategy is based on the assumption that the commercial fishery will target legal size crab (Zheng and Pengilly 2011), although the industry may self-impose retention of crab ≥ 4.9 inches CW (125 mm, without spines) east and west of 166°W. We provided the 2018 biomass estimates for the two legal-size categories, as well as for ≥ 4.9 inches CW east and west of 166°W in the abstract.

Tanner crab were caught at 86 of the 120 stations east of 166°W (Fig. 54), and 173 of the 255 stations west of 166°W. Among those stations west of 166°W, Tanner crab occurred at 41 and 6 stations within the high-density areas of the Pribilof District and St. Matthew Island Section, respectively (Fig. 54; Appendix). Tanner crab were caught at an average depth of 67.1 m (SD = 22.0 m) east of 166°W, and 95.5 m (SD = 32.4 m) west of 166°W, which are similar to what has been observed throughout the entire time series.

Legal-sized Tanner crab were caught at 66 of the 120 stations east of 166°W, and 99 of the 255 stations west of 166°W (Table 5, Fig. 55). One-hundred percent of the legal-sized males caught either east or west of 166°W were measured (Table 5). In 2018, 91% of sampled legal-sized males were of oldshell or very oldshell shell condition (Fig. 61).

The 2018 biomass estimate (± 95% CI) for legal male Tanner crab east of 166°W was 8,861 ± 2,600 t (Table 15), with an associated abundance estimate of 12.0 ± 3.4 million crab (Fig 17). Eighty-two percent of legal males were ≥ 4.9 inches CW, with a biomass estimate of 7,355 ± 2,333 t (9.2 ± 2.9 million crab; Tables 15 and 17). The 2018 estimated biomass of legal Tanner crab in the eastern area was below the previous 20-year average biomass of 12,681 ± 6,927 t. The majority of the Tanner males ≥ 113 mm CW occurring east of 166°W were distributed in the middle and southwest sections of Bristol Bay (Fig. 56).

The 2018 biomass estimate for legal male Tanner crab west of 166°W was 21,572 ± 6,662 t (Table 19), while abundance was estimated at 35.1 ± 10.4 million crab (Fig 21). Sixty percent of legal males were ≥ 4.9 inches CW, for a biomass estimate of 12,871 ± 4,589 t (17.2 ± 6.0 million crab; Tables 19 and 21). The 2017 estimated biomass of legal Tanner crab in the western area was well above the previous 20-year average biomass of 17,134 ± 4,816 t. The majority of Tanner males ≥ 103 mm CW occurring west of 166°W were distributed around the Pribilof Islands (Fig. 56).

In 2018, a total of 2,432 male Tanner crab chela height measurements were collected on the EBS bottom trawl survey. Beginning with this, the 2018 edition of the technical memorandum for commercial crab species, we present estimated abundances of newly morphometrically mature male *Chionoecetes* spp., as determined by comparison of their chela heights vs. carapace widths. Consequently a new procedure was developed with initial results described separately.

In the areas east and west of 166°W, overall newshell males increased (Figs. 59-60 and 62-63). In both areas, for male crabs above 100 mm CW the oldshell category dominated newshell, while both categories were primarily distributed in the southwest section of the EBS shelf at depths greater than 50 m (Fig. 58).

The 2018 mature female Tanner crab biomass estimates east and west of 166°W were 598 ±

269 t and 4,293 ± 1,926 t (3.5 ± 1.6 and 30.3 ± 13.2 million crabs), respectively, while the immature female Tanner crab estimated biomasses east and west of 166°W were 990 ± 492 t and 3,921 ± 1,565 t, respectively (Tables 5, 16 - 22). Twelve percent of the mature female population were distributed east of 166°W in the ADF&G Eastern management district, within the central and southwestern areas of the Bristol Bay District (Fig. 57). In the eastern area only, approximately 2% of the sampled mature females were softshell, while 10% were new-hardshell and 88% were oldshell or very oldshell (Fig. 64). In the western area only, less than 5% of the mature females were softshell, while 41% were new-hardshell and 54% were oldshell or very oldshell (Fig. 65). In the eastern region 72% of the mature sampled females carried newly extruded embryos while 24% were brooding eyed embryos, had not produced a new clutch, or were barren (Fig. 64). In the western region, 89% of the mature sampled females carried newly extruded embryos, while approximately 1% were brooding eyed embryos, had not produced a new clutch, or were barren (Fig. 65). In the eastern region, 4% of the mature females were 1/2 full, 27% were 3/4 full, and 36 % were full, while in the western region 19% were 1/2 full, 35% were 3/4 full, and 24% were full (Figs. 64 and 65).

Pulses of strong recruitment to the mature male and female population appear to have been cyclical throughout the eastern Bering Sea (Figs. 62 and 63), yet it is unclear what environmental conditions triggered the pulses, or if strong cohorts are sequentially linked as theorized for snow crab (Ernst et al. 2005, Ernst et al. 2012, Parada et al. 2010). Shell condition can be used to infer if mature female Tanner crab are primiparous (first clutch of eggs) or multiparous (subsequent clutches). For example, mature newshell female crabs (shell condition 2) are assumed to be primiparous (first clutch of eggs) and likely molted to maturity during the prior winter (Ernst et al. 2005).

The shell condition time series amply demonstrates that the survey fails to detect portions of the population. For example, the population estimate of newshell (shell condition 2) female Tanner crab east of 166°W was 37 million in 1990, yet the estimate of oldshell (shell condition 3) mature females was 76 million in 1991 (Fig. 62). Assuming newshell females become oldshell the following year, estimates of oldshell females should be at or below levels of newshell females the year prior. Further, the shell condition time series for mature male Tanner crab should be interpreted with caution, as physiological, morphological, and functional male maturity vary by size. In most of the historical survey data, it is not possible to differentiate morphologically mature and immature males. Thus, a size cutoff is suboptimal for assessment of mature crabs, and future research will strive to refine the accuracy of estimating mature population abundances.

The centers of distribution for both males and female Tanner crab have moved within a 160 nmi by 100 nmi region east of the Pribilof Islands and west of Bristol Bay (Fig. 66). The center of the distribution moved from the eastern extent of the distribution in the 1970s to the western extent in more recent years.

There is little evidence of changes in Tanner crab production related to the 1977 regime shift (NPFMC 2016), yet pulses of strong production have been cyclical from 1975 to the present (Figs. 67-70). A less pervasive regime shift occurred in 1989, as characterized by briefly negative ALPI and PDO indices, but the system did not return to pre-1977 conditions. A slight

increase in Tanner crab production coincided with the 1989 shift, although the links between climate and crab production remain speculative. Male pre-recruit abundance for east and west of 166°W was down relative to 2017, and levels are above the average over the past 20 years (Fig. 12). The male size frequency distribution in 2014 reveals an increase in abundance of male crabs between 100 and 125 mm CW west of 166°W, which may be related to the slight increase of crabs between 120 and 140 mm CW in 2015 and 2016, though this size category has decreased as of 2017 and 2018 (Figs. 67-70).

Snow Crab

Although the legal minimum size limit for male snow crab is 3.1 inches CW (78 mm), processors currently prefer a minimum size of 4.0 inches CW (102 mm), due to economic considerations. The biomass estimates for male snow crab are reported for both legal and preferred size categories in the abstract.

Snow crab were caught at 224 of the 375 stations in the combined areas of the Bristol Bay District, Pribilof District, and St. Matthew Island Section sampling strata (Figs. 71-74). In 2018 snow crab were caught at an average depth of 102.0 m (SD = 26.2 m), similar to what has been observed throughout the history of the survey.

Legal-sized snow crab were caught at 193 of the 375 standard stations and 50% of the legal-sized males caught were measured (Table 5, Fig. 71). Legal-sized male snow crab estimated biomass (± 95% CI) was 130,474 ± 43,554 t (Table 23) and abundance was 437.8 ± 147.9 million crab (Table 25) which was 7% of the total male abundance. This biomass was higher than the 20-year (1998- 2017) average legal male snow crab biomass of 110,932 ± 42,841 t. Twenty-one percent of those legal males were ≥ 4.0 inches CW with a biomass estimate of 27,018 ± 10,163 t (49.4 ± 19.0 million crab). Mature males (≥ 95 mm CW) were distributed throughout the EBS survey area in waters deeper than 50 m (Fig. 72).

An increase in the number of juvenile new hardshell males in the 30 to 75 mm size category has been observed in recent years, and these strong size classes are beginning to appear in subsequent years in the larger size categories (Fig. 75). Among sampled legal-sized male crab in 2018, 1.6% were in molting or softshell condition while approximately 81% were in new-hardshell condition. Legal males were distributed largely between the 50 and 100 m isobaths in the middle shelf of the EBS survey area, as well as between the 100 and 200 m isobaths in the northwest area of the EBS shelf (Figs. 75 and 76). Approximately 18% of the legal-sized males were either oldshell or very oldshell condition crabs, and were primarily distributed between the 100 and 200 m isobaths within the EBS region (Fig. 76).

The mature female snow crab biomass estimate of 161,573.± 63,268 t and abundance estimate of 3,282 ± 1,341 million crab was 66% of the total female estimated biomass (Tables 24 and 26). The immature female crab biomass estimate was 83,164 ± 42,474 t (Table 24). Among sampled mature females, 67% were in new-hardshell condition, and 33% were oldshell or very oldshell condition (Fig. 78). Ninety-five percent of the mature females were brooding new embryos, while less than 1% had eyed embryos (Fig. 78). One percent of the mature females had empty

egg cases, and 2.5% were barren, while 67% of mature females with embryos were either 75% or 100% full (Fig. 78).

Pulses of strong recruitment to the mature female population have been cyclical (Fig. 77), and it is hypothesized that strong cohorts are sequentially linked (see Ernst et al. 2012, Parada et al. 2010 for a detailed discussion). As with Tanner crab, shell condition can be used to infer if mature female snow crab are primiparous (first clutch of eggs) or multiparous (subsequent clutches). Mature newshell female crabs (shell condition 2) are assumed to be primiparous (first clutch of eggs), and likely molted to maturity during the prior winter (Ernst et al. 2005). Strong cohorts of mature primiparous females occurred approximately every 7 years starting in 1980 (Fig. 77), which matches the theoretical time required between egg extrusion of mature females and those offspring reaching maturity (Ernst et al. 2012). It is unknown what specific environmental conditions triggered the initial pulse, or for how long the sequence may last.

As with Tanner crab, the shell condition time series demonstrates that the survey fails to detect portions of the population. For example, population estimates of newshell (shell condition 2) female snow crab were 125 million in 1999, yet estimates of oldshell (shell condition 3) mature females was nearly 1,000 million in 2000 (Fig. 77). Estimates of oldshell females should be at or below levels of newshell females the year prior. As with Tanner crab, the shell condition time series for mature male snow crab should be interpreted with caution, as physiological, morphological, and functional male maturity vary by size, and it is not possible to differentiate morphologically mature and immature males in most survey data. Future research will strive to refine the accuracy of estimating mature population abundances.

With the exception of 1975 to 1979, the centers of distribution for both males and female snow crab have moved within a 120 nmi by 120 nmi region between St. Matthew Island and the Pribilof Islands (Fig. 79). The center of snow crab distribution moved dramatically to the northwest after 1979. Since then, the centers of distribution have moved throughout the region, with males having a broader distribution, while females are located more to the north. The 2018 mature male center of distribution was located between St. Matthew Island and the Pribilof Islands, while the mature female center of distribution was located near St. Matthew Island (Fig. 74).

Mature male abundance and biomass estimates in 2018 are both higher than those for the past 3 years are, but remain below the average for previous 10-years. Pre-recruit abundance and biomass, which are higher than the past 3 years, are in fact the highest on record since 1980 and, and not surprisingly, are higher than the previous 10-year average (Figs. 8-9, 12 and 80).

Mature female abundance and biomass are higher than 2017 estimates, and are higher than the previous 10-year average (Figs. 10-11, and 81). An increase in juvenile abundance over the past 4 years provides further hope for strong recruitment in upcoming years (Figs. 75, 80, and 81). Ovigerous female snow crab held in water with temperatures below 1.5 °C become biennial spawners in the Bering Sea (NPFMC 2016). Consequently, environmental conditions relating to temperature, including the extent of the cold pool, are likely to regulate recruitment strength via the relative numbers of annual to biennial spawners, and individual fecundity of the female crab.

Distribution-based determination of male Chionoecetes spp. maturity status

Previously, we presented raw data, with an interim maturity classification based on the ratio of the chela to carapace width (Figs. 82a and 82b), with the accepted ratios being 0.18 for Tanner crab and 0.20 for snow crab. However while this procedure is conceptually straightforward and easily applicable, it misclassifies both small morphometrically mature, and large morphometrically immature crabs to interannually varying degrees (Figs. 82a and 82b).

For this procedure, chela height and carapace width measurements are linearized via natural-log transformation. Log-transformed paired carapace width-chela height measurements are then binned by increments of the carapace width (here by increments of 0.025 — see Fig. 83a for example of bins used). For each increment, the underlying bimodal distribution of the data is then computed via application of kernel density estimation procedures resident to the R package stats, and the minima between distribution density peak calculated (see Fig. 83b for example distribution, with estimated minima). Minima x and y coordinates for each increment are extracted, and the underlying linear relationship modeled via the R function lm(), resident to the package stats (see Fig. 83c for example minima coordinate series, and calculated regression line).

The calculated regression line may then be applied as a cutline to classify morphometrically immature and mature males (Fig. 83d), with the caveat that a minimum accepted mature size should be specified for Bairdi, due to residual curvature in the chela height-carapace width relationship that can lead to small numbers of very small crabs being misclassified. For our purposes, we specified that all crab with carapace widths <60 mm were immature. This size cutoff was set based on the average size of female crabs with the expectation that to mate successfully, males should be larger than females. With or without application of this cutoff however, our procedure enjoys minimal misclassification rates within the region of overlap between morphometrically mature and immature groups relative to the previous ratio based method (Fig. 82a-d).

The underlying chela height to carapace width relationship is much more linear for *opilio*, thus specifying a minimum size was not strictly speaking necessary, but was done to maintain conformity with procedures applied to *Bairdi*. We used 50 mm carapace width as the minimum cutoff for mature opilio crabs.

***Chionoecetes* spp. hybrid**

Chionoecetes spp. hybrid crab were caught at 101 of the 375 stations in the combined areas of the Bristol Bay, Pribilof, and Northern Districts (Figs. 84-86; Appendix).

In this document, *Chionoecetes* spp. hybrid crab size classes for legal and mature males and mature females are based on the size categories for snow crab (see Snow Crab section and Table 1). Legal-sized male *Chionoecetes* spp. hybrid crab were caught at 43 stations, throughout all districts combined, resulting in a biomass estimate (± 95% CI) of 1,630 ± 724 t and were primarily distributed around the Pribilof Islands between 50 and 100 m (Fig. 84). Thirty-eight percent of those legal males were ≥ 4 inches in carapace width, with a biomass estimate of 954 ± 410 t with all being either new hardshell or oldshell (Fig. 88). Mature and immature male

Chionoecetes spp. hybrid crab were primarily distributed around the Pribilof Islands and northwest of St. Matthew Island between 50 and 100 m (Figs. 85 and 87).

The 2018 mature female *Chionoecetes* spp. hybrid crab biomass estimate was 382 ± 364 t and the immature female crab biomass estimate was 628 ± 432 t. The majority of the mature and immature female *Chionoecetes* spp. hybrid crab were distributed southwest of St. Matthew Island and between 100 and 200 m isobaths in the northwestern area of the eastern Bering Sea shelf (Fig. 86).

Other Crab Stocks and Species of Interest

Northern District Red King Crab

Red king crab were caught at 17 stations in the Northern District (Fig. 89) outside of the current management units where red king crab are commercially fished (Fig. 5). Legal-sized males were caught at 8 of those stations and the density at a station ranged from 62 to 184 crab nmi^{-2} (Appendix). The 2018 biomass estimate (± 95% CI) of legal-sized males was 823 ± 532 t while the biomass estimate of mature and immature males was 918 ± 529 and 10 ± 20 t, respectively. The biomass estimate of mature female red king crab was 838 ± 482 t. The majority of mature male and mature female red king crab were caught near the 50 m isobath at stations south and west of Nunivak Island (Fig. 89).

Northern District Blue King Crab

No Northern District blue king crab were caught in 2018 (Fig. 90).

Hair Crab

In this report, legal male hair crab (*Erimacrus isenbeckii*) are defined as > 3.25 inches CW (≥ 83 mm CL) which was specified in the previous Pribilof District fishery, while the female hair crab biomass estimate is presented for all sizes and maturity states combined. Hair crab were caught at 48 of the 375 stations throughout all districts combined on the survey (Fig. 91). The 2018 density of legal male hair crab caught at a station ranged from 62 to 650 crab nmi^{-2} resulting in a biomass estimate of 886 ± 338 t (Table 27), and an abundance estimate of 1.4 ± 0.5 million crab (Table 28). Historically, hair crab have been concentrated just north of the Alaska Peninsula and near the Pribilof Islands. In 2018, legal male hair crab were primarily concentrated near St. Paul Island, and distributed along the 50 m isobath from the Alaska Peninsula to Nunivak Island (Fig. 91).

The 2018 sublegal male hair crab biomass estimate (± 95% CI) was 332 ± 228 t, and the female hair crab biomass estimate was 195 ± 105 t (Table 27). Sublegal males were caught near St. Paul Island, and west of Nunivak Island (Fig. 91).

The Pribilof District hair crab fishery has been closed since 2000 due to a shift in the distribution of legal males to the Northern District and, after one year of experimental fishing with minimal vessel participation, the Northern District fishery was closed in 2001 (Fitch et al. 2012). Biomass estimates of both size classes of male hair crab have been on an increasing trend between 2005 and 2013 and then there was a decline in biomass every year from 2014 to 2016. In 2018, the

biomass estimate for legal-sized male hair crab was lower than the previous 20-year average of 1,772 ± 607 t (Table 27).

Golden King Crab

No golden king crab were caught in 2018.

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Table 1. -- Definition of carapace size classes for crab species caught in National Marine Fisheries Service's eastern Bering Sea standard survey. Carapace length (CL) is measured for *Paralithodes* spp. and *Erimacrus isenbeckii*, while carapace width (CW excluding spines) is measured for *Chionoecetes* species. **We define female maturity based on abdominal flap morphology and egg presence throughout this document.** The legal size classes defined by ADF&G (CW in inches) include spines.

Species	District		Immature	Mature	Pre-recruit	Legal Male
Paralithodes camtschaticus	Bristol Bay	male	< 120 mm	≥ 120 mm	110-134 mm	≥ 135 mm CL or ≥ 6.5 in. CW
	Pribilof	male	< 120 mm	≥ 120 mm	120-134 mm	≥ 135 mm CL or ≥ 6.5 in. CW
	Norton Sound	male	< 94 mm	≥ 94 mm	90-120 mm	≥ 104 mm CL or ≥ 4.8 in. CW
P. platypus	Pribilof	male	< 120 mm	≥ 120 mm	120-134 mm	≥ 135 mm CL or ≥ 6.5 in. CW
	St. Matthew	male	< 105 mm	≥ 105 mm	105-119 mm	≥ 120 mm CL or ≥ 5.5 in. CW
	Northern Bering Sea	male	<105 mm	≥ 105 mm	105-119 mm	≥ 120 mm CL or ≥ 5.5 in. CW
Chionoecetes bairdi	East of 166ºW	male	< 113 mm	≥ 113 mm	113-124 mm	≥ 120 mm or ≥ 4.8 in. CW[1]
	West of 166ºW	male	< 103 mm	≥ 103 mm	103-124 mm	≥ 110 mm or ≥ 4.4 in. CW[1]
	Preferred	male				≥ 125 mm or ≥ 5.0 in. CW
Chionoecetes opilio	Eastern Bering Sea	male	< 95 mm	≥ 95 mm	95-101 mm	≥ 78 mm or ≥ 3.1 in. CW[2]
	EBS Preferred	male				≥ 102 mm or ≥ 4.0 in. CW
	Northern Bering Sea	male	< 68 mm	≥ 68 mm	78-101 mm	≥ 78 mm or ≥ 3.1 in. CW
	NBS Preferred	Male				≥ 102 mm or ≥ 4.0 in. CW
Erimacrus isenbeckii		male				≥ 83 mm CL or > 3.25 in. CW[3]

[1] The legal minimum size limit for *C. bairdi* is ≥ 4.8 inches CW (120 mm excluding spines; 122 mm including spines) east of 166° W and ≥ 4.4 inches CW (110 mm excluding spines; 112 including spines) west of 166° W (ADF&G reg. **5 AAC 35.520(b)(1)**).

[2] The legal minimum size limit for *C. opilio* is 3.1 inches CW (78 mm excluding spines; 79 mm including spines.

[3] Legal-sized male crab for *E. isenbeckii* are larger than a minimum size of 3.25 inches CW (≥ 83 mm CL) defined by Alaska Department of Fish and Game permit guidelines.

Table 2. -- History of methods for determining trawl on bottom and estimating net width on National Marine Fisheries Service eastern Bering Sea bottom trawls.

Year	Net width (m)	Trawling methodology
1975		First and only year tow duration = 1 hour
1976-2012		Tow duration = 30 minutes
1975-1995		Brake set and haul back of winch drum wire defined trawl contact with seafloor (net on bottom)
1996-2012		Began using bottom contact sensors to determine trawl contact with seafloor
1975 - 1980	12.2	Mean width of 400-mesh eastern trawl*
1981	18.0	Mean width* of 83-112 Eastern trawl for Vessel 1
1981	13.4 or 14.3	Mean width* of 400-mesh Eastern trawl measurements different on haul 1-112 and 114-156 for Vessel 37*
1982 - 1987	Variable with each tow	Rose and Walters (1990) calculated the 83-112 net width based on an inverse relationship to net scope
1988 - 2001	Variable with each tow	All survey vessels used ScanMar acoustic sensors on the 83-112 trawl net
2001 - 2012	Variable with each tow	All survey vessels used NetMind acoustic sensors on the 83-112 trawl net
2013 - 2018	Variable with each tow	All survey vessels used Marport acoustic sensors on the 83-112 trawl net

*Single value used for net width when calculating area-swept.

Table 3. -- Weight-size regression relationships used to calculate biomass of crab species caught in National Marine Fisheries Service eastern Bering Sea bottom trawl surveys.

Stock	Sex	*a*	*b*
Bristol Bay	males	0.000403	3.141334
red king crab	females	n/a	n/a
	non-ovigerous females	0.000408	3.127956
	ovigerous females	0.003593	2.666076
Pribilof Islands	males	0.000403	3.141334
red king crab	females	n/a	n/a
	non-ovigerous females	0.000408	3.127956
	ovigerous females	0.003593	2.666076
Pribilof Islands	males	0.000508	3.106409
blue king crab	females	0.02065	2.27
	non-ovigerous females	n/a	n/a
	ovigerous females	n/a	n/a
St. Matthew	males	0.000502	3.107158
blue king crab	females	0.02065	2.27
	non-ovigerous females	n/a	n/a
	ovigerous females	n/a	n/a
Tanner crab	males	0.00027	3.022134
	females	n/a	n/a
	non-ovigerous females	0.000562	2.816928
	ovigerous females	0.000441	2.898686
Snow crab	males	0.000267	3.097253
	females	n/a	n/a
	non-ovigerous females	0.001047	2.708367
	ovigerous females	0.001158	2.708793
Hair crab	males	0.00071731	3.02
	females	0.00119453	2.86

Table 4. -- Special projects related to crab species conducted on National Marine Fisheries Service eastern Bering Sea bottom trawl survey in 2018.

Project title	Principle Investigator	Agency
Bitter crab syndrome	Pam Jensen	RACE[1]-SAP[2]
Annual vs. biennial snow crab reproductive cycle	Jennifer Newby	RACE[1]-SAP[2]
Population genomic structure of EBS Tanner crab	Tyler Jackson	ADF&G[3]
Genetics of mating dynamics in EBS snow crab	Tyler Jackson	ADF&G[3]
Crabs for outreach	Laura Slater	ADF&G[3]
Population genomics of red king crab	Jon-Ivar Westgaard	Inst. Mar. Res.[4]

[1] Alaska Fisheries Science Center, Resource Assessment and Conservation Engineering Division, Seattle, Washington.

[2] AFSC, Resource Assessment and Conservation Engineering Division, Shellfish Assessment Program, Kodiak, Alaska.

[3] State of Alaska, Department of Fish and Game.

[4] Institute of Marine Research, Fram Centre, Tromsø, Norway

Table 5. -- Summary of 2018 National Marine Fisheries Service eastern Bering Sea bottom trawl survey details for seven commercial crab stocks. Male size categories are defined in Table 1.

		Tows in District	Tows with crab	Crab measured	Crab caught	Biomass (t)	CI (± 95%)
Bristol Bay District	Immature male	136	35	128	128	2,818	1309
Red King Crab	Mature Male	136	56	155	155	13,226	3,589
	Legal	136	52	130	130	12,010	3,442
	Immature female	136	14	49	49	520	333
	Mature female	136	41	308	308	12,282	5,437
Pribilof District	Immature male	77	3	77	77	1325	2526
Red King Crab	Mature Male	77	8	14	14	929	775
	Legal	77	7	11	11	827	697
	Immature female	77	0	0	0	0	0
	Mature female	77	5	48	48	877	1500
Pribilof District	Immature male	86	4	6	6	94	99
Blue King Crab	Mature Male	86	3	3	3	152	170
	Legal	86	3	3	3	152	170
	Immature female	86	1	1	1	13	25
	Mature female	86	3	6	6	108	154
St. Matthew Is.	Immature male	56	8	58	58	434	497
Blue King Crab	Mature Male	56	12	47	47	1,612	879
	Legal	56	12	35	35	1,358	735
	Immature female	56	7	49	49	312	305
	Mature female	56	7	31	31	316	267
Tanner Crab	Immature male	120	69	1421	1421	2,711	873
east of 166°W	Mature Male	120	73	574	574	11,058	3,127
	Legal	120	66	414	414	8,861	2,600
	Preferred	120	58	320	320	7,355	2,333
	Immature female	120	57	1220	1220	990	492
	Mature female	120	34	121	121	598	269
Tanner Crab	Immature male	255	166	4,826	6,740	8,786	2,277
west of 166°W	Mature Male	255	106	1,898	1,898	23,948	6,999
	Legal	255	99	1,610	1,610	21,572	6,662
	Preferred	255	77	812	812	12,871	4,589
	Immature female	255	141	3,835	6,343	3,921	1565
	Mature female	255	86	1107	1,177	4,293	1,926
Opilio Tanner Crab	Immature male	375	204	16,287	202,255	458,902	137,343
	Mature Male	375	157	3,398	3,976	47,054	18,589
	Legal	375	193	8,288	16,594	130,474	43,554
	Preferred	375	150	1,714	1,861	27,018	10,163
	Immature female	375	135	4,624	85,265	83,164	42,474
	Mature female	375	121	6,164	123,887	161,573	63,268

Table 6. -- Time series of biomass estimates (t) for Bristol Bay District red king crab (*Paralithodes camtschaticus*) by size category (CL) and sex from the National Marine Fisheries Service eastern Bering Sea bottom trawl surveys. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1975-1977 data.

Year	Immature male < 120 mm	Mature male ≥ 120 mm	Mature male ± CI	Legal male ≥ 135 mm	Immature female	Mature female	Mature female ± CI
1978	54,371	146,682	66,417	98,241	3,795	141,265	54,370
1979	16,886	86,906	43,304	63,107	5,132	59,165	21,521
1980	37,369	129,829	65,411	106,655	7,594	73,712	46,197
1981	27,294	41,520	12,659	27,368	4,215	59,099	30,597
1982	51,268	23,038	8,656	10,184	21,932	48,913	18,738
1983	25,675	9,796	2,494	2,867	7,257	7,237	2,683
1984	79,710	16,849	8,751	7,623	38,806	17,529	14,374
1985	12,823	14,006	4,130	5,356	1,602	5,723	2,805
1986	12,382	28,189	27,164	13,033	1,847	5,062	2,860
1987	16,626	30,197	14,575	18,167	7,074	15,427	9,677
1988	9,513	25,861	9,178	19,117	1,205	18,019	14,900
1989	7,059	35,503	15,936	27,552	1,322	11,615	7,455
1990	6,344	32,481	14,786	24,527	2,871	17,995	14,579
1991	6,395	60,142	69,981	52,119	1,826	15,553	13,342
1992	6,787	18,327	6,835	13,747	1,088	11,163	5,657
1993	6,939	28,740	12,766	19,839	1,170	16,101	7,849
1994	3,601	19,775	6,740	13,371	1,104	8,283	3,558
1995	6,359	20,939	14,711	15,570	2,992	7,868	3,839
1996	9,067	18,111	7,309	15,073	5,380	12,042	6,829
1997	27,126	32,533	13,321	27,403	3,051	21,365	14,033
1998	13,035	33,297	10,450	19,409	2,161	35,849	17,889
1999	5,093	39,870	16,942	30,005	1,163	19,126	13,276
2000	6,961	31,450	10,638	22,090	2,615	26,387	18,086
2001	8,942	19,060	5,746	15,360	1,692	22,866	13,703
2002	12,113	33,359	12,655	25,241	5,150	19,144	10,306
2003	11,514	63,271	57,913	51,115	5,642	35,587	16,085
2004	27,917	63,159	54,053	53,895	6,162	34,826	18,589
2005	17,036	38,105	14,021	28,373	8,455	42,715	17,805
2006	11,756	39,808	17,766	32,148	6,521	37,005	14,306
2007	14,043	44,115	17,880	34,226	2,257	42,931	19,123
2008	15,840	51,375	35,542	38,155	1,675	44,194	28,234
2009	8,926	34,250	25,727	21,996	760	46,616	30,241
2010	5,441	33,586	16,497	24,891	535	40,951	21,869
2011	7,952	21,990	9,231	16,622	3,515	38,035	19,244
2012	5,841	24,837	13,411	19,858	2,881	27,282	17,713
2013	5,515	34,141	14,164	28,358	547	22,031	15,783
2014	12,621	48,038	17,559	36,130	1,560	50,926	22,953
2015	4,984	32,121	11,019	27,209	838	26,296	15,078
2016	2,077	25,481	7,302	22,424	772	33,370	17,051
2017	2,239	23,102	8,328	20,842	1,193	26,424	13,139
2018	2,818	13,226	3,589	12,010	520	12,282	5,437

Table 7. -- Time series of abundance estimates (in millions) for Bristol Bay District red king crab (*Paralithodes camtschaticus*) by size category (CL) and sex from the National Marine Fisheries Service eastern Bering Sea bottom trawl surveys. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1975-1977 data.

Year	Immature male < 120 mm	Mature male ≥ 120 mm	Mature male ± CI	Legal male ≥ 135 mm	Immature female	Mature female	Mature female ± CI
1978	89.5	67.9	30.7	38.5	27.8	161.3	61.9
1979	33.4	38.0	19.1	23.6	22.1	57.9	20.3
1980	70.8	51.3	25.3	37.5	34.4	87.9	66.4
1981	41.1	18.4	5.4	9.7	13.1	58.4	29.6
1982	110.9	12.0	4.9	4.0	72.4	52.9	21.8
1983	46.2	5.7	1.5	1.3	23.8	8.7	3.6
1984	164.9	9.1	4.7	3.3	109.8	27.4	23.9
1985	16.8	7.6	2.2	2.3	4.3	8.4	4.1
1986	15.2	14.8	14.6	5.6	5.2	6.4	3.6
1987	24.4	14.6	7.0	7.3	17.4	18.5	11.4
1988	11.3	11.6	4. 0	7.5	2.5	20.1	17.0
1989	10.0	15.1	6.5	10.4	3.9	13.2	8.6
1990	9.7	13.7	6.1	8.9	7.8	17.0	13.8
1991	9.7	23.2	26.1	18.5	4.8	14.9	13.8
1992	8.3	7.5	3.0	4.6	2.3	10.2	4.9
1993	8.2	12.5	5.6	7.0	2.8	14.0	7.0
1994	7.1	8.6	2.9	4.8	3.8	6.1	2.5
1995	11.0	9.1	6.9	5.9	6.1	6.3	3.0
1996	17.5	7.2	2.8	5.3	14.3	9.8	5.6
1997	32.6	12.3	4.8	9.2	5.1	21.8	17.1
1998	16.8	15.4	5.0	6.8	6.3	31.7	17.5
1999	11.3	17.4	7.7	11.7	4.1	15.4	10.8
2000	10.7	14.0	4.9	8.4	6.3	21.0	13.6
2001	12.0	7.4	2.2	5.1	4.3	20.9	12.9
2002	22.9	13.6	5.2	8.6	17.6	17.0	9.7
2003	18.8	24.4	19.4	17.1	13.2	28.3	13.2
2004	43.3	23.7	19.8	18.0	19.7	31.7	18.9
2005	31.5	15.6	5.4	9.6	23.6	35.6	15.3
2006	21.2	16.4	7.2	11.8	16.9	31.0	12.2
2007	17.5	18.2	7.1	12.3	4.5	35.8	16.3
2008	17.1	20.9	13.8	12.9	3.7	36.8	24.3
2009	9.6	15.6	11.5	8.3	1.7	35.8	22.4
2010	6.5	14.7	7.0	9.4	1.2	31.5	17.4
2011	37.5	9.3	3.9	6.1	33.0	29.3	15.1
2012	8.0	9.7	4.9	6.7	7.6	19.6	13.2
2013	6.7	12.9	5.3	9.4	1.3	15.6	11.1
2014	15.5	19.7	7.3	12.4	2.8	36.9	17.0
2015	6.7	11.6	4.0	8.7	2.4	18.4	10.6
2016	4.7	9.0	2.6	7.1	3.6	22.4	11.6
2017	3.3	7.7	2.7	6.4	2.5	17.5	8.6
2018	3.8	4.6	1.2	3.8	1.4	9.0	4.0

Table 8. -- Average bottom water temperatures collected at stations with mature female Bristol Bay red king crab (*Paralithodes camtschaticus*) on the National Marine Fisheries Service eastern Bering Sea bottom trawl survey, and the mean ratio of a combination of eyed, hatching, and freshly hatched eggs to uneyed embryos in mature red king crab females. Bristol Bay stations were sampled twice during the cold years (highlighted in gray). An * indicates statistical significance within the year using a two sample t-test, alpha = 0.95 and P < 0.001.

Sample event	Average bottom temperature (°C)	Standard deviation (n = stations)	Two sample t-test values	Mean eyed to uneyed embryo ratio
May 1999	0.1	0.8 (41)	t = -11.9	6.68
July 1999	2.5*	0.8 (31)		0.03
May 2000	1.7	0.5 (49)	t = -9.2	1.54
July 2000	4.6*	1.6 (23)		0.01
June 2001	3.5	0.3 (40)		0.01
June 2002	3.4	0.6 (52)		0.06
June 2003	4.2	0.4 (51)		0.01
June 2004	3.9	0.5 (61)		0.03
June 2005	4.3	0.5 (49)		0.01
June 2006	2.2	0.7 (69)	t = -12.5	0.63
July 2006	4.2*	0.8 (30)		0.01
June 2007	1.8	0.9 (68)	t = -7.4	1.05
July 2007	3.4*	1.0 (32)		0.01
June 2008	1.4	0.7 (76)	t = -9.5	2.41
July 2008	3.6*	1.1 (32)		0.01
June 2009	1.5	1.6 (73)	t = -8.6	0.93
July 2009	4.5*	1.5 (32)		0.01
June 2010	2	0.9 (40)	t = -10.9	0.64
July 2010	4.8*	1.0 (23)		0.00
June 2011	2.9	0.8 (46)	t = -8.6	0.94
July 2011	5.9*	1.1 (20)		0.06
June 2012	0.9	1.2 (40)	t = -8.4	1.89
July 2012	4.0*	1.3 (15)		0.00
June 2013	2.9	1.1 (35)		0.02
June 2014	4.4	0.8 (40)		0.00
June 2015	4.6	0.4 (44)		0.00
June 2016	5.7	0.7 (57)		0.00
June 2017	3.18	1.02 (51)	t = -4.9153	1.19
August 2017	5.01*	1.54 (20)		0.00
June 2018	4.6	0.39 (41)		0.00

Table 9. -- Time series of biomass estimates (t) for Pribilof District red king crab (*Paralithodes camtschaticus*) by size category (CL) and sex from National Marine Fisheries Service eastern Bering Sea bottom trawl surveys. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1975-1977 data.

Year	Immature male < 120 mm	Mature male ≥ 120 mm	Mature male ± CI	Legal male ≥ 135 mm	Immature female	Mature female	Mature female ± CI
1978	0	1,250	2,022	1,250	0	52	102
1979	0	556	561	488	0	93	182
1980	18	1,269	950	1,269	0	262	374
1981	0	312	358	312	0	35	68
1982	18	1,464	2,002	1,464	14	919	1,402
1983	26	527	551	493	0	309	292
1984	0	317	341	283	0	112	125
1985	0	61	121	61	0	0	0
1986	0	138	188	138	0	79	154
1987	0	54	105	54	31	0	0
1988	713	107	209	44	283	553	940
1989	675	1,529	2,728	871	924	1,327	2,140
1990	7,477	1, 141	2,077	138	522	2,200	3,048
1991	640	4,430	6,913	1,321	66	4,967	5,864
1992	274	3,305	3,864	2,528	278	3,153	5,620
1993	282	9,873	17,834	9,189	7	6,471	9,096
1994	430	9,139	13,748	8,117	47	3,917	6,772
1995	431	18,056	21,267	16,793	315	4,834	6,393
1996	68	2,361	1,720	2,330	31	1,976	2,867
1997	1,510	6,159	7,515	5,940	218	1,744	2,018
1998	416	2,324	1,639	1,778	50	1,669	2,487
1999	3,358	5,523	7,217	4,472	4,117	1,302	1,826
2000	157	4,320	3,164	3,843	8	987	1,214
2001	2,339	8,603	13,262	5,770	406	5,369	10,462
2002	8	7,037	9,461	7,014	12	775	803
2003	0	5,373	6,928	5,275	1	2,268	4,032
2004	152	3,622	4,183	3,622	105	1,187	1,238
2005	55	1,238	1,420	1,238	0	3,118	4,791
2006	109	7,003	5,252	6,696	10	2,173	2,627
2007	214	5,224	5,042	5,007	50	1,760	2,647
2008	332	5,462	5,418	5,102	192	2,825	3,701
2009	44	2,500	3,125	2,127	15	811	841
2010	53	4,405	3,767	3,973	0	840	1,167
2011	44	3,834	4,872	3,751	3	814	1,165
2012	336	4,477	5,031	4,360	0	663	710
2013	104	7,749	9,409	7,567	0	169	194
2014	82	12,047	18,525	11,433	0	1,093	2,015
2015	113	15,173	21,971	14,788	0	3,859	7,270
2016	526	4,150	5,700	3,653	26	1,873	2,241
2017	88	3,658	4,632	3,513	0	505	550
2018	1,325	929	775	827	0	877	1,500

Table 10. -- Time series of abundance estimates (in millions) for Pribilof District red king crab (*Paralithodes camtschaticus*) by size category (CL) and sex from National Marine Fisheries Service eastern Bering Sea bottom trawl surveys. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1975-1978 data.

Year	Immature male < 120 mm	Mature male ≥ 120 mm	Mature male ± CI	Legal male ≥ 135 mm	Immature female	Mature female	Mature female ± CI
1979	0.0	0.2	0.2	0.2	0.0	0.1	0.1
1980	0.1	0.4	0.3	0.4	0.0	0.1	0.2
1981	0.0	0.1	0.1	0.1	0.0	0.0	0.0
1982	0.0	0.3	0.4	0.3	0.0	0.5	0.7
1983	0.0	0.1	0.1	0.1	0.0	0.2	0.1
1984	0.0	0.1	0.1	0.1	0.0	0.1	0.1
1985	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1986	0.0	0.0	0.1	0.0	0.0	0.0	0.1
1987	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1988	1.9	0.1	0.1	0.0	1.6	0.4	0.7
1989	1.1	0.8	1.4	0.4	1.8	1.1	1.7
1990	7.1	0.8	1.4	0.1	0.7	2.3	3.0
1991	0.7	2.4	3.8	0.6	0.3	4.3	5.1
1992	0.4	1.5	1.8	1.0	0.4	2.4	4.4
1993	0.3	3.5	6.4	3.1	0.0	4.5	6.4
1994	0.4	3.1	4.7	2.4	0.1	2.4	4.2
1995	0.5	5.2	5.9	4.4	0.3	3.0	3.9
1996	0.1	0.6	0.4	0.5	0.0	1.1	1.6
1997	1.6	1.6	1.7	1.4	0.3	1.0	1.1
1998	0.4	0.8	0.6	0.4	0.1	1.0	1.4
1999	7.2	1.9	2.2	1.3	9.5	0.9	1.1
2000	0.1	1.5	1.2	1.3	0.0	0.7	0.8
2001	2.5	3.7	6.1	1.9	0.6	3.8	7.5
2002	0.0	1.9	2.5	1.9	0.0	0.4	0.4
2003	0.0	1.5	2.0	1.4	0.0	1.2	2.1
2004	1.4	0.8	0.9	0.8	1.1	0.5	0.6
2005	0.1	0.2	0.3	0.2	0.0	1.3	2.0
2006	0.1	1.4	1.1	1.2	0.0	1.0	1.1
2007	0.2	1.2	1.3	1.1	0.1	0.8	1.3
2008	0.4	1.3	1.2	1.1	0.2	1.5	2.1
2009	0.0	0.9	1.2	0.7	0.0	0.3	0.3
2010	0.1	1.4	1.3	1.2	0.0	0.6	0.8
2011	0.0	1.0	1.3	1.0	0.0	0.5	0.6
2012	0.4	1.2	1.5	1.2	0.0	0.4	0.5
2013	0.1	1.7	2.0	1.6	0.0	0.1	0.1
2014	0.1	3.0	4.2	2.6	0.0	0.5	0.9
2015	0.1	3.5	4.9	3.3	0.0	1.8	3.3
2016	0.5	1.3	1.9	1.0	0.04	1.3	1.4
2017	0.1	1.0	1.3	1.0	0.0	0.3	0.3
2018	1.5	0.3	0.2	0.2	0.0	0.9	1.7

Table 11. -- Time series of biomass estimates (t) for blue king crab (*Paralithodes platypus*) by size category (CL) and sex in the Pribilof District from National Marine Fisheries Service eastern Bering Sea bottom trawl surveys. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1975-1978 data.

Year	Immature male < 120 mm	Mature male ≥ 120 mm	Mature male ± CI	Legal male ≥ 135 mm	Immature female	Mature female	Mature female ± CI
1979	61	10,959	6,775	9,040	92	1,097	1,706
1980	2,084	23,553	19,846	20,679	699	211,604	408,004
1981	1,704	11,628	3,963	10,554	497	5,987	5,507
1982	1,152	7,389	2,712	6,893	553	8,824	11,724
1983	962	5,409	1,882	4,474	258	9,990	15,495
1984	130	2,216	993	1,824	15	3,070	2,292
1985	39	1,055	551	755	5	520	457
1986	4	1,505	893	1,473	11	2,420	4,272
1987	191	2,923	2,357	2,781	119	795	909
1988	170	842	873	842	190	528	508
1989	1,275	827	1,034	827	801	945	1,075
1990	2,004	3,078	3,617	1,514	1,118	1,810	1,803
1991	1,377	4,690	3,544	3,326	343	2,433	1,973
1992	1,801	4,391	3,637	3,035	802	1,848	1,737
1993	1,088	4,556	2,743	3,203	444	1,647	1,489
1994	619	3,410	2,305	2,806	87	4,806	4,207
1995	968	8,360	9,898	6,787	331	3,948	4,017
1996	745	4,641	2,444	3,873	177	5,408	5,318
1997	381	3,233	1,749	2,765	194	2,835	2,386
1998	692	2,798	1,367	2,510	267	1,914	1,654
1999	161	1,729	1,141	1,426	0	2,868	2,625
2000	113	2,091	1,212	1,746	0	1,462	1,319
2001	87	1,599	2,302	1,461	0	1,816	2,571
2002	0	680	674	647	0	1,401	2,129
2003	19	702	550	671	21	1,286	1,880
2004	36	107	122	48	25	98	114
2005	326	344	479	344	477	370	413
2006	87	166	196	139	38	538	801
2007	197	306	479	206	59	223	384
2008	212	46	90	46	222	450	560
2009	254	497	695	187	80		907
2010	92	303	274	190	84	310	401
2011	0	461	763	399	3	34	49
2012	165	644	928	459	9	229	296
2013	15	250	391	190	12	154	211
2014	83	233	320	233	16	91	108
2015	82	622	480	428	0	160	207
2016	70	129	154	68	49	352	340
2017	45	253	254	223	55	204	237
2018	94	152	170	152	13	108	154

Table 12. -- Time series of abundance estimates (in millions) by size category (CL) and sex for blue king crab (*Paralithodes platypus*) in the Pribilof District from National Marine Fisheries Service eastern Bering Sea bottom trawl surveys. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1975-1978 data.

Year	Immature male < 120 mm	Mature male ≥ 120 mm	Mature male ± CI	Legal male ≥ 135 mm	Immature female	Mature female	Mature female ± CI
1979	0.1	4.1	2.6	3.0	0.1	1.2	1.9
1980	2.7	7.8	6.3	6.2	0.8	182.9	350.4
1981	2.1	3.8	1.3	3.2	0.8	5.4	4.7
1982	1.4	2.4	0.8	2.1	0.9	7.8	10.0
1983	1.0	1.9	0.7	1.3	0.5	9.3	14.2
1984	0.5	0.8	0.3	0.6	0.5	2.8	2.1
1985	0.1	0.4	0.2	0.3	0.3	0.5	0.4
1986	0.0	0.5	0.3	0.5	0.0	2.1	3.7
1987	0.6	0.9	0.7	0.8	0.4	0.7	0.8
1988	1.2	0.2	0.2	0.2	0.9	0.5	0.4
1989	3.5	0.2	0.3	0.2	2.6	1.1	1.5
1990	2.4	1.5	1.8	0.6	2.2	2.0	2.2
1991	1.9	2.0	1.4	1.2	0.8	2.8	2.3
1992	2.4	1.9	1.6	1.2	1.8	2.1	2.1
1993	1.5	1.9	1.1	1.1	0.9	1.8	1.6
1994	0.6	1.3	0.9	0.9	0.1	5.0	4.4
1995	1.1	3.1	3.6	2.2	0.7	4.0	4.1
1996	0.7	1.7	0.9	1.3	0.3	5.0	4.8
1997	0.5	1.2	0.7	0.9	0.3	2.6	2.2
1998	0.9	1.0	0.5	0.8	0.5	1.8	1.6
1999	0.2	0.6	0.4	0.5	0.0	2.8	2.6
2000	0.2	0.7	0.4	0.5	0.0	1.4	1.2
2001	0.1	0.5	0.7	0.4	0.0	1.7	2.5
2002	0.0	0.2	0.2	0.2	0.0	1.2	1.9
2003	0.0	0.2	0.2	0.2	0.1	1.1	1.7
2004	0.1	0.0	0.1	0.0	0.1	0.1	0.1
2005	2.0	0.1	0.1	0.1	2.3	0.3	0.3
2006	0.1	0.1	0.1	0.0	0.1	0.4	0.6
2007	0.2	0.1	0.2	0.1	0.1	0.2	0.3
2008	0.2	0.0	0.0	0.0	0.3	0.4	0.6
2009	0.3	0.2	0.4	0.1	0.2	0.5	0.8
2010	0.1	0.1	0.1	0.1	0.2	0.2	0.3
2011	0.0	0.2	0.3	0.1	0.0	0.0	0.0
2012	0.2	0.3	0.4	0.2	0.0	0.3	0.5
2013	0.1	0.1	0.2	0.1	0.0	0.2	0.2
2014	0.1	0.1	0.1	0.1	0.0	0.1	0.1
2015	0.1	0.2	0.2	0.1	0.0	0.2	0.3
2016	0.1	0.1	0.1	0.02	0.1	0.4	0.4
2017	0.1	0.1	0.1	0.1	0.1	0.2	0.3
2018	0.1	0.1	0.1	0.1	0.02	0.1	0.1

Table 13. -- Time series of biomass estimates (t) for blue king crab (*Paralithodes platypus*) by size category (CL) and sex in the St. Matthew Island Section sampling stratum of the Northern District from National Marine Fisheries Service eastern Bering Sea bottom trawl surveys. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1978-1979 data.

Year	Immature male < 105 mm	Mature male ≥ 105 mm	Mature male ± CI	Legal male ≥ 120 mm	Immature female	Mature female	Mature female ± CI
1980	2,646	7,826	7,151	4,786	423	737	1,248
1981	527	6,175	4,894	4,715	97	63	71
1982	1,758	14,934	9,259	12,065	416	0	0
1983	1,162	8,834	4,907	6,919	78	1,597	2,183
1984	539	3,737	1,358	3,145	42	216	285
1985	404	2,831	1,208	2,405	95	38	60
1986	252	1,267	971	725	99	13	25
1987	495	2,022	1,130	1,284	205	35	49
1988	702	2,830	1,346	1,880	612	123	147
1989	3,041	4,790	2,344	3,415	1,219	504	448
1990	1,122	5,931	3,073	4,707	336	13	25
1991	1,664	6,073	2,918	4,099	521	270	506
1992	1,250	6,279	2,513	4,608	280	216	250
1993	2,106	8,425	2,685	6,258	643	1,635	3,026
1994	916	5,812	2,008	4,246	99	128	131
1995	1,038	4,889	1,653	3,448	182	21	28
1996	1,291	8,494	4,013	6,218	364	432	770
1997	1,342	10,005	6,471	7,341	287	407	707
1998	902	7,478	5,269	5,487	210	243	261
1999	272	1,423	507	1,163	93	14	28
2000	315	1,880	1,136	1,534	52	37	52
2001	483	2,512	1,254	1,937	145	43	48
2002	119	1,640	1,033	1,371	1	89	120
2003	542	1,233	765	918	94	339	430
2004	443	1,341	754	1,139	194	66	82
2005	449	1,396	987	1,016	93	52	76
2006	1,050	3,223	2,262	2,460	145	14	28
2007	2,618	4,564	3,113	2,217	247	47	47
2008	1,972	3,655	2,059	2,701	214	40	45
2009	1,891	5,079	2,630	2,571	218	192	191
2010	3,974	8,141	5,955	4,317	112	456	856
2011	1,699	9,516	10,167	5,701	122	32	46
2012	907	5,652	3,668	3,313	52	74	64
2013	446	2,022	860	1,485	85	27	38
2014	796	5,472	4,750	3,568	40	62	75
2015	825	5,134	7,656	3,592	5	24	35
2016	509	3,072	2,273	2,305	0	129	104
2017	122	1,721	1,968	1,333	61	0	0
2018	434	1,612	879	1,358	312	316	267

Table 14. -- Time series of abundance estimates (in millions) for blue king crab (*Paralithodes platypus*) by size category (CL) and sex in the St. Matthew Island Section sampling stratum of the Northern District from National Marine Fisheries Service eastern Bering Sea bottom trawl surveys. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1978-1979 data.

Year	Immature male < 105 mm	Mature male ≥ 105 mm	Mature male ± CI	Legal male ≥ 120 mm	Immature female	Mature female	Mature female ± CI
1980	4.2	5.1	5.1	2.5	1.1	1.3	2.2
1981	0.9	3.5	2.5	2.3	0.2	0.1	0.1
1982	3.0	8.3	5.5	5.9	0.9	0.0	0.0
1983	2.0	5.0	2.9	3.3	0.4	2.6	3.5
1984	1.3	1.9	0.7	1.5	0.2	0.3	0.4
1985	0.7	1.5	0.7	1.1	0.3	0.1	0.1
1986	0.6	0.8	0.7	0.4	0.3	0.0	0.0
1987	1.0	1.3	0.8	0.7	0.6	0.1	0.1
1988	1.5	1.8	0.9	1.0	1.6	0.2	0.2
1989	6.2	2.9	1.5	1.8	3.2	1.0	0.8
1990	1.9	3.4	1.8	2.3	0.8	0.0	0.0
1991	3.3	3.9	1.9	2.2	1.4	0.4	0.8
1992	2.2	3.7	1.5	2.3	0.8	0.5	0.5
1993	4.2	5.1	1.7	3.3	1.7	2.3	4.3
1994	1.4	3.6	1.3	2.3	0.2	0.2	0.2
1995	1.7	2.9	1.0	1.7	0.6	0.0	0.1
1996	2.4	5.0	2.5	3.1	1.1	0.7	1.2
1997	2.3	6.0	4.2	3.8	0.8	0.6	1.1
1998	2.1	4.5	3.4	2.8	0.6	0.4	0.4
1999	0.5	0.8	0.3	0.6	0.3	0.0	0.0
2000	0.5	1.0	0.6	0.7	0.1	0.1	0.1
2001	0.8	1.4	0.7	0.9	0.4	0.1	0.1
2002	0.2	0.9	0.5	0.6	0.0	0.1	0.2
2003	1.2	0.7	0.5	0.5	0.3	0.6	0.7
2004	0.9	0.7	0.5	0.6	0.5	0.1	0.1
2005	0.9	0.8	0.6	0.5	0.3	0.1	0.1
2006	1.8	1.9	1.4	1.2	0.3	0.0	0.0
2007	4.5	3.2	2.3	1.2	0.8	0.1	0.1
2008	3.8	2.3	1.3	1.5	0.7	0.1	0.1
2009	3.4	3.6	2.0	1.4	0.6	0.4	0.4
2010	6.2	5.7	4.6	2.5	0.4	1.0	1.9
2011	2.6	6.5	7.2	3.2	0.4	0.1	0.1
2012	1.6	3.8	2.6	1.8	0.2	0.1	0.1
2013	0.8	1.3	0.5	0.8	0.3	0.1	0.1
2014	1.3	3.4	3.4	1.8	0.1	0.1	0.1
2015	1.2	3.2	4.8	2.0	0.0	0.1	0.1
2016	0.8	1.8	1.5	1.2	0.0	0.3	0.2
2017	0.2	1.0	1.2	0.7	0.1	0.0	0.0
2018	1.1	0.9	0.5	0.7	1.0	0.6	0.5

Table 15. -- Time series of biomass estimates (t) for male Tanner crab (*Chionoecetes bairdi*) by size category (CW) and sex from National Marine Fisheries Service eastern Bering Sea bottom trawl surveys, east of 166° W. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1975-1978 data.

Year	Immature male < 113 mm	Mature male ≥ 113 mm	Mature male ± CI	Mature male based on chela	Legal male ≥ 120 mm	Preferred male ≥ 125 mm
1979	2,278	15,700	5,632	n/a	14,652	13,192
1980	8,433	40,546	25,266	n/a	37,082	34,041
1981	4,668	18,722	8,004	n/a	16,324	14,731
1982	5,518	11,084	3,934	n/a	9,415	7,860
1983	3,289	10,047	4,708	n/a	8,572	7,233
1984	2,522	9,498	4,010	n/a	8,376	7,424
1985	1,735	6,495	3,007	n/a	5,971	5,101
1986	4,583	5,043	3,078	n/a	4,005	3,280
1987	17,778	11,085	4,604	n/a	9,840	8,385
1988	26,460	31,670	29,201	n/a	22,482	18,413
1989	27,575	60,142	20,624	n/a	49,413	41,104
1990	23,938	52,942	18,111	33,904	47,567	42,987
1991	25,932	63,893	40,349	30,285	54,968	47,449
1992	15,381	74,538	47,450	40,267	66,517	57,665
1993	8,056	45,337	17,552	21,007	40,826	34,932
1994	3,217	29,086	9,786	9,753	26,534	23,912
1995	1,985	17,687	8,332	698	16,321	14,757
1996	3,435	16,545	10,642	424	15,562	14,242
1997	3,301	5,787	2,014	828	5,026	4,561
1998	3,175	5,229	1,580	2,185	4,259	3,605
1999	8,470	6,365	3,007	3,217	4,498	3,483
2000	5,297	11,131	6,847	4,693	8,913	7,529
2001	5,780	10,451	4,498	4,474	9,036	8,073
2002	4,359	10,043	4,434	1,081	9,030	8,046
2003	6,281	10,883	4,939	2,652	9,175	7,991
2004	3,444	9,011	5,060	3,125	7,773	6,513
2005	5,325	12,118	5,182	4,897	10,289	8,190
2006	15,136	13,500	5,467	5,335	10,921	8,927
2007	12,137	15,802	8,749	8,066	11,884	9,457
2008	10,424	26,753	28,996	20,012	22,447	18,764
2009	3,849	10,937	5,728	n/a	8,947	7,783
2010	3,674	10,752	5,420	3,610	9,137	7,582
2011	11,865	11,525	6,302	n/a	9,814	8,500
2012	30,882	14,485	6,790	7,868	10,602	8,378
2013	25,423	39,157	25,944	n/a	23,823	14,397
2014	18,262	39,934	12,430	22,749	30,404	24,210
2015	7,853	27,241	6,936	n/a	22,853	19,301
2016	6,997	18,523	4,755	4,685	14,143	10,695
2017	4,565	19,387	6,292	1,788	15,675	12,470
2018	2,711	11,058	3,127	231	8,861	7,355

Table 16. -- Time series of biomass estimates (t) for female Tanner crab (*Chionoecetes bairdi*) by size category (CW) and sex from National Marine Fisheries Service eastern Bering Sea bottom trawl surveys, east of 166° W. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1975-1978 data.

Year	Immature female	Mature female	Mature female ± CI
1979	591	2,858	2,042
1980	1,321	11,562	8,541
1981	893	7,684	4,249
1982	1,310	6,797	3,505
1983	913	4,438	2,368
1984	671	4,129	3,590
1985	324	2,836	2,350
1986	1,499	2,006	1,000
1987	11,912	3,097	1,426
1988	3,703	19,182	11,150
1989	6,666	12,309	4,797
1990	5,990	19,032	8,996
1991	3,633	27,708	17,830
1992	346	11,013	4,847
1993	153	5,171	2,167
1994	65	5,268	3,096
1995	250	5,732	3,442
1996	1,015	5,533	3,885
1997	967	1,947	857
1998	550	1,202	492
1999	1,089	2,272	1,486
2000	729	2,885	2,197
2001	2,617	1,314	618
2002	1,768	1,701	1,106
2003	705	2,090	940
2004	267	863	341
2005	1,673	2,820	2,022
2006	2,451	4,025	2,318
2007	696	5,916	4,373
2008	622	4,457	2,665
2009	533	4,021	3,045
2010	795	2,115	1,752
2011	4,390	2,225	1,174
2012	5,694	8,550	5,264
2013	2,344	11,054	7,122
2014	489	8,159	7,538
2015	628	4,675	3,126
2016	50	1,429	850
2017	158	1,986	769
2018	990	598	269

Table 17. -- Time series of abundance estimates (in millions) for male Tanner crab (*Chionoecetes bairdi*) by size category (CW) and sex from National Marine Fisheries Service eastern Bering Sea bottom trawl surveys, east of 166° W. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1975-1978 data.

Year	Immature male < 113 mm	Mature male ≥ 113 mm	Mature male ± CI	Mature male based on chela	Legal male ≥ 120 mm	Preferred male ≥ 125 mm
1979	12.7	20.1	7.0	n/a	17.8	15.2
1980	40.5	50.4	30.6	n/a	43.0	37.5
1981	29.2	26.2	11.3	n/a	21.0	18.1
1982	28.2	16.3	6.0	n/a	12.7	9.9
1983	38.6	15.2	7.1	n/a	12.1	9.6
1984	27.4	13.0	5.3	n/a	10.6	8.8
1985	12.0	8.5	3.7	n/a	7.4	5.8
1986	50.6	7.3	3.8	n/a	5.1	3.7
1987	136.0	15.7	5.9	n/a	13.0	10.3
1988	138.2	49.3	41.4	n/a	29.6	22.1
1989	243.7	89.5	30.2	n/a	66.4	51.1
1990	167.4	68.1	22.0	47.4	56.7	48.3
1991	123.4	90.2	61.3	65.4	71.3	57.5
1992	54.7	105.7	67.0	56.7	88.5	72.3
1993	30.0	63.8	25.1	26.3	54.2	43.5
1994	12.8	39.4	13.4	13.0	34.0	29.2
1995	10.6	24.0	11.0	1.2	21.2	18.3
1996	29.3	21.8	13.8	1.3	19.8	17.3
1997	36.5	7.9	2.6	1.7	6.3	5.4
1998	24.9	7.8	2.4	4.9	5.8	4.6
1999	50.1	10.1	4.8	7.8	6.1	4.3
2000	32.7	16.8	10.0	8.3	12.1	9.6
2001	118.0	14.5	5.6	6.1	11.5	9.8
2002	45.8	13.2	5.3	1.8	11.0	9.2
2003	41.8	14.9	5.8	5.1	11.2	9.1
2004	18.2	12.4	5.3	6.4	9.7	7.4
2005	41.9	17.5	6.4	10.4	13.5	9.7
2006	84.0	20.1	7.7	12.2	14.6	10.9
2007	52.2	24.7	13.0	17.7	16.2	11.8
2008	42.1	37.8	36.2	31.7	28.7	21.9
2009	32.8	16.1	8.1	n/a	11.8	9.7
2010	39.1	15.3	7.3	5.9	11.9	9.1
2011	135.2	16.0	7.5	n/a	12.4	10.0
2012	167.6	22.7	10.7	24.3	14.4	10.3
2013	110.0	69.6	49.7	n/a	37.0	19.6
2014	75.5	62.3	19.0	39.5	41.9	30.5
2015	40.2	40.0	9.4	n/a	30.7	24.1
2016	24.6	29.6	7.7	8.1	20.2	13.9
2017	20.6	29.8	9.5	2.9	21.8	15.9
2018	40.8	16.7	4.5	0.6	12.0	9.2

Table 18. -- Time series of abundance estimates (in millions) for female Tanner crab (*Chionoecetes bairdi*) by size category (CW) and sex from National Marine Fisheries Service eastern Bering Sea bottom trawl surveys, east of 166° W. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1975-1978 data.

Year	Immature female	Mature female	Mature female ± CI
1979	7.7	13.0	9.5
1980	15.6	50.5	37.7
1981	16.1	35.1	20.4
1982	14.7	31.2	16.6
1983	30.2	18.3	10.0
1984	19.5	16.3	13.1
1985	5.4	10.8	8.0
1986	37.5	8.7	3.9
1987	123.1	13.4	5.5
1988	56.3	84.4	47.9
1989	183.1	57.8	22.9
1990	98.7	101.5	47.2
1991	41.8	145.9	103.7
1992	5.1	53.9	23.2
1993	2.9	24.9	10.8
1994	2.7	27.0	17.2
1995	5.6	30.2	18.5
1996	18.1	28.9	20.4
1997	34.7	11.1	5.2
1998	13.4	6.7	2.9
1999	21.3	12.6	7.8
2000	16.6	15.0	11.2
2001	112.2	7.1	3.3
2002	36.4	10.8	7.9
2003	13.6	12.0	5.7
2004	8.6	4.5	2.1
2005	39.3	16.1	12.1
2006	29.1	21.9	12.0
2007	11.5	30.5	21.1
2008	8.9	24.6	15.2
2009	23.9	22.1	16.9
2010	29.7	10.6	8.4
2011	88.8	12.2	6.2
2012	65.8	52.4	35.7
2013	33.2	60.8	42.5
2014	15.1	44.7	42.0
2015	14.5	27.6	19.2
2016	1.4	7.7	4.7
2017	5.3	10.2	4.0
2018	35.0	3.5	1.6

Table 19. -- Time series of biomass estimates (t) for male Tanner crab (*Chionoecetes bairdi*) by size category (CW) and sex from National Marine Fisheries Service eastern Bering Sea bottom trawl surveys, west of 166° W. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1975-1978 data.

Year	Immature male < 103 mm	Mature male ≥ 103 mm	Mature male ± CI	Mature male based on chela	Legal male ≥ 110 mm	Preferred male ≥ 125 mm
1979	16,462	15,596	6,183	n/a	12,913	7,860
1980	64,467	39,038	17,099	n/a	27,984	12,887
1981	29,763	26,777	8,029	n/a	18,061	8,050
1982	14,735	34,520	12,749	n/a	25,512	11,622
1983	7,761	16,947	6,540	n/a	13,195	5,655
1984	5,865	12,625	4,735	n/a	10,016	3,730
1985	2,533	4,143	1,442	n/a	3,169	1,458
1986	6,228	5,758	4,123	n/a	3,286	816
1987	8,047	8,601	3,960	n/a	6,994	4,163
1988	19,282	21,812	12,530	n/a	17,868	10,618
1989	15,988	29,119	12,768	n/a	24,883	16,499
1990	16,029	39,509	22,820	33,870	35,175	24,356
1991	17,926	38,059	13,836	19,065	34,230	21,816
1992	11,419	26,255	11,787	7,600	23,410	16,311
1993	7,226	12,651	4,912	8,018	10,873	6,312
1994	5,070	10, 962	3,745	3,100	9,526	5,391
1995	3,553	11,757	6,911	1,395	10,592	5,761
1996	2,927	7,863	6,170	1,010	6,682	3,680
1997	1,986	3,575	1,185	813	2,873	1,121
1998	3,041	3,563	1,227	1,515	2,602	1,085
1999	4,409	2,311	961	1,598	1,679	612
2000	4,116	2,787	850	1,324	2,003	627
2001	8,171	4,918	2,069	2,277	3,943	1,780
2002	8,691	4,318	1,595	2,495	3,029	1,222
2003	12,528	8,133	3,789	3,661	6,424	2,661
2004	13,064	13,404	7,012	6,435	9,732	2,805
2005	18,964	27,348	10,511	18,204	23,655	13,839
2006	33,861	39,045	19,584	n/a	32,859	19,083
2007	35,745	40,540	25,656	10,953	31,673	16,281
2008	15,705	32,031	17,342	20,100	26,351	13,145
2009	9,673	22,980	9,143	n/a	19,770	10,812
2010	8,305	26,296	14,128	15,630	23,372	14,460
2011	13,198	26,123	17,353	n/a	23,259	15,660
2012	19,737	15,027	4,271	6,469	11,928	6,365
2013	18,417	20,423	9,311	n/a	15,939	8,220
2014	17,345	33,394	8,146	21,404	24,859	11,766
2015	8,036	31,122	9,281	n/a	27,067	14,306
2016	8,196	35,119	8,671	12,092	31,252	18,326
2017	5,417	24,268	7,812	2,607	21,288	12,553
2018	8,786	23,948	6,999	4,029	21,572	12,871

Table 20. -- Time series of biomass estimates (t) for female Tanner crab (*Chionoecetes bairdi*) by size category (CW) and sex from National Marine Fisheries Service eastern Bering Sea bottom trawl surveys, west of 166° W. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1975-1978 data.

Year	Immature female	Mature female	Mature female ± CI
1979	3,236	16,465	11,111
1980	12,199	52,221	33,389
1981	631	34,893	20,587
1982	410	57,347	32,263
1983	1,426	15,993	6,928
1984	1,573	10,785	5,490
1985	675	2,718	1,636
1986	1,210	1,360	831
1987	3,095	2,042	837
1988	6,484	6,184	3,169
1989	5,165	7,090	3,186
1990	3,869	18,663	17,538
1991	3,390	17,056	7,234
1992	1,644	15,213	6,889
1993	913	6,470	2,484
1994	1,137	4,579	2,492
1995	808	6,667	4,052
1996	424	4,047	3,539
1997	442	1,451	884
1998	1,413	1,076	505
1999	1,793	1,554	635
2000	1,753	1,246	622
2001	3,741	3,247	1,915
2002	3,733	2,766	1,375
2003	3,984	6,313	3,007
2004	3,866	3,865	1,569
2005	8,710	8,759	3,745
2006	10,808	10,914	4,484
2007	4,944	7,521	2,312
2008	2,238	7,206	3,191
2009	2,039	4,456	1,569
2010	3,008	3,358	1,567
2011	6,001	3,189	983
2012	5,982	3,805	1,338
2013	4,071	6,795	2,393
2014	2,023	6,705	3,547
2015	1,038	6,536	4,526
2016	1,057	6,076	3,664
2017	1,255	5,019	3,069
2018	3,921	4,293	1,926

Table 21. -- Time series of abundance estimates (in millions) for male Tanner crab (*Chionoecetes bairdi*) by size category (CW) and sex from National Marine Fisheries Service eastern Bering Sea bottom trawl surveys, west of 166° W. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1975-1978 data.

Year	Immature male < 103 mm	Mature male ≥ 103 mm	Mature male ± CI	Mature male based on chela	Legal male ≥ 110 mm	Preferred male ≥ 125 mm
1979	135.8	28.2	10.9	n/a	20.7	9.9
1980	476.3	80.0	33.1	n/a	49.0	16.7
1981	156.1	56.8	16.8	n/a	32.3	10.7
1982	74.3	71.3	26.1	n/a	46.0	16.3
1983	108.0	34.6	13.5	n/a	24.1	8.1
1984	67.2	25.8	9.6	n/a	18.5	5.3
1985	28.6	8.4	2.9	n/a	5.7	2.1
1986	49.3	13.5	10.5	n/a	6.5	1.1
1987	91.0	16.2	6.6	n/a	11.6	5.6
1988	198.0	39.9	21.1	n/a	28.8	13.5
1989	156.4	50.2	19.6	n/a	38.3	20.7
1990	130.0	65.5	35.9	67.4	53.4	30.9
1991	162.7	65.2	22.5	40.7	54.4	28.6
1992	101.9	43.2	15.5	17.1	35.1	20.5
1993	58.1	23.4	8.4	19.6	18.4	8.8
1994	46.8	20.0	6.4	7.5	15.9	7.3
1995	32.4	21.3	12.3	4.1	18.1	8.2
1996	24.3	15.0	11.1	3.2	11.7	5.4
1997	24.6	7.3	2.3	1.9	5.3	1.5
1998	49.1	7.4	2.5	3.9	4.7	1.5
1999	83.4	5.0	2.2	5.0	3.2	0.9
2000	71.5	6.0	1.8	3.7	3.8	0.9
2001	145.2	9.8	3.7	7.0	7.0	2.4
2002	128.8	9.1	3.2	8.8	5.5	1.7
2003	171.5	16.4	7.2	13.5	11.6	3.6
2004	207.5	29.2	15.9	17.6	18.9	4.1
2005	241.1	49.5	17.8	40.9	39.2	18.7
2006	287.0	72.3	30.4	23.6	54.8	25.9
2007	279.4	80.2	45.3	33.4	55.1	22.6
2008	110.8	62.2	29.9	46.6	46.2	18.5
2009	98.3	42.7	16.6	n/a	33.7	15.0
2010	114.2	45.7	21.5	30.1	37.5	19.1
2011	186.6	42.9	22.9	n/a	34.8	18.9
2012	223.8	28.7	8.1	18.1	20.0	8.3
2013	183.9	39.7	17.1	n/a	27.0	10.8
2014	140.4	68.0	17.8	52.1	43.8	16.1
2015	67.7	57.4	16.5	n/a	46.0	19.6
2016	75.2	62.2	15.5	25.4	51.3	24.7
2017	99.0	43.2	12.4	6.4	34.9	16.8
2018	173.0	41.8	11.4	11.5	35.1	17.2

Table 22. -- Time series of abundance estimates (in millions) for female Tanner crab (*Chionoecetes bairdi*) by size category (CW) and sex from National Marine Fisheries Service eastern Bering Sea bottom trawl surveys, west of 166° W. The 95% confidence intervals (CI) are 1.96 SE. See authors for 1975-1978 data.

Year	Immature female	Mature female	Mature female ± CI
1979	49.0	118.3	80.6
1980	159.2	380.4	259.6
1981	10.3	268.7	170.6
1982	15.5	433.1	265.7
1983	96.5	109.9	48.3
1984	59.0	70.1	36.8
1985	21.0	18.6	12.3
1986	24.1	8.3	4.6
1987	74.9	12.9	5.3
1988	129.9	38.1	18.6
1989	101.9	43.3	19.2
1990	75.1	107.5	91.6
1991	84.1	109.2	48.3
1992	48.6	97.0	43.1
1993	26.4	42.6	16.4
1994	34.3	29.2	15.6
1995	20.6	43.1	25.9
1996	15.0	26.2	22.3
1997	22.6	9.0	5.4
1998	44.7	6.6	3.1
1999	79.7	10.1	4.0
2000	57.0	7.3	3.6
2001	127.2	21.0	11.5
2002	111.6	19.1	10.9
2003	123.8	48.5	26.2
2004	169.9	27.7	13.5
2005	215.7	60.7	27.9
2006	178.1	76.4	31.2
2007	114.3	51.5	16.3
2008	53.4	48.6	21.8
2009	71.4	29.2	10.0
2010	91.6	21.9	10.1
2011	157.6	20.3	6.0
2012	122.0	25.6	8.9
2013	97.2	48.0	17.0
2014	90.4	43.6	23.7
2015	36.3	45.4	33.7
2016	42.1	42.6	27.3
2017	101.2	35.6	21.4
2018	166.2	30.3	13.2

Table 23. -- Time series of biomass estimates (t) for male snow crab (*Chionoecetes opilio*) by size category (CW) and sex from National Marine Fisheries Service bottom trawl surveys, all Districts combined. The 95% confidence intervals (CI) are 1.96 SE.

Year	Immature male < 95 mm	Mature male ≥ 95 mm	Mature male ± CI	Mature male based on chela	Legal male ≥ 78 mm	Preferred male ≥ 102 mm
1980	236,814	99,240	30,937	n/a	180,837	68,592
1981	166,540	38,042	8,061	n/a	97,286	22,630
1982	250,475	65,864	19,430	n/a	177,794	34,823
1983	184,837	68,047	18,468	n/a	163,096	35,087
1984	119,438	119,971	32,543	n/a	183,321	85,096
1985	44,214	55,691	12,225	n/a	79,334	43,099
1986	83,408	58,725	14,454	n/a	84,159	45,967
1987	266,342	107,536	23,901	n/a	178,662	74,290
1988	331,332	144,135	53,992	n/a	246,515	105,695
1989	372,788	143,216	29,275	211,140	291,753	92,421
1990	306,733	347,750	102,169	302,928	521,713	225,142
1991	293,255	347,976	105,727	203,581	477,618	278,678
1992	179,621	166,483	35,962	133,013	223,585	139,020
1993	273,570	98,857	22,246	132,579	143,013	77,228
1994	289,633	57,386	12,134	65,615	109,683	44,637
1995	368,026	61,758	20,003	123,692	158,155	38,179
1996	341,043	143,856	52,118	206,887	312,771	89,015
1997	209,131	232,388	57,042	140,027	362,928	171,516
1998	100,536	164,119	32,216	95,738	219,422	127,490
1999	44,127	67,352	13,850	26,694	87,096	52,043
2000	77,782	53,942	16,022	22,333	76,830	41,129
2001	167,671	56,449	11,370	52,228	106,070	39,995
2002	83,002	55,907	26,886	42,701	100,734	37,172
2003	81,606	44,423	10,558	39,904	72,396	31,535
2004	89,330	44,162	14,554	43,192	61,726	35,580
2005	184,025	50,072	10,120	84,345	105,971	39,847
2006	124,579	90,152	61,487	47,648	141,960	72,344
2007	140,003	99,875	36,249	98,441	162,108	74,720
2008	114,297	79,600	16,993	n/a	123,530	60,329
2009	98,468	103,188	30,883	56,697	149,588	77,510
2010	146,025	105,278	27,471	n/a	134,170	87,099
2011	149,214	111,662	25,824	87,521	145,916	94,381
2012	123,683	67,476	18,910	n/a	104,438	53,152
2013	100,506	58,389	14,779	67,745	99,733	43,126
2014	140,092	105,441	41,571	n/a	151,453	79,510
2015	85,434	46,410	14,071	42,468	71,550	35,838
2016	103,747	29,961	6,869	n/a	51,670	21,997
2017	188,851	29,363	7,301	58,948	52,272	20,617
2018	458,902	47,054	18,589	205,116	130,474	27,018

Table 24. -- Time series of biomass estimates (t) for female snow crab (*Chionoecetes opilio*) by size category (CW) and sex from National Marine Fisheries Service bottom trawl surveys, all Districts combined. The 95% confidence intervals (CI) are 1.96 SE.

Year	Immature female	Mature female*	Mature female ± CI*
1980	27,575	271,682	174,119
1981	10,988	118,845	40,403
1982	3,654	141,492	43,943
1983	3,622	82,182	32,620
1984	14,119	39,369	15,417
1985	5,364	5,889	2,487
1986	26,043	15,174	6,209
1987	107,989	119,551	44,272
1988	36,803	165,619	57,314
1989	23,265	256,728	163,114
1990	38,213	174,942	72,149
1991	68,925	199,020	94,676
1992	49,374	123,479	48,802
1993	74,921	127,081	41,412
1994	68,240	122,604	33,649
1995	31,019	164,959	44,039
1996	9,274	104,429	31,008
1997	5,452	101,393	39,142
1998	13,324	70,183	38,534
1999	6,160	29,849	13,945
2000	12,480	93,882	99,120
2001	17,033	74,840	43,557
2002	4,388	29,508	18,448
2003	14,838	38,761	30,847
2004	30,472	47,743	26,154
2005	55,125	62,603	27,395
2006	28,090	50,592	20,186
2007	27,875	54,449	34,546
2008	8,994	49,352	22,756
2009	29,660	50,002	22,623
2010	90,479	94,956	34,177
2011	41,232	169,117	63,699
2012	41,425	143,268	65,922
2013	31,364	125,672	50,923
2014	54,523	111,362	46,704
2015	35,701	81,628	29,256
2016	53,788	52,022	21,010
2017	66,242	103,422	44,445
2018	83,164	161,573	63,268

* Differences from previous six reports due to reanalysis of length-weight regression data.

Table 25. -- Time series of abundance estimates (in millions) for male snow crab (*Chionoecetes opilio*) by size category (CW) and sex from National Marine Fisheries Service bottom trawl surveys, all Districts combined. The 95% confidence intervals (CI) are 1.96 SE.

Year	Immature male < 95 mm	Mature male ≥ 95 mm	Mature male ± CI	Mature male based on chela	Legal male ≥ 78 mm	Preferred male ≥ 102 mm
1980	2,567.0	194.8	65.0	n/a	513.4	116.6
1981	1,575.4	79.8	17.7	n/a	318.8	40.3
1982	1,779.0	145.3	44.0	n/a	591.1	65.0
1983	1,486.0	150.3	41.2	n/a	511.7	65.6
1984	1,223.6	237.6	62.8	n/a	476.1	148.3
1985	444.6	105.9	23.3	n/a	195.9	73.8
1986	1,143.1	110.6	27.0	n/a	211.2	78.2
1987	3,758.6	215.7	48.8	n/a	493.3	130.8
1988	3,677.9	276.9	94.8	n/a	683.8	178.5
1989	3,111.0	292.3	60.6	853.6	882.5	162.0
1990	2,263.9	710.4	214.0	853.3	1,348.1	395.1
1991	3,331.8	618.3	179.4	584.0	1,093.8	439.7
1992	2,776.2	293.2	62.7	410.9	512.9	223.3
1993	4,805.5	182.8	41.9	829.8	355.8	127.6
1994	4,116.9	106.4	22.2	384.3	320.6	73.8
1995	3,635.3	128.0	43.9	670.0	515.7	67.3
1996	2,309.8	302.4	105.2	854.2	958.6	161.4
1997	1,204.4	447.1	100.4	381.2	945.8	290.8
1998	778.2	308.4	59.3	268.7	514.6	214.9
1999	422.4	124.9	23.9	83.1	198.8	85.7
2000	971.1	102.4	31.8	118.3	191.1	69.8
2001	1,529.4	111.3	24.1	270.2	312.7	69.3
2002	596.3	114.7	54.8	154.8	284.5	66.6
2003	1,073.7	88.1	21.3	144.2	196.0	55.0
2004	1,491.2	79.9	24.2	194.5	147.8	58.0
2005	1,890.3	89.2	17.6	433.1	312.5	63.0
2006	1,178.4	171.9	119.4	251.5	377.6	126.4
2007	1,260.8	196.7	67.0	408.9	435.0	132.5
2008	1,008.8	154.3	31.6	n/a	325.2	105.1
2009	1,055.4	195.7	57.9	176.0	371.5	129.9
2010	2,460.5	184.4	45.1	n/a	293.7	138.3
2011	1,829.8	194.1	45.7	345.4	330.8	150.1
2012	1,384.9	123.5	34.3	n/a	274.1	87.0
2013	1,055.9	112.6	27.6	253.7	280.0	73.6
2014	1,527.8	204.2	76.8	n/a	385.3	138.5
2015	1,504.2	84.2	22.3	166.8	183.8	57.2
2016	2,361.9	57.8	13.2	n/a	143.2	37.4
2017	3,541.7*	58.0	14.0	405.2	151.9	35.8
2018	5,773.1	100.6	41.2	1,462.5	437.8	49.4

* Corrected value: 2017 technical memorandum reported incorrect value in error.

Table 26. -- Time series of abundance estimates (in millions) for female snow crab (*Chionoecetes opilio*) by size category (CW) and sex from National Marine Fisheries Service bottom trawl surveys, all Districts combined. The 95% confidence intervals (CI) are 1.96 SE.

Year	Immature female	Mature female*	Mature female ± CI*
1980	898.5	4,830.3	3,219.6
1981	233.3	2,047.8	713.9
1982	79.9	2,317.2	770.8
1983	240.5	1,466.0	611.0
1984	551.9	670.0	273.8
1985	213.0	103.4	44.7
1986	842.1	267.4	110.5
1987	2,955.5	2,040.2	768.0
1988	1,045.8	2,795.6	975.4
1989	564.7	4,625.9	3,417.8
1990	1,043.9	3,008.7	1,392.7
1991	2,270.7	3,545.4	1,930.8
1992	1,862.2	2,068.9	849.0
1993	2,909.2	2,396.3	818.2
1994	2,684.2	2,204.8	552.4
1995	1,021.7	3,109.1	825.9
1996	258.4	2,107.2	680.4
1997	142.9	2,001.0	813.2
1998	336.0	1,386.7	791.2
1999	187.6	551.0	270.0
2000	391.9	1,649.1	1,711.0
2001	470.9	1,243.8	727.5
2002	121.1	502.8	342.5
2003	542.4	680.2	601.4
2004	1,375.9	931.9	525.2
2005	1,512.2	1,110.9	498.3
2006	765.7	744.3	304.8
2007	620.4	839.6	623.2
2008	395.9	747.7	445.2
2009	1,059.9	747.2	356.6
2010	3,027.6	1,777.8	654.1
2011	1,175.4	3,137.0	1,190.0
2012	1,165.5	2,656.1	1,309.6
2013	1,029.4	2,222.2	994.7
2014	1,590.8	1,815.6	894.7
2015	1,461.0	1,238.6	497.4
2016	2,131.6	818.4	347.2
2017	2,494.8	2,086.9	923.7
2018	2,588.7	3,282.0	1,341.3

* Differences from previous six reports due to reanalysis of length-weight regression data.

Table 27. -- Time series of biomass estimates (t) for hair crab (*Erimacrus isenbeckii*) by size category (CL) and sex from National Marine Fisheries Service bottom trawl surveys, all Districts combined. The 95% confidence intervals (CI) are 1.96 SE.

Year	Sublegal males < 83 mm	Legal males ≥ 83 mm	Legal males ± CI	Total female	Total female ± CI
1980	988	16,164	11,703	758	1,041
1981	183	10,091	3,658	182	114
1982	182	6,717	3,942	120	70
1983	67	4,231	1,331	296	152
1984	310	3,048	999	106	94
1985	83	2,084	1,041	73	57
1986	207	1,482	787	100	69
1987	355	1,083	607	208	110
1988	631	618	354	168	89
1989	2,955	404	240	43	40
1990	2,540	783	453	255	155
1991	1,393	795	434	230	130
1992	778	591	300	80	53
1993	1,111	2,296	1,588	217	148
1994	1,324	2,413	1,253	194	133
1995	1,396	4,326	2,791	158	84
1996	1,152	3,163	1,738	277	132
1997	584	3,103	1,289	92	56
1998	213	1,984	798	361	241
1999	196	1,735	510	308	125
2000	180	2,873	1,259	331	180
2001	132	1,287	521	565	243
2002	65	1,375	529	101	64
2003	357	659	275	83	49
2004	204	491	191	83	71
2005	328	212	132	273	134
2006	357	661	415	877	954
2007	575	1,278	519	357	168
2008	623	1,346	631	387	174
2009	1,104	1,916	731	464	250
2010	903	1,610	677	469	186
2011	1,752	2,129	935	377	162
2012	3,626	2,878	1,128	534	234
2013	3,357	6,469	2,626	1,055	433
2014	1,144	3,391	1,298	304	139
2015	616	1,338	511	127	74
2016	213	716	307	71	50
2017	208	1,084	364	71	45
2018	332	886	338	195	105

Table 28. -- Time series of abundance estimates (in millions) for hair crab (*Erimacrus isenbeckii*) by size category (CL) and sex from National Marine Fisheries Service bottom trawl surveys, all Districts combined. The 95% confidence intervals (CI) are 1.96 SE.

Year	Sublegal males < 83 mm	Legal males ≥ 83 mm	Legal males ± CI	Total female	Total female ± CI
1980	3.0	20.8	15.2	4.8	7.8
1981	0.5	12.2	4.5	0.5	0.3
1982	0.6	8.4	4.9	0.4	0.2
1983	0.3	5.3	1.7	0.9	0.5
1984	1.1	3.8	1.3	0.4	0.3
1985	0.3	2.5	1.3	0.3	0.2
1986	0.7	1.9	1.0	0.4	0.3
1987	1.6	1.4	0.7	0.9	0.4
1988	3.9	0.8	0.4	0.9	0.7
1989	12.6	0.5	0.3	0.1	0.1
1990	10.1	1.2	0.8	1.0	0.6
1991	4.8	1.3	0.7	1.2	0.7
1992	2.5	1.1	0.6	0.5	0.4
1993	3.8	3.9	2.6	1.3	1.0
1994	5.0	4.0	2.1	1.3	1.1
1995	5.0	6.6	4.3	0.7	0.3
1996	3.6	5.1	2.7	1.0	0.5
1997	1.7	4.6	1.8	0.4	0.2
1998	0.6	2.9	1.1	1.3	0.8
1999	0.6	2.4	0.7	1.2	0.4
2000	0.5	4.1	1.7	1.2	0.7
2001	0.5	1.8	0.7	2.2	1.0
2002	0.3	2.0	0.8	0.5	0.3
2003	1.3	0.9	0.4	0.5	0.3
2004	0.6	0.8	0.3	0.3	0.2
2005	1.0	0.3	0.2	0.8	0.5
2006	1.2	1.0	0.7	3.6	4.6
2007	2.3	1.9	0.7	1.3	0.9
2008	2.3	2.2	1.0	1.4	0.6
2009	3.6	3.1	1.1	1.7	0.9
2010	3.3	2.5	1.0	2.2	1.1
2011	6.9	3.5	1.4	1.6	0.6
2012	11.8	4.6	1.8	2.2	0.8
2013	10.3	10.7	4.6	4.0	1.7
2014	3.3	5.4	2.0	1.0	0.4
2015	1.8	2.1	0.8	0.6	0.3
2016	0.6	1.2	0.5	0.3	0.3
2017	0.6	1.6	0.6	0.3	0.2
2018	1.1	1.4	0.5	0.8	0.5

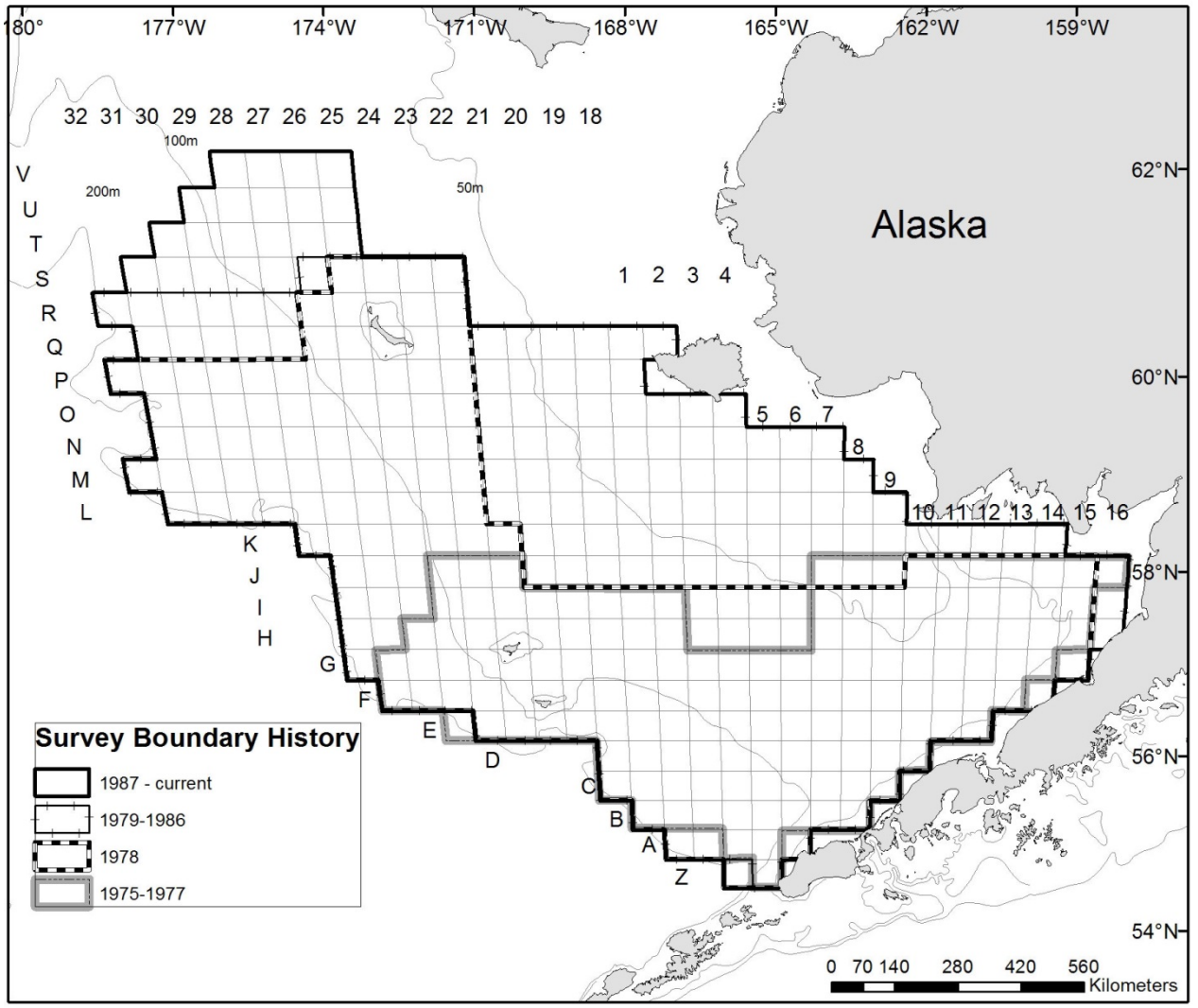

Figure 1. -- National Marine Fisheries Service eastern Bering Sea bottom trawl survey boundary from 1975 to present indicating four major stanzas in total coverage.

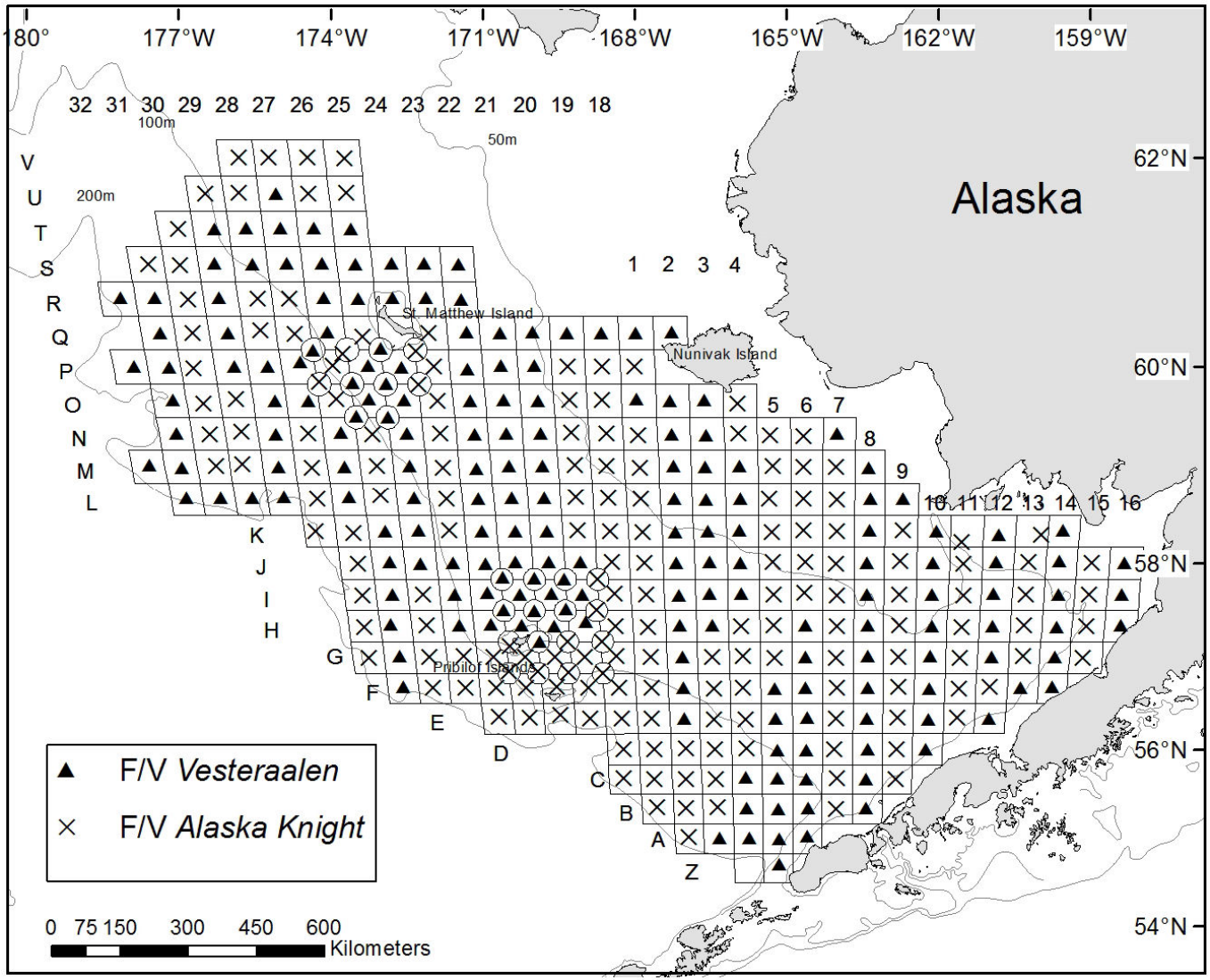

Figure 2. -- National Marine Fisheries Service eastern Bering Sea standard bottom trawl area surveyed by the FV *Alaska Knight* and the FV *Vesteraalen* from 3 June to 31 July 2018.

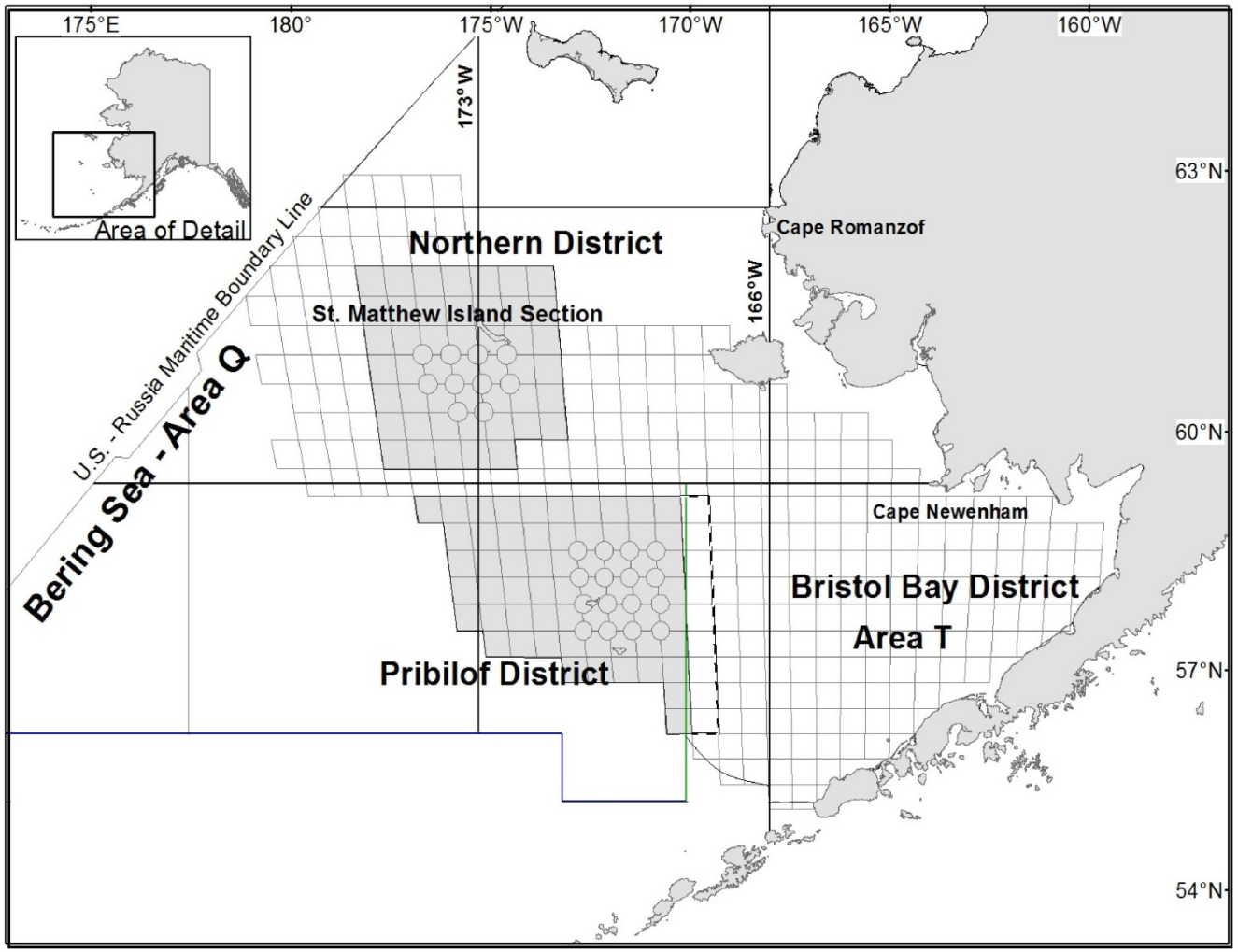

Figure 3. -- Alaska Department of Fish and Game commercial crab management units within the 2018 eastern Bering Sea bottom trawl survey area. Grey areas represent stations included in the Pribilof District (dashed line indicates expanded stock boundary for blue king crab) and St. Matthew Island Section, Northern District sampling strata and circles represent the high-density sampling areas.

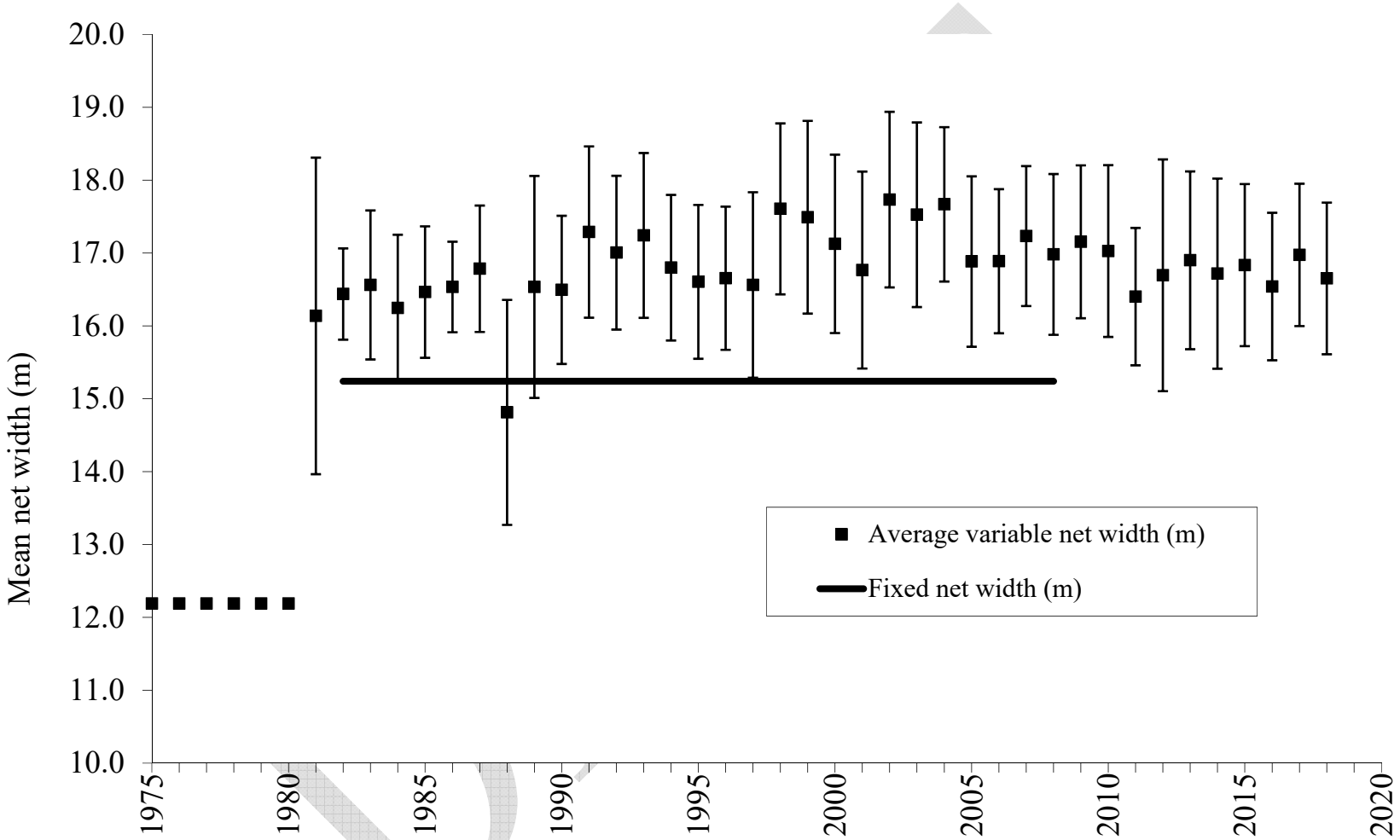

Figure 4. -- Fixed and average variable net widths (± SD) used to calculate area-swept by National Marine Fisheries Service eastern Bering Sea standard bottom trawls from 1975 to the present.

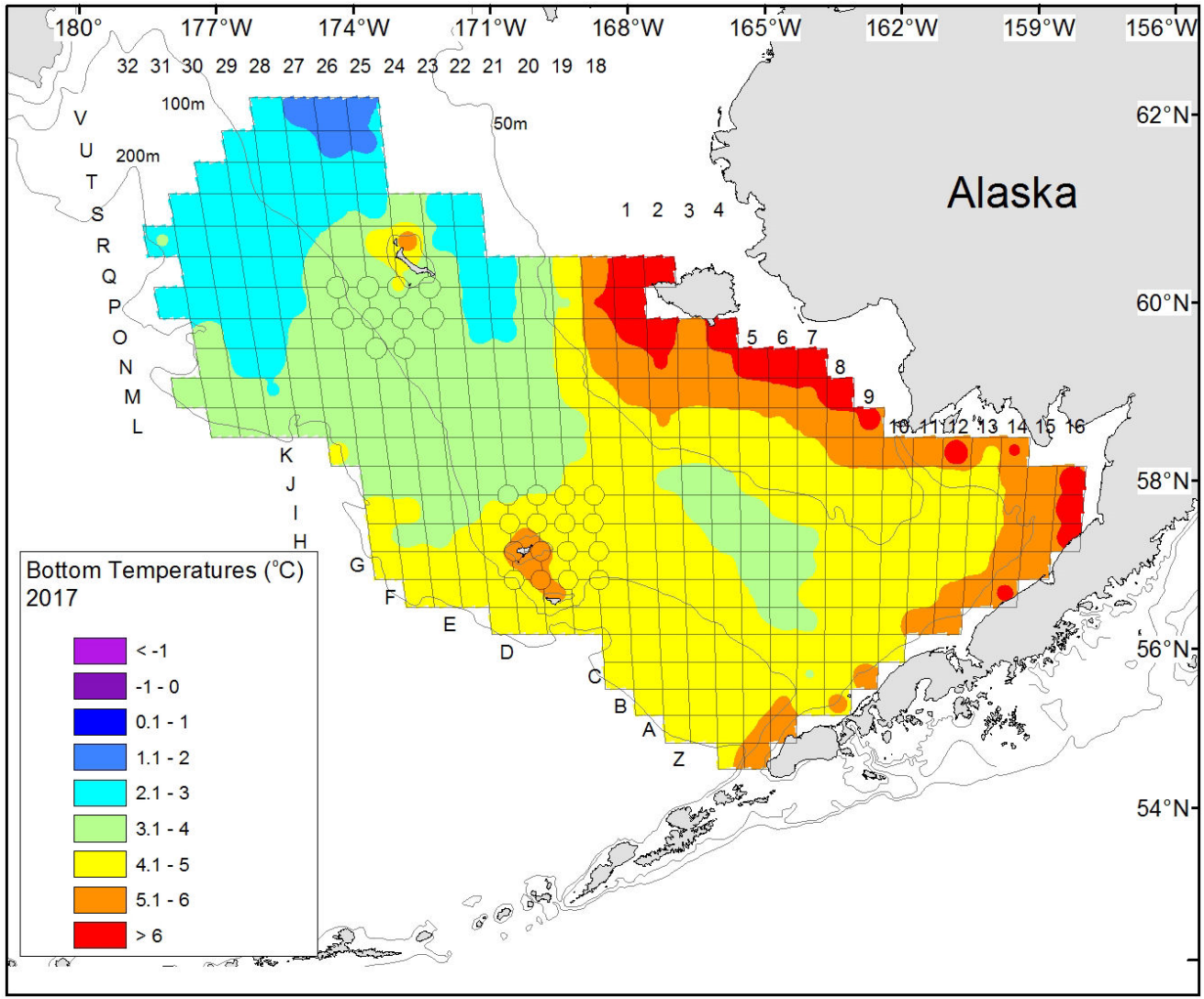

Figure 5. -- Bottom temperatures (°C) measured at stations from the National Marine Fisheries Service eastern Bering Sea bottom trawl survey, beginning 3 June 2018 in Bristol Bay and ending on 31 July 2018 at the western edge of the survey.

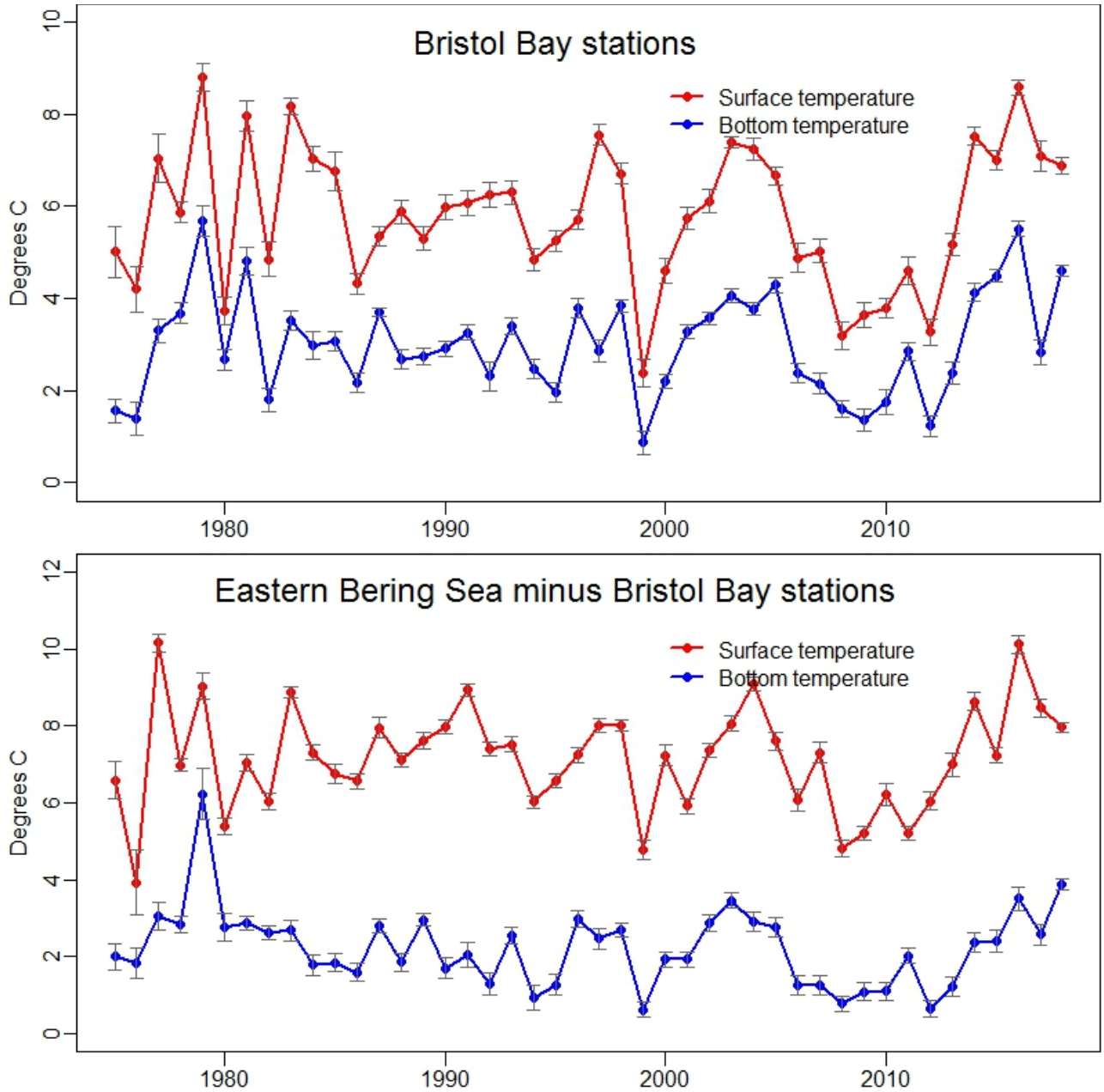

Figure 6. -- Average (± 95% CI) bottom (blue) and surface (red) temperatures for Bristol Bay (standard) stations and the rest of the eastern Bering Sea during the National Marine Fisheries Service's eastern Bering Sea bottom trawl survey. The number of stations used to calculate averages was inconsistent among years, particularly as the survey boundary expanded from 1975 to 1987.

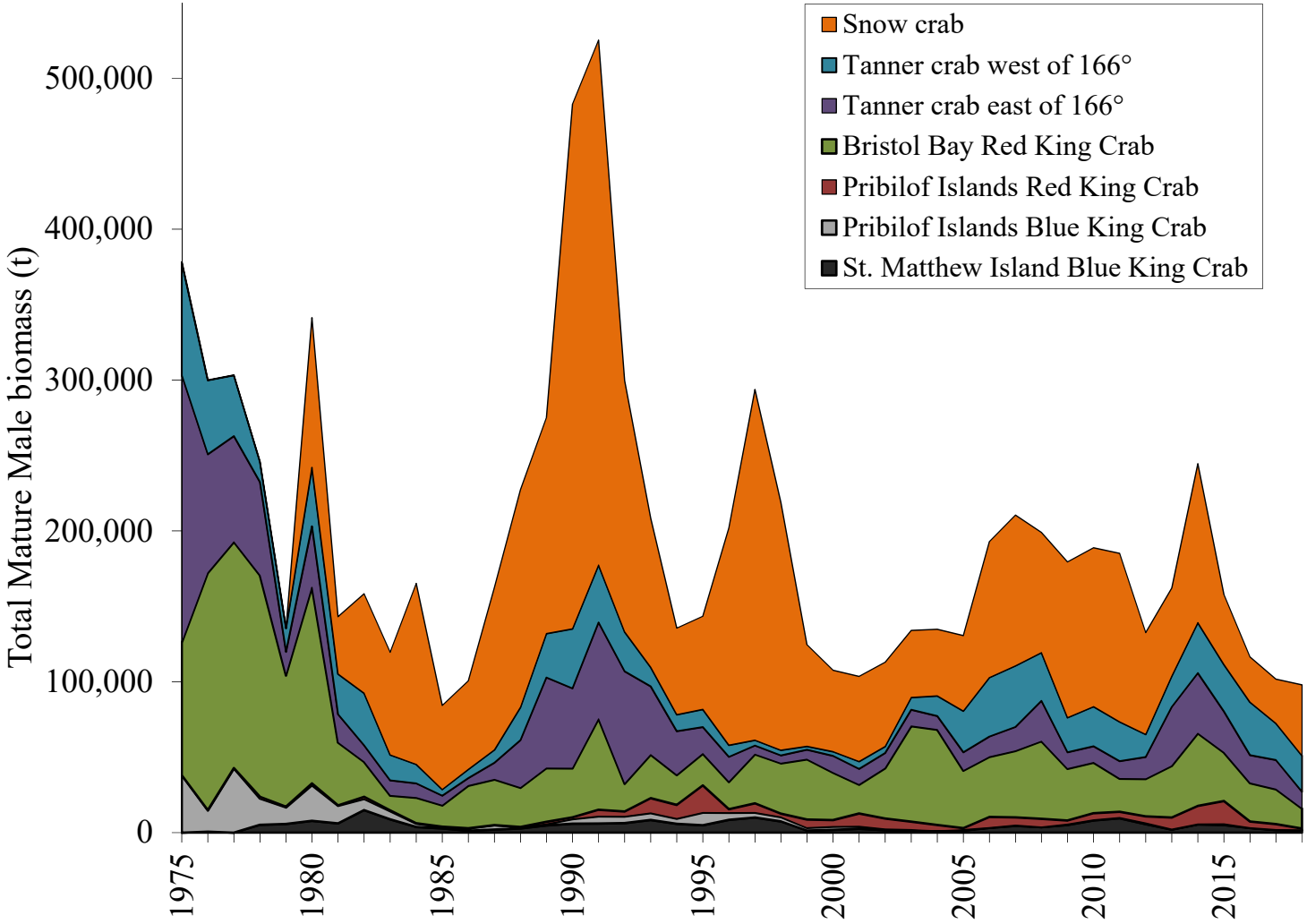

Figure 7. -- Historical mature male biomass (t) for six commercial species caught on National Marine Fisheries Service eastern Bering Sea bottom trawl surveys.

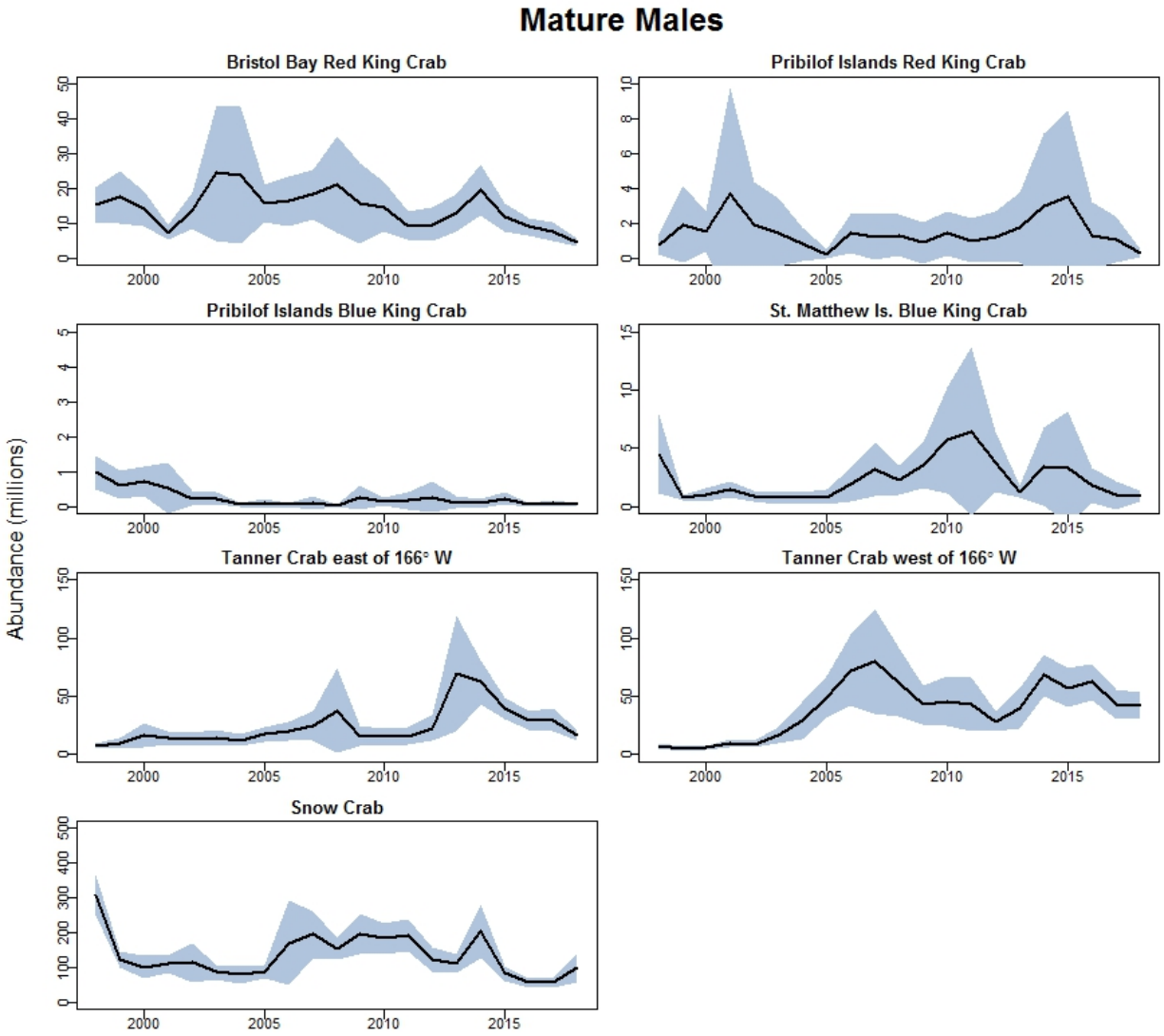

Figure 8. -- Historical mature male abundance (millions, gray area indicates ± 95% CI) for six commercial species caught on the National Marine Fisheries Service eastern Bering Sea bottom trawl surveys (1998-2018).

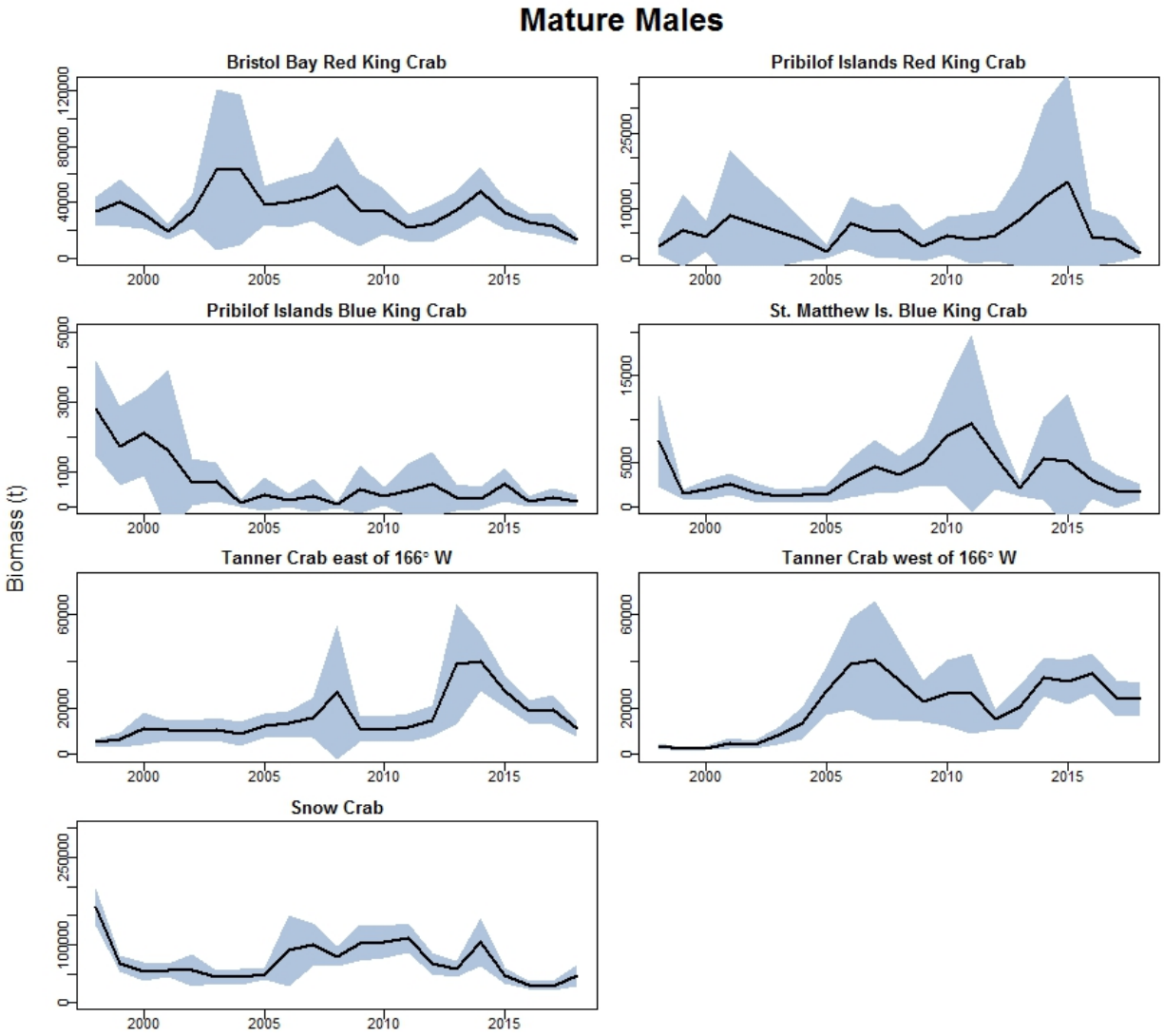

Figure 9. -- Historical mature male biomass (t, gray area indicates ± 95% CI) for six commercial species caught on the National Marine Fisheries Service eastern Bering Sea bottom trawl surveys (1998-2018).

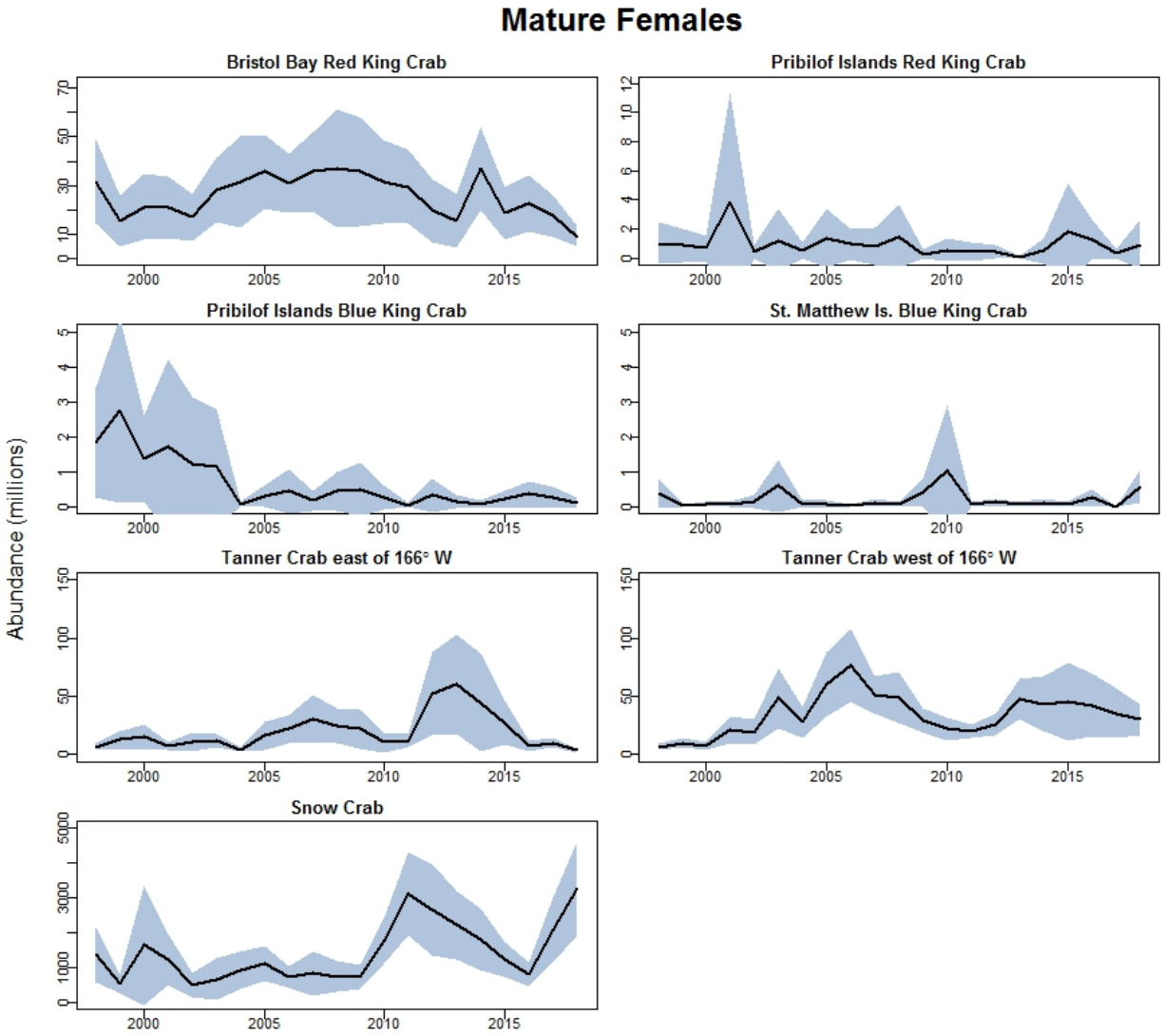

Figure 10. -- Historical mature female abundance (millions, gray area indicates ± 95% CI) for six commercial species caught on the National Marine Fisheries Service eastern Bering Sea bottom trawl survey (1998-2018). Abundance was calculated using actual maturity (abdominal flap morphology and clutch fullness index) as opposed to the size cut-off method used for males.

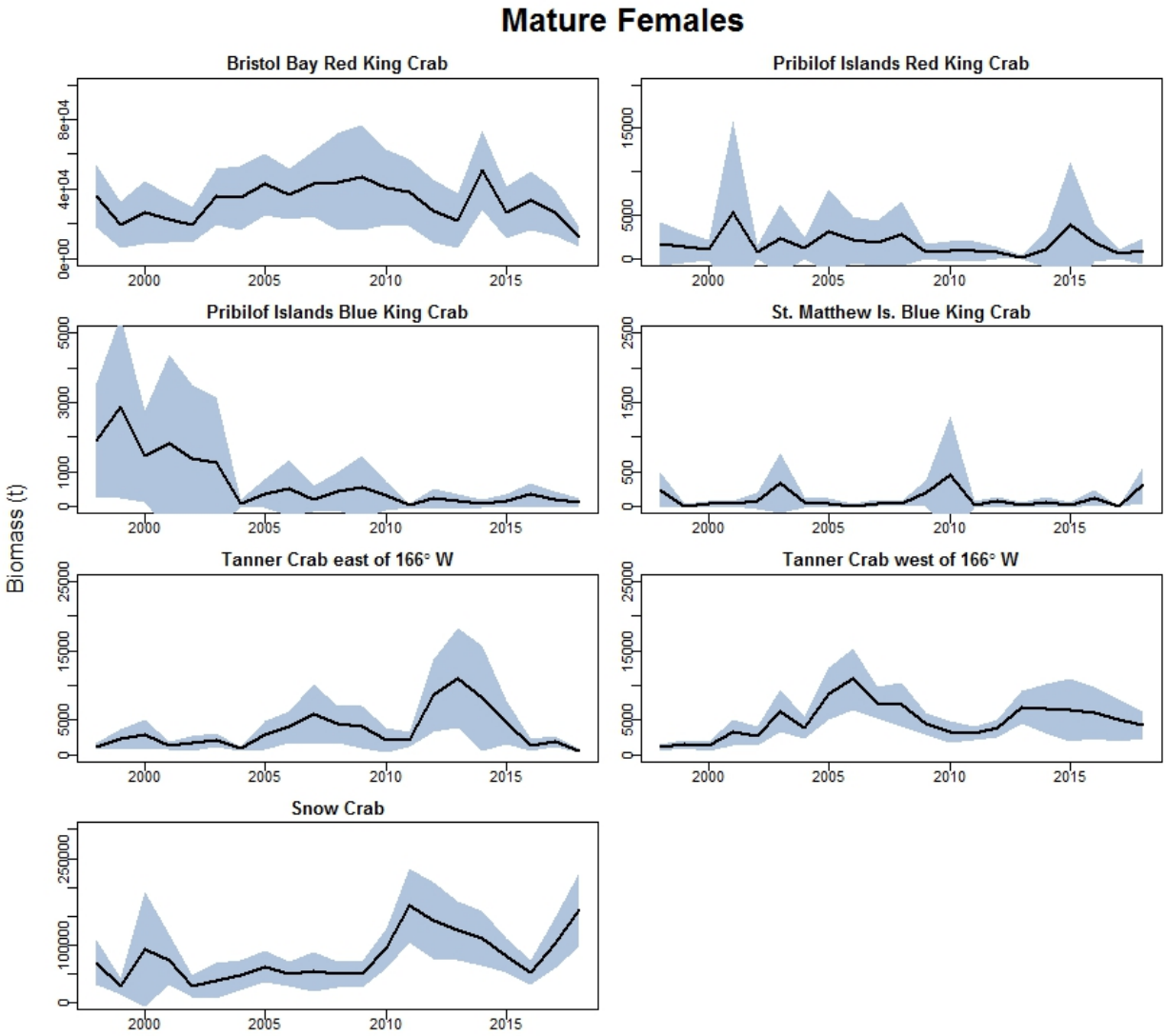

Figure 11. -- Historical mature female biomass (t, gray area indicates ± 95% CI) for six commercial species caught on the National Marine Fisheries Service eastern Bering Sea bottom trawl survey (1998-2018). Biomass was calculated using actual maturity (abdominal flap morphology and clutch fullness index), as opposed to the size cut-off method used for males.

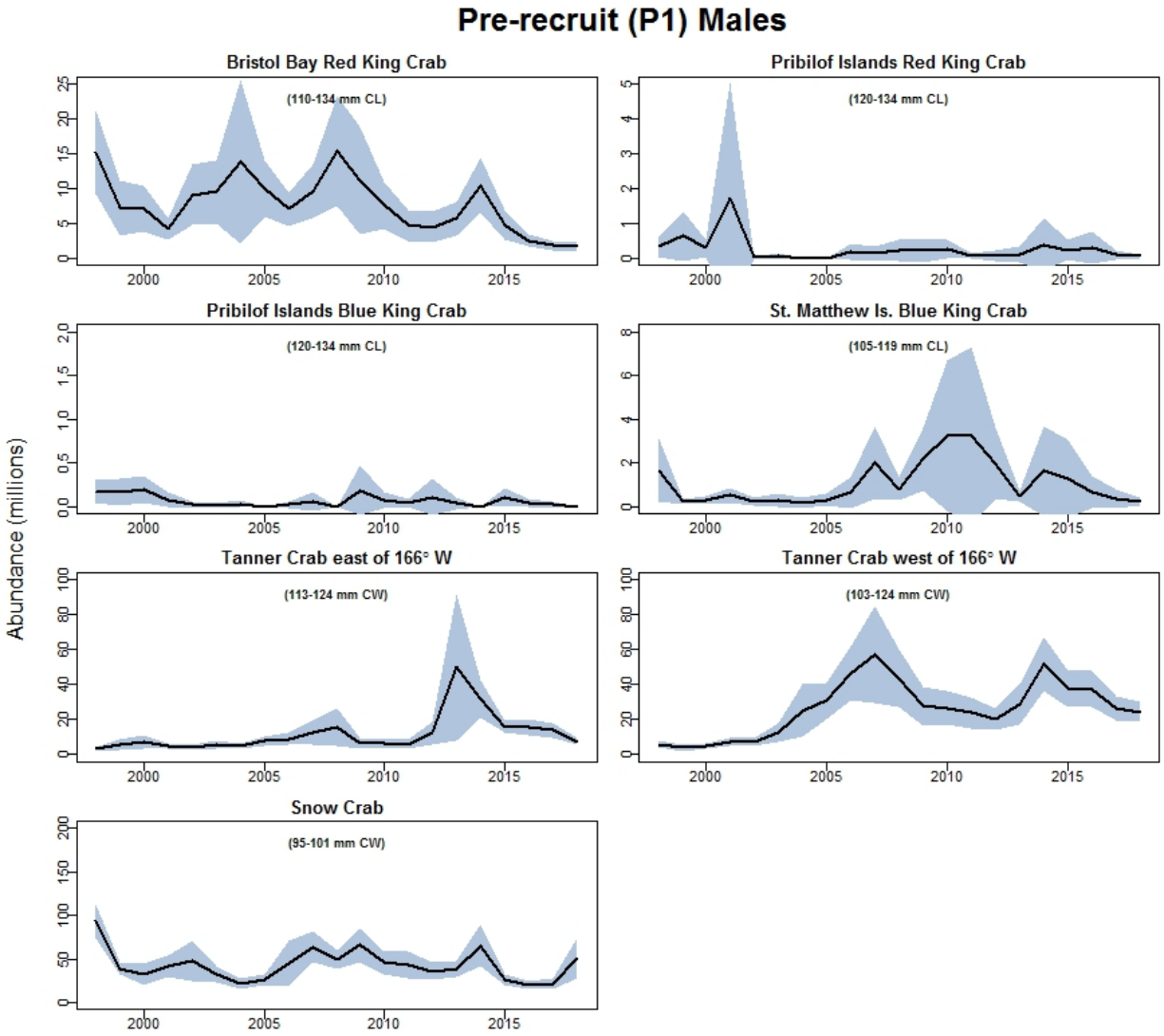

Figure 12. -- Historical abundance (millions, gray area indicates ± 95% CI) of pre-recruit (P1) males for six commercial species caught on the National Marine Fisheries Service eastern Bering Sea bottom trawl survey (1998-2018).

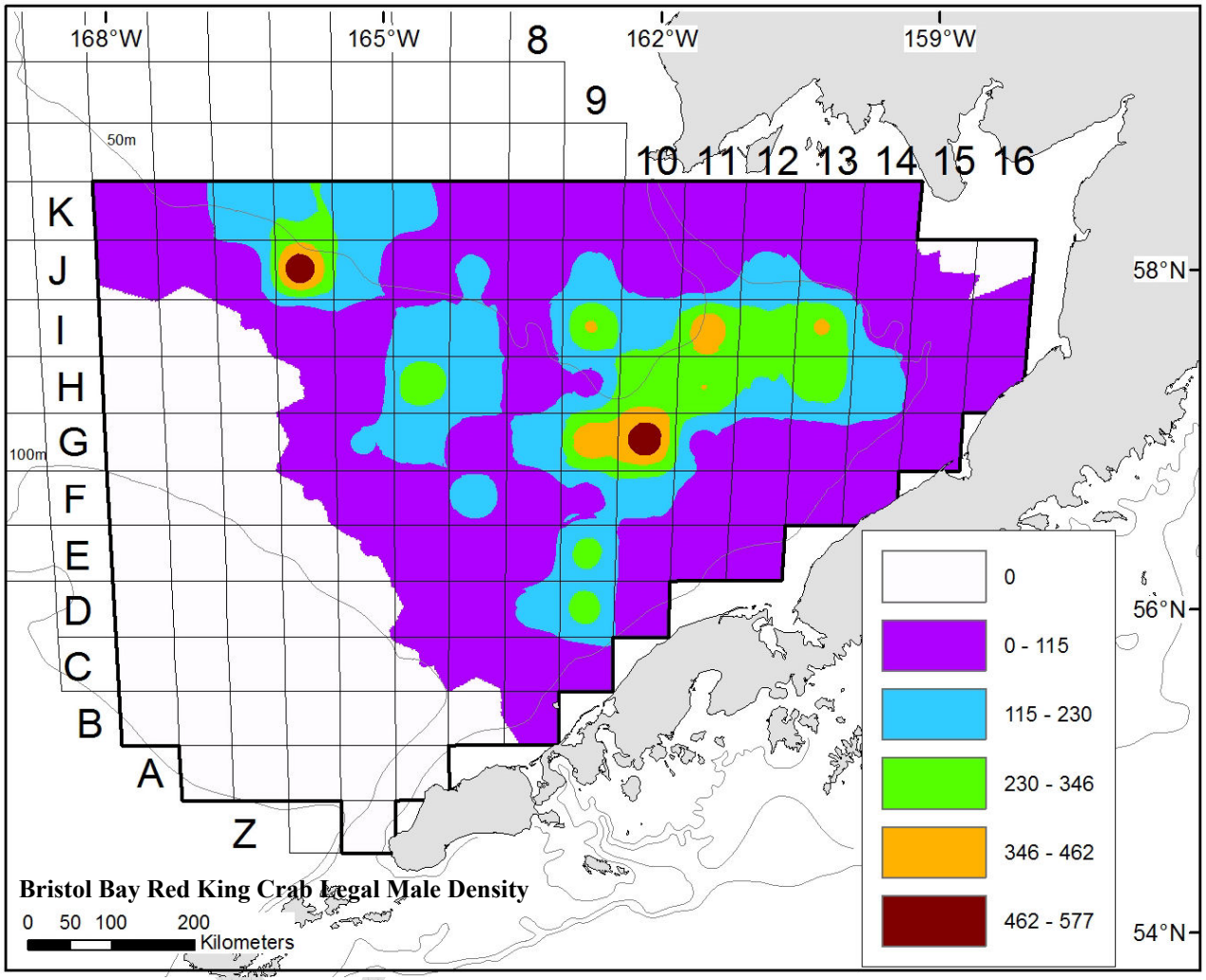

Figure 13. -- Total density (number nmi^{-2}) of legal-sized male red king crab (*Paralithodes camtschaticus*) at each station sampled in the 2018 Bristol Bay District. Outlined area depicts the management district.

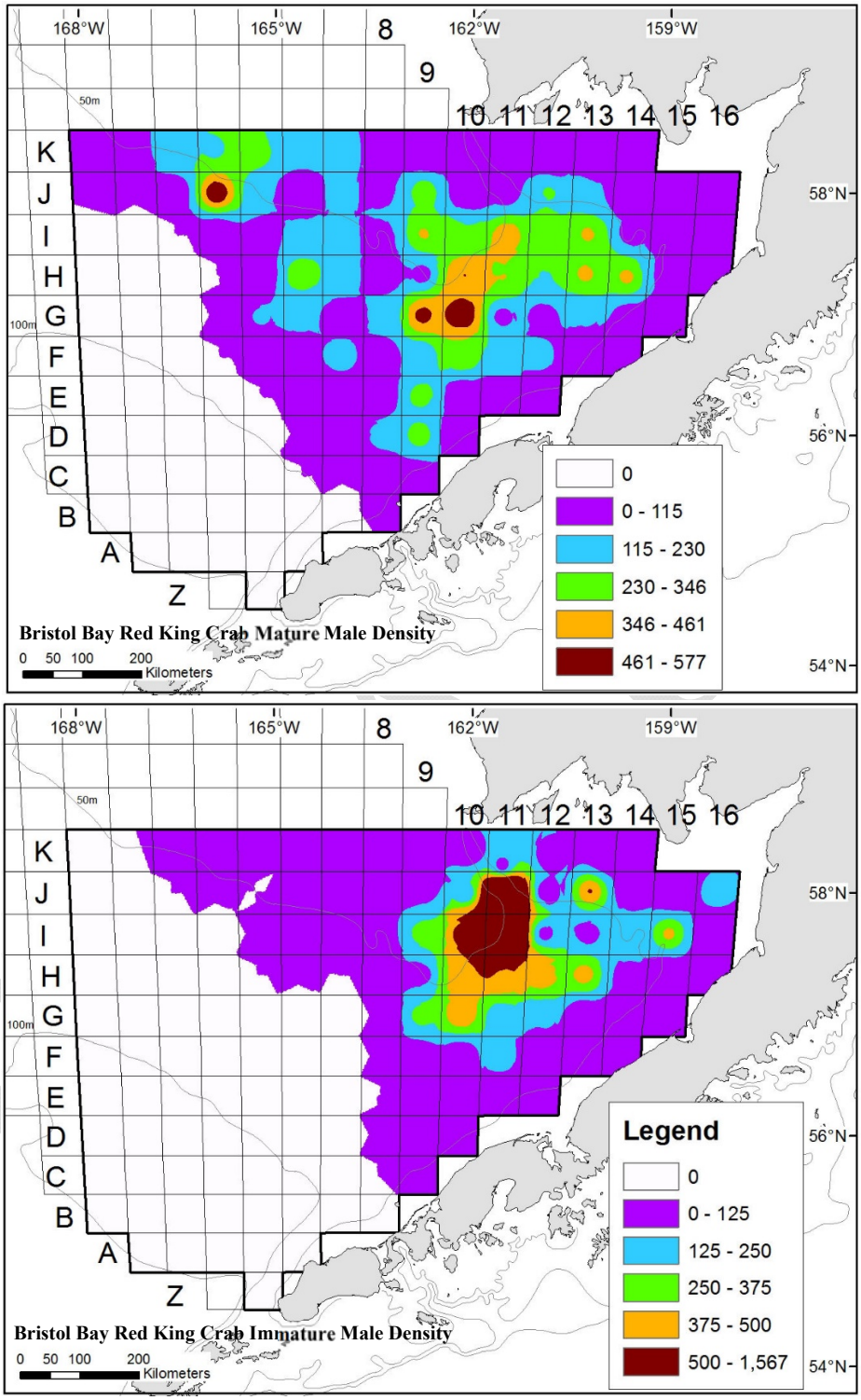

Figure 14. -- Total density (number nmi^{-2}) of mature male (top) and immature male (bottom) red king crab (*Paralithodes camtschaticus*) at each station sampled in the 2018 Bristol Bay District. Outlined area depicts the management district.

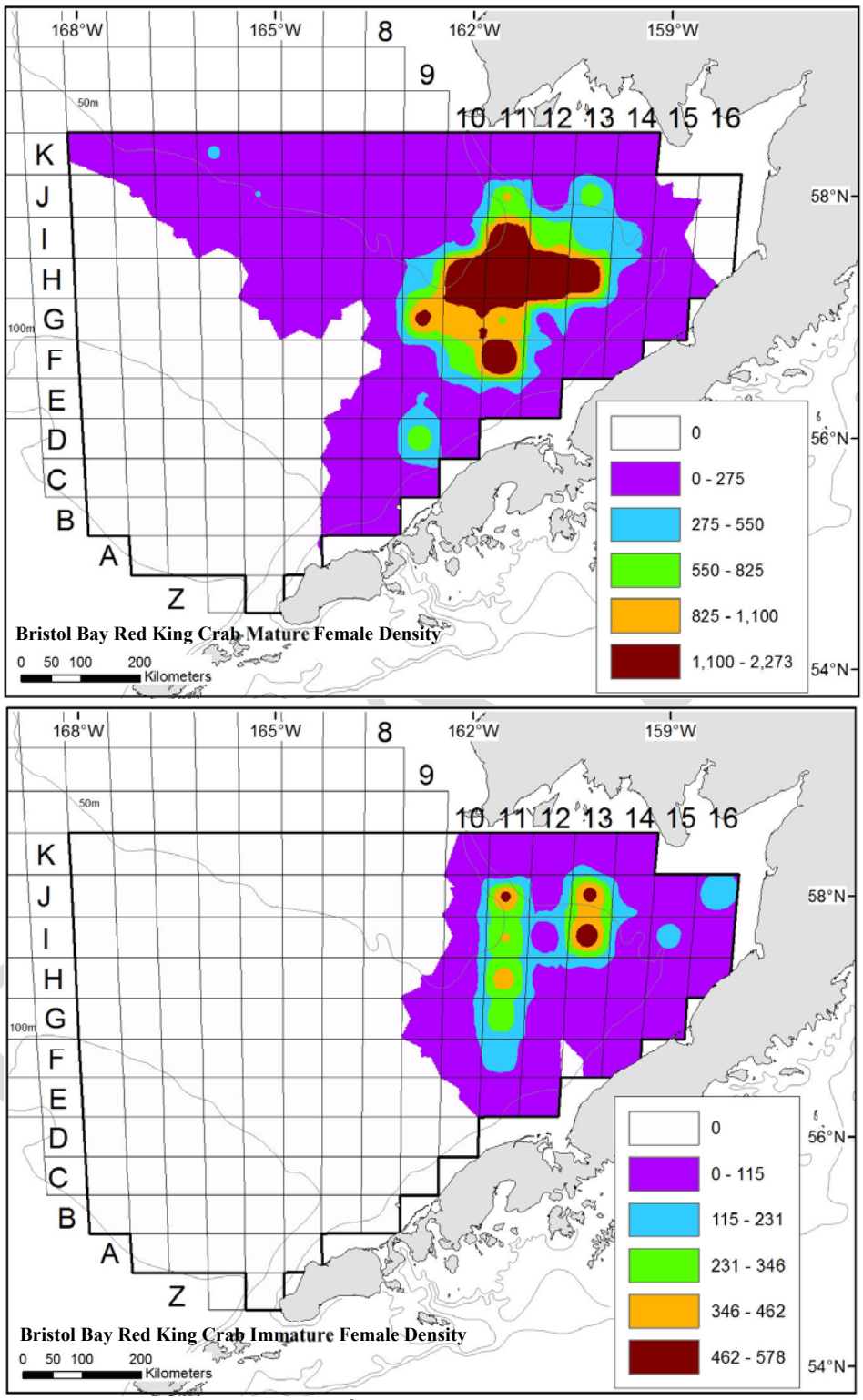

Figure 15. -- Total density (number nmi^{-2}) of mature female (top) and immature female (bottom) red king crab (*Paralithodes camtschaticus*) at each station sampled in the 2018 Bristol Bay District. Outlined area depicts the management district.

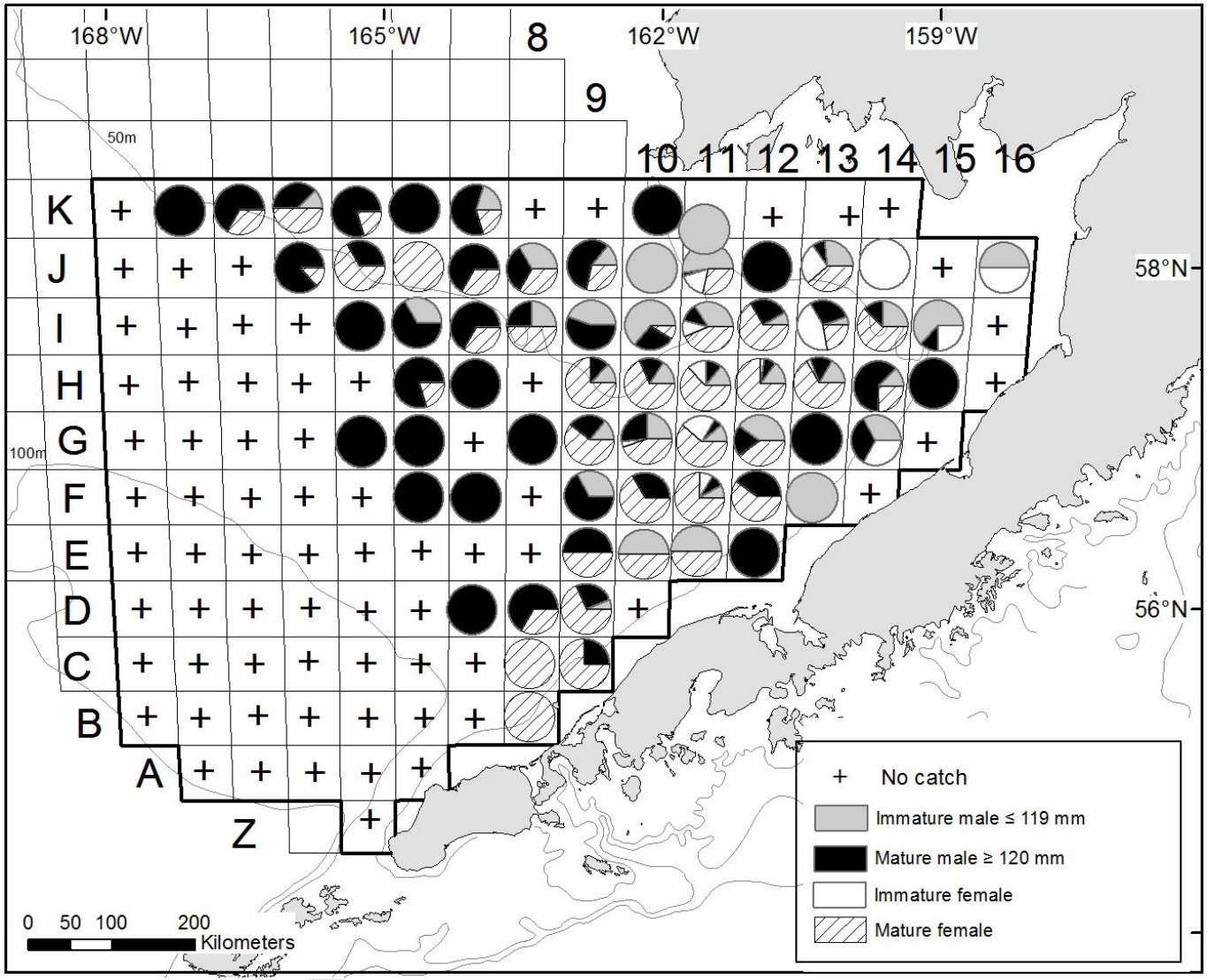

Figure 16. -- Percentage of male and female red king crab (*Paralithodes camtschaticus*) maturity classes caught at each station sampled in the 2018 Bristol Bay District. Outlined area depicts the management.

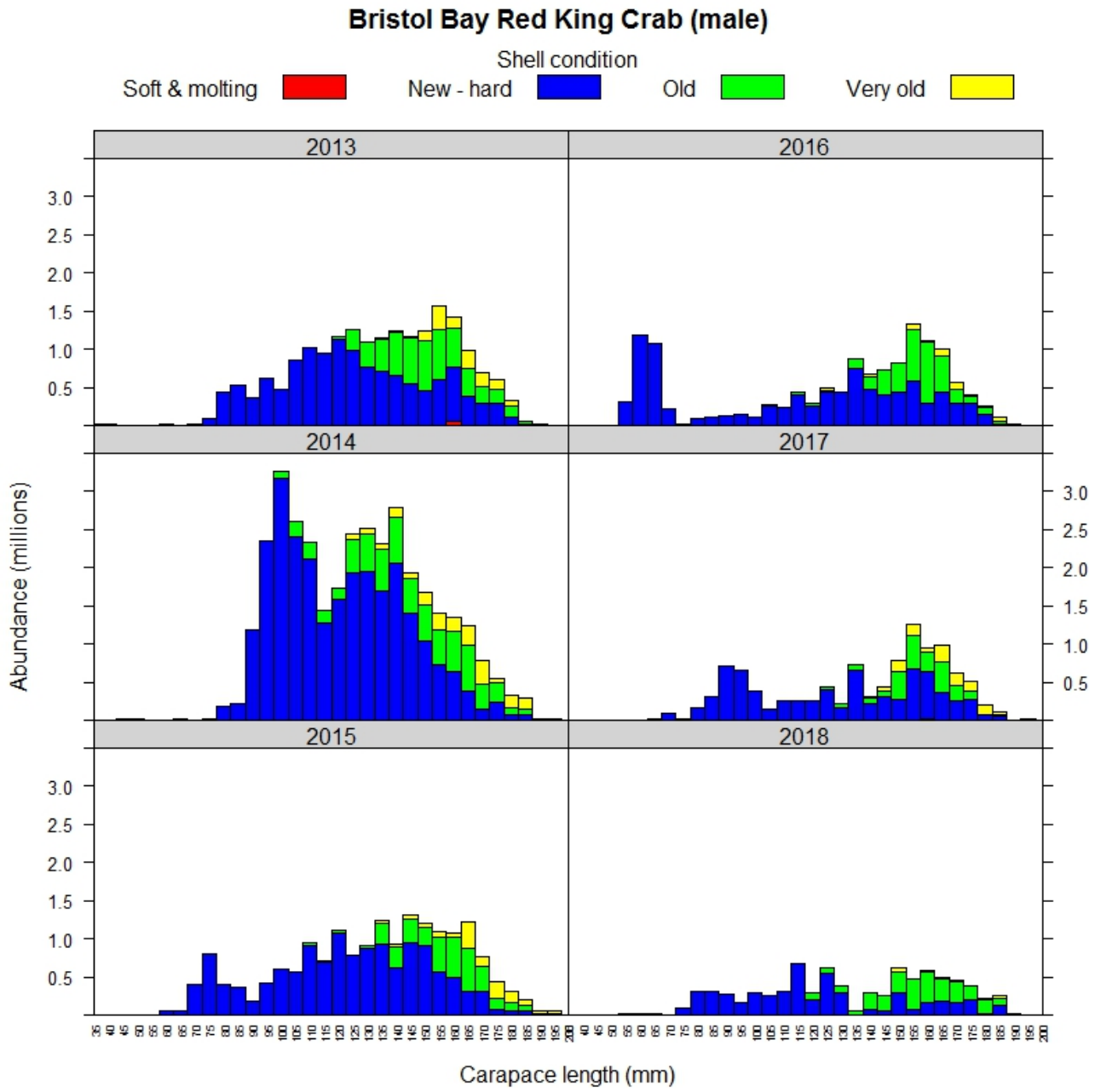

Figure 17. -- Size frequency by shell condition of Bristol Bay District male red king crab (*Paralithodes camtschaticus*) by 5 mm length classes, 2013-2018.

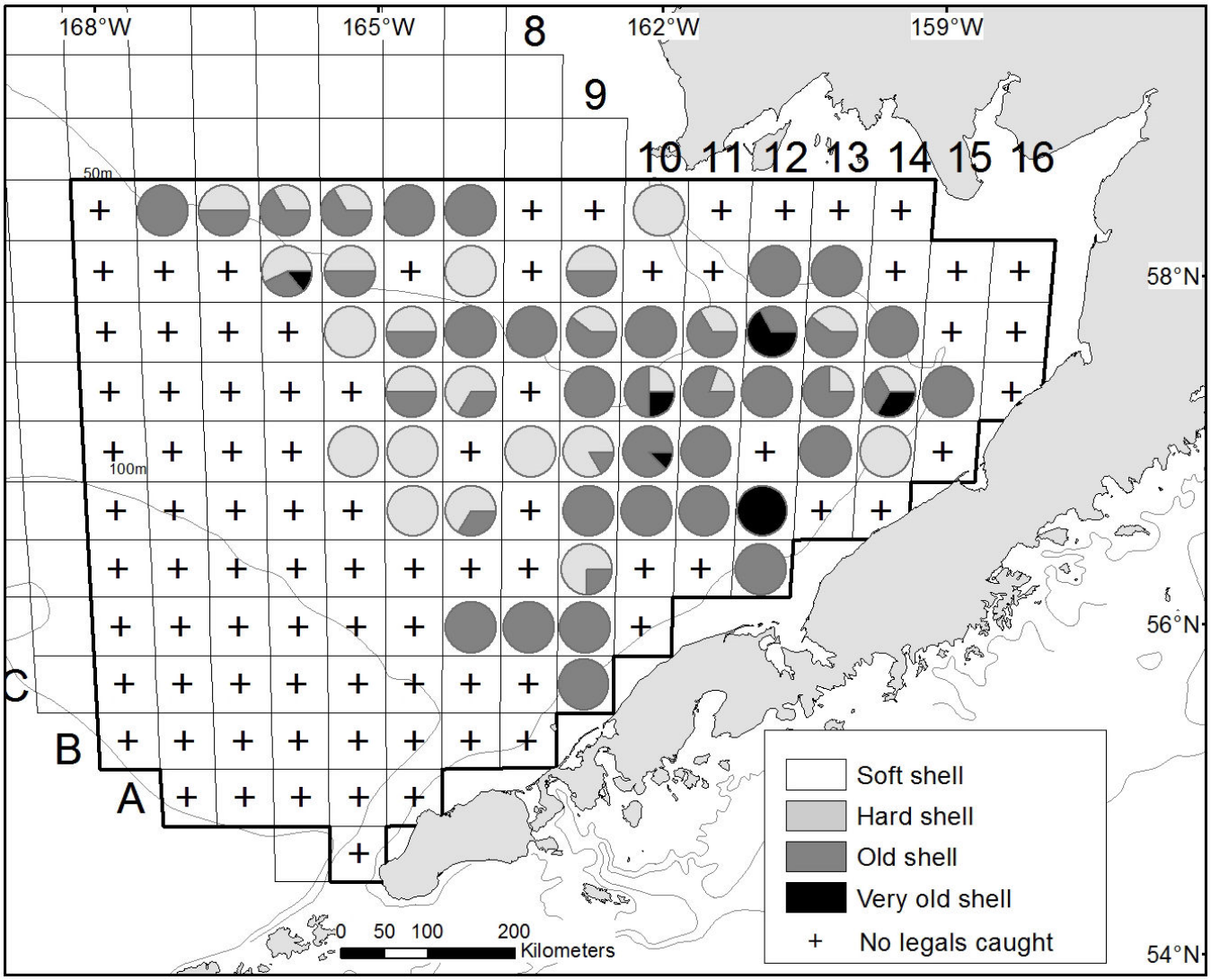

Figure 18. -- Distribution of legal-sized male red king crab (*Paralithodes camtschaticus*) caught at each station in the 2018 Bristol Bay District distinguished by shell condition. The outlined area depicts management district.

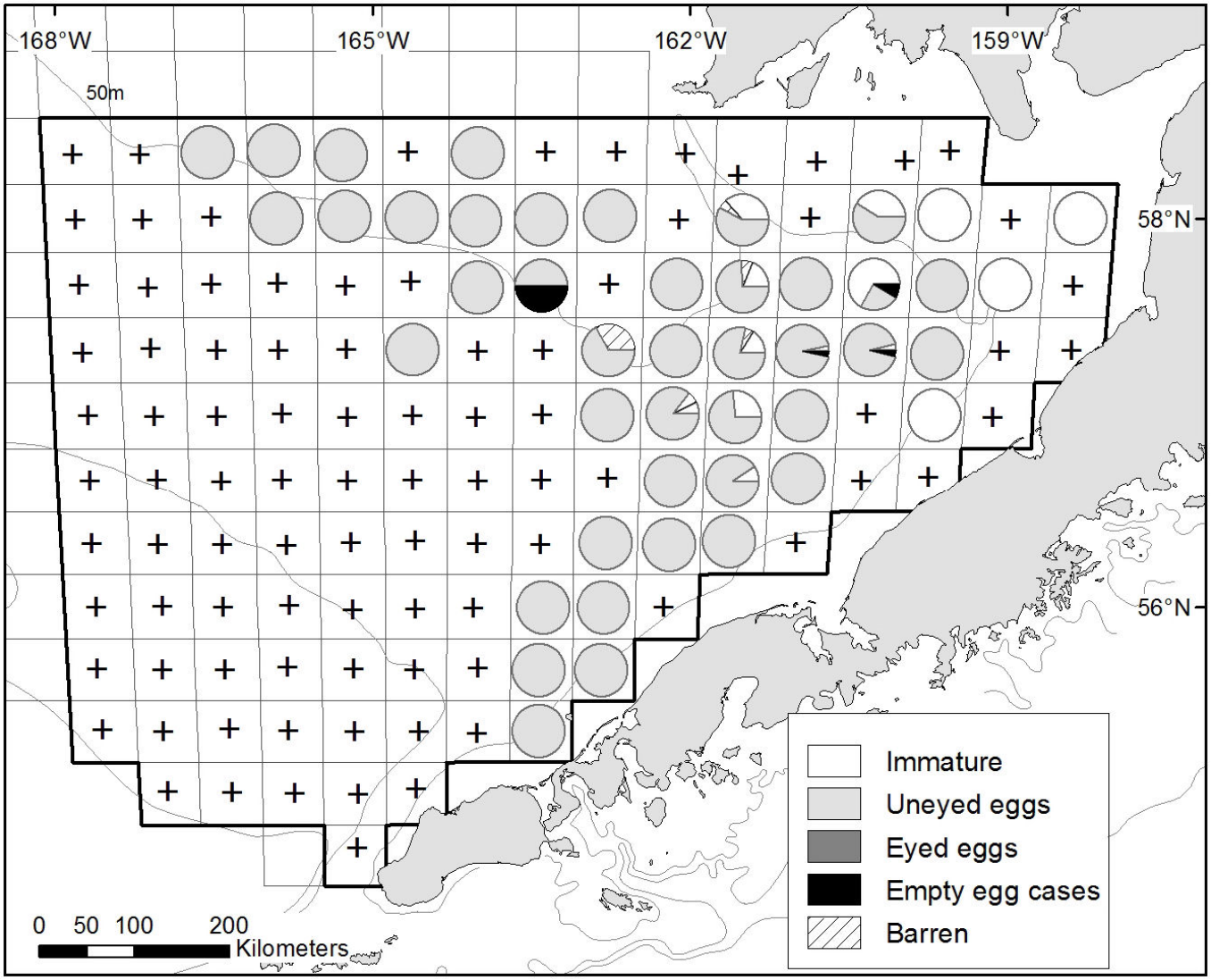

Figure 18a. -- Distribution and egg condition of female red king crab (*Paralithodes camtschaticus)* caught at each station in Bristol Bay District in 2018. The outlined area depicts management district.

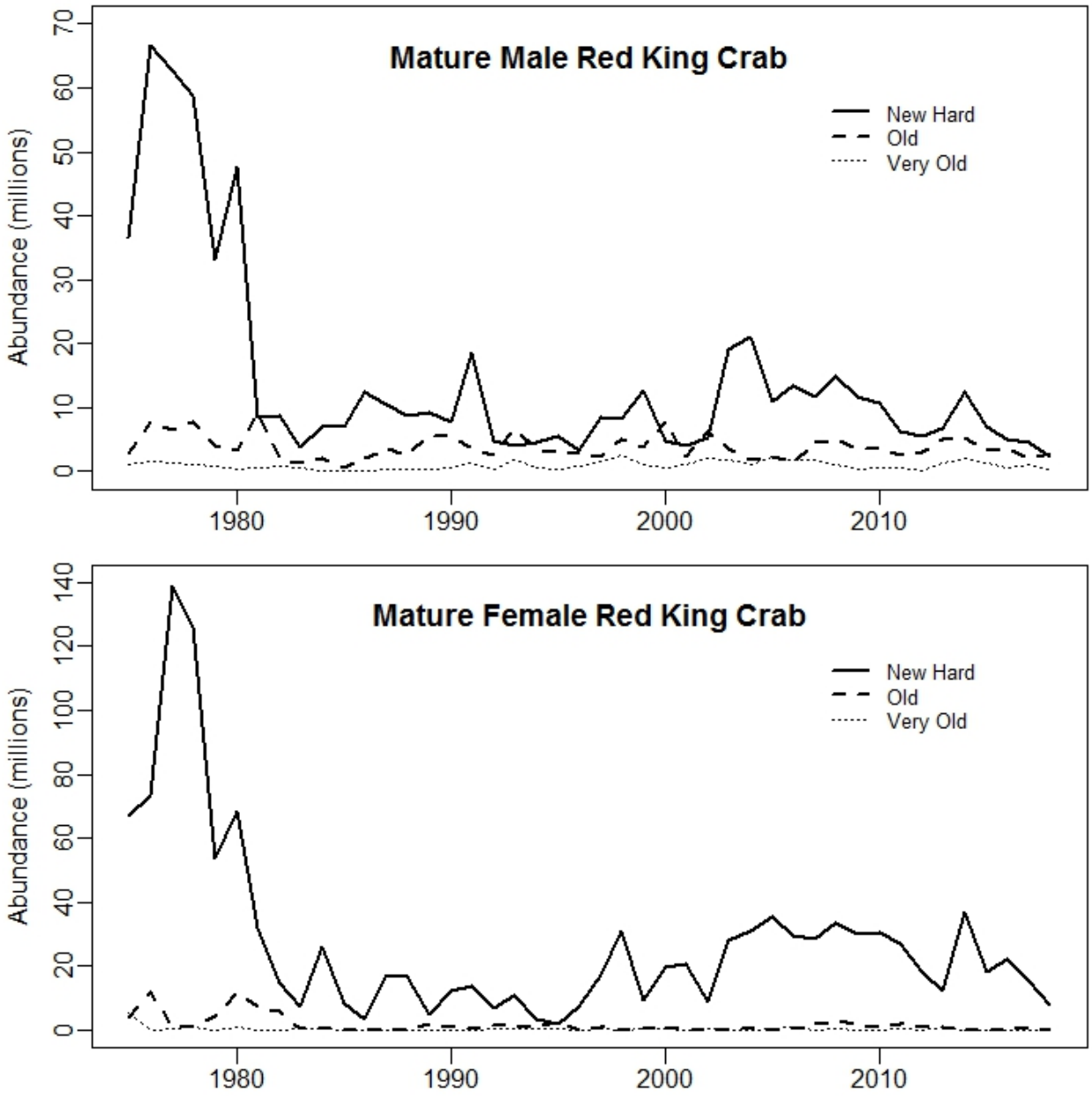

Figure 19. -- Time series of mature male (≥120 mm CL) and female (actual maturity) Bristol Bay District red king crab (*Paralithodes camtschaticus*) by shell condition, 1975-2018. New- Hard = shell condition 2; Old = shell condition 3; Very Old = shell condition 4 and 5 combined.

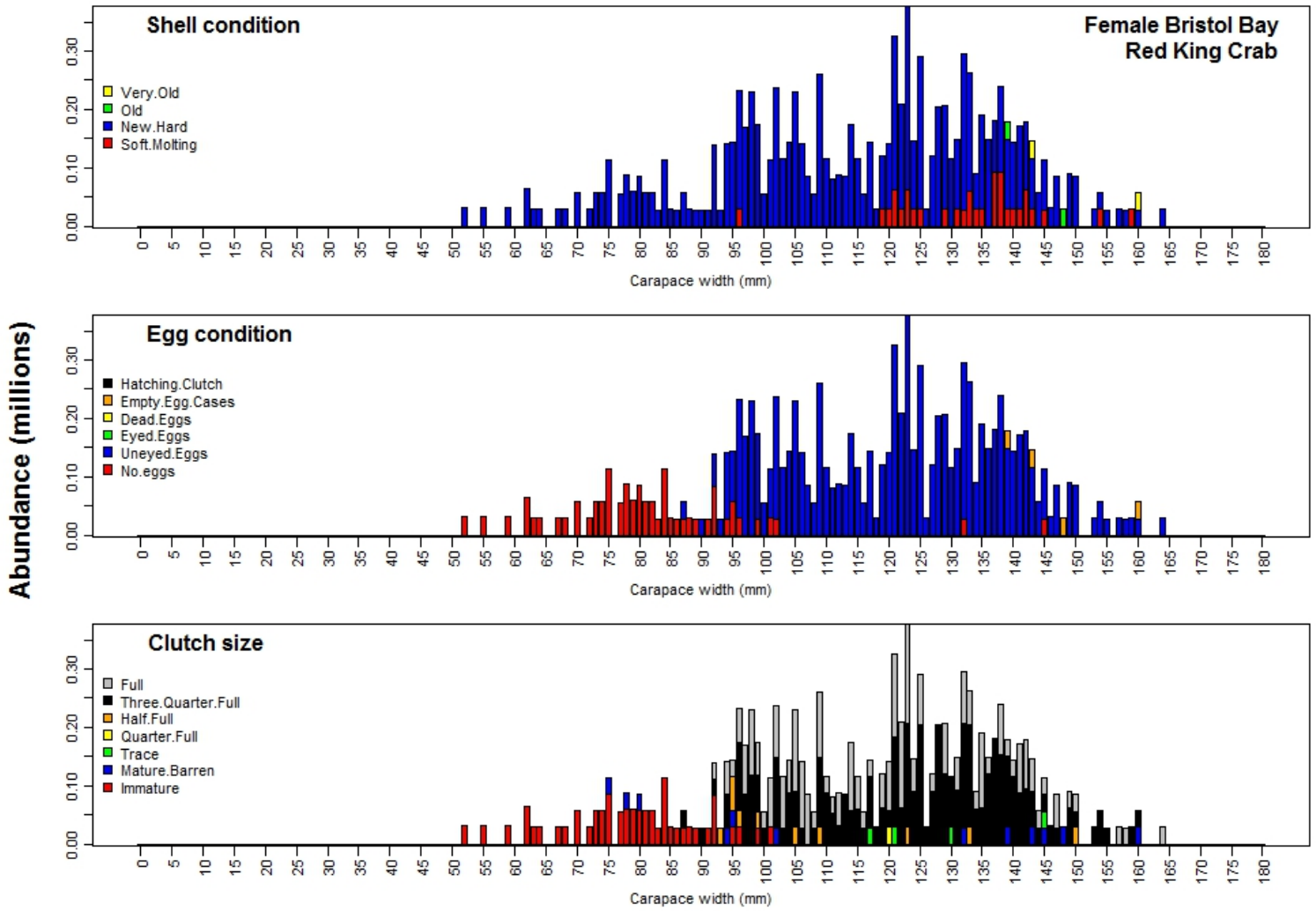

Figure 20. -- Size frequency by shell condition, egg condition, and clutch fullness of Bristol Bay District female red king crab (*Paralithodes camtschaticus*) by 1 mm length classes in 2018.

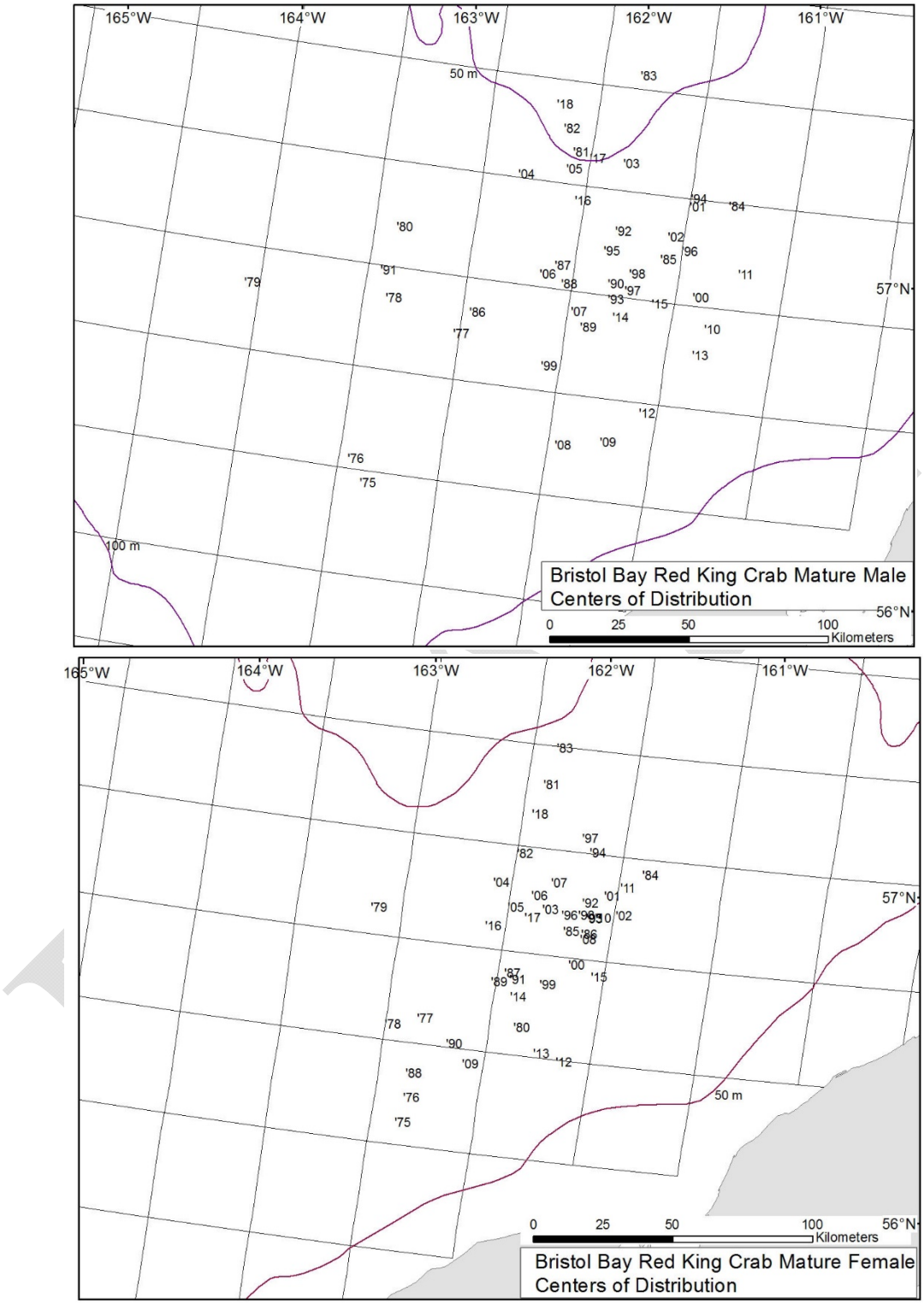

Figure 21. -- Centers of stock distribution of Bristol Bay District mature male and female red king crab (*Paralithodes camtschaticus*) from 1975 to 2018.

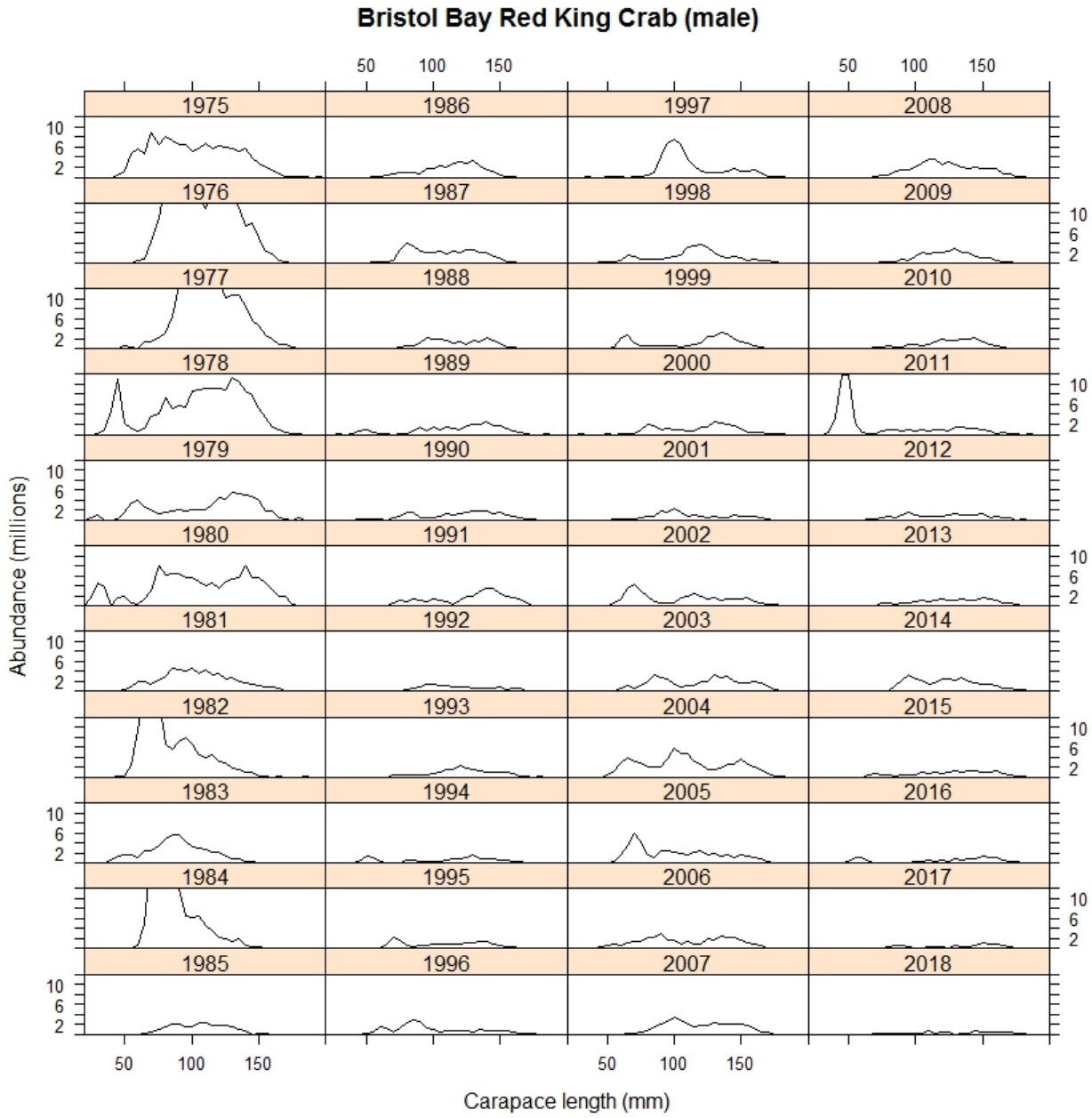

Figure 22. -- Historical size frequency by 5 mm length classes of Bristol Bay District male red king crab (*Paralithodes camtschaticus*), 1975 to 2018.

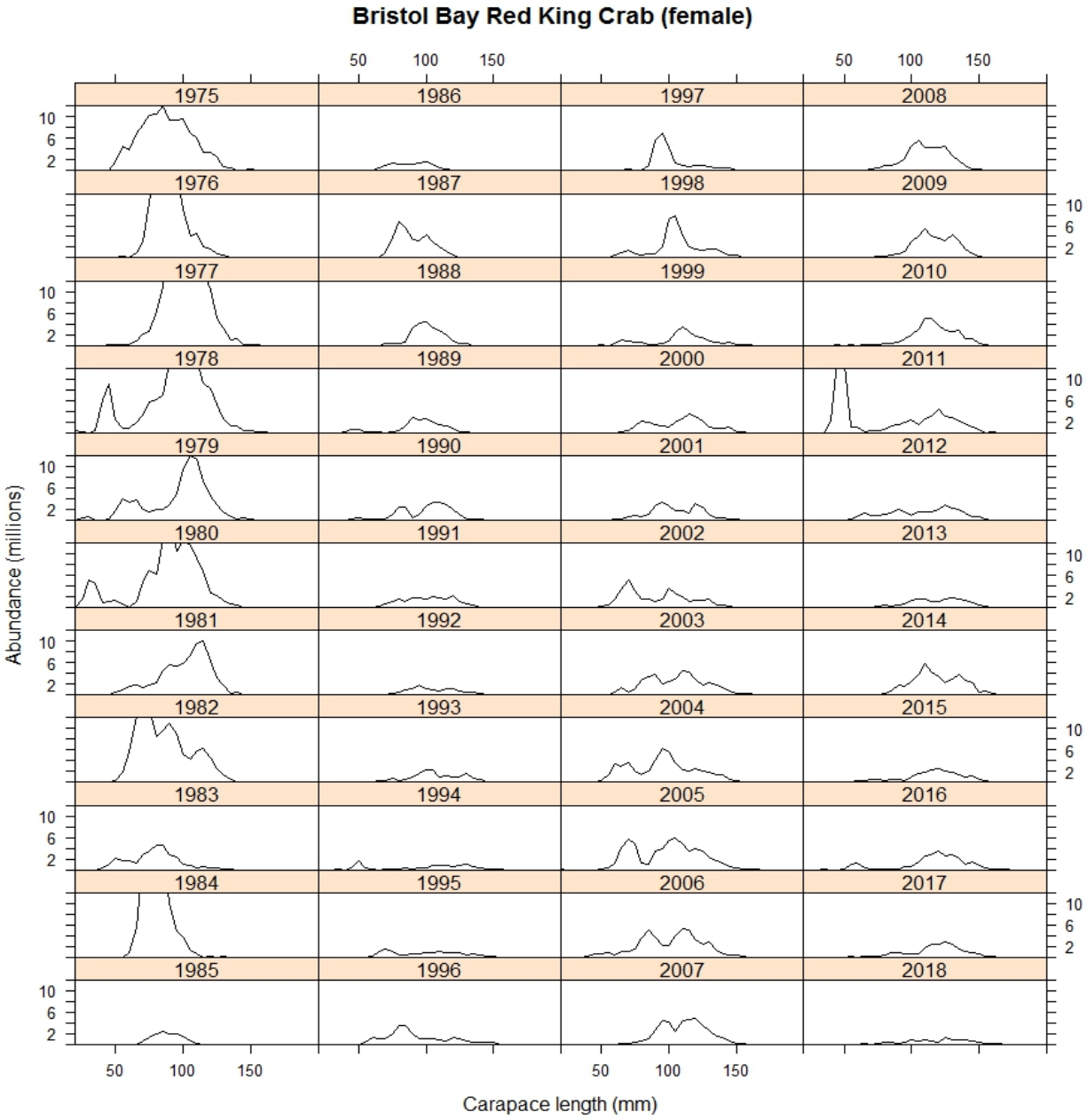

Figure 23. -- Historical size frequency by 5 mm length classes of Bristol Bay District female red king crab (*Paralithodes camtschaticus*), 1975 to 2018.

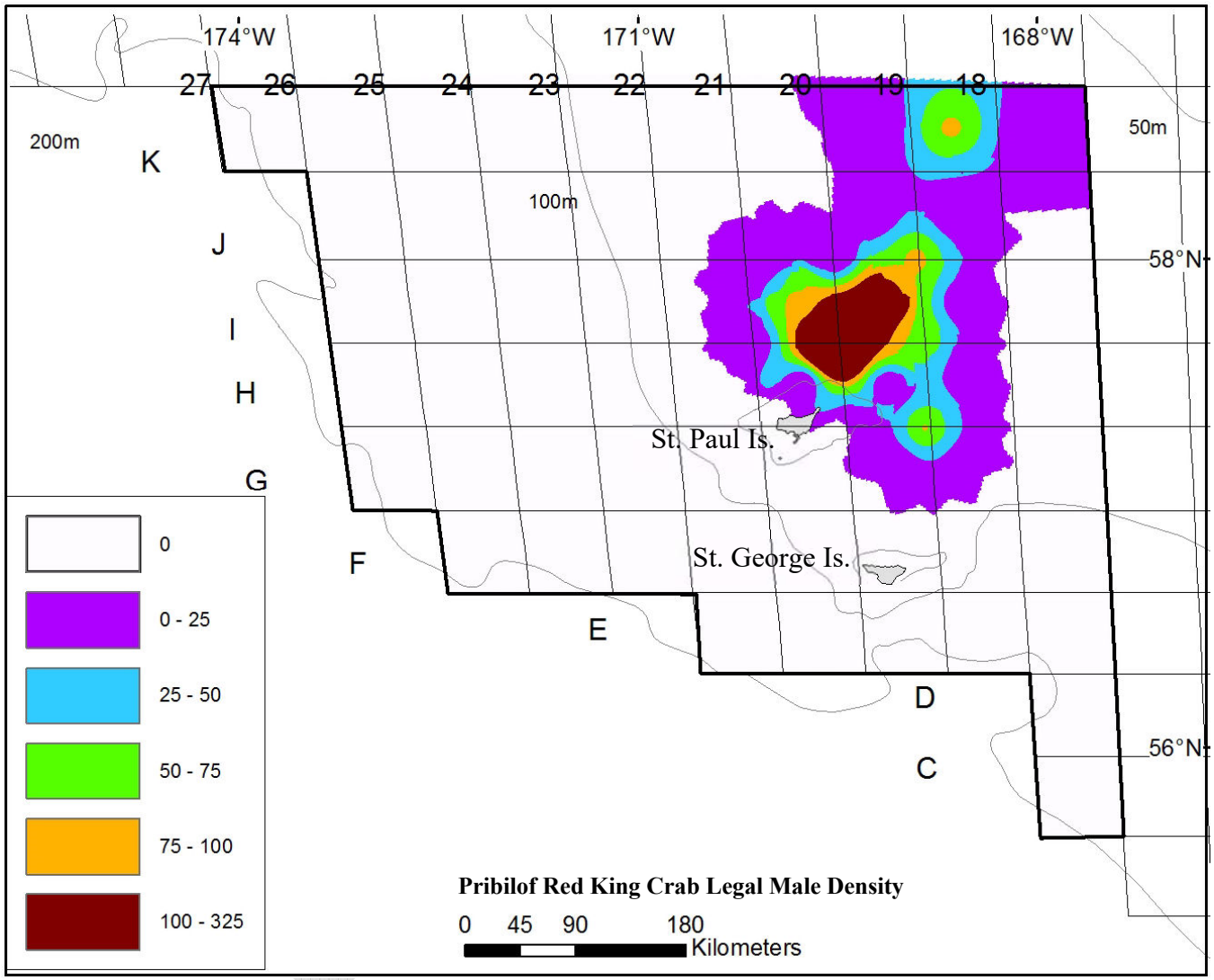

Figure 24. -- Total density (number nmi^{-2}) of legal-sized red king crab (*Paralithodes camtschaticus*) at each station sampled in the Pribilof District in 2018. The outlined area depicts stations within the management district.

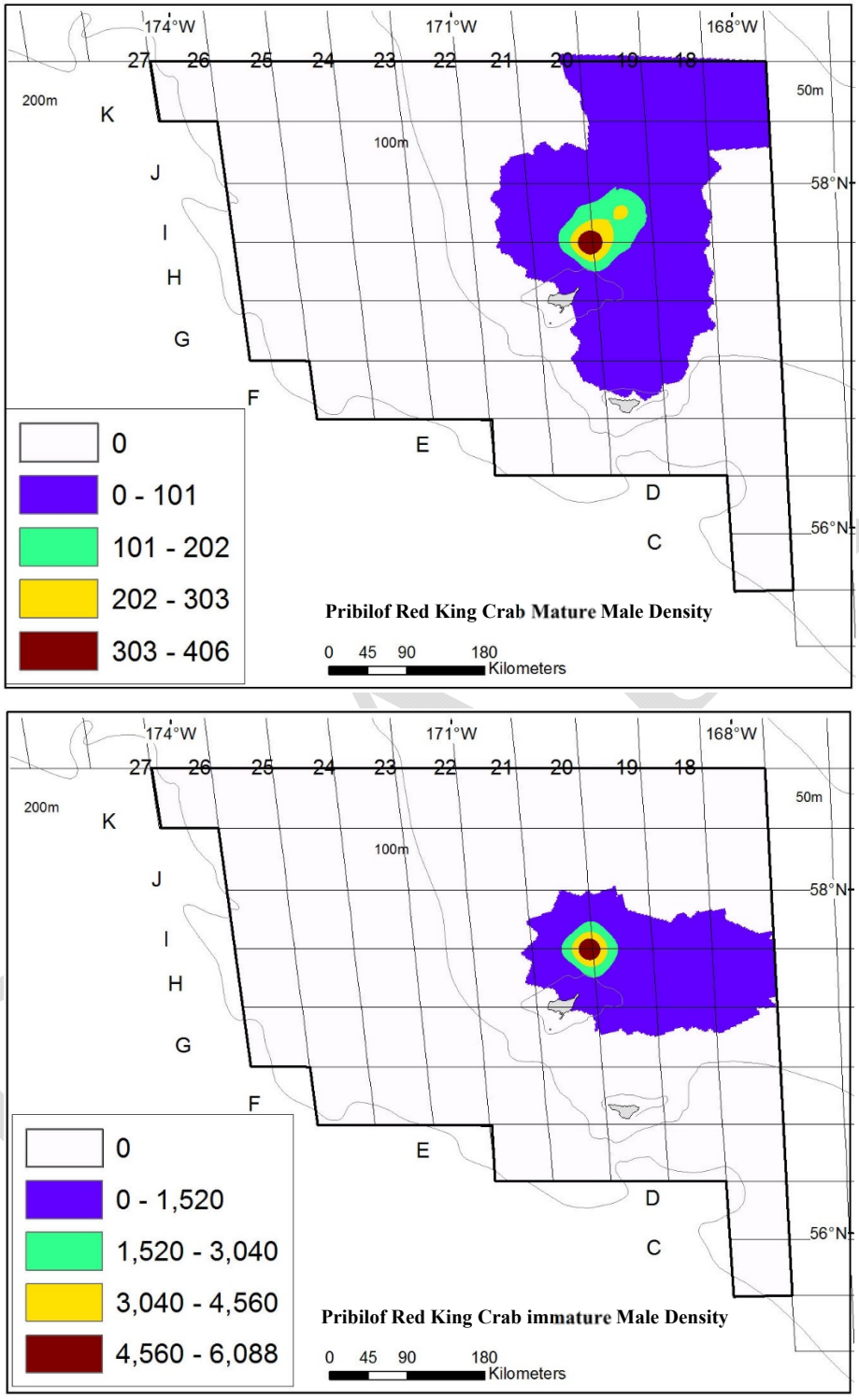

Figure 25. -- Total density (number nmi^{-2}) of mature male (top) and immature male (bottom) red king crab (*Paralithodes camtschaticus*) at each station sampled in the Pribilof District in 2018. The outlined area depicts stations within the management district.

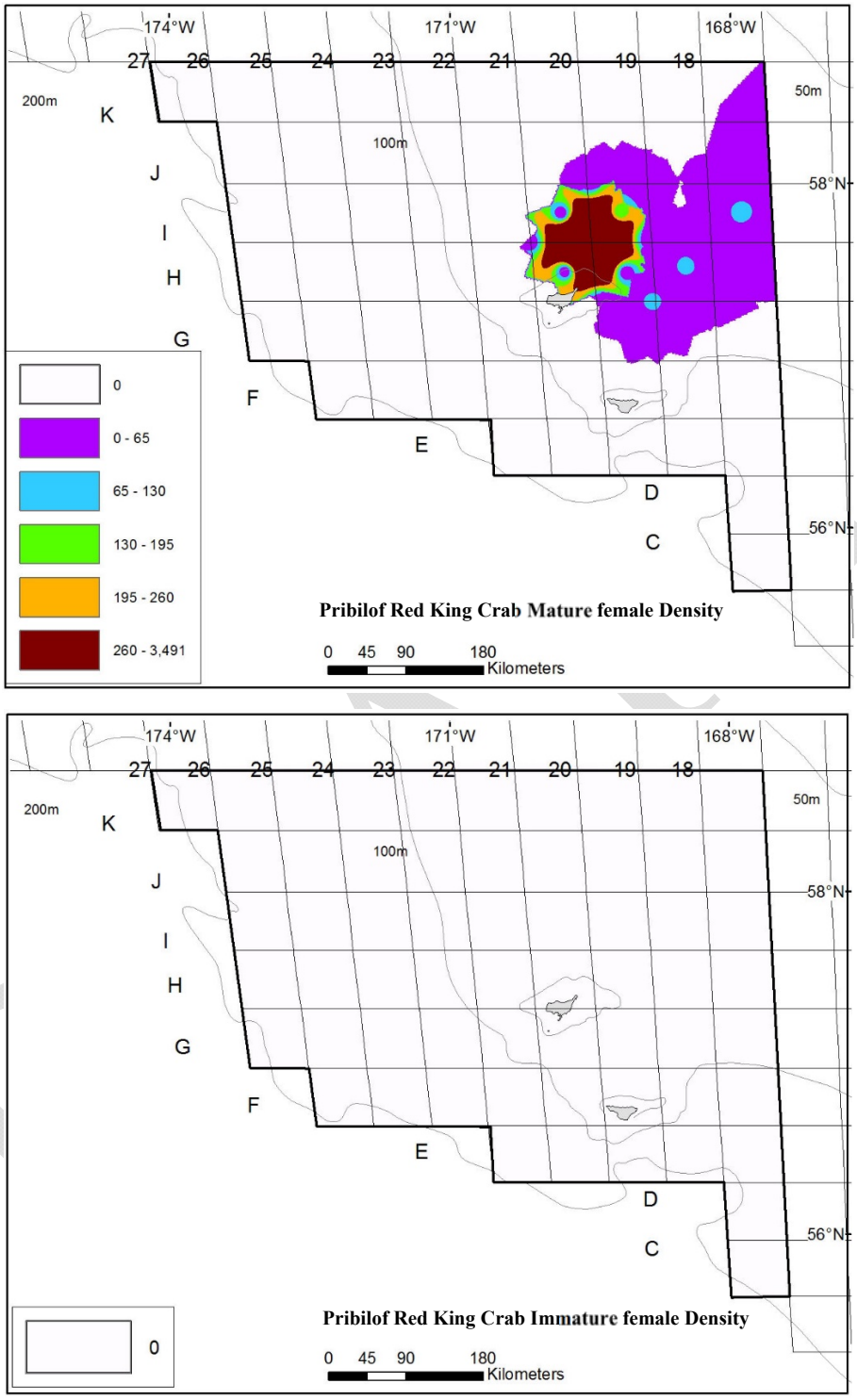

Figure 26. -- Total density (number nmi^{-2}) of mature female (top) and immature female (bottom) red king crab (*Paralithodes camtschaticus*) at each station sampled in the Pribilof District in 2018. The outlined area depicts stations within the management district. Note that there were no immature female red king crab caught in 2018.

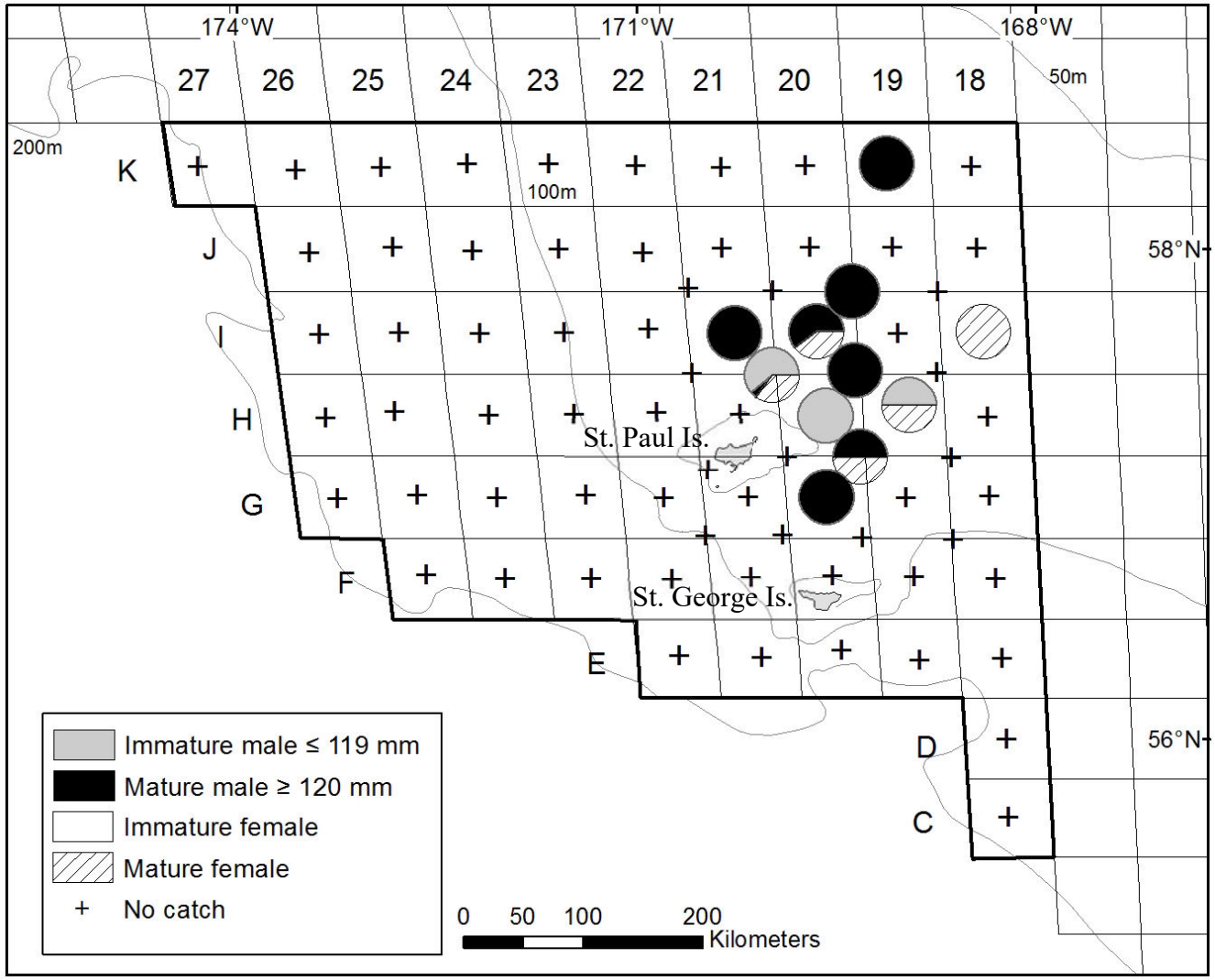

Figure 27. -- Percentage of male and female red king crab (*Paralithodes camtschaticus*) maturity classes at each station of the Pribilof District in 2018. The outlined area depicts stations within the management district.

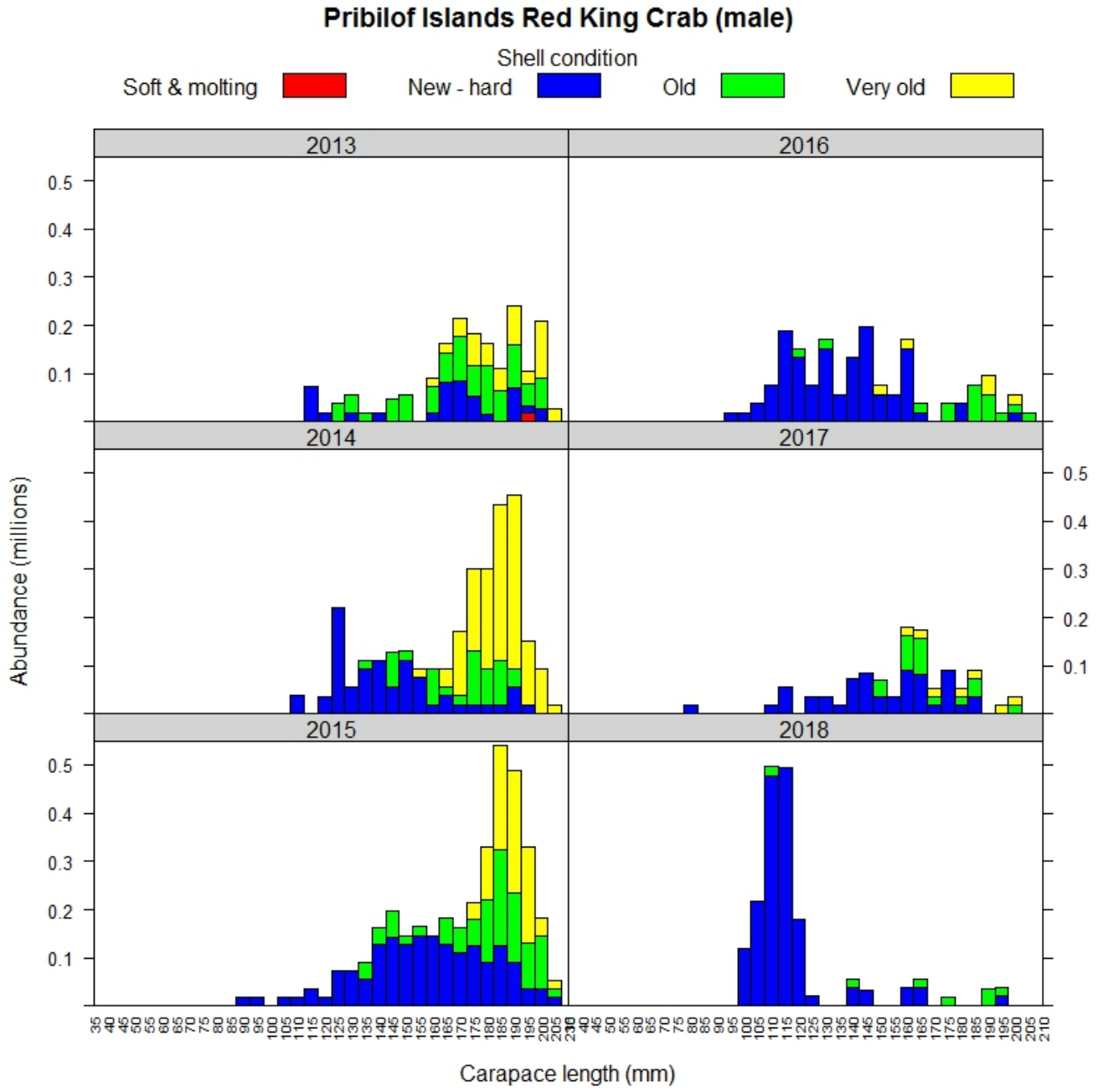

Figure 28. -- Size frequency by shell condition of Pribilof District male red king crab (*Paralithodes camtschaticus*) by 5 mm length classes, 2013-2018.

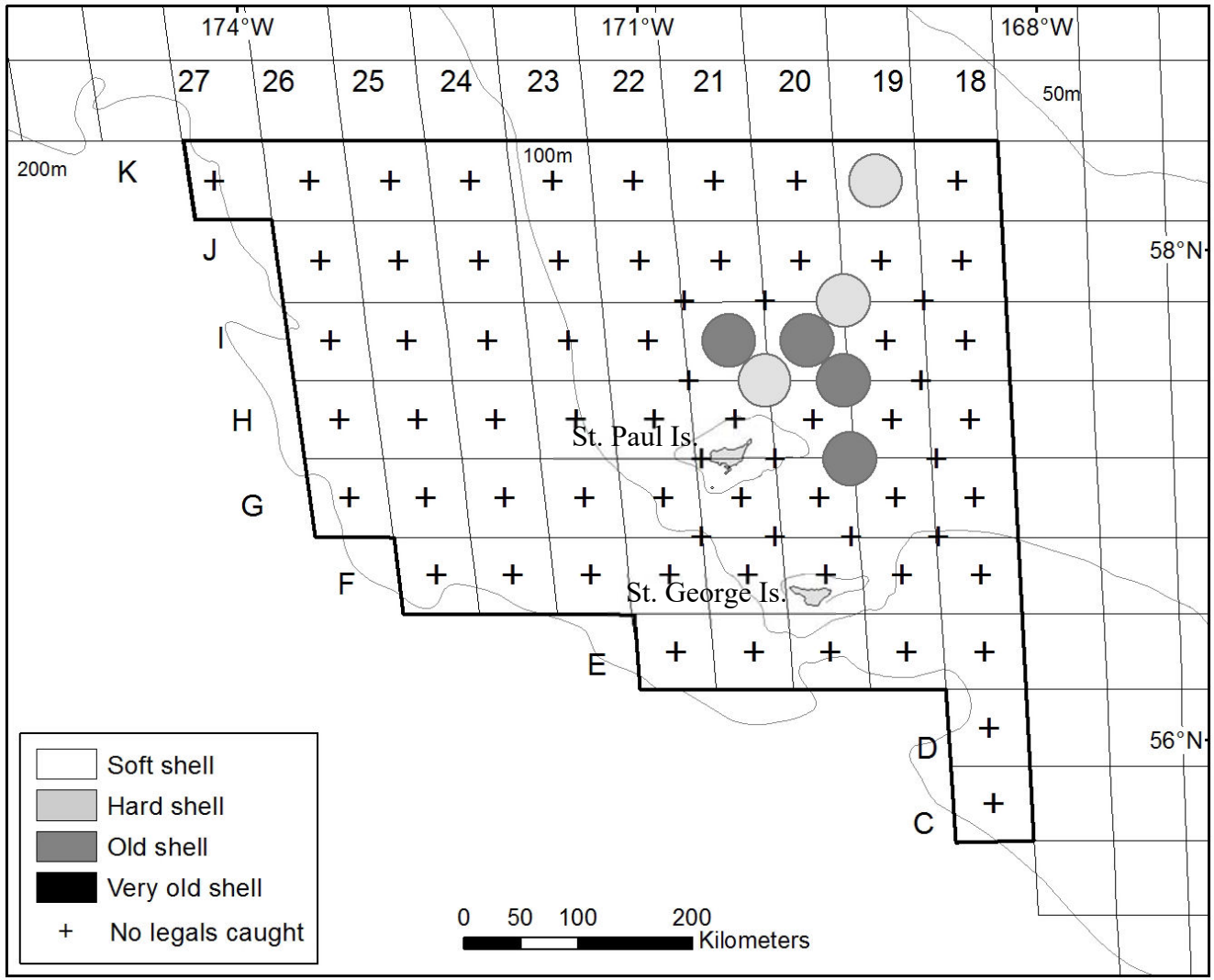

Figure 29. -- Distribution of legal-sized male red king crab (*Paralithodes camtschaticus*) caught at each station of the Pribilof District in 2018 and distinguished by shell condition. The outlined area depicts stations within the management district.

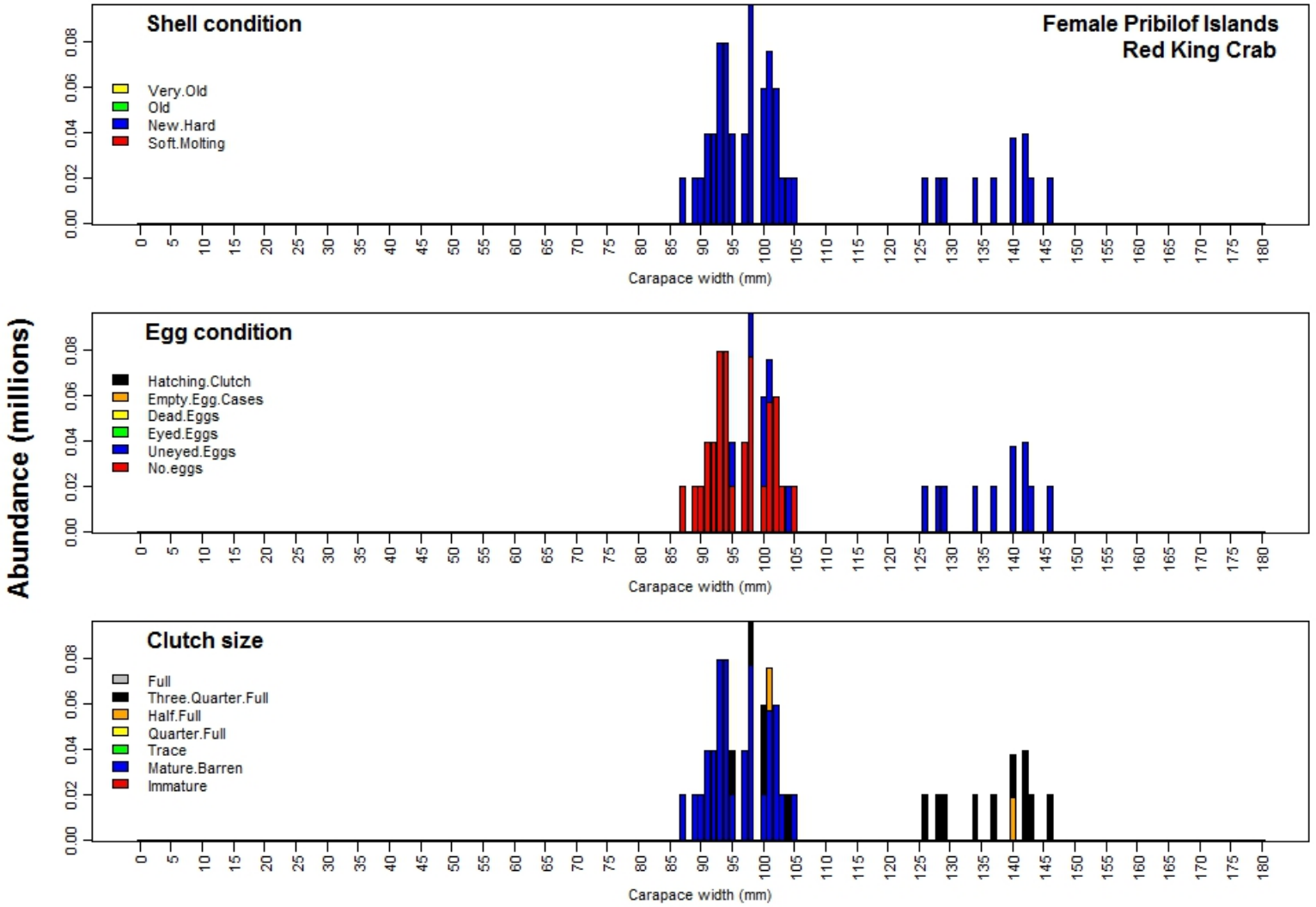

Figure 30. -- Size frequency by shell condition, egg condition, and clutch fullness of Pribilof District female red king crab (*Paralithodes camtschaticus*) by 1 mm length classes in 2018.

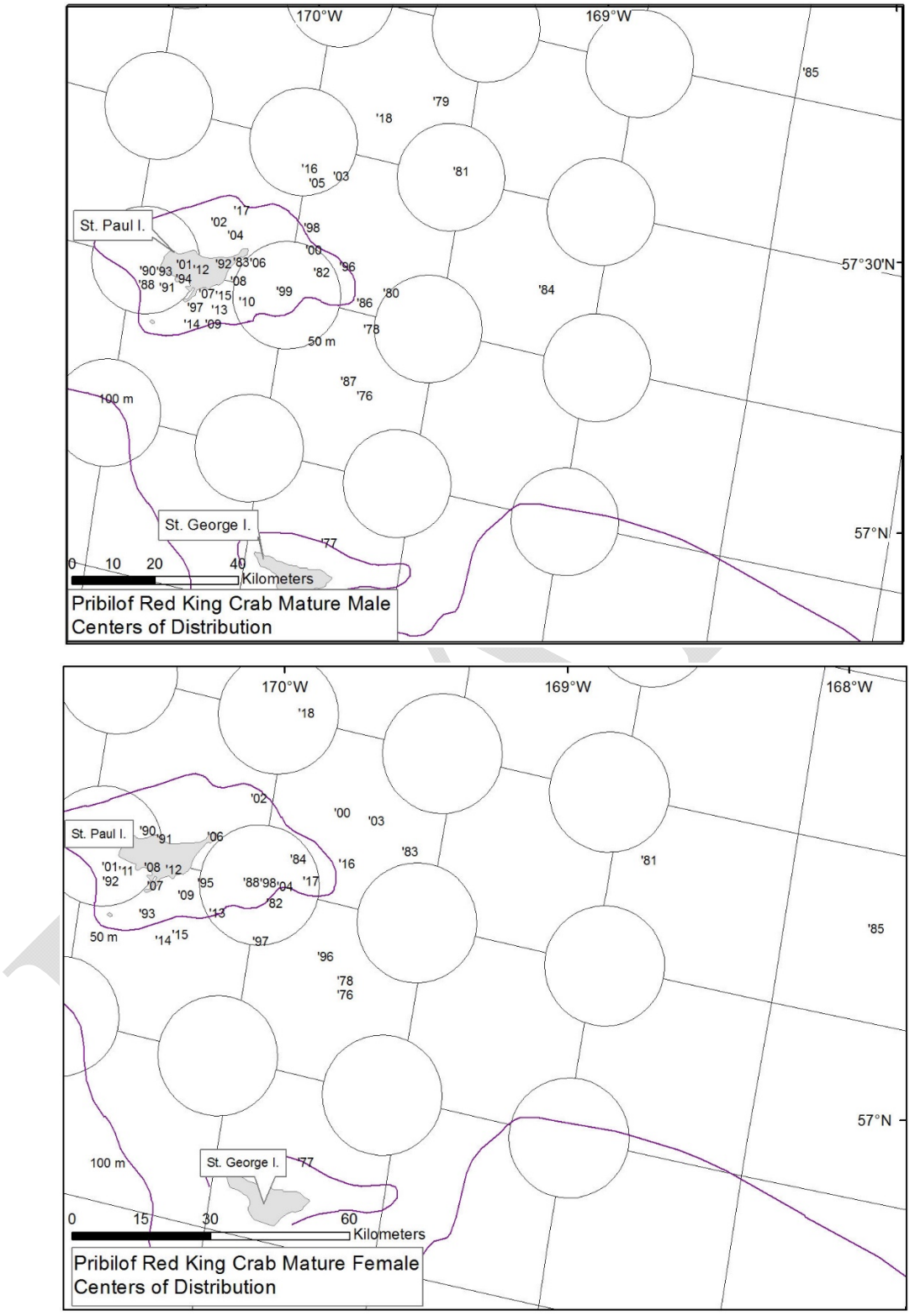

Figure 31. -- Centers of stock distribution of Pribilof Islands mature male and female red king crab (*Paralithodes camtschaticus*) from 1975 to 2018.

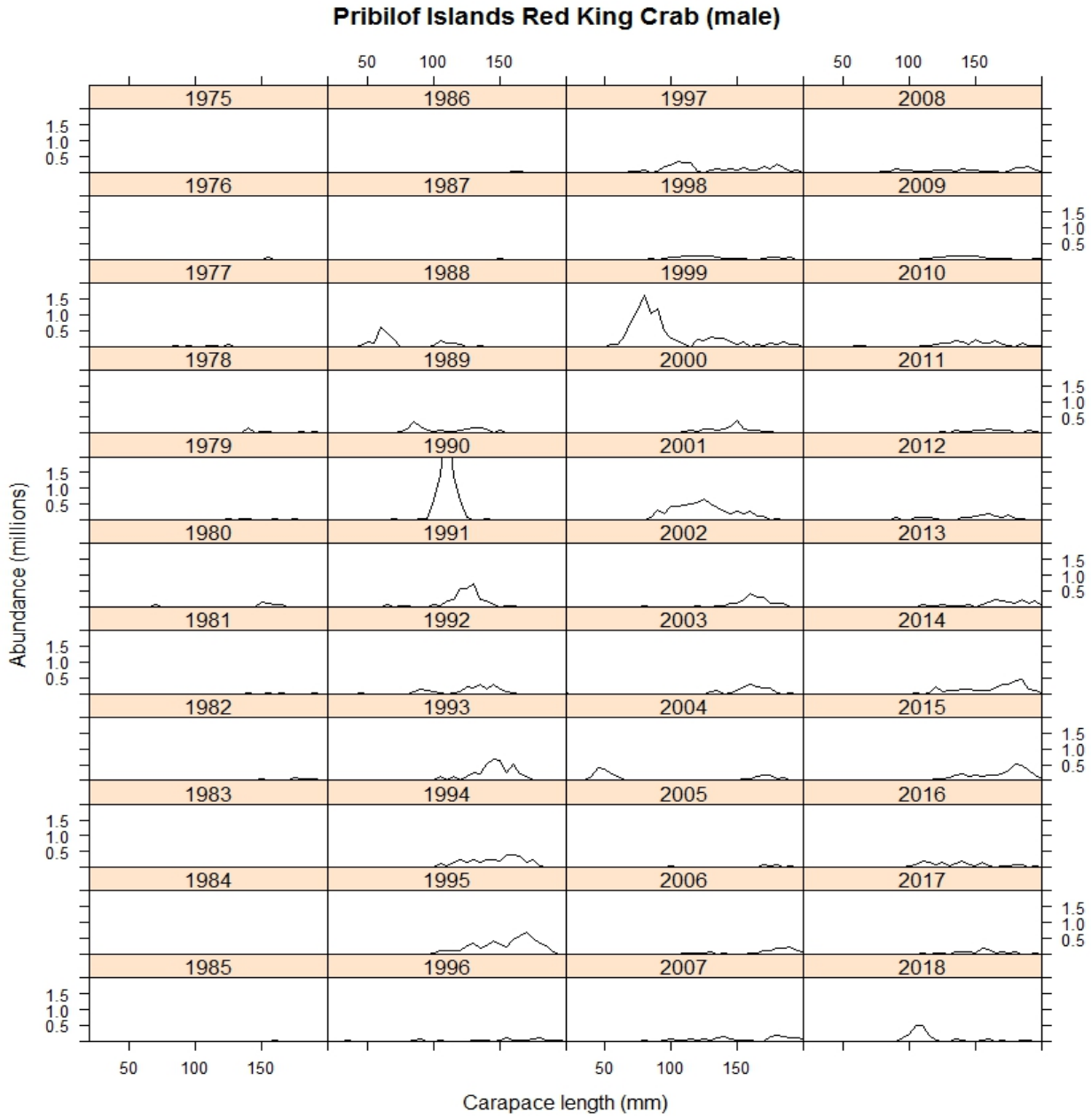

Figure 32. -- Size frequency by 5 mm length classes of Pribilof Islands male red king crab (*Paralithodes camtschaticus*) from 1975 to 2018.

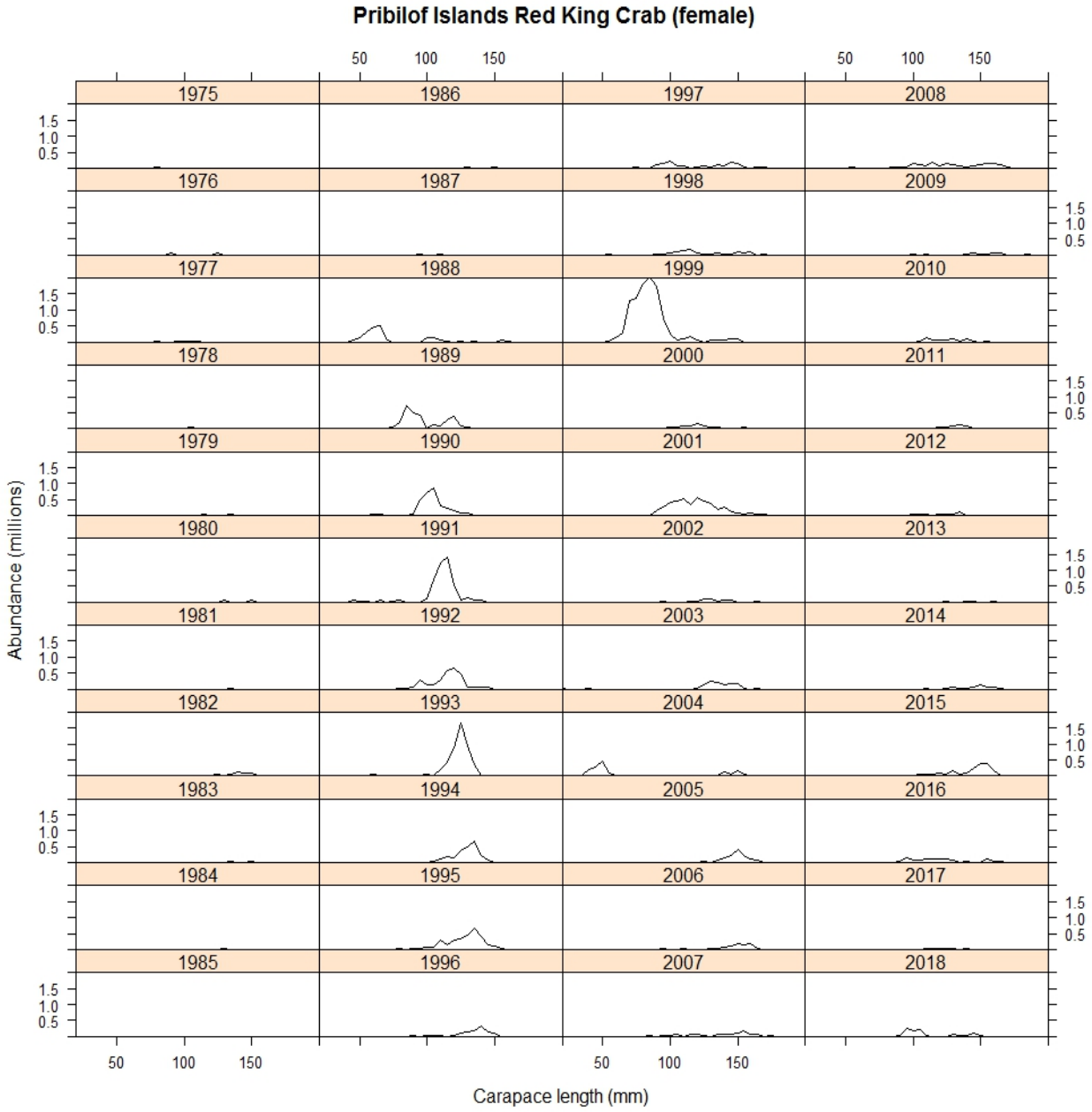

Figure 33. -- Size frequency by 5 mm length classes of Pribilof Islands female red king crab (*Paralithodes camtschaticus*) from 1975 to 2018.

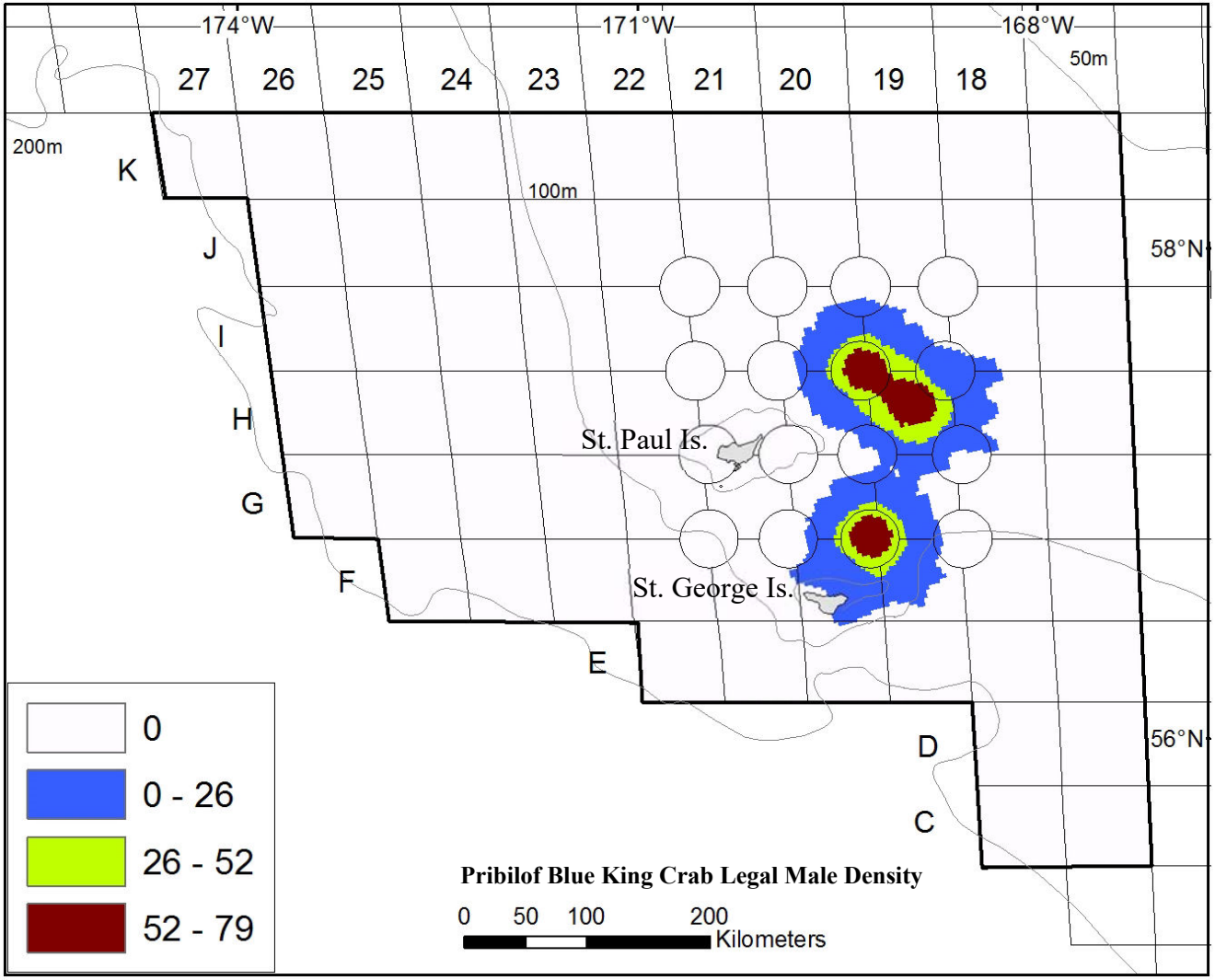

Figure 34. -- Total density (number nmi^{-2}) of legal-sized blue king crab (*Paralithodes platypus*) at each station sampled in the Pribilof District in 2018. The outlined area depicts the management district as defined by ADF&G.

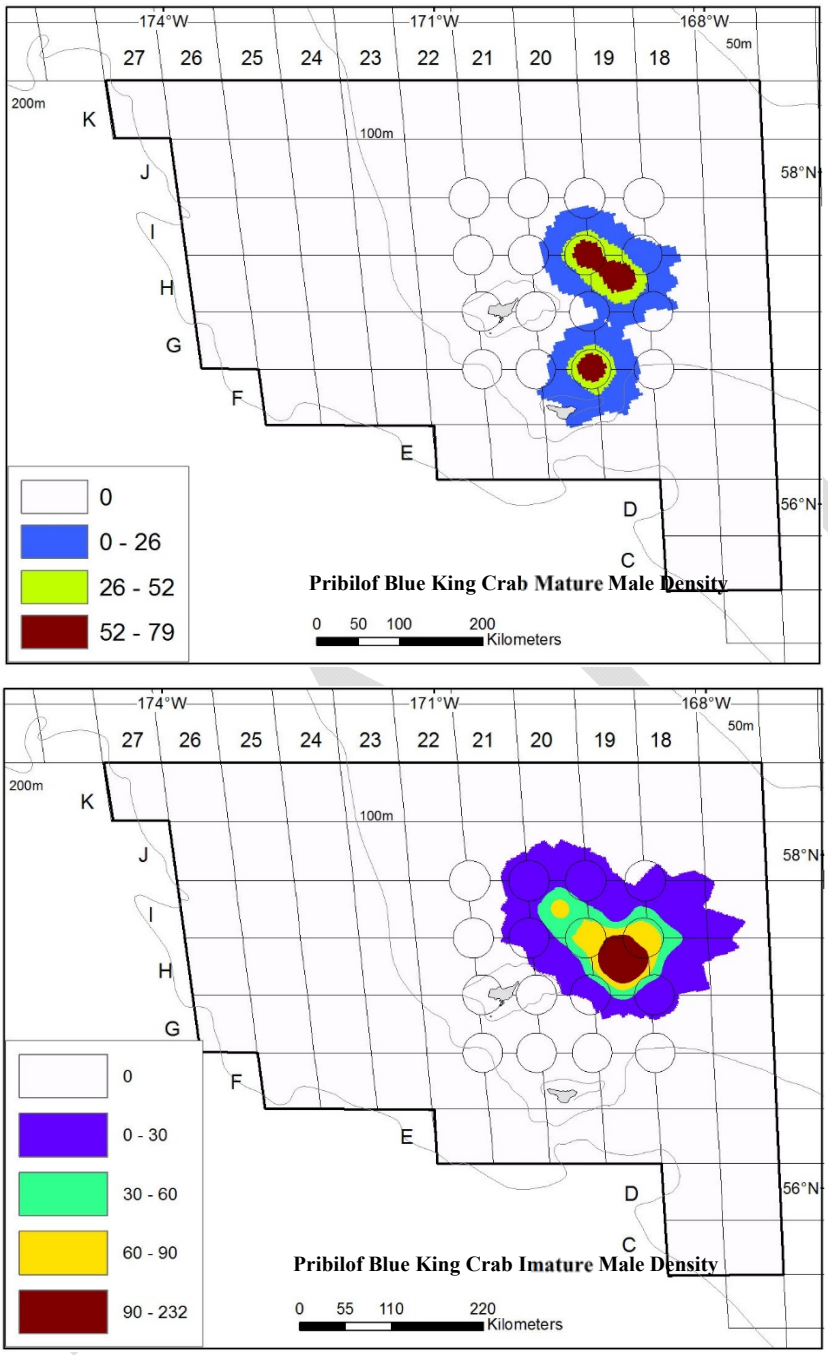

Figure 35. -- Total density (number nmi^{-2}) of mature male (top) and immature male (bottom) blue king crab (*Paralithodes platypus*) at each station sampled in the Pribilof District in 2018. The outlined area depicts the management district as defined by ADF&G.

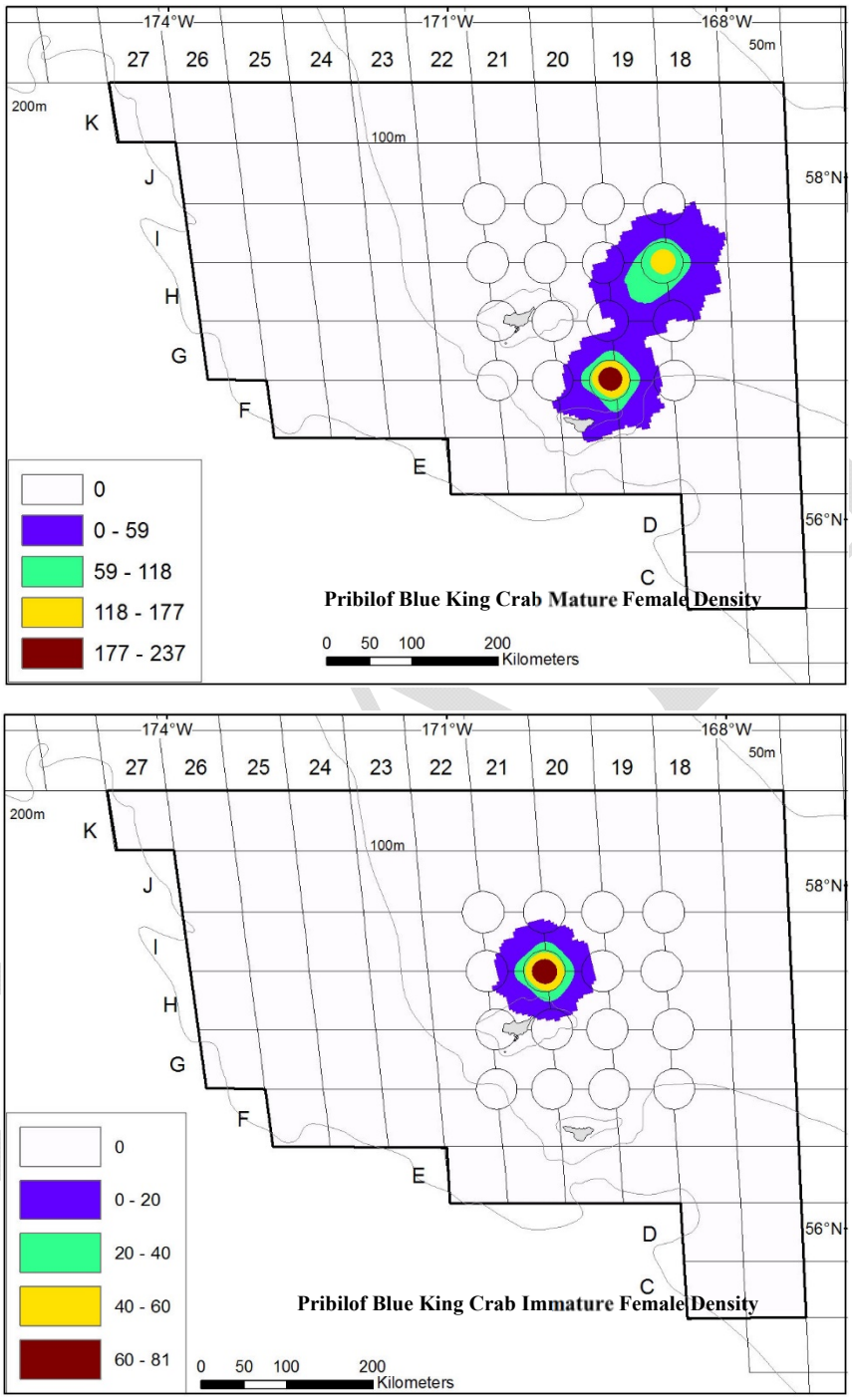

Figure 36. -- Total density (number nmi^{-2}) of mature female (top) and immature female (bottom) blue king crab (*Paralithodes platypus*) at each station sampled in the Pribilof District in 2018. The outlined area depicts the management district as defined by ADF&G.

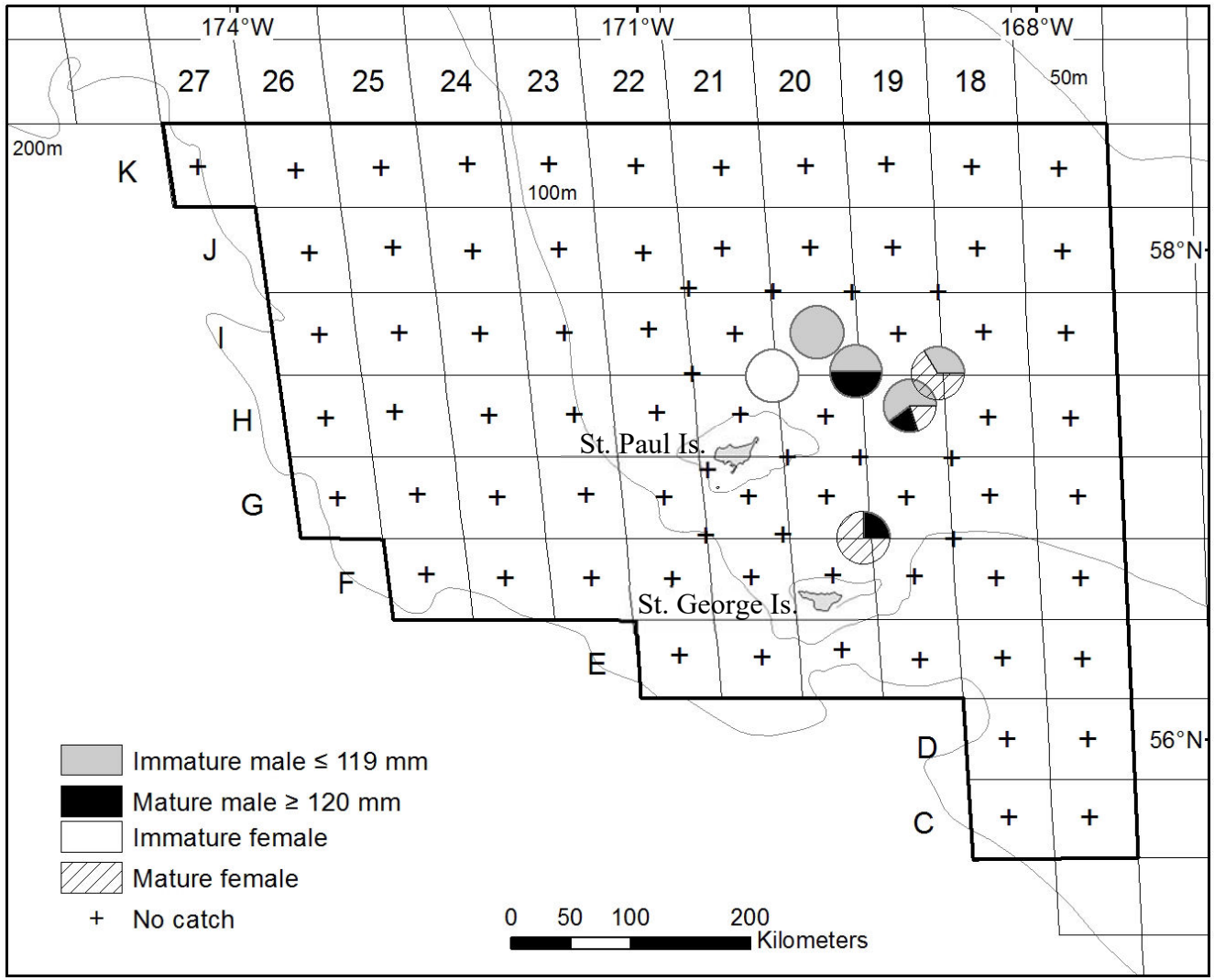

Figure 37. -- Percentage of male and female blue king crab (*Paralithodes platypus*) maturity categories at each station of the Pribilof District in 2018. The outlined area depicts the management district as defined by ADF&G.

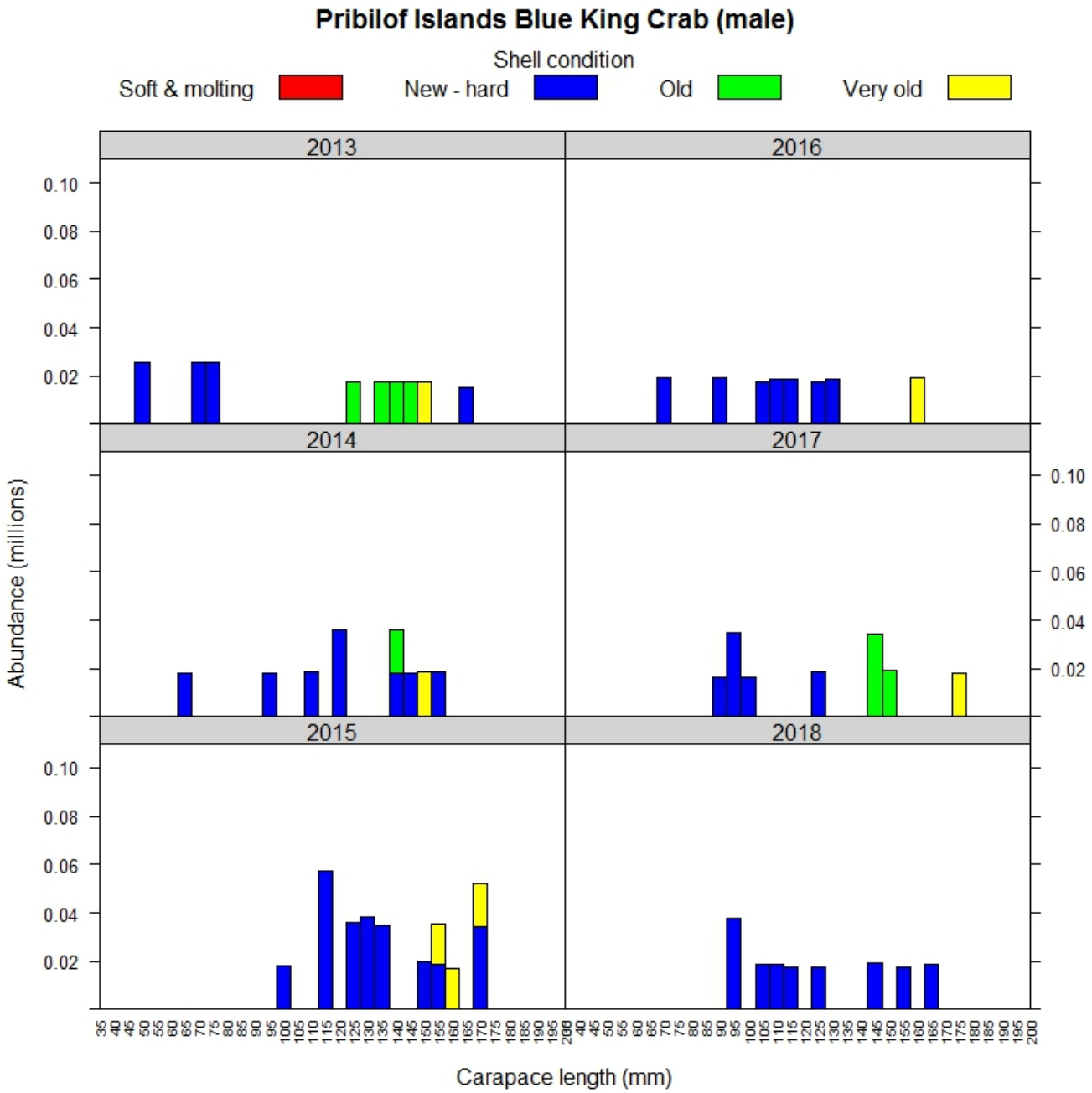

Figure 38. -- Size frequency by shell condition of Pribilof District male blue king crab (*Paralithodes platypus*) by 5 mm length classes, 2013-2018.

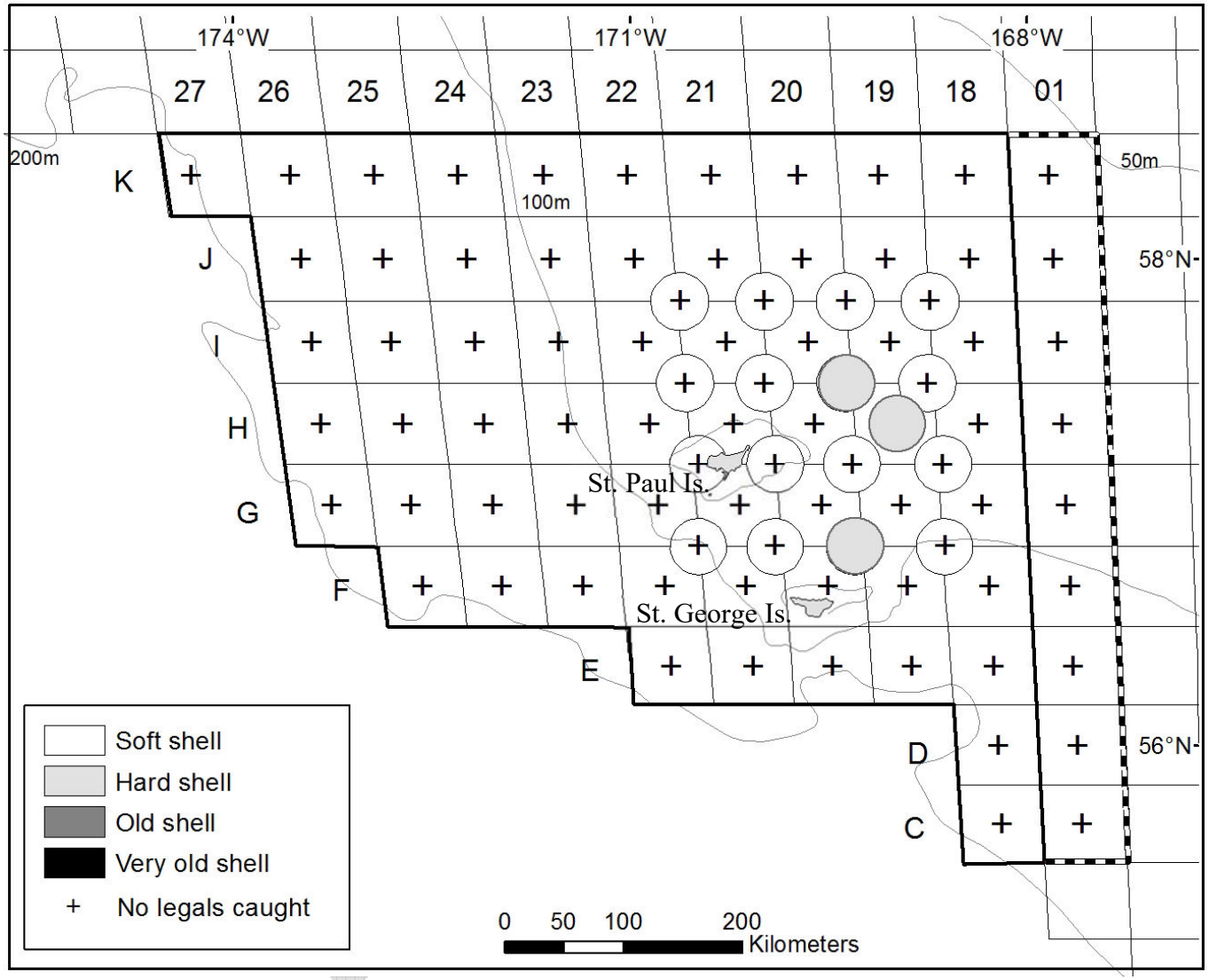

Figure 39. -- Distribution of legal-sized male blue king crab (*Paralithodes platypus*) caught at each station of the Pribilof District in 2018 distinguished by shell condition. The outlined area depicts the management district as defined by ADF&G.

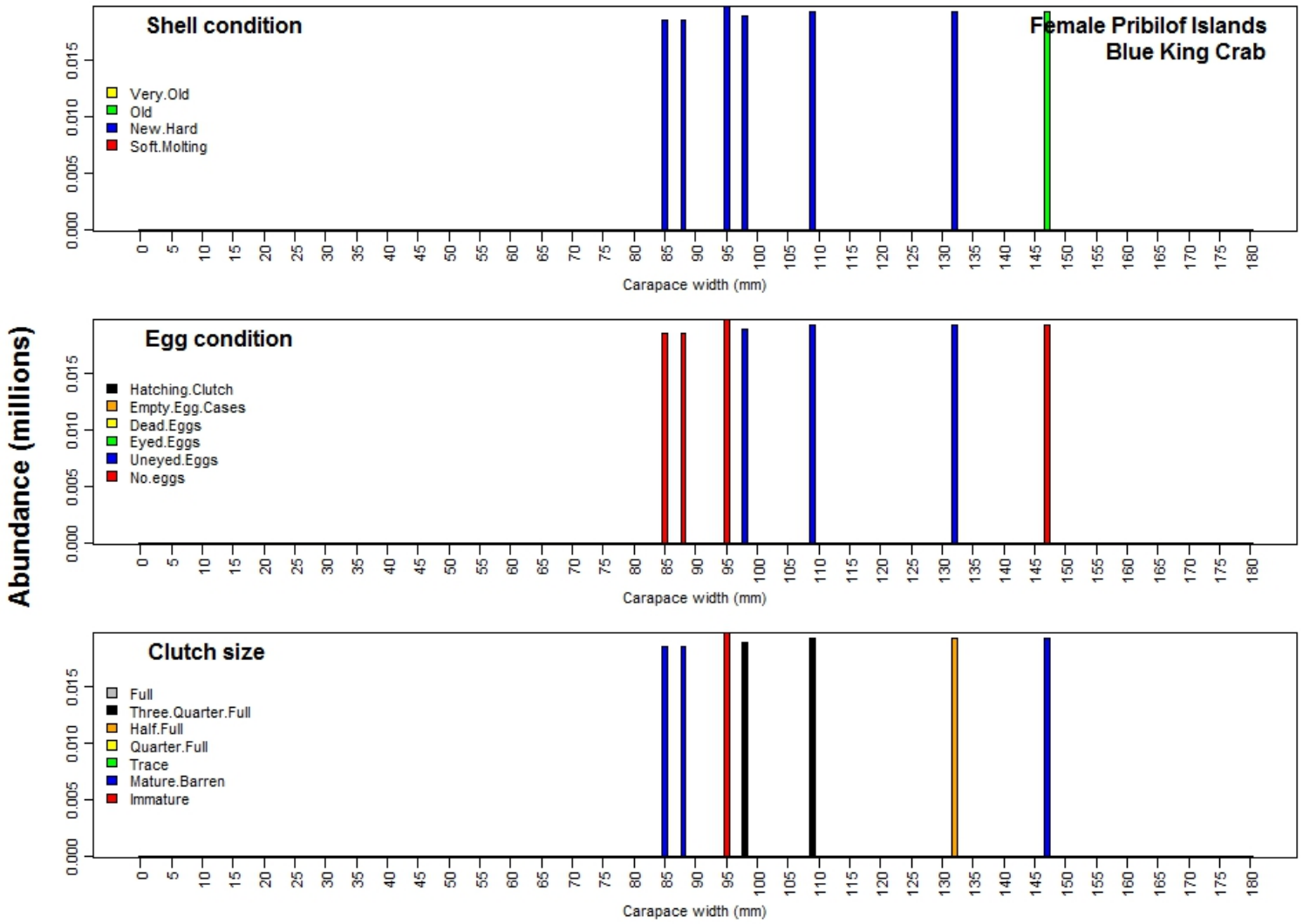

Figure 40. -- Size frequency by shell condition, egg condition, and clutch fullness of Pribilof District female blue king crab (*Paralithodes platypus*) by 1 mm length classes in 2018.

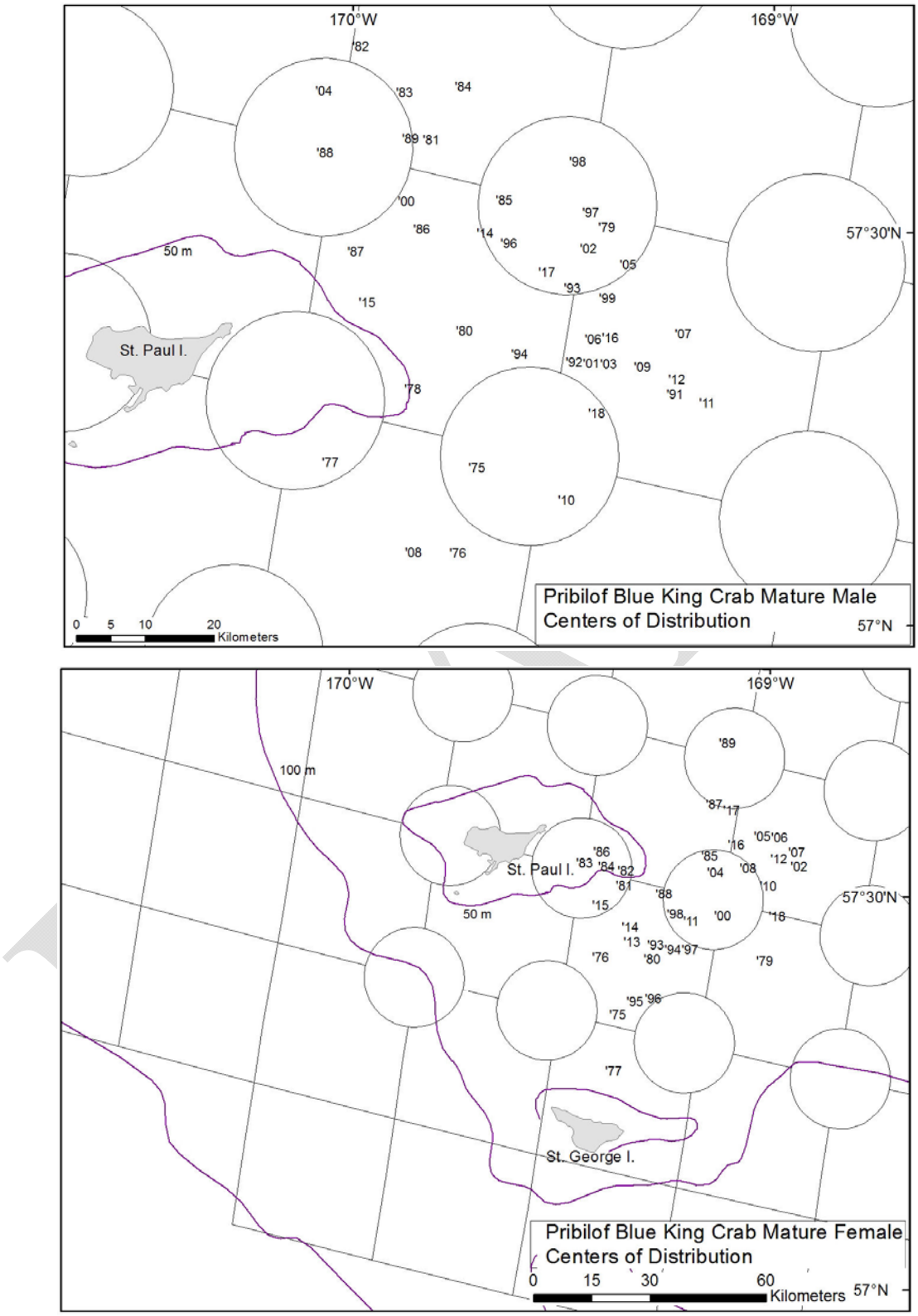

Figure 41. -- Centers of stock distribution of Pribilof Islands mature male and female blue king crab (*Paralithodes platypus*) from 1975 to 2018.

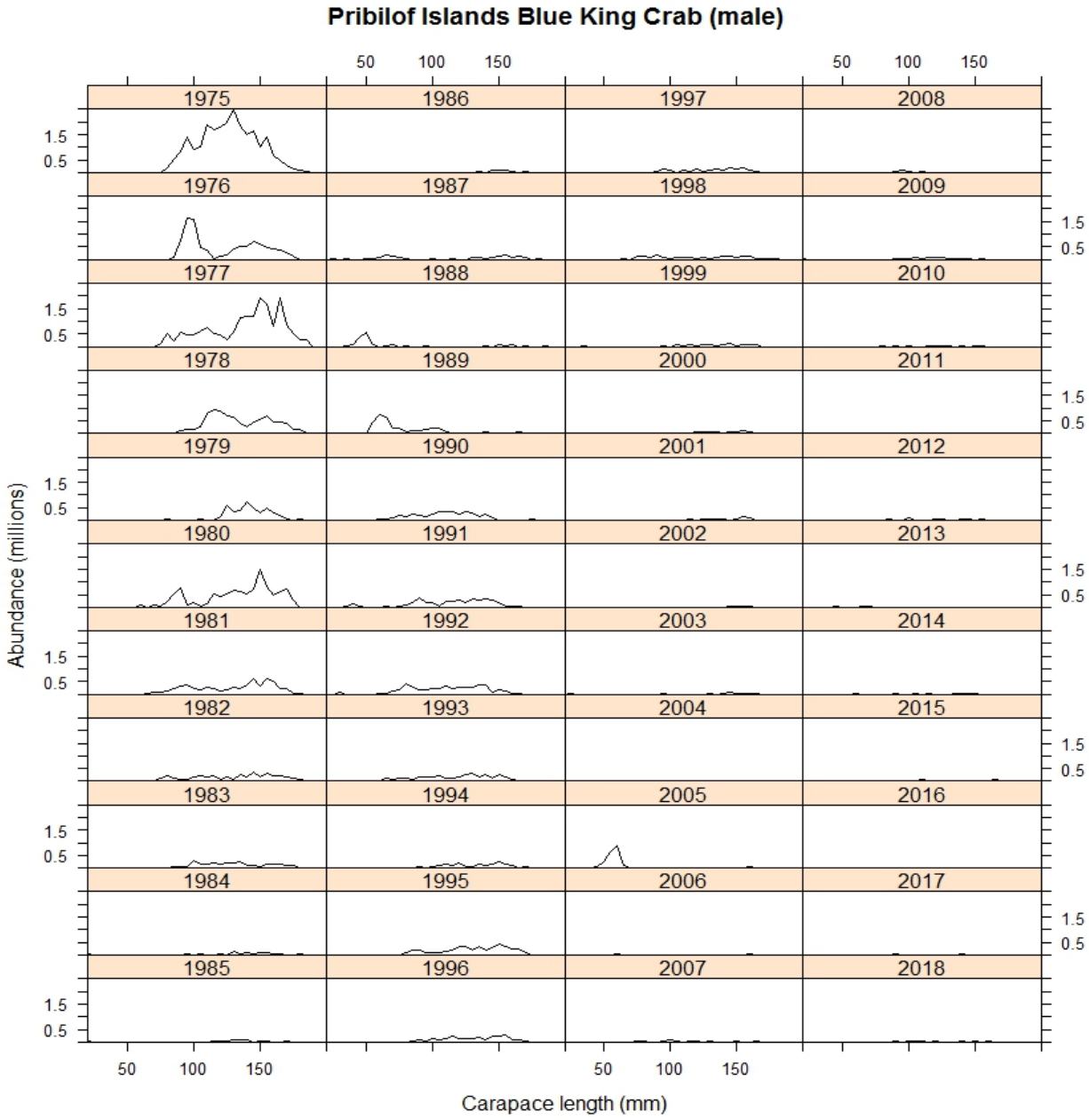

Figure 42. -- Size frequency by 5 mm length classes of Pribilof Islands male blue king crab (*Paralithodes platypus*) from 1975 to 2018.

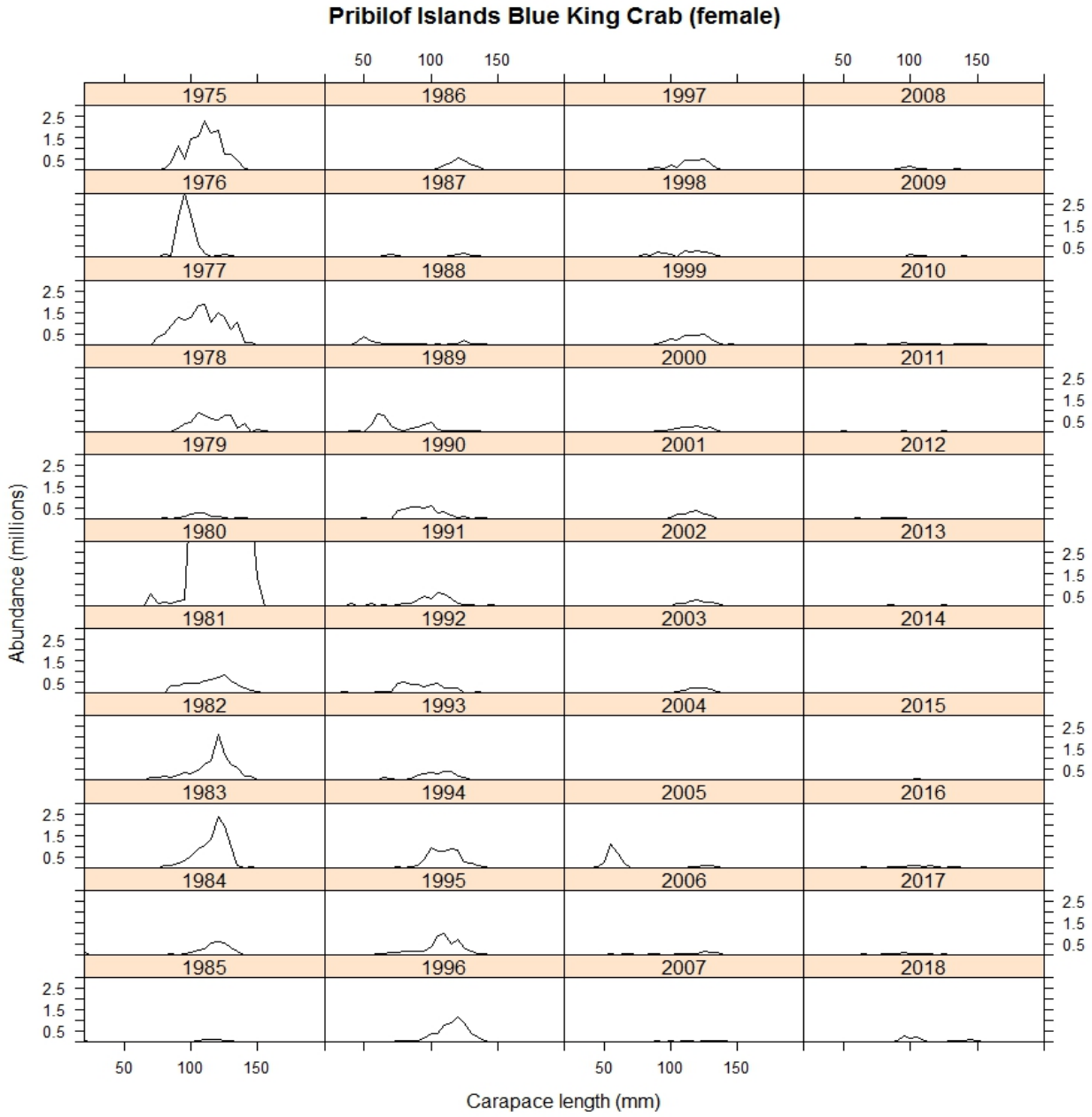

Figure 43. -- Size frequency by 5 mm length classes of Pribilof Islands female blue king crab (*Paralithodes platypus*) from 1975 to 2018.

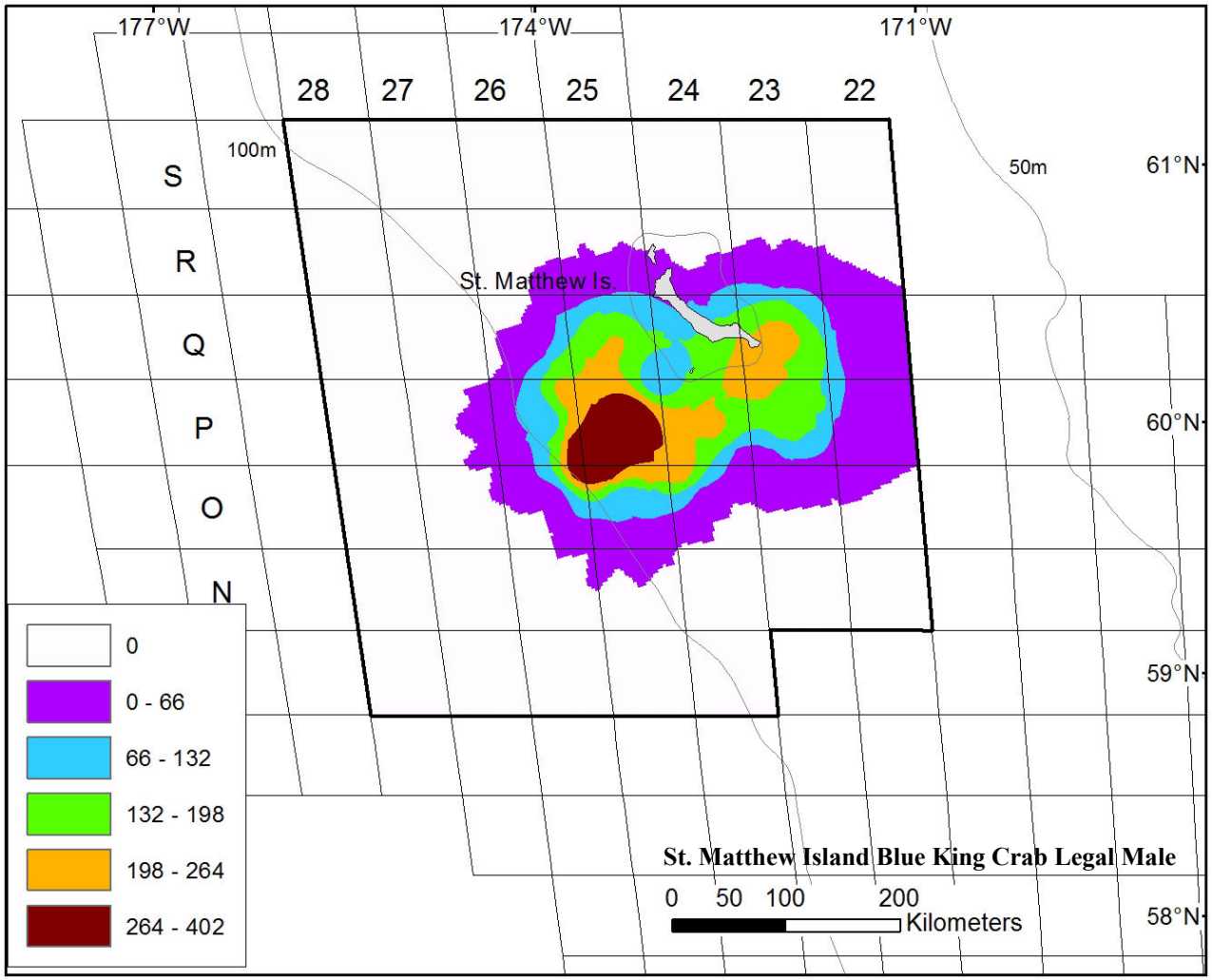

Figure 44. -- Total density (number nmi^{-2}) of legal-sized blue king crab (*Paralithodes platypus*) at each station sampled in the St. Matthew Island Section of the Northern District in 2018. The outlined area depicts stations within the St. Matthew Island Section sampling strata.

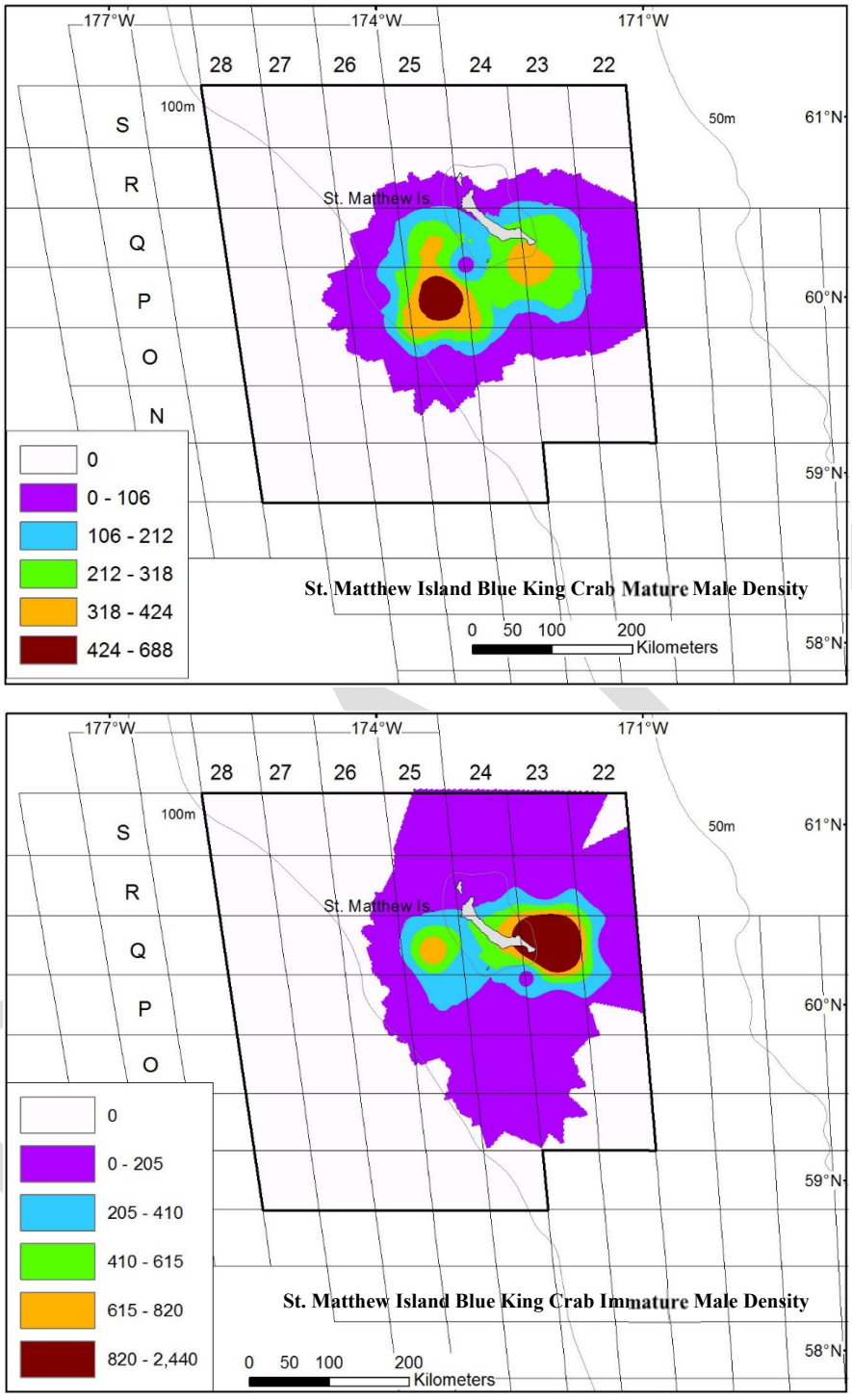

Figure 45. -- Total density (number nmi^{-2}) of mature male (top) and immature male (bottom) blue king crab (*Paralithodes platypus*) at each station sampled in the St. Matthew Island Section of the Northern District in 2018. The outlined area depicts stations within the St. Matthew Island Section sampling strata.

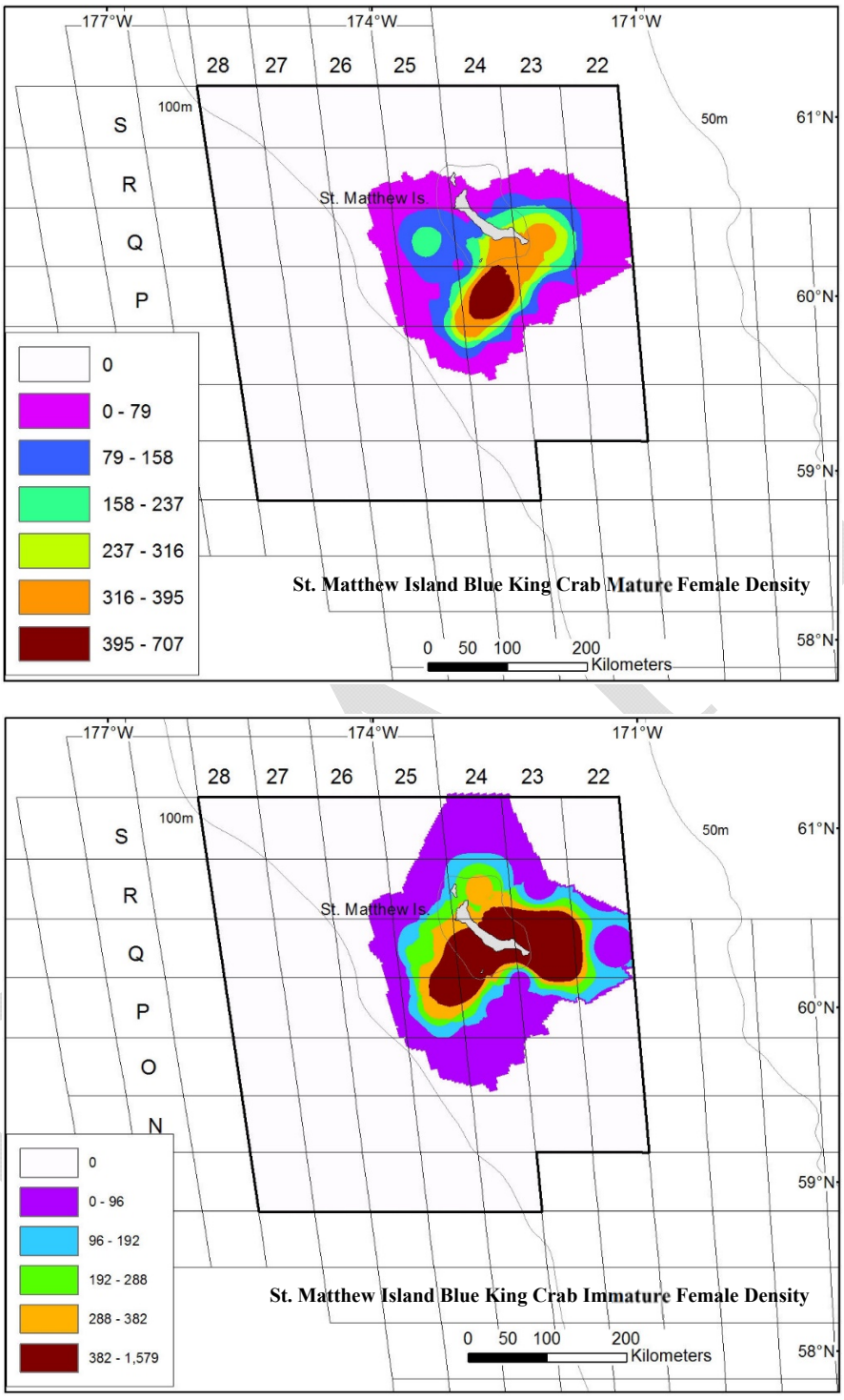

Figure 46. -- Total density (number nmi^{-2}) of mature female (top) and immature female (bottom) blue king crab (*Paralithodes platypus*) at each station sampled in the St. Matthew Island Section of the Northern District in 2018. The outlined area depicts stations within the St. Matthew Island Section sampling strata.

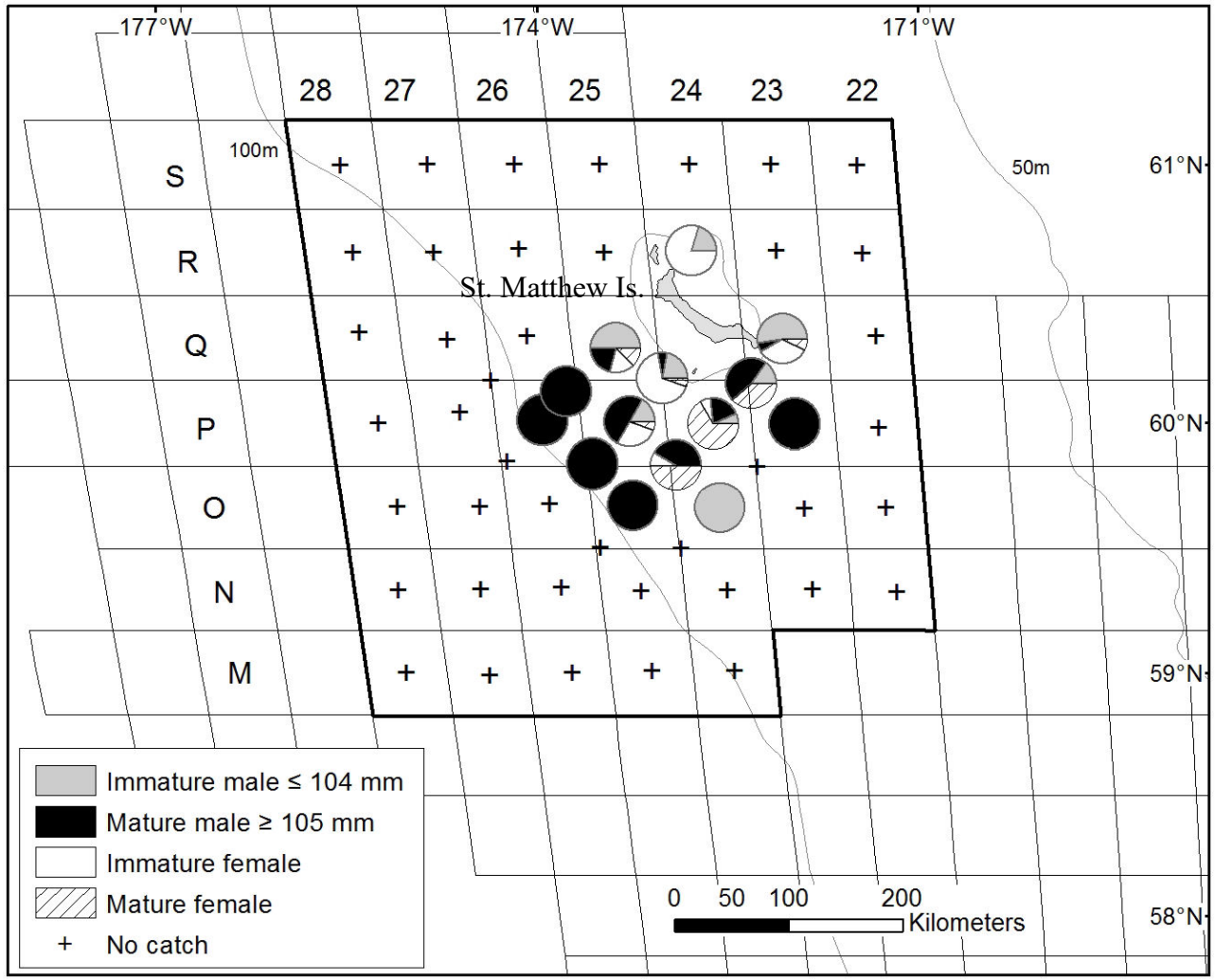

Figure 47. -- Percentage of male and female blue king crab (*Paralithodes platypus*) maturity categories at each station of the St. Matthew Island Section of the Northern District in 2018. The outlined area depicts stations within the St. Matthew Island Section sampling strata.

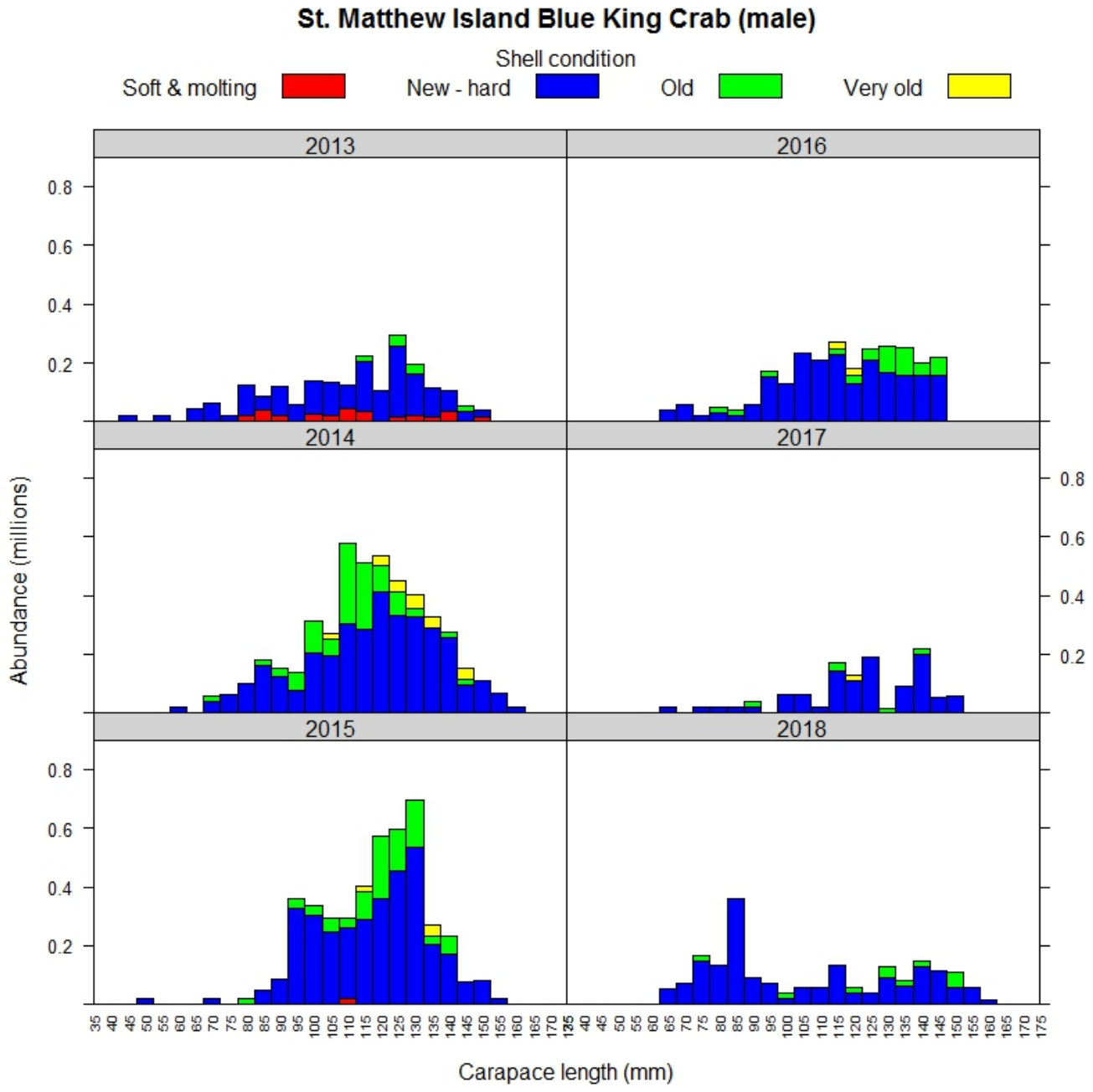

Figure 48. -- Size frequency by shell condition of St. Matthew Island Section male blue king crab (*Paralithodes platypus*) by 5 mm length classes, 2013-2018.

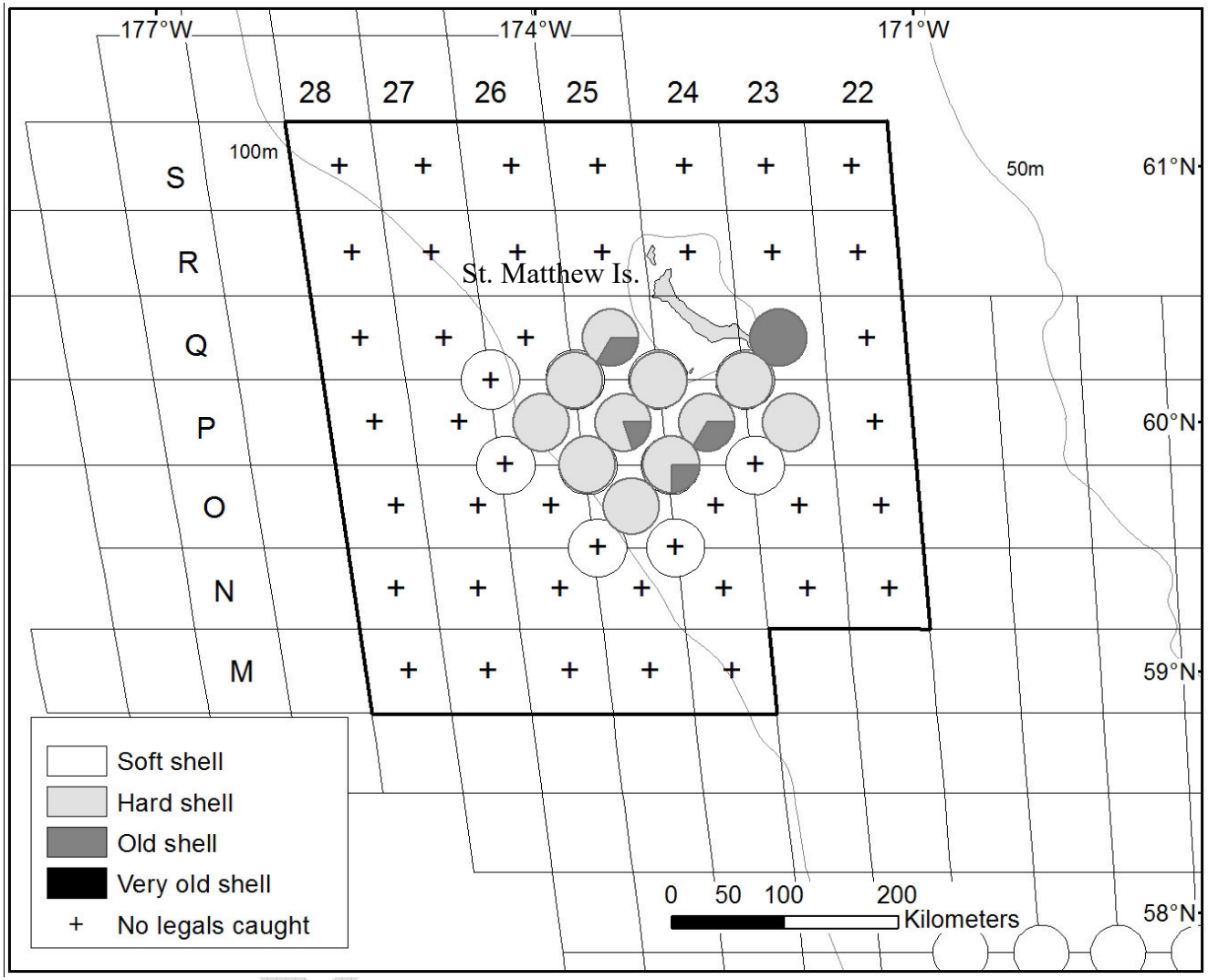

Figure 49. -- Distribution of legal-sized male blue king crab (*Paralithodes platypus*) caught at each station of the St. Matthew Island Section of the Northern District in 2018 and distinguished by shell condition. The outlined area depicts stations within the St. Matthew Island Section sampling strata.

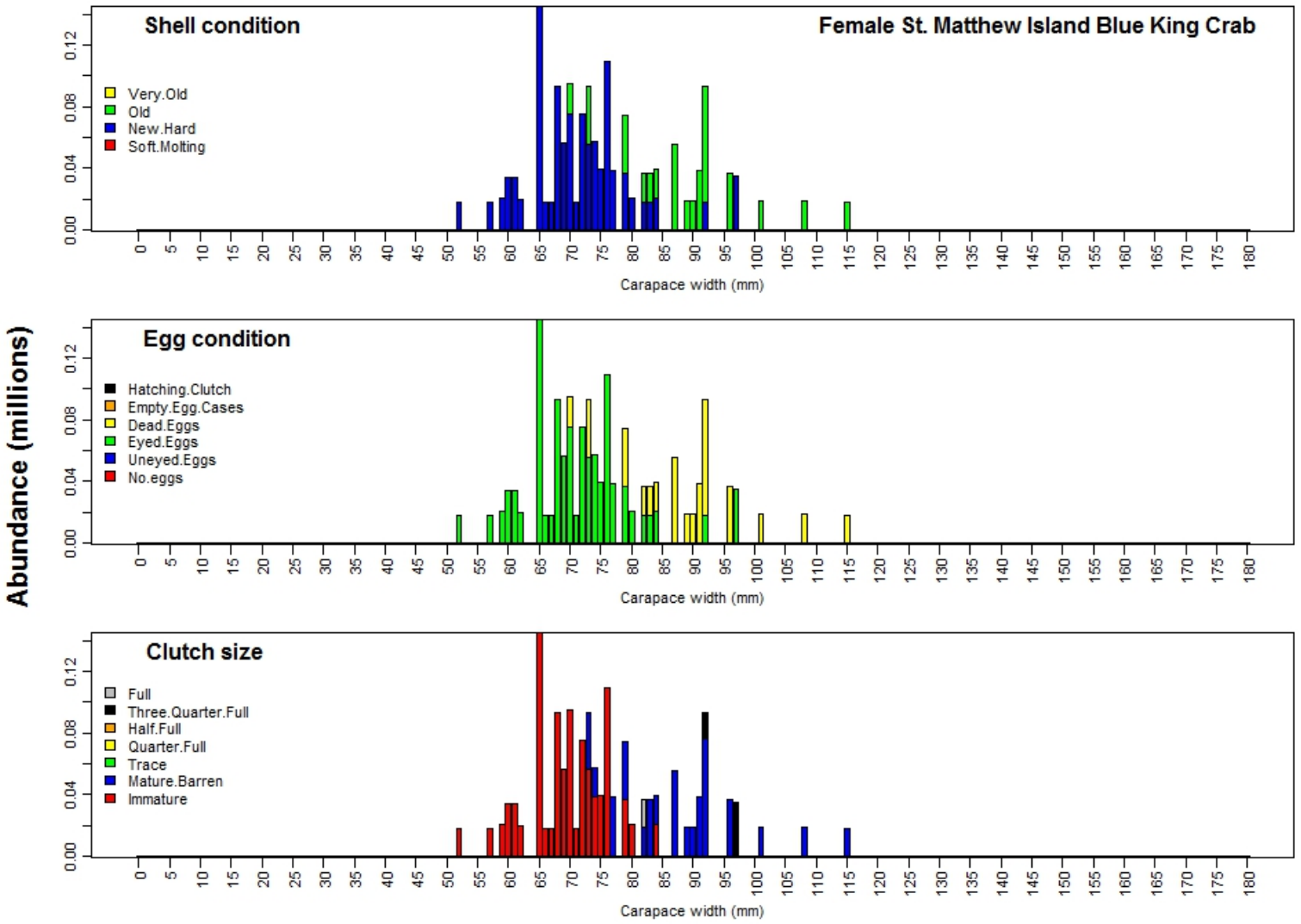

Figure 50. -- Size frequency by shell condition, egg condition, and clutch size of St. Matthew Island Section female blue king crab (*Paralithodes platypus*) by 1 mm length classes in 2018.

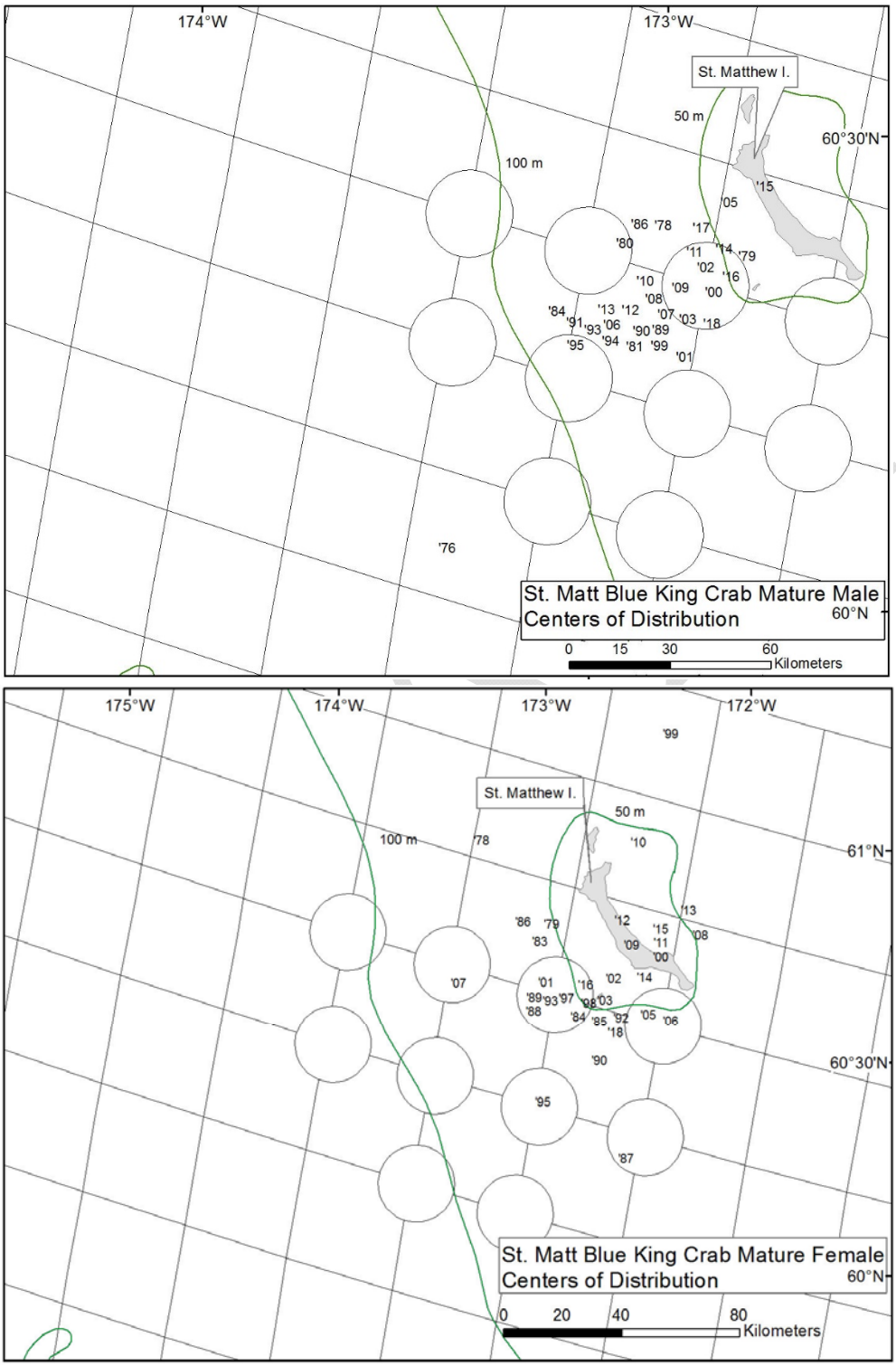

Figure 51. -- Centers of stock distribution of St. Matthew Island mature male and female blue king crab (*Paralithodes platypus*) from 1975 to 2018.

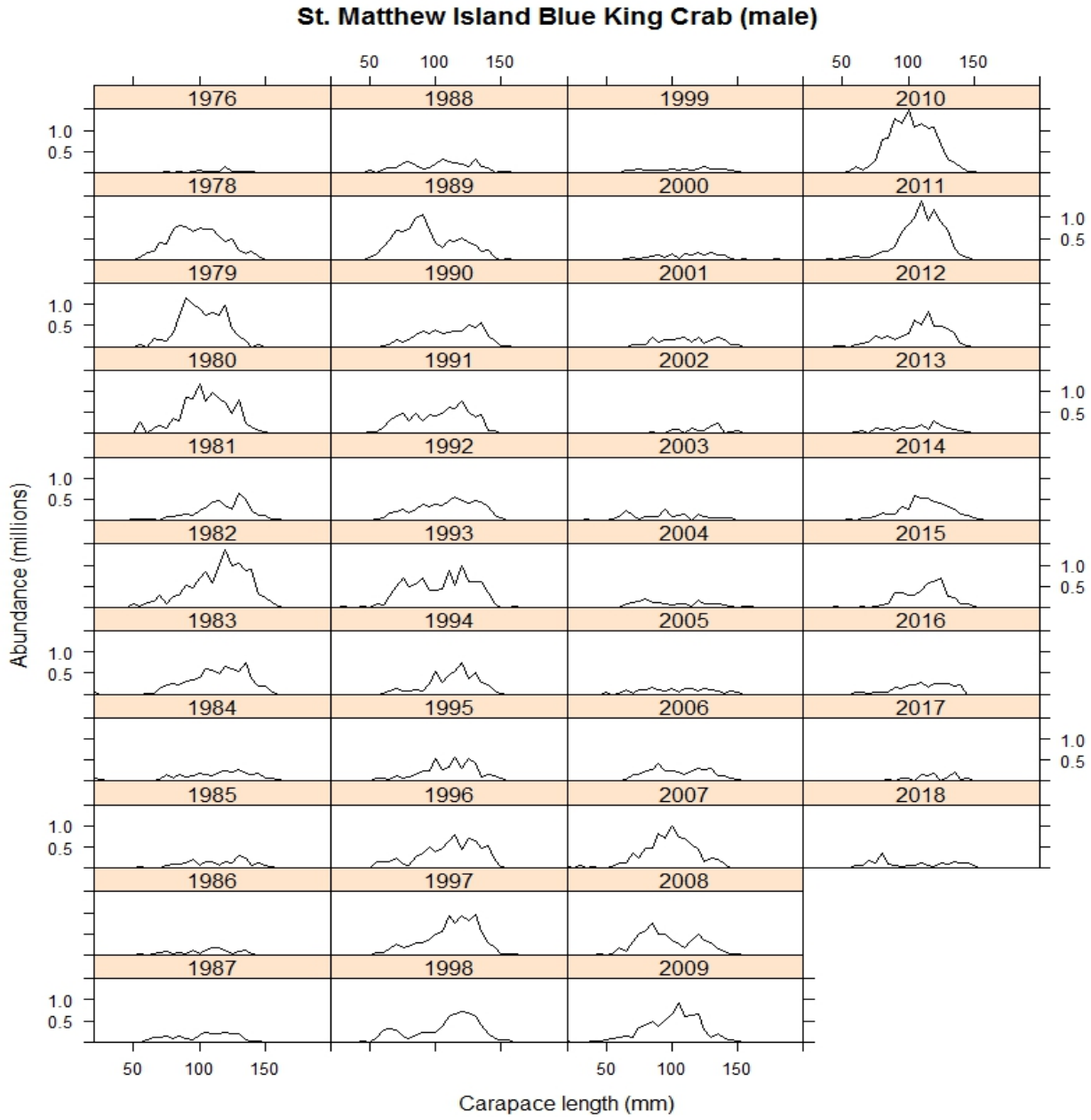

Figure 52. -- Size frequency by 5 mm length classes of St. Matthew Island Section male blue king crab (*Paralithodes platypus*) from 1976 to 2018.

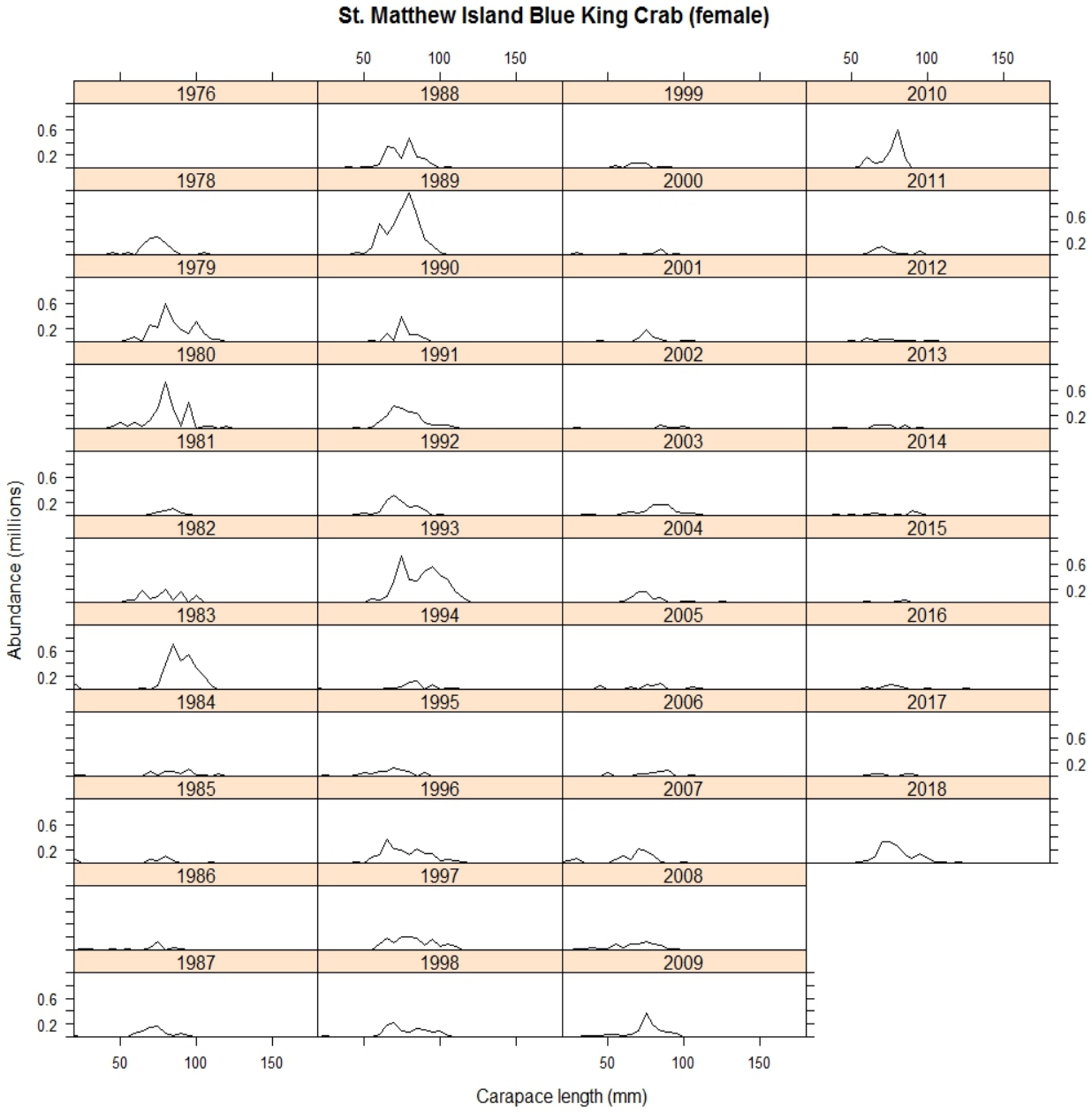

Figure 53. -- Size frequency by 5 mm length classes of St. Matthew Island Section female blue king crab (*Paralithodes platypus*) from 1976 to 2018.

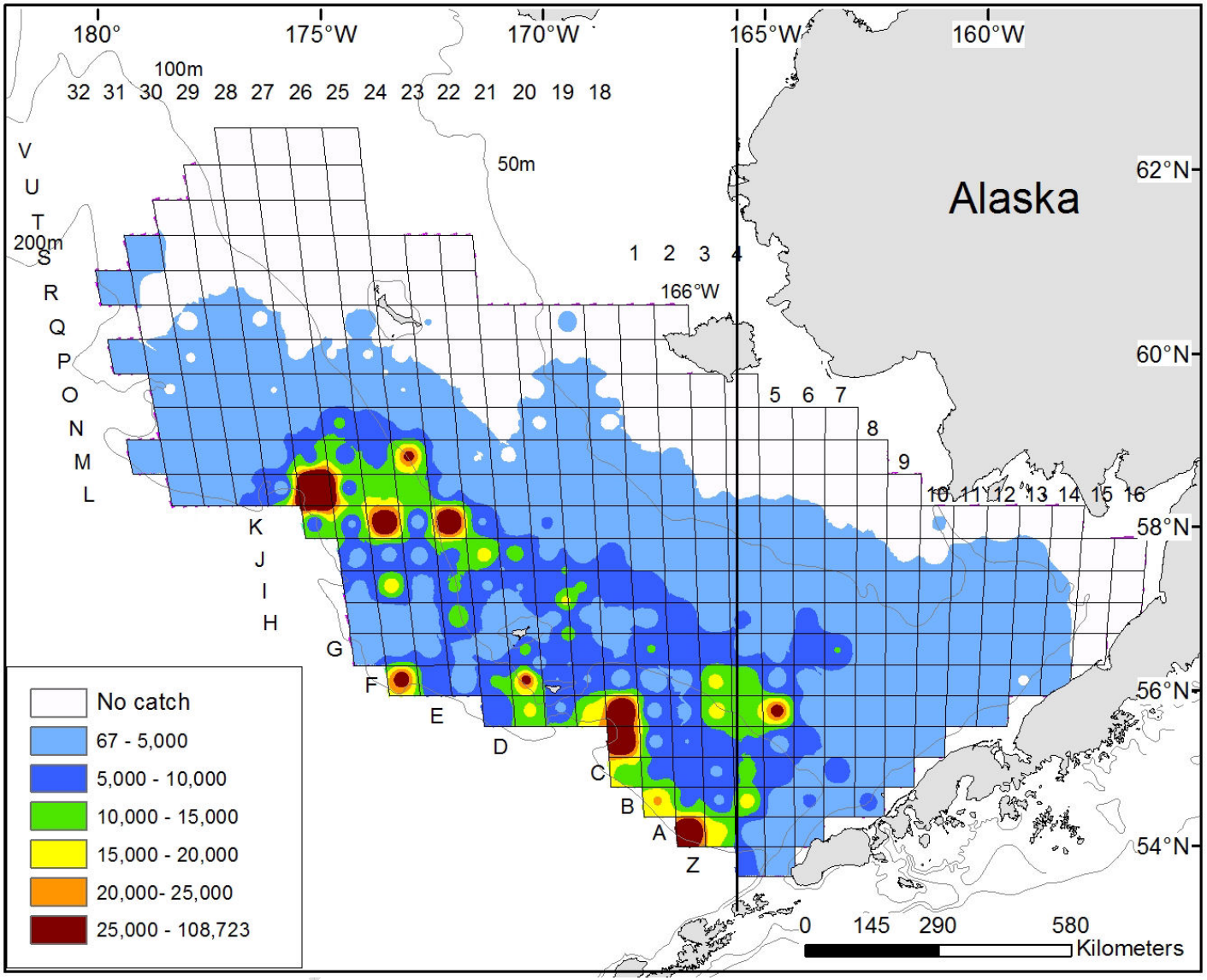

Figure 54. -- Total density (number nmi^{-2}) of Tanner crab (*Chionoecetes bairdi)* at each station sampled in 2018.

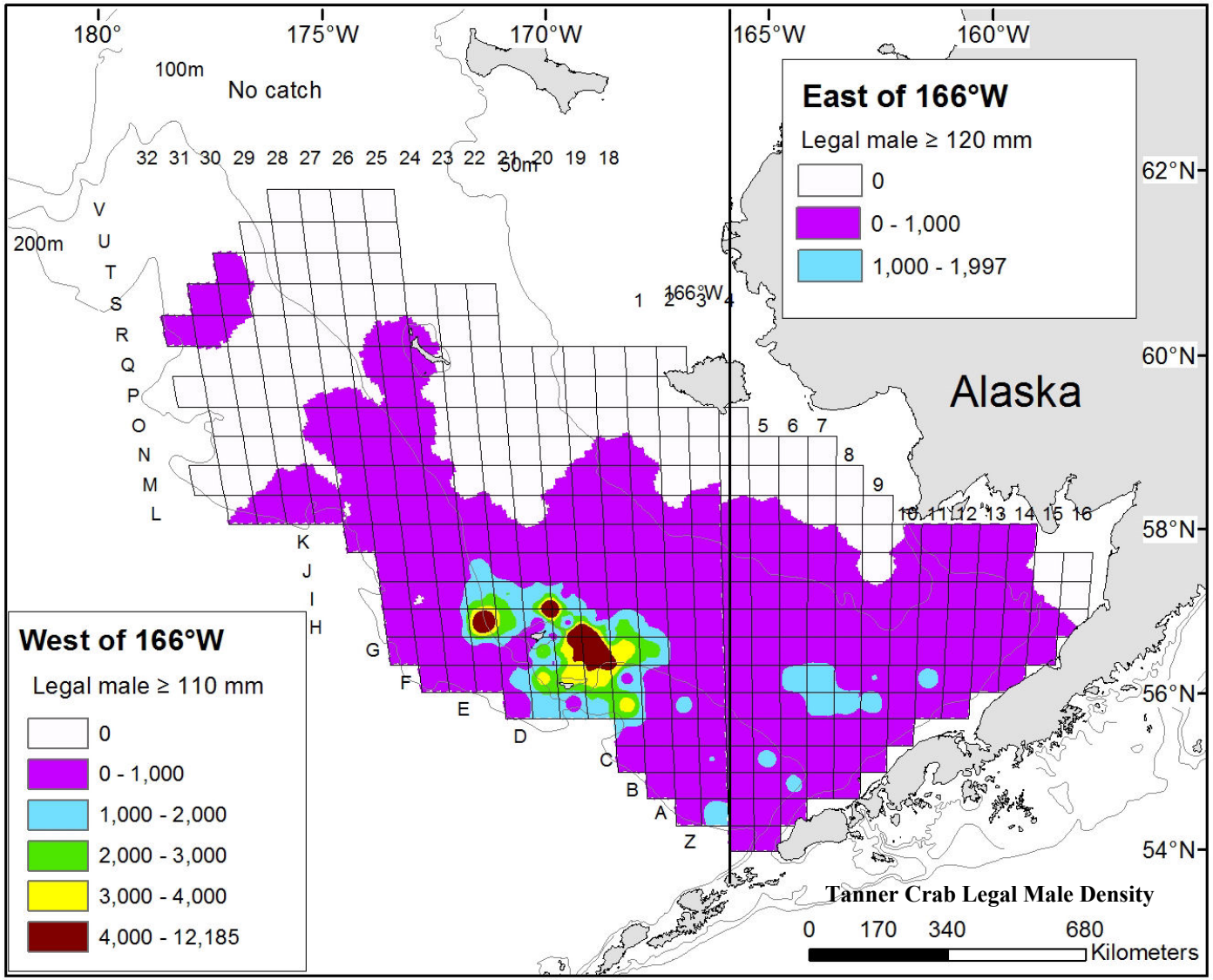

Figure 55. -- Total density (number nmi^{-2}) of legal-sized male Tanner crab (*Chionoecetes bairdi*) at each station sampled in 2018.

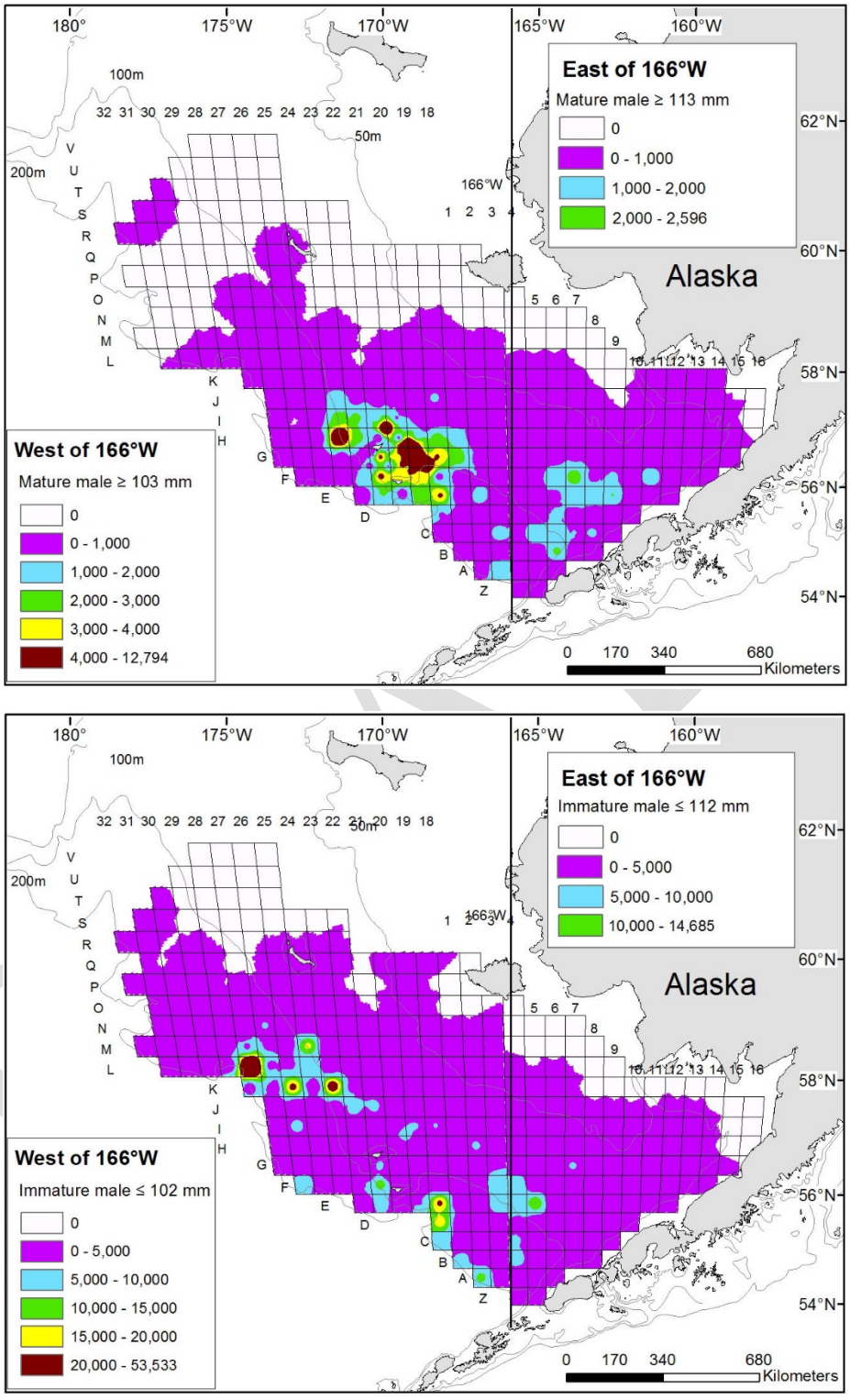

Figure 56. -- Total density (number nmi^{-2}) of mature male (top) and immature male (bottom) Tanner crab (*Chionoecetes bairdi*) at each station sampled in 2018.

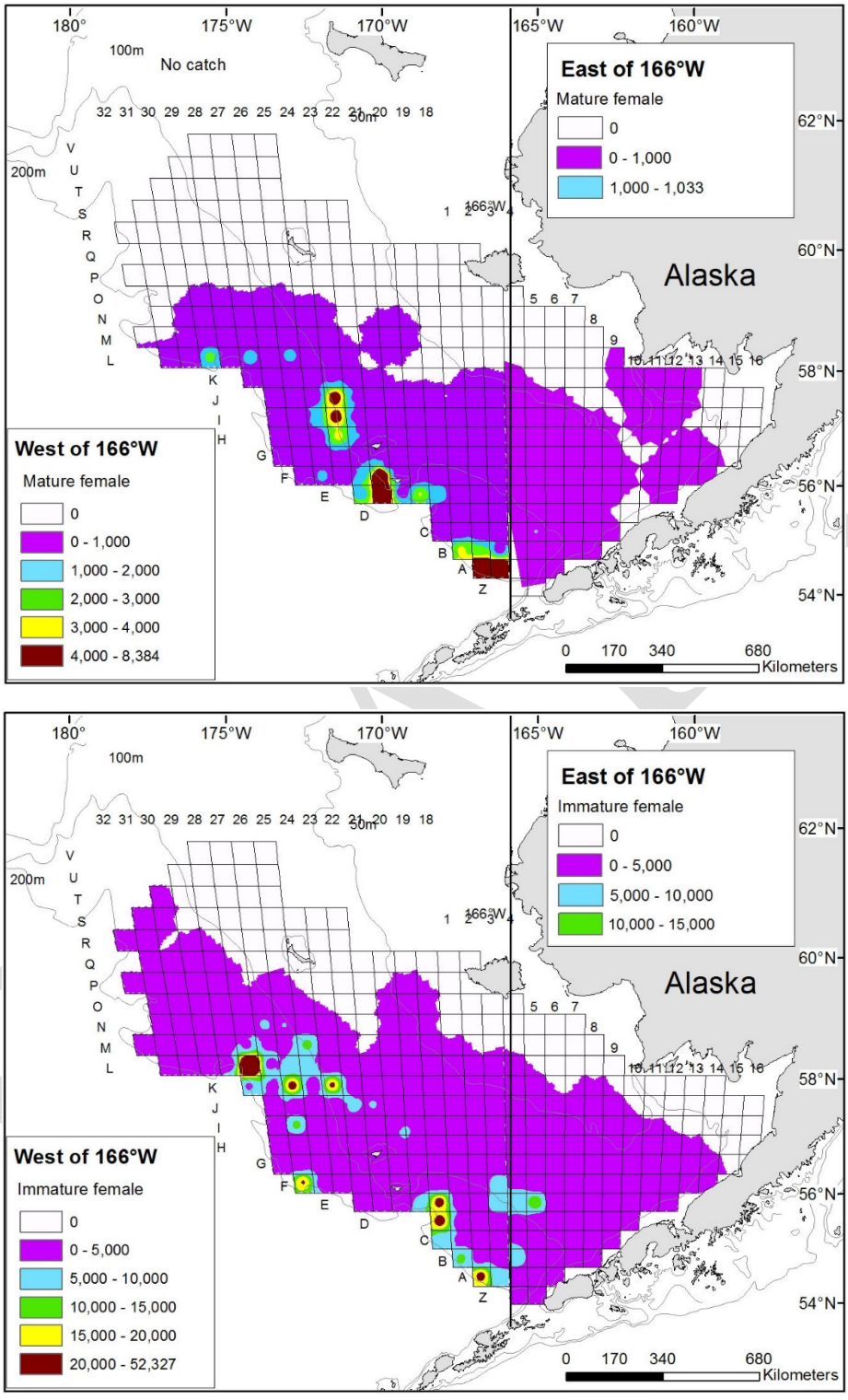

Figure 57. -- Total density (number nmi^{-2}) of mature female (top) and immature female (bottom) Tanner crab (*Chionoecetes bairdi*) at each station sampled in 2018.

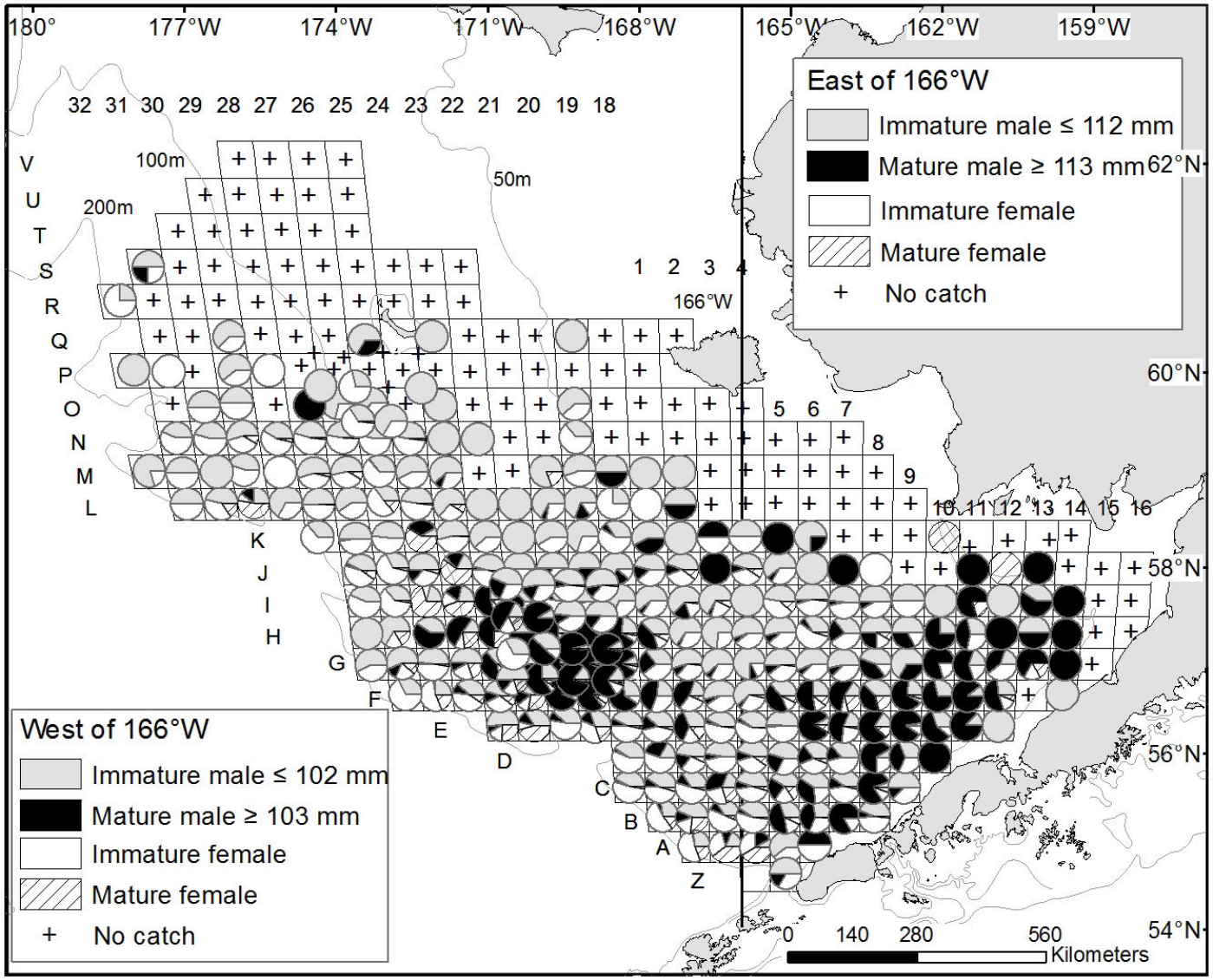

Figure 58. -- Percentage of male and female Tanner crab (*Chionoecetes bairdi*) maturity categories at each station sampled in 2018.

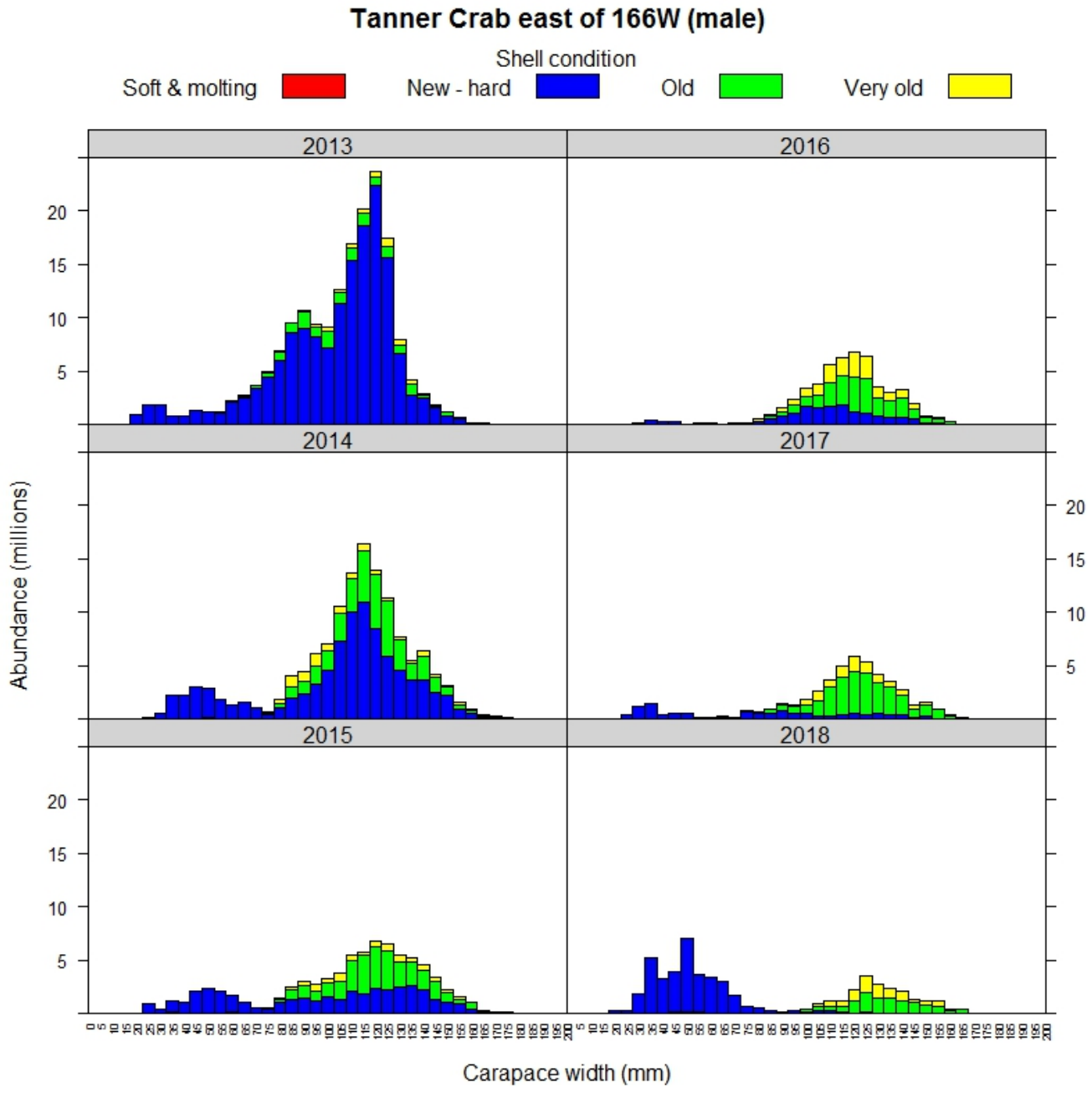

Figure 59. -- Size frequency by shell condition of male Tanner crab (*Chionoecetes bairdi*) east of 166° W by 5 mm width classes of all districts combined, 2013-2018.

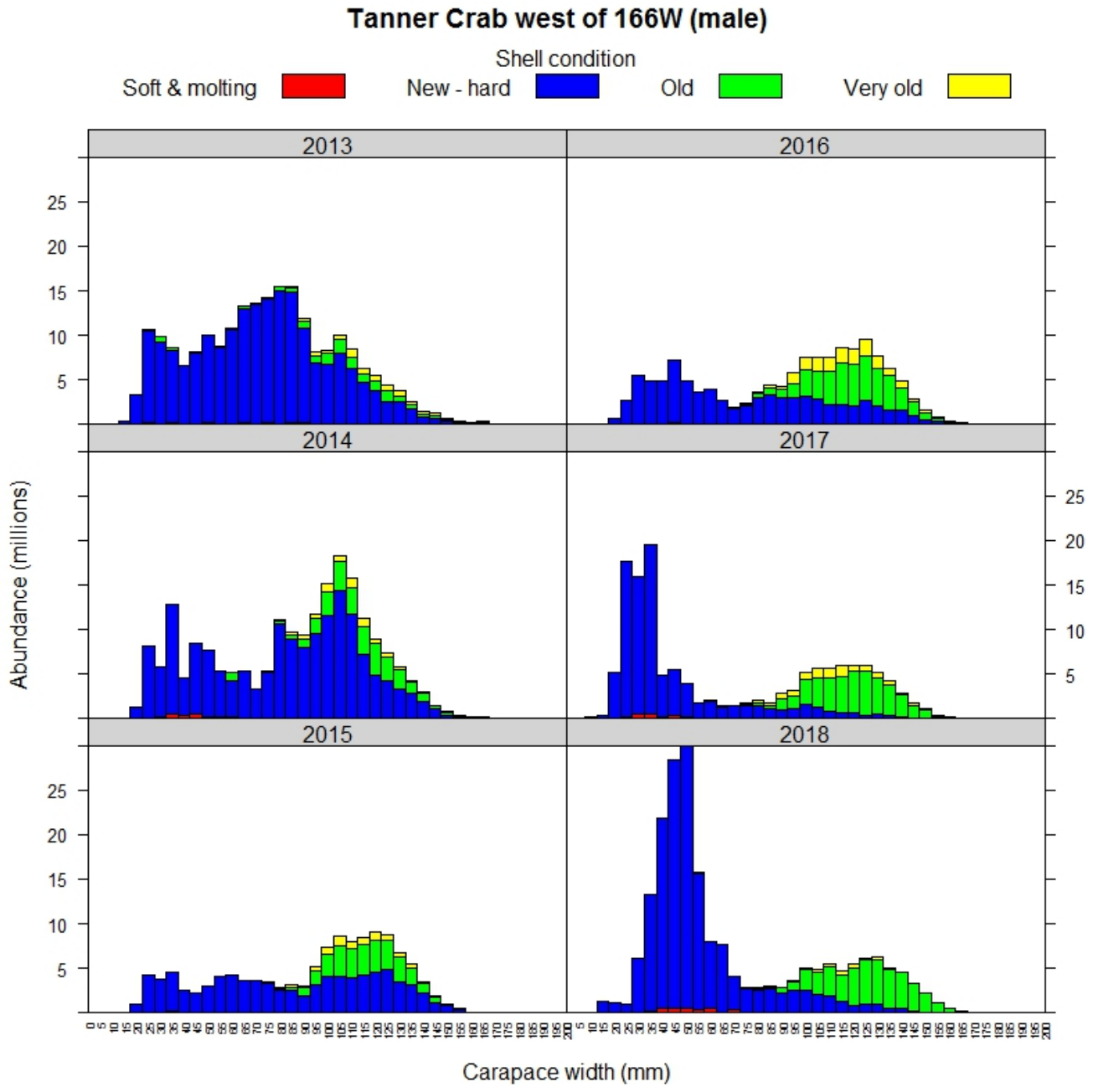

Figure 60. -- Size frequency by shell condition of male Tanner crab (*Chionoecetes bairdi*) west of 166° W by 5 mm width classes of all districts combined, 2013-2018.

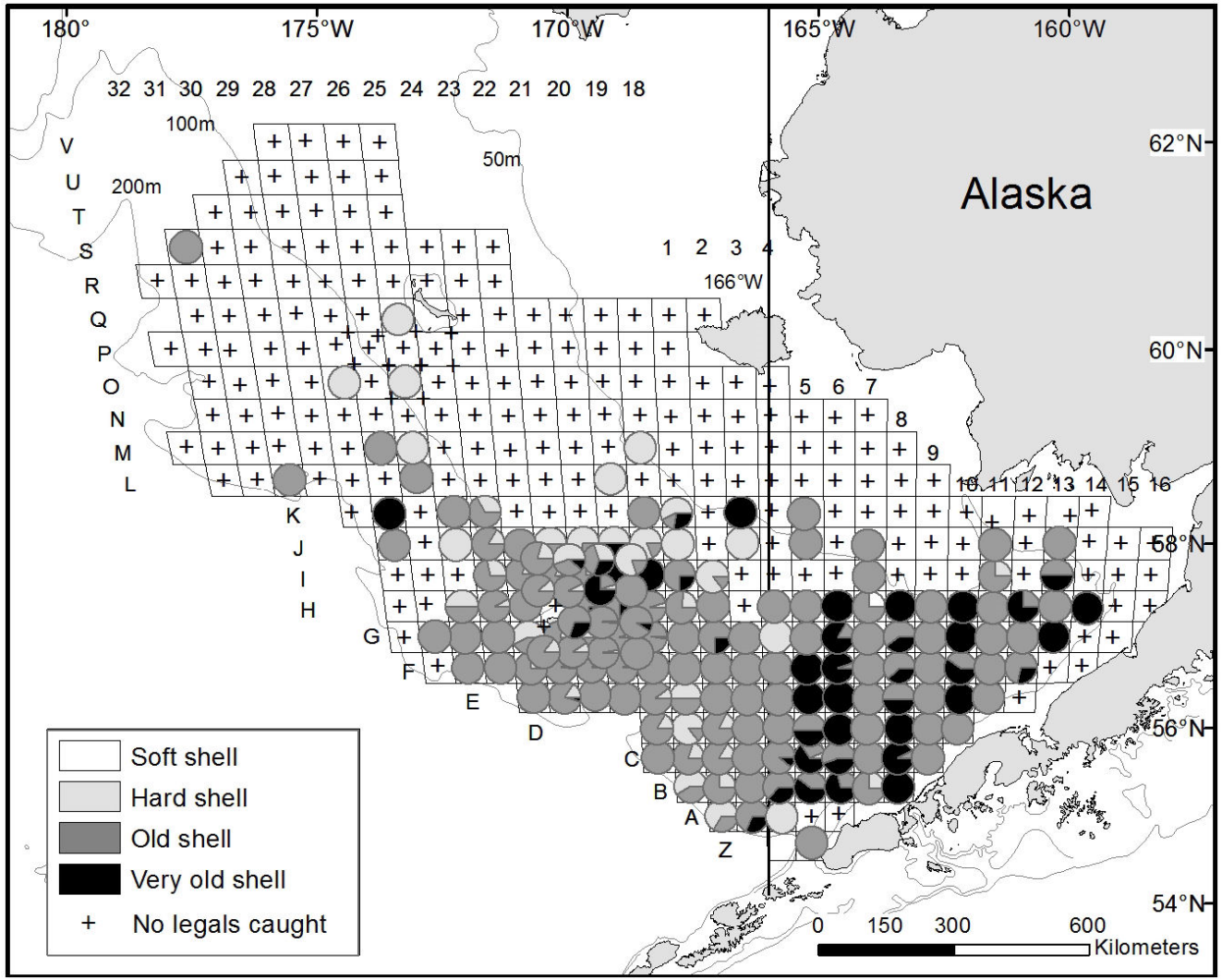

Figure 61. -- Distribution of legal-sized male Tanner crab (*Chionoecetes bairdi*) caught at each station in 2018 and distinguished by shell condition. Tanner male crab ≥ 120 mm and ≥ 110 mm CW are the legal-size categories for east and west of 166° W, respectively.

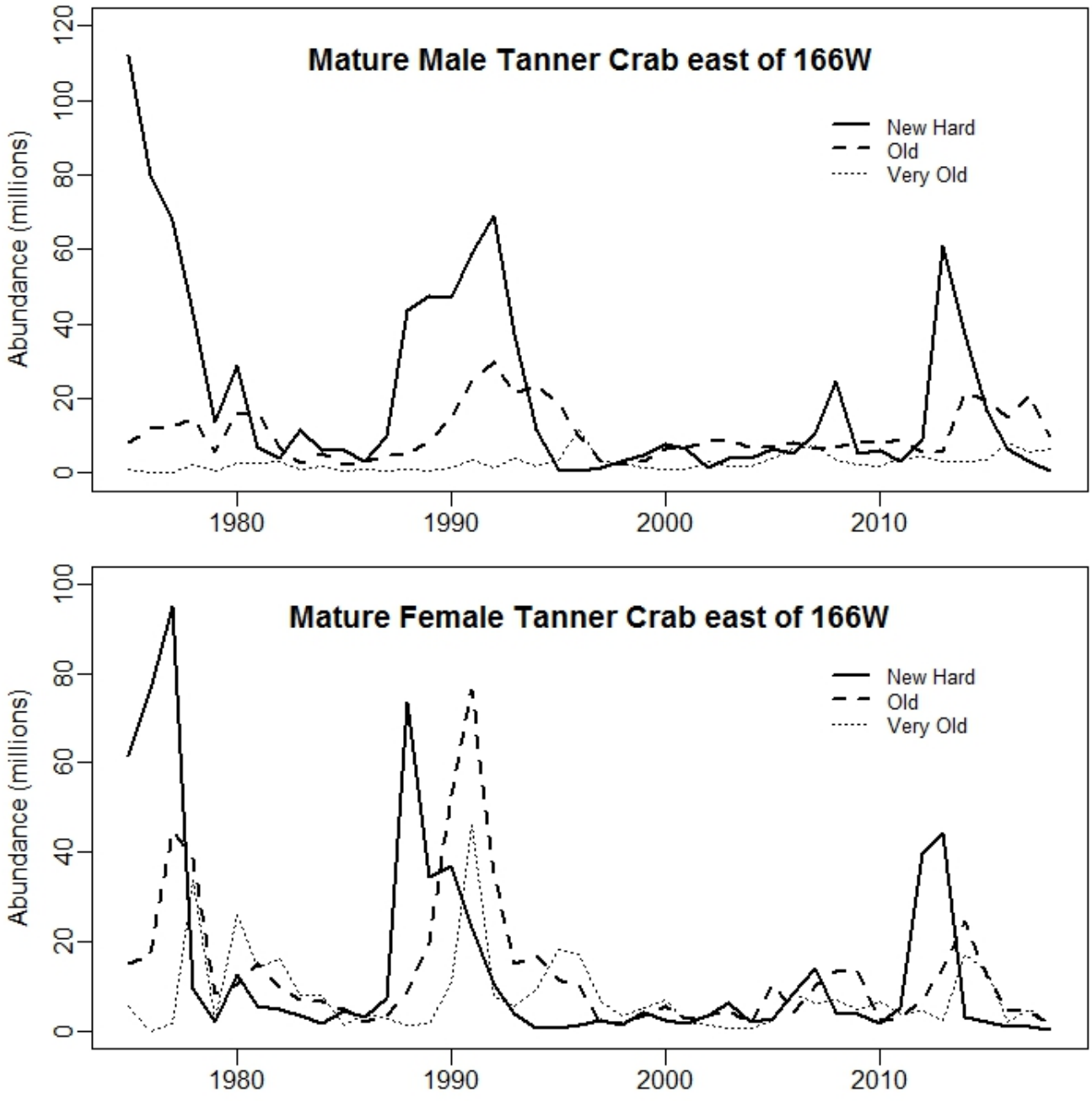

Figure 62. -- Time series of mature male (≥ 113 mm CW) and female (actual maturity) Tanner crab (*Chionoecetes bairdi*) east of 166° W by shell condition, 1975-2018. New-Hard = shell condition 2; Old = shell condition 3; Very Old = shell condition 4 and 5 combined.

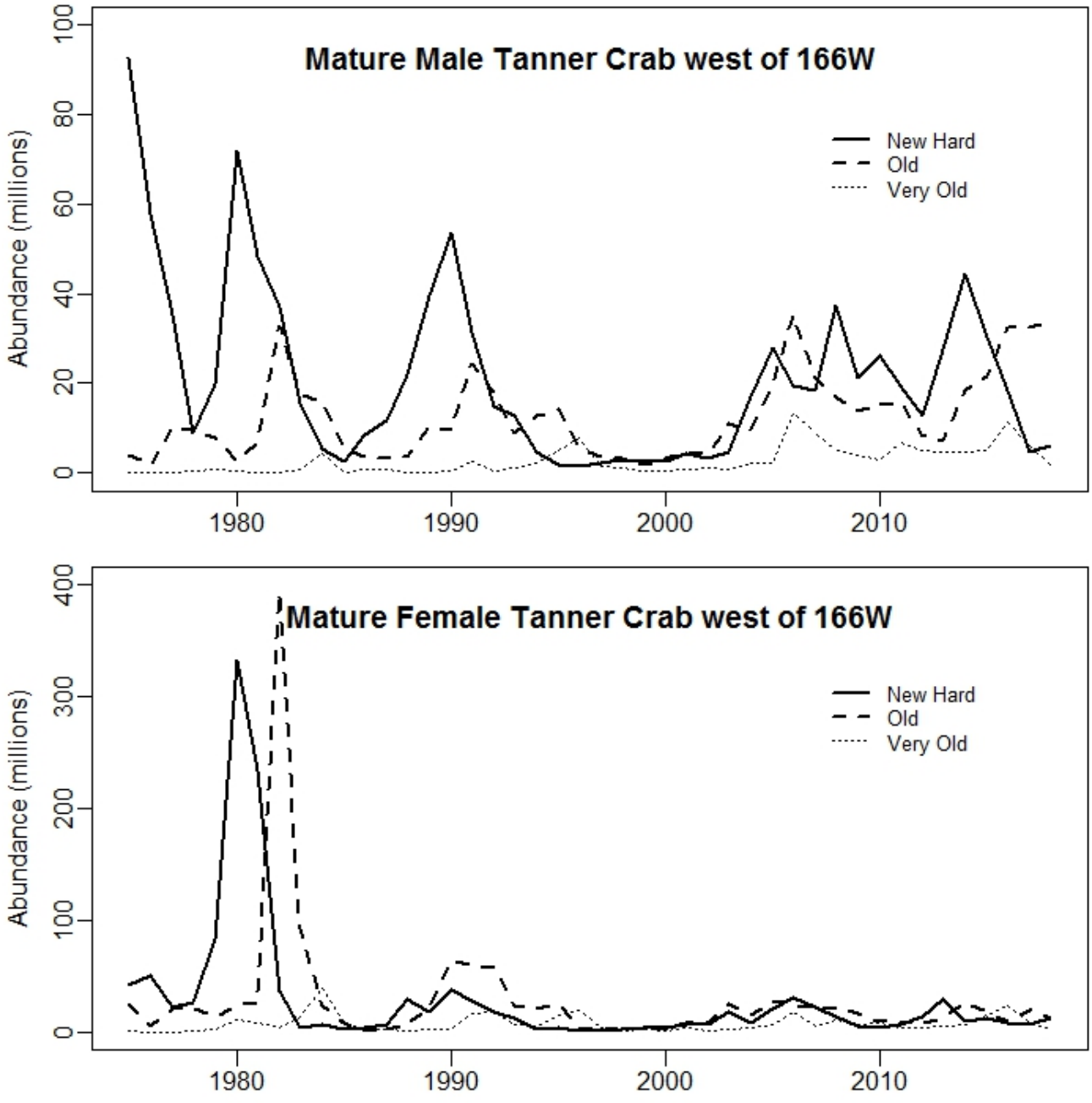

Figure 63. -- Time series of mature male (≥ 103 mm CW) and female (actual maturity) Tanner crab (Chionoecetes bairdi) west of 166° W by shell condition, 1975-2018. New-Hard = shell condition 2; Old = shell condition 3; Very Old = shell condition 4 and 5 combined

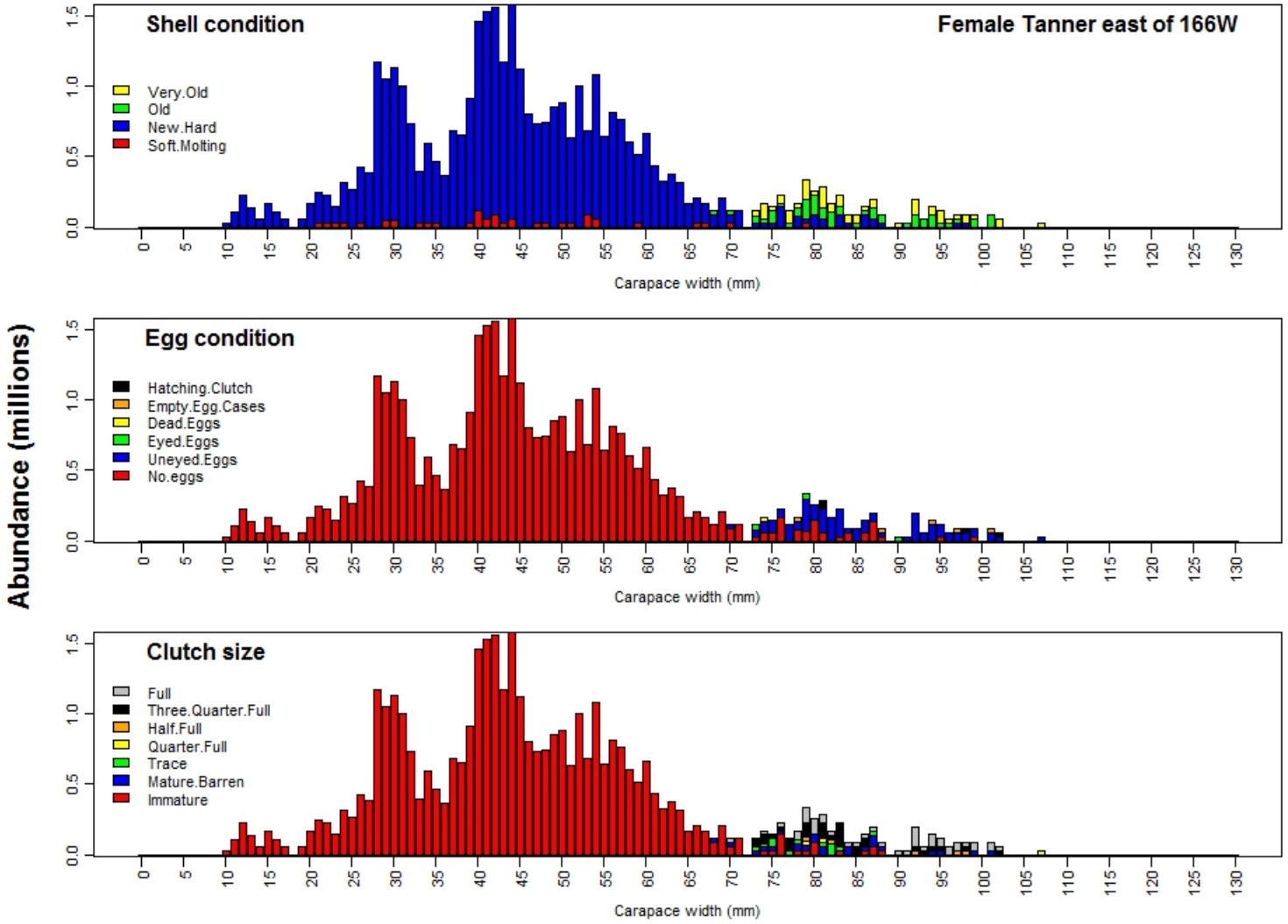

Figure 64. -- Size frequency by shell condition, egg condition, and clutch fullness of female Tanner crab (*Chionoecetes bairdi*) east of 166° W by 1 mm width classes for all districts combined in 2018.

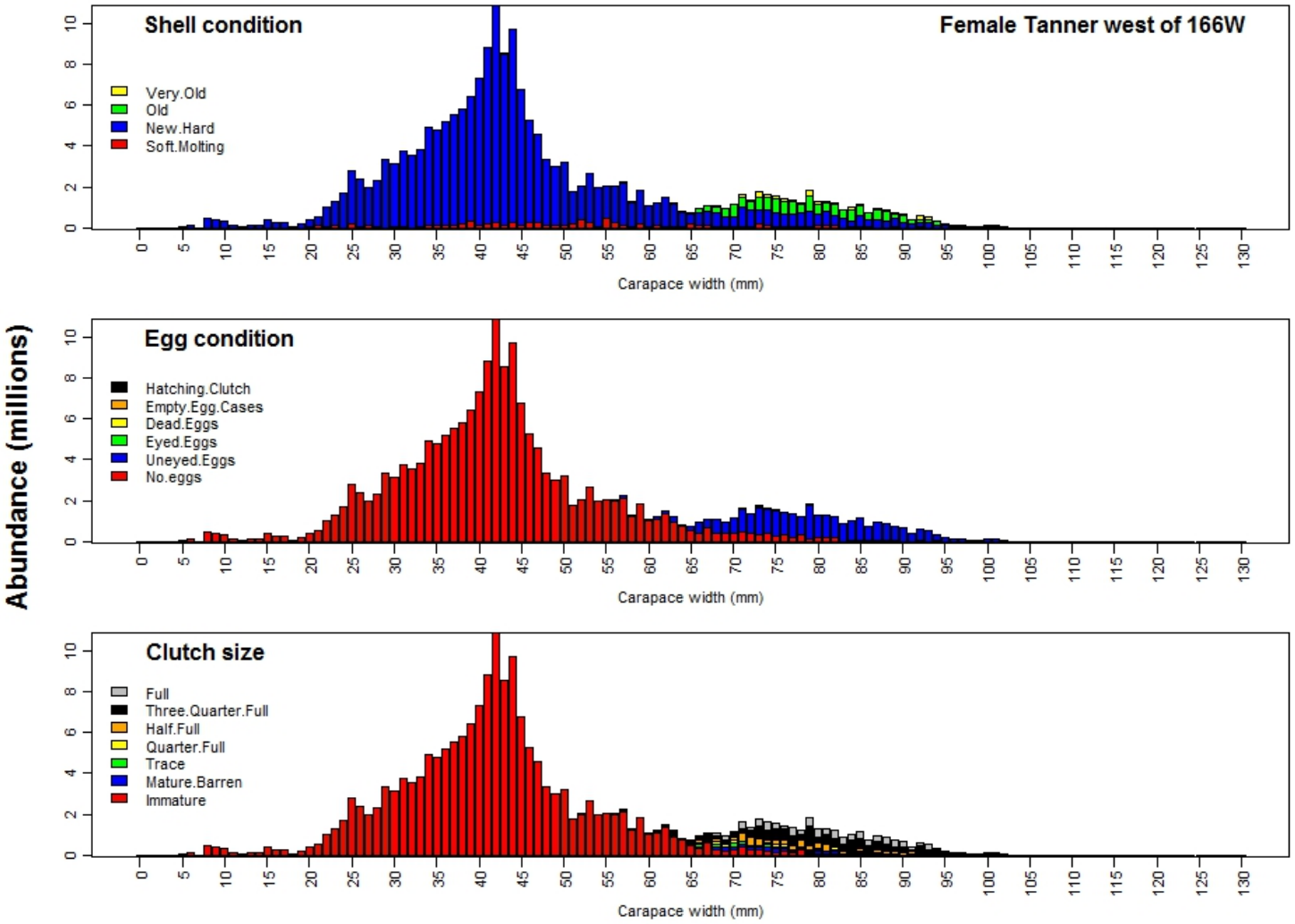

Figure 65. -- Size frequency by shell condition, egg condition, and clutch fullness of female Tanner crab (*Chionoecetes bairdi*) west of 166° W by 1 mm width classes for all districts combined in 2018.

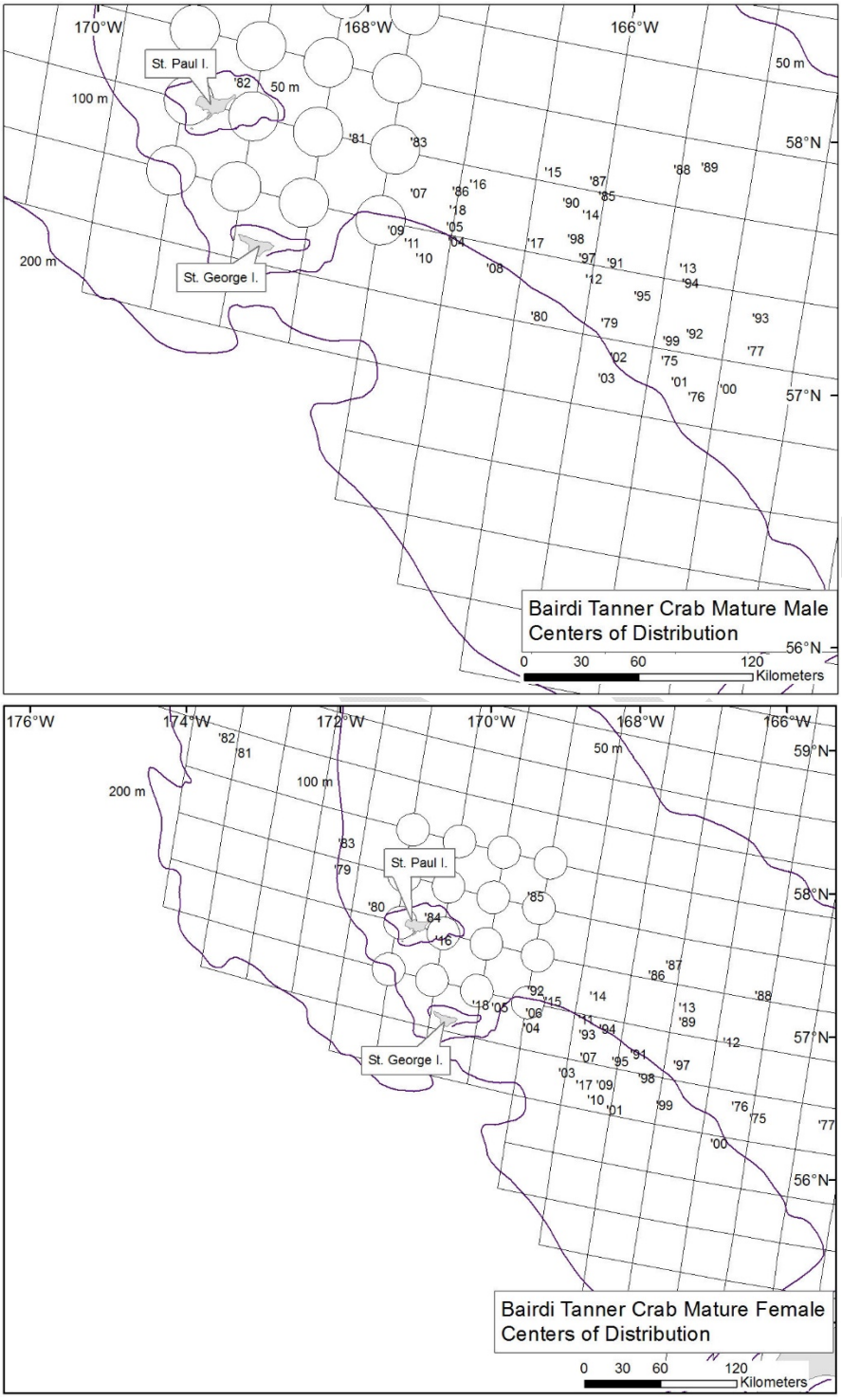

Figure 66. -- Centers of stock distribution of mature male and female Tanner crab (*Chionoecetes bairdi*) from 1975 to 2018.

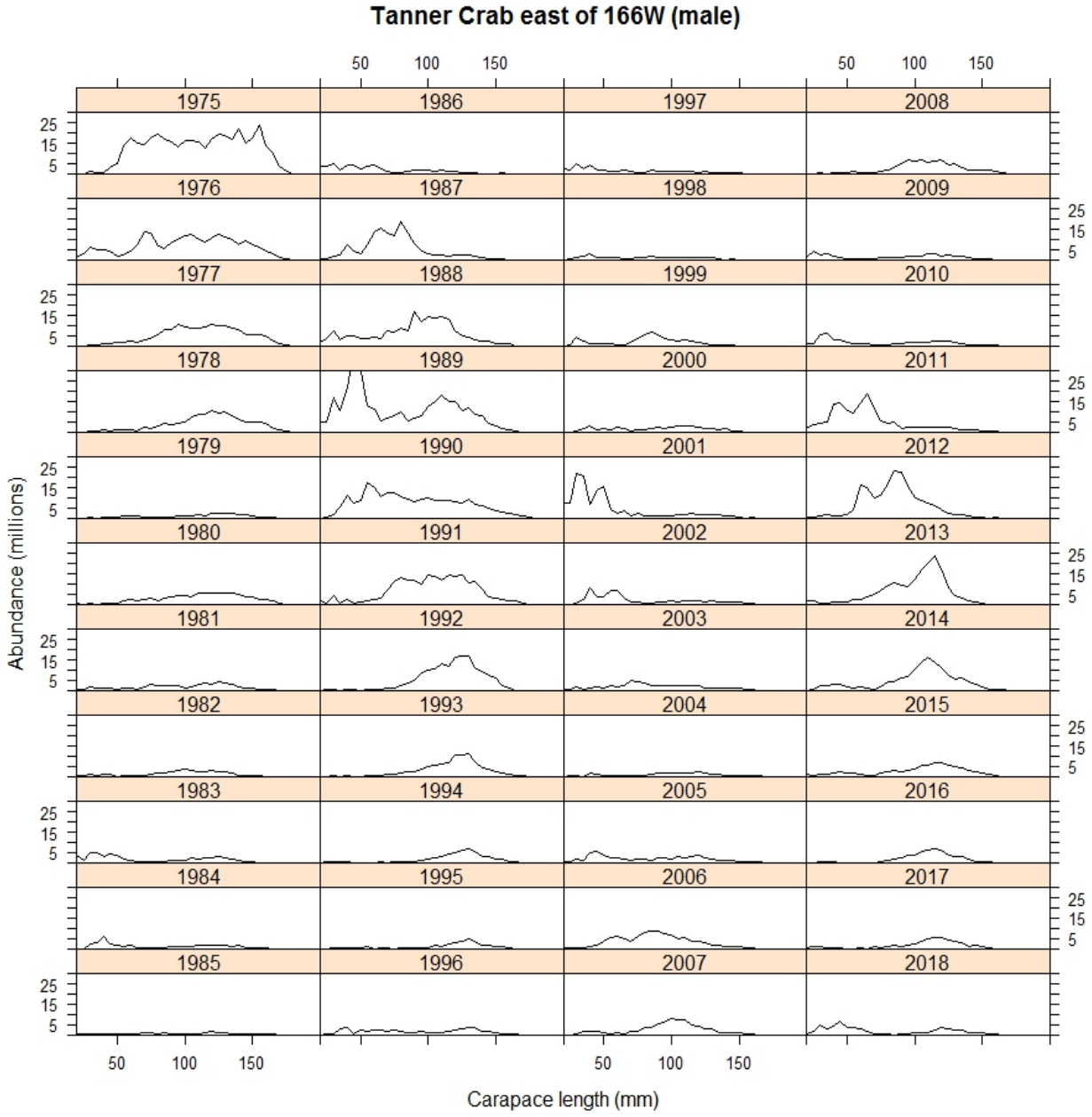

Figure 67. -- Historical size frequency by 5 mm width classes of male Tanner crab (*Chionoecetes bairdi*) east of 166°W, 1975 to 2018.

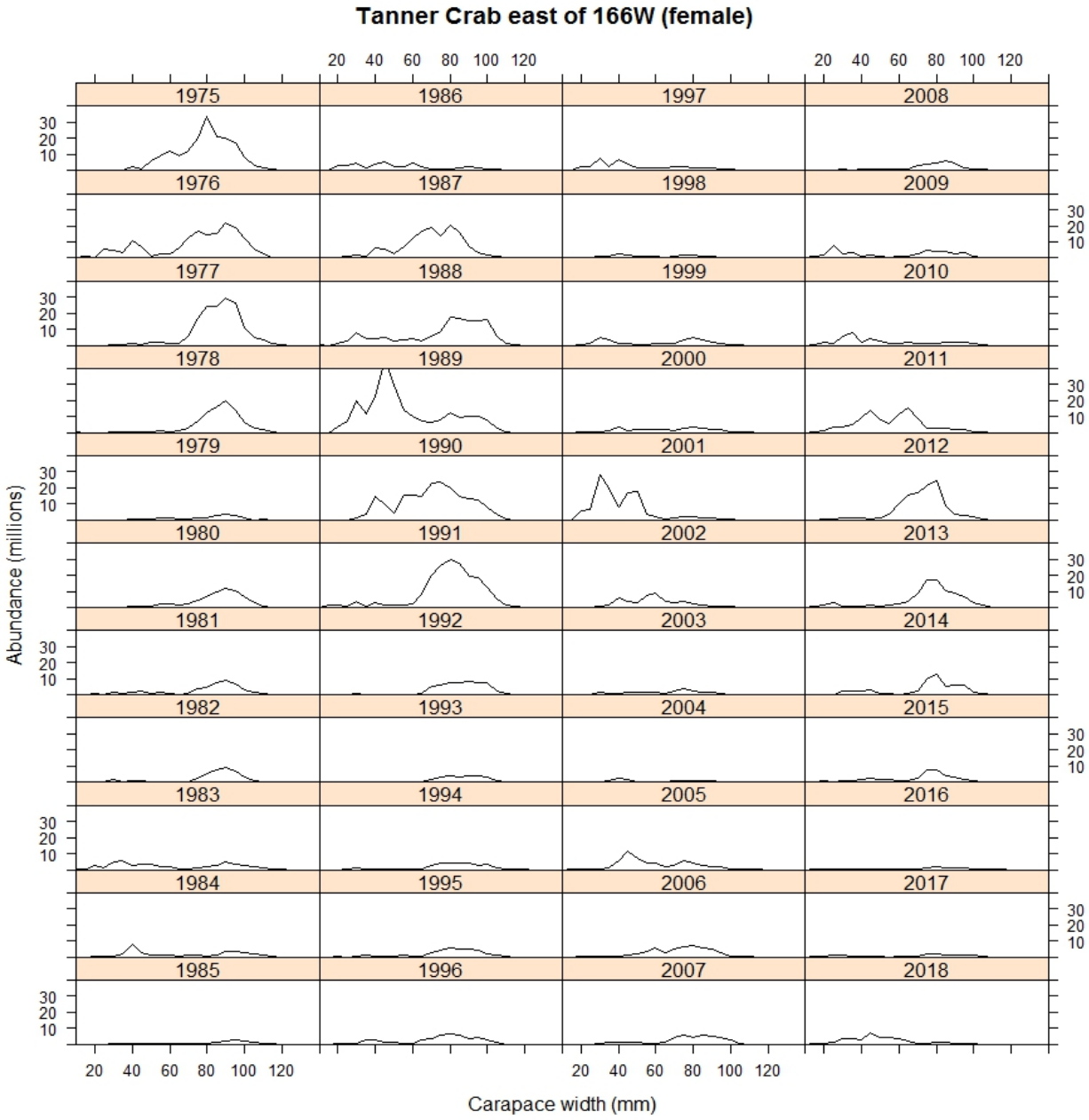

Figure 68. -- Historical size frequency by 5 mm width classes of female Tanner crab (*Chionoecetes bairdi*) east of 166°W, 1975 to 2018.

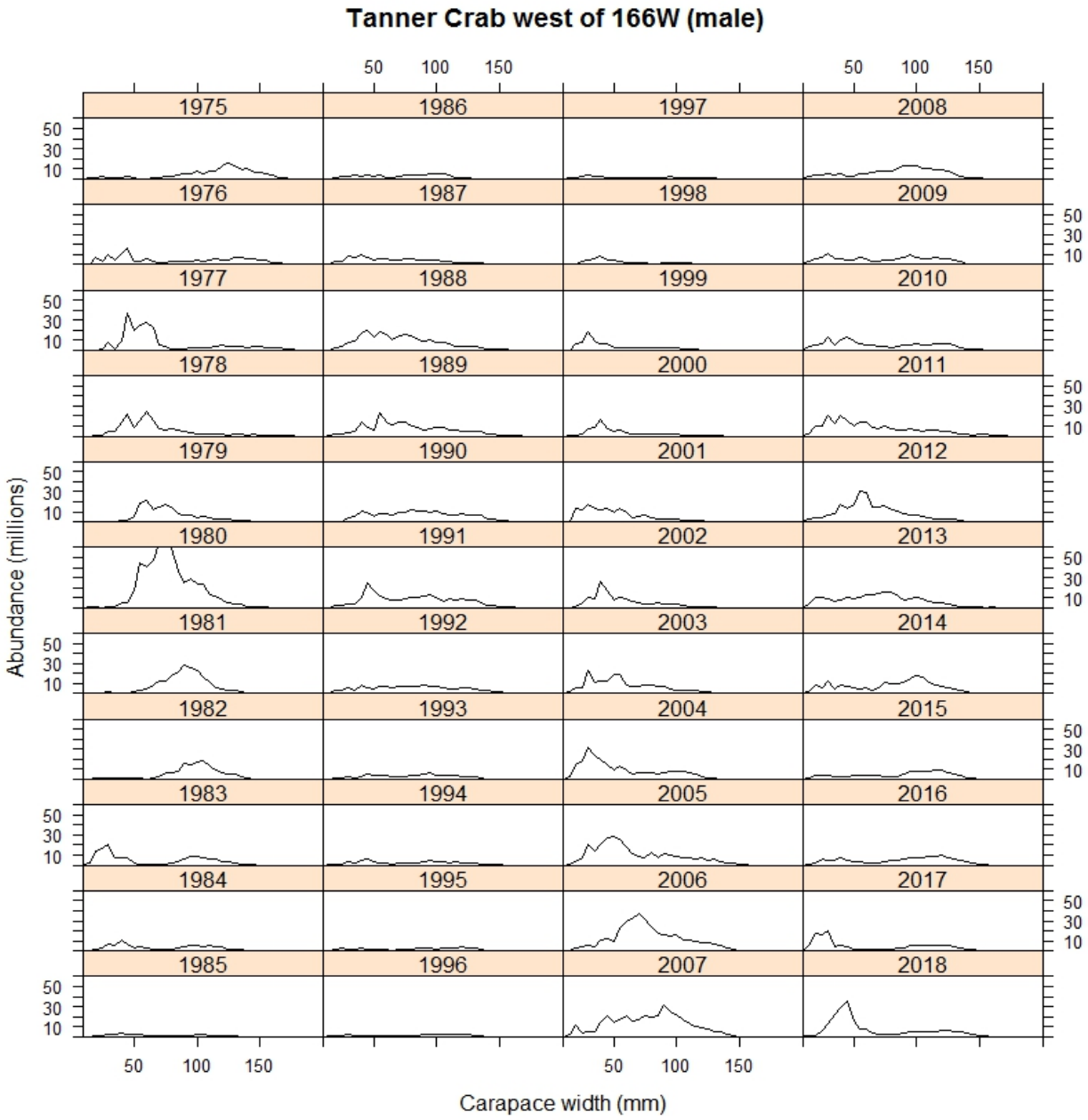

Figure 69. -- Historical size frequency by 5 mm width classes of male Tanner crab (*Chionoecetes bairdi*) west of 166°W, 1975 to 2018.

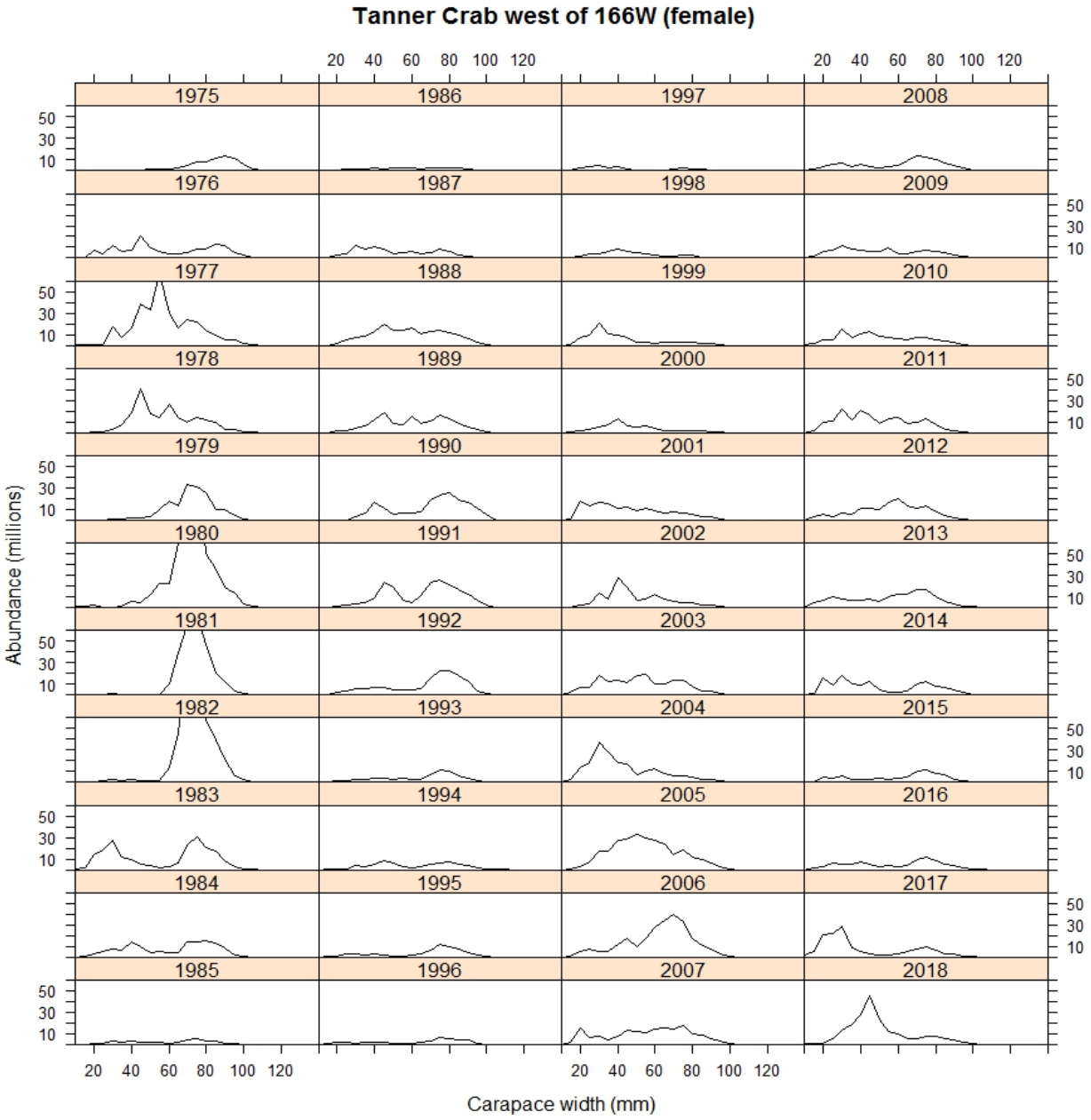

Figure 70. -- Historical size frequency by 5 mm width classes of female Tanner crab (*Chionoecetes bairdi*) west of 166°W, 1975 to 2018.

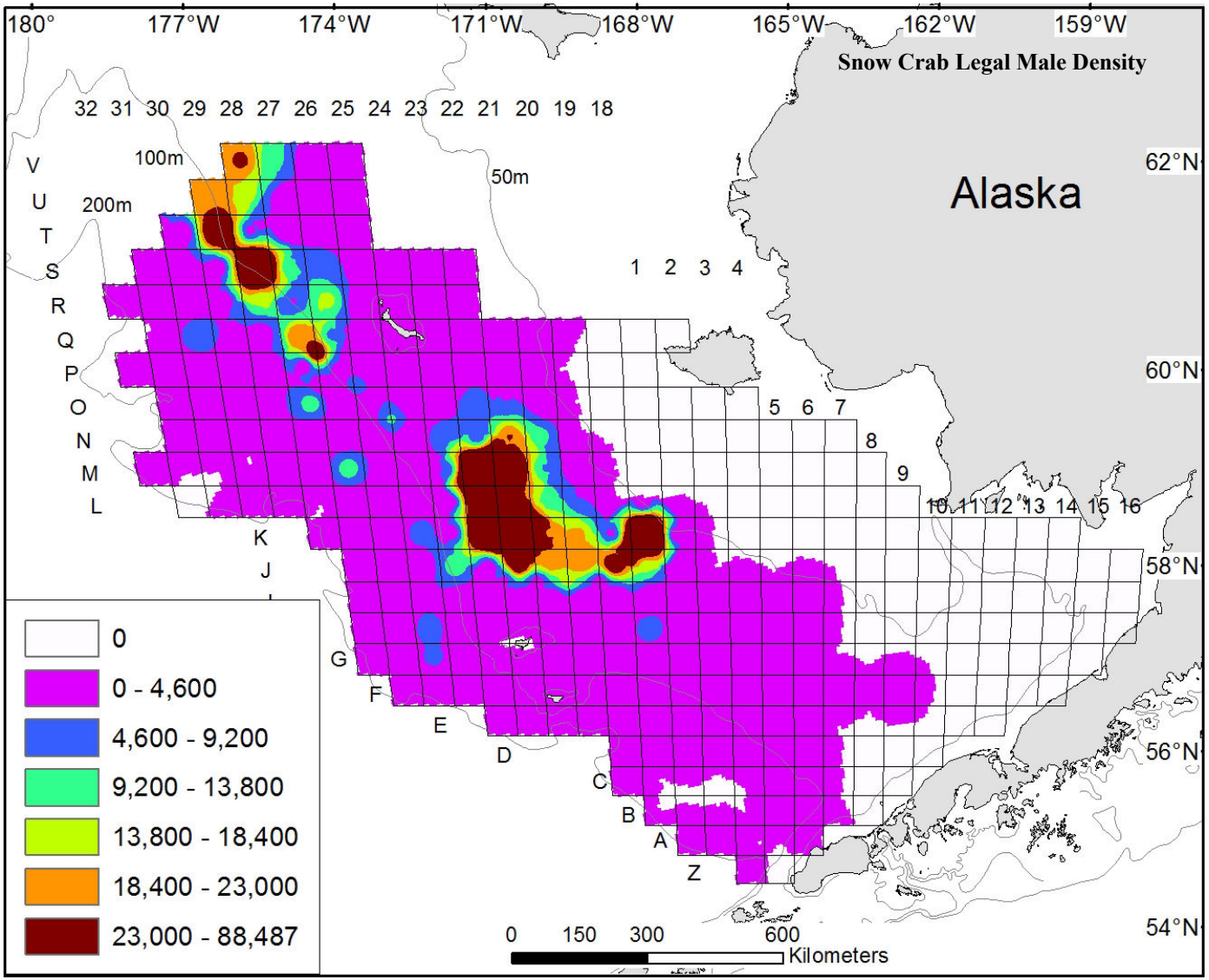

Figure 71. -- Total density (number nmi^{-2}) of legal-sized male snow crab (*Chionoecetes opilio*) at each station sampled in 2018.

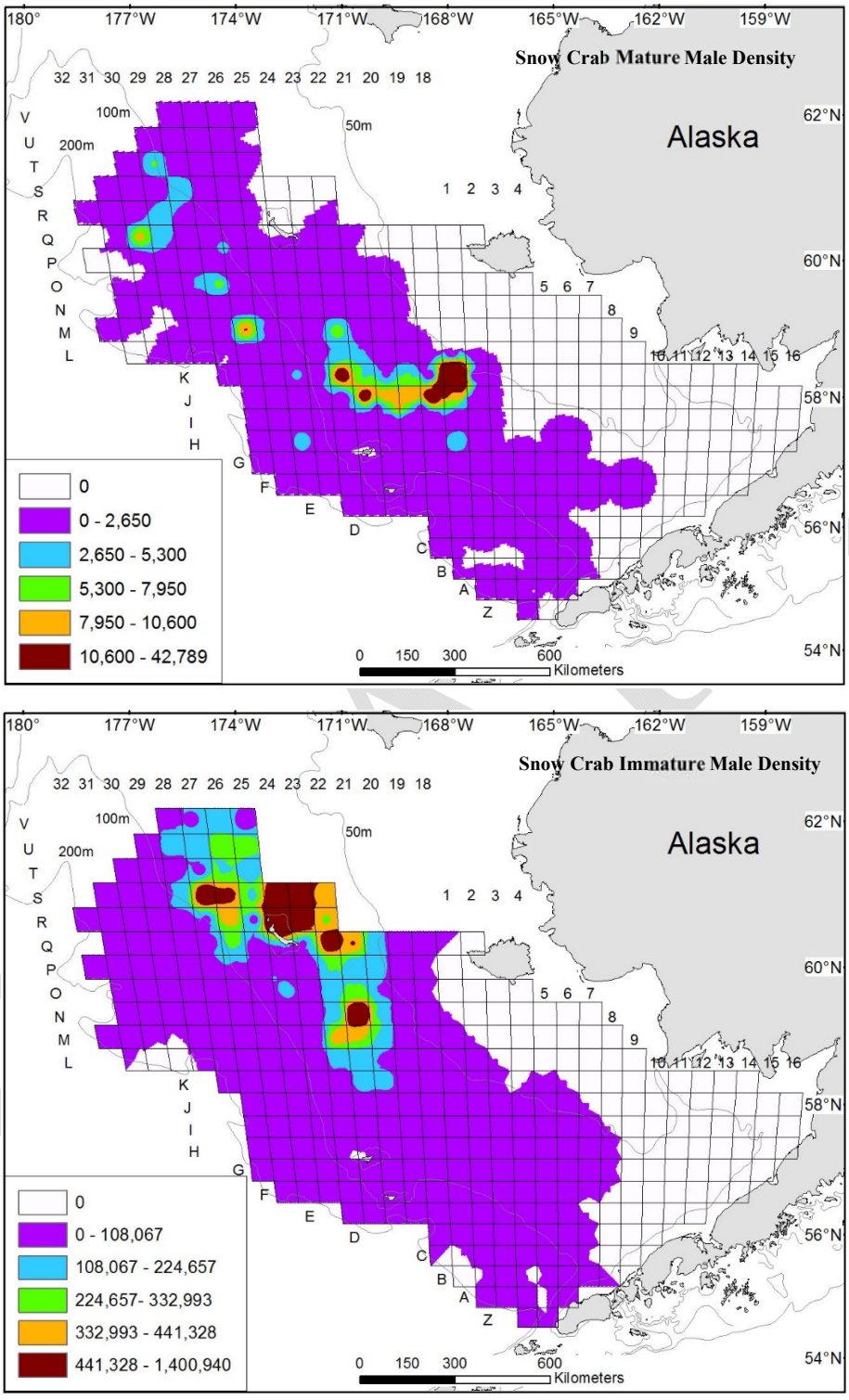

Figure 72. -- Total density (number nmi^{-2}) of mature male (top) and immature male (bottom) snow crab (*Chionoecetes opilio*) at each station sampled in 2018.

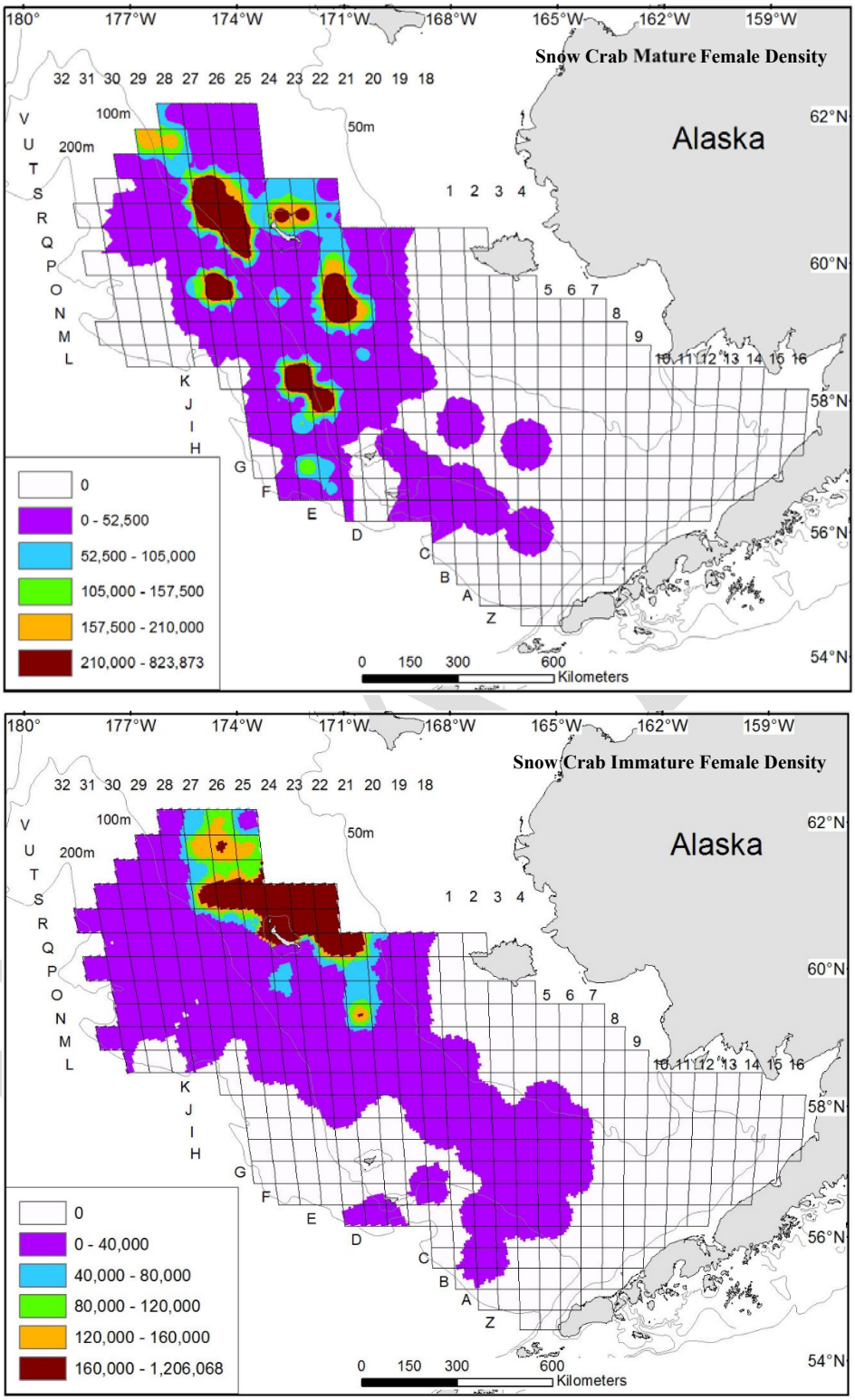

Figure 73. -- Total density (number nmi^{-2}) of mature female (top) and immature female (bottom) snow crab (*Chionoecetes opilio*) at each station sampled in 2018.

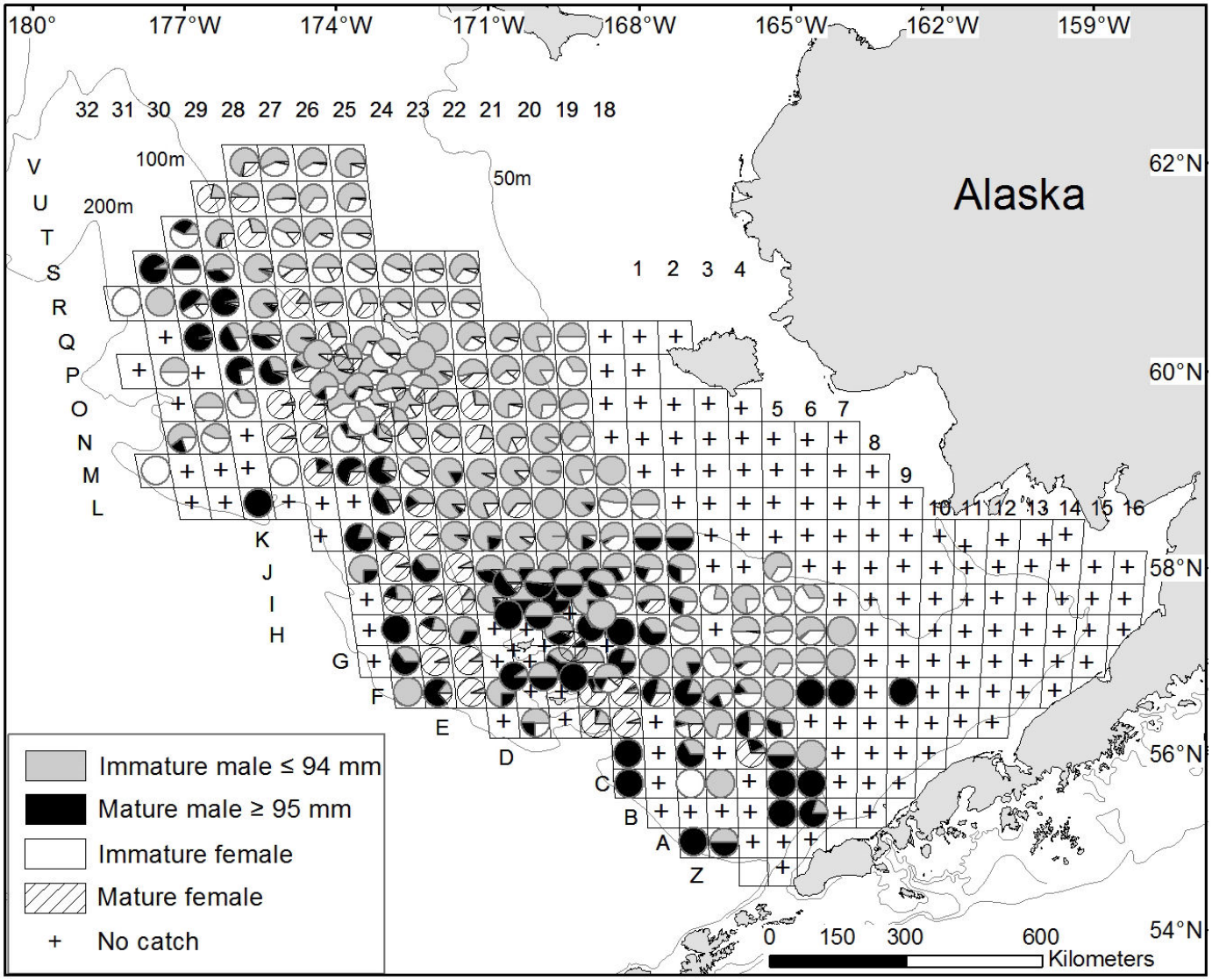

Figure 74. -- Percentage of male and female snow crab (*Chionoecetes opilio*) maturity categories at each station sampled in 2018.

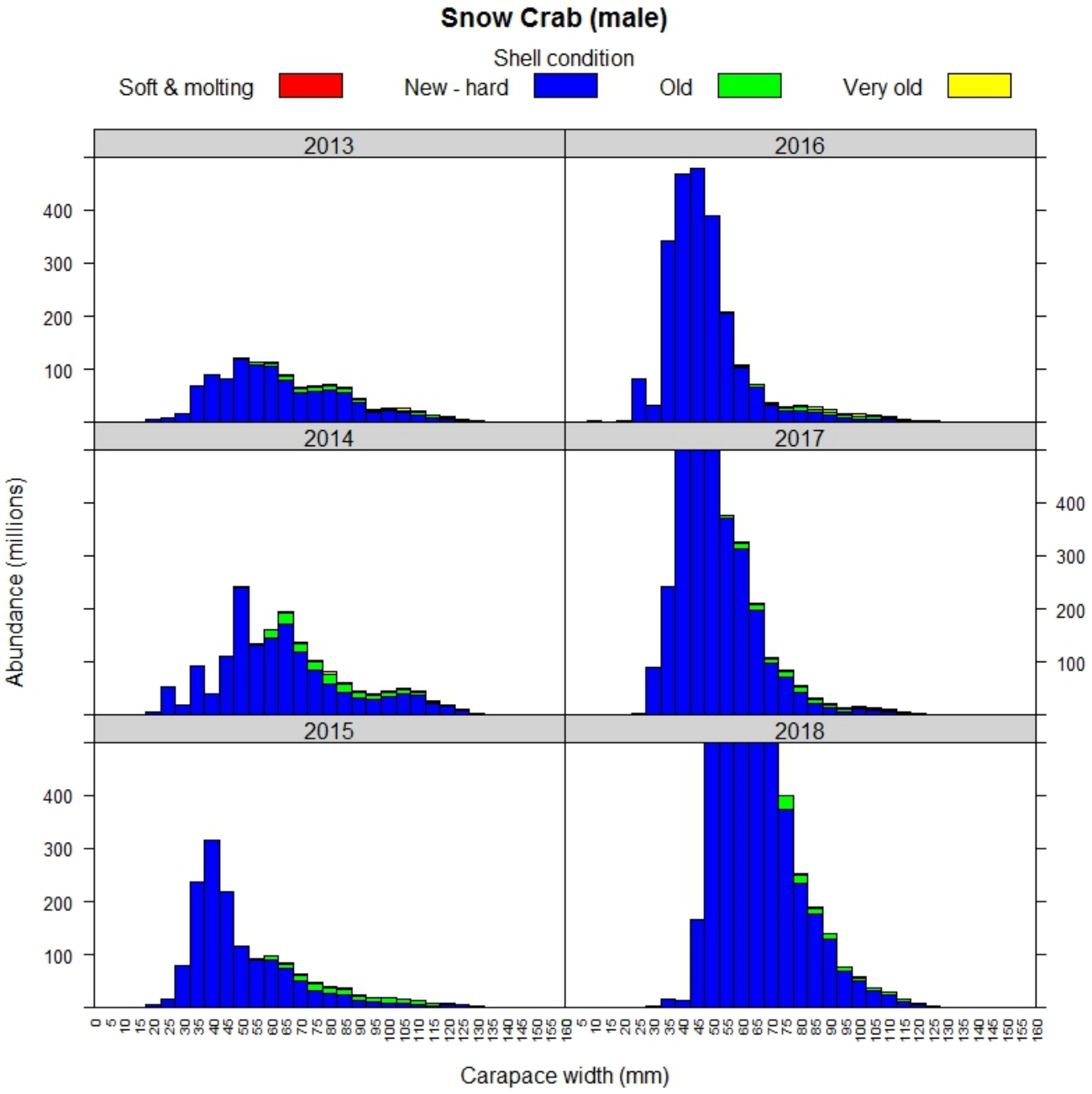

Figure 75. -- Size frequency by shell condition of male snow crab (*Chionoecetes opilio*) by 5 mm width classes of all districts combined, 2013-2018.

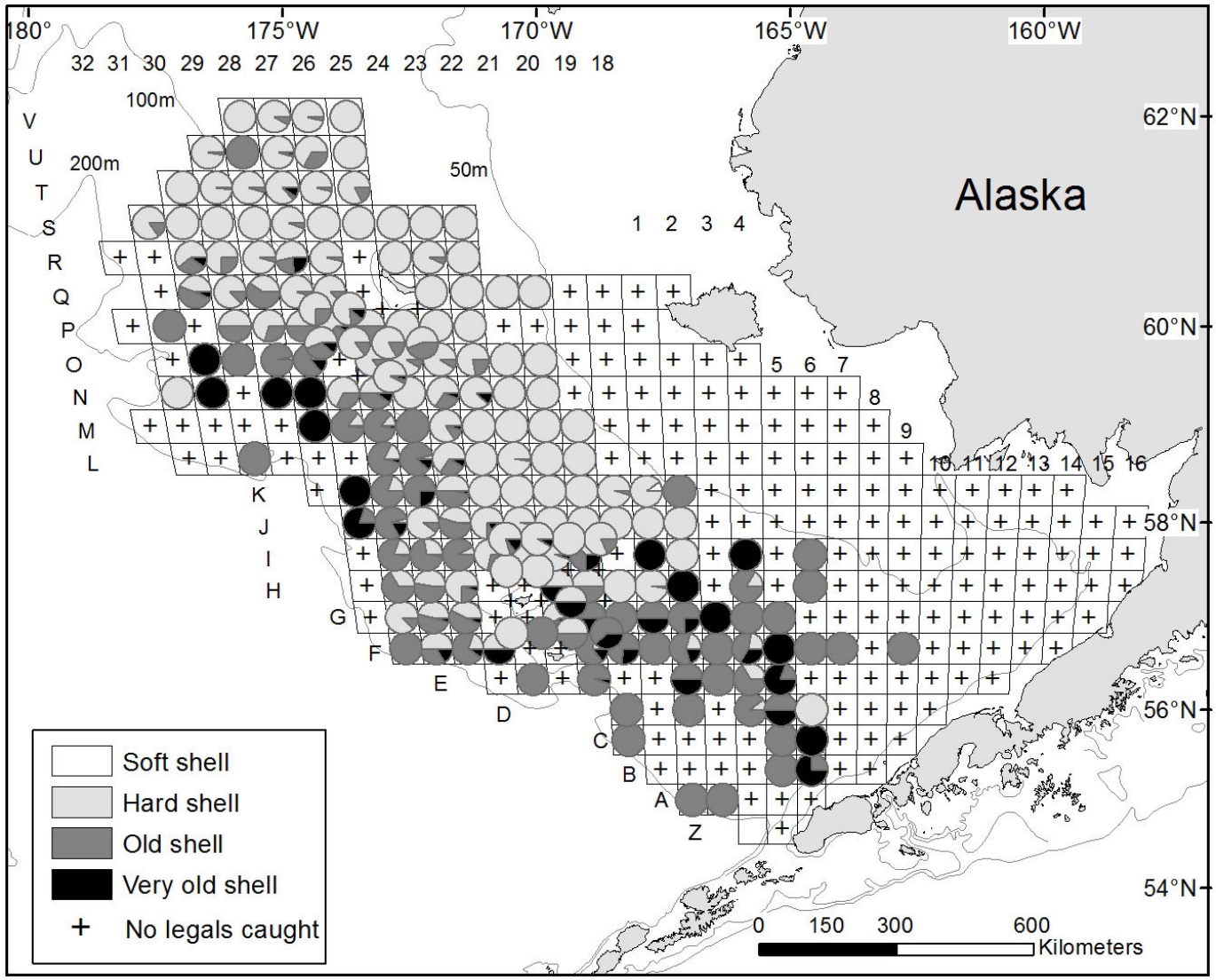

Figure 76. -- Distribution of legal-sized male snow crab (*Chionoecetes opilio*) caught at each station in 2018 and distinguished by shell condition.

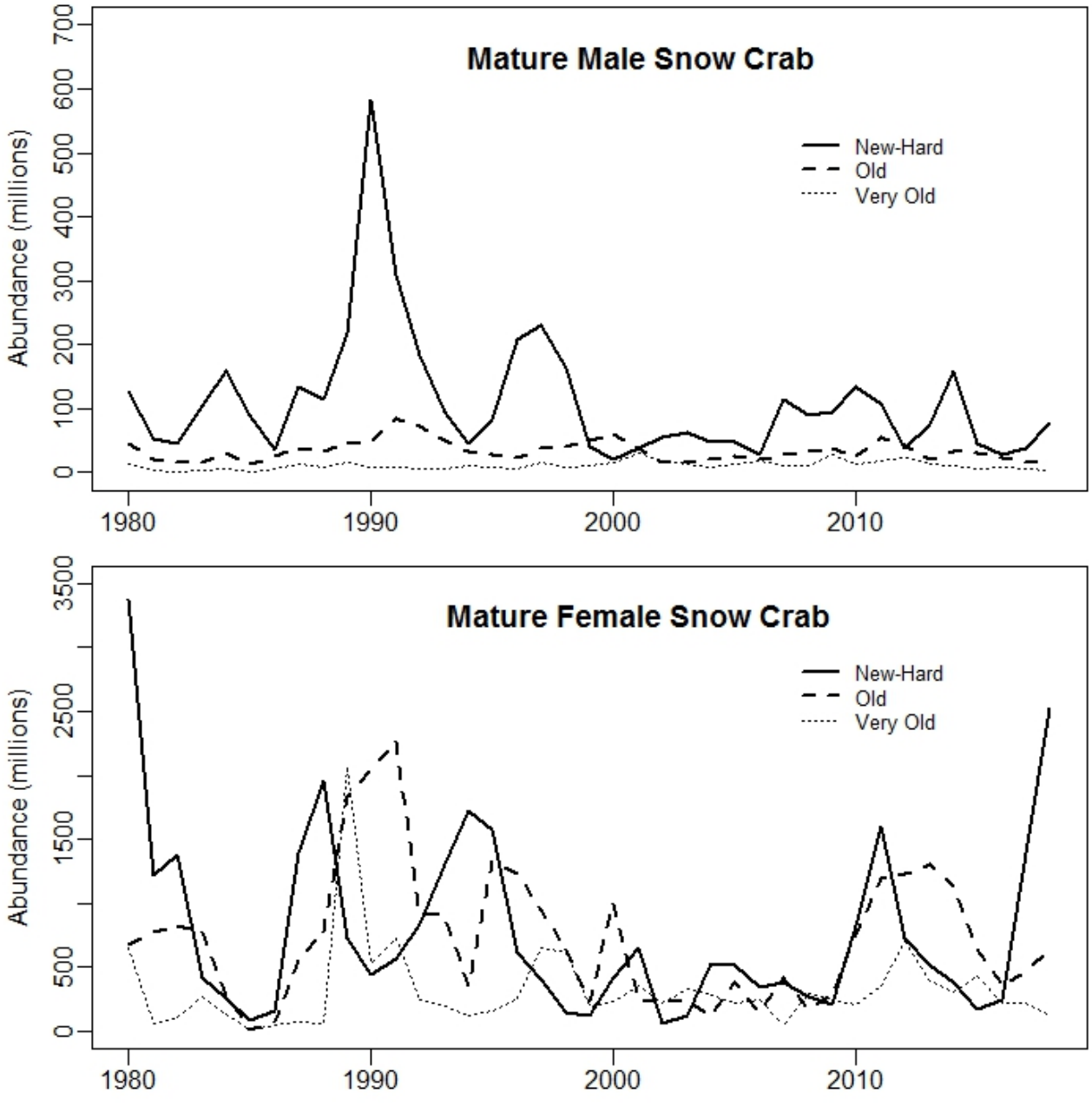

Figure 77. -- Time series of mature male (≥ 95 mm CW) and female (actual maturity) snow crab (Chionoecetes opilio) by shell condition, 1980-2018. New- Hard = shell condition 2; Old = shell condition 3; Very Old = shell condition 4 and 5 combined.

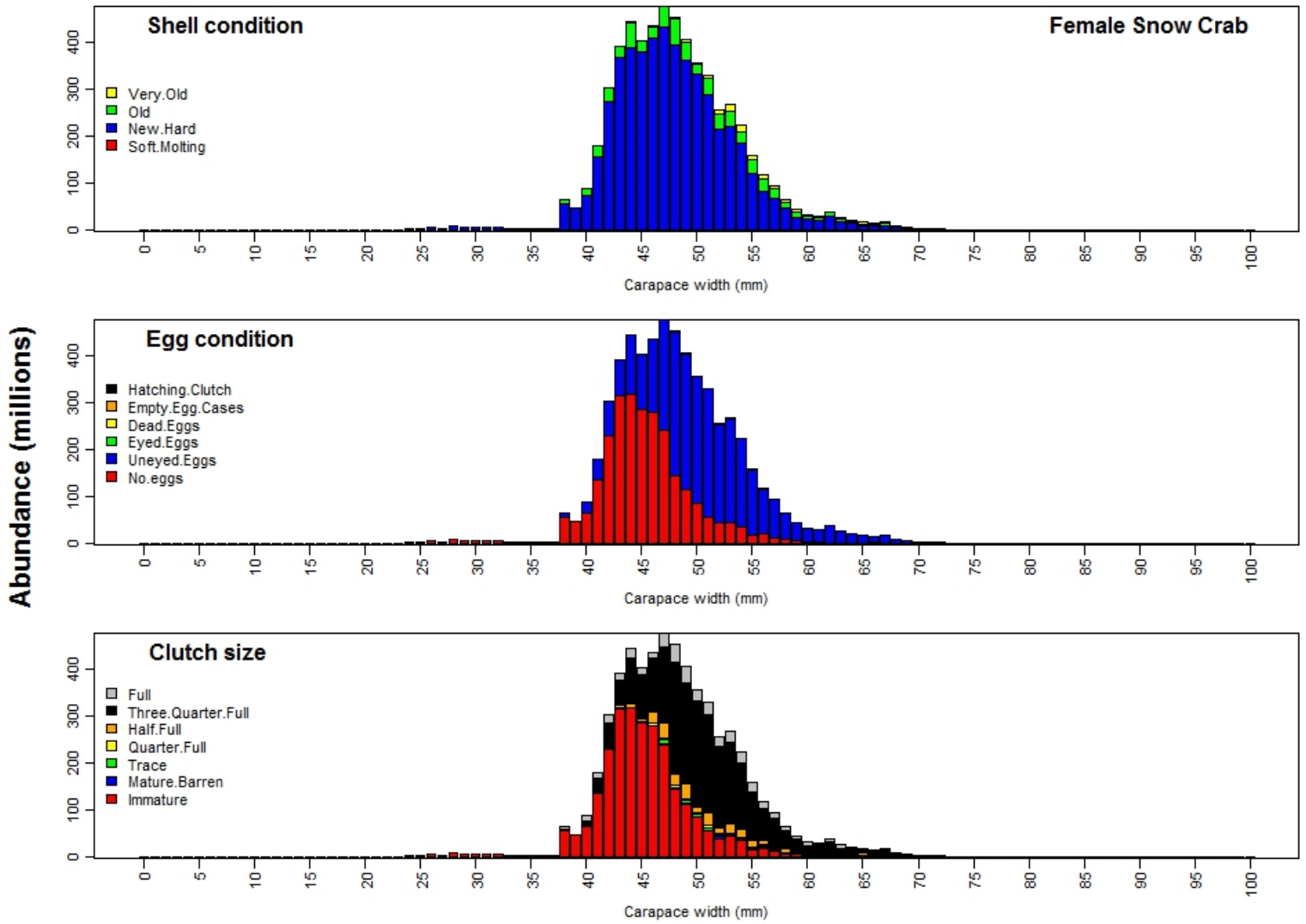

Figure 78. -- Size frequency by shell condition, egg condition, and clutch fullness of female snow crab (*Chionoecetes opilio*) by 1 mm width classes of all districts combined in 2018.

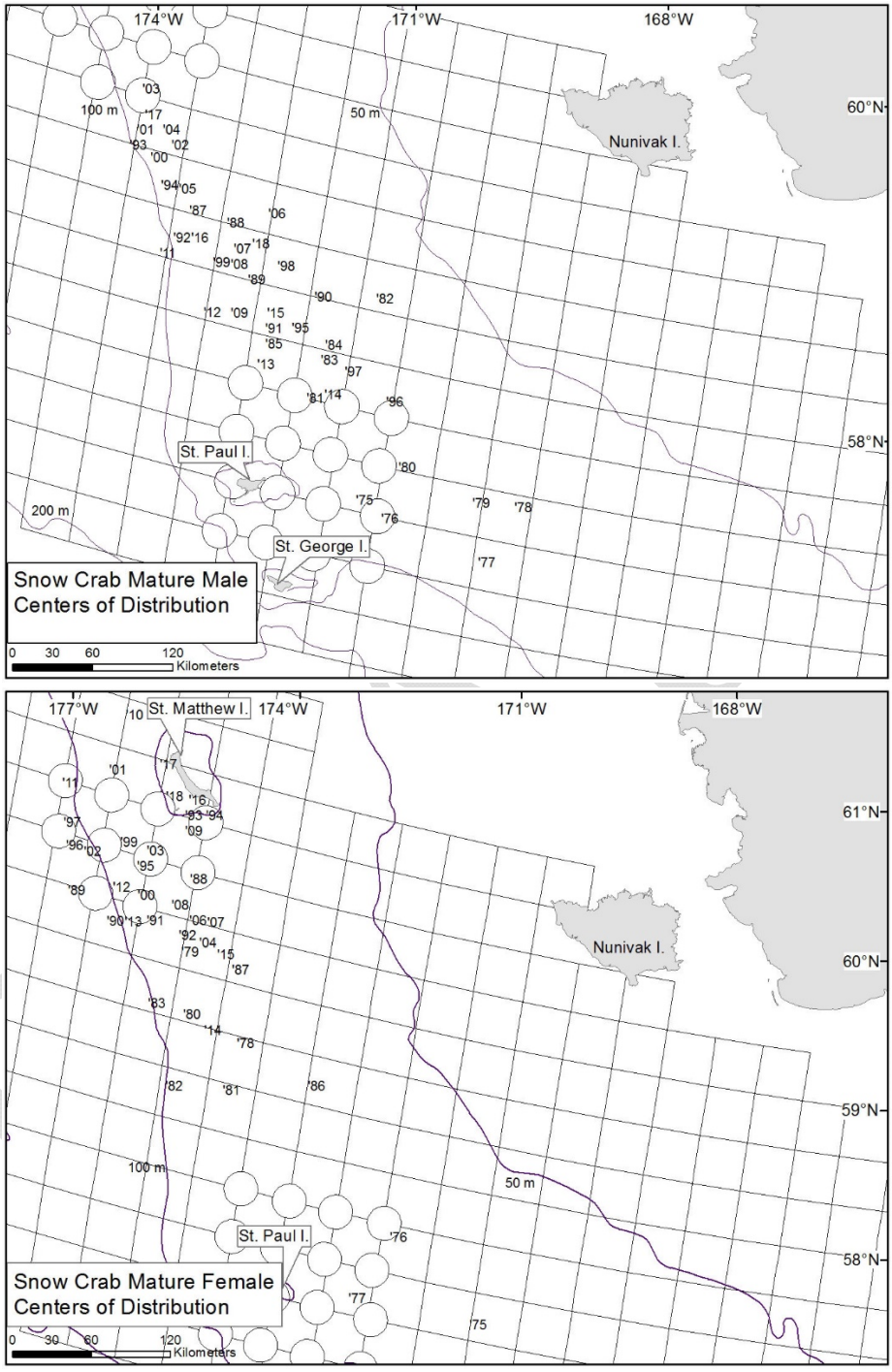

Figure 79. -- Centers of stock distribution of mature male and female snow crab (*Chionoecetes opilio*) from 1975 to 2018.

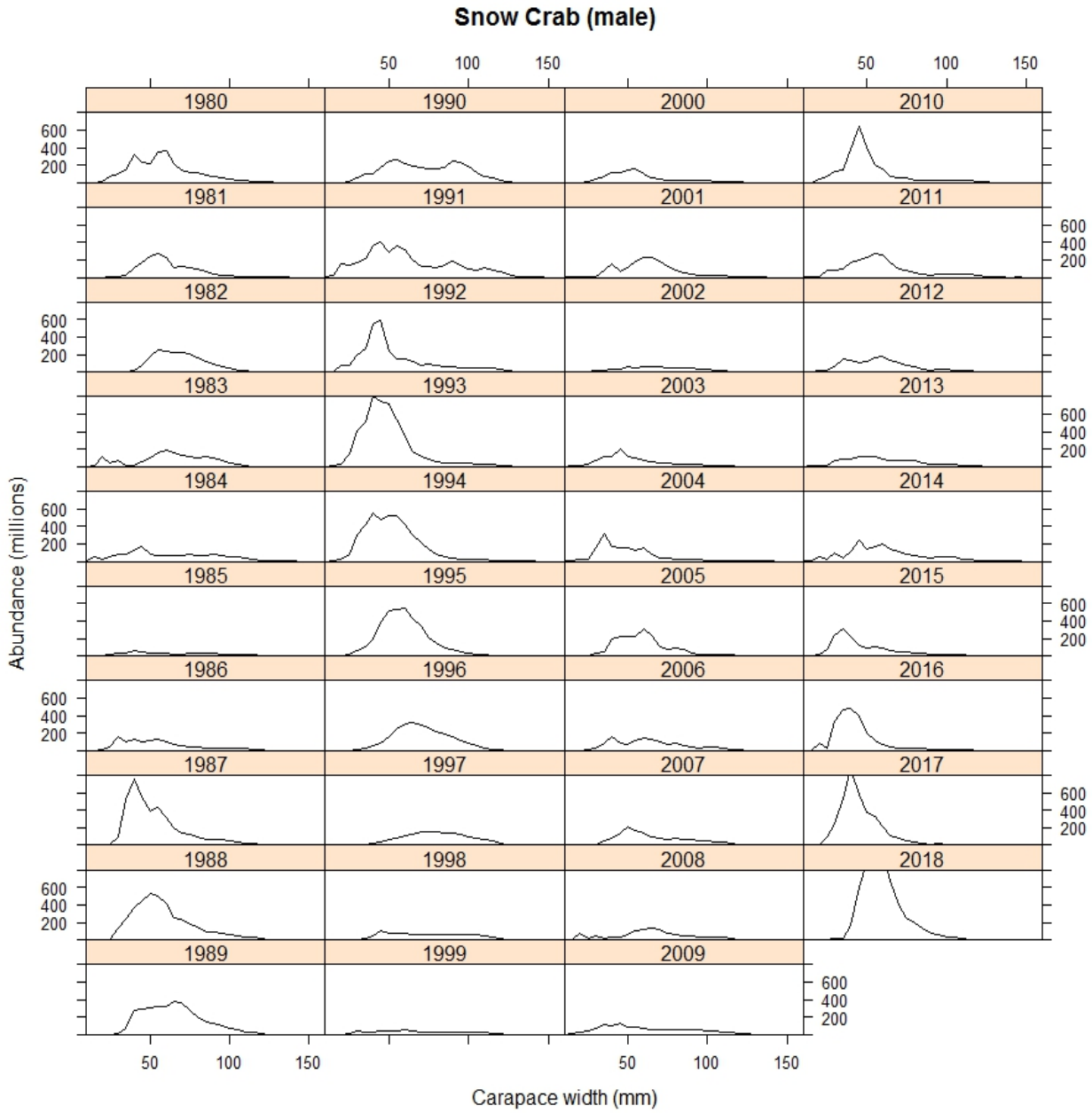

Figure 80. -- Historical size frequency by 5 mm width classes of male snow crab (*Chionoecetes opilio*), 1980 to 2018.

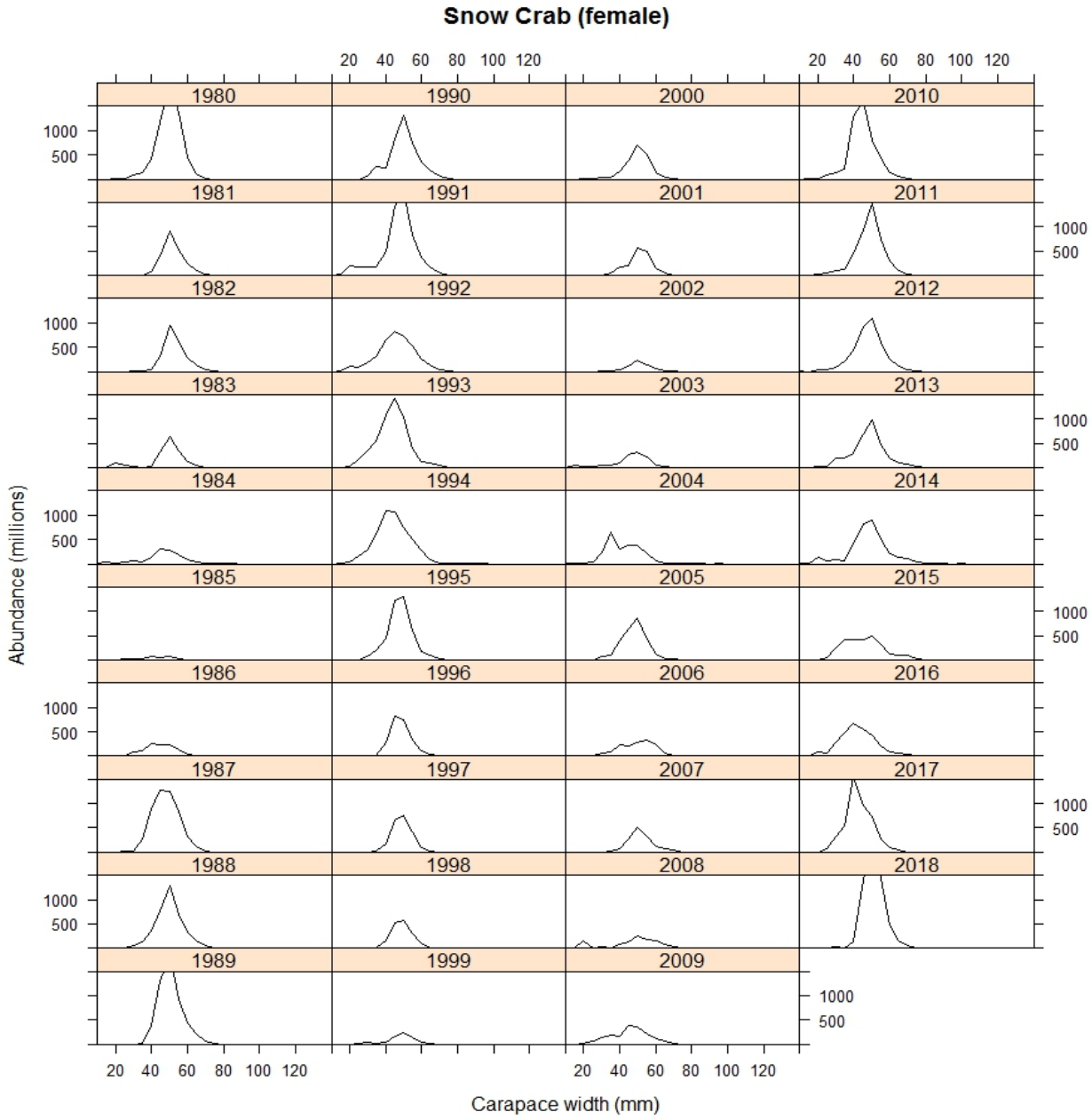

Figure 81. -- Historical size frequency by 5 mm width classes of female snow crab (*Chionoecetes opilio*), 1980 to 2018.

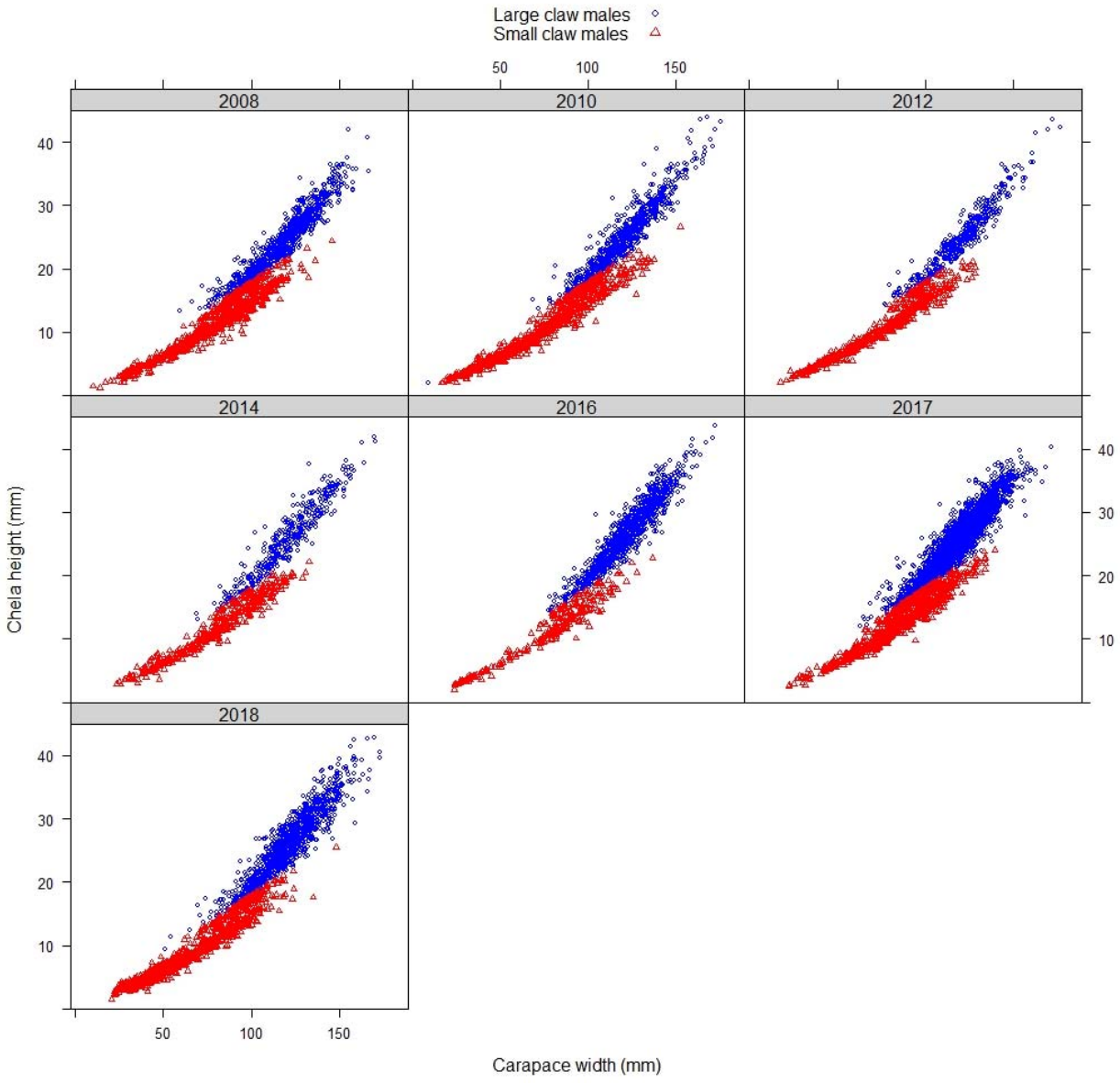

Figure 82a. – Male Tanner crab (*Chionoecetes bairdi*) chela height and carapace width measurements collected during the 2008, 2010, 2012, 2014, 2016, 2017 and 2018 (all years combined, n = 12,897) eastern Bering Sea bottom trawl surveys. Maturity classification on the basis of being large claw or small claw, with cutline at chela height/carapace width = 0.18.

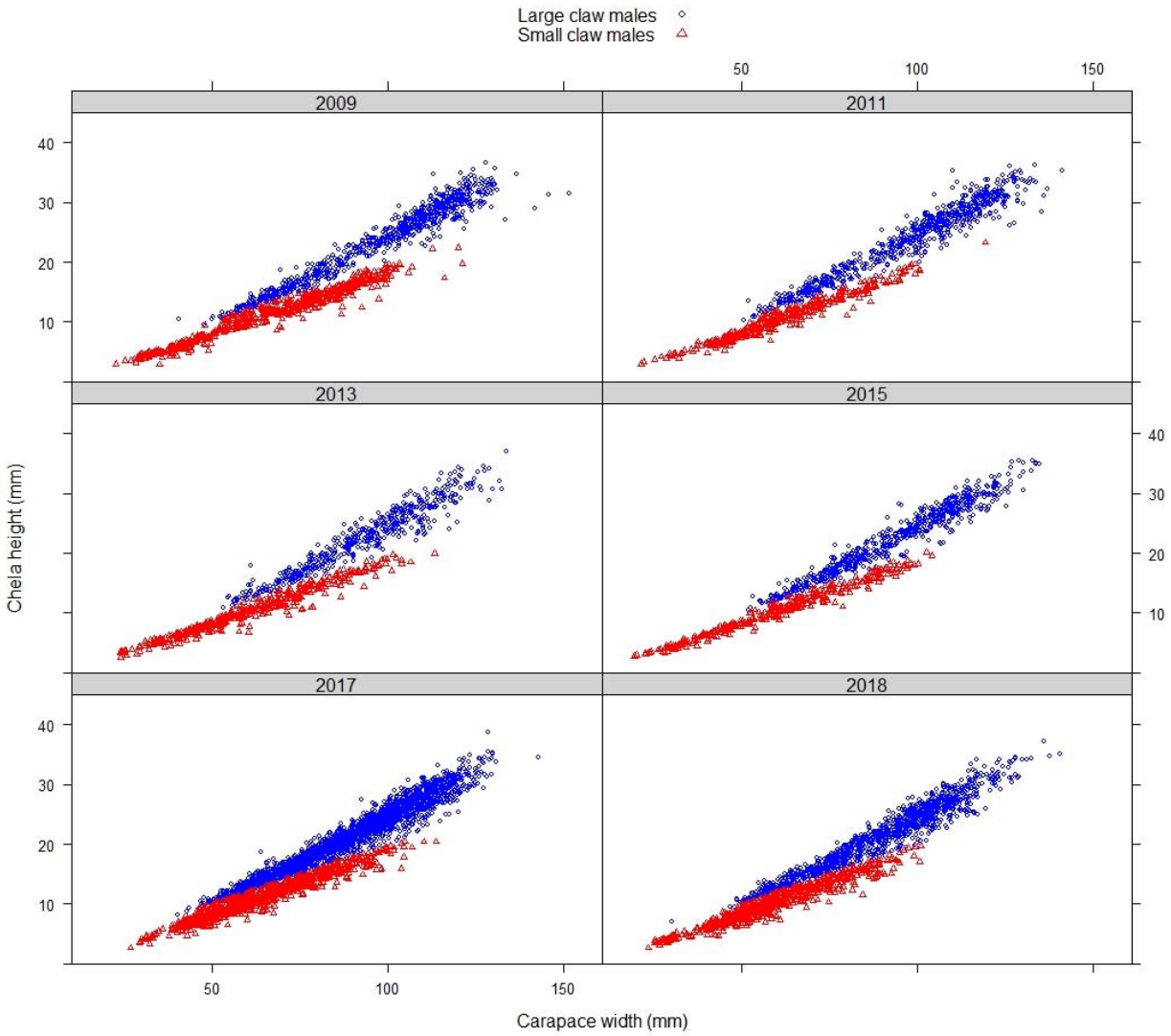

Figure 82b. – Male snow crab (*Chionoecetes opilio*) chela height and carapace width measurements collected during the 2009, 2011, 2013, 2015, 2017 and 2018 (all years combined, n = 9,557) eastern Bering Sea bottom trawl surveys. Maturity classification on the basis of being large claw or small claw, with cutline at chela height/carapace width = 0.20.

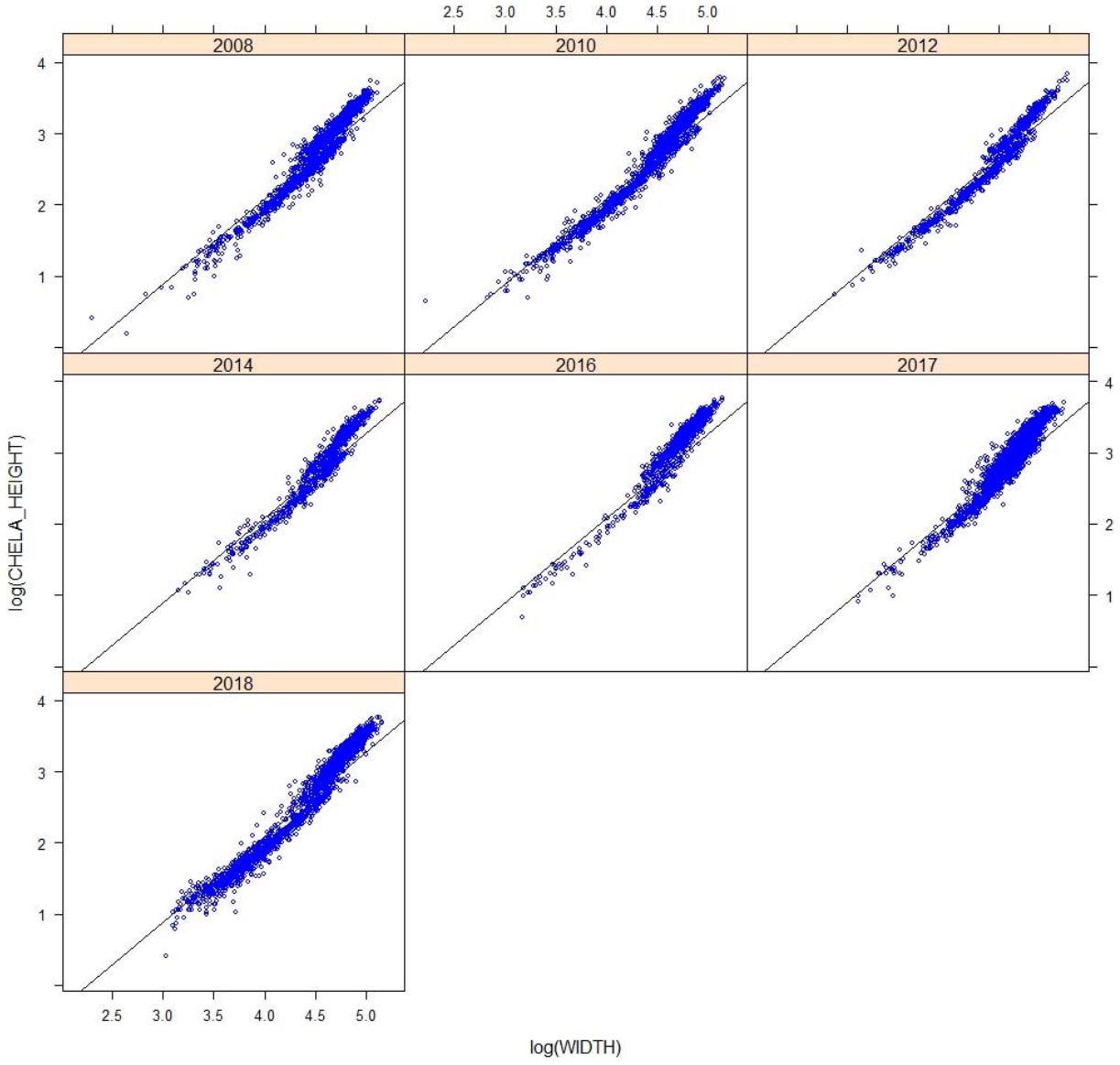

Figure 82c. – Male Tanner crab (*Chionoecetes bairdi*) chela height and carapace width measurements collected during the 2008, 2010, 2012, 2014, 2016, 2017 and 2018 (all years combined, n = 12,897) eastern Bering Sea bottom trawl surveys. Measurements are natural log-linearized. Black line is maturity cutline derived using distribution-based approach

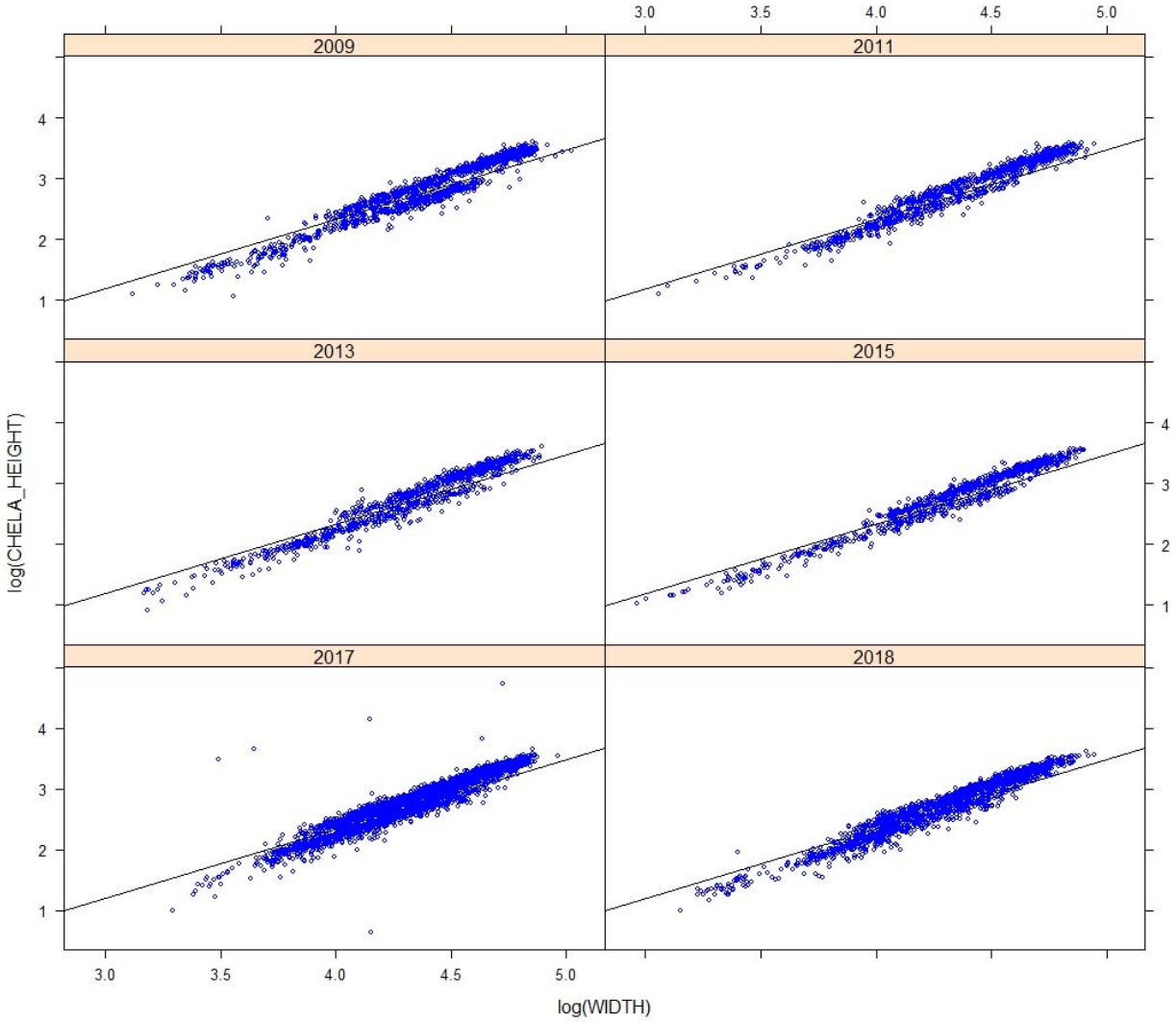

Figure 82d. – Male snow crab (*Chionoecetes opilio*) chela height and carapace width measurement collected during the 2009, 2011, 2013, 2015, 2017 and 2018 (all years combined, n = 9,557) eastern Bering Sea bottom trawl surveys. Measurements are natural log-linearized. Black line is maturity cutline derived using distribution-based approach.

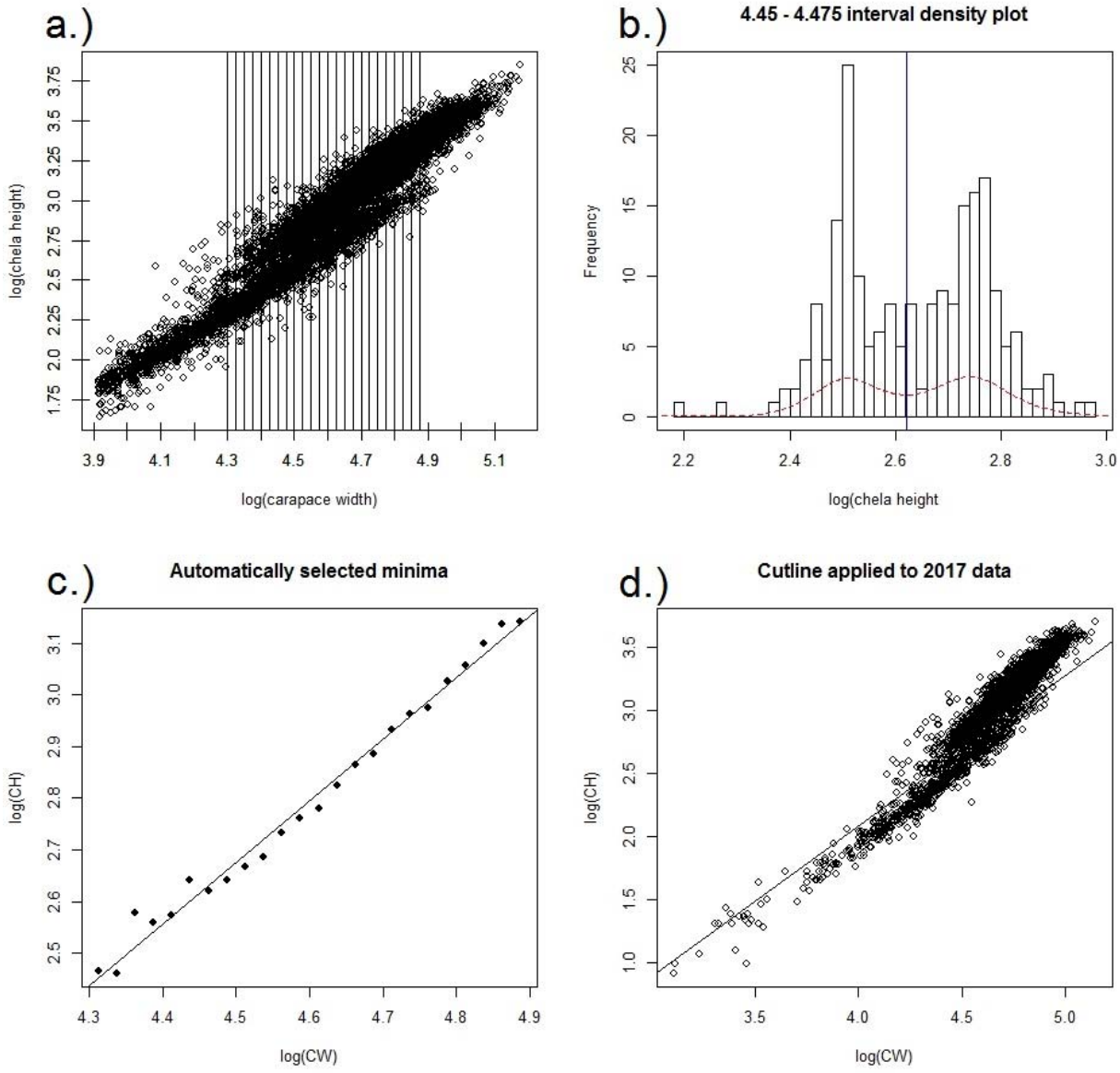

Figure 83. – Example plots from development of distribution based maturity classification approach; a.) combined data for Bairdi from 2008, 2010, 2012, 2014, 2016 and 2017, with intervals (vertical black lines), b.) Example distribution, derived from the log (carapace width) = 4.45 – 4.475 interval, with distribution minima (blue line), c.) plotted minima from all intervals, with fitted linear regression line, d.) linear regression line applied to 2017 Bairdi data as a maturity cutline.

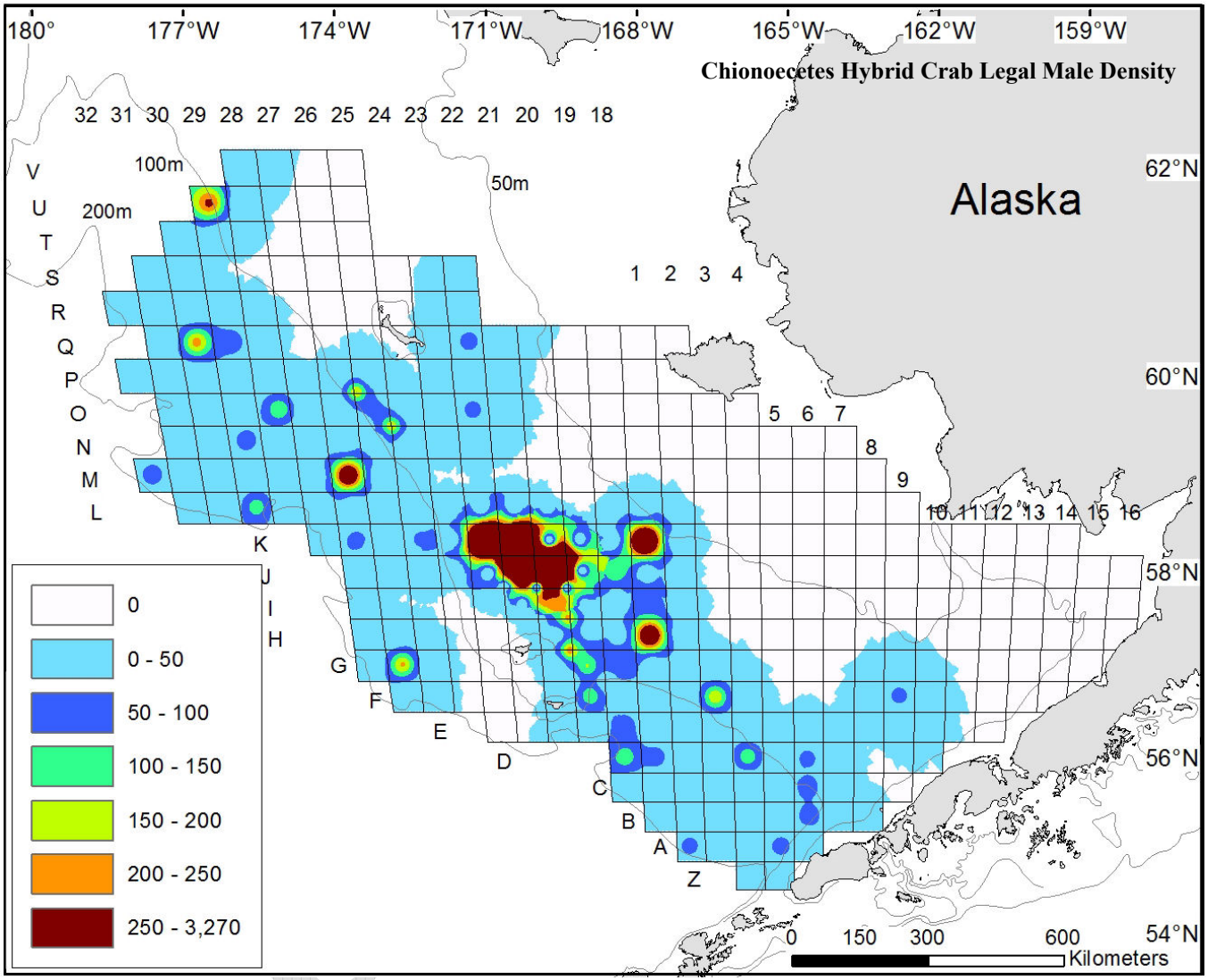

Figure 84. -- Total density (number nmi^{-2}) of legal-sized male *Chionoecetes* spp. hybrid crab at each station sampled in 2018 using *C. opilio* legal size definition (legal size ≥ 78 mm).

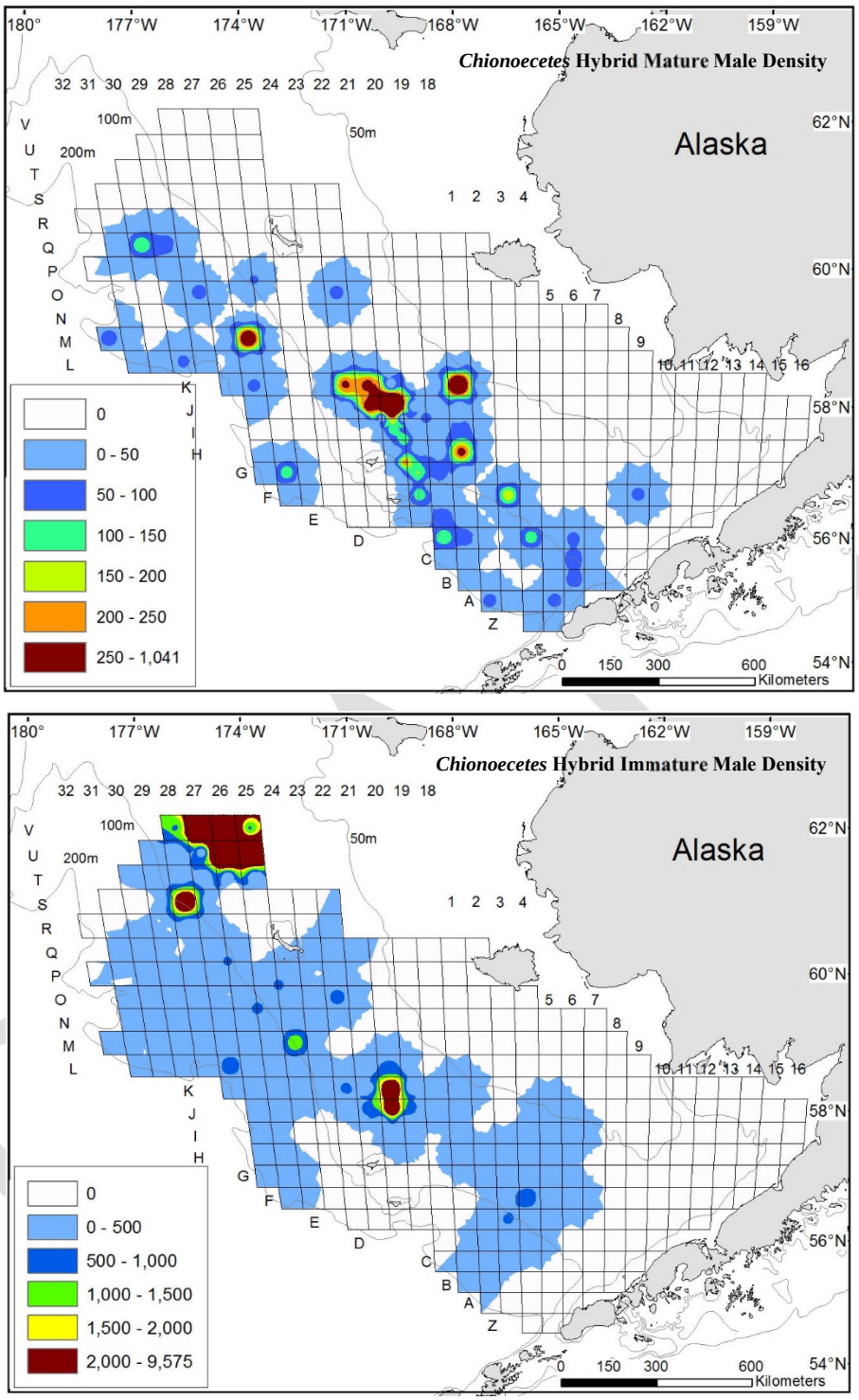

Figure 85. -- Total density (number nmi^{-2}) of mature male (top) and immature male (bottom) *Chionoecetes* spp. hybrid crab at each station sampled in 2018 using C. opilio mature size definitions (mature male ≥ 95 mm).

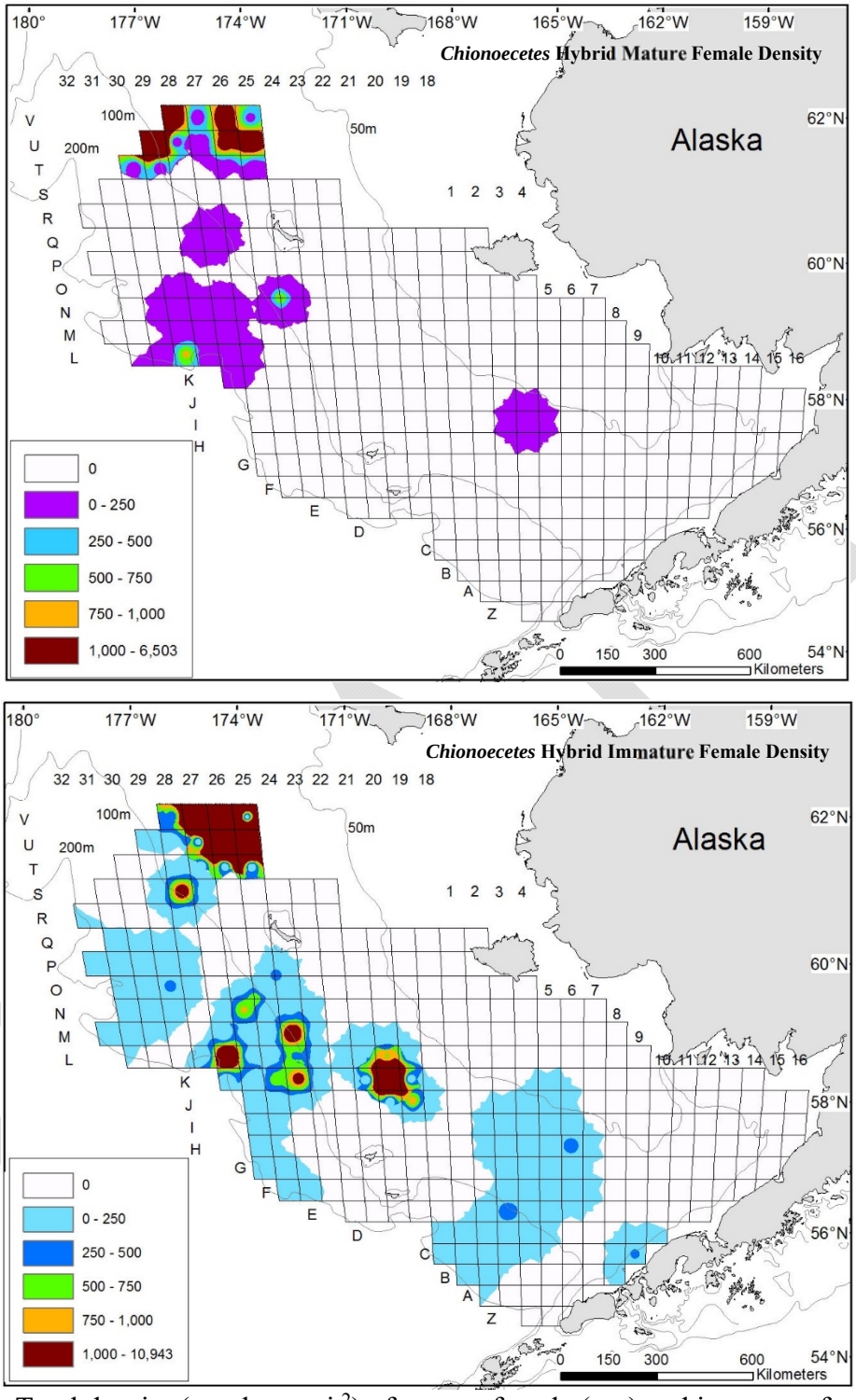

Figure 86. -- Total density (number nmi^{-2}) of mature female (top) and immature female (bottom) *Chionoecetes* spp. hybrid crab at each station sampled in 2018.

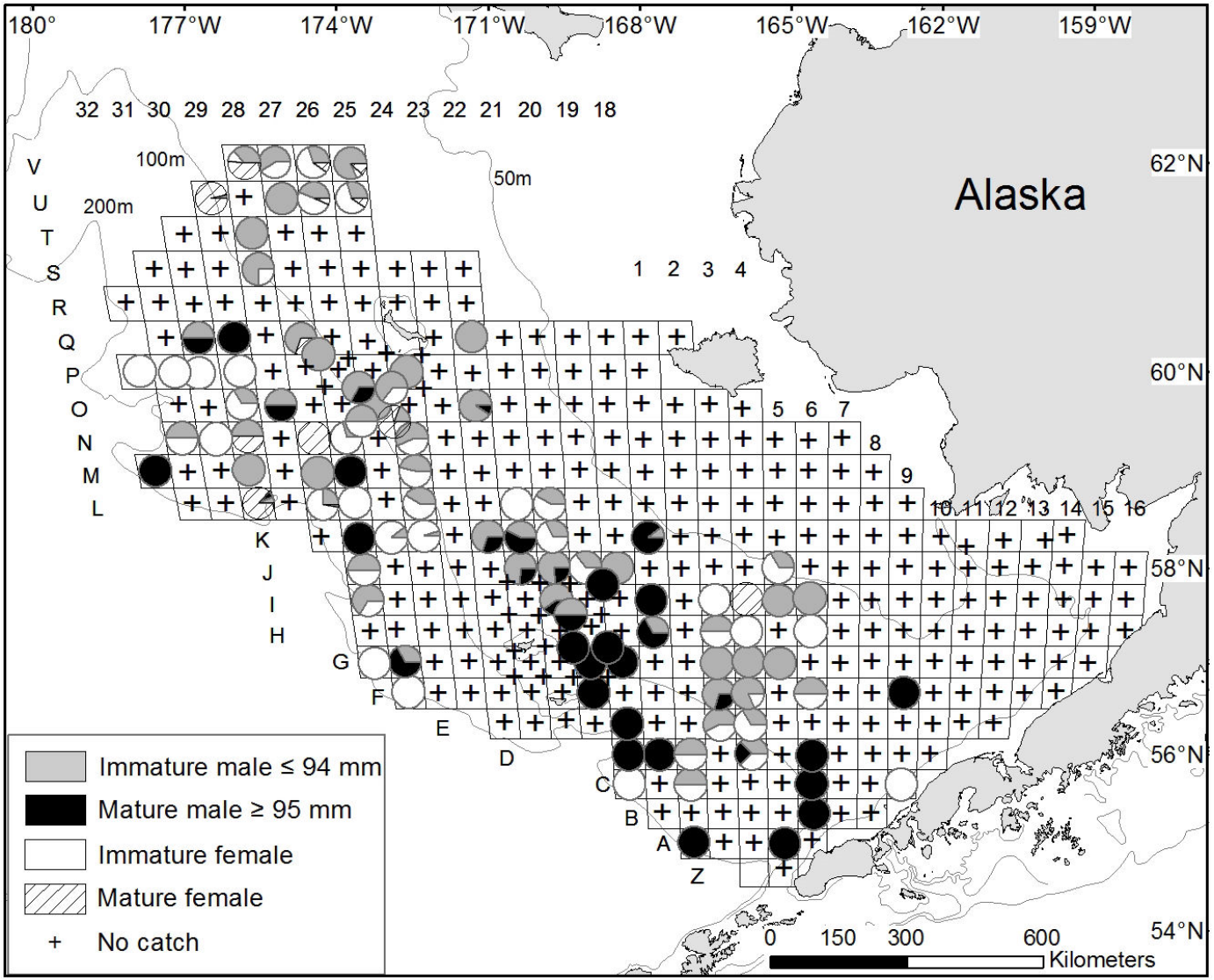

Figure 87. -- Percentage of male and female *Chionoecetes* spp. hybrid crab size and maturity categories at each station sampled in 2018.

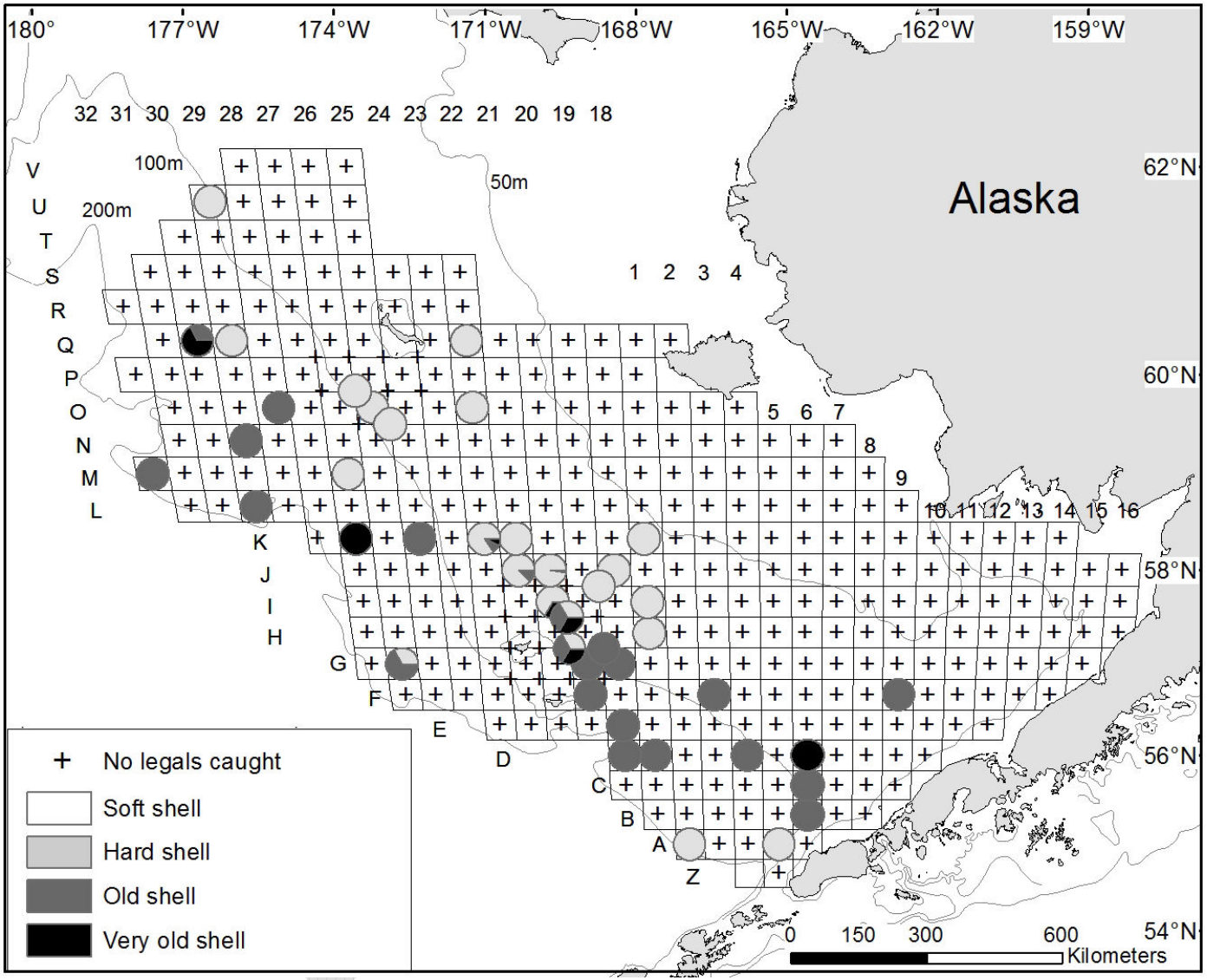

Figure 88. -- Percentage of legal-sized male *Chionoecetes* spp. hybrid crab size and maturity categories at each station sampled in 2018 using opilio legal size definition (legal size ≥ 78 mm).

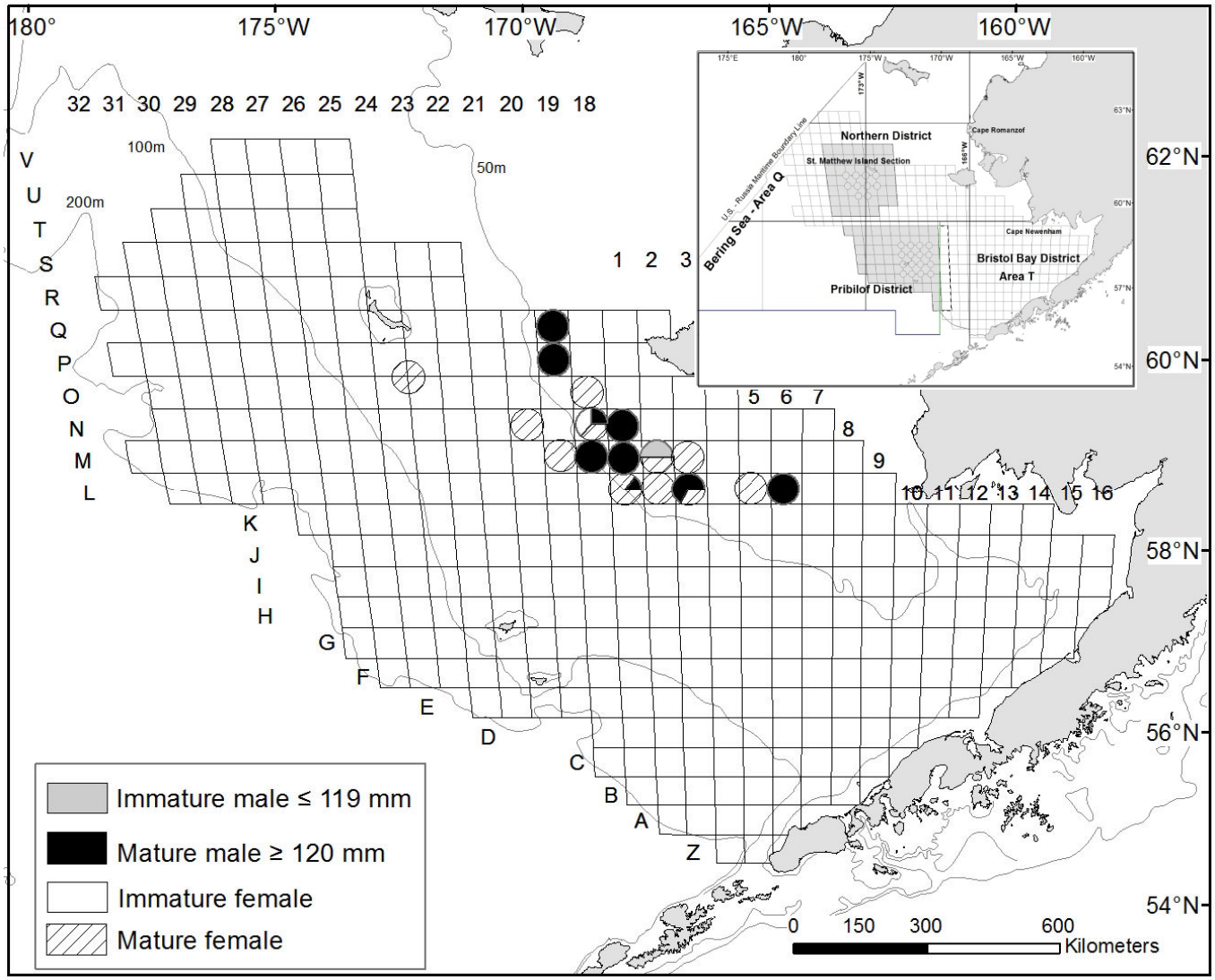

Figure 89. -- Total density (number nmi^{-2}) and percentage of male and female red king crab (*Paralithodes camtschaticus*) maturity categories at each station sampled in the Northern District in 2018. The Northern District is an ADF&G commercial crab management unit in the northern section of the eastern Bering Sea, see inset.

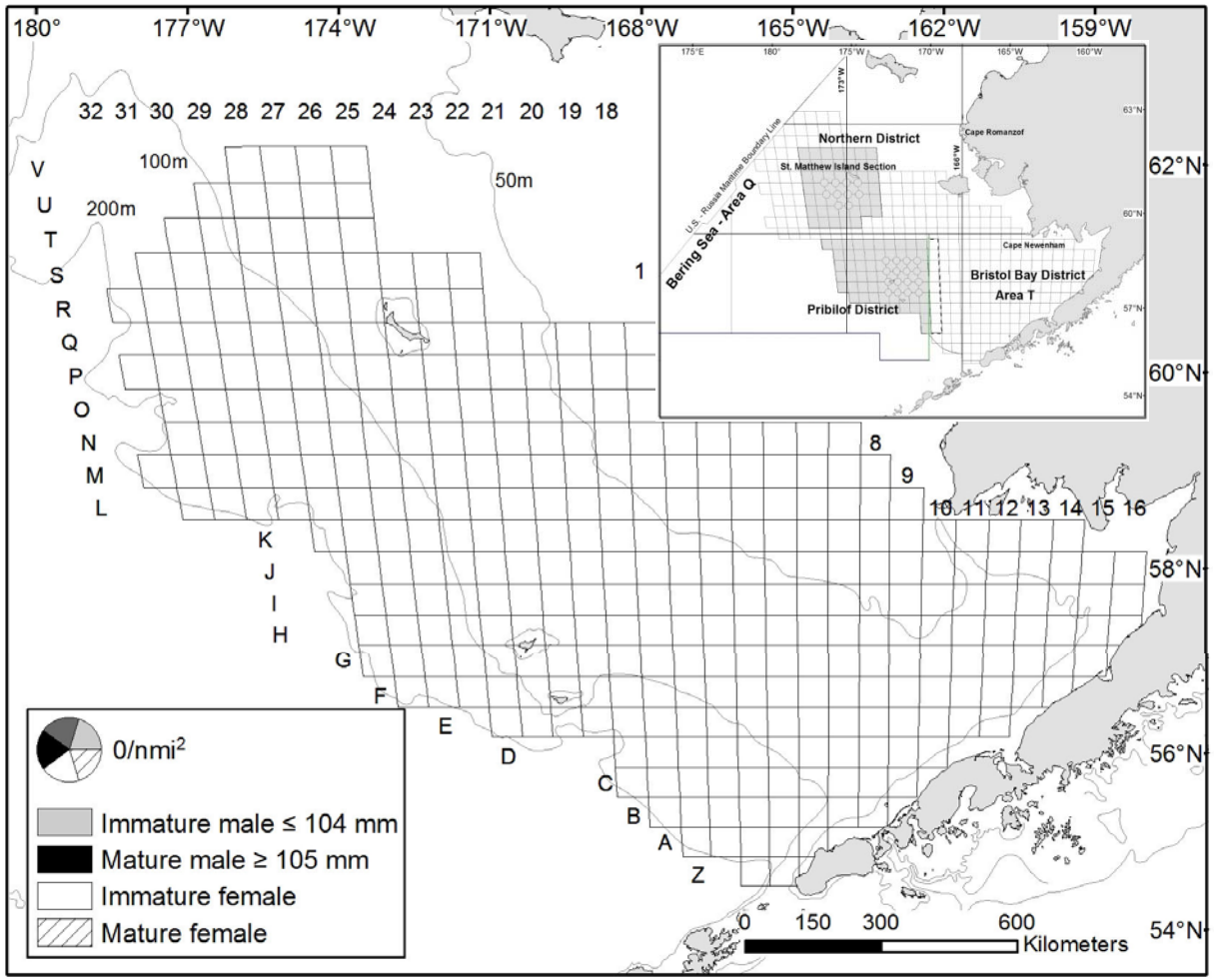

Figure 90. -- Total density (number nmi^{-2}) and percentage of male and female blue king crab (*Paralithodes platypus*) size and maturity categories at stations sampled outside of the Pribilof District and St. Matthew Island section of the Northern District in 2018. The Northern District is an ADF&G commercial crab management unit in the northern section of the eastern Bering Sea, see inset. Note no catch.

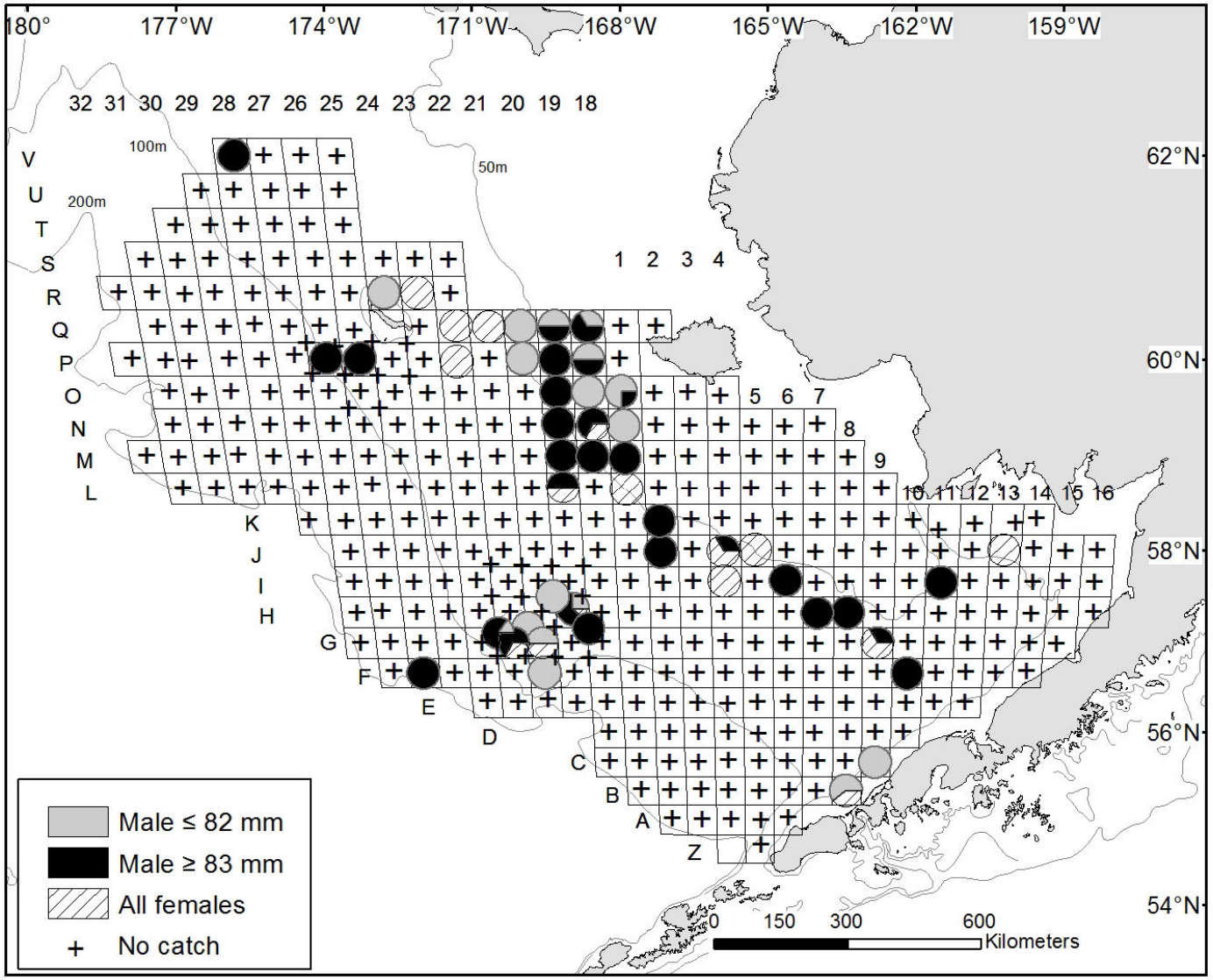

Figure 91. -- Total density (number nmi^{-2}) and percentage of male and female hair crab (*Erimacrus isenbeckii*) size categories at each station sampled in 2018.

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	A-02	A-03	A-04	A-05	A-06	B-01	B-02	B-03	B-04	B-05	B-06
Start Date	6/20/2018	6/19/2018	6/19/2018	6/18/2018	6/18/2018	6/20/2018	6/20/2018	6/19/2018	6/19/2018	6/18/2018	6/18/2018
Duration (hour)	0.51	0.53	0.54	0.51	0.54	0.52	0.51	0.52	0.53	0.55	0.52
Distance Fished (km)	2.93	2.74	2.74	2.78	2.95	2.92	2.91	2.95	2.65	3.05	2.62
Mid-Latitude (ºN)	55.01	55.01	55	55	55.03	55.35	55.34	55.35	55.34	55.33	55.34
Mid-Longitude (ºW)	-166.93	-166.32	-165.73	-165.13	-164.58	-167.55	-166.98	-166.35	-165.79	-165.16	-164.56
Bottom Depth (m)	154	143	129	110	65	147	140	131	120	110	102
Bottom Temperature (ºC)	4.4	4.4	4.4	5	5.9	4.4	4.4	4.4	4.5	4.8	5.1
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	11,357	3,169	73	228	0	5,732	3,394	1,182	7,731	254	1,631
Mature males	856	1,717	146	0	73	1,000	865	328	939	381	2,330
Legal	395	1,452	73	0	0	800	532	197	578	317	1,320
Immature females	22,893	5,216	291	152	73	10,833	1,398	1,774	9,827	127	1,786
Mature females	8,396	6,602	364	0	0	3,199	2,063	197	434	63	78
Total weight (kg)	49.54	44.18	2.27	0.50	0.48	27.44	18.68	5.74	24.16	5.71	24.56
Opilio Tanner Crab											
Immature males	0	66	0	0	0	0	0	0	0	0	78
Mature males	66	66	0	0	0	0	0	0	0	63	311
Legal	66	66	0	0	0	0	0	0	0	63	311
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.55	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77	3.39
Hybrid Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	66	0	0	76	0	0	0	0	0	0	78
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.68	0.00	0.00	0.63	0.00	0.00	0.00	0.00	0.00	0.00	0.55

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	B-07	B-08	C-01	C-02	C-03	C-04	C-05	C-06	C-07	C-08	C-09
Start Date	6/9/2018	6/9/2018	6/19/2018	6/19/2018	6/19/2018	6/19/2018	6/17/2018	6/18/2018	6/9/2018	6/9/2018	6/8/2018
Duration (hour)	0.52	0.51	0.5	0.53	0.51	0.53	0.53	0.53	0.52	0.52	0.51
Distance Fished (km)	2.93	2.72	2.85	2.91	2.9	2.74	2.79	2.66	2.88	2.72	2.85
Mid-Latitude (ºN)	55.33	55.34	55.67	55.67	55.67	55.68	55.67	55.67	55.67	55.67	55.66
Mid-Longitude (ºW)	-164.01	-163.43	-167.6	-166.99	-166.39	-165.8	-165.18	-164.6	-164	-163.43	-162.84
Bottom Depth (m)	76	54	135	136	127	118	108	96	94	82	50
Bottom Temperature (ºC)	4.6	5.2	4.5	4.5	4.4	4.5	4.8	4.8	3.9	4.2	5.5
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	74
Legal	0	0	0	0	0	0	0	0	0	0	74
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	77	0	0	0	0	0	0	0	76	221
Total weight (kg)	0.00	0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.94	8.72
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	2,679	3,093	1,818	757	5,301	2,807	1,259	3,169	76	294
Mature males	360	459	647	559	1,376	895	1,625	1,102	1,011	1,138	74
Legal	288	153	360	420	1,032	620	1,256	708	742	986	74
Immature females	72	2,909	3,524	2,657	1,032	4,956	1,403	708	3,506	152	221
Mature females	0	77	360	210	826	620	1,034	0	270	76	0
Total weight (kg)	3.22	6.88	11.9	9.22	16.92	23.92	24.74	10.56	13.02	13.93	0.95
Opilio Tanner Crab											
Immature males	0	0	0	0	69	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	74	79	0	0	0
Legal	0	0	0	0	0	0	74	79	0	0	0
Immature females	0	0	0	70	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.04	0.17	0.00	0.77	0.57	0.00	0.00	0.00
Hybrid Tanner Crab											
Immature males	0	0	0	70	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	79	0	0	0
Immature females	0	0	0	70	0	0	0	0	0	0	294
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.77	0.00	0.00	0.09

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	C-18	D-01	D-02	D-03	D-04	D-05	D-06	D-07	D-08	D-09	D-10
Start Date	6/19/2018	6/18/2018	6/18/2018	6/18/2018	6/17/2018	6/17/2018	6/17/2018	6/9/2018	6/9/2018	6/8/2018	6/8/2018
Duration (hour)	0.5	0.5	0.51	0.51	0.5	0.55	0.54	0.53	0.52	0.51	0.51
Distance Fished (km)	2.79	2.8	2.87	2.86	2.81	3.07	3	2.99	2.78	2.91	2.58
Mid-Latitude (ºN)	55.67	56	56	56	56.01	55.98	55.99	55.99	56	56	56
Mid-Longitude (ºW)	-168.21	-167.61	-166.99	-166.41	-165.79	-165.18	-164.6	-164.05	-163.39	-162.82	-162.25
Bottom Depth (m)	136	133	134	125	107	96	93	90	88	78	71
Bottom Temperature (ºC)	4.4	4.6	4.5	4.5	4.3	4	4.2	4	4.3	4.8	4.9
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	71	0
Mature males	0	0	0	0	0	0	0	66	149	285	0
Legal	0	0	0	0	0	0	0	66	149	285	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	74	783	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.26	11.05	32.21	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	5,527	356	2,338	3,556	4,322	924	1,888	1,714	74	285	0
Mature males	389	569	825	479	992	462	1,146	725	595	356	87
Legal	311	498	756	205	779	396	742	461	297	285	87
Immature females	6,772	1,139	1,444	3,556	3,330	660	1,956	2,109	223	285	0
Mature females	311	0	344	68	992	0	337	0	0	0	0
Total weight (kg)	11.02	5.79	13.47	8.62	16.04	7.04	13.58	9.58	5.76	4.26	0.60
Opilio Tanner Crab											
Immature males	0	0	69	0	142	66	67	0	0	0	0
Mature males	78	0	138	0	496	66	0	0	0	0	0
Legal	78	0	138	0	638	132	67	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	1,559	0	0	0	0	0	0
Total weight (kg)	0.86	0.00	1.81	0.00	8.02	1.07	0.21	0.00	0.00	0.00	0.00
Hybrid Tanner Crab											
Immature males	0	0	69	0	213	0	0	0	0	0	0
Mature males	0	71	0	0	142	0	67	0	0	0	0
Immature females	78	0	69	0	213	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.01	0.82	0.02	0.00	1.72	0.00	0.64	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	D-18	E-01	E-02	E-03	E-04	E-05	E-06	E-07	E-08	E-09	E-10
Start Date	6/18/2018	6/23/2018	6/23/2018	6/17/2018	6/17/2018	6/17/2018	6/17/2018	6/9/2018	6/9/2018	6/8/2018	6/8/2018
Duration (hour)	0.52	0.53	0.54	0.5	0.52	0.53	0.53	0.5	0.52	0.52	0.52
Distance Fished (km)	2.92	2.97	2.99	2.87	2.87	2.87	2.77	2.8	2.74	2.95	2.88
Mid-Latitude (ºN)	56	56.33	56.33	56.33	56.32	56.33	56.34	56.33	56.33	56.34	56.33
Mid-Longitude (ºW)	-168.22	-167.65	-167.02	-166.42	-165.81	-165.21	-164.59	-164.01	-163.41	-162.8	-162.19
Bottom Depth (m)	149	129	114	104	92	86	87	86	86	77	77
Bottom Temperature (ºC)	4.4	4.6	4.4	4.2	4.2	4	3.9	3.9	4.2	4.4	5
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	71
Mature males	0	0	0	0	0	0	0	0	0	280	0
Legal	0	0	0	0	0	0	0	0	0	280	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	280	71
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	18.70	1.94
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	17,564	649	1,128	7,430	5,987	14,737	74	575	301	70	214
Mature males	947	260	1,327	600	557	726	814	1,642	1,356	2,027	428
Legal	812	130	1,195	525	487	581	592	1,314	1,205	1,258	357
Immature females	23,797	714	597	9,157	8,076	14,737	0	739	0	210	71
Mature females	0	65	531	225	209	145	74	82	226	0	0
Total weight (kg)	18.72	3.34	15.39	9.50	8.88	13.86	8.57	15.68	15.50	22.64	4.77
Opilio Tanner Crab											
Immature males	0	0	398	375	209	290	0	0	0	0	0
Mature males	68	0	66	0	348	218	0	0	0	0	0
Legal	68	0	133	75	418	363	0	0	0	0	0
Immature females	0	0	199	150	209	145	0	0	0	0	0
Mature females	0	0	199	0	0	0	0	0	0	0	0
Total weight (kg)	0.39	0.00	1.39	0.51	3.96	2.76	0.00	0.00	0.00	0.00	0.00
Hybrid Tanner Crab											
Immature males	0	0	0	600	70	0	0	0	0	0	0
Mature males	135	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	450	139	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	1.28	0.00	0.00	0.39	0.03	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	E-11	E-12	E-18	E-19	E-20	E-21	E-22	F-01	F-02	F-03	F-04
Start Date	6/5/2018	6/5/2018	6/30/2018	6/30/2018	7/1/2018	7/1/2018	7/1/2018	6/23/2018	6/23/2018	6/17/2018	6/16/2018
Duration (hour)	0.51	0.51	0.47	0.52	0.33	0.53	0.5	0.52	0.55	0.53	0.52
Distance Fished (km)	2.85	2.73	2.68	2.96	1.91	2.94	2.8	2.95	2.87	3	2.96
Mid-Latitude (ºN)	56.34	56.34	56.34	56.33	56.37	56.34	56.35	56.66	56.67	56.66	56.67
Mid-Longitude (ºW)	-161.63	-161	-168.25	-168.87	-169.46	-170.06	-170.68	-167.67	-167.04	-166.43	-165.86
Bottom Depth (m)	64	53	152	128	129	109	120	103	95	85	75
Bottom Temperature (ºC)	5.4	5.8	4.4	4.4	4.4	4.5	4.3	4.4	4.3	4.3	4.1
Red King Crab											
Immature males	63	0	0	0	0	0	0	0	0	0	0
Mature males	0	80	0	0	0	0	0	0	0	0	0
Legal	0	80	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	63	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	1.32	3.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	63	239	21,622	4,860	1,421	5,652	2,713	217	426	9,193	8,741
Mature males	440	0	4,268	2,152	328	2,003	388	433	994	978	601
Legal	377	0	3,811	1,805	328	1,789	155	433	923	978	467
Immature females	0	0	23,747	5,901	1,968	1,359	775	289	639	7,107	4,538
Mature females	0	0	1,677	3,124	0	7,369	1,395	0	142	65	467
Total weight (kg)	6.45	1.42	45.93	28.18	2.07	50.27	10.82	4.11	10.05	14.35	11.15
Opilio Tanner Crab											
Immature males	0	0	152	1,527	0	143	0	144	71	196	601
Mature males	0	0	0	417	0	72	0	289	284	65	267
Legal	0	0	0	1,319	0	215	0	289	355	130	601
Immature females	0	0	0	0	0	72	0	0	0	65	801
Mature females	0	0	2,744	5,971	0	0	0	217	0	0	0
Total weight (kg)	0.00	0.00	3.98	14.87	0.00	1.32	0.00	2.46	1.84	0.88	3.61
Hybrid Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	0	456	867
Mature males	0	0	76	0	0	0	0	0	0	196	0
Immature females	0	0	0	0	0	0	0	0	0	0	200
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.56	0.00	0.00	0.00	0.00	0.00	0.00	2.31	0.18

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	F-05	F-06	F-07	F-08	F-09	F-10	F-11	F-12	F-13	F-14	F-18
Start Date	6/16/2018	6/16/2018	6/9/2018	6/9/2018	6/8/2018	6/8/2018	6/5/2018	6/5/2018	6/5/2018	6/5/2018	6/30/2018
Duration (hour)	0.54	0.54	0.52	0.53	0.5	0.51	0.53	0.51	0.51	0.51	0.51
Distance Fished (km)	2.93	2.93	2.97	2.81	2.87	2.69	2.88	2.85	2.72	2.84	2.9
Mid-Latitude (ºN)	56.66	56.67	56.66	56.67	56.68	56.66	56.66	56.67	56.66	56.68	56.67
Mid-Longitude (ºW)	-165.23	-164.62	-164.01	-163.4	-162.78	-162.18	-161.6	-160.98	-160.38	-159.75	-168.3
Bottom Depth (m)	75	75	75	75	71	72	89	68	59	38	108
Bottom Temperature (ºC)	4	3.8	4.1	4.1	4.7	4.8	4.3	5.1	5.3	6.3	4.5
Red King Crab											
Immature males	0	0	0	0	73	0	210	0	80	0	0
Mature males	0	72	200	0	146	322	210	145	0	0	0
Legal	0	72	200	0	73	161	70	72	0	0	0
Immature females	0	0	0	0	0	0	210	0	0	0	0
Mature females	0	0	0	0	0	643	1,959	217	0	0	0
Total weight (kg)	0.00	3.36	10.39	0.00	7.11	18.98	34.63	8.75	0.87	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	746	790	732	658	365	161	210	290	0	80	206
Mature males	895	1,723	2,596	732	1,095	402	1,889	579	0	0	482
Legal	522	1,364	1,997	585	1,022	402	1,539	507	0	0	413
Immature females	224	359	333	0	73	0	0	145	0	0	69
Mature females	149	359	998	366	73	0	0	72	0	0	0
Total weight (kg)	9.71	19.98	32.84	12.87	14.41	5.33	23.53	6.28	0.00	0.29	5.46
Opilio Tanner Crab											
Immature males	75	0	0	0	0	0	0	0	0	0	482
Mature males	0	72	67	0	73	0	0	0	0	0	413
Legal	75	72	67	0	73	0	0	0	0	0	757
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	8,876
Total weight (kg)	0.19	0.49	0.48	0.00	0.47	0.00	0.00	0.00	0.00	0.00	16.97
Hybrid Tanner Crab											
Immature males	0	72	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	73	0	0	0	0	0	0
Immature females	0	72	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.02	0.00	0.00	0.65	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	F-19	F-20	F-21	F-22	F-23	F-24	F-25	G-01	G-02	G-03	G-04
Start Date	7/2/2018	7/2/2018	7/1/2018	7/1/2018	7/5/2018	7/6/2018	7/17/2018	6/24/2018	6/23/2018	6/17/2018	6/16/2018
Duration (hour)	0.53	0.51	0.5	0.53	0.52	0.25	0.58	0.52	0.52	0.53	0.5
Distance Fished (km)	3.01	2.88	2.9	3.01	2.89	1.38	3.17	2.91	2.74	2.91	2.79
Mid-Latitude (ºN)	56.67	56.68	56.67	56.66	56.67	56.67	56.68	57	57	57	57.01
Mid-Longitude (ºW)	-168.92	-169.53	-170.14	-170.73	-171.34	-171.99	-172.58	-167.69	-167.06	-166.47	-165.85
Bottom Depth (m)	99	80	98	114	119	127	135	78	74	74	72
Bottom Temperature (ºC)	4.5	5.5	4.9	4.2	4.1	4.3	4.3	4.7	4.9	4.8	4.1
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	298	615	13,557	5,007	596	1,724	10,050	3,771	4,778	4,864	2,140
Mature males	3,656	3,999	4,470	1,269	149	157	0	2,606	824	411	238
Legal	3,506	3,692	3,664	1,128	149	157	0	2,331	659	274	159
Immature females	224	231	3,591	3,455	671	3,604	20,768	4,251	3,130	2,672	476
Mature females	448	77	8,207	1,199	149	1,254	125	69	165	0	0
Total weight (kg)	37.78	38.42	94.12	21.66	2.68	1.95	7.84	25.46	8.62	4.44	2.67
Opilio Tanner Crab											
Immature males	895	0	0	212	2,981	157	63	206	659	69	555
Mature males	597	0	0	71	820	784	0	0	165	0	79
Legal	1,044	0	0	141	2,310	940	63	137	330	69	79
Immature females	0	0	0	0	0	0	0	0	0	137	396
Mature females	3,133	0	0	0	60,891	157	0	0	0	0	0
Total weight (kg)	10.59	0.00	0.00	0.83	62.74	3.03	0.27	0.52	3.37	0.34	1.10
Hybrid Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	0	137	79
Mature males	149	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	138	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.96	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.01	0.03

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	G-05	G-06	G-07	G-08	G-09	G-10	G-11	G-12	G-13	G-14	G-15
Start Date	6/16/2018	6/16/2018	6/10/2018	6/10/2018	6/7/2018	6/8/2018	6/5/2018	6/6/2018	6/4/2018	6/5/2018	6/3/2018
Duration (hour)	0.51	0.52	0.51	0.51	0.52	0.52	0.51	0.52	0.52	0.5	0.52
Distance Fished (km)	2.91	2.73	2.84	2.7	2.94	2.88	2.8	2.77	2.92	2.82	2.84
Mid-Latitude (ºN)	56.99	57	56.99	57.01	57	57.01	56.99	57	57.01	57	56.99
Mid-Longitude (ºW)	-165.24	-164.62	-164.02	-163.4	-162.78	-162.16	-161.57	-160.94	-160.33	-159.7	-159.14
Bottom Depth (m)	71	70	69	66	60	60	68	68	63	57	34
Bottom Temperature (ºC)	3.8	4	3.9	4.5	4.6	4.7	4.5	4.8	4.8	5.1	6
Red King Crab											
Immature males	0	0	0	0	287	495	147	152	0	77	0
Mature males	131	154	0	155	502	566	74	76	137	77	0
Legal	131	154	0	155	431	566	74	0	69	77	0
Immature females	0	0	0	0	0	71	294	0	0	77	0
Mature females	0	0	0	0	1,220	919	809	152	0	0	0
Total weight (kg)	8.30	5.82	0.00	7.15	49.02	51.76	19.17	6.12	4.28	2.83	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	1,762	4,455	5,592	697	144	0	74	76	0	0	0
Mature males	326	461	920	620	72	283	221	152	275	77	0
Legal	261	461	637	387	72	141	74	152	69	0	0
Immature females	1,305	2,995	3,893	232	0	71	74	152	69	0	0
Mature females	65	77	0	0	0	0	0	0	69	0	0
Total weight (kg)	6.69	9.45	16.06	7.88	1.23	2.61	1.70	1.99	2.49	0.51	0.00
Opilio Tanner Crab											
Immature males	131	1,536	71	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	65	0	0	0	0	0	0	0	0	0	0
Immature females	65	1,536	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.28	0.50	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hybrid Tanner Crab											
Immature males	131	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	G-18	G-19	G-20	G-21	G-22	G-23	G-24	G-25	G-26	GF1918	GF2019
Start Date	6/29/2018	7/2/2018	7/3/2018	7/3/2018	7/3/2018	7/5/2018	7/6/2018	7/17/2018	7/17/2018	6/30/2018	7/2/2018
Duration (hour)	0.51	0.52	0.52	0.51	0.52	0.53	0.51	0.55	0.48	0.51	0.52
Distance Fished (km)	2.88	2.97	2.92	2.96	2.93	2.96	2.77	2.95	2.67	2.81	2.89
Mid-Latitude (ºN)	57	57	57	57	57	57.01	57	57.01	56.99	56.83	56.84
Mid-Longitude (ºW)	-168.35	-168.98	-169.57	-170.16	-170.79	-171.38	-172.05	-172.65	-173.25	-168.62	-169.3
Bottom Depth (m)	80	80	61	69	96	109	118	122	142	97	80
Bottom Temperature (ºC)	4.5	4.5	4.9	5.2	4.5	4.1	4.1	4.2	4.3	4.5	4.5
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	80	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	1.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	79
Legal	0	0	0	0	0	0	0	0	0	0	79
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	237
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.24
Bairdi Tanner Crab											
Immature males	397	539	1,118	7,001	628	2,041	1,724	972	324	981	710
Mature males	4,128	7,472	3,672	4,484	706	364	82	208	0	4,624	3,945
Legal	3,890	7,164	3,193	3,068	549	292	82	208	0	4,344	3,787
Immature females	238	154	319	787	235	948	1,724	347	243	771	0
Mature females	159	308	479	708	157	802	82	208	0	350	237
Total weight (kg)	34.53	71.73	29.88	50.82	7.43	7.42	1.69	4.00	0.06	46.45	40.82
Opilio Tanner Crab											
Immature males	79	154	319	0	0	4,738	7,554	1,041	0	631	0
Mature males	318	0	479	0	0	802	1,970	1,874	0	210	316
Legal	318	154	798	0	0	3,207	5,090	2,776	0	560	316
Immature females	0	0	0	0	0	0	0	0	0	280	0
Mature females	0	154	0	0	0	58,706	153,029	0	0	140	0
Total weight (kg)	2.30	0.64	3.46	0.00	0.00	73.39	171.21	17.43	0.00	3.29	1.82
Hybrid Tanner Crab											
Immature males	0	0	0	0	0	0	0	69	0	0	0
Mature males	79	154	0	0	0	0	0	139	0	0	0
Immature females	0	0	0	0	0	0	0	0	243	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.71	1.21	0.00	0.00	0.00	0.00	0.00	1.50	0.02	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	GF2120	GF2221	H-01	H-02	H-03	H-04	H-05	H-06	H-07	H-08	H-09
Start Date	7/3/2018	7/3/2018	6/24/2018	6/24/2018	6/15/2018	6/16/2018	6/15/2018	6/16/2018	6/10/2018	6/10/2018	6/7/2018
Duration (hour)	0.52	0.5	0.5	0.51	0.51	0.52	0.52	0.53	0.52	0.42	0.51
Distance Fished (km)	2.97	2.9	2.8	2.77	2.74	2.86	2.9	2.71	2.86	2.18	2.87
Mid-Latitude (ºN)	56.85	56.84	57.32	57.34	57.33	57.33	57.34	57.34	57.33	57.34	57.34
Mid-Longitude (ºW)	-169.9	-170.48	-167.74	-167.1	-166.47	-165.89	-165.25	-164.62	-164.01	-163.39	-162.77
Bottom Depth (m)	72	101	73	71	69	68	66	65	62	53	49
Bottom Temperature (ºC)	5.2	4.7	4.9	4.9	4	3.7	3.6	3.7	3.7	4.6	4.6
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	70
Mature males	0	0	0	0	0	0	0	321	224	0	70
Legal	0	0	0	0	0	0	0	321	224	0	70
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	80	0	0	420
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14.06	6.25	0.00	11.08
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	396	2,517	1,366	5,515	819	3,319	1,671	2,005	522	621	210
Mature males	871	649	1,510	243	0	282	279	401	373	311	140
Legal	871	568	935	81	0	141	139	160	298	207	140
Immature females	79	812	431	2,676	298	2,331	1,184	3,368	596	207	70
Mature females	158	974	288	0	0	0	0	241	0	104	0
Total weight (kg)	7.60	15.17	12.14	3.68	0.33	4.23	5.18	7.29	3.97	4.14	2.51
Opilio Tanner Crab											
Immature males	79	244	2,948	2,190	0	1,483	1,810	1,283	149	0	0
Mature males	79	2,273	5,178	81	0	0	0	80	0	0	0
Legal	158	2,436	7,839	81	0	424	0	80	0	0	0
Immature females	0	0	0	2,920	0	1,412	1,602	802	0	0	0
Mature females	0	0	0	0	0	71	0	0	0	0	0
Total weight (kg)	0.67	11.64	41.52	1.29	0.00	2.49	1.22	0.89	0.14	0.00	0.00
Hybrid Tanner Crab											
Immature males	0	0	144	0	74	0	0	0	0	0	0
Mature males	0	0	288	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	74	71	0	401	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	2.65	0.00	0.06	0.03	0.00	0.13	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	H-10	H-11	H-12	H-13	H-14	H-15	H-16	H-18	H-19	H-20	H-21
Start Date	6/7/2018	6/6/2018	6/6/2018	6/4/2018	6/4/2018	6/3/2018	6/3/2018	6/29/2018	7/1/2018	7/1/2018	7/2/2018
Duration (hour)	0.51	0.53	0.52	0.52	0.51	0.52	0.52	0.52	0.52	0.53	0.52
Distance Fished (km)	2.72	2.88	2.71	2.88	2.78	2.84	2.7	2.98	2.8	2.72	2.84
Mid-Latitude (ºN)	57.33	57.32	57.33	57.34	57.32	57.33	57.34	57.33	57.37	57.33	57.34
Mid-Longitude (ºW)	-162.13	-161.53	-160.94	-160.31	-159.67	-159.07	-158.39	-168.37	-168.96	-169.58	-170.22
Bottom Depth (m)	51	56	63	61	57	49	31	74	71	63	55
Bottom Temperature (ºC)	4.6	4.7	4.7	4.6	5.1	5.5	6.2	4.7	4.6	4.2	5.8
Red King Crab											
Immature males	462	485	455	433	75	0	0	0	77	80	0
Mature males	462	347	227	361	373	78	0	0	0	0	0
Legal	308	347	227	289	224	78	0	0	0	0	0
Immature females	0	416	76	72	0	0	0	0	0	0	0
Mature females	2,001	2,149	2,273	1,733	149	0	0	0	77	0	0
Total weight (kg)	61.66	52.70	53.49	51.13	13.88	1.61	0.00	0.00	2.92	0.77	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	232	0	0
Mature males	0	0	0	0	0	0	0	0	77	0	0
Legal	0	0	0	0	0	0	0	0	77	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	77	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.40	0.00	0.00
Bairdi Tanner Crab											
Immature males	77	139	0	72	0	0	0	825	465	399	76
Mature males	231	208	303	72	75	0	0	2,475	1,472	718	76
Legal	77	139	303	72	75	0	0	2,227	929	559	0
Immature females	0	139	0	0	0	0	0	247	232	319	0
Mature females	0	0	0	0	0	0	0	82	0	80	0
Total weight (kg)	1.85	2.30	3.10	1.02	0.64	0.00	0.00	19.62	11.10	6.01	0.57
Opilio Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	77	559	0
Mature males	0	0	0	0	0	0	0	165	155	319	0
Legal	0	0	0	0	0	0	0	165	155	479	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	80	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.06	1.04	2.91	0.00
Hybrid Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	H-22	H-23	H-24	H-25	H-26	HG1918	HG2019	HG2120	HG2221	I-01	I-02
Start Date	7/5/2018	7/5/2018	7/6/2018	7/17/2018	7/17/2018	6/29/2018	7/2/2018	7/2/2018	7/5/2018	6/24/2018	6/24/2018
Duration (hour)	0.53	0.53	0.51	0.59	0.49	0.51	0.53	0.52	0.52	0.51	0.52
Distance Fished (km)	2.94	2.79	2.86	3.09	2.76	2.89	3	2.91	2.98	2.88	2.66
Mid-Latitude (ºN)	57.35	57.34	57.33	57.35	57.32	57.16	57.16	57.17	57.11	57.67	57.65
Mid-Longitude (ºW)	-170.85	-171.47	-172.11	-172.81	-173.33	-168.63	-169.32	-169.87	-170.47	-167.78	-167.12
Bottom Depth (m)	83	101	109	116	121	75	72	50	48	68	68
Bottom Temperature (ºC)	4.6	4.1	3.9	3.8	4	4.5	4.4	5.9	5.7	5	4.4
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	76	0	0	0	0
Legal	0	0	0	0	0	0	76	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	76	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	6.64	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	591	2,211	149	755	137	213	457	790	162	5,042	2,906
Mature males	2,494	7,669	223	0	0	1,992	12,794	1,028	0	484	830
Legal	2,429	6,702	149	0	0	1,494	12,185	790	0	276	581
Immature females	0	1,520	0	189	0	0	0	237	325	2,901	830
Mature females	1,050	3,385	0	189	0	71	228	0	0	0	83
Total weight (kg)	30.55	89.92	1.69	2.05	0.19	16.93	118.19	8.35	0.68	6.82	7.93
Opilio Tanner Crab											
Immature males	0	1,175	3,639	0	0	0	0	0	0	622	3,902
Mature males	0	553	3,565	189	0	0	152	0	0	138	2,408
Legal	0	1,313	6,165	189	0	0	152	0	0	276	3,736
Immature females	0	0	0	0	0	0	0	0	0	0	2,325
Mature females	0	0	10,324	0	0	0	1,447	0	0	414	0
Total weight (kg)	0.00	7.70	44.47	1.76	0.00	0.00	3.29	0.00	0.00	1.73	16.71
Hybrid Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	71	228	0	0	69	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.35	1.19	0.00	0.00	0.50	0.00
	H-22	H-23	H-24	H-25	H-26	HG1918	HG2019	HG2120	HG2221	I-01	I-02

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	I-03	I-04	I-05	I-06	I-07	I-08	I-09	I-10	I-11	I-12	I-13
Start Date	6/15/2018	6/15/2018	6/15/2018	6/15/2018	6/10/2018	6/10/2018	6/7/2018	6/7/2018	6/6/2018	6/6/2018	6/4/2018
Duration (hour)	0.52	0.52	0.52	0.51	0.52	0.52	0.52	0.51	0.51	0.5	0.52
Distance Fished (km)	2.9	2.78	3.06	2.9	2.86	2.79	2.95	2.7	2.81	2.72	2.89
Mid-Latitude (ºN)	57.67	57.67	57.66	57.68	57.65	57.66	57.67	57.67	57.66	57.67	57.67
Mid-Longitude (ºW)	-166.52	-165.89	-165.26	-164.64	-164.01	-163.4	-162.76	-162.12	-161.5	-160.91	-160.26
Bottom Depth (m)	66	65	61	53	51	46	43	47	53	56	54
Bottom Temperature (ºC)	3.8	3.5	3.8	4.1	4.3	4.5	4.7	4.8	4.6	4.1	4.3
Red King Crab											
Immature males	0	0	0	70	0	76	286	542	1,206	78	72
Mature males	0	0	66	141	146	76	358	232	426	235	361
Legal	0	0	66	141	146	76	358	155	426	235	361
Immature females	0	0	0	0	0	0	0	0	355	0	578
Mature females	0	0	0	0	73	153	0	77	1,561	627	289
Total weight (kg)	0.00	0.00	4.10	7.16	6.97	4.99	17.69	14.23	52.57	23.26	24.27
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	1,265	734	527	2,185	2,039	458	72	232	0	78	144
Mature males	70	0	0	211	218	76	0	0	284	0	217
Legal	0	0	0	0	73	0	0	0	284	0	144
Immature females	422	0	461	1,903	1,966	382	72	0	0	0	0
Mature females	141	0	132	70	0	0	0	0	71	0	0
Total weight (kg)	1.85	1.16	1.10	5.04	3.94	1.60	0.16	0.24	3.65	0.30	2.52
Opilio Tanner Crab											
Immature males	141	734	264	70	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	73	0	70	0	0	0	0	0	0	0
Immature females	492	220	593	141	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.32	0.50	0.09	0.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hybrid Tanner Crab											
Immature males	0	0	264	282	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Immature females	70	0	0	0	0	0	0	0	0	0	0
Mature females	0	73	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.03	0.12	0.03	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	I-14	I-15	I-16	I-18	I-19	I-20	I-21	I-22	I-23	I-24	I-25
Start Date	6/4/2018	6/3/2018	6/3/2018	6/29/2018	6/30/2018	7/1/2018	7/2/2018	7/3/2018	7/4/2018	7/6/2018	7/18/2018
Duration (hour)	0.51	0.52	0.51	0.5	0.52	0.52	0.52	0.53	0.54	0.51	0.53
Distance Fished (km)	2.8	2.81	2.76	2.78	2.7	2.89	2.7	3.01	2.9	2.83	2.89
Mid-Latitude (ºN)	57.66	57.67	57.66	57.67	57.66	57.67	57.66	57.68	57.67	57.66	57.67
Mid-Longitude (ºW)	-159.62	-159.02	-158.38	-168.4	-169.04	-169.65	-170.27	-170.91	-171.54	-172.18	-172.79
Bottom Depth (m)	50	47	36	71	68	70	72	85	99	108	119
Bottom Temperature (ºC)	5.1	5.3	6.4	4.5	4.4	4	4.1	4.1	3.7	3.8	4.3
Red King Crab											
Immature males	148	405	0	0	0	0	0	0	0	0	0
Mature males	74	81	0	0	0	214	77	0	0	0	0
Legal	74	0	0	0	0	143	77	0	0	0	0
Immature females	0	162	0	0	0	0	0	0	0	0	0
Mature females	369	0	0	78	0	143	0	0	0	0	0
Total weight (kg)	11.19	3.93	0.00	0.93	0.00	11.53	3.34	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	71	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	1.27	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	0	0	5,215	5,501	2,568	1,844	1,116	2,424	382	7,199
Mature males	74	0	0	156	707	856	1,690	2,298	2,031	0	0
Legal	0	0	0	78	550	642	1,383	2,035	1,835	0	0
Immature females	0	0	0	2,491	4,873	3,781	1,306	328	1,638	153	12,032
Mature females	0	0	0	0	79	0	0	591	4,849	1,300	463
Total weight (kg)	0.58	0.00	0.00	1.68	7.27	8.53	15.72	25.28	33.45	2.03	11.67
Opilio Tanner Crab											
Immature males	0	0	0	2,257	550	285	154	722	4,259	4,970	3,561
Mature males	0	0	0	0	157	1,141	154	131	983	1,606	2,351
Legal	0	0	0	0	629	1,427	154	460	2,621	3,900	4,098
Immature females	0	0	0	2,647	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	66	29,672	107,019	6,962
Total weight (kg)	0.00	0.00	0.00	0.86	2.19	8.48	1.11	2.93	51.32	119.11	38.29
Hybrid Tanner Crab											
Immature males	0	0	0	0	0	214	0	0	0	0	0
Mature males	0	0	0	0	0	143	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	1.54	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	I-26	IH1918	IH2019	IH2120	IH2221	J-01	J-02	J-03	J-04	J-05	J-06
Start Date	7/21/2018	6/29/2018	7/1/2018	7/2/2018	7/3/2018	6/24/2018	6/24/2018	6/14/2018	6/15/2018	6/14/2018	6/15/2018
Duration (hour)	0.51	0.5	0.52	0.52	0.52	0.51	0.53	0.52	0.51	0.51	0.52
Distance Fished (km)	2.82	2.85	2.85	2.71	2.87	2.93	2.95	2.66	2.67	2.87	2.94
Mid-Latitude (ºN)	57.66	57.5	57.51	57.49	57.5	57.99	57.99	58.01	58	58.01	58.01
Mid-Longitude (ºW)	-173.38	-168.75	-169.36	-169.99	-170.59	-167.81	-167.17	-166.53	-165.91	-165.26	-164.63
Bottom Depth (m)	144	71	71	67	74	67	63	61	56	50	45
Bottom Temperature (ºC)	4.2	4.4	4.2	4.7	4.4	4.3	3.8	3.4	3.7	4.4	4.6
Red King Crab											
Immature males	0	0	0	6,088	0	0	0	0	0	0	0
Mature males	0	0	72	406	0	0	0	0	577	140	0
Legal	0	0	72	325	0	0	0	0	577	140	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	3,491	0	0	0	0	82	280	138
Total weight (kg)	0.00	0.00	4.95	126.46	0.00	0.00	0.00	0.00	24.23	12.38	2.72
Blue King Crab											
Immature males	0	76	72	0	0	0	0	0	0	0	0
Mature males	0	0	72	0	0	0	0	0	0	0	0
Legal	0	0	72	0	0	0	0	0	0	0	0
Immature females	0	0	0	81	0	0	0	0	0	0	0
Mature females	0	152	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	1.45	3.60	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	1,896	2,049	8,540	812	441	811	291	0	412	769	207
Mature males	0	683	1,794	8,443	1,322	270	73	81	82	70	0
Legal	0	228	1,507	7,956	1,248	135	0	81	0	70	0
Immature females	2,528	1,518	7,176	0	441	676	218	0	330	420	0
Mature females	0	0	72	81	441	0	73	0	82	0	0
Total weight (kg)	1.40	6.00	18.04	75.49	14.09	2.53	0.99	0.48	1.35	2.00	0.53
Opilio Tanner Crab											
Immature males	0	152	0	162	0	17,950	510	0	0	140	0
Mature males	0	0	0	162	147	8,114	364	0	0	0	0
Legal	0	0	0	244	147	14,740	437	0	0	0	0
Immature females	0	0	0	0	0	12,035	291	0	0	70	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.35	0.00	1.67	0.82	74.38	2.76	0.00	0.00	0.07	0.00
Hybrid Tanner Crab											
Immature males	126	0	144	0	0	0	0	0	0	70	0
Mature males	0	0	144	0	0	0	0	0	0	0	0
Immature females	63	0	0	0	0	0	0	0	0	140	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.05	0.00	1.14	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00
	I-26	IH1918	IH2019	IH2120	IH2221	J-01	J-02	J-03	J-04	J-05	J-06

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	J-07	J-08	J-09	J-10	J-11	J-12	J-13	J-14	J-15	J-16	J-18
Start Date	6/10/2018	6/10/2018	6/7/2018	6/7/2018	6/6/2018	6/6/2018	6/4/2018	6/4/2018	6/3/2018	6/3/2018	6/28/2018
Duration (hour)	0.53	0.51	0.51	0.51	0.51	0.51	0.52	0.5	0.51	0.51	0.5
Distance Fished (km)	2.95	2.73	2.89	2.75	2.79	2.64	2.92	2.79	2.79	2.74	2.82
Mid-Latitude (ºN)	57.99	57.99	58.01	57.99	57.99	58	58.01	58.02	58	58	58.01
Mid-Longitude (ºW)	-164.03	-163.4	-162.75	-162.1	-161.5	-160.86	-160.22	-159.6	-158.97	-158.31	-168.45
Bottom Depth (m)	46	43	40	37	55	45	51	42	40	35	69
Bottom Temperature (ºC)	4.3	4.9	4.8	4.8	4.5	4.1	4.4	5.1	5.8	6.2	4.5
Red King Crab											
Immature males	0	81	71	168	1,567	0	507	0	0	161	0
Mature males	141	81	285	0	71	242	145	0	0	0	0
Legal	141	0	142	0	0	161	72	0	0	0	0
Immature females	0	0	0	0	499	0	507	81	0	161	0
Mature females	70	81	142	0	855	0	724	0	0	0	0
Total weight (kg)	7.13	4.06	13.78	2.10	29.74	7.72	26.58	0.13	0.00	0.38	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	4,432
Mature males	70	0	0	0	142	0	145	0	0	0	1,202
Legal	70	0	0	0	142	0	72	0	0	0	826
Immature females	0	81	0	0	0	0	0	0	0	0	826
Mature females	0	0	0	0	0	81	0	0	0	0	0
Total weight (kg)	0.62	0.06	0.00	0.00	1.51	0.33	1.48	0.00	0.00	0.00	9.46
Opilio Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	23,169
Mature males	0	0	0	0	0	0	0	0	0	0	15,856
Legal	0	0	0	0	0	0	0	0	0	0	32,222
Immature females	0	0	0	0	0	0	0	0	0	0	8,038
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	138.77
Hybrid Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	150
Mature males	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	J-19	J-20	J-21	J-22	J-23	J-24	J-25	J-26	JI1918	JI2019	JI2120
Start Date	6/30/2018	6/30/2018	6/29/2018	7/3/2018	7/4/2018	7/4/2018	7/18/2018	7/21/2018	6/28/2018	6/30/2018	6/30/2018
Duration (hour)	0.53	0.52	0.52	0.52	0.53	0.53	0.52	0.5	0.5	0.53	0.52
Distance Fished (km)	2.79	2.72	2.72	2.85	2.85	2.83	2.82	2.82	2.8	2.7	2.76
Mid-Latitude (ºN)	58.01	58.01	58	57.98	58	57.99	58.01	57.98	57.83	57.83	57.83
Mid-Longitude (ºW)	-169.08	-169.7	-170.36	-170.95	-171.58	-172.23	-172.83	-173.46	-168.74	-169.39	-169.98
Bottom Depth (m)	70	70	74	87	98	105	108	118	70	66	72
Bottom Temperature (ºC)	4.2	3.8	3.8	3.5	3.6	3.6	3.6	3.9	4.4	4	4
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	80	0
Legal	0	0	0	0	0	0	0	0	0	80	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.29	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	652	1,412	6,776	8,295	1,551	766	710	1,199	2,675	4,650	3,586
Mature males	580	446	239	627	1,692	209	0	67	535	882	1,068
Legal	435	297	159	349	1,269	139	0	67	382	802	687
Immature females	0	966	5,820	8,156	282	487	1,421	1,266	1,758	4,811	2,136
Mature females	0	0	80	906	5,217	70	71	267	76	160	0
Total weight (kg)	5.87	4.05	4.43	10.58	27.76	3.21	0.82	2.99	6.50	10.71	8.80
Opilio Tanner Crab											
Immature males	14,135	15,088	26,781	906	39,263	836	2,060	400	1,070	9,060	1,373
Mature males	10,511	9,811	14,002	627	1,692	1,462	924	133	917	8,820	1,450
Legal	22,834	21,703	35,256	836	12,596	2,019	1,705	333	1,223	15,875	1,755
Immature females	0	0	0	70	0	0	0	0	382	0	0
Mature females	0	0	159	139	498,016	0	53,144	0	0	0	76
Total weight (kg)	100.53	109.49	145.33	5.40	482.36	13.97	70.01	2.17	6.66	69.60	9.99
Hybrid Tanner Crab											
Immature males	507	3,419	877	0	0	0	0	67	0	0	0
Mature males	0	1,041	319	0	0	0	0	0	76	0	0
Immature females	942	0	0	0	0	0	0	67	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.07	14.29	3.12	0.00	0.00	0.00	0.00	0.08	0.67	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	JI2221	K-01	K-02	K-03	K-04	K-05	K-06	K-07	K-08	K-09	K-10
Start Date	7/3/2018	6/24/2018	6/24/2018	6/14/2018	6/14/2018	6/14/2018	6/14/2018	6/11/2018	6/10/2018	6/7/2018	6/7/2018
Duration (hour)	0.53	0.53	0.53	0.37	0.53	0.52	0.52	0.53	0.52	0.52	0.52
Distance Fished (km)	2.87	2.97	2.89	2.05	2.95	2.98	3.02	2.97	2.79	2.93	2.75
Mid-Latitude (ºN)	57.85	58.32	58.32	58.33	58.34	58.32	58.33	58.33	58.33	58.33	58.33
Mid-Longitude (ºW)	-170.61	-167.83	-167.2	-166.56	-165.93	-165.29	-164.67	-164	-163.36	-162.69	-162.04
Bottom Depth (m)	78	61	52	47	44	45	44	41	37	31	47
Bottom Temperature (ºC)	3.7	4	4.1	4.2	4.4	4.3	4.5	4.6	5.2	5.3	5.4
Red King Crab											
Immature males	0	0	0	0	73	0	0	69	0	0	0
Mature males	0	0	77	212	219	270	141	206	0	0	77
Legal	0	0	77	212	219	203	141	69	0	0	77
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	106	292	68	0	69	0	0	0
Total weight (kg)	0.00	0.00	2.86	6.11	14.53	10.32	7.56	8.43	0.00	0.00	2.22
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	2,060	1,036	310	0	146	0	212	0	0	0	0
Mature males	1,167	777	0	212	0	68	71	0	0	0	0
Legal	687	453	0	106	0	68	0	0	0	0	0
Immature females	1,510	0	0	212	146	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	77
Total weight (kg)	12.64	8.94	0.89	1.06	0.43	0.58	1.54	0.00	0.00	0.00	0.26
Opilio Tanner Crab											
Immature males	1,716	44,861	77	0	0	0	0	0	0	0	0
Mature males	2,677	42,789	77	0	0	0	0	0	0	0	0
Legal	3,364	86,484	77	0	0	0	0	0	0	0	0
Immature females	0	453	0	0	0	0	0	0	0	0	0
Mature females	687	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	21.79	364.25	0.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hybrid Tanner Crab											
Immature males	0	65	0	0	0	0	0	0	0	0	0
Mature males	0	518	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	3.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	K-11	K-12	K-13	K-14	K-18	K-19	K-20	K-21	K-22	K-23	K-24
Start Date	6/6/2018	6/6/2018	6/4/2018	6/4/2018	6/28/2018	6/28/2018	6/29/2018	6/29/2018	7/7/2018	7/7/2018	7/11/2018
Duration (hour)	0.53	0.24	0.53	0.53	0.51	0.49	0.52	0.53	0.53	0.5	0.53
Distance Fished (km)	2.88	1.29	2.85	2.79	2.91	2.75	2.83	2.8	2.82	2.75	2.81
Mid-Latitude (ºN)	58.22	58.29	58.29	58.34	58.33	58.34	58.33	58.32	58.33	58.34	58.34
Mid-Longitude (ºW)	-161.54	-160.8	-159.97	-159.54	-168.49	-169.13	-169.73	-170.36	-171.01	-171.66	-172.27
Bottom Depth (m)	39	31	44	26	65	68	69	73	84	95	103
Bottom Temperature (ºC)	5.1	7.2	4.7	6.2	4.2	3.9	3.7	3.6	3.6	3.3	3.4
Red King Crab											
Immature males	68	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	79	0	0	0	0	0
Legal	0	0	0	0	0	79	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	1.31	0.00	0.00	0.00	0.00	1.98	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	0	0	0	752	2,679	3,197	214	2,744	26,443	68
Mature males	0	0	0	0	150	0	0	0	0	294	274
Legal	0	0	0	0	75	0	0	0	0	221	205
Immature females	0	0	0	0	1,278	1,182	2,203	0	1,646	21,907	0
Mature females	0	0	0	0	0	0	0	0	0	662	479
Total weight (kg)	0.00	0.00	0.00	0.00	1.31	2.93	1.63	0.01	0.72	20.76	3.24
Opilio Tanner Crab											
Immature males	0	0	0	0	5,787	22,376	160,776	183,361	50,366	6,696	12,660
Mature males	0	0	0	0	601	5,436	2,274	5,059	13,570	441	3,010
Legal	0	0	0	0	3,156	19,146	22,321	65,481	52,833	1,913	6,703
Immature females	0	0	0	0	4,058	1,970	0	641	1,715	147	0
Mature females	0	0	0	0	0	79	1,279	17,577	69	147	823,873
Total weight (kg)	0.00	0.00	0.00	0.00	13.02	76.75	300.36	470.24	240.34	15.88	564.71
Hybrid Tanner Crab											
Immature males	0	0	0	0	0	0	3,411	214	617	0	68
Mature males	0	0	0	0	0	0	0	285	274	0	0
Immature females	0	0	0	0	0	0	7,177	0	0	0	1,252
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	3.17	1.94	3.51	0.00	0.91

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	K-25	K-26	K-27	L-01	L-02	L-03	L-04	L-05	L-06	L-07	L-08
Start Date	7/18/2018	7/21/2018	7/22/2018	6/25/2018	6/24/2018	6/13/2018	6/14/2018	6/14/2018	6/14/2018	6/11/2018	6/11/2018
Duration (hour)	0.52	0.51	0.5	0.52	0.53	0.51	0.51	0.51	0.51	0.52	0.53
Distance Fished (km)	2.7	2.82	2.77	2.92	2.84	2.63	2.79	2.87	2.81	2.85	2.92
Mid-Latitude (ºN)	58.32	58.31	58.33	58.66	58.67	58.66	58.66	58.67	58.66	58.66	58.67
Mid-Longitude (ºW)	-172.92	-173.56	-174.3	-167.87	-167.21	-166.59	-165.92	-165.33	-164.67	-164	-163.35
Bottom Depth (m)	108	115	166	47	44	41	37	40	38	36	31
Bottom Temperature (ºC)	3.6	3.8	4.1	4.4	5.1	4.4	4.6	4.5	4.9	5.1	5.7
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	67	0	184	0	0	147	0	0
Legal	0	0	0	67	0	184	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	404	79	92	0	71	0	0	0
Total weight (kg)	0.00	0.00	0.00	10.40	1.51	7.17	0.00	1.64	3.47	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	22,702	1,938	2,139	0	79	0	0	0	0	0	0
Mature males	0	67	0	0	79	0	0	0	0	0	0
Legal	0	67	0	0	0	0	0	0	0	0	0
Immature females	23,679	1,804	3,795	67	0	0	0	0	0	0	0
Mature females	149	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	19.86	1.76	0.72	0.01	0.71	0.00	0.00	0.00	0.00	0.00	0.00
Opilio Tanner Crab											
Immature males	223	67	0	67	0	0	0	0	0	0	0
Mature males	149	267	0	0	0	0	0	0	0	0	0
Legal	372	267	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	67	0	0	0	0	0	0	0
Mature females	149	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	2.26	2.34	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hybrid Tanner Crab											
Immature males	74	0	0	0	0	0	0	0	0	0	0
Mature males	0	67	0	0	0	0	0	0	0	0	0
Immature females	599	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.30	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	L-09	L-18	L-19	L-20	L-21	L-22	L-23	L-24	L-25	L-26	L-27
Start Date	6/11/2018	6/27/2018	6/28/2018	6/29/2018	6/29/2018	7/7/2018	7/7/2018	7/11/2018	7/12/2018	7/19/2018	7/22/2018
Duration (hour)	0.58	0.51	0.52	0.52	0.52	0.53	0.49	0.52	0.5	0.53	0.53
Distance Fished (km)	3.15	2.88	2.89	2.77	2.88	2.88	2.72	2.87	2.75	2.8	2.92
Mid-Latitude (ºN)	58.67	58.68	58.68	58.67	58.67	58.67	58.66	58.67	58.7	58.68	58.66
Mid-Longitude (ºW)	-162.7	-168.52	-169.16	-169.78	-170.43	-171.09	-171.72	-172.36	-173.01	-173.63	-174.27
Bottom Depth (m)	24	54	63	68	73	82	93	101	113	126	156
Bottom Temperature (ºC)	6.3	4	3.8	3.8	3.3	3.6	3.4	3.4	3.5	3.7	4
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	80	703	869	141	337	523	5,439	3,769	2,927	54,149
Mature males	0	0	156	72	0	0	0	0	72	0	64
Legal	0	0	78	0	0	0	0	0	72	0	0
Immature females	0	241	156	362	0	0	224	5,707	5,436	2,021	52,931
Mature females	0	0	0	0	0	0	75	201	1,450	0	1,594
Total weight (kg)	0.00	0.02	2.61	2.02	0.02	0.39	0.43	3.07	6.19	2.29	41.73
Opilio Tanner Crab											
Immature males	0	482	6,879	90,297	111,427	148,351	6,725	1,746	797	0	0
Mature males	0	0	782	652	2,743	2,743	523	806	1,015	0	0
Legal	0	0	4,612	12,825	25,703	35,353	1,718	1,746	1,667	0	0
Immature females	0	562	234	0	632	741	0	134	72	0	0
Mature females	0	0	0	652	61,265	34,458	598	1,746	362	0	0
Total weight (kg)	0.00	0.24	17.19	157.30	318.71	379.11	16.02	13.15	10.89	0.00	0.00
Hybrid Tanner Crab											
Immature males	0	0	0	507	0	0	0	336	0	0	905
Mature males	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	724	211	0	0	470	0	70	2,714
Mature females	0	0	0	0	0	0	0	0	0	0	128
Total weight (kg)	0.00	0.00	0.00	0.26	0.03	0.00	0.00	0.24	0.00	0.01	1.84

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	L-28	L-29	L-30	L-31	M-01	M-02	M-03	M-04	M-05	M-06	M-07
Start Date	7/25/2018	7/25/2018	7/27/2018	7/27/2018	6/25/2018	6/25/2018	6/13/2018	6/14/2018	6/13/2018	6/11/2018	6/11/2018
Duration (hour)	0.51	0.53	0.53	0.52	0.51	0.52	0.51	0.51	0.53	0.53	0.52
Distance Fished (km)	2.92	2.97	2.75	2.93	2.85	2.69	2.71	2.71	3.02	3.06	2.88
Mid-Latitude (ºN)	58.68	58.68	58.67	58.67	58.99	59	59	59.01	59	59	59
Mid-Longitude (ºW)	-174.92	-175.55	-176.18	-176.85	-167.9	-167.23	-166.61	-165.92	-165.28	-164.65	-164.01
Bottom Depth (m)	205	135	140	136	42	40	34	30	28	27	29
Bottom Temperature (ºC)	4	3.8	3.7	3.6	5.3	5.8	5.2	5.5	5.7	5.9	5.9
Red King Crab											
Immature males	0	0	0	0	0	89	0	0	0	0	0
Mature males	0	0	0	0	69	0	0	0	0	0	0
Legal	0	0	0	0	69	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	89	86	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	3.15	2.59	1.35	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	786	1,219	414	128	69	89	0	0	0	0	0
Mature males	0	706	0	0	0	0	0	0	0	0	0
Legal	0	449	0	0	0	0	0	0	0	0	0
Immature females	393	385	345	128	0	0	0	0	0	0	0
Mature females	0	2,503	138	0	0	0	0	0	0	0	0
Total weight (kg)	0.61	15.23	0.53	0.30	0.30	0.33	0.00	0.00	0.00	0.00	0.00
Opilio Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	128	0	0	0	0	0	0	0	0	0
Legal	0	128	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hybrid Tanner Crab											
Immature males	0	64	0	0	0	0	0	0	0	0	0
Mature males	0	64	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	834	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	2.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	M-08	M-18	M-19	M-20	M-21	M-22	M-23	M-24	M-25	M-26	M-27
Start Date	6/11/2018	6/27/2018	6/27/2018	6/28/2018	6/28/2018	7/7/2018	7/7/2018	7/11/2018	7/11/2018	7/19/2018	7/22/2018
Duration (hour)	0.53	0.52	0.52	0.53	0.53	0.54	0.49	0.53	0.5	0.53	0.52
Distance Fished (km)	2.91	3	2.95	2.74	2.71	2.72	2.71	2.73	2.83	2.84	2.92
Mid-Latitude (ºN)	58.99	59.01	59.01	59	59	58.98	58.99	59	59.01	59	58.99
Mid-Longitude (ºW)	-163.37	-168.55	-169.18	-169.83	-170.47	-171.12	-171.78	-172.44	-173.09	-173.72	-174.37
Bottom Depth (m)	22	47	54	63	70	78	88	98	107	117	127
Bottom Temperature (ºC)	7.2	4.9	4.2	3.7	3.3	3.3	3.4	3.3	3.4	3.5	3.6
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	69	0	0	0	0	0	0	0	0	0
Legal	0	69	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	70	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	2.68	1.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	69	349	298	0	0	612	16,551	2,365	3,625	4,061
Mature males	0	69	0	0	0	0	76	0	70	68	0
Legal	0	69	0	0	0	0	0	0	70	68	0
Immature females	0	0	280	0	0	0	306	11,986	4,105	2,667	2,982
Mature females	0	0	0	74	0	0	0	0	0	547	317
Total weight (kg)	0.00	0.67	0.05	0.49	0.00	0.00	1.03	5.30	1.36	4.24	4.85
Opilio Tanner Crab											
Immature males	0	69	559	204,355	338,068	432,057	6,804	1,101	696	1,436	63
Mature males	0	0	0	1,191	759	6,610	1,376	0	2,226	10,874	127
Legal	0	0	70	8,842	37,217	88,487	4,663	70	2,644	12,037	127
Immature females	0	0	140	6,372	11,269	874	76	1,498	70	0	0
Mature females	0	0	0	372	46,639	30,593	76	211	278	5,021	508
Total weight (kg)	0.00	0.00	0.52	244.36	549.79	899.74	24.26	1.28	19.73	97.62	1.24
Hybrid Tanner Crab											
Immature males	0	0	0	0	0	0	0	1,498	0	0	127
Mature males	0	0	0	0	0	0	0	0	0	410	0
Immature females	0	0	0	0	0	0	0	1,748	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.55	0.00	3.41	0.08

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	M-28	M-29	M-30	M-31	M-32	N-01	N-02	N-03	N-04	N-05	N-06
Start Date	7/25/2018	7/27/2018	7/27/2018	7/27/2018	7/27/2018	6/25/2018	6/25/2018	6/13/2018	6/13/2018	6/13/2018	6/11/2018
Duration (hour)	0.55	0.51	0.51	0.54	0.53	0.51	0.52	0.52	0.53	0.54	0.54
Distance Fished (km)	3.04	2.83	2.86	2.93	2.9	2.92	2.65	2.72	3.05	3.1	3.15
Mid-Latitude (ºN)	59	59.02	59	58.99	59.01	59.32	59.33	59.32	59.33	59.31	59.31
Mid-Longitude (ºW)	-175.03	-175.74	-176.27	-176.94	-177.58	-167.93	-167.27	-166.59	-165.95	-165.33	-164.66
Bottom Depth (m)	129	134	136	135	135	39	32	28	25	22	22
Bottom Temperature (ºC)	3.6	2.9	3.1	3.6	3.8	5.6	6.1	5.5	5.8	6.8	6.7
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	67	0	0	0	0	0
Legal	0	0	0	0	0	67	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	2.03	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	605	77	64	256	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	253	756	0	64	64	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.07	0.58	0.02	0.02	0.78	0.00	0.00	0.00	0.00	0.00	0.00
Opilio Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	63	0	0	0	64	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.03	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Hybrid Tanner Crab											
Immature males	0	76	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	64	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.01	0.00	0.00	0.33	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	N-07	N-18	N-19	N-20	N-21	N-22	N-23	N-24	N-25	N-26	N-27
Start Date	6/11/2018	6/25/2018	6/27/2018	6/28/2018	6/28/2018	7/7/2018	7/7/2018	7/11/2018	7/11/2018	7/19/2018	7/22/2018
Duration (hour)	0.54	0.51	0.52	0.54	0.52	0.54	0.5	0.55	0.49	0.54	0.51
Distance Fished (km)	2.95	2.9	2.93	2.89	2.79	2.9	2.77	2.9	2.79	2.88	2.83
Mid-Latitude (ºN)	59.34	59.34	59.35	59.33	59.33	59.32	59.33	59.33	59.33	59.34	59.34
Mid-Longitude (ºW)	-164	-168.54	-169.25	-169.86	-170.53	-171.16	-171.83	-172.5	-173.17	-173.8	-174.44
Bottom Depth (m)	22	41	51	60	68	75	80	87	100	110	120
Bottom Temperature (ºC)	7.2	5.3	4.3	3.8	3.3	3.1	3.4	3.3	3.3	3.4	3.5
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	136	0	0	0	0	0	0	0	0	0
Legal	0	136	0	0	0	0	0	0	0	0	0
Immature females	0	204	0	0	0	0	0	0	0	0	0
Mature females	0	204	0	69	0	0	0	0	0	0	0
Total weight (kg)	0.00	12.96	0.00	1.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	0	281	0	0	68	75	1,791	4,551	5,454	2,131
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	492	0	0	0	0	1,923	5,276	5,826	2,464
Mature females	0	0	0	0	0	0	0	66	0	136	67
Total weight (kg)	0.00	0.00	0.07	0.00	0.00	0.16	0.30	0.87	1.55	2.87	1.51
Opilio Tanner Crab											
Immature males	0	0	2,531	186,533	847,300	121,446	31,786	8,233	791	886	200
Mature males	0	0	0	412	497	473	600	332	330	545	0
Legal	0	0	0	10,124	23,262	4,918	7,722	464	660	614	67
Immature females	0	0	1,476	16,288	163,529	4,128	2,174	13,553	1,781	2,727	200
Mature females	0	0	0	274	206,831	495,463	49,228	3,183	132	136	2,264
Total weight (kg)	0.00	0.00	0.65	269.83	1077.32	542.06	87.91	10.99	4.80	5.98	2.10
Hybrid Tanner Crab											
Immature males	0	0	0	0	0	0	0	265	0	341	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	199	0	818	0
Mature females	0	0	0	0	0	0	0	0	0	0	133
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.21	0.07

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	N-28	N-29	N-30	N-31	O-01	O-02	O-03	O-04	O-18	O-19	O-20
Start Date	7/25/2018	7/27/2018	7/28/2018	7/28/2018	6/25/2018	6/25/2018	6/13/2018	6/13/2018	6/26/2018	6/26/2018	6/27/2018
Duration (hour)	0.52	0.52	0.5	0.52	0.53	0.53	0.52	0.53	0.52	0.53	0.52
Distance Fished (km)	2.9	2.86	2.81	2.83	2.95	3.03	2.76	2.98	2.98	2.97	2.92
Mid-Latitude (ºN)	59.33	59.35	59.33	59.33	59.68	59.66	59.67	59.63	59.67	59.67	59.66
Mid-Longitude (ºW)	-175.09	-175.76	-176.39	-177.06	-167.97	-167.3	-166.62	-165.97	-168.64	-169.28	-169.92
Bottom Depth (m)	132	136	136	149	36	31	28	24	40	48	56
Bottom Temperature (ºC)	3.3	2.8	2.6	3.6	6.2	6.8	5.4	6.5	5.9	4.4	3.6
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	136	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.36	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	670	518	842	200	0	0	0	0	0	541	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	872	370	1,011	267	0	0	0	0	0	338	0
Mature females	67	74	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.65	1.47	0.66	0.50	0.00	0.00	0.00	0.00	0.00	0.04	0.00
Opilio Tanner Crab											
Immature males	67	0	253	200	0	0	0	0	0	1,487	102,160
Mature males	67	0	0	67	0	0	0	0	0	0	73
Legal	67	0	84	67	0	0	0	0	0	0	146
Immature females	0	0	337	67	0	0	0	0	0	1,216	39,026
Mature females	3,285	0	0	0	0	0	0	0	0	0	365
Total weight (kg)	2.77	0.00	0.30	0.57	0.00	0.00	0.00	0.00	0.00	0.43	97.22
Hybrid Tanner Crab											
Immature males	0	74	0	67	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	84	67	0	0	0	0	0	0	0
Mature females	0	74	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.41	0.05	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	O-21	O-22	O-23	O-24	O-25	O-26	O-27	O-28	O-29	O-30	O-31
Start Date	6/27/2018	7/8/2018	7/7/2018	7/11/2018	7/10/2018	7/10/2018	7/19/2018	7/24/2018	7/27/2018	7/28/2018	7/28/2018
Duration (hour)	0.53	0.52	0.49	0.53	0.54	0.5	0.53	0.51	0.51	0.5	0.52
Distance Fished (km)	2.8	2.75	2.76	2.77	2.86	2.81	2.74	2.65	2.77	2.75	2.79
Mid-Latitude (ºN)	59.67	59.66	59.66	59.67	59.68	59.67	59.66	59.66	59.68	59.64	59.67
Mid-Longitude (ºW)	-170.59	-171.25	-171.89	-172.56	-173.25	-173.9	-174.45	-175.1	-175.88	-176.52	-177.13
Bottom Depth (m)	66	72	78	85	95	104	115	126	137	135	168
Bottom Temperature (ºC)	2.8	2.9	3.2	3.3	3.3	3.2	3.2	3.2	2.7	2.6	3.7
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	70	0	0	0	0	0	0	0
Mature males	0	0	0	0	67	0	0	0	0	0	0
Legal	0	0	0	0	67	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.60	2.08	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	0	74	0	1,268	1,647	0	0	1,975	85	0
Mature males	0	0	0	0	67	0	73	0	0	0	0
Legal	0	0	0	0	67	0	73	0	0	0	0
Immature females	0	0	0	0	735	659	0	0	1,975	85	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.12	0.00	1.10	0.78	0.59	0.00	0.48	0.08	0.00
Opilio Tanner Crab											
Immature males	228,222	155,576	60,285	170,491	22,424	659	17,005	2,337	553	85	0
Mature males	146	361	0	350	469	0	6,322	2,775	79	0	0
Legal	4,581	6,550	819	1,679	3,348	0	12,354	4,163	79	85	0
Immature females	67,641	11,511	6,779	44,835	38,697	461	0	0	1,185	85	0
Mature females	10,459	424,206	38,888	40,275	2,411	0	802,228	113,701	0	0	0
Total weight (kg)	258.39	479.45	84.88	215.24	31.75	0.33	611.80	91.73	1.01	0.35	0.00
Hybrid Tanner Crab											
Immature males	0	750	0	0	67	0	0	73	158	0	0
Mature males	0	72	0	0	0	0	0	73	0	0	0
Immature females	0	0	0	0	0	0	0	0	316	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	1.08	0.00	0.00	0.23	0.00	0.00	0.54	0.10	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	ON2524	ON2625	P-01	P-18	P-19	P-20	P-21	P-22	P-23	P-24	P-25
Start Date	7/11/2018	7/19/2018	6/26/2018	6/26/2018	6/26/2018	6/27/2018	6/27/2018	7/8/2018	7/8/2018	7/10/2018	7/10/2018
Duration (hour)	0.54	0.53	0.54	0.51	0.53	0.53	0.53	0.52	0.51	0.52	0.52
Distance Fished (km)	2.95	2.77	3.19	2.85	3.06	2.86	2.94	2.74	2.8	2.77	2.65
Mid-Latitude (ºN)	59.5	59.5	60	60	60	60.01	60.01	59.98	60	60	60.01
Mid-Longitude (ºW)	-172.87	-173.5	-167.99	-168.63	-169.32	-169.97	-170.64	-171.3	-171.97	-172.61	-173.27
Bottom Depth (m)	93	102	26	39	46	55	64	69	66	66	74
Bottom Temperature (ºC)	3.3	3.3	7	6.1	3.9	3.5	2.8	2.7	3.1	3.5	3.5
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	62	0	0	0	0	0	0
Legal	0	0	0	0	62	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	2.46	0.00	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	71	229
Mature males	0	0	0	0	0	0	0	0	238	212	688
Legal	0	0	0	0	0	0	0	0	159	212	382
Immature females	0	0	0	0	0	0	0	0	0	71	382
Mature females	0	0	0	0	0	0	0	0	0	707	76
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.98	14.18	17.84
Bairdi Tanner Crab											
Immature males	1,539	1,604	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	776	2,917	0	0	0	0	0	0	0	0	0
Mature females	0	73	0	0	0	0	0	0	0	0	0
Total weight (kg)	1.36	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Opilio Tanner Crab											
Immature males	40,857	1,750	0	0	125	184,301	114,874	227,984	4,203	74,504	4,356
Mature males	518	0	0	0	0	0	0	71	79	71	0
Legal	10,341	0	0	0	0	0	0	3,807	397	707	306
Immature females	4,657	3,428	0	0	249	36,471	52,023	27,930	159	54,934	2,598
Mature females	116,655	0	0	0	0	824	21,573	175,247	317	565	153
Total weight (kg)	191.56	1.40	0.00	0.00	0.05	157.07	150.07	372.45	6.19	68.86	5.12
Hybrid Tanner Crab											
Immature males	184	729	0	0	0	0	0	0	0	71	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	729	0	0	0	0	0	0	0	0	0
Mature females	776	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	1.66	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	P-26	P-27	P-28	P-29	P-30	P-31	P-32	PO2423	PO2524	PO2625	PO2726
Start Date	7/10/2018	7/20/2018	7/24/2018	7/24/2018	7/28/2018	7/28/2018	7/28/2018	7/8/2018	7/10/2018	7/10/2018	7/10/2018
Duration (hour)	0.5	0.53	0.52	0.51	0.49	0.53	0.51	0.5	0.54	0.54	0.5
Distance Fished (km)	2.78	2.78	2.69	2.76	2.76	2.86	2.65	2.69	2.95	2.84	2.77
Mid-Latitude (ºN)	60.01	60.04	60	60	59.98	59.99	60	59.83	59.83	59.84	59.85
Mid-Longitude (ºW)	-173.96	-174.6	-175.25	-175.91	-176.72	-177.2	-177.89	-172.27	-172.91	-173.56	-174.23
Bottom Depth (m)	95	107	115	129	140	136	141	76	80	94	106
Bottom Temperature (ºC)	3.2	3.1	2.9	2.7	2.1	2.1	2.3	3.3	3.2	3.3	3.2
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	77	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.76	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	72	0	0	0	0	0	0	0	330	402	0
Legal	72	0	0	0	0	0	0	0	264	402	0
Immature females	0	0	0	0	0	0	0	0	66	0	0
Mature females	0	0	0	0	0	0	0	0	395	0	0
Total weight (kg)	2.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	13.45	14.01	0.00
Bairdi Tanner Crab											
Immature males	0	0	0	1,369	0	0	74	77	0	134	268
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	70	890	0	68	0	0	0	335	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.37	0.00	0.07	0.06	0.04	0.00	0.11	0.13
Opilio Tanner Crab											
Immature males	88,649	933	562	68	0	68	0	61,405	112,633	10,520	1,271
Mature males	216	359	1,124	1,095	0	0	0	77	0	1,407	335
Legal	3,313	430	1,404	1,095	0	68	0	693	3,840	6,500	602
Immature females	1,225	72	70	342	0	68	0	26,343	58,004	4,690	468
Mature females	3,172	1,076	70	0	0	0	0	50,579	39,275	603	0
Total weight (kg)	132.17	4.80	10.61	12.34	0.00	0.33	0.00	102.83	231.04	38.13	4.28
Hybrid Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	719	134	0
Mature males	0	0	0	0	0	0	0	0	0	67	0
Immature females	0	0	0	68	84	136	74	0	400	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.02	0.01	0.03	0.01	0.00	0.66	1.06	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	Q-01	Q-02	Q-18	Q-19	Q-20	Q-21	Q-22	Q-23	Q-25	Q-26	Q-27
Start Date	6/26/2018	6/26/2018	6/26/2018	6/26/2018	6/26/2018	7/8/2018	7/8/2018	7/8/2018	7/10/2018	7/20/2018	7/26/2018
Duration (hour)	0.53	0.53	0.53	0.52	0.52	0.54	0.53	0.52	0.51	0.52	0.51
Distance Fished (km)	2.94	2.74	3	2.83	2.86	2.81	2.73	2.91	2.89	2.9	2.85
Mid-Latitude (ºN)	60.33	60.34	60.33	60.33	60.34	60.33	60.34	60.33	60.29	60.34	60.32
Mid-Longitude (ºW)	-167.97	-167.26	-168.66	-169.33	-170.02	-170.67	-171.33	-172.07	-173.38	-174.08	-174.71
Bottom Depth (m)	32	30	36	43	52	61	66	59	63	90	103
Bottom Temperature (ºC)	7.5	7.7	5.7	4.4	3.2	2.8	2.5	3.4	3.9	3.3	3.2
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	80	0	0	0	0	0	0	0
Legal	0	0	0	80	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	2.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	2,440	805	0	0
Mature males	0	0	0	0	0	0	0	287	335	0	0
Legal	0	0	0	0	0	0	0	215	201	0	0
Immature females	0	0	0	0	0	0	0	1,579	268	0	0
Mature females	0	0	0	0	0	0	0	359	201	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.22	13.86	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	0	0	80	0	0	0	72	134	0	0
Mature males	0	0	0	0	0	0	0	0	67	0	0
Legal	0	0	0	0	0	0	0	0	67	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.17	0.50	0.00	0.00
Opilio Tanner Crab											
Immature males	0	0	0	80	122,701	447,740	634,871	93,859	44,256	276,257	33,996
Mature males	0	0	0	0	0	0	72	0	0	622	1,821
Legal	0	0	0	0	626	139	4,553	769	0	7,672	22,765
Immature females	0	0	0	80	32,644	241,453	273,860	287	16,500	17,320	69
Mature females	0	0	0	0	151	30,979	72,023	718	5,500	666,835	415
Total weight (kg)	0.00	0.00	0.00	0.01	99.79	420.75	689.48	113.29	51.97	800.38	115.61
Hybrid Tanner Crab											
Immature males	0	0	0	0	0	0	72	0	0	0	152
Mature males	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	69
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.00	0.05

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	Q-28	Q-29	Q-30	Q-31	QP2423	QP2524	QP2625	QP2726	R-22	R-23	R-24
Start Date	7/26/2018	7/24/2018	7/28/2018	7/29/2018	7/8/2018	7/10/2018	7/10/2018	7/20/2018	7/21/2018	7/21/2018	7/21/2018
Duration (hour)	0.53	0.52	0.51	0.51	0.52	0.54	0.49	0.54	0.52	0.52	0.51
Distance Fished (km)	2.91	2.7	2.86	2.69	2.87	2.93	2.73	2.84	2.74	2.86	2.84
Mid-Latitude (ºN)	60.35	60.33	60.33	60.33	60.16	60.18	60.12	60.17	60.66	60.67	60.67
Mid-Longitude (ºW)	-175.4	-176.03	-176.73	-177.37	-172.31	-173.01	-173.77	-174.36	-171.43	-172.12	-172.79
Bottom Depth (m)	111	121	137	148	58	59	88	100	63	61	44
Bottom Temperature (ºC)	2.9	2.6	2.2	2.6	3.9	4.2	3.3	3.2	2.7	2.6	6
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	141	269	0	0	0	0	84
Mature males	0	0	0	0	424	67	216	0	0	0	0
Legal	0	0	0	0	212	67	216	0	0	0	0
Immature females	0	0	0	0	0	807	0	0	0	0	337
Mature females	0	0	0	0	353	67	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	11.60	6.21	6.06	0.00	0.00	0.00	1.03
Bairdi Tanner Crab											
Immature males	0	366	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	220	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Opilio Tanner Crab											
Immature males	1,495	2,122	372	0	495	605	132,460	230,354	314,397	664,150	1,400,940
Mature males	1,259	3,293	8,843	0	0	0	72	3,861	0	0	0
Legal	1,574	3,439	9,215	0	0	0	2,731	34,902	74	1,214	168
Immature females	157	1,171	0	0	0	942	26,822	0	300,616	442,612	1,206,068
Mature females	236	0	223	0	0	135	315,499	20,727	49,916	242,184	236,240
Total weight (kg)	13.32	29.49	72.06	0.00	0.40	0.52	384.53	486.91	343.41	775.27	1304.26
Hybrid Tanner Crab											
Immature males	0	0	149	0	0	0	0	691	0	0	0
Mature males	0	73	149	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.56	1.61	0.00	0.00	0.00	0.00	1.43	0.00	0.00	0.00
	7/26/2018	7/24/2018	7/28/2018	7/29/2018	7/8/2018	7/10/2018	7/10/2018	7/20/2018	7/21/2018	7/21/2018	7/21/2018

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	R-25	R-26	R-27	R-28	R-29	R-30	R-31	R-32	S-22	S-23	S-24
Start Date	7/21/2018	7/20/2018	7/26/2018	7/26/2018	7/23/2018	7/29/2018	7/29/2018	7/29/2018	7/22/2018	7/22/2018	7/22/2018
Duration (hour)	0.53	0.53	0.52	0.51	0.52	0.52	0.51	0.52	0.53	0.52	0.35
Distance Fished (km)	2.91	2.88	2.83	2.82	2.72	2.84	2.82	2.92	2.77	2.84	1.92
Mid-Latitude (ºN)	60.66	60.68	60.66	60.66	60.67	60.65	60.68	60.68	61	61	61
Mid-Longitude (ºW)	-173.47	-174.14	-174.81	-175.45	-176.21	-176.82	-177.48	-178.16	-171.48	-172.16	-172.8
Bottom Depth (m)	66	87	97	107	119	130	144	160	60	63	66
Bottom Temperature (ºC)	4.7	3.4	3	2.9	2.6	2.3	2.4	3.1	2.7	2.4	3.8
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	0	0	0	0	0	0	64	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	192	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00
Opilio Tanner Crab											
Immature males	47,061	440,809	78,371	20,302	174	227	67	0	337,280	470,068	703,908
Mature males	0	217	1,041	2,256	3,572	756	0	0	0	0	0
Legal	0	15,753	4,166	14,765	3,747	756	0	0	67	73	724
Immature females	56,594	40,427	11,147	149	0	453	0	128	162,714	368,678	849,329
Mature females	53,899	399,777	520,202	746	174	227	0	0	25,861	57,165	86,974
Total weight (kg)	90.29	780.69	450.40	71.81	28.40	6.26	0.01	0.02	289.31	459.35	594.17
Hybrid Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	S-25	S-26	S-27	S-28	S-29	S-30	S-31	T-25	T-26	T-27	T-28
Start Date	7/22/2018	7/22/2018	7/23/2018	7/23/2018	7/23/2018	7/29/2018	7/29/2018	7/31/2018	7/31/2018	7/30/2018	7/30/2018
Duration (hour)	0.53	0.52	0.51	0.52	0.53	0.51	0.51	0.5	0.51	0.51	0.52
Distance Fished (km)	2.72	2.74	2.82	2.82	2.92	2.8	2.83	2.75	2.75	2.85	2.78
Mid-Latitude (ºN)	61	61	61	61	61	60.99	61	61.33	61.34	61.34	61.34
Mid-Longitude (ºW)	-173.51	-174.18	-174.86	-175.55	-176.3	-176.97	-177.61	-173.6	-174.34	-175	-175.67
Bottom Depth (m)	75	83	92	102	111	122	134	73	77	88	98
Bottom Temperature (ºC)	2.5	3	2.6	2.7	2.5	2.3	2	2.5	2.1	2.3	2.6
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	0	0	0	0	0	144	0	0	0	0
Mature males	0	0	0	0	0	0	72	0	0	0	0
Legal	0	0	0	0	0	0	72	0	0	0	0
Immature females	0	0	0	0	0	0	72	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.00	0.00	0.00
Opilio Tanner Crab											
Immature males	193,368	496,206	733,425	160,812	614	0	144	110,119	214,003	61,518	39,509
Mature males	0	0	802	4,730	410	75	1,443	0	70	136	552
Legal	964	7,716	9,619	60,541	546	75	1,443	431	2,041	1,553	2,984
Immature females	250,451	348,100	227,692	6,629	137	75	0	99,032	104,078	59,038	1,821
Mature females	37,043	183,562	621,775	5,649	0	0	0	12,186	23,795	20,125	103,009
Total weight (kg)	268.14	748.72	1276.13	390.34	4.68	0.70	15.70	140.17	298.86	119.40	144.84
Hybrid Tanner Crab											
Immature males	0	0	0	4,074	0	0	0	0	0	0	69
Mature males	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	1,393	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	4.04	0.00	0.00	0.00	0.00	0.00	0.00	0.07

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	T-29	T-30	U-25	U-26	U-27	U-28	U-29	V-25	V-26	V-27	V-28
Start Date	7/30/2018	7/29/2018	7/31/2018	7/31/2018	7/30/2018	7/30/2018	7/30/2018	7/31/2018	7/31/2018	7/30/2018	7/30/2018
Duration (hour)	0.5	0.51	0.5	0.54	0.49	0.52	0.51	0.52	0.51	0.51	0.52
Distance Fished (km)	2.71	2.75	2.71	2.91	2.66	2.8	2.79	2.93	2.82	2.83	2.8
Mid-Latitude (ºN)	61.33	61.33	61.67	61.67	61.67	61.67	61.67	61.99	62	62	62
Mid-Longitude (ºW)	-176.3	-177.01	-173.7	-174.45	-175.08	-175.82	-176.48	-173.73	-174.47	-175.23	-175.82
Bottom Depth (m)	107	117	70	77	85	96	105	62	72	81	92
Bottom Temperature (ºC)	2.4	2.3	1.9	1.8	2.1	2.4	2.3	2	1.6	1.9	2
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Opilio Tanner Crab											
Immature males	46,579	72	314,167	321,449	174,835	159,967	58,482	19,282	197,331	84,224	98,791
Mature males	5,675	145	0	0	482	0	1,335	0	299	1,668	1,742
Legal	42,323	145	3,491	4,104	3,097	16,692	21,363	361	1,867	10,007	24,415
Immature females	71	289	127,412	164,144	158,546	19,115	527	4,550	124,282	59,120	2,442
Mature females	15,875	0	10,472	4,104	3,731	180,218	199,413	1,372	8,877	4,173	37,873
Total weight (kg)	205.14	1.52	258.76	330.12	246.73	429.79	331.77	22.07	192.98	167.42	230.11
Hybrid Tanner Crab											
Immature males	0	0	5,236	9,575	69	0	267	939	4,439	5,003	951
Mature males	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	10,472	10,943	0	0	0	72	8,877	3,478	287
Mature females	0	0	1,745	1,368	0	0	6,503	144	1,480	0	1,337
Total weight (kg)	0.00	0.00	6.19	14.02	0.16	0.00	6.45	0.95	6.07	11.14	2.40

Appendix: Tow details, crab density (number nmi^{-2}), and catch weight at 2017 eastern Bering Sea bottom trawl survey stations.

Station	Z-05
Start Date	6/20/2018
Duration (hour)	0.53
Distance Fished (km)	2.66
Mid-Latitude (ºN)	54.71
Mid-Longitude (ºW)	-165.14
Bottom Depth (m)	85
Bottom Temperature (ºC)	5.8
Red King Crab	
Immature males	0
Mature males	0
Legal	0
Immature females	0
Mature females	0
Total weight (kg)	0.00
Blue King Crab	
Immature males	0
Mature males	0
Legal	0
Immature females	0
Mature females	0
Total weight (kg)	0.00
Bairdi Tanner Crab	
Immature males	237
Mature males	79
Legal	79
Immature females	158
Mature females	0
Total weight (kg)	0.78
Opilio Tanner Crab	
Immature males	0
Mature males	0
Legal	0
Immature females	0
Mature females	0
Total weight (kg)	0.00
Hybrid Tanner Crab	
Immature males	0
Mature males	0
Immature females	0
Mature females	0
Total weight (kg)	0.00