



NOAA Technical Memorandum NMFS-AFSC-295

doi:10.7289/V52R3PN7

# **The 2013 Eastern Bering Sea Continental Shelf Bottom Trawl Survey: Results for Commercial Crab Species**

by

B. J. Daly, C. E. Armistead, and R. J. Foy

**U.S. DEPARTMENT OF COMMERCE**  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Alaska Fisheries Science Center

March 2015

## NOAA Technical Memorandum NMFS

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This document should be cited as follows:

Daly, B. J., C. E. Armistead, and R. J. Foy. 2015. The 2013 eastern Bering Sea continental shelf bottom trawl survey: Results for commercial crab species. U.S. Dep. Commer., NOAA Tech. Memo. NMFS-AFSC-295, 166 p. doi:10.7289/V52R3PN7

Document available: <http://www.afsc.noaa.gov/Publications/AFSC-TM/NOAA-TM-AFSC-295.pdf>

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March 2015

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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. In 2013, 376 standard stations were sampled on the eastern Bering Sea shelf. The 2013 biomass estimates reported in metric tons (t) and pounds (lb) with 95% confidence intervals ( $\pm 1.96$  SE) for legal-sized males of each commercial crab stock in the eastern Bering Sea were as follows:

Commercial Crab Species	2013 Legal-sized Male Biomass ( $\pm 95\%$ CI)	
	t	lb
Bristol Bay District red king crab ( <i>Paralithodes camtschaticus</i> )	28,152 (12,032)	62,063,662 (26,526,894)
Pribilof District red king crab	7,567 (9,297)	16,682,360 (20,496,352)
Pribilof District blue king crab ( <i>P. platypus</i> )	190 (280)	418,690 (617,417)
St. Matthew Is. Section blue king crab	1,485 (702)	3,274,645 (1,546,562)
Southern Tanner crab ( <i>Chionoecetes bairdi</i> ), east 166° W	23,843 (13,352)	52,564,118 (29,436,459)
Southern Tanner crab, east 166° W ≥ 5.5 inches	5,078 (2,306)	11,195,095 (5,084,319)
Southern Tanner crab, west 166° W	15,939 (7,395)	35,139,822 (16,302,110)
Southern Tanner crab, west 166° W ≥ 5.0 inches	8,220 (4,684)	18,122,531 (10,326,384)
Snow crab, all Districts ( <i>C. opilio</i> )	99,724 (23,086)	219,853,525 (50,895,331)
Snow crab, all Districts ≥ 4.0 inches	43,117 (11,822)	95,055,630 (26,063,545)

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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. Starting 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 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 2005) but will be referred to as Tanner crab in this document.

Prior to 1988, the total number of stations varied and gradually increased until 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 a 140,350 square nautical mile (nmi<sup>2</sup>) area of the EBS with station depths ranging from 20 to 200 m (Fig. 2). The annual EBS bottom trawl survey begins in the northeast section of Bristol Bay in early June and approximately 8 to 12 stations are sampled each day from two vessels. 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 when the reproductive cycle of red king crab is delayed due to colder water temperatures (i.e., 1999, 2000, 2006-2012), a small portion of the inner Bristol Bay area is resampled after the conclusion of the standard survey (see Methods).

Between 1994 and 2010, a survey station producing  $\geq 100$  legal-sized red king or Tanner crab males was considered a “hot spot”. At each hot spot, additional tows were made within the station area and all crab species caught were sampled identical to the standard survey tow protocol described in the Methods section. Starting in 2011, the “hot spot” protocol was discontinued.

### 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 2011a). 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 species. The National Marine Fisheries Service determines the procedure for setting overfishing levels and allowable biological catch while ADF&G sets the annual total allowable catch or guideline harvest level for each crab stock. Currently, the Crab Plan Team and the Council’s Scientific and Statistical

Committee 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 (Bowers et al. 2011). Red king crab are split into Bristol Bay and Pribilof Islands stocks, 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 2013 survey results for commercially important crab resources in the EBS. 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 2013 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., Lauth 2011).

## METHODS

### Survey Area and Sampling Logistics

The 2013 standard survey was conducted onboard the chartered fishing vessels FV *Alaska Knight* and FV *Aldebaran*, beginning 9 June in the northeast corner of Bristol Bay, moving westward, and finishing on 1 August. The vessels sampled in close proximity to each other during the survey.

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

The king crab Registration Area T in Bristol Bay (south of  $58^\circ 39' \text{N}$  and east of  $168^\circ \text{W}$ ) is  $54,536 \text{ nmi}^2$  and consists of 136 stations. The king crab Registration Area Q in the Bering Sea is divided into the Northern District (north of  $58^\circ 39' \text{N}$ ) and the Pribilof District (south of  $58^\circ 39' \text{N}$  and west of  $168^\circ \text{W}$ ). The area for the St. Matthew Island Section of the Northern District is divided into two sampling strata: 1) a high-density  $7,218 \text{ nmi}^2$  stratum with 28 stations (one of which is not trawlable but included in the total area surveyed) and 2) a standard-density  $11,629 \text{ nmi}^2$  stratum with 29 stations creating a total of 57 stations within the St. Matthew Island Section. The area of the Pribilof District is divided into two sampling strata: 1) a high-density  $10,025 \text{ nmi}^2$  stratum with 41 total stations and 2) a standard-density  $14,436 \text{ nmi}^2$  stratum with 36 stations creating 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 9 additional stations, as indicated in the 2013 Rebuilding Plan. In general, for all crab stocks, high-density strata have more stations (standard, corner) per area than standard-density strata. Two tows were completed at A-04 due to the final position of the Z-04 tow which only has limited area within the trawlable depth range. At this station, a single estimate of crab density was used by averaging both tows prior to calculating total crab biomass for Tanner and snow crab.

The fishing gear used in 2013 was identical to that of previous EBS annual bottom trawl surveys since 1982 with both vessels fishing a standard 83-112 Eastern otter trawl with an 83 ft (25.3 m) headrope and a 112 ft (34.1 m) footrope (Lauth 2011). The codend mesh size is 8.9 cm stretched and the liner is 3.2 cm. The trawls on each vessel were rotated 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 at a speed of 3 knots ( $1.54 \text{ m sec}^{-1}$ ) and conducted in strict compliance with NMFS bottom trawl protocols established by the National Oceanic and Atmospheric Administration (Stauffer 2004).

Net mensuration equipment was used to monitor the net's fishing performance during each tow (Lauth 2011). 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 consisted of an acoustic sensor attached to the headrope and two sensors attached to the port and starboard dandyines to measure net height and width during trawling operations. The bottom contact of the footrope and GPS data were used 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  $35 \pm 0.002$  °C with pressure sensors measuring to a maximum depth of  $1,000 \pm 1$  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**

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 ( $>300$ ) of a species was caught in a tow. The subsample 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 weight 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 ( $\pm 1$  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 all king crab and hair crab (Donaldson and Byersdorfer 2005). Individual weights are recorded 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 2013, data was collected on up to 5 intact crab per each of the following categories: 1) male red king crab, 2) ovigerous red king crab, 3) non-ovigerous female red king crab, 4) male snow crab, 5) ovigerous snow crab, and 6) non-ovigerous female snow crab. Because of their relative rarity, weight data was collected for all intact blue king crabs encountered that meet the sampling requirements (i.e., whole, live crab without regenerating limbs). Weights were collected from entire size ranges throughout the spatial distribution of each species.

Shell condition classification is necessary for apportioning stock abundance and biomass by length and sex for the purpose of status of stock determination, 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).

Egg clutch and egg condition codes were used to identify the stage in the molt-mate cycle of mature female red king crab during the survey, where the presence of eyed embryos, empty egg cases, or absence of eggs (barren, hereafter) in mature-sized females were indications of an incomplete cycle while mature females brooding uneyed embryos indicated completion of the cycle. The ratio of females with eyed embryos, empty egg cases, and 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 regulates fluctuations in population abundances. Yet, most stock assessment models use spawning stock biomass (i.e., number of mature animals and average weight of mature animals), but not embryo production, which can lead to different perceptions of productivity (Swiney et al. 2012, Trippel 1999). In recent years, process studies conducted during the survey collected egg clutches for red king crabs in Bristol Bay and *Chionoecetes* spp. throughout the eastern Bering Sea to assess female reproductive potential. In addition, spermathecae were sampled for *Chionoecetes* spp. Red king crab and snow crab fecundity was

found to vary 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, samples of mature female crabs were collected (*Chionoecetes* spp. every year, red king crab in even years only) throughout their distribution as standard sampling protocol on the survey to monitor fecundity changes over time. Future analyses will consider the correlations of reproductive potential with demographic and environmental patterns. In 2013, mature female *Chionoecetes* spp. with shell condition 1 – 3 were collected and sent back to the laboratory for an assessment of fecundity. Because fecundity analysis is time intensive in the laboratory, samples collected on the 2012 and 2013 survey will be presented as data in subsequent Technical Memoranda.

Maturity in male *Chionoecetes* spp. can be defined by separating crab into two morphometric groups, small claw and large claw based on the frequency distribution of the chela height to carapace width ratio in the large and small claw categories (Tamone et al. 2007). 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. For 2013, chela height and carapace width measurements ( $\pm 0.1$  mm) were collected from a subsample (typically <15 crab per haul) of male snow crab caught at each station to determine morphometric molt to maturity based on the chela height to carapace width ratio (Stevens et al. 1993, Tamone et al. 2007).

All crab carapaces were scanned for evidence of bitter crab syndrome and black mat fungus. Crabs with bitter crab syndrome were set aside for further testing by the Fisheries Resource Pathology Laboratory at the AFSC in Seattle, WA. Bitter crab syndrome is caused by a parasitic dinoflagellate, *Hematodinium* sp. and is found in Tanner and snow crab throughout Alaskan waters (Meyers et al. 1996). The mortality rate of parasitized crabs is 100% and symptoms include lethargy, pink carapace pigmentation, and white opaque hemolymph (Meyers and Burton 2009a). Meats of parasitized crabs are harmless to humans, but bitter tasting making 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, *Trichomarix invadens*, and was prevalent in the 1970s and 1980s throughout Alaskan 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 could fail to reach legal size or sexual maturity. As a standard part of the survey sampling protocol, crabs were evaluated to understand temporal and spatial variability of bitter crab and black mat infection prevalence.

### **Crab Biomass Estimates**

Crab density (number  $\text{nmi}^{-2}$ ) was estimated at each station for legal males, or sublegal 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 Alaska Department of Fish and Game definition of legal size classes (CW in inches) include spines (ADF&G 2012), while CW measurements reported in this document exclude spines (Table 1). The area swept by the trawl ( $\text{nmi}^2$ ) 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 (Fig. 4). 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 2013 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 2013, 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.

Survey abundance estimates were calculated as follows:

$$\text{CPUE in a cell (station): } CPUE_{cell\ i} = \frac{\text{Crab Count}}{\text{Area Swept (nmi}^2\text{)}}$$

$$\text{Average CPUE among cells in a stratum: } \text{Average } CPUE_{cell} = \frac{\sum_{i=1}^{n_t} CPUE_{cell\ i}}{n_t}$$

$$\text{Total abundance in a stratum: } A_t = SA \times \text{Average } CPUE_{cell}$$

Stock abundance: Sum of all strata abundances

With variance: Sum of all strata variances

All reported historical data and the current biomass estimates are calculated for the number of individual male and female crab species at each 1 mm size category using the weight-size relationships developed by the AFSC 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 mm,  $a$  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.

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 multiplied 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 ( $\pm$  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 lbs 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, and 2006 - 2012) a small number of standard Bristol Bay stations sampled at the beginning of the survey were resampled in late July to accurately assess the percentage of ovigerous red king crab females which had extruded a new clutch of uneyed embryos. In 2013, average bottom temperatures at Bristol Bay stations in June were warm relative to recent years. The ratio of ovigerous females with eyed to uneyed embryos was 0.02 indicating that almost all mature females completed their annual reproductive cycle. As such, Bristol Bay stations were not resampled as in previous years. As with the other species described in this document, the 2013 population estimates for Bristol Bay red king crabs for both males and females were calculated using standard tows.

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.

## **Centers of Distribution**

The centers of distribution for male and female crab from 1975 to 2013 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. For years with retows, 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 2013 EBS bottom trawl survey consisted of 376 bottom trawls conducted from 9 June to 1 August over an area of approximately 140,350 nmi<sup>2</sup> 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. 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 was 1.53 nmi (2.83 km, SD = 0.11 nmi) with a range of 0.80 to 1.91 nmi (1.47 to 3.53 km) and the mean fishing time was 30.9 minutes (SD = 2.09 min). The fishing depth of the 83-112 Eastern otter trawl ranged from 18 to 175 m with a mean gear depth of 79.0 m (SD = 34.1 m). The mean net width per tow ranged from 13.84 to 21.36 m and the average mean net width for all 376 successful tows was 16.9 m (SD = 1.22 m).

The bottom temperature at each station during the standard survey ranged from -1.7 to 6.4 °C (Fig. 5). A cold pool of water < 2 °C extended onto the middle shelf between the 50 and 100 m isobaths to the western portion of Bristol Bay. The Pribilof Islands were just outside the edge of the cold pool. Warmer bottom temperatures were evident between the 100 and 200 m isobaths in the southern area of the survey area and in shallow waters north of Bristol Bay. Cold water temperatures persisted in the northwestern area between the 50 and 200 m isobaths and the waters surrounding St. Matthew Island. In 2013, the average bottom water temperature during the first survey leg (9 to 26 June 2013) was 2.7 °C (SD = 1.4) which was warmer than the average mean bottom water temperature during the same time period in 2012 (Mean = 1.3 °C, SD = 1.5), 2010 (Mean = 1.8 °C, SD = 1.6), 2009 (Mean 1.5 °C, SD = 0.5), 2008 (Mean = 1.4 °C, SD = 0.7), and 2007 (Mean = 1.8 °C, SD = 0.9).

Population abundance and biomass of the seven commercial crab stocks sampled during this survey fluctuated dramatically from 1975 to current (Figs. 6-11). 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 due to increases in snow and Tanner crab in the early 1990s, and has since leveled out around 200,000 t in the past 6 years.

Five special projects were conducted in addition to the standard assessment survey to collect specific biological data from particular crab species (Table 4). Four of the projects originated from the AFSC: 1) record individual crabs weights for length-weight regressions, 2) collect hemolymph samples at randomly selected stations to monitor bitter crab syndrome and for population genetics, 3) collect specimens with rare or unusual pathological conditions, and 4) collect ovigerous female snow crabs for laboratory larval and juvenile growth and habitat studies. One project originated from ADF&G: collection of red king crab, snow crab, and Tanner crab for the evaluation of a technique for age determination.

Hemolymph samples were collected from 84 snow crab, 24 Tanner crab, 2 *Chionoecetes* spp. hybrids, 18 blue king crab, and 323 red king crab to monitor bitter crab syndrome. Six hundred and twenty-seven mature female snow crab, 155 mature female Tanner crab, and 113 mature female *Chionoecetes* spp. hybrid crab were collected to assess female reproductive potential. One hundred and forty female red king crab and 137 juvenile female snow crab were collected for the ADF&G age determination project. All collections were completed within the guidelines stipulated by the ADF&G collection permit for each project.

### **Bristol Bay District Red King Crab**

Red king crab were caught at 56 of the 136 stations in the Bristol Bay management district in 2013. The density of legal-sized male crab caught at a station ranged from 72 to 2,363 crab nmi<sup>-2</sup> (see Appendix). Legal-sized male Bristol Bay red king crab were caught at 43 stations (Table 5, Appendix), resulting in a total biomass estimate ( $\pm$  95% CI) of 28,152  $\pm$  12,032 t (Table 6) and a total abundance estimate ( $\pm$  95% CI) of 9.3  $\pm$  4.0 million crab (Table 7) in the Bristol Bay District. The majority of these males were concentrated in the central and southwest section of Bristol Bay along the Alaska Peninsula (Figs. 12 and 13). The 2013 estimated biomass of legal-sized males is higher than last year and is above the 20-year average of 23,338  $\pm$  2,891 t (Table 6).

Red king crab mature males were encountered at 49 of the 136 surveyed stations with no one station dominating in abundance (Fig. 14). One hundred percent of the 419 mature males and 217 immature males caught were measured (Table 5). The estimated biomass of 33,891  $\pm$  14,120 t for mature males is 86% of the total male biomass in 2013 (Table 6) with immature male red king crab estimated at 5,475  $\pm$  2,386 t (Table 5). The majority of both size categories were centrally located in the Bristol Bay District (Figs. 13 and 14).

The 2011 juvenile size group (40 mm to 50 mm CL size category) was not encountered in 2012 or 2013 and the remaining size distribution in 2013 was similar to previous years with slightly more old and very old crabs (Fig. 15). In 2013, 44% legal-sized male were new hardshell crabs and 55% were oldshell and very oldshell crabs with the majority of oldshell males caught in central Bristol Bay (Fig. 16).

One objective 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). During years with colder than average bottom temperatures, (1999, 2000, and 2006 - 2012) the ratio of eyed to uneyed embryos encountered in mature females on the survey in June was higher compared to warmer years (2001-2005). In years with relatively warmer water temperatures, more than 94% of the mature females in June carried uneyed embryos (Chilton et al. 2010). The eyed to uneyed embryo ratio ranged from 6.54 to 0.42 in cold years, compared to 0.06 to 0.01 in the warmer years, indicating that a high number of females within the survey area did not complete the molting and mating cycle in early June. 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 indication that the molting and mating cycle is delayed is determined during the first leg of the survey by high numbers of oldshell mature females either brooding eyed embryos, which were fertilized from the previous season, or with pleopods exhibiting empty egg cases. To determine whether we need to retow the Bristol Bay red king crab stations, 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.

Unlike the previous 7 years, the relatively warm water temperatures in 2013 did not delay the molting and mating cycle in mature female red king crab. Eighty-four percent of the 522 mature females sampled during the standard survey had extruded a new clutch of uneyed embryos and the 2013 ratio of eyed to uneyed embryos in June was 0.02 compared to 0.91 in 2012 (Table 8). Average bottom temperature of Bristol Bay stations with mature female red king crab in June was 2.9 °C in 2013 compared to 0.9 °C in 2012. As such, Bristol Bay stations were not resampled in 2013.

The 2013 mature female red king crab biomass estimate of  $21,986 \pm 15,759$  t (Table 6) and abundance estimate of  $15.6 \pm 11.1$  million crabs (Table 7) is 93% of the total female abundance with immature female red king crab biomass estimated at  $427 \pm 281$  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 (Fig. 15 and 17). Immature female red king crab with new shells were between 60 and 100 mm while mature crabs were mostly new shell and either 75% or 100% full (Fig. 18).

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. 19). 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. In more recent years from 2008 to 2012 when the cold pool extended onto the Bristol Bay shelf area, the distribution of mature females and males moved from the central area of Bristol Bay to the nearshore areas along the Alaska Peninsula supporting this hypothesis (Chilton et al. 2010). This may be because females avoid water cold enough to delay embryogenesis during brooding (Stone et al. 1992).

Yet the center of distribution for mature females in 2013 was similar to that of 2012 despite being a relatively warm year and a less extensive cold pool.

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 mechanism is true, 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. 20 and 21). 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 adult spatial shift. Despite relatively cold years in 2008-2012 and an extended cold pool, estimated population abundance has been low in recent years. Although an increase in pre-recruit, mature, and legal males was observed from 2012 to 2013, this increase should be interpreted with caution. Mature female biomass and abundance is on a decreasing trend and male pre-recruit (120-134 mm size category) abundance was 5.6 million, well below the average (8.2 million) over the last 10 years (Fig. 11). 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; however, the strong 2011 juvenile size class was not observed in 2012 or 2013.

### **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 fishing for blue king crab was closed. A combined fishery for 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 14 of the 77 stations in the Pribilof District; 13 stations in the high-density sampling area and one station in the standard-density sampling area in 2013. The density of legal-sized males caught at a station ranged from 66 to 3,770 crab nmi<sup>-2</sup> (Appendix; Fig. 22). Legal-sized male red king crab were caught at 14 of the 77 stations in the Pribilof District (Table 5) with a biomass estimate ( $\pm$  95% CI) of 7,567  $\pm$  9,297 t (Table 9) and an abundance estimate ( $\pm$  95% CI) of 1.6  $\pm$  1.9 million crab (Table 10). Legal-sized males represented 96% of the total male biomass and were above the average of 5,430  $\pm$  2,786 t from the previous 10 years (Table 9). The majority of the legal-sized males were distributed around and to the south of St. Paul Island (Fig. 23).

Mature males were encountered at 14 of the 77 stations in the Pribilof District; 13 stations in the high-density sampling area, and one station in the standard-density sampling area (Fig. 24). All

of the 77 mature and 5 immature males caught were measured (Table 5). Two stations accounted for 81% of all mature red king crab caught (Fig. 24). The biomass estimate of mature males was  $7,749 \pm 9,409$  t and represented 99% of the total male biomass (Table 9) with the remaining 1% represented by  $104 \pm 171$  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 west and south of St. Paul Island (Figs. 23 and 24).

The 2013 size-frequency for red king crab males shows slightly more very oldshell legal-sized males compared to 2012 (Fig. 25). In 2013, 24% of the legal-sized males were new hardshell crabs and distributed to the west and south of St. Paul Island. Seventy-five percent of the legal-sized males were in oldshell and very oldshell condition and primarily distributed to the west and south of St. Paul Island (Fig. 26).

The 2013 biomass estimate of mature-sized red king crab females was  $169 \pm 194$  t and abundance was  $0.1 \pm 0.1$  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 (Appendix, Fig. 22), yet 2013 estimates indicate mature female biomass is considerably lower than in 2012. Approximately half of the mature females were carrying uneyed embryos with 56% of the mature females in new hardshell condition (Fig. 27). Females with uneyed embryos were in the 145 mm to 160 mm CL size class.

The centers of distribution for both males and females have moved within a 40 nm by 40 nmi region around St. Paul Island (Fig. 28). The center of the red king crab distribution moved to within 20 nm 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 the exception of 2000-2003 located towards the northeast.

Specific mechanisms for population fluctuations are unknown for Pribilof 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 red king crab occurred followed by a larger increase in the 1990s (Figs. 29 and 30). Male Pribilof red king crab size distribution has been relatively stable over the past 4 years. Mature males have increased, while abundance of male pre-recruits (120-134 mm CL size class) in 2013 was approximately equal to the average (0.11 million) over the past 10 years (Fig. 11). However, the decrease in mature female biomass and abundance is cause for concern.

### **Pribilof District Blue King Crab**

Blue king crab were caught at 6 of the 86 stations in the Pribilof District; 6 stations in the high-density sampling area and zero stations in the standard-density sampling area in 2013 (Fig. 31). Legal-sized males were caught at two stations north of St. George Island with a density of 62 to

219 crab nmi<sup>-2</sup> (Appendix, Fig. 32). The 2013 biomass estimate ( $\pm$  95% CI) of legal-sized males was  $190 \pm 280$  t (Table 11) and abundance was  $0.07 \pm 0.11$  million crab (Table 12), representing 38% of the total male abundance and well below the average of  $1,222 \pm 687$  t for the previous 20 years (Table 11 and 12).

Blue king crab mature males were caught at 2 of the 86 stations in the Pribilof District; 2 stations in the high-density sampling area and zero stations in the standard-density sampling area and 100% of the six mature males and three immature males caught were measured (Table 5; Figs. 33 and 34). One station accounted for 85% of the mature males in the survey (Fig. 33). The mature male biomass estimate of  $250 \pm 391$  t represents 94% of the total male biomass with  $15 \pm 28$  t of immature male blue king crab estimated in the Pribilof District (Tables 5 and 11). All male blue king crab were captured in the Pribilof District north of St. George Island (Figs. 32, 33, and 35).

Six mature female blue king crab were caught in the Pribilof District high-density sampling area which extrapolated to a biomass estimate of  $131 \pm 210$  t (Table 11) and an abundance estimate of  $0.11 \pm 0.18$  million crab, and represents 79% of the total female biomass. Immature female blue king crab were caught at three stations northeast of St. Paul Island in the Pribilof District high-density sampling area with a biomass estimate of  $35 \pm 45$  t (Table 11; Fig. 32). Estimates of female biomass are imprecise due to the preference of these crab 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 is in a non-embryo-bearing phase (Somerton and Macintosh 1985). Three of the six mature female blue king crab sampled in the Pribilof District were brooding eyed embryos, two had empty egg cases, and one was barren (Fig. 36). The mature females with embryos had 75% full clutches (Fig. 36).

The centers of distribution for both males and female blue king crab are located within a 40 nautical mile (nmi) by 40 nmi region east of St. Paul Island (Fig. 37). The center of the blue king crab distribution moved to within 20 nm of the northeast side of St. Paul Island as the population abundance decreased in the 1980s before moving easterly the 1990s. Since then, the centers of distribution have been located at the northeastern edge of the distribution. In 2013, mature male and female centers of distribution were located approximately 20 nmi south of St. Paul Island.

Pribilof blue king crab production was higher in the late 1970s and early 1980s, and increased in the 1990s and female abundances were at an all-time high in 1980 (Figs. 38 and 39). 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 little evidence for improving.

### **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. Blue king crab were caught at 29 of the 57 total stations in the St. Matthew Island Section sampling strata; 21 stations in the high-density sampling area and

8 stations in the standard-density sampling area (Fig. 40). The density of legal-sized males caught at a station ranged from 67 to 494 crab  $\text{nmi}^{-2}$  and were captured primarily south and west of St. Matthew Island (Appendix, Fig. 41). Thirty-nine legal-sized male blue king crab were caught in 2013 with a biomass estimate ( $\pm 95\%$  CI) of  $1,485 \pm 702$  t (Table 13) and abundance estimate ( $\pm 95\%$  CI) of  $0.8 \pm 0.4$  million crab (Table 14) representing 60% of the total male biomass which is below the average of  $2,837 \pm 796$  t from the previous 20 years (Table 13).

Mature male blue king crab were caught at 26 of the 59 stations surveyed in the St. Matthew Island Section sampling strata and 100% of the 60 mature and 37 immature males caught were measured, respectively (Table 5, Figs. 41 and 42). In 2012, one station (R-24) had a mature male density of 3,143 crab  $\text{nmi}^{-2}$ , which accounted for 26% of the mature males; however, in 2013, R-24 had a mature male density of 325 crab  $\text{nmi}^{-2}$ , which accounted for 8% of the mature males (Fig. 42). The decrease in abundance of this one station (R-24) drastically affected population estimates. The mature male biomass estimate in 2013 was  $2,022 \pm 860$  t, representing 82% of the total male biomass (Table 13), while the immature male biomass was estimated at  $445 \pm 320$  t (Table 5). The majority of the immature male blue king crab were distributed in the shallow waters surrounding St. Matthew Island while a majority of the mature males were caught southwest of St. Matthew Island (Figs. 41 and 42).

Oldshell male blue king crab observed in 2012 was not observed in 2013, and the number of newshell males decreased in 2013 (Fig. 43). In 2013, 76% of the legal-sized males were new hardshell crabs, with the majority distributed south of St. Matthew Island, followed by 11% old shell and 13% in soft and molting condition (Fig. 44).

The 2013 mature female blue king crab biomass estimate was  $42 \pm 48$  t and abundance was  $0.1 \pm 0.1$  million crab (Table 14), representing 38% of the total female biomass, and the immature female blue king crab biomass estimate was  $70 \pm 102$  t (Table 13). Mature females were caught at three stations and immature females were caught at three stations in the St. Matthew Island Section sampling strata (Fig. 41). Of the three mature females, two were new hardshell with no eggs, while one was in the softshell condition with a 50% full clutch with uneyed eggs (Fig. 45). The remaining 11 females were new hardshell and immature in the 40 to 95 mm CL size classes (Fig. 45).

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. 46). The center of the blue king crab distribution has randomly moved within this region without a clear pattern of years proximal to each other. In 2013, the mature female center of distribution was located in the northeast side of St. Matthew Island, while the mature male center of distribution was located approximately 30 nmi south west of St. Matthew Island.

NMFS survey abundance estimates for St. Matthew blue king crab do not exist prior to 1978. As such, production cannot be compared between pre- and post-1977 regime shift. Size distribution abundance estimates (Figs. 47 and 48) suggest that production has been strong in recent years; however, the 2013 estimate indicates a considerable decrease in abundance. In 2013, the abundance of pre-recruit male crab in the 105-119 mm size class was below the previous 10-year and 35-year averages (Fig. 11). It is important to highlight that the decrease between 2012 and

2013 is primarily caused by lower catch numbers in the one station (R-24). Although the extent of the cold pool was reduced compared to 2012, water temperatures around St. Matthew Island were colder 2013 and may impact population abundance.

## **Tanner Crab**

In 2011, the ADF&G Board of Fish changed the legal-size limit of Tanner crab from  $\geq 5.5$  inches CW (138 mm, without spines) to  $\geq 4.4$  inches CW (110 mm, without spines) west of  $166^{\circ}\text{W}$  and  $\geq 4.8$  inches CW (120 mm, without spines) east of  $166^{\circ}\text{W}$  (Table 1). According to the regulatory harvest strategy of the State of Alaska (5 AAC 35.508), the annual TAC or GHF for Tanner crab in the area east of  $166^{\circ}\text{W}$  is determined by the biomass estimate of males  $\geq 138$  mm CW while the Tanner crab GHF in the area west of  $166^{\circ}\text{W}$  is determined by the biomass estimate of males  $\geq 125$  mm CW. The harvest strategy is based on the assumption that the commercial fishery will target these size categories (Zheng and Pengilly 2011), although the industry may self-impose retention of crab  $\geq 5.5$  inches CW and 5.0 inches CW (125 mm, without spines) east and west of  $166^{\circ}\text{W}$ , respectively. We provided the 2013 biomass estimates for the two legal-size categories as well as for  $\geq 5.5$  inches CW east of  $166^{\circ}\text{W}$  and  $\geq 5.0$  inches west of  $166^{\circ}\text{W}$  in the abstract.

Tanner crab were caught at 78 of the 121 stations east of  $166^{\circ}\text{W}$  and 148 of the 255 stations west of  $166^{\circ}\text{W}$  with Tanner crab occurring at 40 and 10 stations in the high-density areas of the Pribilof District and St. Matthew Island Section, respectively (Appendix, Fig. 49).

Legal-sized Tanner crab were caught at 51 of the 121 stations east of  $166^{\circ}\text{W}$  and 82 of the 255 stations west of  $166^{\circ}\text{W}$  with no one particular station dominating the catch (Table 5, Fig. 50). Fifty-nine percent of the legal-sized males caught east of  $166^{\circ}\text{W}$  were measured while 60% of the legal-sized males caught west of  $166^{\circ}\text{W}$  were measured (Table 5). The 2013 biomass estimate ( $\pm 95\%$  CI) for legal male Tanner crab east of  $166^{\circ}\text{W}$  was  $23,843 \pm 13,352$  t (Table 15) and abundance was  $37.0 \pm 22.5$  million crab with 15% of those males  $\geq 5.5$  inches CW with a biomass estimate of  $5,078 \pm 2,306$  t ( $5.4 \pm 2.5$  million crab; Tables 15 and 16). The 2013 biomass of legal Tanner crab in the eastern area was substantially above the 20-year average biomass of  $11,825 \pm 2,637$  t. The majority of the Tanner males  $\geq 113$  mm CW east of  $166^{\circ}\text{W}$  were distributed in the southwest section of Bristol Bay (Figs. 50 and 51).

The 2013 biomass estimate for legal male Tanner crab west of  $166^{\circ}\text{W}$  was  $15,939 \pm 7,395$  t (Table 17) and abundance was  $27.1 \pm 11.7$  million crab with 40% of those males  $\geq 5.0$  inches CW with a biomass estimate of  $8,220 \pm 4,684$  t ( $10.8 \pm 5.8$  million crab; Tables 17 and 18). The 2013 biomass of legal Tanner crab in the western area was above the 20-year average biomass of  $13,778 \pm 4,870$  t. The majority of Tanner males  $\geq 103$  mm CW west of  $166^{\circ}\text{W}$  were distributed to the southwest of the Pribilof Islands (Figs. 50 and 51).

The scatterplot of the allometric relationship between chela height and carapace width using the data collected in 2008, 2010, and 2012 ( $n = 4,603$ ) graphically represents two distinct maturity groups; immature, small claw males with a ratio of less than 0.18 and mature, large claw males with a ratio greater than or equal to 0.18 (Fig. 52). The carapace widths for small claw males

ranged from 14.0 to 137.3 mm compared to 61.4 to 177.1 mm for large claw males. Large claw males with carapace widths below the legal-size limit will not recruit to the fishery in the future, as morphometrically mature male *Chionoecetes* spp. crab will not molt again during their lifespan (Tamone et al. 2007).

In the area east of 166 °W, the male cohort around 40 to 70 mm in 2011 grew to approximately 60 to 100 mm in 2012 and then to 80 to 120 mm in 2013, which corresponds to the drastic increase of mature males from 2012 to 2013 east of 166 °W (Fig. 53). In the area west of 166 °W a 30 to 50 mm size cohort grew to 50 to 70 mm in 2012, and a slightly more abundant 2013 cohort in the 60 to 85 mm size class (Fig. 54). In both areas, most male crabs were new, hardshell, and distributed in the southwest section of the EBS shelf at depths greater than 100 m (Fig. 55).

The 2013 mature female Tanner crab biomass estimate east and west of 166°W was  $6,985 \pm 3,957$  t and  $7,770 \pm 1,601$  t ( $31.2 \pm 17.7$  and  $21.5 \pm 8.7$  million crabs), respectively, while the immature female Tanner crab biomass east and west of 166°W was  $6,456 \pm 4,664$  t and  $6,924 \pm 2,283$  t, respectively (Tables 5, 15-18). Fifty-nine percent of the mature female population was distributed east of 166°W in the ADF&G Eastern management district in the central and southwestern area of the Bristol Bay District (Fig. 50). In the eastern area only, less than 1% of the mature females were softshell, while 77% were new-hardshell and 22% were oldshell and very oldshell (Fig. 56). Similar percentages were found in the western area with 57% new-hardshell and 42% were oldshell and very oldshell (Fig. 57). In the eastern region 93% of the mature females carried newly extruded embryos while 4% were brooding eyed embryos, 1% had not produced a new clutch and 2% were barren (Fig. 56). However, in the western region, more crab were recently molted with 96% of the mature females carried newly extruded embryos, while 2% were brooding eyed embryos and 2% were barren (Fig. 57). In the eastern region, 26% of the ovigerous females were ½ full, 52% were ¾ full, and 21% were full, while in the western region 26% were ½ full, 54% were ¾ full, and 13% were full (Figs. 56 and 57).

The centers of distribution for both males and female Tanner crab have moved within a 160 nmi by 100 nm region east of the Pribilof Islands and west of Bristol Bay (Fig. 58). The center of the distribution moved from the eastern extent of the distribution in the 1970s to the western extent in more recent years. However, with extreme cold temperatures in the past few years the centers of distribution for both males and females have tended back towards the east. Yet 2013 was a relatively warm year with male and female centers of distribution towards the east.

There is little evidence of changes in Tanner crab production related to the 1977 regime shift (NPFMC 2011b), yet pulses of strong production have been cyclical from 1975 to the present (Figs. 59-62). A less pervasive regime shift occurred in 1989, as characterized by briefly negative ALPI and PDO indices, although 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. A dramatic increase in abundance of pre-recruit male crabs (110-137 mm CW) east of 166°W relative to levels over the past 20 years was observed in 2013; however, this increase should be interpreted with caution due to the high uncertainty in the 2013 estimate (Fig. 11). Male pre-recruit abundance west of 166°W has been on a decreasing trend between 2007 and 2012, but a slight increase was observed in 2013 Fig.

11). The male size frequency distribution in 2013 reveals an increase in abundance of crabs between 75-130 mm CW east of 166°W, and a lesser increase in mature males and females was observed west of 166°W (Figs. 59-62). Increases in productivity may be related to environmental conditions such as bottom temperature. For example, milder bottom temperatures in 2013 may have dampened westward spatial migrations.

## **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). The biomass estimates for male snow crab are reported for both legal and preferred size categories in the abstract.

Snow crab were caught at 239 of the 376 stations in the combined areas of the Bristol Bay District, Pribilof District, and St. Matthew Island Section sampling strata (Fig. 63). Snow crab occurred at 37 stations in the high-density area of the Pribilof District and 27 stations in the high-density area St. Matthew Island Section sampling strata (Appendix).

Legal-sized snow crab were caught at 203 of the 376 standard stations (Fig. 64) and 70% of the legal-sized males caught were measured (Table 5). Legal-sized male snow crab estimated biomass ( $\pm$  95% CI) was  $99,724 \pm 23,086$  t (Table 19) and abundance was  $280.0 \pm 67.2$  million crab (Table 20) which was 24% of the total male abundance. This biomass is lower than the 20-year average legal male snow crab biomass of  $141,526 \pm 33,625$  t. Twenty-six percent of those legal males were  $\geq 4.0$  inches CW with a biomass estimate of  $43,117 \pm 11,822$  t ( $73.6 \pm 19.6$  million crab), while the biomass estimate of sublegal males was  $59,161 \pm 13,327$  t. These legal-sized male snow crab were distributed throughout the EBS shelf with higher concentrations around the Pribilof Islands (Figs. 64 and 65).

In 2013, a total of 943 male snow crab chela height and carapace width measurements were collected on the EBS bottom trawl survey. The scatterplot of the allometric relationship between chela height and carapace width using the data collected in 2009 ( $n = 1,303$ ), 2011 ( $n = 1,130$ ), and 2013 graphically represents two distinct maturity groups for snow crab; immature males (small claw) with a ratio of  $< 0.20$  and mature males (large claw) with a ratio of  $\geq 0.20$  (Fig. 66). The carapace widths for small claw males ranged from 21.3 to 121.2 mm compared to 40.6 to 151.6 mm for large claw males.

The high number of juvenile new hardshell males that appeared in the 40 to 65 mm size category in 2011 were again observed with a mode at 60 mm in 2012, but was absent in larger size classes in 2013 (Fig. 67). Among legal-sized male crab, 2% were in molting or softshell condition while 76% were in new-hardshell condition indicating a recent molt and distributed 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. Twenty-three percent of the legal-sized males were oldshell and very oldshell condition crabs and primarily distributed in the southeastern section of the EBS shelf (Fig. 68).

The mature female snow crab biomass estimate of  $173,352 \pm 60,068$  t and abundance estimate of  $1,830.5 \pm 665.4$  million crab was 76% of the total female biomass (Tables 19 and 20). The immature female crab biomass estimate was  $53,949 \pm 22,255$  t (Tables 5 and 19). Among sampled mature females; 36% were in new-hardshell condition, 64% were oldshell and very oldshell condition (Fig. 69). Eighty-nine percent of the mature females were brooding new embryos while < 1% had un-hatched embryos (Fig. 69). Less than 1% of the mature females had not produced a new clutch and 10% were barren (Fig. 69). The majority of mature females with embryos were 75% and 100% full (Fig. 69).

Pulses of strong recruitment to the mature female population have been cyclical (Fig. 70), and it is hypothesized that strong cohorts are sequentially linked (see Ernst et al. 2012; Parada et al. 2010 for a detailed discussion). Mature new shell 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. 70), 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 how long the sequence may last.

The shell condition time series demonstrates that the survey fails to detect portions of the population. For example, population estimates of primiparous female snow crab (shell condition 2) were 125 million in 1999, yet estimates of old shell mature females (shell condition 3) was nearly 1,000 million in 2000 (Fig. 70). Assuming primiparous females become old shell (shell condition 3) the following year, estimates of shell condition 3 females should be at or below levels of primiparous females the year prior. Further, 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. 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.

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. 71). The center of snow crab distribution moved dramatically to the northwest after 1979. Since then, the centers of distribution have moved throughout the distribution with males having a broader distribution while females are located more to the north.

Abundance of sub-legal, mature male, and mature female crabs is on a decreasing trend; however, mature female biomass and abundance is above the previous 10 year average (Figs. 11, 72 and 73). Ovigerous female snow crab held in water less than 1.5 °C are biennial spawners in the Bering Sea (NPFMC 2011b). Environmental conditions such as water temperature and the extent of the cold pool will likely regulate recruitment strength through the numbers of biennial spawners and fecundity of females.

### ***Chionoecetes* spp. hybrid**

*Chionoecetes* spp. hybrid crab were caught at 145 of the 376 stations in the combined areas of the Bristol Bay, Pribilof, and Northern Districts (Fig. 74). *Chionoecetes* spp. hybrid crab occurred at 34 stations in the Pribilof District high-density sampling area, and 15 stations in the high-density sampling area of the St. Matthew Island Section of the Northern District (Appendix).

In this document, *Chionoecetes* spp. hybrid crab size classes for legal 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 93 stations, throughout all Districts combined, resulting in a biomass estimate ( $\pm$  95% CI) of  $9,898 \pm 3,257$  t and were primarily distributed around the Pribilof Islands between 50 and 100 m (Fig. 75). Thirty-nine percent of those legal males were  $\geq 4$  inches in carapace width, with a biomass estimate of  $5,592 \pm 1,930$  t. The 2013 sublegal male *Chionoecetes* spp. hybrid crab biomass estimate for all Districts combined was  $2,512 \pm 1,053$  t, were distributed throughout the northeastern Bering Sea shelf at depths greater than 50 m (Fig. 75).

The 2013 mature female *Chionoecetes* spp. hybrid crab biomass estimate was  $2,347 \pm 899$  t and the immature female crab biomass estimate was  $56 \pm 32$  t. The majority of the mature female *Chionoecetes* spp. hybrid crab were primarily distributed south of the Pribilof Islands and St. Matthew Island and between 100 and 200 m in the northwestern area of the eastern Bering Sea shelf (Fig. 75).

### **Other Crab Stocks and Species of Interest**

#### Northern District Red King Crab

Red king crab were caught at 30 stations in the Northern District outside of the current management units where red king crab are commercially fished (Fig. 3). Legal-sized males were caught at 14 of those stations and the density at a station ranged from 63 to 322 crab nmi<sup>-2</sup> (Appendix). The 2013 biomass estimate ( $\pm$  95% CI) of legal-sized males was  $1,935 \pm 956$  t while the biomass estimate of mature and immature males was  $2,291 \pm 1010$  and  $272 \pm 137$  t, respectively. The biomass estimate of mature female red king crab was  $752 \pm 532$  t while the biomass estimate of immature females was  $85 \pm 57$  t. The majority of both legal males and mature female red king crab were caught in depths  $< 50$  m at stations south and west of Nunivak Island (Fig. 76).

#### Northern District Blue King Crab

Blue king crab were caught at nine stations not included in the blue king crab biomass estimates for the Pribilof District or the St. Matthew Island section sampling strata of the Northern District, which consisted of three mature males (two legal), four immature males, and two immature females (Appendix, Fig. 77).

### Hair Crab

In 2013, a total of 869 hair crab were captured at 109 of the 376 stations throughout all Districts combined on the survey (Fig. 78). Historically, hair crab have been concentrated just north of the Alaska Peninsula and near the Pribilof Islands. In recent years, abundance of hair crab has been increasing, particularly in central Bristol Bay and west of Nunivak Island.

In this report, legal male hair crab are defined as  $> 3.25$  inches CW ( $\geq 83$  mm CL) which was specified in the previous Pribilof District fishery while the female hair crab biomass estimate is presented for all sizes combined. The 2013 density of legal male hair crab caught at a station ranged from 62 to 7,017 crab  $\text{nmi}^{-2}$  resulting in a biomass estimate of  $6,438 \pm 2,622$  t (Table 21) and abundance of  $10.6 \pm 4.6$  (Table 22). Legal male hair crab were primarily concentrated in the central Bristol Bay area, near St. Paul Island and distributed along the 50 m isobath near Nunivak Island (Fig. 78).

The 2013 pre-recruit male hair crab biomass estimate ( $\pm 95\%$  CI) was  $3,351 \pm 1,286$  t and the female hair crab biomass estimate was  $1,049 \pm 432$  t (Table 21). A high number of pre-recruit males were caught west of Nunivak Island (Fig. 78). The density of both female and legal male hair crab has increased in these two areas over the last 4 years.

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 (Bowers et al., 2011). Since 2005, the biomass estimates of both size classes of male hair crab have increased. The 2013 biomass estimate for legal-sized male hair crab was higher than the 20-year average of  $2,167 \pm 713$  t (Table 21).

## ACKNOWLEDGMENTS

We thank Captains Norm Bakken and Mike Wiggins of the FV *Aldebaran*, and Captain Jim Hampton of the FV *Alaska Knight* and all their crew without whom the annual EBS bottom trawl survey would not have been possible. We also thank the dedicated field party chiefs, deck bosses, and scientific crew from AFSC, ADF&G, and all those who volunteered to work on the survey. The scientific personnel who made up the 2013 “crab crew” included; D. Benjamin (AFSC, Seattle), R. Caruso (AFSC, Seattle), P. Cummiskey (AFSC, Kodiak Lab), B. Daly (AFSC Kodiak Lab), M. Dawson (AFSC Kodiak Lab), N. Gabriel (AFSC Kodiak Lab), M. Inokuma (ADF&G), W.C. Long (AFSC, Kodiak Lab), E. Munk (AFSC, Kodiak Lab), J. Murawski (AFSC, Kodiak Lab), D. Urban (AFSC Kodiak Lab), and J. Webb (ADF&G).

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Table 1. -- Definition of carapace size classes for crab species caught in National Marine Fisheries Service 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. The legal size classes defined by ADF&G (CW in inches) include spines.

Species	District		Immature	Mature	Pre-recruit	Legal Male
<i>Paralithodes camtschaticus</i>	Bristol Bay	male	<120 mm	≥ 120 mm	110-134 mm	≥ 135 mm CL or ≥ 6.5 in. CW
		female	< 90 mm	≥ 90 mm		
	Pribilof	male	<120 mm	≥ 120 mm	120-134 mm	≥ 135 mm CL or ≥ 6.5 in. CW
		female	< 90 mm	≥ 90 mm		
<i>P. platypus</i>	Pribilof	male	<120 mm	≥ 120 mm	120-134 mm	≥ 135 mm CL or ≥ 6.5 in. CW
		female	< 100 mm	≥ 100 mm		
	St. Matthew	male	< 105 mm	≥ 105 mm	105-119 mm	≥ 120 mm CL or ≥ 5.5 in. CW
		female	< 80 mm	≥ 80 mm		
<i>Chionoecetes bairdi</i>	East of 166° W	male	< 113 mm	≥ 113mm	110-137 mm	≥ 120 mm or ≥ 4.8 in. CW <sup>1</sup>
		female	< 85 mm	≥ 85 mm		
	West of 166° W	male	< 103 mm	≥ 103 mm	110-137 mm	≥ 110 mm or ≥ 4.4 in. CW <sup>1</sup>
		female	< 80 mm	≥ 80 mm		
<i>C. opilio</i>		male	< 95 mm	≥ 95 mm	≤ 77 mm	≥ 78 mm or ≥ 3.1 in. CW <sup>2</sup>
		female	< 50 mm	≥ 50 mm		
<i>Erimacrus isenbeckii</i>		male				≥ 83 mm CL or > 3.25 in. CW <sup>3</sup>
		female				

<sup>1</sup> 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)**).

<sup>2</sup> The legal minimum size limit for *C. opilio* is 3.1 inches CW (78 mm excluding spines; 79 mm including spines), although processors currently prefer a minimum size of 4.0 inches CW (102 mm).

<sup>3</sup> 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	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.

Species	Number collected	<i>a</i>	<i>b</i>
Red king crab males	1086	0.000403	3.141334
Ovigerous red king crab	1010	0.003593	2.666076
Non-ovigerous RKC	201	0.000408	3.127956
Blue king crab males	409	0.000508	3.106409
Blue king crab females <sup>1</sup>	n/a	0.02065	2.2700
St. Matthew males	386	0.000502	3.107158
Tanner crab males	1030	0.00027	3.022134
Ovigerous Tanner crab	331	0.000441	2.898686
Non-ovigerous Tanner	487	0.000562	2.816928
Snow crab males	1107	0.000267	3.097253
Ovigerous snow crab	588	0.001158	2.827784
Non-ovigerous snow crab	344	0.001047	2.708367
Hair crab males <sup>2</sup>	703	0.00071731	3.02
Hair crab females <sup>2</sup>	178	0.00119453	2.86

<sup>1</sup> Unpublished data. Available from Kodiak Laboratory, Alaska Fisheries Science Center, 301 Research Court Kodiak AK 99615.

<sup>2</sup> Armetta and Stevens (1987).

Table 4. -- Special projects related to crab species conducted on National Marine Fisheries Service eastern Bering Sea bottom trawl survey in 2013.

Project Title	Principle Investigator	Agency
Individual crab weights	Bob Foy	RACE <sup>1</sup> -SAP <sup>2</sup>
Bitter crab syndrome	Frank Morado	RACE <sup>1</sup> -SAP <sup>2</sup>
Pathological specimen voucher	Frank Morado	RACE <sup>1</sup> -SAP <sup>2</sup>
Snow crab growth and habitat associations	Cliff Ryer	RACE <sup>1</sup> -FBE <sup>3</sup>
Evaluation of a technique for the direct determination of age for snow crab, red king crab, and Tanner crab	Laura Stichert	ADF&G <sup>4</sup>

<sup>1</sup> Alaska Fisheries Science Center, Resource Assessment and Conservation Engineering Division, Seattle, Washington.

<sup>2</sup> AFSC, Resource Assessment and Conservation Engineering Division, Shellfish Assessment Program, Kodiak, Alaska.

<sup>3</sup> AFSC, Resource Assessment and Conservation Engineering Division, Fisheries Behavioral Ecology Program, Newport, Oregon.

<sup>4</sup> State of Alaska, Department of Fish and Game.

Table 5. -- Summary of 2013 National Marine Fisheries Service eastern Bering Sea bottom trawl survey details for seven commercial crab stocks. Size categories are defined in Table 1.

		Number of tows in District	Tows with crab	Number of crab measured	Number of crab caught	Biomass (t)	CI (± 95%)
Bristol Bay District Red King Crab	Immature male	136	34	217	217	5,475	2,386
	Mature male	136	49	419	419	33,891	14,120
	Legal male	136	43	304	304	28,152	12,032
	Immature female	136	14	39	39	427	281
	Mature female	136	35	523	523	21,986	15,759
Pribilof Island District Red King Crab	Immature male	77	2	5	5	104	171
	Mature male	77	14	77	77	7,749	9,409
	Legal male	77	14	71	71	7,567	9,297
	Immature female	77	0	0	0	0	0
	Mature female	77	3	4	4	169	194
Pribilof Island District Blue King Crab	Immature male	86	1	3	3	15	28
	Mature male	86	2	6	6	250	391
	Legal male	86	2	4	4	190	280
	Immature female	86	3	4	4	35	45
	Mature female	86	2	6	6	131	210
St. Matthew Island Blue King Crab	Immature male	56	12	37	37	445	320
	Mature male	56	26	60	60	2,022	860
	Legal male	56	20	39	39	1,485	702
	Immature female	56	3	11	11	70	102
	Mature female	56	3	3	3	42	48
Tanner Crab east of 166°W	Immature male	121	73	2,397	3,914	25,428	16,034
	Mature male	121	53	1,242	2,390	39,184	25,941
	Legal male	121	51	742	1,257	23,843	13,352
	Immature female	121	59	1,294	2,352	6,456	4,664
	Mature female	121	48	624	1,047	6,985	3,957
Tanner Crab west of 166°W	Immature male	255	136	5,099	8,424	18,416	5,941
	Mature male	255	91	1,472	1,722	20,423	9,312
	Legal male	255	82	1,018	1,169	15,939	7,395
	Immature female	255	119	3,362	5,567	6,924	2,283
	Mature female	255	81	648	996	7,770	1,601
Opilio Tanner Crab	Immature male	376	225	15,386	41,548	100,505	21,380
	Mature male	376	172	3,558	4,502	58,380	14,776
	Legal male	376	203	7,938	11,299	99,724	23,086
	Immature female	376	179	5,263	52,961	53,949	22,255
	Mature female	376	186	7,060	73,251	173,352	60,068

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 < 90 mm	Mature female ≥ 90 mm	Mature female ± CI
1978	52,941	143,700	65,068	96,358	10,809	104,669	40,494
1979	24,478	131,619	48,206	94,312	6,150	74,790	22,065
1980	37,194	122,361	60,234	98,940	12,765	52,526	30,132
1981	26,984	36,083	7,894	24,336	7,670	39,558	12,443
1982	49,074	22,220	8,345	9,838	22,193	37,106	14,474
1983	24,971	9,582	2,440	2,809	6,911	6,022	2,345
1984	64,784	14,117	7,164	6,830	38,569	9,665	7,828
1985	12,395	13,606	4,013	5,210	2,409	3,727	1,828
1986	11,975	27,390	26,390	12,678	1,804	4,021	2,268
1987	15,827	29,162	14,064	17,600	6,409	12,048	7,604
1988	9,018	24,679	8,806	18,296	584	14,313	11,744
1989	7,860	38,901	15,998	28,678	887	9,679	6,395
1990	5,676	29,435	10,316	22,490	2,589	13,559	11,135
1991	6,217	61,403	67,982	53,217	1,715	11,881	10,525
1992	6,562	17,838	6,651	13,393	787	8,547	4,250
1993	6,902	28,283	9,042	19,183	736	12,504	6,149
1994	3,479	19,240	6,588	13,023	577	6,491	2,791
1995	6,141	20,372	14,360	15,159	1,396	6,918	3,299
1996	8,749	17,631	7,148	14,682	4,444	9,706	5,373
1997	26,230	31,679	13,031	26,699	668	18,084	12,686
1998	12,608	32,386	10,211	18,906	1,533	27,643	13,942
1999	4,367	35,215	11,419	26,376	1,446	12,003	5,442
2000	7,971	29,950	6,511	21,180	2,008	15,930	8,610
2001	8,643	18,557	5,622	14,965	1,331	17,589	10,493
2002	11,695	32,469	12,371	24,588	4,952	14,664	7,910
2003	11,010	42,629	16,149	32,165	3,507	28,445	12,691
2004	19,417	39,676	12,686	33,470	4,634	24,260	11,459
2005	16,446	37,090	13,714	27,643	5,273	34,955	14,979
2006	12,733	36,953	15,679	29,273	4,263	24,696	4,995
2007	13,463	42,543	16,015	33,451	1,341	27,532	6,853
2008	14,166	39,411	11,195	28,013	983	35,764	19,492
2009	8,298	34,262	24,416	22,542	594	28,758	18,146
2010	5,641	30,248	9,246	21,346	386	40,797	21,869
2011	7,864	19,599	6,024	15,412	3,760	37,486	19,011
2012	5,799	24,656	13,366	19,713	1,903	28,040	18,669
2013	5,475	33,891	14,120	28,152	427	21,986	15,759

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 < 90 mm	Mature female ≥ 90 mm	Mature female ± CI
1978	89.5	67.9	30.7	38.5	44.5	144.6	54.2
1979	41.1	58.7	22.0	35.7	21.9	96.7	29.4
1980	71.2	50.1	24.6	35.8	46.5	74.9	48.4
1981	48.1	16.2	3.5	8.9	26.6	50.2	15.6
1982	109.2	11.8	4.8	3.9	72.9	50.6	21.3
1983	46.2	5.7	1.5	1.3	23.3	9.1	3.9
1984	145.5	7.7	3.8	3.1	109.5	17.1	14.7
1985	16.7	7.6	2.2	2.3	6.3	6.3	3.1
1986	15.1	14.7	14.5	5.5	5.2	6.3	3.6
1987	23.8	14.4	6.9	7.2	16.7	18.1	11.3
1988	11.0	11.2	3.9	7.3	1.6	20.6	17.3
1989	10.8	17.3	6.8	11.1	3.3	14.1	9.6
1990	9.1	12.6	4.2	8.3	7.5	16.8	13.8
1991	9.7	24.1	25.8	19.2	4.7	14.8	14.3
1992	8.3	7.4	2.9	4.6	2.0	10.4	5.0
1993	8.3	12.6	4.1	6.9	2.3	14.5	7.4
1994	7.0	8.5	2.9	4.8	3.3	6.5	2.8
1995	10.9	9.1	6.9	5.9	4.6	7.6	3.6
1996	17.4	7.1	2.8	5.2	12.9	11.1	6.1
1997	32.3	12.3	4.8	9.1	1.7	24.9	20.3
1998	16.7	15.3	5.0	6.7	5.2	32.5	17.9
1999	8.9	15.6	5.1	10.3	5.8	13.6	6.0
2000	12.6	13.6	3.1	8.2	5.3	17.6	9.1
2001	11.9	7.3	2.2	5.1	3.8	21.2	13.0
2002	22.8	13.5	5.2	8.6	17.0	17.3	9.8
2003	18.6	18.0	6.5	11.6	9.8	31.5	14.4
2004	34.6	15.5	4.8	11.5	16.9	28.2	12.5
2005	31.3	15.5	5.4	9.6	18.2	40.6	19.0
2006	22.9	15.8	6.4	11.1	13.1	28.1	5.9
2007	17.3	17.7	6.3	12.2	3.4	32.3	7.9
2008	16.5	16.9	4.6	9.8	2.5	40.1	20.2
2009	9.1	15.7	11.0	8.5	1.5	30.1	17.3
2010	6.5	13.5	4.0	8.0	1.0	31.5	17.4
2011	37.2	8.1	2.3	5.6	33.4	28.5	14.6
2012	7.9	9.6	4.8	6.7	6.0	21.1	15.0
2013	6.6	12.8	5.3	9.3	1.2	15.6	11.1

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 ratio of eyed to uneyed embryos in mature red king crab females with the warm years highlighted in gray. Bristol Bay stations were sampled twice during the cold years. 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	Eyed to uneyed embryo ratio
May 1999	0.1	0.8 (41)	t = -11.9	6.54
July 1999	2.5*	0.8 (31)		0.02
May 2000	1.7	0.5 (49)	t = -9.2	1.45
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	0.59
July 2006	4.2*	0.8 (30)		0.01
June 2007	1.8	0.9 (68)	t = -7.4	0.86
July 2007	3.4*	1.0 (32)		0.01
June 2008	1.4	0.7 (76)	t = -9.5	0.45
July 2008	3.6*	1.1 (32)		0
June 2009	1.5	1.6 (73)	t = -8.6	0.42
July 2009	4.5*	1.5 (32)		0
June 2010	2	0.9 (40)	t = -10.9	0.64
July 2010	4.8*	1.0 (23)		0.03
June 2011	2.9	0.8 (46)	t = -8.6	0.8
July 2011	5.9*	1.1 (20)		0.06
June 2012	0.9	1.2 (40)	t = -8.4	0.91
July 2012	4.0*	1.3 (15)		0
June 2013	2.9	1.1 (35)		0.02

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 < 90 mm	Mature female ≥ 90 mm	Mature female ± CI
1978	0	1,228	1,986	1,228	0	42	82
1979	0	859	661	790	0	76	108
1980	5	1,312	1,354	1,312	0	195	247
1981	0	299	343	299	0	97	148
1982	18	1,440	1,970	1,440	0	673	1,007
1983	26	518	542	486	0	216	205
1984	0	261	283	233	0	67	75
1985	0	60	118	60	0	0	0
1986	0	135	185	135	0	57	111
1987	0	53	103	53	0	25	49
1988	693	104	204	43	312	420	718
1989	656	1,498	2,671	854	405	1,442	1,961
1990	5,918	897	1,632	109	21	1,754	2,375
1991	624	4,335	6,765	1,295	70	3,790	4,468
1992	266	3,238	3,785	2,479	22	2,591	4,658
1993	276	9,687	17,497	9,017	9	4,829	6,789
1994	548	9,052	13,170	7,994	3	3,393	5,024
1995	572	24,282	20,572	22,428	28	6,171	6,180
1996	66	2,323	1,692	2,292	0	1,456	2,117
1997	1,472	6,056	7,393	5,843	6	1,436	1,597
1998	406	2,282	1,610	1,749	3	1,259	1,885
1999	3,260	5,422	7,092	4,394	2,510	2,252	3,258
2000	153	4,239	3,104	3,773	8	727	891
2001	2,280	8,434	12,995	5,663	0	4,333	8,450
2002	8	6,916	9,299	6,894	0	571	576
2003	0	5,280	6,807	5,184	2	1,642	2,922
2004	146	3,563	4,114	3,563	139	844	881
2005	53	1,219	1,398	1,219	0	2,207	3,393
2006	97	6,762	4,735	6,484	0	1,406	1,690
2007	201	7,176	5,489	6,947	7	2,527	2,563
2008	324	5,375	5,335	5,022	22	2,076	2,827
2009	43	2,454	3,066	2,088	0	546	590
2010	30	3,107	2,336	2,881	0	468	379
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

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 1975-1977 data.

Year	Immature male < 120 mm	Mature male ≥ 120 mm	Mature male ± CI	Legal male ≥ 135 mm	Immature female < 90 mm	Mature female ≥ 90 mm	Mature female ± CI
1978	0.0	0.4	0.6	0.4	0.0	0.1	0.1
1979	0.0	0.3	0.2	0.2	0.0	0.1	0.1
1980	0.0	0.4	0.4	0.4	0.0	0.2	0.2
1981	0.0	0.1	0.1	0.1	0.0	0.1	0.1
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	0.0	0.0	0.0	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	0.1
1988	1.9	0.1	0.1	0.0	1.6	0.4	0.8
1989	1.1	0.8	1.4	0.4	1.0	2.0	2.6
1990	5.7	0.6	1.1	0.0	0.1	2.4	3.2
1991	0.7	2.4	3.8	0.6	0.3	4.3	5.1
1992	0.4	1.5	1.8	1.0	0.1	2.8	5.2
1993	0.3	3.5	6.4	3.1	0.0	4.5	6.4
1994	0.6	3.1	4.6	2.5	0.0	3.2	4.5
1995	0.6	7.1	5.9	6.0	0.1	5.3	5.2
1996	0.1	0.6	0.4	0.5	0.0	1.1	1.6
1997	1.6	1.6	1.7	1.4	0.0	1.3	1.4
1998	0.4	0.8	0.6	0.4	0.0	1.1	1.6
1999	7.2	1.9	2.2	1.3	6.9	3.4	5.7
2000	0.1	1.5	1.2	1.3	0.0	0.7	0.8
2001	2.5	3.7	6.1	1.9	0.0	4.4	8.6
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	1.0	1.2	0.0	0.9	1.0
2007	0.2	1.6	1.4	1.5	0.0	1.7	1.7
2008	0.4	1.3	1.2	1.1	0.1	1.7	2.4
2009	0.0	0.9	1.2	0.7	0.0	0.3	0.3
2010	0.0	0.9	0.7	0.8	0.0	0.3	0.2
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

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 1975-1977 data.

Year	Immature male < 120 mm	Mature male ≥ 120 mm	Mature male ± CI	Legal male ≥ 135 mm	Immature female < 100 mm	Mature female ≥ 100 mm	Mature female ± CI
1978	2,518	15,798	17,288	12,291	321	6,171	8,927
1979	1,302	12,974	6,506	10,843	1,304	2,793	2,673
1980	1,797	14,253	8,368	12,163	635	63,077	111,556
1981	2,270	10,744	3,533	9,686	1,628	8,282	7,338
1982	1,049	6,691	2,455	6,241	613	8,763	11,923
1983	876	4,919	1,712	4,069	384	9,864	15,159
1984	99	1,761	805	1,446	44	2,536	1,922
1985	36	959	501	687	3	520	457
1986	3	1,368	812	1,340	11	2,420	4,272
1987	175	2,659	2,144	2,529	128	785	908
1988	155	766	794	766	239	478	459
1989	1,162	752	940	752	1,032	714	658
1990	2,117	3,259	2,713	1,549	1,587	2,224	1,701
1991	1,254	4,266	3,223	3,025	659	2,117	1,648
1992	1,640	3,995	3,308	2,761	1,106	1,543	1,400
1993	991	4,144	2,495	2,913	455	1,636	1,465
1994	550	3,028	2,051	2,491	334	4,524	3,969
1995	863	7,753	8,198	6,365	362	4,482	3,835
1996	678	4,221	2,223	3,522	166	5,418	5,356
1997	347	2,940	1,591	2,515	189	2,840	2,390
1998	630	2,545	1,243	2,283	420	1,761	1,588
1999	146	1,573	1,037	1,297	113	2,755	2,480
2000	103	1,902	1,103	1,588	23	1,439	1,304
2001	79	1,454	2,093	1,329	0	1,816	2,571
2002	0	618	613	588	0	1,401	2,129
2003	17	638	501	610	21	1,286	1,880
2004	33	97	111	44	5	118	120
2005	297	313	435	313	477	370	413
2006	72	137	163	115	35	522	732
2007	163	254	397	170	41	216	350
2008	193	42	82	42	178	493	637
2009	232	452	632	170	30	595	979
2010	97	322	290	202	88	352	428
2011	0	461	763	399	15	22	43
2012	165	644	928	459	131	106	91
2013	15	250	391	190	35	131	210

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 1975-1977 data.

Year	Immature male < 120 mm	Mature male $\geq$ 120 mm	Mature male $\pm$ CI	Legal male $\geq$ 135 mm	Immature female < 100 mm	Mature female $\geq$ 100 mm	Mature female $\pm$ CI
1978	2.4	6.1	6.0	3.9	0.5	5.5	7.4
1979	4.5	5.2	2.7	3.9	4.7	2.5	2.5
1980	2.6	5.4	3.4	4.2	1.2	55.1	95.7
1981	4.7	3.9	1.3	3.3	3.9	7.1	6.2
1982	1.4	2.3	0.8	2.1	1.2	7.6	9.9
1983	1.0	1.9	0.7	1.3	0.7	9.1	13.7
1984	0.4	0.7	0.3	0.5	0.3	2.3	1.7
1985	0.1	0.4	0.2	0.3	0.1	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	1.0	0.4	0.4
1989	3.5	0.2	0.3	0.2	3.0	0.8	0.8
1990	3.0	1.7	1.5	0.6	3.1	2.3	1.7
1991	1.9	2.0	1.4	1.2	1.3	2.2	1.7
1992	2.4	1.9	1.6	1.2	2.3	1.7	1.5
1993	1.5	1.9	1.1	1.1	0.9	1.8	1.5
1994	0.6	1.3	0.8	0.9	0.5	4.6	4.0
1995	1.1	3.1	3.3	2.3	0.7	4.5	3.9
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	0.7	1.6	1.5
1999	0.2	0.6	0.4	0.5	0.2	2.6	2.4
2000	0.2	0.7	0.4	0.5	0.0	1.3	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	0.0	0.1	0.2	0.3
2008	0.2	0.0	0.0	0.0	0.3	0.5	0.7
2009	0.3	0.2	0.4	0.1	0.1	0.5	0.9
2010	0.1	0.1	0.1	0.1	0.2	0.3	0.4
2011	0.0	0.2	0.3	0.1	0.0	0.0	0.0
2012	0.2	0.3	0.4	0.2	0.3	0.1	0.1
2013	0.1	0.1	0.2	0.1	0.1	0.1	0.2

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.

Year	Immature male < 105 mm	Mature male ≥ 105 mm	Mature male ± CI	Legal male ≥ 120 mm	Immature female < 80 mm	Mature female ≥ 80 mm	Mature female ± CI
1978	2,669	5,387	4,125	3,004	279	143	140
1979	2,560	5,835	4,472	3,500	206	1,025	1,662
1980	2,270	7,586	7,052	4,945	245	938	1,611
1981	470	5,821	4,609	4,483	39	125	109
1982	1,612	13,947	8,641	11,280	131	296	471
1983	1,054	8,129	4,496	6,382	34	1,645	2,194
1984	463	3,486	1,289	2,946	32	228	305
1985	362	2,608	1,109	2,223	39	95	93
1986	227	1,170	891	668	78	34	66
1987	441	1,842	1,029	1,174	156	84	73
1988	625	2,582	1,226	1,722	291	443	414
1989	2,701	4,388	2,152	3,137	684	1,041	830
1990	1,003	5,423	2,809	4,314	206	143	167
1991	1,467	5,559	2,666	3,754	339	454	724
1992	1,116	5,737	2,296	4,223	298	198	262
1993	1,876	7,692	2,451	5,729	447	1,798	3,279
1994	820	5,305	1,830	3,886	30	197	155
1995	929	4,465	1,512	3,160	139	64	54
1996	1,152	7,762	3,662	5,700	310	487	778
1997	1,199	9,137	5,899	6,723	196	498	767
1998	802	6,828	4,803	5,025	172	280	272
1999	242	1,302	465	1,067	83	24	34
2000	281	1,721	1,041	1,407	15	75	66
2001	432	2,297	1,147	1,776	99	89	100
2002	106	1,502	948	1,258	1	89	120
2003	482	1,126	697	841	68	365	467
2004	394	1,227	689	1,044	143	117	110
2005	400	1,276	901	932	42	103	113
2006	937	2,946	2,064	2,254	36	123	115
2007	2,339	4,153	2,829	2,028	214	81	80
2008	1,757	3,335	1,879	2,471	152	103	129
2009	1,689	4,622	2,390	2,351	208	202	178
2010	3,974	8,141	5,955	4,317	206	362	672
2011	1,699	9,516	10,167	5,701	104	51	52
2012	907	5,652	3,668	3,312	52	75	64
2013	445	2,022	860	1,485	70	42	48

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.

Year	Immature male < 105 mm	Mature male ≥ 105 mm	Mature male ± CI	Legal male ≥ 120 mm	Immature female < 80 mm	Mature female ≥ 80 mm	Mature female ± CI
1978	5.3	4.0	3.3	1.8	0.8	0.3	0.3
1979	4.5	4.4	3.5	2.2	0.6	1.7	2.8
1980	4.3	5.3	5.4	2.9	0.8	1.6	2.8
1981	0.9	3.6	2.6	2.3	0.1	0.2	0.2
1982	3.1	8.5	5.6	6.0	0.4	0.5	0.8
1983	2.1	5.0	2.9	3.4	0.3	2.7	3.5
1984	1.3	2.0	0.7	1.5	0.2	0.4	0.5
1985	0.7	1.5	0.7	1.1	0.2	0.2	0.2
1986	0.6	0.8	0.7	0.4	0.3	0.1	0.1
1987	1.0	1.3	0.8	0.7	0.5	0.2	0.1
1988	1.5	1.8	0.9	1.0	0.9	0.9	0.8
1989	6.2	3.0	1.5	1.8	2.2	2.0	1.6
1990	1.9	3.4	1.8	2.3	0.6	0.3	0.3
1991	3.3	3.9	1.9	2.2	1.0	0.8	1.3
1992	2.2	3.7	1.5	2.3	0.9	0.4	0.5
1993	4.2	5.1	1.7	3.3	1.2	2.7	4.9
1994	1.4	3.6	1.3	2.3	0.1	0.3	0.3
1995	1.7	2.9	1.0	1.7	0.5	0.1	0.1
1996	2.4	5.0	2.5	3.1	1.0	0.8	1.2
1997	2.3	6.0	4.2	3.8	0.6	0.8	1.2
1998	2.1	4.5	3.4	2.8	0.5	0.5	0.4
1999	0.5	0.8	0.3	0.6	0.3	0.0	0.1
2000	0.5	1.0	0.6	0.7	0.1	0.1	0.1
2001	0.8	1.4	0.7	0.9	0.3	0.2	0.2
2002	0.2	0.9	0.5	0.6	0.0	0.1	0.2
2003	1.2	0.7	0.5	0.5	0.2	0.6	0.8
2004	0.9	0.7	0.5	0.6	0.4	0.2	0.2
2005	0.9	0.8	0.6	0.5	0.1	0.2	0.2
2006	1.8	1.9	1.4	1.2	0.1	0.2	0.2
2007	4.5	3.2	2.3	1.2	0.8	0.2	0.2
2008	3.8	2.3	1.3	1.5	0.6	0.2	0.3
2009	3.4	3.6	2.0	1.4	0.6	0.4	0.3
2010	6.2	5.7	4.6	2.5	0.6	0.8	1.4
2011	2.6	6.5	7.2	3.2	0.3	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	0.2	0.1	0.1

Table 15. -- Time series of biomass estimates (t) for 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 1975-1977 data.

Year	Immature male < 113 mm	Mature male ≥ 113 mm	Mature male ± CI	Legal male ≥ 120 mm	Immature female < 85 mm	Mature female ≥ 85 mm	Mature female ± CI
1978	11,128	63,680	18,878	58,229	6,223	25,751	14,471
1979	3,897	27,760	7,713	26,134	3,272	6,795	3,212
1980	8,271	41,545	25,844	38,041	4,131	18,268	13,018
1981	4,507	18,159	7,283	15,748	3,031	11,689	6,002
1982	5,416	11,174	3,961	9,509	2,506	11,692	5,364
1983	3,261	10,285	4,820	8,806	2,359	7,148	3,712
1984	1,999	11,333	3,376	10,194	1,295	6,301	4,009
1985	1,720	6,677	3,098	6,146	801	4,714	3,943
1986	4,842	5,384	3,191	4,286	3,313	3,681	1,793
1987	17,684	11,326	4,675	10,033	18,397	10,855	6,155
1988	24,407	31,965	29,716	22,929	10,298	29,619	17,339
1989	37,420	66,357	21,162	54,096	25,787	22,228	6,857
1990	23,905	58,652	20,725	53,184	24,040	22,635	10,978
1991	25,674	63,636	40,678	54,786	20,447	35,255	19,440
1992	15,684	76,423	48,676	68,294	5,020	14,846	7,175
1993	8,330	46,589	18,006	41,993	2,599	6,864	2,924
1994	3,230	29,865	10,034	27,285	2,750	6,525	3,633
1995	1,982	18,103	8,558	16,731	3,265	7,115	4,508
1996	3,381	16,849	10,867	15,867	4,737	6,910	4,645
1997	3,335	6,006	2,075	5,236	3,200	2,327	971
1998	3,168	5,410	1,623	4,421	1,873	1,364	564
1999	8,347	6,461	3,051	4,590	3,267	2,737	2,170
2000	5,216	11,386	7,017	9,150	2,866	3,456	2,627
2001	5,598	10,717	4,627	9,289	5,965	1,616	839
2002	4,298	10,287	4,570	9,253	5,143	1,322	655
2003	6,206	11,150	5,092	9,424	2,903	2,078	964
2004	3,385	9,182	5,233	7,951	886	1,053	425
2005	5,213	12,412	5,336	10,563	5,317	2,747	1,857
2006	14,970	13,627	5,585	11,067	6,139	5,707	4,445
2007	12,252	16,310	8,947	12,271	3,713	7,331	6,411
2008	9,340	23,387	10,912	19,346	3,478	4,902	2,640
2009	4,049	11,545	4,737	9,512	3,268	4,393	3,765
2010	3,871	11,509	5,463	9,752	1,246	1,613	1,509
2011	11,962	11,952	6,325	10,207	4,939	1,727	1,006
2012	30,889	14,650	6,797	10,734	10,235	4,004	2,214
2013	25,428	39,184	25,941	23,843	6,456	6,985	3,957

Table 16. -- Time series of abundance estimates (in millions) for 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 1975-1977 data.

Year	Immature male < 113 mm	Mature male ≥ 113 mm	Mature male ± CI	Legal male ≥ 120 mm	Immature female < 85 mm	Mature female ≥ 85 mm	Mature female ± CI
1978	46.4	78.8	22.6	67.3	29.4	63.4	37.2
1979	47.0	33.1	8.9	29.7	41.1	16.4	7.7
1980	39.9	50.2	30.4	42.8	21.7	43.8	31.3
1981	28.4	25.0	10.5	20.0	20.9	29.0	15.3
1982	27.8	16.0	5.9	12.5	15.7	29.3	13.6
1983	38.6	15.2	7.1	12.1	32.1	16.3	8.4
1984	20.1	14.7	4.2	12.3	14.6	13.7	8.4
1985	11.9	8.5	3.7	7.4	6.0	10.2	7.9
1986	57.2	7.6	3.8	5.3	45.5	8.8	4.0
1987	145.3	15.7	5.8	12.9	118.7	29.5	17.6
1988	131.4	48.4	41.1	29.4	69.2	70.2	40.9
1989	302.6	97.2	30.3	71.2	254.3	55.0	16.7
1990	181.2	72.4	23.9	61.0	168.3	55.4	26.6
1991	125.8	87.7	60.5	69.2	105.3	86.9	49.1
1992	56.4	105.7	67.0	88.5	24.1	35.4	16.9
1993	31.9	63.9	25.1	54.3	13.2	16.1	6.8
1994	12.9	39.4	13.4	34.0	13.6	15.7	9.0
1995	13.0	24.0	11.0	21.1	19.7	17.6	11.3
1996	29.7	21.6	13.7	19.6	30.1	17.3	11.5
1997	39.8	7.9	2.6	6.3	42.5	6.0	2.5
1998	25.3	7.9	2.4	5.8	17.1	3.5	1.5
1999	49.6	10.0	4.7	6.1	25.7	7.4	5.8
2000	31.8	16.8	10.0	12.1	21.0	8.6	6.5
2001	115.2	14.5	5.6	11.5	110.6	4.3	2.1
2002	48.6	13.1	5.3	10.9	45.5	3.4	1.7
2003	42.7	14.8	5.8	11.2	21.0	5.3	2.4
2004	18.2	12.3	5.3	9.7	9.9	2.5	1.0
2005	41.6	17.4	6.4	13.5	46.7	7.0	4.7
2006	86.9	19.8	7.6	14.4	40.4	15.2	12.2
2007	58.9	25.0	13.0	16.4	27.2	18.2	15.1
2008	40.2	33.5	13.8	25.0	19.8	12.9	7.0
2009	38.6	16.5	5.9	12.3	38.5	11.0	9.0
2010	47.4	16.4	7.4	12.7	44.3	6.8	6.1
2011	139.1	16.5	7.5	12.8	98.8	7.8	4.4
2012	168.6	23.0	10.7	14.5	100.8	18.5	11.1
2013	111.0	69.7	49.7	37.0	64.5	31.2	17.7

Table 17. -- Time series of biomass estimates (t) for 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 1975-1977 data.

Year	Immature male < 103 mm	Mature male ≥ 103 mm	Mature male ± CI	Legal male ≥ 110 mm	Immature female < 80 mm	Mature female ≥ 80 mm	Mature female ± CI
1978	11,996	13,989	6,649	12,851	17,662	9,669	4,998
1979	13,770	19,783	5,958	17,212	15,968	16,823	11,222
1980	63,809	39,566	13,321	28,796	76,836	40,718	19,389
1981	34,733	28,350	8,189	19,037	39,466	27,932	13,799
1982	14,664	35,066	12,970	25,998	62,459	40,097	17,934
1983	7,674	17,209	6,637	13,430	15,422	15,813	7,392
1984	5,648	12,661	4,796	10,056	9,545	12,400	6,682
1985	2,495	4,210	1,467	3,230	3,319	2,885	1,634
1986	6,177	5,846	4,167	3,353	2,600	2,273	1,434
1987	7,919	8,771	4,047	7,142	6,480	3,464	1,402
1988	18,909	22,199	12,805	18,235	14,228	9,697	6,333
1989	15,788	29,782	13,083	25,497	12,637	10,402	4,521
1990	15,704	40,385	19,188	36,030	12,984	23,537	20,848
1991	17,700	38,813	14,113	34,951	17,066	19,802	8,528
1992	12,254	27,907	12,237	24,822	12,565	19,740	9,195
1993	7,145	12,887	5,014	11,097	5,942	7,339	2,856
1994	5,104	11,859	4,024	10,351	4,642	6,375	3,435
1995	3,750	13,403	7,360	12,161	5,464	9,413	5,342
1996	2,902	8,002	6,287	6,814	3,185	4,863	4,188
1997	1,960	3,633	1,205	2,926	1,615	1,910	1,177
1998	2,975	3,618	1,248	2,650	3,241	1,586	828
1999	4,311	2,345	974	1,709	4,348	2,156	1,048
2000	3,997	2,815	858	2,029	3,872	1,922	958
2001	7,971	5,001	2,110	4,020	9,326	4,117	2,683
2002	8,496	4,384	1,623	3,087	9,372	3,239	1,368
2003	12,268	8,267	3,857	6,547	14,291	5,145	2,221
2004	12,809	13,593	7,103	9,896	11,015	3,890	1,386
2005	18,588	27,877	10,733	24,158	23,548	9,788	4,278
2006	33,025	41,618	18,696	35,464	29,040	13,290	5,449
2007	36,383	47,741	27,327	37,785	14,552	9,019	2,967
2008	15,566	32,589	17,699	26,871	8,995	8,273	3,867
2009	9,558	23,406	9,319	20,175	6,859	5,236	2,192
2010	8,108	20,506	7,567	17,783	3,998	2,281	1,065
2011	13,198	26,124	17,353	23,259	6,556	2,637	842
2012	19,737	15,027	4,271	11,928	7,053	2,736	972
2013	18,416	20,423	9,312	15,939	6,925	3,941	1,601

Table 18. -- Time series of abundance estimates (in millions) for 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 1975-1977 data.

Year	Immature male < 103 mm	Mature male ≥ 103 mm	Mature male ± CI	Legal male ≥ 110 mm	Immature female < 80 mm	Mature female ≥ 80 mm	Mature female ± CI
1978	153.6	19.4	8.7	16.3	172.9	29.6	16.0
1979	109.7	33.2	9.8	26.1	93.2	51.8	35.0
1980	479.1	77.8	26.1	48.0	414.8	125.7	61.2
1981	186.2	59.6	17	33.5	207.0	91.0	47.1
1982	74.2	71.3	26.2	46.0	321.1	127.5	58.0
1983	108	34.6	13.5	24.0	156.6	49.8	23.4
1984	64.9	25.5	9.6	18.2	88.0	38.6	21.3
1985	28.6	8.4	2.9	5.7	30.5	9.1	5.2
1986	49.4	13.5	10.5	6.5	25.4	7.1	4.2
1987	91.2	16.2	6.6	11.6	76.8	11.3	4.5
1988	197.2	39.8	21.1	28.8	137.1	30.2	19.8
1989	157.1	50.3	19.5	38.4	113.9	31.9	13.5
1990	129.5	65.6	29.3	53.4	102.0	69.0	57.2
1991	162.8	65.2	22.4	54.3	133.9	59.4	25.3
1992	111.6	45.3	15.8	36.7	96.5	61.2	28.5
1993	58.1	23.4	8.4	18.4	46.0	23.0	9.0
1994	47.3	21.1	6.7	16.9	45.6	19.4	10.4
1995	33.6	23.5	12.7	20.1	39.4	28.7	16.0
1996	24.3	15	11.1	11.7	26.2	15.0	12.9
1997	24.6	7.3	2.3	5.3	26.0	5.6	3.5
1998	49.1	7.4	2.5	4.7	46.4	4.9	2.6
1999	83.4	4.9	2.2	3.2	83.1	6.7	3.2
2000	71.2	6	1.8	3.8	58.2	5.8	2.9
2001	145.2	9.8	3.7	7.0	135.6	12.6	8.1
2002	128.8	9.1	3.2	5.4	120.6	10.1	4.3
2003	171.5	16.4	7.2	11.6	156.0	16.3	7.0
2004	207.5	29.2	15.9	18.9	185.8	11.9	4.2
2005	241.1	49.5	17.8	39.2	246.1	30.2	13.5
2006	284.9	74.8	28.4	57.5	216.6	41.4	16.7
2007	283.1	92.6	48.5	64.6	138.6	27.7	8.9
2008	110.8	62.2	29.9	46.2	76.6	25.5	11.8
2009	98.3	42.7	16.6	33.7	84.6	16.0	6.7
2010	113.2	37.2	13.1	29.6	100.3	12.6	5.8
2011	186.6	42.9	22.9	34.8	163.1	14.8	4.6
2012	223.8	28.7	8.1	19.9	132.2	15.5	5.5
2013	183.9	39.7	17.1	27.1	123.7	21.5	8.7

Table 19. -- Time series of biomass estimates (t) for eastern Bering Sea 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	Legal male ≥ 78 mm	Immature female < 50 mm	Mature female ≥ 50 mm	Mature female ± CI
1980	229,658	112,156	23,117	189,234	68,026	260,950	140,114
1981	160,377	38,715	7,935	96,180	23,008	144,871	45,737
1982	251,534	66,073	19,393	177,666	17,878	161,179	47,003
1983	182,804	68,051	18,258	162,470	19,896	86,298	32,808
1984	114,957	112,003	30,107	173,278	23,412	45,606	16,700
1985	43,840	55,857	11,895	79,401	6,872	7,985	3,081
1986	82,583	59,566	14,357	84,972	25,726	29,501	10,552
1987	263,362	110,614	23,086	182,229	103,492	191,911	58,150
1988	323,998	143,031	53,053	244,099	55,820	194,829	62,097
1989	376,717	147,971	29,304	299,545	84,169	270,382	131,495
1990	307,535	356,511	99,367	533,863	56,654	207,679	75,475
1991	288,981	342,610	103,124	471,500	100,717	239,877	87,868
1992	194,661	178,707	39,022	240,544	83,985	154,161	51,594
1993	267,444	98,923	21,198	142,909	131,310	129,262	38,630
1994	284,738	57,849	11,650	109,755	116,084	129,423	37,003
1995	359,485	60,743	19,825	155,270	83,813	160,727	42,361
1996	337,632	144,002	52,199	312,019	51,765	90,375	23,432
1997	207,510	232,831	56,874	362,785	39,995	92,988	33,764
1998	99,597	164,505	30,683	219,565	32,219	73,582	36,071
1999	43,374	67,232	13,595	86,773	12,008	33,562	13,500
2000	75,974	53,757	15,470	76,333	26,947	104,784	104,992
2001	164,874	56,352	10,620	105,477	17,572	97,135	52,856
2002	82,408	56,095	26,889	100,723	7,102	35,224	18,692
2003	80,476	44,514	10,041	72,353	21,070	47,252	28,272
2004	88,141	44,320	14,384	61,831	52,756	50,109	26,079
2005	181,819	50,388	9,605	106,237	50,125	103,619	34,344
2006	122,465	90,094	61,110	141,290	21,923	77,362	25,977
2007	137,947	98,824	35,074	160,504	17,157	87,063	37,408
2008	112,950	79,654	16,881	123,295	11,265	61,862	23,212
2009	97,311	103,550	30,632	149,714	34,333	68,026	26,916
2010	146,348	107,131	27,491	136,140	110,403	131,999	46,658
2011	149,221	112,016	25,828	146,275	72,308	236,886	84,721
2012	123,677	67,497	18,907	104,456	71,837	193,144	74,898
2013	100,505	58,380	14,776	99,724	53,949	173,352	60,068

Table 20. -- Time series of abundance estimates (in millions) for eastern Bering Sea 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	Legal male ≥ 78 mm	Immature female < 50 mm	Mature female ≥ 50 mm	Mature female ± CI
1980	2543.0	212.7	46.3	515.9	1595.4	3452.5	1934.9
1981	1547.4	80.4	17.1	313.3	481.7	1886.4	613.6
1982	1821.9	145.5	43.8	592.9	364.2	2050.4	628.6
1983	1496.6	150.2	40.6	511.2	553.8	1157.5	453.0
1984	1203.4	223.4	58.9	455.4	635.1	586.4	219.8
1985	447.8	106.0	22.6	196.2	209.1	110.0	43.3
1986	1148.7	111.8	26.7	212.8	712.5	403.1	145.5
1987	3755.5	220.7	47.1	501.8	2474.7	2517.7	761.9
1988	3642.0	274.3	92.8	678.3	1308.2	2492.2	805.5
1989	3162.1	301.8	60.7	907.9	1775.4	3513.8	1902.2
1990	2265.4	728.1	207.9	1380.1	1348.3	2651.0	1026.7
1991	3320.3	610.4	174.8	1085.4	2645.9	3147.6	1275.0
1992	3077.7	313.8	67.7	553.4	2355.9	1876.9	639.8
1993	4749.8	182.5	39.8	355.9	3536.0	1710.7	516.7
1994	4114.9	107.2	21.3	321.1	3235.5	1645.1	438.3
1995	3608.6	125.8	43.7	508.3	1933.3	2171.0	562.2
1996	2309.3	302.4	105.1	959.0	1120.4	1243.9	325.7
1997	1205.2	447.0	99.2	946.4	858.4	1279.9	465.6
1998	778.4	308.6	56.2	514.9	711.0	1009.8	496.8
1999	419.9	124.4	23.3	197.9	294.6	439.3	181.8
2000	962.3	101.8	30.5	189.8	632.5	1388.5	1379.4
2001	1523.5	110.9	22.5	311.4	441.7	1264.2	695.7
2002	598.6	115.0	54.7	284.8	161.8	462.4	261.4
2003	1073.8	88.1	20.2	196.0	592.1	630.3	391.8
2004	1491.1	80.0	23.8	148.0	1625.3	683.0	371.2
2005	1892.6	89.3	16.5	313.8	1201.2	1427.9	477.3
2006	1173.4	171.5	118.5	375.9	585.8	914.7	305.5
2007	1258.3	194.5	64.5	432.0	378.1	1075.9	484.2
2008	1008.0	154.2	31.2	324.8	425.6	715.6	299.2
2009	1055.8	195.8	57.1	371.7	979.5	827.9	340.7
2010	2464.3	187.4	44.8	297.0	3375.4	1440.1	490.9
2011	1829.7	194.6	45.7	331.3	1682.9	2629.4	914.8
2012	1384.8	123.5	34.3	274.1	1717.2	2104.3	883.5
2013	1055.9	112.5	27.6	280.0	1421.2	1830.5	665.4

Table 21. -- 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 male ± CI	Total female	Total female ± CI
1980	612	12172	8498	370	338
1981	699	12052	5423	159	83
1982	180	7107	3941	194	69
1983	67	4537	1331	296	151
1984	470	2657	839	123	89
1985	83	2081	1041	60	51
1986	207	1478	786	100	69
1987	354	1079	606	207	109
1988	638	643	350	284	88
1989	3032	507	252	114	127
1990	4412	803	440	246	148
1991	1376	793	433	229	129
1992	898	591	299	120	53
1993	1111	2296	1588	248	148
1994	1329	2420	1223	193	133
1995	1638	5948	3260	189	98
1996	1316	3159	1738	275	132
1997	583	3110	1288	176	56
1998	213	1991	797	359	241
1999	185	1674	503	305	123
2000	324	2865	1255	330	180
2001	131	1283	521	564	243
2002	65	1368	528	101	64
2003	355	676	272	222	47
2004	202	467	184	83	71
2005	325	209	131	271	133
2006	351	662	413	1174	950
2007	579	1266	517	355	167
2008	621	1341	629	464	174
2009	1156	1904	729	512	269
2010	893	1572	670	468	186
2011	1750	2119	933	375	161
2012	3618	2867	1122	612	237
2013	3351	6438	2622	1049	432

Table 22. -- 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 $\geq$ 83 mm	Legal male $\pm$ CI	Total female	Total female $\pm$ CI
1980	1.9	15.4	10.1	1.9	2.2
1981	2.0	15.1	7.3	0.6	0.4
1982	0.5	8.8	4.9	0.8	0.2
1983	0.3	5.9	1.7	0.9	0.5
1984	1.6	3.4	1.1	0.5	0.3
1985	0.3	2.5	1.3	0.3	0.2
1986	0.7	1.8	1.0	0.4	0.3
1987	1.6	1.4	0.7	0.9	0.4
1988	4.0	0.8	0.4	1.4	0.7
1989	12.8	0.7	0.4	0.5	0.6
1990	16.5	1.2	0.7	1.0	0.6
1991	4.7	1.3	0.7	1.2	0.7
1992	3.0	1.1	0.6	1.0	0.4
1993	3.8	3.9	2.6	2.0	1.0
1994	5.0	4.1	2.1	1.3	1.1
1995	5.9	8.4	4.5	1.0	0.6
1996	4.1	5.1	2.7	1.0	0.5
1997	1.7	4.6	1.8	1.3	0.2
1998	0.6	2.9	1.1	1.3	0.8
1999	0.6	2.3	0.7	1.2	0.4
2000	1.0	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	1.0	0.3
2004	0.6	0.7	0.3	0.3	0.2
2005	1.0	0.3	0.2	0.8	0.5
2006	1.2	1.0	0.7	4.7	4.6
2007	2.3	1.9	0.7	1.3	0.9
2008	2.3	2.2	1.0	2.0	0.6
2009	3.9	3.1	1.1	2.0	1.2
2010	3.2	2.4	1.0	2.2	1.1
2011	6.9	3.5	1.4	1.6	0.6
2012	11.8	4.6	1.8	2.8	0.9
2013	10.3	10.6	4.6	3.9	1.7

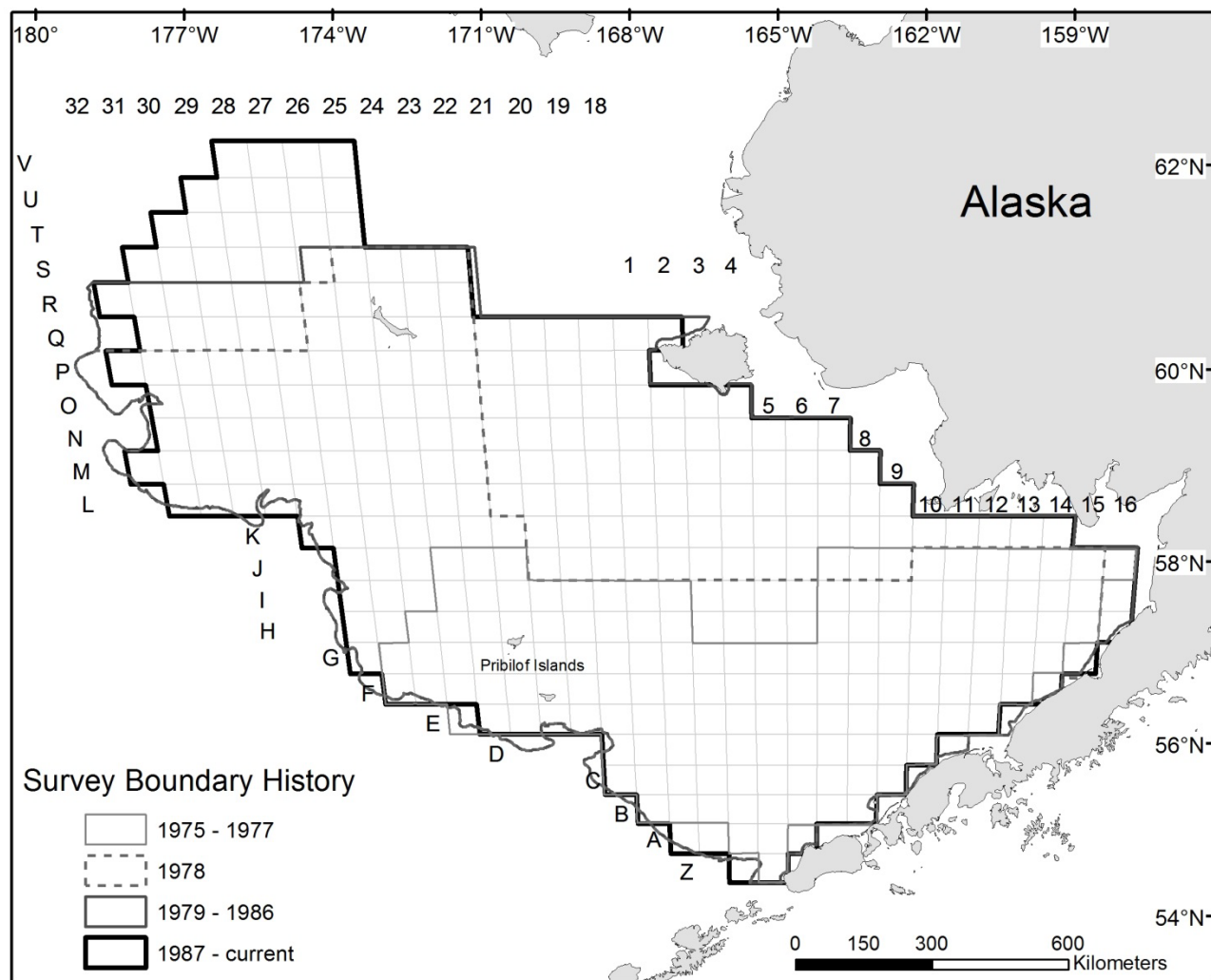


Figure 1. -- National Marine Fisheries Service eastern Bering Sea bottom trawl survey boundary from 1975 to present indicating four major stanzas in total coverage.

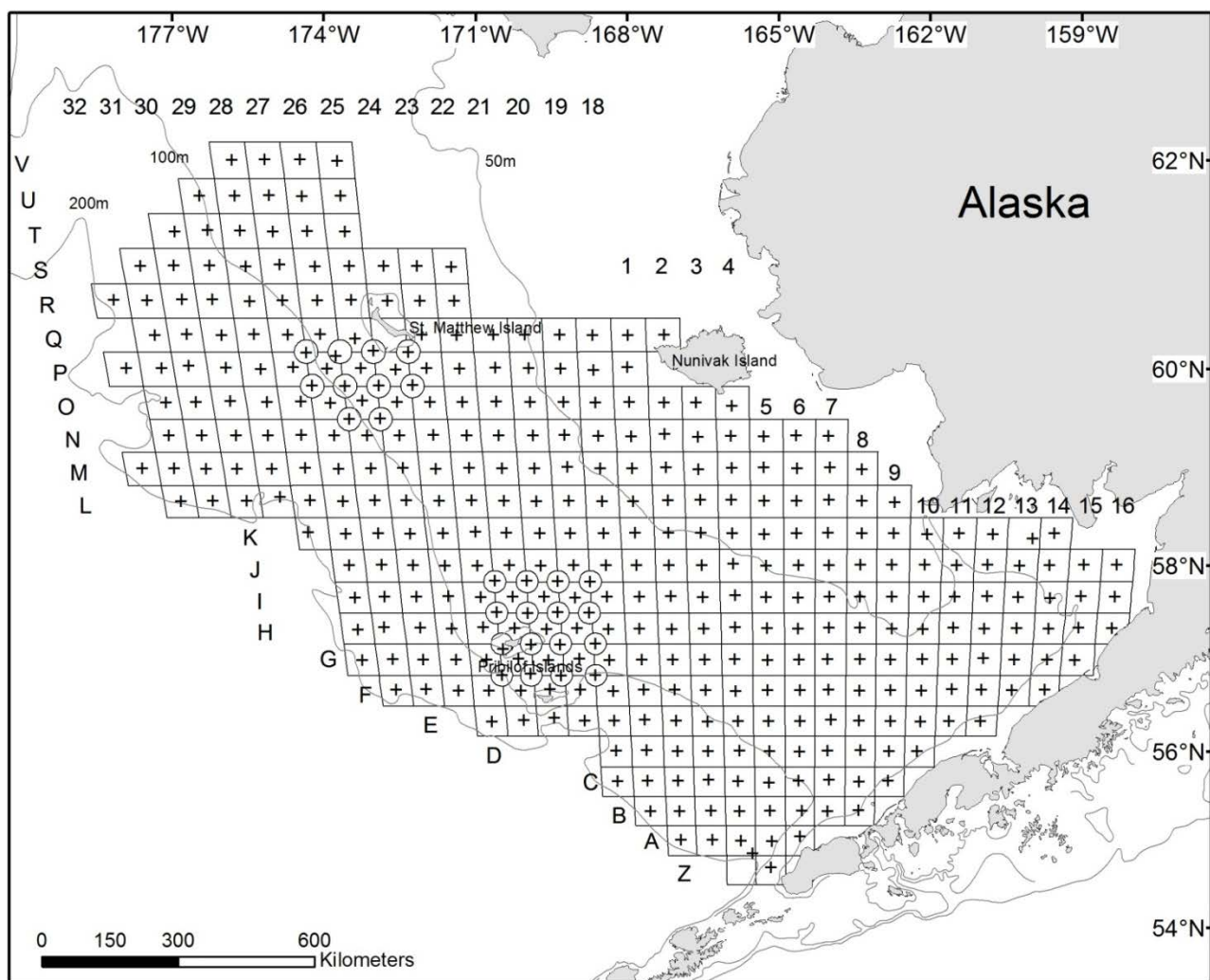


Figure 2. -- National Marine Fisheries Service eastern Bering Sea standard bottom trawl area surveyed by the FV *Alaska Knight* and the FV *Aldebaran* from 9 June to 1 August 2013.

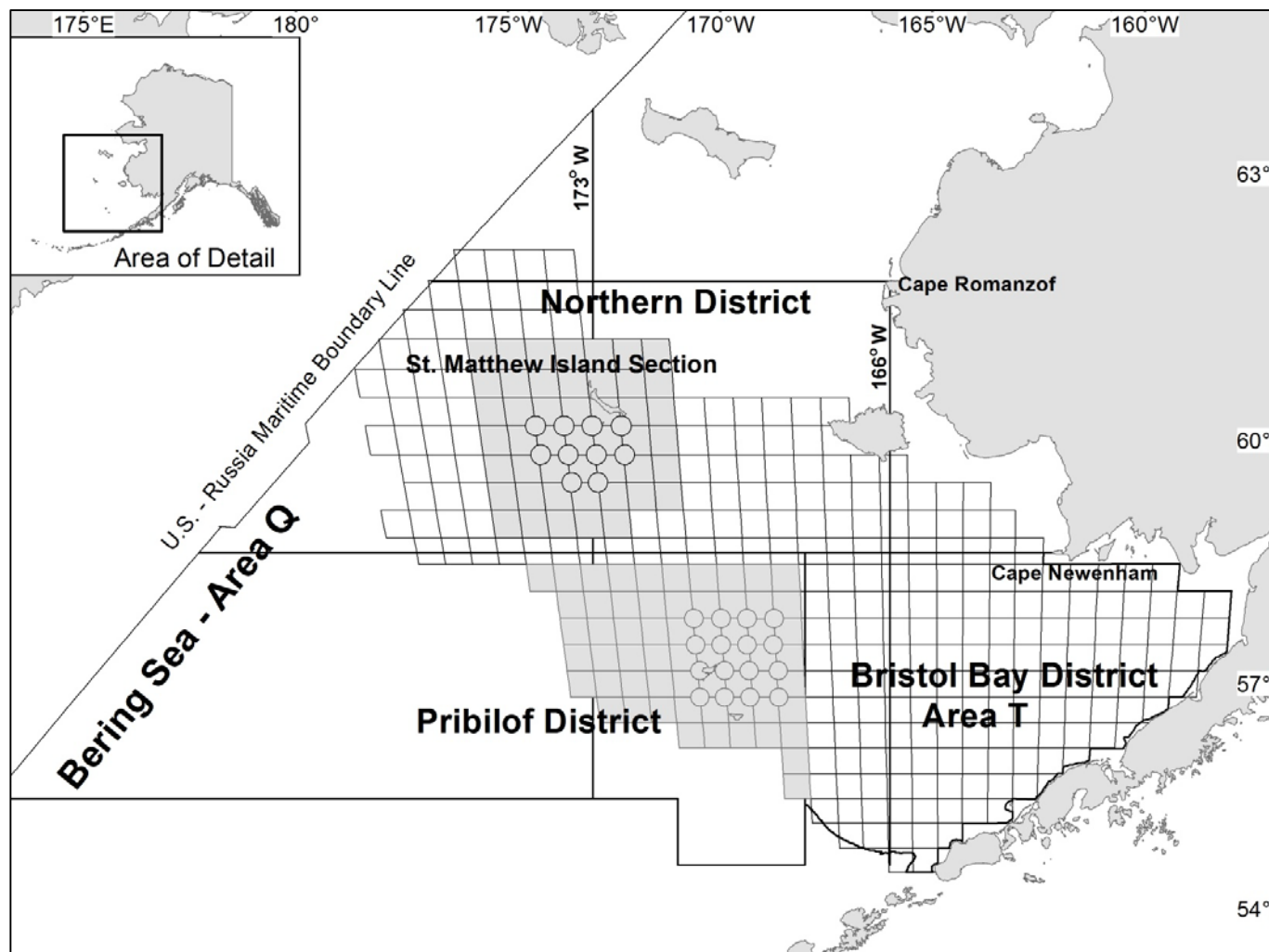


Figure 3. -- Alaska Department of Fish and Game commercial crab management units within the 2013 eastern Bering Sea bottom trawl survey area. Grey areas represent stations included in in the Pribilof District and St. Matthew Island Section, Northern District sampling strata and circles represent the high-density sampling areas.

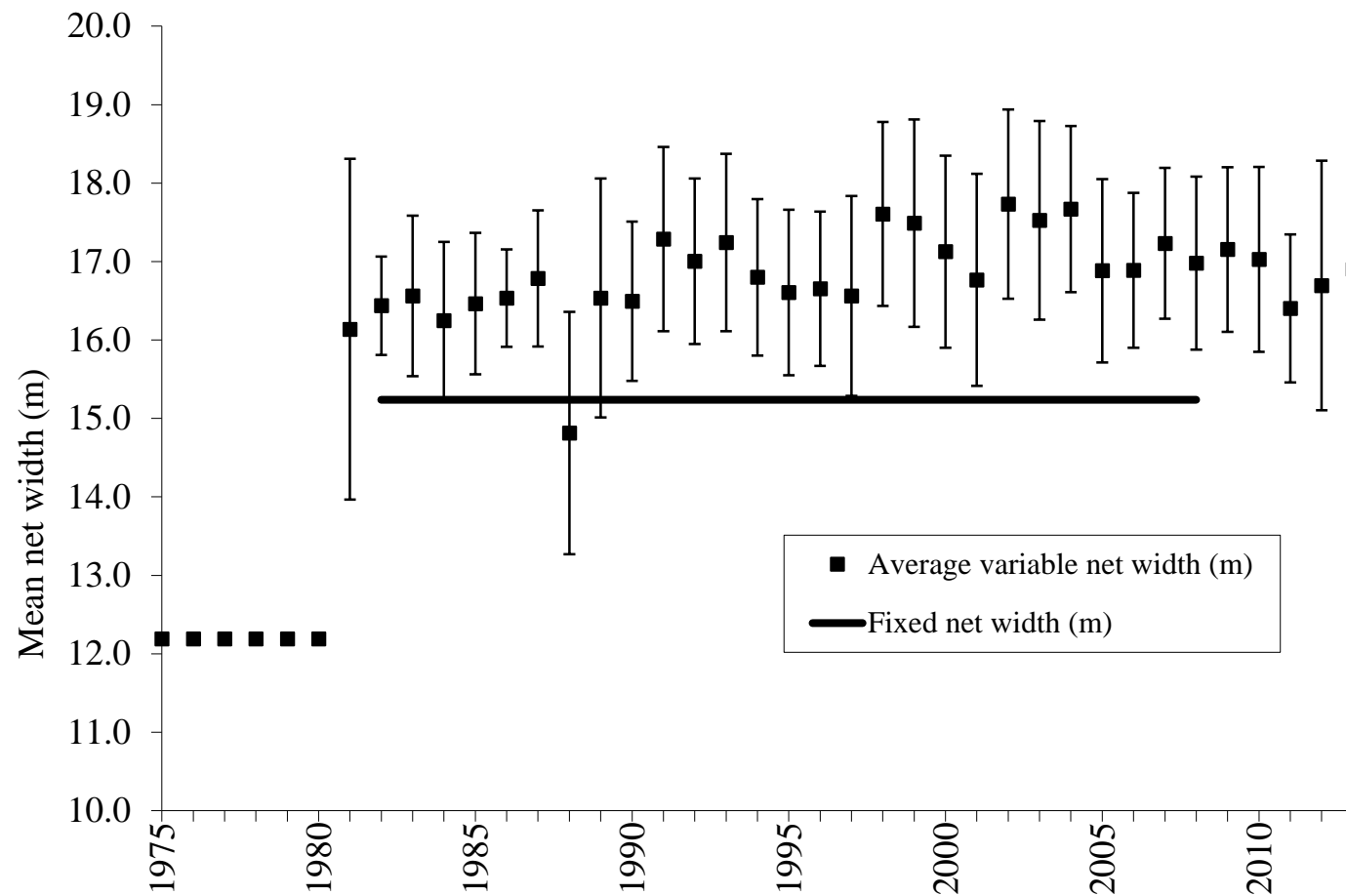


Figure 4. -- Fixed and average variable net widths (SD) used to calculate area swept by National Marine Fisheries Service eastern Bering Sea standard bottom trawls from 1975 to the present.

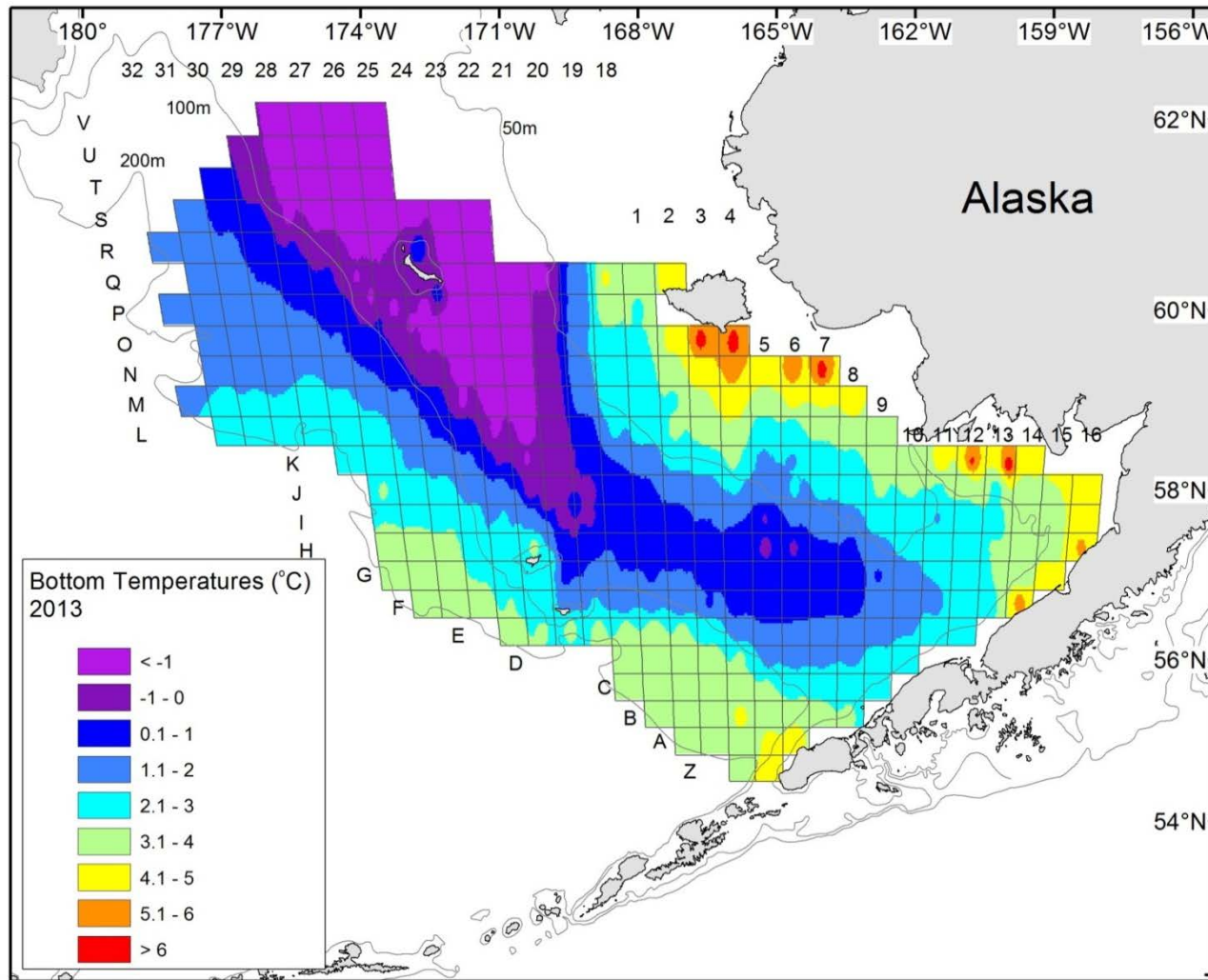


Figure 5. -- Bottom temperatures (°C) measured at stations from the National Marine Fisheries Service eastern Bering Sea bottom trawl survey, beginning 9 June 2013 in Bristol Bay and ending on 1 August 2013 at the western edge of the survey

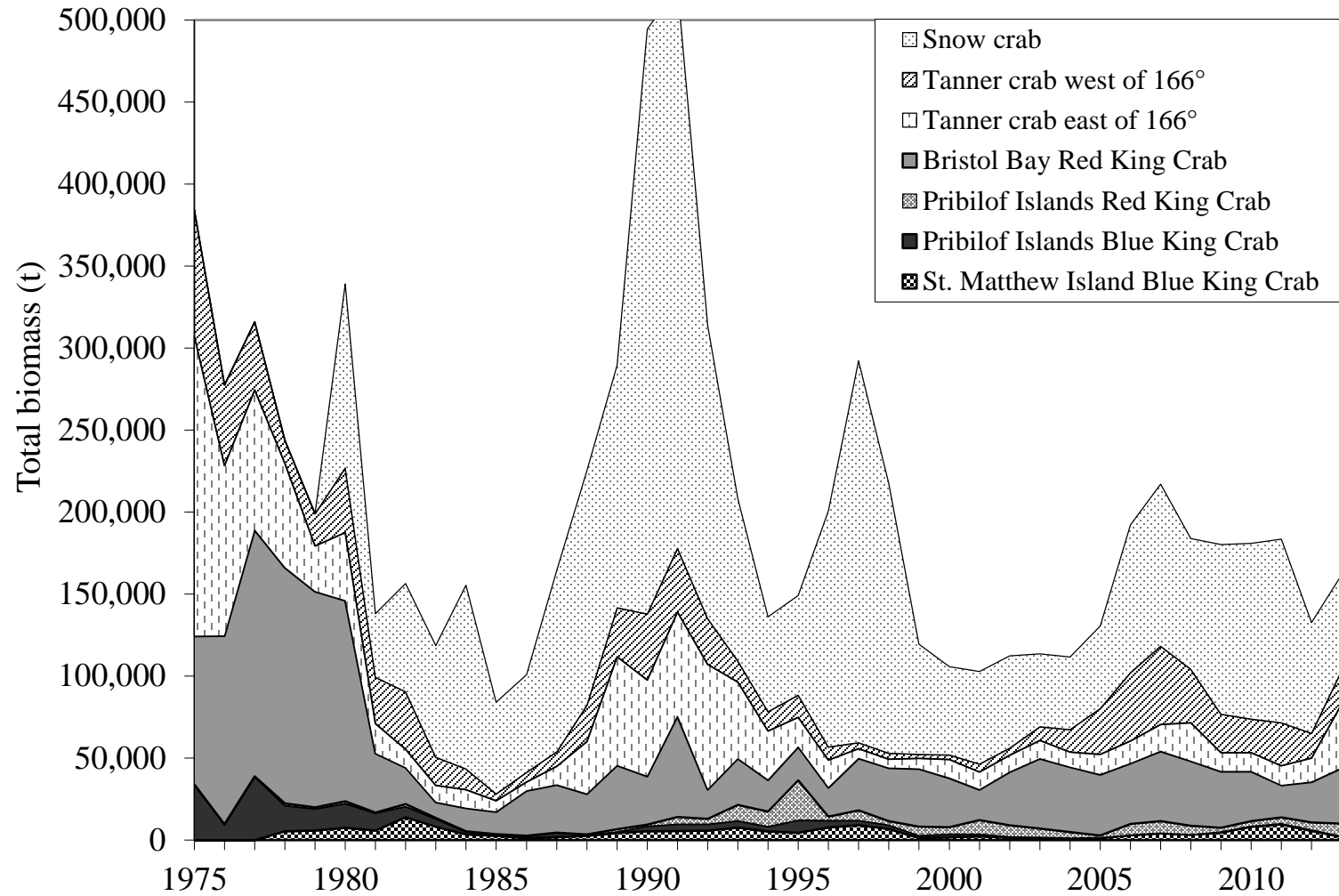


Figure 6. -- Historical mature male biomass for six commercial species caught on National Marine Fisheries Service eastern Bering Sea bottom trawl surveys.

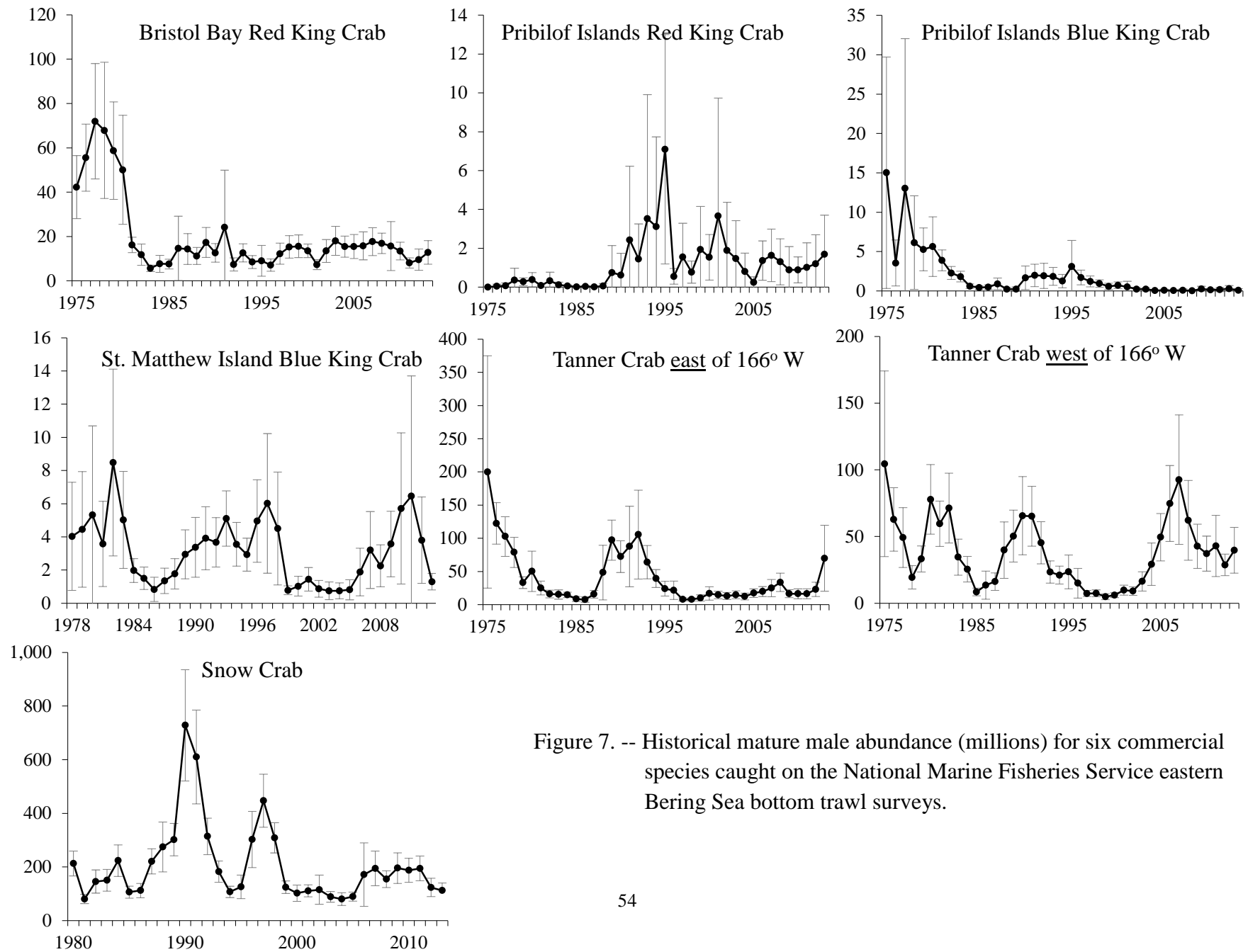


Figure 7. -- Historical mature male abundance (millions) for six commercial species caught on the National Marine Fisheries Service eastern Bering Sea bottom trawl surveys.

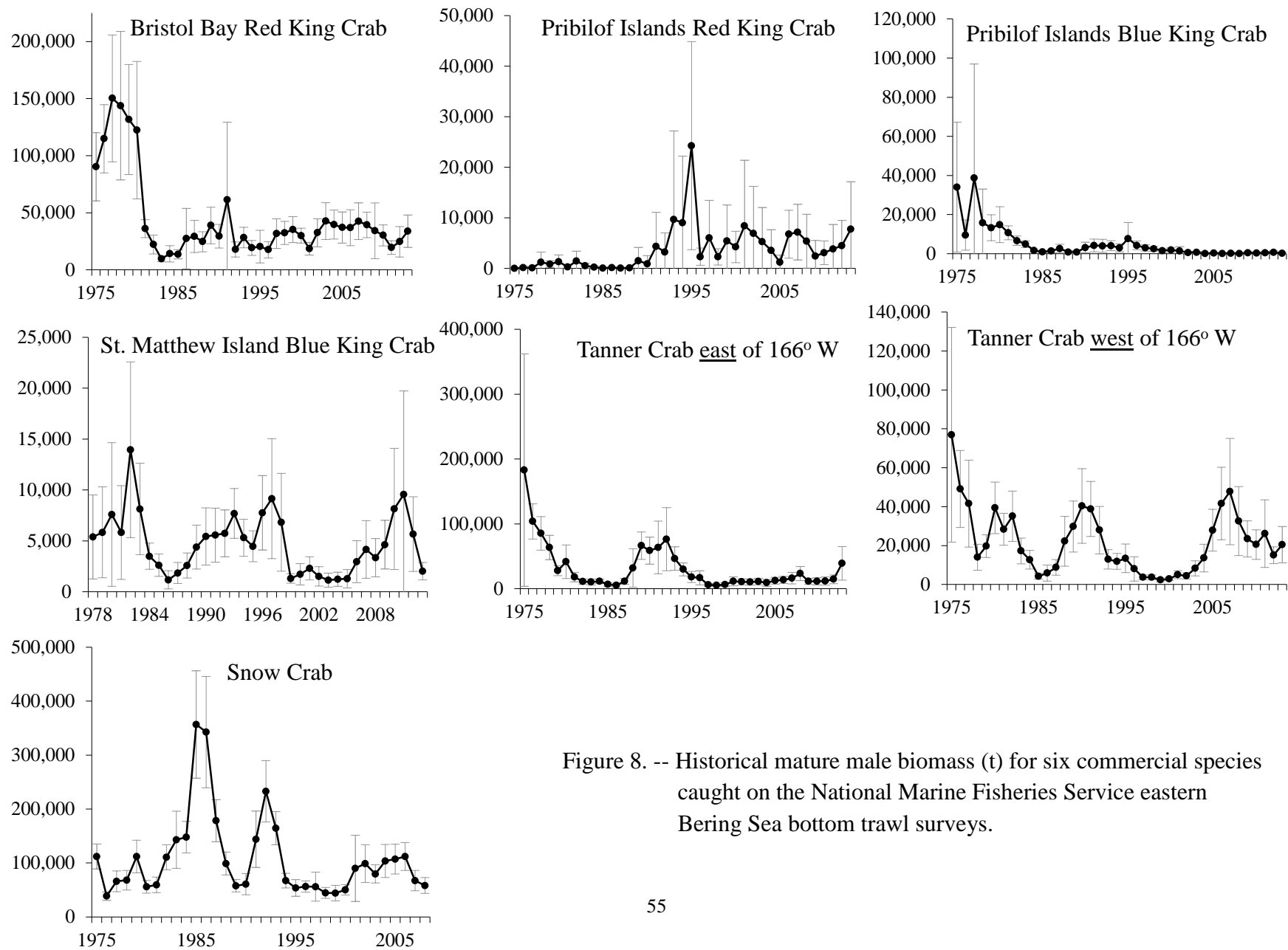


Figure 8. -- Historical mature male biomass (t) for six commercial species caught on the National Marine Fisheries Service eastern Bering Sea bottom trawl surveys.

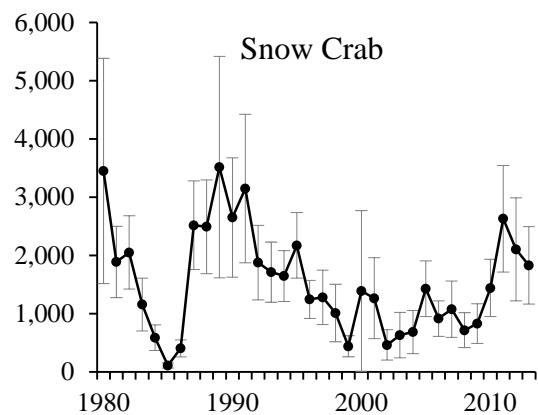
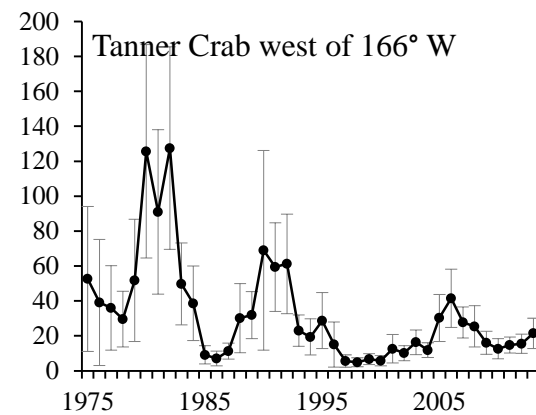
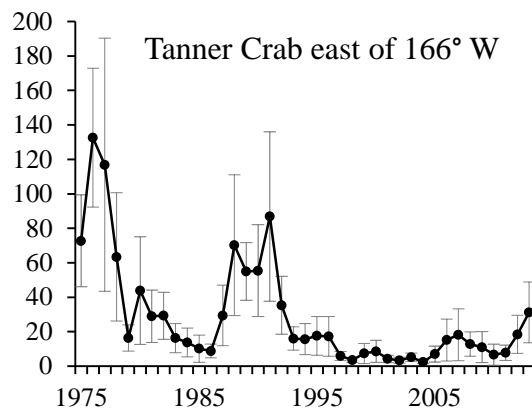
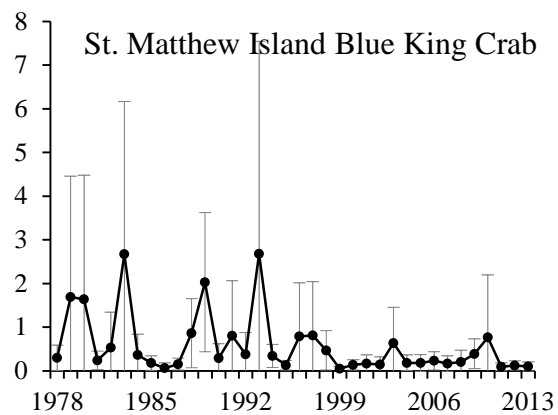
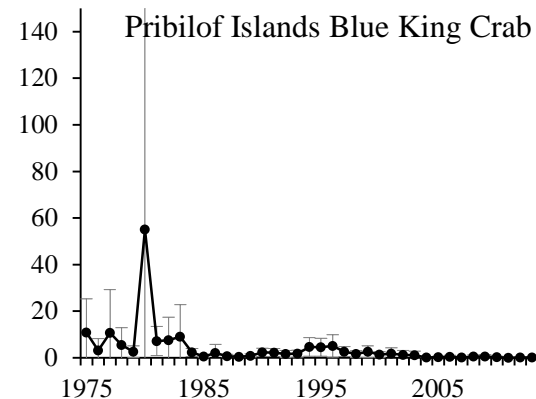
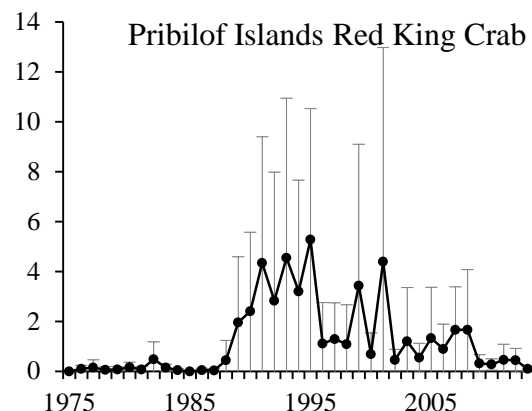
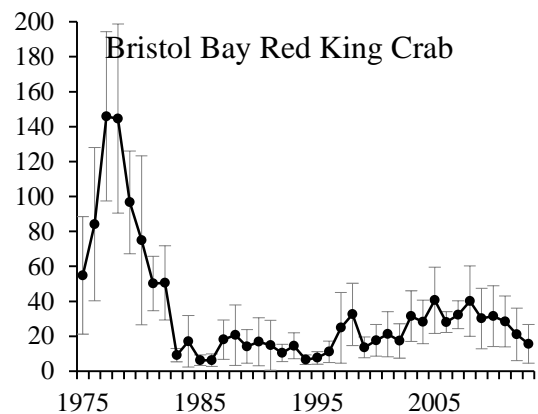


Figure 9. -- Historical mature female abundance (millions) for six commercial species caught on the National Marine Fisheries Service eastern Bering Sea bottom trawl surveys.

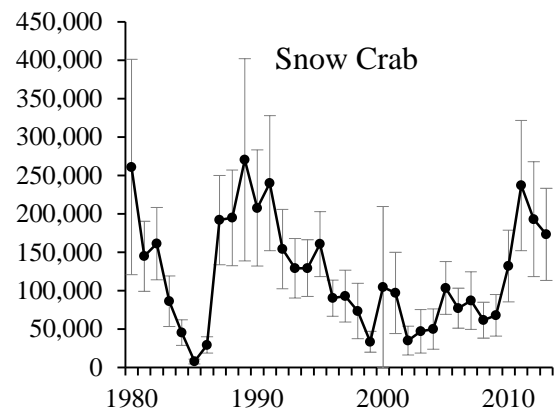
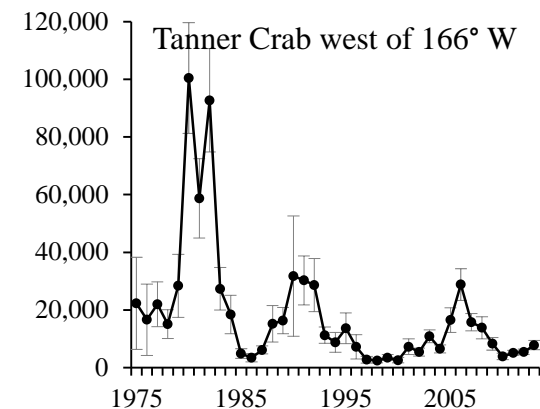
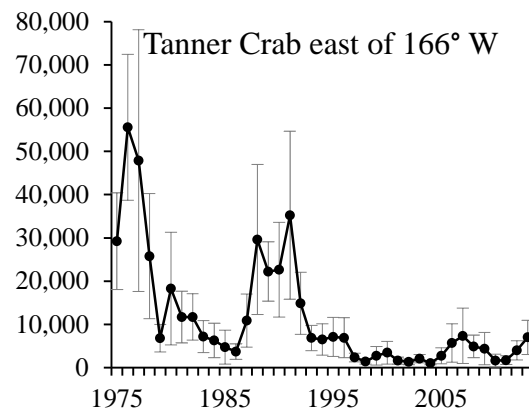
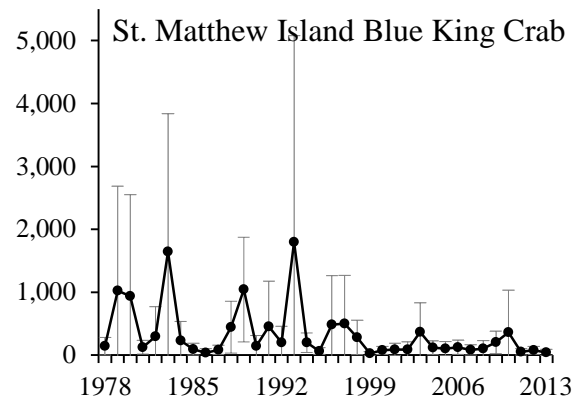
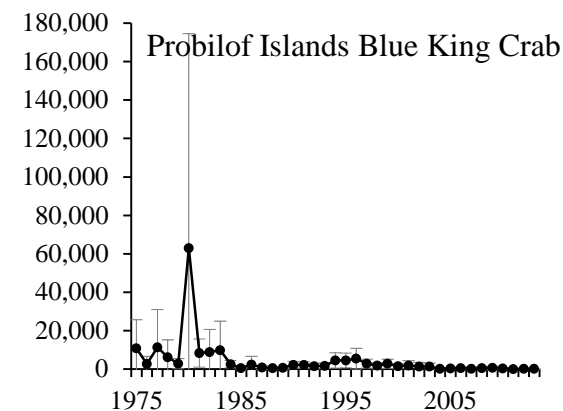
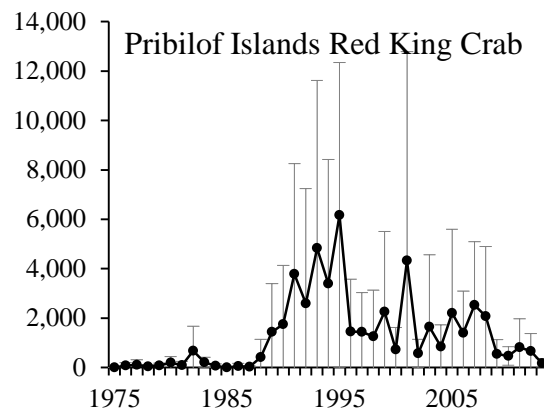
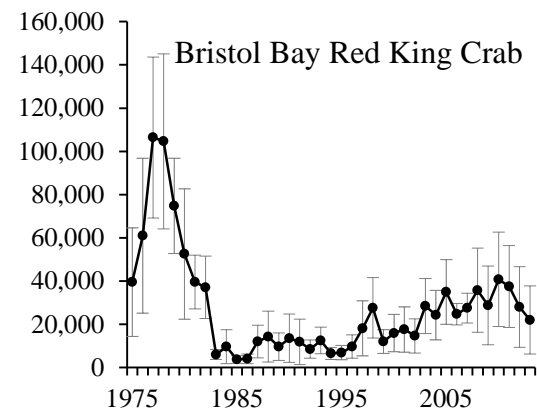


Figure 10. -- Historical mature female biomass (t) for six commercial species caught on the National Marine Fisheries Service eastern Bering Sea bottom trawl surveys.

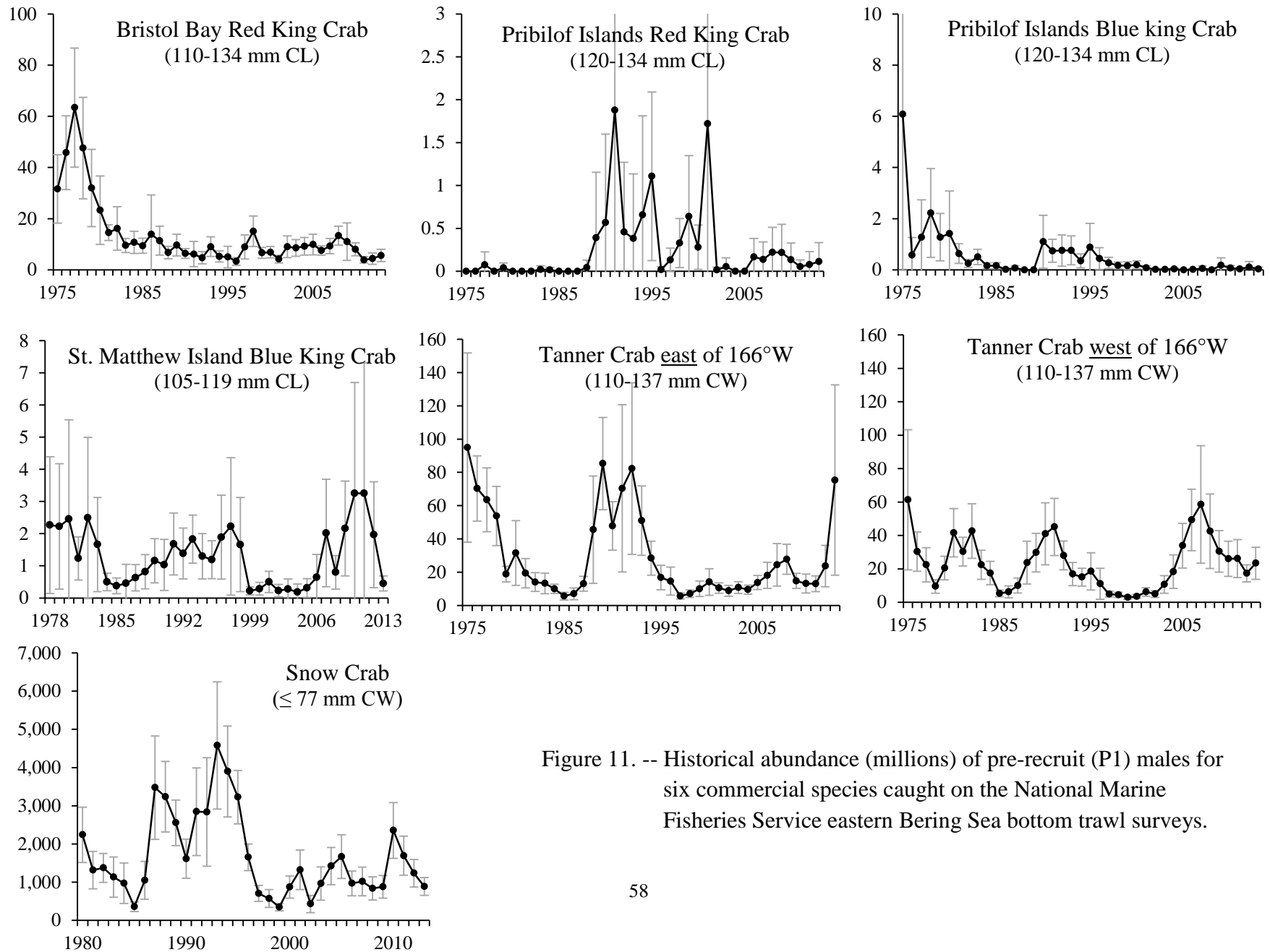


Figure 11. -- Historical abundance (millions) of pre-recruit (P1) males for six commercial species caught on the National Marine Fisheries Service eastern Bering Sea bottom trawl surveys.

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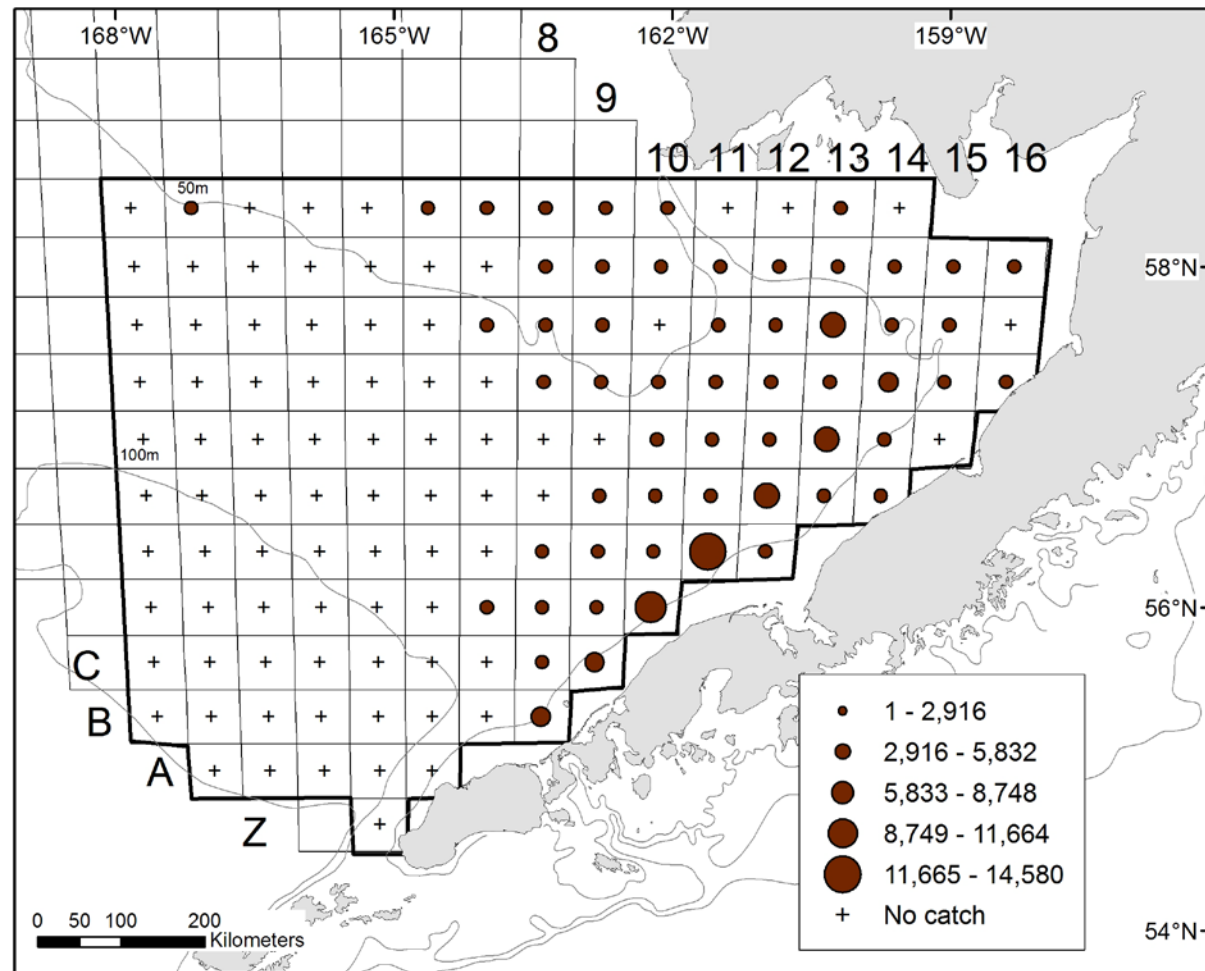


Figure 12. -- Total density (number  $\text{nmi}^{-2}$ ) of red king crab (*Paralithodes camtschaticus*) at each station sampled in the 2013 Bristol Bay District. Data depicted by circles are equal interval densities. The outlined area depicts the management district.

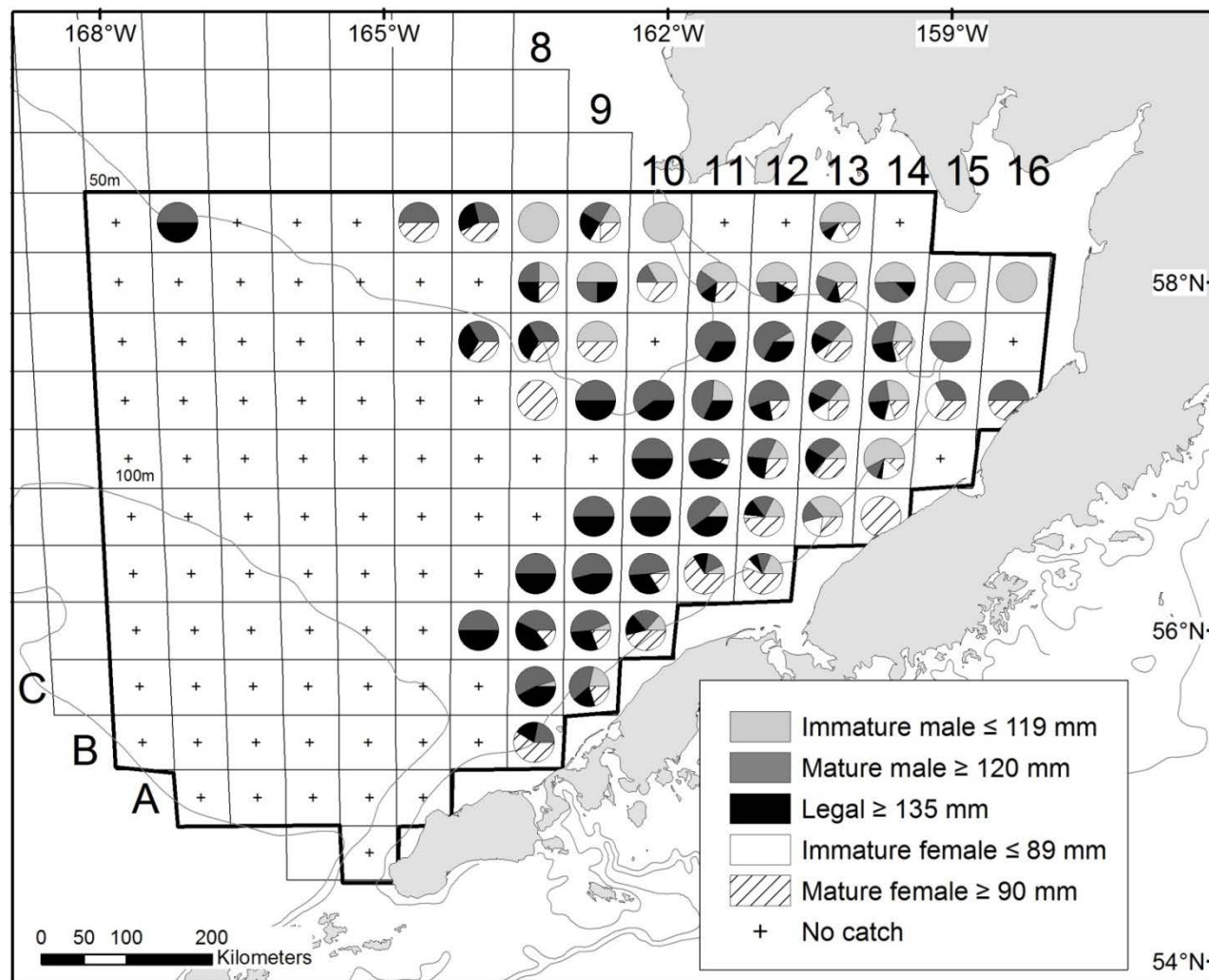


Figure 13. -- Percentage of male and female red king crab (*Paralithodes camtschaticus*) size classes caught at each station of the Bristol Bay District in 2013. The outlined area depicts management district.

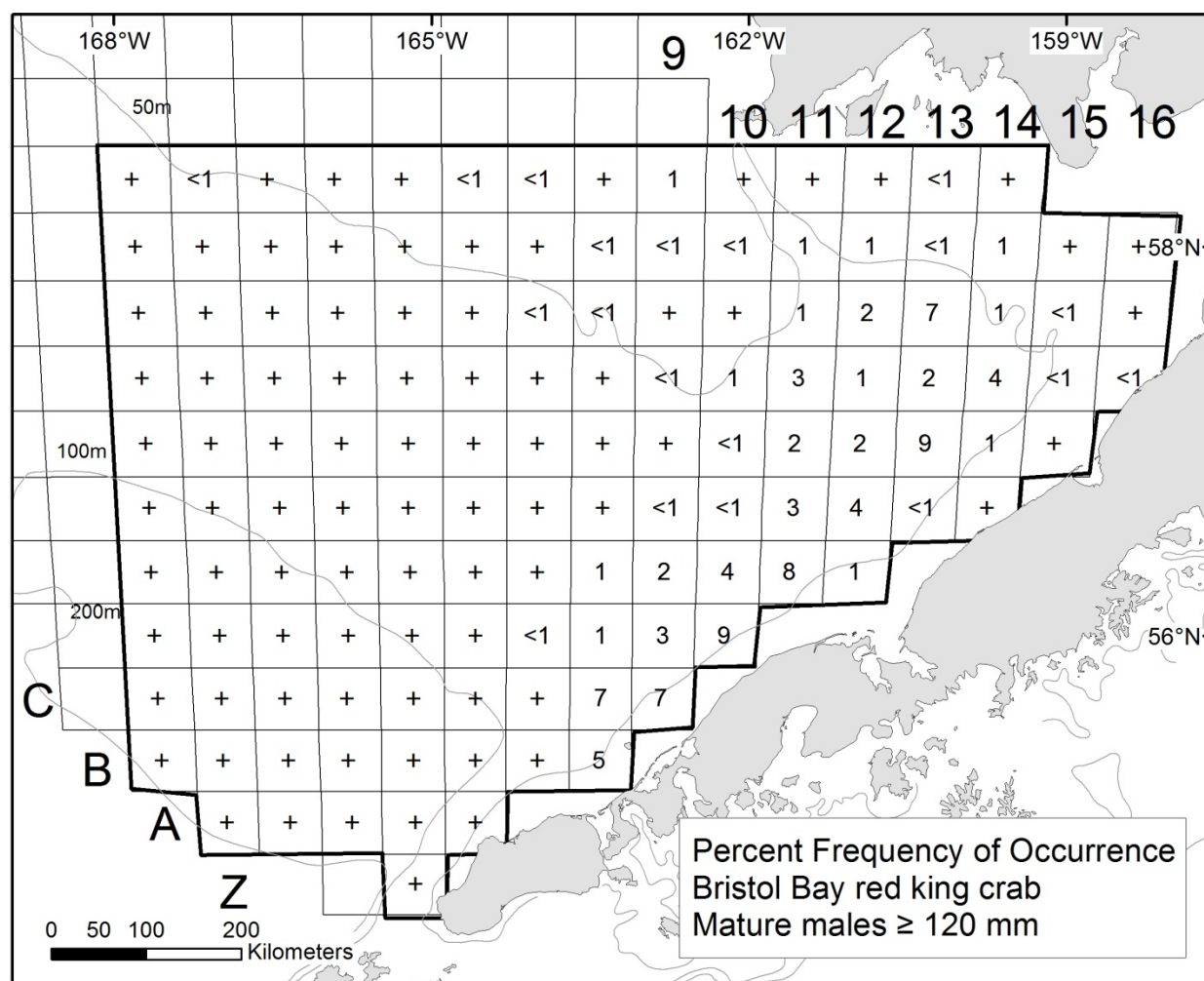


Figure 14. -- Percent frequency of occurrence of mature male red king crab (*Paralithodes camtschaticus*) at stations sampled in the 2013 Bristol Bay District. The outlined area depicts management district.

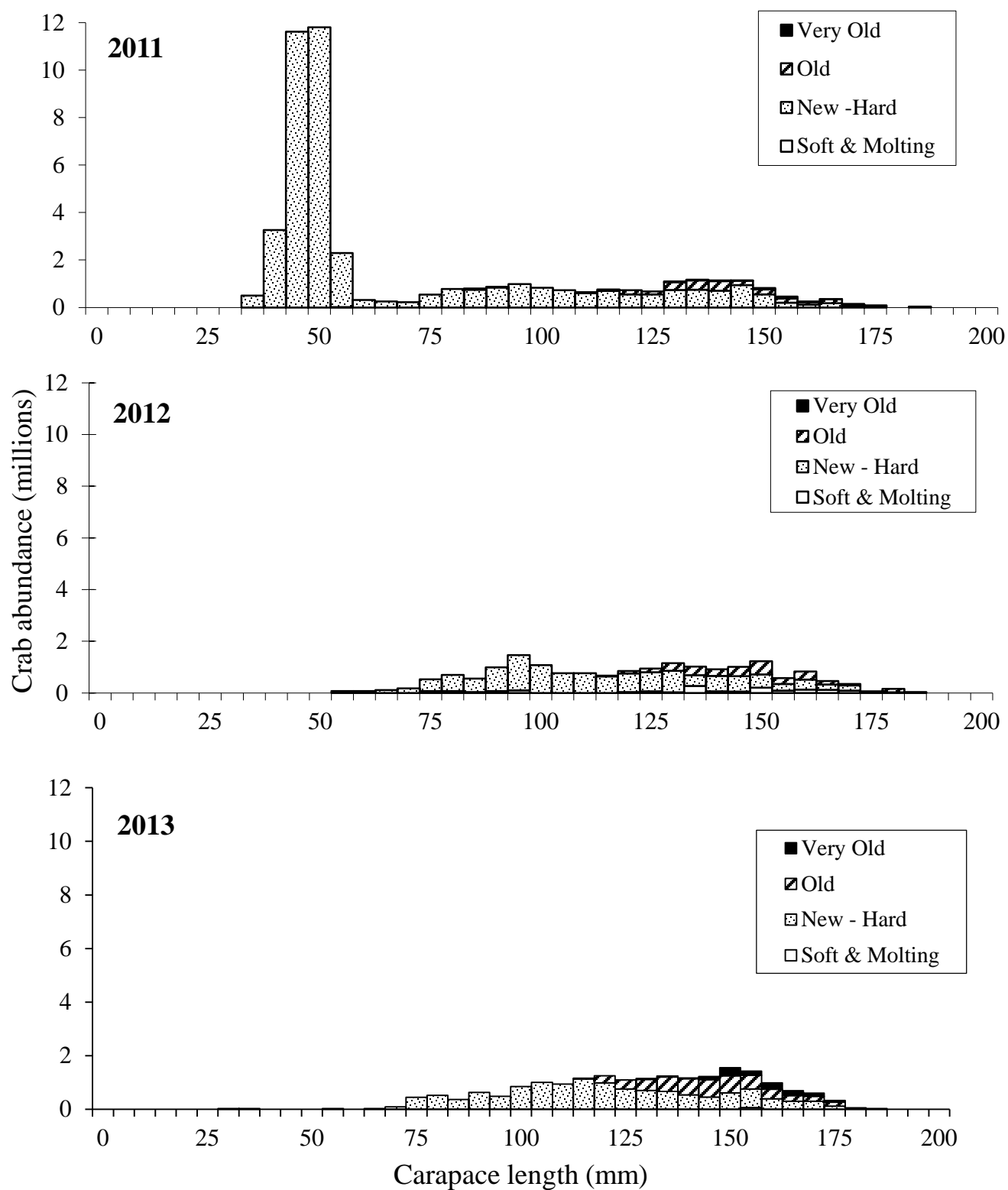


Figure 15. -- Size-frequency by shell condition of Bristol Bay District male red king crab (*Paralithodes camtschaticus*) by 5 mm length classes, 2010-2012.

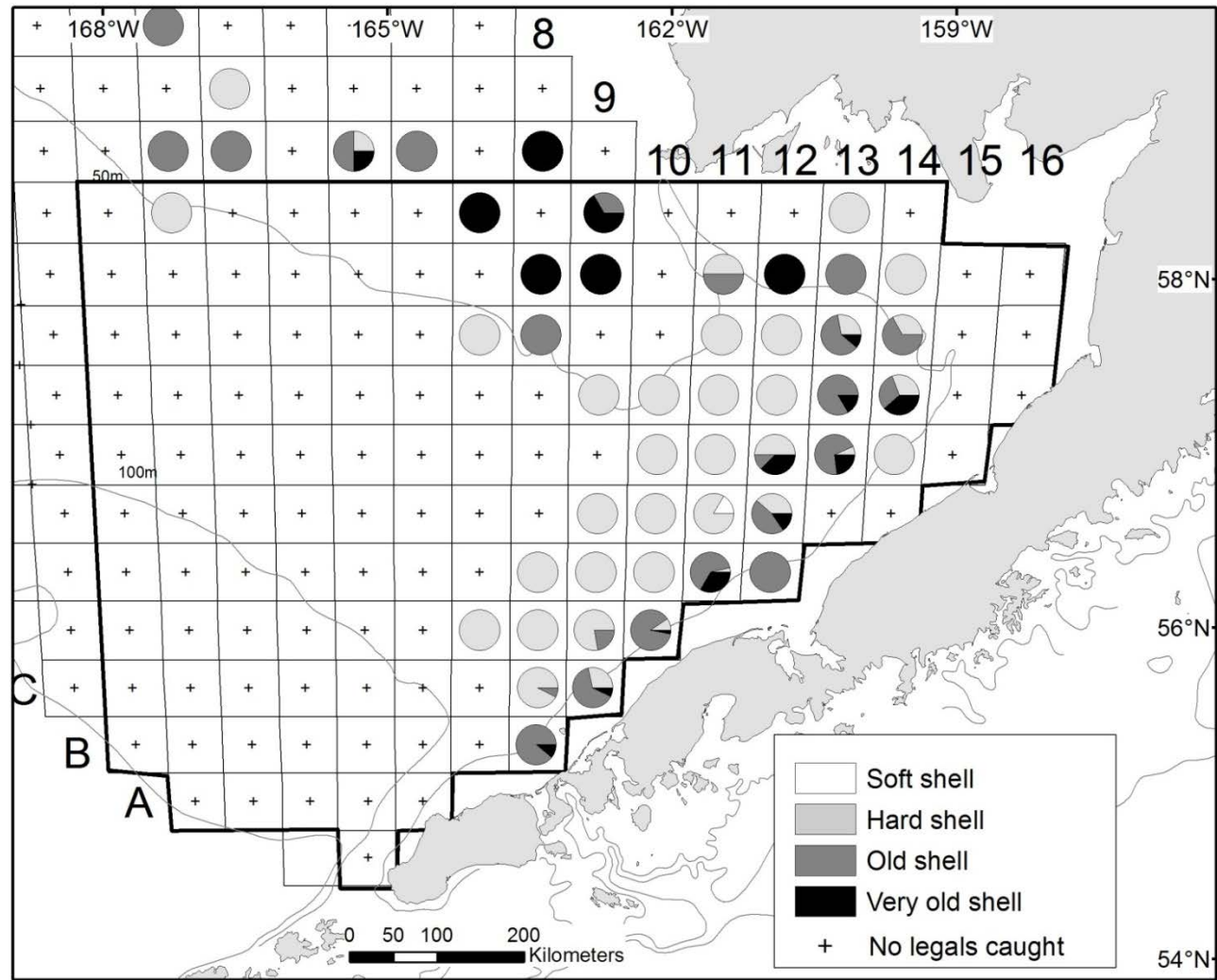


Figure 16. -- Distribution of legal-sized male red king crab (*Paralithodes camtschaticus*) caught at each station in the 2013 Bristol Bay District distinguished by shell condition. The outlined area depicts management district.

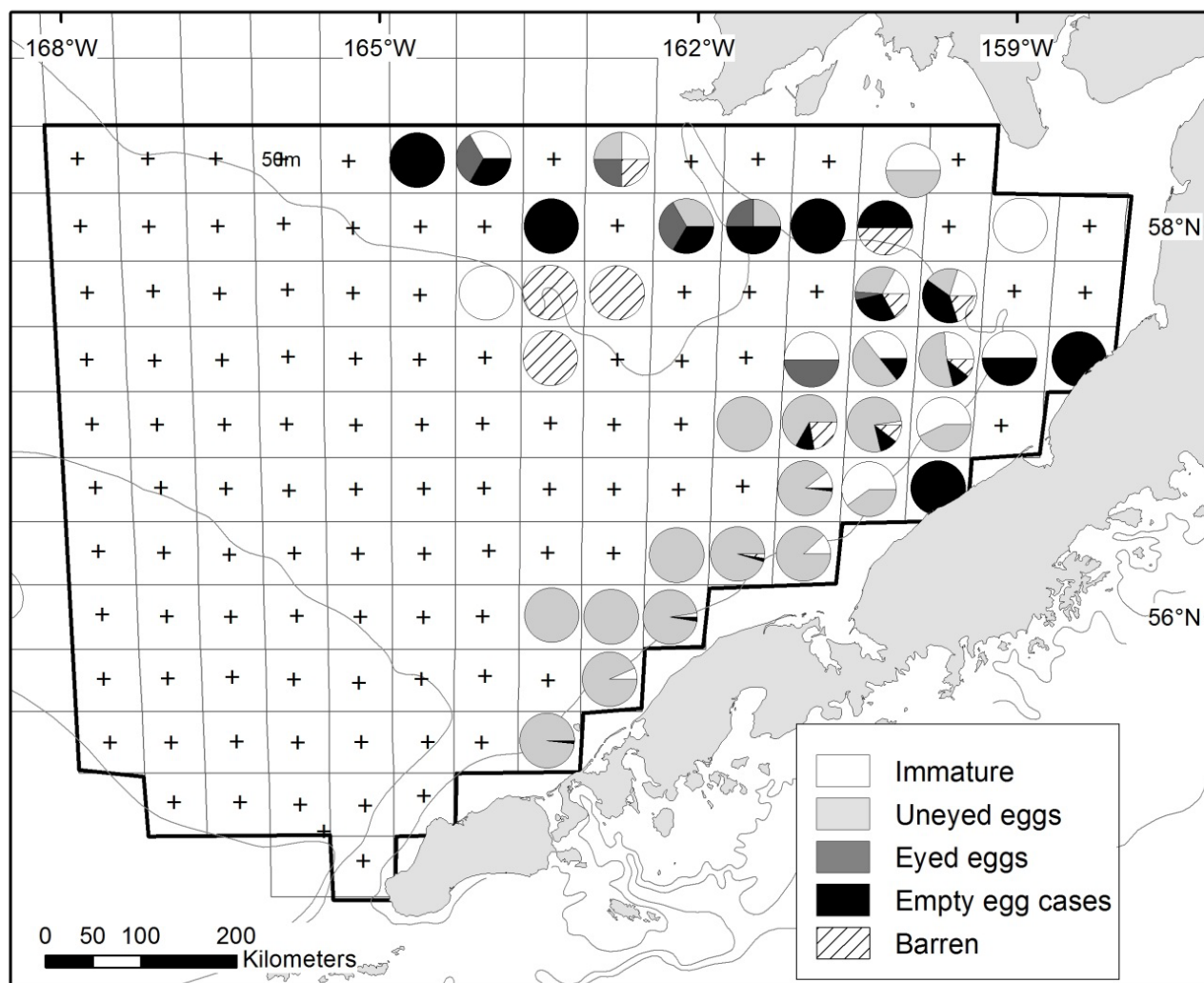


Figure 17. -- Distribution and egg condition of female red king crab (*Paralithodes camtschaticus*) in the Bristol Bay District in 2013. The outlined area depicts management district.

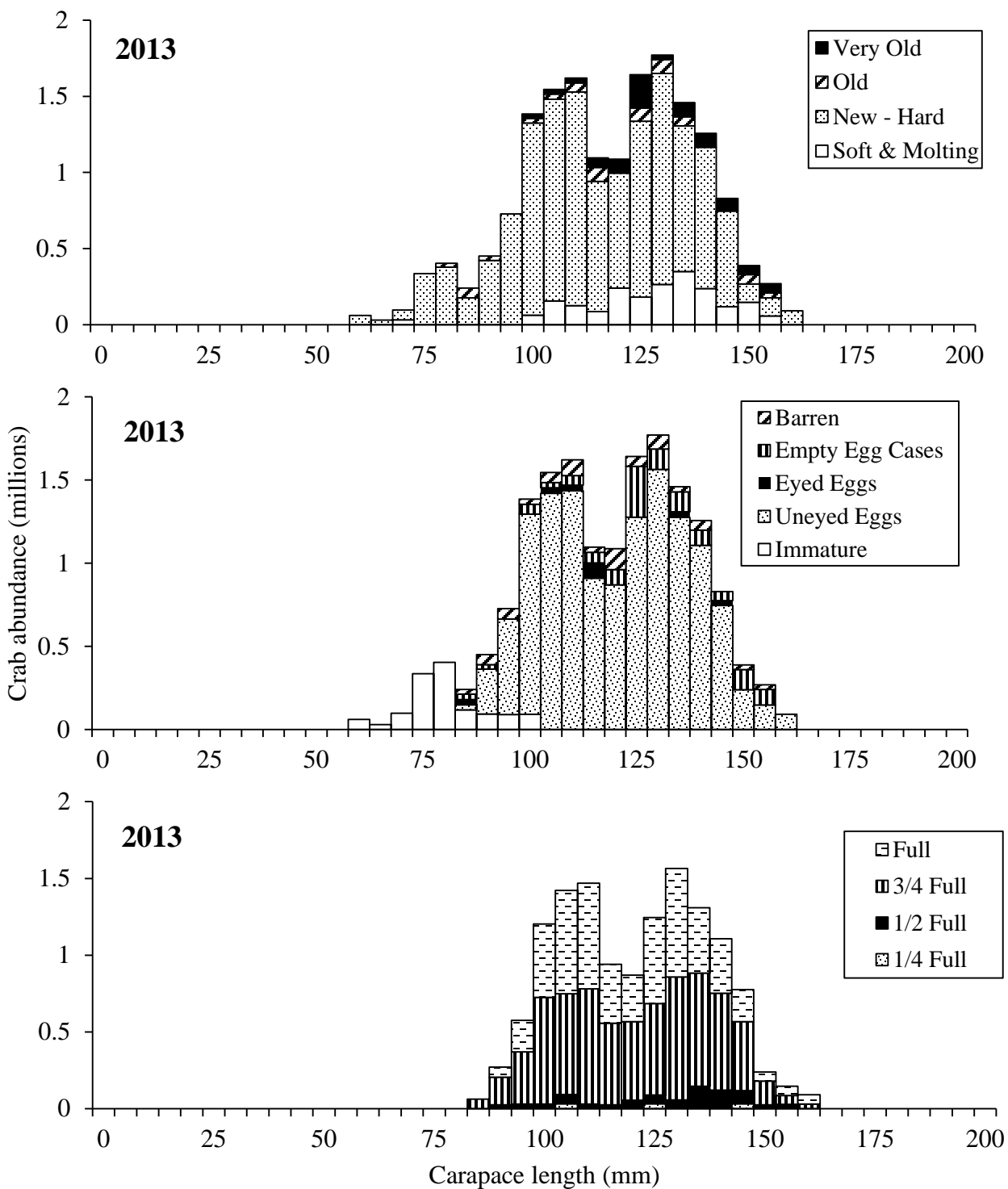


Figure 18. -- Size-frequency by shell condition, egg condition, and clutch fullness of Bristol Bay District female red king crab (*Paralithodes camtschaticus*) by 5 mm length classes in 2013.

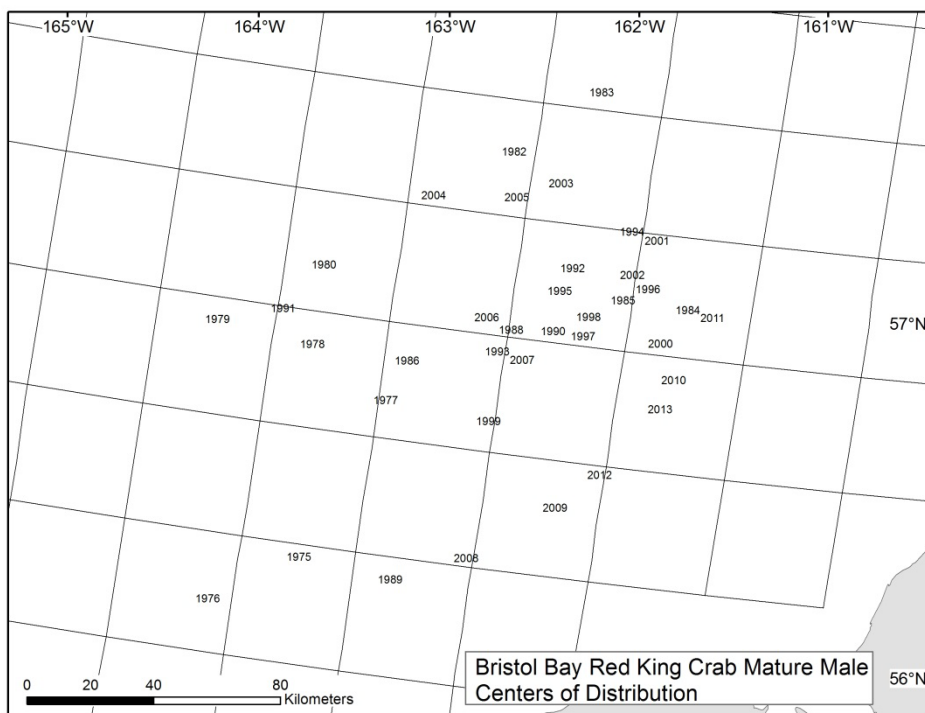
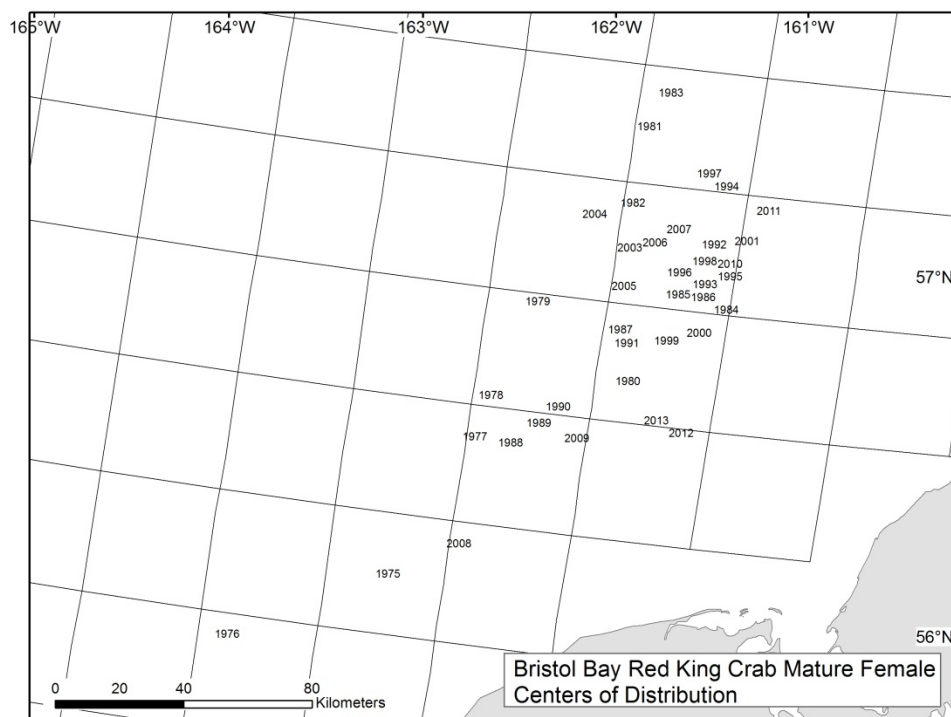


Figure 19. -- Centers of stock distribution of Bristol Bay District female and male red king crab (*Paralithodes camtschaticus*) from 1975 to 2013.

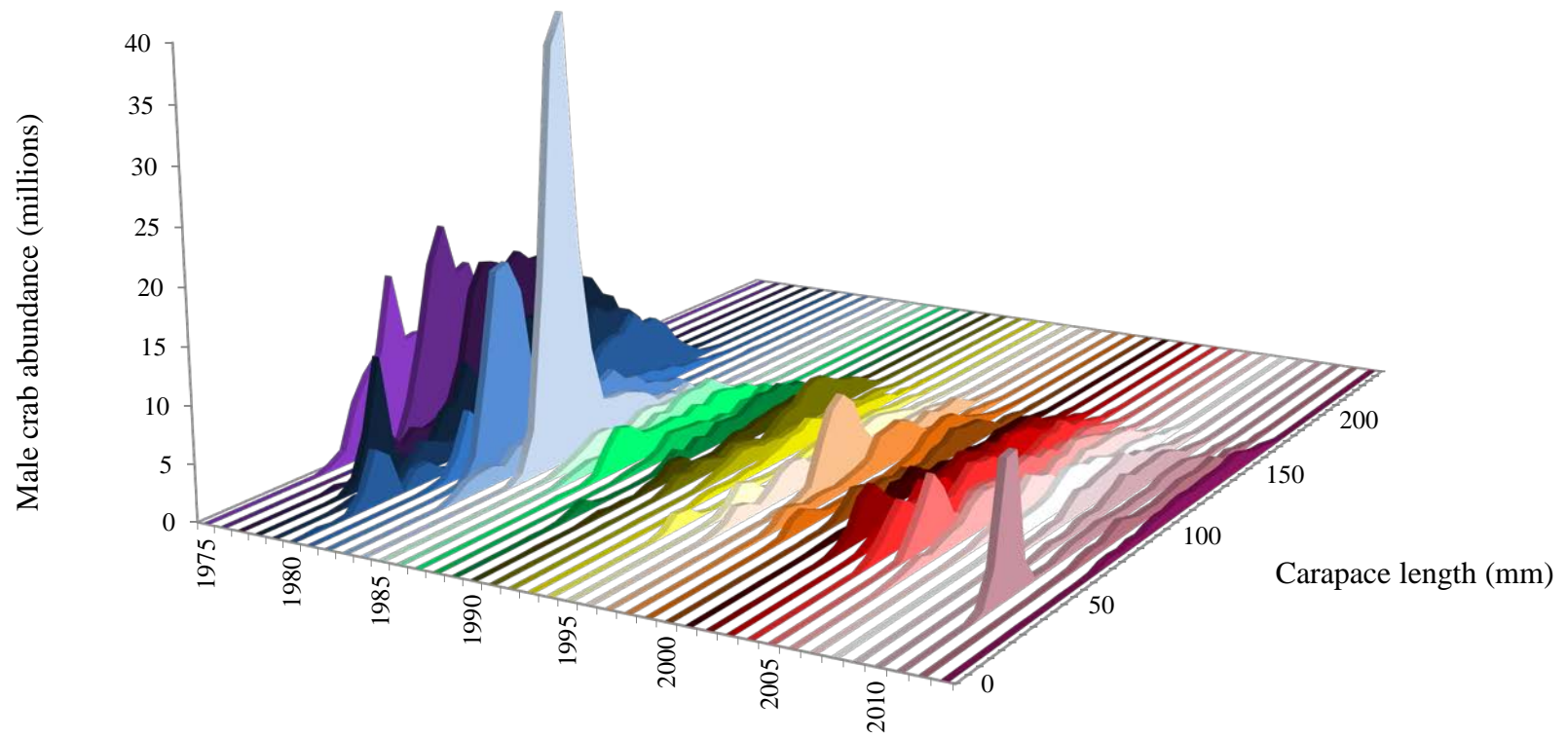


Figure 20. -- Historical size frequency by 5 mm length classes of Bristol Bay District male red king crab (*Paralithodes camtschaticus*), 1975 to 2013.

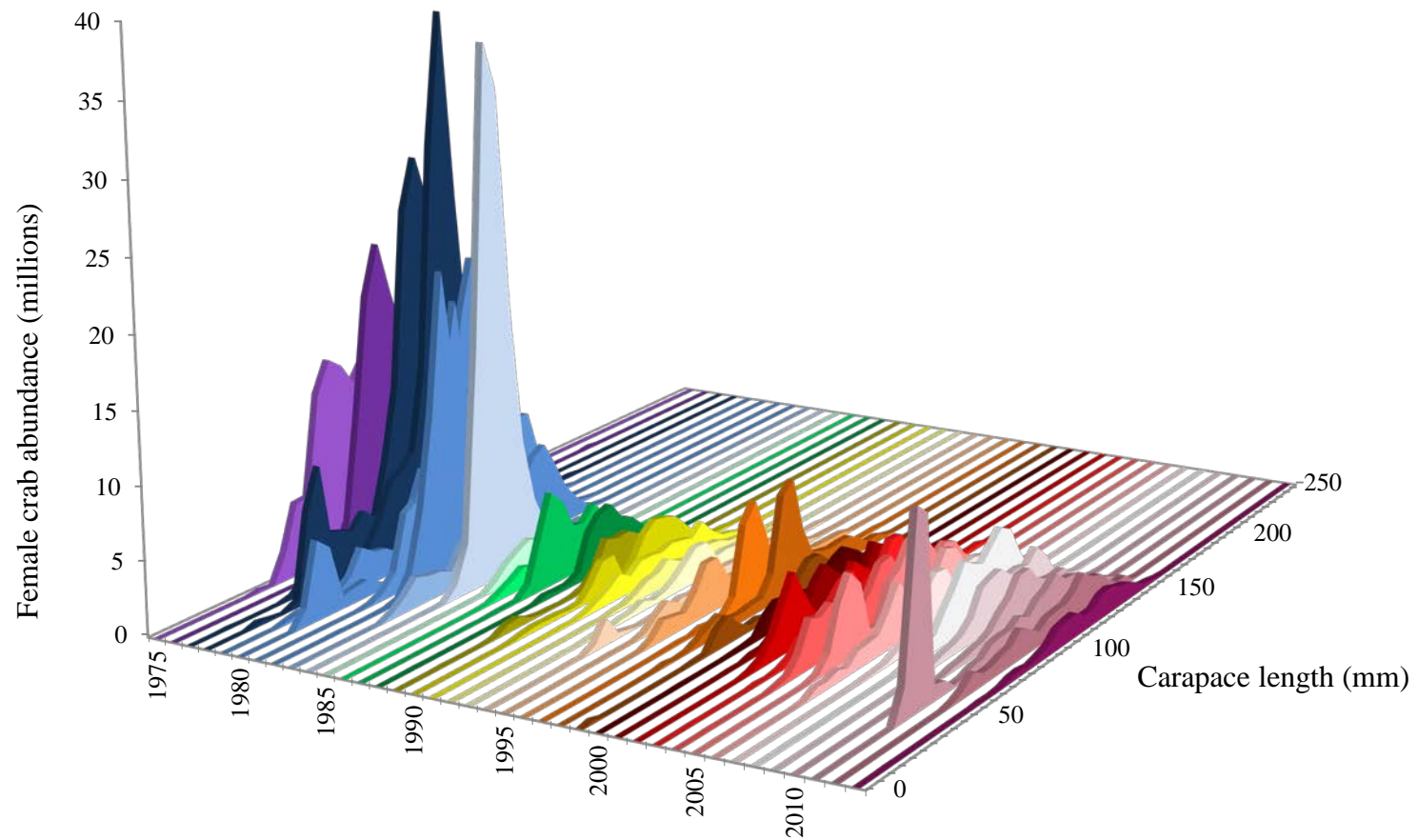


Figure 21. -- Historical size frequency by 5 mm length classes of Bristol Bay District female red king crab (*Paralithodes camtschaticus*), 1975 to 2013.

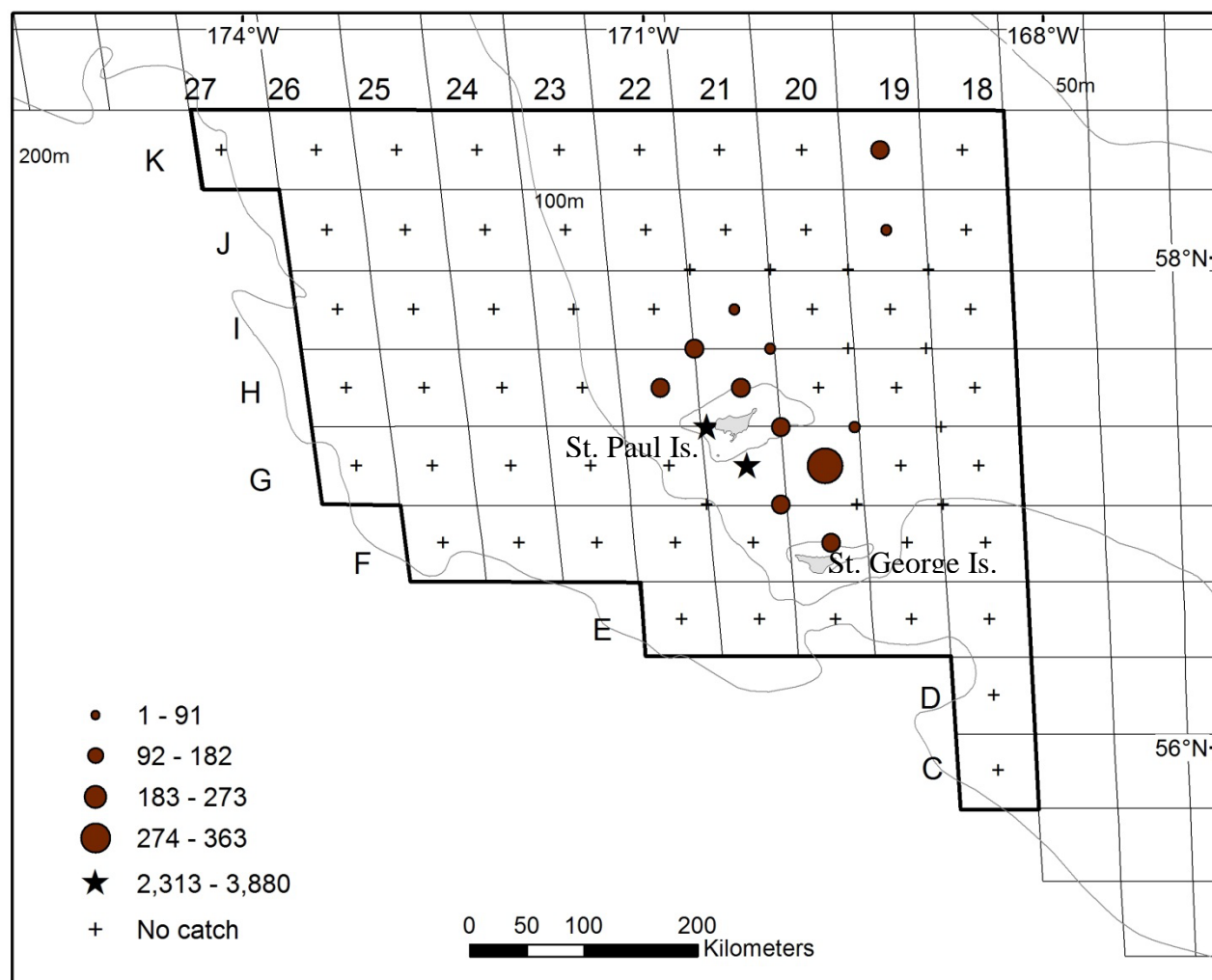


Figure 22. -- Total density (number  $\text{nmi}^{-2}$ ) of red king crab (*Paralithodes camtschaticus*) at each station sampled in the Pribilof District in 2013. Data depicted by circles are equal interval densities, while stars represent densities larger than the standard scale. The outlined area depicts stations within the management district.

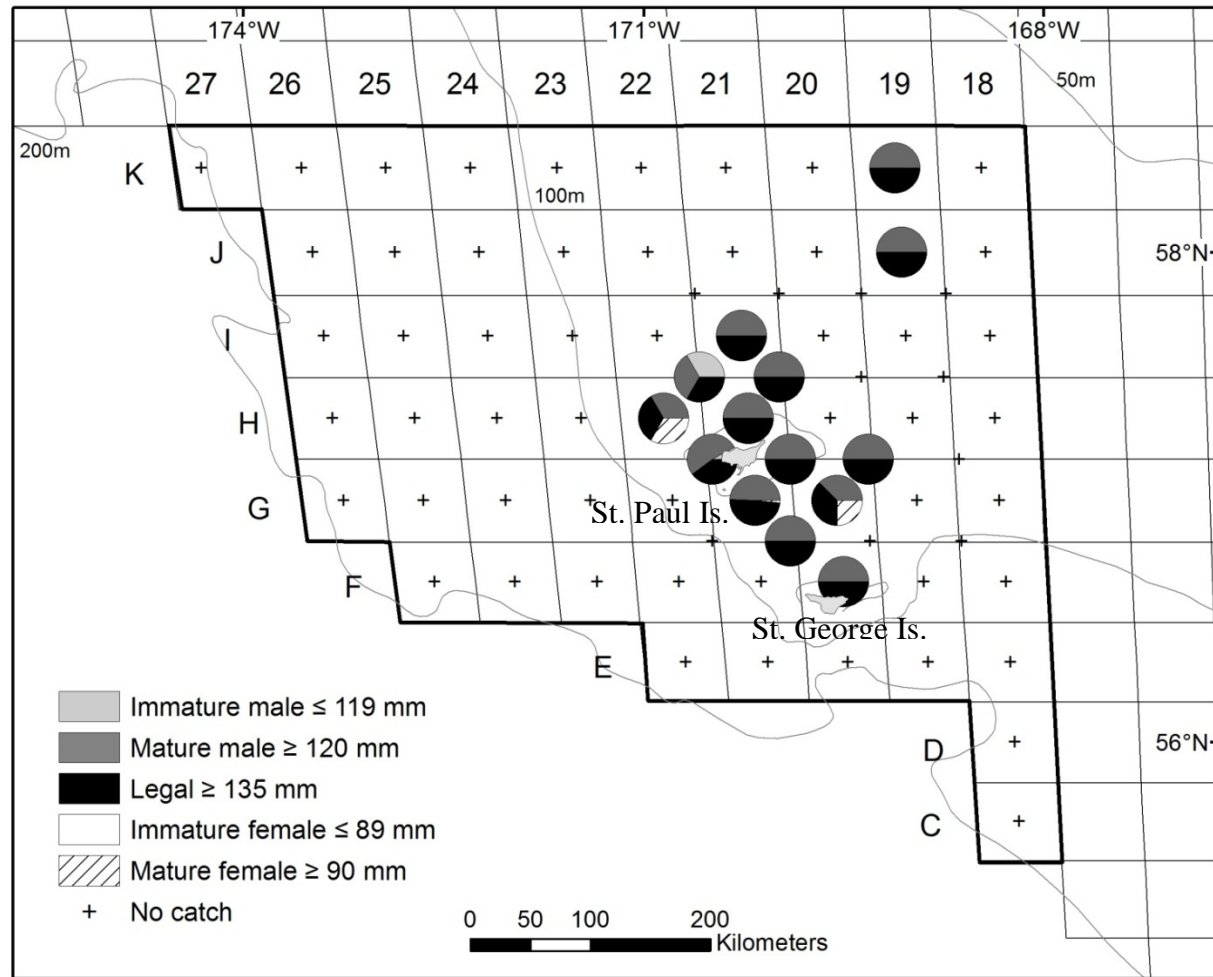


Figure 23. -- Percentage of male and female red king crab (*Paralithodes camtschaticus*) size classes at each station of the Pribilof District in 2013. The outlined area depicts stations within the management district.

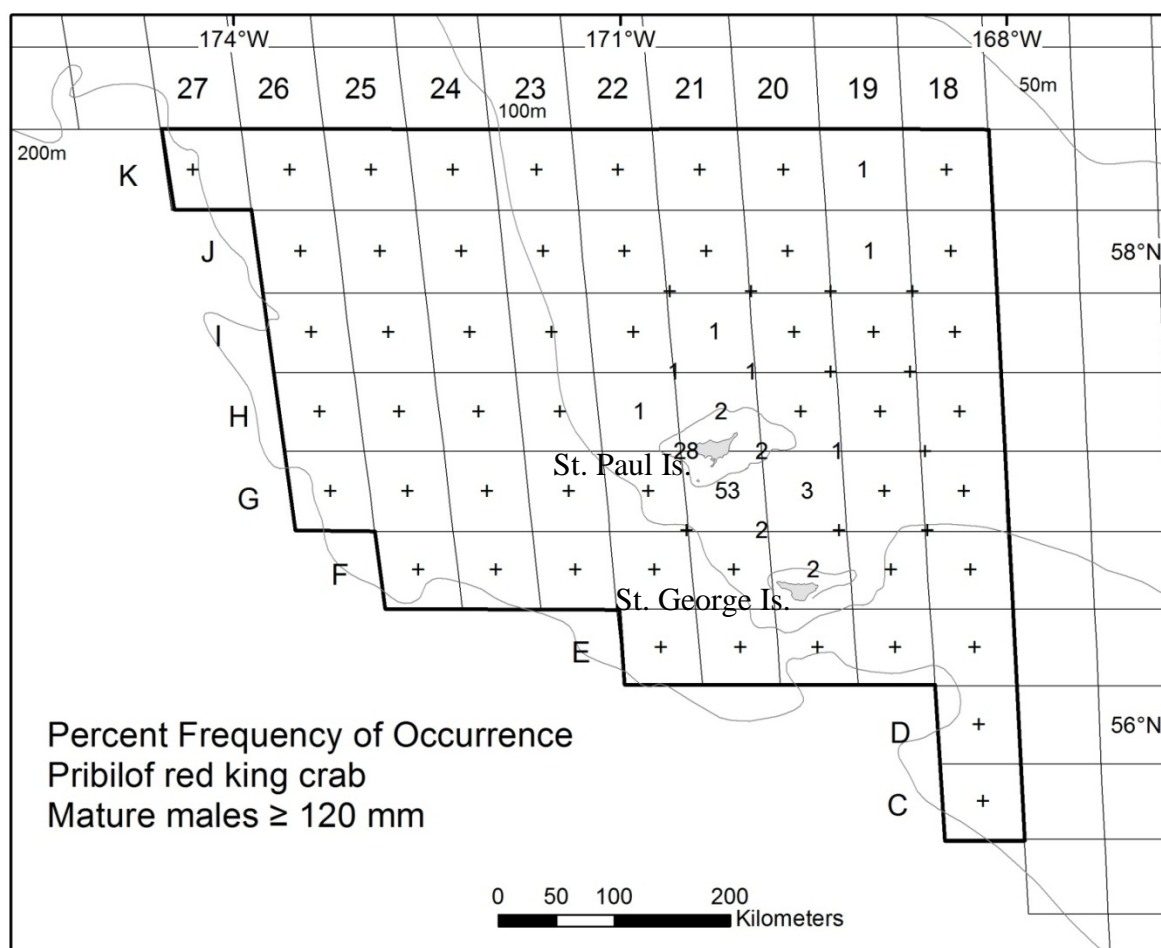


Figure 24. -- Percent frequency of occurrence of mature male red king crab (*Paralithodes camtschaticus*) at stations sampled in the 2013 Pribilof District.

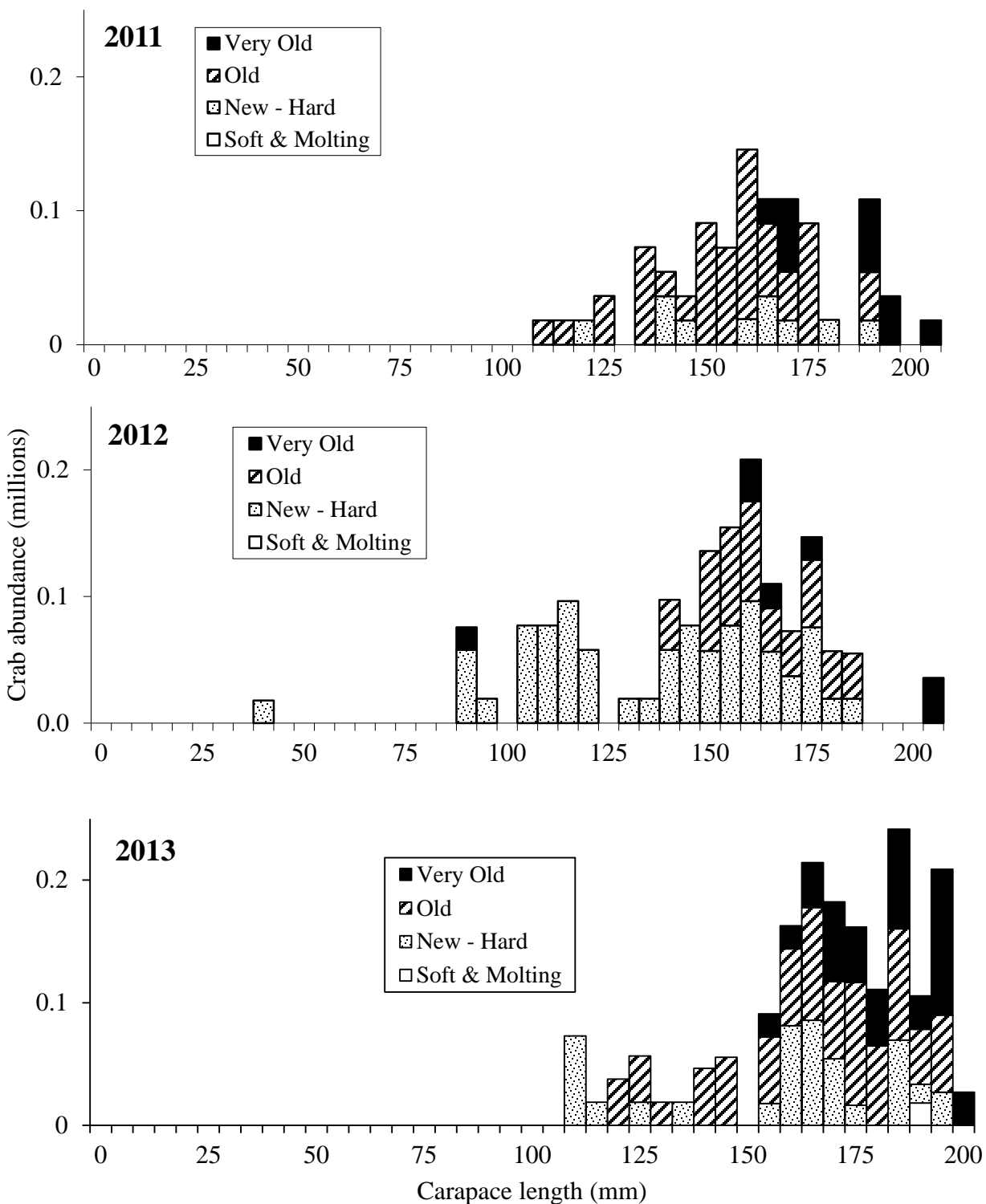


Figure 25. -- Size-frequency by shell condition of Pribilof District male red king crab (*Paralithodes camtschaticus*) by 5 mm length classes, 2011-2013.

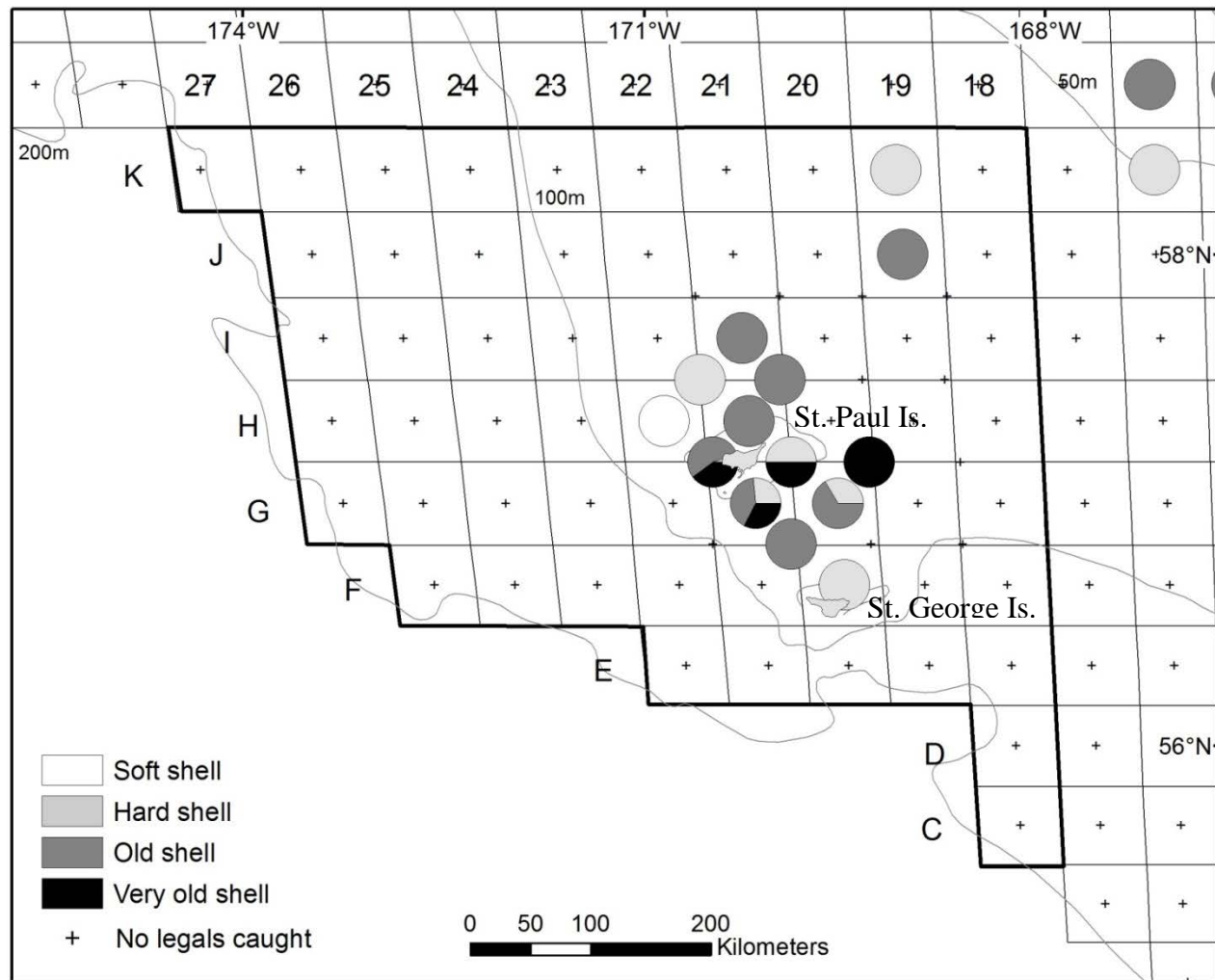


Figure 26. -- Distribution of legal-sized male red king crab (*Paralithodes camtschaticus*) caught at each station of the Pribilof District in 2013 and distinguished by shell condition. The outlined area depicts stations within the management district.

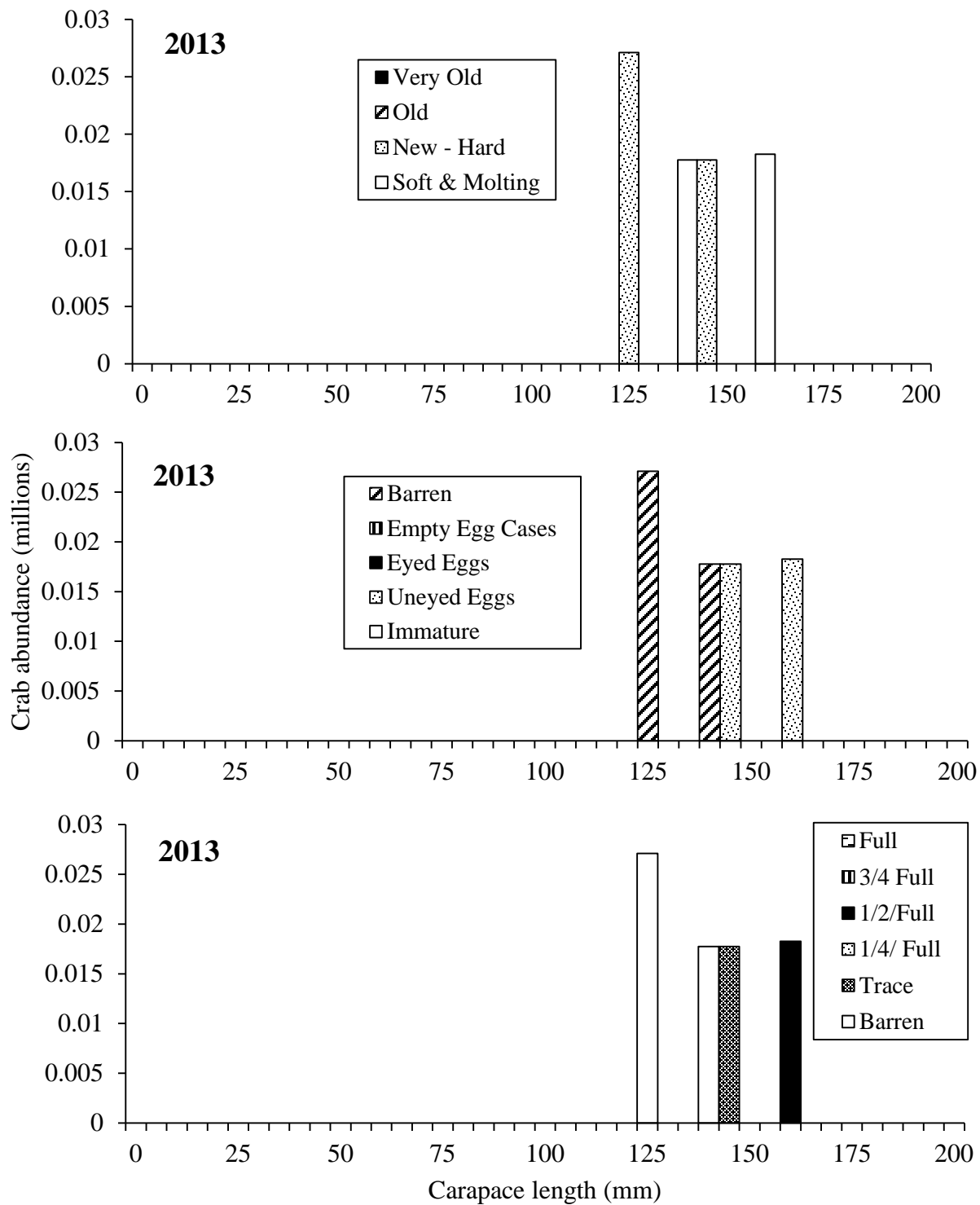


Figure 27. -- Size-frequency by shell condition, egg condition, and clutch fullness of Pribilof District female red king crab (*Paralithodes camtschaticus*) by 5 mm length classes in 2013.

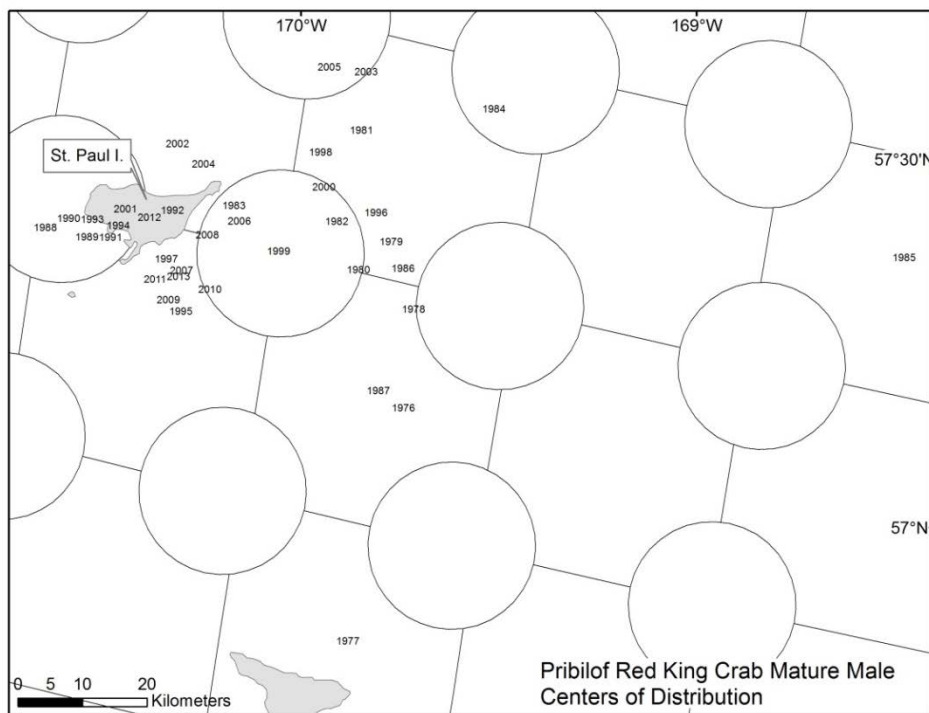
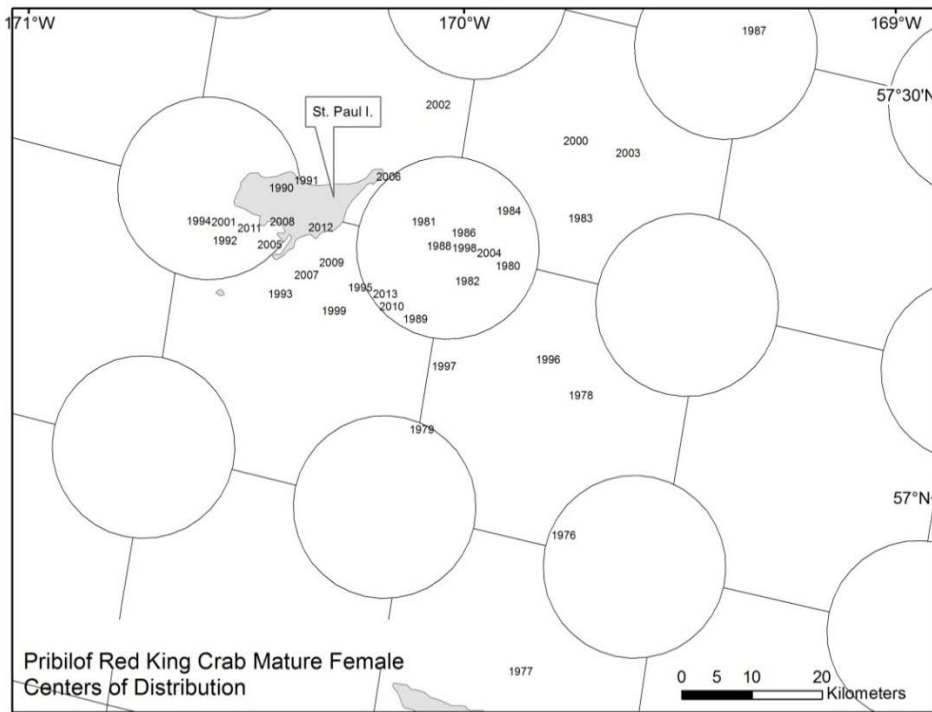


Figure 28. -- Centers of stock distribution of Pribilof Islands female and male red king crab (*Paralithodes camtschaticus*) from 1975 to 2013.

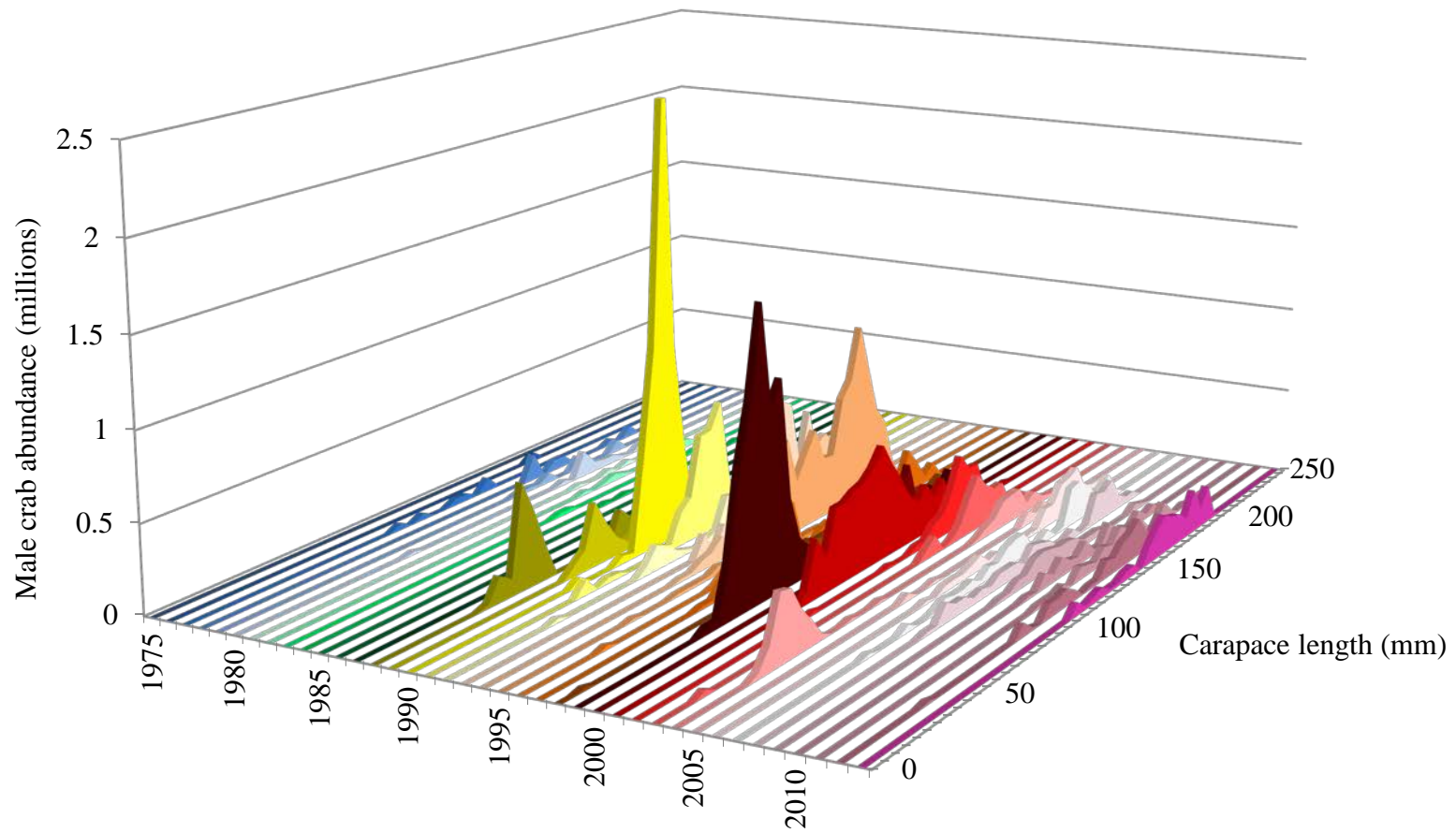


Figure 29. -- Size frequency by 5 mm length classes of Pribilof Islands male red king crab (*Paralithodes camtschaticus*) from 1975 to 2013.

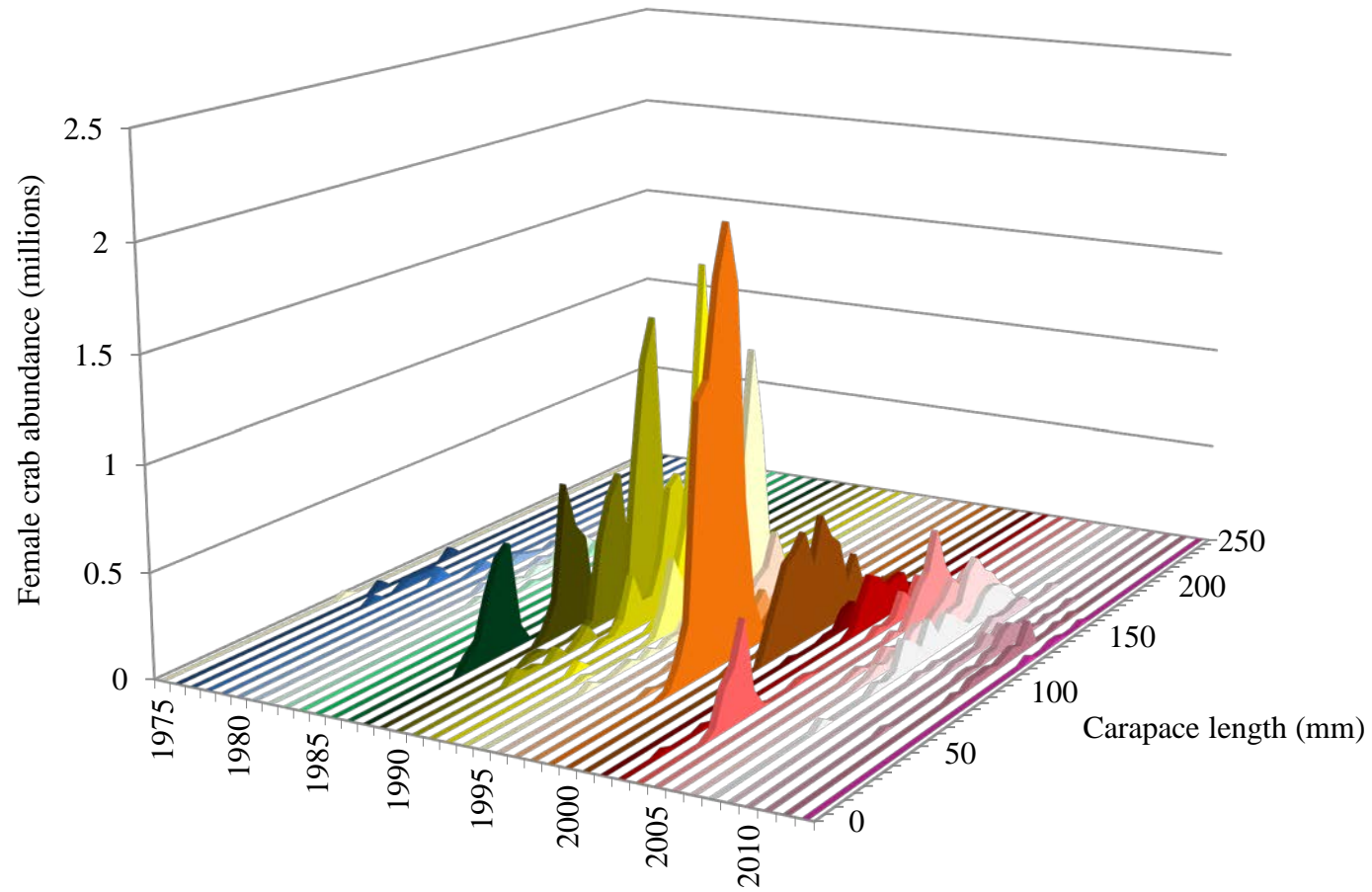


Figure 30. -- Size frequency by 5 mm length classes of Pribilof Islands female red king crab (*Paralithodes camtschaticus*) from 1975 to 2013.

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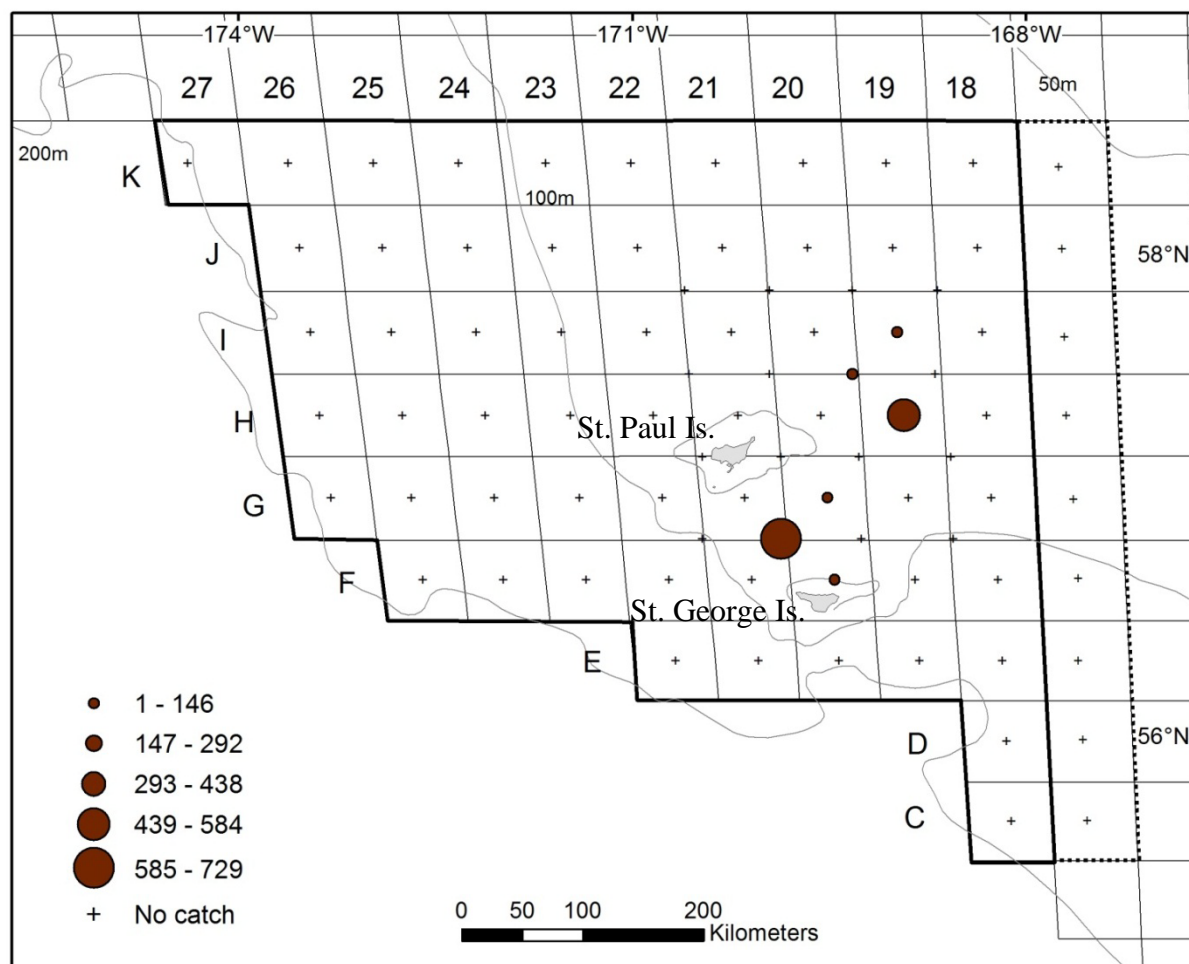


Figure 31. -- Total density (number nmi<sup>-2</sup>) of blue king crab (*Paralithodes platypus*) at each station sampled in the Pribilof District in 2013. The outlined area depicts the management district as defined by ADF&G, while the dashed line depicts the modified eastern boundary as defined in the 2013 Rebuilding Plan (additional 9 stations).

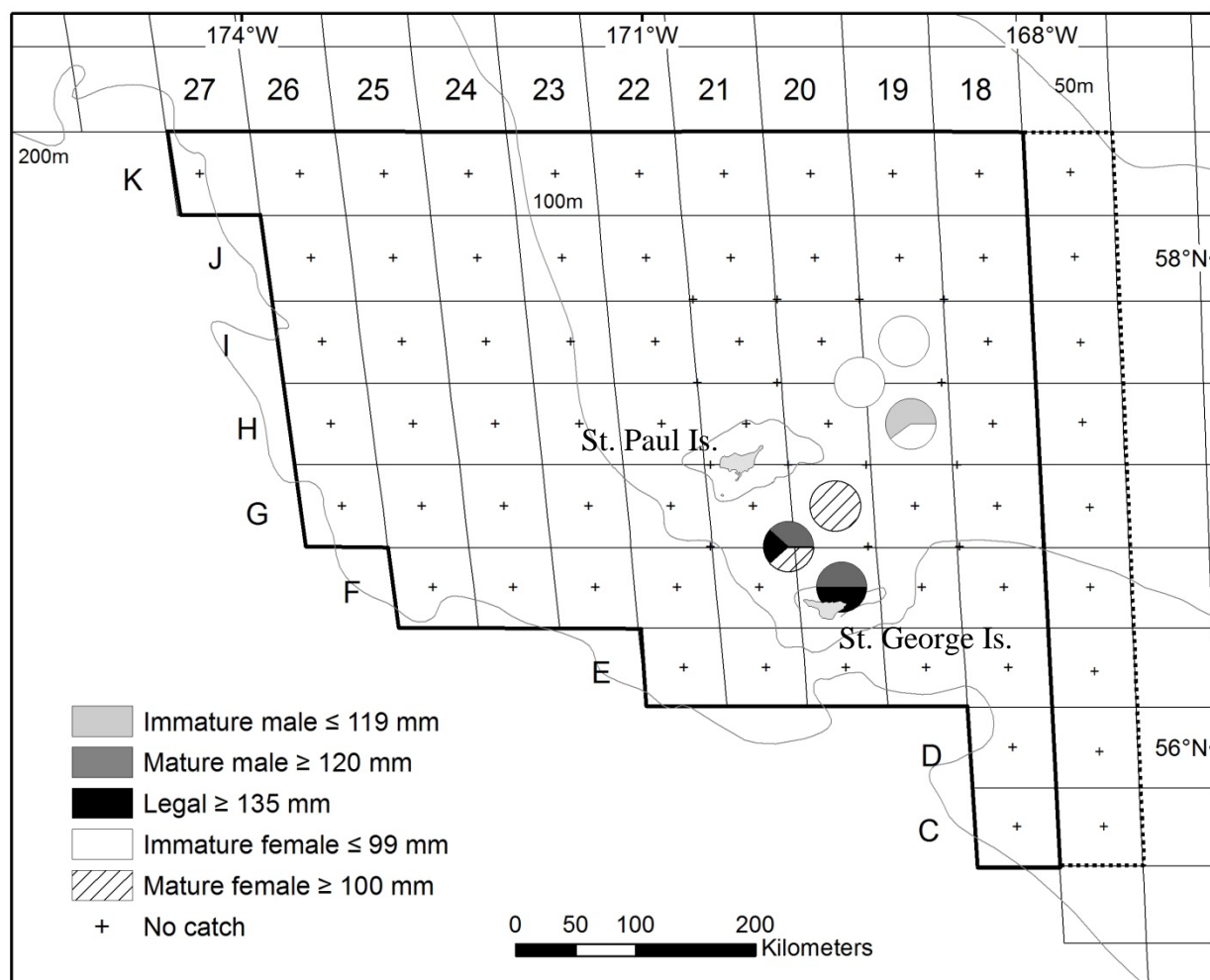


Figure 32. -- Percentage of male and female blue king crab (*Paralithodes platypus*) size categories at each station of the Pribilof District in 2013. The outlined area depicts the management district as defined by ADF&G, while the dashed line depicts the modified eastern boundary as defined in the 2013 Rebuilding Plan (additional 9 stations).

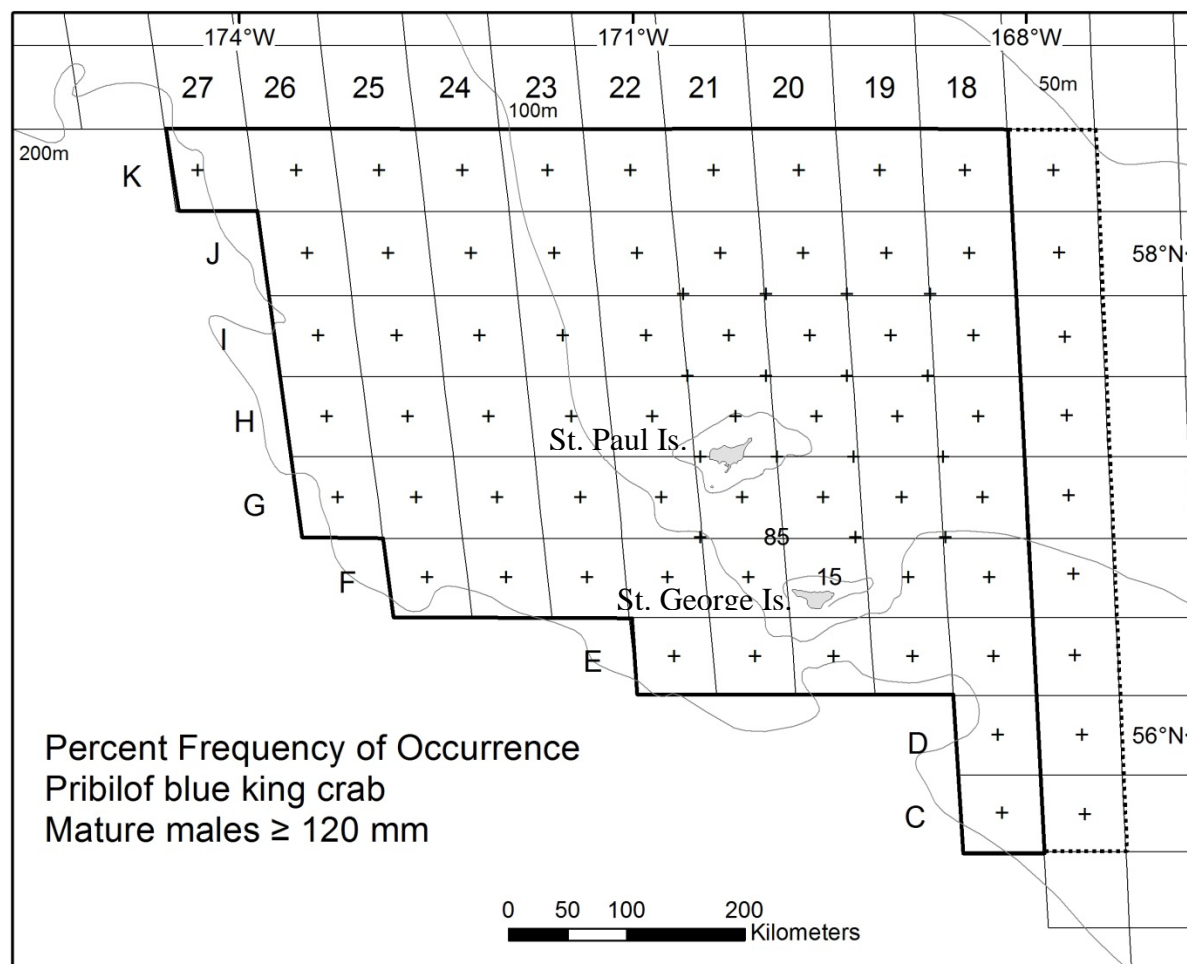


Figure 33. -- Percent frequency of occurrence of mature male blue king crab (*Paralithodes platypus*) at Pribilof District stations sampled in 2013. The outlined area depicts the management district as defined by ADF&G, while the dashed line depicts the modified eastern boundary as defined in the 2013 Rebuilding Plan (additional 9 stations).

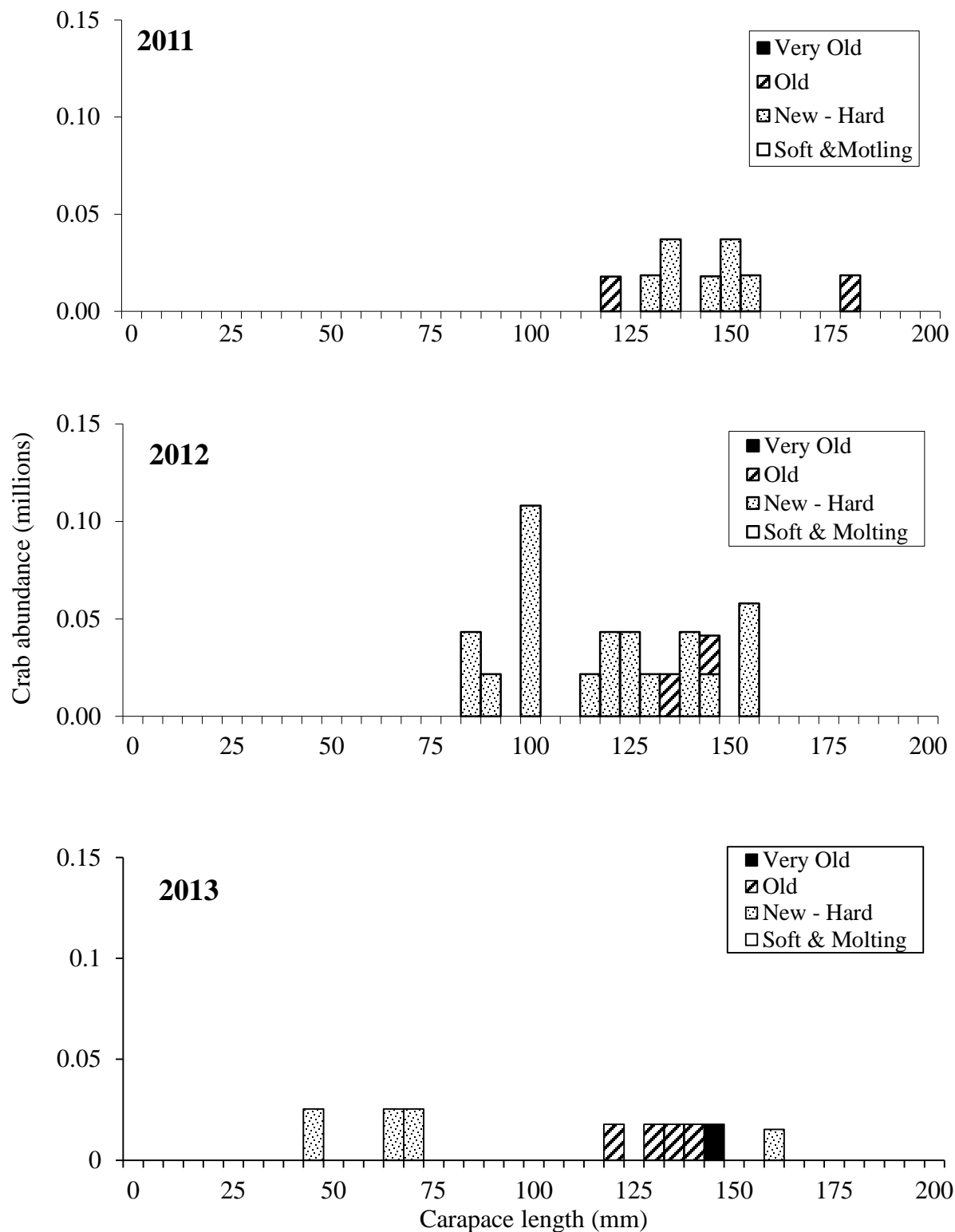


Figure 34. -- Size-frequency by shell condition of Pribilof District male blue king crab (*Paralithodes platypus*) by 5 mm length classes, 2011-2013.

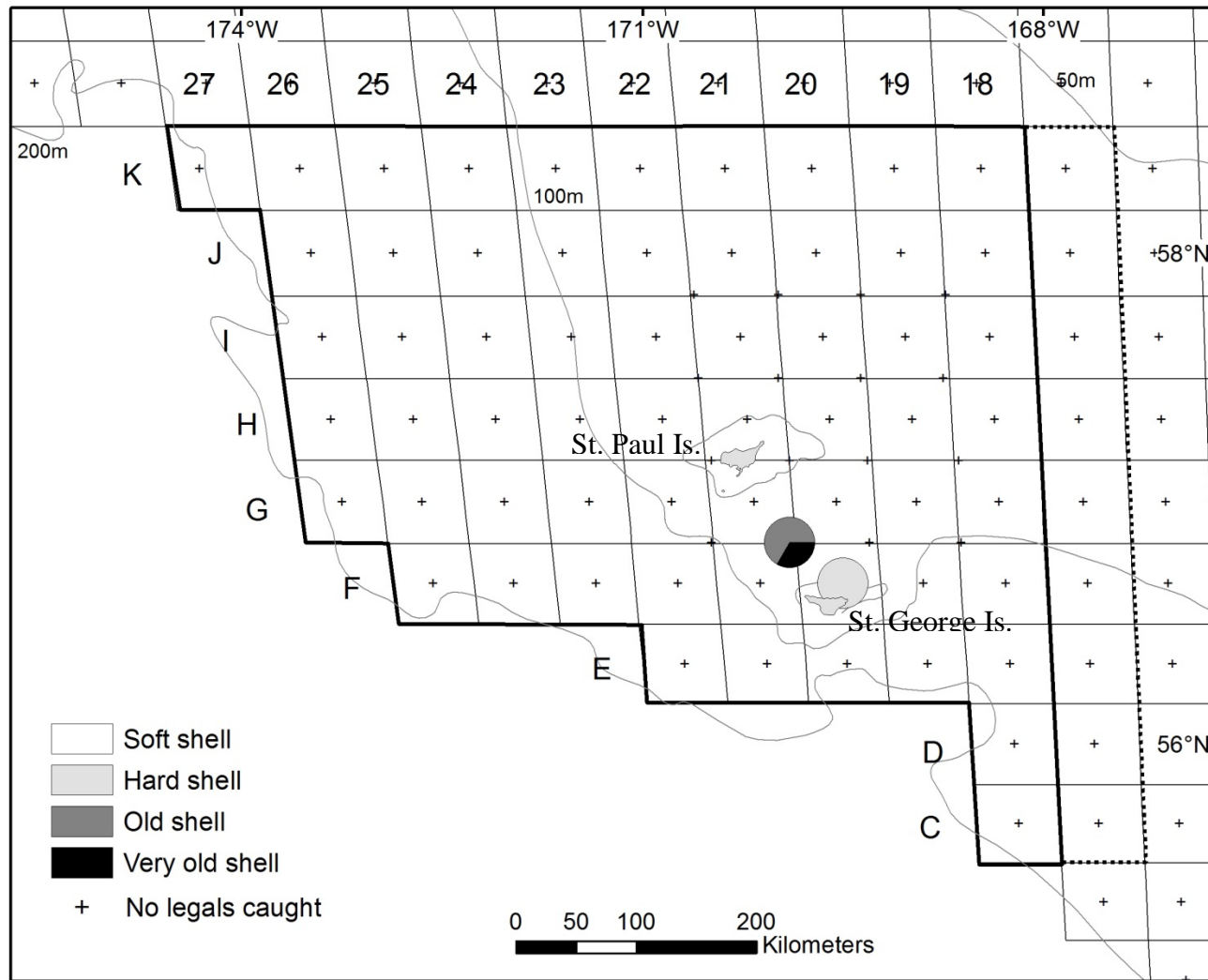


Figure 35. -- Distribution of legal-sized male blue king crab (*Paralithodes platypus*) caught at each station of the Pribilof District in 2013 distinguished by shell condition. The outlined area depicts the management district as defined by ADF&G, while the dashed line depicts the modified eastern boundary as defined in the 2013 Rebuilding Plan (additional 9 stations).

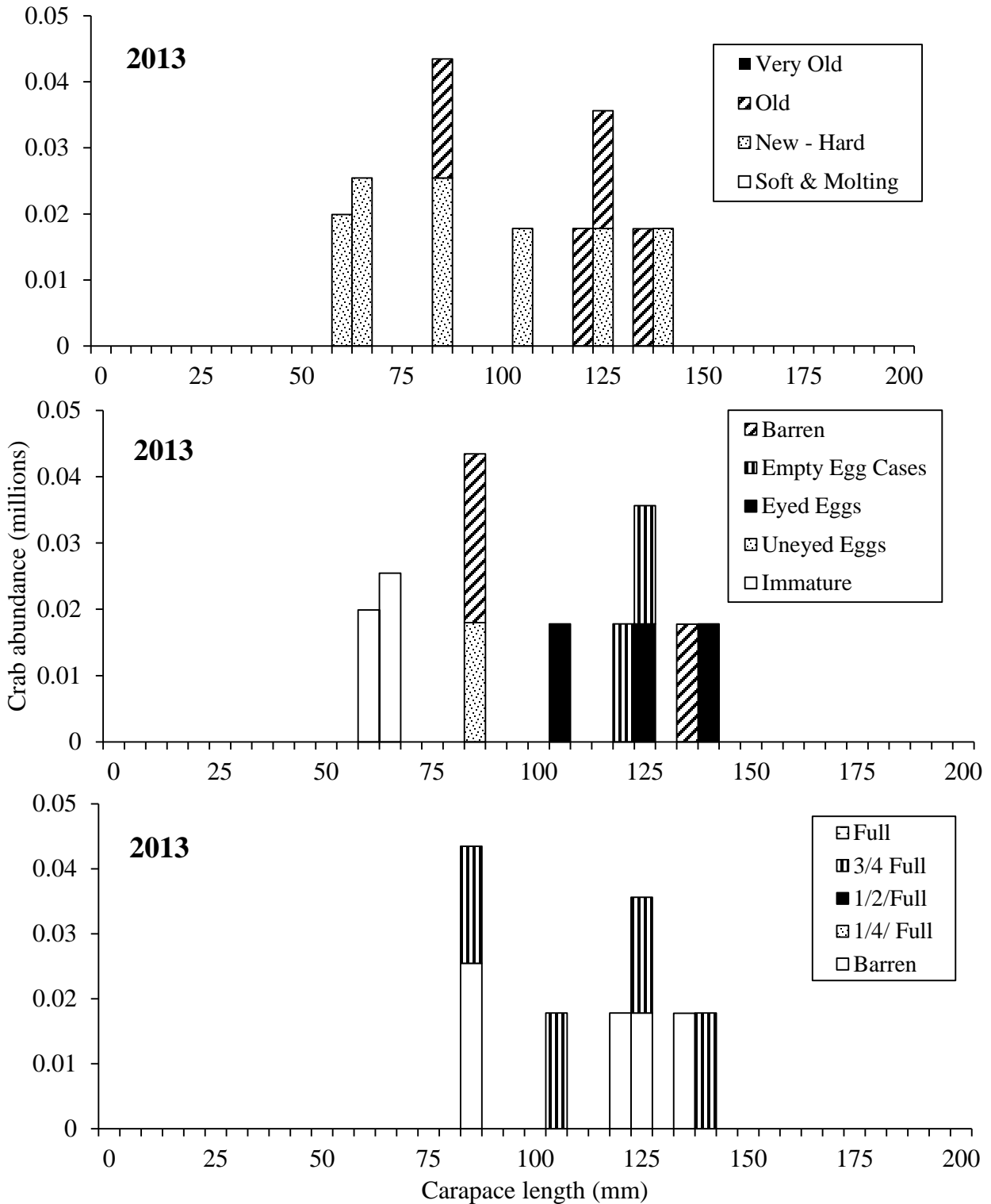


Figure 36. -- Size-frequency by shell condition, egg condition, and clutch fullness of Pribilof District female blue king crab (*P. platypus*) by 5 mm length classes in 2013.

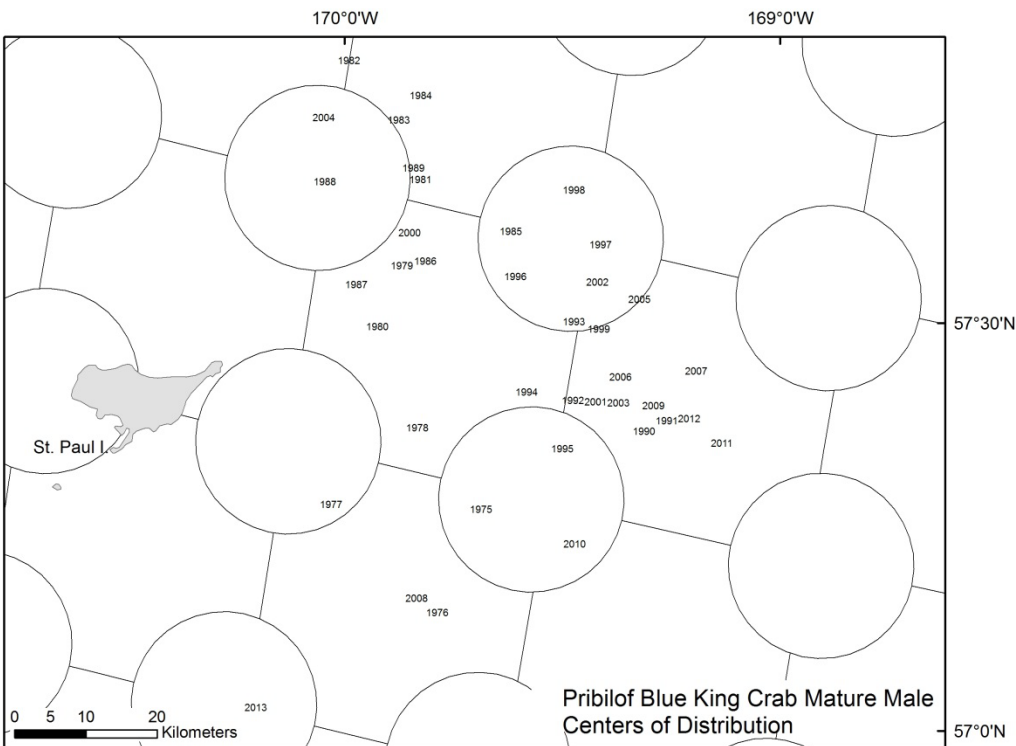
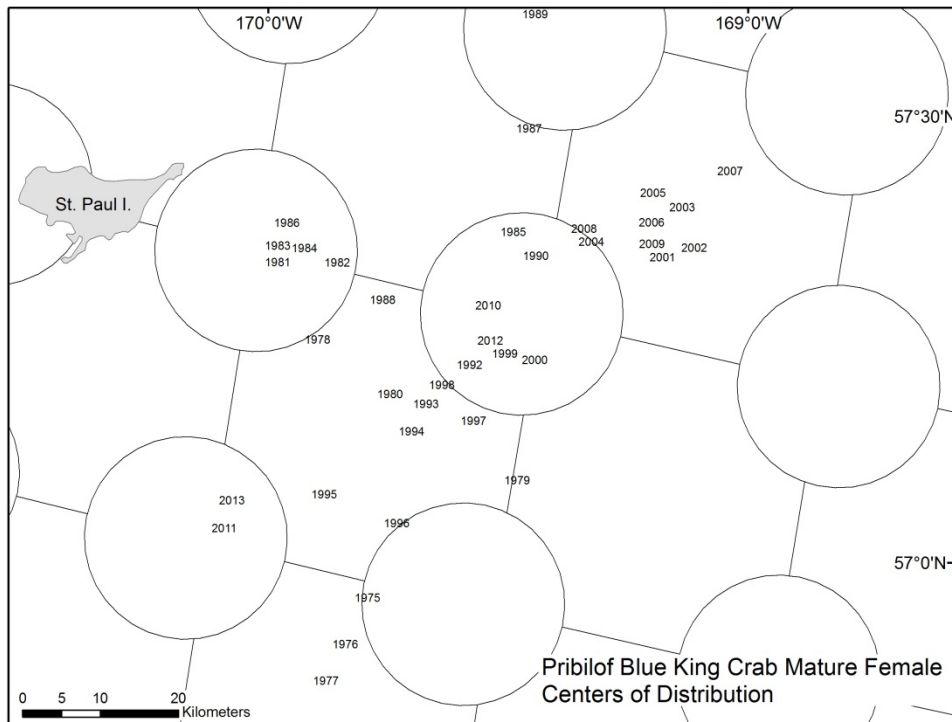


Figure 37. -- Centers of stock distribution of Pribilof Islands female and male blue king crab (*Paralithodes platypus*) from 1975 to 2013.

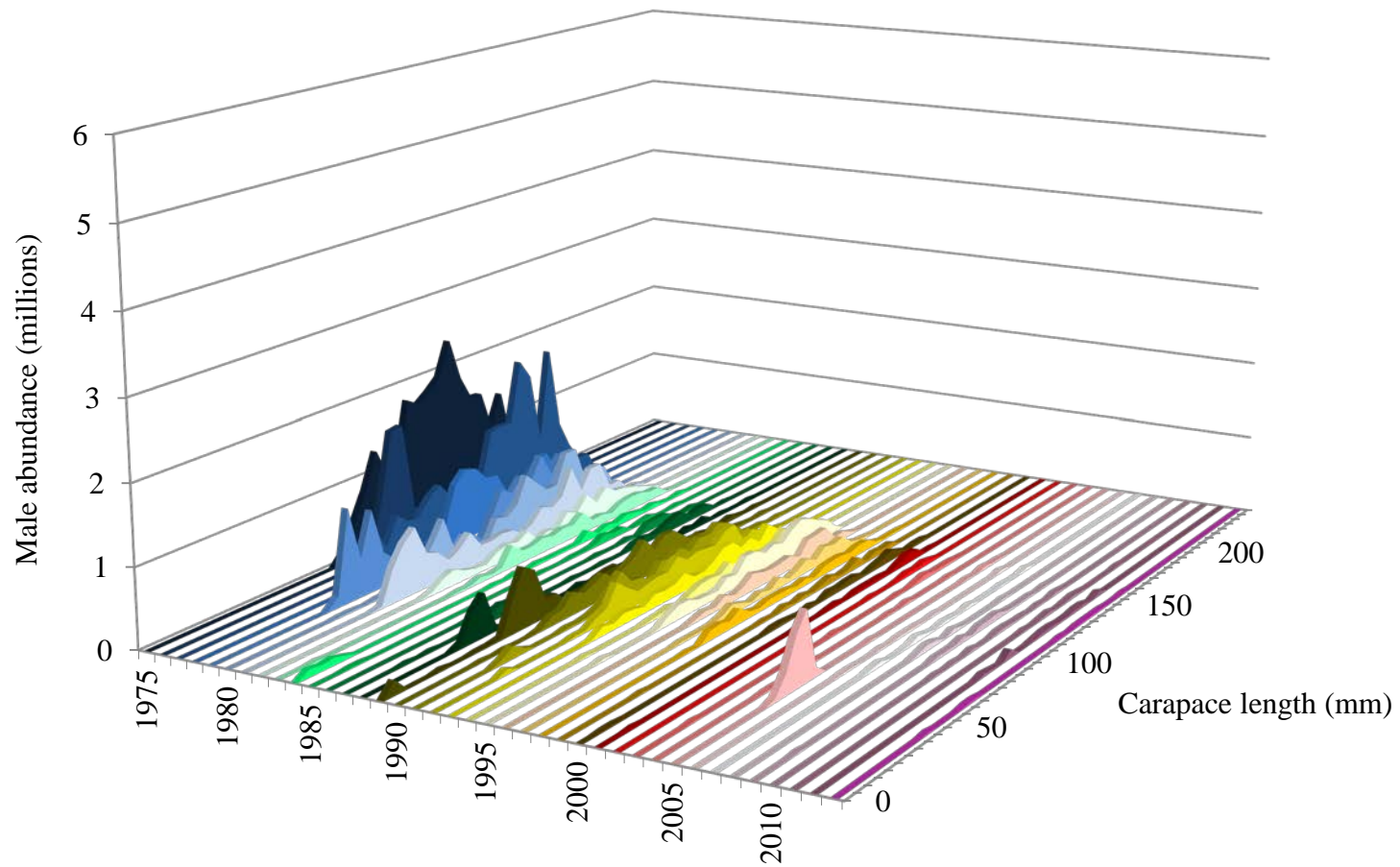


Figure 38. -- Size frequency by 5 mm length classes of Pribilof Islands male blue king crab (*Paralithodes camtschaticus*) from 1975 to 2013.

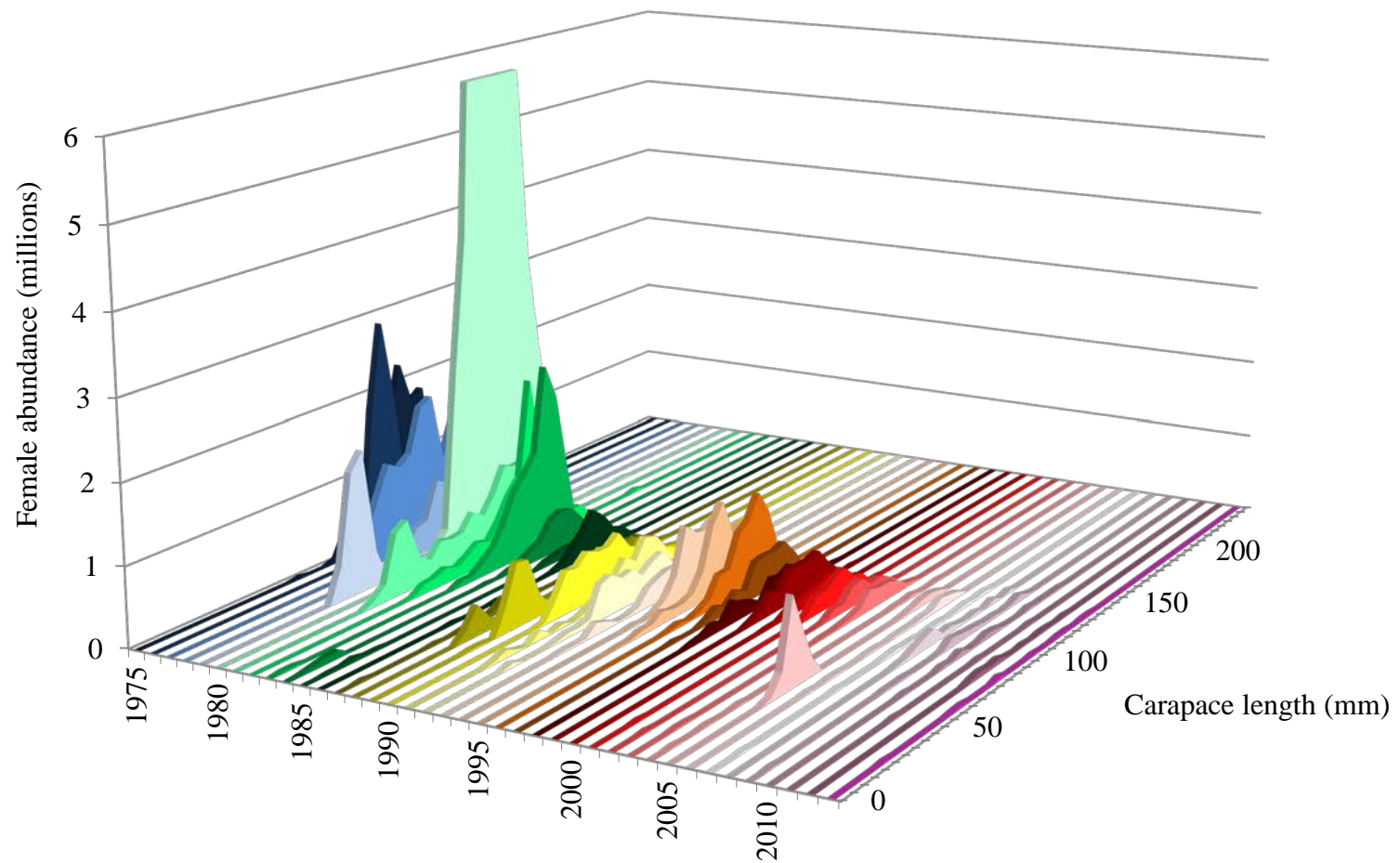


Figure 39. -- Size frequency by 5 mm length classes of Pribilof Islands female blue king crab (*Paralithodes camtschaticus*) from 1975 to 2013.

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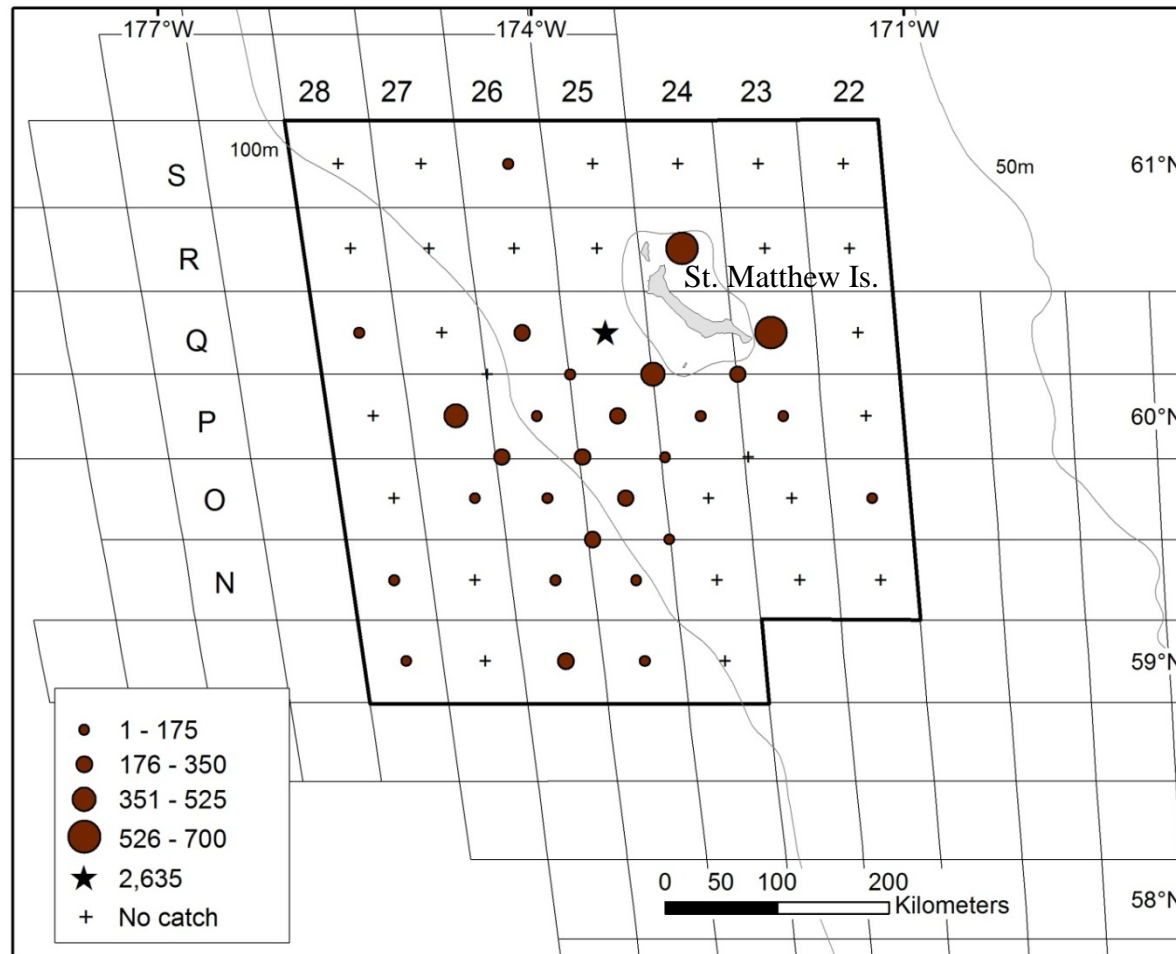


Figure 40. -- Total density (number  $\text{nmi}^{-2}$ ) of blue king crab (*Paralithodes platypus*) at each station sampled in the St. Matthew Island Section of the Northern District in 2013. Data depicted by circles are equal interval densities, while stars are densities larger than the standard scale. The outlined area depicts stations within the St. Matthew Island Section sampling strata.

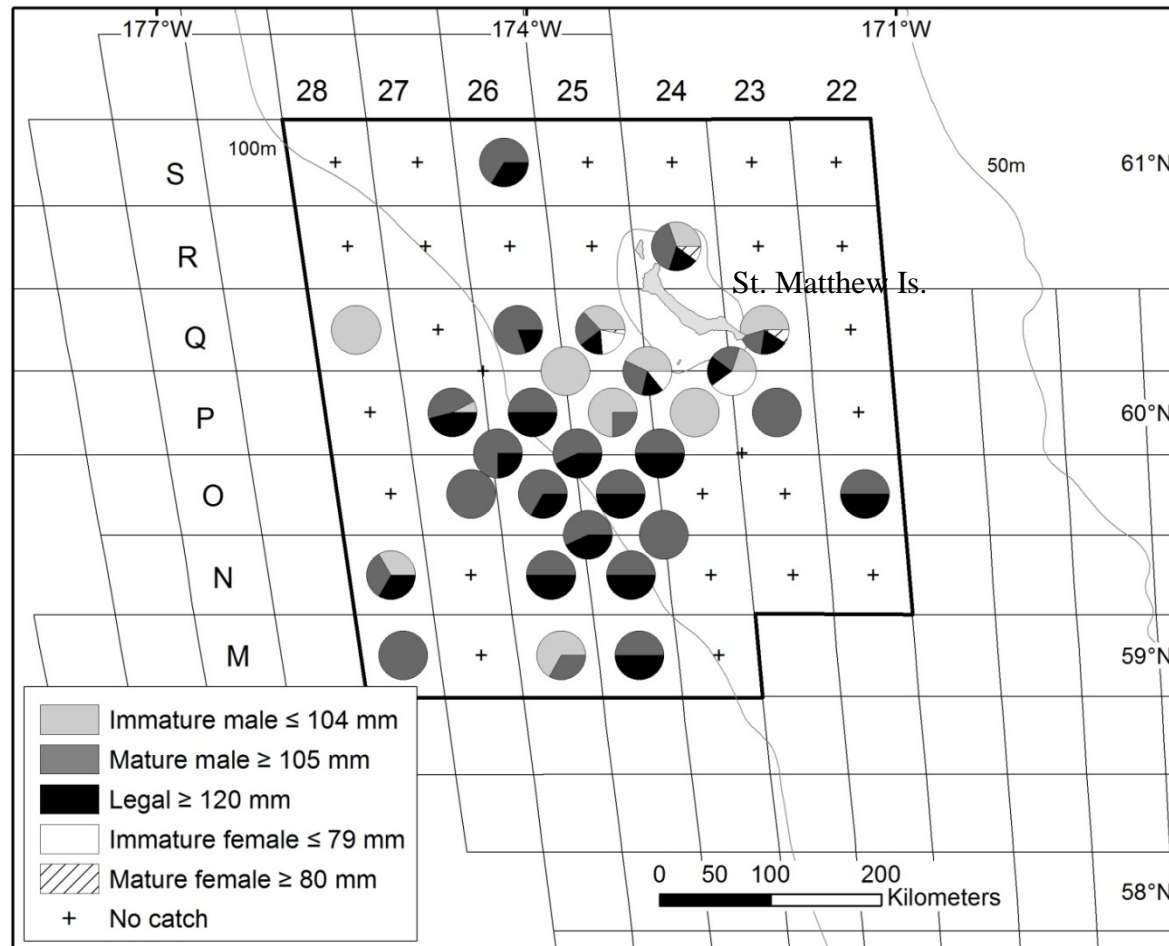


Figure 41. -- Percentage of male and female blue king crab (*Paralithodes platypus*) size categories at each station of the St. Matthew Island Section of the Northern District in 2013. The outlined area depicts stations within the St. Matthew Island Section sampling strata.

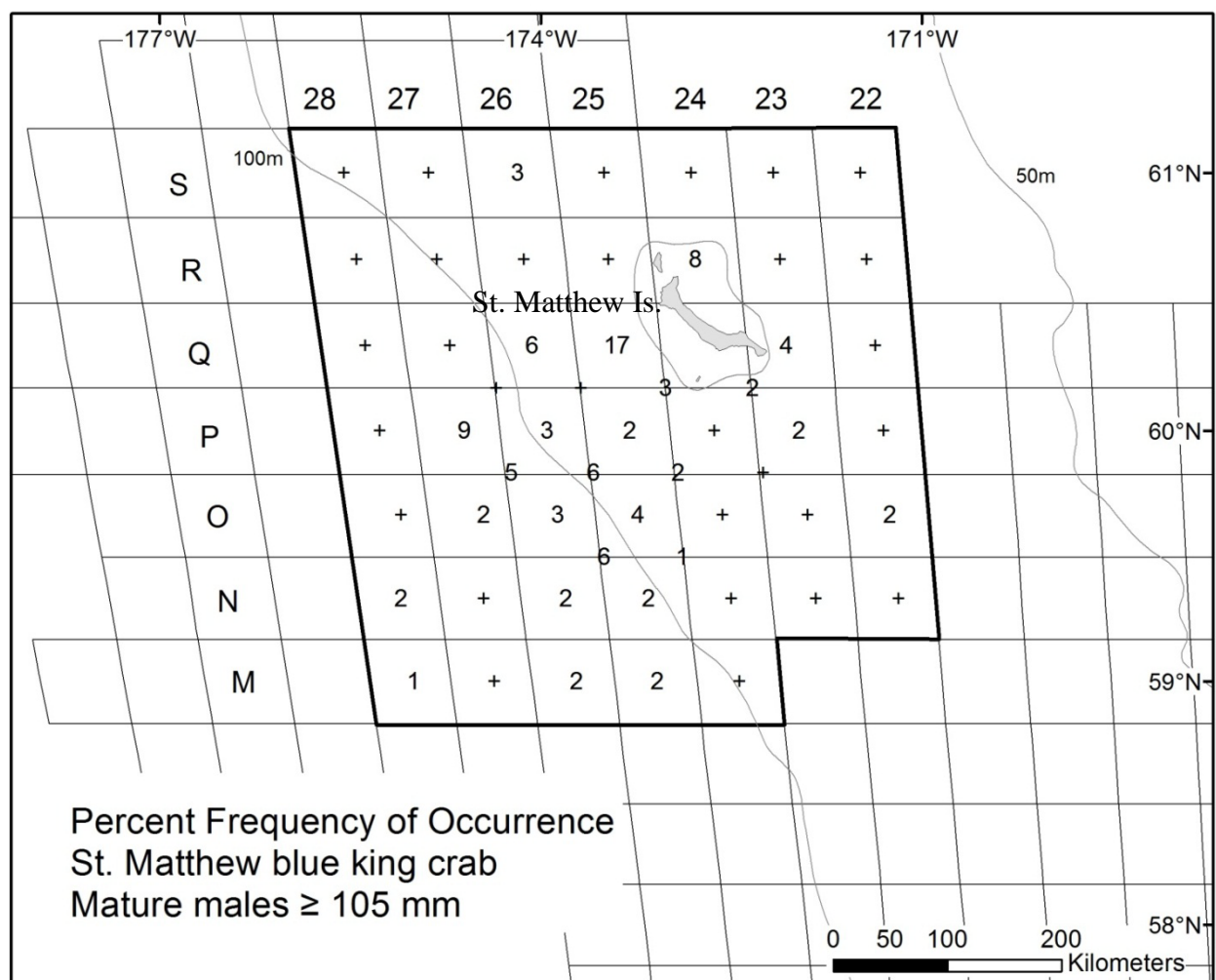


Figure 42. -- Percent frequency of occurrence of mature male blue king crab (*Paralithodes platypus*) at stations in the 2013 St. Matthew Island Section sampling strata of the Northern District.

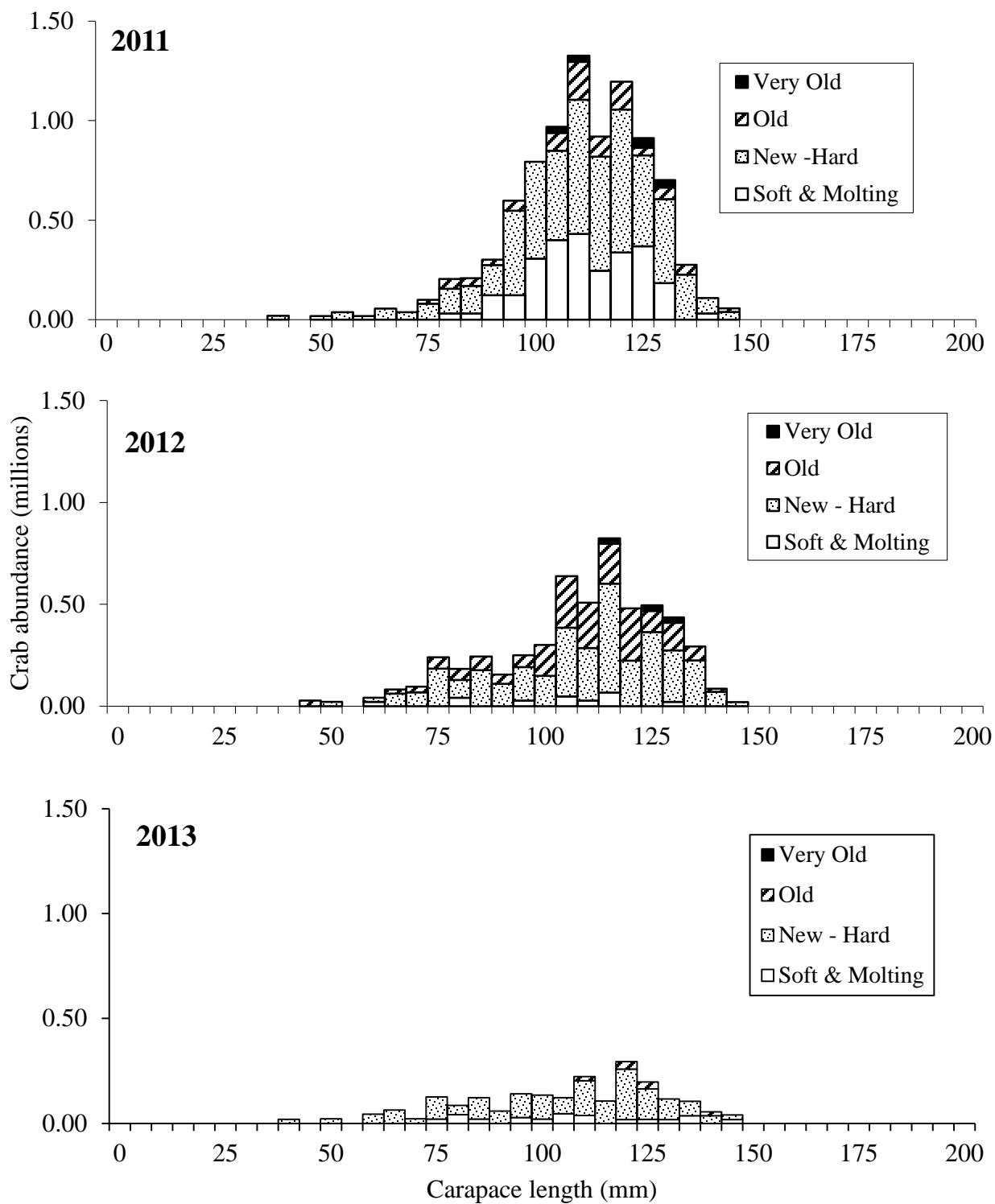


Figure 43. -- Size-frequency by shell condition of St. Matthew Island Section male blue king crab (*Paralithodes platypus*) by 5 mm length classes, 2011-2013.

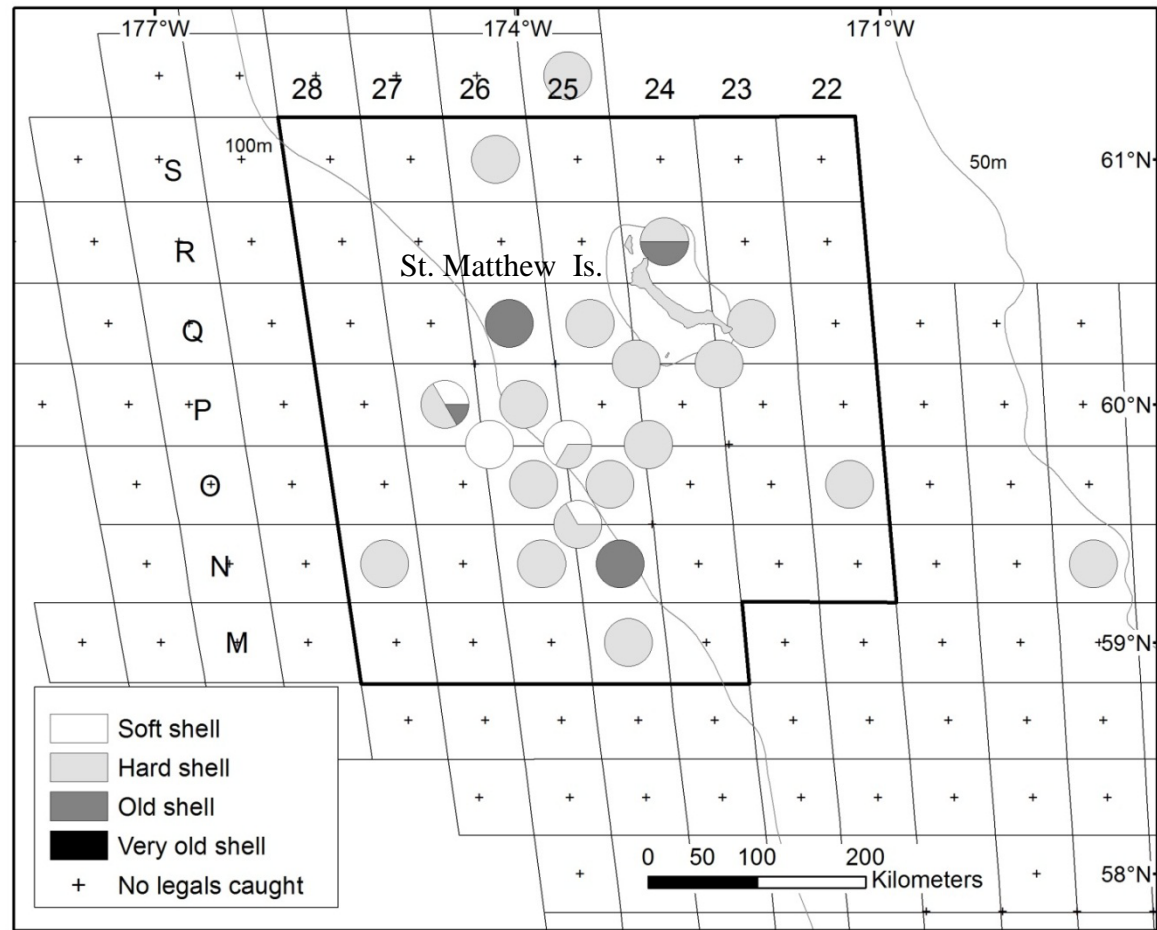


Figure 44. -- Distribution of legal-sized male blue king crab (*Paralithodes platypus*) caught at each station of the St. Matthew Island Section of the Northern District in 2013 and distinguished by shell condition. The outlined area depicts stations within the St. Matthew Island Section sampling strata.

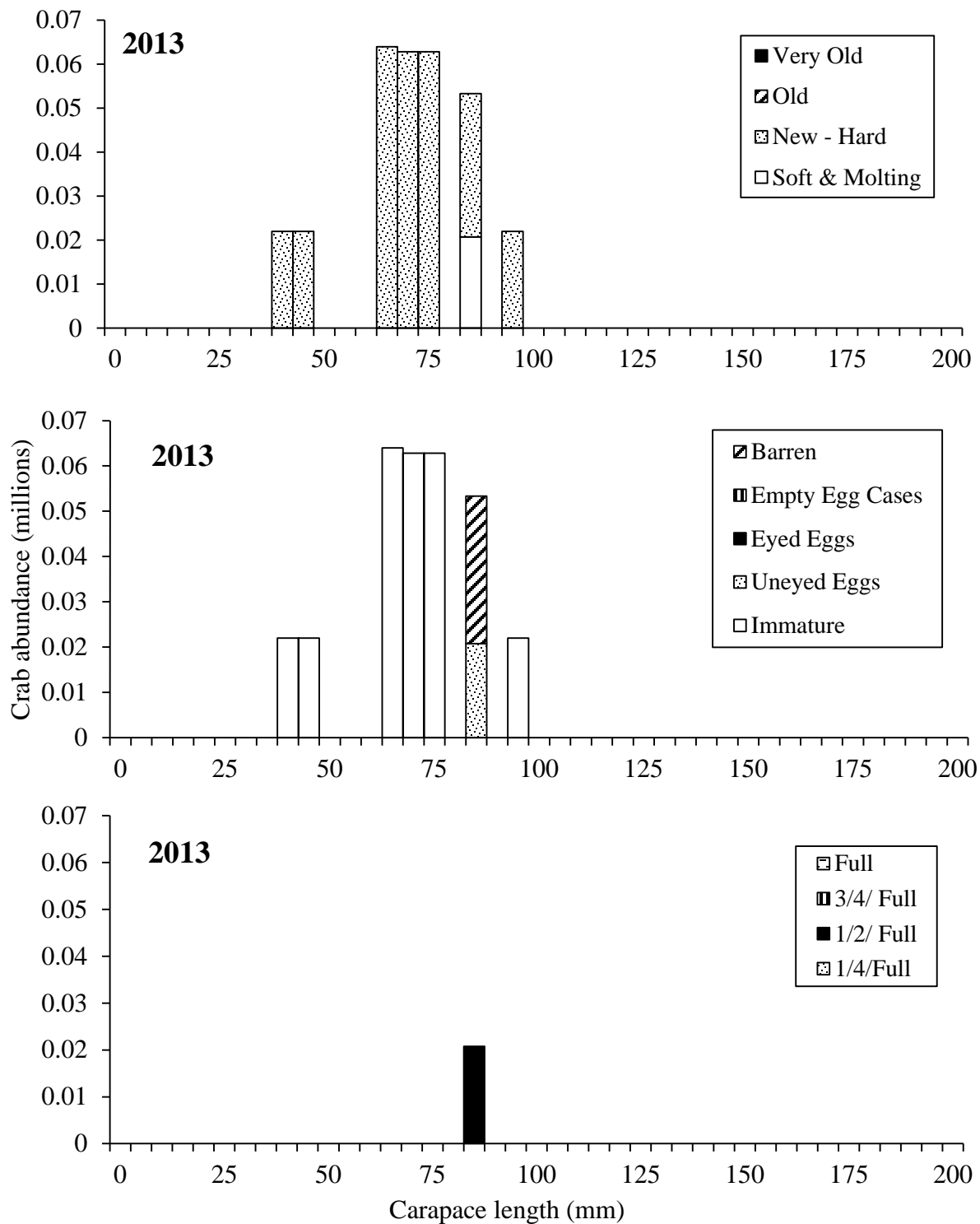


Figure 45. -- Size-frequency by shell condition, egg condition, and clutch size of St. Matthew Island Section female blue king crab (*Paralithodes platypus*) by 5 mm length classes in 2013.

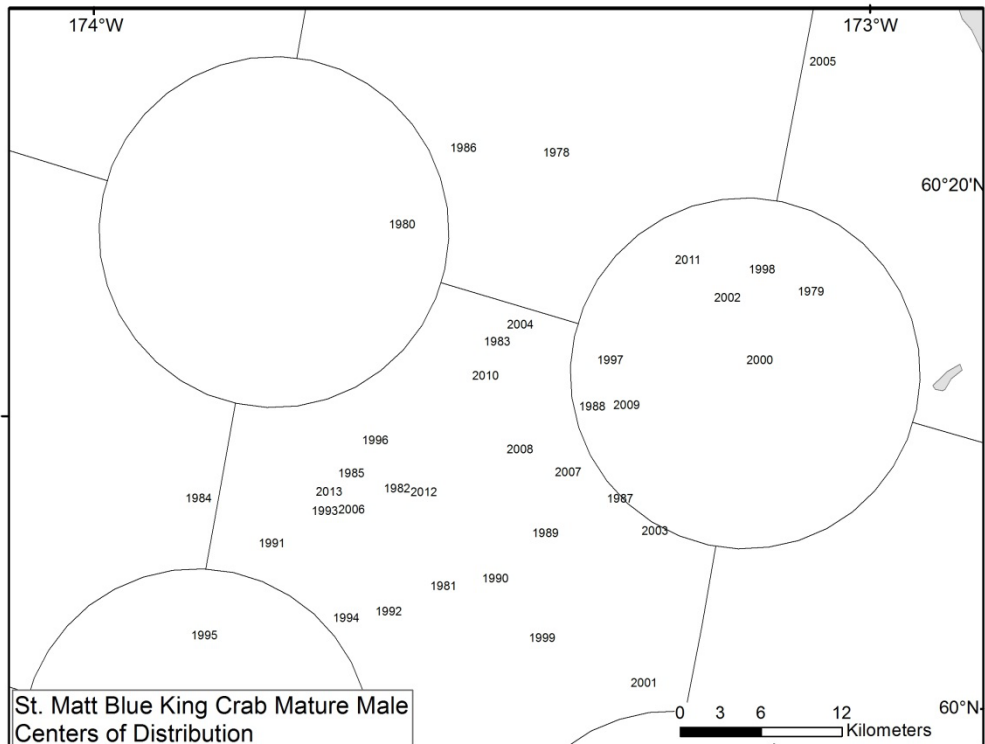
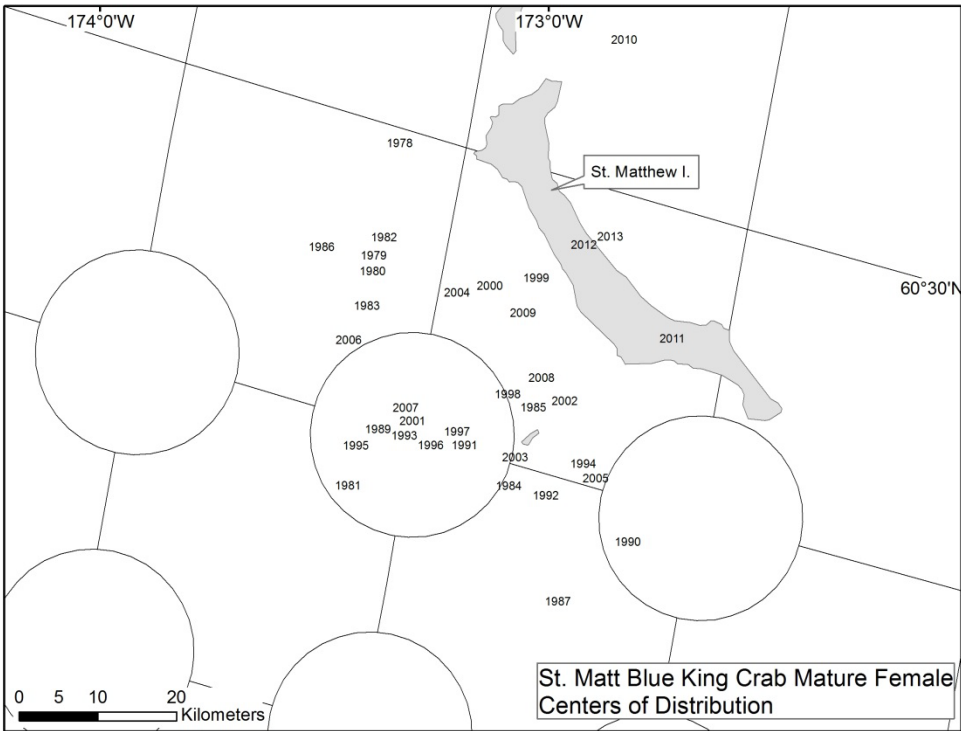


Figure 46. -- Centers of stock distribution of St. Matthew Island female and male blue king crab (*Paralithodes platypus*) from 1975 to 2013.

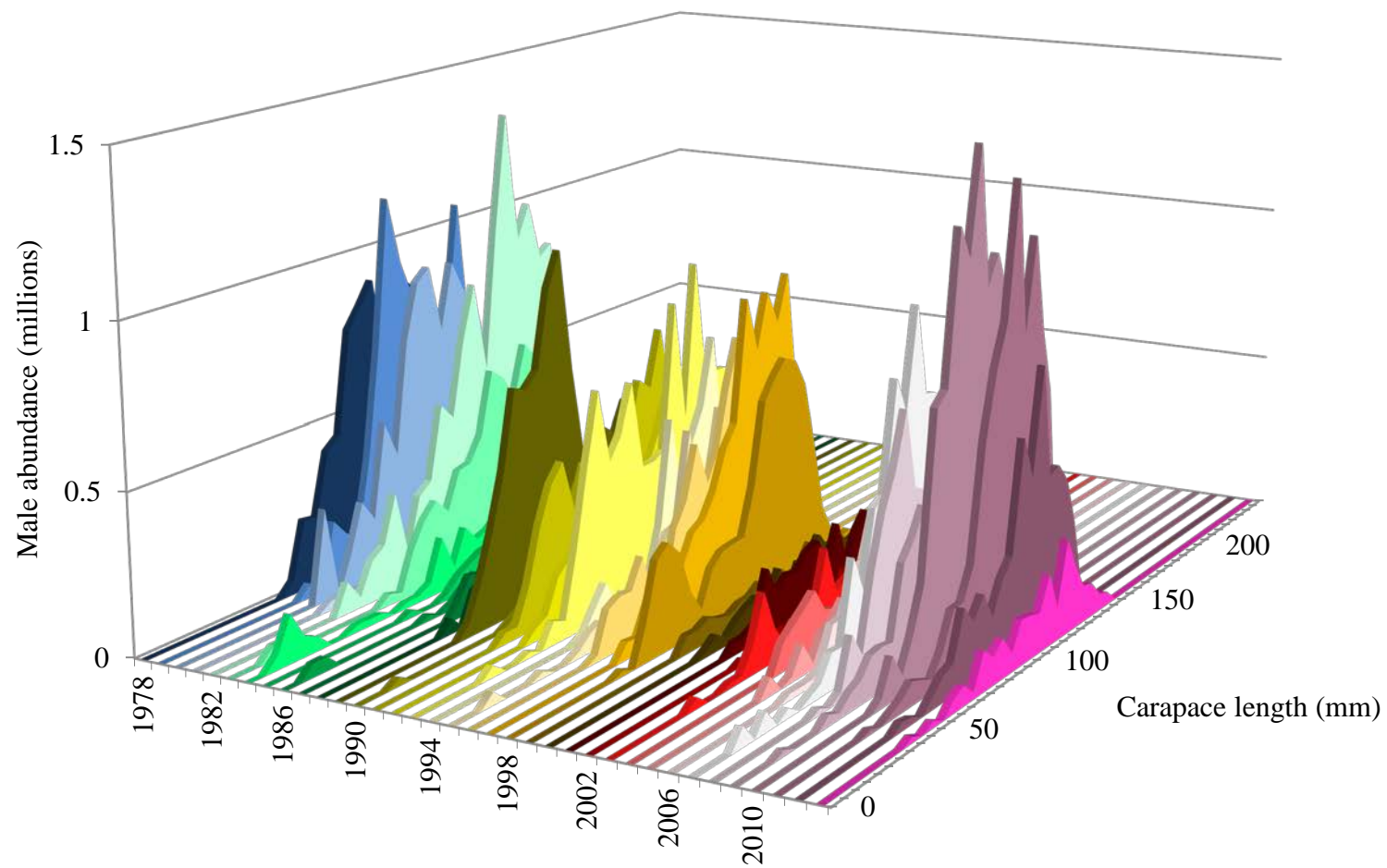


Figure 47. -- Size frequency by 5 mm length classes of St. Matthew Island Section male blue king crab (*Paralithodes camtschaticus*) from 1978 to 2013.

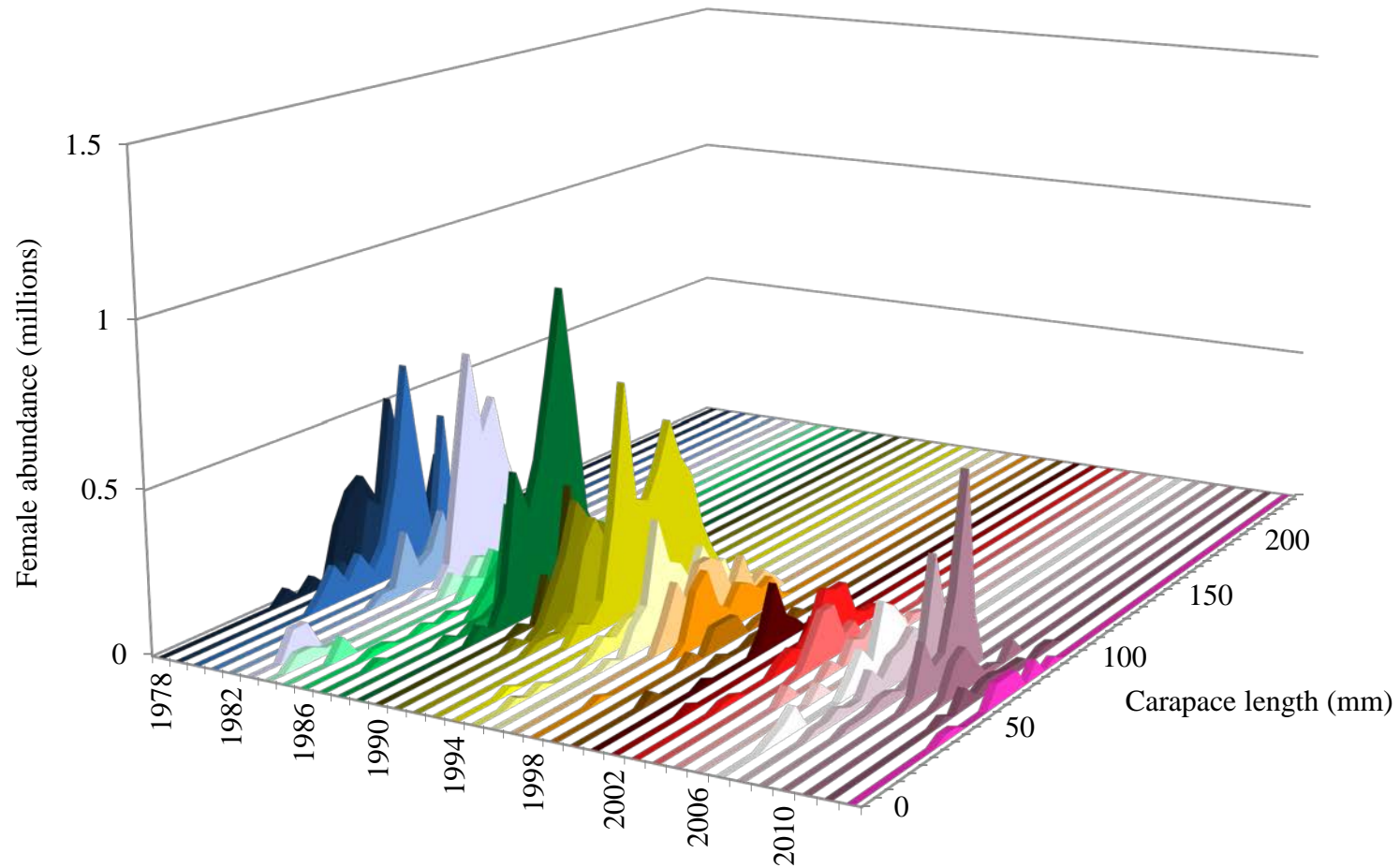


Figure 48. -- Size frequency by 5 mm length classes of St. Matthew Island Section female blue king crab (*Paralithodes camtschaticus*) from 1978 to 2013.

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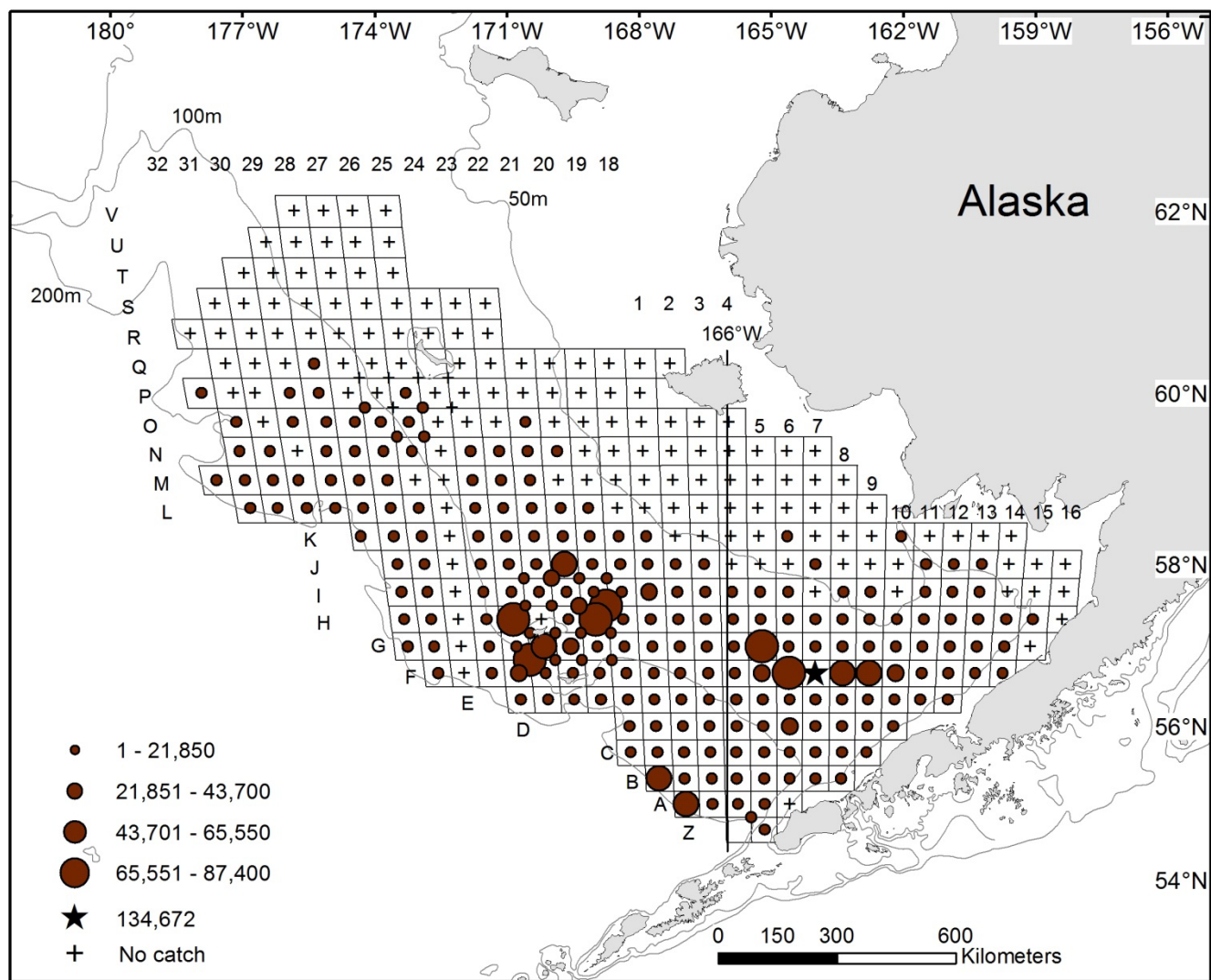


Figure 49. -- Total density (number  $\text{nmi}^{-2}$ ) of Tanner crab (*Chionoecetes bairdi*) at each station sampled in 2013. Data depicted by circles are crab densities at equal intervals, while stars are densities larger than the standard scale.

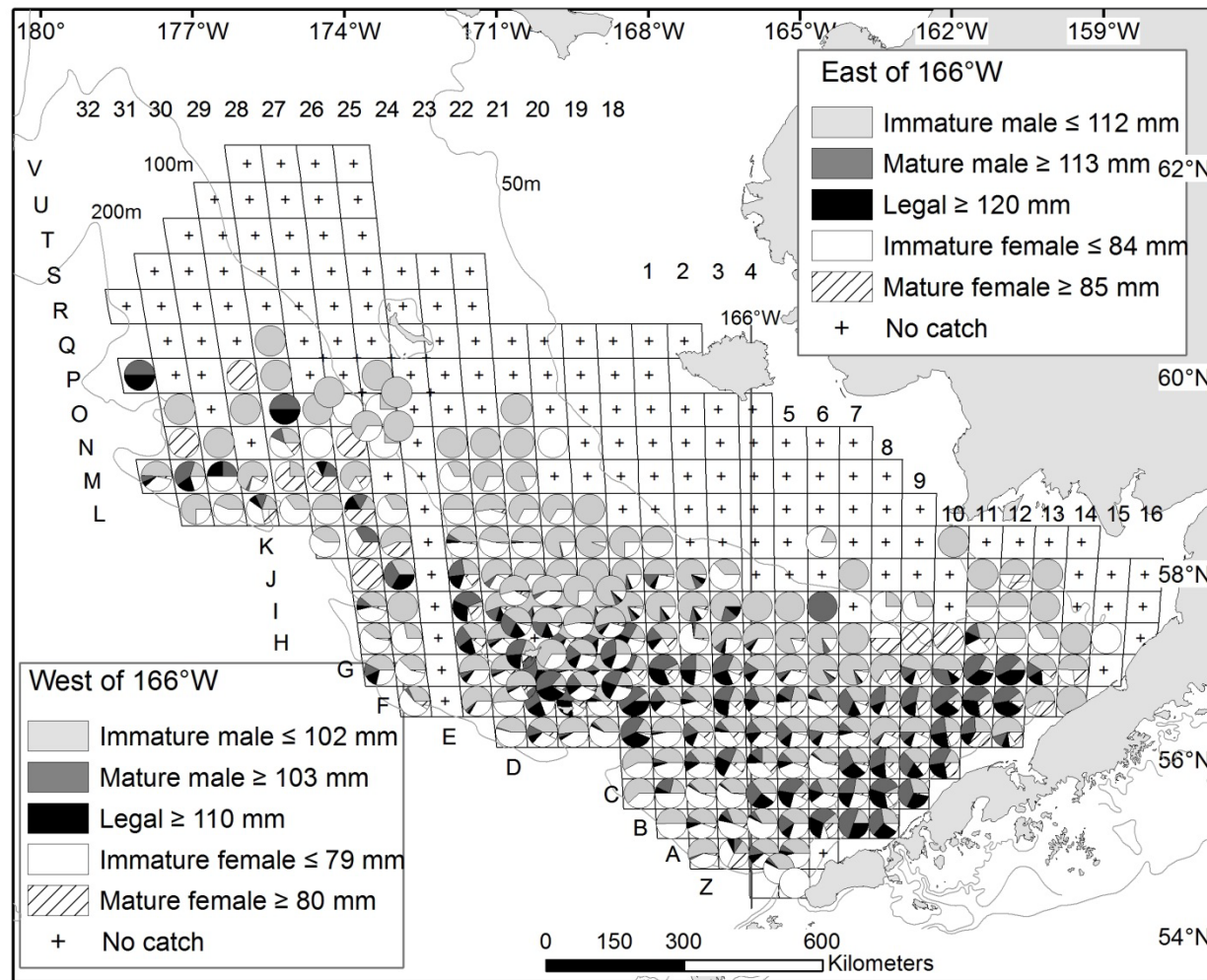


Figure 50. -- Percentage of male and female Tanner crab (*Chionoecetes bairdi*) size categories at each station sampled in 2013. Tanner crab males  $\geq 138$  mm CW east of 166° W and  $\geq 125$  mm CW west of 166° W are preferred size categories while males  $\geq 120$  mm and  $\geq 110$  mm CW are the legal-size categories for east and west of 166° W, respectively.

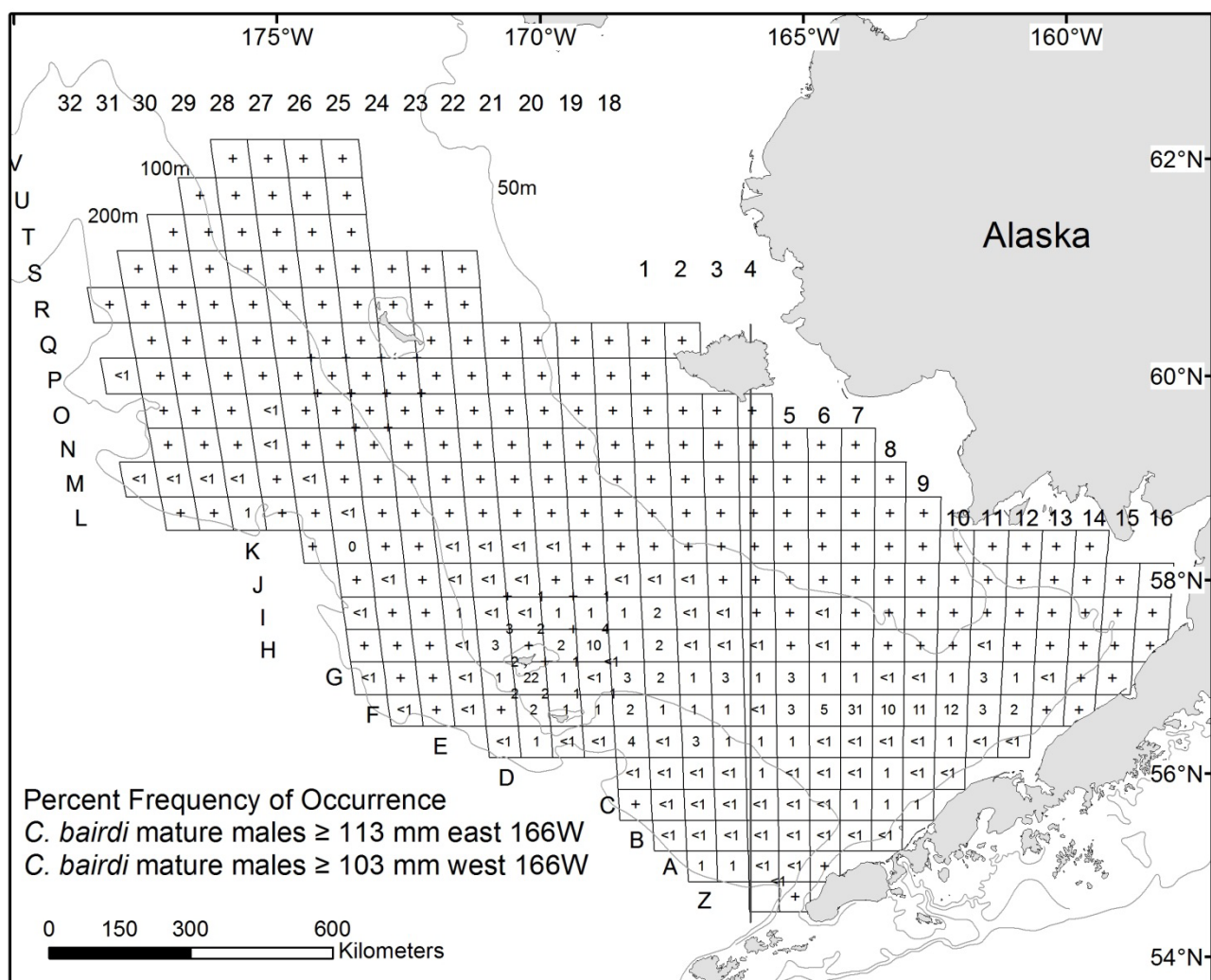


Figure 51. -- Percent frequency of occurrence of mature male Tanner crab (*Chionoecetes bairdi*) at stations sampled in the 2013.

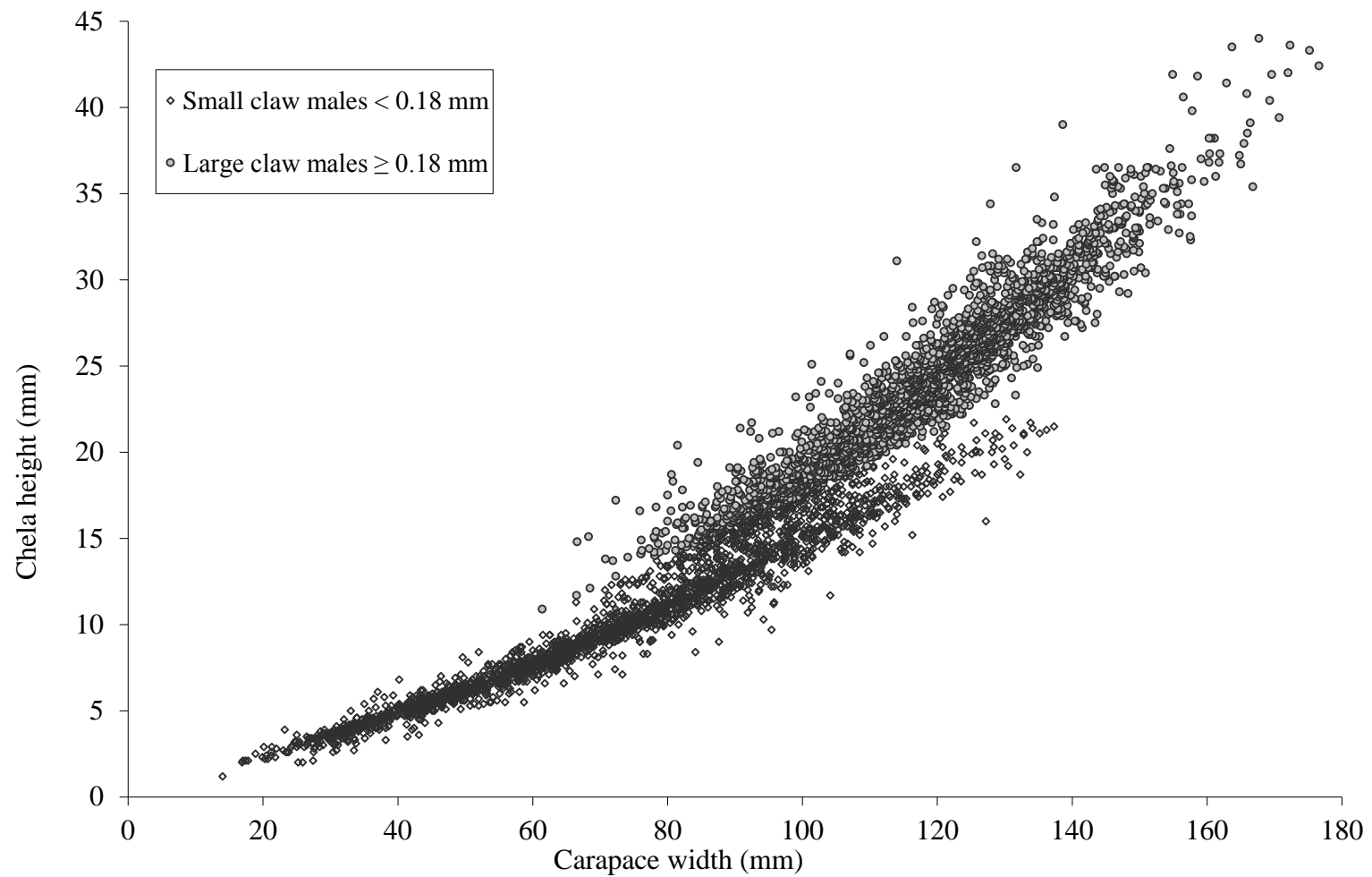


Figure 52. -- Male Tanner crab (*Chionoecetes bairdi*) chela height versus carapace width measurements collected on the 2008, 2010, and 2012 National Marine Fisheries Service eastern Bering Sea bottom trawl surveys.

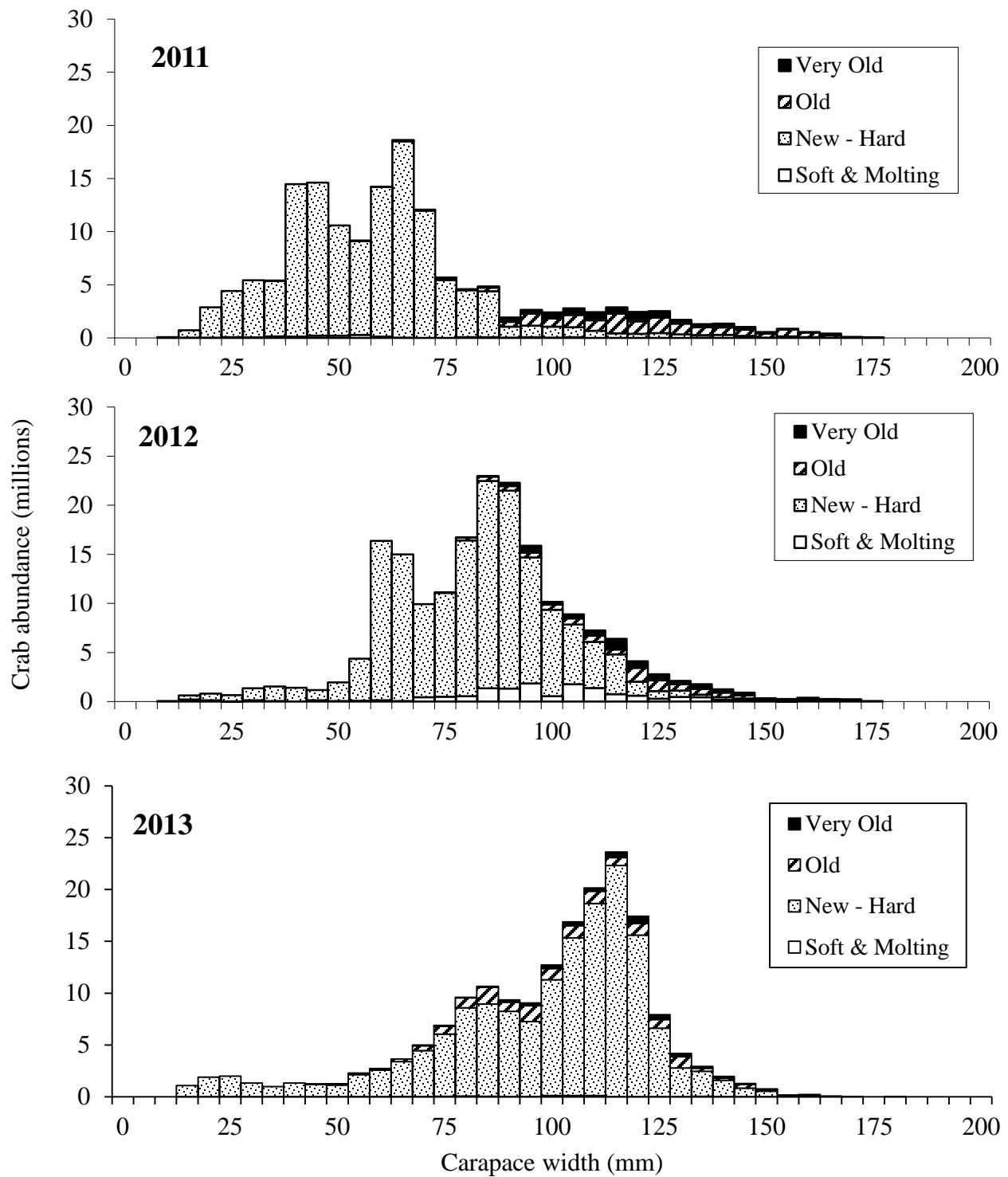


Figure 53. -- Size-frequency by shell condition of male Tanner crab (*Chionoecetes bairdi*) east of 166° by 5 mm width classes of all districts combined, 2011-2013.

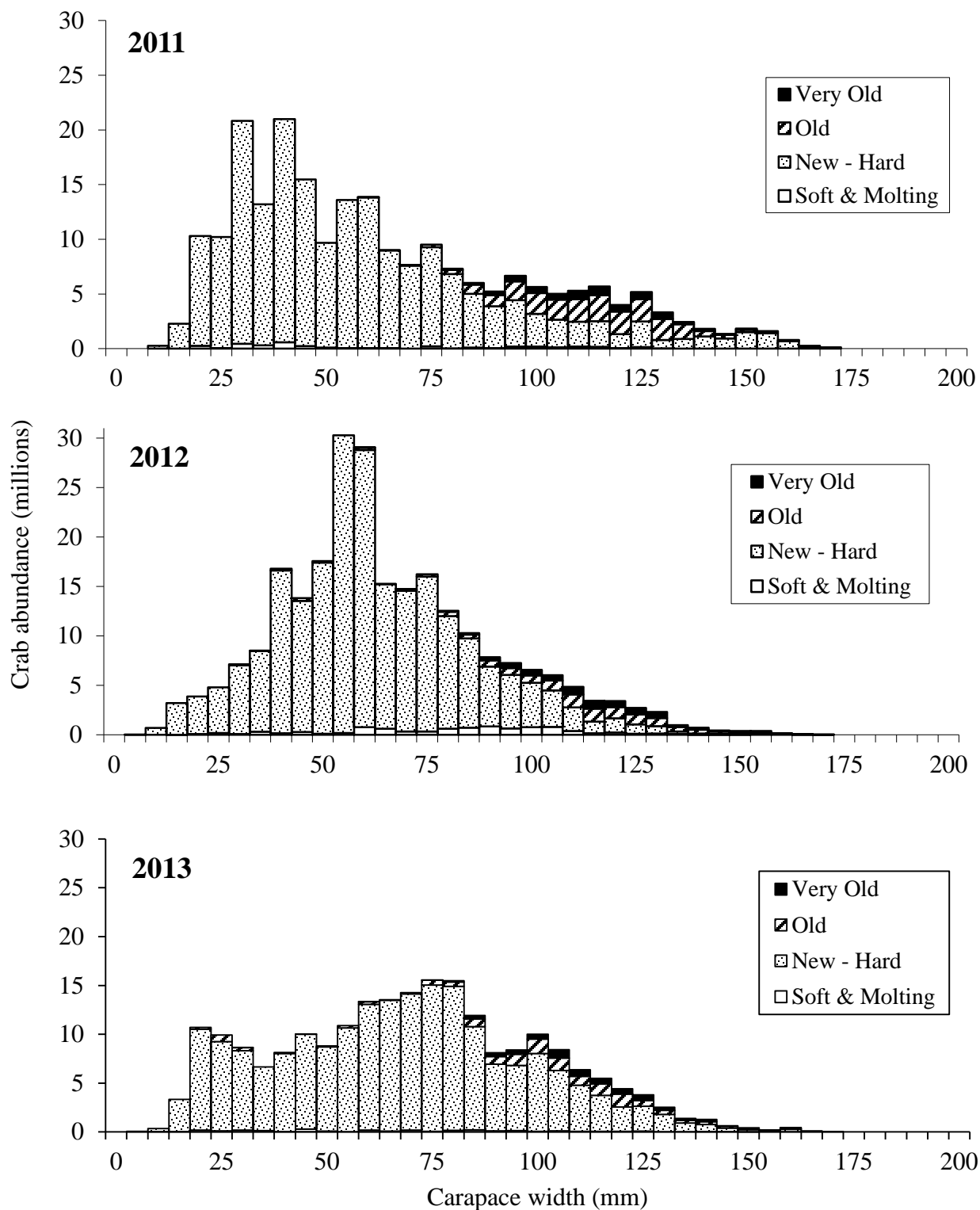


Figure 54. -- Size-frequency by shell condition of male Tanner crab (*Chionoecetes bairdi*) west of 166° by 5 mm width classes of all districts combined, 2011-2013.

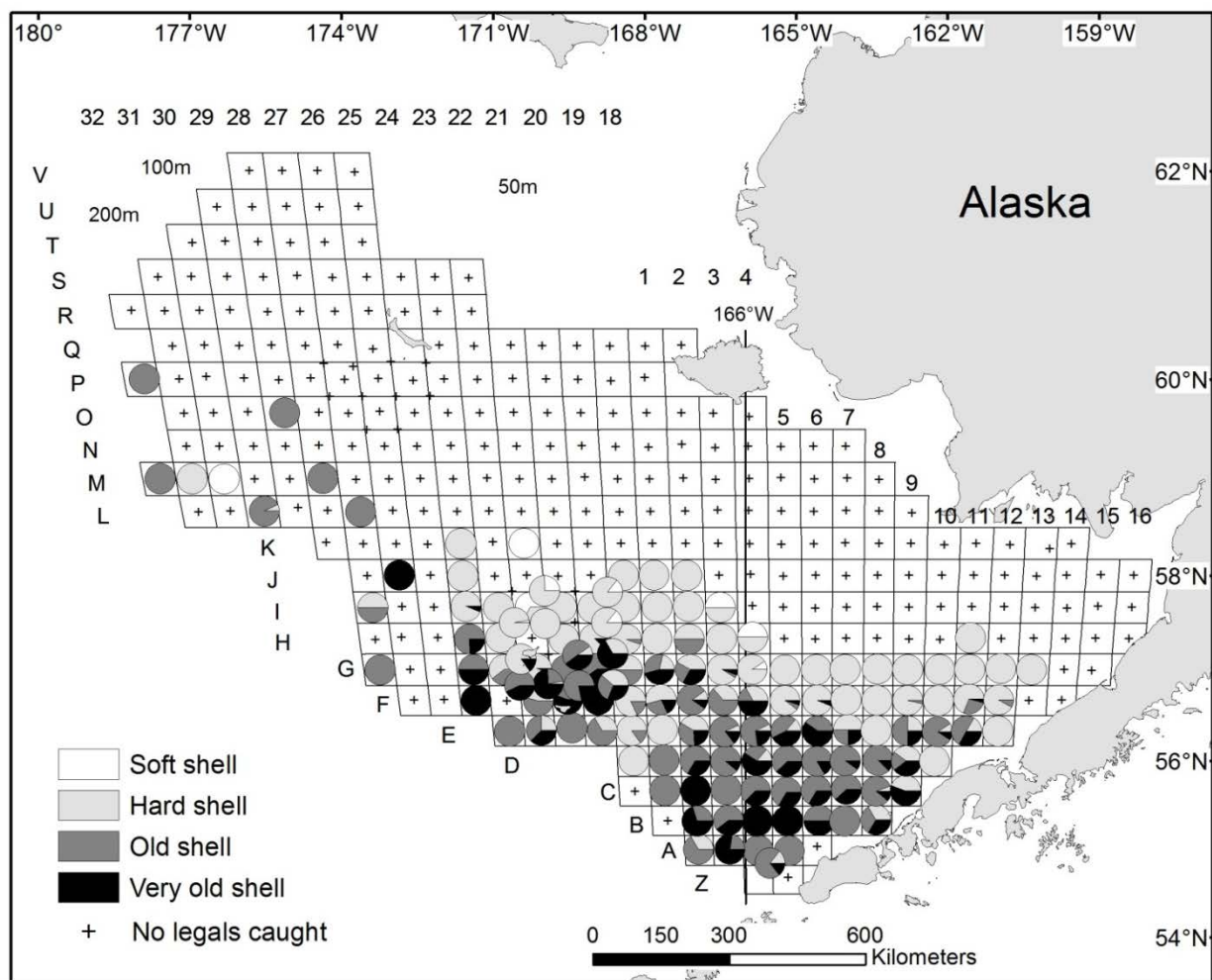


Figure 55. -- Distribution of legal-sized male Tanner crab (*Chionoecetes bairdi*) caught at each station in 2013 and distinguished by shell condition. Tanner male crab  $\geq 120$  mm and  $\geq 110$  mm CW are the legal-size categories for east and west of 166° W, respectively.

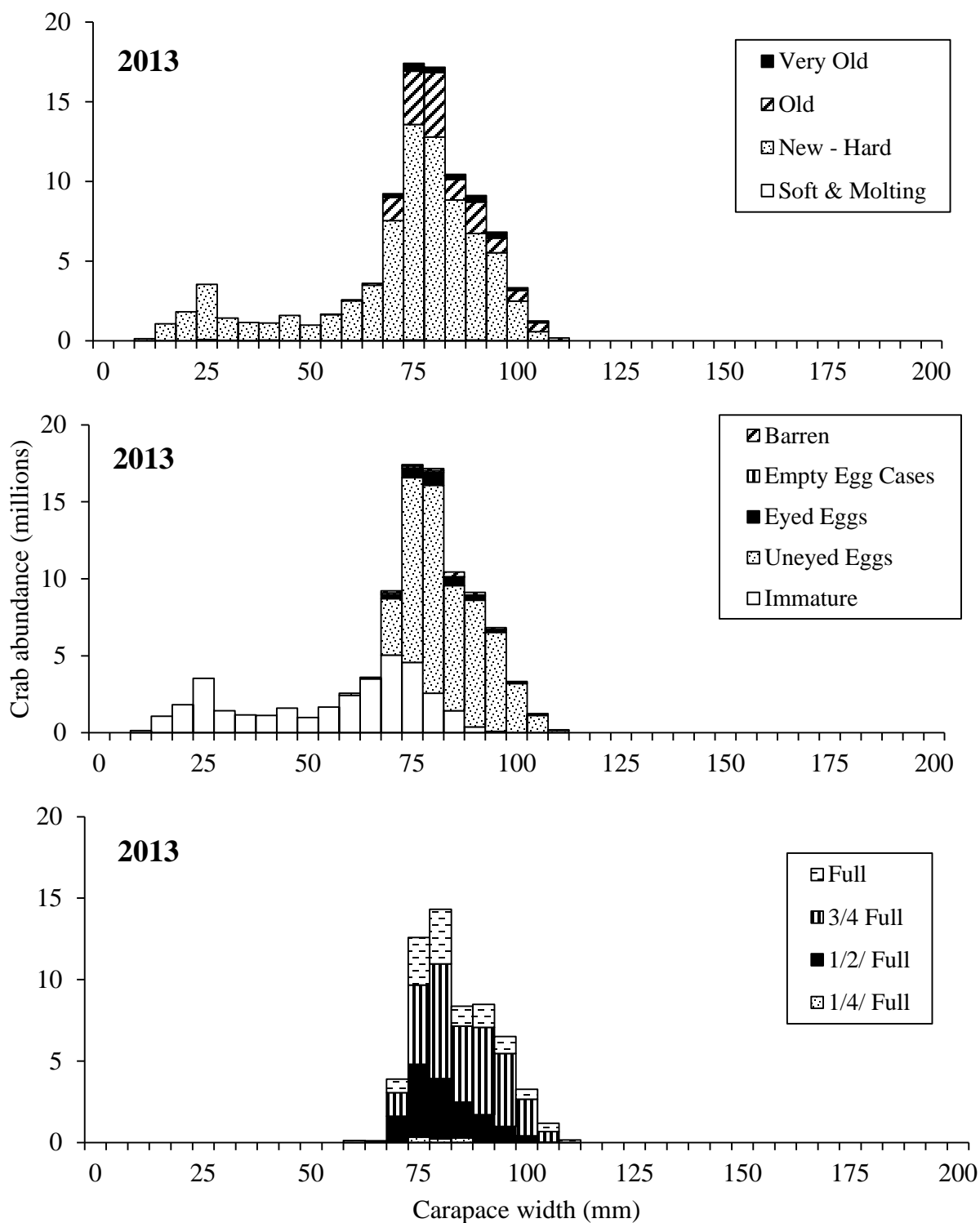


Figure 56. -- Size-frequency by shell condition, egg condition, and clutch fullness of female Tanner crab (*Chionoecetes bairdi*) east of 166° by 5 mm width classes of all districts combined in 2013.

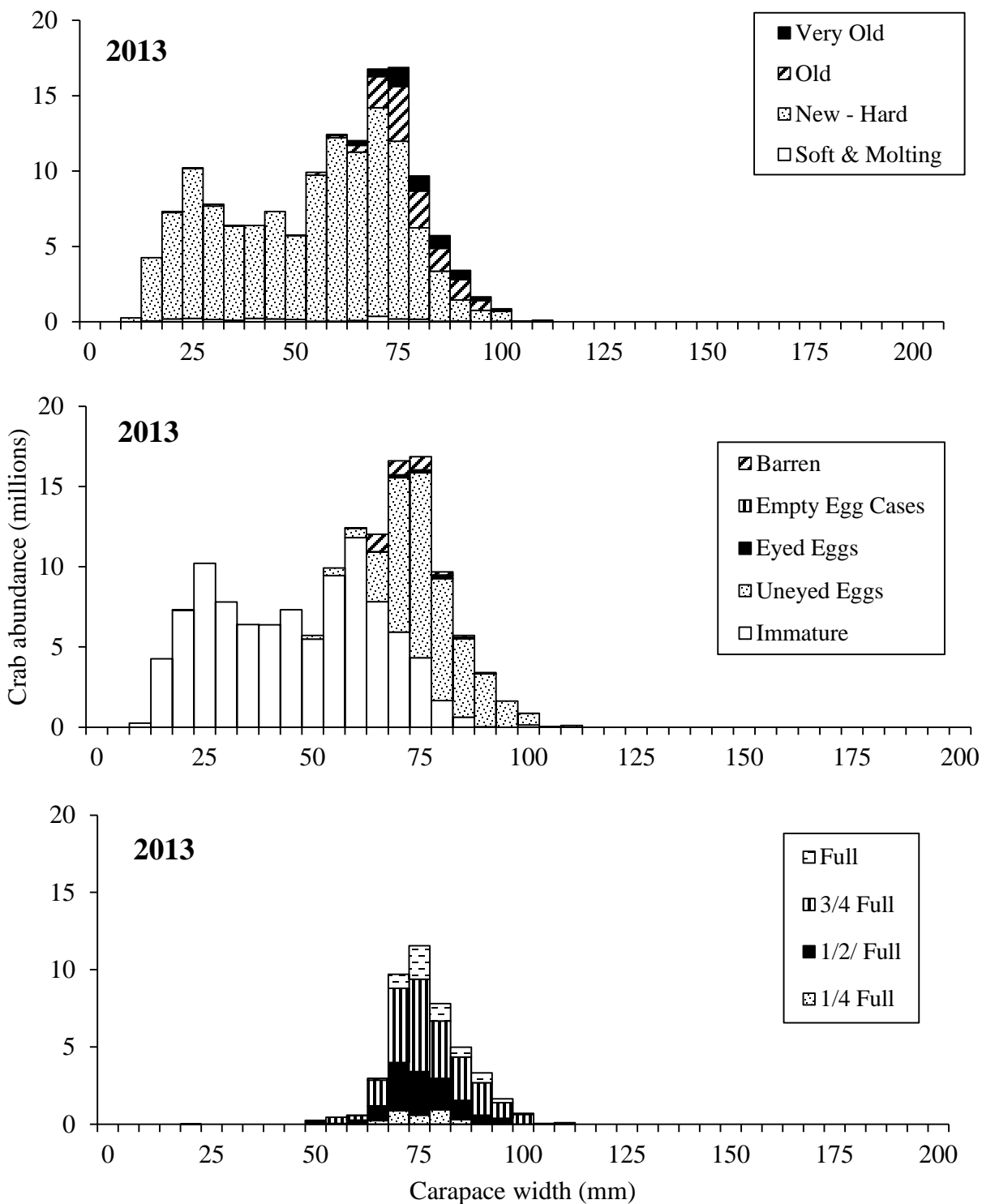


Figure 57. -- Size-frequency by shell condition, egg condition, and clutch fullness of female Tanner crab (*Chionoecetes bairdi*) west of 166° by 5 mm width classes of all districts combined in 2013.

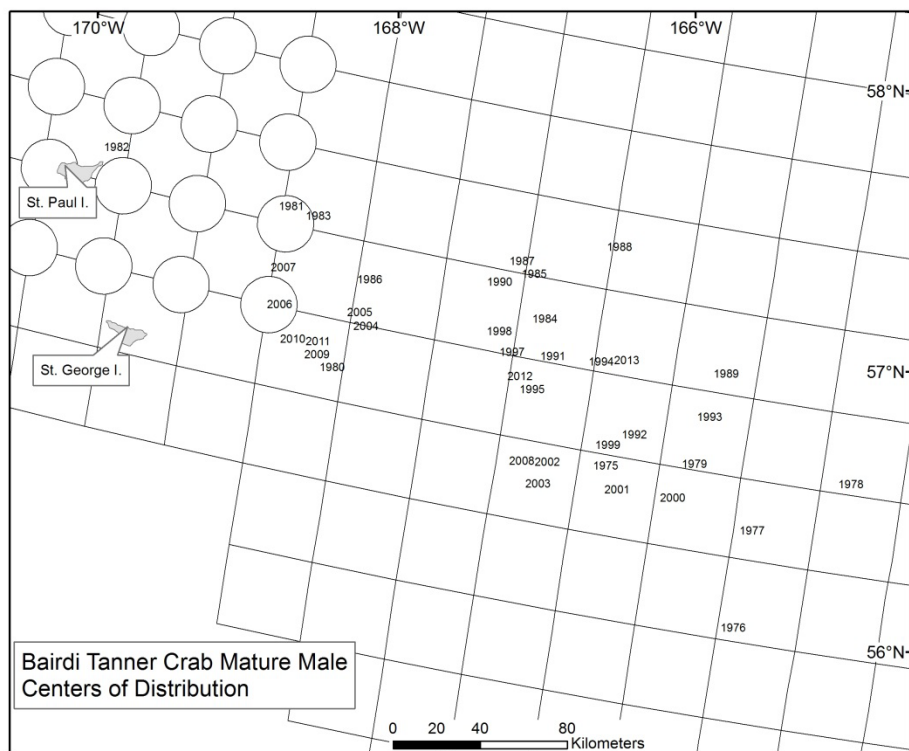
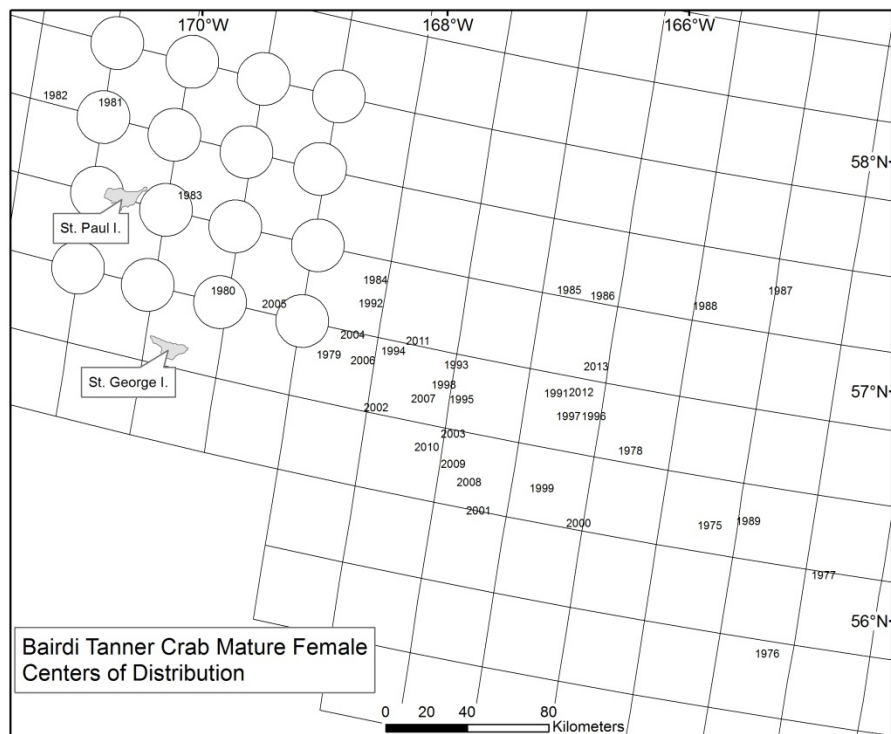


Figure 58. -- Centers of stock distribution of female and male Tanner crab (*Chionoecetes bairdi*) from 1975 to 2013.

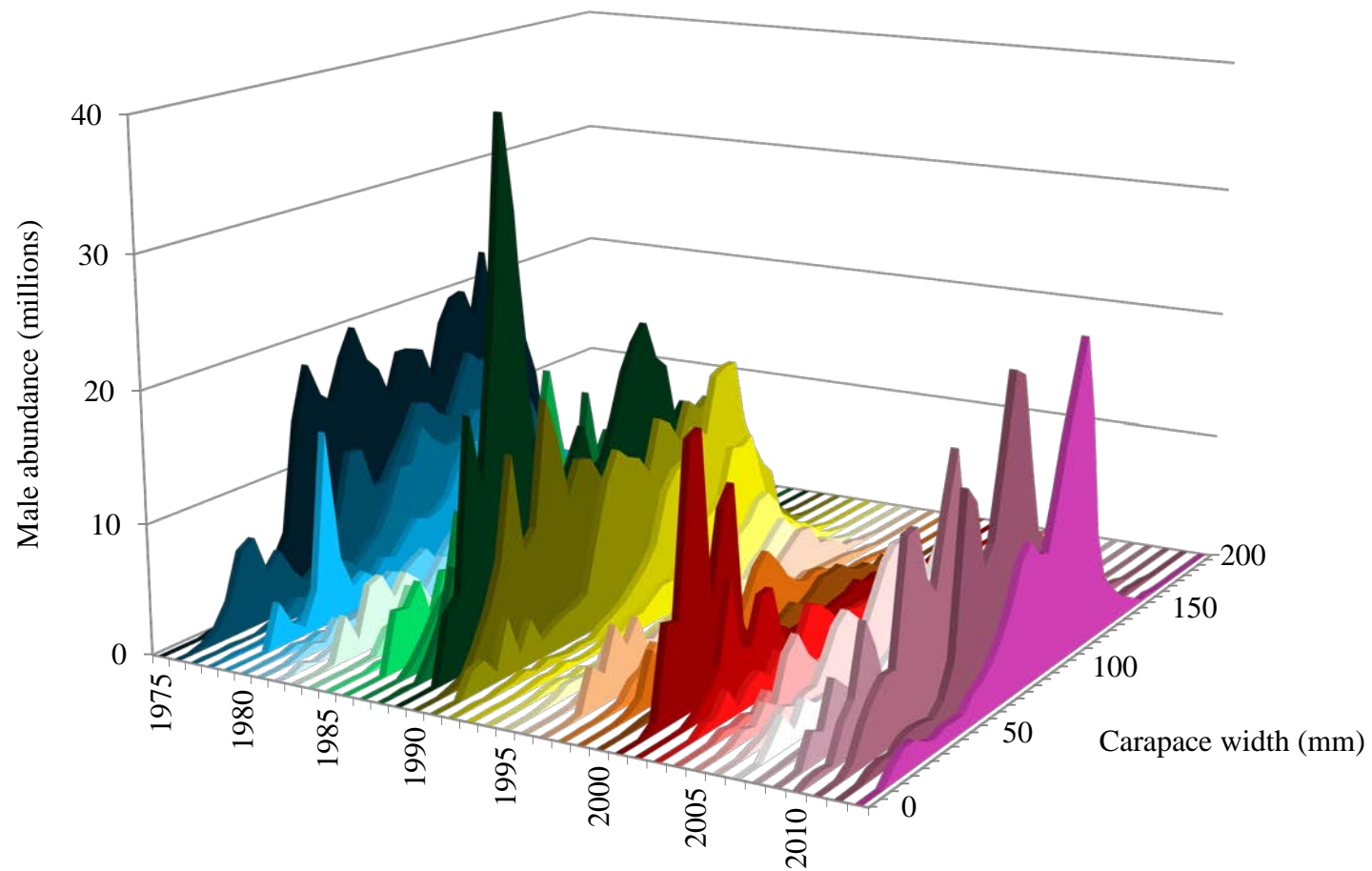


Figure 59. -- Historical size frequency by 5 mm length classes of male Tanner crab (*Chionoecetes bairdi*) east of 166°W, 1975 to 2013.

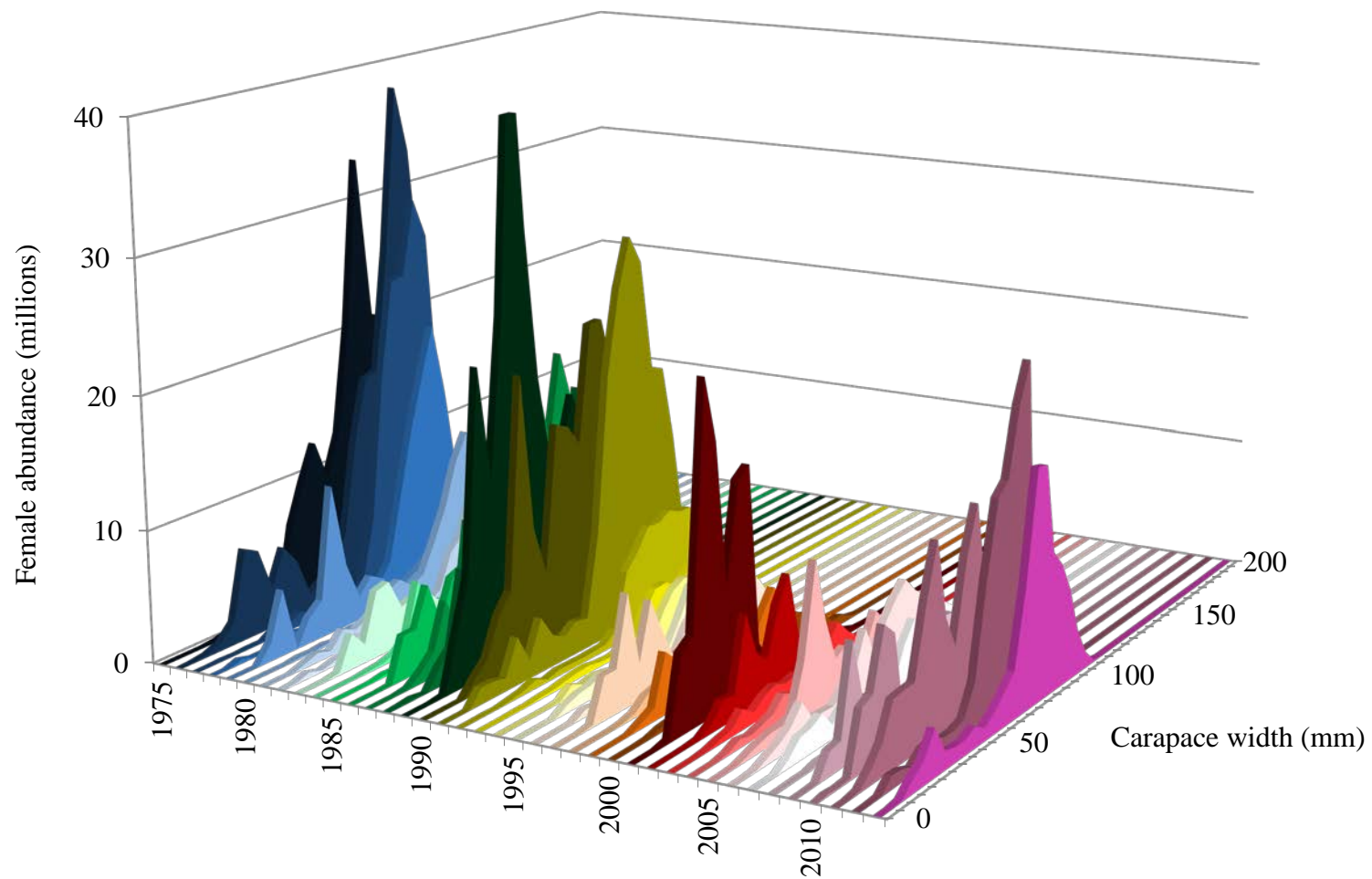


Figure 60. -- Historical size frequency by 5 mm length classes of female Tanner crab (*Chionoecetes bairdi*) east of 166°W, 1975 to 2013.

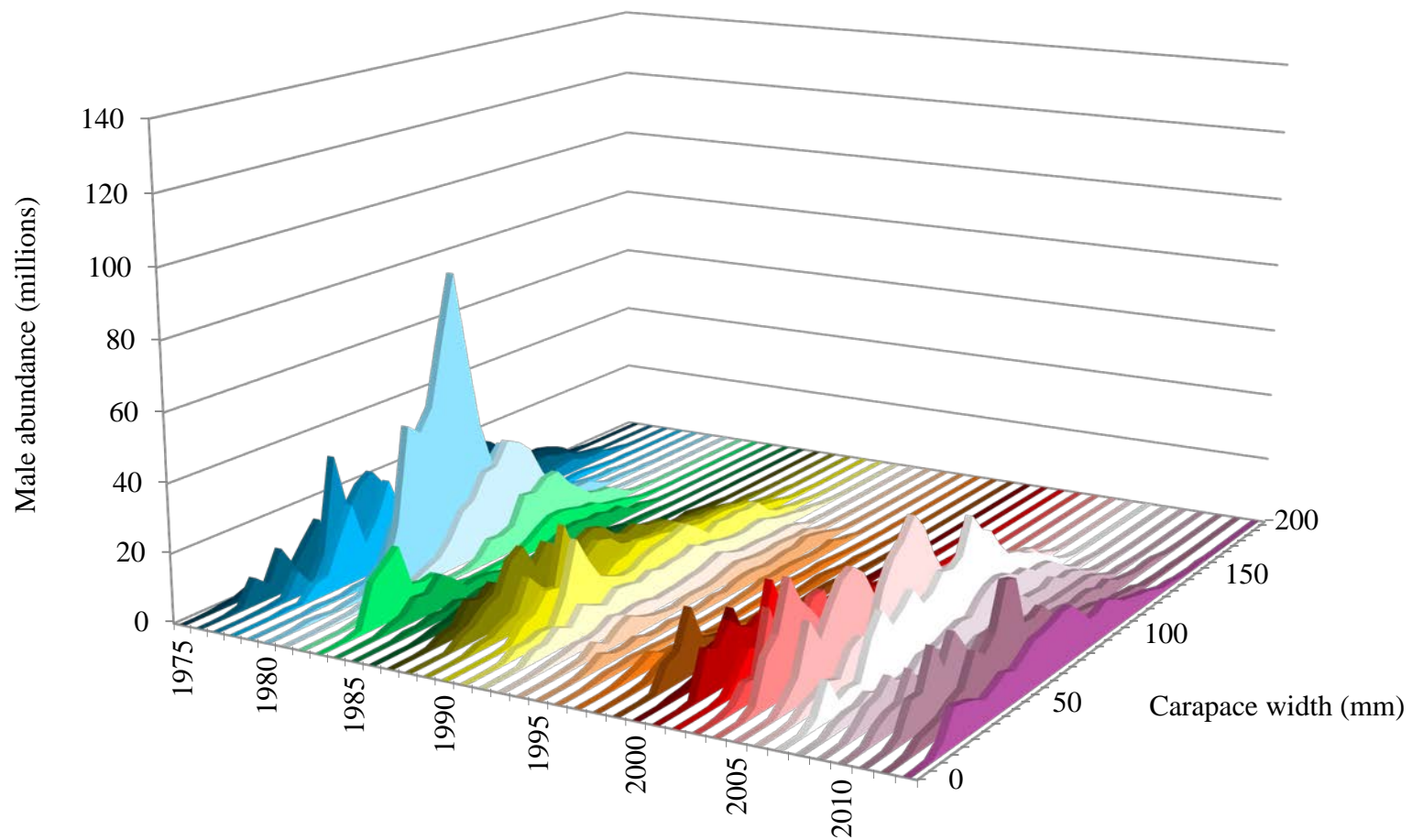


Figure 61. -- Historical size frequency by 5 mm length classes of male Tanner crab (*Chionoecetes bairdi*) west of 166°W, 1975 to 2013.

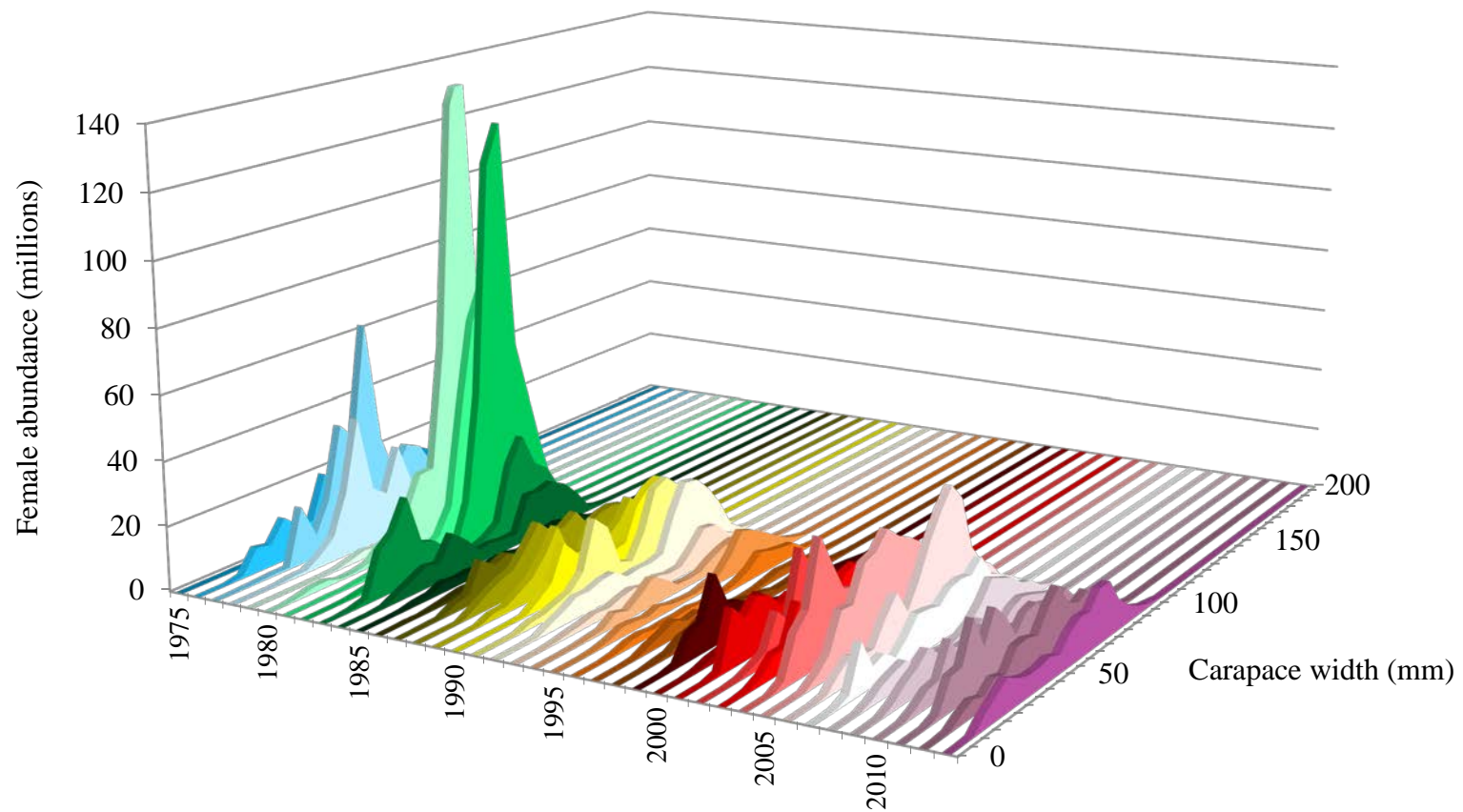


Figure 62. -- Historical size frequency by 5 mm length classes of female Tanner crab (*Chionoecetes bairdi*) west of 166°W, 1975 to 2013.

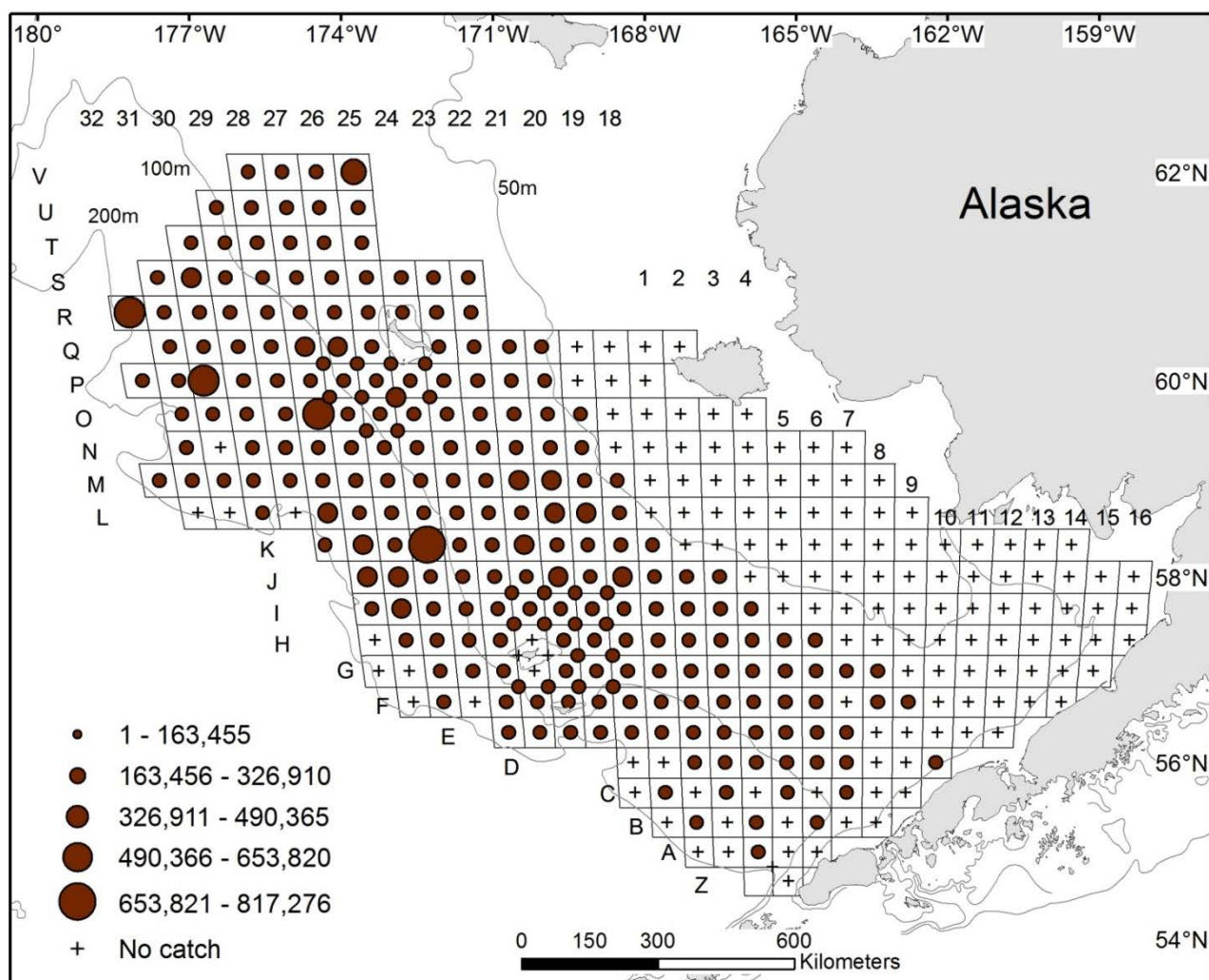


Figure 63. -- Total density (number nmi<sup>-2</sup>) of snow crab (*Chionoecetes opilio*) at each station sampled in 2013. Data depicted by circles are crab densities at equal intervals.

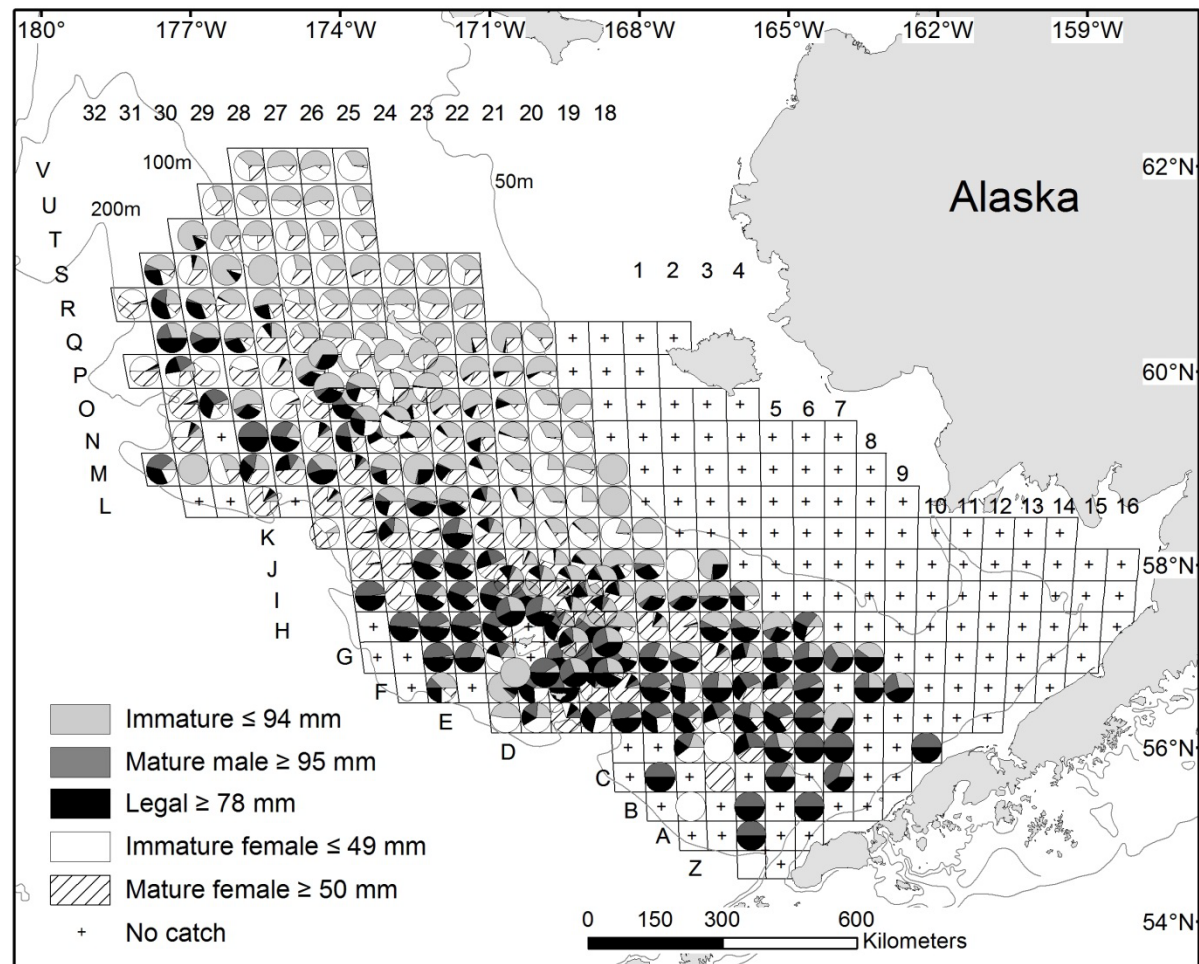


Figure 64. -- Percentage of male and female snow crab (*Chionoecetes opilio*) size categories at each station sampled in 2013.

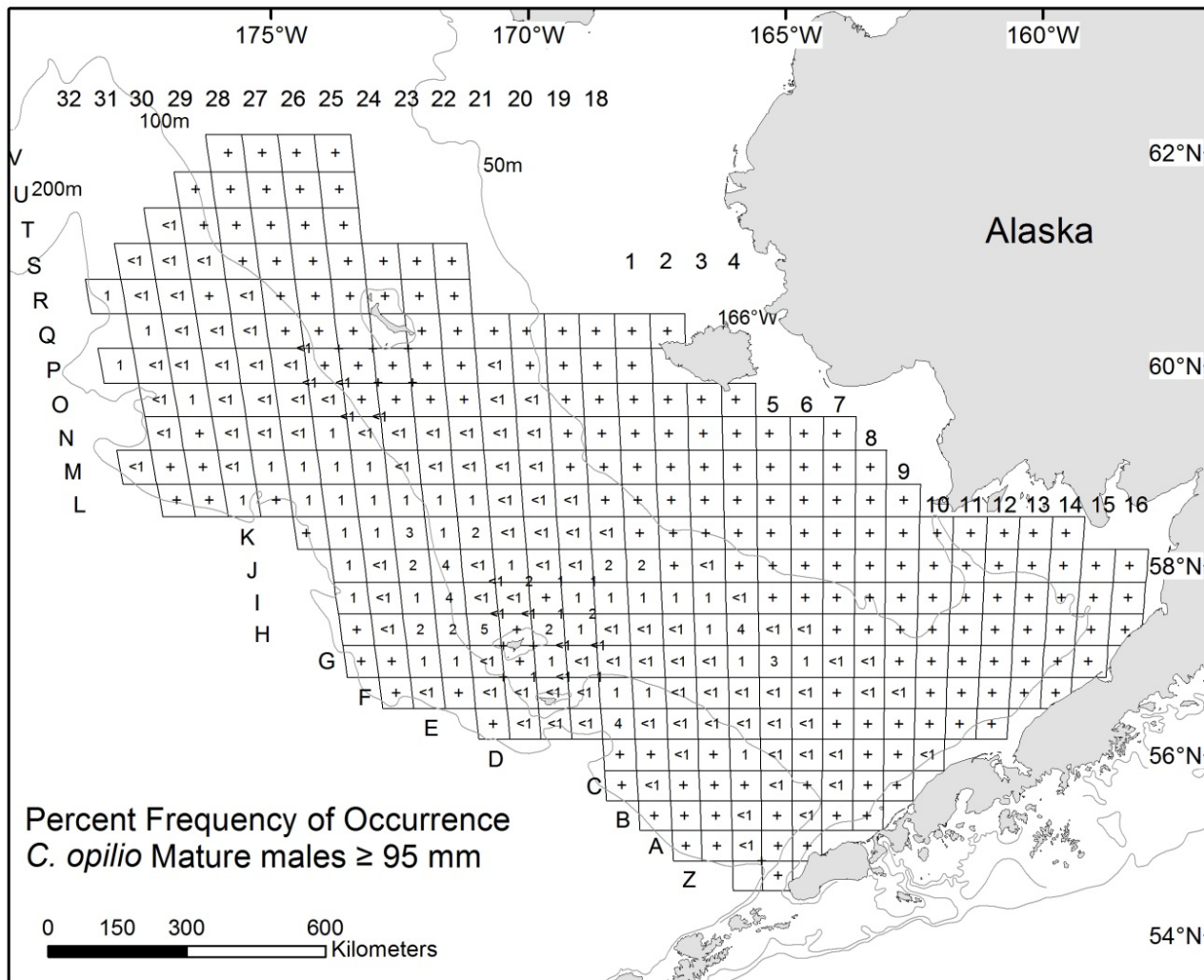


Figure 65. -- Percent frequency of occurrence of mature male snow crab (*Chionoecetes opilio*) at stations sampled in the 2013.

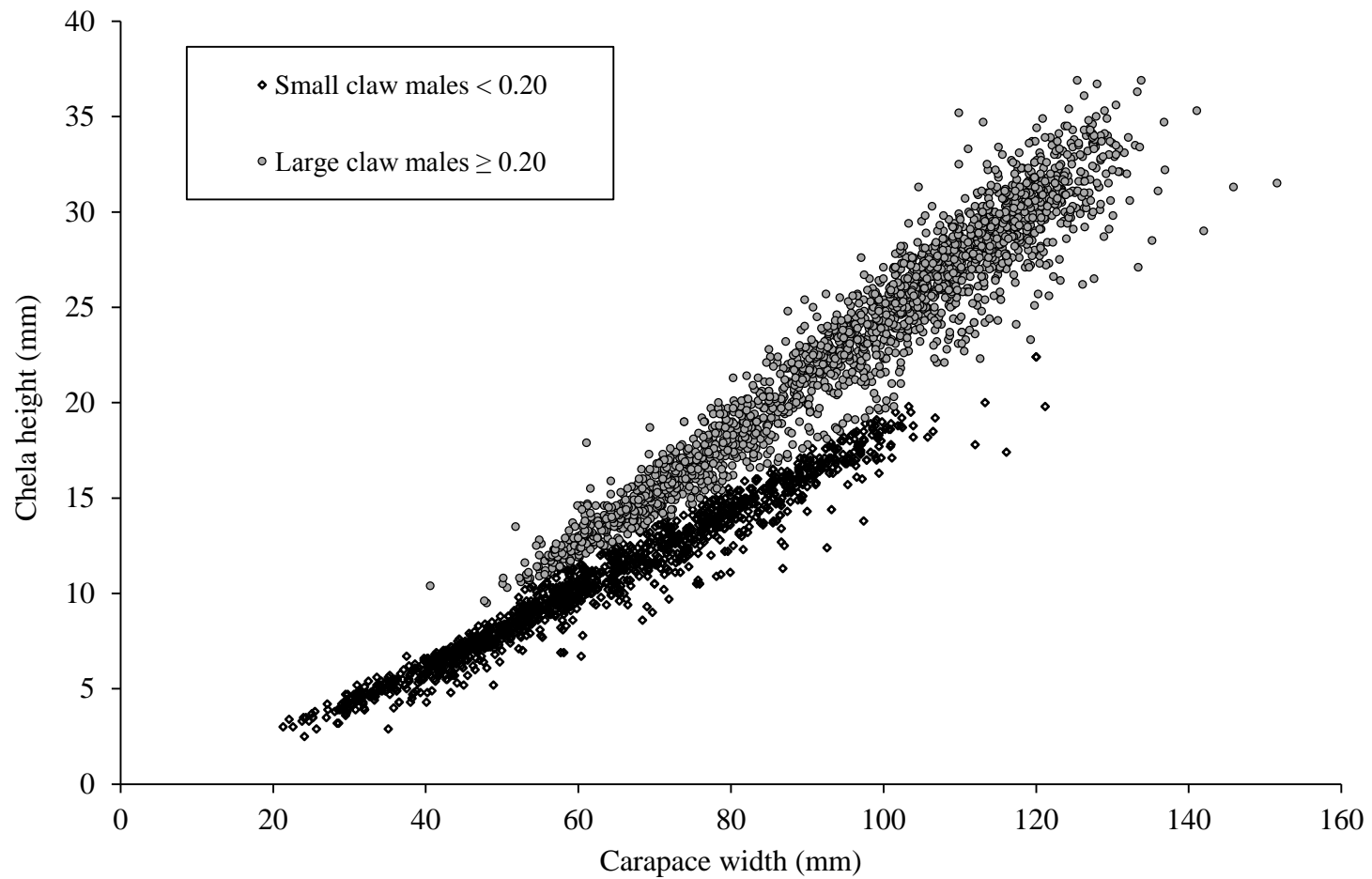


Figure 66. -- Male snow crab (*Chionoecetes opilio*) chela height versus carapace width measurements collected during the 2009, 2011, and 2013 National Marine Fisheries Service eastern Bering Sea bottom trawl surveys.

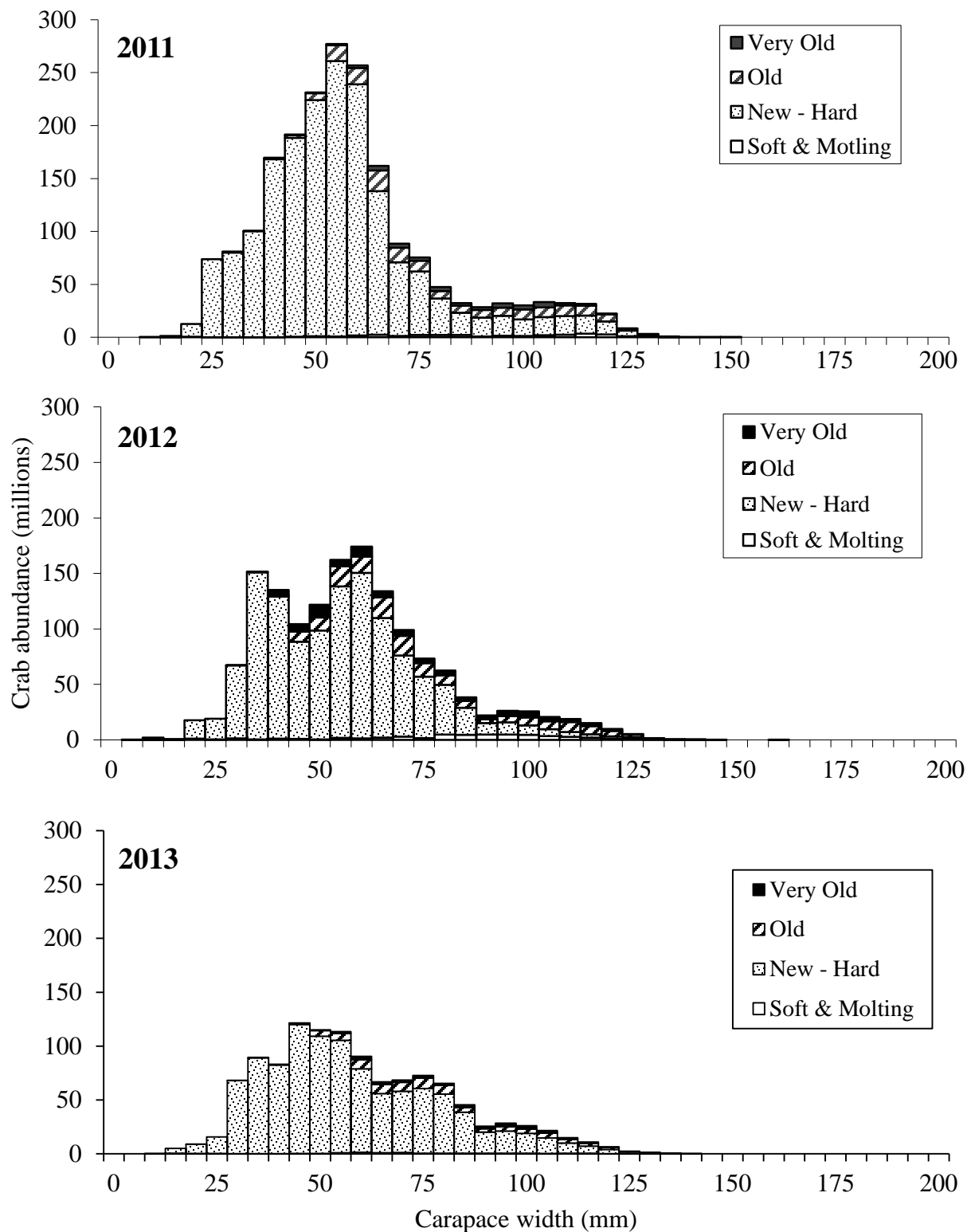


Figure 67. -- Size-frequency by shell condition of male snow crab (*Chionoecetes opilio*) by 5 mm width classes of all districts combined, 2011-2013.

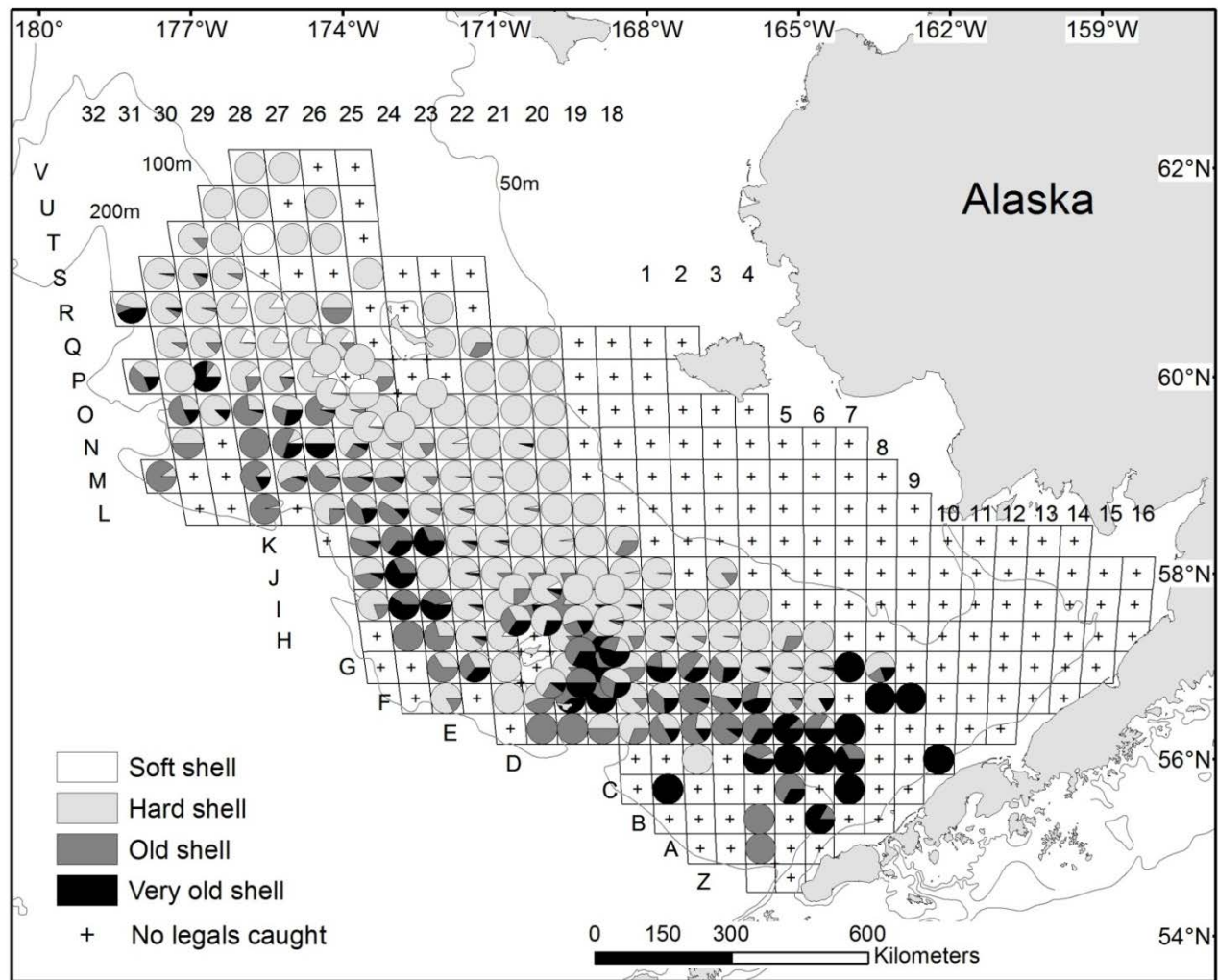


Figure 68. -- Distribution of legal-sized male snow crab (*Chionoecetes opilio*) caught at each station in 2013 and distinguished by shell condition.

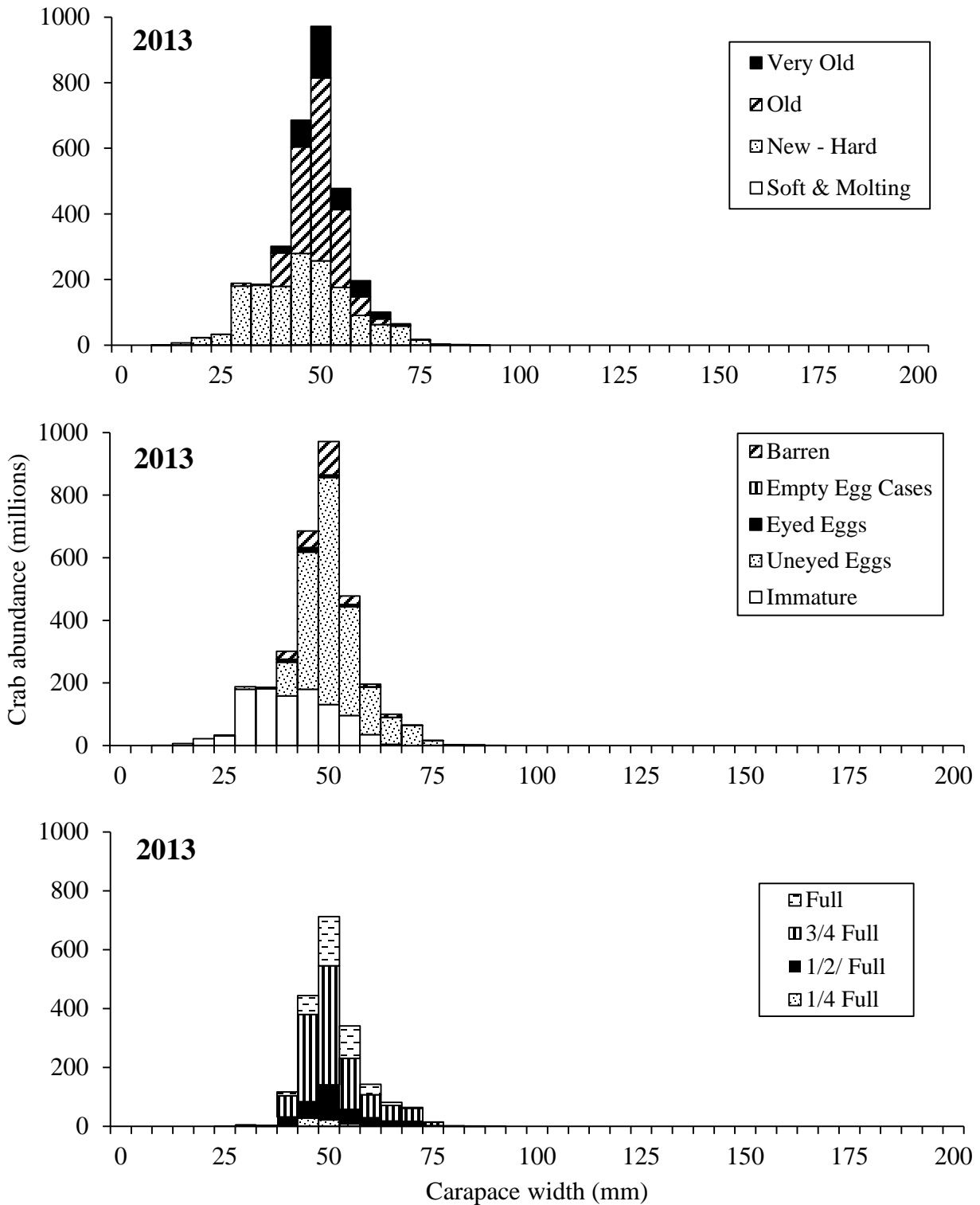


Figure 69. -- Size-frequency by shell condition, egg condition, and clutch fullness of female snow crab (*Chionoecetes opilio*) by 5 mm width classes of all districts combined in 2013.

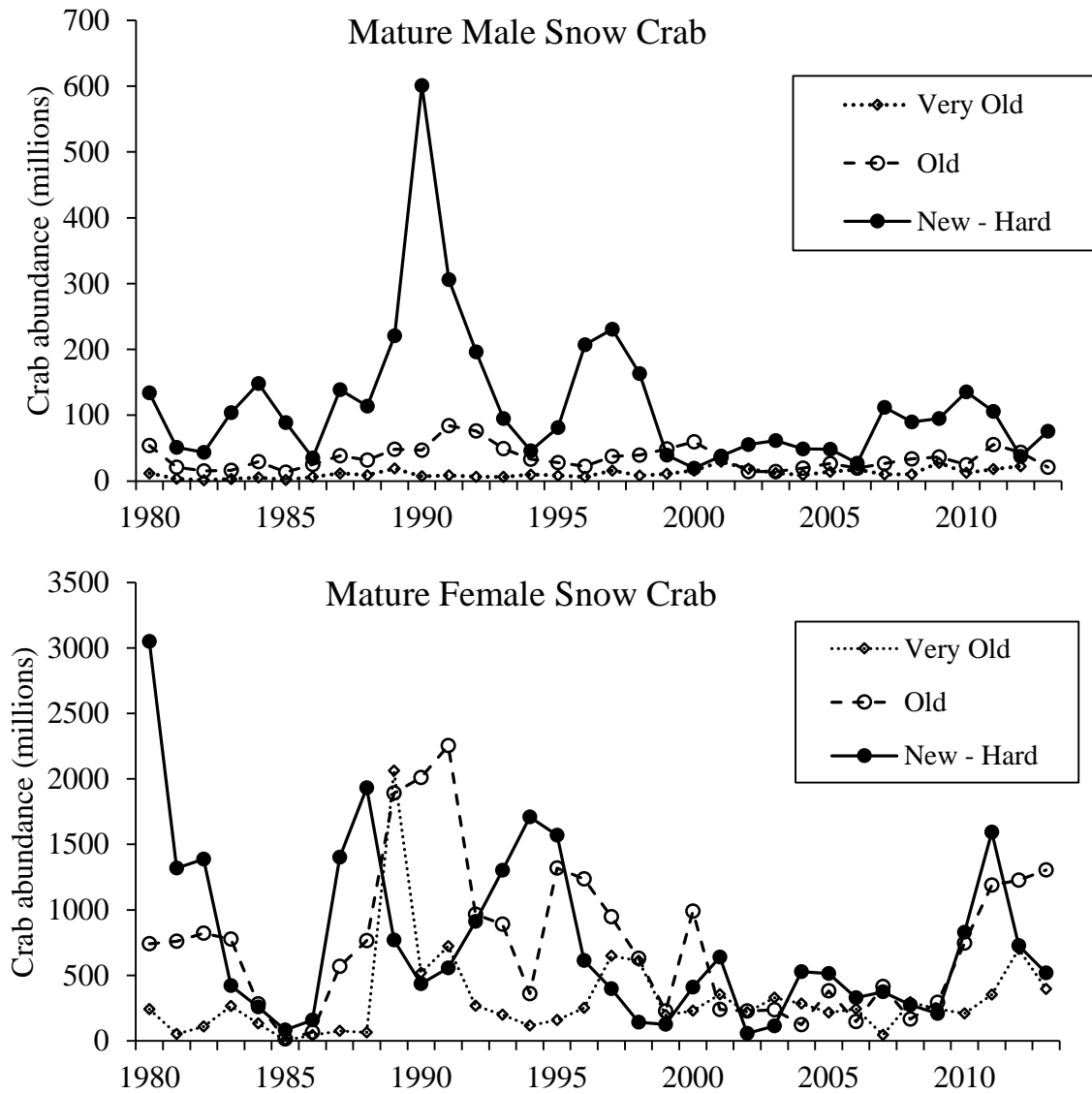


Figure 70. -- Time series of mature male ( $\geq 95$  mm CW) and female (as verified by egg condition) snow crab (*Chionoecetes opilio*) by shell condition, 1980-2013.

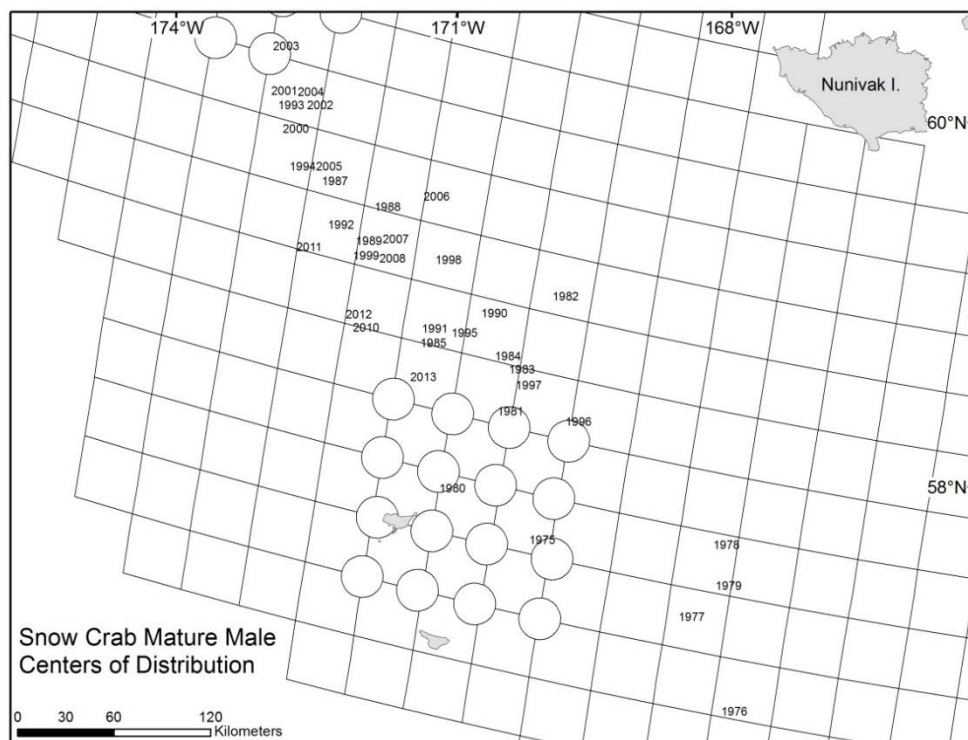
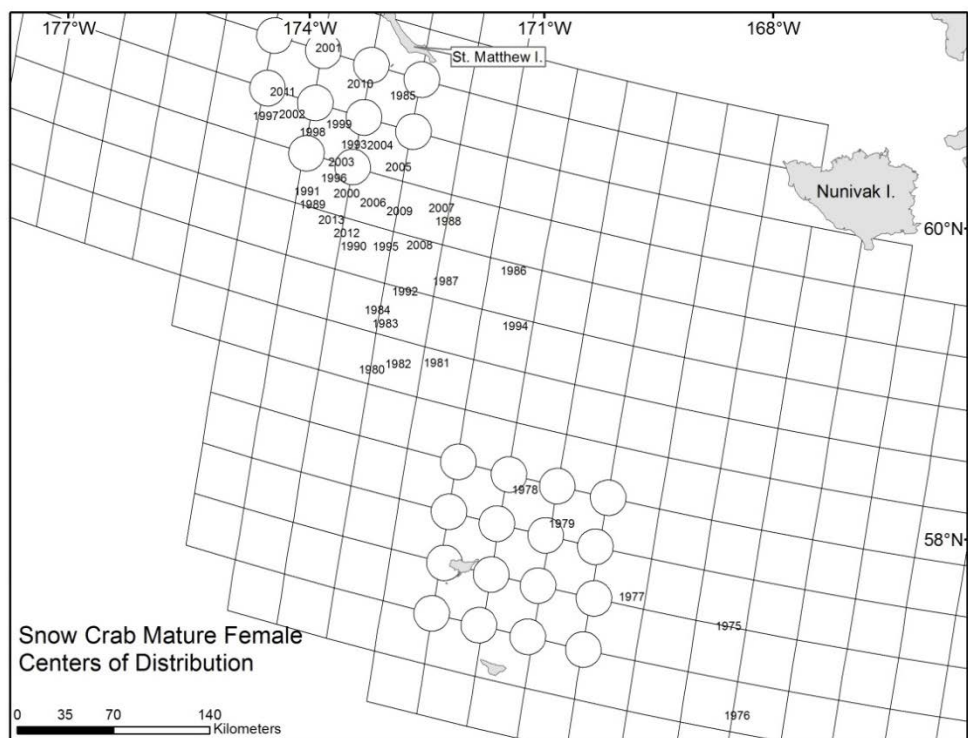


Figure 71. -- Centers of stock distribution of female and male snow crab (*Chionoecetes opilio*) from 1975 to 2013.

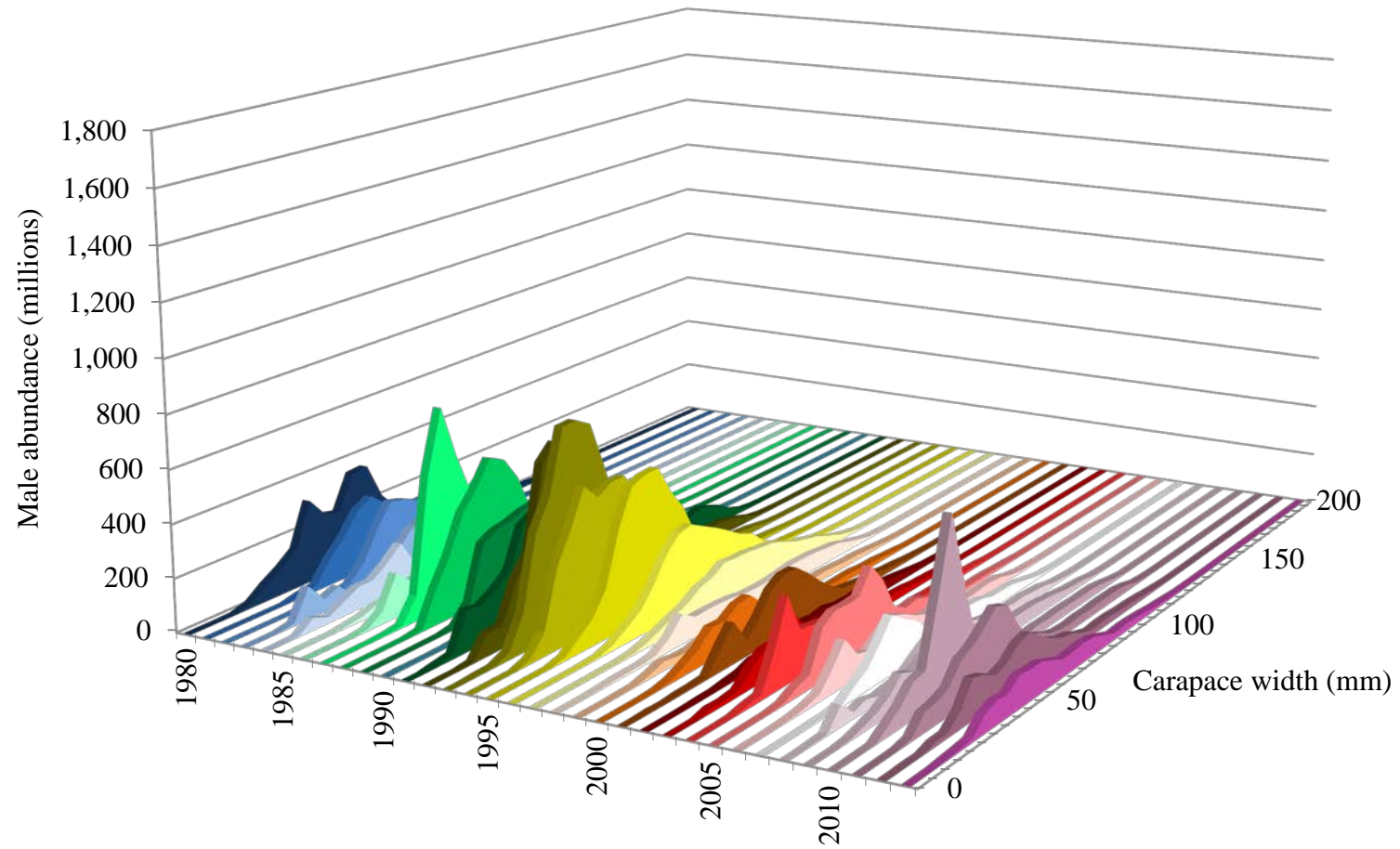


Figure 72. -- Historical size frequency by 5 mm length classes of male snow crab (*Chionoecetes opilio*), 1980 to 2013.

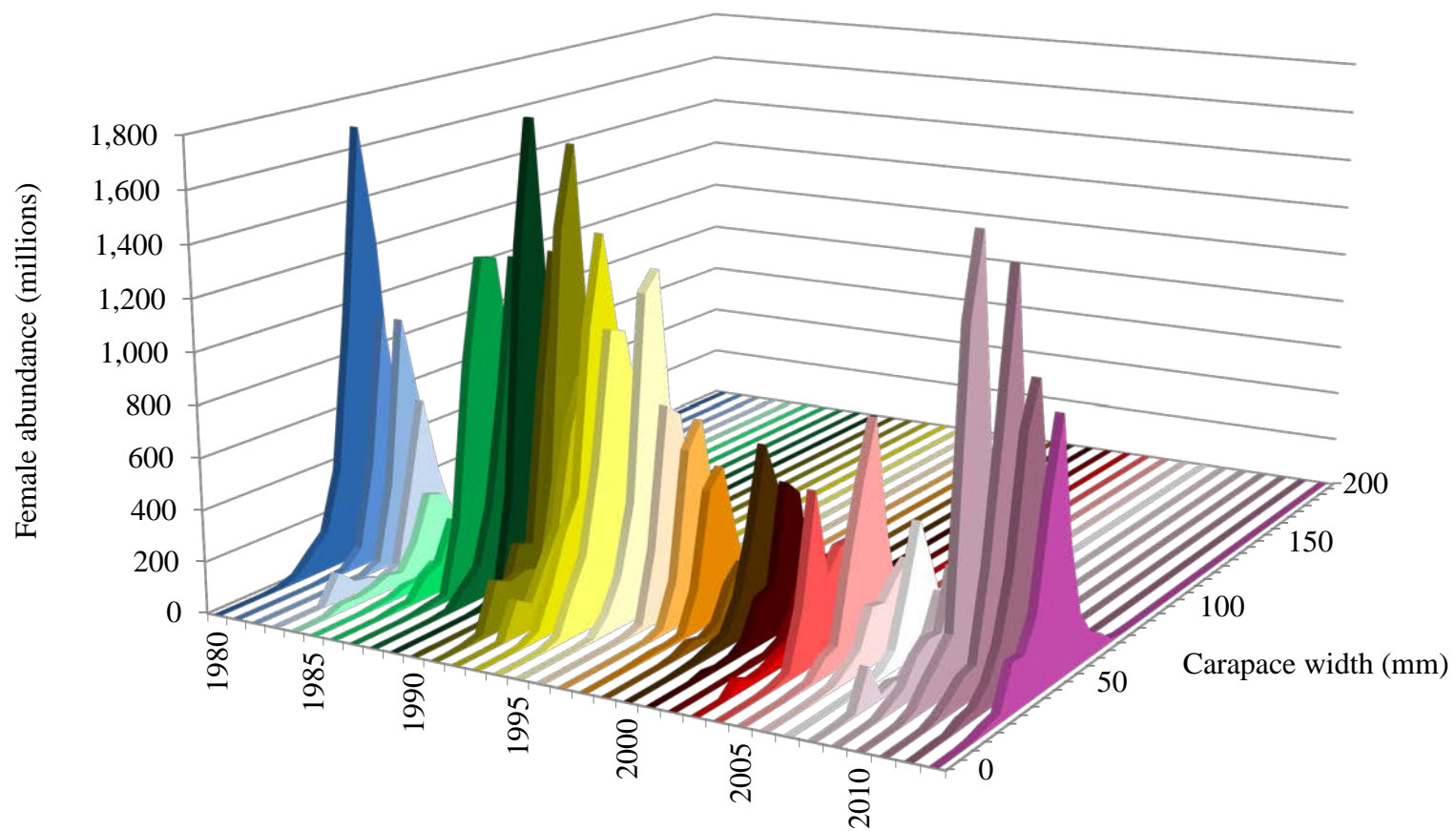


Figure 73. -- Historical size frequency by 5 mm length classes of female snow crab (*Chionoecetes opilio*), 1980 to 2013.

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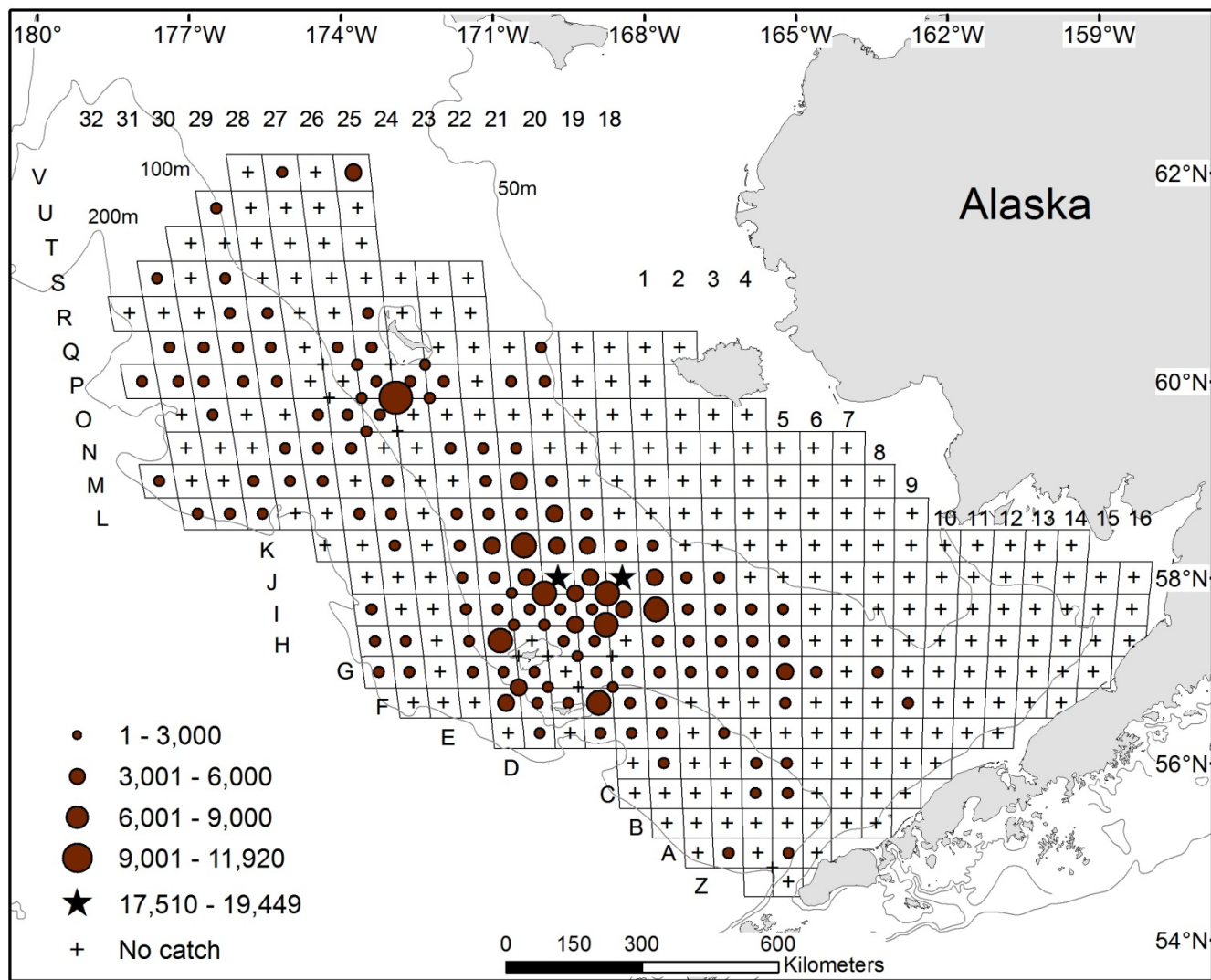


Figure 74. -- Total density (number nmi<sup>-2</sup>) of *Chionoecetes* spp. hybrid crab at each station sampled in 2013. Data depicted by circles are crab densities at equal intervals, while stars are densities larger than the standard scale.

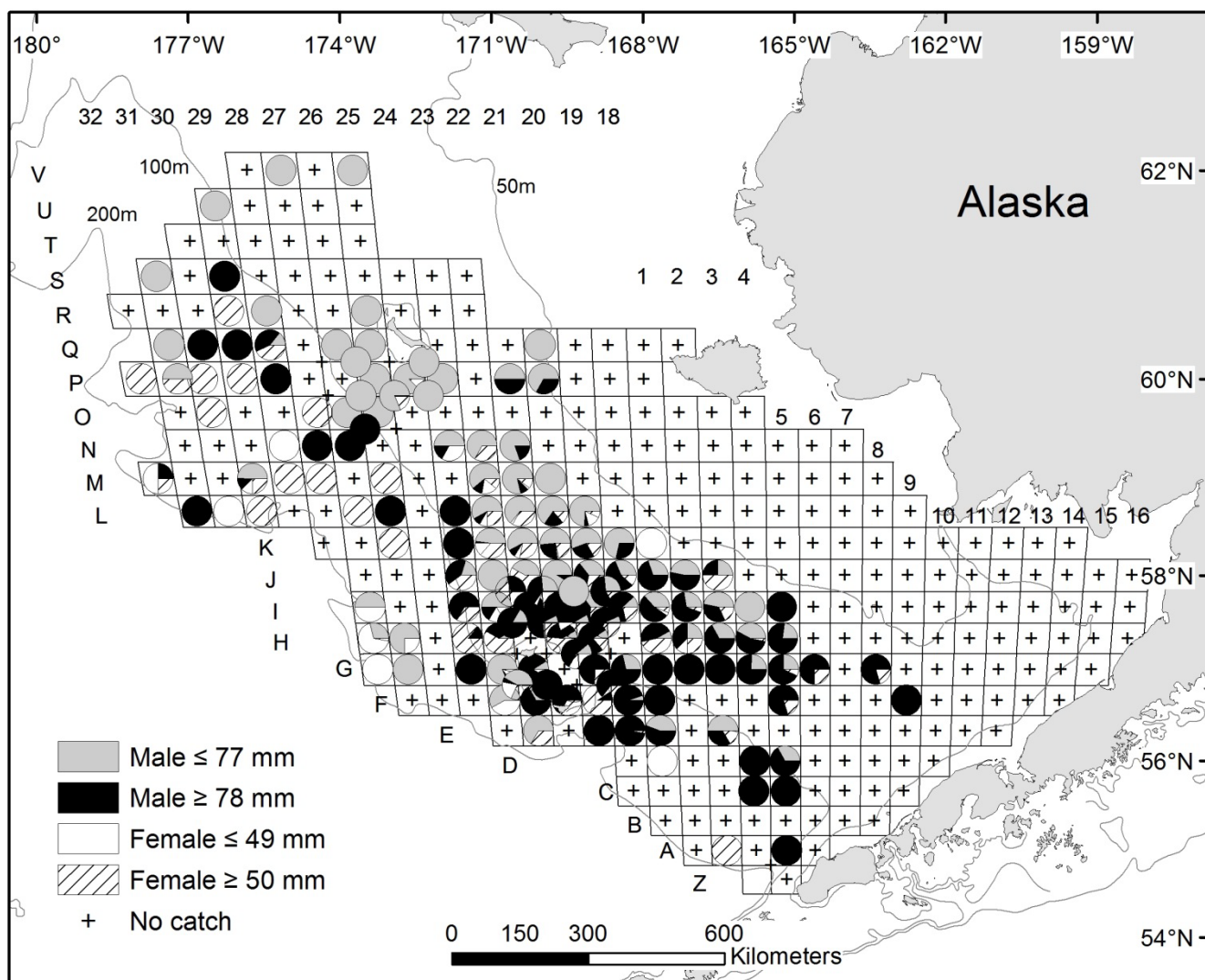


Figure 75. -- Percentage of male and female *Chionoecetes* spp. hybrid crab size categories at each station sampled in 2013.

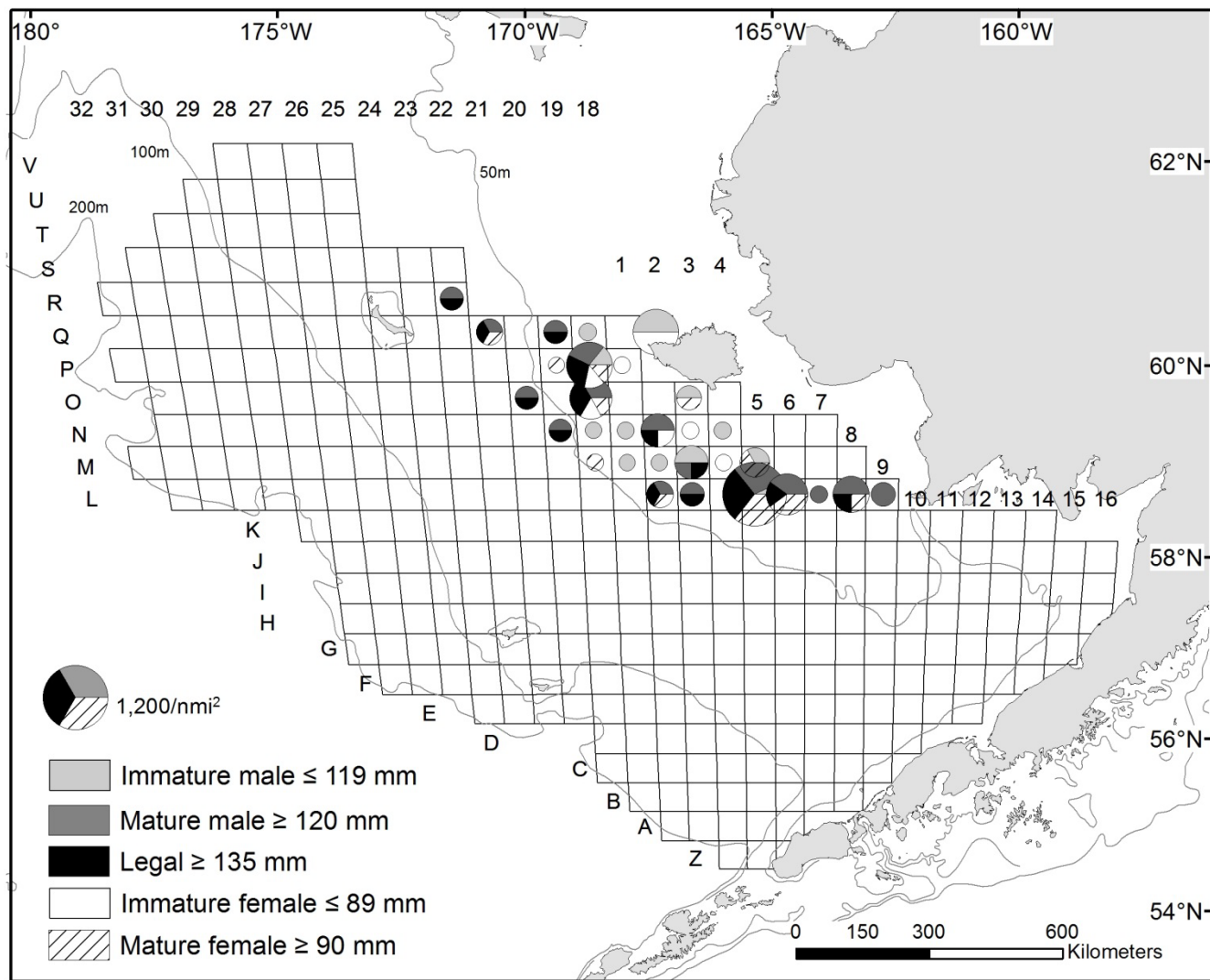


Figure 76. -- Total density (number nmi<sup>-2</sup>) and percentage of male and female red king crab (*Paralithodes camtschaticus*) size categories at each station sampled in the Northern District in 2013.

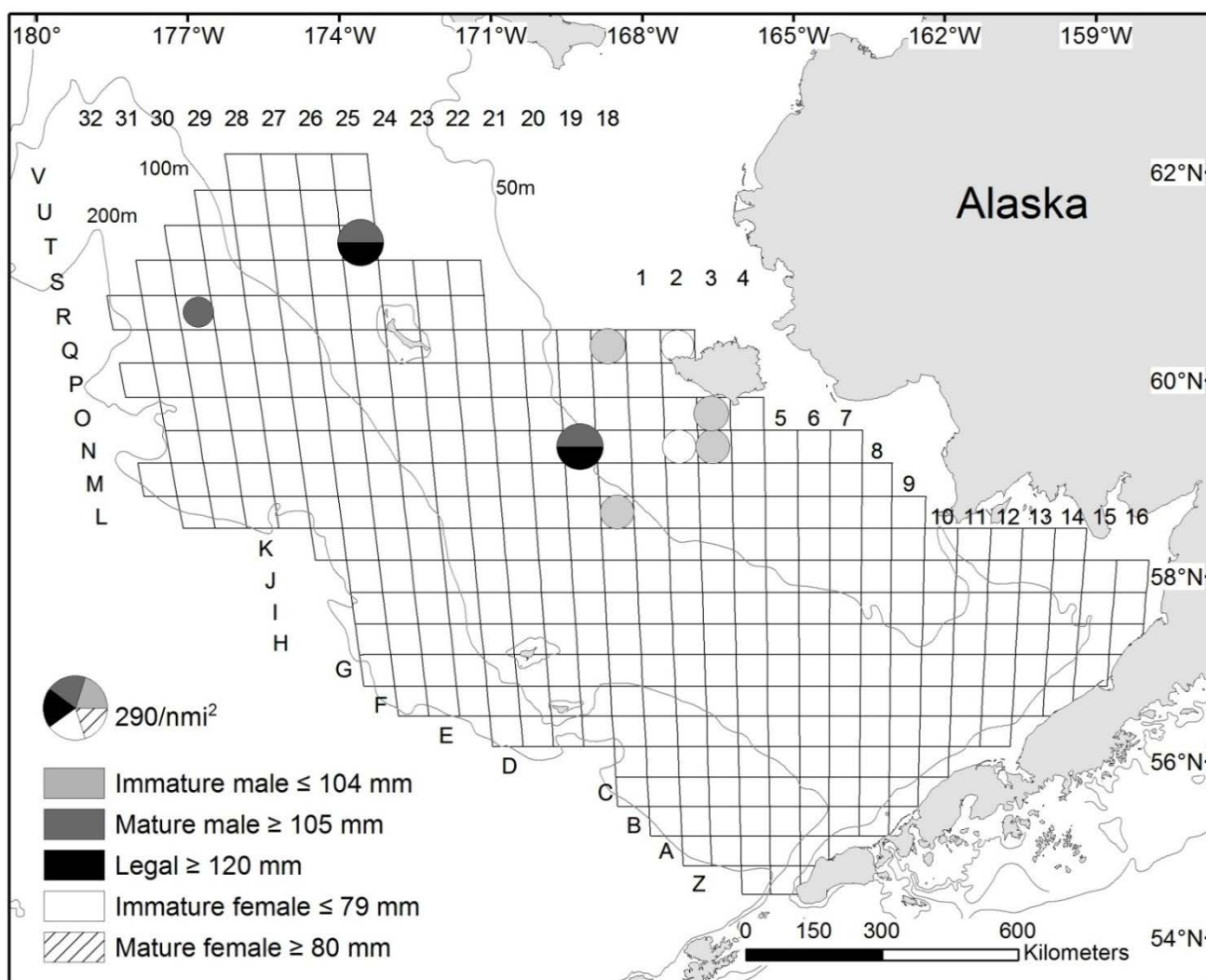


Figure 77. -- Total density (number nmi<sup>-2</sup>) and percentage of male and female blue king crab (*Paralithodes platypus*) size categories at stations sampled outside of the Pribilof District and St. Matthew Island section of the Northern District in 2013.

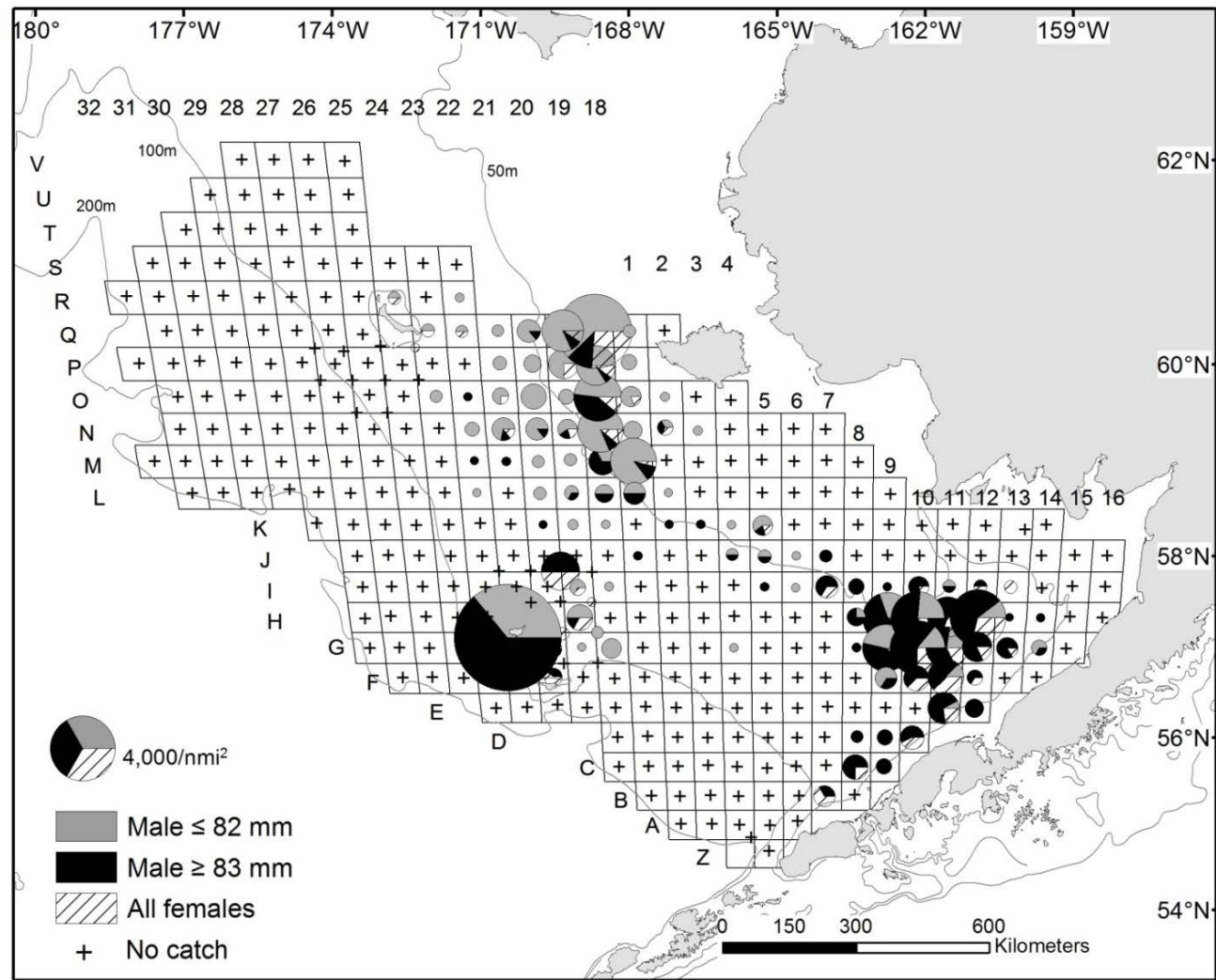


Figure 78. -- Total density (number nmi<sup>-2</sup>) and percentage of male and female hair crab (*Erimacrus isenbeckii*) size categories at each station sampled in 2013.

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Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	A-02	A-03	A-04	A-04	A-05	A-06	B-01	B-02	B-03	B-04	B-05
Start Date	06/27/2013	06/27/2013	06/22/2013	06/22/2013	06/23/2013	06/19/2013	06/27/2013	06/27/2013	06/24/2013	06/22/2013	06/23/2013
Duration (hour)	0.51	0.55	0.52	0.52	0.61	0.51	0.52	0.54	0.58	0.52	0.57
Distance Fished (km)	2.81	3.05	2.84	2.85	3.53	2.76	2.83	2.94	3.32	2.81	3.17
Mid-Latitude (°N)	55.01	55.01	54.85	55.00	54.99	55.04	55.33	55.33	55.34	55.33	55.33
Mid-Longitude (°W)	-166.94	-166.32	-165.52	-165.75	-165.14	-164.58	-167.54	-166.96	-166.35	-165.77	-165.17
Bottom Depth (m)	156	143	148	130	111	66	149	141	131	121	111
Bottom Temperature (°C)	3.7	3.7	3.7	4.0	4.2	4.6	3.7	3.7	3.7	4.2	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	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	31,659	2,364	5,942	1,195	338	0	21,875	3,753	1,063	699	241
Mature males	1,413	1,394	601	332	56	0	192	655	266	117	121
Legal	424	1,091	467	266	56	0	0	596	266	58	60
Immature females	23,084	5,333	9,346	929	394	0	21,812	3,514	1,595	1,166	181
Mature females	1,443	4,848	0	199	0	0	144	477	213	0	0
Total weight (kg)	42.53	40.65	11.69	6.08	1.04	0.00	14.90	13.62	5.85	4.58	2.25
Opilio Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	66	0	0	0	0	0	58	0
Legal	0	0	0	66	0	0	0	0	0	58	0
Immature females	0	0	0	0	0	0	0	60	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	0.67	0.00	0.00	0.00	0.03	0.00	0.88	0.00
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	0	0	0	0	0	0
Males ≥ 78 mm	0	0	0	0	113	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	121	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.30	0.00	0.00	2.06	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	B-06	B-07	B-08	C-01	C-02	C-03	C-04	C-05	C-06	C-07	C-08
Start Date	06/19/2013	06/15/2013	06/14/2013	06/27/2013	06/24/2013	06/23/2013	06/23/2013	06/23/2013	06/19/2013	06/15/2013	06/14/2013
Duration (hour)	0.51	0.52	0.51	0.55	0.52	0.58	0.44	0.54	0.52	0.51	0.51
Distance Fished (km)	2.79	2.79	2.83	3.12	2.81	3.33	2.47	3.12	2.79	2.76	2.78
Mid-Latitude (°N)	55.33	55.33	55.34	55.67	55.67	55.68	55.67	55.65	55.67	55.68	55.66
Mid-Longitude (°W)	-164.55	-164.04	-163.42	-167.60	-166.99	-166.39	-165.81	-165.19	-164.61	-164.01	-163.41
Bottom Depth (m)	101	79	53	135	135	127	117	108	96	95	81
Bottom Temperature (°C)	3.8	3.9	3.2	3.8	3.7	3.6	3.5	3.2	2.5	2.2	2.8
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	222
Mature males	0	0	1,536	0	0	0	0	0	0	0	2,368
Legal	0	0	1,383	0	0	0	0	0	0	0	1,924
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	4,148	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	156.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	98.00
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	274	144	230	184	1,660	1,463	822	317	1,490	1,111	296
Mature males	753	359	307	184	114	54	672	825	670	1,333	1,554
Legal	685	216	230	61	57	54	597	571	670	963	1,332
Immature females	205	0	77	430	2,404	2,276	224	508	1,639	1,333	296
Mature females	479	0	0	0	172	54	0	190	223	148	592
Total weight (kg)	10.08	4.09	3.80	1.82	2.76	3.47	7.61	12.99	6.93	14.09	19.83
Opilio Tanner Crab											
Immature males	0	0	0	0	0	0	0	63	0	74	0
Mature males	411	0	0	61	0	0	0	127	0	148	0
Legal	411	0	0	61	0	0	0	190	0	148	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	54	0	0	0	0	0
Total weight (kg)	3.72	0.00	0.00	0.64	0.00	0.04	0.00	1.49	0.00	1.46	0.00
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	0	0	0	0	0	0
Males ≥ 78 mm	0	0	0	0	0	0	149	127	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	1.51	1.54	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	C-09	C-18	D-01	D-02	D-03	D-04	D-05	D-06	D-07	D-08	D-09
Start Date	06/14/2013	06/27/2013	06/27/2013	06/24/2013	06/24/2013	06/23/2013	06/19/2013	06/19/2013	06/15/2013	06/14/2013	06/14/2013
Duration (hour)	0.51	0.52	0.40	0.52	0.55	0.52	0.54	0.53	0.52	0.52	0.49
Distance Fished (km)	2.79	2.81	2.34	2.85	3.08	2.85	3.01	2.89	2.77	2.93	2.67
Mid-Latitude (°N)	55.67	55.67	56.01	56.00	56.00	56.00	56.00	56.00	56.00	56.01	56.00
Mid-Longitude (°W)	-162.84	-168.19	-167.61	-167.00	-166.40	-165.78	-165.18	-164.59	-164.03	-163.38	-162.82
Bottom Depth (m)	53	136	133	135	124	108	96	93	91	89	78
Bottom Temperature (°C)	2.9	3.9	3.8	3.8	3.5	3.3	1.7	1.7	1.9	1.8	2.4
Red King Crab											
Immature males	1,226	0	0	0	0	0	0	0	0	0	152
Mature males	2,223	0	0	0	0	0	0	0	76	213	1,063
Legal	1,073	0	0	0	0	0	0	0	76	213	684
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	1,150	0	0	0	0	0	0	0	0	71	456
Total weight (kg)	104.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.42	10.56	43.49
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	690	1,849	807	1,153	429	3,307	2,342	12,644	836	639	759
Mature males	920	0	81	404	552	1,822	651	686	760	923	608
Legal	690	0	81	346	552	1,485	521	412	760	568	380
Immature females	0	1,164	807	1,269	491	4,792	2,407	19,090	228	284	0
Mature females	77	0	0	58	245	1,687	325	934	76	355	304
Total weight (kg)	8.50	0.44	1.16	6.16	8.84	30.49	14.26	29.29	11.49	11.42	9.43
Opilio Tanner Crab											
Immature males	0	0	0	58	0	67	260	0	0	0	0
Mature males	0	0	0	58	0	1,822	195	137	228	0	0
Legal	0	0	0	58	0	1,890	390	137	228	0	0
Immature females	0	0	0	115	61	135	0	0	0	0	0
Mature females	0	0	0	0	0	2,497	65	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.47	0.02	23.80	2.89	1.35	1.43	0.00	0.00
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	0	65	0	0	0	0
Males ≥ 78 mm	0	0	0	0	0	67	130	0	0	0	0
Immature females	0	0	161	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	0.03	0.00	0.00	0.82	1.13	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	D-10	D-18	E-01	E-02	E-03	E-04	E-05	E-06	E-07	E-08	E-09
Start Date	06/14/2013	06/27/2013	06/28/2013	06/24/2013	06/24/2013	06/23/2013	06/19/2013	06/18/2013	06/15/2013	06/14/2013	06/14/2013
Duration (hour)	0.50	0.53	0.56	0.52	0.58	0.52	0.51	0.50	0.51	0.53	0.54
Distance Fished (km)	2.73	2.96	3	2.85	3.21	2.83	2.82	2.74	2.69	2.88	2.93
Mid-Latitude (°N)	56.00	56.00	56.34	56.34	56.32	56.33	56.33	56.33	56.35	56.33	56.33
Mid-Longitude (°W)	-162.26	-168.22	-167.65	-167.03	-166.41	-165.80	-165.20	-164.58	-163.97	-163.42	-162.80
Bottom Depth (m)	72	149	129	114	105	93	86	87	86	85	78
Bottom Temperature (°C)	2.4	3.7	3.7	3.4	3.0	1.6	1.1	1.1	1.3	1.4	1.6
Red King Crab											
Immature males	1,830	0	0	0	0	0	0	0	0	0	0
Mature males	2,973	0	0	0	0	0	0	0	0	461	503
Legal	2,363	0	0	0	0	0	0	0	0	461	431
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	6,175	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	214.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.52	21.98
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	305	8,000	4,250	8,671	6,279	2,587	1,756	2,070	2,020	2,613	1,581
Mature males	610	67	175	3,902	1,416	1,089	1,069	571	524	231	359
Legal	457	67	175	2,849	862	885	534	357	299	77	287
Immature females	0	5,782	4,075	4,326	6,033	2,110	1,145	1,213	2,170	1,076	719
Mature females	381	0	0	2,704	2,647	477	153	143	299	307	216
Total weight (kg)	7.16	4.14	3.98	65.04	39.89	40.64	15.91	14.21	11.19	9.84	8.24
Opilio Tanner Crab											
Immature males	0	0	58	186	246	340	76	71	150	0	0
Mature males	76	0	349	681	554	340	534	357	0	0	0
Legal	76	0	349	805	616	613	611	428	75	0	0
Immature females	0	0	233	62	554	0	0	0	0	0	0
Mature females	0	0	0	248	554	204	229	0	0	0	0
Total weight (kg)	0.46	0.00	4.43	7.91	8.34	5.24	5.01	2.44	0.40	0.00	0.00
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	233	0	185	0	0	0	0	0	0
Males ≥ 78 mm	0	0	291	0	123	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	62	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	3.43	0.00	1.07	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	E-10	E-11	E-12	E-18	E-19	E-20	E-21	E-22	F-01	F-02	F-03
Start Date	06/13/2013	06/11/2013	06/11/2013	06/28/2013	07/05/2013	07/05/2013	07/05/2013	07/06/2013	06/28/2013	06/23/2013	06/23/2013
Duration (hour)	0.51	0.53	0.51	0.50	0.50	0.37	0.52	0.51	0.54	0.52	0.52
Distance Fished (km)	2.81	2.98	2.87	2.81	2.74	2.02	2.85	2.77	3.02	2.78	2.84
Mid-Latitude (°N)	56.32	56.33	56.33	56.33	56.33	56.37	56.34	56.33	56.67	56.67	56.67
Mid-Longitude (°W)	-162.20	-161.63	-161.01	-168.26	-168.84	-169.44	-170.05	-170.68	-167.68	-167.06	-166.45
Bottom Depth (m)	77	64	54	155	126	131	109	122	102	95	84
Bottom Temperature (°C)	2.0	2.6	2.9	3.7	3.7	3.6	3.3	3.9	1.5	1.2	0.9
Red King Crab											
Immature males	78	1,166	406	0	0	0	0	0	0	0	0
Mature males	1,395	2,479	244	0	0	0	0	0	0	0	0
Legal	930	1,968	163	0	0	0	0	0	0	0	0
Immature females	0	0	163	0	0	0	0	0	0	0	0
Mature females	465	10,935	1,219	0	0	0	0	0	0	0	0
Total weight (kg)	60.28	286.03	31.77	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	930	802	3,332	2,261	6,399	1,293	2,550	6,701	2,129	4,417	565
Mature males	930	802	813	5,687	527	92	738	195	903	1,192	847
Legal	853	437	488	5,071	452	92	537	130	710	701	777
Immature females	78	0	488	617	9,711	1,016	1,745	8,067	2,000	4,347	424
Mature females	698	1,021	894	274	151	0	470	0	258	1,122	353
Total weight (kg)	12.85	12.68	15.79	63.57	8.23	2.89	13.13	7.70	10.54	15.88	8.79
Opilio Tanner Crab											
Immature males	0	0	0	2,193	226	0	268	520	581	1,122	494
Mature males	0	0	0	12,882	753	92	201	0	3,226	771	565
Legal	0	0	0	13,978	903	92	201	0	3,549	1,052	1,059
Immature females	0	0	0	0	753	92	470	586	194	1,052	0
Mature females	0	0	0	137	0	646	0	0	194	0	0
Total weight (kg)	0.00	0.00	0.00	175.19	6.35	2.49	0.22	0.22	32.04	7.07	6.06
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	0	134	0	0	0	0
Males ≥ 78 mm	0	0	0	2,535	75	0	0	0	1,032	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	69	0	0	67	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	21.06	0.45	0.00	0.16	0.00	7.76	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	F-04	F-05	F-06	F-07	F-08	F-09	F-10	F-11	F-12	F-13	F-14
Start Date	06/23/2013	06/19/2013	06/18/2013	06/16/2013	06/16/2013	06/14/2013	06/13/2013	06/11/2013	06/11/2013	06/11/2013	06/11/2013
Duration (hour)	0.51	0.53	0.52	0.52	0.52	0.51	0.52	0.29	0.52	0.51	0.50
Distance Fished (km)	2.78	2.95	2.78	2.82	2.79	2.88	2.83	1.47	2.83	2.73	2.74
Mid-Latitude (°N)	56.66	56.67	56.67	56.67	56.66	56.67	56.66	56.68	56.67	56.67	56.67
Mid-Longitude (°W)	-165.85	-165.22	-164.58	-164.01	-163.40	-162.79	-162.18	-161.58	-160.99	-160.39	-159.74
Bottom Depth (m)	78	75	75	75	75	72	72	89	68	60	38
Bottom Temperature (°C)	0.3	0.2	0.6	0.7	0.5	1.3	1.3	1.6	2.4	2.7	5.5
Red King Crab											
Immature males	0	0	0	0	0	0	0	310	1,264	298	0
Mature males	0	0	0	0	0	76	153	1,084	1,264	149	0
Legal	0	0	0	0	0	76	153	930	967	0	0
Immature females	0	0	0	0	0	0	0	0	223	149	0
Mature females	0	0	0	0	0	0	0	0	3,495	223	83
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	2.92	3.67	20.39	119.90	10.31	2.26
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	1,574	6,297	29,018	53,866	13,725	11,681	4,469	1,394	744	1,786	83
Mature males	819	5,813	8,832	53,866	17,157	18,704	21,093	5,422	3,049	0	0
Legal	756	3,068	3,154	22,511	6,863	8,856	13,049	4,028	2,826	0	0
Immature females	1,637	6,908	35,786	18,491	6,436	2,290	229	155	74	223	0
Mature females	252	7,349	10,892	8,442	11,262	11,375	4,352	3,098	521	1,042	0
Total weight (kg)	15.78	95.11	222.94	614.61	191.52	205.36	126.53	28.24	33.03	7.23	0.16
Opilio Tanner Crab											
Immature males	126	1,155	75	0	73	153	0	0	0	0	0
Mature males	504	1,495	449	0	73	153	0	0	0	0	0
Legal	567	2,514	449	0	146	229	0	0	0	0	0
Immature females	63	0	0	0	0	0	0	0	0	0	0
Mature females	567	4,755	0	0	0	0	0	0	0	0	0
Total weight (kg)	6.52	21.44	3.12	0.00	0.76	1.37	0.00	0.00	0.00	0.00	0.00
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	0	0	0	0	0	0
Males ≥ 78 mm	0	272	0	0	0	76	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	68	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	1.70	0.00	0.00	0.00	0.49	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	F-18	F-19	F-20	F-21	F-22	F-23	F-24	F-25	G-01	G-02	G-03
Start Date	06/28/2013	07/05/2013	07/05/2013	07/05/2013	07/06/2013	07/15/2013	07/15/2013	07/21/2013	06/28/2013	06/28/2013	06/28/2013
Duration (hour)	0.53	0.55	0.55	0.52	0.51	0.55	0.50	0.57	0.54	0.54	0.54
Distance Fished (km)	2.88	3.09	3.21	2.86	2.70	3.02	2.66	3.10	2.93	2.99	2.98
Mid-Latitude (°N)	56.66	56.67	56.68	56.66	56.66	56.66	56.68	56.67	57.00	57.00	57.00
Mid-Longitude (°W)	-168.28	-168.92	-169.53	-170.11	-170.73	-171.34	-171.97	-172.57	-167.71	-167.09	-166.46
Bottom Depth (m)	107	99	79	97	114	119	126	136	78	74	74
Bottom Temperature (°C)	1.5	2.1	1.6	2.2	3.1	3.7	3.7	3.6	0.9	1.1	0.6
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	125	0	0	0	0	0	0	0	0
Legal	0	0	125	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	10.71	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	62	0	0	0	0	0	0	0	0
Legal	0	0	62	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	3.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	467	5,217	187	2,397	19,830	1,315	0	463	494	902	1,683
Mature males	2,335	880	812	2,260	0	66	0	66	3,245	902	3,435
Legal	1,868	691	562	1,643	0	66	0	0	2,610	833	2,384
Immature females	0	4,965	312	1,506	18,831	723	0	794	494	833	1,192
Mature females	0	1,697	187	68	148	0	0	132	988	139	561
Total weight (kg)	24.70	19.05	8.69	28.39	4.44	1.10	0.00	2.66	28.01	8.42	25.69
Opilio Tanner Crab											
Immature males	2,268	1,131	187	137	1,552	0	685	0	635	1,041	3,435
Mature males	4,003	817	125	479	74	0	228	0	1,129	278	1,332
Legal	5,071	1,383	312	479	148	0	457	0	1,622	971	2,874
Immature females	0	0	0	342	0	0	228	0	0	0	0
Mature females	52,240	5,342	0	0	0	0	228	0	141	139	28,464
Total weight (kg)	269.80	20.40	1.85	4.36	0.15	0.00	1.51	0.00	10.63	5.28	68.15
Hybrid Tanner Crab											
Males ≤ 77 mm	67	0	0	68	2,069	0	0	0	0	0	0
Males ≥ 78 mm	1,334	628	125	137	0	0	0	0	212	208	210
Immature females	0	0	0	0	1,478	0	0	0	0	0	0
Mature females	0	6,096	62	0	0	0	0	0	0	0	0
Total weight (kg)	10.70	16.97	0.97	0.90	0.11	0.00	0.00	0.00	1.40	1.33	1.21

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	G-04	G-05	G-06	G-07	G-08	G-09	G-10	G-11	G-12	G-13	G-14
Start Date	06/29/2013	06/19/2013	06/18/2013	06/16/2013	06/15/2013	06/14/2013	06/13/2013	06/11/2013	06/11/2013	06/10/2013	06/10/2013
Duration (hour)	0.51	0.51	0.50	0.50	0.53	0.52	0.51	0.54	0.51	0.54	0.51
Distance Fished (km)	2.92	2.93	2.70	2.72	2.85	2.92	2.73	2.87	2.76	3.00	2.79
Mid-Latitude (°N)	57.00	56.99	57.00	57.00	57.00	57.00	57.00	57.00	57.01	57.00	57.00
Mid-Longitude (°W)	-165.88	-165.22	-164.60	-164.03	-163.39	-162.79	-162.16	-161.56	-160.95	-160.34	-159.69
Bottom Depth (m)	72	71	69	69	66	61	60	68	62	63	55
Bottom Temperature (°C)	0.4	0.1	0.1	0.0	0.0	0.9	1.9	2.0	2.6	3.0	3.5
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	461	1,154	1,152
Mature males	0	0	0	0	0	0	80	758	769	2,812	230
Legal	0	0	0	0	0	0	80	606	615	2,163	77
Immature females	0	0	0	0	0	0	0	0	0	144	307
Mature females	0	0	0	0	0	0	0	76	692	3,244	230
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	3.08	26.90	45.27	181.38	21.23
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	6,938	38,672	13,325	17,177	9,416	1,661	1,515	1,667	461	1,370	2,457
Mature males	2,385	5,267	979	916	153	528	957	4,622	1,691	577	0
Legal	1,590	2,859	226	458	77	377	319	3,561	1,615	577	0
Immature females	5,854	22,824	1,280	2,672	2,373	377	0	227	0	433	1,382
Mature females	0	2,380	226	458	2,450	679	319	152	0	360	1,152
Total weight (kg)	38.43	152.77	39.29	51.40	30.45	10.58	10.30	44.82	18.63	11.50	9.92
Opilio Tanner Crab											
Immature males	9,901	9,852	2,183	76	306	0	0	0	0	0	0
Mature males	3,469	8,689	2,560	76	77	0	0	0	0	0	0
Legal	11,057	16,967	4,140	76	383	0	0	0	0	0	0
Immature females	145	68	0	0	0	0	0	0	0	0	0
Mature females	21,536	1,368	0	0	0	0	0	0	0	0	0
Total weight (kg)	83.79	68.99	17.05	0.57	1.19	0.00	0.00	0.00	0.00	0.00	0.00
Hybrid Tanner Crab											
Males ≤ 77 mm	72	1,026	0	0	0	0	0	0	0	0	0
Males ≥ 78 mm	217	2,805	226	0	1,761	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	274	75	0	459	0	0	0	0	0	0
Total weight (kg)	1.22	10.91	0.88	0.00	7.13	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	G-15	G-18	G-19	G-20	G-21	G-22	G-23	G-24	G-25	G-26	GF1918
Start Date	06/09/2013	06/28/2013	07/05/2013	07/04/2013	07/06/2013	07/06/2013	07/15/2013	07/15/2013	07/22/2013	07/21/2013	07/05/2013
Duration (hour)	0.50	0.52	0.55	0.52	0.36	0.52	0.55	0.51	0.53	0.51	0.56
Distance Fished (km)	2.72	2.78	3.02	2.80	1.92	2.87	3.04	2.78	2.85	2.77	3.12
Mid-Latitude (°N)	56.99	56.99	57.01	56.99	57.01	57.00	57.00	57.00	57.00	56.99	56.83
Mid-Longitude (°W)	-159.14	-168.35	-168.95	-169.56	-170.15	-170.78	-171.39	-172.04	-172.64	-173.24	-168.63
Bottom Depth (m)	33	82	80	59	67	96	109	117	122	141	96
Bottom Temperature (°C)	4.7	1.0	1.6	0.5	2.8	2.0	3.0	3.6	3.6	3.3	1.3
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	218	3,770	0	0	0	0	0	0
Legal	0	0	0	218	3,770	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	145	111	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	18.81	143.53	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	73	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	2.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	2,996	1,443	15,057	19,846	8,249	1,078	0	813	212	695
Mature males	0	3,653	394	803	30,046	887	127	0	0	71	947
Legal	0	2,484	328	402	19,624	444	127	0	0	71	821
Immature females	0	4,749	1,312	12,575	333	5,234	697	0	1,256	141	1,074
Mature females	0	1,900	66	1,489	1,552	1,774	0	0	74	0	126
Total weight (kg)	0.00	33.96	3.94	35.55	164.32	17.96	2.14	0.00	0.78	1.17	9.74
Opilio Tanner Crab											
Immature males	0	1,900	525	1,234	0	203	951	144	0	0	2,969
Mature males	0	1,023	656	1,598	0	203	1,775	2,526	0	0	2,527
Legal	0	1,754	853	1,961	0	203	2,536	2,526	0	0	4,548
Immature females	0	0	0	145	0	542	0	72	0	0	253
Mature females	0	219	0	508	0	203	63	0	0	0	568
Total weight (kg)	0.00	14.71	6.56	13.94	0.00	1.49	18.75	22.15	0.00	0.00	33.74
Hybrid Tanner Crab											
Males ≤ 77 mm	0	146	0	0	111	1,490	0	0	74	0	0
Males ≥ 78 mm	0	365	197	0	998	68	127	0	0	0	568
Immature females	0	0	0	0	0	203	0	0	0	71	0
Mature females	0	0	66	0	111	68	0	0	0	0	316
Total weight (kg)	0.00	2.06	1.50	0.00	3.27	0.46	0.94	0.00	0.01	0.01	4.77

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	GF2019	GF2120	GF2221	H-01	H-02	H-03	H-04	H-05	H-06	H-07	H-08
Start Date	07/04/2013	07/06/2013	07/05/2013	06/29/2013	06/29/2013	06/29/2013	06/29/2013	06/18/2013	06/18/2013	06/16/2013	06/15/2013
Duration (hour)	0.51	0.52	0.51	0.52	0.53	0.52	0.52	0.51	0.50	0.50	0.51
Distance Fished (km)	2.74	2.83	2.78	2.92	2.82	2.79	2.98	2.83	2.71	2.71	2.87
Mid-Latitude (°N)	56.82	56.84	56.83	57.33	57.33	57.33	57.35	57.33	57.33	57.34	57.34
Mid-Longitude (°W)	-169.31	-169.91	-170.48	-167.76	-167.12	-166.48	-165.86	-165.23	-164.62	-164.01	-163.39
Bottom Depth (m)	80	72	102	73	71	70	68	68	65	62	54
Bottom Temperature (°C)	1.4	2.4	2.2	0.1	0.2	0.5	0.8	-0.2	-0.2	1.0	0.7
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	146	0	0	0	0	0	0	0	0	0
Legal	0	146	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	78
Total weight (kg)	0.00	10.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.42
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	364	0	0	0	0	0	0	0	0	0
Legal	0	219	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	364	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	19.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	2,371	947	34,542	5,441	3,169	3,726	1,637	3,206	773	210	0
Mature males	994	3,133	2,974	2,519	423	502	136	0	77	0	0
Legal	688	2,550	1,601	1,511	141	287	136	0	0	0	0
Immature females	2,218	219	17,212	3,060	9,719	1,577	955	614	155	0	78
Mature females	459	437	11,033	2,344	352	72	0	136	0	0	78
Total weight (kg)	10.93	32.02	100.81	40.60	28.90	9.50	4.83	7.87	1.94	0.53	0.31
Opilio Tanner Crab											
Immature males	459	510	902	4,493	3,381	16,196	36,701	2,387	77	0	0
Mature males	459	2,259	0	391	211	3,081	11,256	546	155	0	0
Legal	612	2,769	0	2,800	1,831	15,837	40,453	1,160	155	0	0
Immature females	0	0	0	912	4,015	72	68	0	0	0	0
Mature females	0	73	0	28,583	95,645	2,651	3,820	273	155	0	0
Total weight (kg)	4.15	15.98	0.48	80.80	236.60	61.00	159.76	8.25	0.83	0.00	0.00
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	1,805	65	141	287	887	341	0	0	0
Males ≥ 78 mm	0	291	208	391	211	573	1,160	1,160	0	0	0
Immature females	0	0	902	0	70	0	0	0	0	0	0
Mature females	0	0	1,388	391	141	0	68	0	0	0	0
Total weight (kg)	0.00	1.43	3.10	2.60	1.60	2.90	5.32	4.76	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	H-09	H-10	H-11	H-12	H-13	H-14	H-15	H-16	H-18	H-19	H-20
Start Date	06/13/2013	06/13/2013	06/12/2013	06/11/2013	06/10/2013	06/10/2013	06/09/2013	06/09/2013	06/28/2013	07/04/2013	07/04/2013
Duration (hour)	0.52	0.50	0.51	0.51	0.55	0.51	0.53	0.51	0.52	0.35	0.51
Distance Fished (km)	2.92	2.71	2.84	2.72	3.14	2.80	2.91	2.78	2.81	2.00	2.77
Mid-Latitude (°N)	57.33	57.32	57.34	57.33	57.34	57.33	57.34	57.33	57.32	57.33	57.33
Mid-Longitude (°W)	-162.76	-162.15	-161.55	-160.93	-160.29	-159.66	-159.07	-158.41	-168.37	-168.99	-169.60
Bottom Depth (m)	50	50	56	62	62	56	49	31	74	70	62
Bottom Temperature (°C)	1.9	2.1	2.4	2.6	3.1	3.4	3.4	5.2	0.4	0.7	0.0
Red King Crab											
Immature males	0	0	473	0	312	1,371	0	0	0	0	0
Mature males	74	241	868	393	624	1,219	77	82	0	0	0
Legal	74	160	631	157	375	990	0	0	0	0	0
Immature females	0	0	0	0	312	457	77	0	0	0	0
Mature females	0	0	0	157	562	990	77	82	0	0	0
Total weight (kg)	2.71	6.70	35.48	12.55	41.46	78.70	3.82	3.29	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	312	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	208	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
Bairdi Tanner Crab											
Immature males	0	0	158	79	62	305	0	0	931	33,636	5,485
Mature males	0	0	79	0	0	0	0	0	1,504	13,654	2,385
Legal	0	0	79	0	0	0	0	0	1,289	9,158	1,192
Immature females	0	0	158	79	125	0	77	0	1,576	16,577	2,623
Mature females	148	241	79	0	0	0	0	0	215	3,855	1,669
Total weight (kg)	0.41	0.70	1.64	1.58	0.35	0.58	0.06	0.00	12.25	116.77	31.82
Opilio Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	2,364	4,268	4,771
Mature males	0	0	0	0	0	0	0	0	143	2,394	5,233
Legal	0	0	0	0	0	0	0	0	788	4,163	7,157
Immature females	0	0	0	0	0	0	0	0	1,289	104	231
Mature females	0	0	0	0	0	0	0	0	286	104	7,619
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.37	13.40	51.75
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	0	0	0	0	208	231
Males ≥ 78 mm	0	0	0	0	0	0	0	0	0	1,665	1,154
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	312	1,462
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.39	13.48

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	H-21	H-22	H-23	H-24	H-25	H-26	HG1918	HG2019	HG2120	HG2221	I-01
Start Date	07/06/2013	07/08/2013	07/15/2013	07/14/2013	07/22/2013	07/22/2013	07/04/2013	07/04/2013	07/06/2013	07/08/2013	07/02/2013
Duration (hour)	0.35	0.50	0.53	0.52	0.56	0.50	0.54	0.53	0.52	0.52	0.51
Distance Fished (km)	1.90	2.74	2.91	2.78	3.03	2.73	2.99	2.90	2.87	2.73	2.75
Mid-Latitude (°N)	57.34	57.34	57.33	57.34	57.35	57.32	57.17	57.16	57.16	57.11	57.67
Mid-Longitude (°W)	-170.23	-170.85	-171.47	-172.10	-172.81	-173.33	-168.63	-169.33	-169.90	-170.45	-167.75
Bottom Depth (m)	55	84	101	109	116	122	76	72	50	51	69
Bottom Temperature (°C)	3.7	2.0	2.1	3.6	3.1	3.2	1.6	0.2	3.0	2.6	0.6
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	308	0
Mature males	113	75	0	0	0	0	0	74	145	2005	0
Legal	113	75	0	0	0	0	0	74	145	1542	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	75	0	0	0	0	0	0	0	0	0
Total weight (kg)	2.30	6.75	0.00	0.00	0.00	0.00	0.00	3.24	7.63	96.18	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	35,672	471	0	327	2,490	404	2,532	145	1,388	20,935
Mature males	0	3,452	337	0	0	0	471	1,192	0	2,236	2,117
Legal	0	2,877	269	0	0	0	202	745	0	1,542	941
Immature females	0	19,562	135	0	851	3,735	471	1,862	73	231	3,999
Mature females	0	7,480	135	0	0	146	0	149	0	1,619	0
Total weight (kg)	0.00	110.49	3.99	0.00	0.42	1.96	4.62	12.79	0.37	18.55	46.24
Opilio Tanner Crab											
Immature males	0	2,315	471	1,186	0	0	875	2,383	0	0	36,913
Mature males	0	16,651	5,049	7,254	1,047	0	942	894	0	0	3,301
Legal	0	17,846	5,385	8,370	1,047	0	1,346	1,787	0	0	19,507
Immature females	0	0	67	140	65	0	0	223	0	0	0
Mature females	0	5,152	740	349	0	0	0	3,575	0	0	2,326
Total weight (kg)	0.00	117.66	41.27	65.00	11.59	0.00	9.79	17.29	0.00	0.00	91.58
Hybrid Tanner Crab											
Males ≤ 77 mm	0	597	0	0	196	806	0	74	0	0	2,551
Males ≥ 78 mm	0	2,315	135	0	0	0	0	372	0	0	3,751
Immature females	0	0	0	0	65	1,904	0	0	0	0	225
Mature females	0	4,032	875	0	0	73	0	223	0	0	450
Total weight (kg)	0.00	17.65	2.67	0.00	0.03	0.43	0.00	1.98	0.00	0.00	15.58

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	I-02	I-03	I-04	I-05	I-06	I-07	I-08	I-09	I-10	I-11	I-12
Start Date	07/02/2013	06/30/2013	06/29/2013	06/18/2013	06/18/2013	06/17/2013	06/15/2013	06/13/2013	06/13/2013	06/12/2013	06/12/2013
Duration (hour)	0.51	0.51	0.53	0.52	0.51	0.51	0.52	0.53	0.51	0.51	0.52
Distance Fished (km)	2.79	2.78	3.04	2.84	2.75	2.67	2.89	2.96	2.76	2.87	2.75
Mid-Latitude (°N)	57.67	57.66	57.68	57.67	57.66	57.67	57.67	57.67	57.67	57.67	57.67
Mid-Longitude (°W)	-167.13	-166.50	-165.87	-165.25	-164.62	-164.00	-163.40	-162.77	-162.13	-161.52	-160.88
Bottom Depth (m)	68	67	64	61	54	50	47	44	47	54	58
Bottom Temperature (°C)	0.8	1.0	1.0	-0.1	1.2	1.4	1.8	2.6	2.4	1.9	2.1
Red King Crab											
Immature males	0	0	0	0	0	0	0	73	0	0	80
Mature males	0	0	0	0	0	79	77	0	0	313	559
Legal	0	0	0	0	0	79	77	0	0	156	319
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	79	77	73	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	3.34	2.96	1.27	0.00	6.67	14.70
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	2,731	832	68	519	0	0	77	147	0	156	239
Mature males	287	208	0	0	65	0	0	0	0	0	0
Legal	216	139	0	0	0	0	0	0	0	0	0
Immature females	431	0	0	0	0	0	232	366	0	156	239
Mature females	144	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	8.50	3.48	0.14	0.85	0.20	0.00	0.30	0.51	0.00	0.28	0.63
Opilio Tanner Crab											
Immature males	29,106	11,088	205	0	0	0	0	0	0	0	0
Mature males	2,515	1,802	68	0	0	0	0	0	0	0	0
Legal	16,601	8,316	137	0	0	0	0	0	0	0	0
Immature females	647	69	68	0	0	0	0	0	0	0	0
Mature females	1,150	832	68	0	0	0	0	0	0	0	0
Total weight (kg)	78.70	43.38	1.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hybrid Tanner Crab											
Males ≤ 77 mm	719	554	205	0	0	0	0	0	0	0	0
Males ≥ 78 mm	1,725	416	0	74	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	144	208	0	0	0	0	0	0	0	0	0
Total weight (kg)	8.70	2.23	0.19	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	I-13	I-14	I-15	I-16	I-18	I-19	I-20	I-21	I-22	I-23	I-24
Start Date	06/10/2013	06/10/2013	06/09/2013	06/09/2013	07/03/2013	07/03/2013	07/03/2013	07/08/2013	07/08/2013	07/15/2013	07/14/2013
Duration (hour)	0.50	0.50	0.53	0.50	0.51	0.51	0.50	0.52	0.50	0.54	0.52
Distance Fished (km)	2.83	2.78	2.92	2.71	2.83	2.74	2.78	2.85	2.75	2.89	2.86
Mid-Latitude (°N)	57.66	57.65	57.67	57.67	57.67	57.66	57.67	57.67	57.66	57.67	57.67
Mid-Longitude (°W)	-160.27	-159.63	-159.02	-158.36	-168.40	-169.03	-169.64	-170.27	-170.89	-171.54	-172.17
Bottom Depth (m)	56	50	47	36	71	69	71	73	86	99	108
Bottom Temperature (°C)	2.5	3.2	3.5	4.3	0.2	-0.2	-0.5	1.5	2.2	2.2	2.8
Red King Crab											
Immature males	1,109	343	69	0	0	0	0	0	0	0	0
Mature males	2,376	480	69	0	0	0	0	70	0	0	0
Legal	1,426	412	0	0	0	0	0	70	0	0	0
Immature females	634	69	0	0	0	0	0	0	0	0	0
Mature females	2,614	275	0	0	0	0	0	0	0	0	0
Total weight (kg)	121.29	25.36	2.57	0.00	0.00	0.00	0.00	3.87	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	81	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	0.18	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	79	0	0	0	11,107	11,797	7,793	3,237	1,125	210	0
Mature males	0	0	0	0	848	814	742	493	300	1,331	0
Legal	0	0	0	0	540	488	371	211	225	1,121	0
Immature females	0	0	0	0	1,311	2,848	7,422	1,055	225	210	0
Mature females	0	0	0	0	309	163	0	0	150	701	0
Total weight (kg)	0.10	0.00	0.00	0.00	22.88	19.44	18.70	8.24	4.65	12.46	0.00
Opilio Tanner Crab											
Immature males	0	0	0	0	31,161	19,282	13,322	1,126	150	3,923	1,140
Mature males	0	0	0	0	4,242	3,987	0	704	450	13,030	3,152
Legal	0	0	0	0	19,746	12,285	4,058	1,337	600	16,603	3,890
Immature females	0	0	0	0	0	2,522	6,891	0	0	70	0
Mature females	0	0	0	0	64,636	28,557	118,824	141	75	4,554	805
Total weight (kg)	0.00	0.00	0.00	0.00	153.75	72.50	134.60	6.73	3.67	110.09	28.53
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	463	895	0	0	225	0	0
Males ≥ 78 mm	0	0	0	0	2,622	976	383	211	75	420	0
Immature females	0	0	0	0	0	0	0	0	75	0	0
Mature females	0	0	0	0	848	651	0	0	75	210	0
Total weight (kg)	0.00	0.00	0.00	0.00	8.76	4.59	2.21	0.73	0.41	2.64	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	I-25	I-26	IH1918	IH2019	IH2120	IH2221	J-01	J-02	J-03	J-04	J-05
Start Date	07/22/2013	07/22/2013	07/04/2013	07/03/2013	07/08/2013	07/08/2013	07/02/2013	07/02/2013	06/30/2013	06/29/2013	06/18/2013
Duration (hour)	0.55	0.51	0.51	0.50	0.53	0.55	0.52	0.52	0.52	0.54	0.51
Distance Fished (km)	2.97	2.73	2.85	2.76	2.87	2.94	2.85	2.80	2.87	3.04	2.80
Mid-Latitude (°N)	57.67	57.66	57.50	57.51	57.49	57.50	58.00	58.00	58.00	58.01	57.99
Mid-Longitude (°W)	-172.80	-173.38	-168.75	-169.38	-169.97	-170.58	-167.82	-167.17	-166.52	-165.90	-165.25
Bottom Depth (m)	119	144	72	71	67	74	66	64	61	55	50
Bottom Temperature (°C)	3.0	3.0	0.1	-0.1	1.9	2.2	0.8	1.0	1.3	2.1	1.6
Red King Crab											
Immature males	0	0	0	0	0	66	0	0	0	0	0
Mature males	0	0	0	0	72	66	0	0	0	0	0
Legal	0	0	0	0	72	66	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	2.60	5.46	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	74	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	0.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	198	1,140	49,538	14,323	6,231	5,850	1,323	3,597	205	0	0
Mature males	0	285	6,056	0	2,536	4,188	389	367	0	0	0
Legal	0	143	4,348	0	1,521	2,526	156	294	0	0	0
Immature females	0	1,211	27,658	12,216	1,594	1,729	700	220	342	0	0
Mature females	0	143	4,098	421	725	465	78	0	0	0	0
Total weight (kg)	0.41	2.82	160.97	32.20	29.71	43.21	3.42	9.63	0.47	0.00	0.00
Opilio Tanner Crab											
Immature males	991	214	13,924	17,306	290	133	38,200	0	2,602	0	0
Mature males	925	4,133	5,846	1,694	435	133	6,458	0	68	0	0
Legal	1,322	4,347	13,308	4,640	507	199	24,274	0	890	0	0
Immature females	37,333	0	0	10,973	0	0	8,480	661	0	0	0
Mature females	143,648	0	51,002	39,988	72	0	1,634	0	0	0	0
Total weight (kg)	169.36	36.88	124.79	87.52	2.89	1.28	106.21	0.13	0.80	0.00	0.00
Hybrid Tanner Crab											
Males ≤ 77 mm	0	428	462	442	145	66	1,245	514	68	0	0
Males ≥ 78 mm	0	0	3,846	2,136	1,304	332	2,879	587	68	0	0
Immature females	0	428	0	442	0	0	0	0	0	0	0
Mature females	0	0	2,077	2,136	435	0	0	0	137	0	0
Total weight (kg)	0.00	0.05	16.50	11.36	7.06	1.09	11.85	2.07	0.63	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	J-06	J-07	J-08	J-09	J-10	J-11	J-12	J-13	J-14	J-15	J-16
Start Date	06/17/2013	06/17/2013	06/15/2013	06/13/2013	06/12/2013	06/12/2013	06/12/2013	06/10/2013	06/10/2013	06/09/2013	06/09/2013
Duration (hour)	0.51	0.52	0.52	0.50	0.51	0.51	0.52	0.52	0.51	0.51	0.51
Distance Fished (km)	2.79	2.88	2.86	2.80	2.90	2.85	2.79	2.91	2.75	2.97	2.74
Mid-Latitude (°N)	58.00	58.00	58.00	58.00	58.00	58.00	58.00	57.99	58.00	58.01	58.00
Mid-Longitude (°W)	-164.61	-164.01	-163.39	-162.76	-162.11	-161.48	-160.87	-160.24	-159.64	-158.97	-158.31
Bottom Depth (m)	45	46	44	42	39	56	45	51	43	41	36
Bottom Temperature (°C)	2.2	2.3	2.4	3.2	3.2	2.9	3.3	2.6	3.4	4.0	4.6
Red King Crab											
Immature males	0	0	75	170	165	502	475	296	290	147	83
Mature males	0	0	75	85	83	251	237	148	217	0	0
Legal	0	0	75	85	0	167	158	74	72	0	0
Immature females	0	0	0	0	83	0	0	0	0	73	0
Mature females	0	0	75	0	165	335	79	148	0	0	0
Total weight (kg)	0.00	0.00	6.66	4.95	6.22	15.32	12.96	11.56	8.86	0.65	0.03
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	146	0	0	0	167	237	74	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	79	0	0	0	0
Mature females	0	0	0	0	0	0	158	0	0	0	0
Total weight (kg)	0.00	0.16	0.00	0.00	0.00	0.26	0.75	0.10	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	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
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	0	0	0	0	0	0
Males ≥ 78 mm	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<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	J-18	J-19	J-20	J-21	J-22	J-23	J-24	J-25	J-26	J11918	J12019
Start Date	07/02/2013	07/03/2013	07/03/2013	07/08/2013	07/08/2013	07/14/2013	07/14/2013	07/22/2013	07/22/2013	07/03/2013	07/03/2013
Duration (hour)	0.52	0.52	0.51	0.52	0.50	0.55	0.50	0.57	0.50	0.50	0.51
Distance Fished (km)	2.87	2.86	2.80	2.77	2.73	3.01	2.75	3.12	2.74	2.79	2.71
Mid-Latitude (°N)	58.00	58.00	57.99	58.00	57.99	57.99	58.00	58.00	58.00	57.83	57.83
Mid-Longitude (°W)	-168.42	-169.06	-169.71	-170.33	-170.96	-171.60	-172.24	-172.86	-173.49	-168.74	-169.38
Bottom Depth (m)	70	71	70	74	86	98	105	109	117	71	66
Bottom Temperature (°C)	0.3	-0.2	-0.4	-0.9	1.4	1.9	2.3	2.5	3.1	0.0	0.2
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	68	0	0	0	0	0	0	0	0	0
Legal	0	68	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	3.42	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	7,918	5,013	34,950	10,297	653	723	0	66	0	13,627	11,768
Mature males	538	0	0	490	73	657	0	66	0	984	0
Legal	231	0	0	0	0	460	0	66	0	530	0
Immature females	1,999	0	27,007	5,393	290	394	0	0	0	1,893	4,154
Mature females	77	0	0	0	73	394	0	0	74	151	0
Total weight (kg)	16.04	8.10	56.74	21.16	1.47	6.40	0.00	0.79	0.20	28.63	14.05
Opilio Tanner Crab											
Immature males	135,684	27,140	74,640	24,541	435	6,112	2,297	1,837	4,821	48,905	36,010
Mature males	6,688	816	1,558	1,928	1,233	12,881	5,096	1,312	1,780	4,467	3,422
Legal	60,962	6,258	7,939	2,966	1,450	18,008	7,249	2,165	3,931	19,835	10,347
Immature females	19,526	12,924	58,762	7,711	363	394	861	23,750	36,786	10,296	7,577
Mature females	20,218	25,916	176,360	114,548	2,175	3,286	646	136,726	230,880	65,636	60,940
Total weight (kg)	300.69	64.55	241.75	164.13	9.15	108.36	38.94	160.17	223.47	162.98	179.62
Hybrid Tanner Crab											
Males ≤ 77 mm	6,073	1,905	15,878	2,447	73	66	0	0	0	2,044	4,807
Males ≥ 78 mm	11,147	1,905	1,558	0	0	131	0	0	0	4,315	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	2,229	1,496	0	3,410	0	131	0	0	0	1,287	0
Total weight (kg)	38.99	7.87	17.77	11.16	0.03	1.76	0.00	0.00	0.00	15.83	4.86

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	JI2120	JI2221	K-01	K-02	K-03	K-04	K-05	K-06	K-07	K-08	K-09
Start Date	07/09/2013	07/08/2013	07/02/2013	07/02/2013	06/30/2013	06/30/2013	06/18/2013	06/17/2013	06/17/2013	06/15/2013	06/13/2013
Duration (hour)	0.52	0.51	0.52	0.51	0.51	0.53	0.52	0.51	0.52	0.51	0.52
Distance Fished (km)	2.87	2.76	2.91	2.79	2.82	2.99	2.91	2.76	2.81	2.89	2.85
Mid-Latitude (°N)	57.84	57.83	58.34	58.34	58.34	58.33	58.32	58.33	58.34	58.33	58.33
Mid-Longitude (°W)	-169.98	-170.62	-167.85	-167.18	-166.54	-165.92	-165.29	-164.65	-164.02	-163.36	-162.72
Bottom Depth (m)	73	78	59	51	47	44	45	44	41	37	33
Bottom Temperature (°C)	-0.6	1.5	1.2	2.5	2.9	3.4	1.8	1.9	2.4	2.8	3.3
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	71	170
Mature males	0	0	0	77	0	0	0	73	150	0	255
Legal	0	0	0	77	0	0	0	0	150	0	255
Immature females	0	0	0	0	0	0	0	0	0	0	85
Mature females	0	0	0	0	0	0	0	73	225	0	255
Total weight (kg)	0.00	0.00	0.00	2.77	0.00	0.00	0.00	2.44	10.66	1.00	15.05
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	15,791	2,866	74	0	0	0	0	147	0	0	0
Mature males	1,252	0	0	0	0	0	0	0	0	0	0
Legal	278	0	0	0	0	0	0	0	0	0	0
Immature females	11,130	1,984	74	0	0	0	0	661	0	0	0
Mature females	348	441	0	0	0	0	0	0	0	0	0
Total weight (kg)	37.56	8.94	0.36	0.00	0.00	0.00	0.00	1.02	0.00	0.00	0.00
Opilio Tanner Crab											
Immature males	19,269	1,690	1,034	0	0	0	0	0	0	0	0
Mature males	5,495	514	0	0	0	0	0	0	0	0	0
Legal	11,895	1,470	0	0	0	0	0	0	0	0	0
Immature females	8,000	73	1,034	0	0	0	0	0	0	0	0
Mature females	47,024	6,467	0	0	0	0	0	0	0	0	0
Total weight (kg)	110.75	15.15	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hybrid Tanner Crab											
Males ≤ 77 mm	2,226	0	0	0	0	0	0	0	0	0	0
Males ≥ 78 mm	3,339	147	0	0	0	0	0	0	0	0	0
Immature females	278	0	74	0	0	0	0	0	0	0	0
Mature females	2,643	367	0	0	0	0	0	0	0	0	0
Total weight (kg)	17.34	0.97	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	K-10	K-11	K-12	K-13	K-14	K-18	K-19	K-20	K-21	K-22	K-23
Start Date	06/12/2013	06/12/2013	06/12/2013	06/10/2013	06/09/2013	07/09/2013	07/09/2013	07/09/2013	07/12/2013	07/13/2013	07/14/2013
Duration (hour)	0.51	0.50	0.47	0.53	0.54	0.53	0.36	0.52	0.51	0.53	0.54
Distance Fished (km)	2.78	2.70	2.53	2.89	2.97	2.88	1.96	2.87	2.78	2.94	2.97
Mid-Latitude (°N)	58.32	58.33	58.32	58.28	58.33	58.33	58.33	58.33	58.34	58.35	58.33
Mid-Longitude (°W)	-162.07	-161.43	-160.77	-159.98	-159.54	-168.46	-169.13	-169.73	-170.39	-171.00	-171.64
Bottom Depth (m)	46	34	24	42	25	65	68	70	74	84	96
Bottom Temperature (°C)	3.4	4.7	6.1	6.4	4.6	1.0	0.3	-0.5	-1.1	-0.1	1.1
Red King Crab											
Immature males	161	0	0	455	0	0	0	0	0	0	0
Mature males	0	0	0	76	0	0	102	0	0	0	0
Legal	0	0	0	76	0	0	102	0	0	0	0
Immature females	0	0	0	152	0	0	0	0	0	0	0
Mature females	0	0	0	152	0	0	0	0	0	0	0
Total weight (kg)	2.55	0.00	0.00	10.93	0.00	0.00	3.80	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	161	0	0	0	0	1,087	1,630	3,493	2,332	3,724	1,384
Mature males	0	0	0	0	0	0	0	68	69	70	198
Legal	0	0	0	0	0	0	0	0	69	0	132
Immature females	0	0	0	0	0	361	102	959	2,263	4,216	1,582
Mature females	0	0	0	0	0	0	0	0	69	141	66
Total weight (kg)	0.16	0.00	0.00	0.00	0.00	1.75	1.81	4.56	4.08	9.60	4.02
Opilio Tanner Crab											
Immature males	0	0	0	0	0	7,322	36,476	42,735	40,606	16,444	3,493
Mature males	0	0	0	0	0	220	509	1,164	1,578	5,833	4,613
Legal	0	0	0	0	0	220	2,242	2,260	2,538	12,509	7,250
Immature females	0	0	0	0	0	31,191	50,639	65,609	63,515	15,179	66
Mature females	0	0	0	0	0	439	10,087	20,409	60,771	36,753	395
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	11.47	37.08	76.82	99.35	106.88	38.87
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	366	2,038	2,465	4,664	1,476	0
Males ≥ 78 mm	0	0	0	0	0	146	1,019	1,233	686	70	66
Immature females	0	0	0	0	0	0	0	68	480	422	0
Mature females	0	0	0	0	0	0	611	1,027	2,263	1,124	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.66	4.30	6.83	6.89	3.22	0.43

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	K-24	K-25	K-26	K-27	L-01	L-02	L-03	L-04	L-05	L-06	L-07
Start Date	07/14/2013	07/22/2013	07/22/2013	07/30/2013	07/02/2013	07/02/2013	06/30/2013	06/30/2013	06/18/2013	06/17/2013	06/17/2013
Duration (hour)	0.51	0.58	0.52	0.53	0.52	0.52	0.53	0.51	0.50	0.46	0.50
Distance Fished (km)	2.74	3.10	2.87	2.92	2.87	2.83	2.84	2.97	2.85	2.58	2.87
Mid-Latitude (°N)	58.33	58.33	58.33	58.34	58.66	58.67	58.68	58.68	58.67	58.67	58.68
Mid-Longitude (°W)	-172.30	-172.92	-173.57	-174.31	-167.88	-167.20	-166.55	-165.94	-165.29	-164.65	-164.01
Bottom Depth (m)	103	110	115	168	47	44	42	36	39	37	34
Bottom Temperature (°C)	1.5	1.8	2.5	2.8	2.8	3.3	3.2	4.0	2.1	2.4	3.1
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	81	0	0
Mature males	0	0	0	0	0	67	78	0	322	190	81
Legal	0	0	0	0	0	67	78	0	322	95	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	67	0	0	403	190	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	4.14	4.37	0.00	22.67	7.44	1.60
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	244	0	1,330	0	0	0	0	0	0	0
Mature males	0	0	71	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	71	1,928	0	0	0	0	0	0	0
Mature females	0	183	71	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	1.09	0.57	0.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Opilio Tanner Crab											
Immature males	28,747	7,673	5,786	66	0	0	0	0	0	0	0
Mature males	8,552	3,897	3,286	0	0	0	0	0	0	0	0
Legal	18,829	7,612	5,143	0	0	0	0	0	0	0	0
Immature females	331,524	1,157	35,572	199	0	0	0	0	0	0	0
Mature females	448,524	11,997	266,647	465	0	0	0	0	0	0	0
Total weight (kg)	792.18	73.46	283.47	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	0	0	0	0	0	0
Males ≥ 78 mm	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	183	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.41	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<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	L-08	L-09	L-18	L-19	L-20	L-21	L-22	L-23	L-24	L-25	L-26
Start Date	06/16/2013	06/13/2013	07/09/2013	07/09/2013	07/11/2013	07/12/2013	07/13/2013	07/14/2013	07/14/2013	07/23/2013	07/22/2013
Duration (hour)	0.50	0.54	0.50	0.53	0.52	0.51	0.53	0.55	0.51	0.55	0.51
Distance Fished (km)	2.79	2.99	2.68	2.99	2.82	2.83	2.94	3.00	2.74	2.99	2.80
Mid-Latitude (°N)	58.67	58.65	58.66	58.67	58.66	58.67	58.67	58.67	58.67	58.67	58.66
Mid-Longitude (°W)	-163.36	-162.70	-168.50	-169.16	-169.79	-170.43	-171.08	-171.72	-172.37	-172.99	-173.63
Bottom Depth (m)	31	24	54	63	67	73	83	93	102	113	126
Bottom Temperature (°C)	3.5	3.5	2.2	0.1	-0.7	-1.3	-1.2	0.6	0.9	1.8	2.5
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	178	158	0	0	0	0	0	0	0	0	0
Legal	89	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	89	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	7.35	3.26	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	79	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	0.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	0	0	134	455	1,525	1,560	132	0	67	71
Mature males	0	0	0	0	0	0	0	0	0	0	71
Legal	0	0	0	0	0	0	0	0	0	0	71
Immature females	0	0	0	0	227	726	1,289	132	0	135	0
Mature females	0	0	0	0	0	0	136	0	0	0	213
Total weight (kg)	0.00	0.00	0.00	0.10	0.54	2.20	3.02	0.28	0.00	0.59	1.31
Opilio Tanner Crab											
Immature males	0	0	158	60,178	78,097	17,430	12,141	14,707	9,723	9,563	3,484
Mature males	0	0	0	134	455	1,235	3,866	2,308	2,484	2,088	2,986
Legal	0	0	0	469	834	2,324	7,664	11,212	7,736	5,118	4,763
Immature females	0	0	0	187,639	147,777	36,966	11,055	528	497	135	4,479
Mature females	0	0	0	1,541	4,170	6,100	17,228	2,506	426	6,802	124,626
Total weight (kg)	0.00	0.00	0.00	77.55	57.87	37.55	64.07	56.19	39.77	48.66	150.65
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	2,144	2,578	1,670	475	0	0	0	0
Males ≥ 78 mm	0	0	0	134	834	0	68	66	0	67	0
Immature females	0	0	0	402	0	73	68	0	0	0	0
Mature females	0	0	0	201	531	871	203	0	0	0	569
Total weight (kg)	0.00	0.00	0.00	1.98	5.32	2.48	0.86	0.22	0.00	0.20	0.97

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	L-27	L-28	L-29	L-30	L-31	M-01	M-02	M-03	M-04	M-05	M-06
Start Date	07/30/2013	07/31/2013	07/31/2013	08/01/2013	08/01/2013	07/02/2013	07/01/2013	06/30/2013	06/30/2013	06/17/2013	06/17/2013
Duration (hour)	0.51	0.53	0.51	0.54	0.53	0.53	0.52	0.51	0.52	0.52	0.52
Distance Fished (km)	2.75	2.95	2.78	2.98	2.93	3.01	2.87	2.75	3.01	2.96	2.85
Mid-Latitude (°N)	58.67	58.71	58.67	58.67	58.66	59.00	59.01	58.99	59.00	59.01	59.00
Mid-Longitude (°W)	-174.27	-174.86	-175.53	-176.20	-176.83	-167.90	-167.24	-166.59	-165.94	-165.30	-164.64
Bottom Depth (m)	155	177	135	140	137	42	40	34	30	27	27
Bottom Temperature (°C)	2.8	2.7	2.7	2.4	2.5	2.4	2.8	3.6	4.7	3.6	4.3
Red King Crab											
Immature males	0	0	0	0	0	74	75	155	0	80	0
Mature males	0	0	0	0	0	0	0	77	0	0	0
Legal	0	0	0	0	0	0	0	77	0	0	0
Immature females	0	0	0	0	0	0	0	0	76	0	0
Mature females	0	0	0	0	0	0	0	0	0	159	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.46	0.65	4.74	0.40	1.99	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	142	1,437	2,111	1,800	580	0	0	0	0	0	0
Mature males	0	0	1,294	0	0	0	0	0	0	0	0
Legal	0	0	885	0	0	0	0	0	0	0	0
Immature females	142	2,613	4,153	2,314	193	0	0	0	0	0	0
Mature females	0	0	2,315	0	0	0	0	0	0	0	0
Total weight (kg)	0.21	0.35	30.00	2.28	1.05	0.00	0.00	0.00	0.00	0.00	0.00
Opilio Tanner Crab											
Immature males	22,330	0	9,124	0	0	0	0	0	0	0	0
Mature males	3,627	0	3,949	0	0	0	0	0	0	0	0
Legal	10,525	0	8,511	0	0	0	0	0	0	0	0
Immature females	15,290	0	9,668	0	0	0	0	0	0	0	0
Mature females	166,198	0	91,577	0	0	0	0	0	0	0	0
Total weight (kg)	222.65	0.00	153.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	0	0	0	0	0	0
Males ≥ 78 mm	0	0	0	0	64	0	0	0	0	0	0
Immature females	0	0	0	257	0	0	0	0	0	0	0
Mature females	0	0	1,157	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	2.55	0.07	0.20	0.00	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	M-07	M-08	M-18	M-19	M-20	M-21	M-22	M-23	M-24	M-25	M-26
Start Date	06/16/2013	06/16/2013	07/09/2013	07/09/2013	07/11/2013	07/12/2013	07/13/2013	07/14/2013	07/13/2013	07/23/2013	07/23/2013
Duration (hour)	0.28	0.52	0.51	0.51	0.53	0.51	0.54	0.53	0.51	0.53	0.51
Distance Fished (km)	1.64	3.00	2.72	2.84	2.93	2.81	2.98	2.88	2.77	2.83	2.80
Mid-Latitude (°N)	59.01	58.99	59.00	59.02	59.00	59.00	59.01	59.00	59.00	59.00	58.99
Mid-Longitude (°W)	-163.99	-163.36	-168.53	-169.18	-169.84	-170.48	-171.12	-171.78	-172.44	-173.07	-173.71
Bottom Depth (m)	26	20	46	54	63	71	77	87	98	106	119
Bottom Temperature (°C)	4.1	4.8	2.9	1.9	-0.8	-1.2	-1.4	-1.2	0.9	1.6	2.0
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	79	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.00	1.43	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	139
Mature males	0	0	0	0	0	0	0	0	0	73	69
Legal	0	0	0	0	0	0	0	0	0	73	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	1.95	2.37
Bairdi Tanner Crab											
Immature males	0	0	0	0	0	1,851	597	68	0	0	277
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	444	265	136	0	0	69
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	1.58	0.86	0.25	0.00	0.00	0.94
Opilio Tanner Crab											
Immature males	0	0	79	497	45,859	111,294	12,663	12,281	1,739	10,355	3,882
Mature males	0	0	0	0	280	1,037	796	478	70	1,909	1,802
Legal	0	0	0	0	700	3,036	4,243	5,731	626	4,627	2,981
Immature females	0	0	0	497	144,228	172,458	15,182	1,433	0	73	2,218
Mature females	0	0	0	71	1,400	13,847	6,961	8,869	0	5,214	25,858
Total weight (kg)	0.00	0.00	0.01	0.15	53.13	94.31	33.99	40.11	4.05	40.58	45.65
Hybrid Tanner Crab											
Males $\leq 77$ mm	0	0	0	0	70	3,258	729	0	0	0	0
Males $\geq 78$ mm	0	0	0	0	0	370	133	0	0	0	0
Immature females	0	0	0	0	0	74	199	0	0	0	0
Mature females	0	0	0	0	0	444	133	0	0	73	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.07	3.19	1.34	0.00	0.00	0.13	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	M-27	M-28	M-29	M-30	M-31	M-32	N-01	N-02	N-03	N-04	N-05
Start Date	07/30/2013	08/01/2013	08/01/2013	07/31/2013	07/31/2013	08/01/2013	07/01/2013	07/01/2013	07/01/2013	06/30/2013	06/17/2013
Duration (hour)	0.51	0.59	0.50	0.51	0.53	0.55	0.50	0.51	0.51	0.53	0.54
Distance Fished (km)	2.74	3.24	2.81	2.83	2.96	2.99	2.88	2.75	2.80	2.89	3.03
Mid-Latitude (°N)	59.00	59.00	59.00	59.00	59.00	59.00	59.32	59.35	59.32	59.33	59.32
Mid-Longitude (°W)	-174.37	-175.03	-175.72	-176.33	-176.96	-177.59	-167.92	-167.26	-166.60	-165.95	-165.30
Bottom Depth (m)	127	130	134	135	137	135	40	32	28	26	21
Bottom Temperature (°C)	2.2	2.5	2.0	2.1	2.2	2.0	2.3	3.8	4.5	5.4	4.6
Red King Crab											
Immature males	0	0	0	0	0	0	79	0	0	81	0
Mature males	0	0	0	0	0	0	0	156	0	0	0
Legal	0	0	0	0	0	0	0	78	0	0	0
Immature females	0	0	0	0	0	0	0	78	80	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	0.60	5.33	0.25	0.64	0.00
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	80	0	0
Mature males	0	56	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	78	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	1.29	0.00	0.00	0.00	0.00	0.00	0.15	0.20	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	56	1,289	0	66	1,723	0	0	0	0	0
Mature males	348	0	68	67	132	255	0	0	0	0	0
Legal	209	0	0	67	66	191	0	0	0	0	0
Immature females	139	0	407	134	66	1,213	0	0	0	0	0
Mature females	1,044	167	136	0	0	128	0	0	0	0	0
Total weight (kg)	5.52	0.68	3.20	0.42	1.19	6.37	0.00	0.00	0.00	0.00	0.00
Opilio Tanner Crab											
Immature males	5,639	3,729	1,560	201	132	191	0	0	0	0	0
Mature males	2,645	2,838	1,085	0	0	638	0	0	0	0	0
Legal	6,614	5,565	1,967	0	0	638	0	0	0	0	0
Immature females	70	223	136	335	0	319	0	0	0	0	0
Mature females	209	11,353	2,171	134	0	0	0	0	0	0	0
Total weight (kg)	38.09	57.76	14.90	0.34	0.02	5.96	0.00	0.00	0.00	0.00	0.00
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	271	0	0	0	0	0	0	0	0
Males ≥ 78 mm	0	0	68	0	0	64	0	0	0	0	0
Immature females	0	0	68	0	0	128	0	0	0	0	0
Mature females	70	111	136	0	0	64	0	0	0	0	0
Total weight (kg)	0.12	0.40	0.60	0.00	0.00	0.81	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	N-06	N-07	N-18	N-19	N-20	N-21	N-22	N-23	N-24	N-25	N-26
Start Date	06/16/2013	06/16/2013	07/09/2013	07/10/2013	07/11/2013	07/12/2013	07/13/2013	07/13/2013	07/13/2013	07/23/2013	07/23/2013
Duration (hour)	0.54	0.53	0.53	0.52	0.53	0.51	0.55	0.54	0.54	0.56	0.52
Distance Fished (km)	2.99	3.17	2.97	2.86	2.94	2.81	2.99	3.00	2.89	2.99	2.80
Mid-Latitude (°N)	59.33	59.33	59.33	59.34	59.33	59.33	59.33	59.34	59.33	59.33	59.33
Mid-Longitude (°W)	-164.66	-164.01	-168.58	-169.24	-169.86	-170.54	-171.17	-171.84	-172.51	-173.14	-173.79
Bottom Depth (m)	23	22	42	50	60	68	75	80	88	99	111
Bottom Temperature (°C)	5.8	6.4	2.7	2.0	-0.5	-1.3	-1.4	-1.3	-0.7	0.4	1.0
Red King Crab											
Immature males	0	0	73	0	0	0	0	0	0	0	0
Mature males	0	0	0	73	0	0	0	0	0	0	0
Legal	0	0	0	73	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	0.96	2.25	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	73	0	0	0	0	0	67	69
Legal	0	0	0	73	0	0	0	0	0	67	69
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	1.63	0.00	0.00	0.00	0.00	0.00	1.45	1.32
Bairdi Tanner Crab											
Immature males	0	0	0	0	0	143	132	66	0	67	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	68	0	0	0	0	201	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	0.06	0.13	0.07	0.14	0.00	0.28	0.21
Opilio Tanner Crab											
Immature males	0	0	0	293	15,824	28,891	9,472	6,624	1,514	1,471	2,539
Mature males	0	0	0	0	135	286	66	66	69	468	1,716
Legal	0	0	0	0	338	1,573	2,981	1,126	413	936	2,608
Immature females	0	0	0	513	30,296	32,539	1,060	3,776	1,032	1,605	480
Mature females	0	0	0	0	1,352	3,218	3,245	7,750	826	468	1,510
Total weight (kg)	0.00	0.00	0.00	0.06	15.19	26.05	26.56	19.20	5.88	7.59	20.53
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	286	132	199	0	0	0
Males ≥ 78 mm	0	0	0	0	0	72	0	66	0	0	69
Immature females	0	0	0	0	0	0	0	132	0	0	0
Mature females	0	0	0	0	0	0	66	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.25	0.28	0.25	0.00	0.00	0.49

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	N-27	N-28	N-29	N-30	N-31	O-01	O-02	O-03	O-04	O-18	O-19
Start Date	07/30/2013	08/01/2013	08/01/2013	08/01/2013	07/31/2013	07/01/2013	07/01/2013	07/01/2013	06/30/2013	07/09/2013	07/10/2013
Duration (hour)	0.51	0.50	0.51	0.51	0.55	0.51	0.52	0.53	0.52	0.51	0.52
Distance Fished (km)	2.75	2.82	2.79	2.86	3.06	2.84	2.85	2.88	2.91	2.74	2.92
Mid-Latitude (°N)	59.34	59.33	59.33	59.33	59.33	59.67	59.66	59.66	59.63	59.66	59.67
Mid-Longitude (°W)	-174.45	-175.11	-175.74	-176.42	-177.07	-167.96	-167.27	-166.64	-165.93	-168.62	-169.26
Bottom Depth (m)	120	133	136	136	150	36	31	27	27	40	48
Bottom Temperature (°C)	1.7	2.0	1.7	1.7	1.8	2.9	4.3	6.4	6.4	2.7	1.8
Red King Crab											
Immature males	0	0	0	0	0	0	0	83	0	0	0
Mature males	0	0	0	0	0	0	0	0	0	164	0
Legal	0	0	0	0	0	0	0	0	0	164	0
Immature females	0	0	0	0	0	0	0	0	0	82	0
Mature females	0	0	0	0	0	0	0	83	0	82	0
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.54	0.00	9.77	0.00
Blue King Crab											
Immature males	0	67	0	0	0	0	0	83	0	0	0
Mature males	0	67	0	0	0	0	0	0	0	0	0
Legal	0	67	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	2.75	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	135	0	133	0	0	0	0	0	0	0
Mature males	0	67	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	140	202	0	0	0	0	0	0	0	0	0
Mature females	0	67	0	0	63	0	0	0	0	0	0
Total weight (kg)	0.07	0.89	0.00	0.54	0.21	0.00	0.00	0.00	0.00	0.00	0.00
Opilio Tanner Crab											
Immature males	140	405	0	0	253	0	0	0	0	0	353
Mature males	70	809	204	0	127	0	0	0	0	0	0
Legal	140	1,147	204	0	127	0	0	0	0	0	0
Immature females	630	135	0	0	696	0	0	0	0	0	212
Mature females	560	0	0	0	1,202	0	0	0	0	0	0
Total weight (kg)	1.62	6.86	2.00	0.00	2.93	0.00	0.00	0.00	0.00	0.00	0.02
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	0	0	0	0	0	0
Males ≥ 78 mm	70	0	0	0	0	0	0	0	0	0	0
Immature females	0	67	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)	0.26	0.02	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<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	O-20	O-21	O-22	O-23	O-24	O-25	O-26	O-27	O-28	O-29	O-30
Start Date	07/11/2013	07/11/2013	07/13/2013	07/13/2013	07/13/2013	07/23/2013	07/23/2013	07/30/2013	07/29/2013	07/29/2013	07/30/2013
Duration (hour)	0.51	0.52	0.52	0.52	0.50	0.55	0.51	0.50	0.51	0.51	0.53
Distance Fished (km)	2.80	2.88	2.91	2.80	2.73	3.05	2.79	2.79	2.78	2.73	2.94
Mid-Latitude (°N)	59.67	59.67	59.67	59.67	59.67	59.68	59.66	59.67	59.67	59.68	59.67
Mid-Longitude (°W)	-169.92	-170.59	-171.26	-171.90	-172.55	-173.24	-173.87	-174.45	-175.13	-175.86	-176.53
Bottom Depth (m)	57	66	72	77	85	95	104	115	126	137	137
Bottom Temperature (°C)	-0.1	-1.5	-1.5	-1.4	-1.3	-0.2	0.7	1.1	1.6	1.7	1.6
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	76	0	0	0	0	0	0	0	0	0	0
Legal	76	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)	3.41	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	68	0	0	193	138	70	0	0	0
Legal	0	0	68	0	0	193	69	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	1.30	0.00	0.00	4.57	3.24	1.62	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	62	0	0	0	64	0	220	0	71	0
Mature males	0	0	0	0	0	0	0	0	70	0	0
Legal	0	0	0	0	0	0	0	0	70	0	0
Immature females	0	0	0	0	0	193	69	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.03	0.00	0.00	0.00	0.26	0.06	0.72	0.46	0.25	0.00
Opilio Tanner Crab											
Immature males	52,137	6,516	15,959	12,938	3,470	3,217	2,765	21,533	8,952	3,527	476
Mature males	153	310	0	0	0	0	1,244	909	352	423	2,449
Legal	535	1,738	3,082	795	738	322	3,179	5,942	3,242	1,834	2,789
Immature females	98,234	4,717	2,877	4,626	517	5,662	553	178,904	92,410	212	1,292
Mature females	1,758	2,172	5,822	3,469	738	3,989	138	314,253	61,113	282	1,156
Total weight (kg)	39.13	14.35	34.68	20.11	6.87	9.87	15.17	384.94	114.05	12.41	19.82
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	64	69	0	0	0	0
Males ≥ 78 mm	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	210	0	0	68
Total weight (kg)	0.00	0.00	0.00	0.00	0.00	0.06	0.02	0.47	0.00	0.00	0.12

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	O-31	ON2524	ON2625	P-01	P-18	P-19	P-20	P-21	P-22	P-23	P-24
Start Date	07/30/2013	07/23/2013	07/23/2013	07/01/2013	07/10/2013	07/10/2013	07/10/2013	07/10/2013	07/12/2013	07/12/2013	07/24/2013
Duration (hour)	0.52	0.56	0.51	0.52	0.50	0.53	0.52	0.37	0.50	0.51	0.54
Distance Fished (km)	2.90	3.08	2.81	2.88	2.77	2.86	2.82	2.02	2.79	2.83	2.93
Mid-Latitude (°N)	59.66	59.50	59.50	60.02	59.98	60.00	60.00	60.01	60.00	60.00	59.99
Mid-Longitude (°W)	-177.12	-172.89	-173.50	-167.99	-168.67	-169.32	-169.95	-170.61	-171.31	-171.97	-172.58
Bottom Depth (m)	171	93	102	25	40	46	54	64	69	66	67
Bottom Temperature (°C)	1.8	-0.6	0.8	2.8	3.6	1.2	-0.9	-1.4	-1.6	-1.5	-1.4
Red King Crab											
Immature males	0	0	0	0	83	0	0	0	0	0	0
Mature males	0	0	0	0	166	0	0	0	0	0	0
Legal	0	0	0	0	166	0	0	0	0	0	0
Immature females	0	0	0	76	83	0	0	0	0	0	0
Mature females	0	0	0	0	83	72	0	0	0	0	0
Total weight (kg)	0.00	0.00	0.00	0.35	8.24	1.51	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	74
Mature males	0	62	274	0	0	0	0	0	0	72	0
Legal	0	0	206	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	1.15	7.91	0.00	0.00	0.00	0.00	0.00	0.00	1.16	0.58
Bairdi Tanner Crab											
Immature males	66	62	137	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	69	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.26	0.02	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Opilio Tanner Crab											
Immature males	1,452	1,861	4,456	0	0	0	3,800	3,256	4,035	4,380	8,045
Mature males	1,386	62	1,234	0	0	0	0	88	0	0	0
Legal	2,244	248	3,222	0	0	0	281	440	216	0	0
Immature females	7,722	2,605	3,085	0	0	0	2,463	880	504	1,723	8,267
Mature females	88,308	310	137	0	0	0	422	1,848	2,090	574	1,698
Total weight (kg)	112.83	3.91	17.69	0.00	0.00	0.00	2.74	4.73	7.70	5.16	7.49
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	0	141	88	0	72	517
Males ≥ 78 mm	0	0	69	0	0	0	70	88	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	74
Total weight (kg)	0.00	0.00	0.21	0.00	0.00	0.00	0.18	0.15	0.00	0.02	0.25

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	P-25	P-26	P-27	P-28	P-29	P-30	P-31	P-32	PO2423	PO2524	PO2625
Start Date	07/24/2013	07/24/2013	07/28/2013	07/28/2013	07/29/2013	07/30/2013	07/30/2013	07/30/2013	07/24/2013	07/24/2013	07/23/2013
Duration (hour)	0.52	0.51	0.52	0.51	0.51	0.54	0.53	0.51	0.55	0.53	0.52
Distance Fished (km)	2.84	2.75	2.81	2.73	2.74	2.82	2.93	2.85	2.94	2.89	2.87
Mid-Latitude (°N)	60.01	60.00	60.01	60.00	60.01	60.03	60.00	60.00	59.83	59.83	59.83
Mid-Longitude (°W)	-173.27	-173.94	-174.61	-175.25	-175.94	-176.68	-177.21	-177.91	-172.25	-172.92	-173.59
Bottom Depth (m)	75	97	108	117	129	142	137	142	75	81	95
Bottom Temperature (°C)	-1.3	-0.8	0.5	1.0	1.3	1.4	1.4	1.6	-1.4	-1.2	0.1
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	214	0	67	0	0	0	0	0	0	0	0
Mature males	71	139	399	0	0	0	0	0	0	71	274
Legal	0	139	399	0	0	0	0	0	0	71	206
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)	2.16	4.16	11.20	0.00	0.00	0.00	0.00	0.00	0.00	1.14	6.54
Bairdi Tanner Crab											
Immature males	149	0	0	139	0	0	0	0	0	749	0
Mature males	0	0	0	0	0	0	0	70	0	0	0
Legal	0	0	0	0	0	0	0	70	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	69	0	0	0	0	0	0
Total weight (kg)	0.14	0.00	0.00	0.06	0.17	0.00	0.00	0.49	0.00	0.15	0.00
Opilio Tanner Crab											
Immature males	33,702	834	4,861	9,074	2,068	3,580	335	5,930	5,652	81,583	685
Mature males	0	0	266	485	207	1,263	736	1,884	0	0	137
Legal	214	0	2,863	3,048	620	2,737	803	4,256	276	0	274
Immature females	61,276	1,390	0	27,777	23,507	211,334	736	59,026	2,206	115,700	343
Mature females	22,729	278	399	23,067	33,502	325,810	937	71,654	3,860	73,374	137
Total weight (kg)	52.18	1.53	14.62	53.90	45.06	392.46	6.33	116.67	10.04	140.78	1.87
Hybrid Tanner Crab											
Males ≤ 77 mm	428	0	0	0	0	0	67	0	69	9,707	69
Males ≥ 78 mm	0	0	0	69	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	138	702	67	1,814	0	2,213	0
Total weight (kg)	0.34	0.00	0.00	0.25	0.23	0.87	0.18	3.45	0.02	7.25	0.15

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	PO2726	Q-01	Q-02	Q-18	Q-19	Q-20	Q-21	Q-22	Q-23	Q-25	Q-26
Start Date	07/24/2013	07/01/2013	07/01/2013	07/10/2013	07/10/2013	07/10/2013	07/10/2013	07/11/2013	07/12/2013	07/25/2013	07/25/2013
Duration (hour)	0.51	0.52	0.52	0.51	0.51	0.50	0.52	0.51	0.52	0.50	0.51
Distance Fished (km)	2.81	2.91	2.99	2.70	2.78	2.83	2.84	2.80	2.75	2.69	2.73
Mid-Latitude (°N)	59.83	60.33	60.34	60.33	60.33	60.33	60.33	60.33	60.34	60.30	60.34
Mid-Longitude (°W)	-174.23	-167.99	-167.27	-168.69	-169.34	-170.02	-170.65	-171.38	-172.06	-173.38	-174.07
Bottom Depth (m)	107	31	31	36	44	52	61	66	59	64	91
Bottom Temperature (°C)	0.9	3.8	4.7	4.2	1.4	-1.3	-1.5	-1.3	-1.5	-0.8	-1.1
Red King Crab											
Immature males	0	0	290	87	0	0	0	0	0	0	0
Mature males	0	0	0	0	76	0	63	0	0	0	0
Legal	0	0	0	0	76	0	63	0	0	0	0
Immature females	0	0	290	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	63	0	0	0	0
Total weight (kg)	0.00	0.00	1.10	0.56	2.27	0.00	4.82	0.00	0.00	0.00	0.00
Blue King Crab											
Immature males	0	0	0	87	0	0	0	0	466	1,153	0
Mature males	211	0	0	0	0	0	0	0	155	741	274
Legal	70	0	0	0	0	0	0	0	155	494	68
Immature females	0	0	73	0	0	0	0	0	0	659	0
Mature females	0	0	0	0	0	0	0	0	78	82	0
Total weight (kg)	4.21	0.00	0.29	0.24	0.00	0.00	0.00	0.00	6.31	20.82	5.09
Bairdi Tanner Crab											
Immature males	70	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)	0.12	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	5,918	0	0	0	0	17,589	7,609	16,399	7,224	5,434	91,596
Mature males	916	0	0	0	0	0	0	0	0	0	0
Legal	3,593	0	0	0	0	143	314	774	78	0	479
Immature females	70	0	0	0	0	19,805	189	70	466	6,258	21,838
Mature females	634	0	0	0	0	7,150	2,578	4,223	3,107	2,058	79,136
Total weight (kg)	21.28	0.00	0.00	0.00	0.00	29.14	13.32	29.64	10.44	5.31	155.49
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	143	0	0	0	82	137
Males ≥ 78 mm	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	0.13	0.00	0.00	0.00	0.10	0.14

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	Q-27	Q-28	Q-29	Q-30	Q-31	QP2423	QP2524	QP2625	QP2726	R-22	R-23
Start Date	07/28/2013	07/29/2013	07/29/2013	07/29/2013	07/29/2013	07/24/2013	07/24/2013	07/24/2013	07/24/2013	07/11/2013	07/12/2013
Duration (hour)	0.51	0.52	0.51	0.54	0.57	0.56	0.55	0.38	0.51	0.51	0.52
Distance Fished (km)	2.74	2.85	2.81	2.95	3.15	3.11	3.03	2.10	2.82	2.75	2.79
Mid-Latitude (°N)	60.33	60.34	60.33	60.34	60.33	60.16	60.18	60.13	60.16	60.66	60.67
Mid-Longitude (°W)	-174.72	-175.39	-176.02	-176.72	-177.35	-172.33	-173.02	-173.77	-174.35	-171.43	-172.10
Bottom Depth (m)	103	111	121	137	149	57	59	88	100	63	61
Bottom Temperature (°C)	0.2	0.6	1.0	1.2	1.5	0.7	-0.6	-1.2	0.0	-1.5	-1.6
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	74	0
Legal	0	0	0	0	0	0	0	0	0	74	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	2.51	0.00
Blue King Crab											
Immature males	0	67	0	0	0	70	224	93	0	0	0
Mature males	0	0	0	0	0	70	149	0	0	0	0
Legal	0	0	0	0	0	70	75	0	0	0	0
Immature females	0	0	0	0	0	141	75	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	0.45	0.00	0.00	0.00	2.60	4.77	0.73	0.00	0.00	0.00
Bairdi Tanner Crab											
Immature males	0	67	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	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Opilio Tanner Crab											
Immature males	100,040	10,233	8,401	4,804	2,824	1,054	224	15,736	2,308	55,574	13,709
Mature males	0	539	615	1,514	1,923	0	0	0	70	0	0
Legal	2,537	3,635	4,713	4,673	4,507	0	0	93	1,119	0	127
Immature females	19,473	5,722	1,093	66	0	281	149	59,520	0	12,104	6,220
Mature females	183,898	20,196	1,639	132	0	422	0	19,161	0	28,562	10,028
Total weight (kg)	294.17	46.47	26.98	25.15	25.57	1.02	0.10	32.90	6.66	73.84	25.20
Hybrid Tanner Crab											
Males ≤ 77 mm	0	67	0	0	60	211	0	463	0	0	0
Males ≥ 78 mm	0	202	273	66	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	202	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.00	1.14	0.87	0.33	0.08	0.06	0.00	0.25	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	R-24	R-25	R-26	R-27	R-28	R-29	R-30	R-31	R-32	S-22	S-23
Start Date	07/12/2013	07/25/2013	07/25/2013	07/28/2013	07/27/2013	07/27/2013	07/29/2013	07/28/2013	07/28/2013	07/11/2013	07/11/2013
Duration (hour)	0.51	0.52	0.50	0.51	0.52	0.51	0.56	0.57	0.54	0.50	0.50
Distance Fished (km)	2.75	2.81	2.73	2.79	2.90	2.73	3.07	3.19	2.99	2.73	2.76
Mid-Latitude (°N)	60.66	60.67	60.67	60.67	60.66	60.68	60.67	60.67	60.67	60.99	61.00
Mid-Longitude (°W)	-172.75	-173.46	-174.13	-174.82	-175.47	-176.21	-176.81	-177.50	-178.16	-171.48	-172.16
Bottom Depth (m)	44	66	87	98	108	119	129	147	161	60	64
Bottom Temperature (°C)	0.8	-1.0	-1.2	-0.7	0.1	0.8	1.2	1.2	1.4	-1.6	-1.5
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	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	244	0	0	0	0	0	0	0	0	0	0
Mature males	325	0	0	0	0	0	63	0	0	0	0
Legal	162	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	81	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	8.78	0.00	0.00	0.00	0.00	0.00	0.96	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	27,440	43,221	36,299	13,762	4,875	40,539	7,387	1,723	15,385	23,411	13,469
Mature males	0	0	0	0	132	0	501	1,247	2,780	0	0
Legal	0	0	149	411	2,108	1,999	5,697	2,673	8,986	0	0
Immature females	22,569	30,788	17,442	9,859	395	8,894	1,064	594	189,148	20,668	11,939
Mature females	4,222	13,026	42,039	28,961	1,647	47,020	2,191	832	315,204	16,139	11,020
Total weight (kg)	14.51	34.90	76.05	42.74	14.47	157.65	29.75	25.70	391.55	46.66	20.30
Hybrid Tanner Crab											
Males $\leq$ 77 mm	0	148	0	0	66	0	0	0	0	0	0
Males $\geq$ 78 mm	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	138	0	0	0	0	0
Total weight (kg)	0.00	0.04	0.00	0.00	0.13	0.16	0.00	0.00	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	S-24	S-25	S-26	S-27	S-28	S-29	S-30	S-31	T-25	T-26	T-27
Start Date	07/11/2013	07/25/2013	07/25/2013	07/28/2013	07/27/2013	07/27/2013	07/28/2013	07/28/2013	07/25/2013	07/25/2013	07/26/2013
Duration (hour)	0.50	0.54	0.50	0.52	0.51	0.51	0.54	0.56	0.50	0.51	0.50
Distance Fished (km)	2.74	2.89	2.73	2.81	2.78	2.82	2.98	3.10	2.73	2.83	2.68
Mid-Latitude (°N)	61.00	61.00	60.99	61.01	60.99	61.00	61.00	61.00	61.33	61.33	61.32
Mid-Longitude (°W)	-172.82	-173.50	-174.18	-174.88	-175.55	-176.27	-176.97	-177.63	-173.58	-174.33	-175.01
Bottom Depth (m)	66	75	83	92	102	112	122	136	73	78	88
Bottom Temperature (°C)	-1.6	-1.5	-1.5	-1.5	-1.2	0.3	0.8	1.3	-1.6	-1.6	-1.6
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	145	0	0	0	0	0	74	0	0
Legal	0	0	73	0	0	0	0	0	74	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	2.91	0.00	0.00	0.00	0.00	0.00	1.68	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	12,620	31,443	8,632	13,199	203	16,867	42,496	6,658	23,765	23,101	32,956
Mature males	0	0	0	0	0	127	1,038	1,048	0	0	0
Legal	0	927	0	0	0	1,902	13,625	4,315	0	70	144
Immature females	9,498	9,126	7,689	19,095	0	190	85,706	1,911	27,850	31,781	44,278
Mature females	9,628	14,545	7,254	14,807	0	888	68,059	1,295	13,591	17,291	33,461
Total weight (kg)	23.84	69.46	16.17	34.01	0.16	34.73	204.64	29.93	52.89	43.79	68.84
Hybrid Tanner Crab											
Males ≤ 77 mm	0	0	0	0	0	0	0	123	0	0	0
Males ≥ 78 mm	0	0	0	0	0	63	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	0.29	0.00	0.06	0.00	0.00	0.00

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	T-28	T-29	T-30	U-25	U-26	U-27	U-28	U-29	V-25	V-26	V-27
Start Date	07/26/2013	07/27/2013	07/27/2013	07/26/2013	07/25/2013	07/26/2013	07/26/2013	07/27/2013	07/26/2013	07/26/2013	07/26/2013
Duration (hour)	0.51	0.52	0.54	0.52	0.50	0.50	0.51	0.53	0.53	0.52	0.54
Distance Fished (km)	2.83	2.84	3.04	2.85	2.67	2.77	2.79	2.83	2.87	2.79	2.88
Mid-Latitude (°N)	61.34	61.34	61.33	61.67	61.66	61.67	61.66	61.66	61.99	62.00	62.00
Mid-Longitude (°W)	-175.66	-176.30	-176.95	-173.67	-174.44	-175.09	-175.77	-176.47	-173.74	-174.48	-175.17
Bottom Depth (m)	97	107	116	70	77	85	95	106	63	73	81
Bottom Temperature (°C)	-1.4	-0.8	0.9	-1.7	-1.6	-1.6	-1.2	-0.9	-1.6	-1.7	-1.6
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	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	6,584	78,608	20,076	19,392	15,660	23,325	3,719	10,105	161,314	32,101	24,593
Mature males	0	0	322	0	0	0	0	0	0	0	0
Legal	66	814	3,089	0	148	0	66	135	0	0	72
Immature females	3,555	18,338	901	33,530	10,093	20,070	3,786	10,239	306,026	20,394	17,070
Mature females	3,226	20,278	837	13,165	2,672	3,729	1,527	12,597	12,414	5,816	5,208
Total weight (kg)	11.35	95.54	42.65	40.05	16.89	23.39	6.17	32.76	206.08	39.97	26.78
Hybrid Tanner Crab											
Males $\leq 77$ mm	0	0	0	0	0	0	0	67	3,085	0	145
Males $\geq 78$ mm	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	0.03	0.86	0.00	0.04

Appendix: Tow details, crab density (number nmi<sup>-2</sup>), and catch weight at 2013 eastern Bering Sea bottom trawl survey stations.

Station	V-28	Z-05
Start Date	07/26/2013	06/22/2013
Duration (hour)	0.55	0.34
Distance Fished (km)	3.00	1.84
Mid-Latitude (°N)	62.00	54.69
Mid-Longitude (°W)	-175.83	-165.15
Bottom Depth (m)	92	86
Bottom Temperature (°C)	-1.4	4.6

Red King Crab

Immature males	0	0
Mature males	0	0
Legal	0	0
Immature females	0	0
Mature females	0	0
Total weight (kg)	0.00	0.00

Blue King Crab

Immature males	0	0
Mature males	0	0
Legal	0	0
Immature females	0	0
Mature females	0	0
Total weight (kg)	0.00	0.00

Bairdi Tanner Crab

Immature males	0	0
Mature males	0	0
Legal	0	0
Immature females	0	320
Mature females	0	0
Total weight (kg)	0.00	0.004

Opilio Tanner Crab

Immature males	12,278	0
Mature males	0	0
Legal	131	0
Immature females	11,821	0
Mature females	7,772	0
Total weight (kg)	24.52	0.00

Hybrid Tanner Crab

Males ≤ 77 mm	0	0
Males ≥ 78 mm	0	0
Immature females	0	0
Mature females	0	0
Total weight (kg)	0.00	0.00

## RECENT TECHNICAL MEMORANDUMS

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### AFSC-

- 294 FOWLER, C. W., and L. K. JOHNSON. 2015. Reality-based marine protected areas for the eastern Bering Sea, 109 p. NTIS number pending.
- 293 JOHNSON, S. W., A. D. NEFF, and M. R. LINDEBERG. 2015. A handy field guide to the nearshore marine fishes of Alaska, 211 p. NTIS number pending.
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