Fishery Management Report No. 16-43

Results of the 2015 St. Matthew Island Blue King Crab Pot Survey

by

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and

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December 2016

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat or long
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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ABSTRACT

The Alaska Department of Fish and Game conducted a pot survey for blue king crab *Paralithodes platypus* during 3–27 August 2015 in the waters surrounding St. Matthew Island, Alaska, within the area bordered by lat 59°30′N, lat 60°50′N, long 172°00′W, and long 174°00′W and at depths of 20–106 m (11–58 fathoms). In total, 147 four-pot stations were fished: 127 from the standard survey station grid and 20 in the area north of St. Matthew Island within the boundaries of NMFS EBS trawl survey station R-24, which has its center at lat 60°40′N, long 172°47′W. Total survey catch of blue king crab was 2,638 (1,146 legal males, 774 sublegal males, 671 mature females, and 47 immature females). Other commercial crab species captured during the survey were 1,533 snow crab *Chionoecetes opilio*, 1 Tanner crab *C. bairdi*, 4 hair crab *Erimacrus isenbeckii*, and 7 Tanner x snow crab hybrids. A total of 817 legal male and 1,153 sublegal male blue king crab captured at survey stations and during performance of a special project were tagged and released. Hemolymph samples from 191 randomly selected snow crab were tested for the presence of the parasitic dinoflagellate *Hematodinium*; 18 samples tested positive, yielding an estimated prevalence for bitter crab syndrome within the survey area of 9.4%. Spatial trends in survey catch per unit effort (CPUE) of blue king crab and snow crab by sex-size classes, and in depths and water temperatures recorded during the survey are presented. Survey CPUE of blue king crab and snow crab by sex-size classes are compared with survey CPUE during the 1995–2013 triennial St. Matthew blue king crab pot surveys at the 96 survey stations that were fished in common. Data on temporal trends in depth and water temperature recordings from 10 locations and on water current recordings from 9 locations within the survey area are also provided.

Key words: blue king crab, *Paralithodes platypus*; snow crab; *Chionoecetes opilio*; St. Matthew Island, Alaska; Bering Sea; stock assessment survey; pot survey; spatial distribution; tagging study; ocean bottom temperature, bitter crab syndrome prevalence

INTRODUCTION

The St. Matthew Island Section for blue king crab *Paralithodes platypus* is within the Northern District of the Bering Sea king crab registration area (Area Q) and includes the waters north of the latitude of Cape Newenham (lat 58°39′N) and south of the latitude of Cape Romanzof (lat 61°49′N; 5 AAC 34.905(c)(2)). A commercial fishery for blue king crab in the St. Matthew Island Section was prosecuted during 1977–1998, with the peak harvest of 9.5 million pounds occurring in 1983 (Fitch et al. 2014). The St. Matthew Island blue king crab stock was declared overfished in 1999 by the National Marine Fisheries Service (NMFS), and the commercial fishery was closed by the Alaska Department of Fish and Game (ADF&G) for the 1999 season and remained closed through the 2008/09 season. The fishery was opened for the first time in ten years for the 2009/10 season and has been prosecuted every season since with the exception of the 2013/14 season, which was closed due to declining trawl survey estimates of abundance and concerns about the health of the stock (Fitch 2013, Fitch 2015, Zheng and Pengilly 2015).

The St. Matthew Island blue king crab stock has been surveyed annually for stock assessment by the summer NMFS eastern Bering Sea (EBS) bottom trawl survey since 1978 (Daly et al. 2015). The first report on the results of the 1978 NMFS trawl survey for blue king crab in the St. Matthew Island Section noted that “much of the bottom area is untrawlable and it is doubtful that the whole range of this population was surveyed” (Otto et al. 1978, page 9). Subsequent trawl survey reports on results for St. Matthew Island blue king crab reiterated the difficulties in assessing the population due to the untrawlable area close to St. Matthew Island (Otto et al. 1980), and noted that the rocky, inshore habitat preferred by female blue king crab in the St. Matthew Island area was not sampled by the trawl survey (e.g. Stevens et al. 1994). In 1995, ADF&G instituted a program to augment information from the trawl survey with data from untrawlable areas by surveying the stock using king crab pots (Watson et al. 1995, Blau 1996).

Since its inception in 1995, ADF&G St. Matthew Island blue king crab pot surveys had been performed triennially through 2013. The survey has been conducted within the area bordered by lat 59°30′N, lat 60°50′N, long 172°00′W, and long 174°00′W, including the rocky, nearshore waters south of St. Matthew Island (Blau 1996, Blau and Watson 1999, Gish et al. 2012, Pengilly and Vanek 2014, Watson 2005, Watson 2008, Watson and Burt 2002). With the exception of the 2013 survey which was conducted in September, the surveys have been conducted during late-July to August and followed the timing of the NMFS EBS trawl survey in the area by approximately 2–6 weeks. ADF&G also performed a special pot survey for female blue king crab in the shallow waters (7–37 m) surrounding St. Matthew Island in cooperation with NMFS in 1999 (Blau 2000), and since 2004 the design of the survey has included stations adjacent to the southern shore of St. Matthew Island at depths of 20–37 m to better sample areas where mature ovigerous female blue king crab are concentrated (Watson 2005). In 2013, 20 stations were added to the survey area north of St. Matthew Island (Vanek 2013), designed to be spatially distributed within the area of NMFS EBS trawl station R-24, which has produced unusually large catches of male blue king crab in its one tow during the 2010–2012 and 2014–15 NMFS EBS trawl surveys (Chilton et al. 2011, 2012; Daly et al. 2014, 2015; Foy and Armistead 2013) and has heavily influenced estimates of blue king crab stock abundance.

In addition to providing information from biologically and commercially important areas not surveyed by the NMFS EBS trawl survey, the closer spacing of survey stations in the ADF&G pot survey relative to the trawl survey allows for better detection of changes in spatial distribution that accompany changes in stock status (Vining et al. 2001). Blue king crab have been tagged and released during the pot surveys and recovered during subsequent commercial fisheries (Blau 1996, Blau and Watson 1999, Gish et al. 2012, Pengilly and Vanek 2014, Watson and Burt 2002). Results from those tagging studies showed that availability to the NMFS EBS trawl survey of the legal males exploited by the commercial fishery varies substantially among years (Gish et al. 2012, Pengilly and Watson 2004), suggesting that in some years trawl survey data provide insufficient information for annual fishery management decisions. Trends in the catch per unit effort (CPUE, expressed as number of crab per pot lift) of male blue king crab during the 1995–2013 triennial ADF&G St. Matthew blue king crab pot surveys (Pengilly and Vanek 2014) have generally followed the trends in annual biomass and abundance estimated from the 1995–2013 NMFS EBS trawl survey data (Gaeuman 2013): pot survey CPUE declined between the 1998 and 2004 surveys, increased in the 2007 and 2010 surveys, and decreased in 2013.

This report provides results of the 2015 St. Matthew Island blue king crab pot survey and compares them with results from previous surveys. During the 2015 survey, 147 stations were sampled (Figure 1), including 20 stations within the boundaries of NMFS EBS station R-24 and 9 standard stations north of St. Matthew Island. Results on three special projects conducted in conjunction with the 2015 survey are also presented: 1) tagging and release of legal and sublegal male blue king crab for recovery during subsequent commercial fisheries; 2) collection of reference oceanographic data; and 3) collection of hemolymph and live snow crab for investigating bitter crab syndrome. A report on a special project conducted to compare the blue king crab catch between survey pots used in the 1998–2010 surveys and survey pots used in the 2013 and 2015 surveys will be published separately.

METHODS

SURVEY

The 2015 St. Matthew Island blue king crab pot survey was conducted 1 August through 27 August from aboard the F/V *Sandra Five*, a chartered 34.6 m commercial crab pot fishing vessel. The area surveyed (Figure 1) was bordered by lat 59°35′N, lat 60°50′N, long 172°00′W, and long 174°00′W.

Strata Design and Stations Fished

Two geographic strata with different densities of survey stations have been defined for the standard survey area offshore and nearshore: Stratum 2 in the nearshore area south and west of St. Matthew Island bordered by lat 60°00′N, lat 60°30′N, long 172°22.5′W, and long 173°27.5′W; and Stratum 1, which includes all other stations in the standard survey grid. Station layout was based on a grid in which stations were spaced north-to-south by 5′ of latitude (5.00 nmi, 9.26 km) and east-to-west by 10′ of longitude (4.93 nmi, 9.13 km, at the northernmost stations and 5.07 nmi, 9.39 km, at the southernmost stations). To provide a higher station density in Stratum 2, the station grid was overlaid with a second grid in which stations were likewise spaced by 5′ of latitude north-to-south and 10′ of longitude east-to-west that was offset from the main grid by 2.5′ of latitude north-to-south and 5′ of longitude east-to-west. Each station in Strata 1 and 2 consisted of 4 pots, spaced 0.125 nm (0.232 km) apart arrayed in a north-south orientation.

Stratum 3 was defined to sample shallow waters along the southern shore of St. Matthew Island generally not included in the standard survey area (Figures 1 and 2). At each of the 10 stations in Stratum 3, 4 pots were set in a line perpendicular to the shore to cover a depth range of 11–20 fathoms (20–37 m), with one pot each set at the depths of 11, 14, 17, and 20 fathoms (20, 26, 31, and 37 m; Figure 2) as the vessel traveled away from shore.

Stratum 4 consisted of 20 stations within the borders of NMFS EBS trawl survey station R-24, which is bounded by lat 60°30′N to the south and by lat 60°50′N to the north and extends as far west as long 173°10′W and as far east as long 172°25′W (Figure 1; Figures 2 and 4 in Vanek and Nault 2015). Station locations were determined by two 5-nmi-by-5-nmi (9.26-km-by-9.26-km) grids placed parallel to the boundaries of R-24 and offset north-to-south and east-to-west by 2.5 nmi (4.63 km), similar to the double density of Stratum 2. Station 409 in Stratum 4 is located at the center of NMFS EBS survey station R-24 (lat 60°40′N, long 172°47′W), the midpoint target of the single tow made by the NMFS trawl survey for station R-24 (Daly et al. 2015). As in the standard survey stations in Strata 1 and 2, each station in Stratum 4 consisted of 4 pots, spaced 0.125 nm (0.232 km) apart arrayed in a north-south orientation.

The 2015 survey fished 147 stations (Figure 1, Appendices B1 and B2): 74 in Stratum 1, 43 in Stratum 2, 10 in Stratum 3, and 20 in Stratum 4. The stations fished included the 96 in common stations fished in all St. Matthew Island pot surveys (65 stations in Stratum 1 and 31 stations in Stratum 2, 12 of which are outside the area trawled by the NMFS EBS trawl survey; Figures 3 and 4). Stations in Stratum 1 that were fished included stations that are adjacent to NMFS EBS station R-24 (Stratum 4). Including the margins of the station grid, an estimated area of 3,057 nmi^2 (10,485 km^2) was surveyed in Strata 1, 2, and 4. A total of 588 pots were set during the standard survey, but one pot was lost at station 147, resulting in a total of 587 pot lifts sampled. Though not included in survey catch results, an additional 74 pots were set and sampled for blue

king crab while conducting special projects; these pots were set strategically within the surveyed area at locations where standard survey stations have not been established (e.g., close to Hall Island) or near midpoints of stations that weren't fished for the survey.

Survey Fishing

All survey pots were identical rectangular king crab pots manufactured in 2013. Each pot measured 7 ft x 7 ft x 34 in (2.1 m x 2.1 m x 0.9 m), was fitted with 2.5 in (6.4 cm) stretched mesh webbing, and had two opposing tunnel eye openings with inside dimensions measuring 9 in x 36 in (22.9 cm x 91.4 cm). Each pot was baited with two 2 qt (1.9 L) containers of chopped frozen Pacific herring *Clupea pallasii.* Soak time ranged from 28.8–34.4 h with an average soak time of 31.0 h.

The vessel captain recorded fishing information for each pot, including latitude and longitude of the set location, date and time the pot was set, and date and time the pot was lifted.

Collecting Station Depths and Temperatures

For stations in Strata 1, 2, and 4, the vessel captain recorded the depth in fathoms from the vessel's echo sounder at the times and locations that the first and last pot in the 4-pot string were set. For report purposes, after converting depths from fathoms to meters, the echo sounder depth estimates for stations in Strata 1, 2, and 4 were further adjusted by adding 2.6 m to account for the depth below the water surface of the vessel's hull-mounted transducer, which could vary between approximately 2.1 m and 3.0 m depending on the vessel's fuel load and the number of pots onboard. For stations in Stratum 3, where pots were set at specific fathoms of depth by design, the captain took into account the distance between the water surface and the transducer on the hull bottom in order to set pots at the true water depths specified, and recorded the pot location's true water depth at the time of setting in fathoms.

Depth and temperature were successfully recorded at all stations fished by deploying a data logger measuring temperature, depth, and conductivity (RBR Ltd. model XR-420-CTD) or temperature and depth (RBR Ltd. model TDR-2050 or RBR*duet*) in the second or third pot set at every station. Station 146 was the one exception with 4 temperature/depth loggers deployed, 1 in each of the 4 pots set. Measurements were recorded every 10 minutes throughout the entire deployment. Data loggers were secured to the webbing on the upper inside surface of the pot at a position that would not interfere with crab entering the pot. Depths recorded in m by the data loggers were adjusted for this report by adding 0.8 m to account for the height above the ocean bottom at which the loggers were secured to the pots. The average of echo sounder depth estimates within a station of the first and fourth pots at the time of setting generally agreed well with the average depth recorded by the data logger in the second or third pot at the same station. (Appendix A1). For stations in Strata 1, 2, and 4, the average of the depths recorded by the logger while deployed at the station is used in this report to estimate station depth. The depths recorded over the soak time by the data logger deployed in the second or third pot set in Stratum 3 stations is compared to the true water depths of the pots at the time of setting the station in Appendix A2. Although depth estimates are available for each pot set in Stratum 3, the depth range of the pots within a station, rather than their average, is used to characterize the depth of stations in Stratum 3 in this report. Conductivity (salinity) data were collected at 105 stations, but is not reported on here.

Pot sampling

The contents of each pot lifted were identified and enumerated. All captured blue king crab, hair crab *Erimacrus isenbeckii*, Tanner crab *Chionoecetes bairdi*, snow crab *C. opilio*, and Tanner x snow crab hybrids were fully enumerated by species and sex, measured for size, and assessed for shell condition. Females were assessed for reproductive condition.

Carapace length (CL) of blue king crab and hair crab was measured to the nearest mm from the posterior margin of the right eye orbit to the midpoint of the rear margin of the carapace (Wallace et al. 1949), as illustrated in Donaldson and Byersdorfer (2005). Carapace width (CW) of Tanner crab and snow crab was measured to the nearest mm across the widest part of the carapace perpendicular to the medial line, with the tips of the calipers reaching inside the lateral spines as in Jadamec et al. (1999). Shell condition was scored according to Donaldson and Byersdorfer (2005) for king crab and according to the guidelines established by the department for snow and Tanner crab.

Legal status of male blue king crab, Tanner crab, and snow crab was determined according to size limits defined in State of Alaska fishery regulations for the surveyed area: ≥5.5 in (140 mm) CW outside the lateral spines for blue king crab in the St. Matthew Island Section (5 AAC 34.920 (b)); ≥4.4 in (112 mm) CW outside the lateral spines for male Tanner crab in the Bering Sea District west of long 166°00′W (5 AAC 35.520 (b) (1)); and ≥3.1 in (79 mm) CW outside the lateral spines for snow crab in the Bering Sea District (5 AAC 35.520 (b) (2)). Male Tanner x snow crab hybrids were recorded as being legally retainable during commercial fisheries as either Tanner crab or snow crab according to identification criteria in 5 AAC 35.521 and size limits for legal Tanner and snow crab for the surveyed area were used accordingly. Male hair crab ≥3.25 in (83 mm) CW were scored as legal-sized according to the minimum size for retention established for male hair crab in the commissioner's permits issued for the Bering Sea hair crab fishery (Fitch et al. 2014). Legal status of male blue king crab and hair crab was determined by using fixed-legal-length measuring sticks. Legal status of *Chionoecetes* male crabs was determined using measured CW as an indicator of CW outside the lateral spines due to the small size of spines, inability of caliper tips to fully reach in between spines, and for consistency with legal status determination methods in historic St. Matthew Island surveys.

Data on reproductive condition (clutch fullness, egg development, clutch condition, and egg color) were recorded for captured female crab as described in Appendix D1 of Vanek and Nault (2015). Clutch fullness of king crab was scored according to Figure 24 in Donaldson and Byersdorfer (2005). Clutch fullness of snow and Tanner crab was scored according to NMFS EBS trawl survey guidelines adapted by ADF&G (Appendix D1 in Vanek and Nault 2015; Rugolo et al. 2005). Female king crab and hair crab with eggs or empty egg cases on the pleopodal setae were classified as mature, whereas those with no eggs and no empty egg cases on the pleopodal setae were classified as immature. Female snow and Tanner crab were identified as mature or immature based on the shape and size of the abdominal flap relative to the ventral surface according to Jadamec et al. (1999).

All other species captured during the survey were identified to the lowest taxonomic level possible and enumerated. Captured groundfish of commercially important species were measured for length to the nearest cm.

Further details on the methods for conducting the survey are provided in Vanek and Nault (2015).

Data Analysis

For purposes of data summarization, legal male blue king crab were divided into "recruits" (defined as new-shell legal males <134 mm CL) or "postrecruits" (defined as new-shell legal males ≥134 mm CL and all old- or very old-shell males of legal size). Sublegal male blue king crab were divided into those <105 mm CL and those ≥105 mm CL, where 105 mm CL corresponds with the size used to distinguish "mature-sized" males for management purposes (5 AAC 34.917 (d) (2); Zheng and Pengilly 2015) and to identify sublegal males presumed to be 1 year from recruiting to legal size (Blau 1996). Male blue king crab data from the 96 stations fished in common in all surveys were also summarized by the 3 size categories used for stock assessment (90–104 mm CL, 105–119 mm CL, and ≥120 mm CL), which assigns legal status for males on a CL size of ≥120 mm (Zheng and Pengilly 2015).

For summarizing data on legal male snow crab, we divided legal males into those <102 mm CW and those ≥102 mm CW, where 102 mm CL corresponds with the size used to distinguish "exploited legal males" for management purposes (5 AAC 35.517 (d) (5)).

Catch per unit effort (CPUE) is reported here in terms of the number of animals captured per pot lift. The CPUE of a species-sex-size class for any aggregate of $N \geq 1$ survey stations was computed by

$$CPUE = \left[\sum_{k=1}^{N} \frac{\sum_{j=1}^{n_k} C_{j,k}}{n_k}\right] \Big/ N,$$

where $C_{j,k}$ is the number of the species-sex-size class captured in the j^{th} pot of the k^{th} station and n_k is the number of pots fished in the k^{th} station. Note that, as computed here, the CPUE of a species-sex-size class for an individual station is simply the number of animals captured at the station divided by the number of pots fished at the station and that the CPUE for any aggregate of $N > 1$ survey stations is the average of the CPUE for the individual stations included in the aggregate.

The coefficient of variation (CV) of station CPUE within an aggregate of $N > 1$ stations is also provided in this report as a descriptive measure of the relative variability in CPUE among the individual stations included in the aggregate of stations. The CV of station CPUE for an aggregate of $N > 1$ stations was computed by

$$CV = S \big/ CPUE,$$

where

$$S = \sqrt{\sum_{k=1}^{N} \frac{\left[\frac{\sum_{j=1}^{n_k} C_{j,k}}{n_k} - CPUE\right]^2}{N-1}},$$

and $CPUE$, $C_{j,k}$, and n_k are defined as above.

Results for blue king crab and snow crab were compared to the results from the 1995–2013 triennial St. Matthew Island surveys by limiting consideration to the 96 standard survey stations that were fished in common to all surveys. Comparisons were made for the in-common stations by strata (Figure 3) and for blue king crab only, by the stations inside and outside the area of the trawl tows of the NMFS EBS trawl survey (Figure 4).

SPECIAL PROJECTS

Tag and Release of Legal and Sublegal Male Blue King Crab

Captured legal and sublegal male blue king crab ≥90 mm CL were tagged and released at survey stations. The tagging goal initially established for each station was 10 legal and 20 sublegal males, or >20 sublegal males if 10 legal males could not be tagged, for a total of 30 tagged crab ≥90 mm CL. However, the tagging goal was increased early in the survey to 25 legal males and 50 sublegal males ≥90 mm CL (no station had yet met the original tagging goal). Additionally, all sublegal male blue king crab ≥90 mm CL captured in pots set for special projects were tagged.

The tagging procedure began within one minute of the pot being emptied, with the intent to have all tagged blue king crab back in the sea within 20 minutes from the time of the pot breaking the water. Male blue king crab captured in the pot were sorted first. Legal males and sublegal males ≥90 mm CL, judged to be in healthy condition and with no severe new injuries, old injuries, or apparent parasitic infections and not bleeding hemolymph, were designated as meeting tagging criteria and were tagged. Crab were tagged through the isthmus muscle with Floy vinyl-tubing "spaghetti" tags according to the method described in Gray (1965). Any crab that bled hemolymph when placement of the tag was attempted through the isthmus muscle was not tagged. At stations where the tagging goal could not be achieved under the tagging criteria, exceptions were made for crab that had two classes of injury or infection deemed minor: 1) three or fewer freshly broken spine tips on the top or margins of the carapace that left a hole ≤1 mm; and 2) one or a few noninvasive torch lesions of approximately 1 cm or less in diameter on the carapace or a leg, such as commonly occurs in older shell condition crab. In cases when crab with either of those two classes of injury or infection were tagged, the presence of those conditions was recorded. The survey vessel remained on station while crab were tagged, and tagged crab were released at the station of capture by placing the crab in the well of the vessel's discard chute in which running water flowed overboard. For sublegal crab tagged from special project pots, the vessel was allowed to move away from the capture location, but slowed to a drifting stop when tagged crab were released back into the water.

Floy tags used during the 2015 survey to tag legal male blue king crab had fluorescent pink tubing and white oval discs, marked tag series "D" and individually numbered within the range 18,100 to 18,928. Floy tags used to tag sublegal males had fluorescent pink tubing and yellow oval discs, marked tag series "F" and individually numbered within the range 1 to 1,154.

Reference Oceanographic Data Collection

Pots that were not fished were set at locations throughout the survey area for varying lengths of time with scientific equipment installed to collect reference oceanographic data concurrent with the survey in addition to the temperatures and depths measured at survey stations. Appendices D1 and D2 contain map and information on deployment dates, locations, and soak times.

Three data loggers (RBR Ltd. multi-channel model RBR*concerto*) were used to measure temperature, depth, pH, and dissolved oxygen. Each data logger was placed in a single, unbaited pot with an open escape hole in the webbing and recorded data every 10 min over the length of deployment. Two were deployed for an extended period of time (22–24 d) at the same locations as the two long-term reference pots set during the 2013 survey, lat 59°45.36′N, long 173°00.25′W in Stratum 1 and lat 60°05.27′N, long 172°34.76′W in Stratum 2. The third was deployed at 4 different locations south and north of St. Matthew Island for periods of 1–4 d. Additional sets of reference data were collected by 4 RBR Ltd. data loggers attached inside pots set at survey stations that were also set at locations opportunistically or while conducting special projects: 1 measuring temperature, depth, and conductivity (salinity) was deployed for 11 d at lat 59°52.51′N, long 172°25.12′W in Stratum 1; and 3 measuring temperature and depth were each deployed for periods of 7–33 h. For report purposes, depth recordings in m were adjusted to account for the height above the ocean bottom at which the loggers were secured in the pots by adding 0.6 m for the RBR*concerto* loggers and 0.8 m for the 4 loggers secured in survey station pots.

A single Falmouth Scientific ACM Plus 200 acoustic current meter was deployed at 9 locations (3 in Stratum 1, 4 in Stratum 2, and 2 in Stratum 4) within the survey area for periods of 26–67 h (Appendices D1 and D10) in an unfished pot that had no tunnels or side webbing. The meter was fastened in the center of the pot with its acoustic transducers measuring the water 0.5 m above the bottom of the pot. Current velocity was recorded in 3 dimensions continuously at 1 Hz for the first minute of each hour deployed, yielding an instantaneous speed and direction each second. Current speed was averaged over the length of deployment; prevailing directions during the deployment were summarized using a rose plot. Temperature was also recorded by the current meter at 1 Hz for the first minute of each hour deployed, and averaged over the length of deployment.

Bitter Crab Syndrome in Snow Crab

Prevalence of BCS

To investigate prevalence of bitter crab syndrome (BCS) in the survey area, hemolymph was collected from 191 snow crab that were randomly selected throughout the survey area from the snow crab catch at survey stations or in special project pots. Snow crab were sorted by sex and crab randomly selected from each sorted group without regard to size. Crab were selected before the physical appearance of a crab was seen to insure no bias related to visual signs of bitter crab syndrome. The number of male or female crab randomly selected was proportional to the numbers of each sex captured. A sample of 0.2 ml of hemolymph was collected from each randomly selected crab and put into a well of a collection array tray prefilled with ethanol. Samples were sent to Dr. P. Jensen at the NMFS RACE Alaska Fisheries Science Center lab in Seattle and tested for the presence of the dinoflagellate *Hematodinium* using polymerase chain reaction (PCR) techniques.

Testing of Crab with Visual Signs of BCS and Collection of Live Specimens

All snow crab captured showing visual signs indicative of BCS (e.g. a white-cream opaque color apparent in the joints and exoskeleton, and milky hemolymph) were retained and maintained live. A sample of 0.2 ml of hemolymph was collected from BCS-positive appearing crab and sent to Dr. P. Jensen to test for the presence of *Hematodinium* using PCR techniques. Additionally, 50 male snow crab showing no visual signs of BCS were collected at the end of the

survey, and along with collected BCS-positive appearing crab, were delivered live to NMFS staff and the NMFS RACE lab in Kodiak for bitter crab syndrome investigations.

RESULTS

SURVEY RESULTS

Station Depths and Temperatures

Depths fished during the survey ranged from 20 to 106 m (Figure 5, Appendices B1 and B2). By survey stratum, station average depths ranged 55–106 m in Stratum 1, 33–76 m in Stratum 2, and 36–66 m in Stratum 4. At each station in Stratum 3, the 20–37 m depth zone was fished.

Bottom temperatures recorded at the survey stations fished, averaged over the pot soak time, ranged from -1.1 to 7.6 °C (Figure 6, Appendices B1 and B2). Bottom temperatures were warmest in Stratum 3. Temperatures at the 10 stations in Stratum 3 were recorded at either 26 or 31 m depth (Figure 2) and average temperatures ranged from 5.6 to 7.6 °C. Compared to the two previous surveys (2010 and 2013), temperatures in Stratum 3 were similarly the warmest seen in each survey but were approximately 0.5–2 °C warmer than those recorded during September 2013 and 1–2.5 °C warmer than temperatures at the 4 Stratum 3 stations fished in August 2010 (Gish et al. 2012, Pengilly and Vanek 2014). Outside of Stratum 3, average temperatures ≥2.1 °C were recorded at stations near St. Matthew Island at depths ≤61 m. Coldest temperatures (≤0.0 °C) were recorded at stations south of St. Matthew Island in a northwest-to-southeast band roughly 15–20 nm (28–37 km) wide between 63 to 100 m in depth. The relationship between the station average bottom temperature and station depth during the 2015 survey is shown in Figure 7.

Marine Species Composition

The total survey catch of commercially exploited crab species was 4,183 crab, with blue king crab accounting for 63% of the catch and snow crab for 37%. Tanner crab, hair crab, and Tanner x snow hybrid crab together accounted for only 0.3% of the catch. Including the commercially exploited crab species, 49 taxa were captured and identified during the survey, with the catch of circumboreal toad crab *Hyas coartatus* ranking as the highest in terms of number of animals captured, followed by blue king crab and snow crab (Appendix C1).

The three commercially important finfish species with the highest catches at survey stations were Pacific cod *Gadus macrocephalus* (1,001 fish), walleye pollock *Gadus chalcogrammus* (98 fish), and Pacific halibut *Hippoglossus stenolepis* (53 fish). Size frequency distributions captured during the survey for these 3 species are shown in Appendix C2.

Blue King Crab

A total of 2,638 blue king crab were captured during the survey, of which 1,920 were males and 718 were females. Catch information is summarized in Tables 1 and 2 for male blue king crab, and in Tables 3 and 4 for female blue king crab. Blue king crab were captured at 134 of the 147 stations fished (Figure 8). Of the 13 stations at which no blue king crab were captured, 8 were in Stratum 1, 4 were among the more western stations in Stratum 3, and 1 was in Stratum 2 near the western end of St. Matthew Island.

Males

Male blue king crab were captured at 130 of the 147 stations fished, with legal males captured at 120 stations and sublegal males captured at 100 stations (Figure 9, Appendices B1 and B2). Of the total 1,920 males captured, 1,146 were legal males and 774 were sublegal males.

The overall survey CPUE of total males, legal males, and sublegal males was 3.3, 2.0, and 1.3 crab per pot lift, respectively. Given the differences in station density and layout among the survey strata, however, the CPUE for individual survey strata (Table 1) is more meaningful than for the overall survey. The highest within-stratum CPUE of legal male blue king crab occurred in Stratum 2, and stations in Stratum 2 accounted for 65% (746 crab) of all legal males captured in the survey. Only 2 stations in the survey had station CPUEs of legal males >20 and these were in Stratum 2: station 53 (23.0 crab per pot lift) and station 20 (20.8 crab per pot lift). The CPUE of legal males in Stratum 2 was over twice that in the stratum with the second-highest within-stratum CPUE of legal males, Stratum 4. The highest within-stratum CPUE of sublegal males occurred in Stratum 4 where 25% (195 crab) of the total sublegal catch in the survey were captured. However, the CPUE for sublegal males in Stratum 2 was nearly as high as that in Stratum 4, and nearly one-half (49%; 383 crab) of the sublegal male blue king crab captured during the survey were in Stratum 2. In Stratum 1, the within-stratum CPUE of legal males and of sublegal males were both low (<1.0 crab per pot lift), and station CPUE for males was ≤3.0 crab per pot lift at 88% (65 stations) of the stations in Stratum 1. Two stations in Stratum 1 had station CPUEs for males that were significantly high for the stratum: station 199 (24.3 crab per pot lift), which is among the relatively few Stratum 1 stations that were fished north of St. Matthew Island, and station 76 (10.5 crab per pot lift). The CPUE for males was lowest in Stratum 3 where a total of only 5 males were captured.

As well as showing differences among survey strata, the catch of male blue king crab during the survey also exhibited spatial trends that were related to station depth and temperature. The CPUE of males at stations 41–60 m depth was the highest at 6.2 crab per pot lift, which was over twice the CPUE at stations 61–80 m, 5 times higher than the CPUE at the deepest stations (81–106 m), and 20 times higher than the CPUE at the shallowest (20–40 m) stations (Table 5). High CPUE of male blue king crab was also associated with intermediate bottom temperatures between 0.1 to 4.0 °C (Table 6). Male CPUE was much lower at stations with bottom temperatures that were colder (-1.1 to 0.0 °C) or warmer (4.1–6.0 °C), whereas at stations with the warmest temperatures (6.1–7.6 °C) male CPUE was close to 0.

Carapace lengths of male blue king crab ranged from 62 mm to 160 mm with a modal size range of 126–130 mm CL (285 crab). The 5-mm-interval size group of 131–135 mm CL contained nearly as many males (274 crab); 29% of all captured males ranged within 126–135 mm CL. Of all captured males, 60% were legal-size, with 27% of the legal males classified as recruits and 73% as postrecruits (Table 1). Males ≥105 mm CL made up 86% (1,659 crab) of all males captured, and included all legal-sized males and 66% of the sublegal males captured. The minimum CL recorded from a legal male was 112 mm and the maximum CL recorded from a sublegal male was 133 mm. The size frequency distribution of males varied across strata, with the males captured in Stratum 2 tending to be larger than those captured in Strata 1 and 4 (Figure 10). A higher percent of the males were legal sized in Stratum 2 (66%) than in Stratum 1 (57%; Table 1). The percent of legal males classified as postrecruits was also higher in Stratum 2 (79%) than in Stratum 1 (67%). In contrast with Strata 1 and 2, the majority (59%) of male crab captured in Stratum 4, were sublegal sized. The sublegal males captured in Stratum 4 also tended

to be smaller than in Strata 1 and 2; 40% of the sublegal males in Stratum 4 were <105 mm CL, as opposed to 30% and 32% of the sublegal males in Strata 1 and 2, respectively. In Stratum 3, only 5 males were captured: 3 sublegal males (85, 102, and 108 mm CL) and 2 legal males (135 and 142 mm CL).

Shell conditions of slightly over half of the males were scored as new (51%; 970 crab) or new, pliable (1%; 28 crab), whereas 44% (838 crab) were scored as old and 4% (83 crab) as very old. Only 1 male, legal-sized, was scored as very very old. The majority of sublegal males (67%; 519 crab) were scored as being in new or new, pliable shell condition, whereas the majority of legal males (58%; 667 crab) were scored as being in old or older shell conditions.

Females

Female blue king crab were captured at 37 survey stations: 3 of the 74 stations in Stratum 1, 25 of the 43 stations in Stratum 2, 6 of the 10 stations in Stratum 3, and 3 of the 20 stations in Stratum 4 (Figure 11, Appendices B1 and B2). A total of 671 mature females (390 ovigerous and 281 barren with matted setae) and 47 immature females were captured. The catch of mature females exceeded the catch of immature females in each stratum except for Stratum 4 (Table 3). Females ranged in size from 61 to 123 mm CL. Size frequencies of females by reproductive condition and by stratum for Strata 2–4 are shown in Figure 12; in Stratum 1, only 13 females were captured, 3 immature females (68–79 mm CL) and 10 barren females with matted setae (77–102 mm CL).

The overall survey CPUE of total females, mature females, and immature females was 1.2, 1.1, and <0.1 crab per pot lift, respectively. Given the differences in station density and layout among the survey strata, CPUE computed for individual survey strata (Table 3) are more meaningful. The highest catches of female blue king crab occurred at Stratum 3 stations, and few females were captured in Strata 1 and 4. Stratum 3 had the highest within-stratum CPUE of females (9.6 crab per pot lift), and 98% of the females captured in Stratum 3 were ovigerous. Stratum 3 also showed the highest relative variability in the catch between stations within a stratum. Catch of females in Stratum 3 was concentrated in 4 stations (stations 307–310), located in the southeastern bight of St. Matthew Island, that accounted for 98% (378 crab) of the total stratum catch and 53% of the total survey catch of females (Appendices B1 and B2). One of these 4 stations, station 309, accounted for 82% (315 crab) of all females captured in Stratum 3 and 44% of the entire survey's female catch; nearly half (46%; 146 crab) of the females captured at station 309 were captured in a single pot. The CPUE of females in Stratum 2 (1.8 crab per pot lift) was much lower than Stratum 3 CPUE, although the CPUE of females at 2 stations in Stratum 2 exceeded Stratum 3 CPUE: station 34 (16.8 crab per pot lift) and station 202 (11.0 crab per pot lift). The 6 stations with the highest female catches in Stratum 2 (Stations 202, 34, 35, 51–53; Figure 11), which combined captured 74% (223 crab) of the females in the stratum, were located east and south of Pinnacle Island and near the stations with the highest catches of females in Stratum 3. The majority (91%) of the females captured in Stratum 2 were mature and most (97%) of those were barren with matted setae.

Catch of female blue king crab was largely restricted to stations at depths ≤60 m, and CPUE of females was highest at the stations 20–40 m in depth (Table 5). Stations in Stratum 3 captured all but 2 of the 387 females captured at stations 20–40 m in depth, and the majority of females captured in Stratum 3 were captured in the deepest (37 m) pots fished (42% of catch; 163 crab) and the second-deepest (31 m) pots fished (28% of catch; 107 crab). The CPUE of ovigerous

females was highest (6.9 crab per pot lift) at stations with depths of 20–40 m, where 97% (380 crab) of all ovigerous females captured during the survey were captured. Catch of barren mature females with matted setae, on the other hand, was highest (CPUE of 1.3 crab per pot lift) at stations 41–60 m depth, where 96% (271 crab) of all barren mature females with matted setae captured during the survey were captured. No ovigerous females were captured at individual stations >59 m depth and no barren mature females were captured at stations >66 m depth.

Catch of females was positively associated with bottom temperature over the station temperature range of -1.1 to 6.0 °C, with a CPUE of <0.1 crab per pot lift at the stations with average temperatures of -1.1 to 0.0 °C and a CPUE of 6.3 crab per pot lift at the stations with average temperatures of 4.1–6.0 °C (Table 6). However, CPUE of females at stations with the warmest temperatures (6.1–7.6 °C) was much lower at 0.4 crab per pot lift, similar to the CPUE of stations with average temperatures of 0.1–2.0 °C (0.6 crab per pot lift). Stations fished at average bottom temperatures of 4.1–6.0 °C produced the highest CPUE of ovigerous females (5.4 crab per pot lift) and accounted for 98% (382 crab) of all ovigerous females captured during the survey. Six of the remaining 8 ovigerous females were captured within the warmest station temperature range of 6.1–7.6 °C, where CPUE of ovigerous females was 0.3 crab per pot lift. Barren mature females with matted setae were captured at stations with bottom temperatures of 0.1–6.0 °C with one exception (1 crab captured at station 69, which averaged -0.1 °C). The CPUE of barren mature females with matted setae was positively associated within the 0.1–6.0 °C temperature range: 0.5 crab per pot lift at stations 0.1–2.0 °C (34% of all barren mature females captured; 95 crab), 0.8 crab per pot lift at stations 2.1–4.0 °C (25% of all captured; 70 crab), and 1.5 crab per pot lift at stations 4.1–6.0 °C (41% of all barren mature females captured; 115 crab).

The majority (97%; 379 crab) of ovigerous females were scored as carrying uneyed eggs. The 8 ovigerous females scored as carrying eyed eggs were all captured in Stratum 3. Three females scored as hatching were captured in Stratum 2 (stations 21, 33, and 52). Clutch sizes of most ovigerous females were scored as either ¾ full (57%; 223 crab) or full (32%; 125 crab). Clutch sizes of the remaining ovigerous females were scored as either ½ full (8%; 31 crab), ¼ full (2%; 8 crab) or trace to $^{1}/_{8}$ full (0.1%: 3 crab).

Snow Crab

A total of 1,533 snow crab (1,280 males, 251 females, and 2 of unknown sex) were captured during the 2015 survey. Catch information for male snow crab is summarized in Tables 7 and 8, and for female snow crab, in Tables 9 and 10. Snow crab were captured at 70 stations in Strata 1, 2, and 4 with 94% of the total snow crab catch occurring in Stratum 1at 57 stations (Figure 13, Appendices B1 and B2). Trends in the CPUE of snow crab by depth (Table 5) and bottom temperature (Table 6) were essentially the opposite of those for blue king crab. No snow crab were captured at the shallowest (20–40 m) stations fished, and CPUE of snow crab was highest in the deepest (61–106 m) depth zones. Snow crab CPUE decreased with increasing temperature. Snow crab were predominantly at stations with bottom temperatures ≤0.0 °C and no snow crab were captured at individual stations with average bottom temperatures ≥3.4 °C. Also in contrast to the CPUE of blue king crab, within-stratum CPUE of snow crab males (Table 7) and females (Table 9) was highest in Stratum 1. Only 6% of the total snow crab catch was captured in Stratum 2, and only 5 snow crab were captured in Stratum 4. No snow crab were captured in Stratum 3.

The majority of snow crab males (68%) captured during the survey were sublegal, and only 5% of the legal males that were captured were the exploited size preferred by industry (≥102 mm CW; Table 7). Most of the female snow crab (71%) captured were reproductively mature (Table 9), and 89% (160 crab) of mature females were scored as being in new-shell condition, indicating that they were primiparous females carrying their first clutch of eggs. The relative size frequency distributions of male snow crab by shell condition in Strata 1 and 2 and of female snow crab by reproductive maturity status in Strata 1 are provided in Figure 14. A single immature female (53 mm CL) was captured in Stratum 2. In Stratum 4, 1 mature female (50 mm CW) and 4 males in new shell condition at sizes 64–74 mm CW were captured.

Other Commercial Crab Species

In addition to blue king crab and snow crab, 2 species that are or have been commercially fished in the Bering Sea were captured: 4 hair crab and 1 Tanner crab (Figure 15). Red king crab *Paralithodes camtshaticus* have occasionally been captured in past St. Matthew Island surveys (Pengilly and Vanek 2014), but none were seen in the 2015 survey. The single Tanner crab was a juvenile male (26 mm CW) in Stratum 3 captured at the shallowest depth fished (20 m) at a station recording an average temperature of 7.4 °C, and was the only marine animal in the pot. The 4 hair crab were males captured between 26 to 41 m depth in Strata 3 and 4: 2 legal sized (81 mm CL in old shell condition, and 90 mm CL in very old shell condition), and 2 sublegal males (69 and 71 mm CL in new shell condition).

Additionally, 7 crab identified as Tanner x snow hybrids were captured at stations in Stratum 1 where snow crab were captured: 6 males that would be considered snow crab, and 1 female that would be considered a Tanner crab under the identification criteria of 5 AAC 35.521. None of the captured hybrid males (72–77 mm CW) would be considered legally retainable in the Bering Sea snow crab commercial fishery, and the female hybrid was immature.

Comparison with the 1995–2013 Surveys for 96 Stations Fished In Common

Each of the 96 survey stations that were fished in common during the 1995–2013 St. Matthew Island blue king crab surveys (Figure 3) were fished during the 2015 survey. Four pots were sampled at each station with the exception of station 147 (3 pots were sampled due the loss of 1 pot) for a total of 383 pots sampled. The 65 in-common stations within Stratum 1 and the 31 within Stratum 2 have the same layout and density, so that pooling the data to compute a CPUE for all 96 in-common stations, without regard to stratum, provides a meaningful population index for comparison across survey years. Nonetheless, the within-stratum CPUE for the in-common stations allows for comparison within and among survey years of the CPUE in the offshore (Stratum 1) in-common stations with the CPUE in the nearshore (Stratum 2) in-common stations. The 96 in-common stations may also be categorized by those stations outside (12 stations within Stratum 2 that are near St. Matthew Island) and those stations inside (84 stations) the area trawled during the NMFS EBS trawl survey (Figure 4). Average station depths of the 12 in-common stations in the non-trawled area ranged 35–59 m and the 84 in-common stations in the area trawled ranged 55–106 m. During the 2015 survey, average station temperatures at the 12 stations in the non-trawled area ranged 0.8–5.6 °C and at the 84 in the trawled area ranged -1.1 to 4.3 °C. Note that when comparing the 96 in-common stations in 1995–2015 survey years, the comparability of the 2013 survey may have been affected by its later timing relative to other surveys (Pengilly and Vanek 2014).

Blue King Crab

The numbers of male and female blue king crab captured and CPUE of male, legal male, sublegal male, and female blue king crab at the 96 in-common stations during the 1995–2015 surveys are presented by stratum in Table 11. Trends in the CPUE of legal males, sublegal males, and females during the 1995–2015 surveys at the 96 in-common stations, overall and by stratum, are presented graphically in Figure 16. In general, there has been an overall decreasing trend in CPUE seen over the last three surveys in 2010, 2013, and 2015. All 8 of the surveys performed during 1995–2015 produced a similar spatial trend in catch of legal males in that the CPUE at the nearshore Stratum 2 in-common stations was higher than at the offshore Stratum 1 in-common stations. The CPUE of legal males, of sublegal males, and of females for the 96 in-common stations during the 2015 survey all declined from the 2013 survey and were each at the second lowest levels seen in all surveys, exceeding only the CPUE during the 2004 survey. The CPUE for each were at levels less than 30% of the CPUE during the 1995 and 1998 surveys, the surveys with the highest CPUEs.

The overall size distribution of male blue king crab captured at the 96 in-common stations in 2015 showed a slight increase in modal size range to 131–135 mm CL from that seen in 2013 (126–130 mm CL), which likewise had increased from the mode at 121–125 mm CL seen in 2010 (Figure 17). Legal males accounted for 65% (725 crab) of the males captured in 2015, the highest percentage of all surveys, whereas 50% of the males captured in 2013 and 46% in 2010 were legal males. However, the percentage of legal males captured in 2015 was similar to the 1998–2004 surveys (60–63%). The percentage of males ≥105 mm CL was 90% (998 crab), higher than in all previous surveys, which ranged from 74% in 2013 to 85% in 1998 and 2004. Size distributions for female blue king crab captured at the 96 in-common stations for all surveys is shown in Figure 18. Mature females accounted for 92% of the females captured in 2015, the highest percentage in all surveys, which ranged within 74–82% in most surveys years (1995–2001 and 2010–2013) and to as low as 46–48% in 2004 and 2007. Barren females with matted setae accounted for the majority (98%; 204 crab) of the mature females captured, similar to the range of 97–99% seen in previous surveys with the exception of 2004 and 2013. During the 2013 survey, 93% of mature females were barren with matted setae; during the 2004 survey, the lowest percentage of 80% was seen. Of the females captured in 2015, 85% (193 crab) were ≥81 mm CL, the estimated size at 50% maturity for female blue king crab in the St. Matthew Island area (Somerton and MacIntosh 1983). This was similar to percentages in 1995–2001 (81–84%) and higher than the percentages since 2004 (46%; 59% in 2007, 71% in 2010, and 72% in 2013).

The catch of male blue king crab from the 96 in-common stations was summarized for the three size classes used for stock assessment (90–104 mm CL, 105–119 mm CL, and ≥120 mm CL; Zheng and Pengilly 2015) and provided to stock analyzers for the 2015 stock assessment of St. Matthew blue king crab. Catch totals and CPUE for male blue king crab ≥90 mm CL and the CPUE for males by these size classes at the 96 in-common stations during the 1995–2015 surveys are in Table 12. For comparison, the catch and CPUEs at the 12 stations in-common that are outside the area covered by the NMFS trawl survey (Figure 4) are also presented. Although only one-eighth of the total number of in-common stations fished, 41% of the total males ≥90 mm CL were captured at these 12 stations located outside the trawled area. Over all surveys, the percentage of total males ≥90 mm CL captured in the 96 in-common stations that were captured in the area not covered by the NMFS EBS trawl survey ranges from a low of 13% in 1998 to a high of 56% in 2013, suggesting male crab are distributed differently depending on the year,

moving in and out of the trawled area. Trends in the CPUE of males 90–104 mm CL, 105–119 mm CL, and ≥120 mm CL during the 1995–2015 surveys at the 96 in-common stations are graphed in Figure 19, along with trends for the 12 outside and 84 stations inside the trawled area. For all survey years, CPUE for total males ≥90 mm CL and CPUE for males ≥120 mm CL are higher for the 12 stations outside compared to the 84 stations inside the trawled area; the CPUEs for each of the 90–104 mm CL and 105–119 mm CL size classes follow the same trend with the exception of 1998, the survey year with the highest percent of males ≥90 mm CL captured at the 84 in-common stations within the trawled area (87%).

Snow crab

The catch of snow crab at the 96 in-common stations has varied widely among the 8 surveys conducted during 1995–2015 (Table 13). Total catch of snow crab at the 96 in-common stations during the 2015 survey was twice that of the survey with the lowest catch (2004), but was only 5–40% of the catch in all other surveys. As in previous surveys, only a small portion (6%) of the snow crab was captured at the 31 in-common stations within Stratum 2. The catch of sublegal males was twice the catch of legal males, and the CPUE of sublegal crab was twice the CPUE of legal crab in both strata. Only in the 2013 survey were more sublegal to legal crab captured; in all other surveys (1995–2010) the catch of sublegal males was less than the catch of legal males. Females accounted for 17% of the snow crab captured in 2015, less than the percentage seen in 2013 (31%), but similar to or greater than the percentage of females in the snow crab catch in surveys during 1995–2010, which ranged from <1% in 1995 to 16% in 2001.

Stratum 4 (NMFS Station R-24)

Additional results specific to Stratum 4 are summarized to help facilitate considerations specific to NMFS EBS station R-24 (Zheng and Pengilly 2015), and are compared to the 20 stations in Stratum 4 fished in 2013 (Pengilly and Vanek 2014). Fishing was conducted during 19–23 August, an average of 35 days (5 weeks) after the NMFS EBS trawl survey tow on July 17 at station R-24. Note that when comparing Stratum 4 catches between the 2013 and 2015 survey years, Stratum 4 was fished during 20–25 September in 2013 and the 1 month difference in survey timing may have an effect on results.

Station soak time averaged 31.3 h with a range of 30.1–34.0 h. Average depths fished by the 20 stations in Stratum 4 ranged from 36 to 66 m (Figure 5, Appendix B2) with the deepest depths occurring at the stations located in the northwestern section of the stratum. The 3 stations in the northwest corner (stations 414, 417, and 418) had average depths ranging 61–66 m, whereas the majority of the stations (16 stations; 80%) had average depths ranging 41–59 m. The shallowest station (station 408), located near the passage between Hall and St. Matthew Islands, averaged 36 m depth.

Bottom temperatures recorded at stations, averaged over the pot soak time, ranged 1.5–5.6 °C (Figure 6, Appendix B2). In comparison to the 19 Stratum 4 stations that had temperatures measured during the 2013 survey (Figure 19 and Appendix C2 in Pengilly and Vanek 2014), station average temperatures during the 2015 survey were 0.1–2.7 °C warmer at 18 stations and 0.5 °C cooler at 1 station (station 414). Station 409 at the center of NMFS station R-24, had a station average of 4.6 °C, with a range of 4.4–4.9 °C; during the 2013 survey, this station had a bottom temperature average of 2.3 °C and ranged 1.9–3.0 °C.

Blue king crab was the predominant commercially important crab species captured at Stratum 4 stations. Only 5 snow crab (4 sublegal males and 1 ovigerous female) and 1 hair crab (1 sublegal male) were also captured. Blue king crab were captured at all 20 stations fished, with at least 1 male captured at every station and females captured at only 3 stations (Figure 8). Sublegal males were caught at all but one station (station 407).

A total of 333 males and 18 female blue king crab were captured in Stratum 4 for a total of 351 blue king crab (Tables 1 and 3). The 2015 total blue king crab catch was 90% of the total blue king crab catch in 2013 (392 crab), though similar in proportions of males and females. The male blue king crab catch in 2015 was 88% of the 2013 male catch (378 crab), and 4 more females were captured in 2015 than in 2013. Notably, at the 96 stations fished in common in all surveys and located south of St. Matthew Island (Figure 3), the male blue king crab catch in 2015 was 45% of the male blue king crab catch in 2013 (Table 11). In Stratum 4, the ratio of sublegal to legal males was higher (1.4:1) compared to the survey area south of St. Matthew Island at the 96 in-common stations (0.5:1; Tables 1 and 2).

Captured male blue king crab ranged in size from 63 mm to 151 mm CL, with a modal size range of 116–120 mm CL, a slight shift larger compared to the 111–115 mm CL modal size range for males in 2013 (Figure 10; Figure 21 in Pengilly and Vanek 2014). The majority (59%) of males were sublegal, a lower percentage than in 2013 (76%). Sixty percent (60%; 117 crab) of the sublegal males were ≥105 mm CL in 2015, as compared to 55% (259 crab) in 2013 (Table 1; Table 9 in Pengilly and Vanek 2014). The 2 mature female blue king crab that were captured (77 and 87 mm CL) were barren with matted setae. The 16 immature female blue king crab captured ranged 61–87 mm CL. The CPUE of male blue king crab in Stratum 4 (4.2 crab per pot lift; Table 1) was nearly 3 times the Stratum 1 CPUE of males (1.5 crab per pot lift; Table 1), and two-thirds of the Stratum 2 CPUE of males (6.6 crab per pot lift; Table 1). The Stratum 4 CPUE of legal male blue king crab (1.7 crab per pot lift) was nearly twice the Stratum 1 CPUE (0.9 crab per pot lift) but less than half of the Stratum 2 CPUE (4.3 crab per pot lift).

Two stations alone accounted for 60% (200 crab) of the total male blue king crab captured, and were located directly northwest of station 409 (stations 411 and 414; Figure 9 and Appendix B2). Station CPUE for male blue king crab was 19.5 (crab per pot lift) at station 411 and 30.5 (crab per pot lift) at station 414. Station 409 was one of 16 stations with a station CPUE of ≤3 for male blue king crab. This was a different spatial distribution than that seen in 2013, where the 3 highest-catching stations were immediately adjacent to and surrounding station 409, and station 409 was one of the 7 highest-catching stations for male blue king crab with individual station CPUEs ranging 8–16 crab per pot lift (Figure 20 and Appendix C2 in Pengilly and Vanek 2014).

Incidence of Disease and Parasites in Crab

Torch lesions (chitinoclastic bacterial infection affecting the shell; also known as shell disease) were seen on 97 blue king crab and 79 snow crab. Blue king crab consisted of 67 legal males (2 in new shell condition, 41 in old shell condition, and 24 in very old shell condition), 17 sublegal males (1 in new shell condition, 10 in old shell condition, and 6 in very old shell condition), and 13 mature females (8 ovigerous in new or old shell condition and 5 barren with matted setae in old or very old shell condition). Overall, 92% of the blue king crab with torch lesions were in old or very old shell condition. Snow crab with torch lesions were 42 sublegal and 33 legal males (83% were in old, very old, or very very old shell condition) and 5 females in old shell condition.

Lesions ranged from singular to multi-focal; and in size from small lesions, approximately 1 cm in diameter, to severe lesions over 2 cm in diameter.

There were 24 legal male and 4 sublegal male blue king crab recorded as having "leatherback", a condition where the carapace of a crab that is leathery or rubbery, regardless of shell condition. In the 28 crab recorded as "leatherback", the carapace had either 2 or 3 areas that were soft and could be pushed in easily while the rest of the carapace was hard. The location of the soft areas was on the dorsal surface of the carapace: the 2 raised areas in the posterior section of the branchial regions on each side of the midline, which were effected in all "leatherback" crab; and one area on the midline towards the rostrum, which was the third area effected in only some of the crab. No discoloration of the carapace was present. Shell condition of "leatherback" crab was very old in the majority of crab (64%; 18 crab), old in 9 crab, and new in 1 crab.

Five blue king crab (1 legal male, 3 sublegal males, and 1 immature female) were recorded as having "cottage cheese disease", a microsporidian infection. Photos of the characteristic white cheese-curd-like lumps that could be seen through the integument (e.g. around the isthmus muscle and abdominal flap) were taken for identification training purposes. Hemolymph samples were taken from 3 of the crab, and an attempt is being made to identify the genus of Microsporidia present.

SPECIAL PROJECT RESULTS

Tagging and Release of Male Blue King Crab

A total of 817 legal male blue king crab were tagged from the 1,146 legal males captured at survey stations, representing 71% of all legal males that were captured in the survey (Table 14, Appendices B1 and B2). Legal males were tagged and released from 98% of the 120 stations in Strata 1–4 where at least 1 legal male was captured. By stratum, legal males were tagged and released at all stations in Strata 2 and 3 where captured, and at all but one of the stations in Stratum 1 (station 95) and in Stratum 4 (station 420) where at least 1 legal male was captured. The number of legal males tagged and released per station ranged from 1 to 26, with 10 stations having 25 legal males tagged and released (one station accidently had 26), and the tagging rate (number of legal males tagged per number of legal males captured, expressed as a percentage) ranged from 27% to 100%. The within-stratum tagging rate was highest (83%) in Stratum 1, although those animals represented only 26% of all tagged and released legal males. Within Strata 2 and 4, the tagging rate was the same at 68%, although Stratum 2 had the highest (62%) of all tagged and released legal males due to some stations catching large numbers of legal males compared to only 12% of all tagged and released legal males coming from Stratum 4. Legal males were tagged and released throughout the range of depths at which legal males were captured during the survey, with 0.7% (6 crab) of the legal male tag releases occurring at stations 20–40 m deep, 61% (495 crab) at stations 41–60 m deep, 27% (221 crab) at stations 61–80 m deep, and 12% (95 crab) at stations 81–109 m deep.

A total of 1,153 sublegal crab ≥90 mm CL were tagged and released: 663 sublegal crab that were captured and released at survey stations (Table 15, Appendices B1 and B2), and 490 sublegal crab that were captured in pots set for special projects. The 663 sublegal crab that were captured, tagged, and released at 97 stations represented 98% of the sublegal males ≥90 mm CL captured for the survey (Table 1; 679 crab). All stations capturing sublegal males ≥90 mm CL had at least 1 tagged and released; only 3 stations capturing sublegal males did not capture any ≥90 mm CL (stations 3, 6, and 34). Nearly 100% of the sublegal crab ≥90 mm CL captured in Strata 1, 2, and

4, were tagged and released (97%, 98%, and 98%, respectively); and 100% (2 crab) were in Stratum 3.

Tagged Crab Recovery

Only 17 legal males tagged during the 2015 survey were recovered in the 2015/16 St. Matthew Island blue king crab fishery, an overall recovery rate of 2% (Table 14). Recovery information was recorded by onboard crab observers. All recoveries had been released at stations south of St. Matthew Island in Strata 1 and 2, with each stratum having the same recovery rate of 2%. Approximately 24,400 blue king crab were harvested during the fishery with 96% of the harvested crab coming from statistical areas 735930 and 736001 (J. Shaishnikoff, fish ticket administrator, ADF&G, Dutch Harbor, personal communication), which are the two statistical areas covering the western half of the survey area south of St. Matthew Island. Release and recovery data for tagged legal males recovered in the 2015/16 fishery is summarized in Appendix E1; see Appendix E2 for a map showing the locations and number of tagged legal male releases during the 2015 survey, and the portion of tagged crab released at each station that were recovered in the 2015/16 fishery. In general, most of the recovered legal male crab had moved further from St. Matthew Island in a roughly southward direction into deeper waters between the time of capture during the 2015 survey to the time of capture in the following fishery of 2015/16. Included in the summarized data in Appendix E1 are 6 recovered tagged legal crab that were legal sized crab tagged during the 2013 survey; of interesting note is half (3 crab) have not molted since being tagged 2 years ago (CLs of 124, 130, and 141 mm). One legal tagged male that had been tagged during the 2013 survey was recovered and re-released during the 2015 survey, and it also had not molted since being tagged and released in 2013 (125 mm CL). Sublegal crab tagged during the 2015 survey are expected to be recovered in future fisheries. Recovery and growth information of tagged male blue king crab will be compiled in a future report.

Reference Oceanographic Data Collection

Deployment information and depth and bottom temperature data (average and range measured over length of deployment) recorded from data loggers collecting reference data are summarized in Appendix D2. Profiles of depth and temperature data recorded from the 3 data loggers measuring temperature, depth, dissolved oxygen and pH, deployed at 6 locations during the 2015 survey, are presented in Appendices D5–D8. Dissolved oxygen and pH recordings are not presented in this report. The long-term reference pot (Ref 1) set for 24 days in Stratum 1 had partial sensor failure, and while depth recordings were deemed reliable for the length of the deployment, reliable temperature data were recorded for only the first 38 h. However, temperature and depth data for a period of 10 days was recorded in Stratum 1 by a data logger in a special project pot (Ref B) set near station 95 and profiles of the data are in Appendix D9. Average, minimum, and maximum temperatures and depths are shown in Appendix D2 for the 3 additional reference sets of data not depicted in profiles (Ref A, C, and D). Bottom temperatures at any one single location experienced a range of up to 3 °C difference over the soak time of the logger. Reference pot 2 set in Stratum 2 measuring temperature for 22 days recorded the highest variation of 3 °C. As seen in Appendices D4 and D8, changes in temperature could be dramatic and fast over a single day. On the depth profiles, sections showing darker and noisier tracings correlate with higher seas. Ranges of depth measured with a wider spread between minimum and maximum depths recorded generally correlate with higher seas and/or higher more extreme tides at some time during the deployment of the logger.

Average current speeds measured at 9 locations ranged from 1.9 to 10.1 cm/s with the strongest currents and greatest variation occurring at the Stratum 1 (offshore) locations (Appendices D1, D10 and D11). Instantaneous current speeds of 0.5–26.3 cm/s were recorded in Stratum 1. Average current speeds observed at locations in Stratum 2 (nearshore) and Stratum 4 (north of St. Matthew Island and similarly nearer to shore) were relatively static (1.9–2.5 cm/s) and instantaneous current speed varied less than in offshore locations. Of the nearshore locations, CM 8 (set at the midpoint of station 203 when the station was not being fished and tends to catch no or few blue king crab compared to surrounding stratum 2 stations) and CM 9 exhibited the greatest variation in instantaneous current speed (Appendix D10). Instrument tilt (offset from z-axis) ranged from 1 to 14° over all 9 locations, well within the optimum operational range of 0–30°. See Appendix D11 for a rose plot map depicting the joint frequencies of current speed and direction at each location monitored.

Bitter Crab Syndrome in Snow Crab

A total of 191 samples of hemolymph collected from randomly selected snow crab were collected from 46 legal males ranging 79–107 mm CW, 120 sublegal males ranging 48–78 mm CW, and 25 females ranging 50–63 mm CW. Respectively, this represented 24%, 63%, and 13% of the samples collected, and was comparable to the proportions of snow crab captured during the survey (legal males, 27%; sublegal males, 57%; females, 16%; Tables 7 and 9). Eighteen (18) of the 191 randomly collected samples tested positive for the presence of the parasitic dinoflagellate *Hematodinium* that causes bitter crab syndrome (P. Jensen, Fisheries Resource Pathology Team, NMFS-AFSC, Seattle, personal communication), yielding an estimate of prevalence of 9.4% for *Hematodinium* infection (bitter crab syndrome) in the snow crab captured within the area surveyed around St. Matthew Island in 2015. Of the 18 crab testing positive for *Hematodinium* presence, 14 were sublegal males (49–76 mm CW), 3 were legal males (80–85 mm CW), and 1 was an immature female (57 mm CW).

A total of 46 live snow crab exhibiting visual signs consistent with bitter crab syndrome, including milky hemolymph and shell and/or joint color changes, were collected during the survey. Hemolymph samples were collected from a total of 32 of these and analyzed using PCR techniques. Results were positive for 27 crab, confirming the presence of *Hematodinium* (P. Jensen, Fisheries Resource Pathology Team, NMFS-AFSC, Seattle, personal communication). Thus, 84% of snow crab with visual signs consistent with bitter crab syndrome at the time of capture and sampling on the deck, tested positive for the presence of *Hematodinium.*

Twelve (12) of the 46 live snow crab collected with BCS-consistent signs perished before the vessel arrived in port at the end of the survey. The remaining 34 BCS-positive appearing snow crab and 50 healthy-appearing male snow crab were delivered live to NMFS staff in Dutch Harbor for transport to the NMFS RACE lab in Kodiak.

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REFERENCES CITED

Blau, S. F. 1996. The 1995 St. Matthew Island blue king crab survey. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report 4K96-27, Kodiak.

Blau, S. F. 2000. Nearshore blue king crab survey St. Matthew Island, 1999. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K00-42, Kodiak.

Blau, S. F., and L. J. Watson. 1999. St. Matthew Island blue king crab survey, 1998. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K99-66, Kodiak.

Chilton, E. A., C. E. Armistead, and R. Foy. 2011. The 2010 eastern Bering Sea Continental shelf bottom trawl survey: Results for commercial crab species. NOAA Technical Memorandum NMFS-AFSC-216. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Fisheries Science Center, February 2011.

Chilton, E. A., C. E. Armistead, and R. Foy. 2012. The 2011 eastern Bering Sea Continental shelf bottom trawl survey: results for commercial crab species. NOAA Technical Memorandum NMFS-AFSC-235. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Fisheries Science Center, May 2012.

Daly, B. J., C. E. Armistead, and R. J. Foy. 2014. The 2014 eastern Bering Sea Continental shelf bottom trawl survey: Results for commercial crab species. NOAA Technical Memorandum NMFS-AFSC-282. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Fisheries Science Center, Kodiak Laboratory, October 2014.

Daly, B. J., C. E. Armistead, and R. J. Foy. 2015. The 2015 eastern Bering Sea Continental shelf bottom trawl survey: Results for commercial crab species. NOAA Technical Memorandum NMFS-AFSC-308. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Fisheries Science Center, November 2015.

Donaldson, W. E., and S. C. Byersdorfer. 2005. Biological field techniques for lithodid crabs. Alaska Sea Grant College Program, University of Alaska, AK-SG-05-03, Fairbanks.

Fitch, H. 2013. Saint Matthew Island Section blue king crab season closed. Alaska Department of Fish and Game, Divison of Commercial Fisheries, News Release #10-02-13 St Matthew BKC. [issued 2013 Oct 4; cited 2014 Jan 21]. http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/368744338.pdf (Accessed January 2014).

Fitch, H. 2015. Saint Matthew Island Section blue king crab season opens October 15 Total Allowable Catch Announced. Alaska Department of Fish and Game, Divison of Commercial Fisheries, News Release #10-05-15 St Matthew BKC. [issued 2015 Oct 5; cited 2016 April 11]. http://www.adfg.alaska.gov/static/applications/dcfnewsrelease/625124737.pdf (Accessed April 2016).

Fitch, H., M. Schwenzfeier, B. Baechler, C. Trebesch, M. Salmon, M. Good, E. Aus, C. Cook, E. Evans, E. Henry, L. Wald, J. Shaishnikoff, and K. Herring. 2014. Annual management report for the commercial and subsistence shellfish fisheries of the Aleutian Islands, Bering Sea and the Westward Region's Shellfish Observer Program, 2011/12. Alaska Department of Fish and Game, Fishery Management Report No. 14-54, Anchorage.

Foy, R. J., and C. E. Armistead. 2013. The 2012 eastern Bering Sea Continental shelf bottom trawl survey: results for commercial crab species. NOAA Technical Memorandum NMFS-AFSC-242. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, Alaska Fisheries Science Center, January 2013.

Gaeuman, W. B. 2013. 2013 Saint Matthew Island blue king crab stock assessment. Pages 558–615 [*In*] NPFMC. 2013. Stock assessment and fishery evaluation report for the king and Tanner crab fisheries of the Bering Sea and Aleutian Islands Regions: 2013 final crab SAFE. North Pacific Fishery Management Council, Anchorage, September 2013.

Gish, R. K., V. A. Vanek, and D. Pengilly. 2012. Results of the 2010 triennial St. Matthew Island blue king crab pot survey and 2010/11 tagging study. Alaska Department of Fish and Game, Division of Commercial Fisheries, Fishery Management Report No. 12-24, Anchorage.

REFERENCES CITED (Continued)

Gray, G. W. 1965. Tags for marking king crabs. Progressive Fish Culturist, October: 221–227.

Jadamec, L. S., W. E. Donaldson, and P. Cullenberg. 1999. Biological field techniques for *Chionoecetes* crabs. Alaska Sea Grant College Program, University of Alaska, AK-SG-99-02, Fairbanks.

Otto, R., R. MacIntosh, T. Armetta, and A. Fukuyama. 1978. Report to industry on 1978 eastern Bering Sea survey king crab. NWAFC Processed Report. National Marine Fisheries Service, Northwest and Alaska Fisheries Center, Kodiak Facility, September 1978.

Otto, R. S., R. A. MacIntosh, L. A. Gardner, and T. M. Armetta. 1980. Report to industry on the 1980 eastern Bering Sea king and Tanner crab survey. NWAFC Processed Report 80-13. National Marine Fisheries Service, Northwest and Alaska Fisheries Center, Kodiak Facility, September 1980.

Pengilly, D., and L. J. Watson. 2004. Recoveries of tagged blue king crabs *Paralithodes platypus* in St. Matthew Island commercial fisheries, 1995–1998. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K04-2, Kodiak.

Pengilly, D., and V. A. Vanek. 2014. Results of the 2013 triennial St. Matthew Island blue king crab pot survey. Alaska Department of Fish and Game, Fishery Management Report No. 14-35, Anchorage

Rugolo, L., D. Pengilly, R. MacIntosh, and K. Gravel. 2005. Reproductive potential and life history of snow crabs in the eastern Bering Sea. Pages 57–324 [*In*] Pengilly, D. 2005. Bering Sea snow crab fishery restoration research, Final comprehensive performance report, NOAA Cooperative Agreement NA17FW1274, April 13, 2005.

Somerton, D. A., and R. A. MacIntosh. 1983. The size at sexual maturity of blue king crab, *Paralithodes platypus*, in Alaska. Fishery Bulletin 81(3): 621–628.

Stevens, B. G., J. A. Haaga, and R. A. MacIntosh. 1994. Report to industry on the 1994 eastern Bering Sea crab survey. National Marine Fisheries Service, Alaska Fisheries Science Center, Processed Report 94-07.

Vanek, V. 2013. Project operational plan for the 2013 St. Matthew Island blue king crab survey. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Operational Plan ROP.CF.4K.2013.02, Kodiak.

Vanek, V., and A. Nault. 2015. Project operational plan for the 2015 St. Matthew Island blue king crab survey. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Operational Plan ROP.CF.4K.2015.21, Kodiak.

Vining, I., S. F. Blau, and D. Pengilly. 2001. Evaluating changes in spatial distribution of blue king crab near St. Matthew Island. Pages 327-346 [*In*] G. H. Kruse, N. Bez, A. Booth, M. W. Dorn, R. N. Lipscius, D. Pelletier, C. Roy, S. J. Smith, and D. Witherell, editors. Spatial processes and management of marine populations, University of Alaska Sea Grant College Program, AK-SG-01-02, Fairbanks.

Wallace, M. M., C. J. Pertuit, and A. R. Hvatum. 1949. Contribution to the biology of the king crab (*Paralithodes camtschatica*) Tilesius. U. S. Department of the Interior, Fish and Wildlife Service, Fishery Leaflet No. 340.

Watson, L. J. 2005. The 2004 triennial St. Matthew Island blue king crab survey and comparisons to the 1995, 1998, and 2001 surveys. Alaska Department of Fish and Game, Fishery Management Report No. 05-22, Anchorage.

Watson, L. J. 2008. The 2007 triennial St. Matthew Island blue king crab survey and comparisons to historic surveys. Alaska Department of Fish and Game, Fishery Management Report No. 08-41, Anchorage.

Watson, L. J., and R. Burt. 2002. The 2001 triennial St. Matthew Island blue king crab survey and comparisons to the 1995 and 1998 surveys. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K02-37, Kodiak.

Watson, L. J., D. Pengilly, and S. C. Byersdorfer. 1995. Project operational plan for the 1995 St. Matthew Island blue king crab tagging survey. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report 4K95-48, Kodiak.

REFERENCES CITED (Continued)

Zheng, J., and D. Pengilly. 2015. Saint Matthew Island Blue King Crab Stock Assessment for Fall 2015. Pages 563–646 [*In*] NPFMC. 2015. Stock assessment and fishery evaluation report for the king and Tanner crab fisheries of the Bering Sea and Aleutian Islands Regions: 2015 final crab SAFE. North Pacific Fishery Management Council, Anchorage, September 2015.

TABLES AND FIGURES

Table 1.–Male blue king crab catch (number of crab), catch per unit effort (CPUE = number of crab per pot lift), and coefficient of variation (CV) of station CPUE by survey stratum during the 2015 St. Matthew Island blue king crab pot survey.

				Males			Legal					Sublegal					
								Post				mm CL					
Stratum	Stations	Pots	Sample dates	Total	CPUE	(CV)	Recruit	Recruit	Subtotal	CPUE	(CV)	<90	90–104	≥105	Subtotal	CPUE	(CV)
1	74	296	8/03–8/24	453	1.5	(2.06)	87	173	260	0.9	(2.08)	18	40	135	193	0.7	(2.45)
2	43	171	8/06–8/26	1,129	6.6	(1.13)	158	588	746	4.3	(1.19)	41	82	260	383	2.2	(1.21)
3	10	40	8/17–8/25	5	0.1	(1.94)	0	2	2	0.1	(2.11)	1	1	1	3	0.1	(3.16)
4	20	80	8/19–8/23	333	4.2	(1.80)	61	77	138	1.7	(2.05)	35	43	117	195	2.4	(1.78)
Total	147	587	8/03–8/26	1,920	–	–	306	840	1,146	–	–	95	166	513	774	–	–

Table 2.–Male blue king crab catch (number of crab), catch per unit effort (CPUE = number of crab per pot lift), and coefficient of variation (CV) of station CPUE by survey stratum for the 96 in-common stations fished during the 2015 St. Matthew Island blue king crab pot survey.

				Males			Legal					Sublegal					
								Post				mm CL					
Stratum	Stations	Pots	Sample dates	Total	CPUE	(CV)	Recruit	Recruit	Subtotal	CPUE	(CV)	<90	90–104	≥105	Subtotal	CPUE	(CV)
1	65	260	8/03–8/17	285	1.1	(1.39)	52	106	158	0.6	(1.20)	12	24	91	127	0.5	(2.49)
2	31	123	8/06–8/17	830	6.7	(1.11)	107	460	567	4.6	(1.18)	26	55	182	263	2.1	(1.08)
1 & 2	96	383	8/03–8/17	1,115	2.9	(1.76)	159	566	725	1.9	(1.91)	38	79	273	390	1.0	(1.77)

Table 3.–Female blue king crab catch (number of crab), catch per unit effort (CPUE = number of crab per pot lift), and coefficient of variation (CV) of station CPUE by survey stratum during the 2015 St. Matthew Island blue king crab pot survey.

				Females			Mature					Immature		
Stratum	Stations	Pots	Sample dates	Total	CPUE	(CV)	Ovigerous	Matted setae	Subtotal	CPUE	(CV)	Subtotal	CPUE	(CV)
1	74	296	8/03–8/24	13	<0.1	(7.32)	0	10	10	<0.1	(7.78)	3	<0.1	(6.38)
2	43	171	8/06–8/26	302	1.8	(1.99)	12	263	275	1.6	(2.09)	27	0.2	(2.03)
3	10	40	8/17–8/25	385	9.6	(2.55)	378	6	384	9.6	(2.55)	1	<0.1	(3.16)
4	20	80	8/19–8/23	18	0.2	(2.47)	0	2	2	<0.1	(3.08)	16	0.2	(2.45)
Total	147	587	8/03–8/26	718	–	–	390	281	671	–	–	47	–	–

Table 4.–Female blue king crab catch (number of crab), catch per unit effort (CPUE = number of crab per pot lift), and coefficient of variation (CV) of station CPUE by survey stratum for the 96 in-common stations fished during the 2015 St. Matthew Island blue king crab pot survey.

				Females			Mature					Immature		
Stratum	Stations	Pots	Sample dates	Total	CPUE	(CV)	Ovigerous	Matted setae	Subtotal	CPUE	(CV)	Subtotal	CPUE	(CV)
1	65	260	8/03–8/17	1	<0.1	(8.06)	0	0	0	0.0	–	1	<0.1	(8.06)
2	31	123	8/06–8/17	226	1.8	(2.03)	5	204	209	1.7	(2.06)	17	0.1	(1.93)
1 & 2	96	383	8/03–8/17	227	0.6	(3.80)	5	204	209	0.5	(3.86)	18	<0.1	(3.49)

Table 5.–Catch per unit effort (CPUE = number of crab per pot lift) of blue king crab and snow crab, with coefficient of variation (CV) of station CPUE, by depth zone during the 2015 St. Matthew Island blue king crab pot survey.

		Blue King Crab							
		Total		Males		Females		Snow Crab	
Depth (m)	Stations	CPUE	(CV)	CPUE	(CV)	CPUE	(CV)	CPUE	(CV)
20–40	14	7.2	(2.90)	0.3	(1.55)	6.9	(3.01)	0.0	–
41–60	51	7.8	(1.18)	6.2	(1.27)	1.6	(2.09)	0.1	(5.93)
61–80	45	2.6	(1.86)	2.6	(1.81)	0.1	(4.03)	4.8	(2.22)
81–106	37	1.2	(1.50)	1.2	(1.50)	0.0	–	4.3	(1.69)

Table 6.–Catch per unit effort (CPUE = number of crab per pot lift) of blue king crab and snow crab, with coefficient of variation (CV) of station CPUE, by bottom temperature zone during the 2015 St. Matthew Island blue king crab pot survey.

		Blue King Crab							
Temperature		Total		Males		Females		Snow Crab	
(°C)	Stations	CPUE	(CV)	CPUE	(CV)	CPUE	(CV)	CPUE	(CV)
-1.1–0.0	53	1.3	(1.47)	1.2	(1.47)	<0.1	(5.10)	6.6	(1.67)
0.1–2.0	47	5.8	(1.50)	5.2	(1.46)	0.6	(2.81)	0.7	(1.95)
2.1–4.0	22	7.6	(1.13)	6.6	(1.16)	1.0	(2.01)	0.1	(2.69)
4.1–6.0	20	7.6	(2.32)	1.2	(0.99)	6.3	(2.78)	0.0	–
6.1–7.6	5	0.4	(1.86)	0.0	–	0.4	(1.86)	0.0	–

Table 7.–Male snow crab catch (number of crab), catch per unit effort (CPUE = number of crab per pot lift), and coefficient of variation (CV) of station CPUE by survey stratum during the 2015 St. Matthew Island blue king crab pot survey.

				Males			Legal					Sublegal		
Stratum	Stations	Pots	Sample dates	Total	CPUE	(CV)	≥102 mm CW	<102 mm CW	Subtotal	CPUE	(CV)	Subtotal	CPUE	(CV)
1[a]	74	296	8/03–8/24	1,190	4.0	(1.75)	22	362	384	1.3	(1.68)	806	2.7	(1.92)
2	43	171	8/06–8/26	86	0.5	(2.83)	0	23	23	0.1	(3.06)	63	0.4	(2.84)
3	10	40	8/17–8/25	0	0.0	–	0	0	0	0.0	–	0	0.0	–
4	20	80	8/19–8/23	4	0.1	(3.08)	0	0	0	0.0	–	4	0.1	(3.08)
Total[a]	147	587	8/03–8/26	1,280	–	–	22	385	407	–	–	873	–	–

[a] Totals do not include 2 snow crab of unknown sex.

Table 8.–Male snow crab catch (number of crab), catch per unit effort (CPUE = number of crab per pot lift), and coefficient of variation (CV) of station CPUE by survey stratum for the 96 in-common stations fished during the 2015 St. Matthew Island blue king crab pot survey.

				Males			Legal					Sublegal		
Stratum	Stations	Pots	Sample dates	Total	CPUE	(CV)	≥102 mm CW	<102 mm CW	Subtotal	CPUE	(CV)	Subtotal	CPUE	(CV)
1[a]	65	260	8/03–8/17	1,164	4.5	(1.64)	22	362	384	1.5	(1.53)	780	3.0	(1.83)
2	31	123	8/06–8/17	86	0.7	(2.35)	0	23	23	0.2	(2.56)	63	0.5	(2.36)
1 & 2[a]	96	383	8/03–8/17	1,250	3.3	(1.95)	22	385	407	1.1	(1.86)	843	2.2	(2.14)

[a] Totals do not include 1 snow crab of unknown sex.

Table 9.–Female snow crab catch (number of crab), catch per unit effort (CPUE = number of crab per pot lift), and coefficient of variation (CV) of station CPUE by survey stratum during the 2015 St. Matthew Island blue king crab pot survey.

				Females			Mature			Immature		
Stratum	Stations	Pots	Sample dates	Total	CPUE	(CV)	Number	CPUE	(CV)	Number	CPUE	(CV)
1[a]	74	296	8/03–8/24	249	0.8	(4.27)	178	0.6	(5.16)	71	0.2	(3.72)
2	43	171	8/06–8/26	1	<0.1	(6.56)	0	0.0	–	1	<0.1	(6.56)
3	10	40	8/17–8/25	0	0.0	–	0	0.0	–	0	0.0	–
4	20	80	8/19–8/23	1	<0.1	(4.47)	1	<0.1	(4.47)	0	0.0	–
Total[a]	147	587	8/03–8/26	251	–	–	179	–	–	72	–	–

[a] Totals do not include 2 snow crab of unknown sex.

Table 10.–Female snow crab catch (number of crab), catch per unit effort (CPUE = number of crab per pot lift), and coefficient of variation (CV) of station CPUE by survey stratum for the 96 in-common stations fished during the 2015 St. Matthew Island blue king crab pot survey.

				Females			Mature			Immature		
Stratum	Stations	Pots	Sample dates	Total	CPUE	(CV)	Number	CPUE	(CV)	Number	CPUE	(CV)
1[a]	65	260	8/03–8/17	249	1.0	(3.99)	178	0.7	(4.83)	71	0.3	(3.47)
2	31	123	8/06–8/17	1	<0.1	(5.57)	0	0.0	–	1	<0.1	(5.57)
1 & 2[a]	96	383	8/03–8/17	250	0.7	(4.87)	178	0.5	(5.89)	72	0.2	(4.21)

[a] Totals do not include 1 snow crab of unknown sex.

Table 11.–Blue king crab catch (number of crab), catch per unit effort (CPUE = number of crab per pot lift), and coefficient of variation (CV) of station CPUE by survey stratum during the 8 St. Matthew Island pot surveys, 1995–2015, at the 96 stations fished in common in all survey years.

			Total males			Legal males		Sublegal males		Total females		
Stratum	Year	Sample dates	Number	CPUE	(CV)	CPUE	(CV)	CPUE	(CV)	Number	CPUE	(CV)
1	1995	8/03 – 8/19	2,158	8.3	(1.28)	4.3	(1.30)	4.0	(1.41)	27	0.1	(4.19)
	1998	8/02 – 8/16	3,166	12.2	(0.57)	7.7	(0.52)	4.5	(0.80)	128	0.5	(2.33)
	2001	7/25 – 8/16	1,714	6.6	(0.79)	4.2	(0.70)	2.4	(1.23)	34	0.1	(2.09)
	2004	7/27 – 8/18	231	0.9	(1.66)	0.7	(1.56)	0.2	(2.28)	3	<0.1	(4.58)
	2007	7/27 – 8/18	1,963	7.6	(0.90)	3.3	(0.88)	4.2	(0.95)	41	0.2	(2.09)
	2010	7/27 – 8/09	2,081	8.0	(0.83)	3.5	(0.94)	4.5	(0.82)	26	0.1	(2.37)
	2013	9/03 – 9/20	770	3.0	(2.33)	1.2	(1.48)	1.8	(3.20)	27	0.1	(6.00)
	2015	8/03 – 8/17	285	1.1	(1.39)	0.6	(1.20)	0.5	(2.49)	1	<0.1	(8.06)
	Average:	8/03 – 8/20	1,546	5.9	(1.22)	3.2	(1.07)	2.8	(1.65)	36	0.1	(3.96)
2	1995	8/04 – 8/12	2,911	23.5	(0.91)	11.0	(1.04)	12.5	(0.85)	1,518	12.2	(2.59)
	1998	8/06 – 8/16	2,091	16.9	(0.57)	9.7	(0.68)	7.1	(0.78)	1,909	15.4	(0.88)
	2001	7/25 – 8/06	1,705[a]	13.8	(0.65)	7.7	(0.68)	6.0	(0.80)	343	2.8	(1.47)
	2004	7/30 – 8/12	468	3.8	(0.92)	2.1	(1.10)	1.6	(1.05)	114	0.9	(2.60)
	2007	7/31 – 8/10	1,589	12.8	(0.82)	7.9	(0.88)	4.9	(0.79)	341	2.8	(1.91)
	2010	7/31 – 8/16	2,105	17.0	(0.97)	8.1	(1.17)	8.9	(0.91)	864	7.0	(2.16)
	2013	9/07 – 9/19	1,702	13.7	(1.22)	7.5	(1.42)	6.2	(1.25)	719	5.8	(2.19)
	2015	8/06 – 8/17	830	6.7	(1.11)	4.6	(1.18)	2.1	(1.08)	226	1.8	(2.03)
	Average:	8/05 – 8/17	1,675	13.5	(0.90)	7.3	(1.02)	6.2	(0.94)	754	6.1	(1.98)
1 & 2	1995	8/03 – 8/19	5,069	13.2	(1.25)	6.5	(1.31)	6.7	(1.27)	1,545	4.0	(4.66)
	1998	8/02 – 8/16	5,257	13.7	(0.60)	8.3	(0.61)	5.4	(0.84)	2,037	5.3	(1.96)
	2001	7/25 – 8/16	3,419[a]	8.9	(0.84)	5.4	(0.78)	3.5	(1.12)	377	1.0	(2.65)
	2004	7/27 – 8/18	699	1.8	(1.46)	1.1	(1.50)	0.7	(1.85)	117	0.3	(4.63)
	2007	7/27 – 8/18	3,552	9.3	(0.92)	4.8	(1.05)	4.4	(0.89)	382	1.0	(3.23)
	2010	7/27 – 8/16	4,186	10.9	(1.06)	5.0	(1.28)	5.9	(0.98)	890	2.3	(3.91)
	2013	9/03 – 9/20	2,472	6.4	(1.88)	3.2	(2.13)	3.2	(2.09)	746	1.9	(3.94)
	2015	8/03 – 8/17	1,115	2.9	(1.76)	1.9	(1.91)	1.0	(1.77)	227	0.6	(3.80)
	Average:	8/03 – 8/21	3,221	8.4	(1.22)	4.5	(1.32)	3.9	(1.35)	790	2.1	(3.60)

Notes: 1) Stratum 1 consists of 65 stations fishing a total of 260 pots. In the 1998 and 2004 surveys, only 259 pots were sampled.
2) Stratum 2 consists of 31 stations fishing a total of 124 pots. In the 2015 survey, only 123 pots were sampled.

[a] Includes 2 males without legal status recorded.

Table 12.–Male blue king crab (≥ 90 mm CL) catch (number of crab), catch per unit effort (CPUE = number of crab per pot lift), and coefficient of variation (CV) of station CPUE at the 96 stations fished in common during the 8 St. Matthew Island pot surveys, 1995–2015, and separated by the 84 in-common stations inside and 12 in-common stations outside the area trawled by the NMFS EBS trawl survey. Size categories are those used in the annual stock assessment for St. Matthew Island blue king crab.

			Blue King Crab males								
			Total ≥90 mm CL			90–104 mm CL		105–119 mm CL		≥120 mm CL	
Stations	Year	Sample dates	Number	CPUE	(CV)	CPUE	(CV)	CPUE	(CV)	CPUE	(CV)
84 (inside)	1995[a]	8/03 – 8/19	2,696	8.0	(1.16)	1.3	(1.51)	2.2	(1.25)	4.5	(1.18)
	1998[b]	8/02 – 8/16	4,166	12.4	(0.54)	1.0	(1.09)	2.9	(0.75)	8.5	(0.52)
	2001[c]	7/25 – 8/16	2,565	7.6	(0.76)	1.2	(1.51)	1.6	(1.04)	4.8	(0.65)
	2004	7/27 – 8/18	478	1.4	(1.47)	0.1	(2.07)	0.4	(2.11)	0.9	(1.37)
	2007	7/27 – 8/18	2,362	7.0	(0.85)	1.0	(1.14)	2.5	(1.02)	3.5	(0.79)
	2010[d]	7/27 – 8/14	2,601	7.7	(0.83)	1.2	(0.95)	2.7	(0.88)	3.9	(0.89)
	2013[a]	9/03 – 9/20	956	2.8	(1.75)	0.6	(3.15)	0.8	(2.18)	1.5	(1.32)
	2015	8/03 – 8/17	631	1.9	(1.91)	0.1	(2.29)	0.5	(2.02)	1.2	(2.16)
	Average:	8/03 – 8/21	2,057	6.1	(1.16)	0.8	(1.71)	1.7	(1.41)	3.6	(1.11)
12 (outside)	1995[b]	8/04 – 8/12	1,928	40.2	(0.45)	6.2	(0.53)	10.1	(0.55)	23.8	(0.48)
	1998	8/08 – 8/14	646	13.5	(0.86)	0.7	(1.16)	2.0	(1.21)	10.8	(0.88)
	2001[e]	7/26 – 8/06	690	14.4	(0.78)	1.9	(1.05)	2.5	(1.09)	10.0	(0.72)
	2004	7/31 – 8/12	162	3.4	(1.17)	0.1	(1.35)	0.7	(1.30)	2.5	(1.25)
	2007[a]	8/02 – 8/10	957	19.9	(0.49)	1.6	(0.63)	4.4	(0.46)	13.9	(0.55)
	2010[a]	8/07 – 8/16	1,305	27.2	(0.62)	2.4	(1.03)	7.3	(0.58)	17.5	(0.70)
	2013	9/12 – 9/19	1,197	24.9	(0.68)	2.9	(0.98)	5.4	(0.65)	16.6	(0.83)
	2015	8/12 – 8/17	446	9.3	(0.88)	0.7	(1.06)	2.1	(0.97)	6.5	(0.91)
	Average:	8/08 – 8/17	916	19.1	(0.74)	2.1	(0.97)	4.3	(0.85)	12.7	(0.79)
All 96	1995[e]	8/03 – 8/19	4,624	12.0	(1.25)	1.9	(1.41)	3.2	(1.29)	6.9	(1.30)
	1998[b]	8/02 – 8/16	4,812	12.6	(0.59)	1.0	(1.10)	2.8	(0.80)	8.8	(0.60)
	2001[f]	7/25 – 8/16	3,255	8.5	(0.82)	1.3	(1.43)	1.7	(1.07)	5.5	(0.76)
	2004	7/27 – 8/18	640	1.7	(1.48)	0.1	(1.97)	0.4	(1.94)	1.1	(1.49)
	2007[a]	7/27 – 8/18	3,319	8.6	(0.90)	1.1	(1.06)	2.7	(0.93)	4.8	(1.05)
	2010[g]	7/27 – 8/16	3,906	10.2	(1.03)	1.3	(1.06)	3.3	(0.94)	5.6	(1.24)
	2013[a]	9/03 – 9/20	2,153	5.6	(1.86)	0.9	(2.42)	1.4	(1.84)	3.4	(2.12)
	2015	8/03 – 8/17	1,077	2.8	(1.79)	0.2	(2.09)	0.7	(1.84)	1.9	(1.93)
	Average:	8/03 – 8/21	2,973	7.7	(1.22)	1.0	(1.57)	2.0	(1.33)	4.8	(1.31)

Notes: 1) See Figure 4 for the locations of NMFS EBS trawl survey tows and stations inside and outside the trawled area.

2) The 84 stations inside the NMFS EBS survey trawled area fish 336 pots. The 1998 and 2004 surveys sampled 335 pots.

3) The 12 stations outside the NMFS EBS survey trawled area fish 48 pots. The 2015 survey sampled 47 pots.

[a] Totals do not include 1 male crab without carapace length recorded.

[b] Totals do not include 4 male crab without carapace length recorded.

[c] Totals do not include 3 male crab without carapace length recorded.

[d] Totals do not include 10 male crab without carapace length recorded.

[e] Totals do not include 5 male crab without carapace length recorded.

[f] Totals do not include 8 male crab without carapace length recorded.

[g] Totals do not include 11 male crab without carapace length recorded.

Table 13.–Snow crab catch (number of crab), catch per unit effort (CPUE = number of crab per pot lift), and coefficient of variation (CV) of station CPUE by survey stratum during the 8 St. Matthew Island pot surveys, 1995–2015, at the 96 stations fished in common in all survey years.

			Snow Crab									
			Total males			Legal males		Sublegal males		Total females		
Stratum	Year	Sample dates	Number	CPUE	(CV)	CPUE	(CV)	CPUE	(CV)	Number	CPUE	(CV)
1	1995	8/03 – 8/19	11,469	44.1	(1.89)	30.3	(1.93)	13.8	(2.03)	5	<0.1	(5.77)
	1998	8/02 – 8/16	26,519	102.4	(0.72)	92.6	(0.74)	9.8	(0.98)	192	0.7	(5.91)
	2001	7/25 – 8/16	23,276[a]	89.5	(0.79)	45.6	(0.80)	43.9	(1.09)	4,288	16.5	(2.61)
	2004	7/27 – 8/18	682	2.6	(1.31)	2.3	(1.19)	0.4	(3.68)	5	<0.1	(3.49)
	2007	7/27 – 8/18	9,909[b]	38.1	(0.81)	30.9	(0.83)	7.2	(1.13)	443	1.7	(2.33)
	2010	7/27 – 8/09	3,296[c]	12.7	(1.07)	9.0	(1.41)	3.6	(1.78)	356	1.4	(3.95)
	2013[d]	9/03 – 9/20	2,900[e]	11.2	(1.64)	1.1	(2.19)	10.0	(1.72)	1,330	5.1	(1.95)
	2015[f]	8/03 – 8/17	1,164	4.5	(1.64)	1.5	(1.53)	3.0	(1.83)	249	1.0	(3.99)
	Average:	8/03 – 8/20	9,902	38.1	(1.23)	26.7	(1.33)	11.5	(1.78)	859	3.3	(3.75)
2	1995	8/04 – 8/12	1	<0.1	(5.57)	<0.1	(5.57)	0.0	–	0	0.0	–
	1998	8/06 – 8/16	1,337	10.8	(1.67)	8.9	(1.74)	1.9	(1.60)	36	0.3	(4.21)
	2001	7/25 – 8/06	765	6.2	(2.79)	2.2	(2.64)	4.0	(2.88)	261	2.1	(2.95)
	2004	7/30 – 8/12	17	0.1	(4.66)	0.1	(5.14)	<0.1	(3.87)	0	0.0	–
	2007	7/31 – 8/10	1,972	15.9	(1.65)	11.5	(1.62)	4.4	(1.92)	72	0.6	(1.74)
	2010	7/31 – 8/16	60	0.5	(2.33)	0.2	(2.71)	0.3	(2.34)	22	0.2	(3.05)
	2013	9/07 – 9/19	130	1.0	(2.26)	<0.1	(3.87)	1.0	(2.28)	37	0.3	(3.15)
	2015	8/06 – 8/17	86	0.7	(2.35)	0.2	(2.56)	0.5	(2.36)	1	<0.1	(5.57)
	Average:	8/05 – 8/17	546	4.4	(2.91)	2.9	(3.23)	1.5	(2.47)	54	0.4	(3.44)
1 & 2	1995	8/03 – 8/19	11,470	29.9	(2.39)	20.5	(2.44)	9.3	(2.56)	5	<0.1	(7.03)
	1998	8/02 – 8/16	27,856	72.8	(1.03)	65.6	(1.06)	7.2	(1.22)	228	0.6	(6.15)
	2001	7/25 – 8/16	24,041[a]	62.6	(1.13)	31.6	(1.16)	31.0	(1.42)	4,549	11.8	(3.05)
	2004	7/27 – 8/18	699	1.8	(1.69)	1.6	(1.56)	0.3	(4.33)	5	<0.1	(4.29)
	2007	7/27 – 8/18	11,881[b]	30.9	(1.00)	24.6	(1.02)	6.3	(1.31)	515	1.3	(2.50)
	2010	7/27 – 8/16	3,356[c]	8.7	(1.44)	6.2	(1.82)	2.5	(2.18)	378	1.0	(4.55)
	2013[d]	9/03 – 9/20	3,030[e]	7.9	(2.00)	0.7	(2.72)	7.1	(2.09)	1,367	3.6	(2.39)
	2015[f]	8/03 – 8/17	1,250	3.3	(1.95)	1.1	(1.86)	2.2	(2.14)	250	0.7	(4.87)
	Average:	8/03 – 8/21	10,448	27.2	(1.58)	19.0	(1.70)	8.2	(2.16)	912	2.4	(4.35)

Notes: 1) Stratum 1 consists of 65 stations fishing a total of 260 pots. In the 1998 and 2004 surveys, only 259 pots were sampled.
2) Stratum 2 consists of 31 stations fishing a total of 124 pots. In the 2015 survey, only 123 pots were sampled.

[a] Includes 1 male without legal status recorded.

[b] Includes 2 males without legal status recorded.

[c] Includes 3 males without legal status recorded.

[d] Totals do not include 2 crab of unknown sex.

[e] Includes 24 males without legal status recorded.

[f] Totals do not include 1 crab of unknown sex.

Table 14.–Number of stations at which legal male blue king crab were captured and tagged, and number of legal males captured and tagged by survey stratum during the 2015 St. Matthew Island blue king crab pot survey, with the number of tagged crab released within a stratum that were recovered during the 2015/16 St. Matthew Island blue king crab fishery.

	Number of stations		Number of legal males		
Stratum	Captured	Tagged	Captured	Tagged	Recovered
1	60	59	260	216	5
2	41	41	746	505	12
3	2	2	2	2	0
4	17	16	138	94	0
Total	120	118	1,146	817	17

Table 15.–Number of stations at which sublegal male blue king crab ≥90 mm CL were captured and tagged, and number of sublegal males ≥90 mm CL captured and tagged by survey stratum during the 2015 St. Matthew Island blue king crab pot survey.

	Number of stations		Number of sublegal males	
Stratum	Captured	Tagged	Captured	Tagged
1	40	40	175	169
2	37	37	342	336
3	1	1	2	2
4	19	19	160	156
Total	97	97	679	663

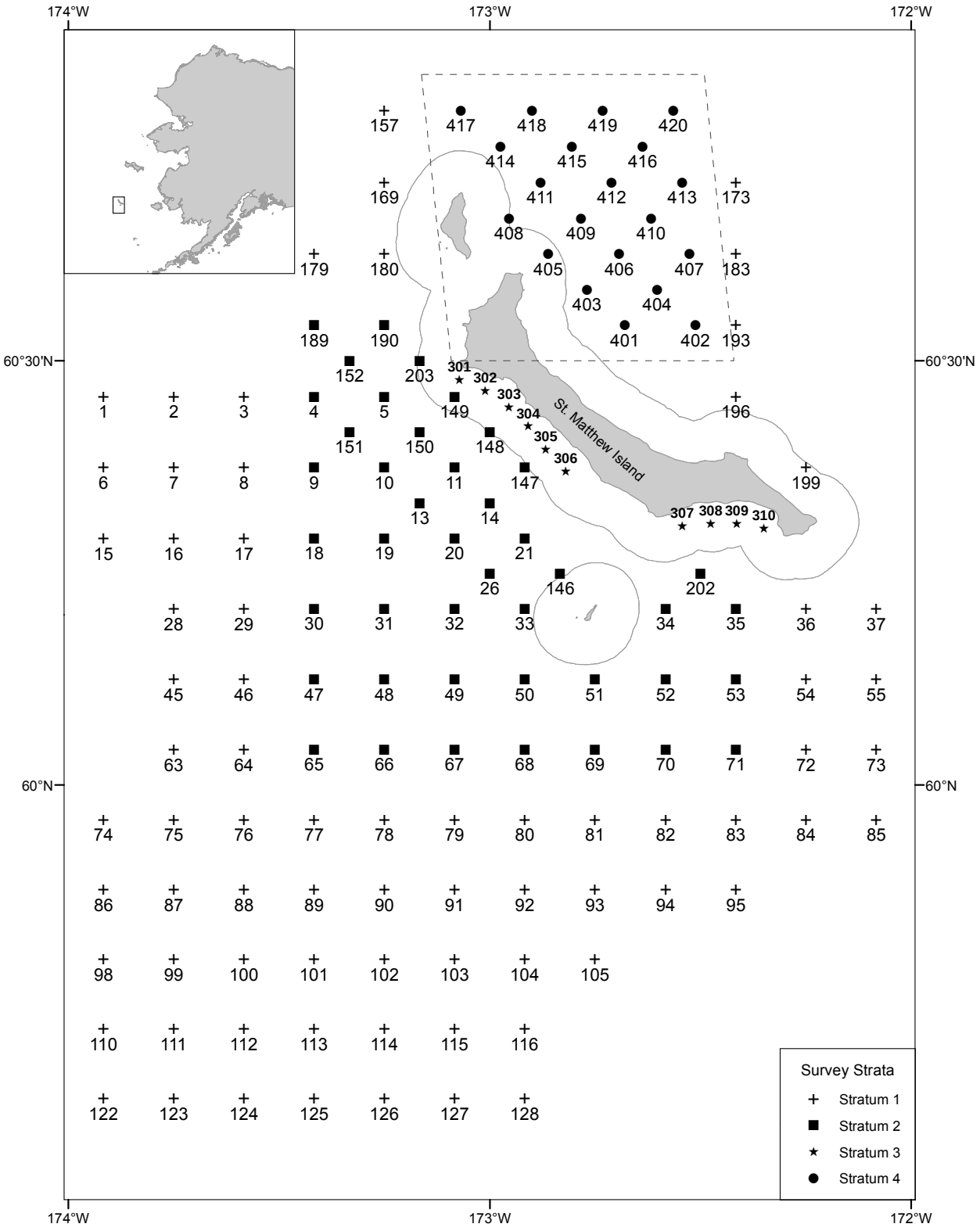

Figure 1.–Survey station layout (midpoint of station locations labeled by stratum symbol) of the 147 stations fished during the 2015 St. Matthew Island blue king crab pot survey. Dashed line denotes the boundary of NMFS EBS trawl survey station R-24.

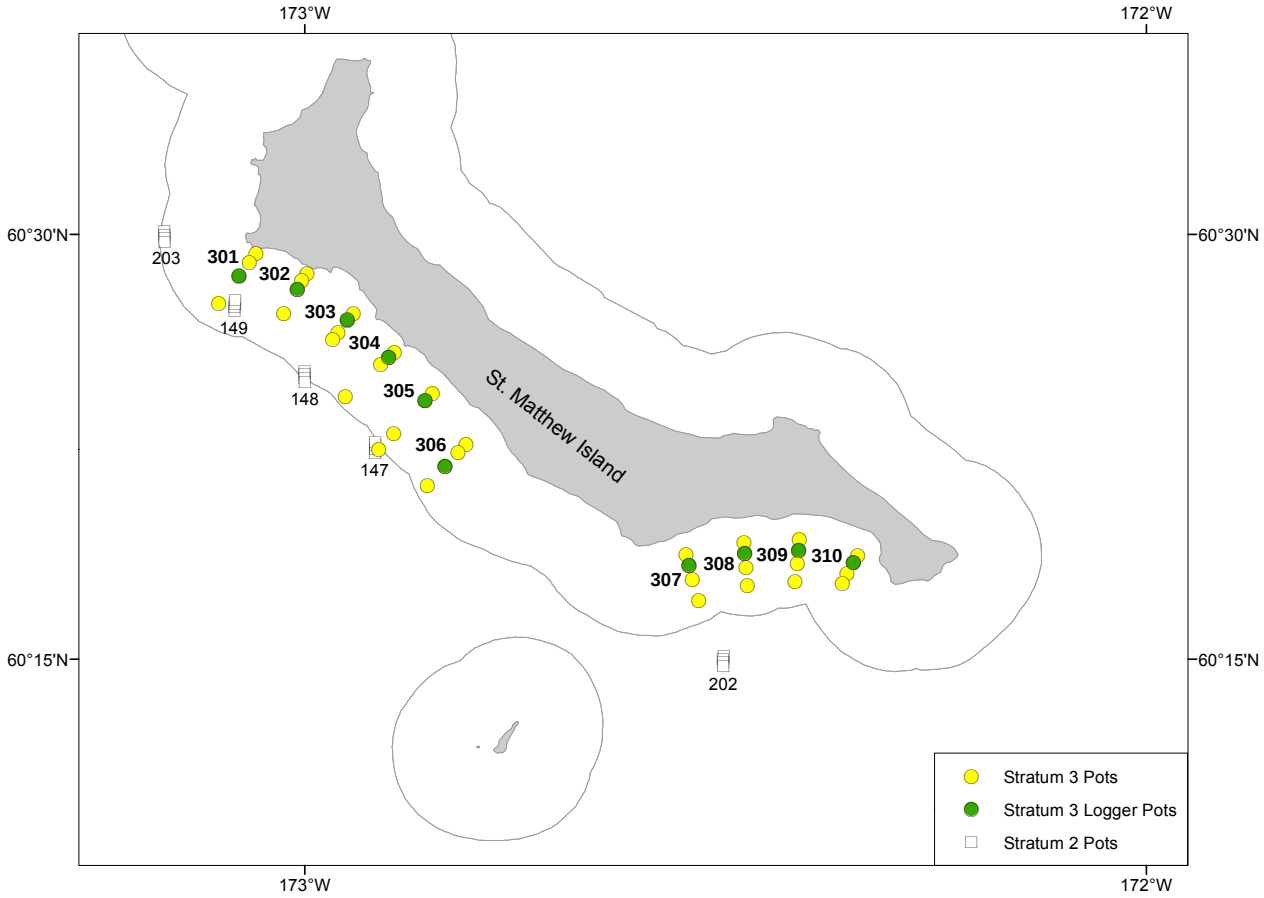

Figure 2.–Locations and orientation of pots within Stratum 3 stations and of pots within adjacent Stratum 2 stations fished during the 2015 St. Matthew Island blue king crab pot survey.

Note: See Figure 1 for the layout of all 147 stations fished during the survey.

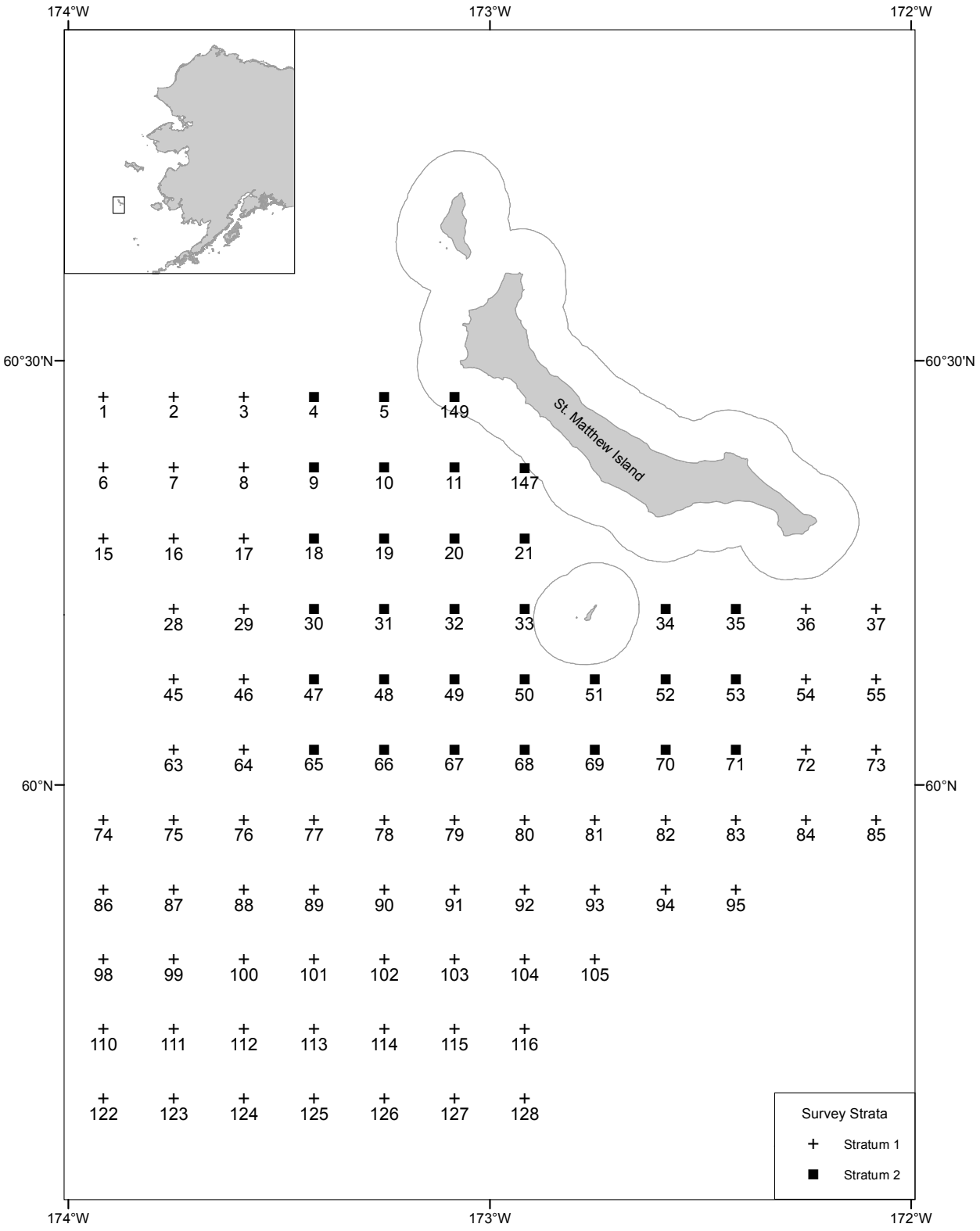

Figure 3.–Locations of the 96 stations fished in common during the 8 St. Matthew Island blue king crab pot surveys, 1995–2015.

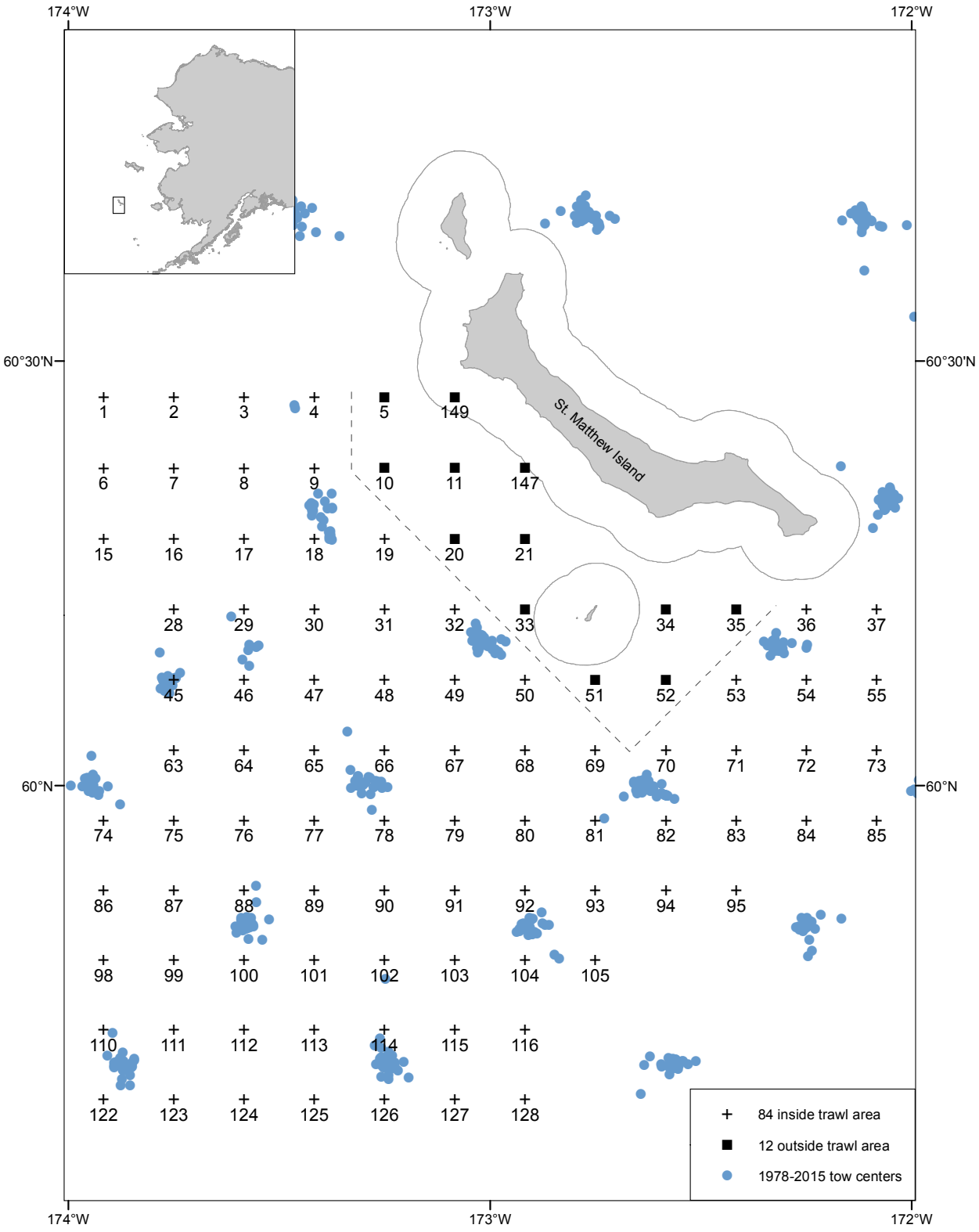

Figure 4.–Locations of the 84 in-common stations inside and 12 in-common stations outside the area covered by the NMFS EBS trawl survey relative to the locations of historic NMFS EBS survey trawl tow centers (1978–2015).

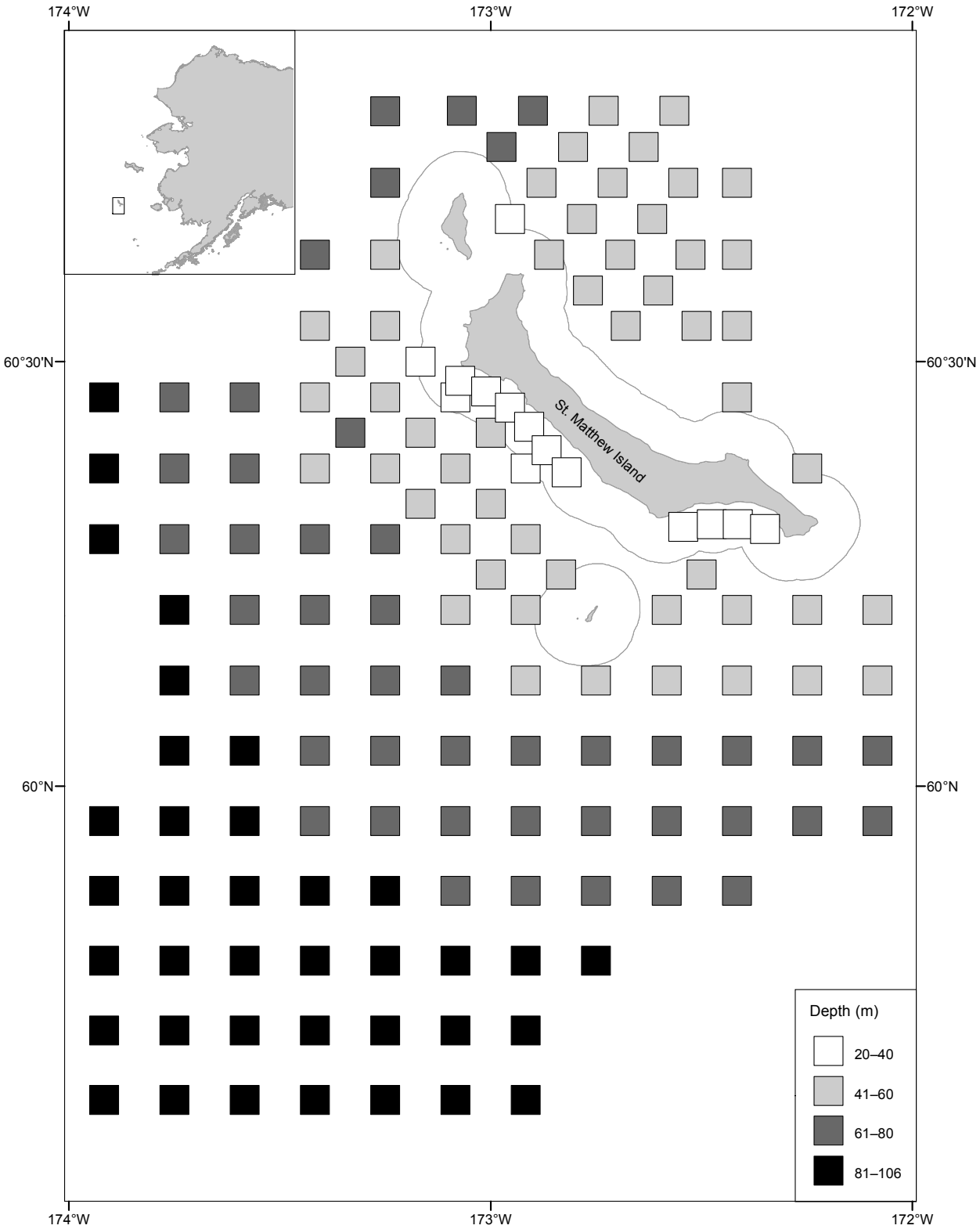

Figure 5.–Depths of survey stations fished during the 2015 St. Matthew Island blue king crab pot survey.

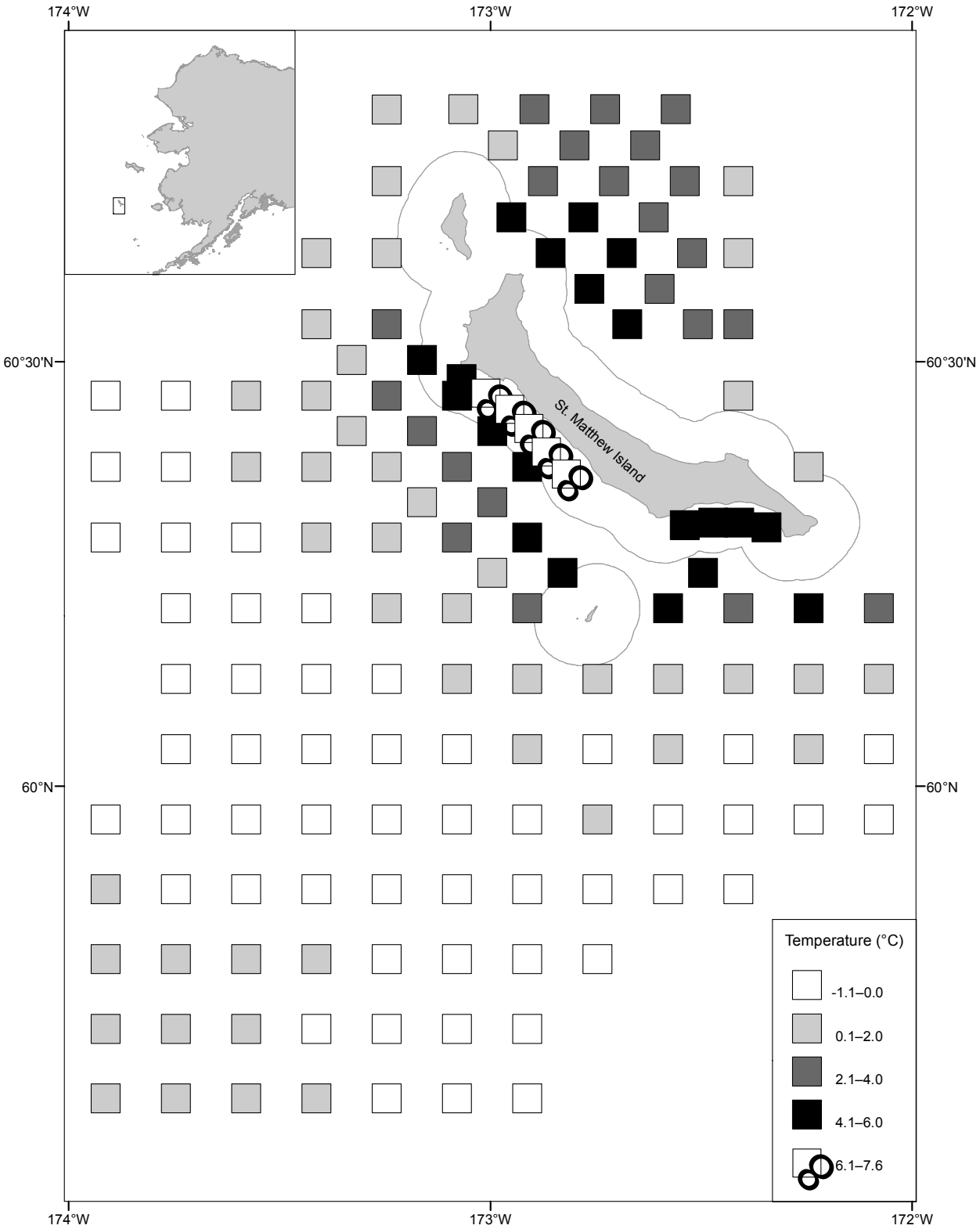

Figure 6.–Average bottom temperatures recorded at survey stations fished during the 2015 St. Matthew Island blue king crab pot survey.

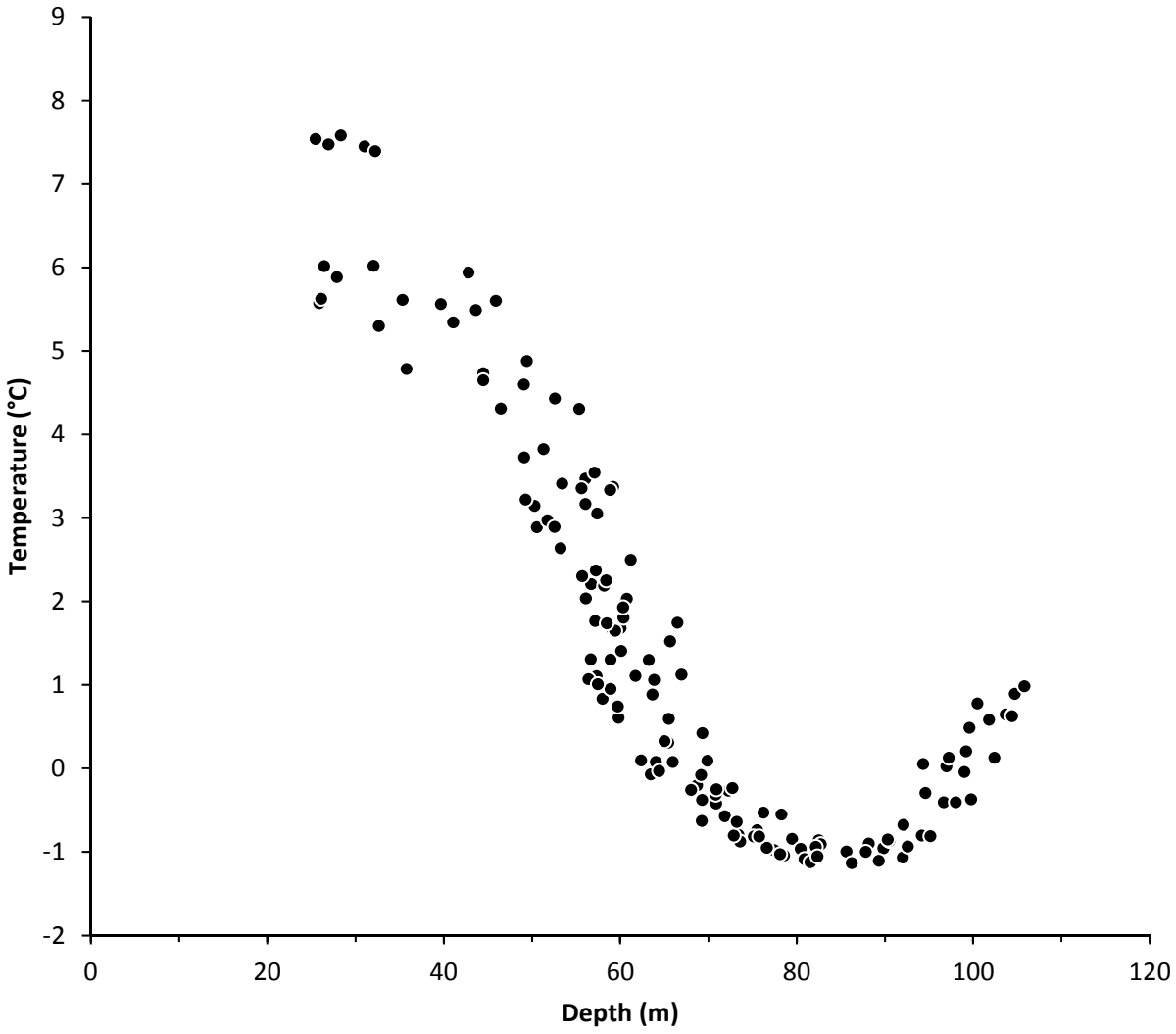

Figure 7.–Average bottom temperatures plotted against average depths at the 147 stations fished during the 2015 St. Matthew Island blue king crab pot survey.

Source: Data from data loggers deployed in one pot at each station.

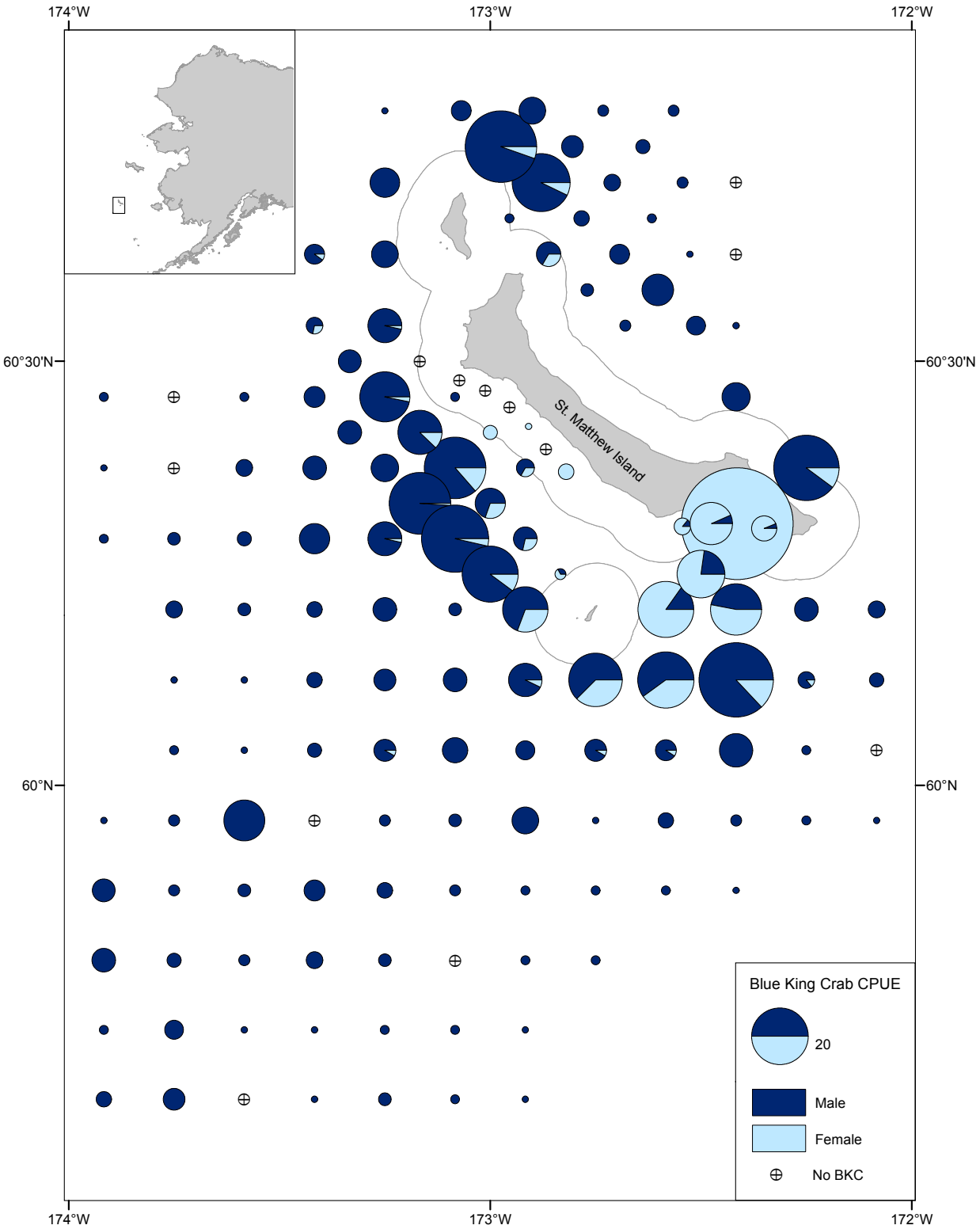

Figure 8.–Catch per unit effort (CPUE = number of crab per pot lift) of male and female blue king crab at each station during the 2015 St. Matthew Island blue king crab pot survey. Areas of filled circles are proportional to the station CPUE of blue king crab, with the largest circle representing a CPUE of 79 crab per pot lift.

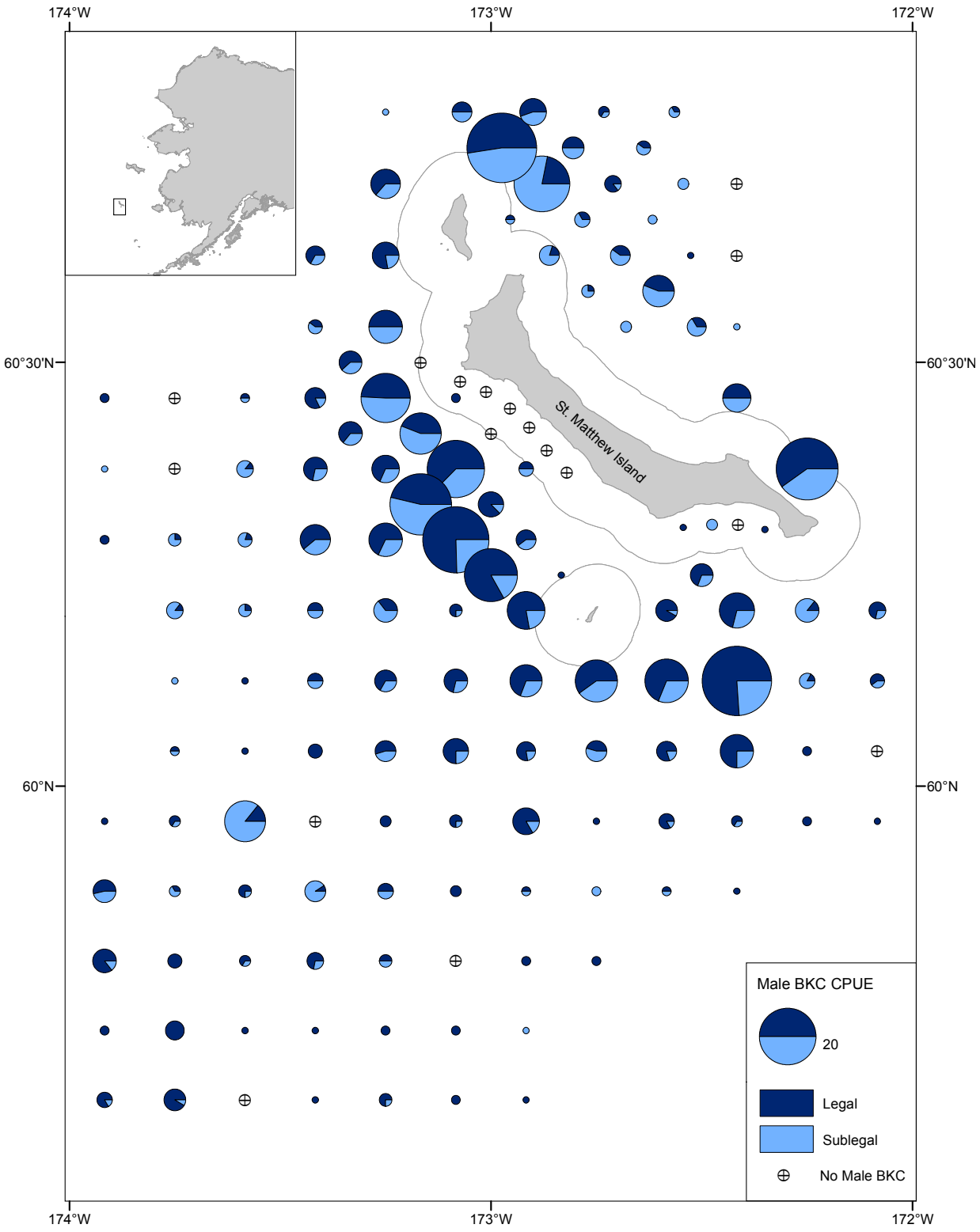

Figure 9.–Catch per unit effort (CPUE = number of crab per pot lift) of legal and sublegal male blue king crab at each station during the 2015 St. Matthew Island blue king crab pot survey. Areas of filled circles are proportional to the station CPUE of male blue king crab, with the largest circle representing a CPUE of 31 crab per pot lift.

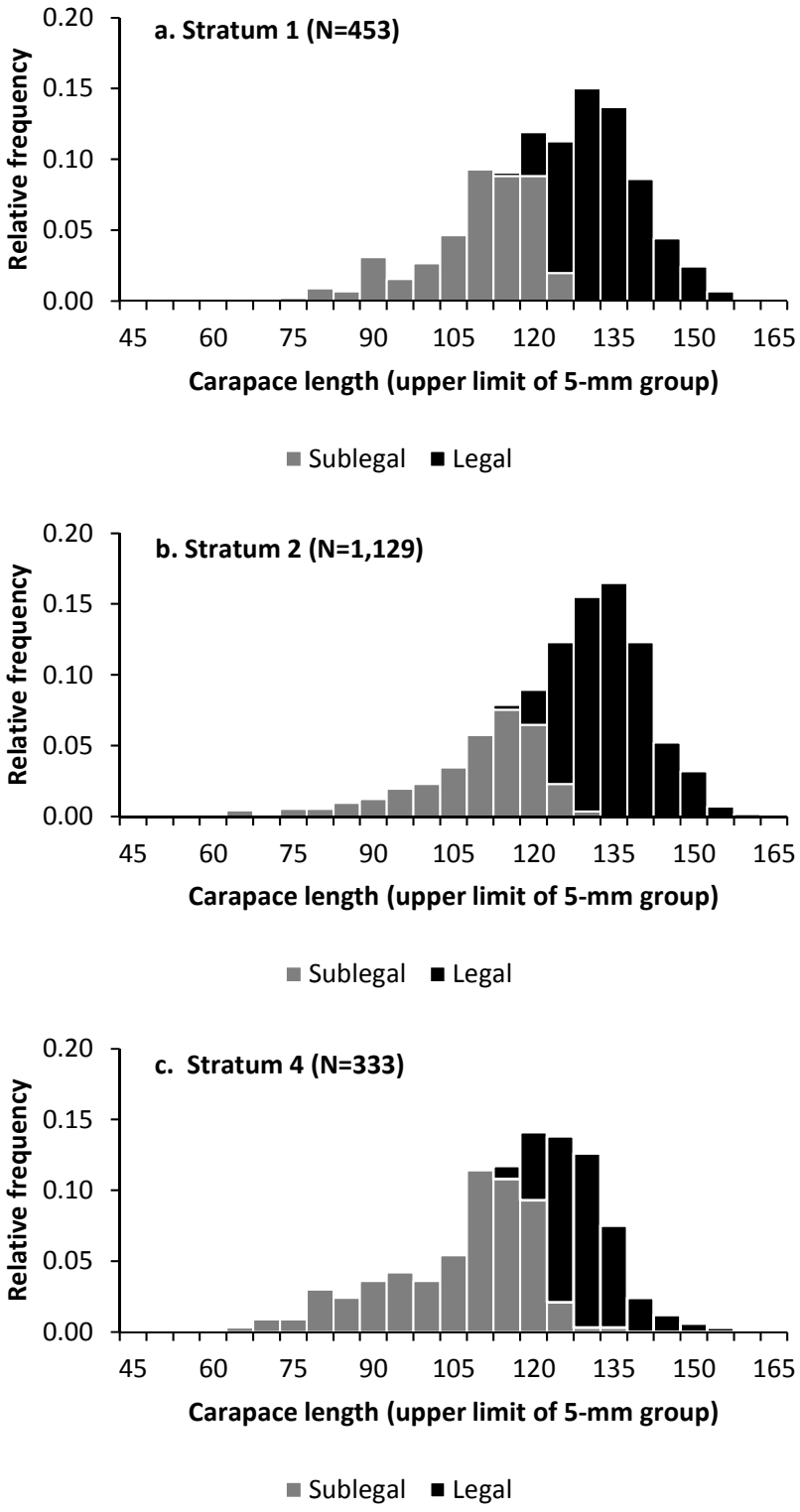

Figure 10.–Relative size frequency distributions of male blue king crab captured during the 2015 St. Matthew Island blue king crab pot survey by legal status in Strata 1 (a), 2 (b), and 4 (c). Size frequency for Stratum 3 not plotted (N = 5 males).

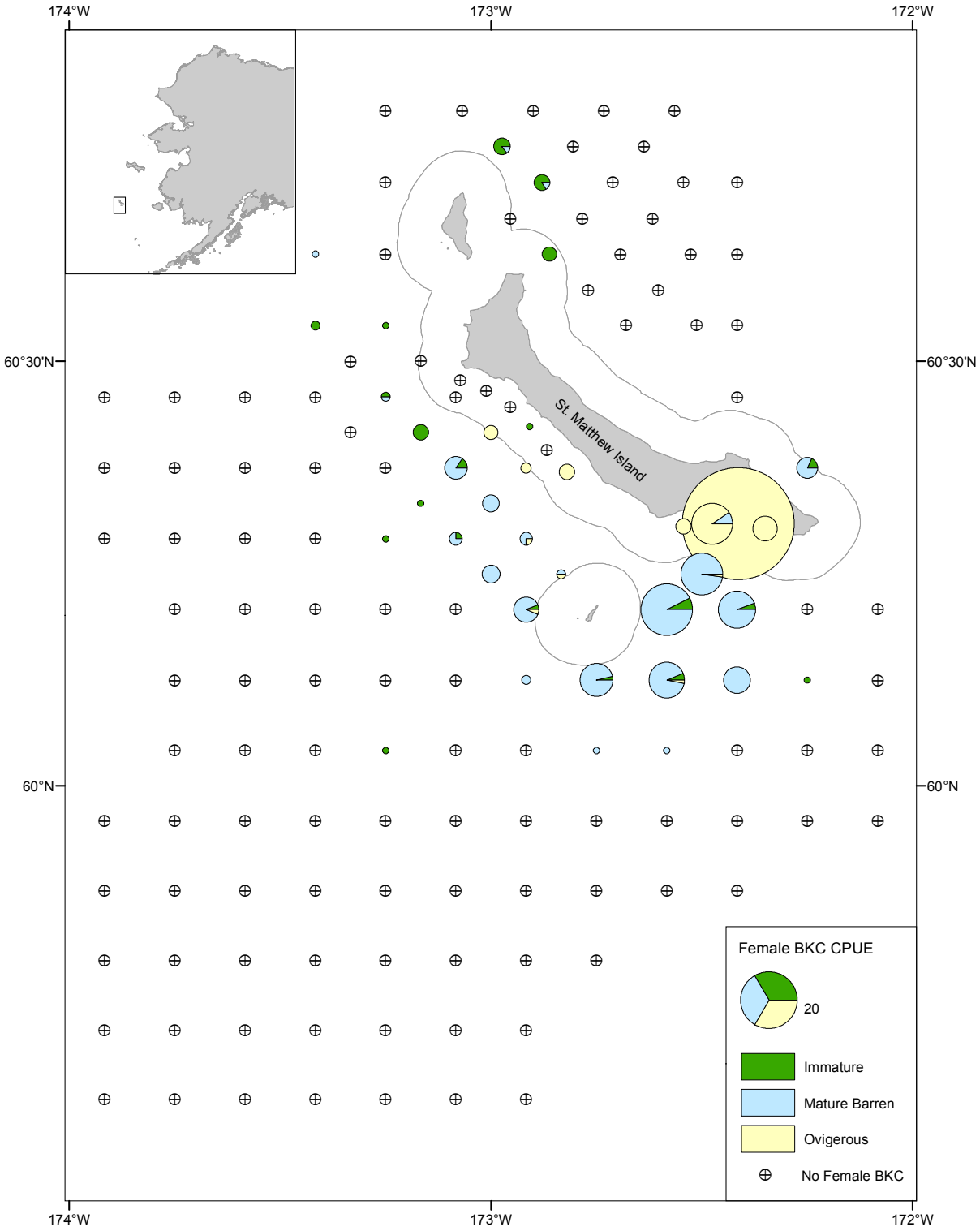

Figure 11.–Catch per unit effort (CPUE = number of crab per pot lift) of ovigerous females, mature barren females with matted setae, and immature female blue king crab at each station during the 2015 St. Matthew Island blue king crab pot survey. Areas of filled circles are proportional to the station CPUE of female blue king crab, with the largest circle representing a CPUE of 79 crab per pot lift.

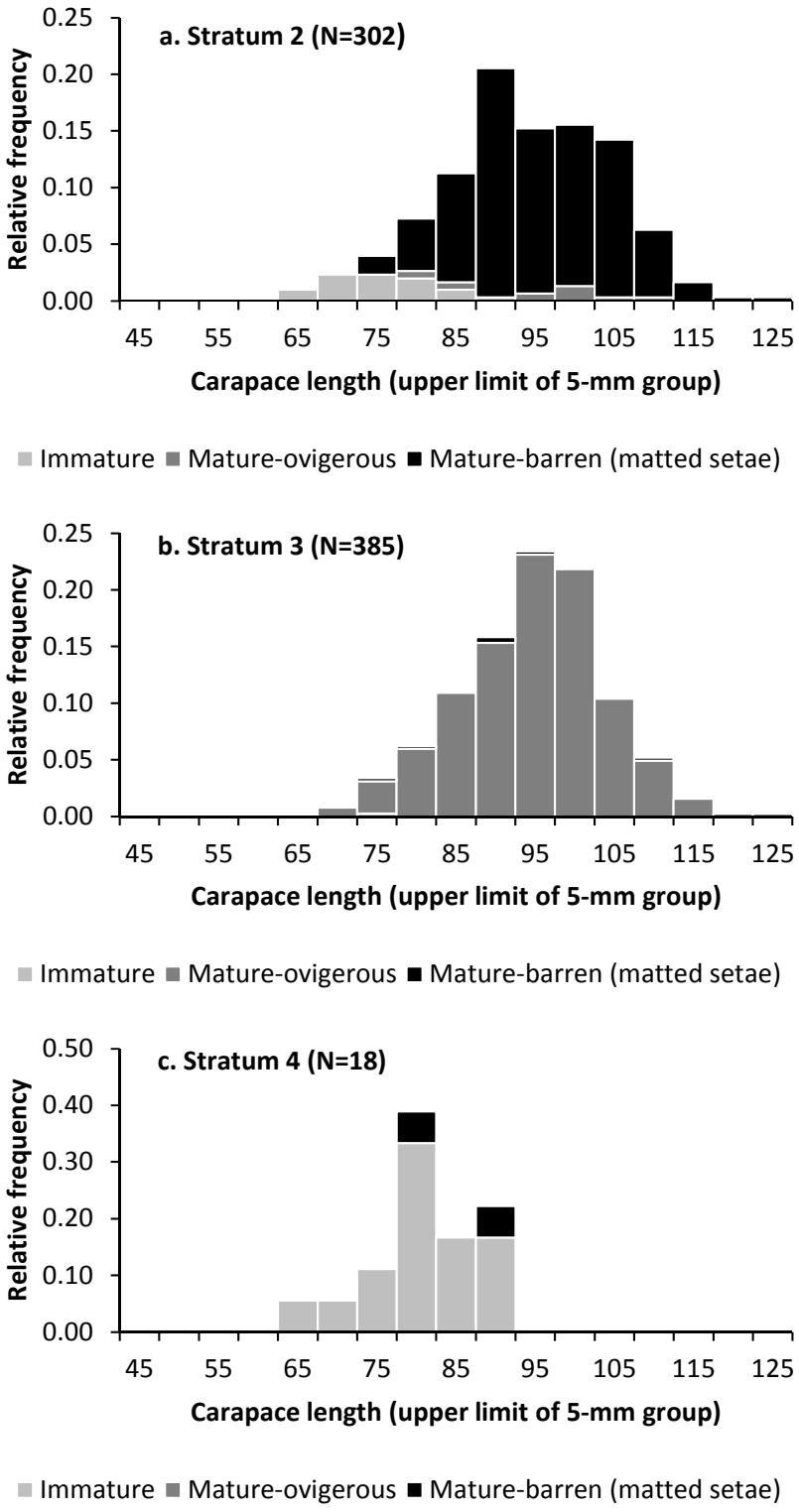

Figure 12.–Relative size frequency distributions of female blue king crab captured during the 2015 St. Matthew Island blue king crab pot survey by reproductive condition in Strata 2 (a), 3 (b), and 4 (c). Size frequency for Stratum 1 not plotted (*N* = 13 females).

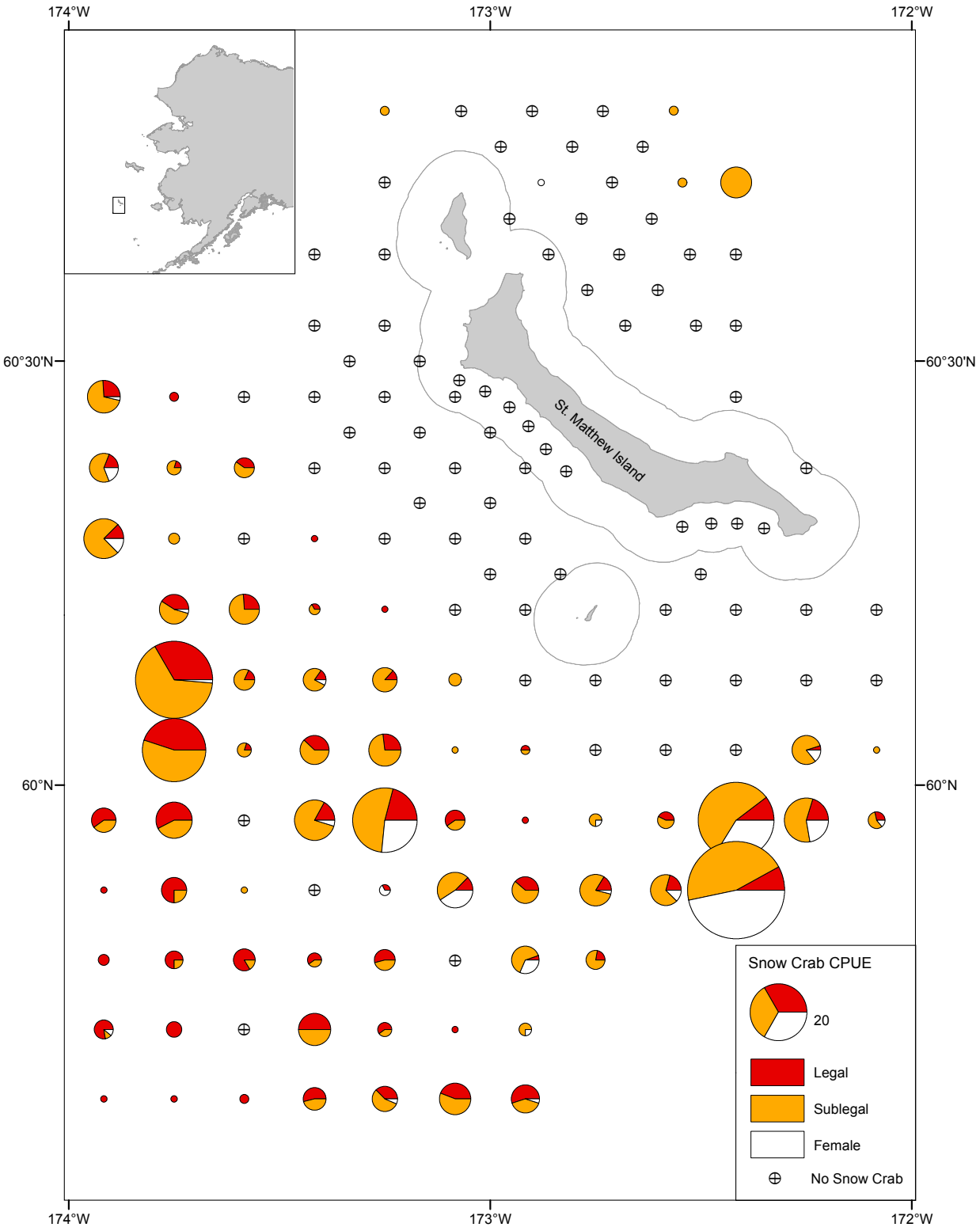

Figure 13.–Catch per unit effort (CPUE = number of crab per pot lift) of legal male, sublegal male, and female snow crab at each station during the 2015 St. Matthew Island blue king crab pot survey. Areas of filled circles are proportional to the station CPUE of snow crab, with the largest circle representing a CPUE of 60 crab per pot lift.

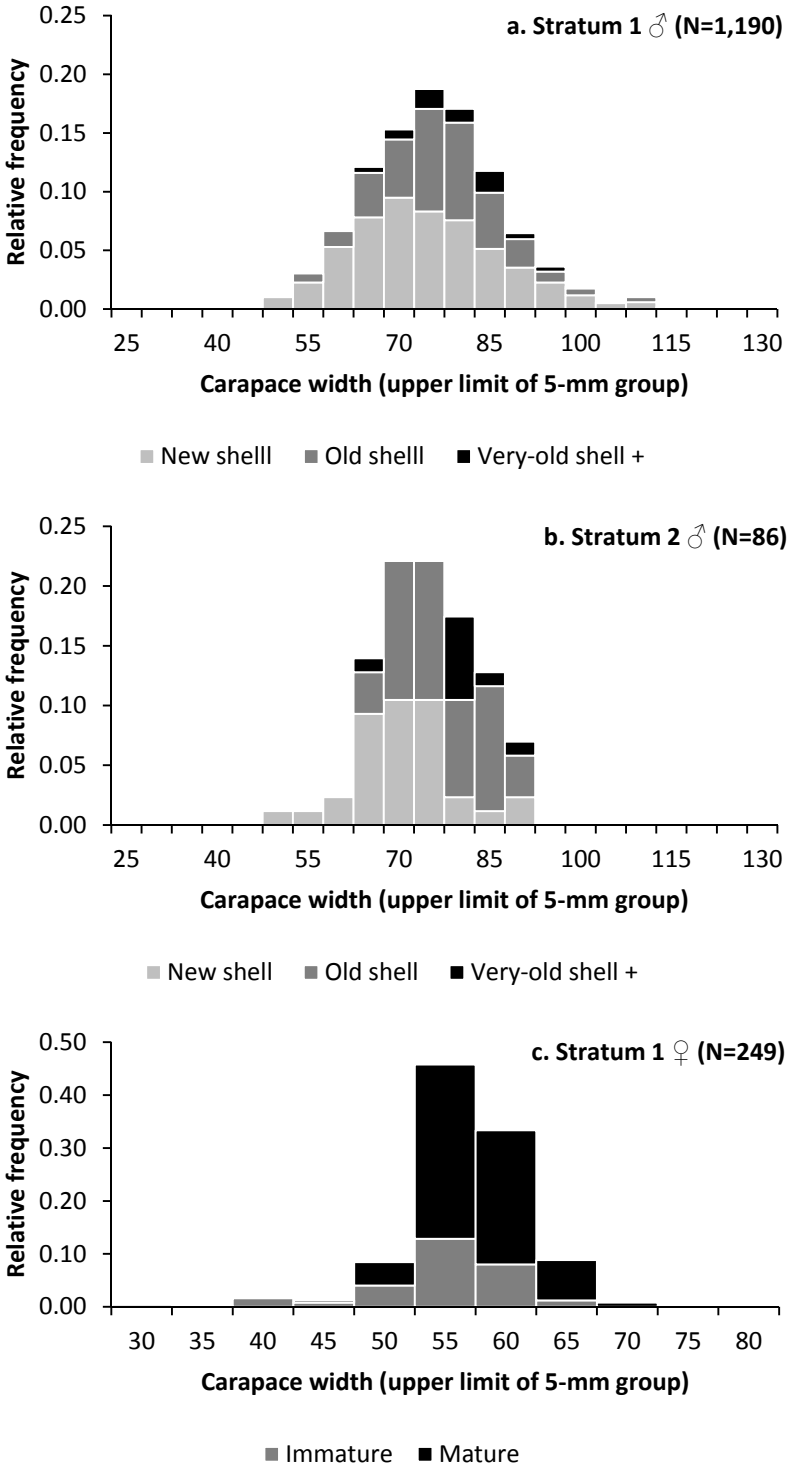

Figure 14.–Relative size frequency distributions of male snow crab captured during the 2015 St. Matthew Island blue king crab pot survey by shell condition in Strata 1 (a) and 2 (b) and of female snow crab captured during the survey by reproductive maturity in Stratum 1 (c). Size frequency for female snow crab in Stratum 2 not plotted (N = 1).

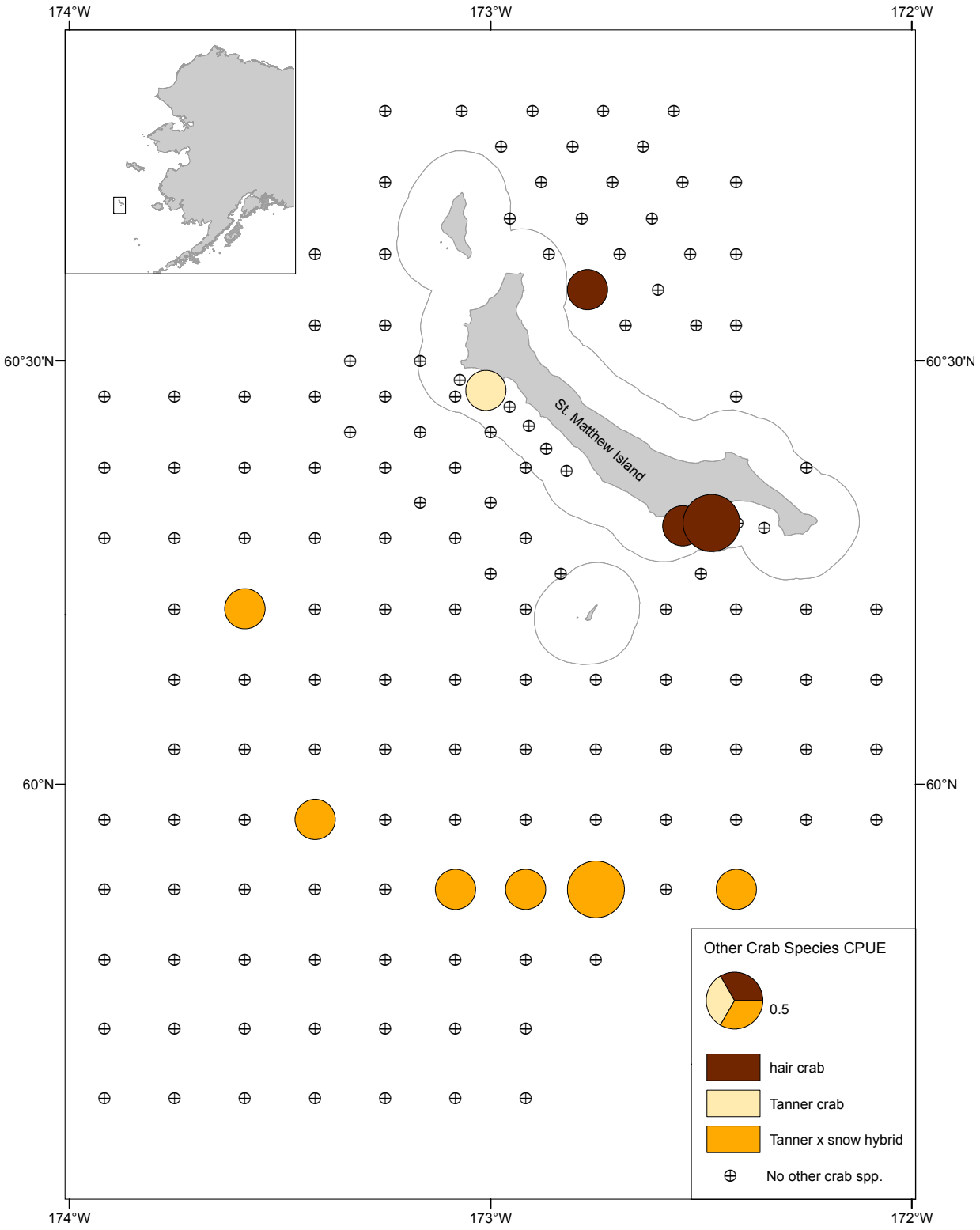

Figure 15.–Catch per unit effort (CPUE = number of crab per pot lift) of hair crab, Tanner crab, and Tanner x snow hybrid crab at each station during the 2015 St. Matthew Island blue king crab pot survey. Areas of filled circles are proportional to the station CPUE, with the largest circle representing 0.5 crab per pot lift.

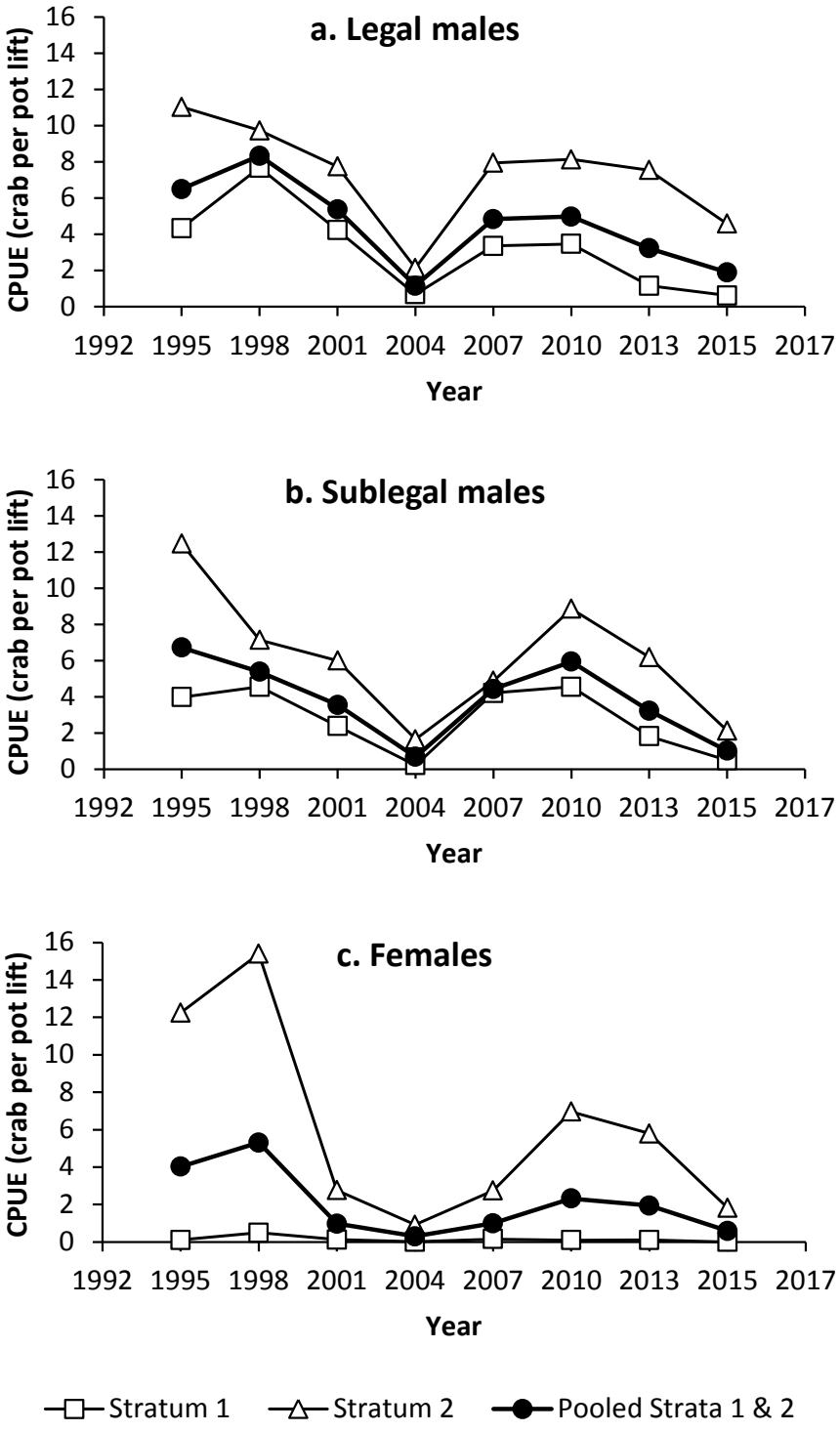

Figure 16.–Catch per unit effort (CPUE = number of crab per pot lift) of legal male (a), sublegal male (b), and female (c) blue king crab during the 1995–2015 St. Matthew Island blue king crab pot surveys for the 96 stations that were fished in common each survey year within survey Stratum 1 (65 stations), survey Stratum 2 (31 stations), and the pooled Strata 1 and 2.

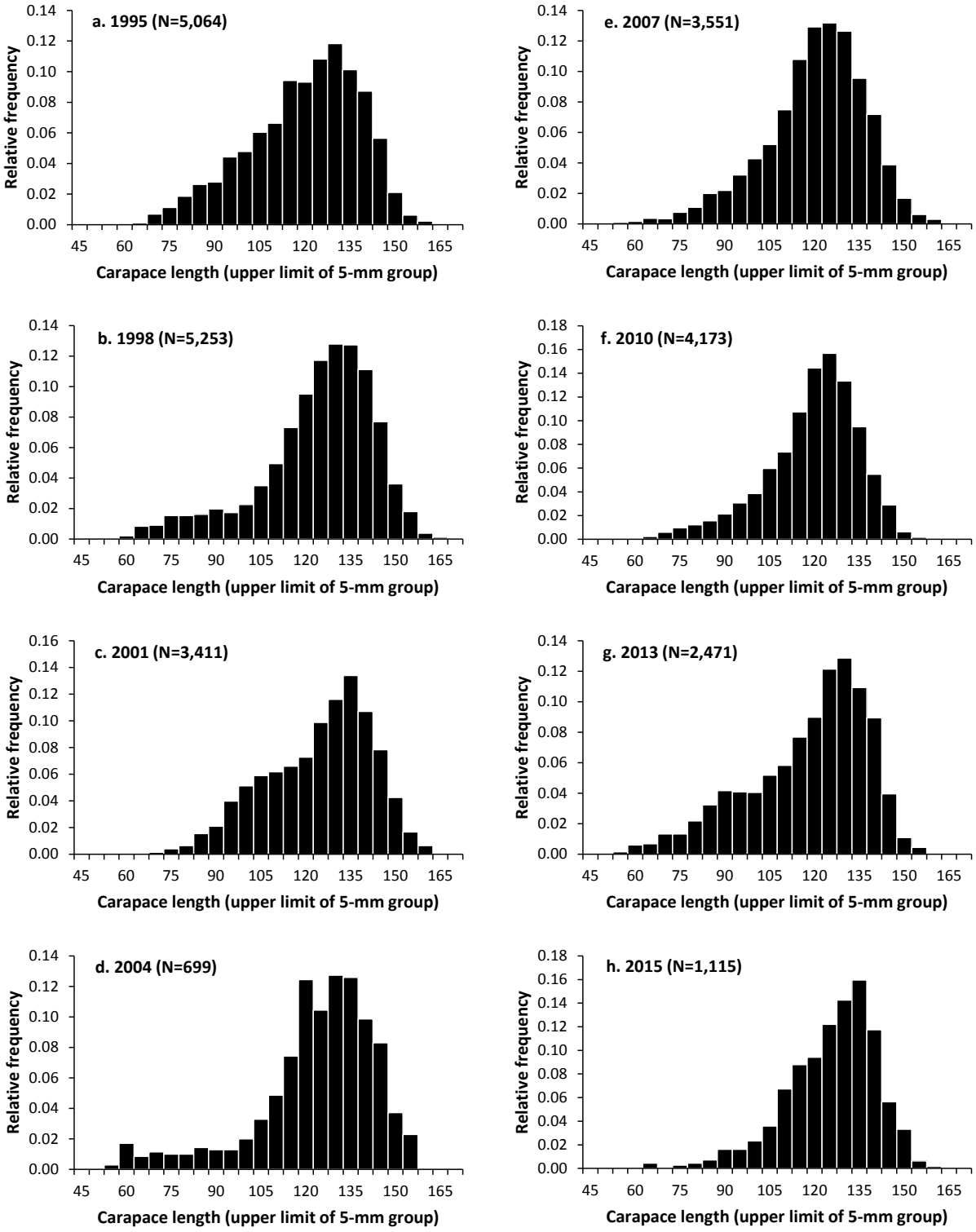

Figure 17.–Relative size frequency distributions of male blue king crab captured during the 1995–2015 St. Matthew Island blue king crab pot surveys at the 96 stations that were fished in common in all survey years.

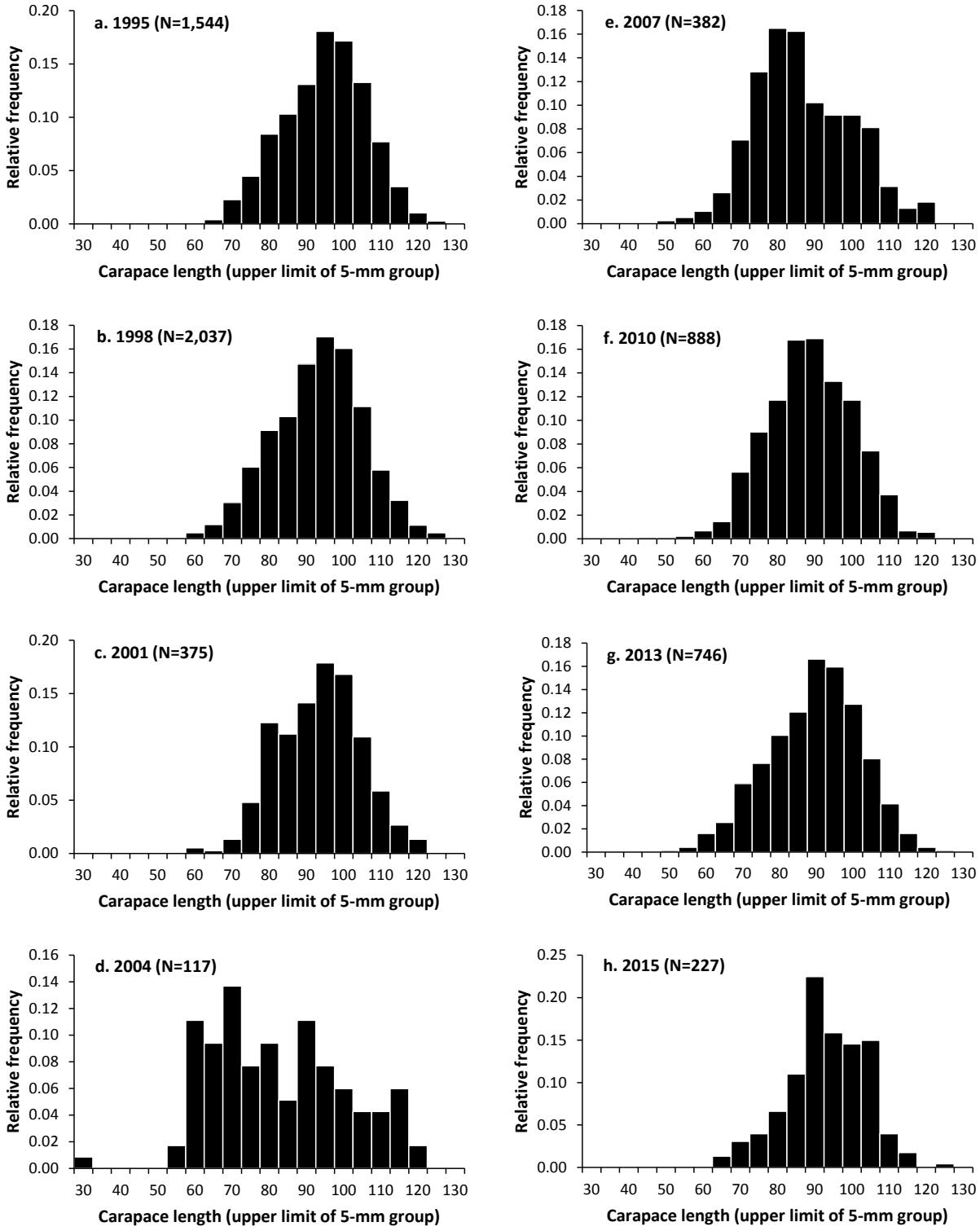

Figure 18.–Relative size frequency distributions of female blue king crab captured during the 1995–2015 St. Matthew Island blue king crab pot surveys at the 96 stations that were fished in common in all survey years.

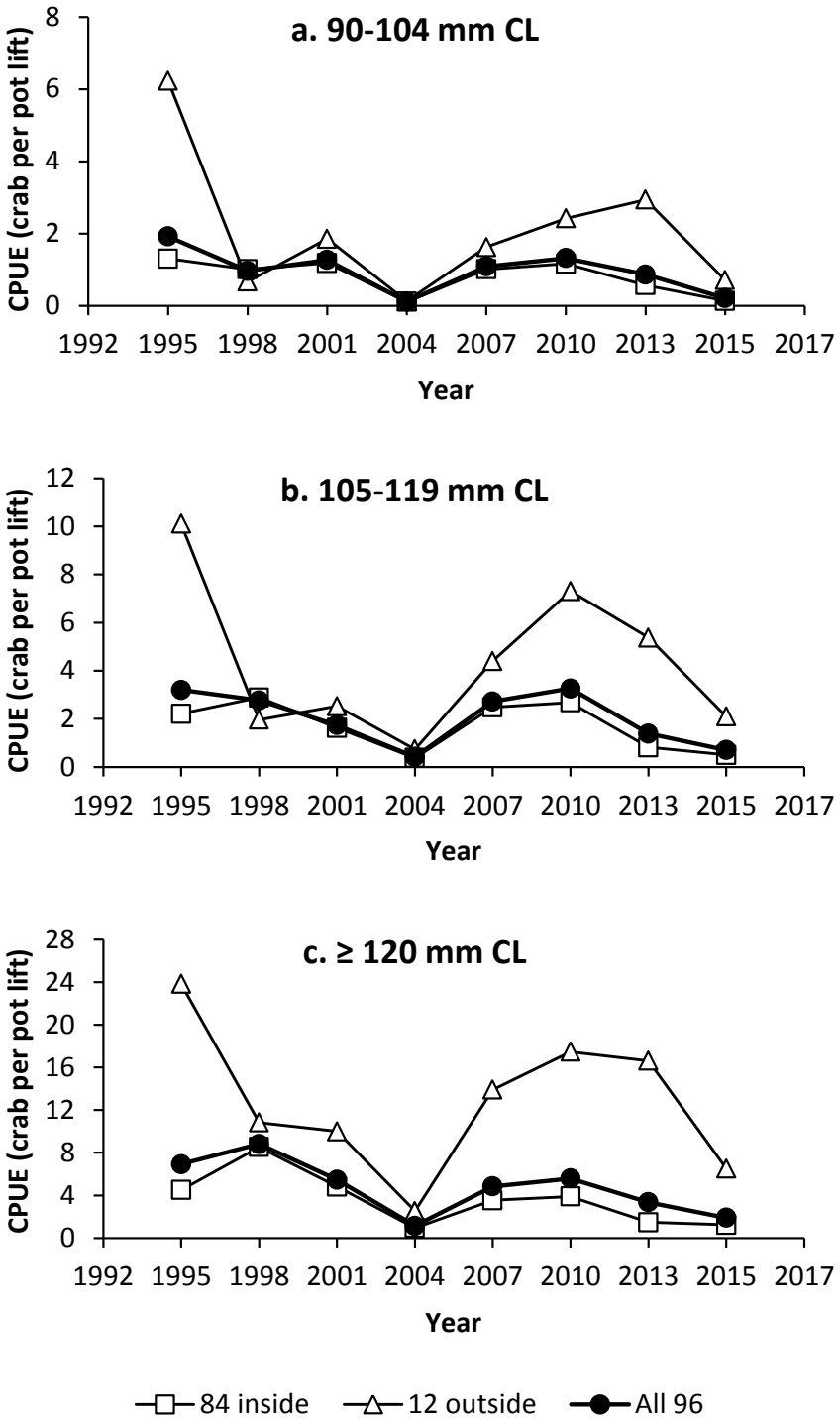

Figure 19.– Catch per unit effort (CPUE = number of crab per pot lift) of male blue king crab 90–104 mm CL (a), 105–119 mm CL (b), and ≥120 mm CL (c) captured during the 1995–2015 St. Matthew Island blue king crab pot surveys at the 96 stations fished in common each survey year, and the 96 in-common stations separated into the 84 stations inside and 12 stations outside the area covered by the NMFS EBS trawl survey.

APPENDIX A. COMPARISON OF DEPTHS RECORDED FROM VESSEL ECHO SOUNDER WITH DEPTHS RECORDED BY DATA LOGGERS

Appendix A1.–Comparison of station depths recorded from the vessel's echo sounder to station depths recorded by data loggers in strata 1, 2, and 4 during the 2015 St. Matthew Island blue king crab pot survey. Echo sounder depths listed are from soundings taken at the setting of the first and fourth pot at each station. Logger depths listed are from loggers deployed in the second or third pot set at each station.

	Depth (m) echo sounder[a]			Depth (m) data logger[b]		
Station	Station Min	Station Avg	Station Max	Logger Min	Logger Avg	Logger Max
1	79	79	79	82	82	83
2	72	72	72	70	71	71
3	65	65	65	63	64	64
4	61	61	61	58	59	59
5	54	54	54	53	53	54
6	83	83	83	82	83	83
7	74	75	76	73	73	74
8	67	67	67	65	66	66
9	61	61	61	60	60	61
10	57	58	59	57	57	58
11[c]	48	50	50	50	51	51
13	57	57	57	56	57	58
14	50	50	50	49	50	51
15	89	89	89	89	90	90
16	79	79	79	78	78	79
17	72	72	72	70	71	71
18	65	65	65	65	65	66
19	61	61	61	61	62	62
20	57	57	57	57	57	58
21	48	48	48	49	49	49
26	57	57	57	56	57	58
28	85	85	85	82	82	83
29	76	77	78	73	74	74
30	68	68	68	68	69	69
31	65	65	65	62	62	63
32	59	60	61	59	59	60
33	57	57	57	59	59	60
34[d]	48	50	50	49	49	50
35	57	57	57	56	56	56
36	56	56	56	55	55	56
37	57	57	57	56	56	56
45	89	89	90	88	88	89
46	78	78	79	79	80	80
47	72	72	72	71	72	72
48[d]	68	68	68	69	69	70

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Station	Depth (m) echo sounder[a]			Depth (m) data logger[b]		
	Station Min	Station Avg	Station Max	Logger Min	Logger Avg	Logger Max
49	65	65	65	63	64	64
50	61	61	61	59	60	60
51	59	59	59	58	58	58
52	59	59	59	58	59	59
53	61	61	61	60	60	61
54	59	59	59	60	60	61
55	61	61	61	59	60	60
63	94	94	94	92	92	93
64	85	85	85	85	86	86
65	78	78	78	75	76	76
66	74	74	74	72	73	73
67	68	68	68	68	68	69
68	67	67	67	65	65	65
69	65	65	65	63	63	64
70[d]	65	65	65	64	64	64
71	68	68	68	69	69	69
72[d]	67	67	67	66	66	66
73	65	65	65	64	64	65
74	100	100	100	98	99	100
75	96	96	96	94	95	95
76[d]	89	89	90	90	91	91
77	81	81	81	80	80	81
78	78	78	78	77	77	78
79	74	75	76	75	75	76
80	72	72	72	72	73	74
81	70	70	70	69	70	70
82	70	70	70	69	69	70
83	72	73	74	72	72	73
84	72	72	72	71	71	71
85	70	70	70	72	73	73
86	103	103	103	100	100	101
87	100	100	100	96	97	97
88	96	96	96	96	97	97
89	90	90	90	92	92	93
90	83	83	83	80	81	81

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Station	Depth (m) echo sounder[a]			Depth (m) data logger[b]		
	Station Min	Station Avg	Station Max	Logger Min	Logger Avg	Logger Max
91	76	76	76	78	79	79
92	78	78	78	78	78	79
93	78	78	78	76	77	77
94	78	78	78	75	76	76
95	76	77	78	76	76	77
98	105	105	105	103	104	104
99	101	101	101	99	99	100
100	100	100	100	97	97	98
101	96	96	96	94	94	95
102	89	89	89	87	88	88
103	87	87	87	86	86	87
104	83	83	83	81	82	82
105	81	81	81	82	82	83
110	107	107	107	104	105	105
111	103	103	103	104	105	105
112	101	101	101	99	100	100
113	100	100	100	97	98	99
114	96	96	96	94	94	95
115	92	92	92	90	90	91
116[c]	89	89	89	89	89	90
122	109	109	109	105	106	106
123	107	107	107	104	104	105
124	103	103	103	101	102	102
125	101	101	101	102	102	103
126	100	100	100	99	100	100
127	96	96	96	95	95	96
128[c]	94	94	94	92	93	93
146	45	45	45	40	44	46
147[c]	36	37	39	39	40	40
148	43	43	43	42	43	44
149[c]	34	36	39	35	35	36
150	50	51	52	51	52	52
151	59	59	59	60	61	61
152	57	58	59	58	58	59
157	68	68	68	69	69	70

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Station	Depth (m) echo sounder[a]			Depth (m) data logger[b]		
	Station Min	Station Avg	Station Max	Logger Min	Logger Avg	Logger Max
169	65	65	65	66	67	67
173	57	58	59	59	59	59
179	63	63	63	63	63	64
180	59	59	59	60	60	60
183	57	57	57	56	56	57
189	61	61	61	60	60	61
190	48	49	50	49	49	50
193	56	56	56	56	57	57
196	56	56	56	56	56	56
199	57	58	59	57	57	58
202	48	48	48	52	53	53
203[c]	30	32	34	32	33	33
401	41	42	43	44	44	45
402	52	52	52	52	53	53
403	41	41	41	41	41	41
404	48	48	48	49	49	49
405	45	46	46	46	46	46
406	46	46	46	46	46	47
407	54	54	54	57	57	58
408	36	36	37	35	36	36
409	45	45	45	44	44	45
410	52	52	52	53	53	54
411	59	60	61	58	59	59
412	52	52	52	51	51	52
413	56	56	56	55	56	56
414	65	65	65	65	66	66
415	54	55	56	57	57	57
416	56	56	56	55	56	56
417	67	67	67	66	66	67
418	61	61	61	61	61	61
419	57	58	59	58	58	58
420	57	58	59	58	58	59

[a] Depths recorded to the nearest fathom at the time of pot deployment were converted to meters and approximately corrected for the depth of the vessel's hull-mounted echo sounder below the water surface by adding 2.6 m.

[b] Depths recorded in meters by data loggers were corrected for the height of the logger above the ocean floor due to its position in the deployed pot by adding 0.8 m.

[c] Echo sounder depths were recorded at the setting of all 4 pots in the station.

[d] Echo sounder depths were recorded at the setting of 3 of 4 pots in the station.

Appendix A2.–Comparison of depths recorded from the vessel's echo sounder to depths recorded by data loggers in Stratum 3 during the 2015 St. Matthew Island blue king crab pot survey. Echo sounder depths listed are from soundings taken at the setting of each pot in a station; logger depths listed are from loggers deployed in the second or third pot set at each station.

		Depth (m)	Depth (m) data logger[c]		
Station	Pot[a]	echo sounder[b]	Logger Min	Logger Avg	Logger Max
301	1	37	–	–	–
	2	31	31	32	33
	3	26	–	–	–
	4	20	–	–	–
302	1	37	–	–	–
	2	31	30	31	32
	3	26	–	–	–
	4	20	–	–	–
303	1	37	–	–	–
	2	31	–	–	–
	3	26	26	27	29
	4	20	–	–	–
304	1	37	–	–	–
	2	31	–	–	–
	3	26	24	25	27
	4	20	–	–	–
305	1	37	–	–	–
	2	31	–	–	–
	3	26	27	28	29
	4	20	–	–	–
306	1	37	–	–	–
	2	31	31	32	33
	3	26	–	–	–
	4	20	–	–	–

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Station	Pot[a]	Depth (m) echo sounder[b]	Depth (m) data logger[c] Logger Min	Logger Avg	Logger Max
307	1	20	–	–	–
	2	26	26	26	26
	3	31	–	–	–
	4	37	–	–	–
308	1	20	–	–	–
	2	26	26	26	26
	3	31	–	–	–
	4	37	–	–	–
309	1	20	–	–	–
	2	26	28	28	28
	3	31	–	–	–
	4	37	–	–	–
310	1	37	–	–	–
	2	31	–	–	–
	3	26	26	26	27
	4	20	–	–	–

[a] Order that pots were set within a station.

[b] Depths read to the nearest fathom at pot deployment were corrected for the depth of the vessel's hull-mounted echo sounder below the water surface at the time of recording and converted to meters.

[c] Depths recorded in meters by data loggers were corrected for the height of the logger above the ocean floor due to its position in the deployed pot by adding 0.8 m.

APPENDIX B. STATION DETAILS, BLUE KING CRAB CATCH AND SNOW CRAB CATCH

Appendix B1.–Details on the stations fished in Strata 1–3 during the 2015 St. Matthew Island blue king crab pot survey, including catch (number of crab) of blue king crab per station and catch of snow crab per station; numbers in parentheses are the number of legal or sublegal blue king crab that were tagged and released at the station.

										Blue King Crab					Snow Crab		
		Location		Lift	Soak	Depth[a]	Temperature (°C)			Male					Male		
Station	Stratum	N Lat	W Long	Date	(h)	(m)	Avg	Min	Max	Legal		Sublegal		Female	Legal	Sublegal	Female
1	1	60.46	173.92	8/12	31	82	-0.9	-0.9	-0.7	2	(2)	0	(0)	0	7	19	1
2[b]	1	60.46	173.75	8/12	31	71	-0.4	-0.8	0.2	0	(0)	0	(0)	0	2	0	0
3	1	60.46	173.58	8/13	32	64	1.1	0.9	1.9	1	(1)	1	(0)	0	0	0	0
4	2	60.46	173.42	8/13	32	59	1.7	1.5	2.0	9	(9)	2	(2)	0	0	0	0
5	2	60.46	173.25	8/13	31	53	2.6	1.9	4.0	30	(25)	31	(26)	2	0	0	0
6	1	60.38	173.92	8/12	31	83	-0.9	-1.0	-0.9	0	(0)	1	(0)	0	4	13	4
7	1	60.38	173.75	8/12	30	73	-0.8	-0.9	-0.7	0	(0)	0	(0)	0	1	4	0
8	1	60.38	173.58	8/13	32	66	0.6	0.2	1.5	1	(1)	6	(4)	0	4	6	0
9	2	60.38	173.42	8/13	32	60	1.7	1.4	1.9	10	(10)	4	(4)	0	0	0	0
10	2	60.38	173.25	8/13	31	57	1.1	0.9	1.5	13	(13)	6	(6)	0	0	0	0
11	2	60.38	173.08	8/14	32	51	2.9	2.6	3.6	52	(25)	31	(29)	13	0	0	0
13	2	60.33	173.17	8/26	31	57	1.3	1.3	1.3	44	(25)	51	(46)	1	0	0	0
14	2	60.33	173.00	8/26	29	50	3.1	1.6	4.1	14	(14)	2	(1)	7	0	0	0
15	1	60.29	173.92	8/12	31	90	-1.0	-1.0	-0.9	2	(2)	0	(0)	0	5	30	5
16	1	60.29	173.75	8/12	30	78	-0.6	-1.0	-0.4	1	(1)	3	(2)	0	0	3	0
17	1	60.29	173.58	8/12	30	71	-0.3	-0.5	-0.1	1	(1)	4	(1)	0	0	0	0
18	2	60.29	173.42	8/13	33	65	0.3	-0.1	1.0	14	(13)	9	(6)	0	1	0	0
19	2	60.29	173.25	8/13	30	62	1.1	0.9	1.4	19	(18)	9	(7)	1	0	0	0
20	2	60.29	173.08	8/14	33	57	2.4	2.0	2.7	83	(26)	27	(26)	4	0	0	0
21	2	60.29	172.92	8/14	30	49	4.6	4.1	5.3	6	(6)	4	(4)	4	0	0	0
26	2	60.25	173.00	8/26	32	57	1.8	1.4	2.4	59	(25)	12	(10)	8	0	0	0
28	1	60.21	173.75	8/11	30	82	-0.9	-1.0	-0.9	1	(1)	6	(6)	0	9	12	1
29	1	60.21	173.58	8/11	30	74	-0.9	-0.9	-0.8	1	(1)	3	(3)	0	6	17	0
30	2	60.21	173.42	8/11	30	69	-0.2	-0.5	0.1	3	(3)	3	(3)	0	1	2	0
31	2	60.21	173.25	8/11	31	62	0.1	-0.1	0.5	5	(5)	9	(8)	0	1	0	0
32	2	60.21	173.08	8/14	33	59	1.6	1.3	2.1	3	(3)	1	(1)	0	0	0	0
33	2	60.21	172.92	8/14	30	59	3.4	2.2	3.8	28	(25)	8	(4)	16	0	0	0
34	2	60.21	172.58	8/17	30	49	4.9	4.6	5.1	11	(11)	1	(0)	67	0	0	0
35	2	60.21	172.42	8/17	30	56	3.5	2.6	4.3	22	(22)	9	(8)	35	0	0	0
36	1	60.21	172.25	8/17	30	55	4.3	4.0	4.6	2	(2)	12	(10)	0	0	0	0
37	1	60.21	172.08	8/17	30	56	3.2	2.3	4.2	5	(5)	2	(2)	0	0	0	0
45	1	60.13	173.75	8/10	31	88	-0.9	-1.0	-0.6	0	(0)	1	(1)	0	50	98	2
46	1	60.13	173.58	8/11	32	80	-0.8	-0.9	-0.8	1	(1)	0	(0)	0	2	9	0
47	2	60.13	173.42	8/11	32	72	-0.6	-0.6	-0.4	3	(3)	3	(3)	0	2	10	1
48	2	60.13	173.25	8/11	31	69	-0.4	-0.6	0.1	8	(6)	4	(4)	0	2	13	0
49	2	60.13	173.08	8/11	31	64	0.9	0.6	1.7	10	(9)	4	(4)	0	0	4	0
50	2	60.13	172.92	8/15	32	60	0.6	0.3	0.8	18	(17)	8	(6)	2	0	0	0
51	2	60.13	172.75	8/15	32	58	0.8	0.5	2.3	27	(25)	18	(15)	27	0	0	0
52	2	60.13	172.58	8/15	30	59	1.3	0.6	2.9	33	(25)	15	(13)	32	0	0	0
53	2	60.13	172.42	8/16	32	60	1.4	1.1	2.5	92	(25)	29	(28)	18	0	0	0
54	1	60.13	172.25	8/17	31	60	1.8	0.8	2.7	1	(1)	5	(5)	1	0	0	0
55	1	60.13	172.08	8/17	31	60	0.7	0.4	1.8	3	(3)	2	(2)	0	0	0	0
63	1	60.04	173.75	8/10	31	92	-0.7	-0.8	-0.6	1	(1)	1	(1)	0	45	55	1
64	1	60.04	173.58	8/10	31	86	-1.0	-1.0	-0.9	1	(1)	0	(0)	0	1	4	0
65	2	60.04	173.42	8/10	31	76	-0.7	-0.8	-0.6	5	(5)	0	(0)	0	8	13	0

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										Blue King Crab					Snow Crab		
		Location		Lift	Soak	Depth[a]	Temperature (°C)			Male					Male		
Station	Stratum	N Lat	W Long	Date	(h)	(m)	Avg	Min	Max	Legal		Sublegal		Female	Legal	Sublegal	Female
66	2	60.04	173.25	8/07	31	73	-0.8	-0.9	-0.6	6	(6)	5	(5)	1	7	19	0
67	2	60.04	173.08	8/07	31	68	-0.3	-0.4	0.2	12	(11)	4	(4)	0	0	1	0
68	2	60.04	172.92	8/15	31	65	0.3	0.0	0.6	7	(6)	2	(1)	0	1	1	0
69	2	60.04	172.75	8/15	31	63	-0.1	-0.2	0.3	5	(5)	6	(4)	1	0	0	0
70	2	60.04	172.58	8/15	31	64	0.1	-0.2	0.8	8	(8)	2	(2)	1	0	0	0
71	2	60.04	172.42	8/16	31	69	-0.1	-0.2	0.3	21	(14)	7	(7)	0	0	0	0
72	1	60.04	172.25	8/16	30	66	0.1	-0.1	0.4	2	(2)	0	(0)	0	1	17	3
73	1	60.04	172.08	8/16	30	64	0.0	-0.1	0.0	0	(0)	0	(0)	0	0	1	0
74	1	59.96	173.92	8/10	33	99	0.0	-0.2	0.1	1	(1)	0	(0)	0	9	6	0
75	1	59.96	173.75	8/10	33	95	-0.3	-0.7	-0.1	2	(2)	1	(1)	0	19	14	0
76	1	59.96	173.58	8/10	32	91	-0.9	-1.0	-0.8	6	(5)	36	(32)	0	0	0	0
77	1	59.96	173.42	8/10	32	80	-1.0	-1.0	-0.9	0	(0)	0	(0)	0	7	32	2
78	1	59.96	173.25	8/07	31	77	-1.0	-1.0	-0.9	3	(3)	0	(0)	0	22	55	28
79	1	59.96	173.08	8/07	32	75	-0.8	-0.9	-0.7	3	(3)	1	(1)	0	6	4	0
80	1	59.96	172.92	8/06	30	73	-0.6	-0.8	-0.3	15	(14)	3	(3)	0	1	0	0
81	1	59.96	172.75	8/06	30	70	0.1	-0.5	0.4	1	(1)	0	(0)	0	0	3	1
82	1	59.96	172.58	8/06	29	69	-0.6	-0.7	-0.5	5	(4)	1	(1)	0	3	4	0
83	1	59.96	172.42	8/16	31	72	-0.3	-0.5	-0.1	2	(1)	1	(1)	0	15	81	49
84	1	59.96	172.25	8/16	30	71	-0.3	-0.3	-0.2	2	(2)	0	(0)	0	10	28	11
85	1	59.96	172.08	8/16	30	73	-0.2	-0.3	-0.1	1	(1)	0	(0)	0	2	4	1
86	1	59.88	173.92	8/09	29	100	0.8	0.7	0.9	7	(6)	6	(6)	0	1	0	0
87	1	59.88	173.75	8/09	32	97	0.0	-0.3	0.2	1	(1)	2	(2)	0	12	4	0
88	1	59.88	173.58	8/08	30	97	-0.4	-0.7	-0.3	3	(2)	1	(1)	0	0	1	0
89	1	59.88	173.42	8/07	30	92	-1.1	-1.1	-1.0	1	(1)	10	(10)	0	0	0	0
90	1	59.88	173.25	8/07	30	81	-1.1	-1.1	-1.1	3	(3)	3	(3)	0	1	0	2
91	1	59.88	173.08	8/07	32	79	-1.0	-1.1	-0.8	3	(3)	0	(0)	0	4	15	13
92	1	59.88	172.92	8/06	30	78	-1.0	-1.1	-1.0	1	(1)	1	(1)	0	7	11	0
93	1	59.88	172.75	8/06	30	77	-1.0	-1.0	-0.9	0	(0)	2	(1)	0	4	20	1
94	1	59.88	172.58	8/06	29	76	-0.8	-0.9	-0.7	1	(1)	1	(1)	0	5	16	3
95	1	59.88	172.42	8/16	30	76	-0.5	-0.6	-0.4	1	(0)	0	(0)	0	19	108	111
98	1	59.79	173.92	8/09	30	104	0.6	0.4	0.9	12	(11)	2	(2)	0	3	0	0
99	1	59.79	173.75	8/09	32	99	0.2	0.1	0.3	5	(5)	0	(0)	0	6	2	0
100	1	59.79	173.58	8/08	30	97	0.1	-0.4	0.5	2	(2)	1	(1)	0	10	2	0
101	1	59.79	173.42	8/08	31	94	0.1	-0.3	0.2	5	(5)	2	(2)	0	3	2	0
102	1	59.79	173.25	8/05	30	88	-1.0	-1.1	-0.9	2	(1)	2	(2)	0	6	5	0
103	1	59.79	173.08	8/05	30	86	-1.1	-1.2	-1.1	0	(0)	0	(0)	0	0	0	0
104	1	59.79	172.92	8/05	30	82	-1.1	-1.2	-1.1	2	(2)	0	(0)	0	1	12	6
105	1	59.79	172.75	8/06	30	82	-1.1	-1.1	-1.0	2	(2)	0	(0)	0	2	7	0
110	1	59.71	173.92	8/09	30	105	0.9	0.8	1.0	2	(2)	0	(0)	0	7	1	1
111	1	59.71	173.75	8/09	31	105	0.6	0.3	0.8	9	(8)	0	(0)	0	6	0	0
112	1	59.71	173.58	8/08	30	100	0.5	0.2	0.6	1	(1)	0	(0)	0	0	0	0
113	1	59.71	173.42	8/08	30	98	-0.4	-0.5	-0.3	1	(1)	0	(0)	0	13	13	0
114	1	59.71	173.25	8/05	31	94	-0.8	-1.0	-0.6	2	(2)	0	(0)	0	3	2	0
115	1	59.71	173.08	8/05	31	90	-0.9	-0.9	-0.8	2	(2)	0	(0)	0	1	0	0
116	1	59.71	172.92	8/05	31	89	-1.1	-1.1	-1.1	0	(0)	1	(1)	0	0	3	1

-continued-

Appendix B1.–Page 3 of 3.

										Blue King Crab					Snow Crab		
		Location		Lift	Soak	Depth[a]	Temperature (°C)			Male					Male		
Station	Stratum	N Lat	W Long	Date	(h)	(m)	Avg	Min	Max	Legal		Sublegal		Female	Legal	Sublegal	Female
122	1	59.63	173.92	8/09	31	106	1.0	0.8	1.2	5	(5)	1	(1)	0	1	0	0
123	1	59.63	173.75	8/09	31	104	0.6	0.4	0.9	11	(11)	1	(1)	0	1	0	0
124	1	59.63	173.58	8/08	30	102	0.6	0.0	1.1	0	(0)	0	(0)	0	2	0	0
125	1	59.63	173.42	8/08	30	102	0.1	-0.1	0.5	1	(1)	0	(0)	0	7	6	0
126	1	59.63	173.25	8/04	29	100	-0.4	-0.5	-0.3	3	(3)	1	(1)	0	6	9	1
127	1	59.63	173.08	8/04	30	95	-0.8	-0.9	-0.6	2	(2)	0	(0)	0	11	14	0
128	1	59.63	172.92	8/04	30	93	-0.9	-1.0	-0.8	1	(1)	0	(0)	0	11	8	1
146[c]	2	60.25	172.83	8/26	33	44	5.5	5.2	6.3	1	(1)	0	(0)	2	0	0	0
147[d]	2	60.38	172.92	8/14	31	40	5.6	4.9	6.1	2	(1)	2	(2)	2	0	0	0
148	2	60.42	173.00	8/26	30	43	5.9	4.8	7.2	0	(0)	0	(0)	5	0	0	0
149	2	60.46	173.08	8/14	31	35	5.6	4.8	6.2	2	(2)	0	(0)	0	0	0	0
150	2	60.42	173.17	8/24	30	52	3.0	2.1	4.0	19	(19)	24	(17)	6	0	0	0
151	2	60.42	173.33	8/24	31	61	2.0	1.8	2.4	9	(9)	5	(5)	0	0	0	0
152	2	60.50	173.33	8/24	32	58	1.7	1.6	1.9	8	(7)	5	(5)	0	0	0	0
157	1	60.79	173.25	8/23	31	69	0.4	0.2	0.5	0	(0)	1	(1)	0	0	2	0
169	1	60.71	173.25	8/23	31	67	1.1	0.5	1.7	14	(14)	8	(8)	0	0	0	0
173[b]	1	60.71	172.42	8/21	32	59	1.0	0.8	1.2	0	(0)	0	(0)	0	0	24	0
179	1	60.63	173.42	8/24	32	63	1.3	0.9	1.5	6	(5)	3	(3)	1	0	0	0
180	1	60.63	173.25	8/23	32	60	1.4	1.0	1.9	14	(14)	4	(4)	0	0	0	0
183	1	60.63	172.42	8/21	32	56	1.1	0.6	1.6	0	(0)	0	(0)	0	0	0	0
189	2	60.54	173.42	8/24	32	60	1.9	1.7	2.1	2	(2)	3	(3)	2	0	0	0
190	2	60.54	173.25	8/23	32	49	3.2	2.6	4.1	14	(14)	14	(14)	1	0	0	0
193	1	60.54	172.42	8/21	32	57	2.2	1.9	2.5	0	(0)	1	(1)	0	0	0	0
196	1	60.46	172.42	8/20	31	56	2.0	1.7	3.5	10	(10)	10	(9)	0	0	0	0
199	1	60.38	172.25	8/20	32	57	1.0	0.1	3.2	58	(25)	39	(31)	11	0	0	0
202	2	60.25	172.50	8/18	33	53	4.4	4.2	5.2	9	(7)	4	(3)	44	0	0	0
203	2	60.50	173.17	8/23	33	33	5.3	4.5	6.8	0	(0)	0	(0)	0	0	0	0
301	3	60.48	173.07	8/23	33	20-37	6.0	5.2	7.1	0	(0)	0	(0)	0	0	0	0
302	3	60.47	173.01	8/25	31	20-37	7.4	6.8	7.7	0	(0)	0	(0)	0	0	0	0
303	3	60.45	172.95	8/25	31	20-37	7.5	7.3	7.7	0	(0)	0	(0)	0	0	0	0
304	3	60.42	172.91	8/25	31	20-37	7.5	7.2	7.7	0	(0)	0	(0)	1	0	0	0
305	3	60.40	172.87	8/25	32	20-37	7.6	7.2	7.8	0	(0)	0	(0)	0	0	0	0
306	3	60.37	172.82	8/25	32	20-37	7.4	6.6	7.8	0	(0)	0	(0)	6	0	0	0
307	3	60.31	172.54	8/18	32	20-37	5.6	5.3	5.9	1	(1)	0	(0)	6	0	0	0
308	3	60.31	172.48	8/18	32	20-37	5.6	5.5	5.8	0	(0)	3	(2)	42	0	0	0
309	3	60.31	172.41	8/18	31	20-37	5.9	5.6	6.5	0	(0)	0	(0)	315	0	0	0
310	3	60.30	172.35	8/18	30	20-37	6.0	5.3	6.6	1	(1)	0	(0)	15	0	0	0

[a] Depths at Strata 1 and 2 stations recorded in meters by data loggers and corrected for the height of the logger above the ocean floor due to its position in the deployed pot by adding 0.8 m. Station depths in Stratum 3 listed as a range due to the variation in depths covered.

[b] Catch of snow crab at the station does not include 1 crab of unknown sex.

[c] Temperature and depth summary from data recorded at all 4 pots fished at the station.

[d] Catch of blue king crab and snow crab is from 3 of 4 pots fished at the station (1 pot not recovered).

Appendix B2.–Details on the stations fished in Stratum 4 during the 2015 St. Matthew Island blue king crab pot survey, including catch (number of crab) of blue king crab per station and catch of snow crab per station; numbers in parentheses are the number of legal or sublegal blue king crab that were tagged and released at the station.

										Blue King Crab					Snow Crab		
		Location		Lift	Soak	Depth[a]	Temperature (°C)			Male					Male		
Station	Stratum	N Lat	W Long	Date	(h)	(m)	Avg	Min	Max	Legal		Sublegal		Female	Legal	Sublegal	Female
401	4	60.54	172.68	8/20	30	44	4.7	4.5	5.1	0	(0)	3	(3)	0	0	0	0
402	4	60.54	172.51	8/20	31	53	2.9	2.5	3.6	3	(3)	6	(5)	0	0	0	0
403	4	60.58	172.77	8/20	30	41	5.3	4.8	5.7	1	(1)	3	(3)	0	0	0	0
404	4	60.58	172.60	8/20	31	49	3.7	3.6	3.9	11	(10)	14	(14)	0	0	0	0
405	4	60.63	172.86	8/22	31	46	5.6	5.2	6.8	2	(2)	8	(4)	5	0	0	0
406	4	60.63	172.69	8/20	30	46	4.3	4.1	4.6	4	(4)	6	(6)	0	0	0	0
407	4	60.63	172.53	8/20	30	57	3.1	2.8	3.4	1	(1)	0	(0)	0	0	0	0
408	4	60.67	172.95	8/22	31	36	4.8	4.3	5.3	1	(1)	1	(1)	0	0	0	0
409	4	60.67	172.78	8/22	31	44	4.6	4.4	4.9	2	(2)	4	(4)	0	0	0	0
410	4	60.67	172.62	8/21	32	53	3.4	2.8	3.8	0	(0)	2	(2)	0	0	0	0
411	4	60.71	172.88	8/22	32	59	3.3	2.3	4.5	17	(17)	61	(47)	6	0	0	1
412	4	60.71	172.71	8/21	31	51	3.8	3.0	4.2	6	(6)	1	(1)	0	0	0	0
413	4	60.71	172.54	8/21	32	56	2.3	2.0	2.5	0	(0)	3	(3)	0	0	2	0
414	4	60.75	172.97	8/22	34	66	1.5	1.2	1.8	64	(25)	58	(40)	7	0	0	0
415	4	60.75	172.81	8/22	33	57	3.5	2.7	4.5	6	(4)	6	(5)	0	0	0	0
416	4	60.75	172.64	8/21	31	56	3.4	2.3	4.3	2	(2)	3	(3)	0	0	0	0
417	4	60.79	173.07	8/23	30	66	1.7	1.5	1.9	5	(5)	5	(5)	0	0	0	0
418	4	60.79	172.90	8/22	33	61	2.5	1.5	2.8	10	(9)	8	(7)	0	0	0	0
419	4	60.79	172.73	8/21	31	58	2.2	2.1	2.3	2	(2)	1	(1)	0	0	0	0
420	4	60.79	172.56	8/21	31	58	2.2	2.2	2.4	1	(0)	2	(2)	0	0	2	0

[a] Depths recorded in meters by data loggers were corrected for the height of the logger above the ocean floor due to its position in the deployed pot by adding 0.8 m.

APPENDIX C. SURVEY CATCH COMPOSITIONAND LENGTHS OF SELECTED FISHES

Appendix C1.–Catch composition from 587 pots fished at 147 stations during the 2015 St. Matthew Island blue king crab pot survey, with taxa ranked by number captured.

Catch Composition–2015 St. Matthew Island Pot Survey		
Common Name	Scientific Name	Number
circumboreal toad crab	*Hyas coarctatus*	3,253
blue king crab	*Paralithodes platypus*	2,638
snow crab	*Chionoecetes opilio*	1,533
brittle star unidentified	Subclass Ophiuroidea	1,165
Pacific cod	*Gadus macrocephalus*	1,001
sunrise jellyfish	*Chrysaora melanaster*	252
great sculpin	*Myoxocephalus polyacanthocephalus*	211
walleye pollock	*Gadus chalcogrammus*	98
fuzzy hermit crab	*Pagurus trigonocheirus*	97
Pacific halibut	*Hippoglossus stenolepis*	53
Buccinum snail unidentified	*Buccinum* sp.	45
knobby six-rayed star	*Leptasterias polaris*	37
Alaska skate	*Bathyraja parmifera*	35
Leptasterias star unidentified	*Leptasterias* sp.	34
rose sea star	*Crossaster papposus*	31
Aleutian hermit crab	*Pagurus aleuticus*	16
common mud star	*Ctenodiscus crispatus*	12
Neptune snail unidentified	*Neptunea* sp.	11
yellowfin sole	*Limanda aspera*	11
angled buccinum (or angular whelk)	*Buccinum angulosum*	10
sand dollar unidentified	Order Clypeastroida	9
polar whelk	*Buccinum polare*	8
starfish unident.	Subclass Asteroidea	8
hybrid Tanner crab	*Chionoecetes*	7
silky buccinum (or ladder whelk)	*Buccinum scalariforme*	6
basketstar	*Gorgonocephalus eucnemis*	5
longfinger hermit crab	*Pagurus rathbuni*	5
mussel unidentified	*Mytilidae*	5
Pribilof neptune (or Pribilof whelk)	*Neptunea pribiloffensis*	5
snail unidentified	Class Gastropoda	5
hair crab	*Erimacrus isenbeckii*	4
northern neptune	*Neptunea heros*	4
Greenland halibut (or Greenland turbot)	*Reinhardtius hippoglossoides*	3
jellyfish unidentified	Class Scyphozoa	3

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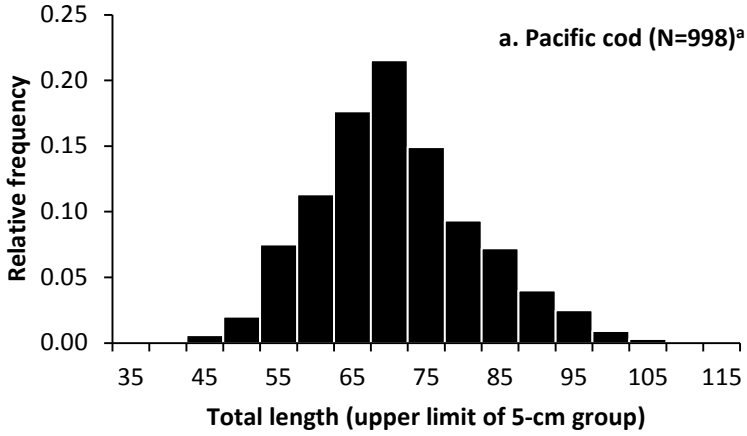
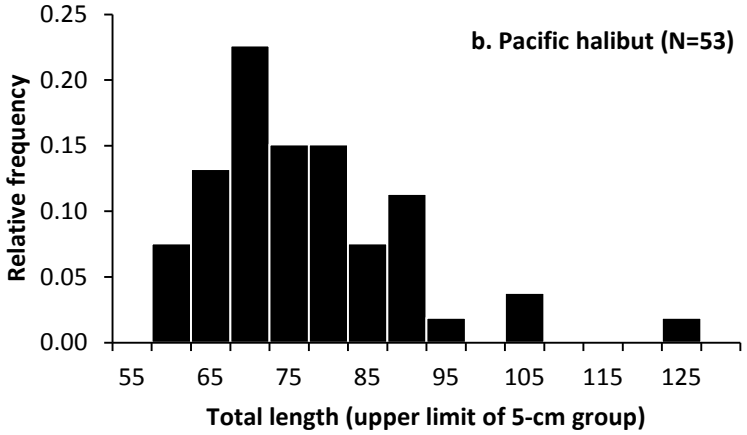
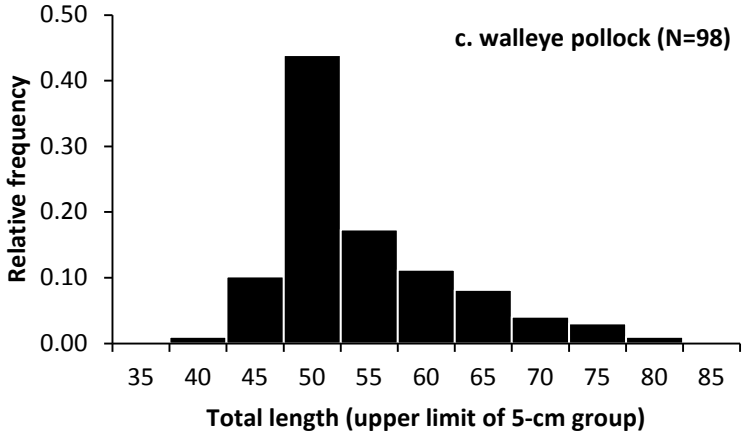
Common Name	Scientific Name	Number
lyre buccinum (or sinuous whelk)	*Buccinum plectrum*	3
Pacific lyre crab	*Hyas lyratus*	3
Bering's beringius	*Beringius beringii*	2
bivalve unidentified	Class Bivalvia	2
Colus snail unidentified	*Colus* sp.	2
Arctic star	*Leptasterias arctica*	2
sea anemone unidentified	Order Actiniaria	2
blackspined sea star	*Lethasterias nanimensis*	1
bryozoan unidentified	Phylum Bryozoa	1
fat whelk	*Neptunea ventricosa*	1
hairy cockle	*Clinocardium ciliatum*	1
hairy hermit crab	*Pagurus capillatus*	1
salmon snailfish	*Careproctus rastrinus*	1
sponge unidentified	Phylum Porifera	1
Tanner crab	*Chionoecetes bairdi*	1

Appendix C2.–Relative size frequency distributions of (a) Pacific cod, (b) Pacific halibut, and (c) walleye pollock captured during the 2015 St. Matthew Island blue king crab pot survey.



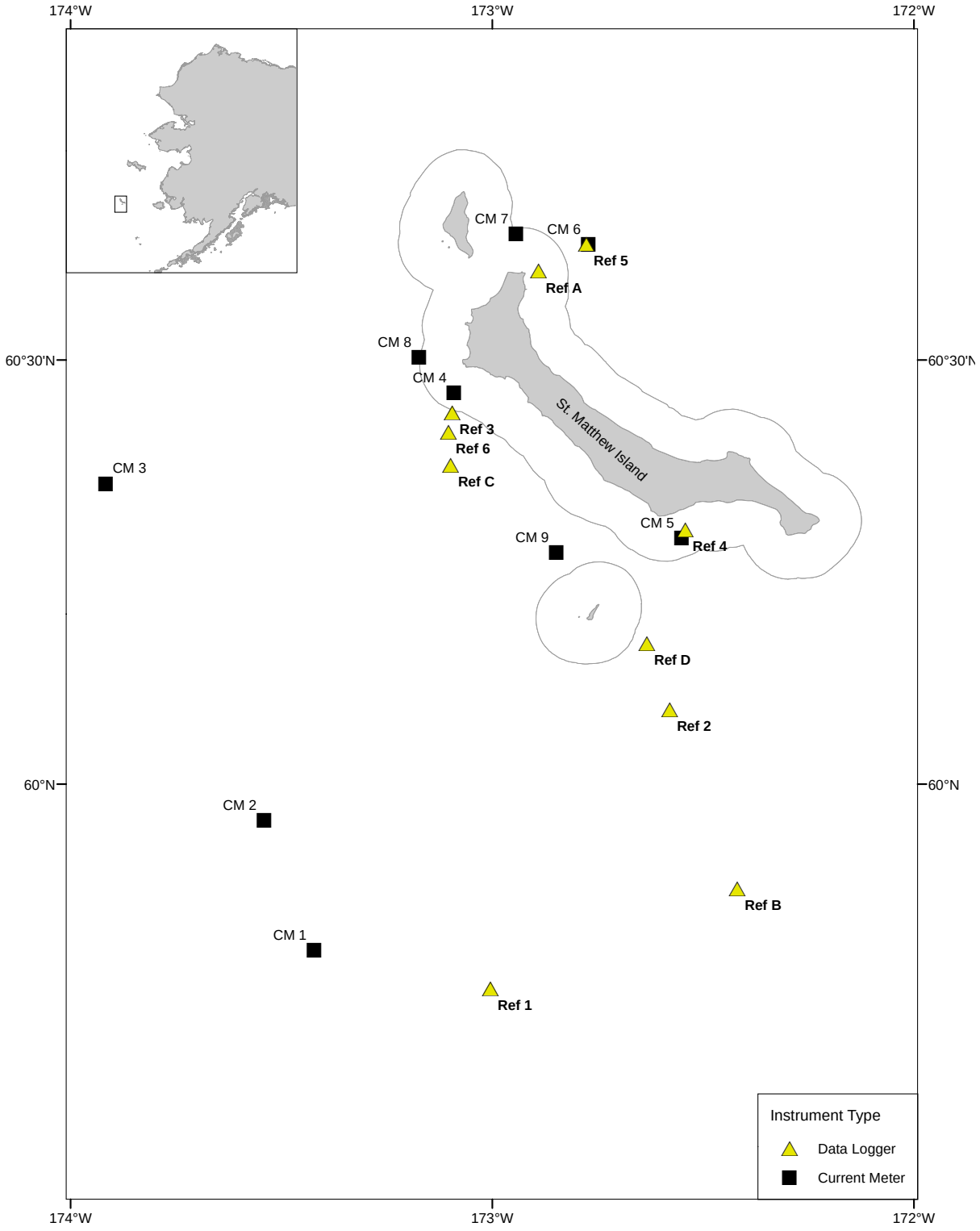




[a] Excludes 3 Pacific cod without lengths recorded.

APPENDIX D. REFERENCE DEPTH, TEMPERATURE, AND CURRENT DATA

Appendix D1.–Locations of reference pots deployed to record oceanographic data during the 2015 St. Matthew Island blue king crab pot survey.



Appendix D2.–Summary of reference data collected from data logger deployments throughout the survey area during the 2015 St. Matthew Island blue king crab pot survey (see Appendix D1 for deployment locations and see Appendices D3–D9 for time-plots of selected data).

	Location			Soak	Depth (m)[a]			Temperature (°C)		
ID	N Lat	W Long	Dates	(h)	Avg	Min	Max	Avg	Min	Max
Ref 1[b]	59.76	173.00	03-27 Aug	578	86	85	87	-1.1	-1.2	-1.0
Ref 2	60.09	172.58	05-27 Aug	532	61	60	61	0.6	-0.3	3.3
Ref 3	60.44	173.09	13-14 Aug	31	44	43	44	4.6	3.7	5.3
Ref 4	60.30	172.54	15-18 Aug	68	28	28	29	5.4	5.2	5.9
Ref 5	60.64	172.78	19-22 Aug	79	43	42	43	4.9	4.6	5.3
Ref 6	60.42	173.10	23-26 Aug	88	47	46	48	3.7	2.4	5.0
Ref A	60.60	172.89	20-21 Aug	7	24	24	24	6.3	6.2	6.4
Ref B	59.88	172.42	16-27 Aug	263	76	76	77	-0.7	-0.9	-0.4
Ref C	60.38	173.10	24-25 Aug	33	51	50	51	1.8	1.4	2.4
Ref D	60.17	172.63	26-27 Aug	27	56	55	56	2.8	2.1	3.0

Notes: 1) Loggers Ref 1–6 measured depth, temperature, dissolved oxygen, and pH.

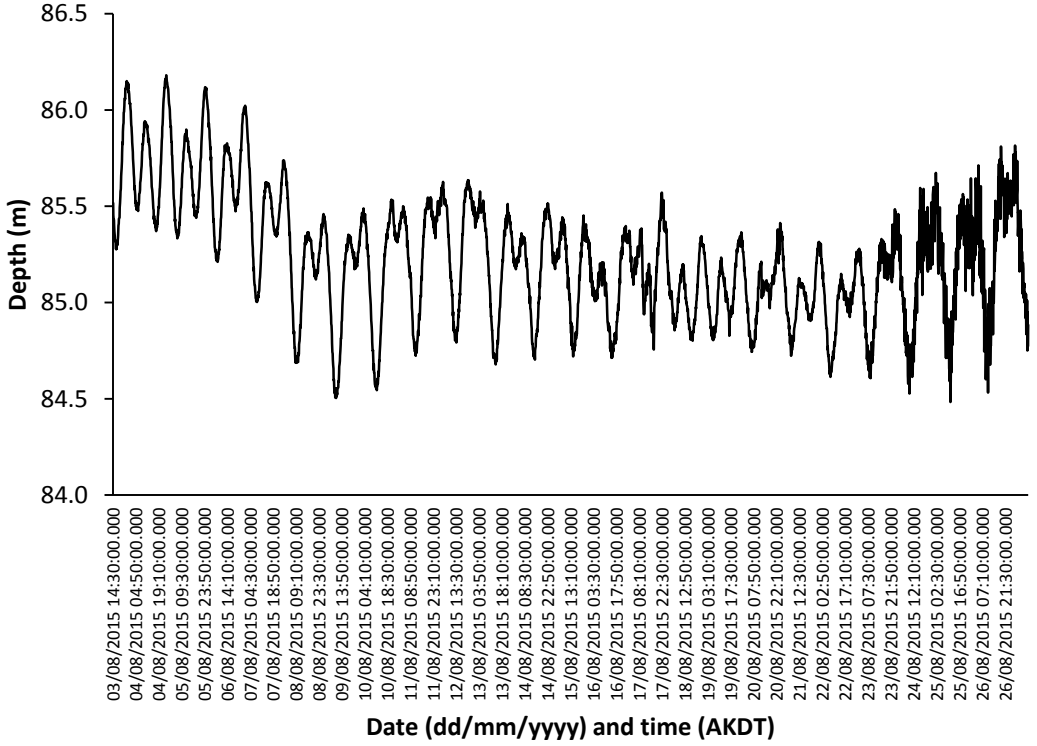
2) Loggers Ref A, C, and D measured depth and temperature.

3) Logger Ref B measured depth, temperature, and conductivity.

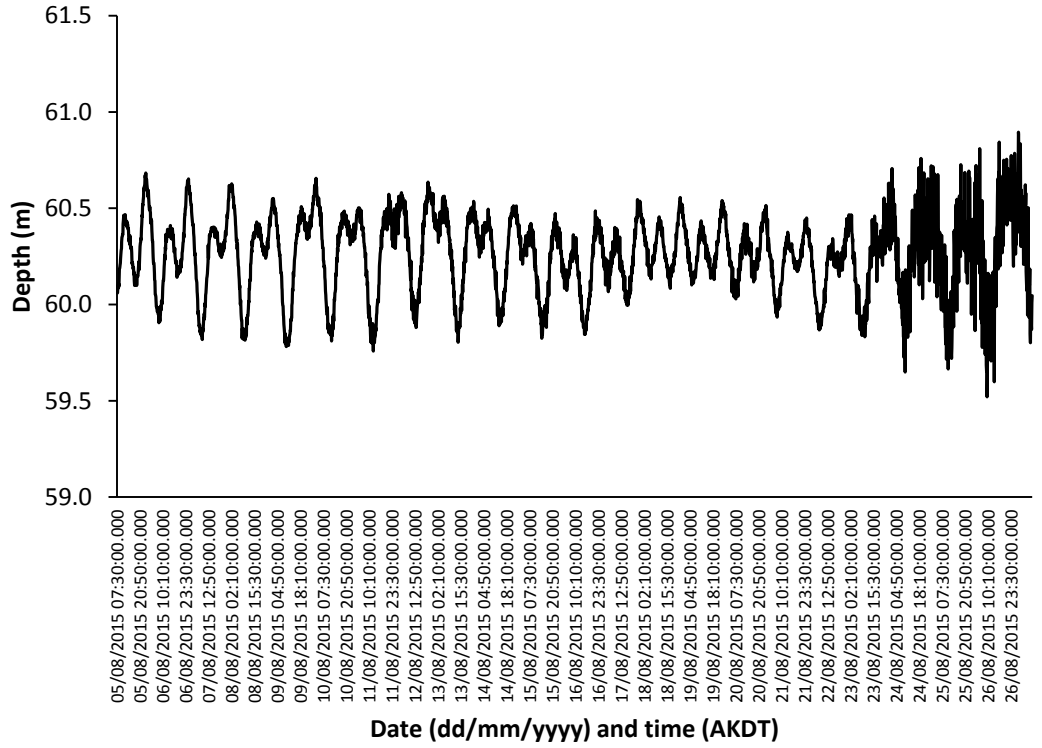
[a] Depths recorded in meters by data loggers were corrected for the height of the logger above the ocean floor due to its position in the deployed pot by adding either 0.6m (Ref 1–6) or 0.8 m (Ref A–D).

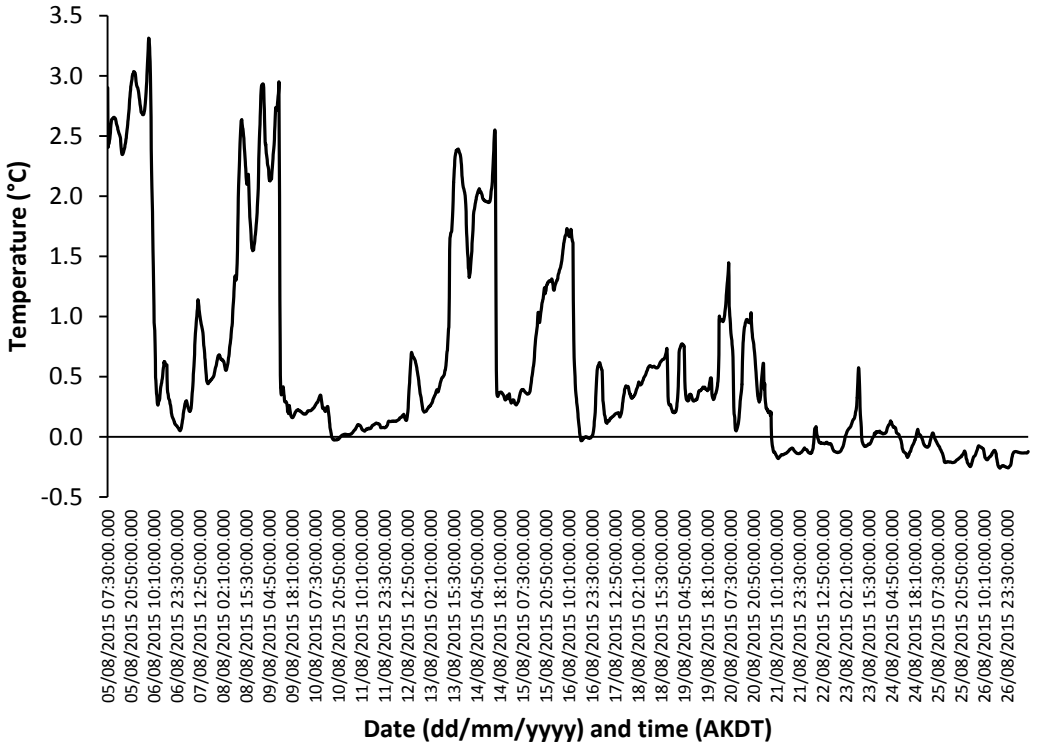
[b] Logger had partial sensor failure during deployment (temperature data is from the first 38 hours, depth data is from the entire soak period).

Appendix D3.–Depths recorded every 10 min for a period of 578 h by data logger (Ref 1) deployed at lat 59.76° N, long 173.00° W during 03–27 August 2015 (see Appendix D1–D2).

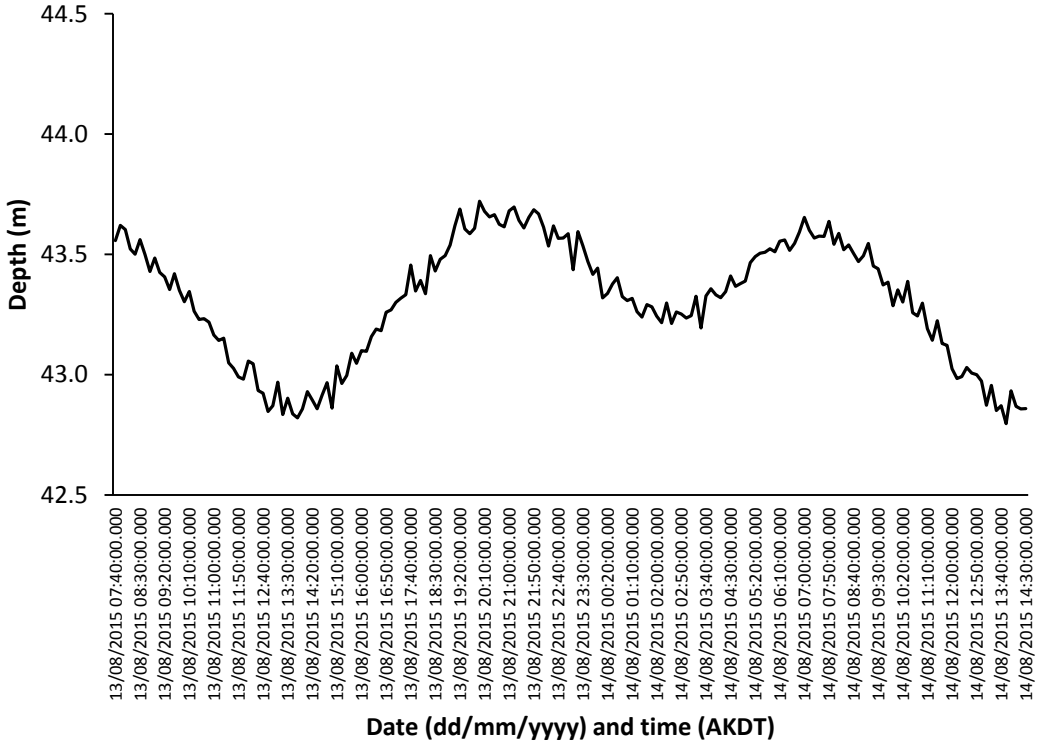


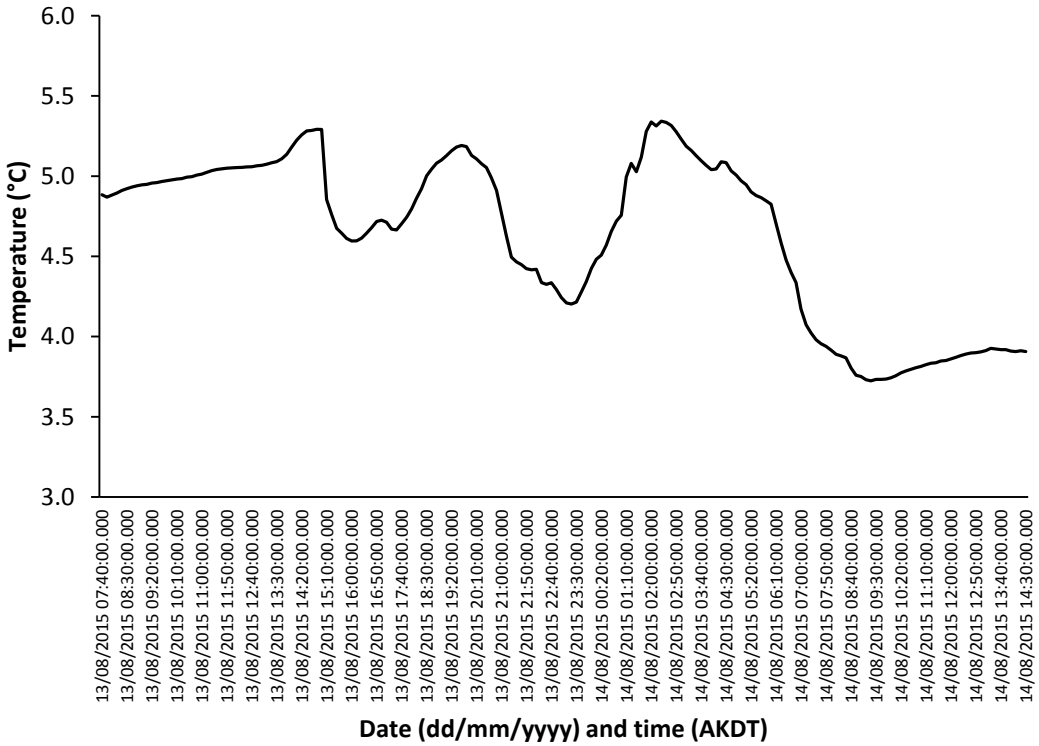
Appendix D4.–Depths and temperatures recorded every 10 min for a period of 532 h by data logger (Ref 2) deployed at lat 60.09° N, long 172.58° W during 05–27 August 2015 (see Appendix D1–D2).



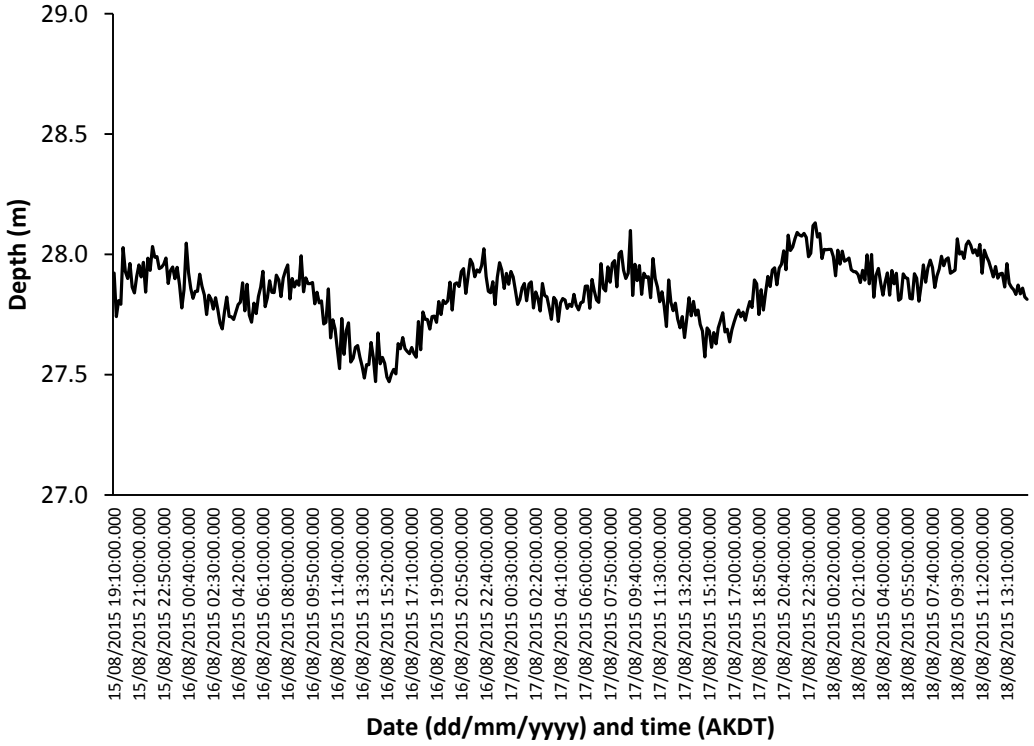


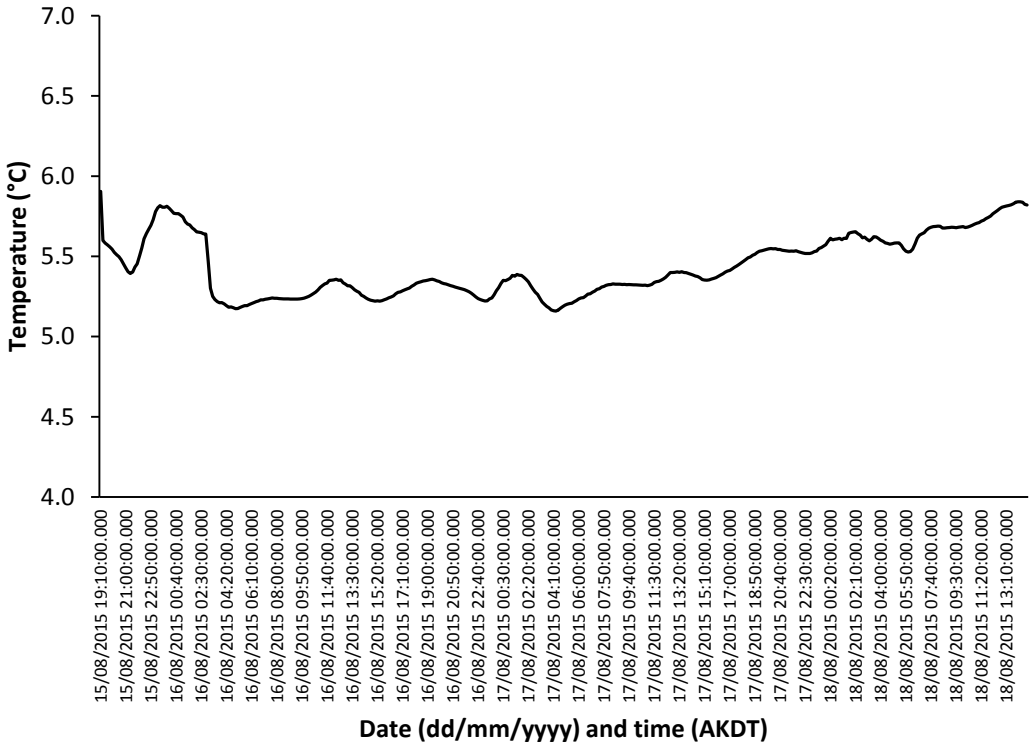
Appendix D5.–Depths and temperatures recorded every 10 min for a period of 31 h by data logger (Ref 3) deployed at lat 60.44° N, long 173.09° W during 13–14 August 2015 (see Appendix D1–D2).



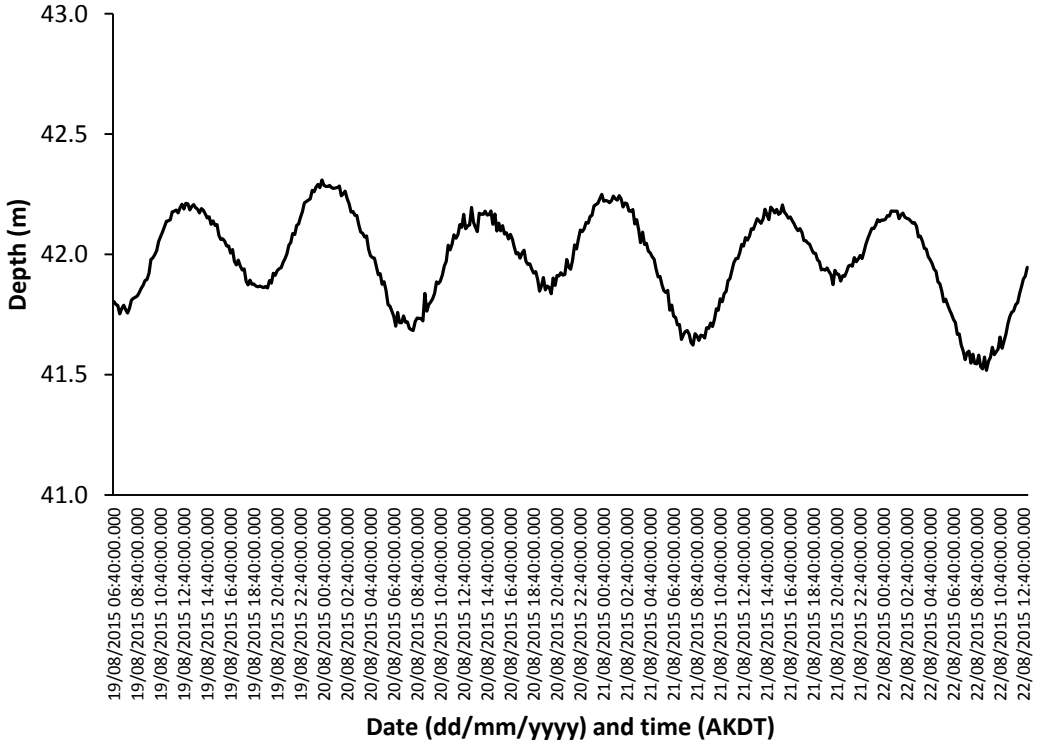


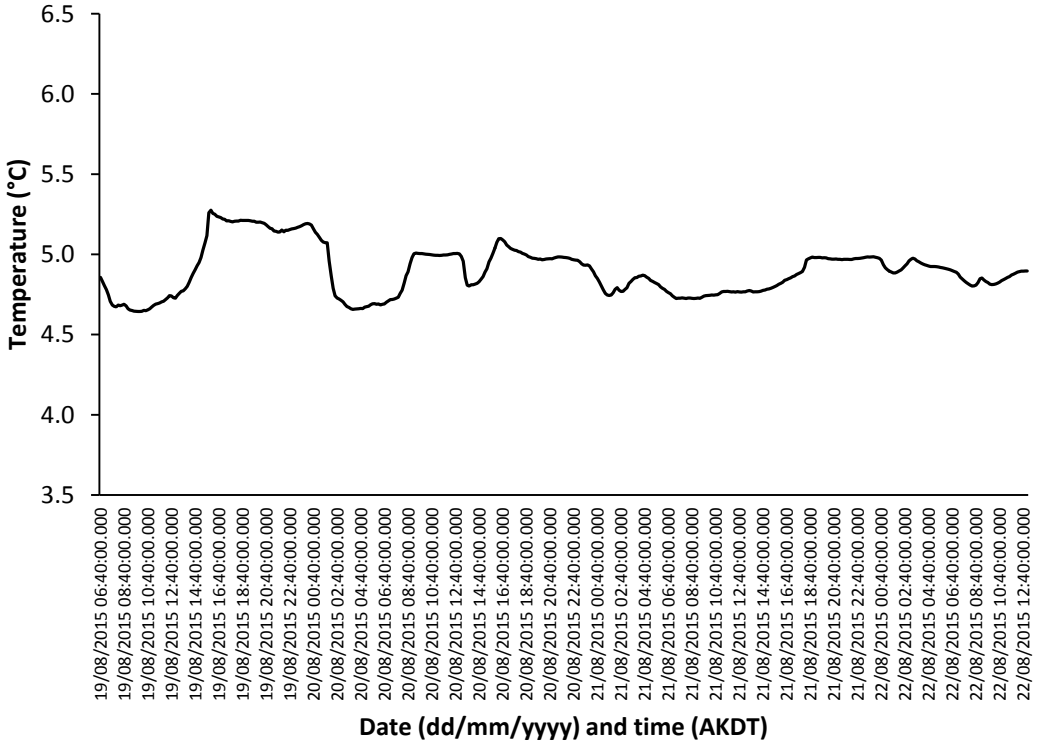
Appendix D6.–Depths and temperatures recorded every 10 min for a period of 68 h by data logger (Ref 4) deployed at lat 60.30° N, long 172.54° W during 15–18 August 2015 (see Appendix D1–D2).



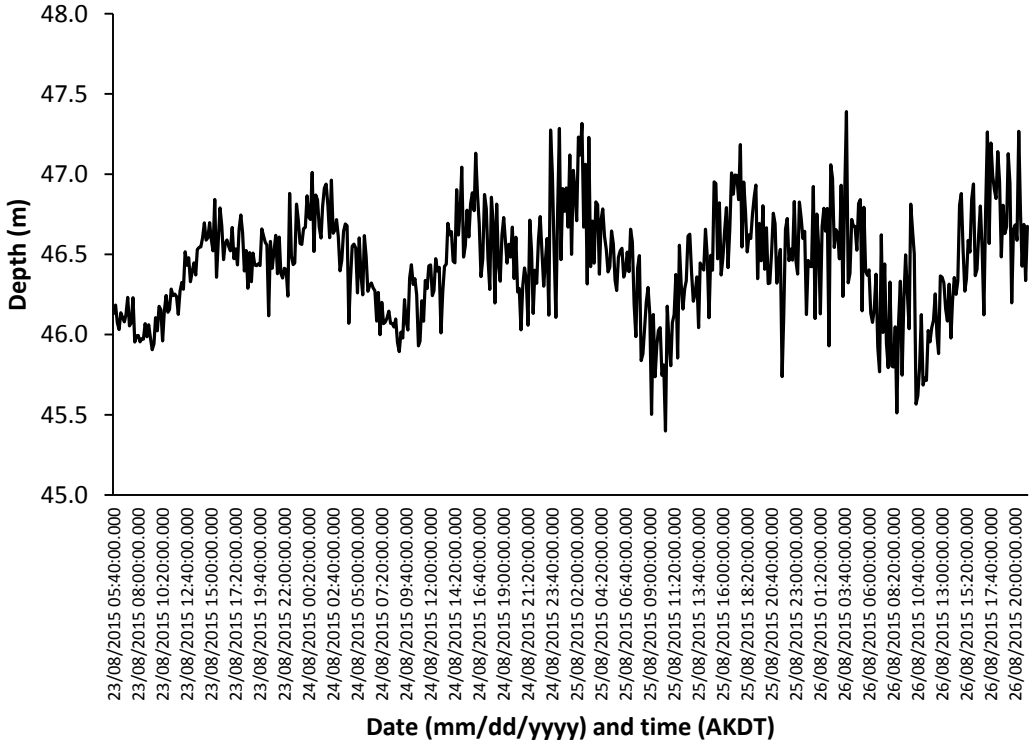


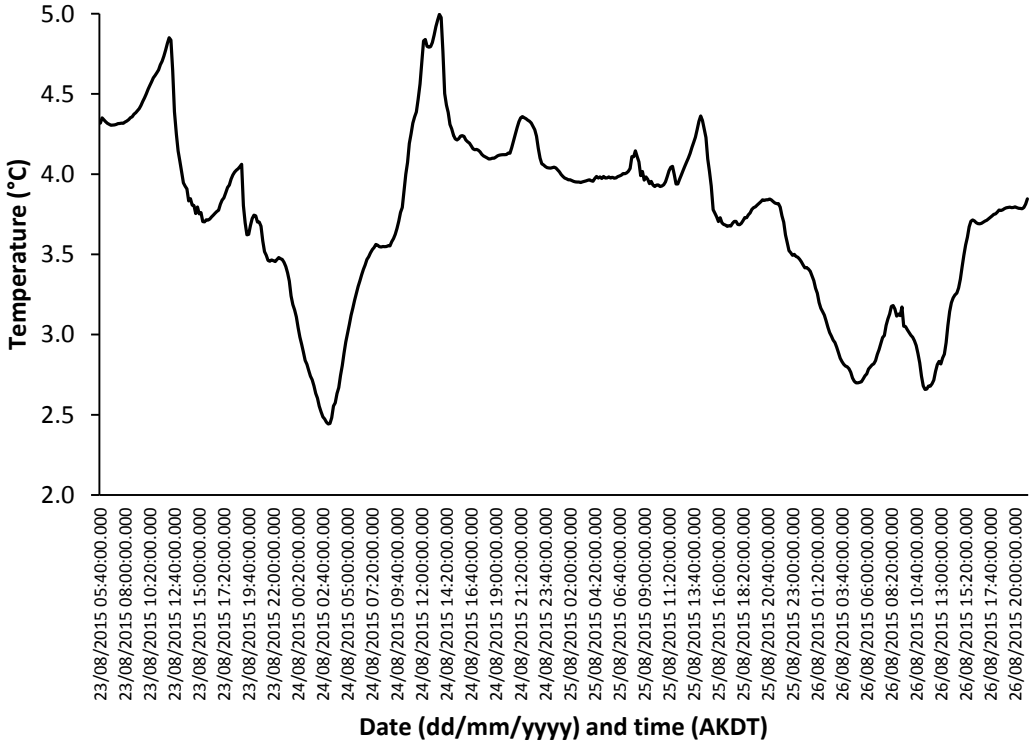
Appendix D7.–Depths and temperatures recorded every 10 min for a period of 79 h by data logger (Ref 5) deployed at lat 60.64° N, long 172.78° W during 19–22 August 2015 (see Appendix D1–D2).



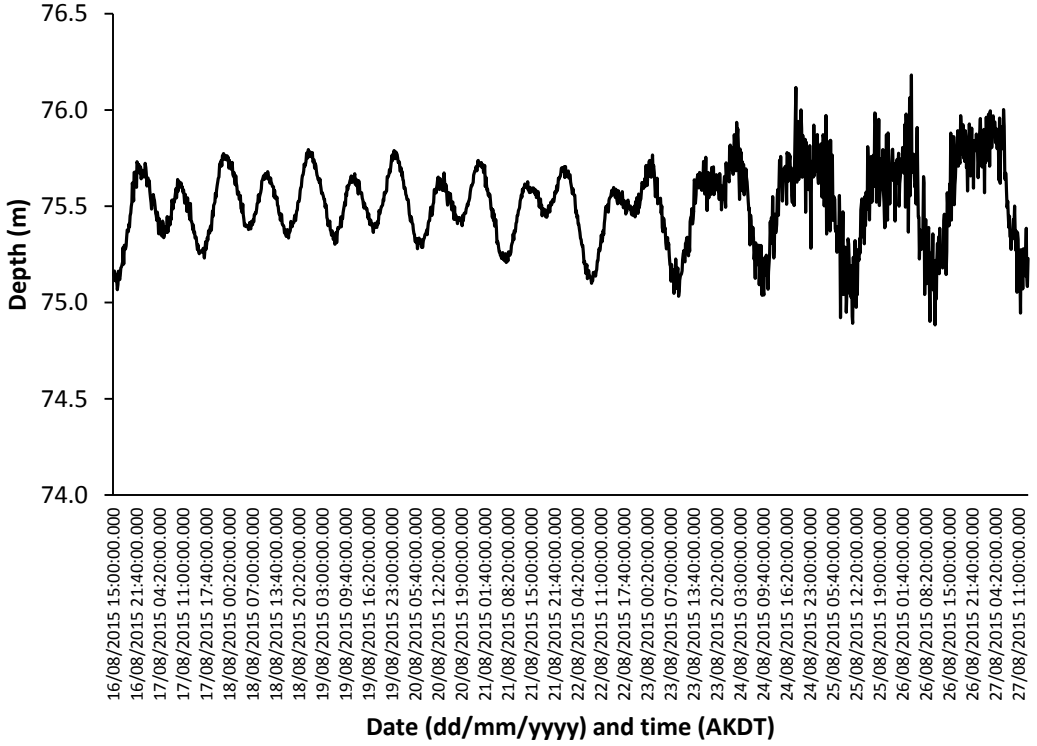


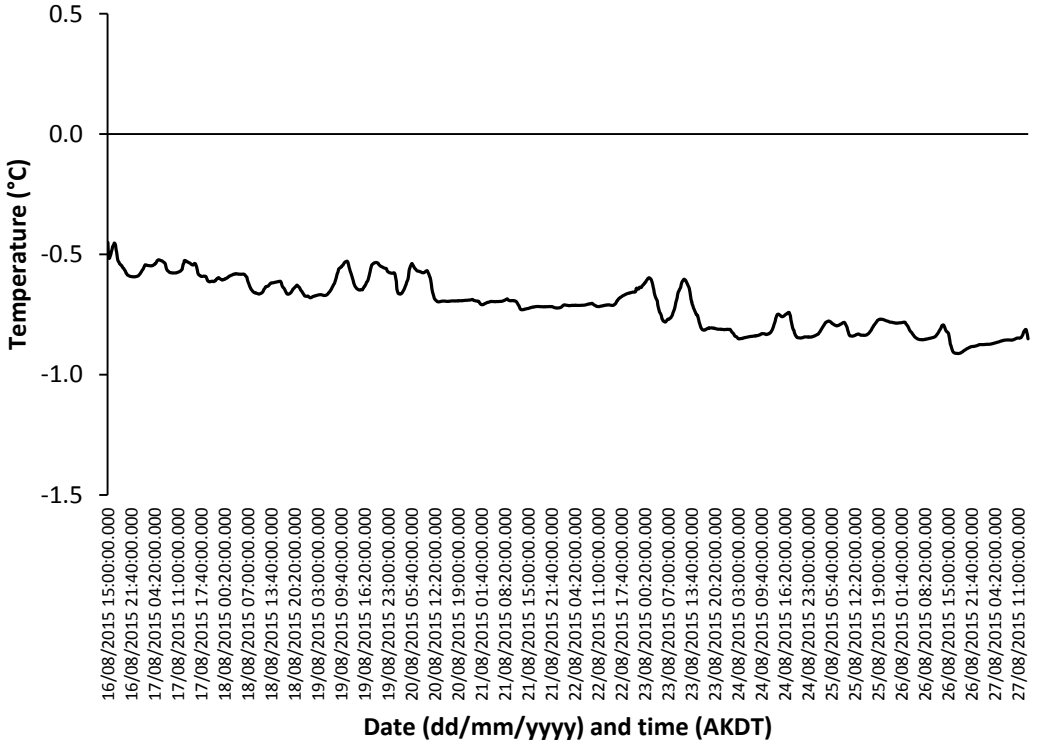
Appendix D8.–Depths and temperatures recorded every 10 min for a period of 88 h by data logger (Ref 6) deployed at lat 60.42° N, long 173.10° W during 23–26 August 2015 (see Appendix D1–D2).





Appendix D9.–Depths and temperatures recorded every 10 min for a period of 263 h by data logger (Ref B) deployed at lat 59.88° N, long 172.42° W during 16–27 August 2015 (see Appendix D1–D2).



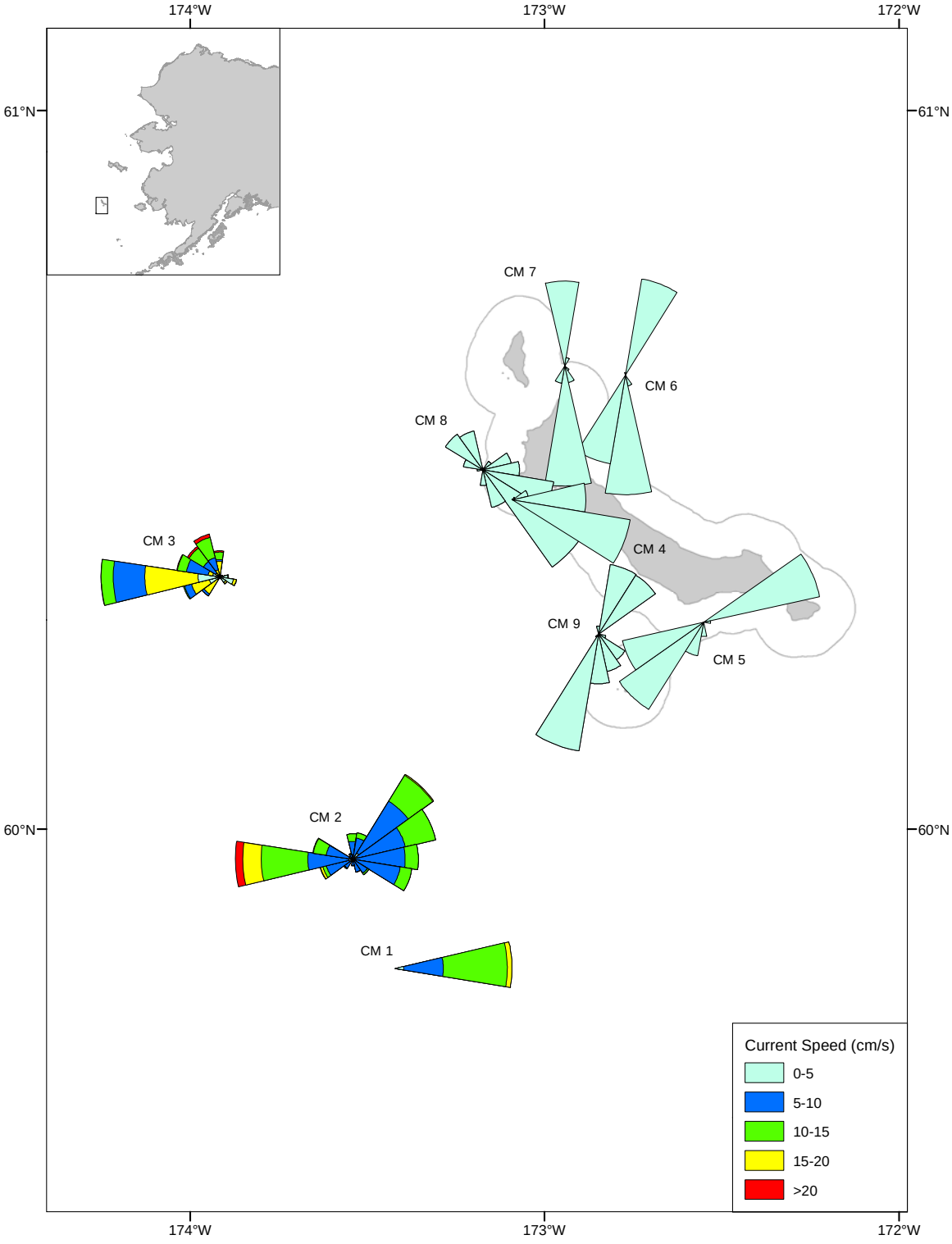


Appendix D10.–Summary of reference data collected from current meter deployments throughout the survey area during the 2015 St. Matthew blue king crab pot survey (see Appendix D1 for deployment locations and see Appendix D11 for a graphical summary of speed and direction data).

	Location			Soak	Depth[a]	Temperature (°C)			Current Speed (cm/s)		
ID	N Lat	W Long	Dates	(h)	(m)	Avg	Min	Max	Avg	Min	Max
CM 1	59.80	173.42	07-08 Aug	31	95	0.2	-0.6	0.4	10.1	2.6	17.9
CM 2	59.96	173.54	08-10 Aug	46	87	-0.7	-0.8	-0.5	9.2	2.1	26.3
CM 3	60.35	173.92	11-12 Aug	31	84	-0.7	-0.8	-0.1	9.8	0.5	23.5
CM 4	60.46	173.09	13-14 Aug	31	30	5.9	5.2	6.5	2.5	1.1	2.8
CM 5	60.29	172.55	15-18 Aug	67	33	5.5	5.3	5.9	1.9	1.1	3.2
CM 6	60.64	172.77	19-21 Aug	51	42	5.1	4.9	5.5	2.1	1.1	3.3
CM 7	60.65	172.94	21-22 Aug	26	34	5.5	4.6	6.6	2.3	1.0	3.4
CM 8	60.50	173.17	23-25 Aug	49	30	6.4	5.1	8.0	2.2	0.4	4.9
CM 9	60.27	172.85	25-26 Aug	33	39	6.1	5.6	6.9	2.1	0.7	5.1

[a] Depths recorded to the nearest fathom at the time of pot deployment were converted to meters and approximately corrected for the depth of the vessel's hull-mounted echo sounder below the water surface by adding 2.6 m.

Appendix D11.–Rose plots of current speed and direction from each location monitored during the 2015 St. Matthew Island blue king crab pot survey. The sum of radius lengths of all circular sectors in a single plot is proportional to the total number of observations at that location; for a given direction, the length of each segment of the sector radius is proportional to the joint frequency of the corresponding direction-speed category; plots are not drawn on the same scale.



APPENDIX E. RELEASE AND RECOVERY INFORMATION FOR TAGGED LEGAL MALE BLUE KING CRAB

Appendix E1.–Summary of release information from legal male blue king crab tagged and released during the 2013 or 2015 St. Matthew Island blue king crab pot surveys and corresponding recovery information from their capture in the 2015/16 St. Matthew Island blue king crab fishery.

	Release Information						Recovery Information		
Year Tagged	Station	Stat Area	N Lat	W Long	Date	CL (mm)	Stat Area	Date	CL (mm)
2015	10	736001	60.38	173.25	8/13/2015	129	735930	11/03/2015	129
	10	736001	60.38	173.25	8/13/2015	126	736001	11/05/2015	125
	13	736001	60.34	173.17	8/26/2015	131	736001	11/03/2015	131
	30	736001	60.21	173.42	8/11/2015	131	735930	11/10/2015	131
	31	736001	60.21	173.25	8/11/2015	133	735930	11/05/2015	134
	32	736001	60.21	173.08	8/14/2015	146	736001	11/18/2015	146
	47	736001	60.12	173.42	8/11/2015	134	736001	11/22/2015	133
	48	736001	60.13	173.25	8/11/2015	125	735930	10/31/2015	125
	50	726001	60.12	172.92	8/15/2015	133	735930	11/02/2015	133
	50	726001	60.13	172.92	8/15/2015	122	736001	11/22/2015	122
	51	726001	60.13	172.75	8/15/2015	123	735930	10/28/2015	127
	63	736001	60.04	173.75	8/10/2015	154	736001	11/03/2015	153
	70	726001	60.04	172.58	8/15/2015	128	735930	11/07/2015	128
	78	735930	59.96	173.25	8/07/2015	129	735930	11/01/2015	128
	79	735930	59.96	173.08	8/07/2015	147	735930	10/20/2015	146
	86	735930	59.88	173.92	8/09/2015	128	735930	10/26/2015	128
	91	735930	59.88	173.08	8/07/2015	118	735930	10/19/2015	130
2013	28	736001	60.21	173.75	9/11/2013	131	736001	11/18/2015	148
	62	736001	60.04	173.92	9/10/2013	128	736001	11/07/2015	140
	67	736001	60.04	173.08	9/15/2013	127	735930	10/22/2015	141
	100	735930	59.79	173.58	9/05/2013	141	735930	10/22/2015	141
	151	736001	60.42	173.33	9/13/2013	130	735930	11/07/2015	130
	189	736031	60.54	173.42	9/13/2013	124	736001	11/05/2015	124

Note: CL = carapace length

Appendix E2.–Number of legal male blue king crab tagged per station during the 2015 St. Matthew Island blue king crab pot survey, with the proportion of legal crab tagged at each station that was recovered during the 2015/16 St. Matthew Island blue king crab fishery. Areas of filled circles are proportional to the total number of legal male blue king crab tagged per station, with the largest circle representing 26 crab.