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The 2022 Eastern Bering Sea Continental Shelf Trawl Survey: Results for Commercial Crab Species

By

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ABSTRACT

The eastern Bering Sea bottom trawl survey has been conducted by the National Marine Fisheries Service annually since 1975. The purpose of this survey is to collect data on the distribution and abundance of crab, groundfish, and other benthic resources. These data are used to estimate population abundance and biomass for the management of commercially important species. In 2022, 375 total stations were sampled on the eastern Bering Sea shelf between 30 May and 29 July. This document includes results for the full 1975-2022 time series.

The 2022 combined estimate of mature male biomass for all commercial crab stocks in the eastern Bering Sea was 64,894 t, an 11% increase over the record-low 2021 estimate. Abundance estimates for mature male and female snow crab (*Chionoecetes opilio*) were 22% and 33% lower, respectively, than the 2021 estimates. This is the lowest estimate in the time series for mature male abundance and the third lowest for mature female abundance. However, there was evidence of recruitment to the snow crab stock, with estimated immature male and female abundance increasing by 138% and 3,902%, respectively, from 2021 estimates. Estimated abundance for Tanner crab (*C. bairdi*) generally increased from 2021 for crab east of 166º W (with the exception of mature females), but declined or remained constant west of 166º W. Abundance estimates for Bristol Bay red king crab (*Paralithodes camtschaticus*) and St. Matthew Island blue king crab (*P. platypus*) increased from 2021 estimates across all size and sex categories. Mature female Pribilof Islands red king crab estimated abundance declined, while estimated abundance for mature males showed a moderate increase. Pribilof Islands blue king crab abundance remained low.

Biomass estimates from the 2022 survey, reported in metric tons (t) and pounds (lb) with 95% confidence intervals (± 1.96 SE) for legal and preferred-size males of each commercial crab stock in the eastern Bering Sea. Size classes for carapace length (CL) and carapace width (CW) are given in inches and millimeters. The legal size classes defined by ADF&G are in inches and include spines, while those listed in millimeters exclude spines.

		2022 legal or preferred-size male biomass (±95% CI)	
Stock	Size	t	lb
Bristol Bay District red king crab	≥ 135 mm CL	18,060	39,815,112
Legal Size	(≥ 6.5 in. CW)	(7,616)	(16,790,159)
Pribilof District red king crab	≥ 135 mm CL	5,075	11,187,494
Legal Size	(≥ 6.5 in. CW)	(2,973)	(6,554,733)
Pribilof District blue king crab	≥ 135 mm CL	111	243,986
Legal Size	(≥ 6.5 in. CW)	(152)	(335,934)
St. Matthew Is. Section blue king	≥ 120 mm CL	1,467	3,234,183
Legal Size	(≥ 5.5 in. CW)	(1,734)	(3,822,360)
Tanner crab, east of 166° W	≥ 120 mm CW	6,450	14,220,755
Legal Size	(≥ 4.8 in. CW)	(2,805)	(6,183,714)
Preferred-size	≥ 125 mm CW	4,676	10,309,401
	(≥ 4.9 in. CW)	(2,142)	(4,721,515)
Tanner crab, west of 166° W	≥ 110 mm CW	5,131	11,312,680
Legal Size	(≥ 4.4 in. CW)	(1,330)	(2,932,788)
Preferred-size	≥ 125 mm CW	1,576	3,475,527
	(≥ 4.9 in. CW)	(517)	(1,139,433)
Snow crab	≥ 78 mm CW	33,447	73,739,018
Legal Size	(≥ 3.1 in. CW)	(9,780)	(21,560,623)
Preferred-size	≥ 102 mm CW	13,494	29,748,372
	(≥ 4.0 in. CW)	(5,731)	(12,635,031)

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INTRODUCTION

Survey History and Purpose

The eastern Bering Sea (EBS) bottom trawl survey has been conducted by scientists in the Resource Assessment and Conservation Engineering (RACE) Division of the Alaska Fisheries Science Center (AFSC), National Marine Fisheries Service (NMFS), since the early 1970s. Beginning in 1975, surveys were expanded beyond Bristol Bay to include the majority of the EBS continental shelf, with the original purpose of assessing potential resource impacts of offshore oil development (Pereyra et al. 1978). The survey has been conducted annually since 1975, with the exception of 2020 when the survey was cancelled due to restrictions imposed by the COVID-19 pandemic. The annual collection of data on the distribution and abundance of crab and groundfish resources provides fishery-independent population estimates and biological data critical to the management of commercially important species in the EBS. Commercially important 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*). Although the common name for *C. bairdi* changed from Tanner crab to southern Tanner crab in 2005 (McLaughlin et al. 2005), it will still be referred to as "Tanner crab" in this document.

The total number of stations gradually increased over time until the survey grid was standardized in 1987 (Fig. 1). Therefore, the pre-1987 estimates provided in this document for stocks that extend northwest of the Pribilof Islands are not directly comparable to later estimates, as the entire stocks were not sampled. From 1987 to 2014, 376 standard stations were included in the survey covering approximately 140,350 square nautical mile (nmi^2) of the EBS, with station depths ranging from 20 to 200 m (Fig. 1). Since 2015, station Z-04 (AZ-0504) has been excluded for crab population estimation because the station has a limited area of crab habitat within a range of depths accessible to survey trawl gear. This document reports the full time series re-calculated without data from this station. The annual EBS bottom trawl survey begins in the northeast section of Bristol Bay between late May and early June, and 4 stations are typically sampled each day from each of two vessels (Fig. 2). The standard survey is completed in late July to early August at the western edge of the survey grid, northwest of St. Matthew Island. In some years (1999, 2000, 2006-2012, 2017, and 2021) when the Bristol Bay red king crab reproductive cycle is delayed due to colder water temperatures, a small portion of the inner Bristol Bay area is resampled after the conclusion of the standard survey to improve the accuracy of female size composition and abundance estimates (see Methods). In addition to the EBS survey grid, the northern Bering Sea (NBS) has been surveyed in 2010, 2017, 2018 (with reduced effort), 2019, and 2021. The full NBS survey grid was again sampled in 2022, but the results are not included in this draft tech memo; the finalized version of this tech memo will include results for the NBS survey.

Eastern Bering Sea Crab Stock Assessment Process

Crab species included in the Federal Bering Sea and Aleutian Islands (BSAI) King and Tanner Crab Fisheries Management Plan are managed by the Alaska Department of Fish and Game

(ADF&G), with federal oversight by NMFS (NPFMC 2011). The annual stock assessment and fishery evaluation (SAFE) report reviewed by the North Pacific Fishery Management Council (NPFMC) provides current directed fishery catch, bycatch, and survey biomass and size composition data for these commercial crab species. The procedure for setting overfishing levels (OFL) and allowable biological catch (ABC) is determined by NMFS, while ADF&G sets the annual total allowable catch (TAC) or guideline harvest level (GHL) for each crab stock. The NPFMC Crab Plan Team (CPT) and the Scientific and Statistical Committee (SSC) review each assessment and recommend biological reference points associated with the status of each crab stock. Crab stock boundaries are defined by ADF&G management units for blue and red king crab and Tanner crab (Fitch et al. 2012). The Pribilof Islands blue king crab stock boundary also includes a 180 nmi × 20 nmi (9 × 1 station) column on the east side of the management unit, which was added in 2013 to account for blue king crab survey and bycatch data (NPFMC 2014). In the EBS, red king crab are split into Bristol Bay, Pribilof Islands, and Northern District stocks, while blue king crab are split into Pribilof Islands and St. Matthew Island stocks. The EBS Tanner crab population is considered a single stock, but is split into two fishery management units defined by the ADF&G Board of Fisheries, using 166° W as the boundary.

This report summarizes the 2022 survey results for commercially important crab resources in the EBS. Readers should note that area-swept estimates in this document are indices of abundance and biomass that are not expected to match the final modeled population estimates reported in the SAFE (Stock Assessment and Fishery Evaluation) documents for individual stocks, as the stock assessment models include additional population dynamics information. Further 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 the 2022 survey will be reported in a separate NOAA Technical Memorandum (e.g., Lauth et al. 2019).

METHODS

Survey Area and Sampling Gear

The 2022 standard survey was conducted onboard the chartered fishing vessels *Alaska Knight* and *Vesteraalen*, beginning 30 May in the northeast corner of Bristol Bay, moving westward, and finishing on 29 July. The vessels sampled in close proximity to each other for much of the survey (Fig. 2).

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

The king crab Registration Area T in Bristol Bay (south of 58 °39 ′N and east of 168 °W) is 54,536 nmi^2 and consists of 136 stations. The king crab Registration Area Q in the Bering Sea is

divided into the Northern District (north of 58° 39′ N) and the Pribilof District (south of 58° 39′ N and west of 168° W). The area for the St. Matthew Island Section of the Northern District is divided into two sampling strata: 1) a high-density 7,218 nmi^2 stratum with 28 stations (one of which is not trawlable, but is included in the total area surveyed), and 2) a standard-density 11,629 nmi^2 stratum with 29 stations, for a total of 56 stations within the St. Matthew Island Section. The area of the Pribilof District is divided into two sampling strata: 1) a high-density 10,025 nmi^2 stratum with 41 total stations, and 2) a standard-density 14,436 nmi^2 stratum with 36 stations, for a total of 77 stations within the stock area. For Pribilof District blue king crab, the eastern stock boundary is 20 miles east of the Pribilof District and includes nine additional stations, as indicated in the 2013 Pribilof Islands Blue King Crab Rebuilding Plan (NPFMC 2014). High-density strata are classified on the basis of having more stations (both the standard center and up to four corner stations) per area than standard-density strata (Fig. 3).

The 2022 survey utilized a 83-112 Eastern otter trawl employing an 83 ft (25.3 m) head rope, and a 112 ft (34.1 m) footrope (Lauth and Nichol 2013); this is the same gear used in EBS bottom trawl surveys since 1982. The cod-end mesh size is 8.9 cm stretched and the liner is 3.2 cm. The trawl nets on each vessel were rotated every 20-30 tows (every ~5 days) to mitigate potential impacts from changes in net configuration due to fishing. Tows were generally 0.5 h in duration and 1.5 nmi (2.8 km) in length and were conducted at a speed of 3 knots (1.54 m sec^{-1}; see Results for details), in strict compliance with NMFS bottom trawl protocols established by the National Oceanic and Atmospheric Administration (Stauffer 2004).

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

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

Biological Data Collection

Catch Sorting and Measurement

Following each tow, all crab were removed from the catch, sorted by species and sex, and a total catch weight was obtained for each species. Tanner and snow crab hybrids are identified by a

combination of characteristics including curve of the epistome margin, eye color, carapace shape, and space between or shape of the rostrum horns (Karinen and Hoopes 1971, Urban et al. 2002). The total catch of crabs was randomly subsampled for biological data collection in cases when a large number (approximately > 300) of a given species was caught in a tow. When conducted, subsamples varied in size and composition depending on the particular tow. The subsample may have occurred at the level of the entire catch or at the level of a particular size and sex category once the catch was sorted. The total weights of the sampled crab and non-sampled crab were recorded and an expansion factor was calculated to determine the final number of each species in a particular tow.

Individual crab carapaces were measured (± 0.1 mm) to provide a size-frequency distribution for each sample. Crab sizes are reported as carapace width (CW) for Tanner and snow crab, and carapace length (CL) for hair crab and all king crab species (Donaldson and Byersdorfer 2005). All size measurements excluded spines. Weights are taken to add to the existing size-weight data and to monitor variability in size-weight relationships. Individual weight data (in addition to size data) are collected for blue and red king crab annually, while Tanner and snow crab weights are collected in alternate years to keep the workload for catch processing manageable. For every haul in 2022, individual weight data were collected on up to five snow crab and five red king crab per each of the following categories: 1) males, 2) ovigerous females, and 3) non-ovigerous females. Because of their scarcity, weight data were collected for all intact blue king crab encountered that met the sampling requirements (i.e., whole, live crab without regenerating or missing limbs). Weights were collected from representative size ranges throughout the spatial distribution of each species.

Shell Condition and Clutch Assessment

In the absence of reliable age estimates, shell condition 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 harvest quotas. Carapace shell condition was assessed for each crab sampled and assigned to one of six classes according to specific criteria (0 = premolt or molting, 1 = soft and pliable, 2 = new hardshell both firm and clean, 3 = oldshell slightly worn, 4 = oldshell worn, 5 = very oldshell).

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

For mature females, egg condition codes were used to identify a given female's stage in the molt-mate cycle. Completion of the molt-mate cycle was indicated by uneyed embryos. Conversely, the presence of eyed embryos, hatching eggs, empty egg cases, or absence of eggs (hereafter, "barren") in morphologically mature females indicated an incomplete cycle.

Maturity Estimates

Maturity for female crab was determined based on morphological characteristics, including the presence of a clutch or shape and size of the abdominal flap. For males, maturity and legal size classes are established size cutoffs, based on values from the literature and State of Alaska regulations (Table 1). The ADF&G definitions for legal size classes (CW in inches) include spines (ADF&G 2017), while CW measurements reported in this document exclude spines (Table 1).

In addition, maturity in male *Chionoecetes* spp. can be determined by the allometric change in chela height, where morphometrically immature and mature crab are separated into two groups based on the frequency distribution of the chela height (large claw or small claw) to carapace width ratio (Comeau and Conan 1992, Stevens et al. 1993, Tamone et al. 2007). Chela height measurements have been taken for *Chionoecetes* spp. since 1989. In 2008, a standard sampling protocol for measuring chela height was developed (measurements to ± 0.1 mm), with measurements taken for male Tanner crab and snow crab during even and odd years, respectively. Beginning in 2018, chela height measurements were collected annually from a subsample (typically ≤ 15 crab per haul) of male Tanner and snow crab caught at each station.

In years prior to 2021, we presented a distribution-based determination of male *Chionoecetes* spp. maturity status using chela height and carapace width measurements. This maturity curve approach more accurately classifies small, mature males and large, immature males compared to established maturity size cutoffs, which can result in discrepancies in biomass and abundance estimates generated from each method. Although the chela-based method provided an interesting view of maturity in *Chionoecetes*, these results were easily misinterpreted. The chela-based maturity estimates could not be directly compared with the maturity estimates from the established size cutoffs because the chela-based method only estimated maturity for new shell crab. Due to these complications, we have eliminated the chela-based estimates of maturity from this report and only used established size cutoffs to classify male maturity (95 mm carapace width for snow crab, and 103/113 mm carapace width for Tanner crab west/east of 166° W).

Diseases

EBS crab are vulnerable to infection by a variety of pathogens, and disease prevalence may serve as an indicator of stock or ecosystem health. Bitter crab syndrome is caused by a parasitic dinoflagellate, *Hematodinium* sp., and is found in Tanner and snow crab throughout Alaska waters (Meyers et al. 1996). The mortality rate of parasitized crab is believed to be high, and symptoms include lethargy, pink carapace pigmentation, and white opaque hemolymph (Meyers and Burton 2009). Meat from parasitized crab is harmless to humans, but is bitter tasting, making it unmarketable. The prevalence of bitter crab syndrome fluctuates both temporally and spatially in *Chionoecetes* spp. in the EBS (Meyers et al. 1996), and may be influenced by changes in environmental conditions (Morado et al. 2010). All measured crab were scanned for visual evidence of bitter crab syndrome. In addition, crab were scanned for the following pathologies: 1) black mat syndrome, 2) shell disease, 3) rhizocephalan barnacles, 4) cottage cheese disease, 5) pepper spot syndrome, 6) leatherback, 7) snailfish eggs, and 8) black eye syndrome.

Crab Biomass and Abundance Estimates

Crab densities (number nmi^{-2}) were estimated at each station for sublegal and legal males, as well as mature and immature males and females of each stock, with the exception of hair crab (density estimates only for sub-legal and legal males and all females). The area swept by the trawl (nmi^2) was calculated as the product of the distance traveled while the net had bottom contact and the mean net width over the duration of the tow. Prior to 2009, data reported in this annual document were calculated using a fixed width of 15.2 m (0.008 nmi) in the area-swept calculation to maintain consistency with historical crab population estimates. Since 2009, all population abundance and biomass estimates for the entire time series have been calculated using the variable net width based on net mensuration data obtained during the tow (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), and changes with the depth of the tow due to changes in scope of the trawl wire (Rose and Walters 1990). For 2022 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 2022, 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 (Fig. 4). Distance traveled by the trawl was determined from ship GPS positions recorded at the beginning and end of each tow.

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

$$W = a\, L^b,$$

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

The weights calculated for each 1 mm size bin are summed for each station by the following categories: legal, mature and immature male, and mature and immature female. The crab biomass within a given district or section stratum was estimated by averaging crab densities from all stations within that stratum, and multiplying by the total area of the 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 for each stratum was calculated under the assumption that each station was an independent sample,

and variance of the total biomass estimate for each size class was calculated by summing the variance of each stratum. The 95% confidence intervals were calculated using the standard error of the total population multiplied by 1.96. All biomass estimates and confidence intervals (± 95%) reported in this document are reported in metric tons (t) except in the Abstract where both metric tons (t) and pounds (lb) are reported. Metric tons can be converted to pounds by multiplying by 2,204.62 for comparison with ADF&G reported values of total allowable catch (TAC) and guideline harvest levels (GHL). Abundance by 1 mm bin for the crab stocks are calculated using the same procedures as used for biomass calculations, save that numbers of crab are summed by size bin while accounting for subsampling.

The population biomass and abundance estimates reported in this document have substantial uncertainty due to the expanse of the area being sampled and the typically aggregated distribution patterns of the sampled stocks. These estimates are least precise for small crab 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, catchability is assumed to be near or equal to one for the indices developed in this document; however, catchability is likely much lower, especially for the smaller size classes (Somerton et al. 2013). The stock assessment models that incorporate these survey data consider catchability when estimating abundance and biomass.

In years with colder than average bottom water temperatures (1999, 2000, 2006-2012, 2017, 2021), a small number of standard Bristol Bay stations sampled at the beginning of the survey are resampled in late July/August because the Bristol Bay red king crab molt-mate cycle is delayed in colder years and is not complete at the start of the survey. The primary goal of resampling is to improve the accuracy of size composition data for post-molt Bristol Bay red king crab females. Secondary goals are to 1) improve abundance estimates of mature females by including post-molt females potentially unavailable to survey gear early in the summer and 2) improve the accuracy of estimates for mature female reproductive status (e.g., fullness of newly extruded clutch). Resampling efforts are considered when 10% or more of mature females have not yet completed the molt-mate cycle, as determined by egg codes. Mature females with eyed embryos, empty egg cases, hatching eggs, or no eggs indicate an incomplete molt-mate cycle, while uneyed embryos indicate a complete cycle. Resample stations are selected based on the density of female red king crab with incomplete molt-mate cycles sampled during the original survey, with consideration of the total mature female distribution. When resampling is prompted, total population estimates for male Bristol Bay red king crabs are calculated using only standard tows from the original sampling in June, while female Bristol Bay red king crab biomass and abundance estimates are calculated by replacing data collected at the original stations with data collected at the resampled stations.

Centers of Abundance and Mapping

The centers of abundance for male and female crab from 1975 to 2021 were determined by averaging the latitude and longitude of each positive tow for a particular species. Latitude and longitude were weighted by the CPUE for each size and sex class. In years when Bristol Bay stations were resampled, only tows from Leg 1 were included. Interpolations for maps of crab

density were created using inverse distance weighting, expanding on R packages akgfmaps and coldpool (Rohan 2022, Rohan and Barnett 2022)

Special Projects

In addition to the standard survey, twelve special projects were conducted to collect stock-specific biological data (Table 4):

1) Tag legal male Bristol Bay red king crab with pop-up satellite tags to elucidate movement from summer into the fall.

2) Tag commercial size snow crab with pop-up satellite tags to test tagging methods and elucidate movement trajectories from the summer survey to the start of the winter fishery.

3) Take photos of commercial shellfish of different sex, maturity status, shell conditions, egg conditions, and with any diseases to improve training manuals.

4) Collect snow crab carapace samples for radiometric ageing (post-terminal molt shell age), to improve maximum age and natural mortality estimates.

5) Collect immature snow crab that are nearing maturity across six regions to assess body condition and lipid allocation.

6) Monitor the prevalence of bitter crab syndrome by collecting blood samples from immature snow crab for diagnostic PCR assays

7) Collect live, immature snow crab to experimentally quantify the impact of temperature on bitter crab syndrome progression and host mortality with a pilot laboratory study.

8) Collect live, mature male Tanner crab for ocean acidification laboratory experiments.

9) Collect live, mature male snow crab for ocean acidification laboratory experiments.

10) Assess whole-haul subsampling methods for estimating abundance, biomass and size composition of snow and Tanner crab.

11) Collect live snow crab with and without black eye syndrome for experiments on the effects of temperature and disease progression.

12) Collect eye stalks of snow crab with and without black eye syndrome to characterize the pathology, microbiome, and quantify gene expression.

Pop-up satellite tags were placed on 16 mature male Bristol Bay red king crab and 18 commercial sized male snow crab; these tags will release from crabs and transmit location information in mid-October and December 2022, respectively. Fifty-seven snow crab and 120 Tanner crab were collected and transported to the AFSC Kodiak Laboratory for ocean acidification experiments. One

hundred and nine snow crab were collected live and transported to the ADF&G Kodiak Laboratory for the black eye syndrome project. Preserved samples were collected for projects on radiometric shell ageing (carapaces from 54 snow crab), lipid condition metrics (hepatopancreas samples from 118 snow crab), black eye syndrome (157 snow crab eyestocks), and bitter crab syndrome (blood samples from 201 snow crab). Approximately 400 juvenile snow crab were collected for a pilot laboratory study on bitter crab syndrome progression, however collection goals were not met for infected crab so specimens will be used for a laboratory study on the multiplicative effects of temperature and food quality (AFSC Newport Laboratory). Whole-haul subsampling methods were tested for one haul and photos were taken of all commercial crab species to update training manuals. Chela heights were measured for maturity estimates; 1,723 male Tanner crab and 1,371 male snow crab chela heights were measured in 2022. All collections were completed within the guidelines stipulated by the survey's Scientific Research Permit (NOAA: 2022-8) and Aquatic Resource Permit (ADF&G: CF-22-022), as well as project-specific permits (CF-22-023, CF-22-092, CF-22-039, CF-22-057).

RESULTS

Survey Overview

The 2022 EBS bottom trawl survey consisted of 375 total bottom trawls conducted from 30 May to 29 July. The survey was conducted over a total area of approximately 140,350 nmi^2, beginning in the southeast corner of Bristol Bay, moving east to west, and finishing with the northernmost stations. The latitude and longitude of the midpoint of each successful tow along with the duration (h), distance fished (km), bottom depth (m) and bottom temperatures (°C) are listed in the Appendix. The mean distance fished across all tows was 1.54 nmi (SD = 0.12 nmi) with a range of 0.58 to 1.75 nmi and the mean tow duration was 31.2 minutes (SD = 2.4 min, range = 11.3 to 35 min) for standard stations. The fishing depth ranged from 18 to 181 m with a mean gear depth of 78.7 m (SD = 33.6 m) for standard stations. Mean net width for standard tows ranged from 14 to 20.3 m and the average mean net width for all 375 standard tows was 17.2 m (SD = 1.2 m). The 2022 net fishing performance (distance fished, tow duration, gear depth, net width) was consistent with previous years with the exception of 1975, when tow duration was 60 minutes and mean distance fished was 2.26 ± 0.18 nmi.

The mean bottom water temperature was 2.5 °C (SD = 1.8), ranging from -1.6°C to 8.4°C (Fig. 4). A cold pool of water < 2°C extended down the middle shelf between the 50 and 100 m isobaths, as far south as the Pribilof Islands and as far west as Unimak Island, but not reaching into Bristol Bay. Conditions were similar to 2017, with cooler temperatures and a more pronounced cold pool than the last few years (2018 – 2021). Bristol Bay temperatures were warmer, generally 3 – 4°C. The survey time series is valuable for tracking decadal-scale changes in bottom temperature, but changes in the timing and spatial extent of the survey confound comparison of mean bottom temperatures across years, especially early in the time series. To construct a comparable time series of bottom temperatures, we selected a set of stations that had temperature data available for at least 42 years of the 47 year time series (Fig. 5a). We then used multiple imputation to estimate missing temperatures from this restricted set of stations, and used a generalized additive model to account for differences among years in the timing of sampling. For the subset of stations selected, the resulting estimate for mean bottom temperature in 2022

was 2.74°C, indicating a continued decline from the values > 4°C observed in 2016 and 2018-2019 (Fig. 5b).

Population abundance and biomass estimates of the seven commercial crab stocks sampled during the EBS bottom trawl survey have fluctuated dramatically over the 1975 – 2022 time series (Fig. 6). Overall, mature male biomass of commercial crab stocks decreased from approximately 300,000 t to below 100,000 t in the mid-1980s, followed by an increase to nearly 500,000 t in the early 1990s attributed to increases in snow and Tanner crab. Total mature male biomass then leveled out around 200,000 t between 2005 and 2015, but has been steadily dropping since. The 2022 total estimated mature male biomass for all stocks was 64,894 t, 11% higher than the record-low estimate from 2021 (Fig. 6).

Bristol Bay District Red King Crab

Red king crab (*Paralithodes camtschaticus*) were caught at 68 of the 136 stations in the Bristol Bay management district during the standard survey, and 100% of these crab were measured (Table 5). Estimated biomass of legal-sized male crab (± 95% CI) in 2022 was 18,060 ± 7,616 t (5.9 ± 2.4 million crab; Tables 6 & 7). This estimate is higher than the 2021 estimate, but less than the previous 20-year average of 27,106 ± 5,797 t. The majority of legal males were concentrated around central Bristol Bay and south to the Black Hills. Few legal males were found along the northern Bristol Bay district boundary, as in 2021 (Fig. 22). Sixty-six percent of legal-sized males were new hardshell crab (Fig. 14). New hardshell males were generally found in deeper waters below the 50m isobath, with older shell males closer to shore around Bristol Bay (Fig. 28).

Mature and immature male Bristol Bay red king crab biomass estimates were 21,832± 8,610 t (8.2 ± 3.1 million crab) and 3,129 ± 1,295 t (4.3 ± 1.7 million crab), respectively (Tables 6 & 7). Both size categories were located in central Bristol Bay, with mature males also nearshore along the Alaska Peninsula (Figs. 23 & 24). In 2022 both mature and immature male biomass and abundance estimates increased from the 2021 estimates (Tables 6 & 7); however, compared with historic values the male population remains low across all size classes (Figs. 7 & 10).

In 2022 no Bristol Bay stations were resampled at the end of the survey. Of the 245 mature females sampled in late May through June, 86% had uneyed eggs, 3% were barren, 10% had empty egg cases and 1% had eggs in the process of hatching (Fig. 18). Seventy-three percent of mature females were new hardshell, 18% had a soft shell or were in the process of molting, and 10% were oldshell (Fig. 16). Overall, 14% of females had not completed the annual molt-mate cycle at the time of sampling, which was slightly above the 10% threshold to consider resampling. State and federal managers examined preliminary results and models to determine the efficacy of resampling a subset of the Bristol Bay stations. It was determined that resampling would not appreciably change the assessment, so resampling of Bristol Bay stations was not conducted at the end of the survey. The average bottom water temperature in the Bristol Bay District was 3.5 °C, which was warmer than any years when resampling occurred, with the exception of 2021 (Fig. 31). Mature females with an incomplete reproductive cycle tended to

occur to the west and northwest, while most mature females in eastern Bristol Bay and along the Alaska Peninsula had uneyed eggs (Fig. 32).

The 2022 mature female red king crab biomass estimate was 10,280 ± 4,991 t (7.5 ± 4.2 million crab) and the immature female biomass estimate was 946 ± 642 t (2.5 ± 1.6 million crab; Tables 6 & 7). The mature female biomass estimate in 2022 increased by 3% from the 2021 estimate, but was well below the 20-year average of 31,771 ± 5,905 t (Fig. 7; Table 6). In addition, estimates for immature female biomass were greater than 2021 values (Table 6). However, female abundance across all size classes remains low compared with historic values (Fig. 12). The majority of mature female red king crab were in central Bristol Bay, while immature females were generally in shallower waters closer to shore (Figs. 25 - 27). Eighty-one percent of mature females were carrying clutches that were either three-quarters or completely full (Fig. 20).

Spatial distributions of red king crab have fluctuated over the 1975-2022 time series. Centers of abundance for mature male and female red king crab shifted north and east of the southwest Bristol Bay region from 1975 to 1987 (Fig. 29). From 1988 to 1991, mature female centers of abundance shifted slightly to the south before returning to the northeastern trend, while male centers of abundance 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. However, an alternative hypothesis suggests that the disappearance of the southwestern portion of the population near the Unimak region during the late 1970s and early 1980s was caused by trawl bycatch (Dew and McConnaughey 2005). In more recent years when the cold pool extended onto the Bristol Bay shelf area (from 2008 to 2012, and 2017), the distribution of mature females and males moved from the central area of Bristol Bay to nearshore areas along the Alaska Peninsula, supporting the temperature hypothesis (Chilton et al. 2010). This may be the result of females avoiding water cold enough to delay embryogenesis during brooding (Stone et al. 1992). Centers of abundance for mature males and females in 2022 were further south than in 2021, but still slightly north of central Bristol Bay (Fig. 29).

The location of ovigerous females at larval release may impact post-larval settlement success and subsequent recruitment strength. Southwestern Bristol Bay has long been considered the most important area for larval release, since larvae released in that area are expected to drift into favorable juvenile habitat in nearshore Bristol Bay (McMurray et al. 1984, Armstrong et al. 1993, Dew and McConnaughey 2005). This hypothesis predicts increased settlement success in cold years when the female center of abundance is shifted southwest (Evans et al. 2012). This prediction is supported by observations that high year-class strengths in the 1970s occurred when the spawning stock was located in southern Bristol Bay (Armstrong et al. 1993). However, despite relatively cold years and an extensive cold pool in 2008-2012, Bristol Bay red king crab abundance has remained low. A recent study modeling larval trajectories under different climate scenarios suggests that southwestern Bristol Bay is not as favorable for hatching as previously hypothesized (Daly et al. 2020). Modeled larvae that hatched in central and nearshore Bristol Bay were more likely to settle in high-quality habitat and greater larval retention was found in warm years (Daly et al. 2020).

Pribilof District Red King Crab

Red king crab were caught at 25 of the 77 stations in the Pribilof District in 2022, most of which were in the high-density sampling area (Fig. 27), and all of which were measured (Table 5). Legal male biomass was 5,075 ± 2,973 t (1.3 ± 0.7 million crab; Table 8 & 9), which was higher than in 2021, and similar to the previous 20-year average of 4,982 ± 1,672 t (Table 8). Fifty-one percent of legal-sized males were new hardshell (Fig. 15). Oldshell legal males were distributed close to shore around St. Paul Island, while new hardshell males were further offshore to the north and east (Fig. 28).

The biomass estimate for mature males was 5,105 ± 2,973 t (1.3 ± 0.7 million crab) and 0.1 ± 0.3 t (0.02 ± 0.03 million crab) for immature males (Tables 8 & 9). Legal and mature males were distributed around most of St. Paul Island (Figs. 22 and 23), while immature males were caught at a single station northeast of St. Paul Island (Fig. 24). In recent years the center of abundance for mature males has been northeast of St. Paul Island. The same trend was present in 2022, although the center of abundance was much closer to the island (Fig. 30).

The biomass estimate for mature females was 989 ± 768 t (0.5 ± 0.4 million crab) and no immature females were caught (Tables 8 & 9). Female biomass estimates are imprecise due to the limited number of tows with crab catches (Fig. 27; Appendix), but 2022 mature female biomass was below the previous 20 year average biomass estimate (1,464 ± 478 t; Table 8; Fig. 8). Eighty-four percent of the mature females were new hardshell, 10% were oldshell and 7% were softshell or molting (Fig. 17). Eighty-one percent of these mature females had uneyed eggs, 16% were barren, and 3% had empty egg cases (Fig. 19). All females with eggs had clutches that were three-quarters full (Fig. 21). Mature females were distributed to the northeast of St. Paul Island (Figs. 25 and 27). As with males, the center of abundance for mature females was northeast of St. Paul Island and closer to the island than in recent years (Fig. 30).

Historically, red king crab were not abundant in the Pribilof District and landings were taken incidentally during the blue king crab fishery. The population began to increase in the 1990s and the red king crab fishery first opened in 1993, while the blue king crab fishery was closed. A combined fishery for both red and blue king crab occurred in the Pribilof District from 1995 through 1998, but due to low abundance of blue king crab, both the combined fishery and the red king crab fishery have remained closed since the 1998-1999 season (Gish 2006). The red king crab population has remained relatively stable since the 1990's, although no large pseudo-cohorts have been apparent in the past decade (Figs. 11 & 13).

Northern District Red King Crab

Red king crab were caught at 23 stations in the Northern District (Fig. 27), outside of the current management units where red king crab are commercially fished (Fig. 3). Since there is no stock assessment or fishery for the Northern District, we report survey results for the size classes for legal and mature males that are used in the Pribilof and Bristol Bay Districts (Table 1). The 2022 biomass estimate of legal-sized males (≥ 135 mm) was 1,754 ± 1,099 t (0.5 ± 0.3 million crab), while the biomass estimates for mature and immature males were 2,335 ± 1,197 t (0.9 ± 0.4

million crab) and 423 ± 211 t (0.5 ± 0.2 million crab), respectively. Mature male biomass increased from 2021 and was the second highest on record (Fig. 9). Northern District immature and mature males were distributed nearshore, above the 50m isobath (Figs. 23 & 24).

Estimated biomass of mature and immature female red king crab was 1,550 ± 982 t (1.2 ± 0.7 million crab) and 15 ± 29 t (0.03 ± 0.06 million crab), respectively. The 2022 biomass and abundance of mature females declined from 2021, but was higher than any other year in the time series (Fig. 9). Northern District mature females were distributed nearshore above the 50m isobath (Fig. 25).

Pribilof District Blue King Crab

Blue king crab (*Paralithodes platypus*) were caught at 4 of the 86 stations in the Pribilof stock boundary area in 2022 (Fig. 52). All individuals were caught in the high-density sampling area, and 100% of crab were measured (Table 5). Only two males were caught in the Pribilof District, both of which were of legal size, one being oldshell and the other being new hardshell (Figs. 39 & 53). Legal male crab biomass was estimated at 111 ± 152 t (0.03 ± 0.05 million crab), which was below the average of 270 ± 87 t for the previous 20 years (Tables 10 & 11; Fig. 33). Male blue king crab were caught to the northeast of St. Paul Island (Figs. 47 & 48) and the center of abundance was similar to 2021 (Fig. 54).

The biomass estimate for mature females was 145 ± 189 t (0.1 ± 0.1 million crab) and no immature females were caught (Tables 10 & 11; Fig. 33). Mature female biomass in 2022 was less than the previous 20-year average of 380 ± 179 t, although estimates of female biomass are imprecise due to a preference for rocky habitat that is difficult to sample with bottom trawls. Blue king crab females are predominantly biennial spawners with only a portion of the female population carrying eyed embryos in a given year, while the remainder are in a non-embryo-bearing phase (Somerton and Macintosh 1985). Eighty-six percent of mature female blue king crab sampled in the Pribilof stock boundary area were new hardshell, with the remainder having old shells (Fig. 41). Twenty-eight percent were barren and 81% of the crab with eggs had clutches that were three-quarters full (Fig. 45). All females with eggs had uneyed embryos (Fig. 43). The distribution of mature female blue king crab was east of St. Paul Island (Fig. 50), with the center of abundance slightly north of its location in 2021 (Fig. 54).

Pribilof blue king crab abundance was higher in the late 1970s and early 1980s, and increased in the 1990s with female abundances at an all-time high in 1980 (Figs. 35 and 37). Male and female blue king crab abundances have been extremely low in recent years with no evidence of an increasing trend (Fig. 33).

St. Matthew Island Section, Northern District Blue King Crab

Blue king crab were caught at 12 of the 56 total stations in the St. Matthew Island Section, primarily in the high-density sampling area (Figs. 47-52), and all crab were measured (Table 5). Legal male crab biomass was estimated at 1,467 ± 1,734 t (0.8 ± 0.9 million crab; Tables 12 &

13). The legal male biomass estimate was similar to 2021 and well below the previous 20-year average of 2,373 ± 613 t. In 2022, 78% of the legal-sized males were new hardshell crab (Fig. 40). The legal males were distributed to the south of St. Matthew Island, particularly at the southeastern tip of the island (Fig. 47)

The mature male biomass estimate was 1,902 ± 2,036 t (1.1 ± 1.2 million crab) and the immature male biomass estimate was 1,352 ± 1,354 t (3.2 ± 3.7 million crab; Tables 12 & 13; Fig. 34). One or two stations often greatly affect the population estimates for St. Matthew Island blue king crab. In 2022, 57% of mature males were caught at QP-2423 and 64% of immature males were caught at Q-23. Similar to recent years since 2018, males were distributed in nearshore areas south and southeast of the island (Figs. 48 & 49). The mature male center of abundance was similar to 2021, occurring very close to shore within the 50 m isobath (Fig. 55).

The mature female blue king crab biomass estimate was 549 ± 612 t (1.1 ± 1.3 million crab) and the immature female biomass estimate was 360 ± 511 t (1.1 ± 1.6 million crab; Tables 12 and 13). The 2022 mature female biomass estimate is similar to 2021 and higher than the previous 20 year average (142 ± 71 t; Fig. 34), although estimates of female blue king crab biomass are imprecise because they prefer rocky untrawlable habitat. Thirty-five percent of the mature female blue king crab were caught at one station (Q-25) to the southwest of St. Matthew Island (Fig. 50), while 80% of immature females were caught further east at Q-23 (Fig. 46). Compared with recent years, the mature female center of abundance shifted westward in 2022 (Fig. 55). Seventy-two percent of mature females were new hardshell (Fig. 42) and no mature females had eggs (Fig. 44 & 46).

The St. Matthew blue king crab population has gone through three peaks in abundance (Figs. 34, 36, & 38). Abundance declined in the late 1990s, and the fishery was closed in 1999. The fishery opened again in 2009 after a 10-year rebuilding plan, but was then closed on and off over the next several years, and has remained closed since 2016. In 2022 immature male biomass and abundance estimates are the highest they have been in a decade, although mature male estimates are depressed (Fig. 36). Female abundance and biomass estimates have been elevated over the past four years (Fig. 38).

Tanner Crab

Tanner crab were caught at 76 of the 120 stations east of 166° W (Figs. 70-76) and 100% of legal crab were measured (Table 5). The biomass estimate for legal male Tanner crab east of 166° W (≥ 120 mm carapace width) was 6,450 ± 2,805 t (9.5 ± 4.0 million crab; Tables 14 and 15). Sixty-six percent of legal males were ≥ 4.9 in CW, with a biomass estimate of 4,676 ± 2,142 t (6.3 ± 2.8 million crab; Tables 14 and 15). The 2022 estimated biomass of legal Tanner crab in the eastern area was higher than in 2021, but well below the previous 20-year average biomass of 12,885 ± 3,400 t. In 2022, 75% of sampled legal males east of 166° W were new hardshell (Fig. 62). East of 166°W the Tanner crab mature male biomass estimate was 8,725 ± 3,457 t (14.3 ± 5.4 million crab) and the immature male biomass estimate was 6,036 ± 2,165 t (60.7 ± 36.9 million crab). Mature and immature biomass estimates increased over 2021 values, but remain relatively low (Fig. 56; Tables 14 & 15).

Estimated biomass for mature female Tanner crab east of 166° W was 1,800 ± 811 t (9.6 ± 4.6 million crab), while the immature female Tanner crab estimated biomass was 690 ± 509 t (38.9 ± 33.9 million crab; Tables 14 & 15). Estimated mature female biomass declined from 2021 and was below the previous 20-year average of 3,692 ± 1401 t (Fig. 56). Thirty-two percent of the sampled mature females were new hardshell, while 66% were either oldshell or very oldshell (Fig. 63). Newly extruded uneyed embryos were carried by 94% of the mature females sampled, while 3% were barren, 2% had eyed eggs, and less than 1% had eggs in the process of hatching or had empty egg cases (Fig. 66). Eighty-nine percent of females had clutches that were full or three-quarters full (Fig. 68).

Tanner crab were caught at 172 of the 255 stations west of 166° W (Figs. 70-76) and 100% of legal-sized crab were measured (Table 5). The 2022 biomass estimate for legal male Tanner crab west of 166° W (≥ 110 mm carapace width) was 5,131 ± 1,330 t (9.8 ± 2.5 million crab; Tables 16 and 17). Twenty-three percent of legal males were ≥ 4.9 in CW, for a biomass estimate of 1,576 ± 517 t (2.3 ± 0.8 million crab; Tables 16 & 17). The 2022 estimated biomass of legal Tanner crab in the western area was well below the previous 20-year average biomass of 19,373 ± 4,510 t. In 2022, 43% of sampled legal-sized males were new hardshell west of 166° W (Fig. 63). West of 166°W the mature male biomass estimate was 6,816 ± 1,715 t (14.6 ± 3.6 million crab) and the immature male biomass estimate was 7,676 ± 2,510 t (118.8 ± 53.6 million crab). Both mature and immature male biomass decreased for western Tanner crab from 2021 values (Fig. 57; Tables 16 & 17).

Estimated biomass for mature female Tanner crab west of 166° W was 4,767 ± 2,490 t (33.2 ± 18.7 million crab), while the immature female Tanner crab estimated biomasses was 1,975 ± 910 t (91.2 ± 42.6 million crab). Twenty-one percent of the mature females were new hardshell and 76% were oldshell or very oldshell (Fig. 65). Ninety-five percent of the sampled mature females carried newly extruded embryos, 3% were barren, 1% had empty egg cases, and <1% had eyed eggs or were in the process of hatching (Fig. 67). Eighty-four percent of mature females had clutches that were either full or three-quarters full (Fig. 69).

Legal and mature male Tanner crab were distributed across the outer shelf, principally south and east of the Pribilof Islands. East of the Pribilof Islands, they also spread across the middle shelf, particularly in a band just below the 50m isobath (Figs. 70-72). This band of crab was comprised almost exclusively of new hardshell crab, while most other areas were dominated by oldshell crab (Fig. 77). The center of abundance for mature males shifted eastward compared with the past few years (Fig. 78). Mature females were primarily found on the outer shelf, particularly south of St. George Island near the shelf break (Fig. 74). The 2022 mature female center of abundance was very similar to 2021, occurring approximately 50 nmi east of St. George Island (Fig. 78). Immature males and females had a patchy distribution on the middle and outer shelf, south and east of the Pribilof Islands, with one high density station further north, near Zhemchug Canyon (Figs. 73 & 75).

Pulses of strong recruitment to the mature male and female components of the population appear to have been cyclical throughout the EBS (Figs. 58-61), yet it is unclear if recruitment is linked to environmental conditions, or if strong cohorts are sequentially linked through population

dynamics. Peaks in abundance of 20 – 50 mm juveniles in recent years have been difficult to follow in subsequent years. Since both male and female Tanner crab have a terminal molt to maturity, shell condition can be used to infer whether they molted to maturity within the past year (new hardshell) or in previous years (oldshell). New hardshell mature male and female crab indicate recruitment into the mature stock (Figs. 62 – 65).

Snow Crab

Historically low snow crab catches continued in 2022 for mature males and females, but juvenile numbers increased (Figs. 79-81; Tables 18 & 19). During the 2022 survey, snow crab were caught at 210 of the 375 stations in the EBS (Figs. 86-92; Tables 18 & 19) and 89% of legal male crab were measured (Table 5). Legal male snow crab estimated biomass was 33,447 ± 9,780 t (92.6 ± 26.0 million crab; Tables 18 & 19). This represents a 44% decline in estimated biomass since 2021, and is less than one third of the previous 20-year average of 110,299 ± 19,188 t. Forty percent of the legal male biomass was comprised of crab ≥ 4.0 in CW, resulting in an industry preferred-size male biomass estimate of 13,494 ± 5,731 t (24.6 ± 10.3 million crab). The biomass estimate of preferred-size males increased by 9% over the 2021 estimate, thus the decline in legal sized crab was caused by a lack of recruitment into the legal size category, rather than a loss of larger crab. Legal and preferred-size males were found in greatest abundance on the middle shelf, north of 58ºN (Figs. 86 & 87). Less than 5% of legal-sized male crab were in molting or softshell condition, while 47% were in new hardshell condition and 48% were oldshell or very oldshell (Fig. 82). Legal males on the outer shelf and south of the Pribilof Islands were almost entirely oldshell crab, while new hardshell crab were more dominant between the 50 and 100 m isobaths north of the Pribilof Islands, as well as north of St. Matthew Island (Fig. 93).

Estimated mature male biomass was 20,403 ± 7,374 t (42.2 ± 14.6 million crab), which was a 16% decline in biomass from 2021 (Tables 22 and 24). Estimated immature biomass was 37,727 ± 14,414 t (602.5 ± 260.1 million crab). Immature male biomass and abundance had begun to decline in 2019 and this pattern continued in 2021, resulting in a 96% drop in estimated abundance from 2018 to 2021. In 2022 immature male biomass declined by 23% from 2021, but immature male abundance increased by 138%; this difference is caused by higher catches of crab less than 50 mm carapace width (Tables 18 and 19; Figs. 80 & 82). Mature males were primarily distributed on the middle shelf north of 58ºN and on the outer shelf northwest of St. Matthew Island (Fig. 88). The mature male center of abundance was approximately 40 nmi south of St. Matthew Island, similar to 2021, but not quite as far north (Fig. 94). Immature males were found in highest abundance around and north of St. Matthew Island (Fig. 91). Mature males dominated the population structure at the southernmost stations and on the outer shelf, while immature crab were more dominate on the middle shelf (Fig. 92).

Estimated mature female snow crab biomass was 20,941 ± 14,162 t (408.7 ± 280.4 million crab), while estimated immature female snow crab biomass was 26,219 ± 17,548 t (903.8 ± 519.6 million crab; Tables 18 & 19). The 2022 mature female biomass estimate was 30% lower than the 2021 estimate and well below the previous 20-year average (82,246 ± 21,349 t), making it the second lowest in the time series (Fig. 79). After dramatic declines in the immature female

biomass and abundance from 2019 through 2021, immature female biomass and abundance estimates in 2022 increased by 8,713% and 3,902%, respectively (Figs. 81 & 85). Pulses of strong recruitment to the mature female population have been cyclical in the past (Fig. 81), and it has been hypothesized that strong cohorts are sequentially linked (see Ernst et al. 2012, Parada et al. 2010 for a detailed discussion). As with Tanner crab, shell condition can be used to infer whether mature crab are newly mature or if the molted to maturity in years prior. In 2021 over 99% of mature females were oldshell or very oldshell, indicating an aging stock of mature female crab. In 2022, although the biomass and abundance declined, some new recruitment into the mature age class was observed, as 44% of mature females were new hardshell and 56% were oldshell or very oldshell (Fig. 83). Eighty-four percent of the mature females were brooding new embryos, while 13% were barren and 2% had empty egg cases (Fig. 84). Forty percent of mature females had clutches that were full or three-quarters full, compared with 60% in 2021 and 87% in 2019 (Fig. 85). Mature female snow crab were primarily distributed around St. Matthew Island (Fig. 90), while immature snow crab were east of St. Matthew Island and north to the survey boundary (Fig. 91). The center of abundance for mature females was further north than typically observed, occurring north of St. Matthew Island (Fig. 94).

Chionoecetes spp. Hybrid

Chionoecetes spp. hybrid crab were caught at 101 of the 375 stations in the EBS (Figs. 96-101). In this document, *Chionoecetes* spp. hybrid size classes for legal and mature males are based on the size categories for snow crab (Table 1). Legal male crab had a biomass estimate of 814 ± 314 t (1.7 ± 0.6 million crab). Fifty-two percent of the legal males were ≥ 4 inches in carapace width, with a biomass estimate of 579 ± 265 t (0.9 ± 0.4 million crab). The mature male biomass estimate was 664 ± 287 t (1.1. ± 0.5 million crab; Fig. 95) and the immature male biomass estimate was 381 ± 59 t (6.0 ± 2.5 million crab). Hybrid males were primarily distributed in the southeastern half of the survey grid below the 50 m isobath (Figs. 96-98, 101).

The 2022 mature female *Chionoecetes* spp. hybrid crab biomass estimate was 66 ± 55 t (0.5 ± 0.4 million crab; Fig. 95), and the immature female crab biomass estimate was 101 ± 59 t (4.1 ± 2.6 million crab). Mature female *Chionoecetes* spp. hybrid crab had a patchy distribution across the middle and outer shelves, while immature females were generally distributed on the central middle shelf (Figs. 99-101).

Hair Crab

In this report, legal male hair crab (*Erimacrus isenbeckii*) are defined as > 3.25 inches CW (≥ 83 mm CL), which was specified in the previous Pribilof District fishery, while the female hair crab biomass estimate is presented for all sizes and maturity states combined. Hair crab were caught at 43 of the 375 stations throughout all districts combined on the survey (Fig. 106). The 2022 biomass estimate of legal males was 506 ± 225 t (0.8 ± 0.4 million crab) and 392 ± 149 t (1.1 ± 0.4 million crab) for sub-legal males (Tables 20 & 21). Male hair crab primarily occurred along the 50m isobath and into Bristol Bay (Figs. 103, 104 & 106). The female hair crab

biomass estimate was 268 ± 134 t (0.6 ± 0.3 million crab; Tables 20 & 21). Females were primarily distributed on the southern portion of the middle shelf (Figs. 105 & 106).

The Pribilof District hair crab fishery has been closed since 2000 due to a shift in the distribution of legal males to the Northern District and, after one year of experimental fishing with minimal vessel participation, the Northern District fishery was closed in 2001 (Fitch et al. 2012).

Golden King Crab

No golden king crab were caught in 2022.

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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. **We define female maturity based on abdominal flap morphology throughout this document.** The legal size classes defined by ADF&G (CW in inches) include spines.

Species	District	Sex	Immature	Mature	Legal Male
Paralithodes camtschaticus	Bristol Bay	male	< 120 mm	≥ 120 mm	≥ 135 mm CL or ≥ 6.5 in. CW
	Pribilof	male	< 120 mm	≥ 120 mm	≥ 135 mm CL or ≥ 6.5 in. CW
	Norton Sound	male	< 94 mm	≥ 94 mm	≥ 104 mm CL or ≥ 4.8 in. CW
Paralithodes platypus	Pribilof	male	< 120 mm	≥ 120 mm	≥ 135 mm CL or ≥ 6.5 in. CW
	St. Matthew	male	< 105 mm	≥ 105 mm	≥ 120 mm CL or ≥ 5.5 in. CW
	Northern Bering Sea	male	<105 mm	≥ 105 mm	≥ 120 mm CL or ≥ 5.5 in. CW
Chionoecetes bairdi	East of 166° W	male	< 113 mm	≥ 113 mm	≥ 120 mm or ≥ 4.8 in. CW[1]
	West of 166° W	male	< 103 mm	≥ 103 mm	≥ 110 mm or ≥ 4.4 in. CW[1]
	Preferred	male			≥ 125 mm or ≥ 4.9 in. CW
Chionoecetes opilio	Eastern Bering Sea	male	< 95 mm	≥ 95 mm	≥ 78 mm or ≥ 3.1 in. CW[2]
	EBS Preferred	male			≥ 102 mm or ≥ 4.0 in. CW
	Northern Bering Sea	male	< 68 mm	≥ 68 mm	≥ 78 mm or ≥ 3.1 in. CW
	NBS Preferred	male			≥ 102 mm or ≥ 4.0 in. CW
Erimacrus isenbeckii		male			≥ 83 mm CL or > 3.25 in. CW[3]

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

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

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

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

Year	Net width (m)	Trawling methodology
1975		First and only year tow duration = 1 hour
1976 - 2012		Tow duration = 30 minutes
1975 - 1995		Brake set and haul back of winch drum wire defined trawl contact with seafloor (net on bottom)
1996 - 2012		Began using bottom contact sensors to determine trawl contact with seafloor
1975 - 1980	12.2	Mean width of 400-mesh Eastern trawl*
1981	18.0	Mean width* of 83-112 Eastern trawl for Vessel 1
1981	13.4 or 14.3	Mean width* of 400-mesh Eastern trawl measurements different on haul 1-112 and 114-156 for Vessel 37*
1982 - 1987	Variable with each tow	Rose and Walters (1990) calculated the 83-112 net width based on an inverse relationship to net scope
1988 - 2001	Variable with each tow	All survey vessels used ScanMar acoustic sensors on the 83-112 trawl net
2001 - 2012	Variable with each tow	All survey vessels used NetMind acoustic sensors on the 83-112 trawl net
2013 - 2022	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. – Size-weight regression relationships used to calculate biomass of crab species caught in National Marine Fisheries Service eastern Bering Sea bottom trawl surveys. The size-weight relationships are described by the expression: $W = a\ L^b$, where W is the total weight in grams, L is either carapace length or carapace width in millimeters, *a* is the intercept in log scale and *b* is the slope.

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

Table 4. -- Special projects related to crab species conducted on National Marine Fisheries Service eastern Bering Sea bottom trawl survey in 2022.

Project Title	Principle Investigator	Agency
Bristol Bay red king crab tagging	Leah Zacher	RACE[1]-SAP[2]
Snow crab tagging	Leah Zacher Connie Melovidov	RACE[1]-SAP[2] UAF[3]
Shellfish photo documentation	Allie Conrad	RACE[1]-SAP[2]
Snow crab radiometric ageing	Erin Fedewa	RACE[1]-SAP[2]
Snow crab body condition	Erin Fedewa	RACE[1]-SAP[2]
Snow crab bitter crab syndrome field monitoring	Erin Fedewa	RACE[1]-SAP[2]
Snow crab bitter crab syndrome lab experiments	Erin Fedewa	RACE[1]-SAP[2]
Tanner and snow crab ocean acidification	Chris Long	RACE[1]-SAP[2]
Whole-haul subsampling	Chris Long	RACE[1]-SAP[2]
Snow crab black eye syndrome lab experiments	Maya Groner	Bigelow[4]
Snow crab black eye histology & transcriptomics	Maya Groner	Bigelow[4]

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

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

[3] University of Alaska Fairbanks, Fairbanks, Alaska.

[4] Bigelow Laboratory for Ocean Science, East Boothbay, Maine

Table 5. -- Summary of 2022 National Marine Fisheries Service eastern Bering Sea bottom trawl survey details for seven commercial crab stocks. Male size categories are defined in Table 1.

		Tows in District	Tows with crab	Crab caught	Crab measured	Biomass (t)	CI (± 95%)
Bristol Bay District	Immature male	136	34	136	136	3,129	1,295
Red King Crab	Mature Male	136	59	270	270	21,832	8,610
	Legal	136	55	196	196	18,060	7,616
	Immature female	136	19	78	78	946	642
	Mature female	136	44	245	245	10,280	4,991
Pribilof District	Immature male	77	1	1	1	0	0
Red King Crab	Mature Male	77	22	76	76	5,105	2,973
	Legal	77	22	75	75	5,075	2,973
	Immature female	77	0	0	0	0	0
	Mature female	77	12	31	31	989	768
Pribilof District	Immature male	86	0	0	0	0	0
Blue King Crab	Mature Male	86	2	2	2	111	152
	Legal	86	2	2	2	111	152
	Immature female	86	0	0	0	0	0
	Mature female	86	4	7	7	145	189
St. Matthew Is.	Immature male	56	8	133	133	1352	1,354
Blue King Crab	Mature Male	56	10	51	51	1,902	2,036
	Legal	56	8	34	34	1,467	1,734
	Immature female	56	5	50	50	360	511
	Mature female	56	5	37	37	549	612
Tanner Crab	Immature male	120	71	1,557	2,161	6,036	2,165
east of 166°W	Mature Male	120	60	499	499	8,725	3,457
	Legal	120	54	330	330	6,450	2,805
	Preferred	120	47	217	217	4,676	2,142
	Immature female	120	37	885	1381	690	509
	Mature female	120	51	345	345	1,800	811
Tanner Crab	Immature male	255	160	3,079	4,791	7,676	2,510
west of 166°W	Mature Male	255	115	593	593	6,816	1,715
	Legal	255	102	401	401	5,131	1,330
	Preferred	255	50	94	94	1,576	517
	Immature female	255	124	2,141	3,668	1,975	910
	Mature female	255	91	827	1,240	4,767	2,490
Snow Crab	Immature male	375	228	6,953	23,431	37,727	14,414
	Mature Male	375	191	1,594	1,730	20,403	7,374
	Legal	375	223	3,399	3,809	33,447	9,780
	Preferred	375	155	920	1,000	13,494	5,731
	Immature female	375	130	3,902	35,851	26,219	17,548
	Mature female	375	74	1,810	18,591	20,941	14,162

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. See authors for 1975-1977 data.

Year	Immature male < 120 mm	Mature male ≥ 120 mm	Legal male ≥ 135 mm	Immature female	Mature female
1978	54,371	146,682	98,241	3,795	141,265
1979	16,886	86,906	63,107	5,132	59,165
1980	37,369	129,829	106,655	7,594	73,712
1981	27,294	41,520	27,368	4,215	59,099
1982	51,268	23,038	10,184	21,932	48,913
1983	25,675	9,796	2,867	7,257	7,237
1984	79,710	16,849	7,623	38,806	17,529
1985	12,823	14,006	5,356	1,602	5,723
1986	12,382	28,189	13,033	1,847	5,062
1987	16,626	30,197	18,167	7,074	15,427
1988	9,513	25,861	19,117	1,205	18,019
1989	7,059	35,503	27,552	1,322	11,615
1990	6,344	32,481	24,527	2,871	17,995
1991	6,395	60,142	52,119	1,826	15,553
1992	6,787	18,327	13,747	1,088	11,163
1993	6,939	28,740	19,839	1,170	16,101
1994	3,601	19,775	13,371	1,104	8,283
1995	6,359	20,939	15,570	2,992	7,868
1996	9,067	18,111	15,073	5,380	12,042
1997	27,126	32,533	27,403	3,051	21,365
1998	13,035	33,297	19,409	2,161	35,849
1999	5,093	39,870	30,005	1,163	19,126
2000	6,961	31,450	22,090	2,615	26,387
2001	8,942	19,060	15,360	1,692	22,866
2002	12,113	33,359	25,241	5,150	19,144
2003	11,514	63,271	51,115	5,642	35,587
2004	27,917	63,159	53,895	6,162	34,826
2005	17,036	38,105	28,373	8,455	42,715
2006	11,756	39,808	32,148	6,521	37,005
2007	14,043	44,115	34,226	2,257	42,931
2008	15,840	51,375	38,155	1,675	44,194
2009	8,926	34,250	21,996	760	46,616
2010	5,441	33,586	24,891	535	40,951
2011	7,952	21,990	16,622	3,515	38,035
2012	5,841	24,837	19,858	2,881	27,282
2013	5,515	34,141	28,358	547	22,031
2014	12,621	48,038	36,130	1,560	50,926
2015	4,984	32,121	27,209	838	26,296
2016	2,077	25,481	22,424	772	33,370
2017	2,239	23,102	20,842	1,193	26,424
2018	2,818	13,226	12,010	520	12,282
2019	2,793	12,431	8,965	351	13,088
2021	2,406	15,856	12,559	361	9,944
2022	3,129	21,832	18,060	946	10,280

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. See authors for 1975-1977 data.

Year	Immature male < 120 mm	Mature male ≥ 120 mm	Legal male ≥ 135 mm	Immature female	Mature female
1978	89.5	67.9	38.5	27.8	161.3
1979	33.4	38.0	23.6	22.1	57.9
1980	70.8	51.3	37.5	34.4	87.9
1981	41.1	18.4	9.7	13.1	58.4
1982	110.9	12.0	4.0	72.4	52.9
1983	46.2	5.7	1.3	23.8	8.7
1984	164.9	9.1	3.3	109.8	27.4
1985	16.8	7.6	2.3	4.3	8.4
1986	15.2	14.8	5.6	5.2	6.4
1987	24.4	14.6	7.3	17.4	18.5
1988	11.3	11.6	7.5	2.5	20.1
1989	10.0	15.1	10.4	3.9	13.2
1990	9.7	13.7	8.9	7.8	17.0
1991	9.7	23.2	18.5	4.8	14.9
1992	8.3	7.5	4.6	2.3	10.2
1993	8.2	12.5	7.0	2.8	14.0
1994	7.1	8.6	4.8	3.8	6.1
1995	11.0	9.1	5.9	6.1	6.3
1996	17.5	7.2	5.3	14.3	9.8
1997	32.6	12.3	9.2	5.1	21.8
1998	16.8	15.4	6.8	6.3	31.7
1999	11.3	17.4	11.7	4.1	15.4
2000	10.7	14.0	8.4	6.3	21.0
2001	12.0	7.4	5.1	4.3	20.9
2002	22.9	13.6	8.6	17.6	17.0
2003	18.8	24.4	17.1	13.2	28.3
2004	43.3	23.7	18.0	19.7	31.7
2005	31.5	15.6	9.6	23.6	35.6
2006	21.2	16.4	11.8	16.9	31.0
2007	17.5	18.2	12.3	4.5	35.8
2008	17.1	20.9	12.9	3.7	36.8
2009	9.6	15.6	8.3	1.7	35.8
2010	6.5	14.7	9.4	1.2	31.5
2011	37.5	9.3	6.1	33.0	29.3
2012	8.0	9.7	6.7	7.6	19.6
2013	6.7	12.9	9.4	1.3	15.6
2014	15.5	19.7	12.4	2.8	36.9
2015	6.7	11.6	8.7	2.4	18.4
2016	4.7	9.0	7.1	3.6	22.4
2017	3.3	7.7	6.4	2.5	17.5
2018	3.8	4.6	3.8	1.4	9.0
2019	3.7	5.0	2.9	1.2	8.4
2021	3.5	6.3	4.4	1.4	6.3
2022	4.3	8.2	5.9	2.5	7.5

Table 8. -- 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. See authors for 1975-1977 data.

Year	Immature male < 120 mm	Mature male ≥ 120 mm	Legal male ≥ 135 mm	Immature female	Mature female
1978	0	1,250	1,250	0	52
1979	0	556	488	0	93
1980	18	1,269	1,269	0	262
1981	0	312	312	0	35
1982	18	1,464	1,464	14	919
1983	26	527	493	0	309
1984	0	317	283	0	112
1985	0	61	61	0	0
1986	0	138	138	0	79
1987	0	54	54	31	0
1988	713	107	44	283	553
1989	675	1,529	871	924	1,327
1990	7,477	1,141	138	522	2,200
1991	640	4,430	1,321	66	4,967
1992	274	3,305	2,528	278	3,153
1993	282	9,873	9,189	7	6,471
1994	430	9,139	8,117	47	3,917
1995	431	18,056	16,793	315	4,834
1996	68	2,361	2,330	31	1,976
1997	1,510	6,159	5,940	218	1,744
1998	416	2,324	1,778	50	1,669
1999	3,358	5,523	4,472	4,117	1,302
2000	157	4,320	3,843	8	987
2001	2,339	8,603	5,770	406	5,369
2002	8	7,037	7,014	12	775
2003	0	5,373	5,275	1	2,268
2004	152	3,622	3,622	105	1,187
2005	55	1,238	1,238	0	3,118
2006	109	7,003	6,696	10	2,173
2007	214	5,224	5,007	50	1,760
2008	332	5,462	5,102	192	2,825
2009	44	2,500	2,127	15	811
2010	53	4,405	3,973	0	840
2011	44	3,834	3,751	3	814
2012	336	4,477	4,360	0	663
2013	104	7,749	7,567	0	169
2014	82	12,047	11,433	0	1,093
2015	113	15,173	14,788	0	3,859
2016	526	4,150	3,653	26	1,873
2017	88	3,658	3,513	0	505
2018	1,325	929	827	0	877
2019	293	2,086	1,101	13	797
2021	85	3,744	3,615	0	1,406
2022	0	5,105	5,075	0	989

Table 9. -- 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. See authors for 1975-1977 data.

Year	Immature male < 120 mm	Mature male ≥ 120 mm	Legal male ≥ 135 mm	Immature female	Mature female
1978	0.0	0.4	0.4	0.0	0.1
1979	0.0	0.2	0.2	0.0	0.1
1980	0.1	0.4	0.4	0.0	0.1
1981	0.0	0.1	0.1	0.0	0.0
1982	0.0	0.3	0.3	0.0	0.5
1983	0.0	0.1	0.1	0.0	0.2
1984	0.0	0.1	0.1	0.0	0.1
1985	0.0	0.0	0.0	0.0	0.0
1986	0.0	0.0	0.0	0.0	0.0
1987	0.0	0.0	0.0	0.0	0.0
1988	1.9	0.1	0.0	1.6	0.4
1989	1.1	0.8	0.4	1.8	1.1
1990	7.1	0.8	0.1	0.7	2.3
1991	0.7	2.4	0.6	0.3	4.3
1992	0.4	1.5	1.0	0.4	2.4
1993	0.3	3.5	3.1	0.0	4.5
1994	0.4	3.1	2.4	0.1	2.4
1995	0.5	5.2	4.4	0.3	3.0
1996	0.1	0.6	0.5	0.0	1.1
1997	1.6	1.6	1.4	0.3	1.0
1998	0.4	0.8	0.4	0.1	1.0
1999	7.2	1.9	1.3	9.5	0.9
2000	0.1	1.5	1.3	0.0	0.7
2001	2.5	3.7	1.9	0.6	3.8
2002	0.0	1.9	1.9	0.0	0.4
2003	0.0	1.5	1.4	0.0	1.2
2004	1.4	0.8	0.8	1.1	0.5
2005	0.1	0.2	0.2	0.0	1.3
2006	0.1	1.4	1.2	0.0	1.0
2007	0.2	1.2	1.1	0.1	0.8
2008	0.4	1.3	1.1	0.2	1.5
2009	0.0	0.9	0.7	0.0	0.3
2010	0.1	1.4	1.2	0.0	0.6
2011	0.0	1.0	1.0	0.0	0.5
2012	0.4	1.2	1.2	0.0	0.4
2013	0.1	1.7	1.6	0.0	0.1
2014	0.1	3.0	2.6	0.0	0.5
2015	0.1	3.5	3.3	0.0	1.8
2016	0.5	1.3	1.0	0.0	1.3
2017	0.1	1.0	1.0	0.0	0.3
2018	1.5	0.3	0.2	0.0	0.9
2019	0.2	0.9	0.3	0.0	0.6
2021	0.1	1.2	1.1	0.0	0.9
2022	0.0	1.3	1.3	0.0	0.5

Table 10. -- 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. See authors for 1975-1977 data.

Year	Immature male	Mature male	Legal male	Immature female	Mature female
	< 120 mm	≥ 120 mm	≥ 135 mm		
1978	2,765	17,370	13,517	76	6,416
1979	61	10,959	9,040	92	1,097
1980	2,084	23,553	20,679	699	211,604
1981	1,704	11,628	10,554	497	5,987
1982	1,152	7,389	6,893	553	8,824
1983	962	5,409	4,474	258	9,990
1984	130	2,216	1,824	15	3,070
1985	39	1,055	755	5	520
1986	4	1,505	1,473	11	2,420
1987	191	2,923	2,781	119	795
1988	170	842	842	190	528
1989	1,275	827	827	801	945
1990	2,004	3,078	1,514	1,118	1,810
1991	1,377	4,690	3,326	343	2,433
1992	1,801	4,391	3,035	802	1,848
1993	1,088	4,556	3,203	444	1,647
1994	619	3,410	2,806	87	4,806
1995	968	8,360	6,787	331	3,948
1996	745	4,641	3,873	177	5,408
1997	381	3,233	2,765	194	2,835
1998	692	2,798	2,510	267	1,914
1999	161	1,729	1,426	0	2,868
2000	113	2,091	1,746	0	1,462
2001	87	1,599	1,461	0	1,816
2002	0	680	647	0	1,401
2003	19	702	671	21	1,286
2004	36	107	48	25	98
2005	326	344	344	477	370
2006	87	166	139	38	538
2007	197	306	206	59	223
2008	212	46	46	222	450
2009	254	497	187	80	545
2010	92	303	190	84	310
2011	0	461	399	3	34
2012	165	644	459	9	229
2013	15	250	190	12	154
2014	83	233	233	16	91
2015	82	622	428	0	160
2016	70	129	68	49	352
2017	45	253	223	55	204
2018	94	152	152	13	108
2019	114	204	204	0	407
2021	15	401	295	0	260
2022	0	111	111	0	145

Table 11. -- 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. See authors for 1975-1977 data.

Year	Immature male < 120 mm	Mature male ≥ 120 mm	Legal male ≥ 135 mm	Immature female	Mature female
1978	2.4	6.1	3.9	0.1	5.9
1979	0.1	4.1	3.0	0.1	1.2
1980	2.7	7.8	6.2	0.8	182.9
1981	2.1	3.8	3.2	0.8	5.4
1982	1.4	2.4	2.1	0.9	7.8
1983	1.0	1.9	1.3	0.5	9.3
1984	0.5	0.8	0.6	0.5	2.8
1985	0.1	0.4	0.3	0.3	0.5
1986	0.0	0.5	0.5	0.0	2.1
1987	0.6	0.9	0.8	0.4	0.7
1988	1.2	0.2	0.2	0.9	0.5
1989	3.5	0.2	0.2	2.6	1.1
1990	2.4	1.5	0.6	2.2	2.0
1991	1.9	2.0	1.2	0.8	2.8
1992	2.4	1.9	1.2	1.8	2.1
1993	1.5	1.9	1.1	0.9	1.8
1994	0.6	1.3	0.9	0.1	5.0
1995	1.1	3.1	2.2	0.7	4.0
1996	0.7	1.7	1.3	0.3	5.0
1997	0.5	1.2	0.9	0.3	2.6
1998	0.9	1.0	0.8	0.5	1.8
1999	0.2	0.6	0.5	0.0	2.8
2000	0.2	0.7	0.5	0.0	1.4
2001	0.1	0.5	0.4	0.0	1.7
2002	0.0	0.2	0.2	0.0	1.2
2003	0.0	0.2	0.2	0.1	1.1
2004	0.1	0.0	0.0	0.1	0.1
2005	2.0	0.1	0.1	2.3	0.3
2006	0.1	0.1	0.0	0.1	0.4
2007	0.2	0.1	0.1	0.1	0.2
2008	0.2	0.0	0.0	0.3	0.4
2009	0.3	0.2	0.1	0.2	0.5
2010	0.1	0.1	0.1	0.2	0.2
2011	0.0	0.2	0.1	0.0	0.0
2012	0.2	0.3	0.2	0.0	0.3
2013	0.1	0.1	0.1	0.0	0.2
2014	0.1	0.1	0.1	0.0	0.1
2015	0.1	0.2	0.1	0.0	0.2
2016	0.1	0.1	0.0	0.1	0.4
2017	0.1	0.1	0.1	0.1	0.2
2018	0.1	0.1	0.1	0.0	0.1
2019	0.2	0.1	0.1	0.0	0.3
2021	0.0	0.2	0.1	0.0	0.2
2022	0.0	0.0	0.0	0.0	0.1

Table 12. -- 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. See authors for 1978-1979 data.

Year	Immature male < 105 mm	Mature male ≥ 105 mm	Legal male ≥ 120 mm	Immature female	Mature female
1980	2,646	7,826	4,786	423	737
1981	527	6,175	4,715	97	63
1982	1,758	14,934	12,065	416	0
1983	1,162	8,834	6,919	78	1,597
1984	539	3,737	3,145	42	216
1985	404	2,831	2,405	95	38
1986	252	1,267	725	99	13
1987	495	2,022	1,284	205	35
1988	702	2,830	1,880	612	123
1989	3,041	4,790	3,415	1,219	504
1990	1,122	5,931	4,707	336	13
1991	1,664	6,073	4,099	521	270
1992	1,250	6,279	4,608	280	216
1993	2,106	8,425	6,258	643	1,635
1994	916	5,812	4,246	99	128
1995	1,038	4,889	3,448	182	21
1996	1,291	8,494	6,218	364	432
1997	1,342	10,005	7,341	287	407
1998	902	7,478	5,487	210	243
1999	272	1,423	1,163	93	14
2000	315	1,880	1,534	52	37
2001	483	2,512	1,937	145	43
2002	119	1,640	1,371	1	89
2003	542	1,233	918	94	339
2004	443	1,341	1,139	194	66
2005	449	1,396	1,016	93	52
2006	1,050	3,223	2,460	145	14
2007	2,618	4,564	2,217	247	47
2008	1,972	3,655	2,701	214	40
2009	1,891	5,079	2,571	218	192
2010	3,974	8,141	4,317	112	456
2011	1,699	9,516	5,701	122	32
2012	907	5,652	3,313	52	74
2013	446	2,022	1,485	85	27
2014	796	5,472	3,568	40	62
2015	825	5,134	3,592	5	24
2016	509	3,072	2,305	0	129
2017	122	1,721	1,333	61	0
2018	434	1,612	1,358	312	316
2019	765	2,879	2,304	525	389
2021	804	1,620	1,426	404	346
2022	1,352	1,902	1,467	360	549

Table 13. -- 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. See authors for 1978-1979 data.

Year	Immature male < 105 mm	Mature male ≥ 105 mm	Legal male ≥ 120 mm	Immature female	Mature female
1980	4.2	5.1	2.5	1.1	1.3
1981	0.9	3.5	2.3	0.2	0.1
1982	3.0	8.3	5.9	0.9	0.0
1983	2.0	5.0	3.3	0.4	2.6
1984	1.3	1.9	1.5	0.2	0.3
1985	0.7	1.5	1.1	0.3	0.1
1986	0.6	0.8	0.4	0.3	0.0
1987	1.0	1.3	0.7	0.6	0.1
1988	1.5	1.8	1.0	1.6	0.2
1989	6.2	2.9	1.8	3.2	1.0
1990	1.9	3.4	2.3	0.8	0.0
1991	3.3	3.9	2.2	1.4	0.4
1992	2.2	3.7	2.3	0.8	0.5
1993	4.2	5.1	3.3	1.7	2.3
1994	1.4	3.6	2.3	0.2	0.2
1995	1.7	2.9	1.7	0.6	0.0
1996	2.4	5.0	3.1	1.1	0.7
1997	2.3	6.0	3.8	0.8	0.6
1998	2.1	4.5	2.8	0.6	0.4
1999	0.5	0.8	0.6	0.3	0.0
2000	0.5	1.0	0.7	0.1	0.1
2001	0.8	1.4	0.9	0.4	0.1
2002	0.2	0.9	0.6	0.0	0.1
2003	1.2	0.7	0.5	0.3	0.6
2004	0.9	0.7	0.6	0.5	0.1
2005	0.9	0.8	0.5	0.3	0.1
2006	1.8	1.9	1.2	0.3	0.0
2007	4.5	3.2	1.2	0.8	0.1
2008	3.8	2.3	1.5	0.7	0.1
2009	3.4	3.6	1.4	0.6	0.4
2010	6.2	5.7	2.5	0.4	1.0
2011	2.6	6.5	3.2	0.4	0.1
2012	1.6	3.8	1.8	0.2	0.1
2013	0.8	1.3	0.8	0.3	0.1
2014	1.3	3.4	1.8	0.1	0.1
2015	1.2	3.2	2.0	0.0	0.1
2016	0.8	1.8	1.2	0.0	0.3
2017	0.2	1.0	0.7	0.1	0.0
2018	1.1	0.9	0.7	1.0	0.6
2019	1.9	1.7	1.2	1.5	0.8
2021	1.7	0.8	0.7	1.1	0.8
2022	3.2	1.1	0.8	1.1	1.1

Table 14. -- 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. See authors for 1975-1978 data.

Year	Immature male < 113 mm	Mature male ≥ 113 mm	Legal male ≥ 120 mm	Preferred male ≥ 125 mm	Immature female	Mature female
1979	2,278	15,700	14,652	13,192	591	2,858
1980	8,433	40,546	37,082	34,041	1,321	11,562
1981	4,668	18,722	16,324	14,731	893	7,684
1982	5,518	11,084	9,415	7,860	1,310	6,797
1983	3,289	10,047	8,572	7,233	913	4,438
1984	2,522	9,498	8,376	7,424	671	4,129
1985	1,735	6,495	5,971	5,101	324	2,836
1986	4,583	5,043	4,005	3,280	1,499	2,006
1987	17,778	11,085	9,840	8,385	11,912	3,097
1988	26,460	31,670	22,482	18,413	3,703	19,182
1989	27,575	60,142	49,413	41,104	6,666	12,309
1990	23,938	52,942	47,567	42,987	5,990	19,032
1991	25,932	63,893	54,968	47,449	3,633	27,708
1992	15,381	74,538	66,517	57,665	346	11,013
1993	8,056	45,337	40,826	34,932	153	5,171
1994	3,217	29,086	26,534	23,912	65	5,268
1995	1,985	17,687	16,321	14,757	250	5,732
1996	3,435	16,545	15,562	14,242	1,015	5,533
1997	3,301	5,787	5,026	4,561	967	1,947
1998	3,175	5,229	4,259	3,605	550	1,202
1999	8,470	6,365	4,498	3,483	1,089	2,272
2000	5,297	11,131	8,913	7,529	729	2,885
2001	5,780	10,451	9,036	8,073	2,617	1,314
2002	4,359	10,043	9,030	8,046	1,768	1,701
2003	6,281	10,883	9,175	7,991	705	2,090
2004	3,444	9,011	7,773	6,513	267	863
2005	5,325	12,118	10,289	8,190	1,673	2,820
2006	15,136	13,500	10,921	8,927	2,451	4,025
2007	12,137	15,802	11,884	9,457	696	5,916
2008	10,424	26,753	22,447	18,764	622	4,457
2009	3,849	10,937	8,947	7,783	533	4,021
2010	3,674	10,752	9,137	7,582	795	2,115
2011	11,865	11,525	9,814	8,500	4,390	2,225
2012	30,882	14,485	10,602	8,378	5,694	8,550
2013	25,423	39,157	23,823	14,397	2,344	11,054
2014	18,262	39,934	30,404	24,210	489	8,159
2015	7,853	27,241	22,853	19,301	628	4,675
2016	6,997	18,523	14,143	10,695	50	1,429
2017	4,565	19,387	15,675	12,470	158	1,986
2018	2,711	11,058	8,861	7,355	990	598
2019	4,414	6,377	5,521	4,769	1,481	652
2021	7,704	5,023	3,514	2,403	1,063	2,816
2022	6,036	8,725	6,450	4,676	690	1,800

Table 15. -- 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. See authors for 1975-1978 data.

Year	Immature male < 113 mm	Mature male ≥ 113 mm	Legal male ≥ 120 mm	Preferred male ≥ 125 mm	Immature female	Mature female
1979	12.7	20.1	17.8	15.2	7.7	13.0
1980	40.5	50.4	43.0	37.5	15.6	50.5
1981	29.2	26.2	21.0	18.1	16.1	35.1
1982	28.2	16.3	12.7	9.9	14.7	31.2
1983	38.6	15.2	12.1	9.6	30.2	18.3
1984	27.4	13.0	10.6	8.8	19.5	16.3
1985	12.0	8.5	7.4	5.8	5.4	10.8
1986	50.6	7.3	5.1	3.7	37.5	8.7
1987	136.0	15.7	13.0	10.3	123.1	13.4
1988	138.2	49.3	29.6	22.1	56.3	84.4
1989	243.7	89.5	66.4	51.1	183.1	57.8
1990	167.4	68.1	56.7	48.3	98.7	101.5
1991	123.4	90.2	71.3	57.5	41.8	145.9
1992	54.7	105.7	88.5	72.3	5.1	53.9
1993	30.0	63.8	54.2	43.5	2.9	24.9
1994	12.8	39.4	34.0	29.2	2.7	27.0
1995	10.6	24.0	21.2	18.3	5.6	30.2
1996	29.3	21.8	19.8	17.3	18.1	28.9
1997	36.5	7.9	6.3	5.4	34.7	11.1
1998	24.9	7.8	5.8	4.6	13.4	6.7
1999	50.1	10.1	6.1	4.3	21.3	12.6
2000	32.7	16.8	12.1	9.6	16.6	15.0
2001	118.0	14.5	11.5	9.8	112.2	7.1
2002	45.8	13.2	11.0	9.2	36.4	10.8
2003	41.8	14.9	11.2	9.1	13.6	12.0
2004	18.2	12.4	9.7	7.4	8.6	4.5
2005	41.9	17.5	13.5	9.7	39.3	16.1
2006	84.0	20.1	14.6	10.9	29.1	21.9
2007	52.2	24.7	16.2	11.8	11.5	30.5
2008	42.1	37.8	28.7	21.9	8.9	24.6
2009	32.8	16.1	11.8	9.7	23.9	22.1
2010	39.1	15.3	11.9	9.1	29.7	10.6
2011	135.2	16.0	12.4	10.0	88.8	12.2
2012	167.6	22.7	14.4	10.3	65.8	52.4
2013	110.0	69.6	37.0	19.6	33.2	60.8
2014	75.5	62.3	41.9	30.5	15.1	44.7
2015	40.2	40.0	30.7	24.1	14.5	27.6
2016	24.6	29.6	20.2	13.9	1.4	7.7
2017	20.6	29.8	21.8	15.9	5.3	10.2
2018	40.8	16.7	12.0	9.2	35.0	3.5
2019	37.6	9.3	7.5	6.1	30.3	3.7
2021	50.6	8.6	5.4	3.4	22.8	14.8
2022	60.7	14.3	9.5	6.3	38.9	9.6

Table 16. -- 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. See authors for 1975-1978 data.

Year	Immature male	Mature male	Legal male	Preferred male	Immature female	Mature female
	< 103 mm	≥ 103 mm	≥ 110 mm	≥ 125 mm		
1979	16,462	15,596	12,913	7,860	3,236	16,465
1980	64,467	39,038	27,984	12,887	12,199	52,221
1981	29,763	26,777	18,061	8,050	631	34,893
1982	14,735	34,520	25,512	11,622	410	57,347
1983	7,761	16,947	13,195	5,655	1,426	15,993
1984	5,865	12,625	10,016	3,730	1,573	10,785
1985	2,533	4,143	3,169	1,458	675	2,718
1986	6,228	5,758	3,286	816	1,210	1,360
1987	8,047	8,601	6,994	4,163	3,095	2,042
1988	19,282	21,812	17,868	10,618	6,484	6,184
1989	15,988	29,119	24,883	16,499	5,165	7,090
1990	16,029	39,509	35,175	24,356	3,869	18,663
1991	17,926	38,059	34,230	21,816	3,390	17,056
1992	11,419	26,255	23,410	16,311	1,644	15,213
1993	7,226	12,651	10,873	6,312	913	6,470
1994	5,070	10,962	9,526	5,391	1,137	4,579
1995	3,553	11,757	10,592	5,761	808	6,667
1996	2,927	7,863	6,682	3,680	424	4,047
1997	1,986	3,575	2,873	1,121	442	1,451
1998	3,041	3,563	2,602	1,085	1,413	1,076
1999	4,409	2,311	1,679	612	1,793	1,554
2000	4,116	2,787	2,003	627	1,753	1,246
2001	8,171	4,918	3,943	1,780	3,741	3,247
2002	8,691	4,318	3,029	1,222	3,733	2,766
2003	12,528	8,133	6,424	2,661	3,984	6,313
2004	13,064	13,404	9,732	2,805	3,866	3,865
2005	18,964	27,348	23,655	13,839	8,710	8,759
2006	33,861	39,045	32,859	19,083	10,808	10,914
2007	35,745	40,540	31,673	16,281	4,944	7,521
2008	15,705	32,031	26,351	13,145	2,238	7,206
2009	9,673	22,980	19,770	10,812	2,039	4,456
2010	8,305	26,296	23,372	14,460	3,008	3,358
2011	13,198	26,123	23,259	15,660	6,001	3,189
2012	19,737	15,027	11,928	6,365	5,982	3,805
2013	18,417	20,423	15,939	8,220	4,071	6,795
2014	17,345	33,394	24,859	11,766	2,023	6,705
2015	8,036	31,122	27,067	14,306	1,038	6,536
2016	8,196	35,119	31,252	18,326	1,057	6,076
2017	5,417	24,268	21,288	12,553	1,255	5,019
2018	8,786	23,948	21,572	12,871	3,921	4,293
2019	7,691	9,813	8,749	5,001	3,339	4,113
2021	10,920	7,491	5,301	2,006	2,238	5,604
2022	7,676	6,816	5,131	1,576	1,975	4,767

Table 17. -- 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. See authors for 1975-1978 data.

Year	Immature male < 103 mm	Mature male ≥ 103 mm	Legal male ≥ 110 mm	Preferred male ≥ 125 mm	Immature female	Mature female
1979	135.8	28.2	20.7	9.9	49.0	118.3
1980	476.3	80.0	49.0	16.7	159.2	380.4
1981	156.1	56.8	32.3	10.7	10.3	268.7
1982	74.3	71.3	46.0	16.3	15.5	433.1
1983	108.0	34.6	24.1	8.1	96.5	109.9
1984	67.2	25.8	18.5	5.3	59.0	70.1
1985	28.6	8.4	5.7	2.1	21.0	18.6
1986	49.3	13.5	6.5	1.1	24.1	8.3
1987	91.0	16.2	11.6	5.6	74.9	12.9
1988	198.0	39.9	28.8	13.5	129.9	38.1
1989	156.4	50.2	38.3	20.7	101.9	43.3
1990	130.0	65.5	53.4	30.9	75.1	107.5
1991	162.7	65.2	54.4	28.6	84.1	109.2
1992	101.9	43.2	35.1	20.5	48.6	97.0
1993	58.1	23.4	18.4	8.8	26.4	42.6
1994	46.8	20.0	15.9	7.3	34.3	29.2
1995	32.4	21.3	18.1	8.2	20.6	43.1
1996	24.3	15.0	11.7	5.4	15.0	26.2
1997	24.6	7.3	5.3	1.5	22.6	9.0
1998	49.1	7.4	4.7	1.5	44.7	6.6
1999	83.4	5.0	3.2	0.9	79.7	10.1
2000	71.5	6.0	3.8	0.9	57.0	7.3
2001	145.2	9.8	7.0	2.4	127.2	21.0
2002	128.8	9.1	5.5	1.7	111.6	19.1
2003	171.5	16.4	11.6	3.6	123.8	48.5
2004	207.5	29.2	18.9	4.1	169.9	27.7
2005	241.1	49.5	39.2	18.7	215.7	60.7
2006	287.0	72.3	54.8	25.9	178.1	76.4
2007	279.4	80.2	55.1	22.6	114.3	51.5
2008	110.8	62.2	46.2	18.5	53.4	48.6
2009	98.3	42.7	33.7	15.0	71.4	29.2
2010	114.2	45.7	37.5	19.1	91.6	21.9
2011	186.6	42.9	34.8	18.9	157.6	20.3
2012	223.8	28.7	20.0	8.3	122.0	25.6
2013	183.9	39.7	27.0	10.8	97.2	48.0
2014	140.4	68.0	43.8	16.1	90.4	43.6
2015	67.7	57.4	46.0	19.6	36.3	45.4
2016	75.2	62.2	51.3	24.7	42.1	42.6
2017	99.0	43.2	34.9	16.8	101.2	35.6
2018	173.0	41.8	35.1	17.2	166.2	30.3
2019	143.4	17.6	14.6	6.9	146.0	32.9
2021	139.2	16.0	9.9	2.9	93.4	39.5
2022	118.8	14.6	9.8	2.3	91.2	33.2

Table 18. -- Time series of biomass estimates (t) for snow crab (*Chionoecetes opilio*) by size category (CW) and sex from National Marine Fisheries Service bottom trawl surveys, all Districts combined.

Year	Immature male < 95 mm	Mature male ≥ 95 mm	Legal male ≥ 78 mm	Preferred male ≥ 102 mm	Immature female	Mature female
1980	236,814	99,240	180,837	68,592	27,575	271,682
1981	166,540	38,042	97,286	22,630	10,988	118,845
1982	250,475	65,864	177,794	34,823	3,654	141,492
1983	184,837	68,047	163,096	35,087	3,622	82,182
1984	119,438	119,971	183,321	85,096	14,119	39,369
1985	44,214	55,691	79,334	43,099	5,364	5,889
1986	83,408	58,725	84,159	45,967	26,043	15,174
1987	266,342	107,536	178,662	74,290	107,989	119,551
1988	331,332	144,135	246,515	105,695	36,803	165,619
1989	372,788	143,216	291,753	92,421	23,265	256,728
1990	306,733	347,750	521,713	225,142	38,213	174,942
1991	293,255	347,976	477,618	278,678	68,925	199,020
1992	179,621	166,483	223,585	139,020	49,374	123,479
1993	273,570	98,857	143,013	77,228	74,921	127,081
1994	289,633	57,386	109,683	44,637	68,240	122,604
1995	368,026	61,758	158,155	38,179	31,019	164,959
1996	341,043	143,856	312,771	89,015	9,274	104,429
1997	209,131	232,388	362,928	171,516	5,452	101,393
1998	100,536	164,119	219,422	127,490	13,324	70,183
1999	44,127	67,352	87,096	52,043	6,160	29,849
2000	77,782	53,942	76,830	41,129	12,480	93,882
2001	167,671	56,449	106,070	39,995	17,033	74,840
2002	83,002	55,907	100,734	37,172	4,388	29,508
2003	81,606	44,423	72,396	31,535	14,838	38,761
2004	89,330	44,162	61,726	35,580	30,472	47,743
2005	184,025	50,072	105,971	39,847	55,125	62,603
2006	124,579	90,152	141,960	72,344	28,090	50,592
2007	140,003	99,875	162,108	74,720	27,875	54,449
2008	114,297	79,600	123,530	60,329	8,994	49,352
2009	98,468	103,188	149,588	77,510	29,660	50,002
2010	146,025	105,278	134,170	87,099	90,479	94,956
2011	149,214	111,662	145,916	94,381	41,232	169,117
2012	123,683	67,476	104,438	53,152	41,425	143,268
2013	100,506	58,389	99,733	43,126	31,364	125,672
2014	140,092	105,441	151,453	79,510	54,523	111,362
2015	85,434	46,410	71,550	35,838	35,701	81,628
2016	103,747	29,961	51,670	21,997	53,788	52,022
2017	188,851	29,363	52,272	20,740*	66,242	103,422
2018	458,901*	47,054	130,474	27,018	83,164	161,573
2019	284,181	54,550	175,907	28,955	5,125	106,799
2021	49,158	24,387	60,095	12,437	298	29,844
2022	37,727	20,403	33,447	13,494	26,219	20,941

*Corrected value: previous versions of technical memoranda reported incorrect value in error.

Table 19. -- Time series of abundance estimates (in millions) for snow crab (*Chionoecetes opilio*) by size category (CW) and sex from National Marine Fisheries Service bottom trawl surveys, all Districts combined.

Year	Immature male < 95 mm	Mature male ≥ 95 mm	Legal male ≥ 78 mm	Preferred male ≥ 102 mm	Immature female	Mature female
1980	2,567.0	194.8	513.4	116.6	898.5	4,830.3
1981	1,575.4	79.8	318.8	40.3	233.3	2,047.8
1982	1,779.0	145.3	591.1	65.0	79.9	2,317.2
1983	1,486.0	150.3	511.7	65.6	240.5	1,466.0
1984	1,223.6	237.6	476.1	148.3	551.9	670.0
1985	444.6	105.9	195.9	73.8	213.0	103.4
1986	1,143.1	110.6	211.2	78.2	842.1	267.4
1987	3,758.6	215.7	493.3	130.8	2,955.5	2,040.2
1988	3,677.9	276.9	683.8	178.5	1,045.8	2,795.6
1989	3,111.0	292.3	882.5	162.0	564.7	4,625.9
1990	2,263.9	710.4	1,348.1	395.1	1,043.9	3,008.7
1991	3,331.8	618.3	1,093.8	439.7	2,270.7	3,545.4
1992	2,776.2	293.2	512.9	223.3	1,862.2	2,068.9
1993	4,805.5	182.8	355.8	127.6	2,909.2	2,396.3
1994	4,116.9	106.4	320.6	73.8	2,684.2	2,204.8
1995	3,635.3	128.0	515.7	67.3	1,021.7	3,109.1
1996	2,309.8	302.4	958.6	161.4	258.4	2,107.2
1997	1,204.4	447.1	945.8	290.8	142.9	2,001.0
1998	778.2	308.4	514.6	214.9	336.0	1,386.7
1999	422.4	124.9	198.8	85.7	187.6	551.0
2000	971.1	102.4	191.1	69.8	391.9	1,649.1
2001	1,529.4	111.3	312.7	69.3	470.9	1,243.8
2002	596.3	114.7	284.5	66.6	121.1	502.8
2003	1,073.7	88.1	196.0	55.0	542.4	680.2
2004	1,491.2	79.9	147.8	58.0	1,375.9	931.9
2005	1,890.3	89.2	312.5	63.0	1,512.2	1,110.9
2006	1,178.4	171.9	377.6	126.4	765.7	744.3
2007	1,260.8	196.7	435.0	132.5	620.4	839.6
2008	1,008.8	154.3	325.2	105.1	395.9	747.7
2009	1,055.4	195.7	371.5	129.9	1,059.9	747.2
2010	2,460.5	184.4	293.7	138.3	3,027.6	1,777.8
2011	1,829.8	194.1	330.8	150.1	1,175.4	3,137.0
2012	1,384.9	123.5	274.1	87.0	1,165.5	2,656.1
2013	1,055.9	112.6	280.0	73.6	1,029.4	2,222.2
2014	1,527.8	204.2	385.3	138.5	1,590.8	1,815.6
2015	1,504.2	84.2	183.8	57.2	1,461.0	1,238.6
2016	2,361.9	57.8	143.2	37.4	2,131.6	818.4
2017	3,541.7	58.0	151.9	36.0	2,494.8	2,086.9
2018	5,773.1	100.6	437.8	49.4	2,588.7	3,282.0
2019	2,018.0	119.7	611.1	53.7	117.3	2,040.9
2021	253.6	54.2	192.1	23.5	22.6	609.8
2022	602.5	42.2	92.6	24.6	903.8	408.7

Table 20. -- 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 male < 83 mm	Legal male ≥ 83 mm	Total female
1980	988	16,164	758
1981	183	10,091	182
1982	182	6,717	120
1983	67	4,231	296
1984	310	3,048	106
1985	83	2,084	73
1986	207	1,482	100
1987	355	1,083	208
1988	631	618	168
1989	2,955	404	43
1990	2,540	783	255
1991	1,393	795	230
1992	778	591	80
1993	1,111	2,296	217
1994	1,324	2,413	194
1995	1,396	4,326	158
1996	1,152	3,163	277
1997	584	3,103	92
1998	213	1,984	361
1999	196	1,735	308
2000	180	2,873	331
2001	132	1,287	565
2002	65	1,375	101
2003	357	659	83
2004	204	491	83
2005	328	212	273
2006	357	661	877
2007	575	1,278	357
2008	623	1,346	387
2009	1,104	1,916	464
2010	903	1,610	469
2011	1,752	2,129	377
2012	3,626	2,878	534
2013	3,357	6,469	1,055
2014	1,144	3,391	304
2015	616	1,338	127
2016	213	716	71
2017	208	1,084	71
2018	332	886	195
2019	459	552	147
2021	597	544	589
2022	392	506	268

Table 21. -- 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 male	Legal male	Total female
	< 83 mm	≥ 83 mm	
1980	3.0	20.8	4.8
1981	0.5	12.2	0.5
1982	0.6	8.4	0.4
1983	0.3	5.3	0.9
1984	1.1	3.8	0.4
1985	0.3	2.5	0.3
1986	0.7	1.9	0.4
1987	1.6	1.4	0.9
1988	3.9	0.8	0.9
1989	12.6	0.5	0.1
1990	10.1	1.2	1.0
1991	4.8	1.3	1.2
1992	2.5	1.1	0.5
1993	3.8	3.9	1.3
1994	5.0	4.0	1.3
1995	5.0	6.6	0.7
1996	3.6	5.1	1.0
1997	1.7	4.6	0.4
1998	0.6	2.9	1.3
1999	0.6	2.4	1.2
2000	0.5	4.1	1.2
2001	0.5	1.8	2.2
2002	0.3	2.0	0.5
2003	1.3	0.9	0.5
2004	0.6	0.8	0.3
2005	1.0	0.3	0.8
2006	1.2	1.0	3.6
2007	2.3	1.9	1.3
2008	2.3	2.2	1.4
2009	3.6	3.1	1.7
2010	3.3	2.5	2.2
2011	6.9	3.5	1.6
2012	11.8	4.6	2.2
2013	10.3	10.7	4.0
2014	3.3	5.4	1.0
2015	1.8	2.1	0.6
2016	0.6	1.2	0.3
2017	0.6	1.6	0.3
2018	1.1	1.4	0.8
2019	1.8	0.8	0.5
2021	2.2	0.8	1.8
2022	1.1	0.8	0.6

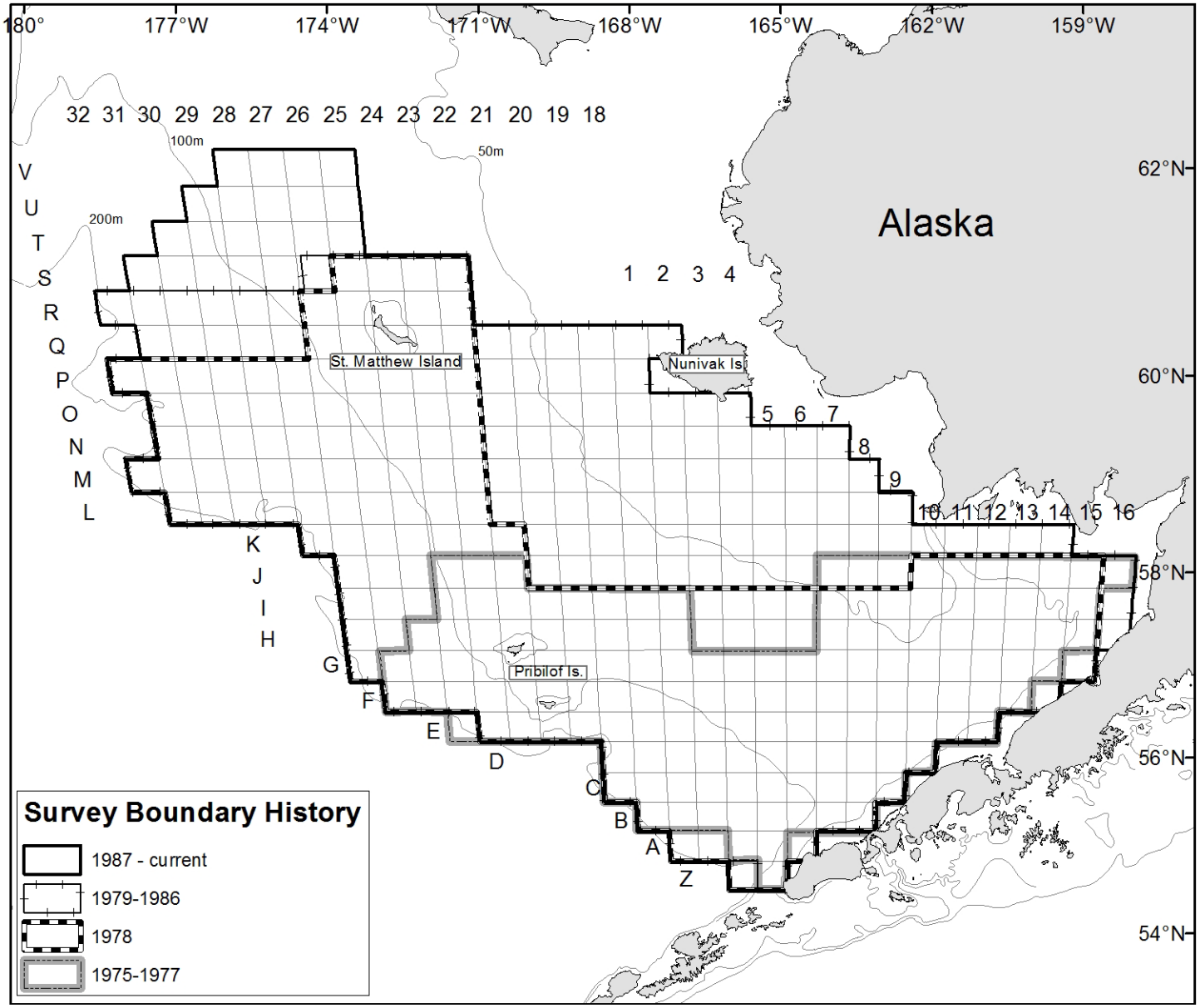

Figure 1. -- National Marine Fisheries Service eastern Bering Sea bottom trawl survey boundary from 1975 to present indicating four major stanzas in survey coverage.

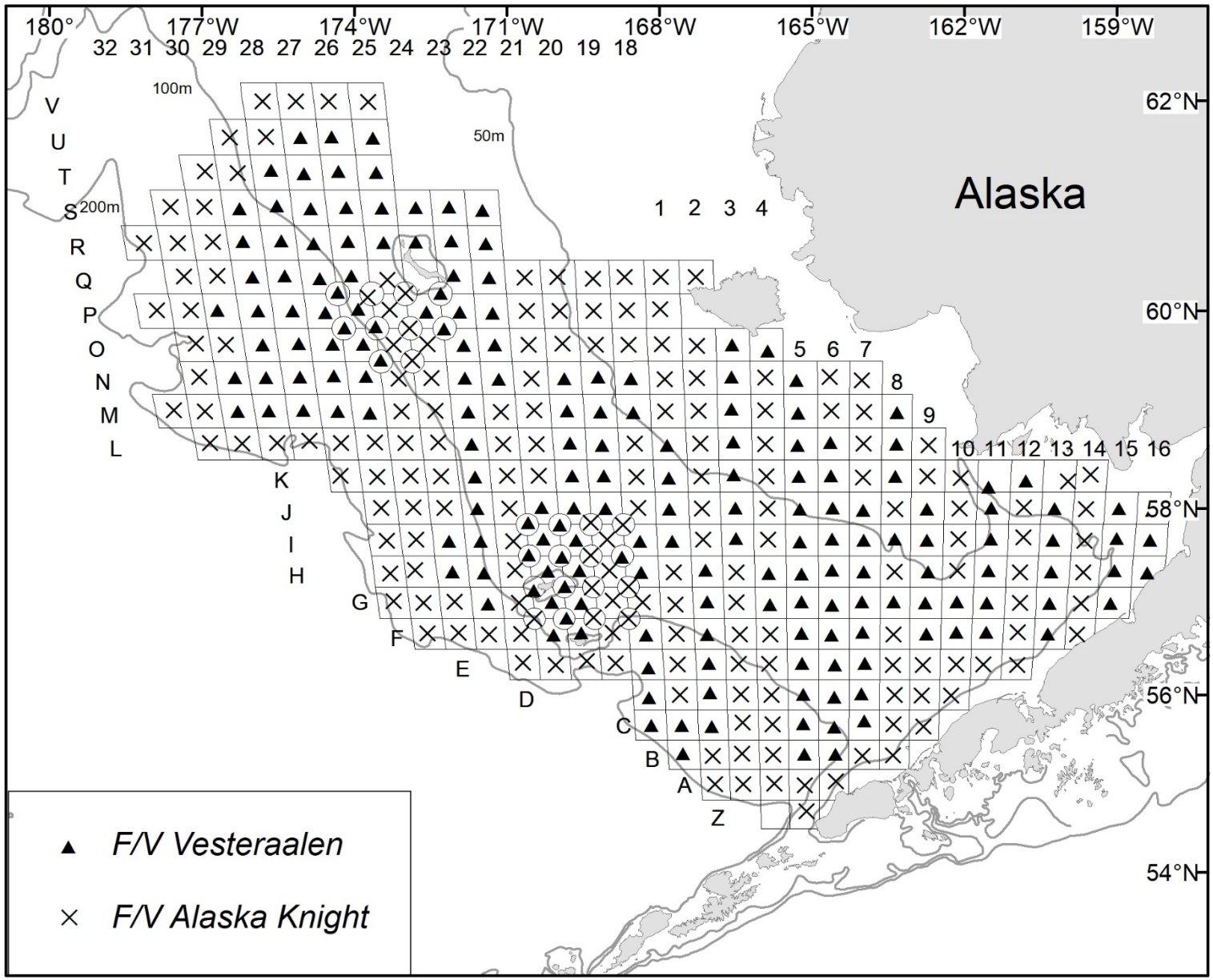

Figure 2. -- National Marine Fisheries Service eastern Bering Sea standard bottom trawl area surveyed by the FV *Alaska Knight* and the FV *Vesteraalen* from 30 May to 29 July 2022.

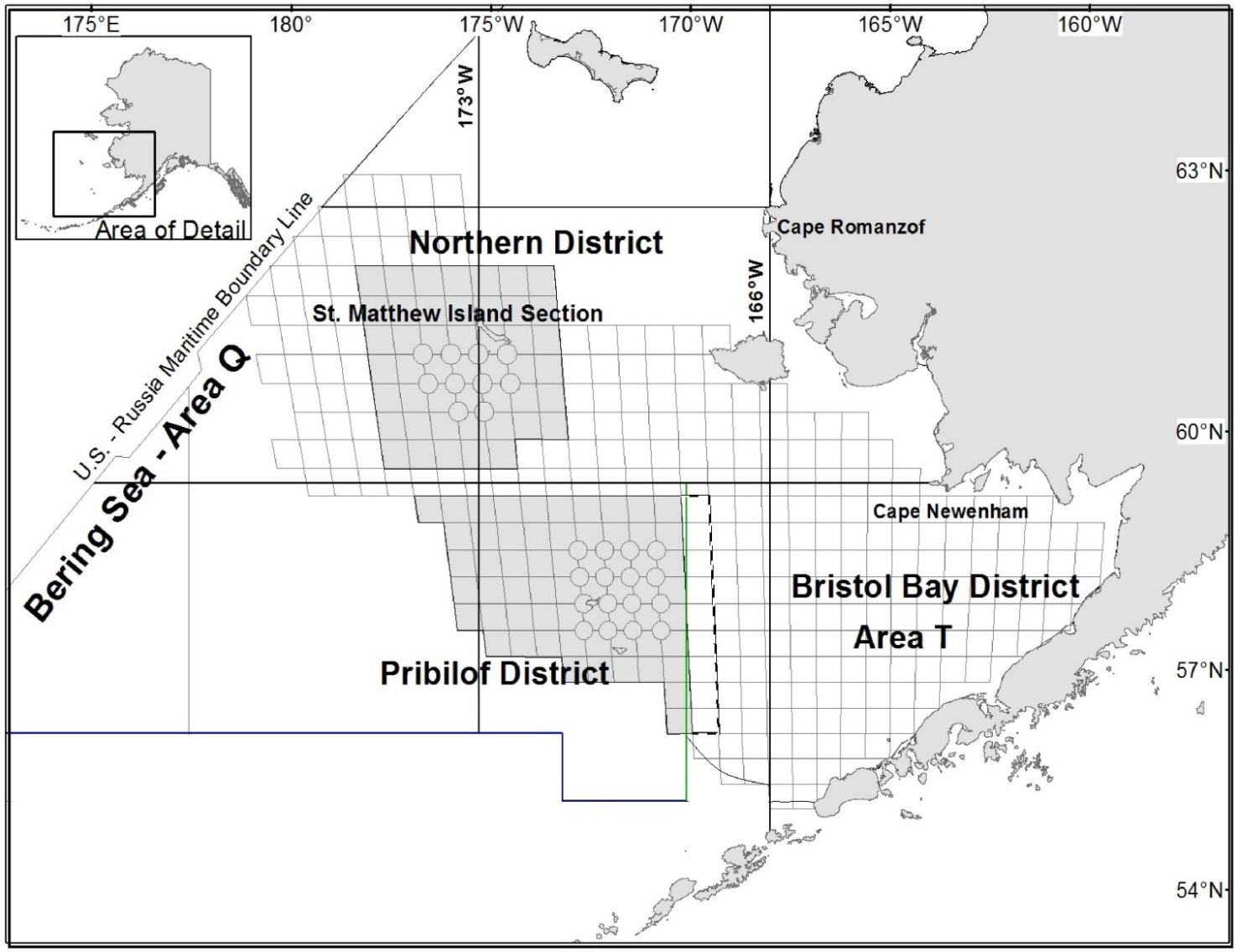

Figure 3. -- Alaska Department of Fish and Game commercial crab management units within the 2022 eastern Bering Sea bottom trawl survey area. Grey areas represent stations included in the Pribilof District (dashed line indicates expanded stock boundary for blue king crab) and St. Matthew Island Section, Northern District sampling strata and circles represent the high-density sampling areas.

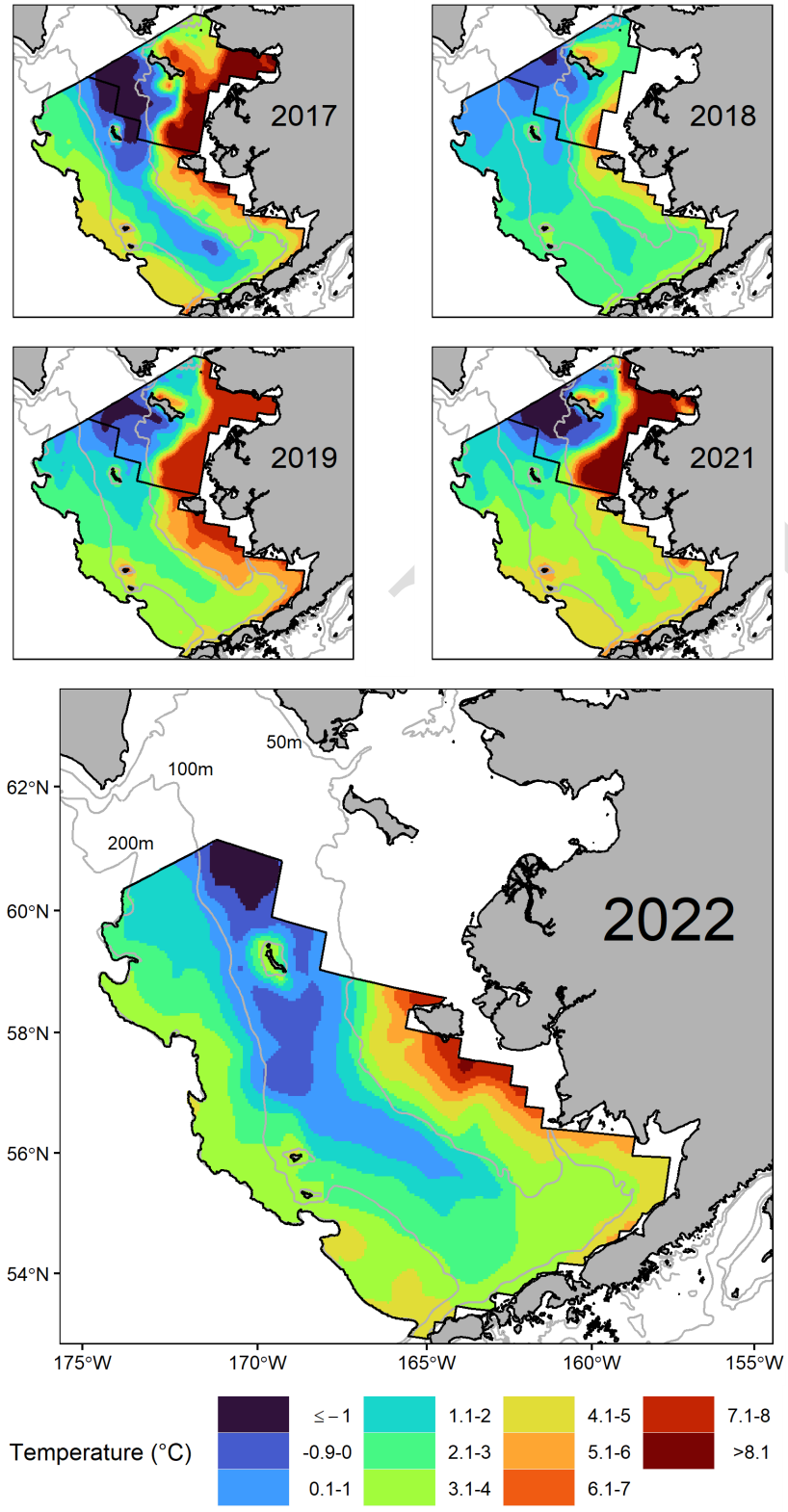

Figure 4. -- Bottom temperatures (°C) measured at stations from the National Marine Fisheries Service eastern and northern Bering Sea bottom trawl surveys for the past five surveys. Surveys begin in Bristol Bay in late May to early June in each year and proceed north and west, concluding in late July to August. Northern Bering Sea data are not yet available for 2022.

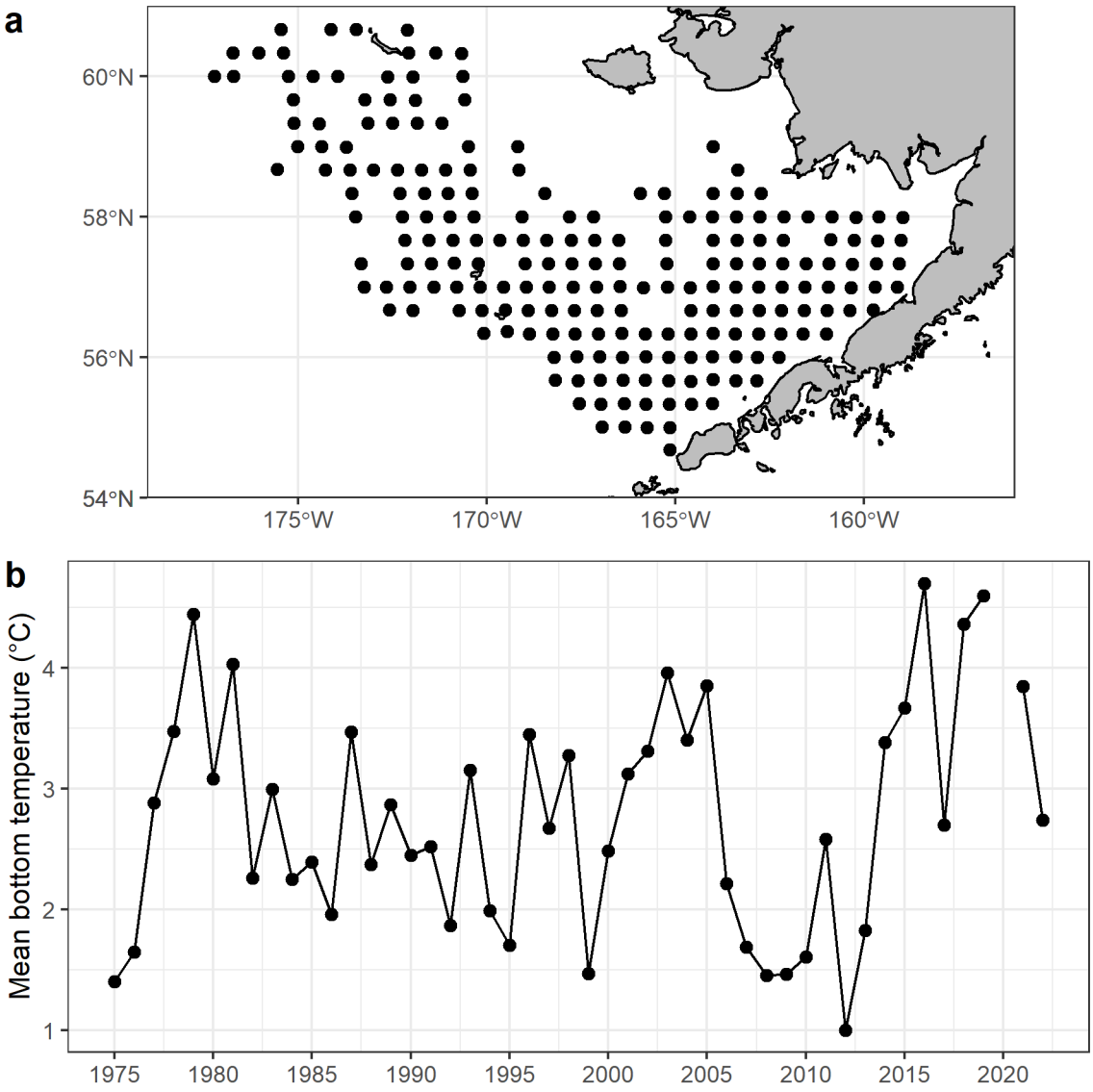

Figure 5. – Eastern Bering Sea bottom temperature time series. (a) Stations with at least 42 bottom temperature measurements during the 47-year time series (n = 206). (b) Mean bottom temperature from these 206 stations, corrected for missing values and sampling date.

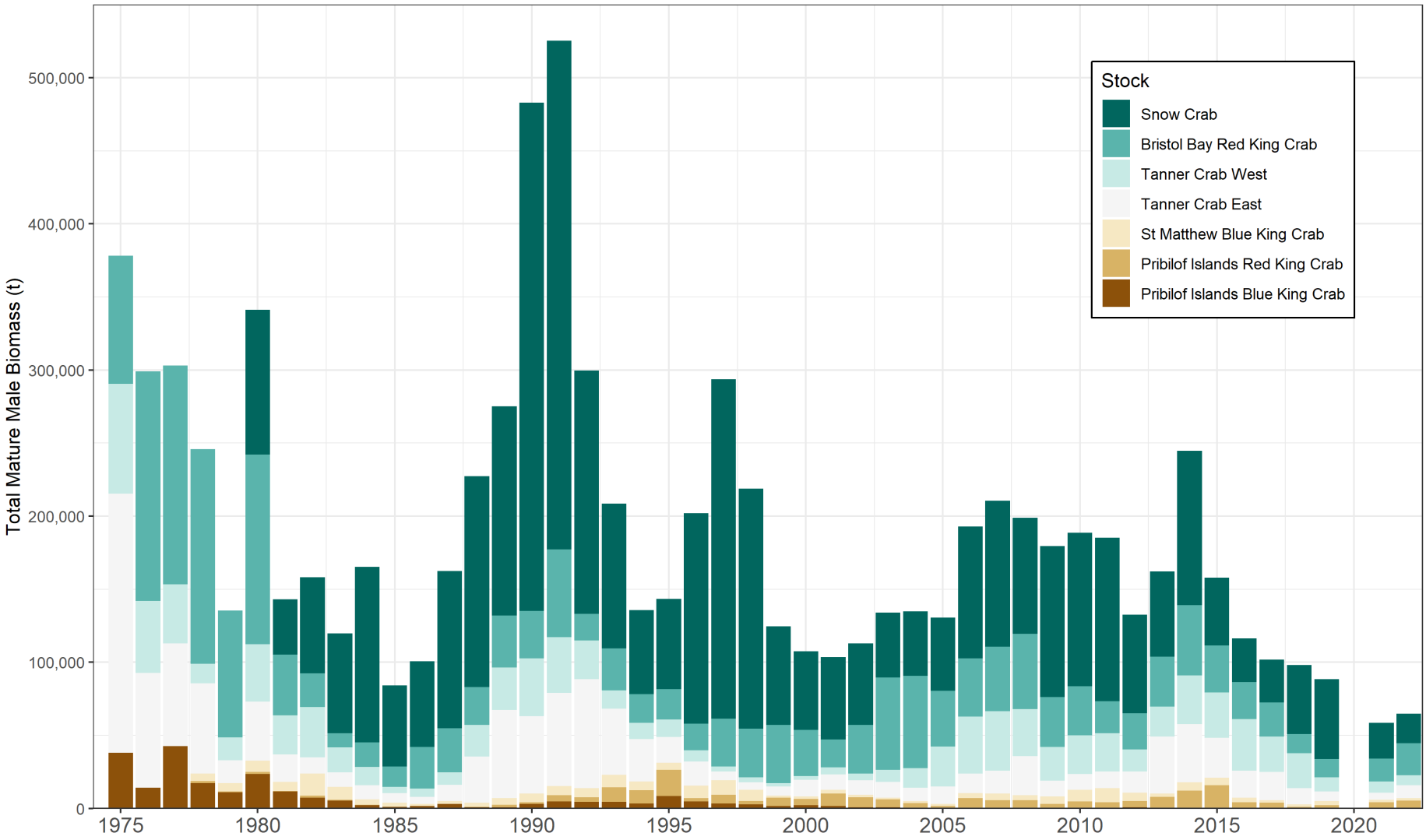

Figure 6. -- Historical mature male biomass (t) for four commercial species caught on National Marine Fisheries Service eastern Bering Sea bottom trawl surveys from 1975 through 2022, by stock. Note that the survey boundaries have changed over the time series (see Fig. 1), thus years before 1987 are not directly comparable to recent years. Snow crab biomass is not reported until 1980 due to very poor coverage of snow crab habitat in earlier surveys.

Red King Crab Figures

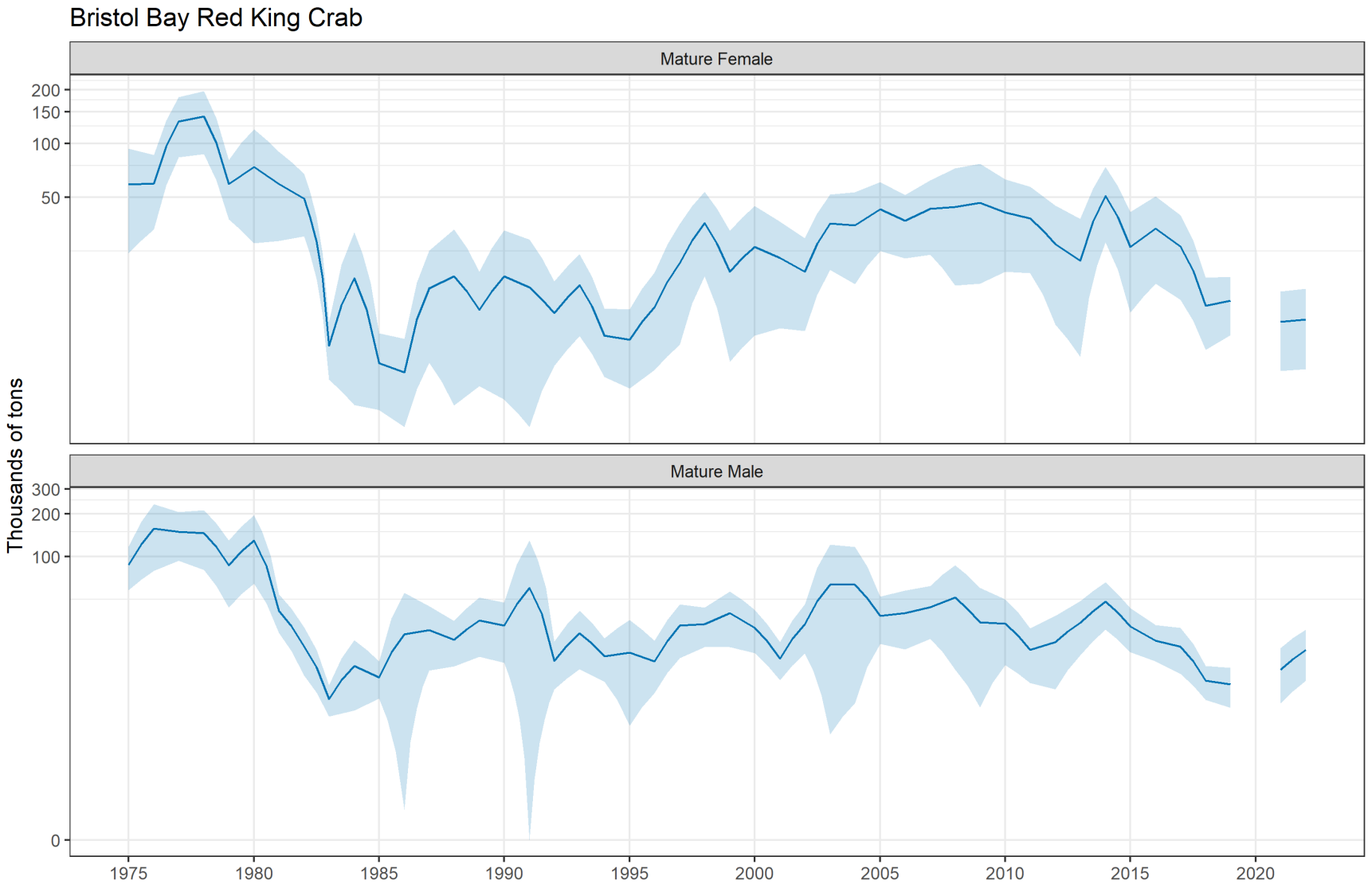

Figure 7. -- Historical biomass of mature female and mature male (carapace length ≥ 120 mm) red king crab (*Paralithodes camtchaticus*) in the Bristol Bay District. In years when a subset of stations in Bristol Bay were resampled, the resample stations replace data from the original stations for females only. Light blue area indicates ± 95% CI. **Note that Y-axis is plotted on a log scale.**

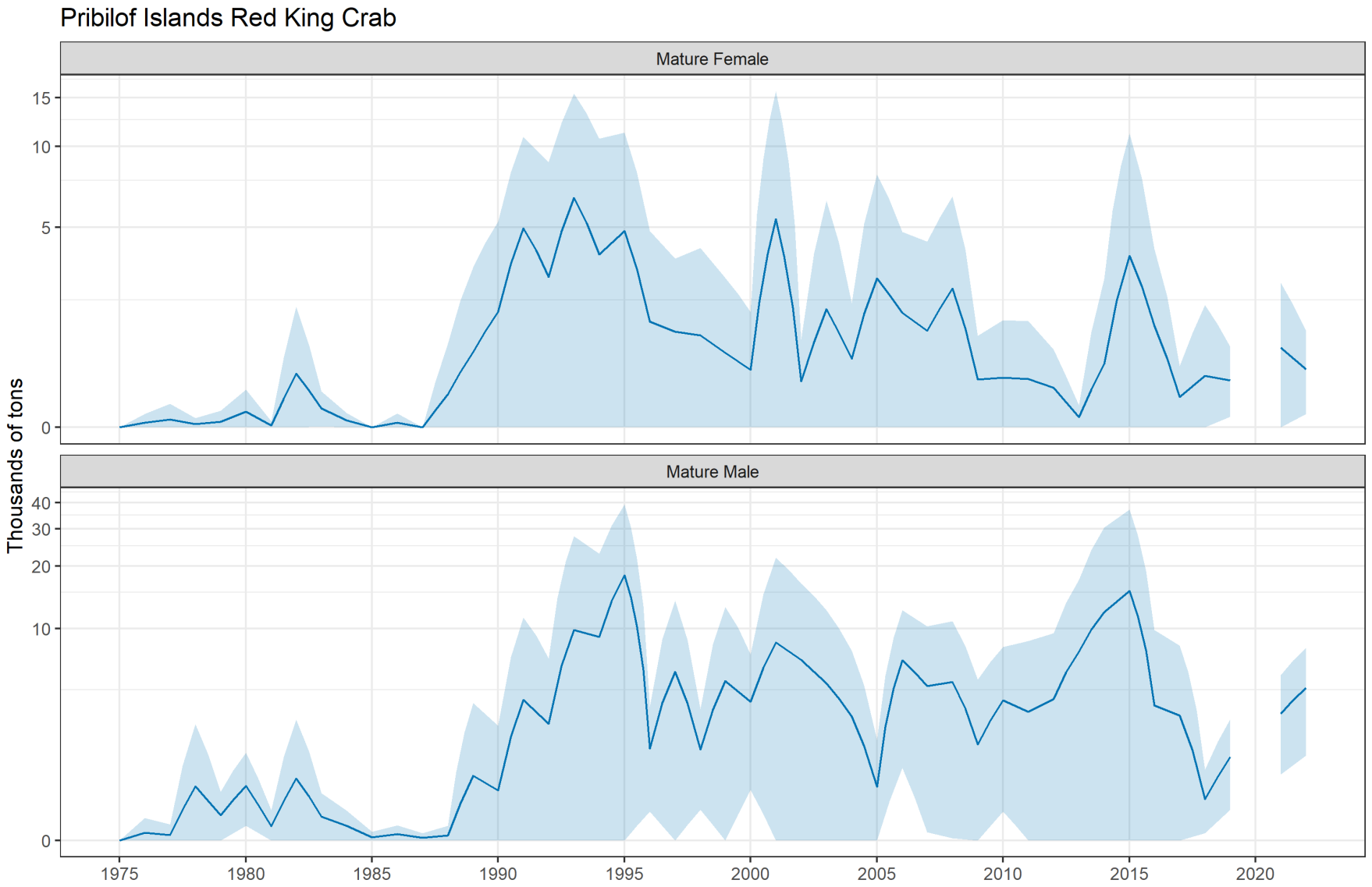

Figure 8. -- Historical biomass of mature female and mature male (carapace length ≥ 120 mm) red king crab (*Paralithodes camtchaticus*) in the Pribilof District. Light blue area indicates ± 95% CI. **Note that Y-axis is plotted on a log scale.**

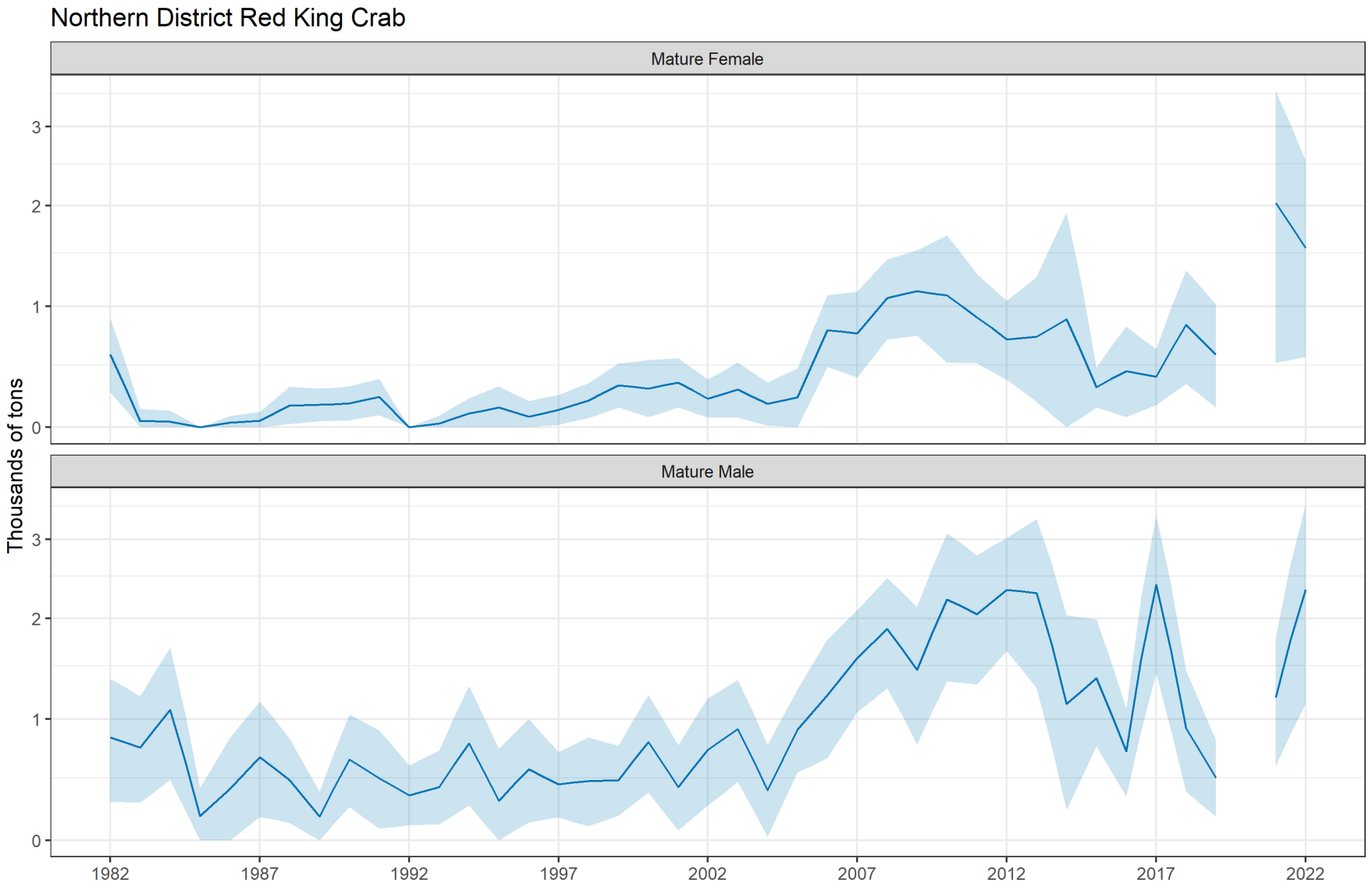

Figure 9. -- Historical biomass of mature female and mature male (carapace length ≥ 120 mm) red king crab (*Paralithodes camtchaticus*) in the Northern District. Light blue area indicates ± 95% CI. **Note that Y-axis is plotted on a log scale.**

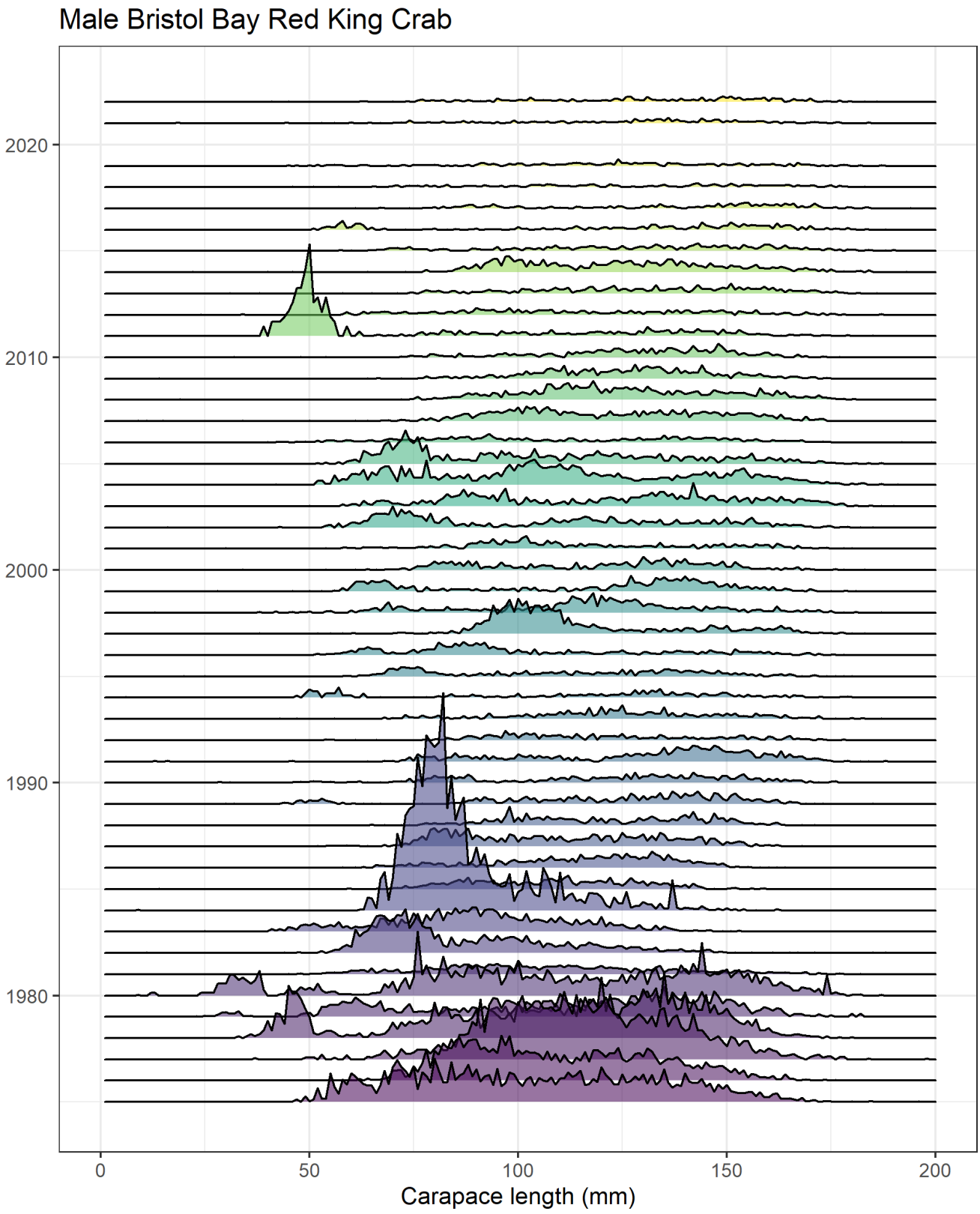

Figure 10. -- Historical size frequency for Bristol Bay District male red king crab (*Paralithodes camtschaticus*). Data are from standard survey stations only and do not include data from resampled stations.

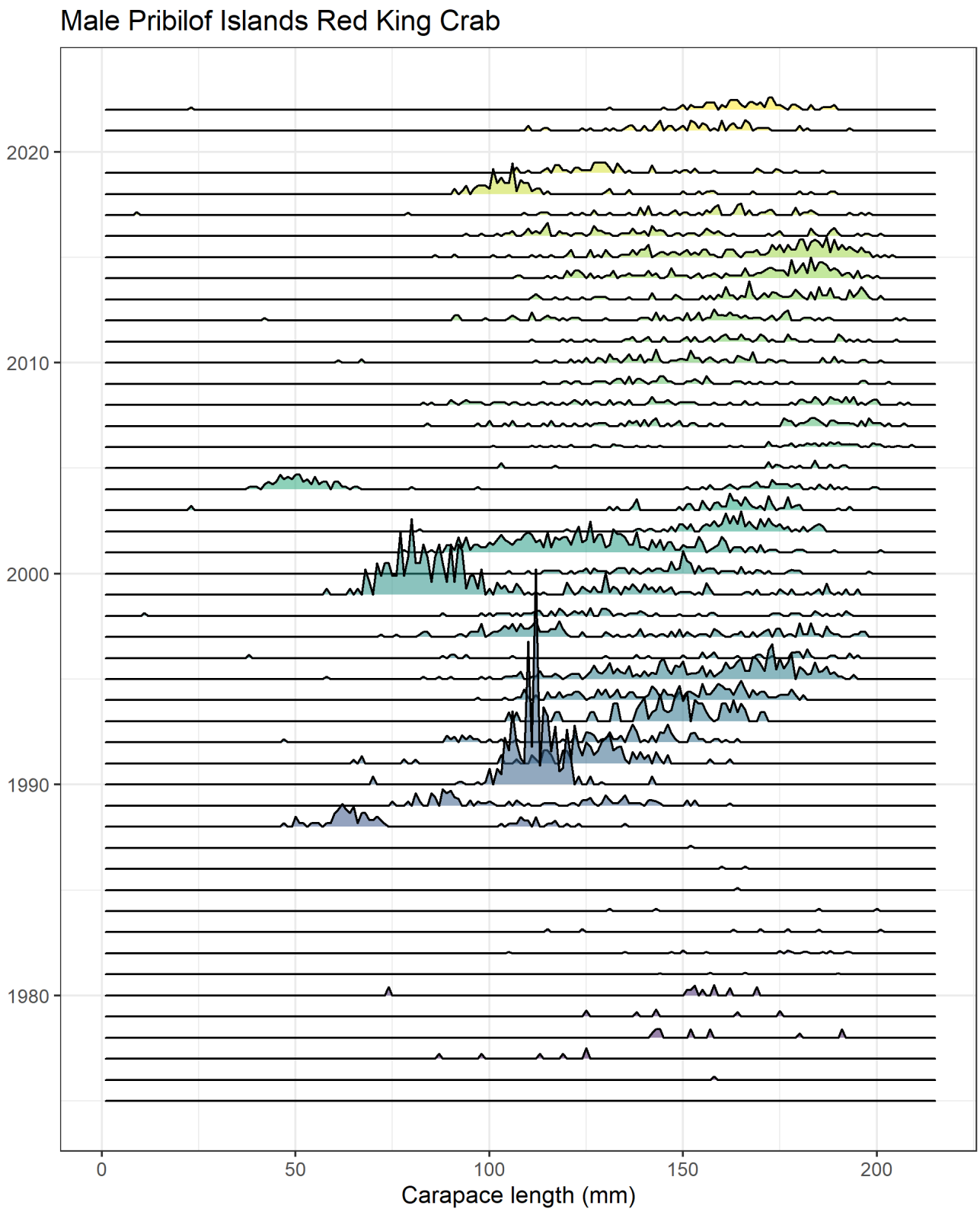

Figure 11. -- Historical size frequency for Pribilof District male red king crab (*Paralithodes camtschaticus*).

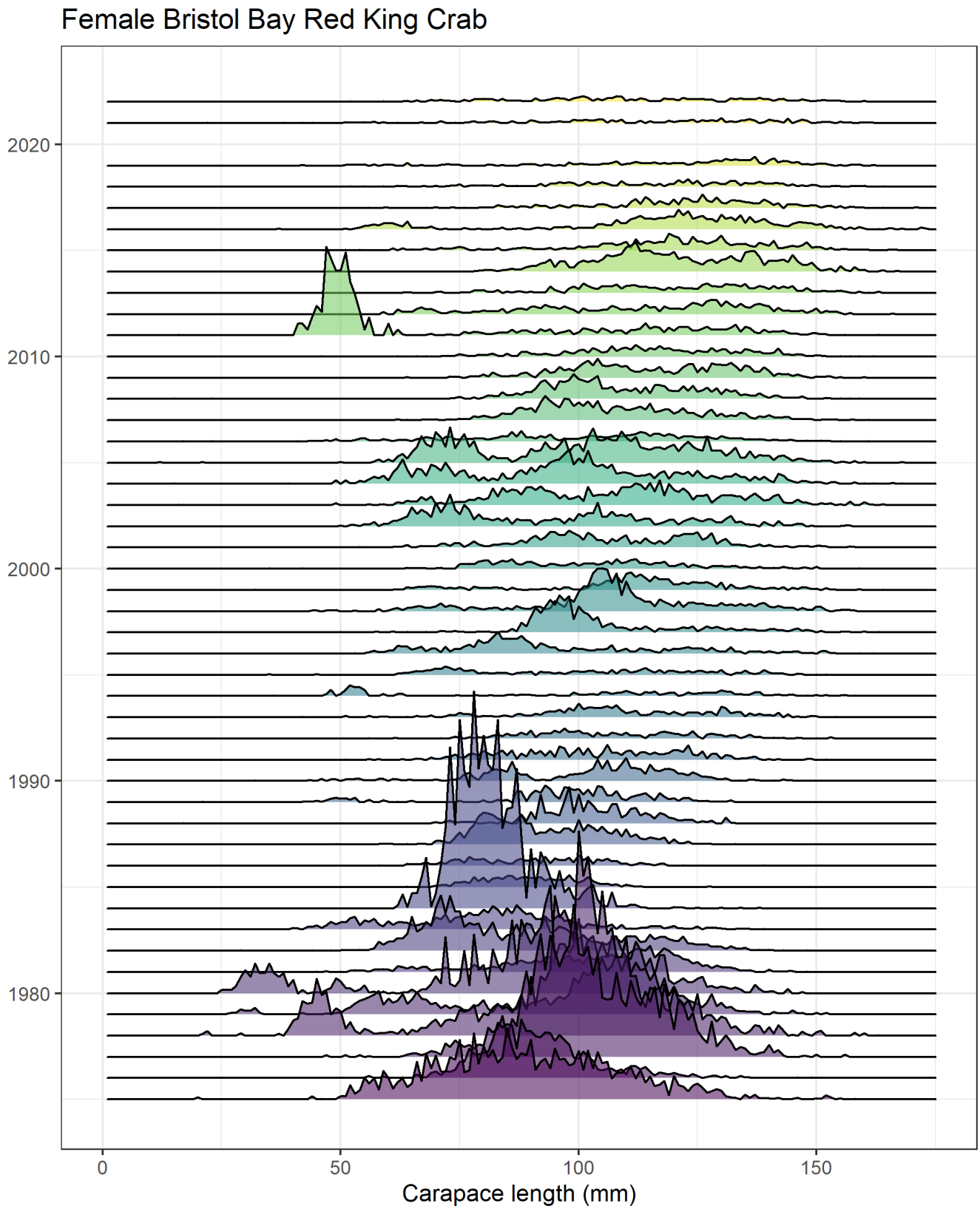

Figure 12. -- Historical size frequency for Bristol Bay District female red king crab (*Paralithodes camtschaticus*). In years when a subset of stations in Bristol Bay were resampled later in the summer the resample stations replace data from the original stations.

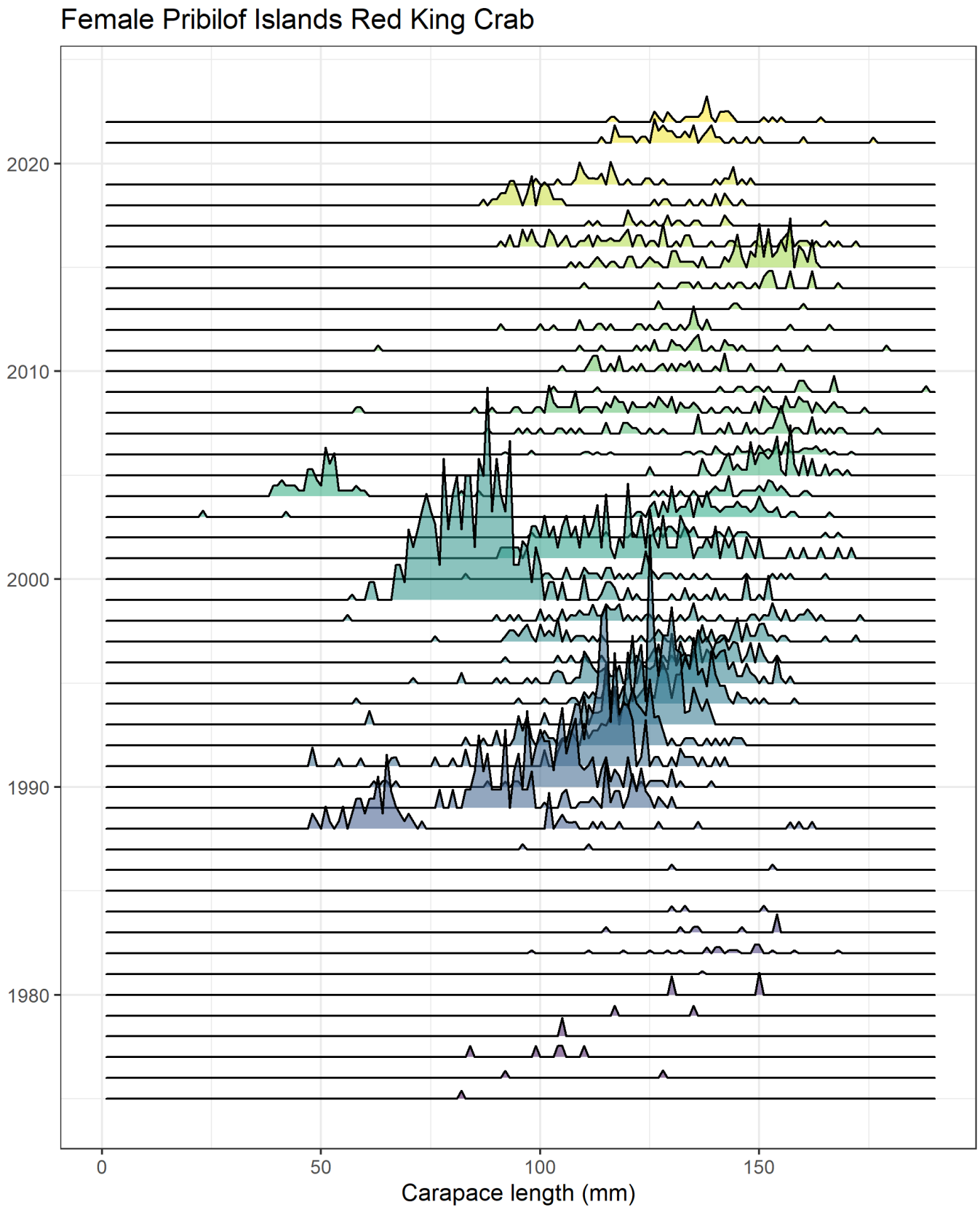

Figure 13. -- Historical size frequency for Pribilof District female red king crab (*Paralithodes camtschaticus*)

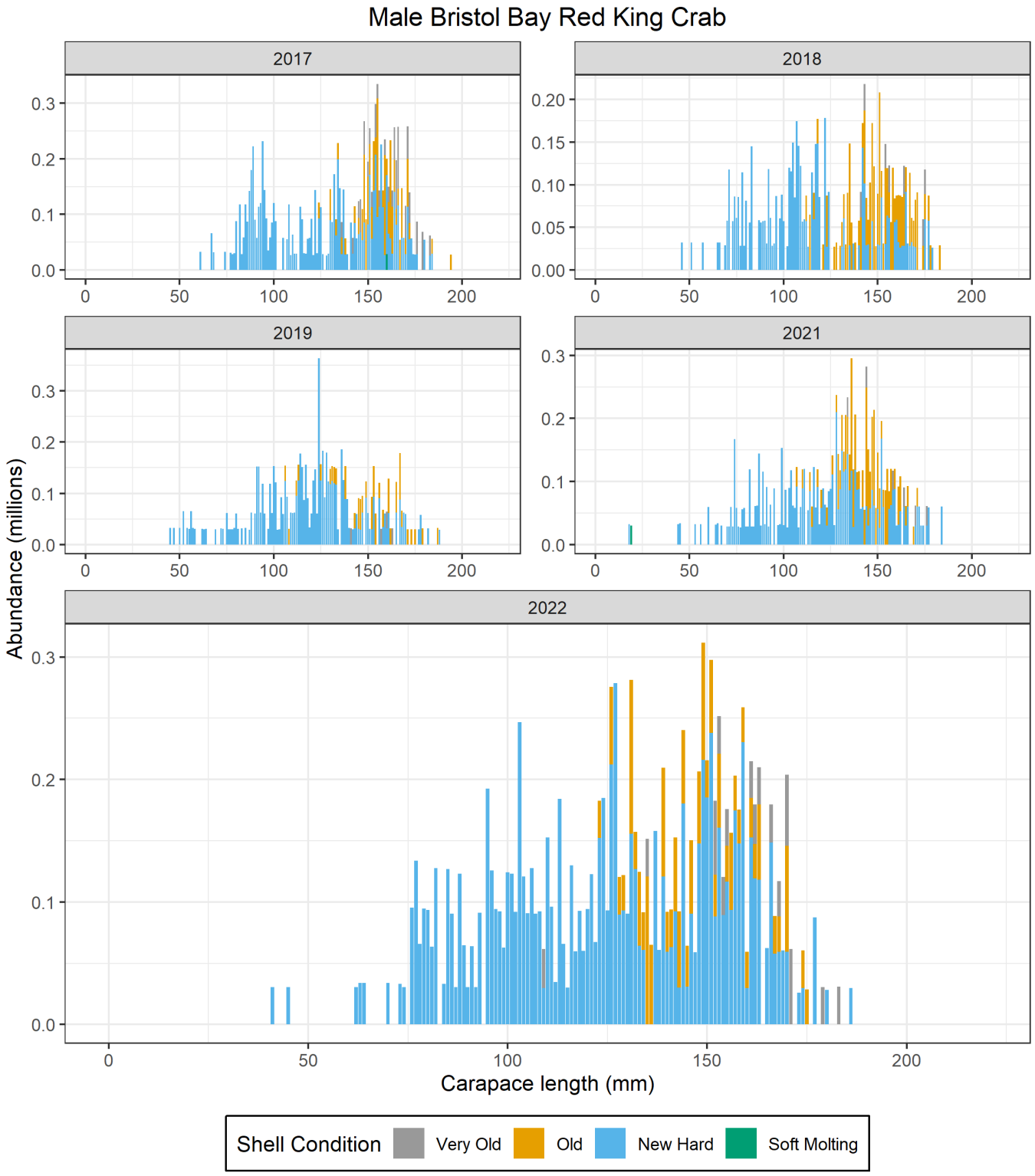

Figure 14. – Abundance (millions) by size and shell condition of Bristol Bay District male red king crab (*Paralithodes camtschaticus*) using 1 mm length classes. **Note that Y-axis scale varies among years.**

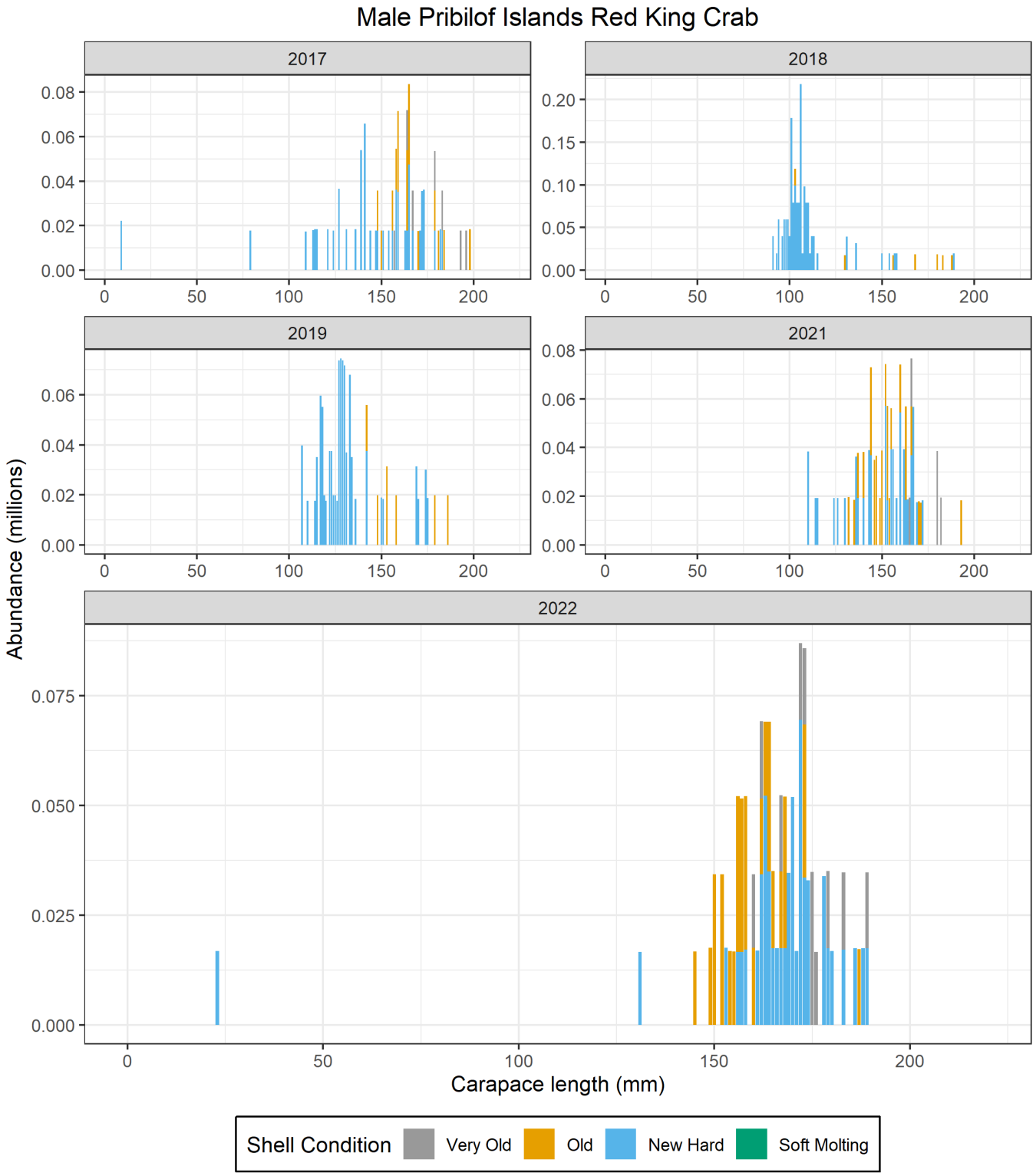

Figure 15. – Abundance (millions) by size and shell condition of Pribilof District male red king crab (*Paralithodes camtschaticus*) using 1 mm length classes. **Note that Y-axis scale varies among years.**

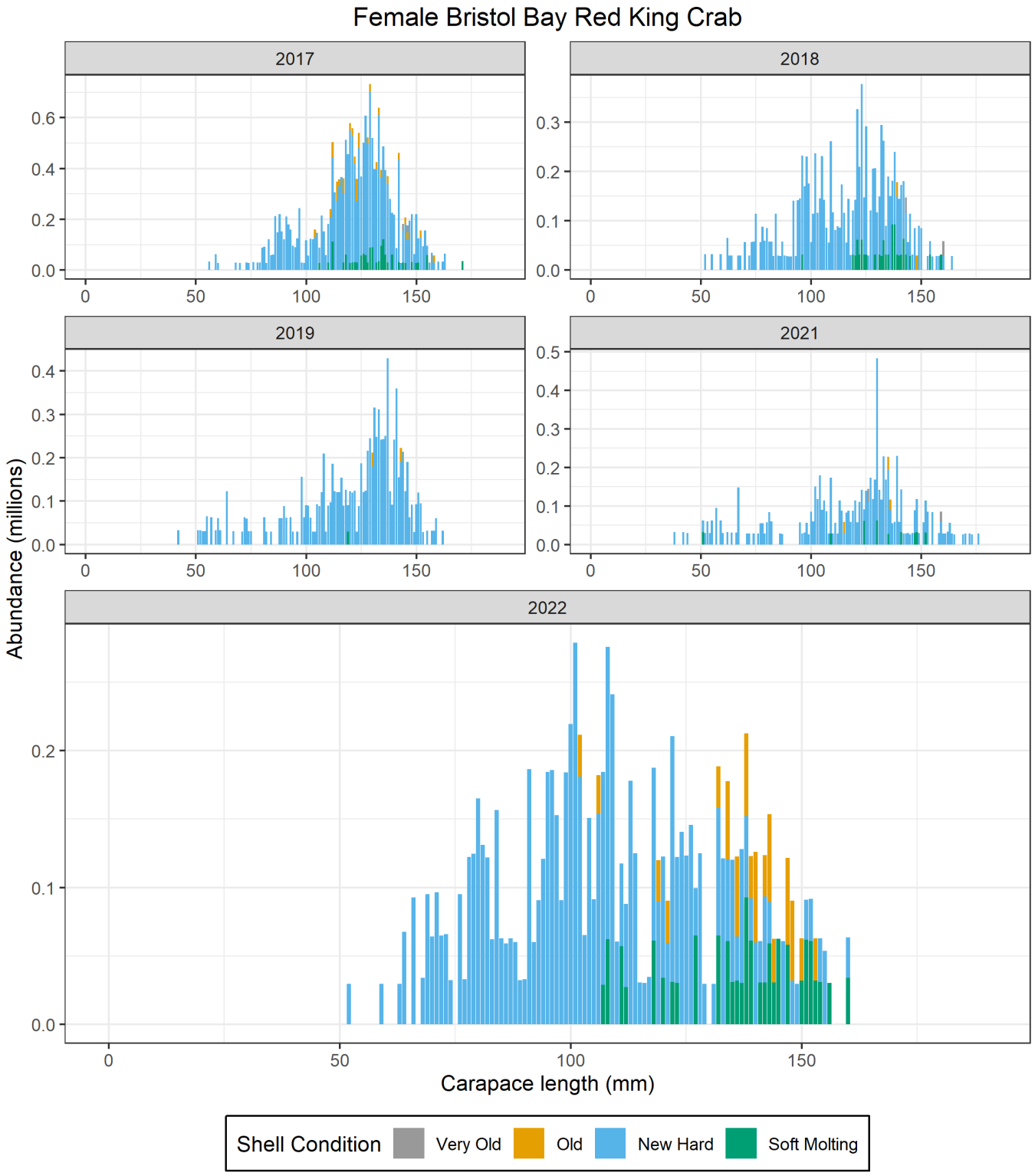

Figure 16. -- Abundance (millions) by size and shell condition of Bristol Bay District female red king crab (*Paralithodes camtschaticus*) using 1 mm length classes. In years when a subset of stations in Bristol Bay were resampled later in the summer, the resample stations replace data from the original stations. **Note that Y-axis scale varies among years.**

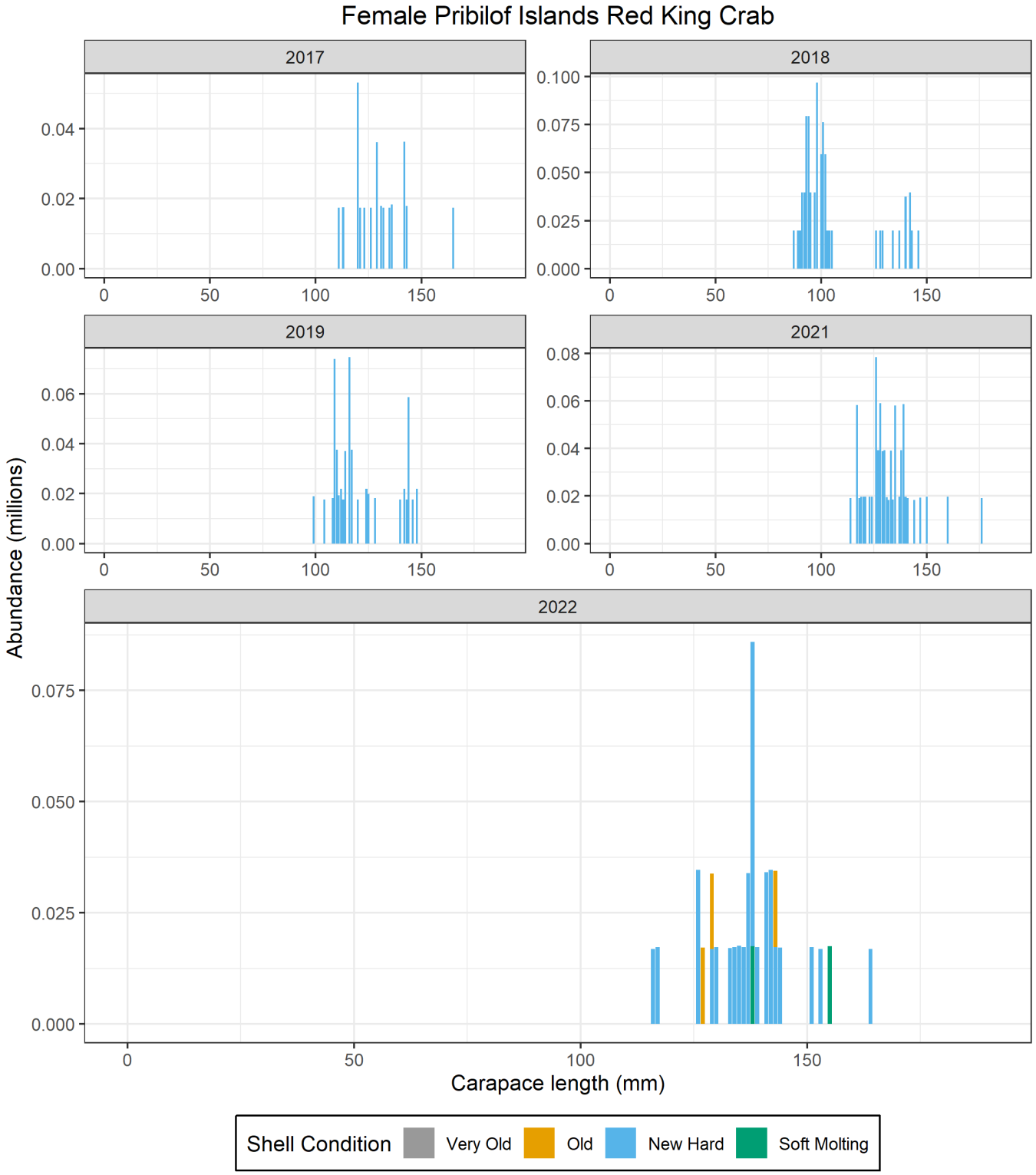

Figure 17. -- Abundance (millions) by size and shell condition of Pribilof District female red king crab (*Paralithodes camtschaticus*) using 1 mm length classes. **Note that Y-axis scale varies among years.**

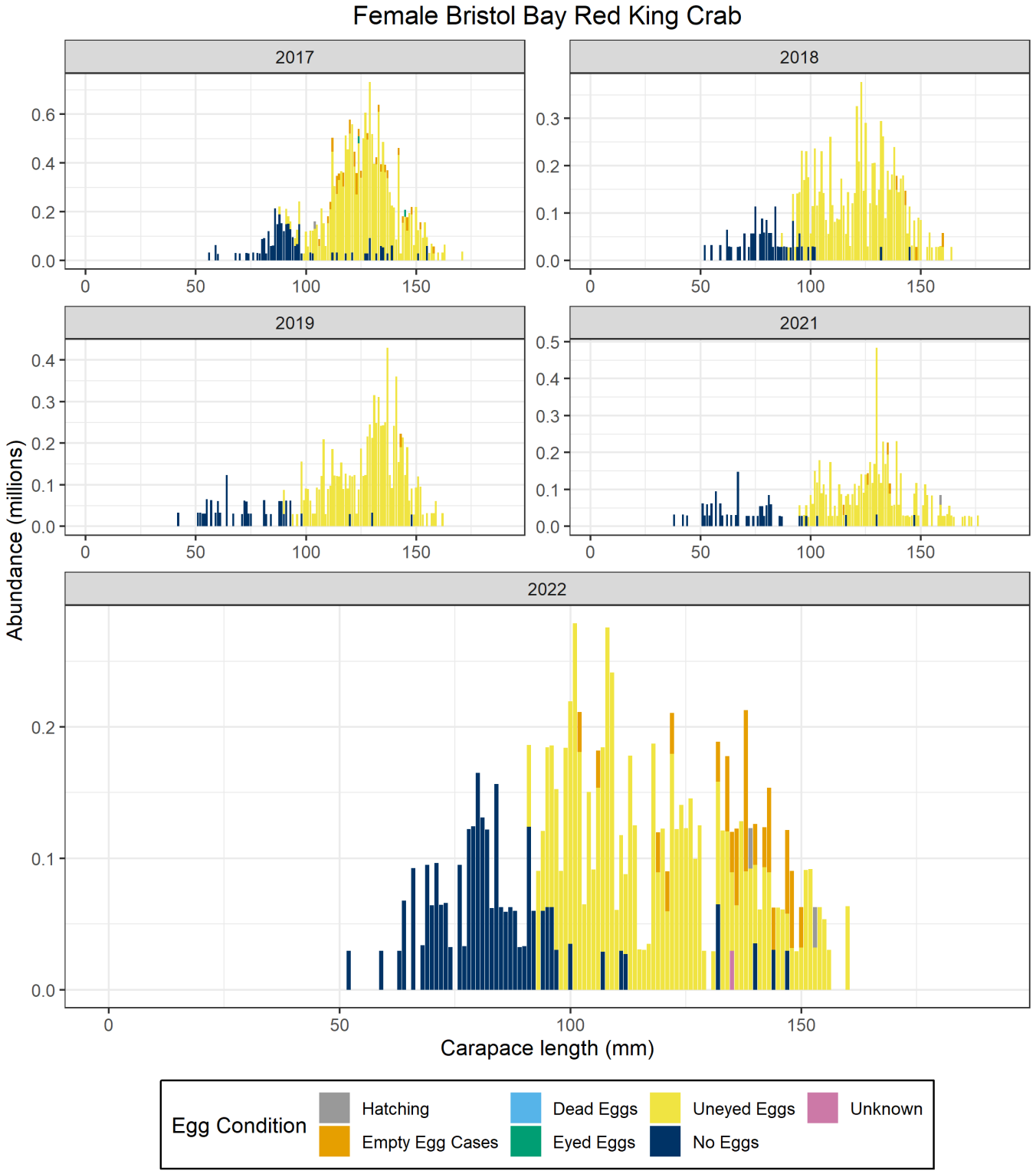

Figure 18. -- Abundance (millions) by size and egg condition of Bristol Bay District female red king crab (*Paralithodes camtschaticus*) using 1 mm length classes. In years when a subset of stations in Bristol Bay were resampled later in the summer, the resample stations replace data from the original stations. **Note that Y-axis scale varies among years.**

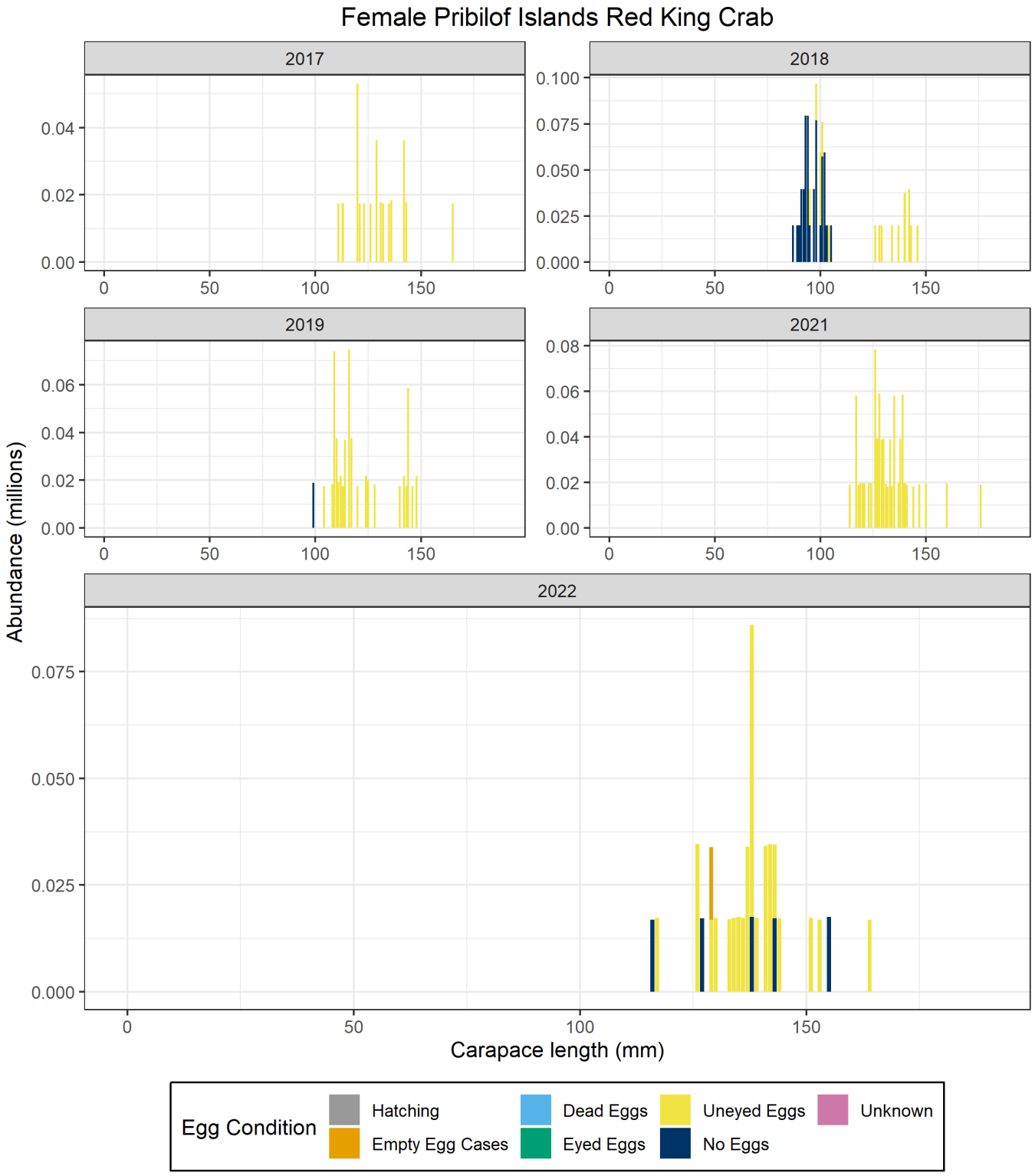

Figure 19. -- Abundance (millions) by size and egg condition of Pribilof District female red king crab (*Paralithodes camtschaticus*) using 1 mm length classes. **Note that Y-axis scale varies among years.**

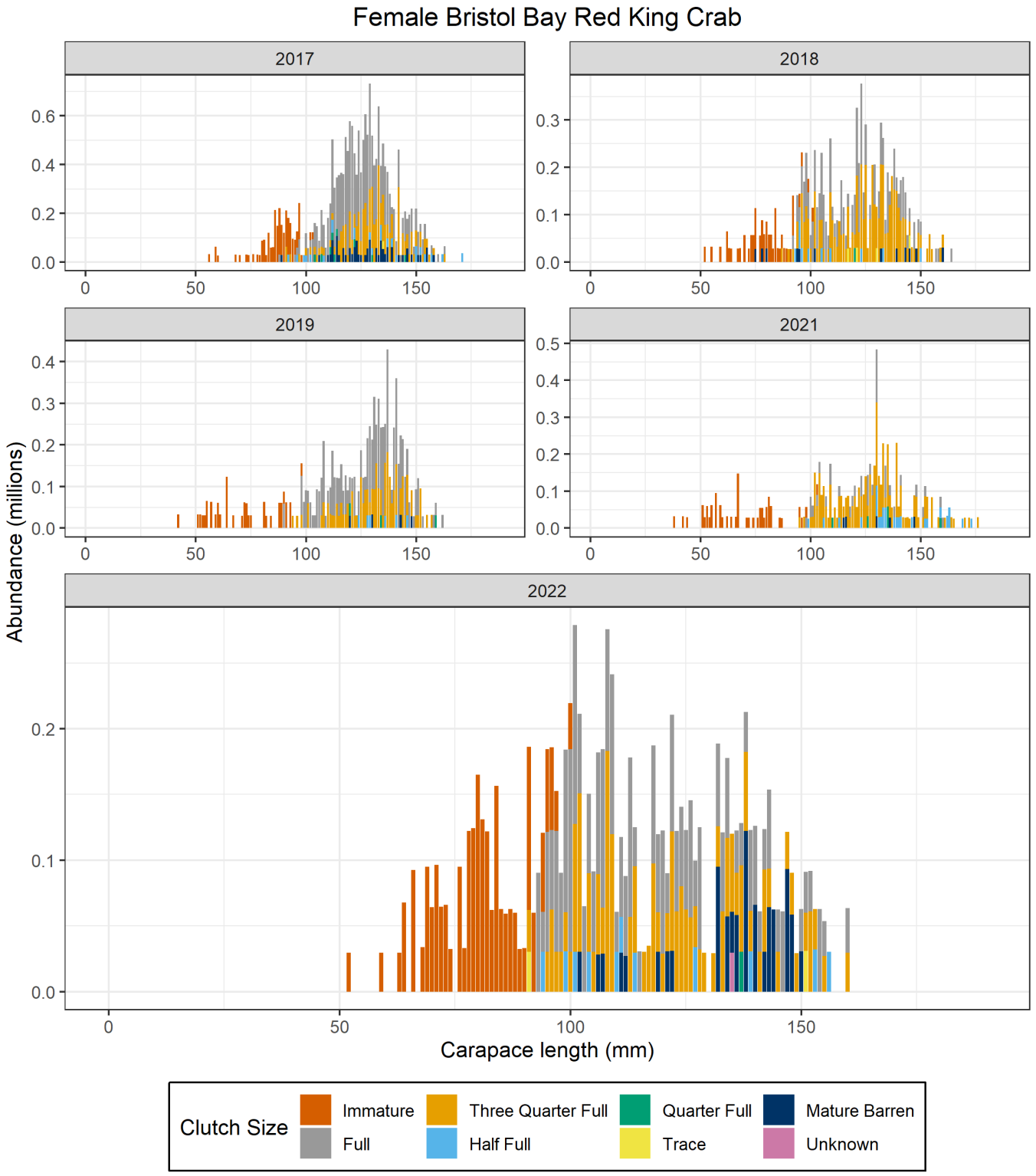

Figure 20. -- Abundance (millions) by size and clutch fullness of Bristol Bay District female red king crab (*Paralithodes camtschaticus*) using 1 mm length classes. In years when a subset of stations in Bristol Bay were resampled later in the summer, the resample stations replace data from the original stations. **Note that Y-axis scale varies among years.**

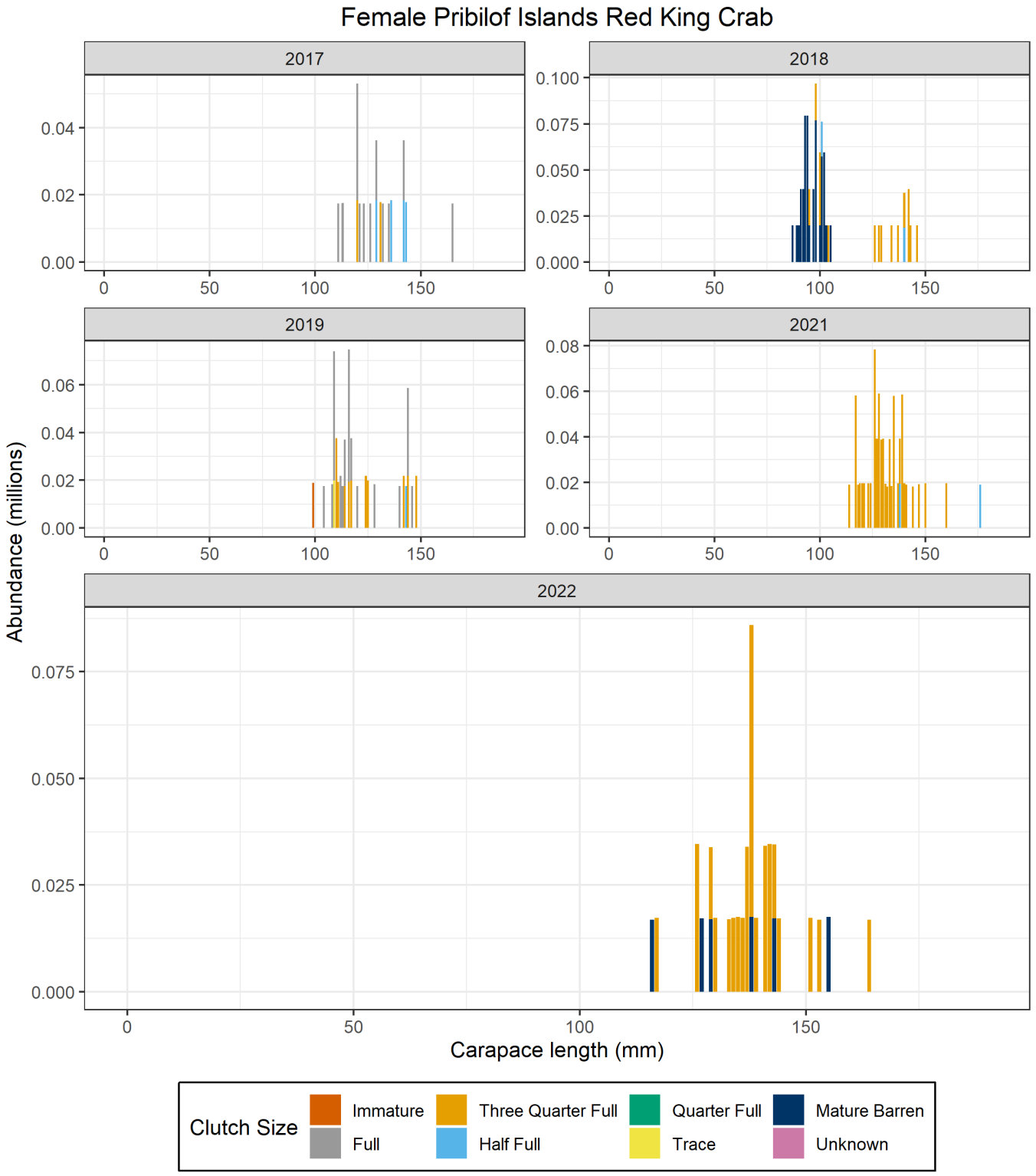

Figure 21. -- Abundance (millions) by size and clutch fullness of Pribilof District female red king crab (*Paralithodes camtschaticus*) using 1 mm length classes. **Note that Y-axis scale varies among years.**

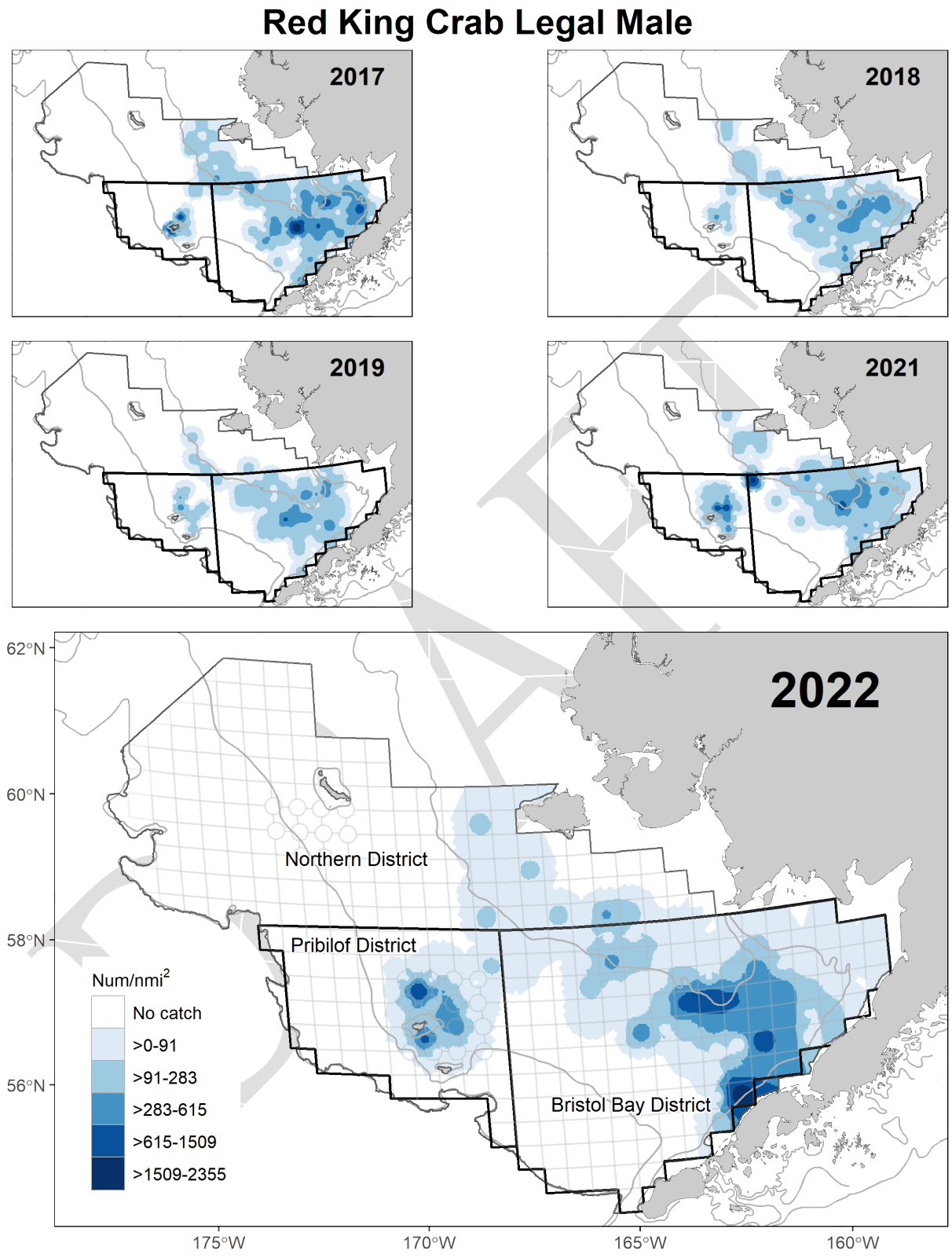

Figure 22. -- Estimated total density of legal-sized (≥ 135 mm carapace length) male red king crab (*Paralithodes camtschaticus*) for the past five survey years. Outlined areas depict management districts.

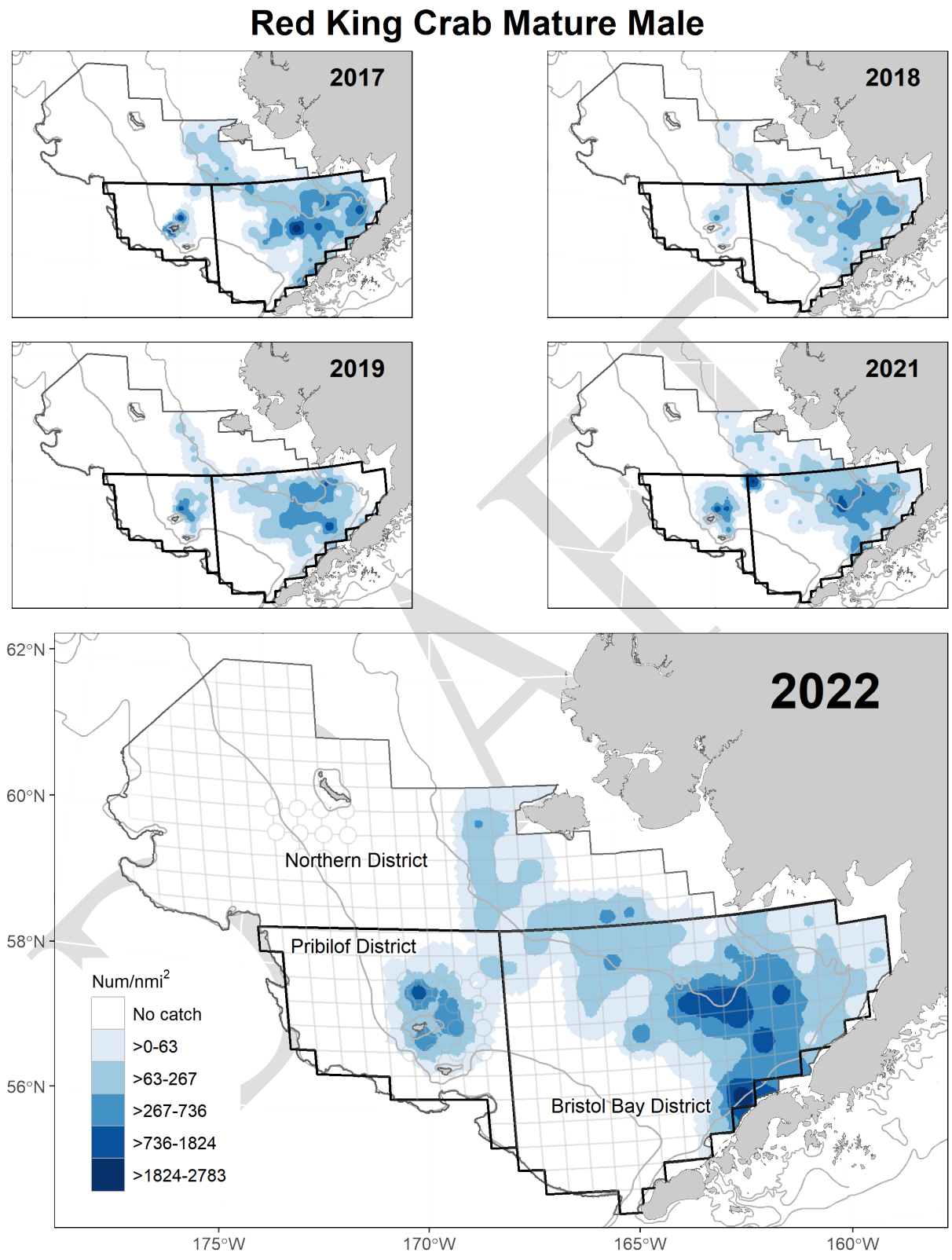

Figure 23. -- Estimated total density of mature-sized (≥ 120 mm carapace length) male red king crab (*Paralithodes camtschaticus*) for the past five survey years. Outlined areas depict management districts.

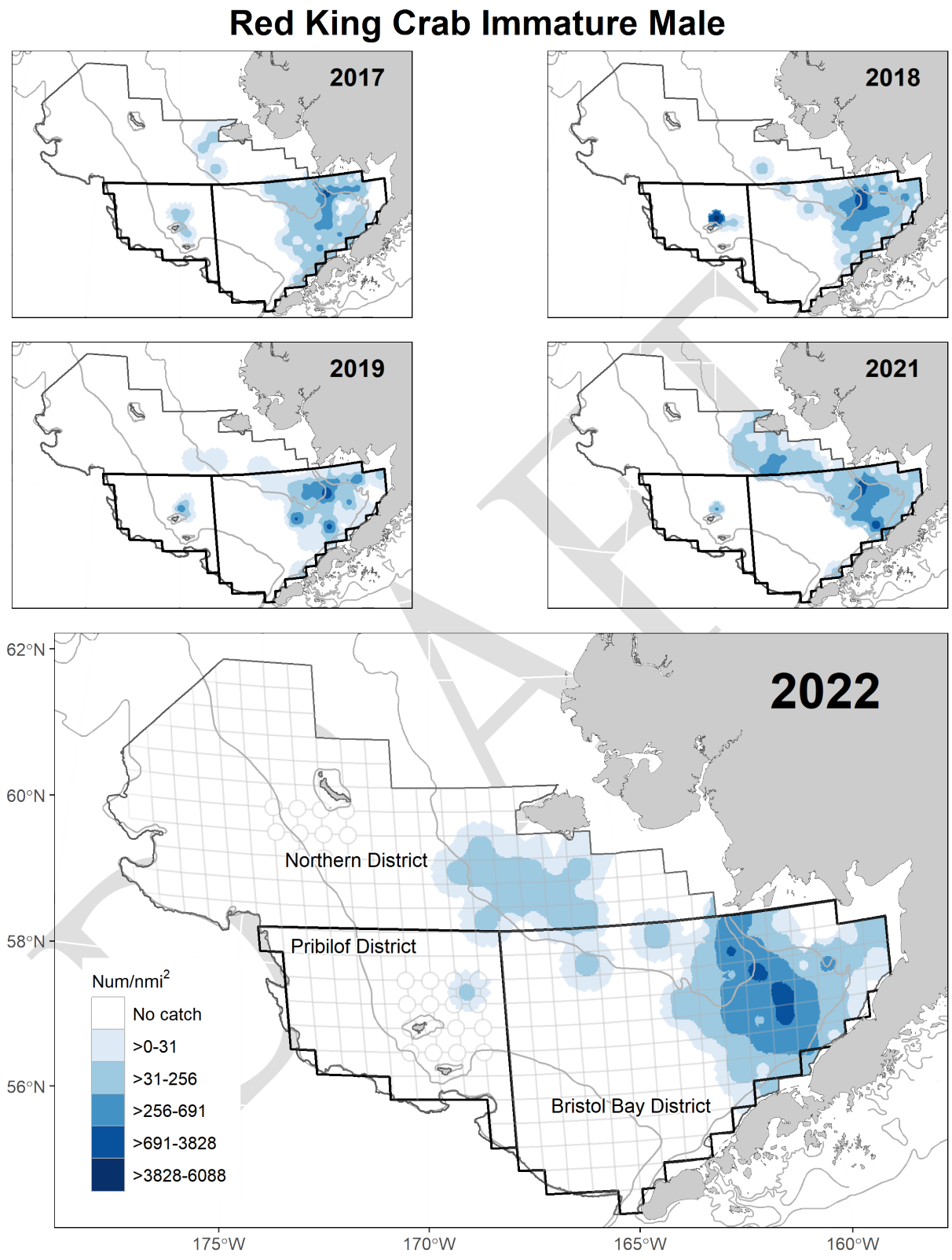

Figure 24. -- Estimated total density of immature-sized (< 120 mm carapace length) male red king crab (*Paralithodes camtschaticus*) for the past five survey years. Outlined areas depict management districts.

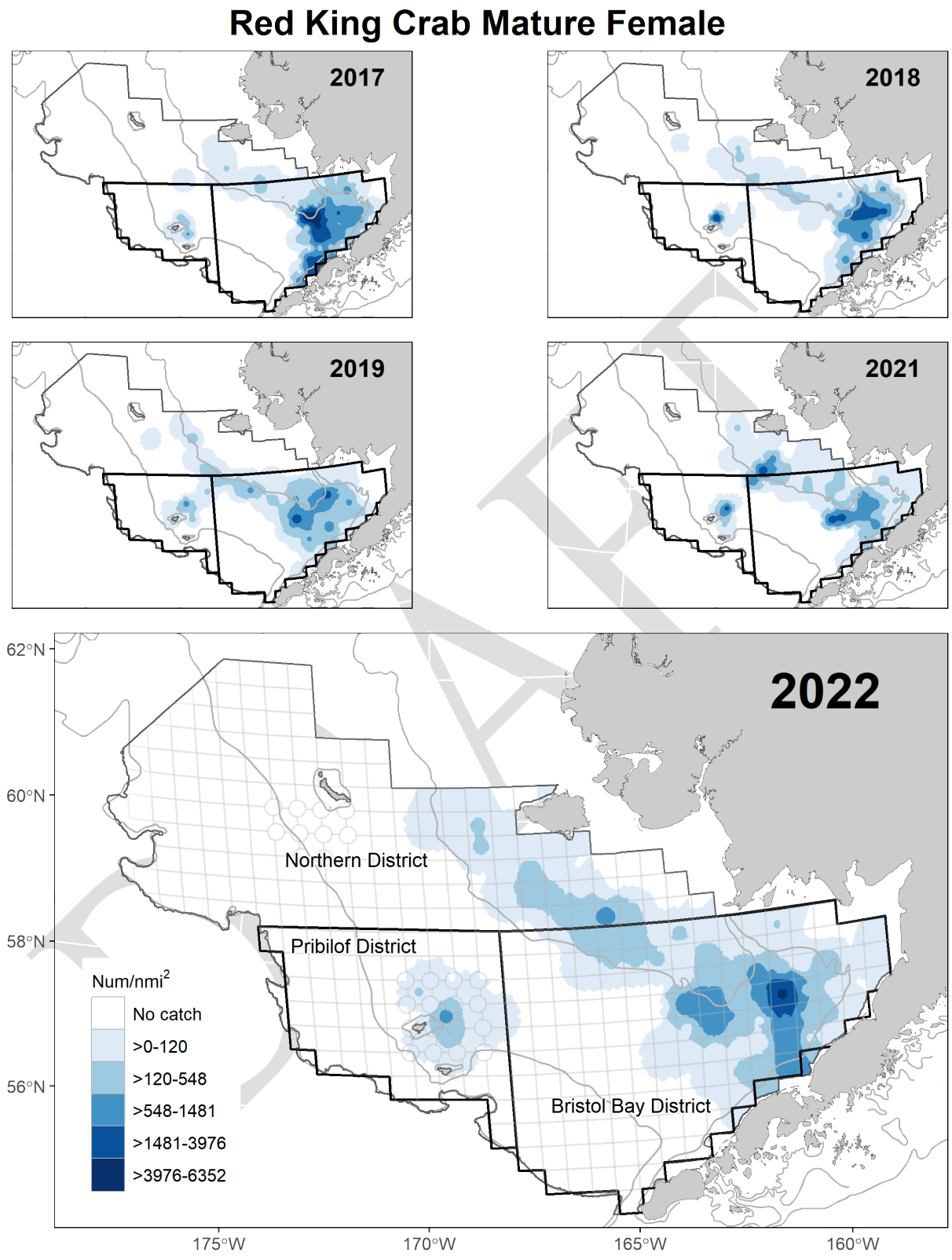

Figure 25. -- Estimated total density of mature female red king crab (*Paralithodes camtschaticus*) for the past five survey years. Outlined areas depict management districts. In years when a subset of stations were resampled, the resample stations replace data from the original stations.

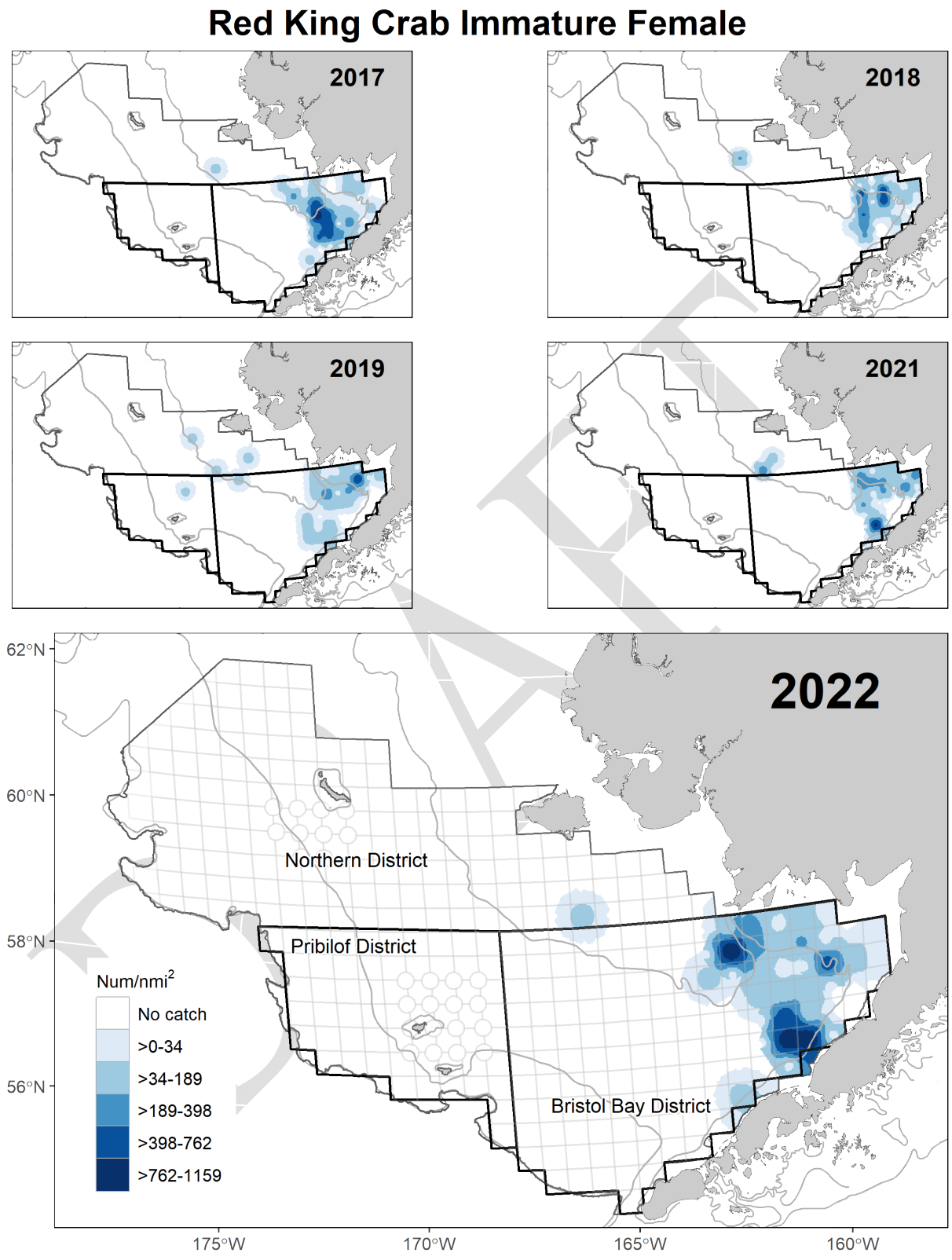

Figure 26. -- Estimated total density of immature female red king crab (*Paralithodes camtschaticus*) for the past five survey years. Outlined areas depict management districts. In years when a subset of stations were resampled, the resample stations replace data from original stations.

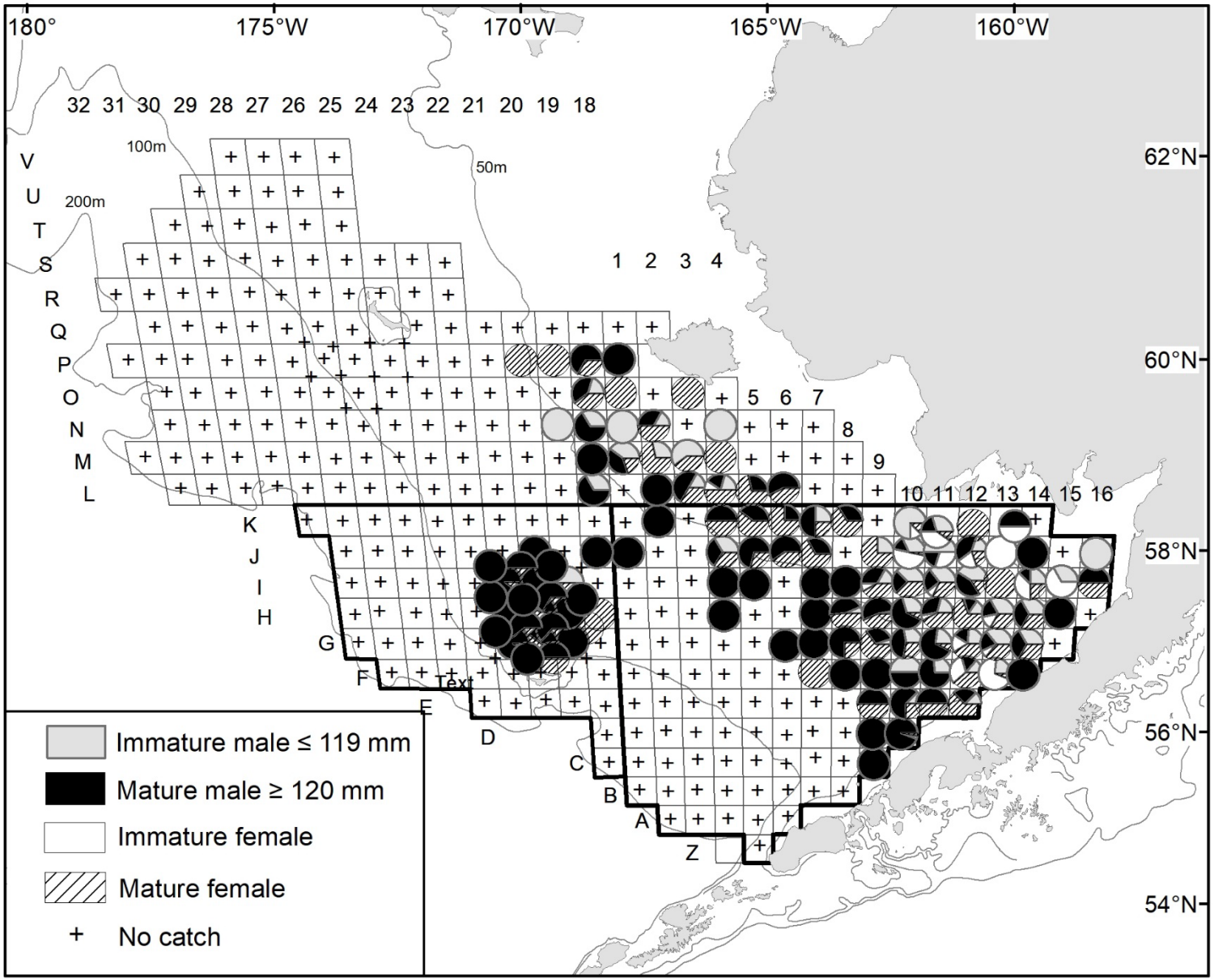

Figure 27. -- Proportion of male and female red king crab (*Paralithodes camtschaticus*) maturity classes caught at each station sampled in 2022. Outlined areas depict management districts.

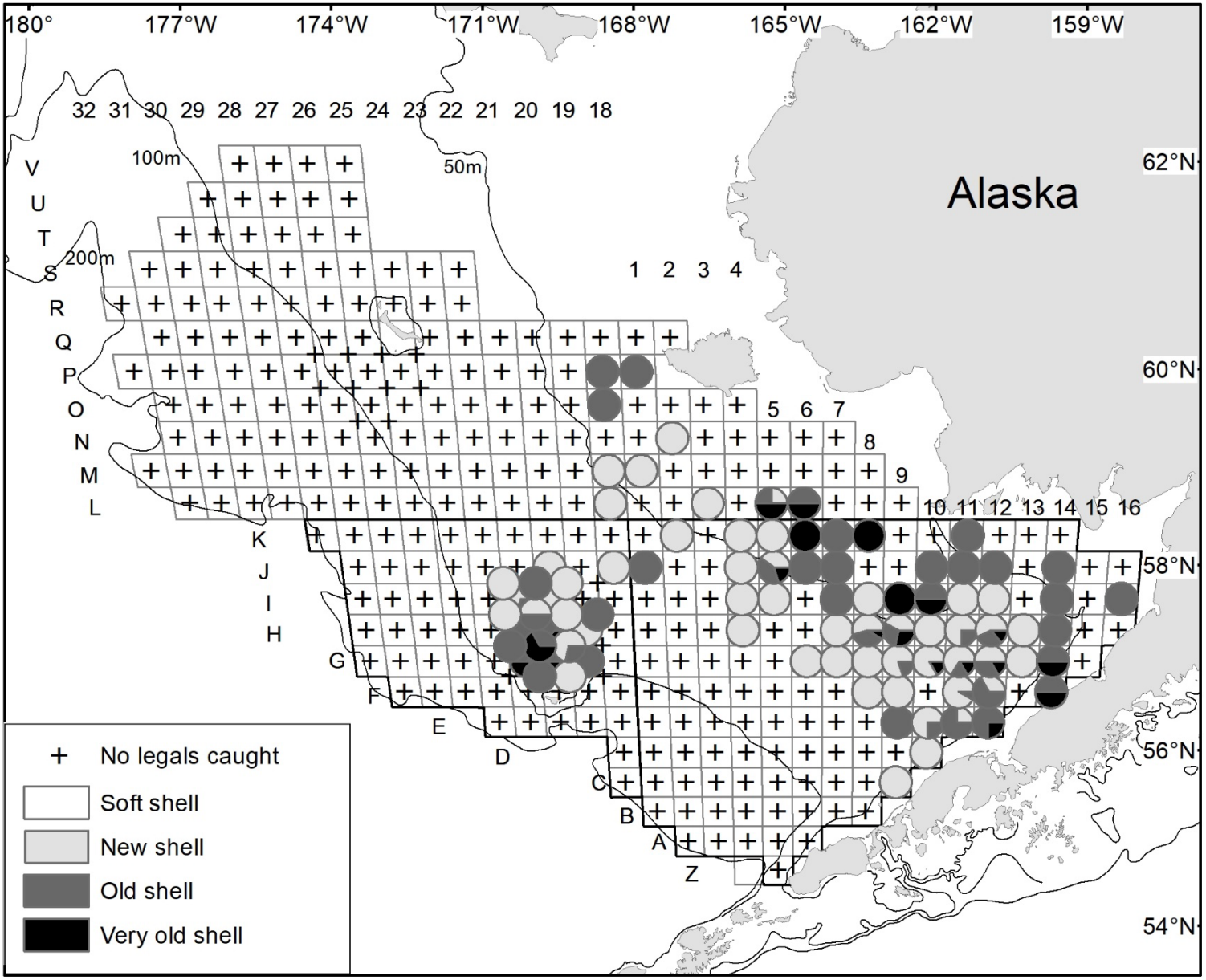

Figure 28. -- Proportion of legal-sized (≥ 135 mm carapace length), male red king crab (*Paralithodes camtschaticus*) shell condition classes caught at each station sampled in 2022. Outlined areas depict management districts.

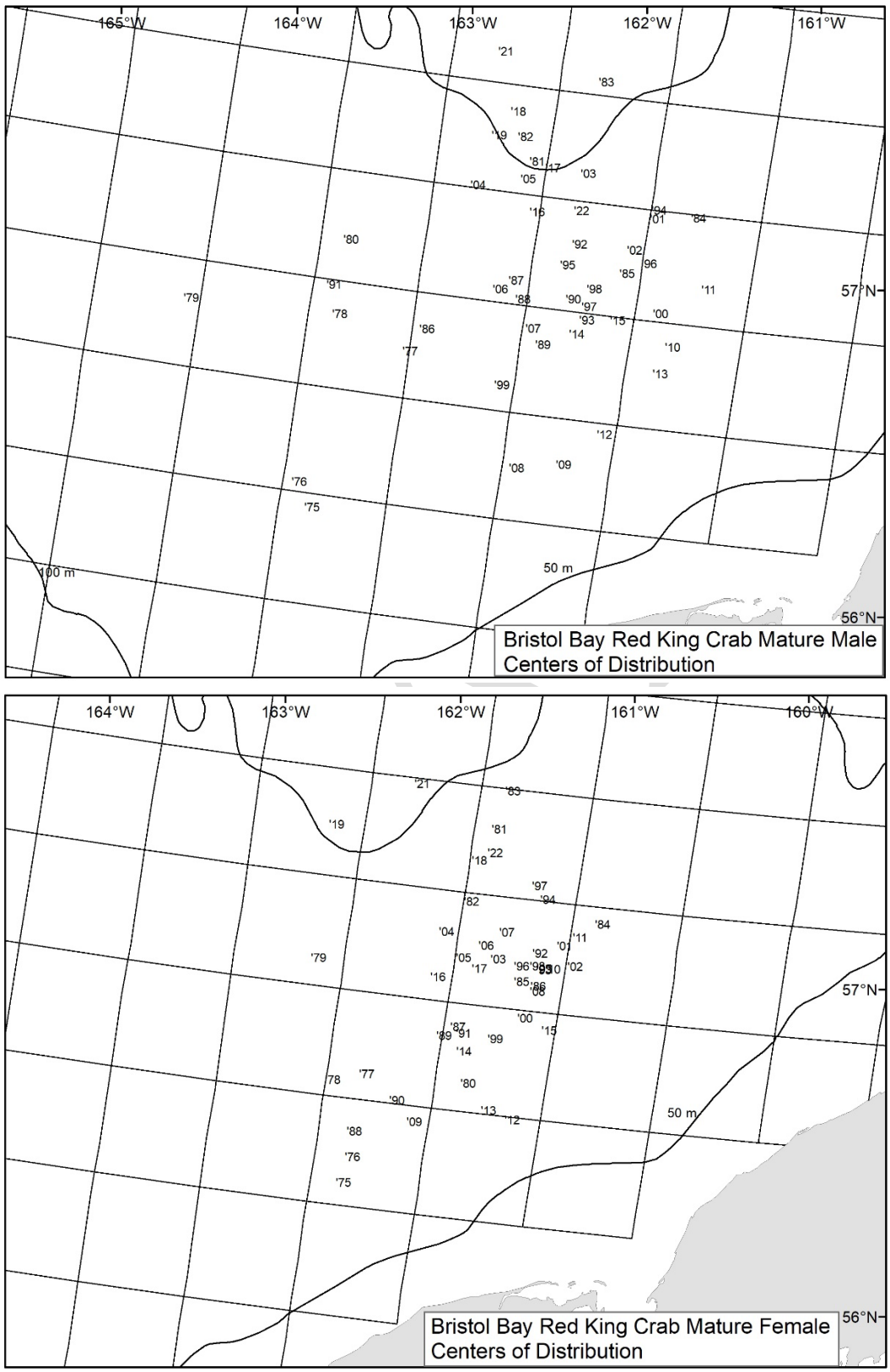

Figure 29. -- Centers of stock abundance of Bristol Bay District mature male (top) and female (bottom) red king crab (*Paralithodes camtschaticus*) from 1975 to 2022. Data are from standard survey stations only (resampled stations **do not** replace data from original stations).

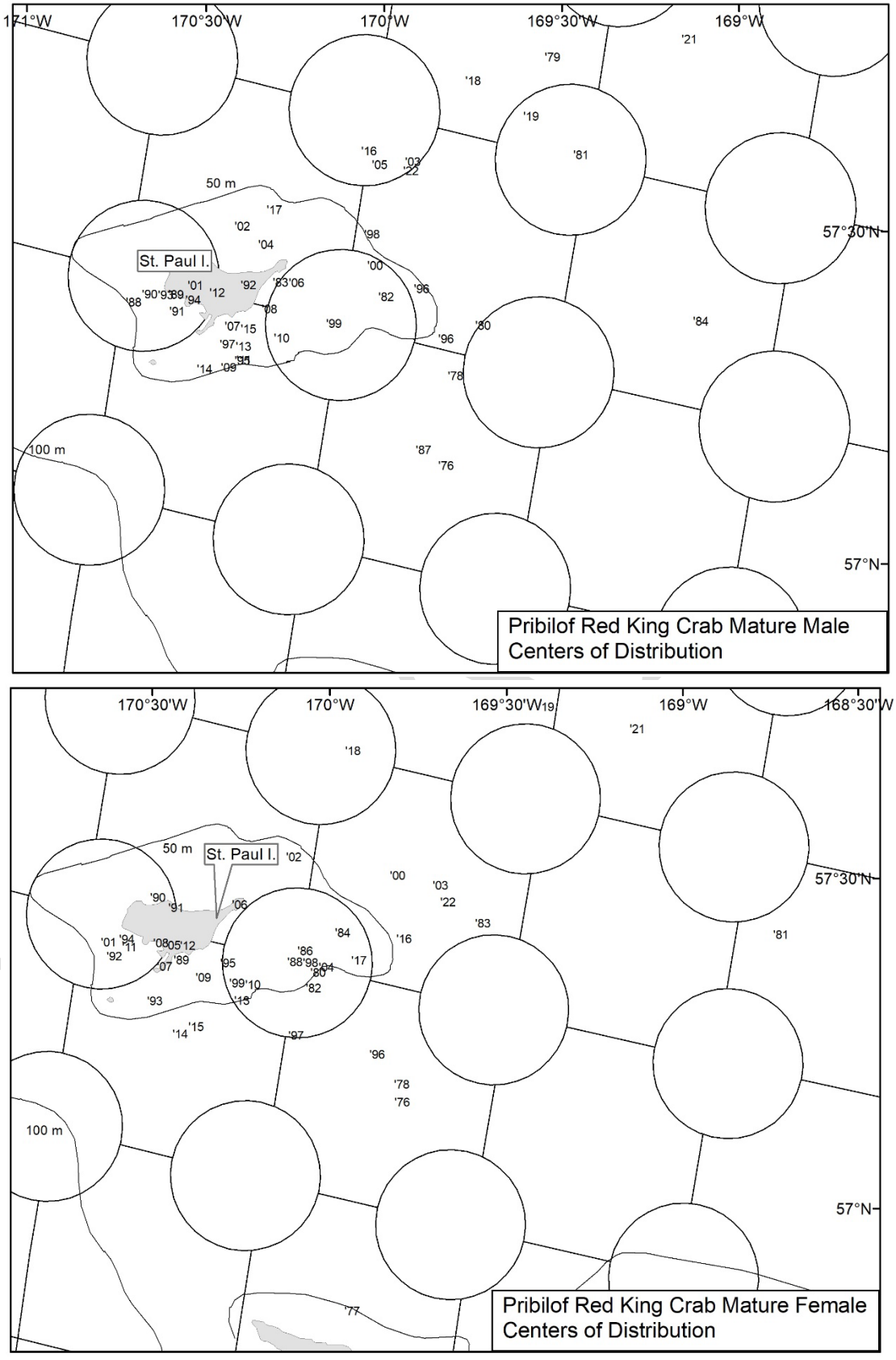

Figure 30. -- Centers of stock abundance of Pribilof Island mature male (top) and female (bottom) red king crab (*Paralithodes camtschaticus*) from 1975 to 2022.

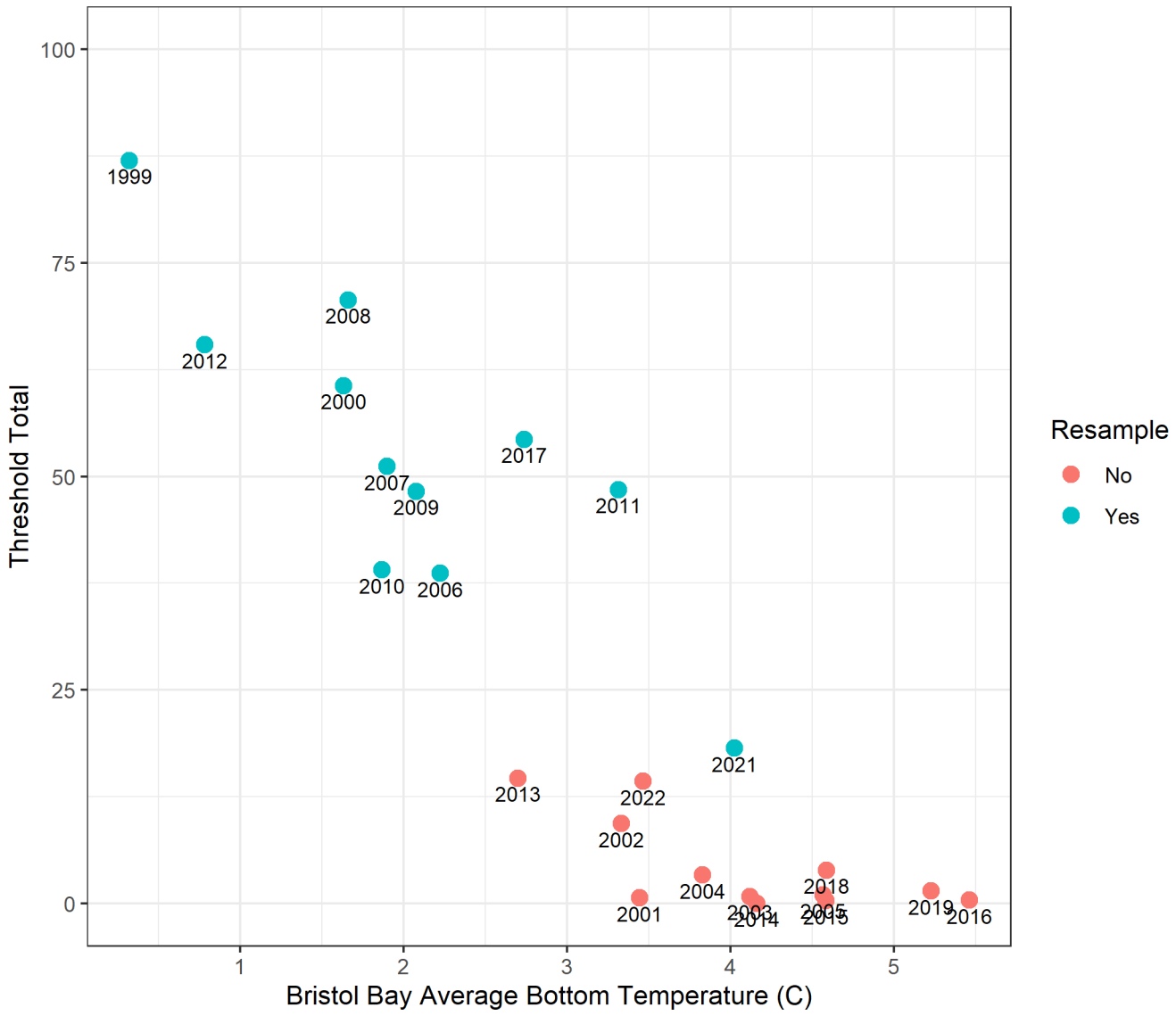

Figure 31. – Relationship between Bristol Bay average bottom water temperature and the status of the female red king crab reproductive cycle relative to whether resampling was conducted in Bristol Bay. Average bottom water temperature is spatially subset for the Bristol Bay District during the standard National Marine Fisheries Service eastern Bering Sea trawl survey. Females are considered to have an incomplete reproductive cycle if they have eggs with eyed embryos, hatching eggs, empty egg cases, or no clutch (barren).

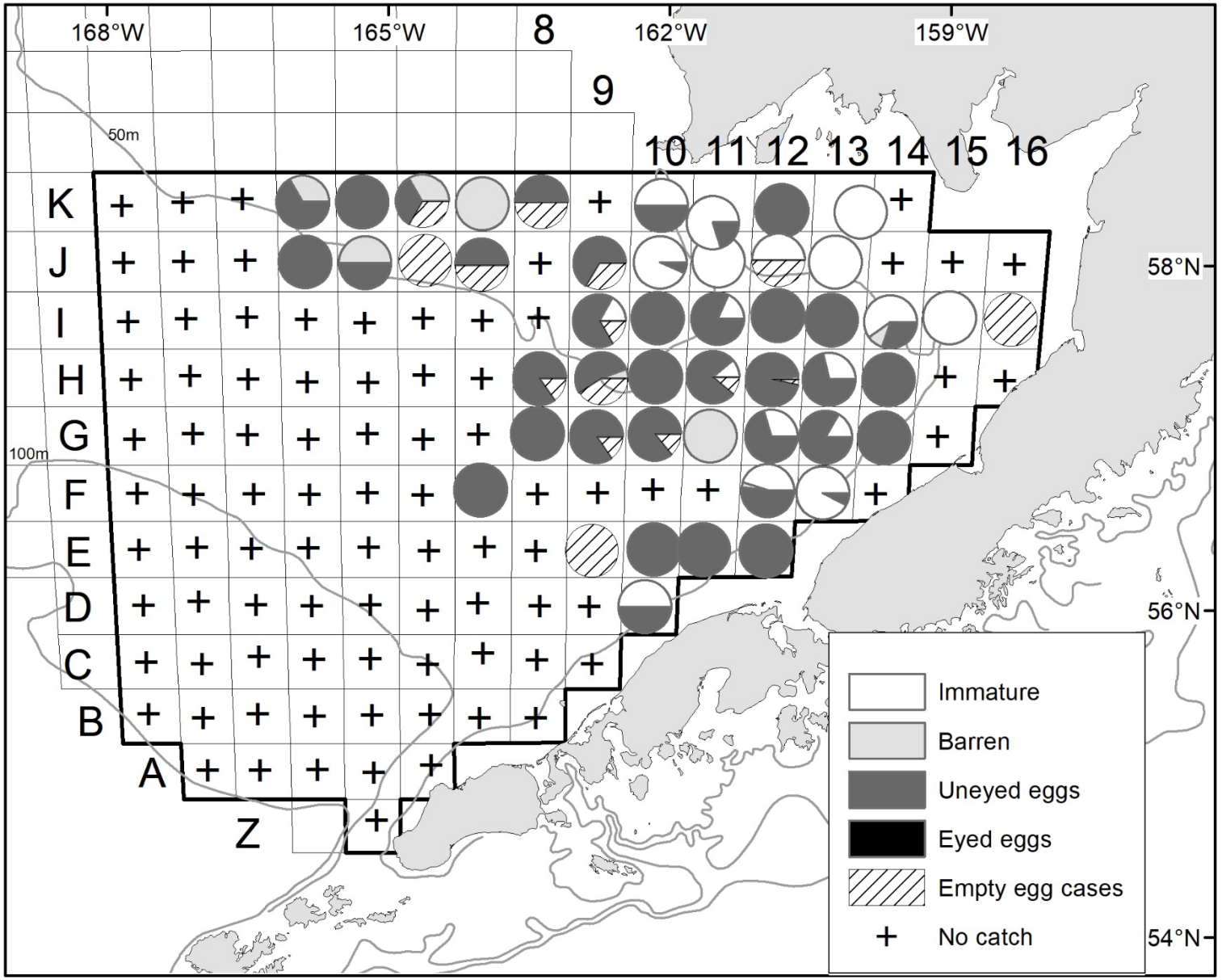

Figure 32. -- Proportion of female red king crab (*Paralithodes camtschaticus)* egg condition classes caught at each station sampled in 2022 in the Bristol Bay District. The black outlined area depicts the management district.

Blue King Crab Figures

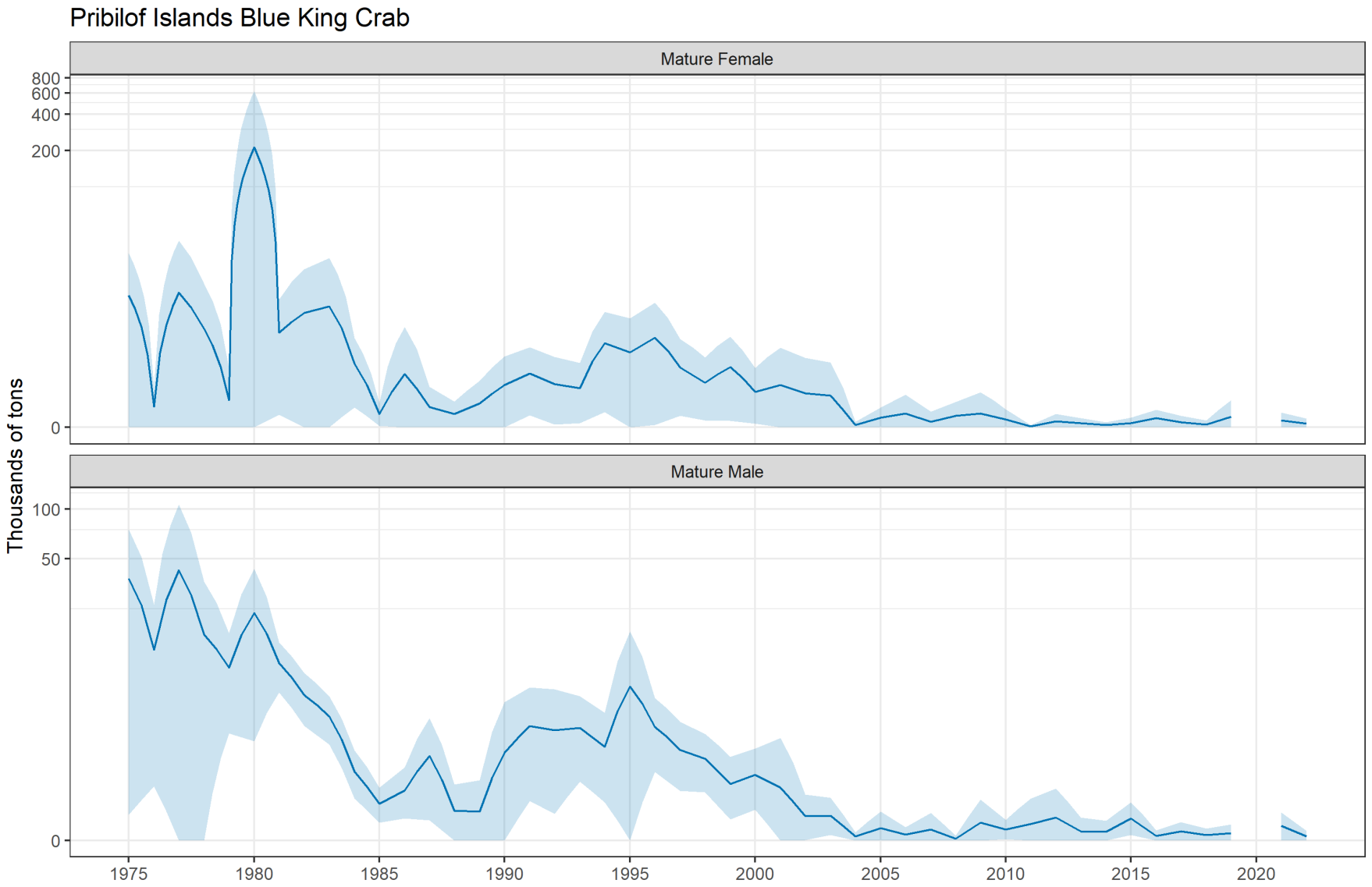

Figure 33. -- Historical biomass of mature female and mature male (carapace length ≥ 120 mm) blue king crab (*Paralithodes platypus*) in the Pribilof District. Light blue area indicates ± 95% CI. **Note that Y-axis is plotted on a log scale.**

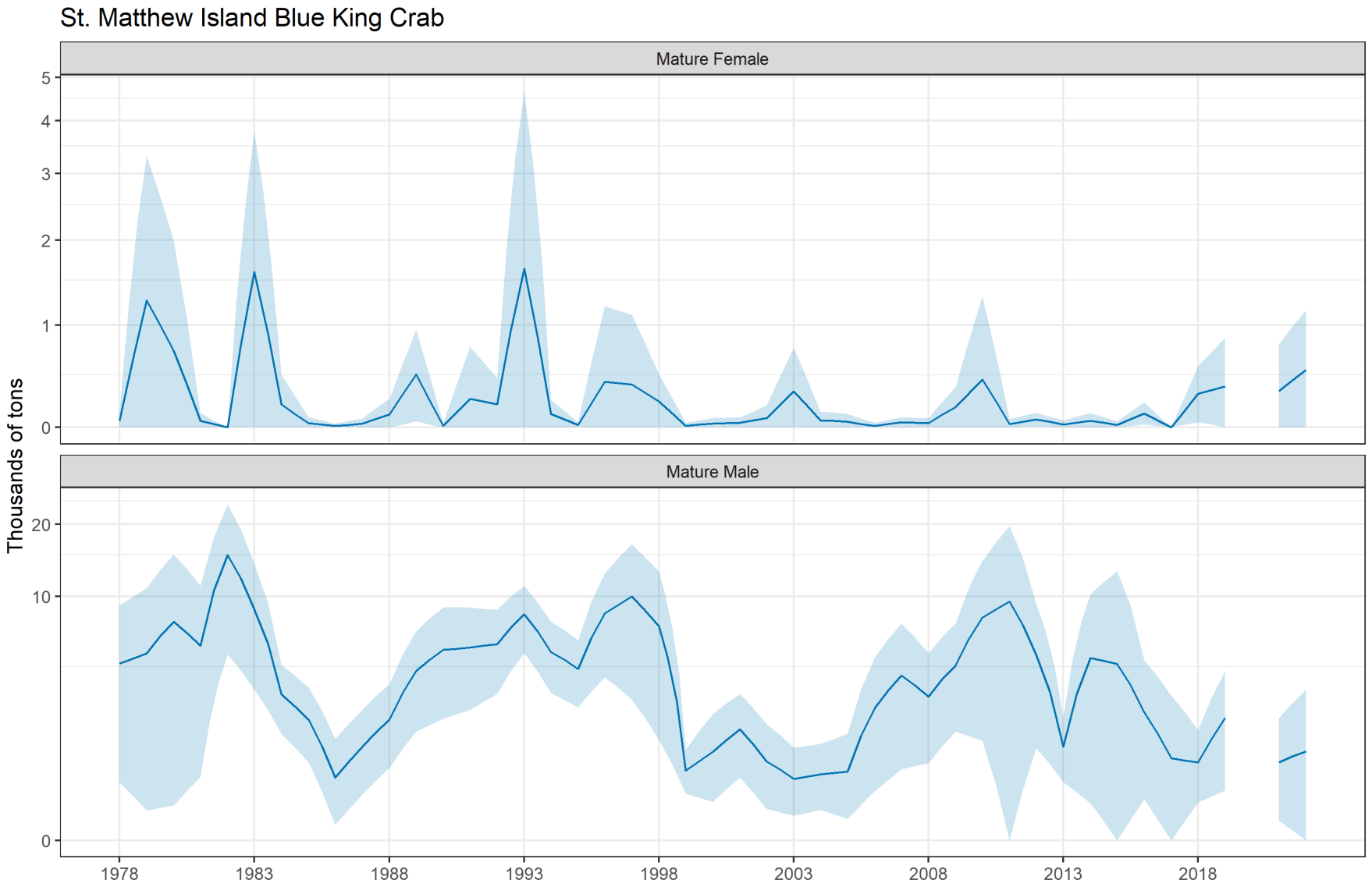

Figure 34. -- Historical biomass of mature female and mature male (carapace length ≥ 105 mm) blue king crab (*Paralithodes platypus*) in the Saint Matthew Island Section. Light blue area indicates ± 95% CI. **Note that Y-axis is plotted on a log scale.**

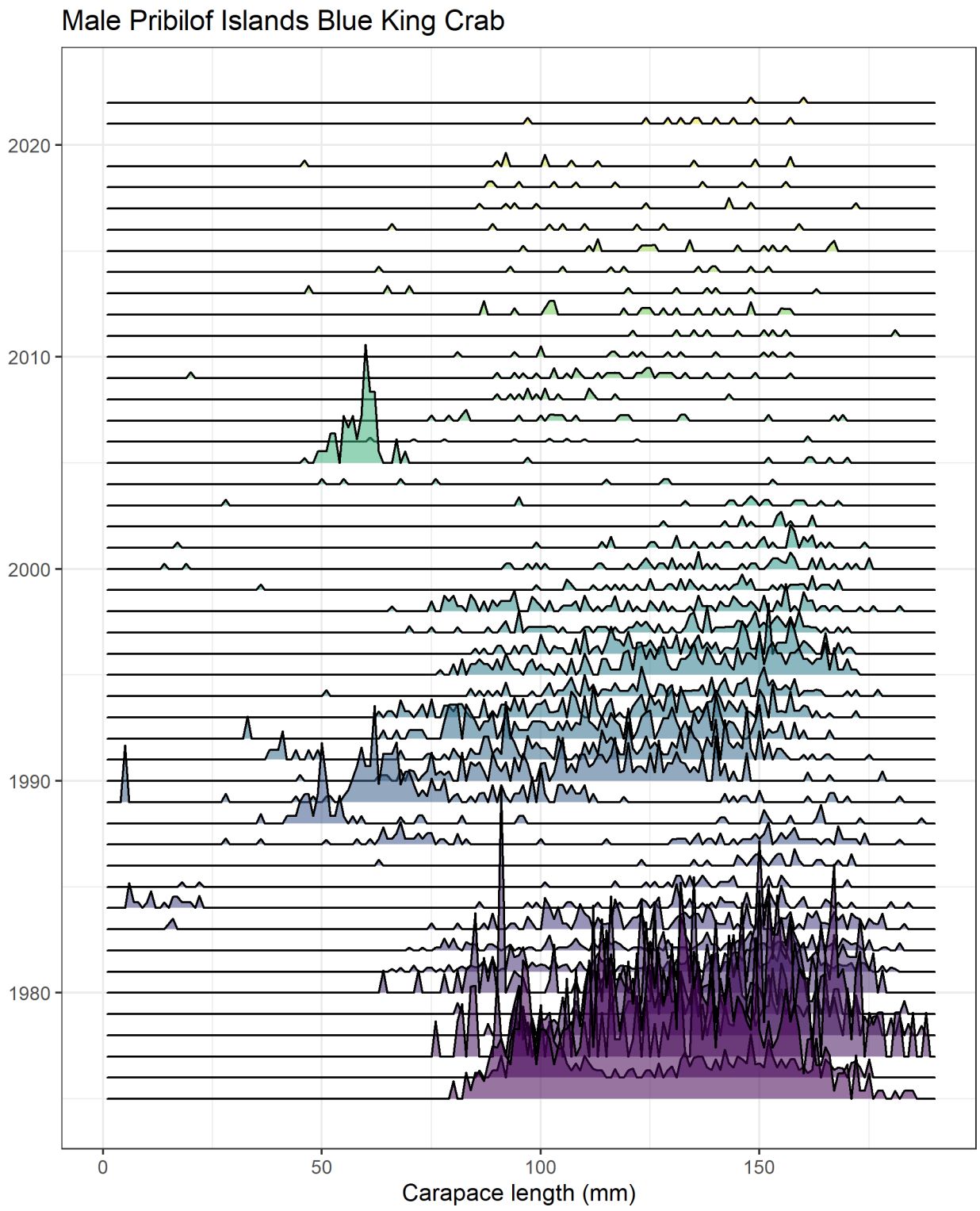

Figure 35. -- Historical size frequency for Pribilof District male blue king crab (*Paralithodes platypus*).

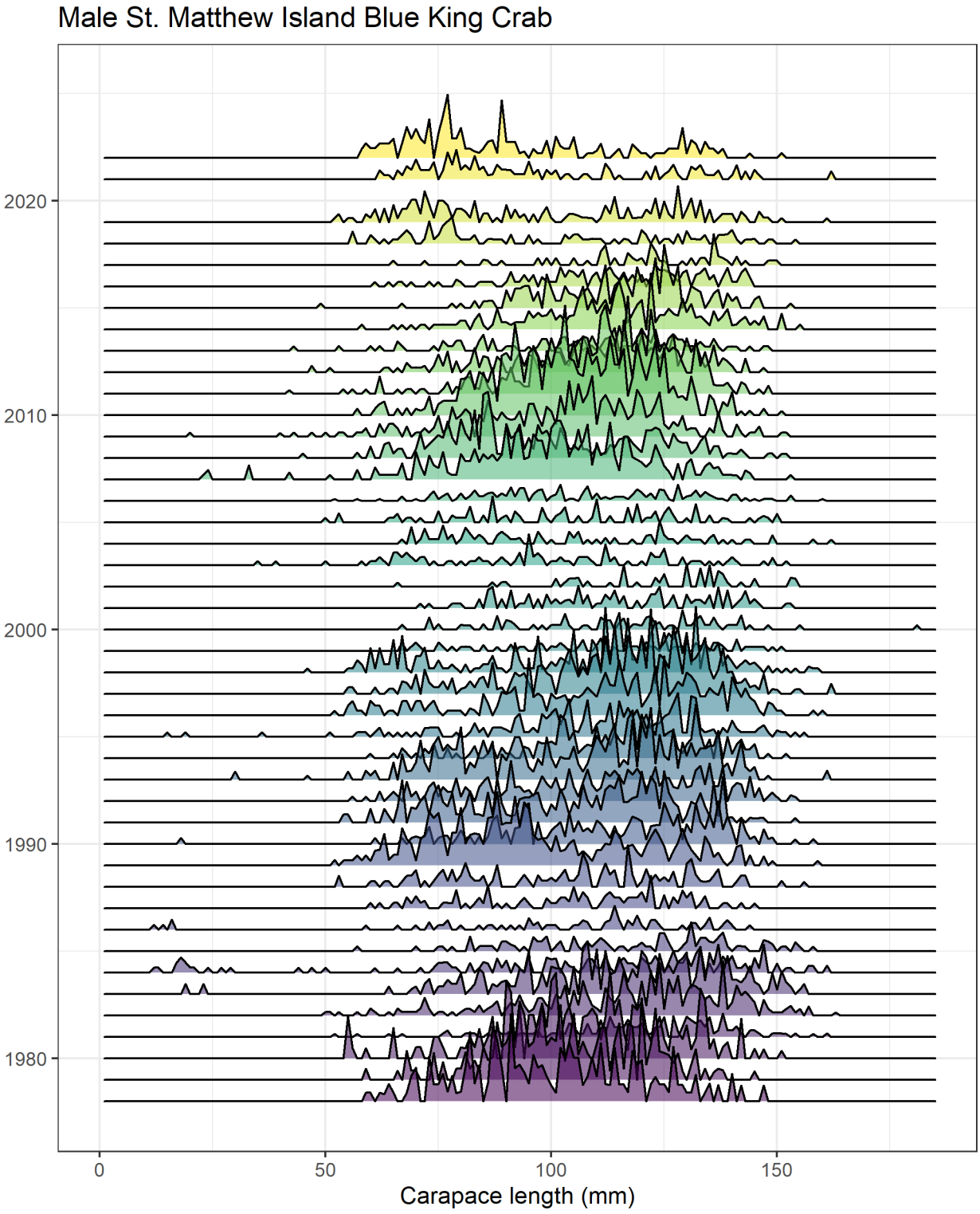

Figure 36. -- Historical size frequency for Saint Matthew Island Section male blue king crab (*Paralithodes platypus*).

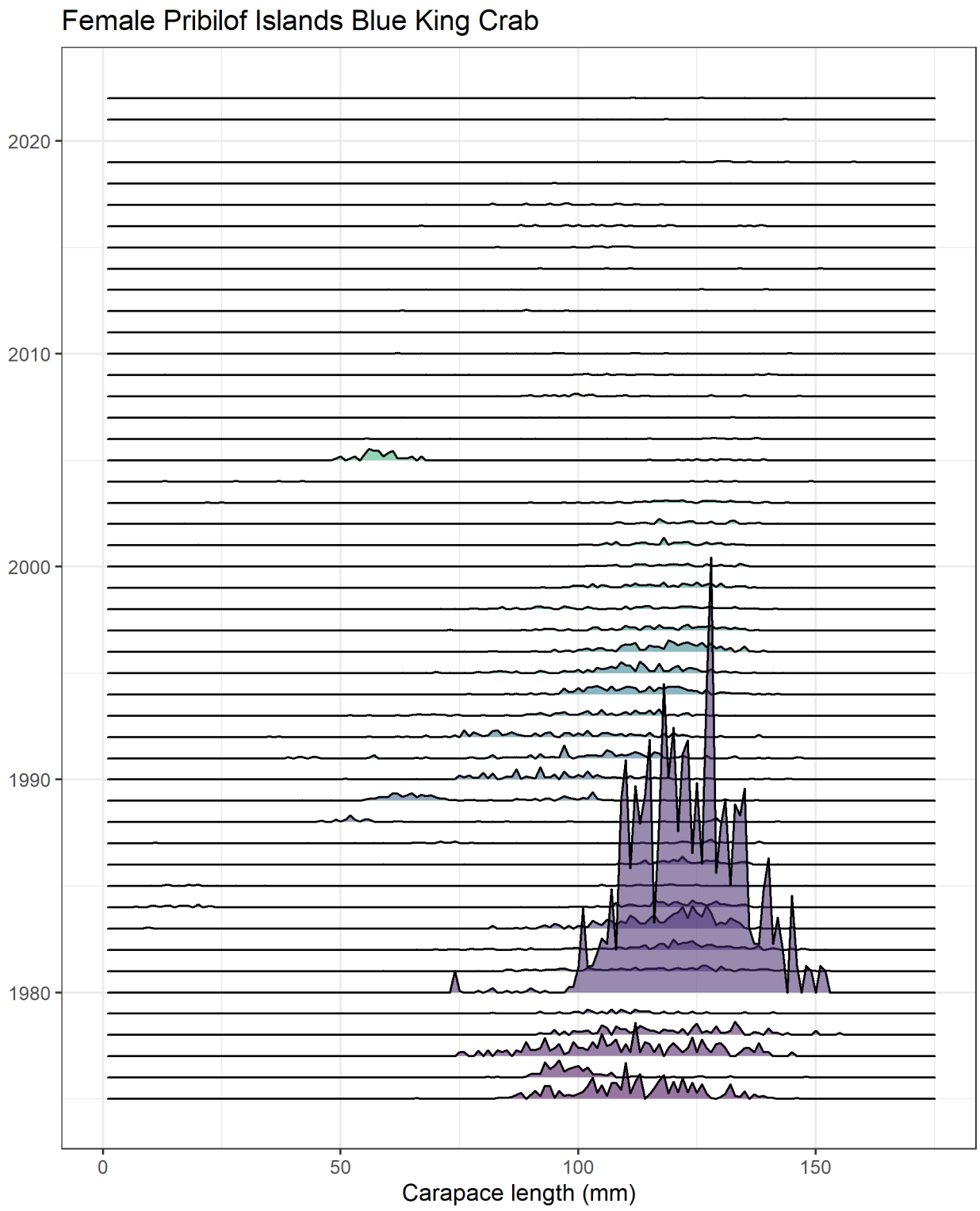

Figure 37. -- Historical size frequency for Pribilof District female blue king crab (*Paralithodes platypus*).

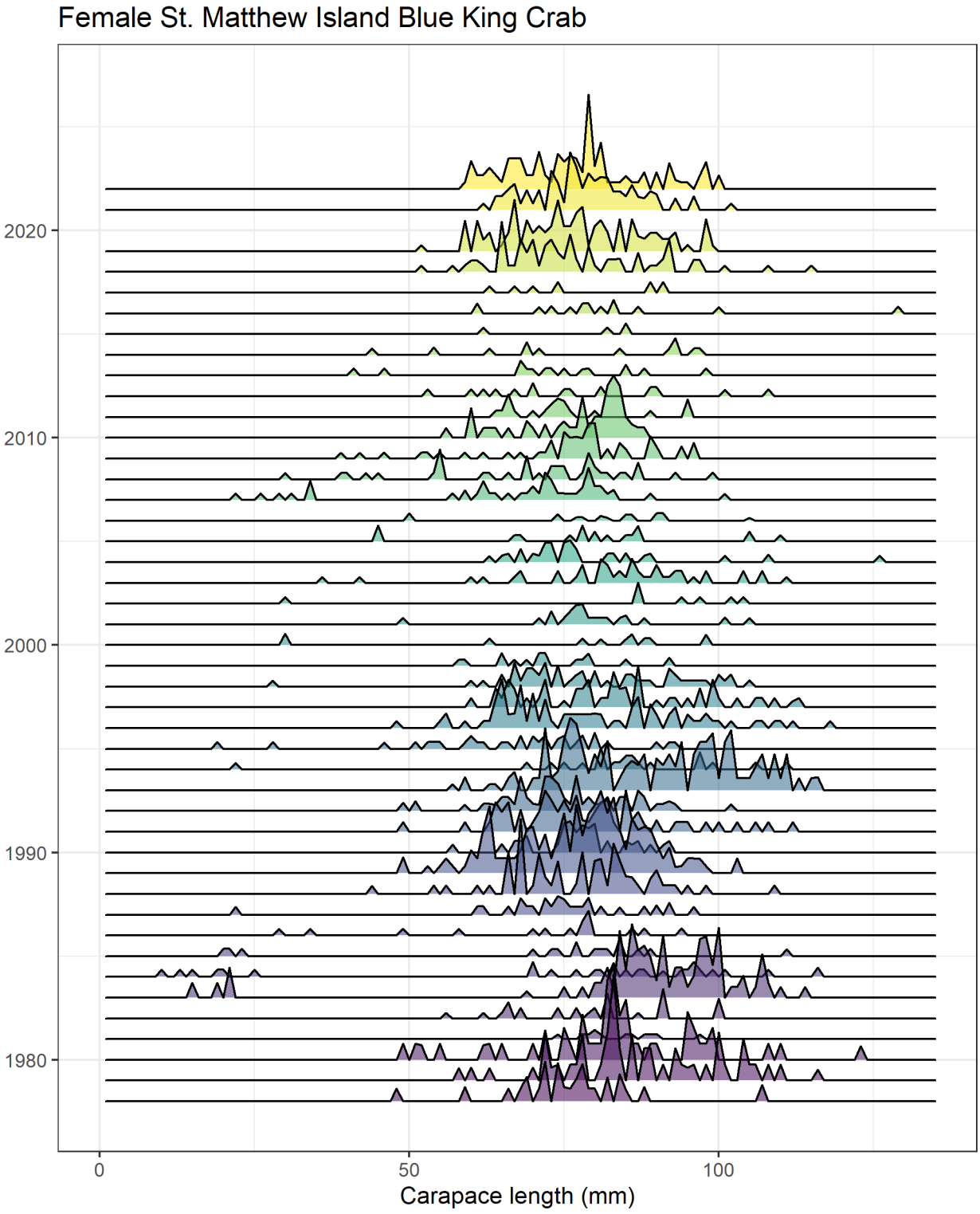

Figure 38. -- Historical size frequency for Saint Matthew Island Section female blue king crab (*Paralithodes platypus*).

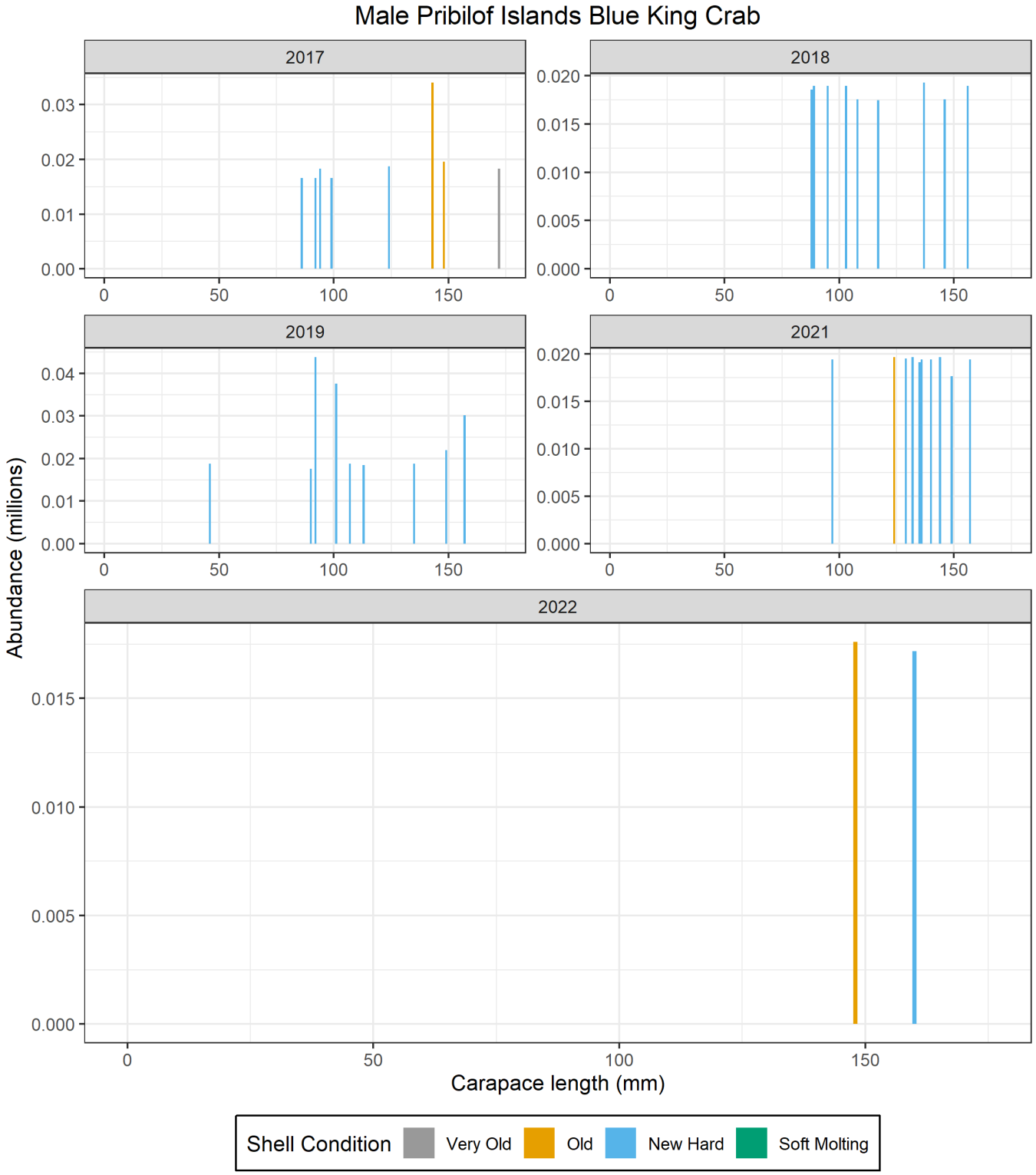

Figure 39. – Abundance (millions) by size and shell condition of Pribilof District male blue king crab (*Paralithodes platypus*) using 1 mm length classes. **Note that Y-axis scale varies among years.**

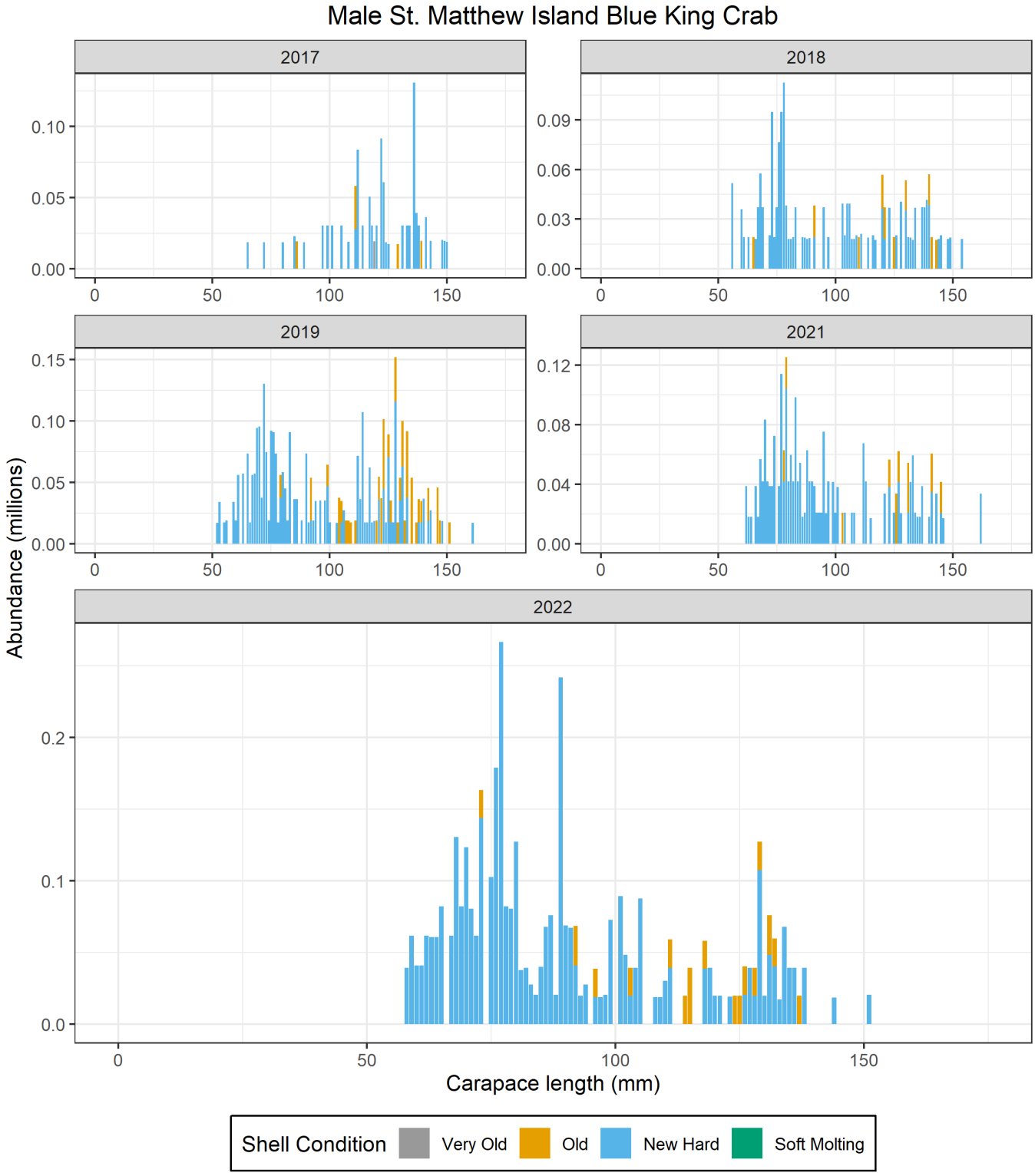

Figure 40. – Abundance (millions) by size and shell condition of Saint Matthew Island Section male blue king crab (*Paralithodes platypus*) using 1 mm length classes. **Note that Y-axis scale varies among years.**

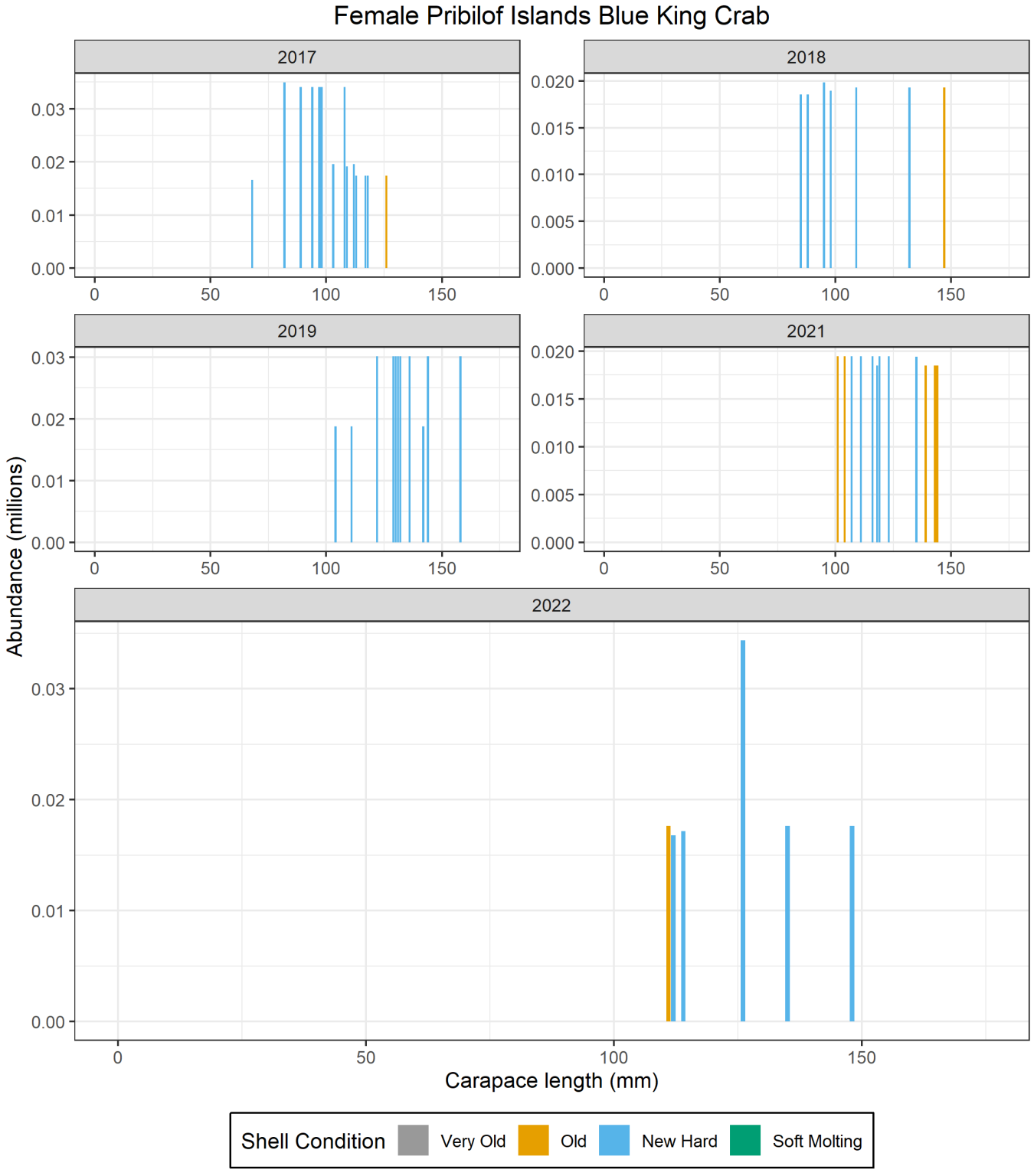

Figure 41. -- Abundance (millions) by size and shell condition of Pribilof District female blue king crab (*Paralithodes platypus*) using 1 mm length classes. **Note that Y-axis scale varies among years.**

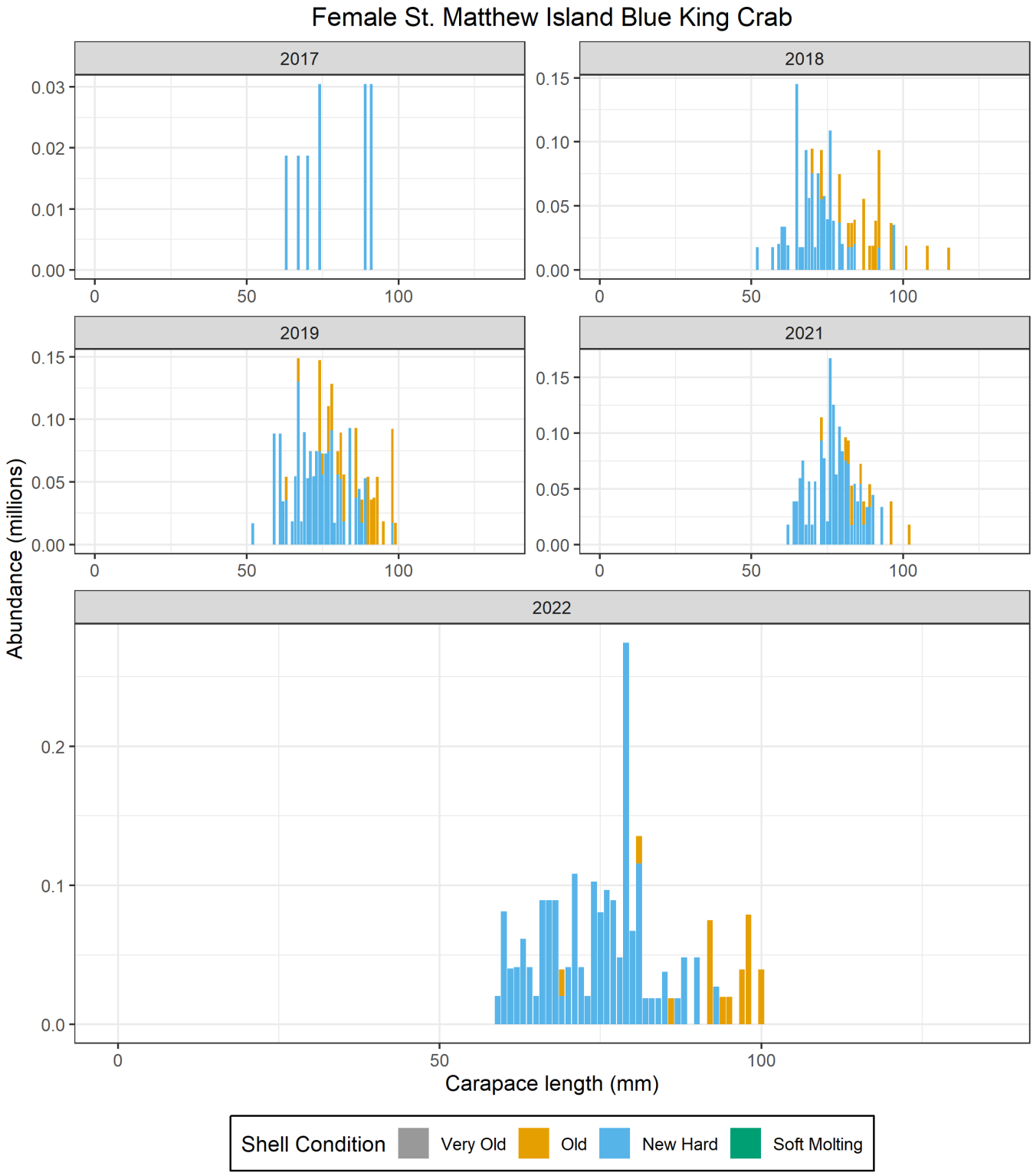

Figure 42. -- Abundance (millions) by size and shell condition of Saint Matthew Island Section female blue king crab (*Paralithodes platypus*) using 1 mm length classes. **Note that Y-axis scale varies among years.**

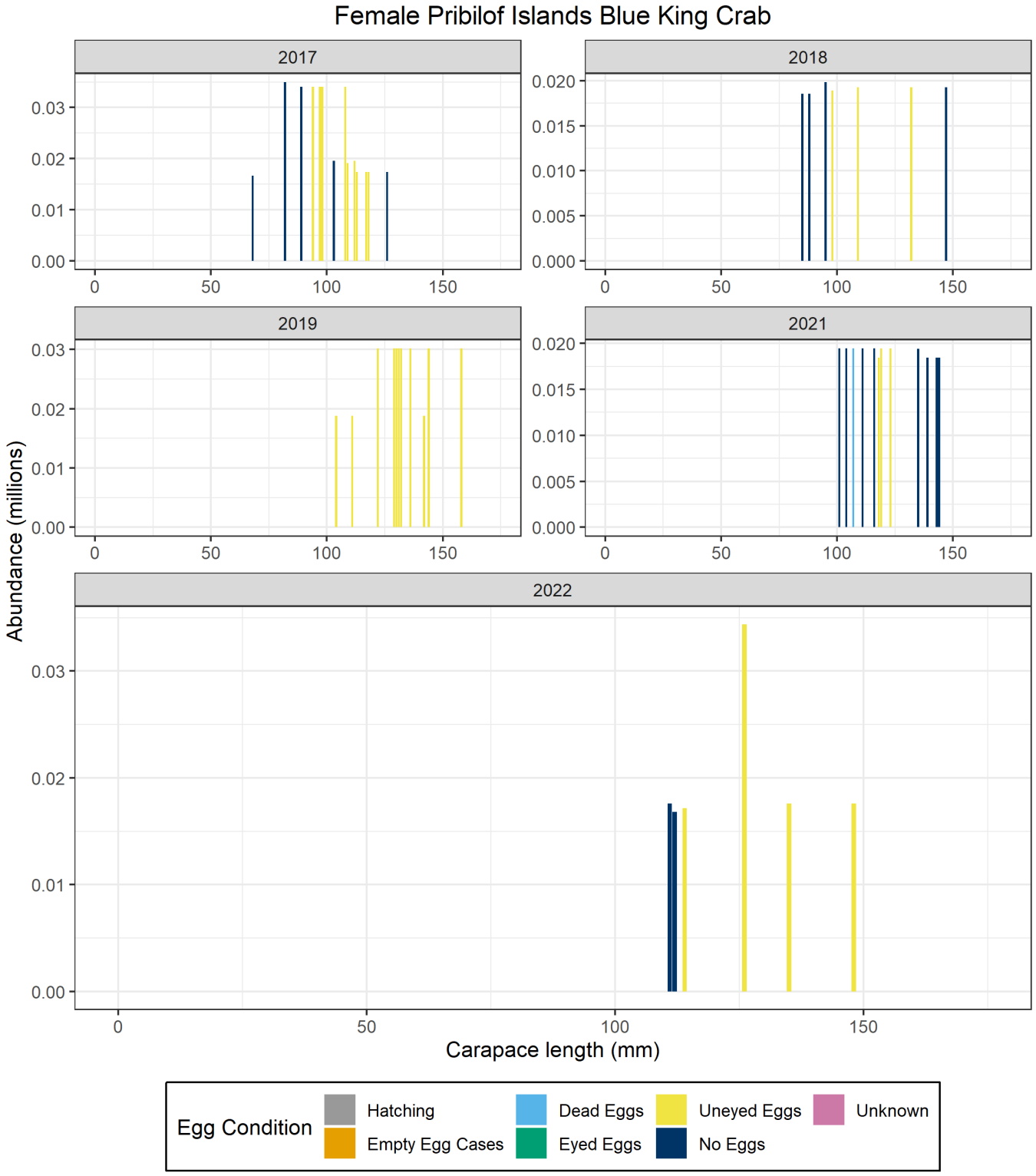

Figure 43. -- Abundance (millions) by size and egg condition of Pribilof District female blue king crab (*Paralithodes platypus*) using 1 mm length classes. **Note that Y-axis scale varies among years.**

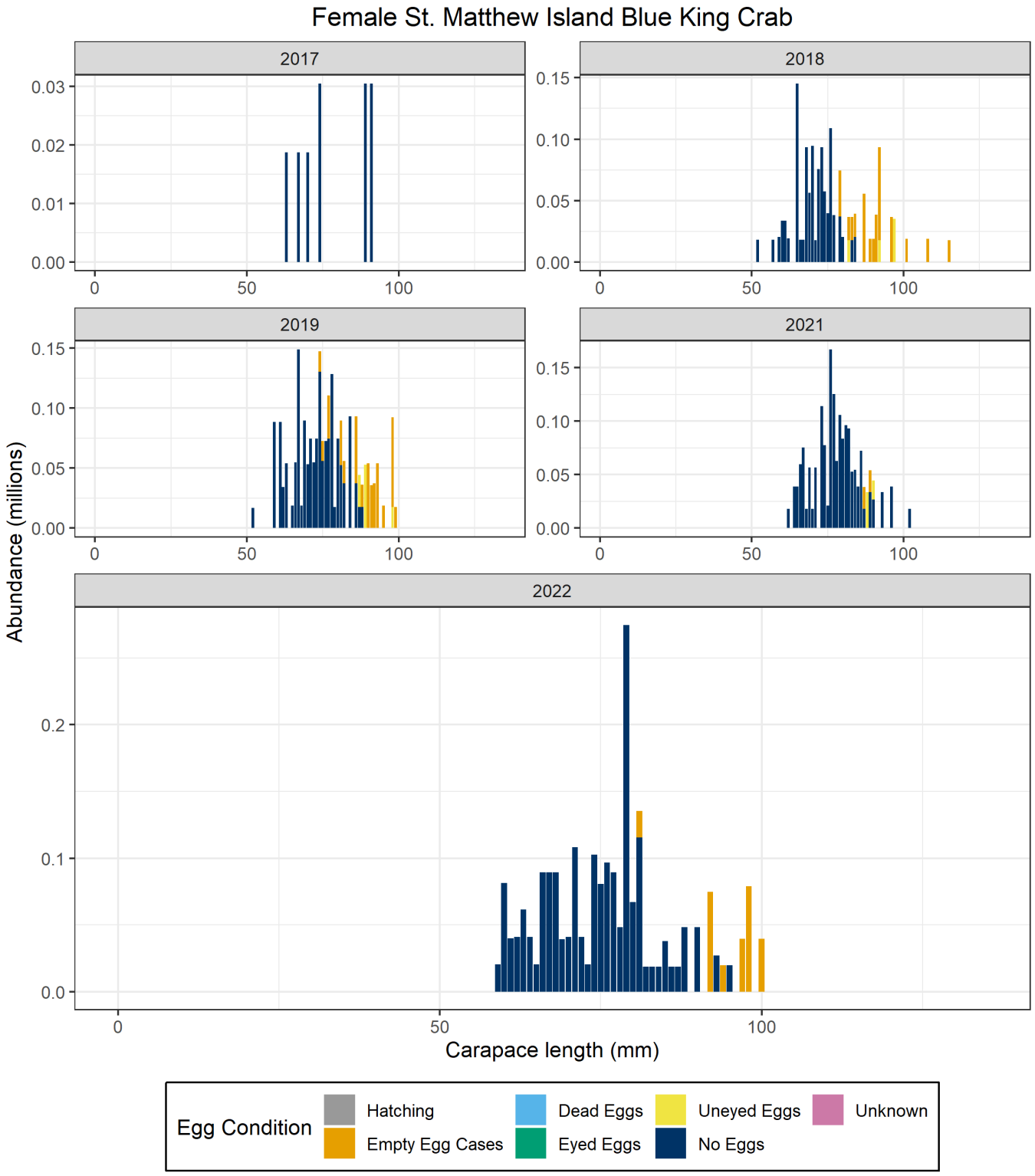

Figure 44. -- Abundance (millions) by size and egg condition of Saint Matthew Island Section female blue king crab (*Paralithodes platypus*) using 1 mm length classes. **Note that Y-axis scale varies among years.**

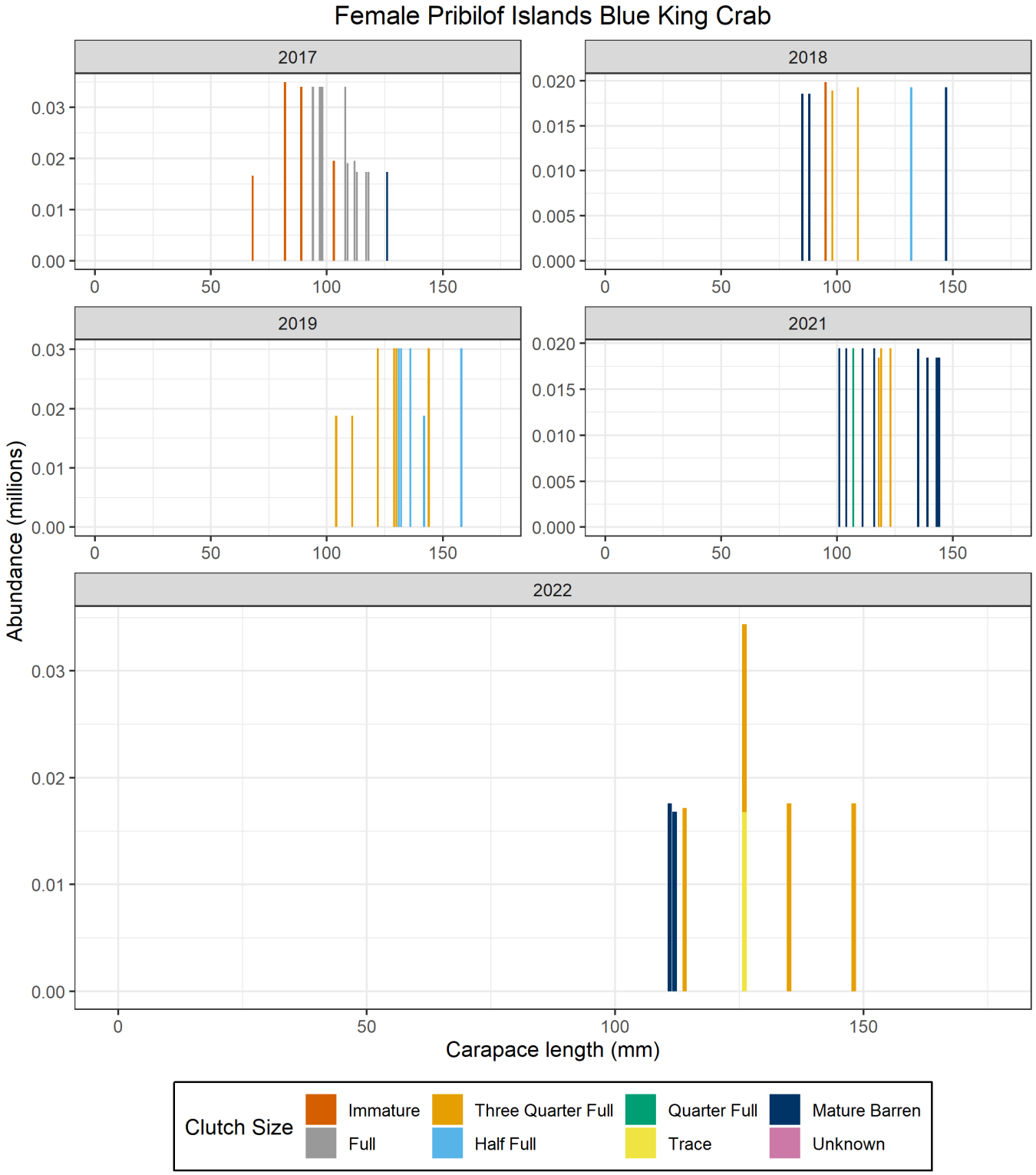

Figure 45. -- Abundance (millions) by size and clutch fullness of Pribilof District female blue king crab (*Paralithodes platypus*) using 1 mm length classes. **Note that Y-axis scale varies among years.**

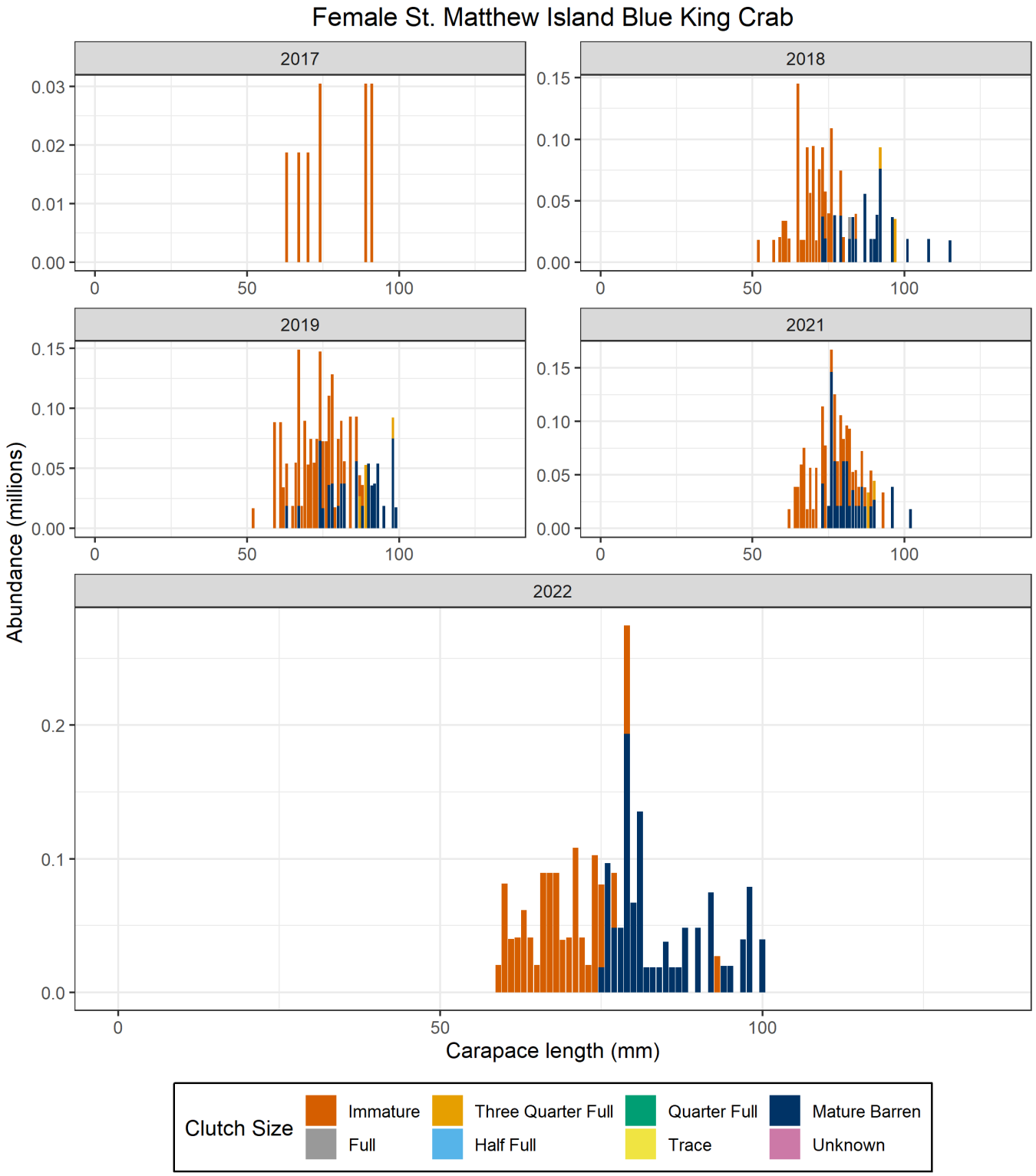

Figure 46. -- Abundance (millions) by size and clutch fullness of Saint Matthew Island Section female blue king crab (*Paralithodes platypus*) using 1 mm length classes. **Note that Y-axis scale varies among years.**

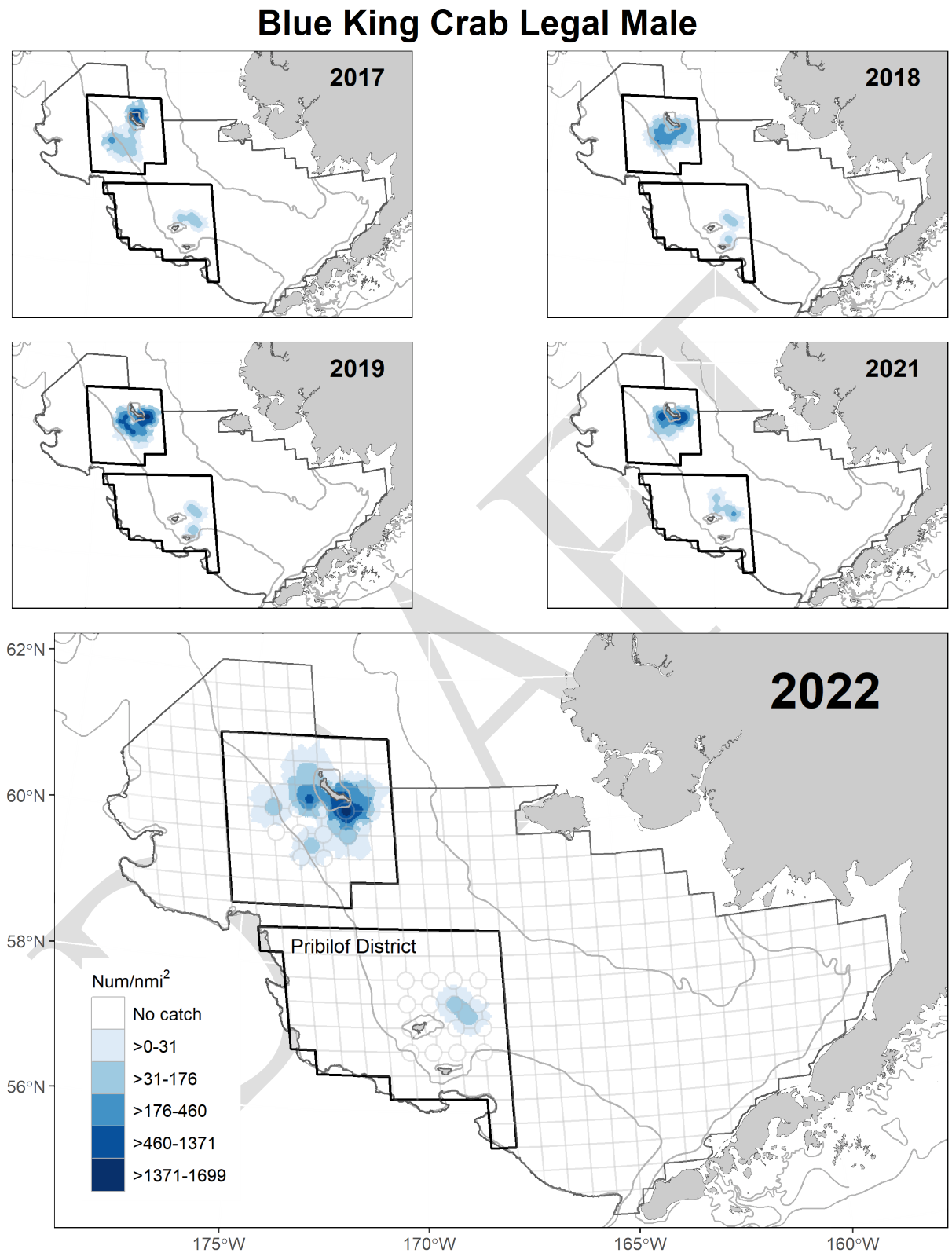

Figure 47. -- Estimated total density of legal-sized (carapace length ≥ 135 mm for Pribilof District and ≥ 120 mm for Saint Matthew Island Section) male blue king crab (*Paralithodes platypus*) for the past five survey years. Outlined areas depict management districts.

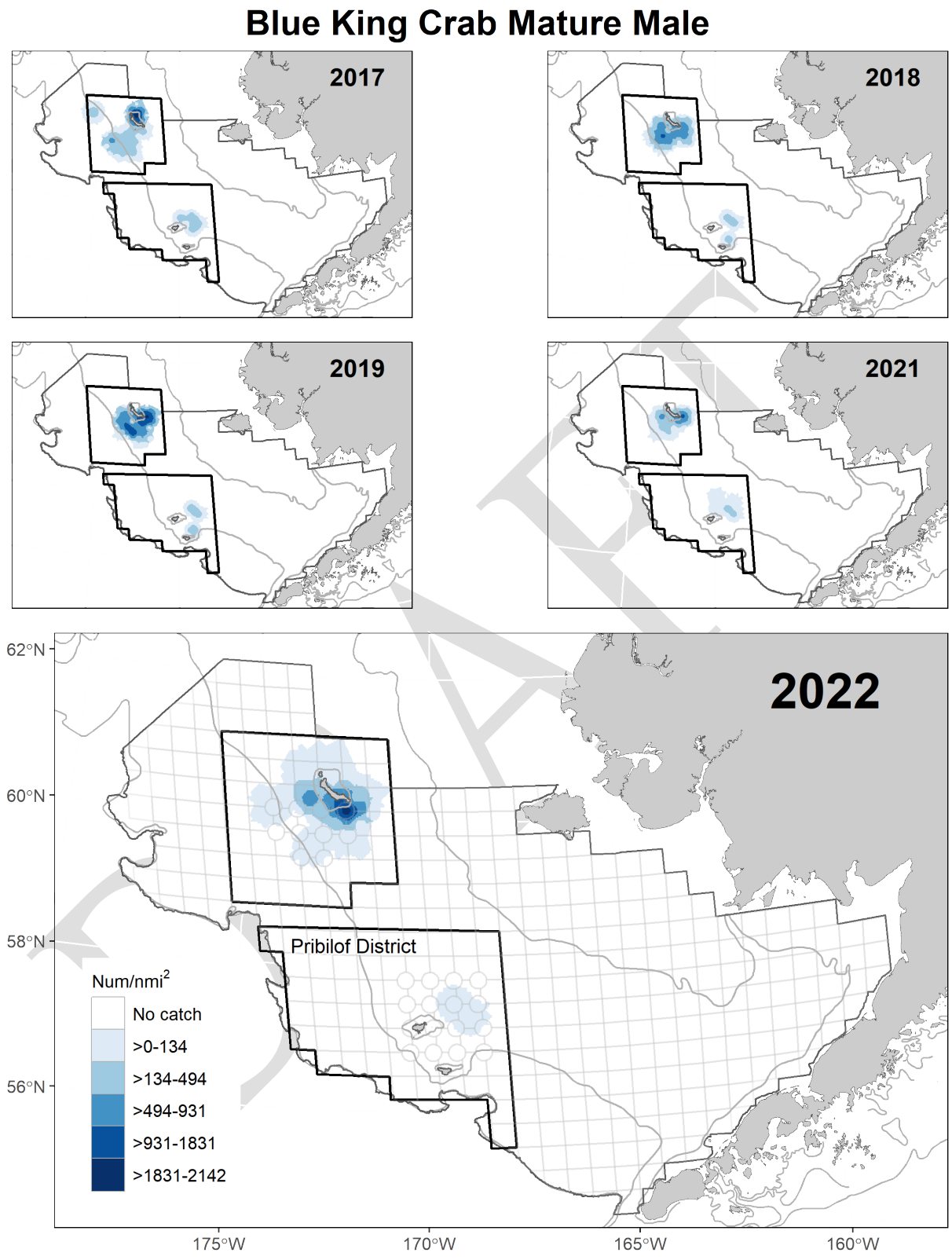

Figure 48. -- Estimated total density of mature-sized (carapace length ≥ 120 mm for Pribilof District and ≥ 105 mm for Saint Matthew Island Section) male blue king crab (*Paralithodes platypus*) for the past five survey years. Outlined areas depict management districts.

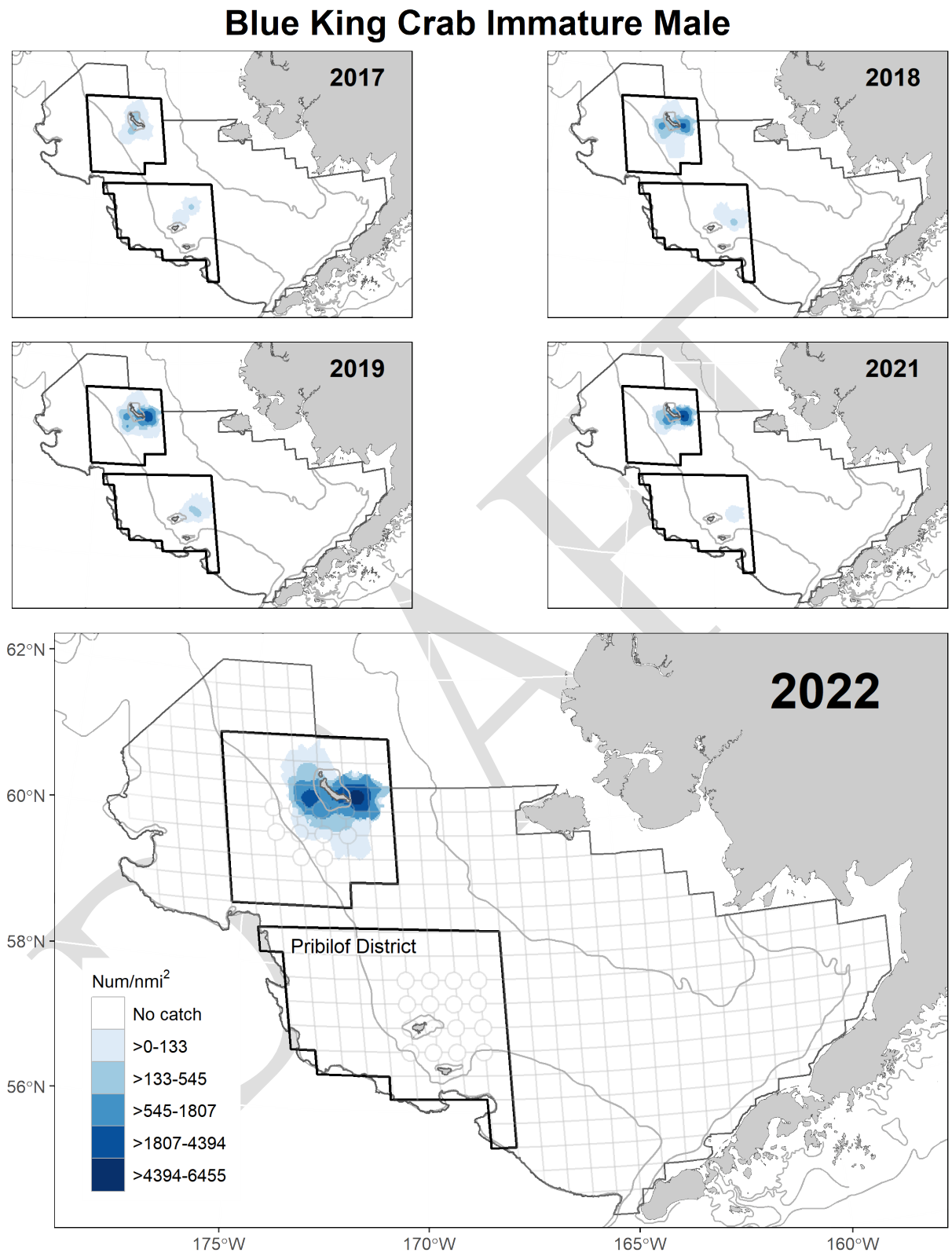

Figure 49. -- Estimated total density of immature-sized (carapace length <120 mm for Pribilof District and <105 mm for Saint Matthew Island Section) male blue king crab (*Paralithodes platypus*) for the past five survey years. Outlined areas depict management districts.

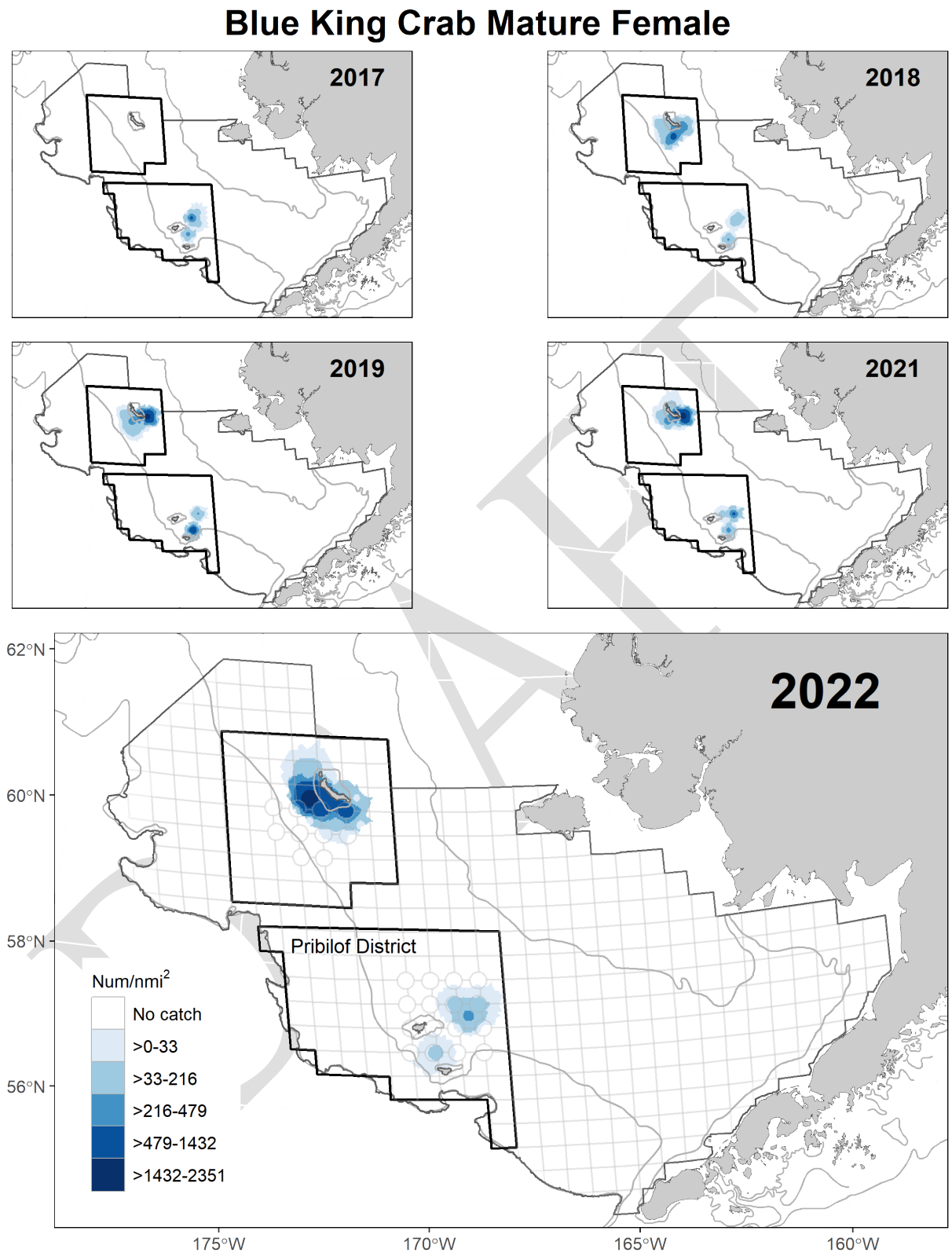

Figure 50. -- Estimated total density of mature female blue king crab (*Paralithodes platypus*) for the past five survey years. Outlined areas depict management districts.

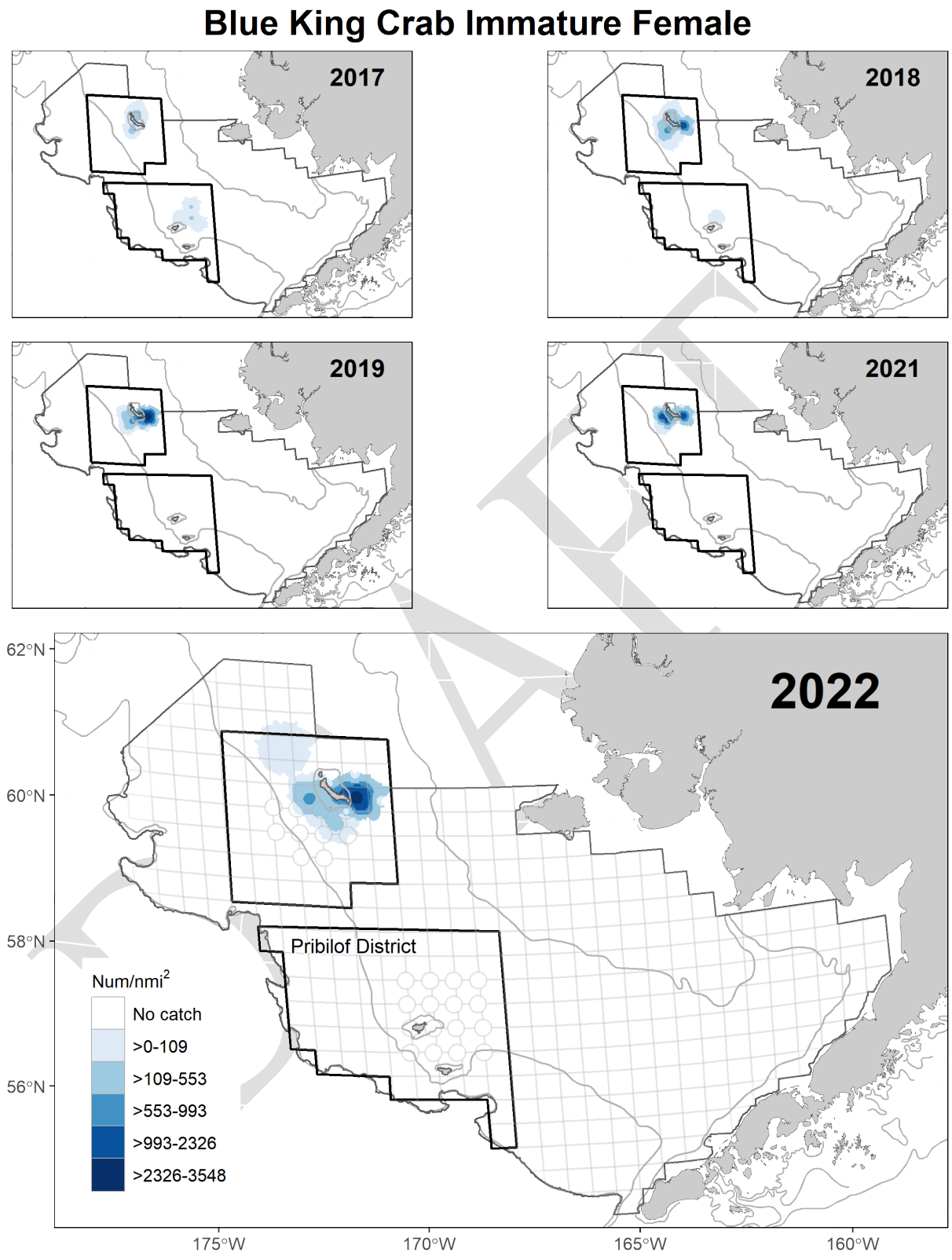

Figure 51. -- Estimated total density of immature female blue king crab (*Paralithodes platypus*) for the past five survey years. Outlined areas depict management districts.

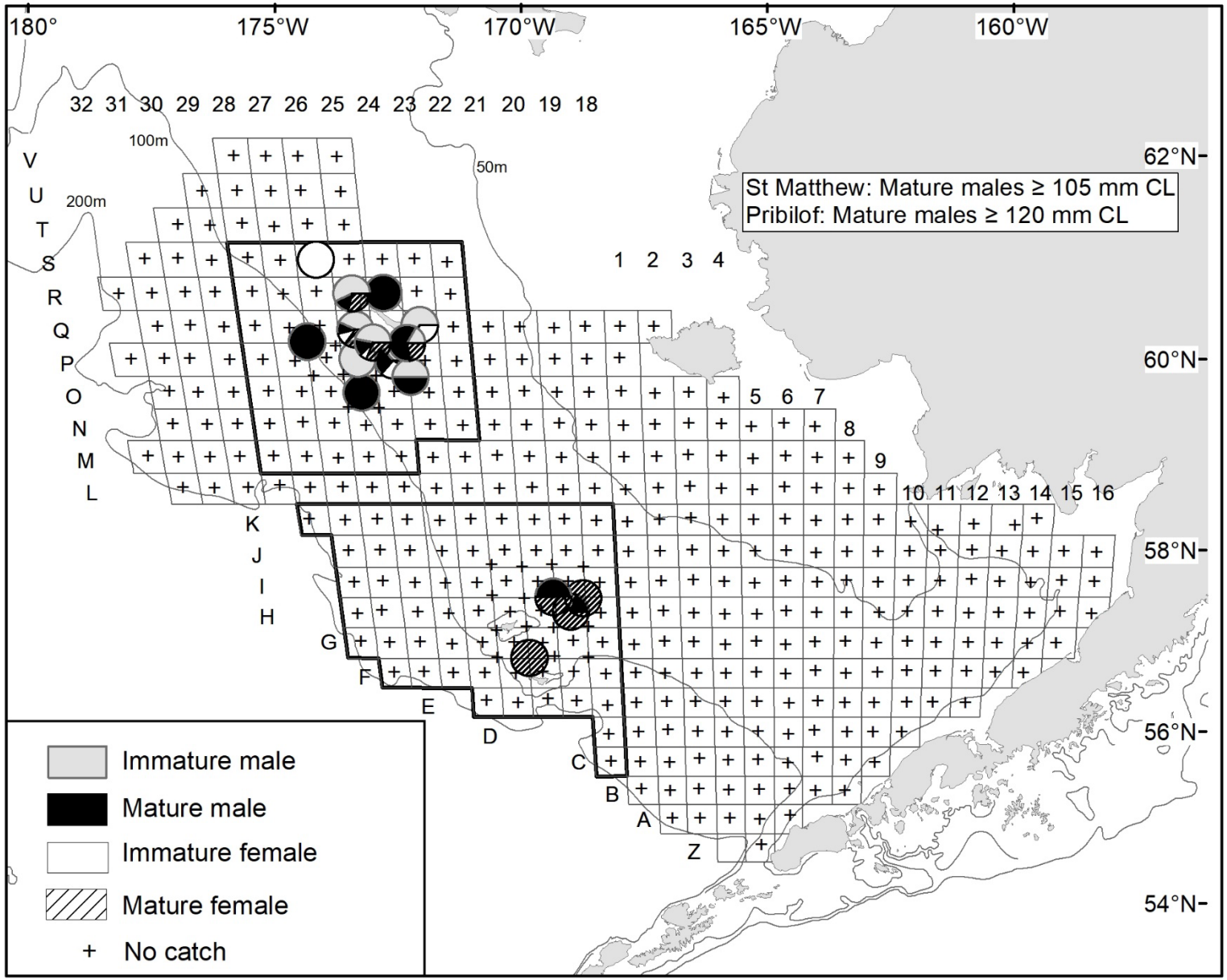

Figure 52. -- Proportion of male and female blue king crab (*Paralithodes platypus*) maturity classes caught at each station sampled in 2022. Outlined areas depict management districts.

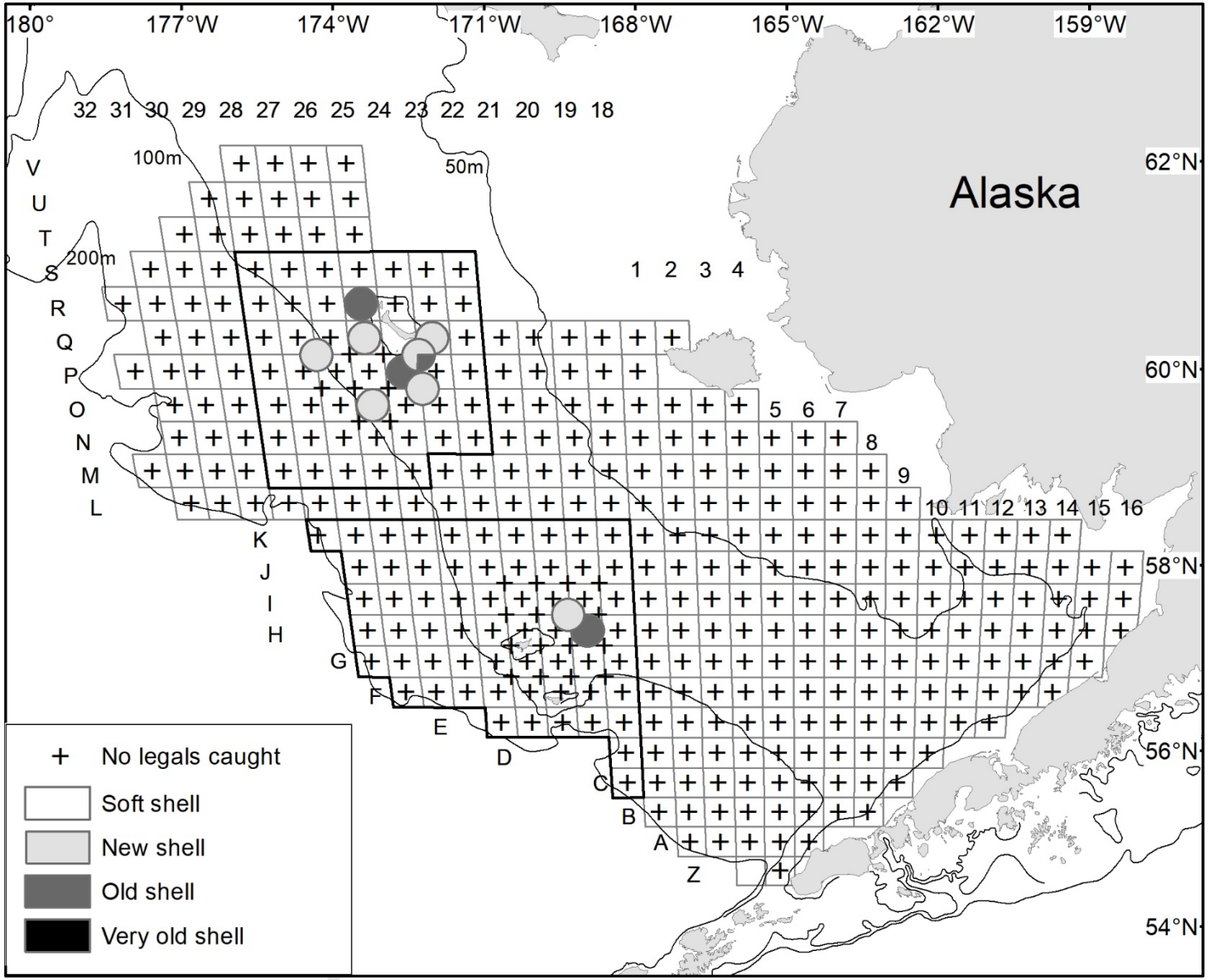

Figure 53. -- Proportion of legal-sized (carapace length ≥ 135 mm for Pribilof District and ≥ 120 mm for Saint Matthew Island Section), male blue king crab (*Paralithodes platypus*) shell condition classes caught at each station sampled in 2022. Outlined areas depict management districts.

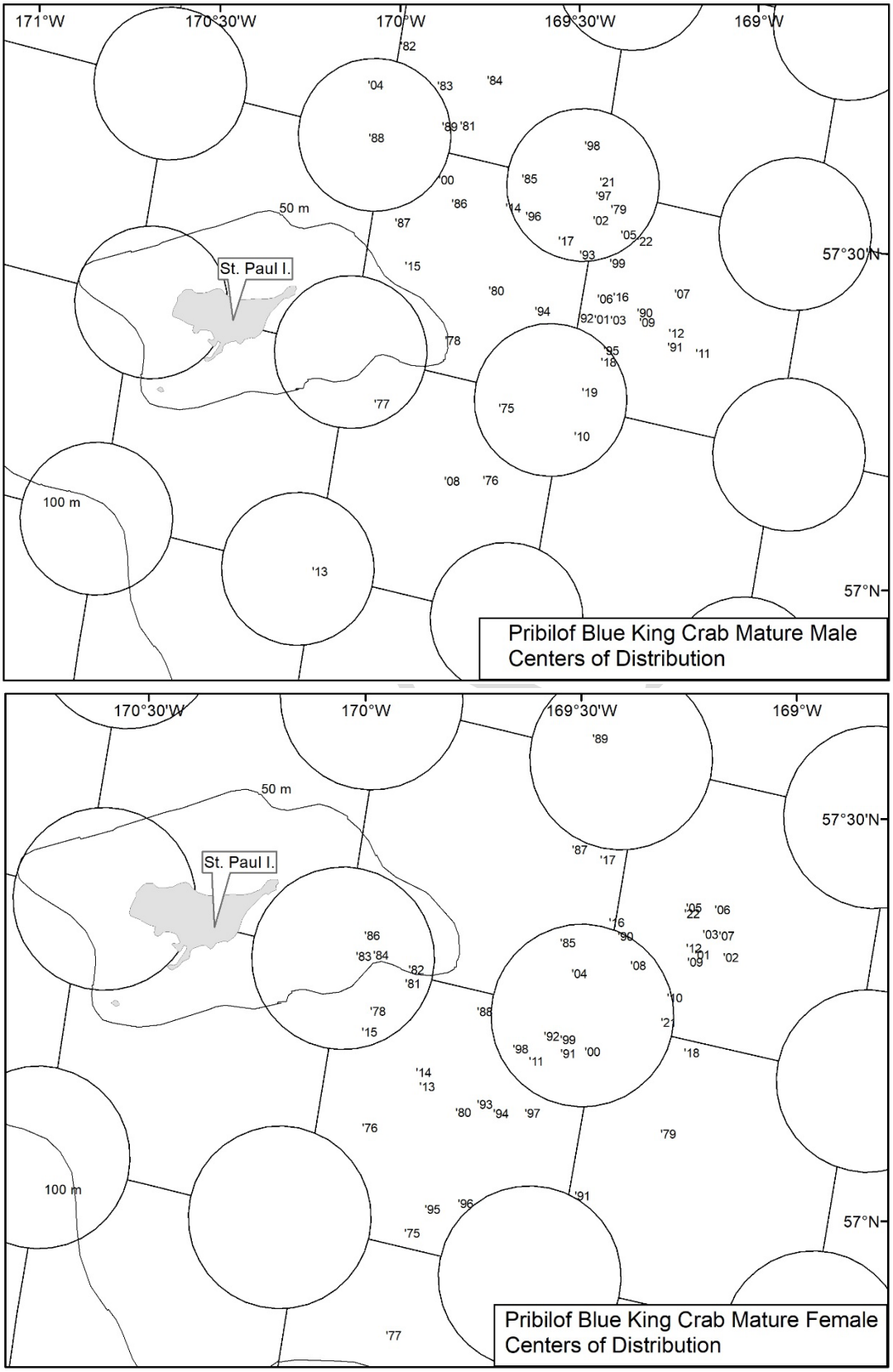

Figure 54. -- Centers of stock abundance of Pribilof Island mature male (top) and female (bottom) blue king crab (*Paralithodes platypus*) from 1975 to 2022.

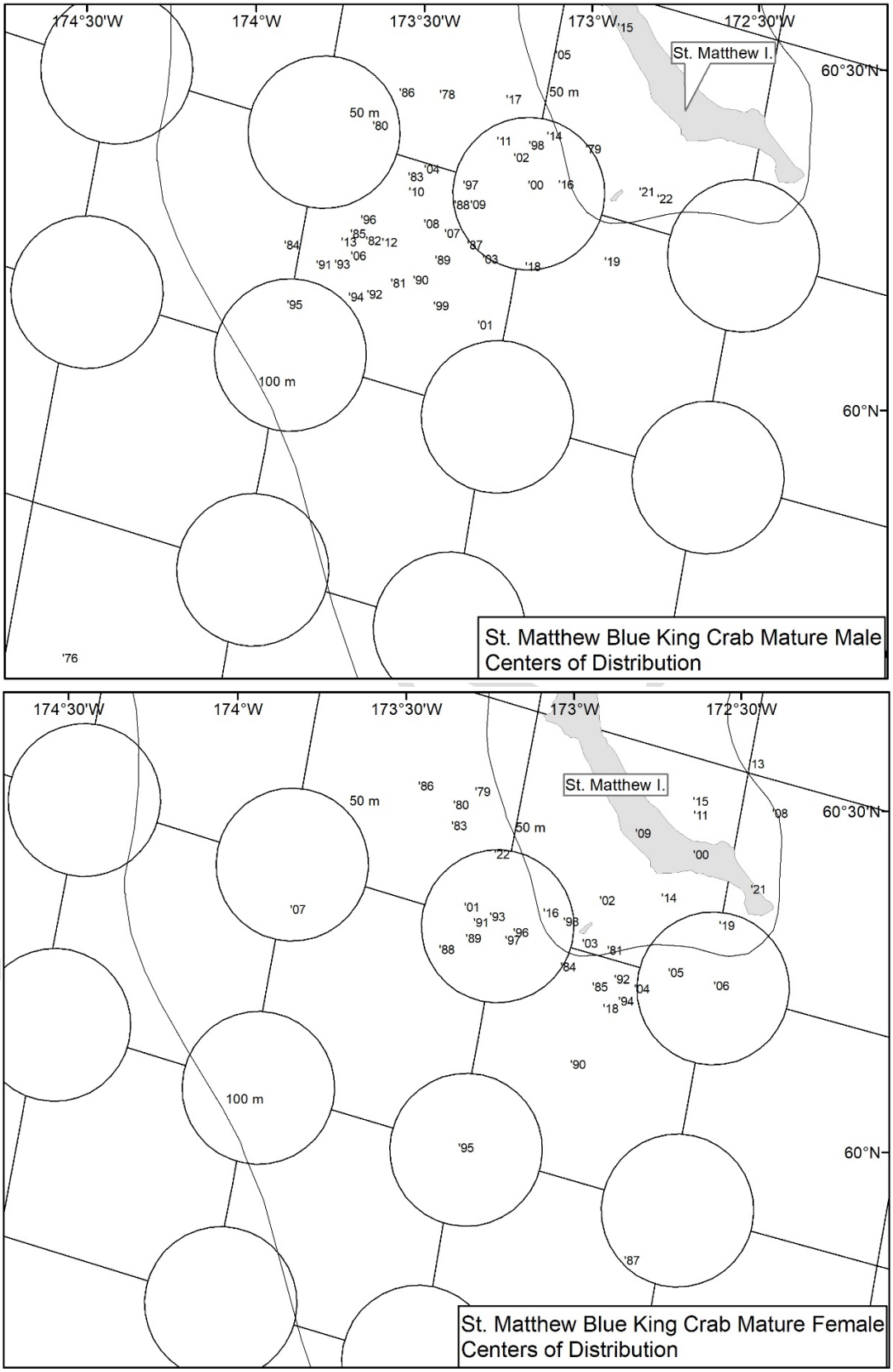

Figure 55. -- Centers of stock abundance of Saint Matthew Island mature male (top) and female (bottom) blue king crab (*Paralithodes platypus*) from 1975 to 2022.

Tanner Crab Figures

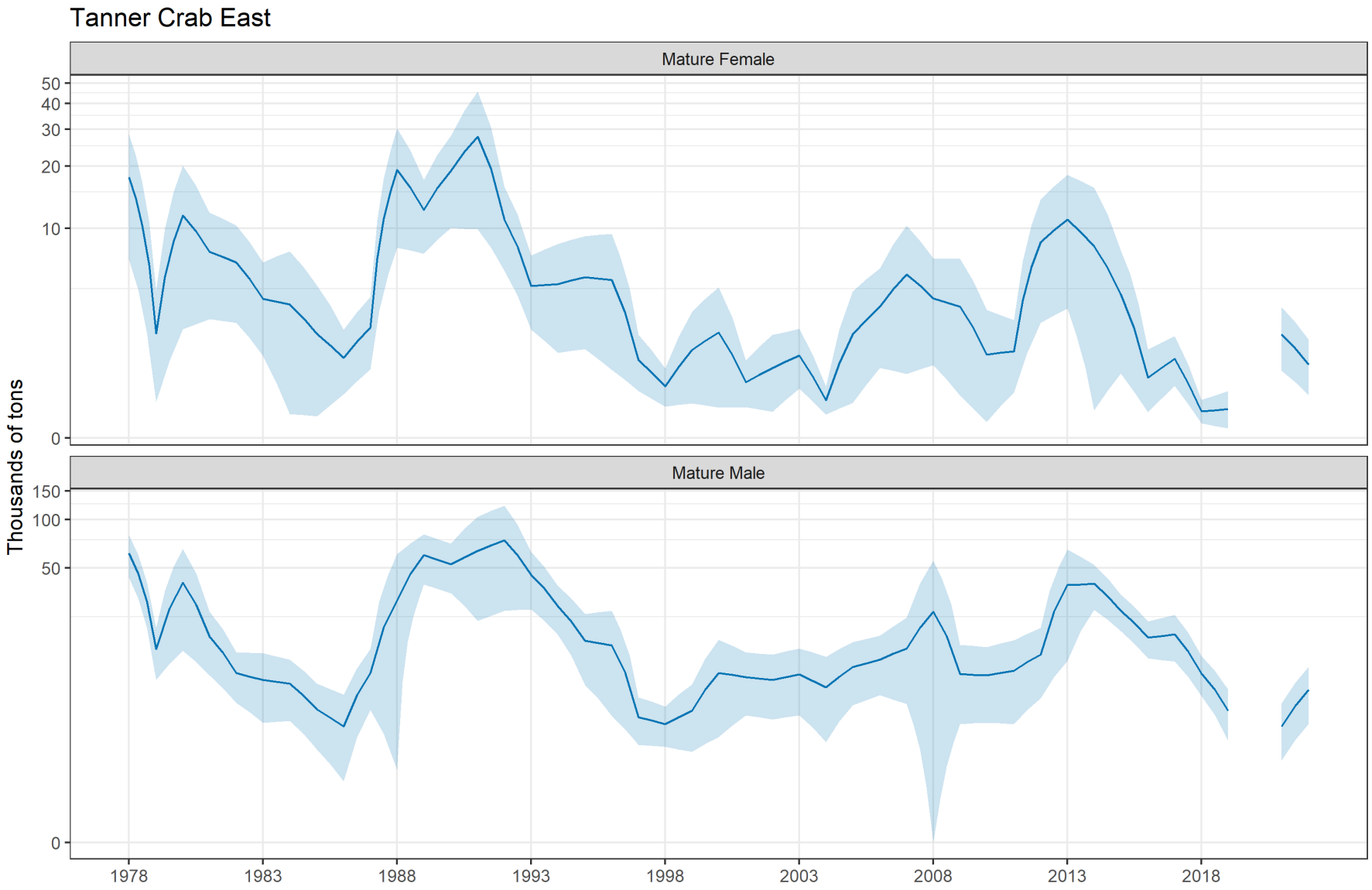

Figure 56. -- Historical biomass of mature female and mature male (carapace width ≥ 113 mm) Tanner crab (*Chionoecetes bairdi*) east of 166°W in the eastern Bering Sea. Light blue area indicates ± 95% CI. **Note that Y-axis is plotted on a log scale.**

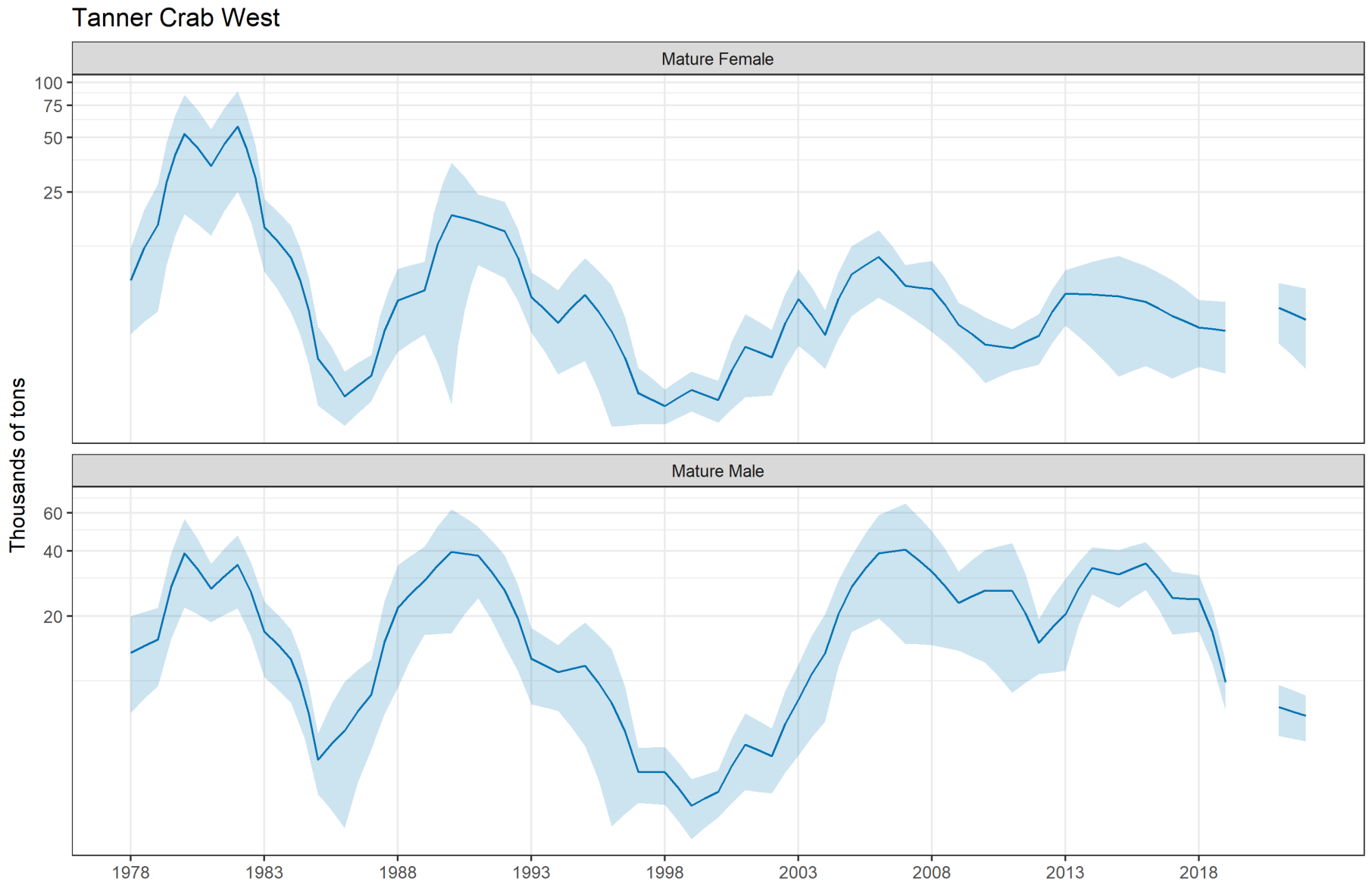

Figure 57. -- Historical biomass of mature female and mature male (carapace width ≥ 103 mm) Tanner crab (*Chionoecetes bairdi*) west of 166ºW in the eastern Bering Sea. Light blue area indicates ± 95% CI. **Note that Y-axis is plotted on a log scale.**

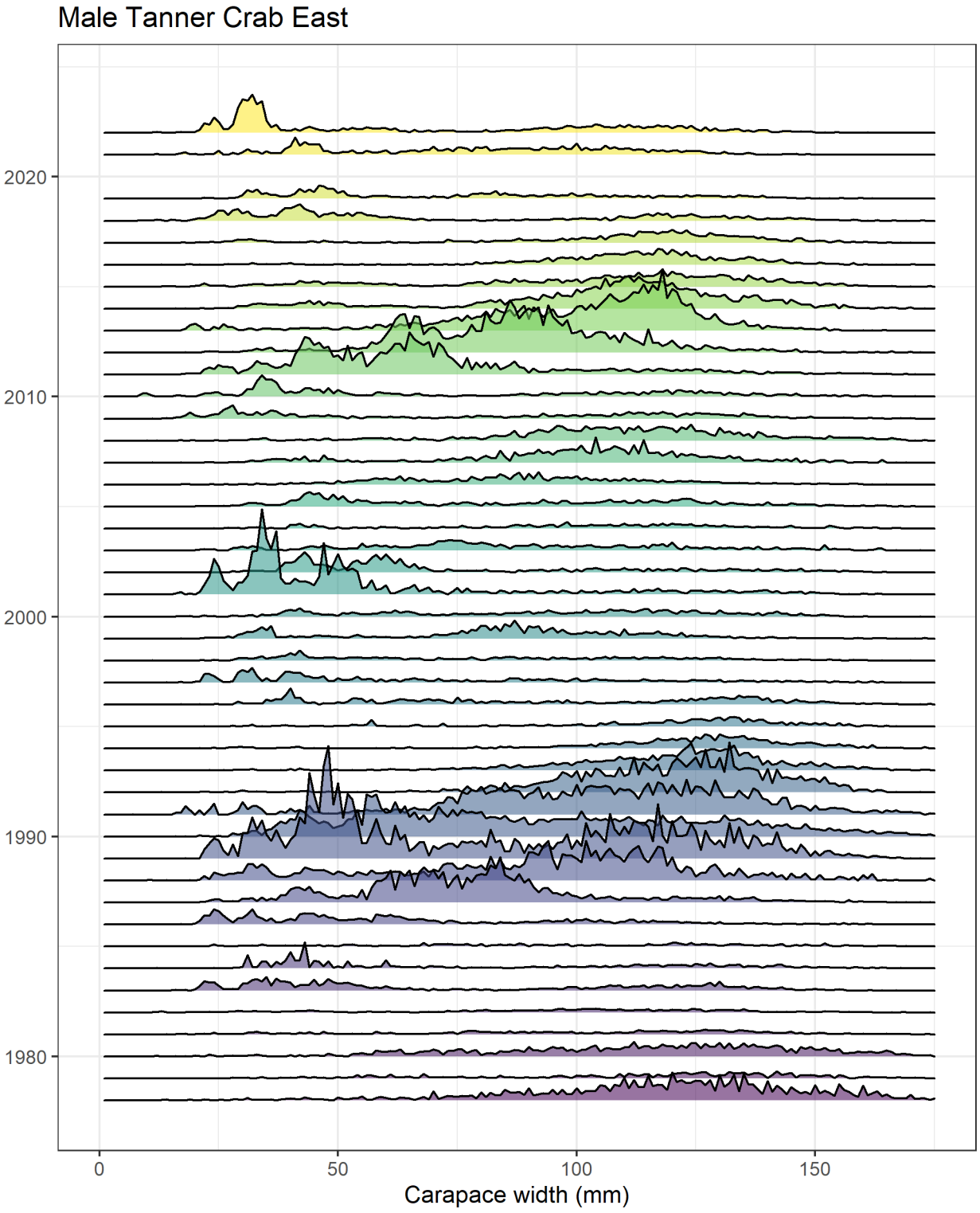

Figure 58. -- Historical size frequency for male Tanner crab (*Chionoecetes bairdi*) east of 166ºW in the eastern Bering Sea.

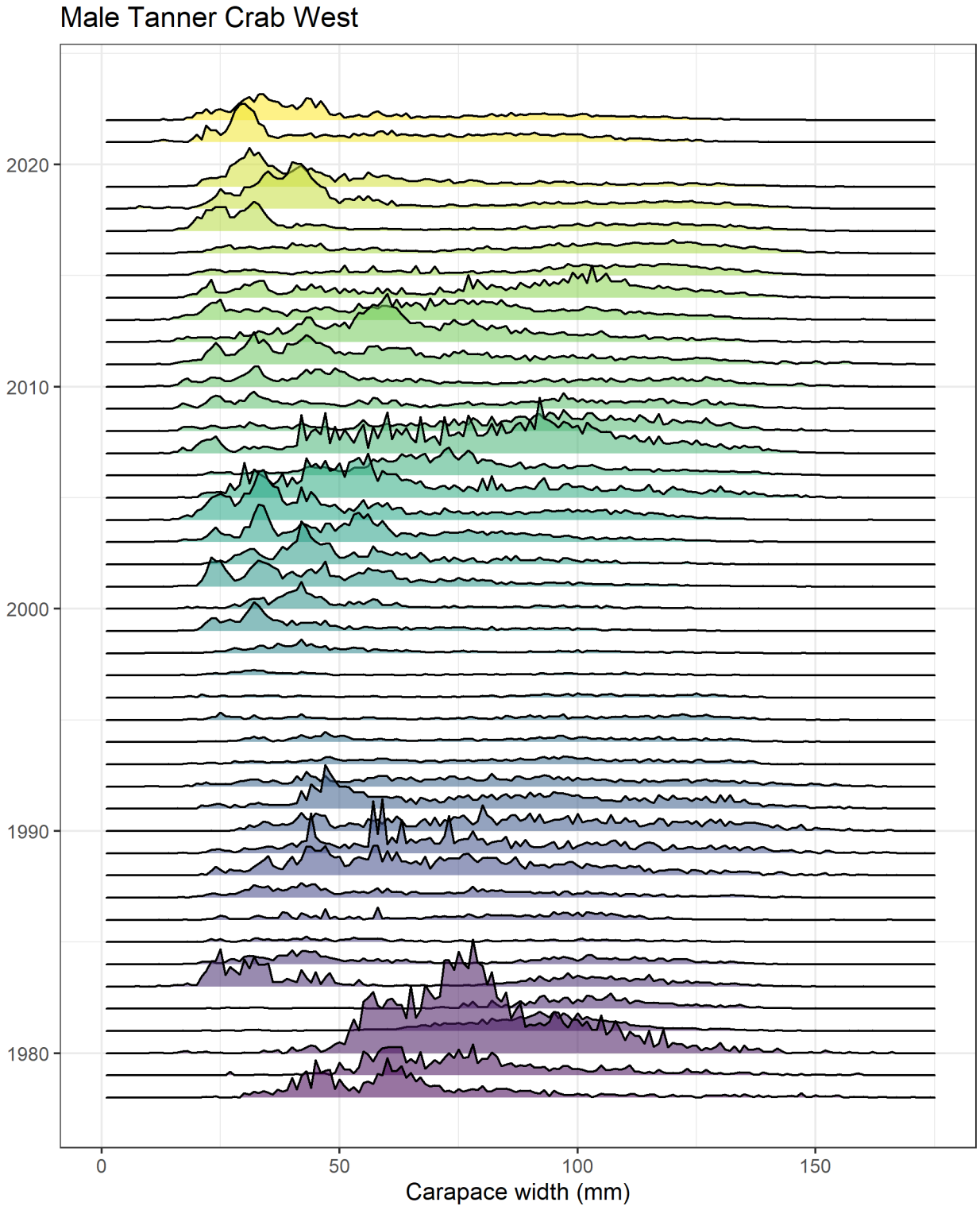

Figure 59. -- Historical size frequency for male Tanner crab (*Chionoecetes bairdi*) west of 166°W in the eastern Bering Sea.

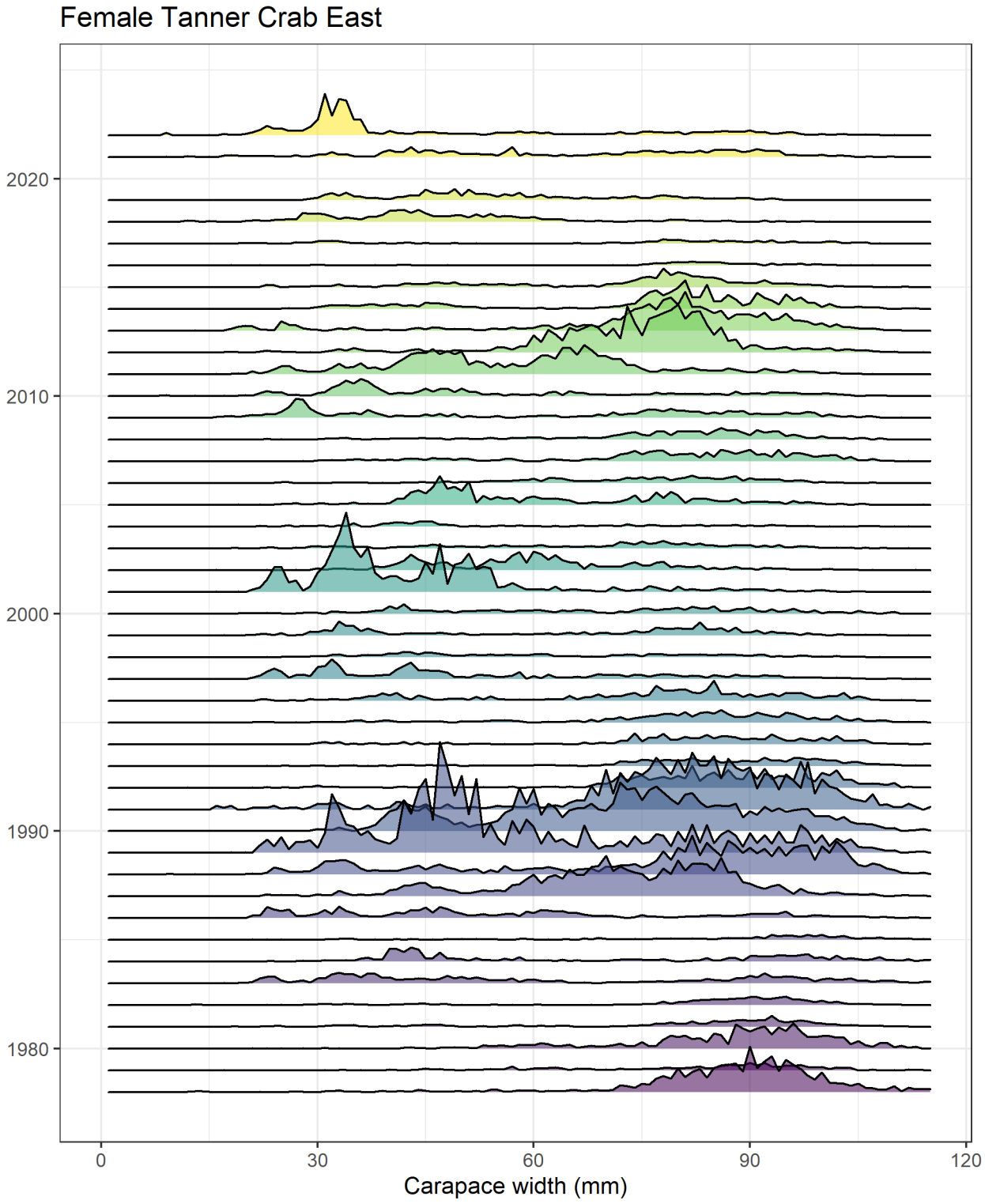

Figure 60. -- Historical size frequency for female Tanner crab (*Chionoecetes bairdi*) east of 166ºW in the eastern Bering Sea.

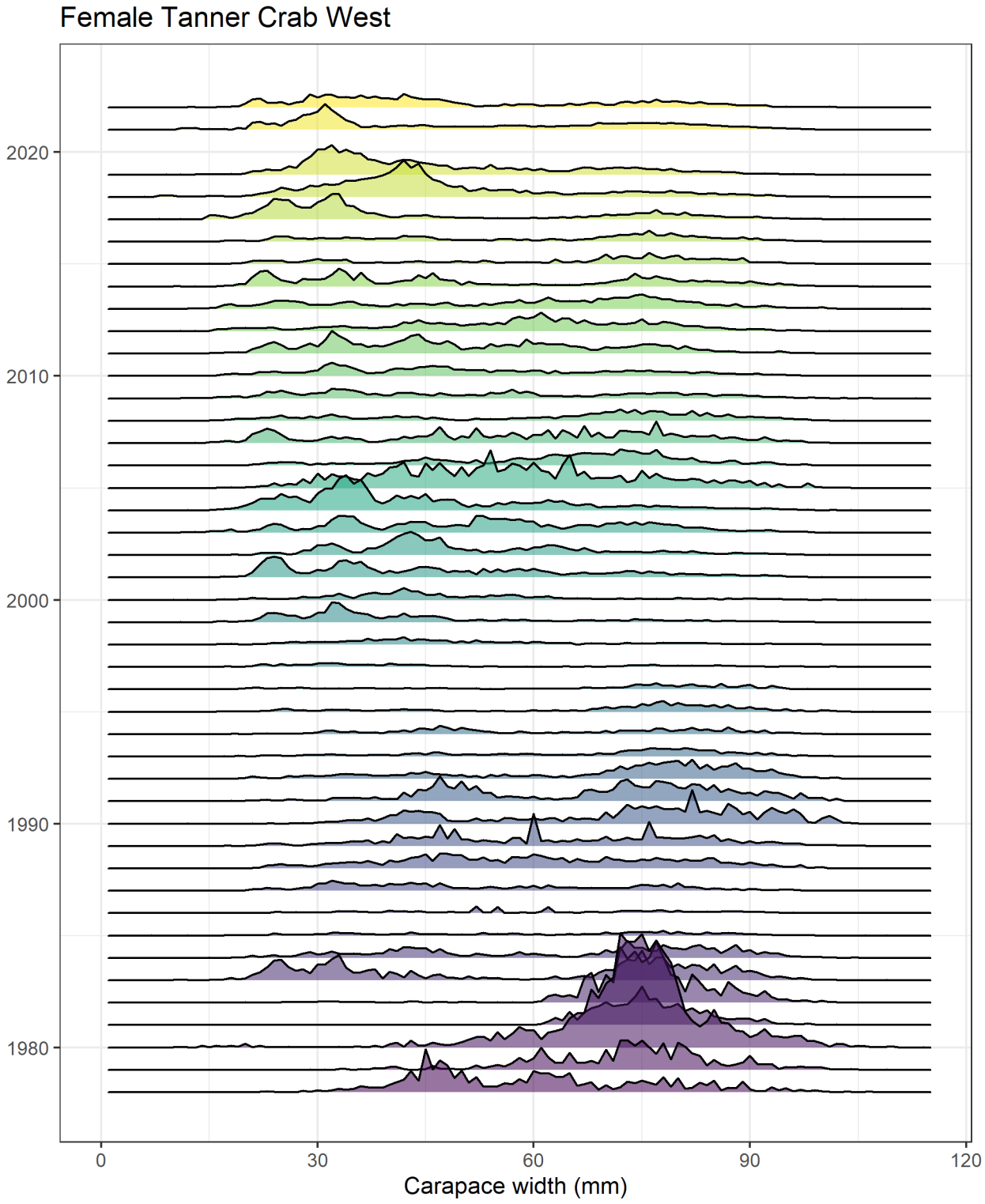

Figure 61. -- Historical size frequency for female Tanner crab (*Chionoecetes bairdi*) west of 166ºW in the eastern Bering Sea.

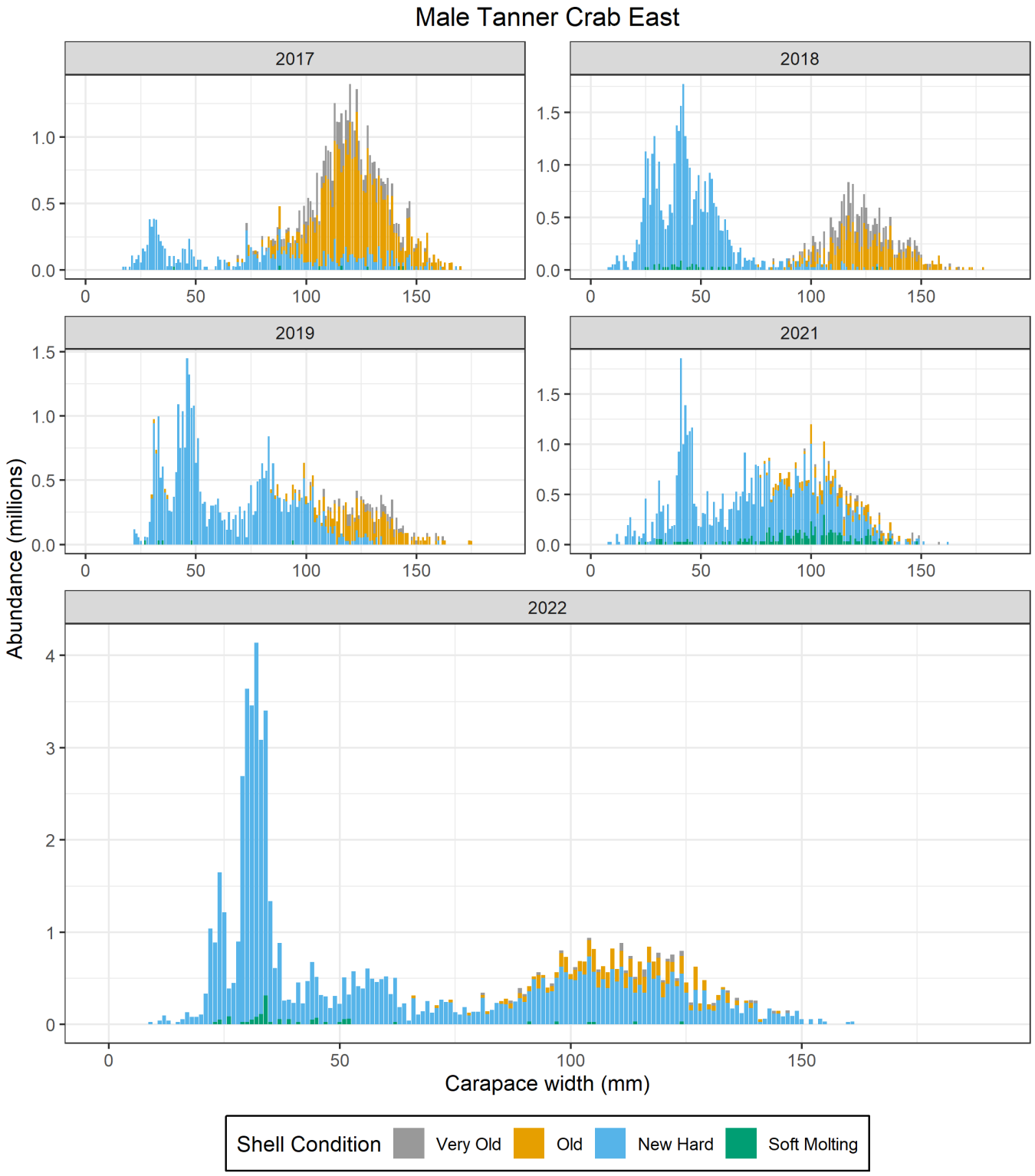

Figure 62. – Abundance (millions) by size and shell condition of male Tanner crab (*Chionoecetes bairdi*) east of 166°W in the eastern Bering Sea using 1 mm width classes. **Note that Y-axis scale varies among years.**

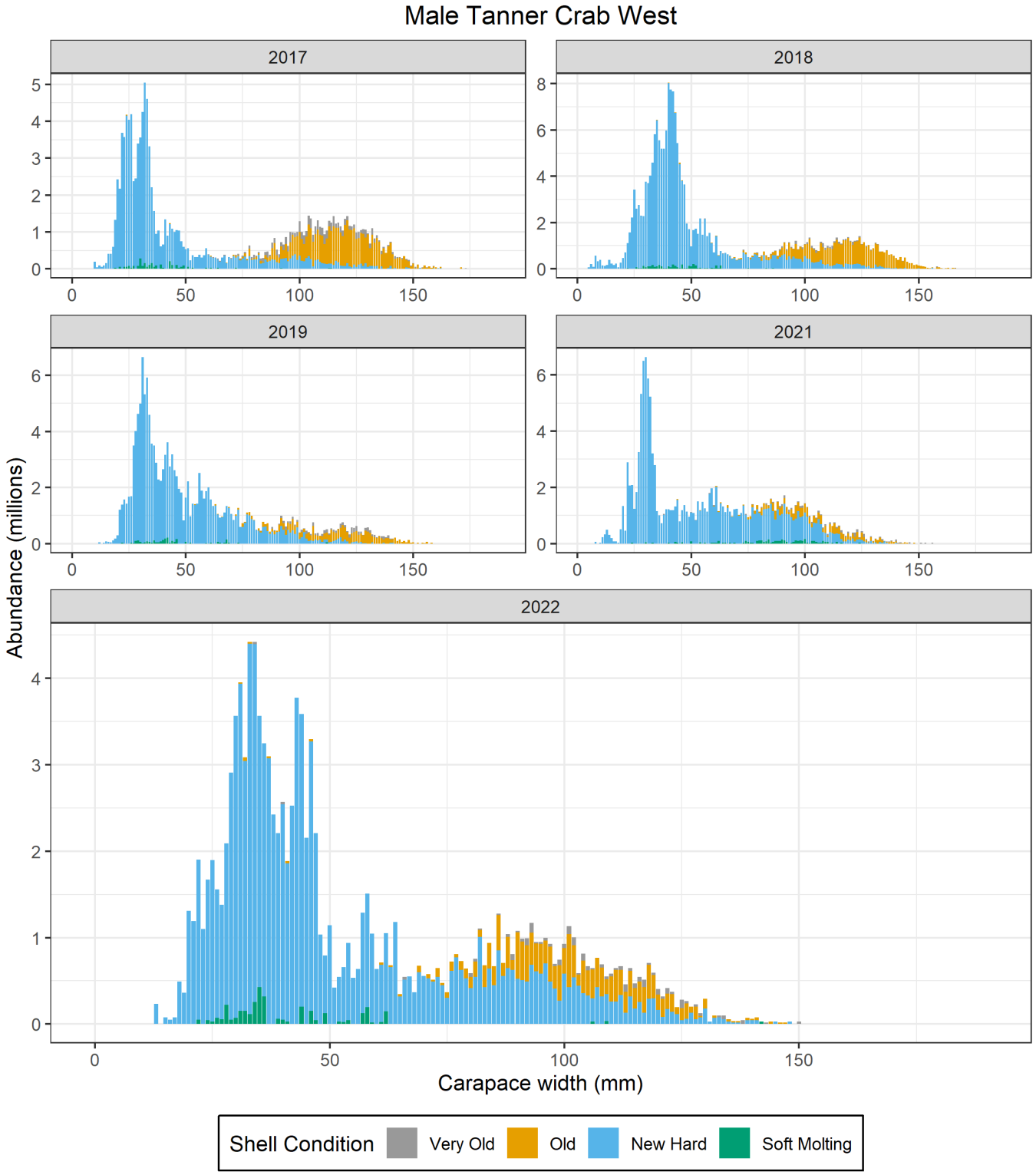

Figure 63. – Abundance (millions) by size and shell condition of male Tanner crab (*Chionoecetes bairdi*) west of 166°W in the eastern Bering Sea using 1 mm width classes. **Note that Y-axis scale varies among years.**

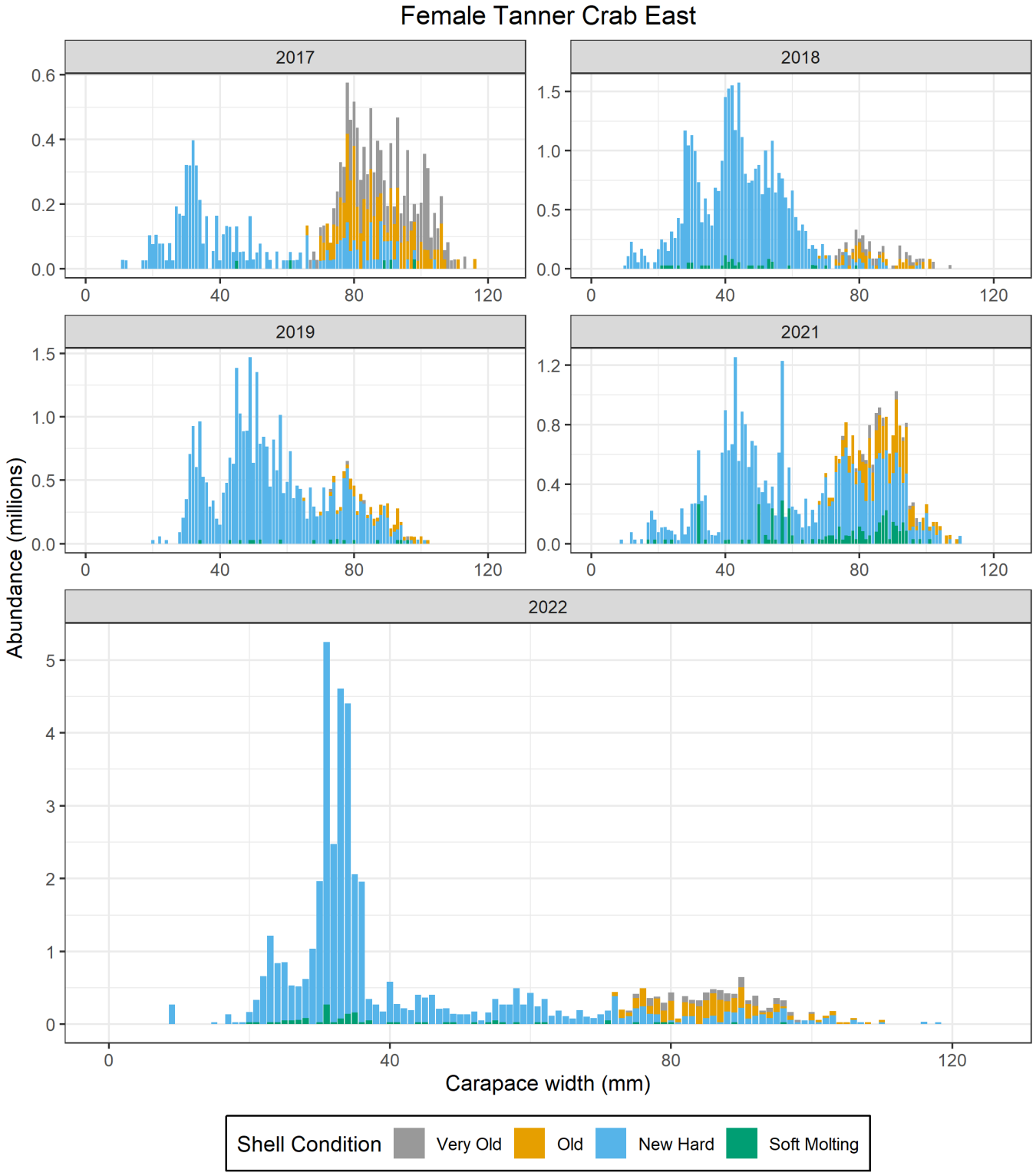

Figure 64. -- Abundance (millions) by size and shell condition of female Tanner crab (*Chionoecetes bairdi*) east of 166°W in the eastern Bering Sea using 1 mm width classes. **Note that Y-axis scale varies among years.**

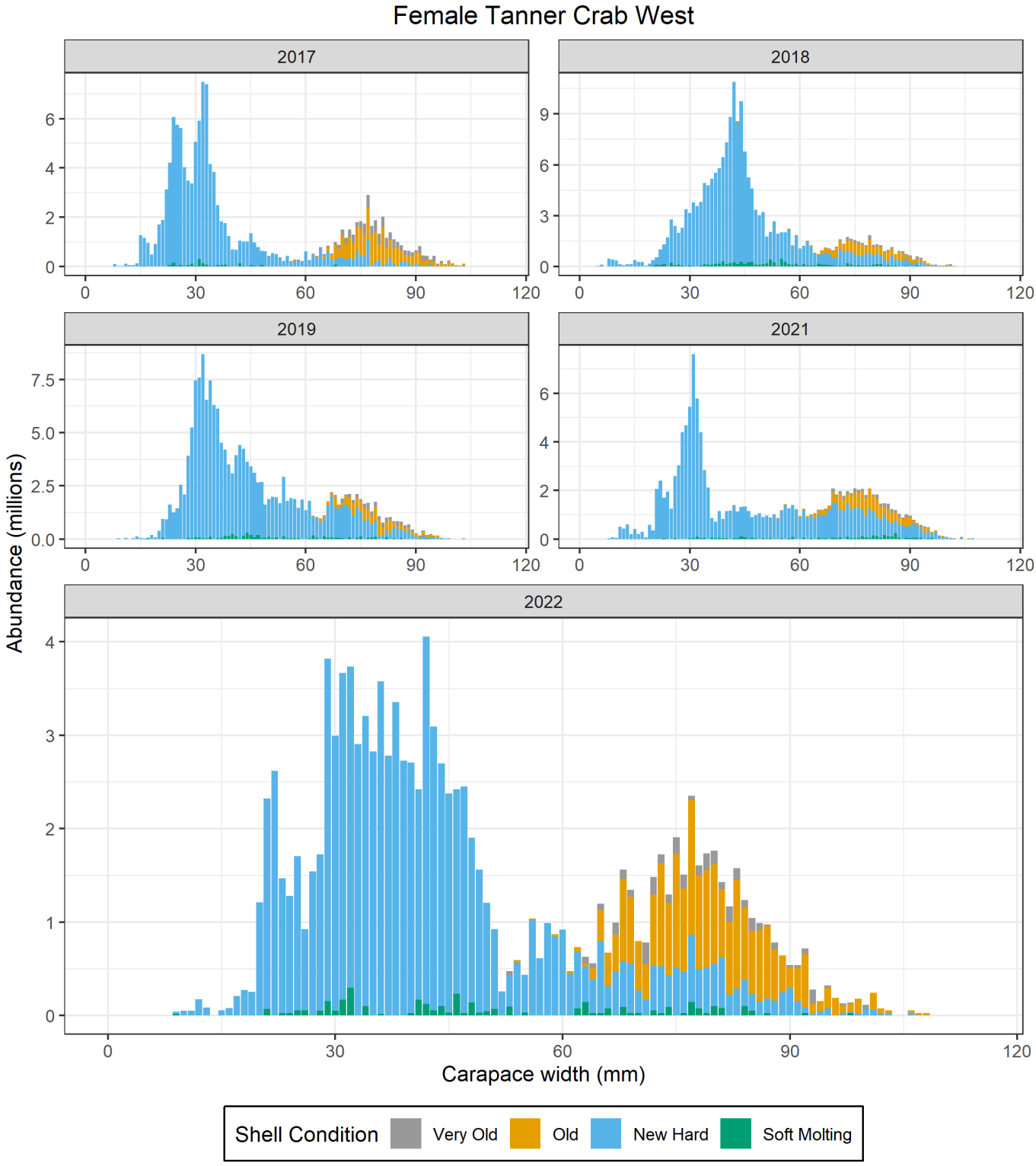

Figure 65. -- Abundance (millions) by size and shell condition of female Tanner crab (*Chionoecetes bairdi*) west of 166°W in the eastern Bering Sea using 1 mm width classes. **Note that Y-axis scale varies among years.**

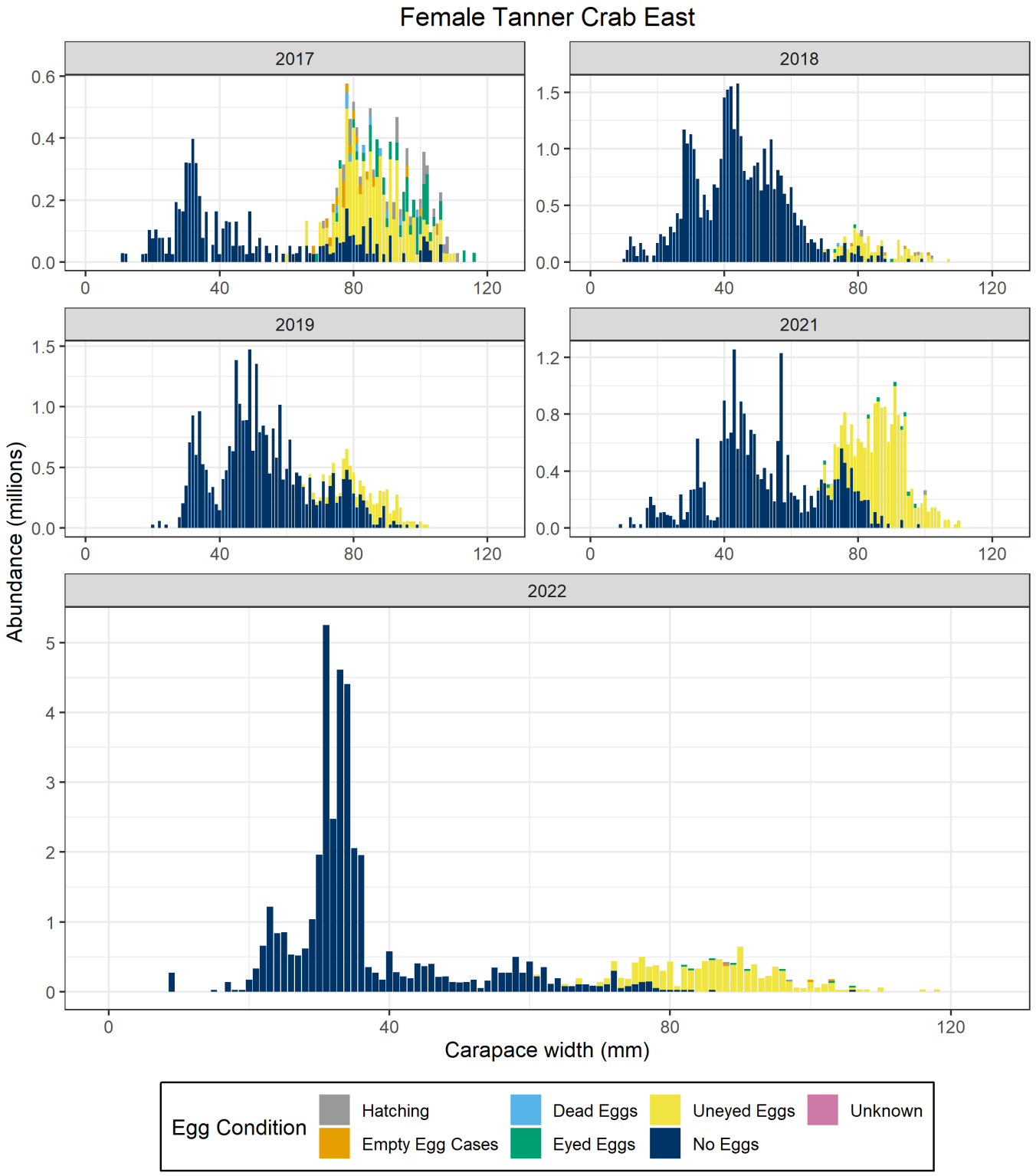

Figure 66. -- Abundance (millions) by size and egg condition of female Tanner crab (*Chionoecetes bairdi*) east of 166°W in the eastern Bering Sea using 1 mm width classes. **Note that Y-axis scale varies among years.**

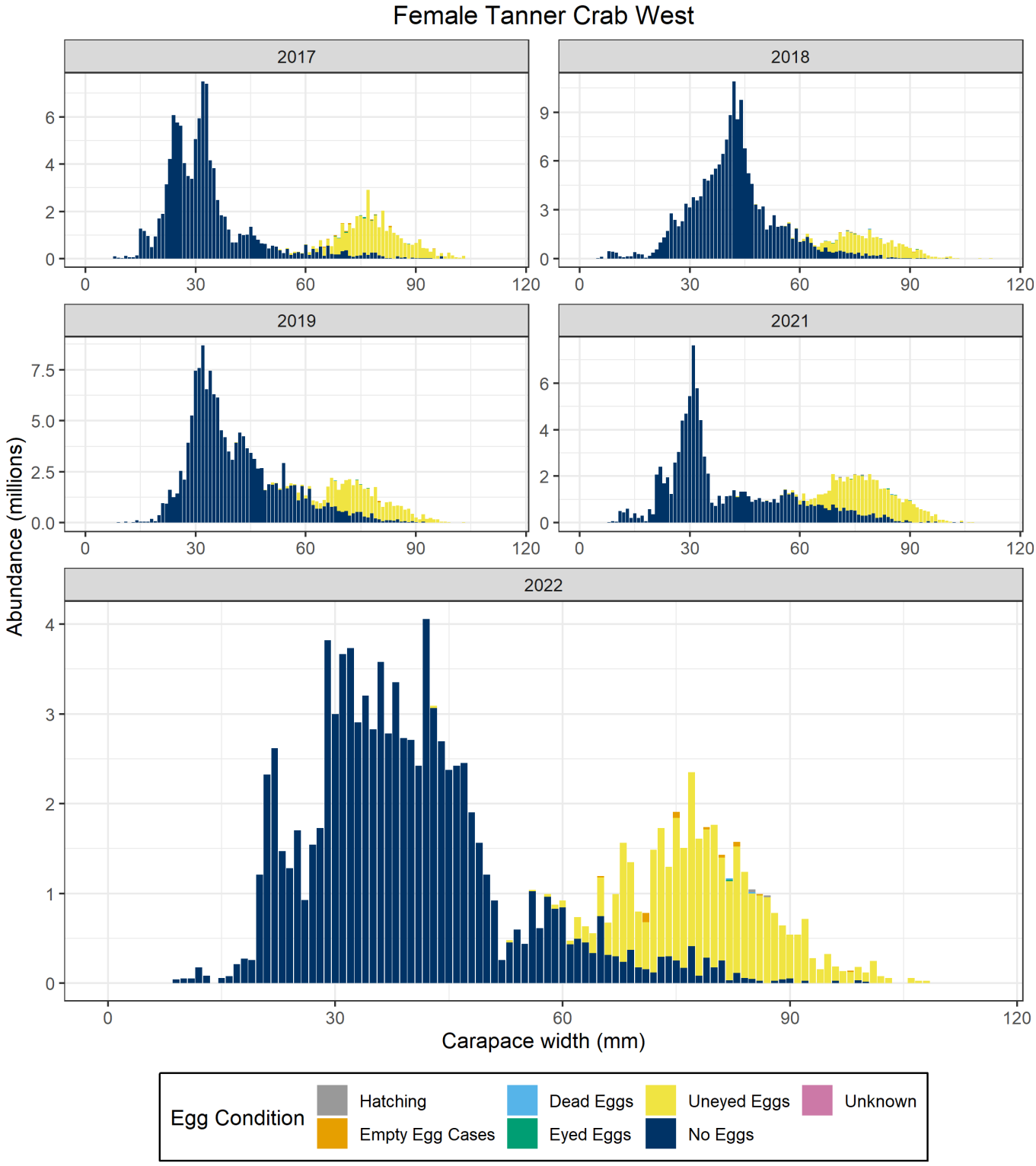

Figure 67. -- Abundance (millions) by size and egg condition of female Tanner crab (*Chionoecetes bairdi*) west of 166°W in the eastern Bering Sea using 1 mm width classes. **Note that Y-axis scale varies among years.**

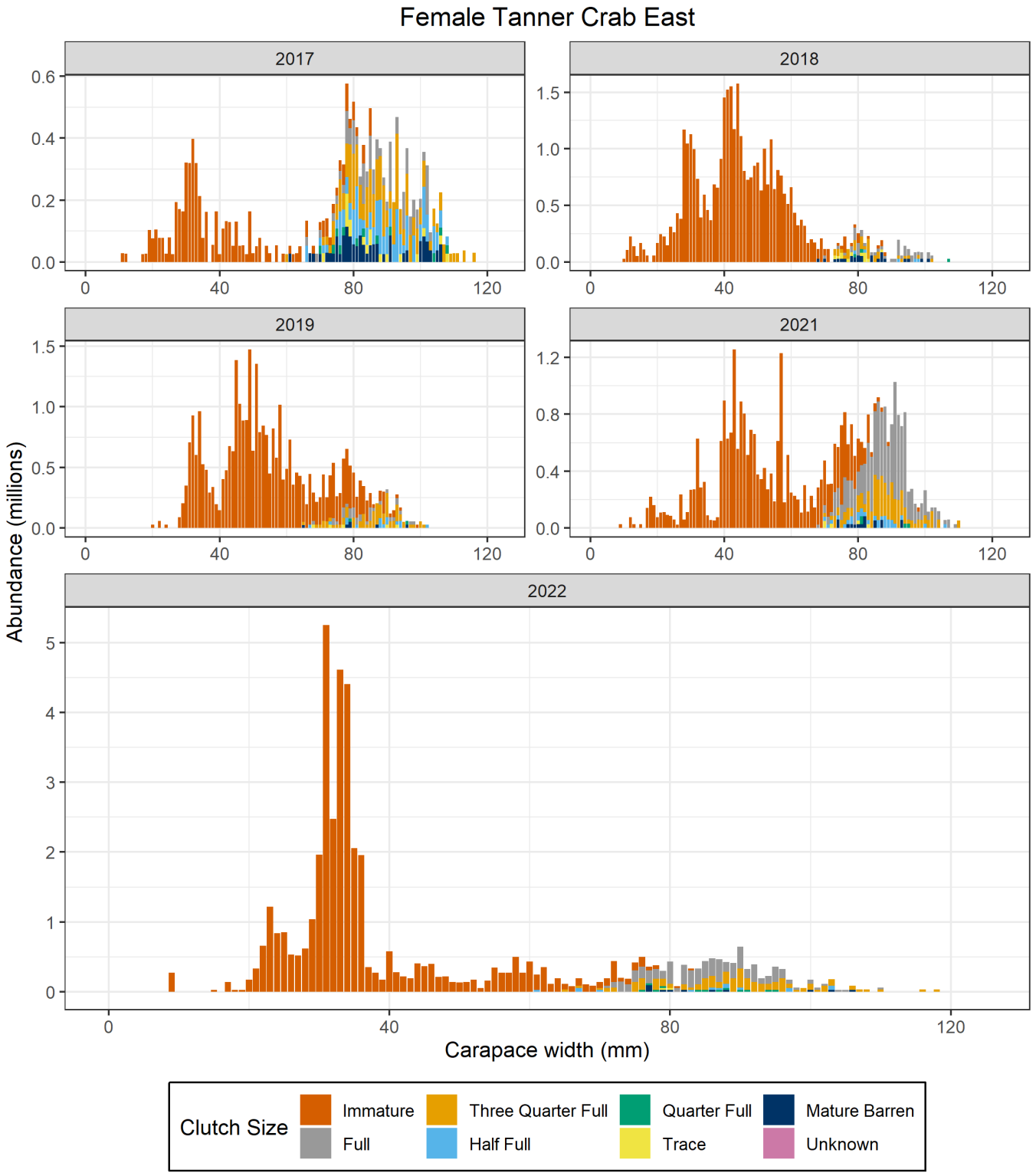

Figure 68. -- Abundance (millions) by size and clutch fullness of female Tanner crab (*Chionoecetes bairdi*) east of 166°W in the eastern Bering Sea using 1 mm width classes. **Note that Y-axis scale varies among years.**

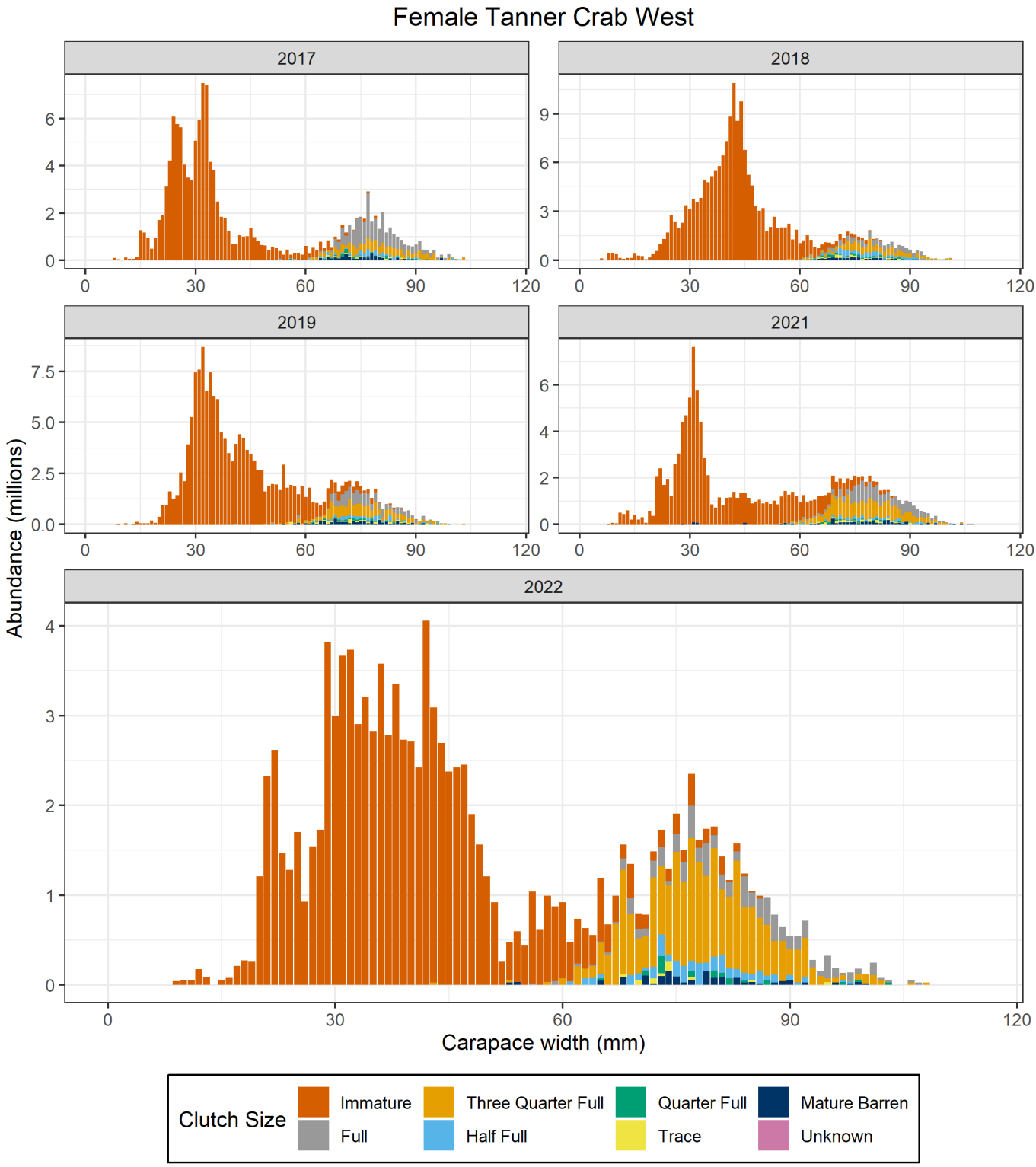

Figure 69. -- Abundance (millions) by size and clutch fullness of female Tanner crab (*Chionoecetes bairdi*) west of 166°W in the eastern Bering Sea using 1 mm width classes. **Note that Y-axis scale varies among years.**

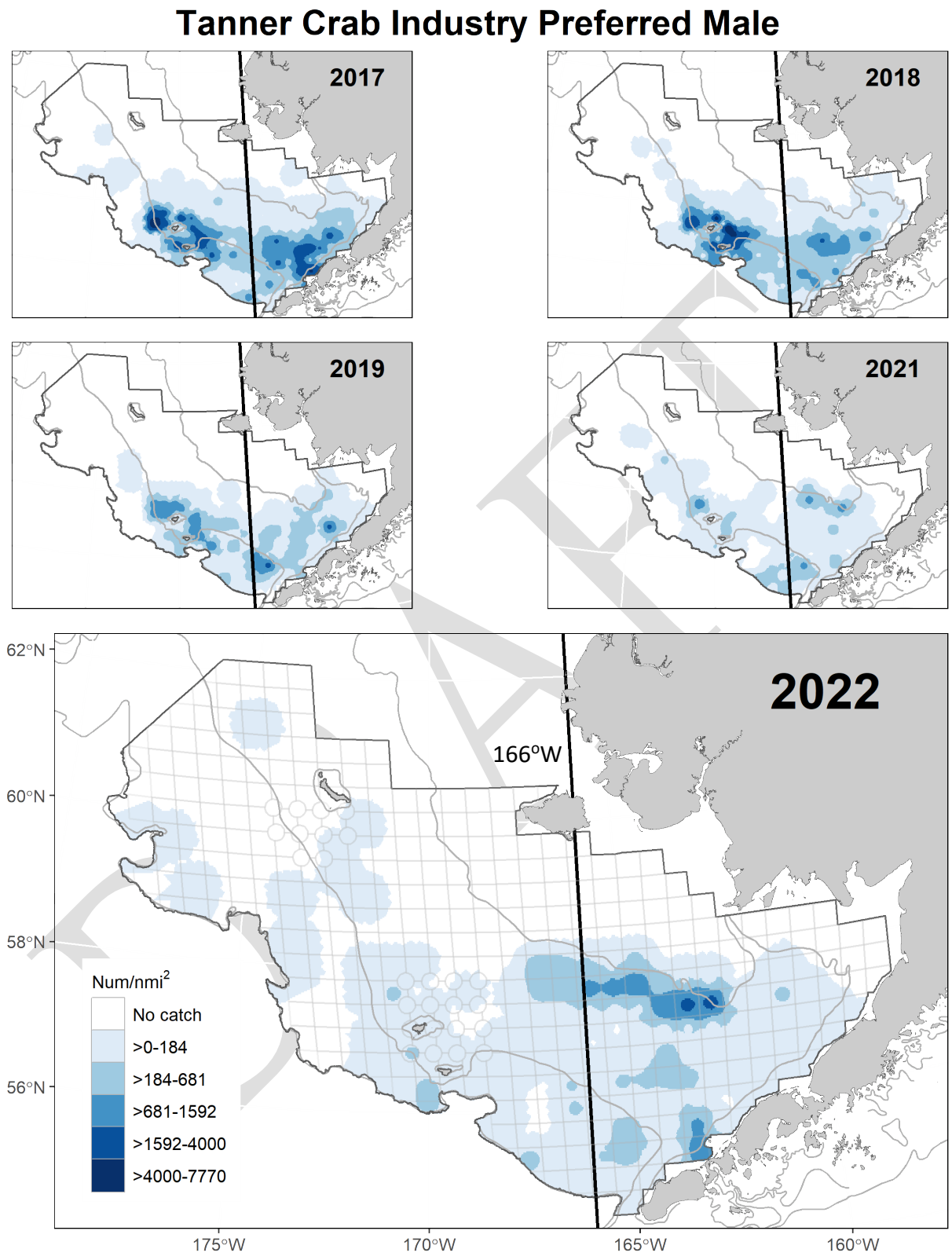

Figure 70. -- Estimated total density of industry preferred-sized (carapace width ≥ 125 mm) male Tanner crab (*Chionoecetes bairdi*) in the eastern Bering Sea for the past five survey years

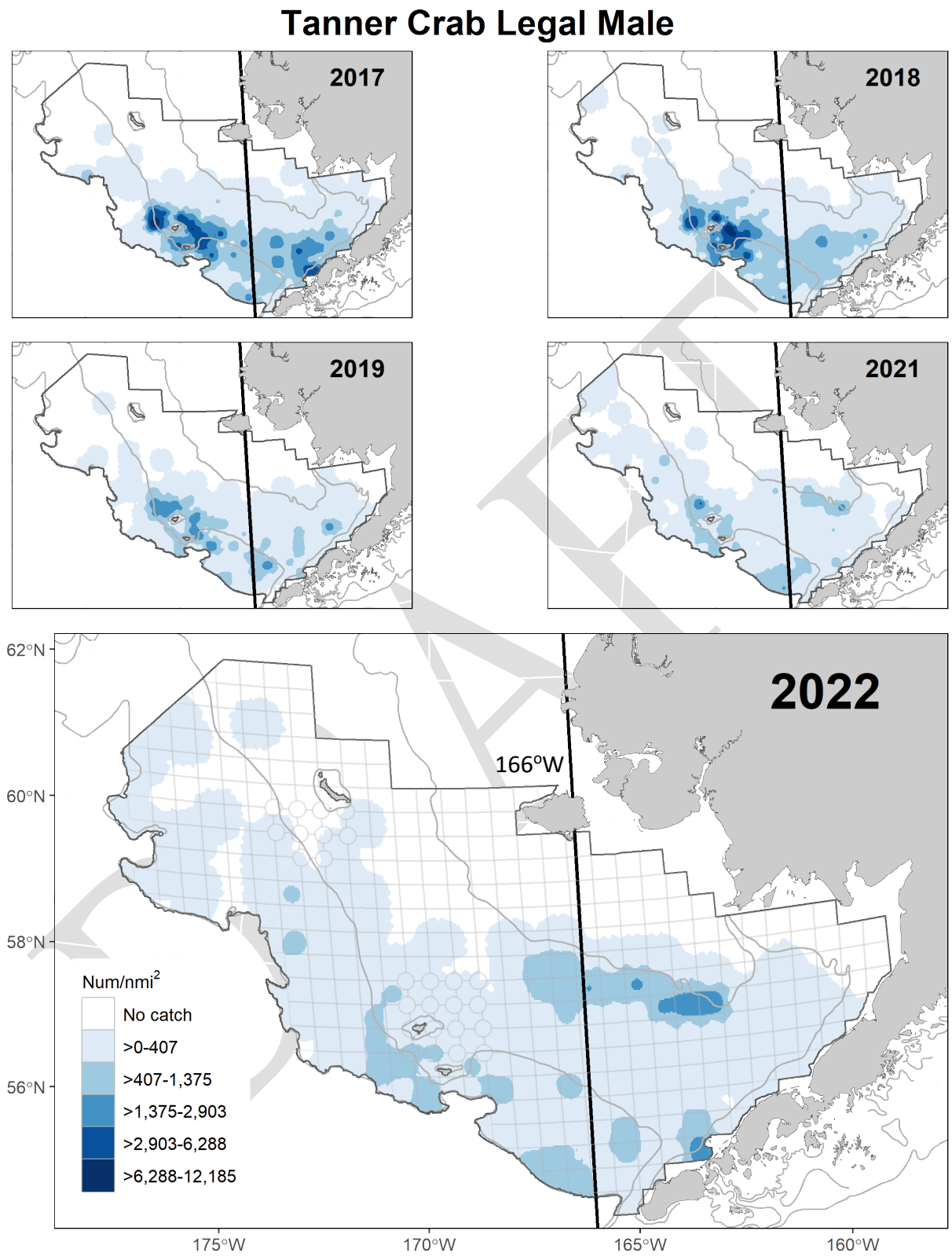

Figure 71. -- Estimated total density of legal-sized (carapace width ≥ 120 mm east of 166°W and ≥ 110 mm west of 166°W) male Tanner crab (*Chionoecetes bairdi*) in the eastern Bering Sea for the past five survey years.

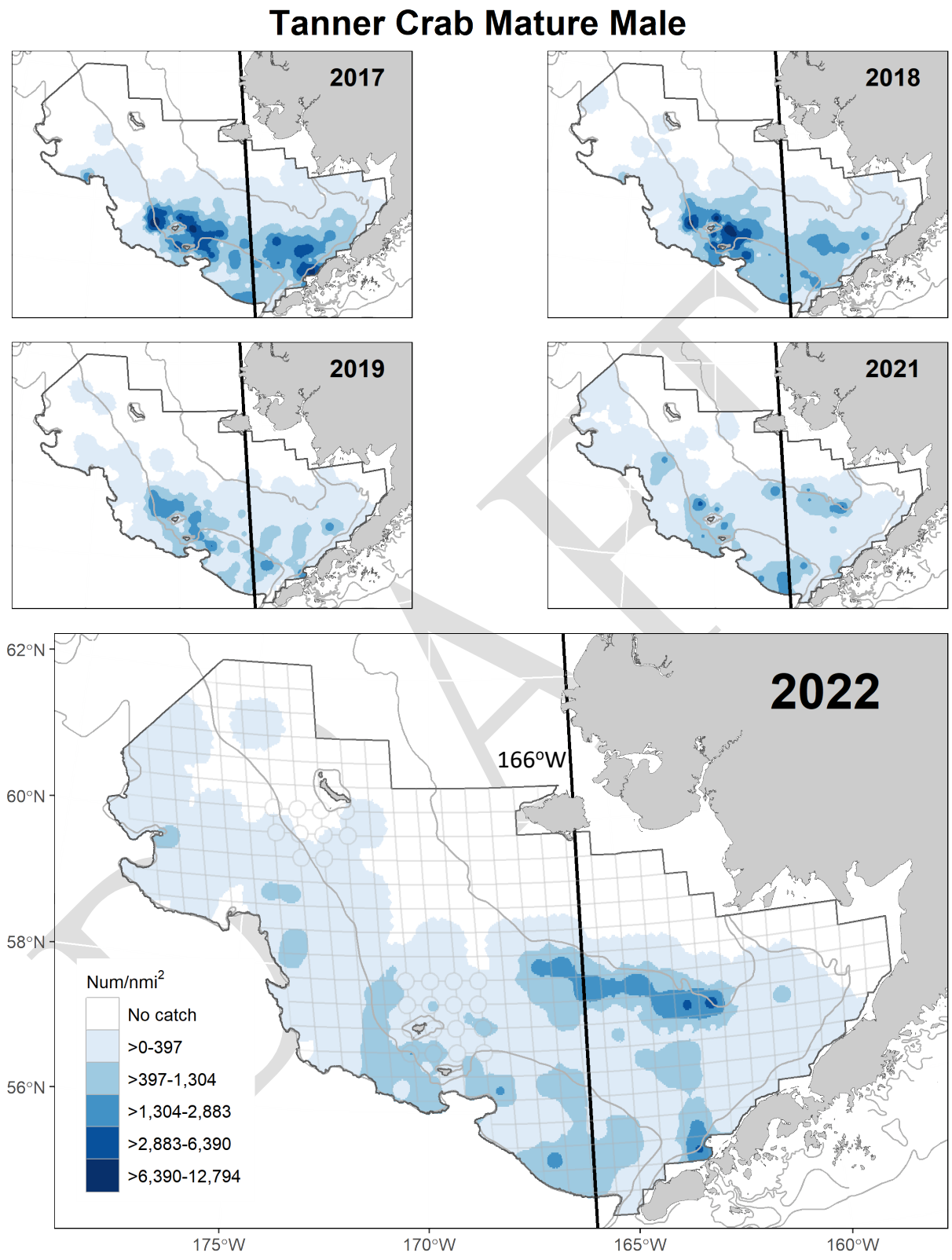

Figure 72. -- Estimated total density of mature-sized (carapace width ≥ 113 mm east of 166°W and ≥ 103 mm west of 166°W) male Tanner crab (*Chionoecetes bairdi*) in the eastern Bering Sea for the past five survey years.

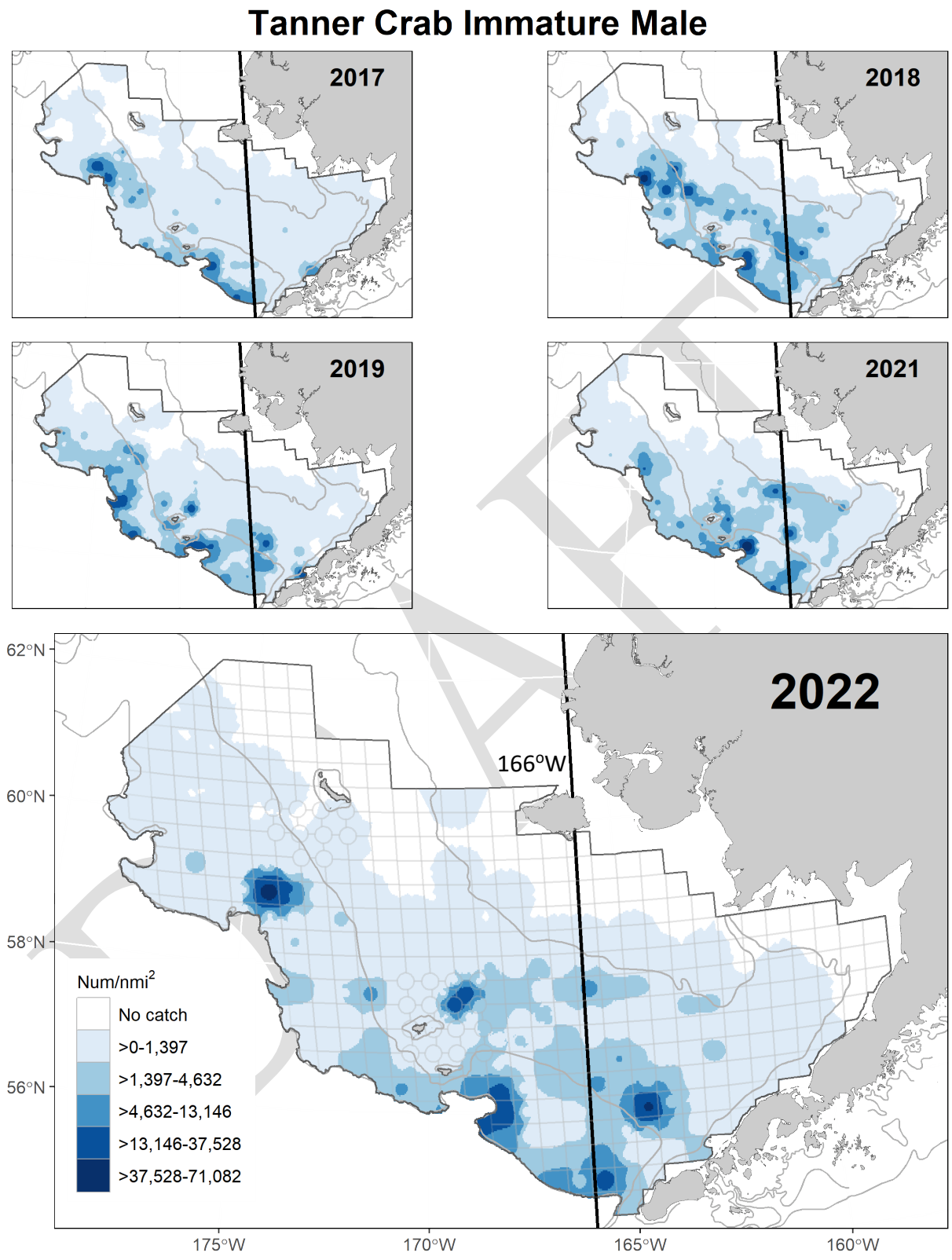

Figure 73. -- Estimated total density of immature-sized (carapace width < 113 mm east of 166°W and < 103 mm west of 166°W) male Tanner crab (*Chionoecetes bairdi*) in the eastern Bering Sea for the past five survey years.

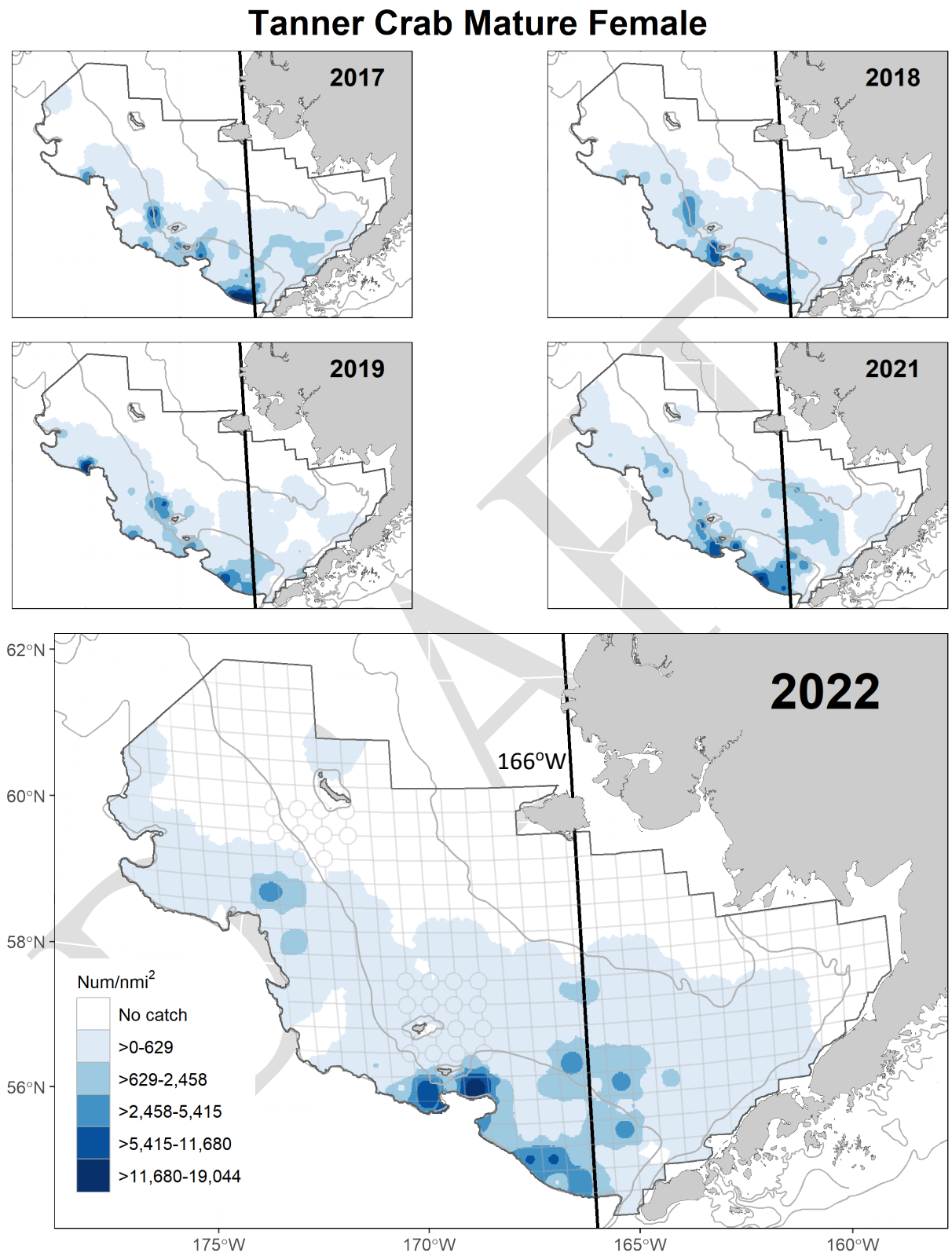

Figure 74. -- Estimated total density of mature female Tanner crab (*Chionoecetes bairdi*) for the past five survey years.

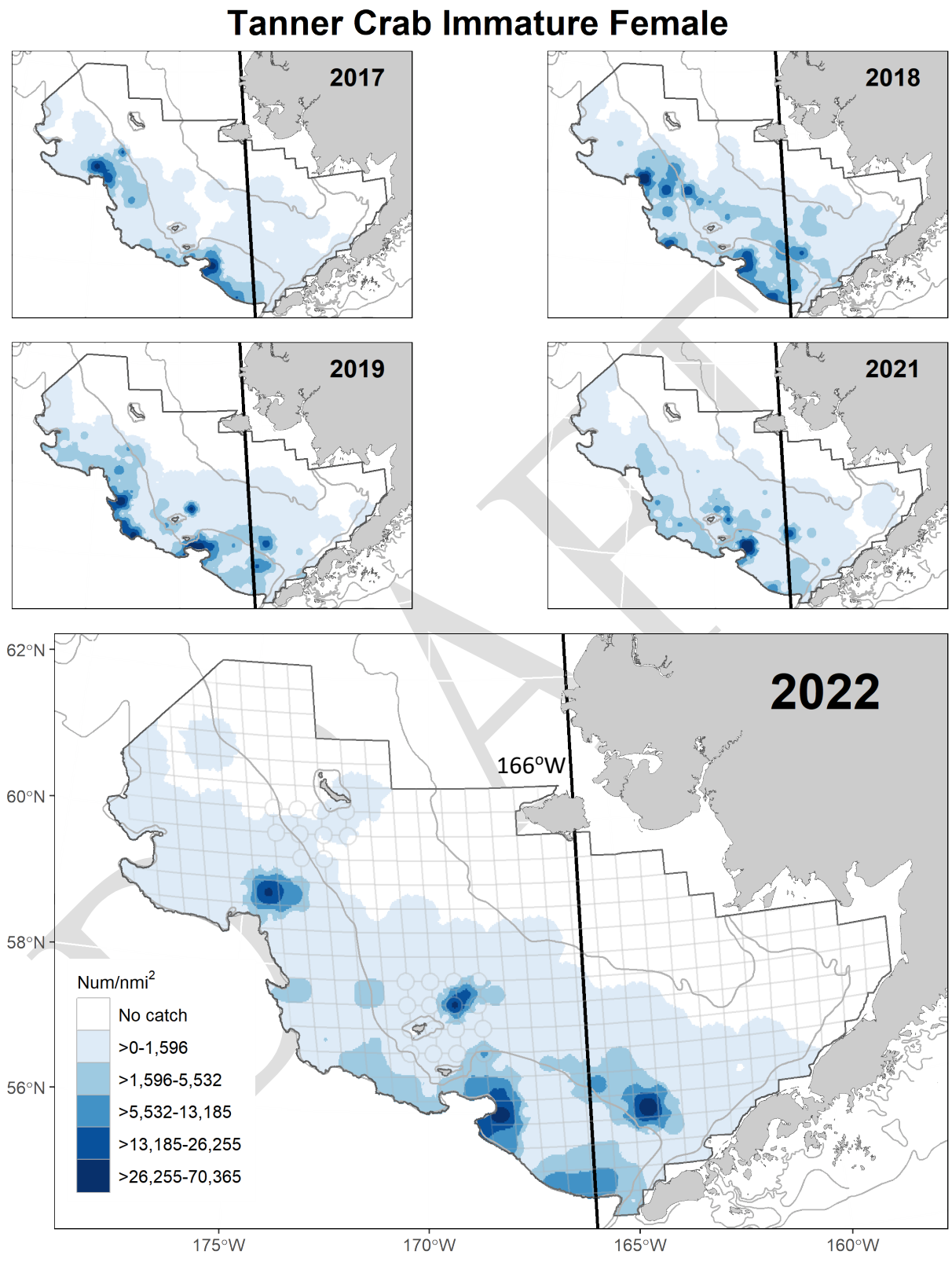

Figure 75. -- Estimated total density of immature female Tanner crab (*Chionoecetes bairdi*) for the past five survey years.

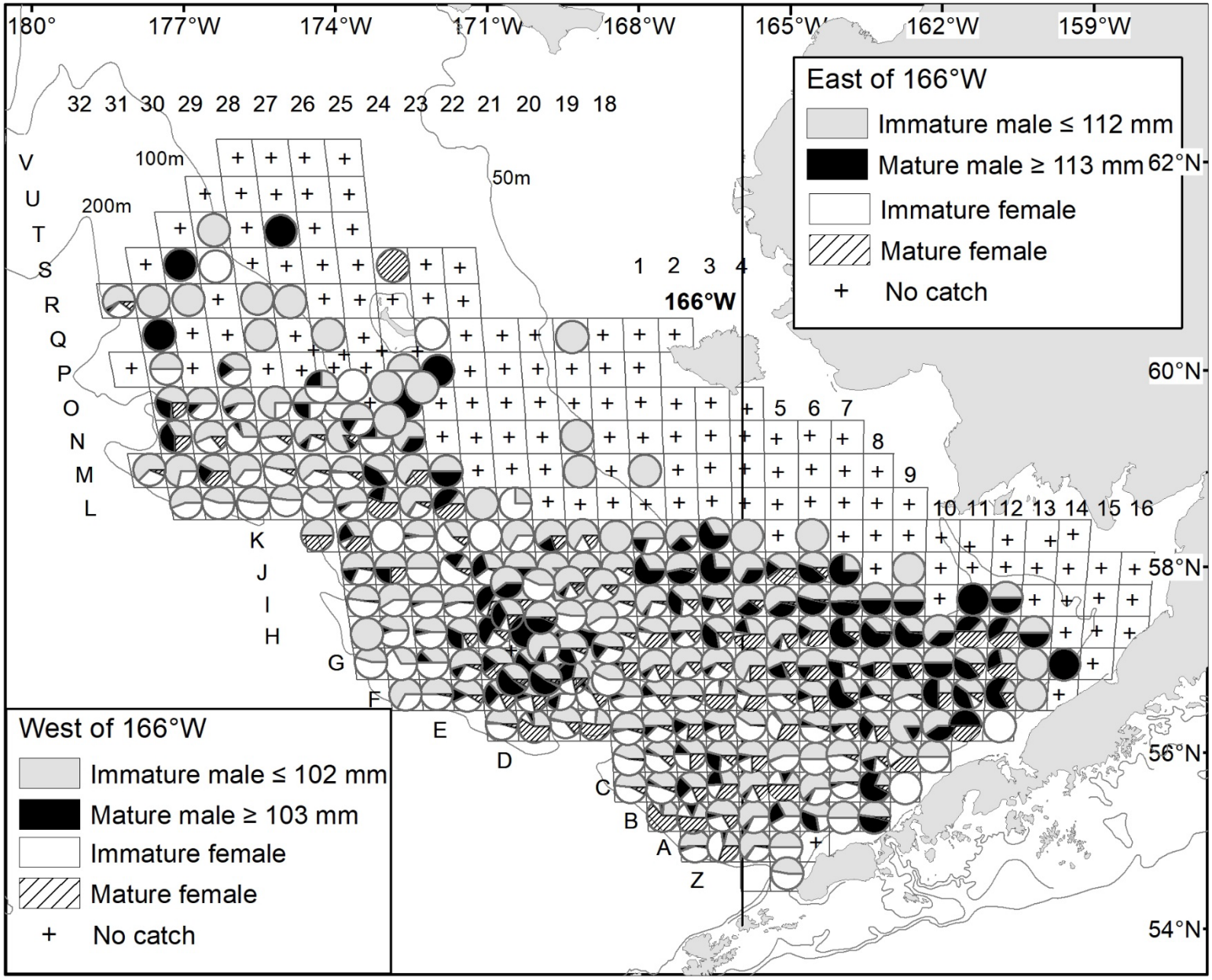

Figure 76. -- Proportion of male and female Tanner crab (*Chionoecetes bairdi*) maturity classes caught at each station sampled in 2022.

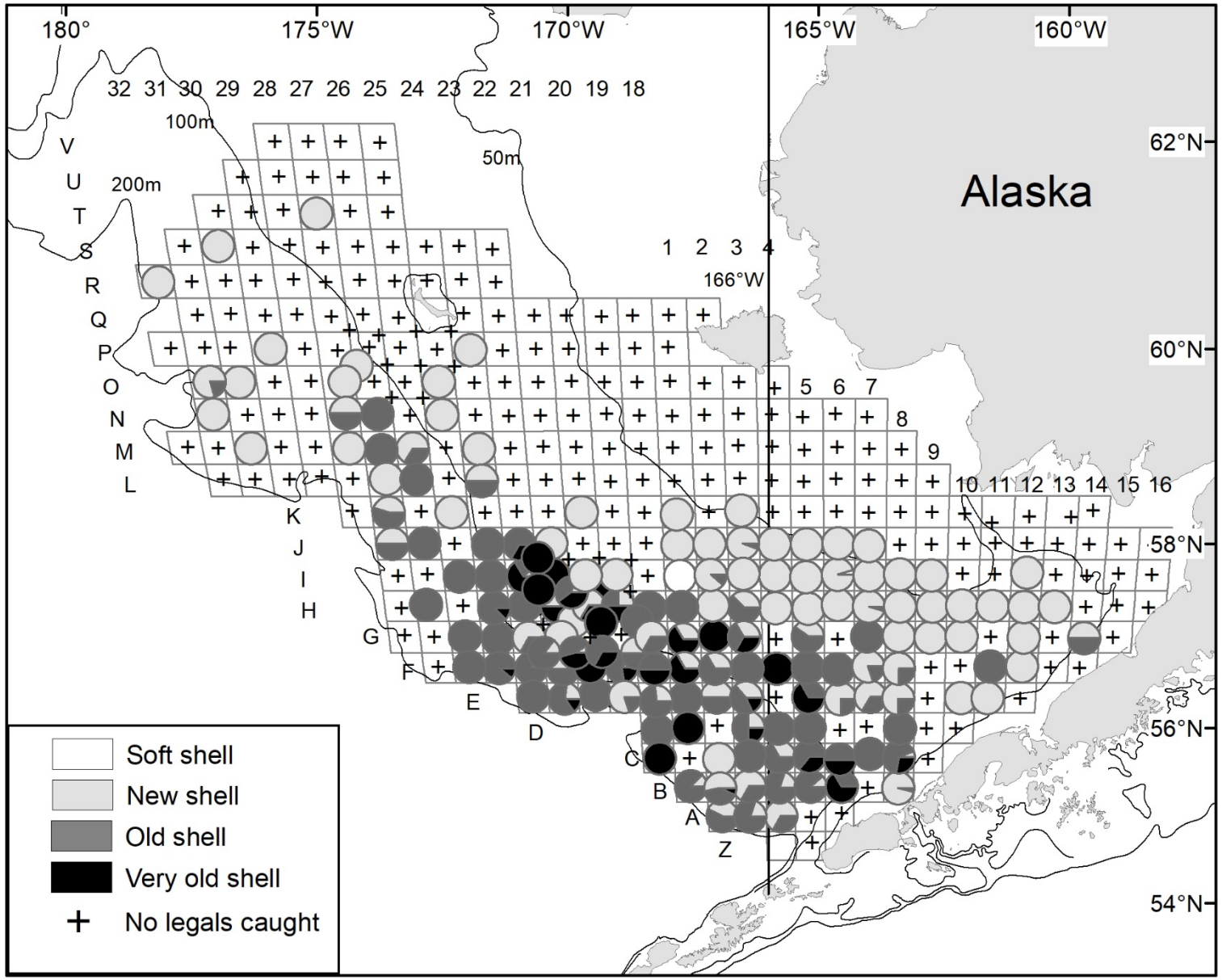

Figure 77. -- Proportion of legal-sized (carapace width ≥ 120 mm east of 166ºW and ≥ 110 mm west of 166ºW) male Tanner crab (*Chionoecetes bairdi*) shell condition classes caught at each station sampled in 2022.

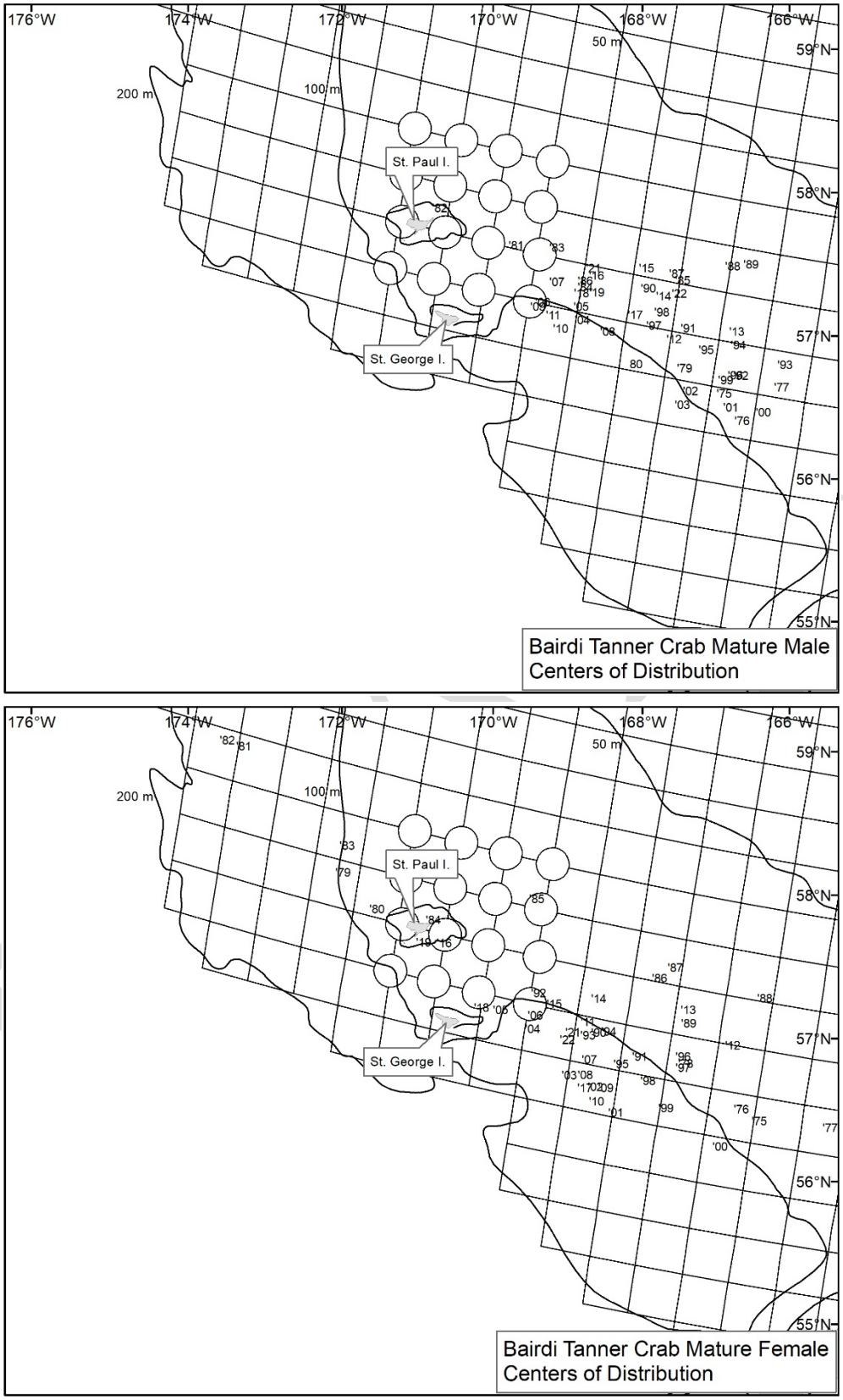

Figure 78. -- Centers of stock abundance of mature male (top) and female (bottom) Tanner crab (*Chionoecetes bairdi*) from 1975 to 2022.

Snow Crab Figures

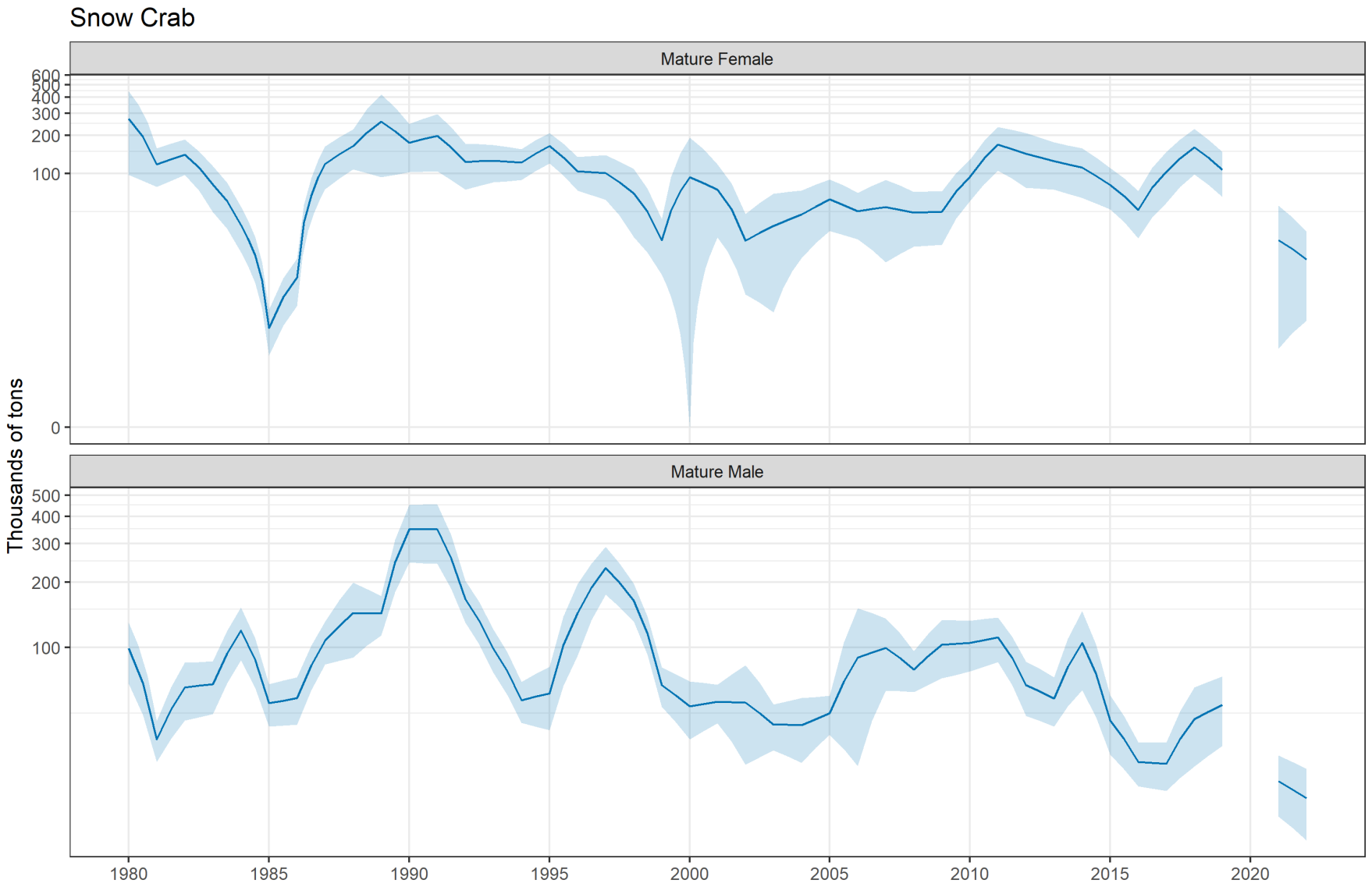

Figure 79. -- Historical biomass of mature female and mature male (carapace width ≥ 95 mm) snow crab (*Chionoecetes opilio*) in the eastern Bering Sea. Light blue area indicates ± 95% CI. **Note that Y-axis is plotted on a log scale.**

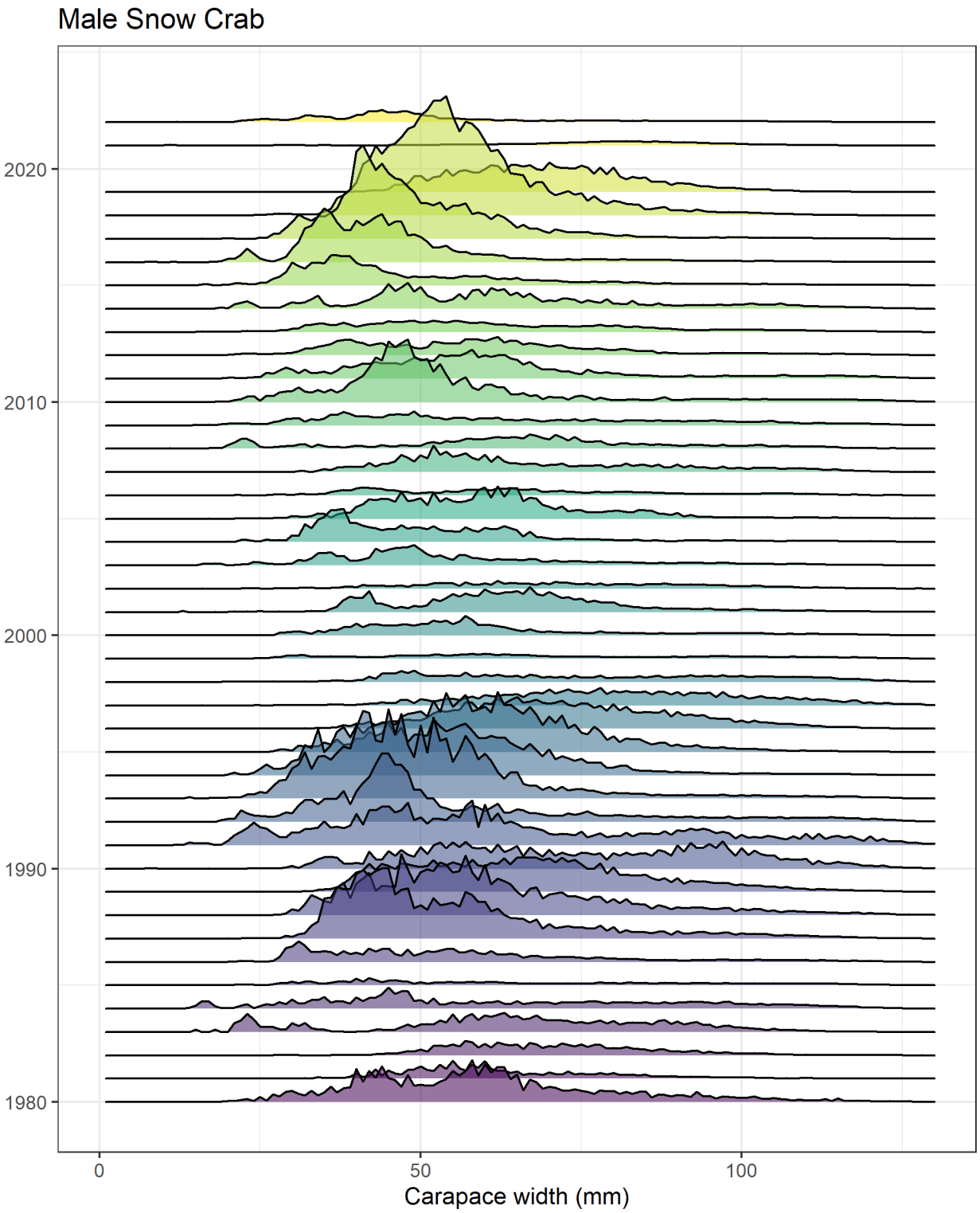

Figure 80. -- Historical size frequency for male snow crab (*Chionoecetes opilio*) in the eastern Bering Sea.

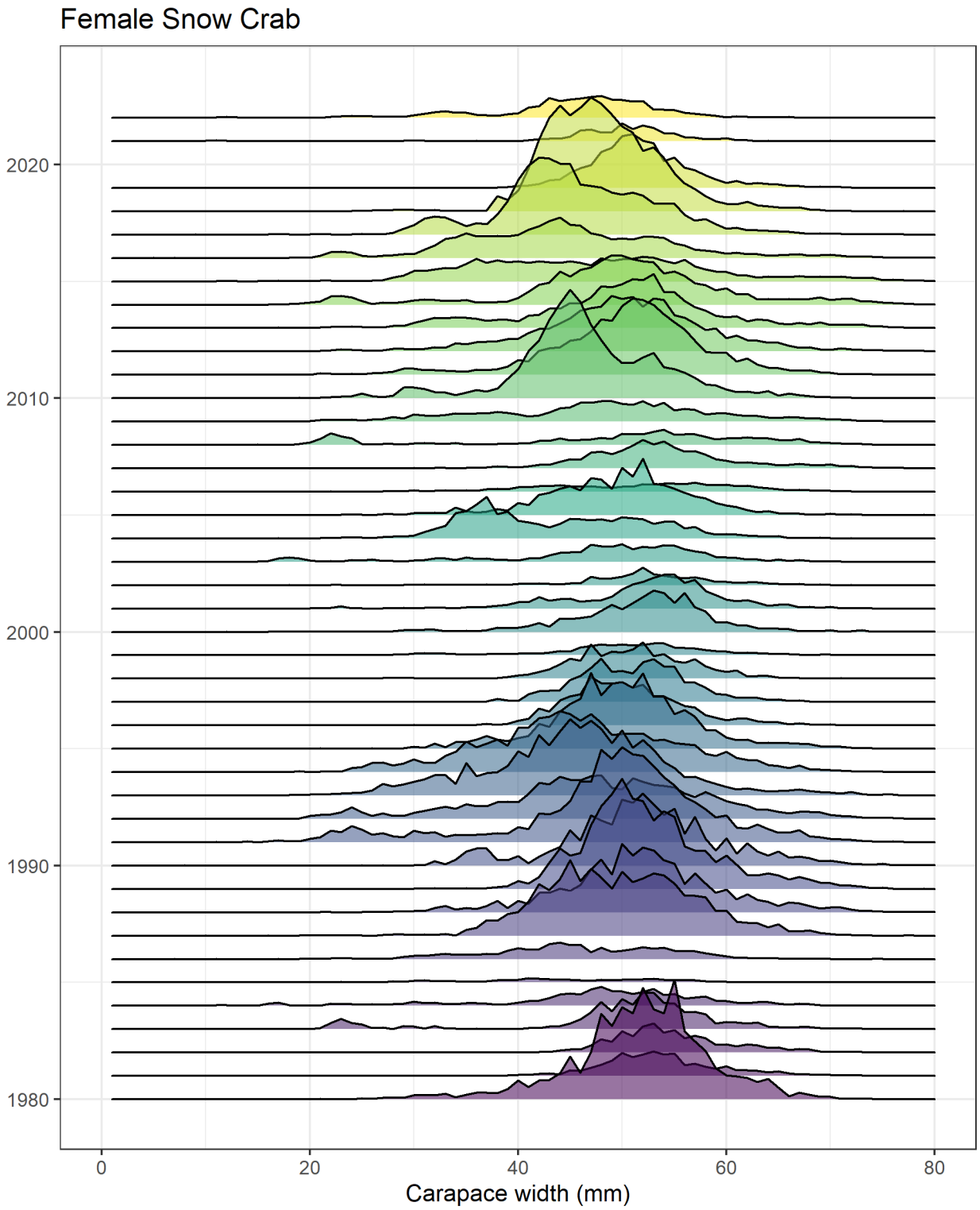

Figure 81. -- Historical size frequency for female snow crab (*Chionoecetes opilio*) in the eastern Bering Sea

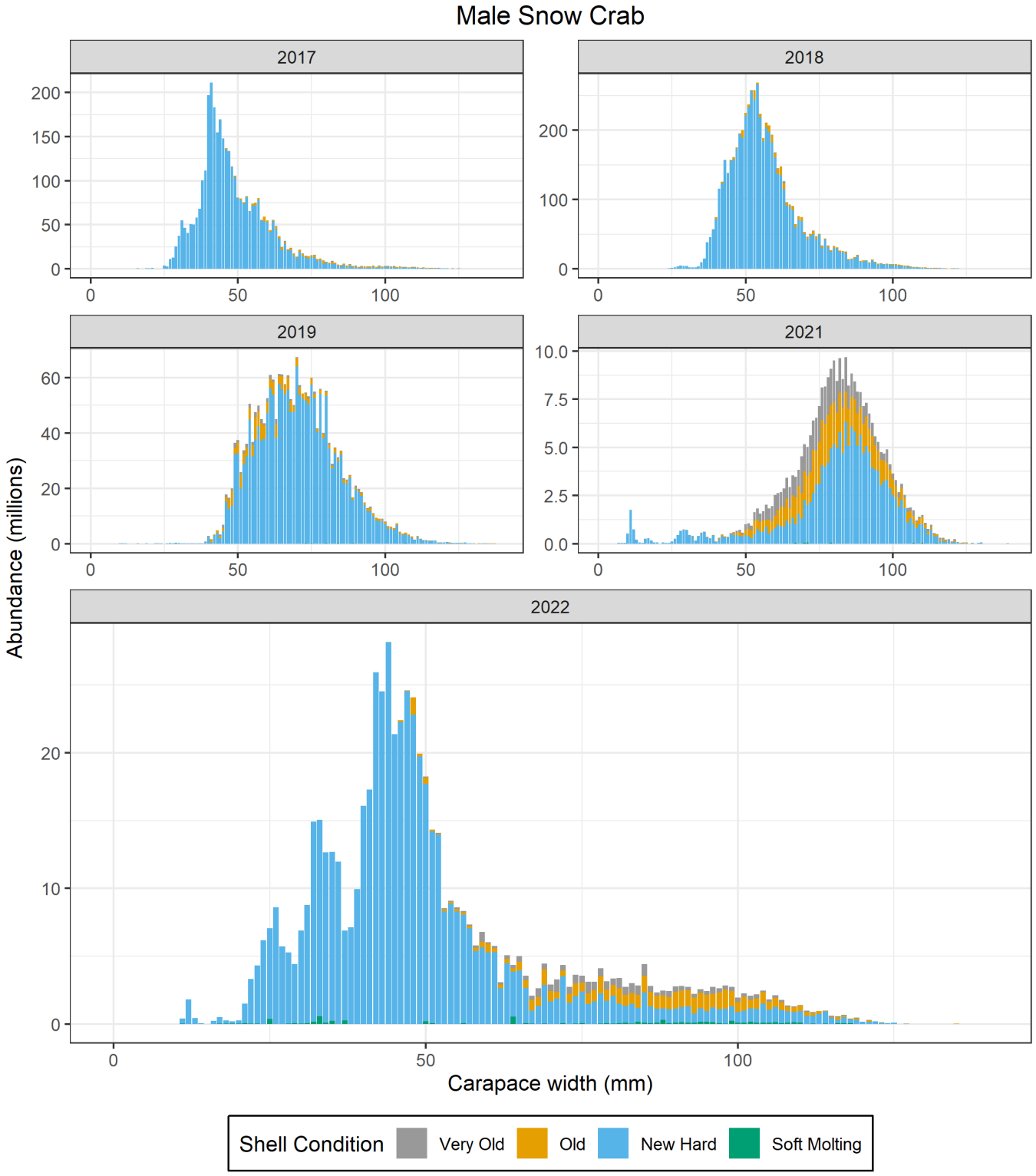

Figure 82. – Abundance (millions) by size and shell condition of male snow crab (*Chionoecetes opilio*) in the eastern Bering Sea using 1 mm width classes. **Note that Y-axis scale varies among years.**

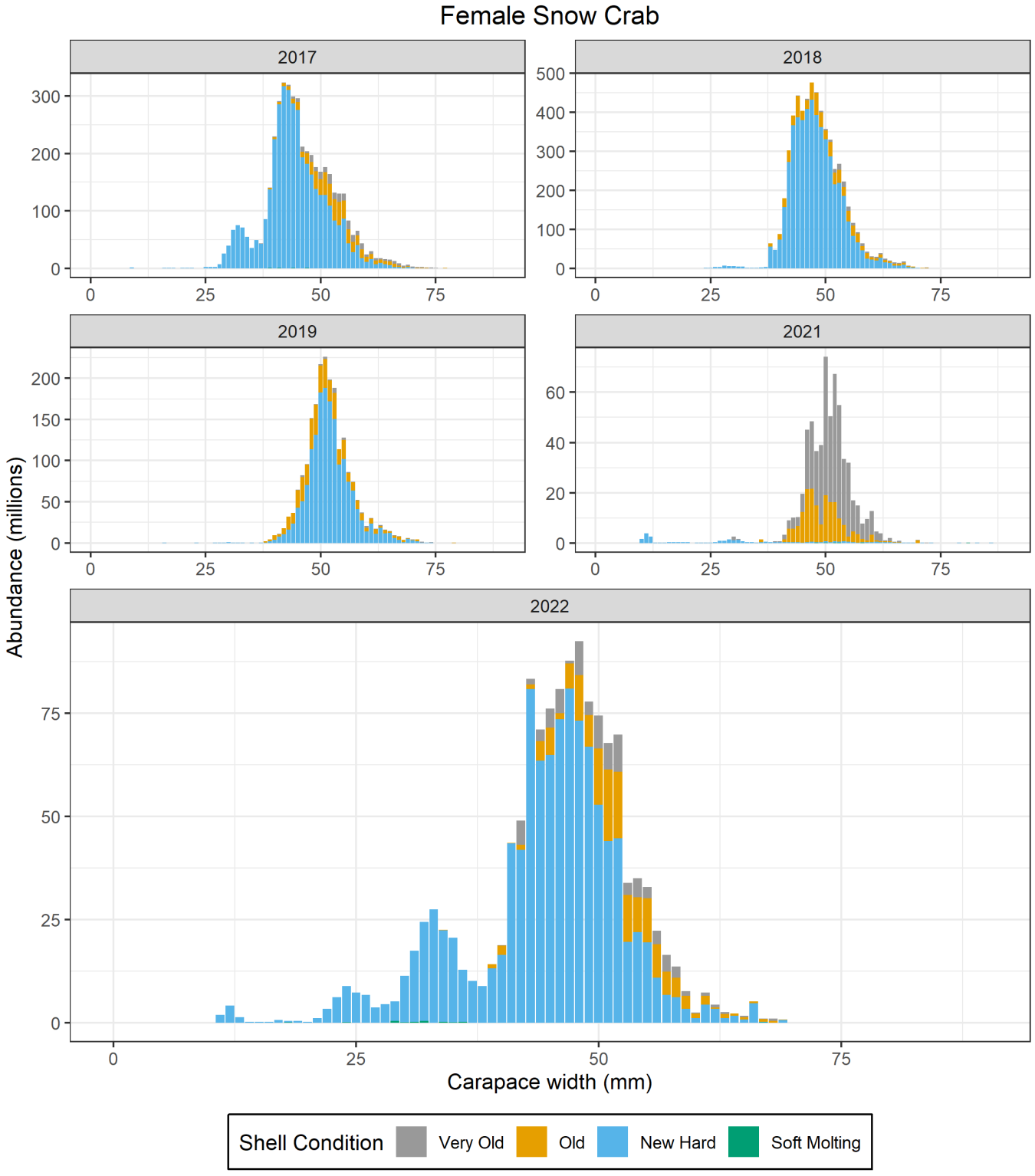

Figure 83. -- Abundance (millions) by size and shell condition of female snow crab (*Chionoecetes opilio*) in the eastern Bering Sea using 1 mm width classes. **Note that Y-axis scale varies among years.**

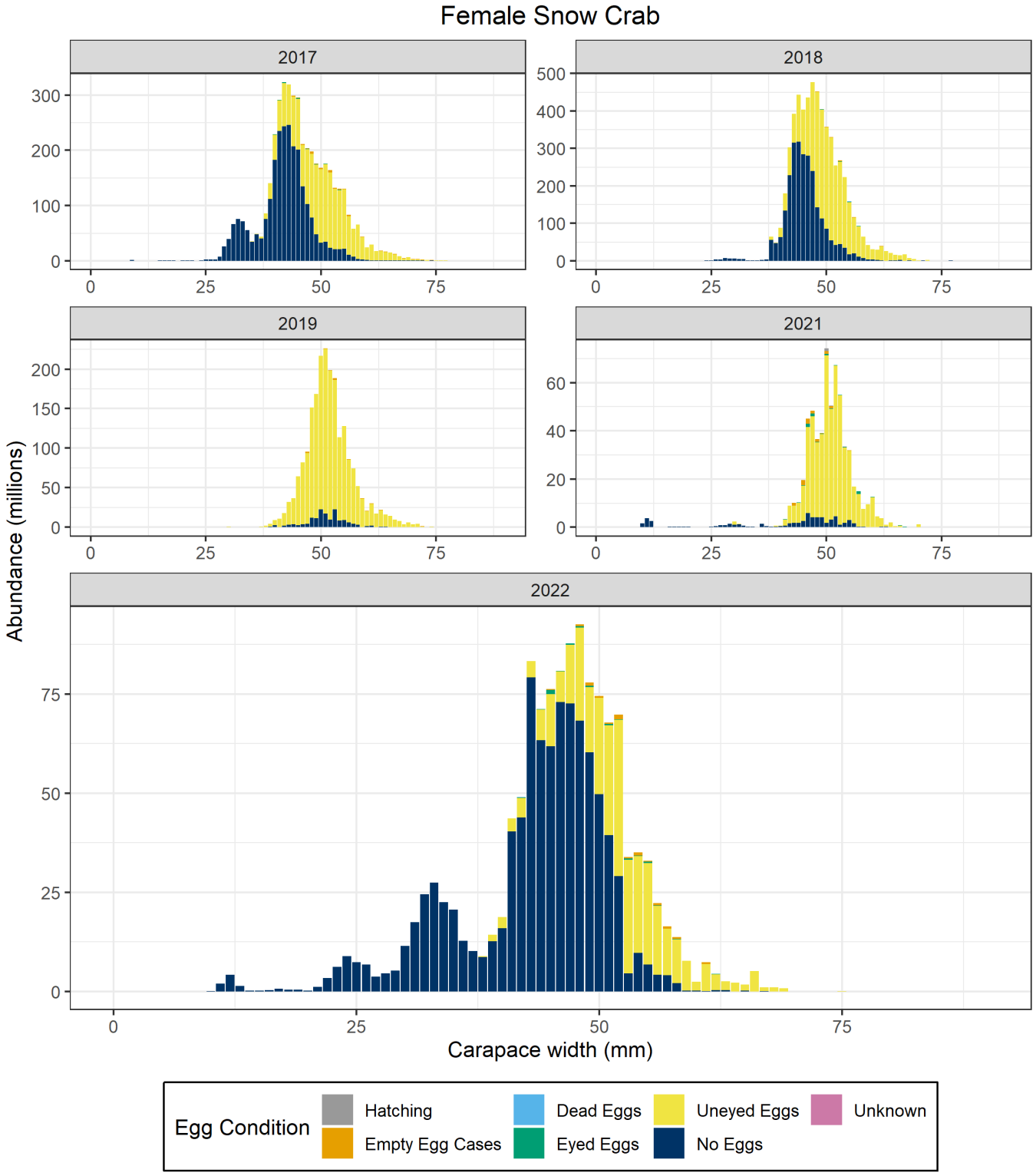

Figure 84. -- Abundance (millions) by size and egg condition of female snow crab (*Chionoecetes opilio*) in the eastern Bering Sea using 1 mm width classes. **Note that Y-axis scale varies among years.**

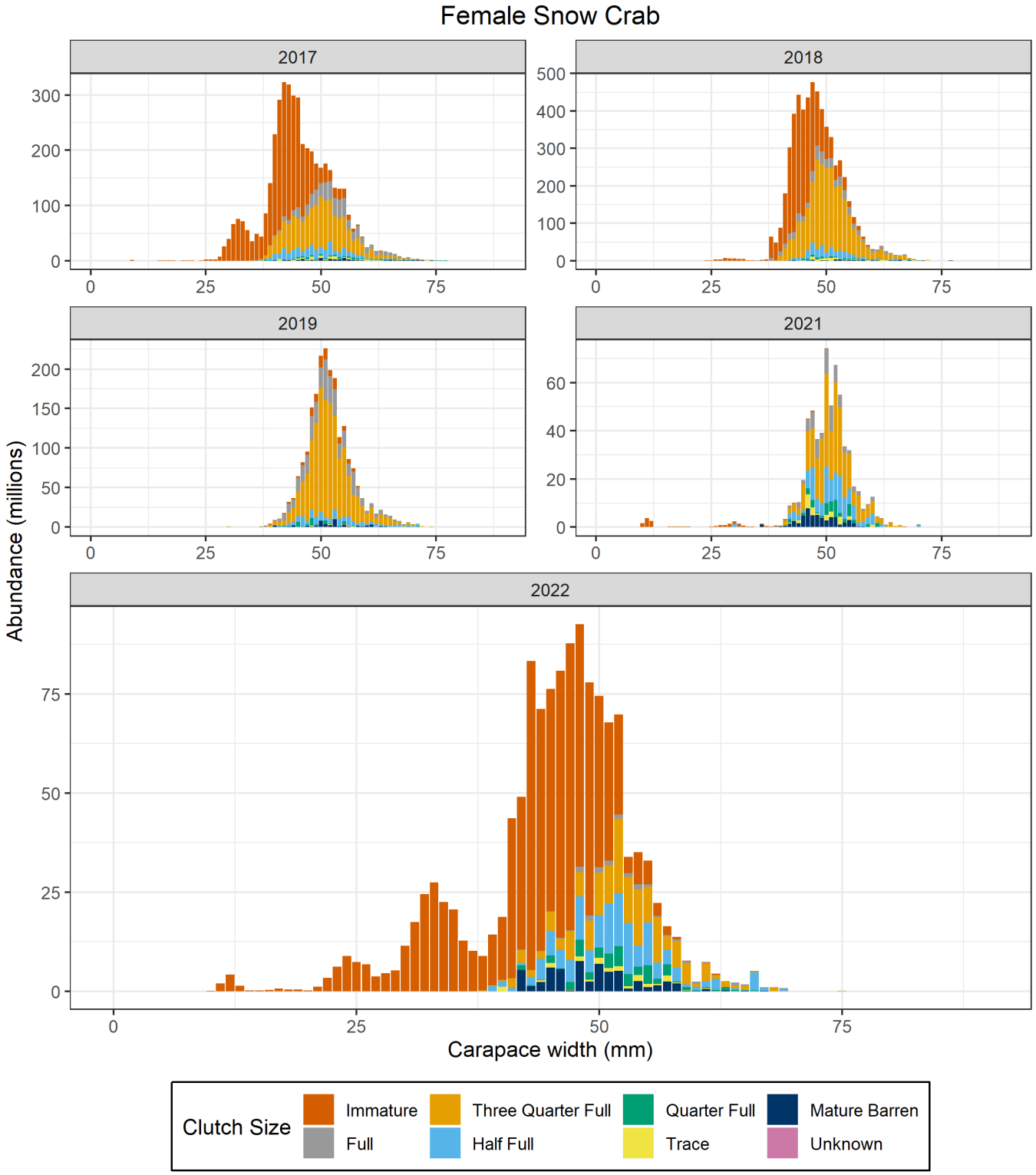

Figure 85. -- Abundance (millions) by size and clutch fullness of female snow crab (*Chionoecetes opilio*) in the eastern Bering Sea using 1 mm width classes. **Note that Y-axis scale varies among years.**

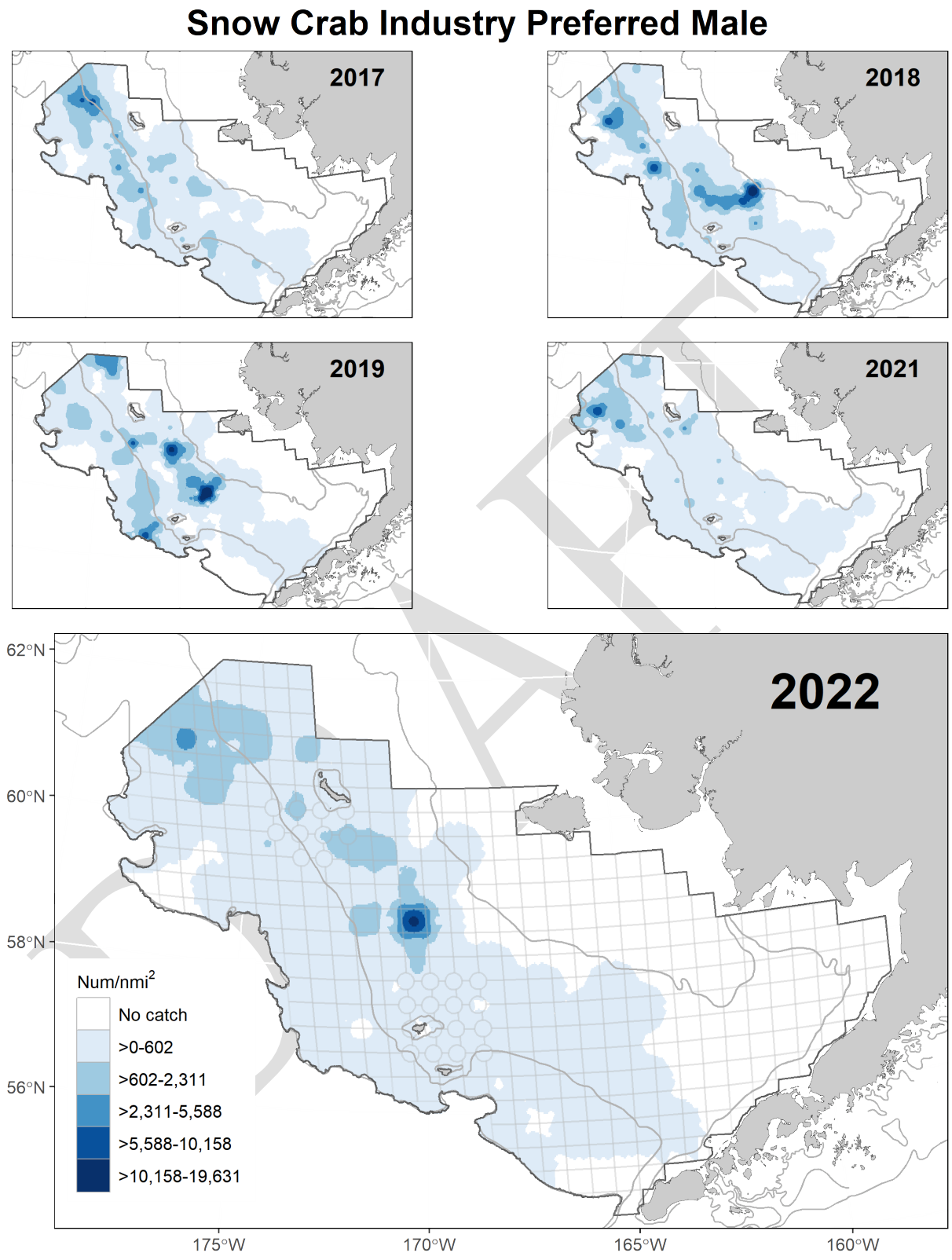

Figure 86. -- Estimated total density of industry preferred-sized (carapace width ≥ 102 mm) snow crab (*Chionoecetes opilio*) in the eastern Bering Sea for the past five survey years.

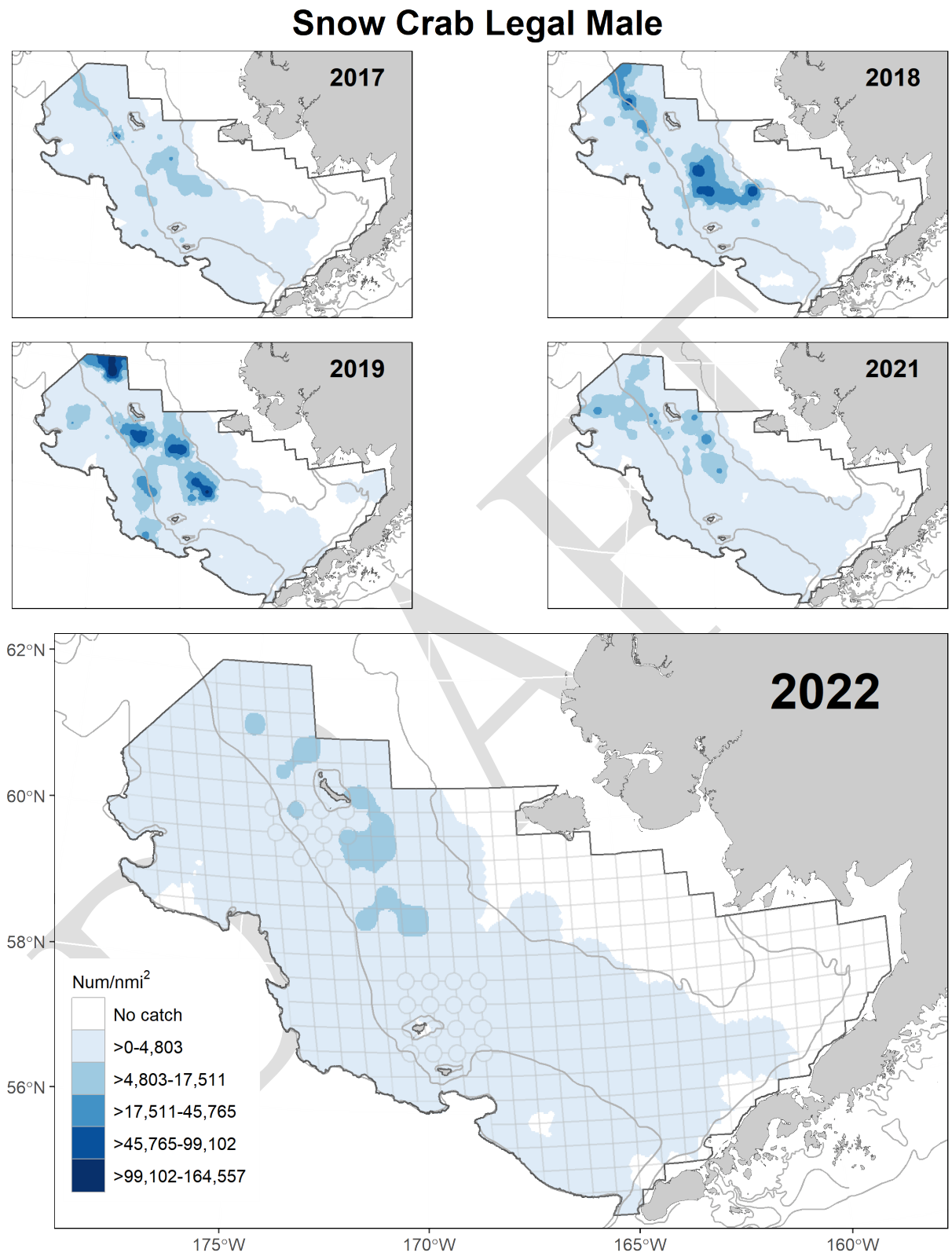

Figure 87. -- Estimated total density of legal-sized (carapace width ≥ 78 mm) snow crab (*Chionoecetes opilio*) in the eastern Bering Sea for the past five survey years.

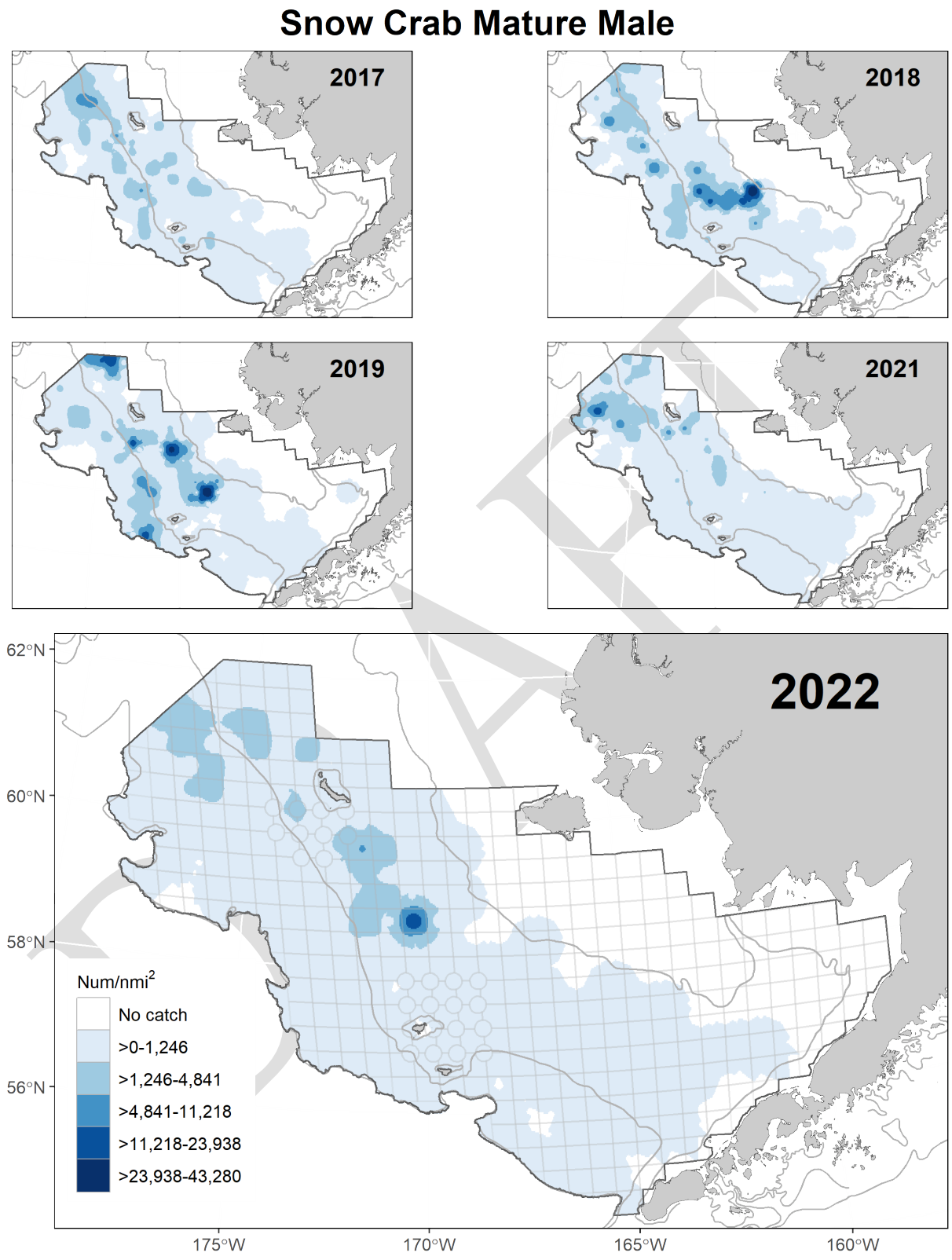

Figure 88. -- Estimated total density of mature-sized (carapace width ≥ 95 mm) male snow crab (*Chionoecetes opilio*) in the eastern Bering Sea for the past five survey years.

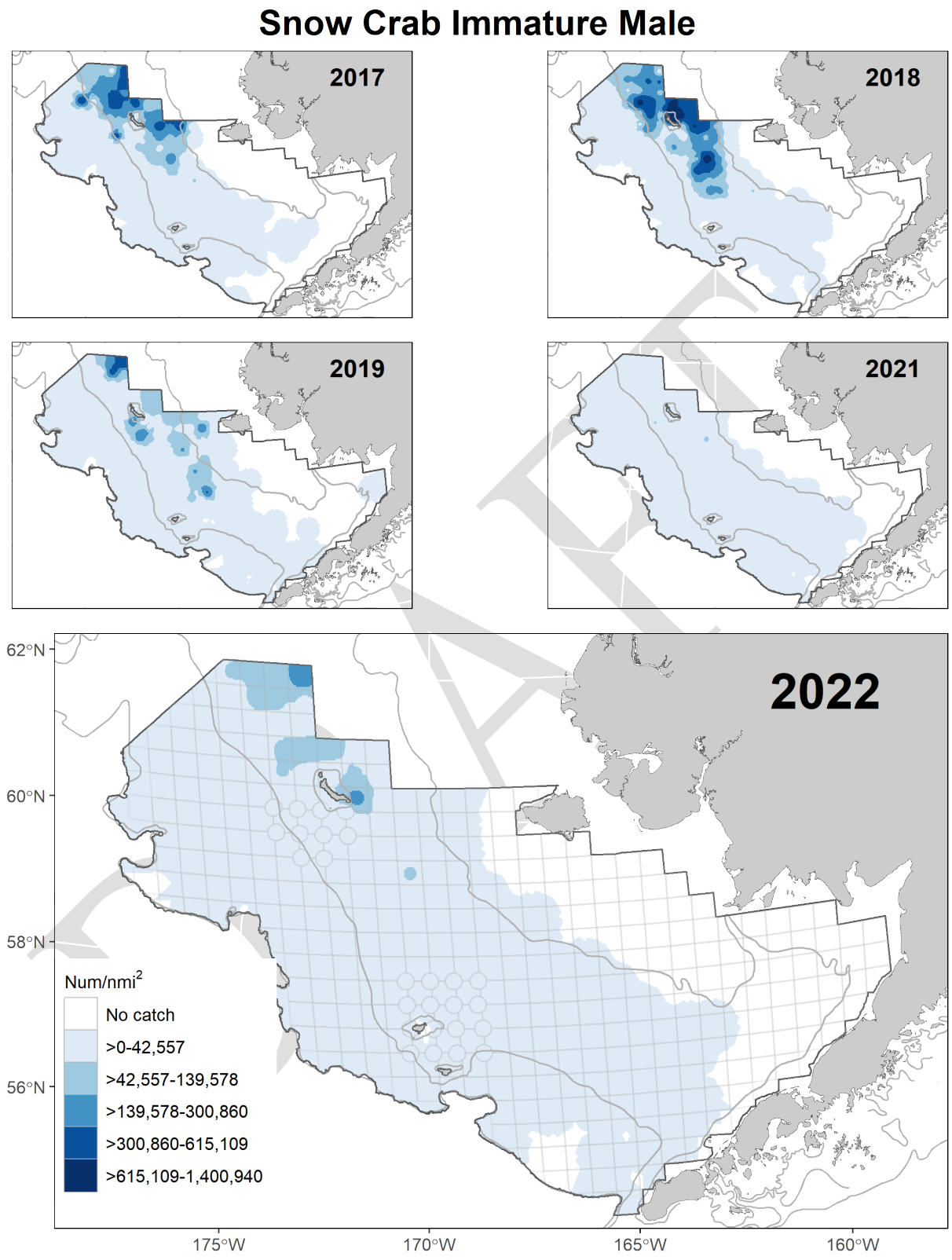

Figure 89. -- Estimated total density of immature-sized (carapace width < 95 mm) male snow crab (*Chionoecetes opilio*) in the eastern Bering Sea for the past five survey years.

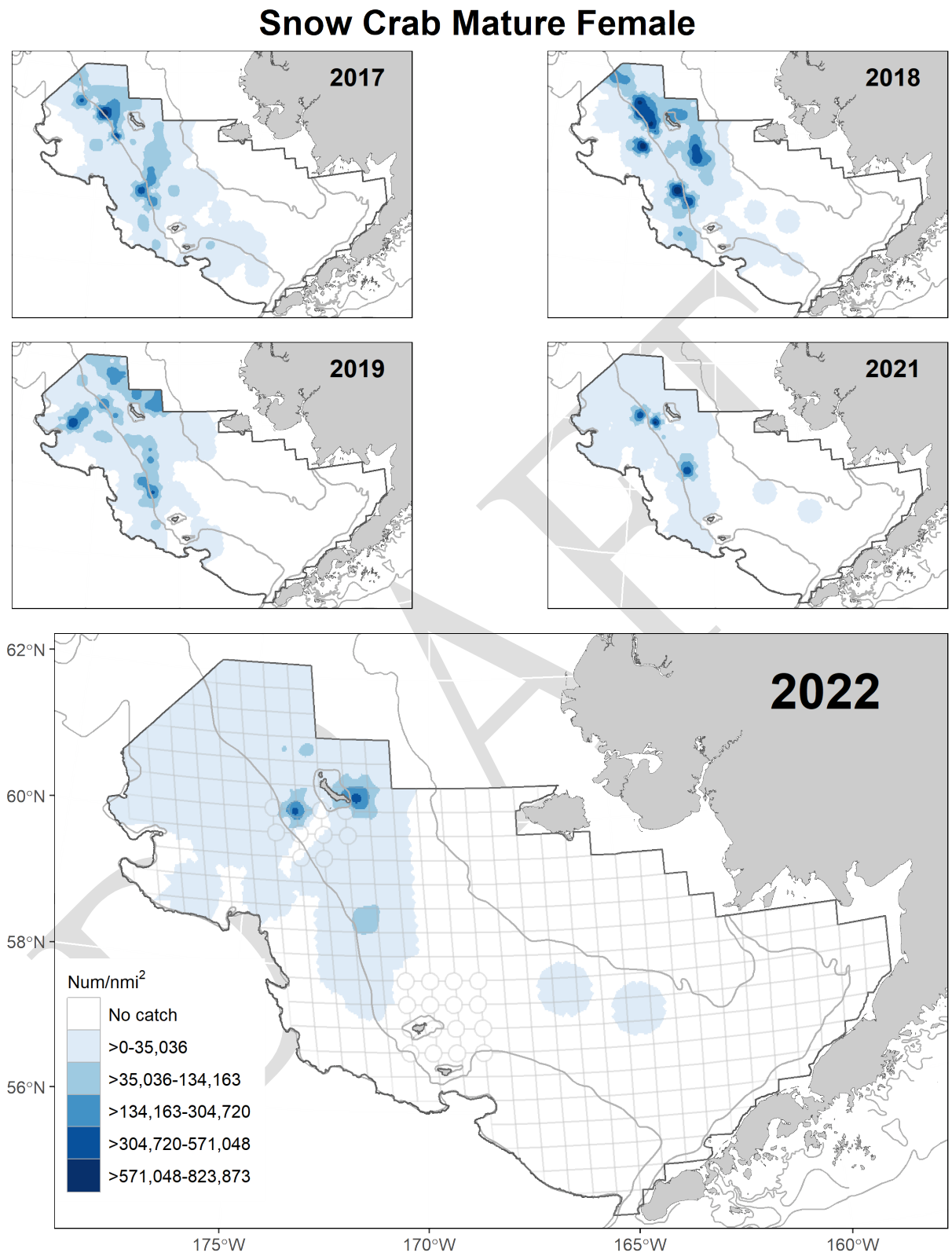

Figure 90. -- Estimated total density of mature female snow crab (*Chionoecetes opilio*) for the past five survey years.

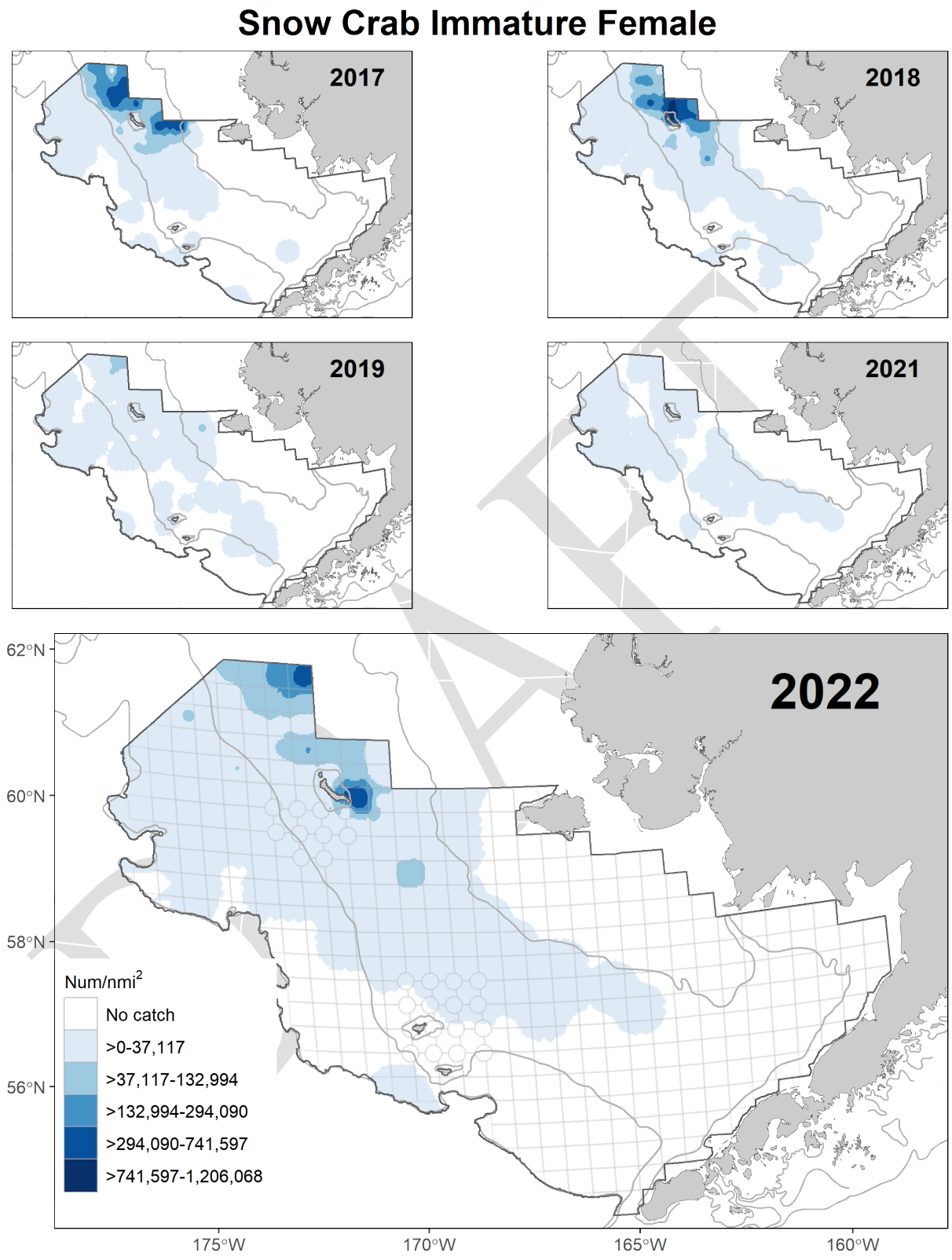

Figure 91. -- Estimated total density of immature female snow crab (*Chionoecetes opilio*) for the past five survey years.

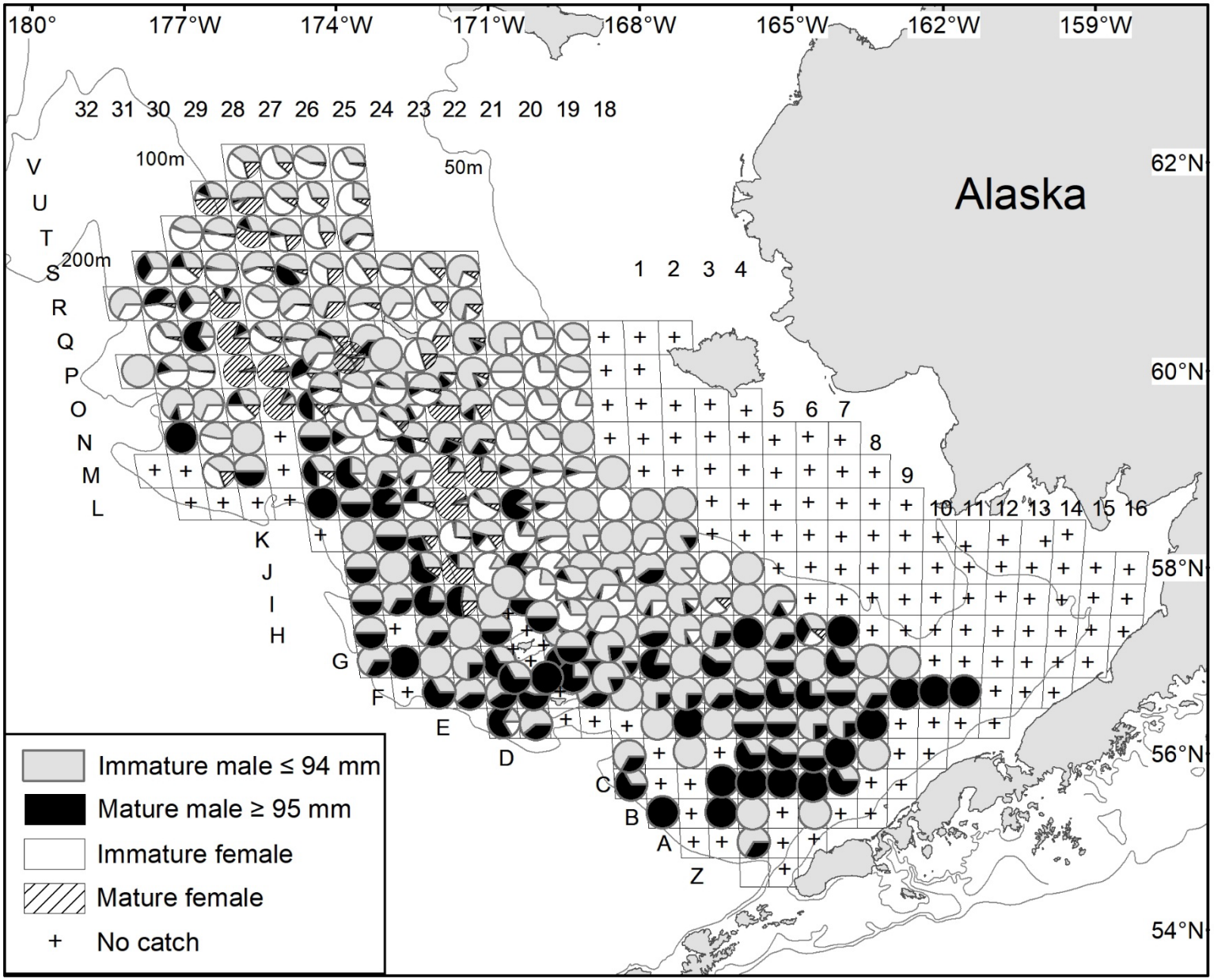

Figure 92. -- Proportion of male and female snow crab (*Chionoecetes opilio*) maturity classes caught at each station sampled in 2022.

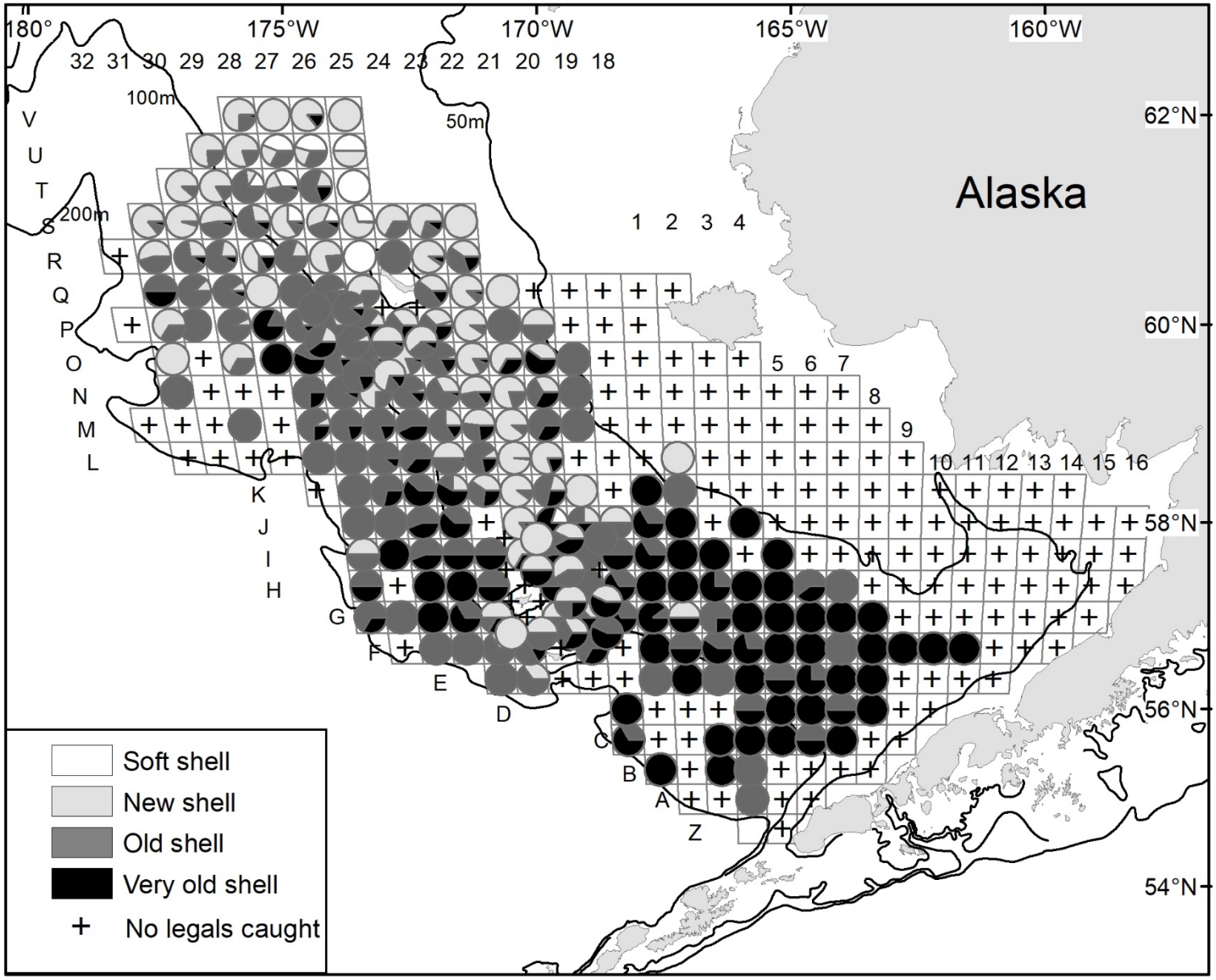

Figure 93. -- Proportion of legal-sized (carapace width ≥78) male snow crab (*Chionoecetes opilio*) shell condition classes caught at each station sampled in 2022.

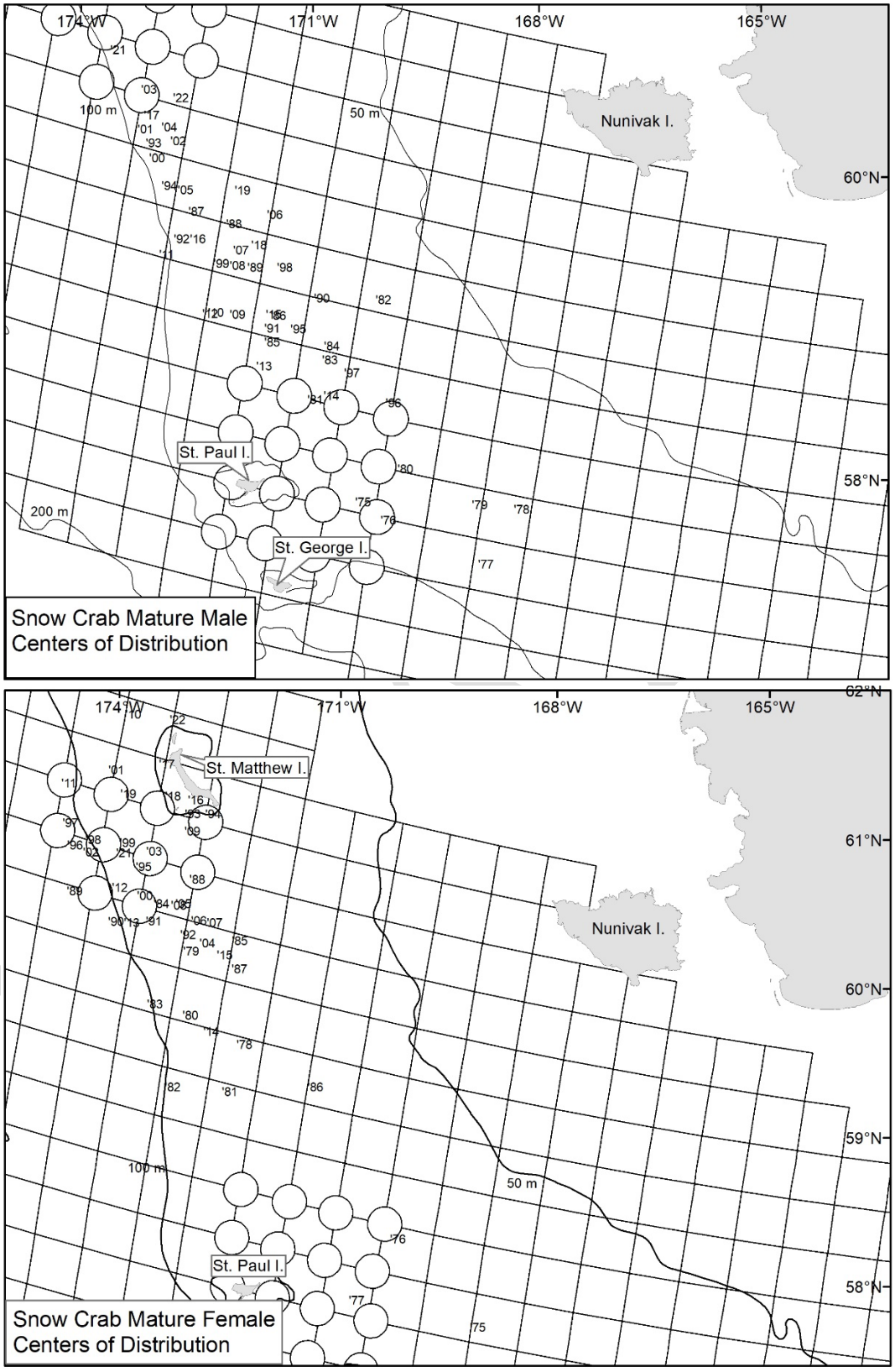

Figure 94. -- Centers of stock abundance of mature male (top) and female (bottom) snow crab (*Chionoecetes opilio*) from 1975 to 2022.

Chionoecetes spp. Hybrid Figures

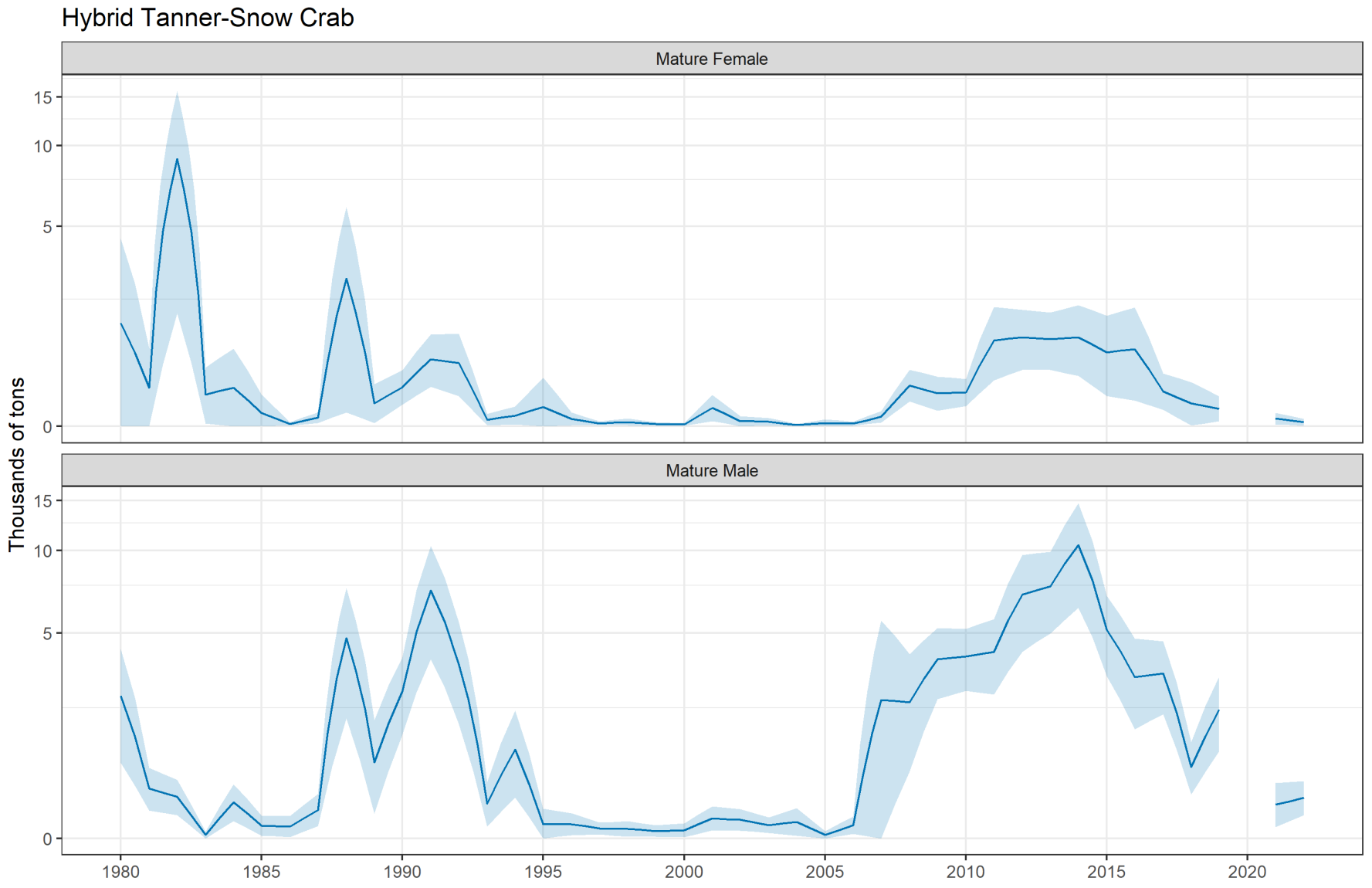

Figure 95. -- Historical biomass of mature female and mature male (≥ 95 mm carapace width) hybrid *Chionoecetes* spp. in the eastern Bering Sea. Light blue area indicates ± 95% CI. **Note that Y-axis is plotted on a log scale.**

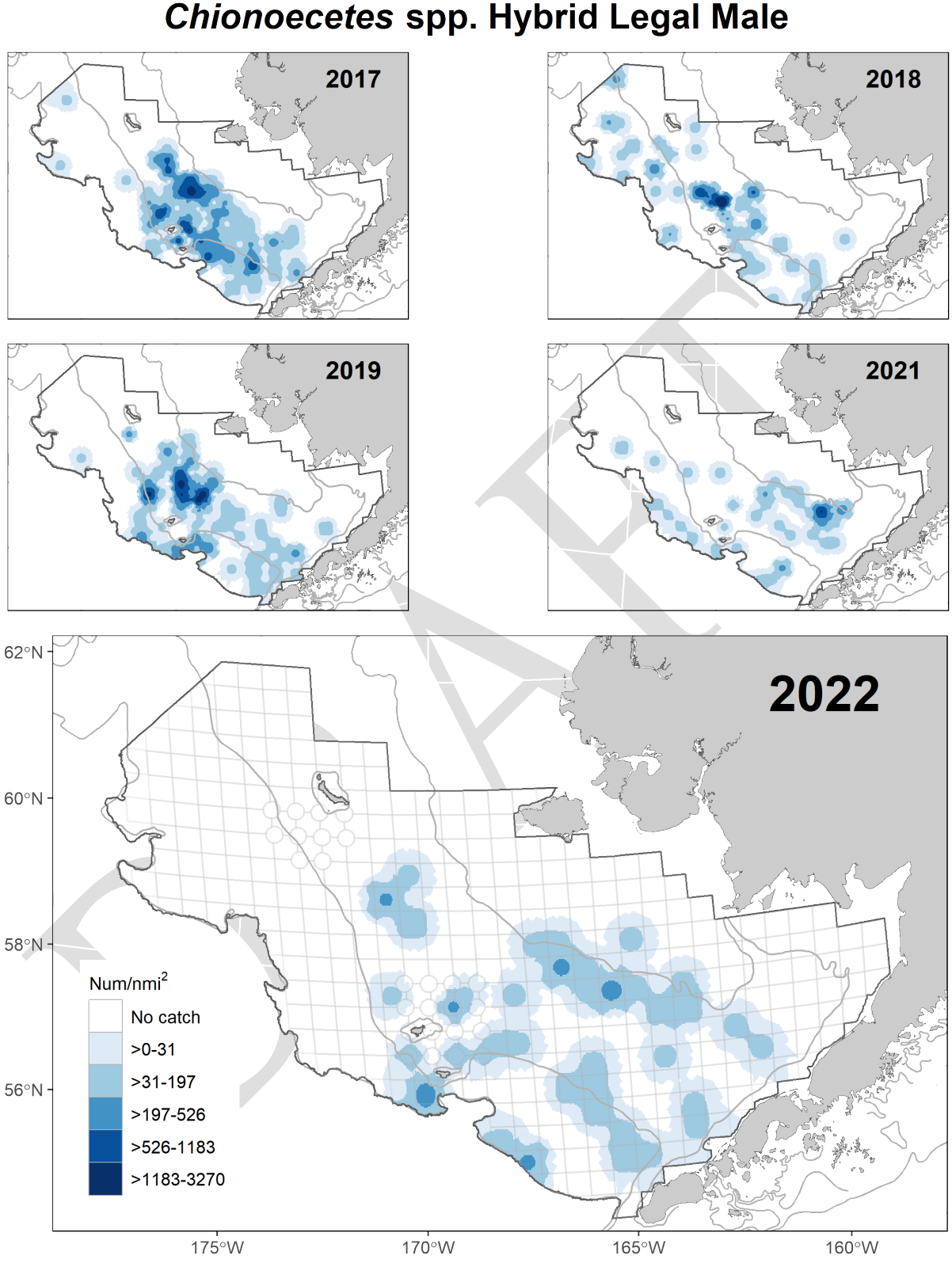

Figure 96. -- Estimated total density of legal-sized (≥ 102 mm carapace width) hybrid *Chionoecetes* spp. in the eastern Bering Sea for the past five survey years.

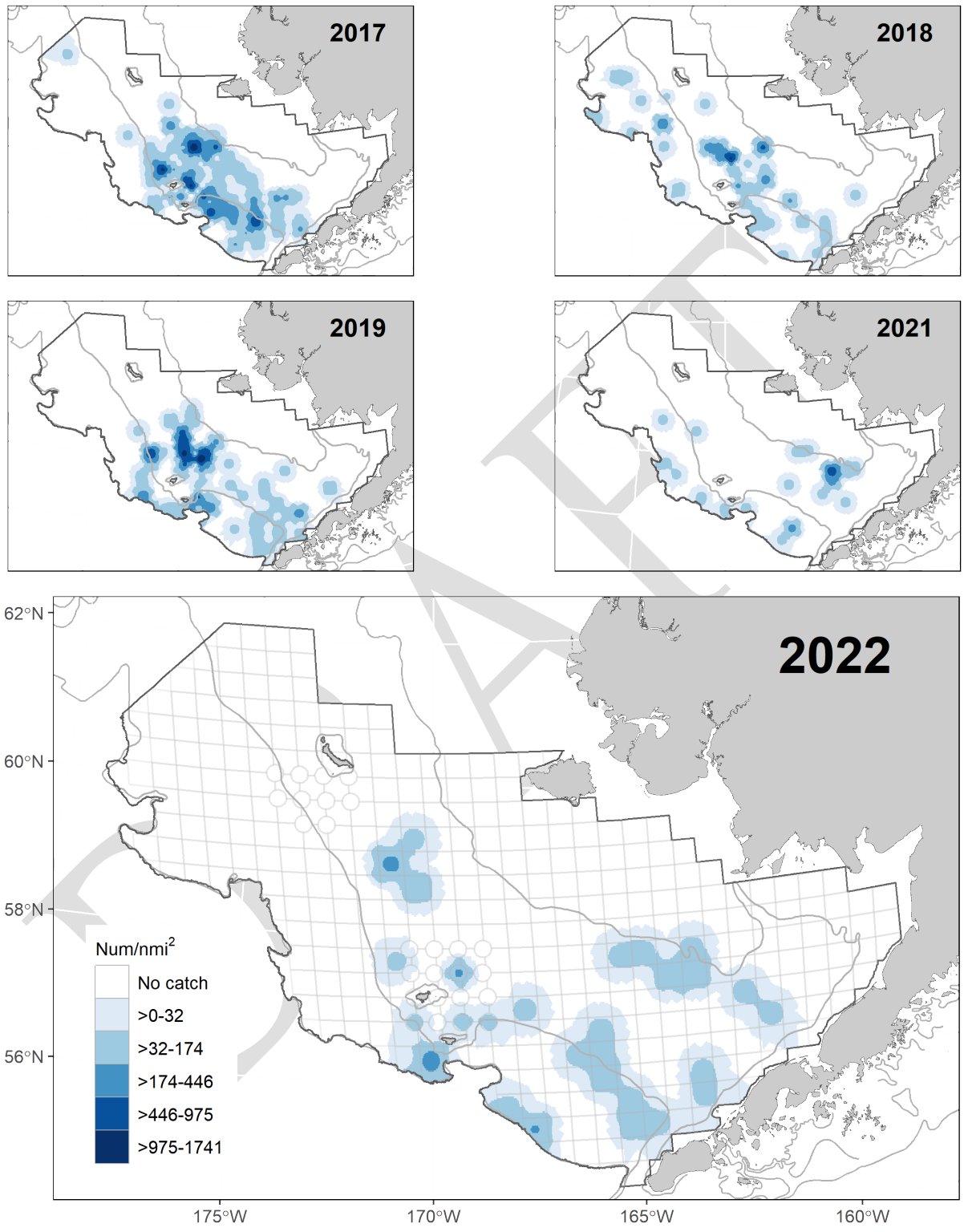

Figure 97. -- Estimated total density of mature-sized (≥ 95 mm carapace width) hybrid *Chionoecetes* spp. in the eastern Bering Sea for the past five survey years.

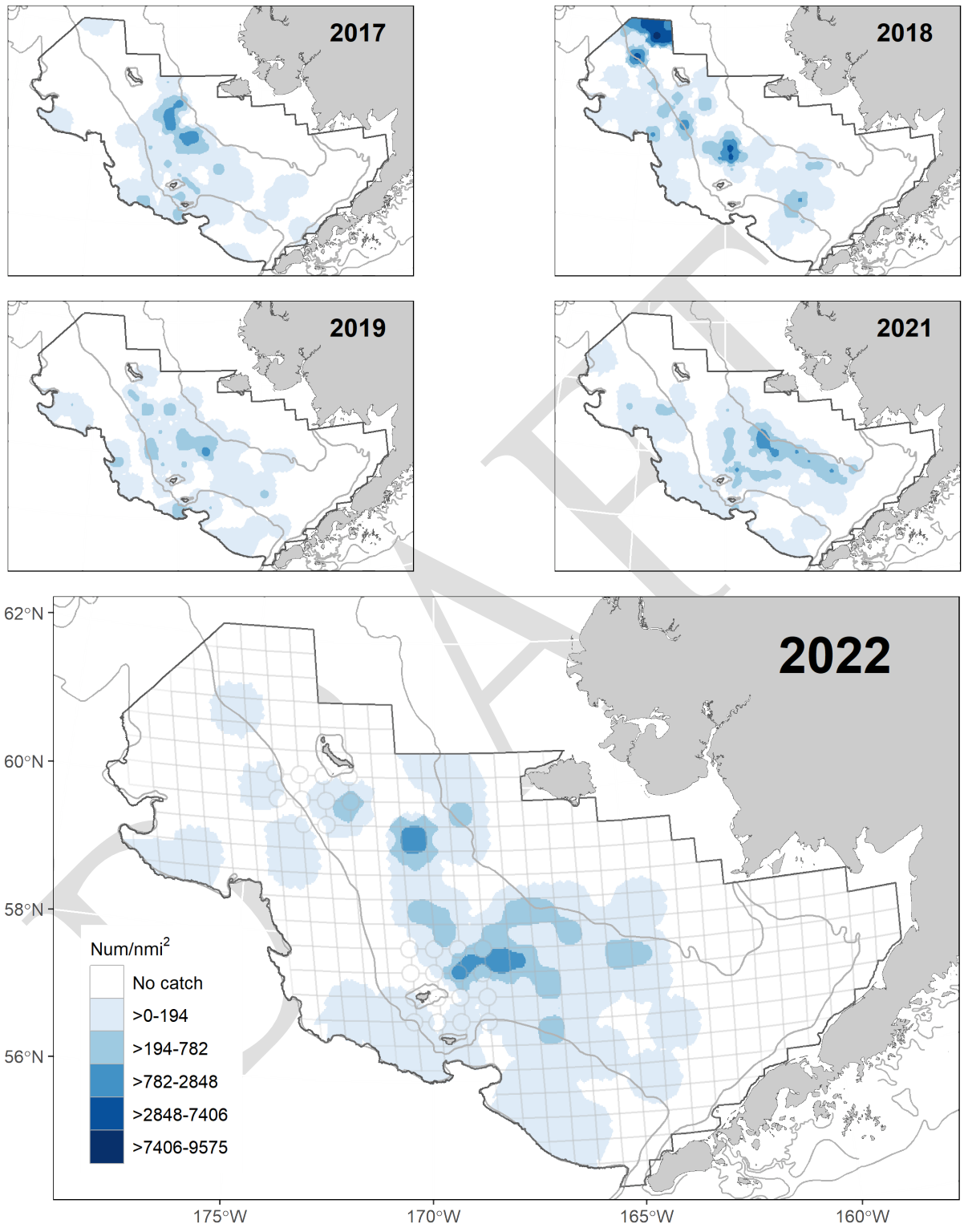

Figure 98. -- Estimated total density of immature-sized (< 95 mm carapace width) hybrid *Chionoecetes* spp. in the eastern Bering Sea for the past five survey years.

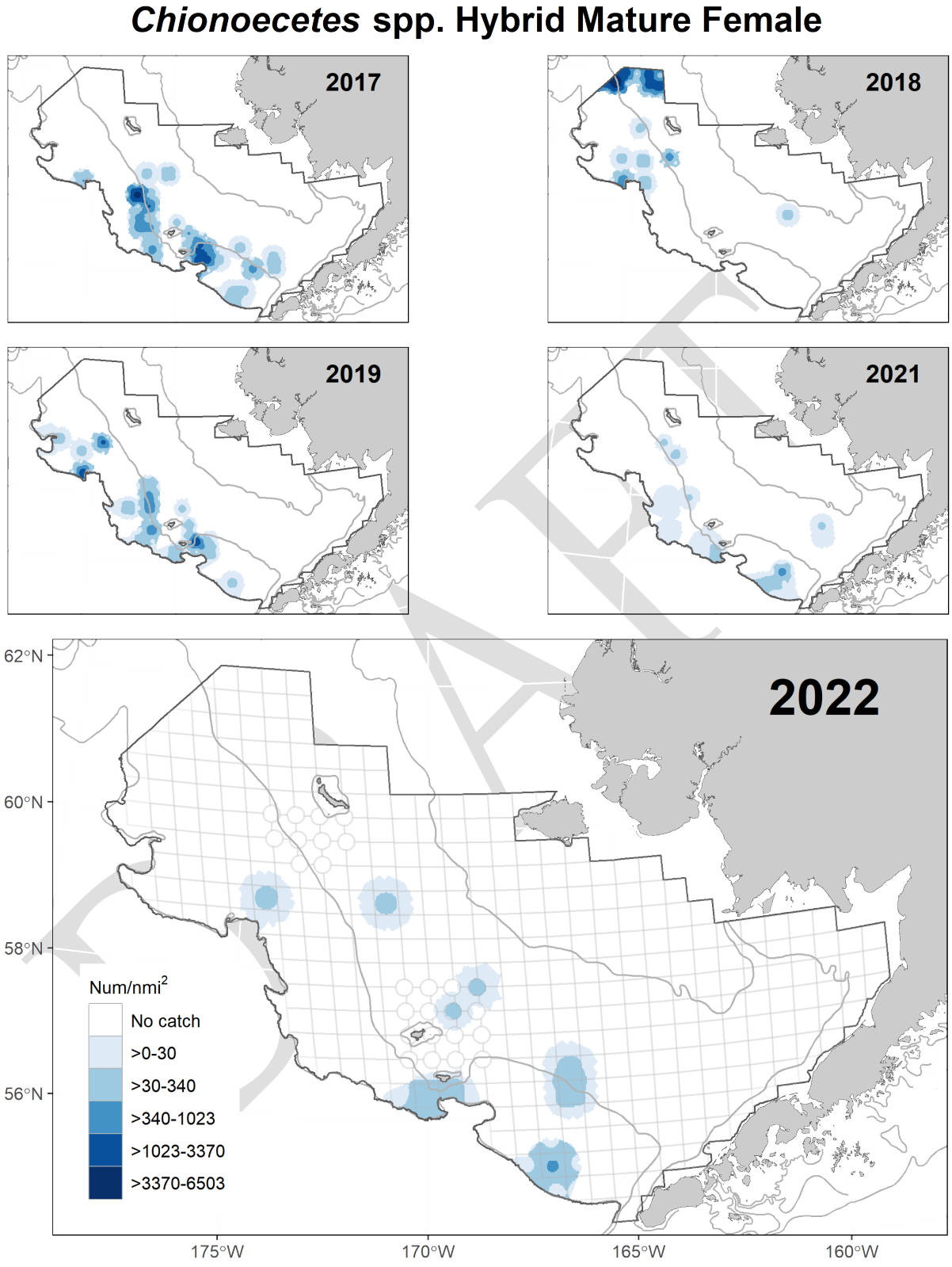

Figure 99. -- Estimated total density of mature female hybrid *Chionoecetes* spp. for the past five survey years.

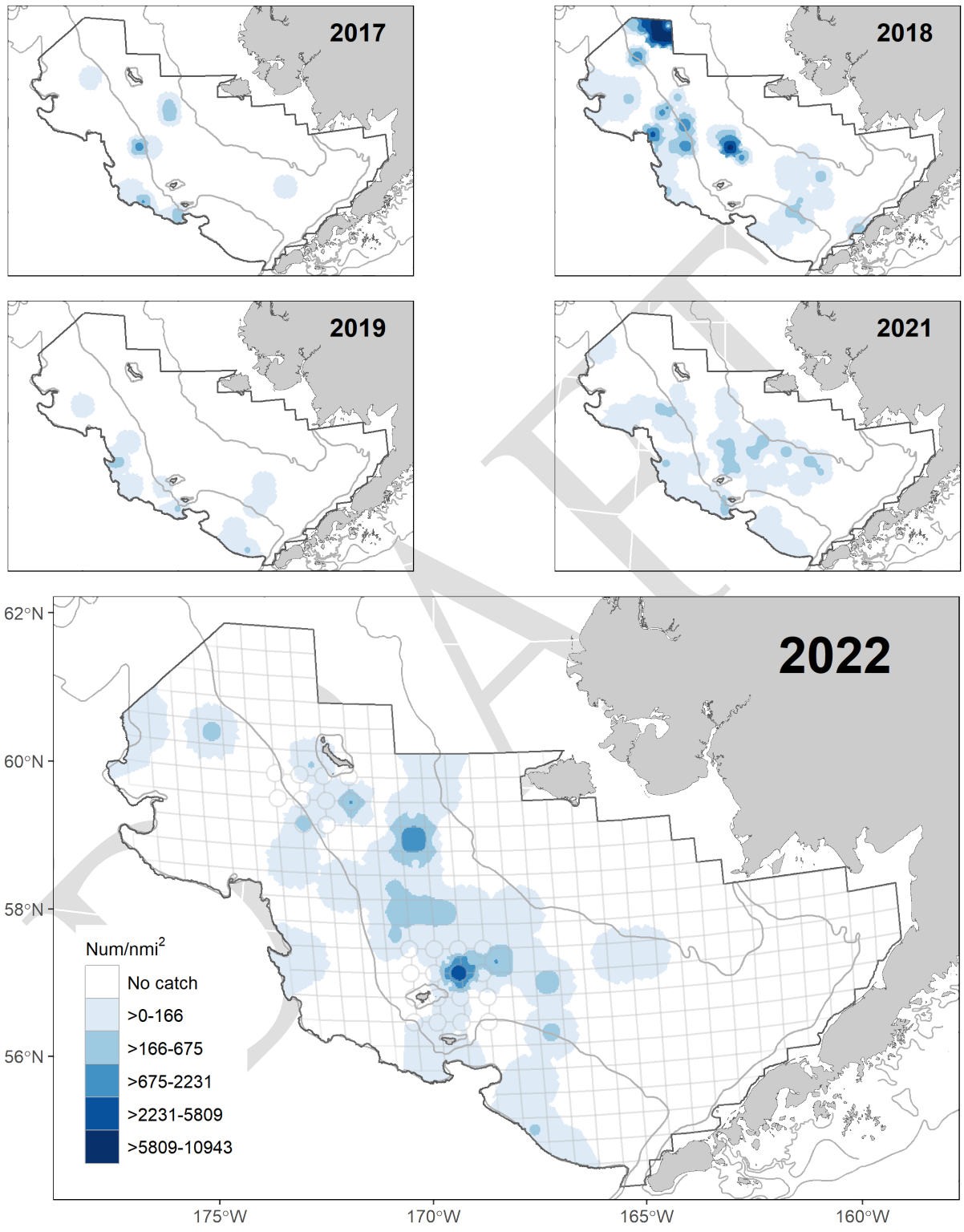

Figure 100. -- Estimated total density of immature female hybrid *Chionoecetes* spp. for the past five survey years.

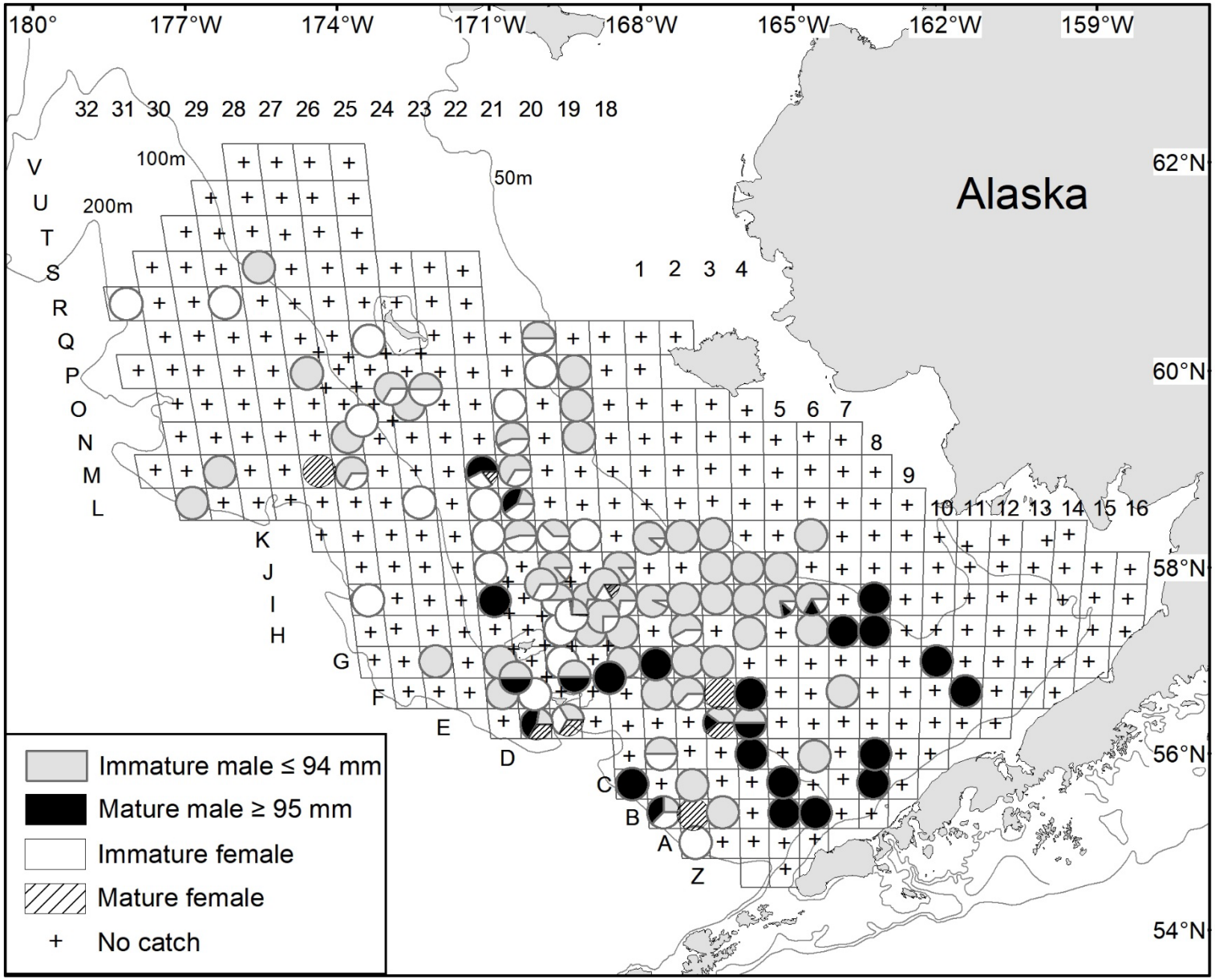

Figure 101. -- Proportion of male and female hybrid *Chionoecetes* spp. maturity classes caught at each station sampled in 2022.

Hair Crab Figures

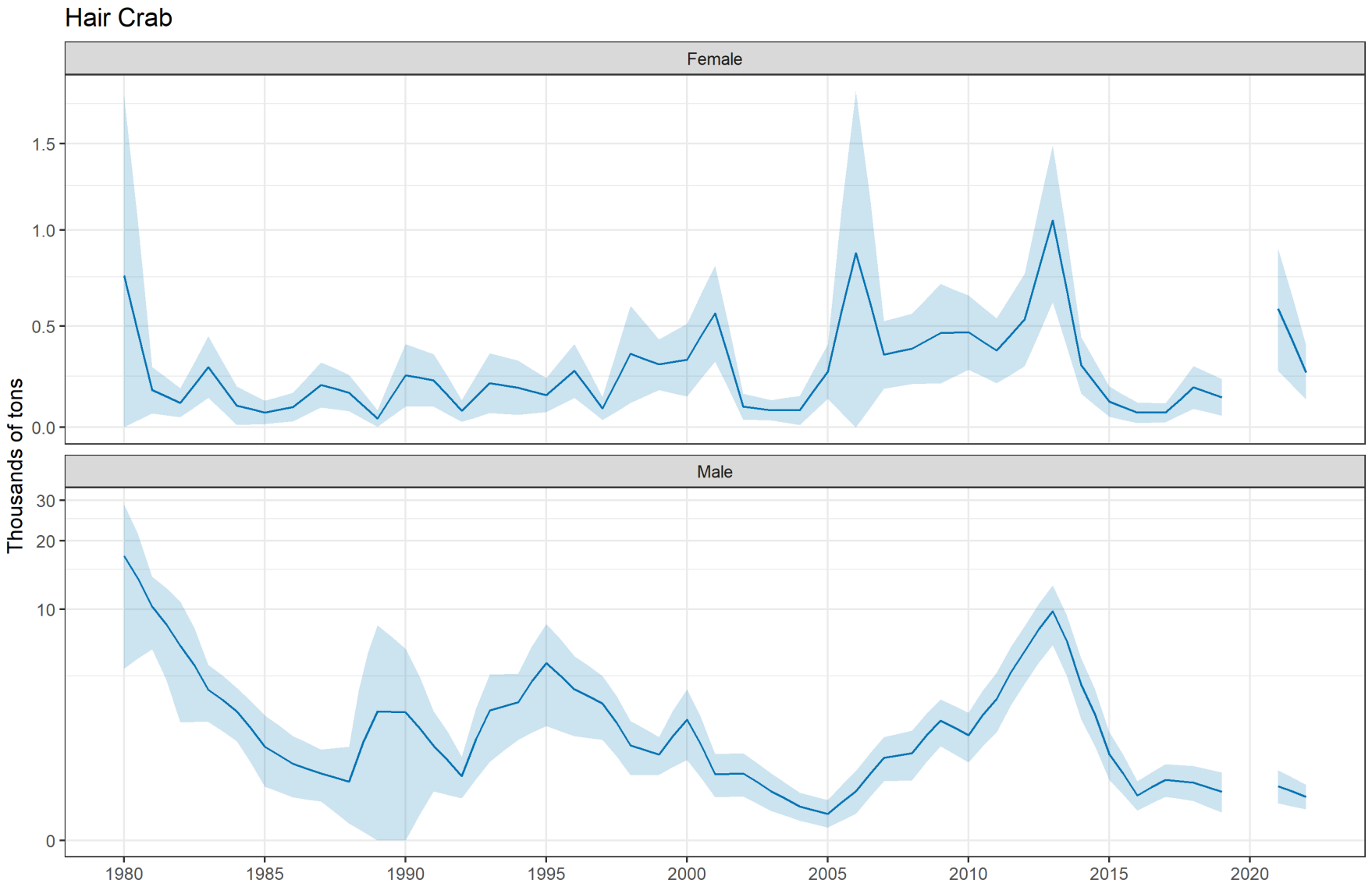

Figure 102. -- Historical biomass of female and male (all size categories) hair crab (*Erimacrus isenbeckii*) in the eastern Bering Sea. Light blue area indicates ± 95% CI. **Note that Y-axis is plotted on a log scale.**

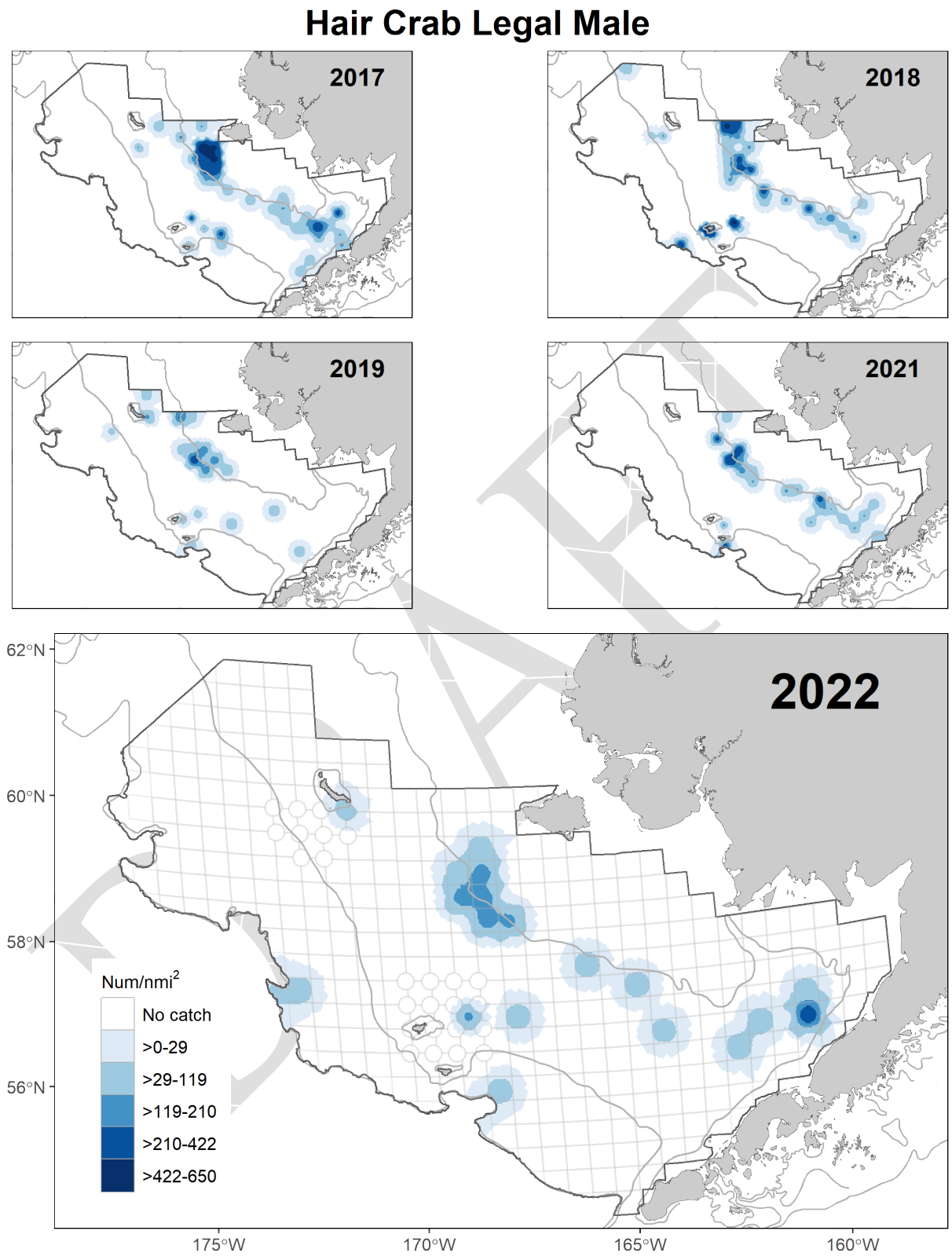

Figure 103. -- Estimated total density of legal-sized (≥ 83 mm carapace length) male hair crab (*Erimacrus isenbeckii*) for the past five survey years.

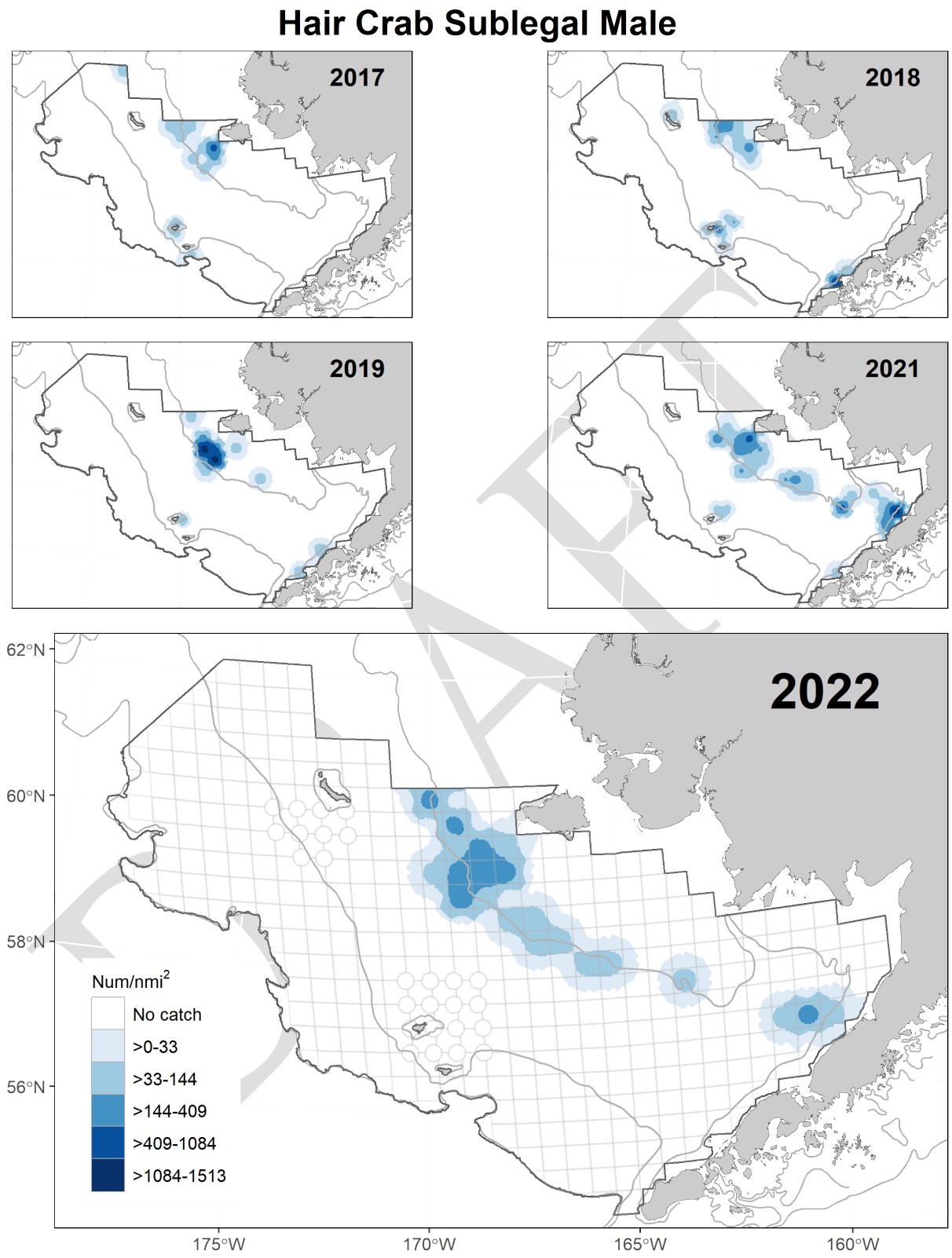

Figure 104. -- Estimated total density of sublegal-sized (< 83 mm carapace length) male hair crab (*Erimacrus isenbeckii*) for the past five survey years.

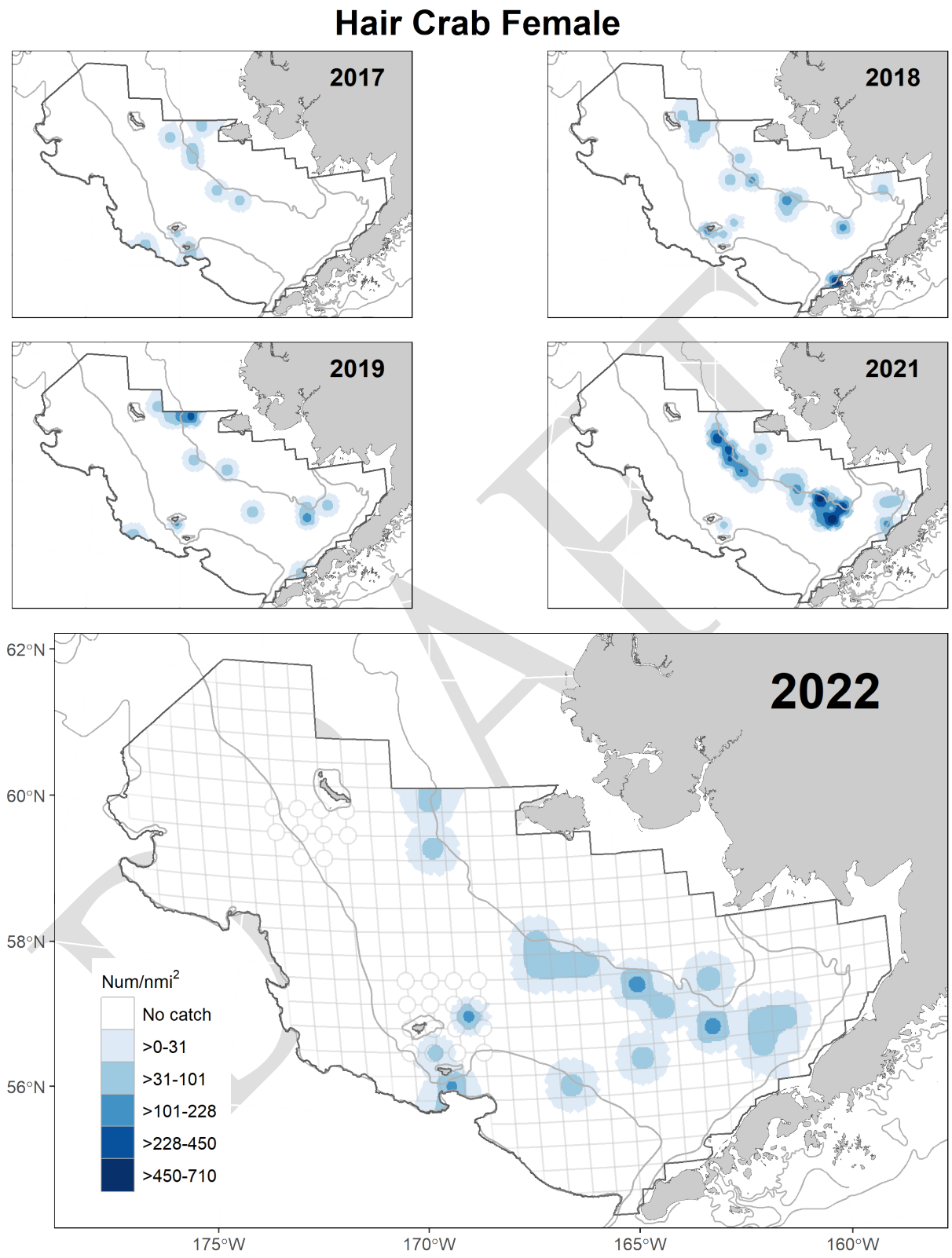

Figure 105. -- Estimated total density of female hair crab (*Erimacrus isenbeckii*) for the past five survey years.

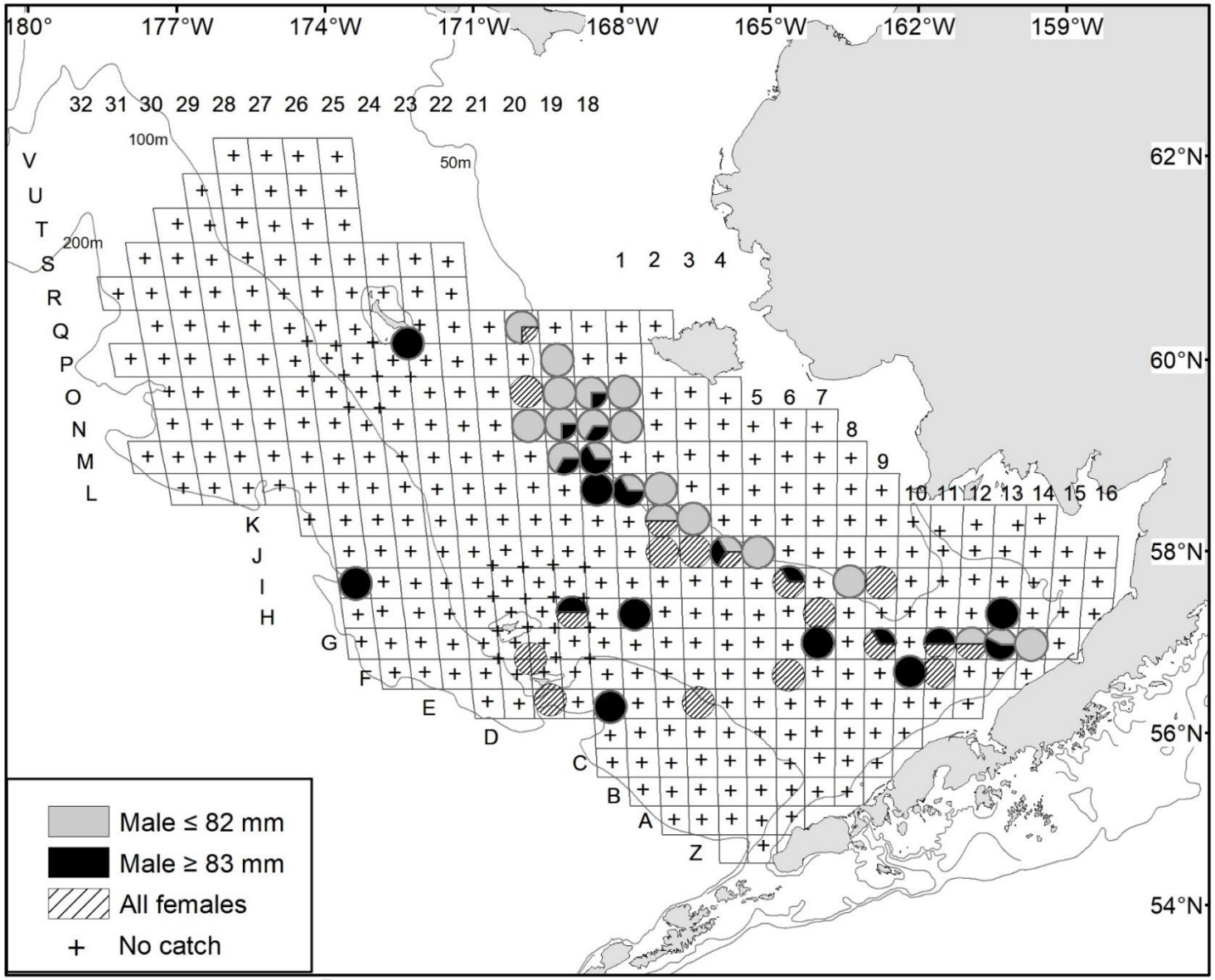

Figure 106. -- Proportion of male and female hair crab (*Erimacrus isenbeckii*) maturity classes caught at each station sampled in 2022.

Appendix A. – Tow details, crab density (number nmi^{-2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

Station	A-02	A-03	A-04	A-05	A-06	B-01	B-02	B-03	B-04	B-05	B-06
Start Date	6/19/2022	6/19/2022	6/13/2022	6/12/2022	6/12/2022	6/25/2022	6/19/2022	6/15/2022	6/13/2022	6/15/2022	6/12/2022
Duration (hour)	0.41	0.27	0.51	0.51	0.52	0.53	0.52	0.53	0.5	0.55	0.54
Distance Fished (km)	2.27	1.51	2.83	2.86	2.83	2.93	2.82	2.91	2.82	3.04	2.94
Mid-Latitude (ºN)	55.01	55	55.01	54.99	55.04	55.35	55.32	55.35	55.33	55.34	55.34
Mid-Longitude (ºW)	-166.92	-166.37	-165.75	-165.15	-164.54	-167.55	-166.97	-166.39	-165.78	-165.17	-164.55
Bottom Depth (m)	156	144	130	110	62	147	140	132	120	111	100
Bottom Temperature (ºC)	4	4	4	4.2	4.2	3.9	3.9	4	4.1	3.9	3.9
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	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	10434	3239	17753	4050	0	2133	2237	3744	6575	917	283
Mature males	904	997	470	71	0	502	1608	581	598	721	212
Legal	575	623	201	0	0	502	1048	387	332	590	212
Immature females	8462	6602	8787	4121	0	690	1747	2324	3387	1179	142
Mature females	575	4609	671	71	0	5708	5957	1356	66	0	0
Total weight (kg)	20.07	11.6	31.21	2.64	0	21.9	26.35	11.53	13.23	8.08	2.78
Snow Crab											
Immature males	0	0	134	0	0	0	0	0	66	0	71
Mature males	0	0	67	0	0	63	0	65	0	0	0
Legal	0	0	201	0	0	63	0	65	66	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	0	1.1	0	0	0.49	0	0.45	0.26	0	0.16
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	0	0	125	0	65	0	0	0
Males ≥ 78 mm	0	0	0	0	0	188	0	0	0	131	71
Immature females	82	0	0	0	0	188	0	0	0	0	0
Mature females	0	0	0	0	0	0	419	0	0	0	0
Total weight (kg)	0.08	0	0	0	0	2.22	0.69	0.08	0	1.25	0.31

Station	B-07	B-08	C-01	C-02	C-03	C-04	C-05	C-06	C-07	C-08	C-09

Appendix A. – Tow details, crab density (number nmi-^{2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

Start Date	6/11/2022	6/11/2022	6/25/2022	6/25/2022	6/15/2022	6/13/2022	6/15/2022	6/12/2022	6/12/2022	6/11/2022	6/4/2022
Duration (hour)	0.52	0.51	0.53	0.53	0.53	0.5	0.56	0.55	0.54	0.51	0.5
Distance Fished (km)	2.88	2.8	2.96	2.84	2.97	2.82	2.98	3.04	2.95	2.87	2.8
Mid-Latitude (ºN)	55.32	55.33	55.66	55.65	55.69	55.68	55.68	55.65	55.71	55.68	55.65
Mid-Longitude (ºW)	-164.02	-163.42	-167.57	-166.98	-166.38	-165.79	-165.19	-164.58	-163.99	-163.41	-162.82
Bottom Depth (m)	77	51	136	136	127	117	109	97	95	82	50
Bottom Temperature (ºC)	3.3	3.7	4	3.9	3.9	4	3.8	3	2.8	3.1	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	165
Legal	0	0	0	0	0	0	0	0	0	0	165
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	0	0	0	0	0	0	0	0	0	5.34
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	70	2955	435	374	545	3909	1191	2023	3398	355	0
Mature males	0	3031	62	250	424	326	1059	196	333	1420	0
Legal	0	2046	0	62	242	195	927	131	200	1278	0
Immature females	70	0	497	187	303	912	1390	1044	2665	0	83
Mature females	0	227	62	187	605	1173	3772	0	267	142	0
Total weight (kg)	0.12	35.7	1.04	2.6	6.18	18.42	22.42	4.74	7.9	14.96	0.05
Snow Crab											
Immature males	0	0	0	0	0	0	0	0	67	0	0
Mature males	0	0	0	0	121	130	265	131	133	0	0
Legal	0	0	0	0	121	130	265	131	133	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	0	0	0	1.15	1.22	2.16	1.06	1.08	0	0
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	62	0	0	0	0	0	0	0
Males ≥ 78 mm	0	0	0	0	0	0	66	0	0	71	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	0	0	0.1	0	0	0.61	0	0	0.56	0

Station	C-18	D-01	D-02	D-03	D-04	D-05	D-06	D-07	D-08	D-09	D-10
Start Date	6/26/2022	6/24/2022	6/24/2022	6/15/2022	6/13/2022	6/14/2022	6/12/2022	6/11/2022	6/11/2022	6/4/2022	6/4/2022
Duration (hour)	0.54	0.53	0.55	0.5	0.53	0.54	0.54	0.53	0.52	0.51	0.53

Appendix A. – Tow details, crab density (number nmi^{-2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

Distance Fished (km)	2.93	2.91	2.9	2.74	2.94	2.96	2.81	2.94	2.97	2.85	2.85
Mid-Latitude (°N)	55.66	56	56.03	56.01	56	56	55.97	56.01	56	56	56
Mid-Longitude (°W)	-168.18	-167.61	-167.02	-166.41	-165.81	-165.19	-164.57	-164.04	-163.38	-162.85	-162.27
Bottom Depth (m)	136	133	132	125	109	96	94	90	89	80	73
Bottom Temperature (°C)	4	4.1	3.7	3.8	3.5	3.1	2.7	2.6	2.7	3.1	3.3
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	75	2507
Legal	0	0	0	0	0	0	0	0	0	0	2286
Immature females	0	0	0	0	0	0	0	0	0	0	74
Mature females	0	0	0	0	0	0	0	0	0	0	74
Total weight (kg)	0	0	0	0	0	0	0	0	0	1.43	96.41
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	10195	444	192	814	1622	4985	41986	2242	1230	150	74
Mature males	128	63	64	475	324	133	0	0	410	0	0
Legal	64	63	0	271	130	133	0	0	205	0	0
Immature females	9203	444	128	271	649	3921	40999	1834	342	75	74
Mature females	1596	127	128	204	843	66	360	272	273	150	0
Total weight (kg)	16.28	1.41	1.23	5.55	9.4	3.62	13.92	2.8	7.8	0.78	0.16
Snow Crab											
Immature males	64	0	64	0	130	133	144	0	137	0	0
Mature males	128	0	0	0	259	199	144	136	0	0	0
Legal	192	0	0	0	389	332	216	136	137	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	1.03	0	0.14	0	2.48	2.44	1.57	0.68	0.51	0	0
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	63	0	0	0	0	72	0	0	0	0
Males ≥ 78 mm	64	0	0	0	130	0	0	0	68	0	0
Immature females	0	63	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)	0.61	0.03	0	0	0.95	0	0.19	0	0.58	0	0

Station	D-18	E-01	E-02	E-03	E-04	E-05	E-06	E-07	E-08	E-09	E-10
Start Date	6/26/2022	6/24/2022	6/24/2022	6/14/2022	6/14/2022	6/14/2022	6/13/2022	6/11/2022	6/10/2022	6/4/2022	6/3/2022
Duration (hour)	0.53	0.54	0.55	0.51	0.52	0.53	0.53	0.53	0.5	0.52	0.53
Distance Fished (km)	2.82	3	2.91	2.87	2.93	2.86	2.69	2.96	2.8	2.89	2.74
Mid-Latitude (°N)	55.97	56.33	56.34	56.34	56.34	56.34	56.33	56.35	56.33	56.33	56.34

Appendix A. – Tow details, crab density (number nmi^{-2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

Mid-Longitude (ºW)	-168.22	-167.65	-167.04	-166.45	-165.85	-165.21	-164.56	-163.97	-163.42	-162.83	-162.17
Bottom Depth (m)	148	129	113	104	93	85	88	86	85	78	75
Bottom Temperature (ºC)	4.1	3.7	3.3	2.7	2.5	2.3	2.2	2.2	2.5	2.9	3.4
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	76
Mature males	0	0	0	0	0	0	0	0	0	72	379
Legal	0	0	0	0	0	0	0	0	0	72	303
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	72	152
Total weight (kg)	0	0	0	0	0	0	0	0	0	6.13	18.9
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	27827	497	1935	3451	5482	3991	1756	2771	718	358	227
Mature males	133	124	749	1015	0	285	293	594	574	72	152
Legal	67	62	375	744	0	214	293	396	287	0	152
Immature females	34222	311	562	1489	7860	3848	1830	1253	215	0	0
Mature females	866	62	1186	1692	198	3634	220	858	431	0	0
Total weight (kg)	15.77	1.43	16.66	19.57	2.86	14.61	5.1	11.63	8.15	1.61	2.5
Snow Crab											
Immature males	133	62	0	68	198	143	220	198	0	0	0
Mature males	67	0	62	0	198	143	73	66	72	0	0
Legal	133	62	62	68	264	143	293	66	72	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	1	0.33	0.58	0.24	2.02	1.24	1.89	1.21	0.37	0	0
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	135	66	0	0	0	0	0	0
Males ≥ 78 mm	0	0	0	68	66	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	135	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	1.21	0.48	0	0	0	0	0	0

Station	E-11	E-12	E-18	E-19	E-20	E-21	E-22	F-01	F-02	F-03	F-04
Start Date	6/3/2022	6/3/2022	6/26/2022	6/25/2022	7/8/2022	7/7/2022	7/13/2022	6/24/2022	6/24/2022	6/14/2022	6/14/2022
Duration (hour)	0.53	0.52	0.52	0.53	0.28	0.54	0.52	0.53	0.55	0.51	0.51
Distance Fished (km)	2.99	2.92	2.71	2.93	1.58	3.07	2.89	2.97	2.88	2.8	2.74
Mid-Latitude (ºN)	56.33	56.33	56.3	56.35	56.37	56.33	56.35	56.66	56.66	56.66	56.66
Mid-Longitude (ºW)	-161.65	-160.98	-168.24	-168.87	-169.45	-170.06	-170.7	-167.67	-167.07	-166.43	-165.84
Bottom Depth (m)	64	53	151	128	128	110	120	102	96	84	79

Appendix A. – Tow details, crab density (number nmi-^{2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

Bottom Temperature (ºC)	3.7	4	4	3.8	3.8	3.1	4	2.4	2.5	2.4	2.4
Red King Crab											
Immature males	0	160	0	0	0	0	0	0	0	0	0
Mature males	363	320	0	0	0	0	0	0	0	0	0
Legal	290	320	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	363	800	0	0	0	0	0	0	0	0	0
Total weight (kg)	20.14	25.53	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	0	0	16754	8170	3941	4241	4997	535	2530	1802	1940
Mature males	73	0	1416	536	119	1139	205	201	259	300	224
Legal	73	0	1062	335	119	823	137	201	195	150	75
Immature females	0	80	13742	8639	3224	1329	4792	468	1946	1802	970
Mature females	73	0	1486	19043	1194	9317	479	201	324	4055	1492
Total weight (kg)	1.02	0.03	28.01	40.62	3.52	43.86	6.99	3.13	3.89	14.32	7.62
Snow Crab											
Immature males	0	0	0	0	0	696	68	201	389	676	224
Mature males	0	0	0	0	0	443	274	67	130	375	298
Legal	0	0	0	0	0	886	274	134	259	751	522
Immature females	0	0	0	0	0	0	68	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	0	0	5.24	2.3	1.25	2.17	4.42	3.12
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	0	119	127	0	67	454	0	0
Males ≥ 78 mm	0	0	0	0	0	253	0	0	0	0	75
Immature females	0	0	0	0	119	0	0	0	259	0	0
Mature females	0	0	0	0	119	190	0	0	0	75	0
Total weight (kg)	0	0	0	0	0.04	2.95	0	0.01	0.12	0.13	0.32

Station	F-05	F-06	F-07	F-08	F-09	F-10	F-11	F-12	F-13	F-14	F-18
Start Date	6/14/2022	6/13/2022	6/10/2022	6/10/2022	6/4/2022	6/4/2022	6/3/2022	6/3/2022	6/1/2022	5/31/2022	6/26/2022
Duration (hour)	0.54	0.53	0.54	0.52	0.53	0.53	0.52	0.52	0.52	0.56	0.53
Distance Fished (km)	2.91	2.85	2.9	2.97	2.91	2.91	2.83	2.87	2.84	2.97	2.86
Mid-Latitude (ºN)	56.67	56.65	56.69	56.66	56.67	56.69	56.68	56.68	56.67	56.66	56.65
Mid-Longitude (ºW)	-165.22	-164.63	-164.02	-163.41	-162.76	-162.17	-161.59	-160.96	-160.37	-159.8	-168.27
Bottom Depth (m)	76	75	75	75	73	71	86	70	60	38	107
Bottom Temperature (ºC)	2	2.2	2.3	2.6	3	3.1	3.3	3.7	3.8	5.1	2.5

Appendix A. – Tow details, crab density (number nmi-^{2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

Red King Crab											
Immature males	0	0	0	0	0	75	371	443	324	0	0
Mature males	0	0	0	67	73	75	1037	517	0	222	0
Legal	0	0	0	67	73	0	889	443	0	148	0
Immature females	0	0	0	0	0	0	0	1033	971	0	0
Mature females	0	0	68	0	0	0	0	1254	81	0	0
Total weight (kg)	0	0	2.14	2.51	3.72	2.39	44.59	47	7.66	7.9	0
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	4776	1506	205	1067	2252	75	296	74	243	0	540
Mature males	208	479	409	600	0	151	296	295	0	0	120
Legal	69	274	341	267	0	0	74	148	0	0	120
Immature females	3600	753	0	1201	1526	0	74	0	0	0	540
Mature females	1038	822	68	200	218	75	74	74	0	0	0
Total weight (kg)	7.32	7.85	4.49	7.2	2.53	1.64	3.61	3.17	0.07	0	1.29
Snow Crab											
Immature males	138	68	68	133	0	0	0	0	0	0	60
Mature males	346	205	68	67	73	75	74	0	0	0	0
Legal	415	205	68	200	73	75	74	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)	2.85	1.57	0.6	1.15	0.45	0.43	0.48	0	0	0	0.19
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	68	0	0	0	0	0	0	0	0
Males ≥ 78 mm	0	0	0	0	0	0	74	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	0	0.17	0	0	0	0.61	0	0	0	0

Station	F-19	F-20	F-21	F-22	F-23	F-24	F-25	G-01	G-02	G-03	G-04
Start Date	6/25/2022	6/30/2022	6/30/2022	7/7/2022	7/13/2022	7/14/2022	7/14/2022	6/24/2022	6/23/2022	6/20/2022	6/19/2022
Duration (hour)	0.53	0.54	0.54	0.51	0.53	0.53	0.49	0.54	0.52	0.54	0.53
Distance Fished (km)	2.95	2.9	2.85	2.87	2.99	2.97	2.7	3.03	2.85	2.99	2.82
Mid-Latitude (ºN)	56.68	56.68	56.65	56.67	56.66	56.68	56.67	56.98	57.01	57	56.98
Mid-Longitude (ºW)	-168.93	-169.55	-170.1	-170.73	-171.37	-171.96	-172.57	-167.7	-167.08	-166.5	-165.85
Bottom Depth (m)	99	79	98	114	119	126	135	78	74	74	73
Bottom Temperature (ºC)	2.4	4.1	3.5	3.3	3.4	3.6	3.9	2.5	2.9	2.1	1.9
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	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	3037	262	930	1196	3123	4548	143	1518	960	2305	763
Mature males	660	66	199	864	1083	64	0	207	74	349	0
Legal	594	66	133	797	574	64	0	207	74	210	0
Immature females	3830	131	465	598	2485	4292	71	414	295	978	69
Mature females	1519	0	465	598	637	256	0	483	222	419	278
Total weight (kg)	11.68	1.58	5.25	10.93	17.86	4.93	0.23	5.06	2.43	6.82	3.39
Snow Crab											
Immature males	198	0	266	199	382	256	0	138	148	140	69
Mature males	132	0	332	133	255	512	0	552	0	210	0
Legal	198	0	399	199	382	769	0	690	148	279	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)	1.95	0	3.04	1.61	3.18	5.14	0	4.42	0.73	1.73	0.29
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	66	0	0	0	0	148	140	0
Males ≥ 78 mm	0	0	0	0	0	0	0	69	0	0	0
Immature females	0	0	66	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	0	0.03	0.01	0	0	0	0.4	0.03	0.02	0

Station	G-05	G-06	G-07	G-08	G-09	G-10	G-11	G-12	G-13	G-14	G-15
Start Date	6/14/2022	6/13/2022	6/10/2022	6/10/2022	6/4/2022	6/4/2022	6/3/2022	6/2/2022	6/1/2022	5/31/2022	5/31/2022
Duration (hour)	0.54	0.54	0.52	0.54	0.54	0.54	0.52	0.53	0.53	0.53	0.53
Distance Fished (km)	2.94	2.83	2.88	3.01	2.88	2.91	2.81	2.89	2.93	2.83	2.98
Mid-Latitude (ºN)	57.01	56.98	57.01	57.01	57	57.01	57	57	56.99	56.99	57
Mid-Longitude (ºW)	-165.22	-164.62	-164.04	-163.41	-162.78	-162.16	-161.57	-160.92	-160.34	-159.72	-159.14
Bottom Depth (m)	72	69	68	67	60	60	69	68	63	56	32
Bottom Temperature (ºC)	1.5	2.3	2.4	2.1	3.1	3.7	3.3	3.8	3.8	4.2	5.1
Red King Crab											
Immature males	0	0	0	0	73	527	228	837	382	154	0
Mature males	0	423	69	198	441	828	685	609	229	154	0
Legal	0	423	69	198	367	452	457	457	76	154	0

Immature females	0	0	0	0	0	0	0	609	76	0	0
Mature females	0	0	0	66	955	527	76	1446	382	154	0
Total weight (kg)	0	18.37	3.26	10.9	38.87	39.32	24.99	43.76	15.6	11.29	0
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	1152	634	556	725	588	75	228	152	153	0	0
Mature males	474	211	347	264	367	75	228	152	0	154	0
Legal	339	0	69	132	147	75	0	152	0	154	0
Immature females	68	0	208	0	0	0	0	0	0	0	0
Mature females	339	423	69	330	220	0	76	228	0	0	0
Total weight (kg)	8.48	5.89	4.1	6.46	4.96	0.95	2.71	2.42	0.63	1.2	0
Snow Crab											
Immature males	136	141	69	66	73	0	0	0	0	0	0
Mature males	136	0	139	0	0	0	0	0	0	0	0
Legal	203	70	208	66	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)	1.66	0.38	1.16	0.35	0.18	0	0	0	0	0	0
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	0	0	0	0	0	0	0	0
Males ≥ 78 mm	0	0	0	0	0	75	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	0	0	0	0	0.59	0	0	0	0	0

Station	G-18	G-19	G-20	G-21	G-22	G-23	G-24	G-25	G-26	GF1918	GF2019
Start Date	6/26/2022	6/25/2022	6/29/2022	7/6/2022	7/7/2022	7/11/2022	7/14/2022	7/14/2022	7/15/2022	6/26/2022	6/25/2022
Duration (hour)	0.52	0.53	0.53	0.54	0.52	0.54	0.51	0.53	0.51	0.55	0.53
Distance Fished (km)	2.84	3.02	2.78	2.81	2.95	2.84	2.83	2.96	2.85	3.17	2.94
Mid-Latitude (ºN)	57	57.02	57	57	57	56.99	57.01	57	57.02	56.83	56.84
Mid-Longitude (ºW)	-168.35	-168.93	-169.55	-170.14	-170.78	-171.39	-172.05	-172.66	-173.25	-168.62	-169.32
Bottom Depth (m)	81	79	60	68	95	109	117	122	142	97	79
Bottom Temperature (ºC)	2.6	3.1	2.2	3.1	3.1	3.4	3.5	3.5	3.8	2.5	3.2
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	70	142	718	0	0	0	0	0	0	70
Legal	0	70	142	718	0	0	0	0	0	0	70
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	213	72	0	0	0	0	0	0	70

Total weight (kg)	0	2.78	10.81	41.61	0	0	0	0	0	0	6.02
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	762	418	567	216	512	3541	191	807	684	4541	211
Mature males	305	0	71	359	256	802	64	0	0	126	351
Legal	229	0	0	287	192	601	64	0	0	126	211
Immature females	229	70	0	0	0	1804	255	1614	820	6117	211
Mature females	381	0	283	0	512	401	0	0	0	63	211
Total weight (kg)	4.53	0.58	3.17	3.03	3.73	12.23	0.9	0.83	0.82	4.51	3.83
Snow Crab											
Immature males	381	279	71	0	128	200	128	0	137	505	70
Mature males	76	279	142	0	256	67	0	67	68	126	211
Legal	229	558	142	0	384	200	64	67	205	441	211
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	1.95	2.69	0.98	0	2.17	1.26	0.4	0.5	1.03	2.71	1.51
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	76	0	0	0	64	0	64	0	0	0	70
Males ≥ 78 mm	0	0	0	0	0	0	0	0	0	63	70
Immature females	0	0	142	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.19	0	0.02	0	0.27	0	0.01	0	0	0.62	1.07

Station	GF2120	GF2221	H-01	H-02	H-03	H-04	H-05	H-06	H-07	H-08	H-09
Start Date	6/29/2022	7/7/2022	6/23/2022	6/23/2022	6/20/2022	6/19/2022	6/13/2022	6/8/2022	6/8/2022	6/10/2022	6/5/2022
Duration (hour)	0.53	0.5	0.53	0.52	0.52	0.54	0.54	0.54	0.54	0.5	0.52
Distance Fished (km)	2.96	2.8	2.97	2.76	2.9	2.81	2.92	2.93	2.89	2.8	2.84
Mid-Latitude (ºN)	56.83	56.83	57.33	57.35	57.33	57.31	57.31	57.35	57.33	57.33	57.33
Mid-Longitude (ºW)	-169.85	-170.48	-167.74	-167.11	-166.49	-165.86	-165.21	-164.62	-164	-163.39	-162.73
Bottom Depth (m)	72	101	74	70	70	69	68	65	62	53	50
Bottom Temperature (ºC)	2.8	3.2	1.5	1.5	1.5	1	1.2	1	1.5	2	3.4
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	153	77
Mature males	69	0	0	0	0	69	0	0	214	1070	1622
Legal	69	0	0	0	0	69	0	0	214	841	1081
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	1147	1313
Total weight (kg)	2.43	0	0	0	0	2.49	0	0	7.38	62.82	85.37

Appendix A. – Tow details, crab density (number nmi-^{2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

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	69	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.76	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	962	924	700	1622	880	343	475	778	784	1835	1931
Mature males	1237	1320	70	369	880	206	68	354	1924	3058	3321
Legal	756	924	70	74	586	69	68	141	1568	2370	2780
Immature females	69	66	280	737	220	69	68	141	0	0	0
Mature females	137	198	560	442	293	548	136	566	285	76	77
Total weight (kg)	12	13.64	3.66	5.5	9.01	4.09	2.48	6.91	20.86	30.44	32.12
Snow Crab											
Immature males	0	66	350	958	366	0	136	212	0	0	0
Mature males	137	132	280	74	147	137	68	212	71	0	0
Legal	137	132	560	442	293	137	136	354	71	0	0
Immature females	0	0	0	221	0	0	0	141	0	0	0
Mature females	0	0	0	0	0	0	0	71	0	0	0
Total weight (kg)	0.8	1.28	2.5	2.51	1.74	0.99	0.95	2.77	0.42	0	0
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	66	0	516	0	69	0	71	0	0	0
Males ≥ 78 mm	0	66	0	0	0	0	0	0	143	153	0
Immature females	0	0	0	369	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0.75	0	0.22	0	0.11	0	0.13	0.93	1.28	0

Station	H-10	H-11	H-12	H-13	H-14	H-15	H-16	H-18	H-19	H-20	H-21
Start Date	6/5/2022	6/3/2022	6/2/2022	6/1/2022	5/31/2022	5/31/2022	5/30/2022	6/27/2022	6/27/2022	6/29/2022	7/6/2022
Duration (hour)	0.51	0.52	0.52	0.54	0.55	0.52	0.56	0.53	0.51	0.54	0.53
Distance Fished (km)	2.79	2.87	2.9	2.97	3.04	2.89	3	2.87	2.8	2.81	2.89
Mid-Latitude (ºN)	57.34	57.34	57.33	57.33	57.32	57.34	57.32	57.32	57.34	57.35	57.34
Mid-Longitude (ºW)	-162.15	-161.54	-160.91	-160.3	-159.67	-159.06	-158.42	-168.38	-169	-169.59	-170.22
Bottom Depth (m)	51	56	65	61	56	48	31	75	72	67	55
Bottom Temperature (ºC)	4	3.9	3.7	3.7	3.2	3.8	5	1.7	1.7	1.5	4.2
Red King Crab											
Immature males	644	320	983	376	71	0	0	0	0	0	0
Mature males	1369	480	907	225	71	153	0	0	72	566	144
Legal	644	320	529	150	71	0	0	0	72	566	144
Immature females	0	80	76	150	0	0	0	0	0	0	0
Mature females	161	640	4462	376	71	0	0	70	0	850	0
Total weight (kg)	39.64	32.78	98.02	16.93	5.38	3.34	0	1.64	3.5	51.32	7.28
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	72	0	0
Legal	0	0	0	0	0	0	0	0	72	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	288	0	0
Total weight (kg)	0	0	0	0	0	0	0	0	9.38	0	0
Tanner Crab											
Immature males	403	80	227	225	0	0	0	2648	360	920	0
Mature males	242	240	529	225	0	0	0	348	432	283	144
Legal	81	160	227	75	0	0	0	139	288	212	144
Immature females	0	0	0	0	0	0	0	1185	0	283	0
Mature females	0	320	529	0	0	0	0	279	0	0	0
Total weight (kg)	2.7	2.75	6.8	2.43	0	0	0	6.48	3.69	4.35	0.64
Snow Crab											
Immature males	0	0	0	0	0	0	0	767	144	425	0
Mature males	0	0	0	0	0	0	0	0	72	71	0
Legal	0	0	0	0	0	0	0	209	216	142	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	0	0	0	0	0	0	2.19	1.14	1.53	0
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	0	0	0	0	70	144	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	71	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	0	0	0	0	0.02	0.29	0.03	0

Station	H-22	H-23	H-24	H-25	H-26	HG1918	HG2019	HG2120	HG2221	I-01	I-02
Start Date	7/6/2022	7/11/2022	7/11/2022	7/15/2022	7/15/2022	6/26/2022	6/26/2022	6/29/2022	7/6/2022	6/27/2022	6/23/2022
Duration (hour)	0.51	0.52	0.52	0.51	0.51	0.54	0.54	0.53	0.53	0.53	0.52
Distance Fished (km)	2.91	2.82	2.83	2.81	2.84	3.02	3.04	3	2.86	2.89	2.93
Mid-Latitude (ºN)	57.35	57.32	57.33	57.35	57.31	57.17	57.16	57.18	57.13	57.66	57.67
Mid-Longitude (ºW)	-170.86	-171.47	-172.09	-172.82	-173.32	-168.63	-169.34	-169.88	-170.49	-167.77	-167.15
Bottom Depth (m)	83	100	107	116	121	76	72	49	54	69	67
Bottom Temperature (ºC)	2.9	2.9	2.5	3.7	3.8	2.1	2.3	3.3	4.1	0.9	0.7
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	0	482	204	145	0	0
Legal	0	0	0	0	0	0	482	204	145	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	70	276	136	0	0	0
Total weight (kg)	0	0	0	0	0	1.85	32.9	14.2	6.5	0	0
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	65	823	479	278	417	1687	551	409	0	3732	730
Mature males	325	617	68	70	0	703	345	68	0	276	657
Legal	195	549	0	70	0	281	207	68	0	69	657
Immature females	130	137	479	278	0	1195	138	136	0	1520	292
Mature females	65	343	0	0	0	141	69	0	0	207	219
Total weight (kg)	2.94	7.72	0.98	0.7	1.39	7.31	4.27	1.58	0	10.7	7.35
Snow Crab											
Immature males	65	137	137	0	69	492	207	0	0	1106	511
Mature males	65	0	68	0	69	141	207	0	0	138	73
Legal	130	69	205	0	139	492	276	0	0	207	365
Immature females	0	0	0	0	0	0	0	0	0	415	73
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.92	0.36	0.96	0	0.68	3.07	1.9	0	0	2.1	1.57
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	0	0	0	0	0	0	898	73
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	69	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	0	0	0	0	0	0	0.51	0.1

Station	I-03	I-04	I-05	I-06	I-07	I-08	I-09	I-10	I-11	I-12	I-13
Start Date	6/23/2022	6/20/2022	6/20/2022	6/8/2022	6/9/2022	6/9/2022	6/5/2022	6/5/2022	6/3/2022	6/2/2022	6/1/2022
Duration (hour)	0.53	0.53	0.54	0.54	0.53	0.53	0.54	0.52	0.48	0.53	0.53
Distance Fished (km)	2.78	2.95	2.98	2.93	2.91	2.88	2.97	2.9	2.62	2.86	2.85
Mid-Latitude (ºN)	57.68	57.67	57.65	57.67	57.66	57.68	57.66	57.68	57.68	57.69	57.67
Mid-Longitude (ºW)	-166.51	-165.87	-165.25	-164.62	-163.99	-163.39	-162.75	-162.13	-161.49	-160.85	-160.28
Bottom Depth (m)	66	65	61	55	53	48	44	48	53	57	54
Bottom Temperature (ºC)	0.7	0.6	0.9	1.3	2	2.8	3.9	3.8	3.4	3.3	3.6
Red King Crab											
Immature males	0	0	0	0	0	0	148	229	868	373	0
Mature males	0	140	64	0	71	224	296	153	608	373	0
Legal	0	140	64	0	71	224	74	153	434	75	0
Immature females	0	0	0	0	0	0	74	0	174	0	0
Mature females	0	0	0	0	0	0	369	229	782	149	80
Total weight (kg)	0	7.24	4.21	0	4.11	8.12	16.88	12.5	34.47	16.41	2.02
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	2014	6155	2443	1992	1212	447	74	0	0	75	0
Mature males	863	2798	1479	2213	1069	447	74	0	87	75	0
Legal	647	1399	1029	1549	642	373	74	0	0	75	0
Immature females	719	0	0	0	0	0	0	0	0	0	0
Mature females	719	1049	129	148	71	0	0	0	0	0	0
Total weight (kg)	12.16	39.39	21.3	22.11	12.01	4.46	0.73	0	0.56	0.85	0
Snow Crab											
Immature males	360	210	257	0	0	0	0	0	0	0	0
Mature males	0	0	64	0	0	0	0	0	0	0	0
Legal	144	0	129	0	0	0	0	0	0	0	0
Immature females	144	0	64	0	0	0	0	0	0	0	0
Mature females	72	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	1.31	0.4	1.49	0	0	0	0	0	0	0	0
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	72	70	450	295	0	0	0	0	0	0	0
Males ≥ 78 mm	0	0	64	74	0	75	0	0	0	0	0
Immature females	0	0	64	74	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.08	0.11	1.63	0.56	0	0.38	0	0	0	0	0

Station	I-14	I-15	I-16	I-18	I-19	I-20	I-21	I-22	I-23	I-24	I-25
Start Date	6/1/2022	5/31/2022	5/30/2022	6/27/2022	6/27/2022	7/1/2022	7/5/2022	7/6/2022	7/12/2022	7/11/2022	7/15/2022
Duration (hour)	0.53	0.53	0.53	0.53	0.52	0.53	0.53	0.5	0.52	0.51	0.52
Distance Fished (km)	2.69	2.93	2.81	2.91	2.87	2.8	2.86	2.82	2.74	2.66	2.93
Mid-Latitude (ºN)	57.66	57.68	57.67	57.66	57.67	57.66	57.68	57.66	57.65	57.65	57.67
Mid-Longitude (ºW)	-159.65	-159.02	-158.36	-168.41	-169.04	-169.65	-170.3	-170.89	-171.53	-172.15	-172.8
Bottom Depth (m)	51	45	36	70	69	71	73	86	99	107	118
Bottom Temperature (ºC)	3.2	3.9	4.7	1	0.9	1	2	2.7	2.3	2.3	3.3
Red King Crab											
Immature males	338	74	0	0	69	0	0	0	0	0	0
Mature males	169	0	83	0	0	287	1216	0	0	0	0
Legal	85	0	83	0	0	287	1216	0	0	0	0
Immature females	507	149	0	0	0	0	0	0	0	0	0
Mature females	338	0	83	0	69	0	143	0	0	0	0
Total weight (kg)	13.08	0.49	4.29	0	1.71	14.97	65.13	0	0	0	0
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	0	0	0	0	0	0	0	0	0	0

Appendix A. – Tow details, crab density (number nmi-^{2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

Tanner Crab											
Immature males	0	0	0	4081	20954	683	215	271	5945	1312	1069
Mature males	0	0	0	69	69	144	72	744	440	146	0
Legal	0	0	0	0	69	72	72	609	294	73	0
Immature females	0	0	0	2283	14558	1528	0	135	4770	1167	755
Mature females	0	0	0	346	69	0	143	474	220	0	0
Total weight (kg)	0	0	0	3.71	9.89	2.2	1.77	7.98	8.12	1.52	1.1
Snow Crab											
Immature males	0	0	0	1107	1532	5056	143	135	147	146	126
Mature males	0	0	0	69	69	502	143	0	367	510	63
Legal	0	0	0	138	275	933	215	135	440	656	189
Immature females	0	0	0	2628	1636	15527	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	147	0	0
Total weight (kg)	0	0	0	2.37	1.89	9.71	0.93	0.5	2.57	4	0.92
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	1798	1214	72	0	0	0	0	0
Males ≥ 78 mm	0	0	0	0	0	0	0	68	0	0	0
Immature females	0	0	0	692	491	72	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	0.58	0.73	0.12	0	0.47	0	0	0

Station	I-26	IH1918	IH2019	IH2120	IH2221	J-01	J-02	J-03	J-04	J-05	J-06
Start Date	7/21/2022	6/27/2022	6/27/2022	7/1/2022	7/6/2022	6/28/2022	6/23/2022	6/23/2022	6/20/2022	6/20/2022	6/8/2022
Duration (hour)	0.43	0.5	0.51	0.53	0.54	0.53	0.53	0.53	0.54	0.54	0.54
Distance Fished (km)	2.36	2.93	2.83	2.95	2.88	2.85	2.99	2.92	2.94	3	2.99
Mid-Latitude (°N)	57.66	57.49	57.51	57.49	57.51	57.99	58	58.01	58	57.99	58
Mid-Longitude (°W)	-173.38	-168.75	-169.36	-169.93	-170.59	-167.82	-167.18	-166.52	-165.89	-165.25	-164.61
Bottom Depth (m)	143	72	71	68	75	68	63	62	56	50	45
Bottom Temperature (°C)	3.9	1.3	1.3	1.6	3.2	0.9	0.5	0.6	1.3	2.5	2.3
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	73	0	0
Mature males	0	69	281	205	202	69	0	0	73	339	212
Legal	0	69	281	137	202	69	0	0	73	339	212
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	140	0	0	0	0	0	73	136	141
Total weight (kg)	0	3.3	18.36	6.71	15.22	2.53	0	0	5.32	19.72	11.82
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	70	0	0	0	0	0	0	0	0
Legal	0	0	70	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	69	70	0	0	0	0	0	0	0	0
Total weight (kg)	0	0.99	4.44	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	3122	1783	26008	546	202	138	2085	680	1025	136	282

Mature males	0	0	281	478	202	276	1582	1836	513	68	282
Legal	0	0	70	341	202	207	1079	1224	293	68	282
Immature females	3356	1234	29198	0	67	0	0	0	0	0	0
Mature females	78	0	70	68	135	0	216	0	0	136	71
Total weight (kg)	2.75	0.53	16.3	5.78	2.48	2.08	15.09	12.55	6.28	1.67	3.67
Snow Crab											
Immature males	78	137	2521	68	0	207	503	0	220	0	0
Mature males	78	0	632	68	0	138	0	0	0	0	0
Legal	156	0	1685	137	0	207	72	0	73	0	0
Immature females	0	69	6107	0	0	0	72	68	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.68	0.24	8.4	0.66	0	1.24	1.21	0.04	0.69	0	0
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	206	1458	0	0	0	0	340	146	136	0
Males ≥ 78 mm	0	0	211	0	0	0	0	0	0	0	0
Immature females	78	69	4441	0	0	0	0	0	0	0	0
Mature females	0	0	70	0	0	0	0	0	0	0	0
Total weight (kg)	0.03	0.06	2.55	0	0	0	0	0.68	0.19	0.2	0

Station	J-07	J-08	J-09	J-10	J-11	J-12	J-13	J-14	J-15	J-16	J-18
Start Date	6/9/2022	6/9/2022	6/6/2022	6/6/2022	6/2/2022	6/2/2022	6/2/2022	6/1/2022	5/31/2022	5/30/2022	6/28/2022
Duration (hour)	0.54	0.51	0.53	0.51	0.52	0.53	0.53	0.55	0.54	0.53	0.5
Distance Fished (km)	2.9	2.9	2.9	2.82	2.84	2.67	2.92	3.11	3.07	2.96	2.77
Mid-Latitude (°N)	57.98	57.99	57.99	58	58	58.01	58	57.99	58	57.98	58
Mid-Longitude (°W)	-164.01	-163.38	-162.75	-162.11	-161.48	-160.84	-160.24	-159.61	-158.98	-158.32	-168.44
Bottom Depth (m)	47	43	41	37	55	46	51	42	43	38	69
Bottom Temperature (°C)	3.1	3.6	3.9	4.2	3.9	3.2	3.8	4.3	4.5	4.3	0.9
Red King Crab											
Immature males	0	0	76	745	394	82	0	0	0	151	0
Mature males	72	0	0	331	158	163	0	71	0	0	140
Legal	72	0	0	83	158	82	0	71	0	0	140
Immature females	0	0	0	1158	236	82	221	0	0	0	0
Mature females	144	0	227	83	0	82	0	0	0	0	0
Total weight (kg)	5.53	0	5.06	16.74	8.8	6.77	0.73	3.07	0	0.1	7.4
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	72	0	76	0	0	0	0	0	0	0	1677
Mature males	215	0	0	0	0	0	0	0	0	0	0
Legal	72	0	0	0	0	0	0	0	0	0	0

Immature females	0	0	0	0	0	0	0	0	0	0	769
Mature females	0	0	0	0	0	0	0	0	0	0	210
Total weight (kg)	1.28	0	0.31	0	0	0	0	0	0	0	5.31
Snow Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	629
Mature males	0	0	0	0	0	0	0	0	0	0	210
Legal	0	0	0	0	0	0	0	0	0	0	280
Immature females	0	0	0	0	0	0	0	0	0	0	210
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	0	0	0	0	0	0	0	2.27
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	0	0	0	0	0	0	0	419
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	70
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	0	0	0	0	0	0	0	0.39

Station	J-19	J-20	J-21	J-22	J-23	J-24	J-25	J-26	JI1918	JI2019	JI2120
Start Date	7/2/2022	7/1/2022	7/5/2022	7/6/2022	7/12/2022	7/19/2022	7/19/2022	7/21/2022	6/28/2022	6/27/2022	7/1/2022
Duration (hour)	0.53	0.53	0.54	0.5	0.54	0.5	0.52	0.52	0.5	0.53	0.53
Distance Fished (km)	2.83	2.85	2.79	2.72	2.85	2.77	2.97	2.93	2.82	2.99	2.83
Mid-Latitude (ºN)	58	58	58.01	57.99	58	58	58.01	58	57.83	57.85	57.83
Mid-Longitude (ºW)	-169.08	-169.69	-170.34	-170.97	-171.6	-172.25	-172.85	-173.49	-168.73	-169.37	-169.98
Bottom Depth (m)	70	70	75	87	96	105	109	117	71	67	72
Bottom Temperature (ºC)	0.7	0.7	0.3	1.3	1.6	1.8	2.7	3.6	0.9	1	0.5
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	69	0	0	0	0	0	0	0	68	70
Legal	0	69	0	0	0	0	0	0	0	68	70
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	70
Total weight (kg)	0	2.76	0	0	0	0	0	0	0	2.62	5.55
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	485	577	70	424	141	341	253	1198	749	546	417
Mature males	0	0	70	424	212	0	126	399	0	68	0
Legal	0	0	70	212	212	0	126	266	0	0	0
Immature females	0	69	0	494	494	341	0	666	272	136	557
Mature females	277	0	0	71	71	0	126	67	136	136	0

Appendix A. – Tow details, crab density (number nmi^{-2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

Total weight (kg)	2.15	0.48	0.54	3.97	2.06	0.41	1.78	5.79	0.88	1.37	0.67
Snow Crab											
Immature males	1038	4466	209	353	423	205	253	266	817	546	209
Mature males	69	208	906	0	212	410	0	266	68	205	0
Legal	277	347	906	0	564	614	190	533	68	478	70
Immature females	900	27103	139	1765	0	0	0	0	341	887	696
Mature females	0	0	0	0	1128	68	0	0	0	0	0
Total weight (kg)	2.31	8.57	5.13	0.44	3.69	3.75	1.01	3.09	1.66	2.75	0.61
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	450	0	0	0	0	0	0	272	0	139
Males ≥ 78 mm	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	69	0	212	0	0	0	0	68	0	70
Mature females	0	0	0	0	0	0	0	0	68	0	0
Total weight (kg)	0	0.26	0	0.04	0	0	0	0	0.28	0	0.09

Station	JI2221	K-01	K-02	K-03	K-04	K-05	K-06	K-07	K-08	K-09	K-10
Start Date	7/5/2022	6/28/2022	6/23/2022	6/22/2022	6/21/2022	6/20/2022	6/7/2022	6/8/2022	6/6/2022	6/6/2022	6/6/2022
Duration (hour)	0.54	0.58	0.52	0.53	0.54	0.54	0.54	0.48	0.54	0.52	0.53
Distance Fished (km)	2.82	3.24	2.93	2.86	2.97	2.97	2.94	2.71	2.9	2.93	3
Mid-Latitude (ºN)	57.85	58.31	58.33	58.35	58.33	58.33	58.34	58.32	58.33	58.33	58.31
Mid-Longitude (ºW)	-170.6	-167.83	-167.19	-166.55	-165.91	-165.28	-164.64	-164	-163.37	-162.74	-162.09
Bottom Depth (m)	78	61	52	48	44	48	46	41	39	32	47
Bottom Temperature (ºC)	2.4	0.8	1.5	2.3	3.3	4	2.8	3.8	4.1	4.8	5
Red King Crab											
Immature males	0	0	0	0	0	0	0	88	0	0	465
Mature males	72	0	150	0	222	136	72	176	77	0	0
Legal	72	0	75	0	74	68	72	88	77	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	78
Mature females	0	0	0	0	222	204	217	88	154	0	78
Total weight (kg)	2.5	0	5.54	0	8.66	5.51	7.78	6.63	8.36	0	5.68
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	215	318	376	69	369	0	72	0	0	0	0
Mature males	143	127	150	138	0	0	0	0	0	0	0
Legal	72	127	0	69	0	0	0	0	0	0	0
Immature females	0	191	75	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	1.84	1.08	1.52	0.71	1.04	0	0.18	0	0	0	0

Appendix A. – Tow details, crab density (number nmi-^{2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

Snow Crab											
Immature males	72	127	376	0	0	0	0	0	0	0	0
Mature males	0	0	75	0	0	0	0	0	0	0	0
Legal	0	64	150	0	0	0	0	0	0	0	0
Immature females	0	64	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)	0.17	0.43	0.95	0	0	0	0	0	0	0	0
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	510	376	138	0	0	72	0	0	0	0
Males ≥ 78 mm	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	64	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	0.3	0.53	0.23	0	0	0.17	0	0	0	0

Station	K-11	K-12	K-13	K-14	K-18	K-19	K-20	K-21	K-22	K-23	K-24
Start Date	6/2/2022	6/2/2022	6/1/2022	6/1/2022	6/28/2022	7/2/2022	7/5/2022	7/5/2022	7/6/2022	7/12/2022	7/19/2022
Duration (hour)	0.51	0.31	0.54	0.54	0.51	0.53	0.53	0.52	0.49	0.53	0.52
Distance Fished (km)	2.93	1.77	3.02	3.07	2.89	2.74	2.83	2.92	2.71	2.77	2.87
Mid-Latitude (ºN)	58.22	58.29	58.28	58.35	58.32	58.34	58.34	58.34	58.34	58.32	58.33
Mid-Longitude (ºW)	-161.54	-160.81	-159.97	-159.53	-168.47	-169.11	-169.73	-170.39	-171.02	-171.65	-172.31
Bottom Depth (m)	40	33	41	24	66	68	70	75	84	94	103
Bottom Temperature (ºC)	4.4	5.4	4.4	5.6	0.8	0.9	0.4	0	-0.6	-0.6	0.7
Red King Crab											
Immature males	237	0	0	0	0	0	0	0	0	0	0
Mature males	158	0	74	0	0	0	0	0	0	0	0
Legal	79	0	0	0	0	0	0	0	0	0	0
Immature females	316	0	74	0	0	0	0	0	0	0	0
Mature females	79	124	0	0	0	0	0	0	0	0	0
Total weight (kg)	6.57	1.03	1.64	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	0	0	0	0	135	291	207	407	0	708	520
Mature males	0	0	0	0	0	0	69	0	0	0	65
Legal	0	0	0	0	0	0	69	0	0	0	65
Immature females	0	0	0	0	0	73	0	203	149	1133	520
Mature females	0	0	0	0	0	73	69	0	0	212	0
Total weight (kg)	0	0	0	0	0.33	0.69	0.91	0.31	0.01	0.97	0.87
Snow Crab											
Immature males	0	0	0	0	68	581	2966	1831	1119	1982	715

Mature males	0	0	0	0	0	0	276	1221	448	283	390
Legal	0	0	0	0	0	145	966	1356	1119	849	845
Immature females	0	0	0	0	0	145	2345	7833	522	5734	65
Mature females	0	0	0	0	0	0	0	0	373	142	195
Total weight (kg)	0	0	0	0	0.17	1.28	8.32	7.75	5.87	5.63	4.86
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	0	0	0	207	407	0	0	0
Males ≥ 78 mm	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	73	345	339	224	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	0	0	0.09	0.43	0.23	0.03	0	0
Station	K-25	K-26	K-27	L-01	L-02	L-03	L-04	L-05	L-06	L-07	L-08
Start Date	7/19/2022	7/21/2022	7/21/2022	6/28/2022	6/22/2022	6/22/2022	6/21/2022	6/20/2022	6/7/2022	6/8/2022	6/6/2022
Duration (hour)	0.52	0.5	0.26	0.53	0.54	0.53	0.52	0.52	0.54	0.5	0.54
Distance Fished (km)	2.87	2.74	1.43	3.05	3.02	2.8	2.87	2.82	3.03	2.79	2.97
Mid-Latitude (ºN)	58.34	58.33	58.34	58.65	58.67	58.69	58.66	58.65	58.68	58.67	58.66
Mid-Longitude (ºW)	-172.91	-173.57	-174.3	-167.87	-167.21	-166.57	-165.94	-165.3	-164.65	-164	-163.35
Bottom Depth (m)	109	115	158	49	45	41	37	41	38	34	32
Bottom Temperature (ºC)	2.5	3.4	3.7	2.7	3.5	3.7	4.7	4.5	3.4	4.5	5.1
Red King Crab											
Immature males	0	0	0	0	0	76	163	0	0	0	0
Mature males	0	0	0	0	71	227	163	310	293	0	0
Legal	0	0	0	0	0	151	0	310	146	0	0
Immature females	0	0	0	0	0	0	81	0	0	0	0
Mature females	0	0	0	0	0	151	407	774	220	0	0
Total weight (kg)	0	0	0	0	1.19	7.91	9.74	29.58	13.92	0	0
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	0	1483	131	0	0	0	0	0	0	0	0
Mature males	0	989	0	0	0	0	0	0	0	0	0
Legal	0	777	0	0	0	0	0	0	0	0	0
Immature females	129	353	0	0	0	0	0	0	0	0	0
Mature females	0	1554	131	0	0	0	0	0	0	0	0
Total weight (kg)	0.08	15.3	0.11	0	0	0	0	0	0	0	0
Snow Crab											
Immature males	258	212	0	138	71	0	0	0	0	0	0
Mature males	258	0	0	0	0	0	0	0	0	0	0
Legal	452	212	0	0	71	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)	2.8	0.96	0	0.09	0.29	0	0	0	0	0	0
Chionoecetes spp. Hybrid											
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	0	0	0	0	0	0	0	0	0	0
Station	L-09	L-18	L-19	L-20	L-21	L-22	L-23	L-24	L-25	L-26	L-27
Start Date	6/6/2022	6/28/2022	7/2/2022	7/4/2022	7/5/2022	7/5/2022	7/12/2022	7/16/2022	7/20/2022	7/20/2022	7/22/2022
Duration (hour)	0.53	0.5	0.54	0.36	0.52	0.52	0.53	0.53	0.53	0.51	0.52
Distance Fished (km)	3.01	2.77	2.89	1.99	2.92	2.91	2.81	2.91	2.96	2.87	2.9
Mid-Latitude (ºN)	58.65	58.67	58.65	58.68	58.66	58.66	58.66	58.68	58.67	58.68	58.68
Mid-Longitude (ºW)	-162.72	-168.5	-169.14	-169.78	-170.43	-171.08	-171.72	-172.37	-173.02	-173.62	-174.27
Bottom Depth (m)	27	54	63	67	74	83	91	102	113	126	156
Bottom Temperature (ºC)	6	2.1	1.1	0.8	-0.1	-0.4	-0.2	0.4	2.8	3.3	3.6
Red King Crab											
Immature males	0	74	0	0	0	0	0	0	0	0	0
Mature males	0	149	0	0	0	0	0	0	0	0	0
Legal	0	149	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	5.02	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	0	0	0	0	65	64	72	1778	125	454	823
Mature males	0	0	0	0	0	0	215	64	125	65	0
Legal	0	0	0	0	0	0	143	0	62	65	0
Immature females	0	0	0	0	195	0	0	699	0	324	1266
Mature females	0	0	0	0	0	0	215	191	312	0	0
Total weight (kg)	0	0	0	0	0.3	0.02	2.03	3.18	2.33	1.56	0.57
Snow Crab											
Immature males	0	0	70	1300	2121	2812	4729	572	62	130	0
Mature males	0	0	0	300	15469	511	4586	572	499	130	127
Legal	0	0	0	500	17085	2045	7954	699	561	259	127
Immature females	0	74	0	1100	1363	4346	0	1016	0	0	0
Mature females	0	0	0	0	0	639	102589	127	0	0	0

Total weight (kg)	0	0.03	0.15	2.91	99.16	12.43	125.09	5.19	4.03	1.56	0.99
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	0	65	0	0	0	0	0	0
Males ≥ 78 mm	0	0	0	0	130	0	0	0	0	0	0
Immature females	0	0	0	0	130	192	0	64	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	0	0.7	0.02	0	0.02	0	0	0
Station	L-28	L-29	L-30	L-31	M-01	M-02	M-03	M-04	M-05	M-06	M-07
Start Date	7/22/2022	7/22/2022	7/22/2022	7/23/2022	6/29/2022	6/22/2022	6/22/2022	6/21/2022	6/21/2022	6/7/2022	6/7/2022
Duration (hour)	0.53	0.52	0.52	0.52	0.52	0.51	0.54	0.54	0.54	0.51	0.53
Distance Fished (km)	2.99	2.93	2.85	2.92	2.96	2.84	3.05	3.01	2.9	2.3	2.73
Mid-Latitude (°N)	58.7	58.67	58.67	58.67	59	59	59.02	59.01	58.98	59	58.99
Mid-Longitude (°W)	-174.9	-175.54	-176.22	-176.86	-167.9	-167.24	-166.6	-165.93	-165.29	-164.63	-163.98
Bottom Depth (m)	183	135	139	135	42	39	33	31	27	28	27
Bottom Temperature (°C)	3.6	3.6	3.4	3.6	4.5	4.2	4.9	6	6.6	5.2	5.4
Red King Crab											
Immature males	0	0	0	0	145	158	208	0	0	0	0
Mature males	0	0	0	0	145	0	0	0	0	0	0
Legal	0	0	0	0	73	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	73	395	138	81	0	0	0
Total weight (kg)	0	0	0	0	5.92	5.36	2.59	2.46	0	0	0
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	1231	507	328	648	73	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	1361	571	394	518	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.4	0.16	0.05	0.16	0.04	0	0	0	0	0	0
Snow 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	0	0	0	0	0	0	0	0	0	0

Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	130	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	0	0	0.01	0	0	0	0	0	0	0
Station	M-08	M-18	M-19	M-20	M-21	M-22	M-23	M-24	M-25	M-26	M-27
Start Date	6/6/2022	7/3/2022	7/2/2022	7/4/2022	7/4/2022	7/5/2022	7/13/2022	7/16/2022	7/18/2022	7/21/2022	7/21/2022
Duration (hour)	0.55	0.54	0.53	0.54	0.52	0.52	0.52	0.53	0.51	0.54	0.55
Distance Fished (km)	2.96	2.81	2.78	2.89	2.87	2.94	2.73	2.97	2.83	2.69	2.86
Mid-Latitude (°N)	58.98	58.99	58.99	59	59.01	58.99	58.99	59	59	58.98	59
Mid-Longitude (°W)	-163.35	-168.54	-169.17	-169.83	-170.48	-171.14	-171.78	-172.43	-173.09	-173.71	-174.35
Bottom Depth (m)	23	47	54	63	71	78	87	99	106	117	127
Bottom Temperature (°C)	7	3	1.6	0.9	0.1	-0.5	0.1	0.6	1.4	2.7	2.9
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	75	0	0	0	0	0	0	0	0	0
Legal	0	75	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	2.93	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	0	0	75	0	0	0	71	255	200	12734	52894
Mature males	0	0	0	0	0	0	71	0	200	555	527
Legal	0	0	0	0	0	0	71	0	200	555	264
Immature females	0	0	0	0	0	0	0	0	67	10827	28712
Mature females	0	0	0	0	0	0	0	127	0	2427	4023
Total weight (kg)	0	0	0.09	0	0	0	0.82	0.76	2.05	20.44	61.86
Snow Crab											
Immature males	0	75	375	346	3125	10483	2571	892	600	277	461
Mature males	0	0	75	69	957	1737	1357	127	200	693	527
Legal	0	0	150	208	1212	7071	3071	446	333	971	791
Immature females	0	0	375	346	3189	0	0	446	67	139	198
Mature females	0	0	0	0	0	33881	12307	0	0	0	132
Total weight (kg)	0	0.01	1.07	1.37	7.27	73.89	25.45	2.45	1.85	6.43	5.18
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	0	255	0	0	0	0	139	0

Males ≥ 78 mm	0	0	0	0	0	248	0	0	0	0	0
Immature females	0	0	0	0	128	124	0	0	0	69	0
Mature females	0	0	0	0	0	62	0	0	0	0	66
Total weight (kg)	0	0	0	0	0.08	2.18	0	0	0	0.18	0.1

Station	M-28	M-29	M-30	M-31	M-32	N-01	N-02	N-03	N-04	N-05	N-06
Start Date	7/21/2022	7/21/2022	7/22/2022	7/23/2022	7/23/2022	6/29/2022	6/22/2022	6/22/2022	6/21/2022	6/21/2022	6/7/2022
Duration (hour)	0.54	0.54	0.53	0.52	0.52	0.49	0.53	0.54	0.55	0.54	0.53
Distance Fished (km)	2.78	2.87	2.89	2.93	2.94	2.75	3	3.07	3.1	3.04	2.69
Mid-Latitude (ºN)	59.01	59	58.99	59	59.01	59.32	59.33	59.35	59.34	59.31	59.35
Mid-Longitude (ºW)	-175.02	-175.71	-176.31	-176.96	-177.57	-167.92	-167.28	-166.6	-165.93	-165.32	-164.66
Bottom Depth (m)	130	133	134	135	134	40	32	28	26	22	22
Bottom Temperature (ºC)	3.2	2.8	3	3.2	3.6	4.6	5.2	6.2	6.8	8.4	7.3
Red King Crab											
Immature males	0	0	0	0	0	78	77	0	78	0	0
Mature males	0	0	0	0	0	0	153	0	0	0	0
Legal	0	0	0	0	0	0	153	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	230	0	0	0	0
Total weight (kg)	0	0	0	0	0	1.27	9.6	0	0.19	0	0
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	466	708	379	330	662	0	0	0	0	0	0
Mature males	0	0	189	0	0	0	0	0	0	0	0
Legal	0	0	63	0	0	0	0	0	0	0	0
Immature females	466	386	0	132	331	0	0	0	0	0	0
Mature females	67	0	316	0	66	0	0	0	0	0	0
Total weight (kg)	1.01	0.62	3.44	0.83	0.58	0	0	0	0	0	0
Snow Crab											
Immature males	0	64	126	0	0	0	0	0	0	0	0
Mature males	0	64	0	0	0	0	0	0	0	0	0
Legal	0	64	0	0	0	0	0	0	0	0	0
Immature females	0	0	126	0	0	0	0	0	0	0	0
Mature females	0	0	63	0	0	0	0	0	0	0	0
Total weight (kg)	0	0.76	0.18	0	0	0	0	0	0	0	0
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	63	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	0	0.01	0	0	0	0	0	0	0	0
Station	N-07	N-18	N-19	N-20	N-21	N-22	N-23	N-24	N-25	N-26	N-27
Start Date	6/7/2022	7/3/2022	7/3/2022	7/3/2022	7/4/2022	7/13/2022	7/13/2022	7/16/2022	7/18/2022	7/19/2022	7/20/2022
Duration (hour)	0.55	0.53	0.53	0.54	0.51	0.51	0.52	0.51	0.52	0.54	0.53
Distance Fished (km)	2.86	2.85	2.93	2.89	2.88	2.84	2.86	2.88	2.94	2.89	3.07
Mid-Latitude (ºN)	59.31	59.33	59.35	59.33	59.33	59.32	59.33	59.33	59.32	59.35	59.36
Mid-Longitude (ºW)	-164.03	-168.58	-169.23	-169.89	-170.54	-171.17	-171.84	-172.5	-173.14	-173.79	-174.42
Bottom Depth (m)	22	42	50	61	69	74	79	88	100	109	118
Bottom Temperature (ºC)	7.7	4.3	2.5	0.8	0.1	-0.2	-0.5	-0.1	0.5	1.4	2.8
Red King Crab											
Immature males	0	77	70	0	0	0	0	0	0	0	0
Mature males	0	153	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	4.03	0.89	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	0	0	139	0	0	0	0	131	64	583	1148
Mature males	0	0	0	0	0	0	0	66	64	65	181
Legal	0	0	0	0	0	0	0	66	0	65	121
Immature females	0	0	0	0	0	0	0	0	127	0	423
Mature females	0	0	0	0	0	0	0	0	0	65	121
Total weight (kg)	0	0	0.11	0	0	0	0	0.8	0.4	2.32	4.95
Snow Crab											
Immature males	0	0	906	4951	53985	3381	4121	1249	892	1425	181
Mature males	0	0	0	68	1089	1014	1511	920	255	648	181
Legal	0	0	70	203	1857	2840	4189	1578	255	907	242
Immature females	0	0	0	9209	128722	541	137	460	2358	1360	0
Mature females	0	0	0	0	0	203	275	131	64	0	0
Total weight (kg)	0	0	0.7	4.78	43.56	15.64	22.39	8.81	2.89	6.77	1.38
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	70	0	2286	0	0	0	0	65	0
Males ≥ 78 mm	0	0	0	0	64	0	0	0	0	0	0
Immature females	0	0	0	0	1714	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0	0.08	0	1.17	0	0	0	0	0.02	0

Appendix A. – Tow details, crab density (number nmi-^{2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

Station	N-28	N-29	N-30	N-31	O-01	O-02	O-03	O-04	O-18	O-19	O-20
Start Date	7/22/2022	7/22/2022	7/22/2022	7/23/2022	7/1/2022	6/22/2022	6/21/2022	6/21/2022	7/2/2022	7/2/2022	7/4/2022
Duration (hour)	0.53	0.53	0.53	0.54	0.51	0.54	0.54	0.54	0.5	0.52	0.53
Distance Fished (km)	2.84	2.85	2.88	3.02	2.83	3.01	2.93	2.82	2.74	2.92	2.98
Mid-Latitude (ºN)	59.34	59.34	59.34	59.34	59.67	59.65	59.67	59.6	59.66	59.67	59.68
Mid-Longitude (ºW)	-175.1	-175.75	-176.37	-177.07	-167.96	-167.27	-166.59	-165.89	-168.62	-169.26	-169.93
Bottom Depth (m)	132	136	135	150	36	32	31	27	39	48	57
Bottom Temperature (ºC)	2.7	2.2	2.4	2.9	5.3	4.8	6.8	7.6	4.5	2.4	0.9
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	75	0	0
Mature males	0	0	0	0	0	0	0	0	149	0	0
Legal	0	0	0	0	0	0	0	0	75	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	75	0	70	0	149	0	0
Total weight (kg)	0	0	0	0	0.99	0	2.08	0	8.28	0	0
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	738	261	2322	252	0	0	0	0	0	0	0
Mature males	0	65	0	315	0	0	0	0	0	0	0
Legal	0	0	0	126	0	0	0	0	0	0	0
Immature females	537	588	1225	0	0	0	0	0	0	0	0
Mature females	134	0	580	189	0	0	0	0	0	0	0
Total weight (kg)	1.23	0.63	5.43	3.42	0	0	0	0	0	0	0
Snow Crab											
Immature males	0	65	387	0	0	0	0	0	0	2055	1047
Mature males	0	0	0	63	0	0	0	0	0	71	62
Legal	0	0	0	63	0	0	0	0	0	71	308
Immature females	0	0	451	0	0	0	0	0	0	8006	2280
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0.06	0.22	0.42	0	0	0	0	0	0.77	1.69
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	0	0	0	0	0	0	425	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	0	0	0	0	0	0	0	0	0.05	0

Station	O-21	O-22	O-23	O-24	O-25	O-26	O-27	O-28	O-29	O-30	O-31

Appendix A. – Tow details, crab density (number nmi^{-2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

Start Date	7/4/2022	7/13/2022	7/14/2022	7/16/2022	7/18/2022	7/19/2022	7/20/2022	7/23/2022	7/23/2022	7/24/2022	7/24/2022
Duration (hour)	0.51	0.52	0.52	0.52	0.52	0.53	0.53	0.53	0.53	0.52	0.52
Distance Fished (km)	2.85	2.75	2.82	2.94	2.9	2.74	2.82	2.83	2.79	2.89	2.9
Mid-Latitude (ºN)	59.67	59.67	59.66	59.67	59.67	59.67	59.67	59.68	59.67	59.67	59.67
Mid-Longitude (ºW)	-170.59	-171.25	-171.86	-172.58	-173.25	-173.85	-174.44	-175.12	-175.83	-176.55	-177.13
Bottom Depth (m)	67	71	77	84	95	103	113	124	136	136	170
Bottom Temperature (ºC)	0	-0.2	-0.7	-0.5	0.4	0.6	1.6	2.8	1.9	2.3	3
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	0	0	0	0	0	0	0	0	0	0
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	65	0	0	0	0	0	0
Legal	0	0	0	0	65	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	0	0	0	2.22	0	0	0	0	0	0
Tanner Crab											
Immature males	0	0	0	0	0	68	129	208	399	266	1070
Mature males	0	0	0	67	0	0	65	0	66	67	692
Legal	0	0	0	67	0	0	65	0	0	67	315
Immature females	0	0	0	0	0	68	65	69	266	200	63
Mature females	0	0	0	0	0	0	0	0	0	0	566
Total weight (kg)	0	0	0	0.33	0	0.06	0.54	0.05	0.7	1.58	10.32
Snow Crab											
Immature males	778	12399	19619	4619	2134	2787	647	1041	332	732	378
Mature males	0	2867	5029	1272	517	272	841	764	199	0	63
Legal	195	9532	15610	4753	1100	340	1035	1527	199	0	63
Immature females	1168	1720	473	1205	4463	2719	259	139	399	333	126
Mature females	0	3727	25993	67	0	0	259	9012	133	0	0
Total weight (kg)	1.84	46.71	121.72	21.35	7.63	3.45	7.41	15.22	1.59	0.43	0.78
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	201	0	0	0	0	0	0	0
Males ≥ 78 mm	0	0	0	0	0	0	0	0	0	0	0
Immature females	130	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)	0.02	0	0	0.04	0	0	0	0	0	0	0

Station	ON2524	ON2625	P-01	P-18	P-19	P-20	P-21	P-22	P-23	P-24	P-25
Start Date	7/18/2022	7/19/2022	7/1/2022	7/1/2022	7/2/2022	7/3/2022	7/3/2022	7/14/2022	7/14/2022	7/16/2022	7/17/2022
Duration (hour)	0.51	0.53	0.51	0.51	0.52	0.51	0.51	0.52	0.52	0.53	0.27

Appendix A. – Tow details, crab density (number nmi^{-2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

Distance Fished (km)	2.87	2.76	2.84	2.87	2.92	2.84	2.87	2.78	2.82	2.77	1.53
Mid-Latitude (°N)	59.5	59.51	60.01	60.01	60	60	60	59.98	59.99	59.99	60.01
Mid-Longitude (°W)	-172.88	-173.5	-168	-168.66	-169.31	-169.98	-170.63	-171.3	-171.94	-172.61	-173.33
Bottom Depth (m)	94	101	26	39	46	55	65	68	65	65	75
Bottom Temperature (°C)	0.3	0.7	5.1	4.1	2.4	1	0	-0.2	1.1	0.5	0.1
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	72	290	0	0	0	0	0	0	0
Legal	0	0	72	145	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	145	71	68	0	0	0	0	0
Total weight (kg)	0	0	3.9	13.72	0.72	0.95	0	0	0	0	0
Blue King Crab											
Immature males	0	0	0	0	0	0	0	0	0	293	125
Mature males	0	0	0	0	0	0	0	0	0	220	0
Legal	0	0	0	0	0	0	0	0	0	73	0
Immature females	0	0	0	0	0	0	0	0	0	220	0
Mature females	0	0	0	0	0	0	0	0	0	73	0
Total weight (kg)	0	0	0	0	0	0	0	0	0	8.35	0.43
Tanner Crab											
Immature males	66	199	0	0	0	0	0	0	0	147	0
Mature males	0	66	0	0	0	0	0	0	70	0	0
Legal	0	0	0	0	0	0	0	0	70	0	0
Immature females	0	133	0	0	0	0	0	0	0	147	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0.01	0.49	0	0	0	0	0	0	0.46	0.1	0
Snow Crab											
Immature males	722	3253	0	0	1693	1712	1885	12536	2382	7334	1746
Mature males	131	332	0	0	0	68	0	980	701	440	249
Legal	459	332	0	0	0	137	65	7703	2032	1614	873
Immature females	853	7312	0	0	2186	4658	1885	1191	350	2420	1247
Mature females	262	0	0	0	0	0	0	980	70	0	0
Total weight (kg)	2.68	4.63	0	0	0.07	0.8	1.45	37.77	9.91	10.12	2.61
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	0	71	0	0	0	0	0	0
Males ≥ 78 mm	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	332	0	0	0	68	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0.07	0	0	0.14	0.01	0	0	0	0	0

Station	P-26	P-27	P-28	P-29	P-30	P-31	P-32	PO2423	PO2524	PO2625	PO2726
Start Date	7/18/2022	7/23/2022	7/23/2022	7/24/2022	7/24/2022	7/24/2022	7/24/2022	7/14/2022	7/18/2022	7/19/2022	7/23/2022
Duration (hour)	0.53	0.52	0.53	0.52	0.55	0.52	0.51	0.52	0.52	0.53	0.52
Distance Fished (km)	2.79	2.76	2.92	2.88	3.02	2.95	2.8	2.75	2.9	2.74	2.82
Mid-Latitude (°N)	60.01	59.98	60	60	60.01	60.01	60.01	59.82	59.83	59.84	59.83

Appendix A. – Tow details, crab density (number nmi-^{2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

Mid-Longitude (ºW)	-173.95	-174.59	-175.24	-175.91	-176.72	-177.24	-177.91	-172.25	-172.93	-173.6	-174.21
Bottom Depth (m)	95	108	116	128	141	136	142	75	80	94	105
Bottom Temperature (ºC)	0.5	1.1	1.7	1.9	2	2	1.9	-0.6	-0.5	0.6	0.9
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	0	0	0	0	0	0	0	0	0	0
Blue King Crab											
Immature males	0	0	0	0	0	0	0	70	0	0	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	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	0	0	0	0	3.02	0	0	0
Tanner Crab											
Immature males	0	0	0	136	0	129	0	70	65	0	66
Mature males	0	0	0	68	0	0	0	0	0	0	66
Legal	0	0	0	68	0	0	0	0	0	0	66
Immature females	0	0	0	136	0	129	0	0	0	134	133
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	0.51	0	0.64	0	0.27	0.06	0.03	0.94
Snow Crab											
Immature males	1295	337	593	409	1581	323	352	16091	3938	13778	1524
Mature males	409	877	725	613	132	129	0	3149	710	535	265
Legal	682	944	1120	954	198	194	0	7626	1033	870	331
Immature females	545	675	0	204	1845	387	0	12783	5229	18230	1259
Mature females	0	270	24912	26984	66	0	0	1469	0	0	133
Total weight (kg)	4.63	7.7	24.52	29.22	2.7	1.72	0.05	42.19	8.64	11.02	3.2
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	67	0	0	0	0	0	700	129	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	700	65	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0.01	0	0	0	0	0	0.49	0.07	0	0

Station	Q-01	Q-02	Q-18	Q-19	Q-20	Q-21	Q-22	Q-23	Q-25	Q-26	Q-27
Start Date	6/30/2022	6/30/2022	7/1/2022	7/2/2022	7/3/2022	7/3/2022	7/15/2022	7/16/2022	7/17/2022	7/18/2022	7/27/2022
Duration (hour)	0.52	0.52	0.51	0.52	0.51	0.53	0.52	0.53	0.19	0.52	0.53
Distance Fished (km)	2.92	2.91	2.84	2.91	2.81	2.98	2.74	2.78	1.08	2.73	2.81
Mid-Latitude (ºN)	60.33	60.33	60.33	60.32	60.33	60.33	60.33	60.35	60.3	60.34	60.32
Mid-Longitude (ºW)	-167.98	-167.3	-168.7	-169.32	-170.02	-170.67	-171.37	-172.07	-173.37	-174.08	-174.7
Bottom Depth (m)	32	32	37	44	53	63	65	59	63	90	102

Appendix A. – Tow details, crab density (number nmi-^{2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

Bottom Temperature (ºC)	6.5	7.6	4.9	2.7	1.3	0.3	0	0.1	2.4	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	0	0	0	0	0	0	0	0	0	0
Blue King Crab											
Immature males	0	0	0	0	0	0	0	6455	2892	0	0
Mature males	0	0	0	0	0	0	0	384	723	0	0
Legal	0	0	0	0	0	0	0	231	542	0	0
Immature females	0	0	0	0	0	0	0	3074	723	0	0
Mature females	0	0	0	0	0	0	0	0	2350	0	0
Total weight (kg)	0	0	0	0	0	0	0	41.49	20.18	0	0
Tanner Crab											
Immature males	0	0	0	64	0	0	0	0	0	139	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	865	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	0.08	0	0	0	1.49	0	0.04	0
Snow Crab											
Immature males	0	0	0	1987	1467	644	8403	198938	904	1532	4638
Mature males	0	0	0	0	0	0	942	692	542	1114	409
Legal	0	0	0	0	0	193	4491	9823	1085	1741	1023
Immature females	0	0	0	3332	3563	193	290	633864	0	627	4228
Mature females	0	0	0	0	0	0	507	356296	0	488	409
Total weight (kg)	0	0	0	0.1	0.94	1.28	23.85	737.46	2.46	11.69	8.28
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	0	70	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	70	0	0	0	181	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	0	0.02	0	0	0	0	0	0

Station	Q-28	Q-29	Q-30	Q-31	QP2423	QP2524	QP2625	QP2726	R-22	R-23	R-24
Start Date	7/26/2022	7/24/2022	7/26/2022	7/26/2022	7/16/2022	7/17/2022	7/17/2022	7/18/2022	7/15/2022	7/16/2022	7/17/2022
Duration (hour)	0.54	0.53	0.54	0.54	0.53	0.51	0.54	0.52	0.53	0.53	0.53
Distance Fished (km)	2.82	2.88	3.01	3.07	2.92	2.82	3.07	2.73	2.71	2.89	2.94
Mid-Latitude (ºN)	60.34	60.33	60.34	60.34	60.17	60.17	60.14	60.18	60.66	60.68	60.67
Mid-Longitude (ºW)	-175.39	-176.03	-176.71	-177.37	-172.33	-173.02	-173.76	-174.35	-171.43	-172.11	-172.81
Bottom Depth (m)	111	121	136	149	57	59	88	99	62	60	42
Bottom Temperature (ºC)	1.1	1.3	1.9	1.6	3.8	2.8	-0.2	0.8	0.2	-0.2	3.7

Appendix A. – Tow details, crab density (number nmi-^{2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

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	0	0	0	0	0	0	0	0	0	0
Blue King Crab											
Immature males	0	0	0	0	591	1061	0	0	0	0	0
Mature males	0	0	0	0	2141	354	0	71	0	0	76
Legal	0	0	0	0	1698	0	0	71	0	0	0
Immature females	0	0	0	0	0	141	0	0	0	0	0
Mature females	0	0	0	0	812	707	0	0	0	0	0
Total weight (kg)	0	0	0	0	61.37	16.72	0	1.65	0	0	1.2
Tanner Crab											
Immature males	66	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	59	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)	0.32	0	0	0.31	0	0	0	0	0	0	0
Snow Crab											
Immature males	1657	970	484	535	222	71	13284	1214	1990	53613	152
Mature males	199	1746	1571	59	0	0	3656	71	74	477	0
Legal	199	2587	1934	119	0	0	10349	143	737	2727	152
Immature females	2518	129	363	1011	369	0	0	643	442	91104	76
Mature females	265	10777	0	59	148	0	356917	0	295	20829	0
Total weight (kg)	2.43	27.99	14.86	1.73	0.38	0.15	308.36	1.34	4.83	103.75	0.52
Chionoecetes spp. Hybrid											
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	0	0	0	0	0	0	0	0	0	0

Station	R-25	R-26	R-27	R-28	R-29	R-30	R-31	R-32	S-22	S-23	S-24
Start Date	7/17/2022	7/18/2022	7/27/2022	7/26/2022	7/25/2022	7/26/2022	7/25/2022	7/25/2022	7/15/2022	7/15/2022	7/17/2022
Duration (hour)	0.52	0.52	0.53	0.52	0.53	0.55	0.49	0.55	0.53	0.52	0.51
Distance Fished (km)	2.94	2.71	2.78	2.84	2.79	3.09	2.72	3.12	2.85	2.75	2.7
Mid-Latitude (ºN)	60.67	60.68	60.66	60.68	60.67	60.67	60.66	60.66	60.97	61	61
Mid-Longitude (ºW)	-173.45	-174.14	-174.82	-175.46	-176.21	-176.81	-177.49	-178.16	-171.5	-172.16	-172.82
Bottom Depth (m)	64	86	97	106	118	129	146	161	59	62	65
Bottom Temperature (ºC)	3.2	-0.5	0.7	1.1	1.5	1.6	1.5	2	0.1	-0.4	0.4
Red King Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0

Mature males	0	0	0	0	0	0	0	0	0	0	0
Legal	0	0	0	0	0	0	0	0	0	0	0
Immature females	0	0	0	0	0	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	0	0	0	0	0	0	0	0
Blue King Crab											
Immature males	275	0	0	0	0	0	0	0	0	0	0
Mature males	69	0	0	0	0	0	0	0	0	0	0
Legal	69	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	137	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	5.35	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	0	0	136	226	0	60	68	597	0	0	0
Mature males	0	0	0	0	0	0	0	54	0	0	0
Legal	0	0	0	0	0	0	0	54	0	0	0
Immature females	0	0	0	0	0	0	0	271	0	0	0
Mature females	0	0	0	0	0	0	0	109	0	0	72
Total weight (kg)	0	0	0.02	0.05	0	0.22	0.2	1.53	0	0	0.05
Snow Crab											
Immature males	1100	46589	27091	25349	3232	656	204	109	2780	37952	57522
Mature males	0	858	476	592	2269	537	679	0	0	0	0
Legal	69	6178	680	789	3369	656	747	0	66	725	216
Immature females	825	429	16241	37764	1788	715	747	54	861	53453	65820
Mature females	137	19754	612	131	12597	0	68	0	331	12288	1581
Total weight (kg)	1.06	91.94	15.22	20.04	33	5.94	6.95	0.04	2.9	40.65	22.39
Chionoecetes spp. Hybrid											
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	275	0	0	54	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	0	0.04	0	0	0.04	0	0	0

Station	S-25	S-26	S-27	S-28	S-29	S-30	S-31	T-25	T-26	T-27	T-28
Start Date	7/17/2022	7/28/2022	7/27/2022	7/26/2022	7/25/2022	7/27/2022	7/26/2022	7/29/2022	7/28/2022	7/27/2022	7/26/2022
Duration (hour)	0.53	0.51	0.54	0.53	0.53	0.53	0.54	0.5	0.52	0.52	0.53
Distance Fished (km)	2.9	2.85	2.85	2.75	2.88	2.9	3.05	2.71	2.82	2.79	2.93
Mid-Latitude (ºN)	61	61	60.99	61.02	60.99	61.01	61.01	61.33	61.35	61.32	61.35
Mid-Longitude (ºW)	-173.48	-174.18	-174.88	-175.54	-176.28	-176.97	-177.63	-173.59	-174.33	-175.01	-175.66
Bottom Depth (m)	74	81	91	100	111	122	135	73	77	87	96
Bottom Temperature (ºC)	-0.8	-0.8	0	0.6	1.2	1.6	1.5	-0.7	-1.3	-0.6	-0.9
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	0	0	0	0	0	0	0	0	0	0
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	68	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	0.6	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	0	0	0	0	0	0	0	0	0	0	0
Mature males	0	0	0	0	0	64	0	0	0	62	0
Legal	0	0	0	0	0	64	0	0	0	62	0
Immature females	0	0	0	0	66	0	0	0	0	0	0
Mature females	0	0	0	0	0	0	0	0	0	0	0
Total weight (kg)	0	0	0	0	0.01	0.55	0	0	0	0.61	0
Snow Crab											
Immature males	97051	62408	2373	12419	8938	6070	1015	3629	11479	19711	3783
Mature males	2985	271	2307	875	852	3898	1074	356	72	3151	1475
Legal	13201	1827	3361	1951	1114	4217	1254	427	361	7353	3526
Immature females	137195	52217	527	8869	9584	7731	1074	2063	25098	11307	192
Mature females	42333	35614	264	1009	66	2300	0	142	7932	9930	6660
Total weight (kg)	207.2	107.3	18.96	15.71	11.9	38.49	10.3	3.58	25.5	75.18	28.48
Chionoecetes spp. Hybrid											
Males ≤ 77 mm	0	0	0	67	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	0	0	0.01	0	0	0	0	0	0	0

Station	T-29	T-30	U-25	U-26	U-27	U-28	U-29	V-25	V-26	V-27	V-28
Start Date	7/27/2022	7/27/2022	7/29/2022	7/28/2022	7/28/2022	7/27/2022	7/27/2022	7/28/2022	7/28/2022	7/28/2022	7/28/2022
Duration (hour)	0.51	0.53	0.52	0.52	0.51	0.52	0.51	0.52	0.51	0.52	0.52
Distance Fished (km)	2.86	2.96	2.72	2.83	2.68	2.95	2.83	2.89	2.84	2.92	2.89
Mid-Latitude (°N)	61.33	61.34	61.66	61.67	61.66	61.67	61.66	61.99	62	62	62
Mid-Longitude (°W)	-176.31	-176.96	-173.66	-174.47	-175.07	-175.76	-176.47	-173.74	-174.53	-175.17	-175.83
Bottom Depth (m)	106	116	69	76	85	95	105	62	73	81	93
Bottom Temperature (°C)	0.9	1.2	-1.1	-1.4	-1.3	-1.5	0	-1.2	-1.3	-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	0	0	0	0	0	0	0	0	0	0
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	0	0	0	0	0	0	0	0	0	0
Tanner Crab											
Immature males	164	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)	0.04	0	0	0	0	0	0	0	0	0	0
Snow Crab											
Immature males	12845	32533	23062	57976	59814	5506	1905	195066	129834	50638	47799
Mature males	1254	1825	0	351	679	522	799	0	70	254	295
Legal	1584	2140	141	914	2920	1739	1291	141	489	2115	1886
Immature females	13669	42349	60849	115673	84841	753	492	380562	170221	97525	48472
Mature females	911	0	6050	19499	13703	3825	3012	17497	8853	19973	25751
Total weight (kg)	24.26	30.52	43.8	100.97	105.65	19.94	14.3	256.1	132.24	108.97	118.48
Chionoecetes spp. Hybrid											
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	0	0	0	0	0	0	0	0	0	0

Station	Z-05
Start Date	6/12/2022
Duration (hour)	0.24
Distance Fished (km)	1.34
Mid-Latitude (°N)	54.7
Mid-Longitude (°W)	-165.12
Bottom Depth (m)	82
Bottom Temperature (°C)	4.6
Red King Crab	
Immature males	0
Mature males	0
Legal	0
Immature females	0
Mature females	0
Total weight (kg)	0

Appendix A. – Tow details, crab density (number nmi-^{2}), and catch weight at 2022 eastern Bering Sea bottom trawl survey stations.

Blue King Crab	
Immature males	0
Mature males	0
Legal	0
Immature females	0
Mature females	0
Total weight (kg)	0
Tanner Crab	
Immature males	1406
Mature males	0
Legal	0
Immature females	1562
Mature females	0
Total weight (kg)	0.35
Snow Crab	
Immature males	0
Mature males	0
Legal	0
Immature females	0
Mature females	0
Total weight (kg)	0
Chionoecetes spp. Hybrid	
Males ≤ 77 mm	0
Males ≥ 78 mm	0
Immature females	0
Mature females	0
Total weight (kg)	0