Fishery Management Report No. 14-35

Results of the 2013 Triennial St. Matthew Island Blue King Crab Pot Survey

by

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and

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September 2014

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

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

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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RESULTS OF THE 2013 TRIENNIAL ST. MATTHEW ISLAND BLUE KING CRAB POT SURVEY

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ABSTRACT

The Alaska Department of Fish and Game conducted a pot survey for blue king crab *Paralithodes platypus* in the waters surrounding St. Matthew Island, Alaska, between lat 59°30'N and lat 60°50'N, and long 172°00'W and long 174°00'W at depths of 20–109 m during 3 September through 1 October 2013. One-hundred-eighty-nine (189) 4-pot stations were fished. Total survey catch of blue king crab was 9,036 (2,542 legal males, 2,364 undersized males, 3,795 mature females, and 334 immature females). Other commercial crab species captured during the survey were 11,954 snow crab *Chionoecetes opilio*, 14 Tanner crab *C. bairdi*, 7 red king crab *Paralithodes camtschaticus*, 2 hair crab *Erimacrus isenbeckii*, and 15 Tanner x snow crab hybrids. Spatial trends in catch per unit effort (CPUE) during the 2013 survey of blue king crab and snow crab by sex-size classes are presented. Temporal trends in survey CPUE of blue king crab and snow crab by sex-size classes at the 96 survey stations that were fished in-common during the 1995–2013 triennial St. Matthew blue king crab pot surveys are presented. Concurrent with the 2013 survey, a special project survey was also conducted with 20 four-pot stations in an area north of St. Matthew Island between lat 60°30'N and lat 60°50'N, and long 172°25'W and long 173°10'W, during which an additional 378 male and 14 female blue king crab and 50 snow crab were captured. During performance of the 2013 survey and the concurrent special project survey, 1,209 legal male blue king crab captured were tagged and released.

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.

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. 2012). 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 again for the 2009/10 through 2012/13 seasons, but it was closed by ADF&G for the 2013/14 season (Fitch 2013).

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 (Foy and Armistead 2013, Otto et al. 1978). 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). A subsequent trawl survey report 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 later reports 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). To address those concerns, ADF&G instituted a program in 1995 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).

The ADF&G St. Matthew Island blue king crab pot survey has been performed on a triennial basis since 1995 within the area between lat 59°30'N and lat 60°50'N and 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, Watson 2005, Watson 2008, Watson and Burt 2002). 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 the design of the triennial survey since 2004 has included stations adjacent to the southern shore of St. Matthew Island at depths of 20–37 m to better sample from areas where mature ovigerous female blue king crab are concentrated (Watson 2005). As well as providing information from commercially and biologically 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, 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 the 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 1995–2010 triennial ADF&G St. Matthew blue king crab pot surveys (Gish et al. 2012) generally followed the trends in annual biomass and abundance estimated from the 1995–2010 NMFS EBS trawl survey data (Gaeuman and Zheng 2010). The pot survey CPUE declined between the 1998 and 2001 surveys, although not to the degree shown by estimates from the trawl survey data, and declined further in 2004. Likewise, the 2007 and 2010 pot survey CPUE showed the same increasing trend evident in the trawl survey data, although, again, not to the degree indicated by the trawl survey data.

This report provides the results of the 2013 St. Matthew Island blue king crab pot survey and compares them with results from the previous triennial surveys. During the 2013 survey, 189 stations were sampled, 10 more than in any previous survey; in addition, for the first time since 1998, the surveyed area included locations over the entire northern perimeter of St. Matthew Island. This report also describes three special projects that were conducted in conjunction with the 2013 survey: 1) a high-density pot survey north of St. Matthew Island to provide data on the distribution and relative density of male blue king crab within the boundaries of NMFS EBS trawl survey station R-24, a station that produced unusually large catches of male blue king crab during the 2010–2012 NMFS EBS trawl surveys (Chilton et al. 2011, 2012; Foy and Armistead 2013); 2) tagging and release of legal male blue king crab for recovery during subsequent commercial fisheries; and 3) collection of reference oceanographic data.

METHODS

SURVEY

The 2013 St. Matthew Island blue king crab pot survey was conducted during 3 September through 1 October from aboard the F/V *Sandra Five*, a chartered 34.6 m commercial crab pot fishing vessel. The area surveyed (Figure 1) was between lat 59°30'N and lat 60°50'N and long 172°00'W and long 174°00'W. Two geographic strata with different densities of survey stations were defined for the standard survey area: Stratum 2 in the nearshore area south and west of St. Matthew Island between lat 60°00'N and lat 60°30'N and long 172°22.5'W and long 173°27.5'W; and Stratum 1, which included all other stations in the standard survey grid. Station layout in both Strata 1 and 2 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 another grid in which stations were 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 and arrayed in a north-south orientation. Additionally, a third stratum (Stratum 3; Figures 1 and 2) was defined to sample shallow waters along the southern shore of St. Matthew Island not included in the standard survey area. Each station in Stratum 3 consisted of 4 pots 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).

The overall survey consisted of 189 stations (Figure 1, Appendix C1): 122 in Stratum 1, 57 in Stratum 2, and 10 in Stratum 3. An additional station was fished during the survey, but results from that station are not presented; see footnote 2, below. Including the margins of the station grid, we estimate the Stratum 1 stations to survey an area of approximately 3,050 nmi^2 (10,461 km^2) and the Stratum 2 stations to survey an area of approximately 906 nmi^2 (3,107 km^2), for an estimated total surveyed area of 3,956 nmi^2 (13,568 km^2) for the stations in the standard survey area. Although 756 pots were set during the survey (4 at each of the 189 stations fished), results from only 754 pot lifts are reported on due to the unclipping of the bait jar in one pot fished at each of stations 27 (Stratum 1) and 306 (Stratum 3).

All survey pots were identical rectangular king crab pots that were newly manufactured in the months prior to the survey and never fished before. 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). The pots used in the 2013 St. Matthew blue king crab survey were the same size as those used in the 1998–2010 triennial surveys, but differed from them by having slightly smaller mesh webbing (2.5 in or 6.4 cm stretched mesh, as opposed to 2.75 in or 7.0 cm stretched mesh), minor differences in the size and orientation of the tunnel eyes, and a retainer bar for the door in the new pots (Appendix A1).

Each pot was baited with two 2 qt (1.9 L) containers of chopped frozen Pacific herring *Clupea pallasii* and soaked for 25.9–36.0 h after setting (average soak time = 31.0 h). The vessel captain recorded the dates and times that each pot was set and lifted and the latitude and longitude of where it was set. For stations in Strata 1 and 2, the vessel captain recorded the depth in fathoms at the locations at which the first and last pot in each station was set using the vessel's echo sounder. After converting from fathoms to meters, the depths recorded from the echo sounder at stations in Strata 1 and 2 were adjusted to provide depth estimates for this report by adding 2.6 m to account for the depth below the water surface of the vessel's hull-mounted echo sounder, 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. In addition to the station depths estimated from the vessel's echo sounder, depth and temperature were also recorded at 169 of the stations fished in Strata 1 and 2 by deploying either a temperature/depth/conductivity data logger (RBR Global model XR-420-CTD[1]) or a temperature/depth data logger (RBR Global model TDR-2050) in the second or third pot set at the station. Data loggers were secured to the webbing on the upper inside surface of the pot at a position that did not interfere with crab entering the pot. Depths recorded by the

[1] Product names are included for completeness but do not constitute endorsement.

data loggers at survey stations 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. There was little variation between the depths estimated from the echo sounder of the first and fourth pot set in the stations fished in Strata 1 and 2, and the average of those two depth estimates within a station generally agreed well with the average depth recorded by the data logger in the second or third pot at the same station (Appendix B1)[2]. For those stations in Strata 1 and 2 for which depth recordings from data loggers were available, the average of the depth recorded by the logger while deployed at the station is used in this report to estimate the station depth. For stations for which depth recordings from data loggers were not available, the average of the depths estimated from the echo sounder at the first and fourth pot set at the station is used. For stations in Stratum 3, where pots were set at predetermined depths, depth readings were taken from the echo sounder at the location of each pot set in the station, and the depth read from the echo sounder was corrected to account for the additional distance from the water surface to the bottom of the hull prior to recording (Appendix B2). A data logger was also deployed in the second or third pot set at each station in Stratum 3 for recording depth (Appendix B2) and temperature. 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.

The contents of each sampled pot were identified and enumerated. All captured blue king crab, red king crab *P. camtschaticus*, 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, and all were sampled for size measurements, shell condition, legal status of males, and reproductive condition of females, except at 2 stations where large catches of snow crab were subsampled.

Carapace length (CL) of blue king crab, red 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 Jadamec et al. (1999) for snow and Tanner crab.

Legal status of male blue king crab, Tanner crab, and snow crab was recorded according to the 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 the identification criteria in (5 AAC 35.521) and the size limits for Tanner and snow crab for the surveyed area. Male hair crab ≥3.25-in (83 mm)

[2] The one notable exception occurred at survey station 146 in Stratum 2, where the depth estimated from the echo sounder for the first and fourth pot set were both 45 m and the average of the depth recorded by the data logger in the third pot set was 21 m (Appendix B1). That discrepancy was so large that it raised uncertainties on characterizing the bottom terrain and depth of station 146, and the data from station 146 are not presented in the Results.

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. 2012). No minimum legal size has been established for male red king crab occurring in the area surveyed.

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 (2013) and with clutch fullness scored according to the photographic references in Figure 24 of Donaldson and Byersdorfer (2005) for king crab and in Figure 28 of Jadamec et al. (1999) for snow and Tanner crab. 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 Figure 15 of Jadamec et al. (1999).

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

Further details on the methods for conducting the survey are provided in Vanek (2013).

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). Undersized 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); Gaeuman 2013) and to identify undersized males presumed to be 1 year from recruiting to legal size (Blau 1996). 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,

$$CV = {}^{S}/_{CPUE},$$

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 1995–2010 triennial St. Matthew Island surveys by limiting consideration to only those from the 96 standard survey stations that were fished in common to all surveys (Figure 3).

SPECIAL PROJECTS

Three special projects were conducted concurrent with the 2013 St. Matthew Island blue king crab pot survey.

Stratum 4 (NMFS Station R-24) Survey

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 4). 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 by 2.5 nmi (4.63 km) in both directions. Station 409 in Stratum 4 is located at the center of the NMFS EBS survey station R-24 (lat 60°40'N, long 172°47°W), the mid-point target of the tow made by the NMFS trawl survey within station R-24 (Foy and Armistead 2013). 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 and arrayed in a north-south orientation. The Stratum 4 stations were fished during 20–25 September (Appendix C2), concurrent with performance of the 2013 survey. Fishing gear and methods employed for fishing, collecting catch data, and recording station location, soak time, depth and temperature (Appendices B3 and C2) during the special project in Stratum 4 were identical to the methods employed during the standard survey in Strata 1 and 2. Likewise, the methods for summarizing catch data and the convention for reporting CPUE for the Stratum 4 stations in this report are identical to those described for the survey. Although 80 pots were set during the survey of Stratum 4 (4 at each of the 20 stations fished), results from only 79 pot lifts are reported on due to the loss of the bait jar in one pot fished at station 408. Note that 10 standard stations that were fished during the 2013 survey in Stratum 1 were also located within the boundaries of NMFS EBS trawl survey station R-24

(Figure 4; Appendix C1) and were fished concurrently with the 20 stations fished for the special project in Stratum 4.

Tag and Release of Legal Male Blue King Crab

Captured legal male blue king crab were tagged and released during the 2013 survey and during the special project survey of Stratum 4. On the first day that survey pots were lifted and sampled (4 September), the tagging goal for each survey station followed the plans established prior to the survey (Vanek 2013) to tag and release the first 15 handled crab that met the criteria for tagging (see below). The tagging goal was increased to 20 crab per station during 5–12 September and was increased again to 25 crab per station beginning 13 September. 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. The legal male blue king crab captured in the pot were sorted first, and those 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 the tagging criteria. 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 the 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 $\leq$ 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 was going overboard. The Floy® tags used to tag the legal male blue king crab during the 2013 survey had fluorescent pink tubing and white oval discs, were marked as tag series "D", and were individually numbered within the range, 16851 to 18072.

Reference Oceanographic Data Collection

In addition to the data loggers deployed in pots fished during the 2013 survey and the special project Stratum 4 survey, three additional data loggers (RBR Global multi-channel model RBRconcerto) were used for collection of reference oceanographic data concurrent with the survey. Each data logger was placed in a single, unbaited pot with an open escape hole in the webbing to record pH, dissolved oxygen, temperature, and depth every 10 min during deployment. Two of those pots were set for approximately 3 weeks, one at lat 59°45.36'N long 173°00.25'W in Stratum 1 during 5–29 September and the other at lat 60°05.27'N long 172°34.76'W in Stratum 2 during 7–28 September, whereas the third pot was set for 2–3 d during the survey period at five different locations south and north of St. Matthew Island (Appendix E1).

RESULTS

SURVEY RESULTS

Depths fished during the survey ranged from 20 to 109 m (Figure 5, Appendix C1). By survey stratum, station depths ranged from 38 to 109 m in Stratum 1 and from 21 to 75 m in Stratum 2,

whereas each station in Stratum 3 was fished within the 20–37 m depth zone. Bottom temperatures recorded at stations, averaged over the pot soak time, ranged from -1.1 to 5.9 °C (Figure 6, Appendix C1). Bottom temperatures were warmest in Stratum 3, where station average temperatures ranged from 5.0 to 5.7 °C for the 10 stations. Outside of Stratum 3, the warmest temperatures (≥2.1 °C) were encountered at the stations in Strata 1 and 2 that were located in the shallower (≤60 m) waters closest to St. Matthew Island. The relationship between the station average bottom temperature and station depth during the 2013 survey is shown in Figure 7.

The total survey catch of commercially exploited crab species was 21,028 crab, with snow crab accounting for 57% of those; blue king crab for 43%; and red king crab, Tanner crab, hair crab, and Tanner x snow hybrid crab together for only 0.2%. Including the commercially exploited crab species, 75 taxa were captured and identified during the survey, with the catch of circumboreal toad crab *Hyas coartatus* ranking as the third highest after snow crab and blue king crab (Appendix D1).

Blue King Crab

A total of 9,036 blue king crab were captured during the survey, of which 4,906 were males (Table 1) and 4,130 were females (Table 2). Blue king crab were captured at 169 of the 189 stations fished (Figure 8). The 20 stations at which no blue king crab were captured were all at the margins, mainly at the northern or southeastern margins, of the area surveyed by Stratum 1.

Male blue king crab were captured at 166 of the 189 stations fished, and legal males were captured at 145 stations (Figure 9, Appendix C1). The overall survey CPUE of total males, legal males, and sublegal males was 6.5, 3.4, and 3.1 crab per pot lift, respectively. Given the differences in station density and layout among the survey strata, however, the CPUE for the individual strata (Table 1) is more meaningful than for the overall survey. The highest within-stratum CPUE of legal and sublegal male blue king crab occurred in Stratum 2, where the CPUE at individual stations was as high as 80 crab per pot lift. The CPUE of males at stations fished in Stratum 3 was uniformly low (<3 crab per pot lift for each Stratum 3 station), whereas relative variability among stations in CPUE of males in Stratum 1 was greater than in either Strata 2 or 3. Although station CPUE of males was ≤3 crab per pot lift at 82% of the stations in Stratum 1, Stratum 1 stations in the southwest corner of the survey area or close to St. Matthew Island produced CPUE of 4–50 male crab per pot lift. Highest CPUE of males (50 crab per pot lift) at any single station in Stratum 1 occurred at station 36, which is located adjacent to Stratum 2 and south of the eastern end of St. Matthew Island. Notably, the second- and third-highest station CPUE of males in Stratum 1 occurred at stations 170 (26 crab per pot lift) and 199 (22 crab per pot lift), both of which were among the relatively few Stratum 1 stations that were fished directly north of St. Matthew Island.

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 in depth was, at 19.7 crab per pot lift, more than seven times higher than the CPUE at stations at the greater depths (61–109 m) and more than 20 times higher than the CPUE at the shallowest (20–40 m) stations (Table 3). High CPUE of male blue king crab was also associated with intermediate bottom temperatures (2.1–4.0 °C), whereas those stations at which the warmest (4.1–5.9 °C) and coldest (-1.1–0.0 °C) bottom temperatures were recorded tended to produce the lowest CPUE of male blue king crab (Table 4).

Carapace lengths of the 4,905 male blue king crab that were measured during the survey ranged from 43 mm to 159 mm CL with a modal size range of 125–130 mm CL. Fifty-two percent (52%) of the captured males were legal-size, and 70% of the legal males were classified as postrecruits (Table 1). Seventy-seven percent (77%) of all measured males and 52% of measured sublegal males were ≥105 mm CL. Shell conditions of the majority (61%) of males were scored as new shell, with 35% scored as old shell and nearly all of the remainder scored as very old shell. Only 2 males were scored as having new-pliable shells, and only 2 males were scored as being in very very old shell condition. Among the legal males, 53% were scored as being in old shell or older shell condition, whereas 25% of the sublegal males were scored as old shell or older. The size frequency distribution of males varied across strata, with the males captured in Stratum 2 tending to be larger than those captured in Stratum 1. Although the size range of males in Strata 1 and 2 were similar, the modal size range of males in Stratum 2 was 126–130 mm CL, whereas the modal size range for males in Stratum 1 was 116–120 mm CL (Figure 10). Fifty-seven percent (57%) of the males in Stratum 2 were legal-size, as compared to 38% in Stratum 1, and 74% of the legal males were classified as postrecruits in Stratum 2, as compared to 51% in Stratum 1 (Table 1). Twenty percent (20%) of the males captured in Stratum 2 were <105 mm CL, whereas 32% in Stratum 1 were <105 mm CL. Too few males were captured in Stratum 3 (N = 30) to characterize the male size distribution for comparison with Strata 1 and 2.

Female blue king crab were captured at 69 survey stations: 16 of the 120 stations in Stratum 1, 43 of the 59 stations in Stratum 2, and all 10 of the 10 stations in Stratum 3 (Figure 11, Appendix C1). The overall survey CPUE of total females, mature females, and immature females was 5.5, 5.0, and 0.6 crab per pot lift, respectively. Again, however, given the differences in station density and layout among the survey strata, CPUE computed for the individual strata (Table 2) are more meaningful than for the overall survey. Highest catches of female blue king crab occurred at Stratum 3 stations, and few females were captured in Stratum 1. As well as showing the highest within-stratum CPUE of females (52.2 crab per pot lift), Stratum 3 also showed the highest relative variability in station CPUE, with station 309 alone accounting for 64% of all females captured in Stratum 3 (Appendix C1). Although Stratum 2 CPUE of females (8.4 crab per pot lift) was far lower than Stratum 3 CPUE, station CPUE of females at three stations in Stratum 2 exceeded the Stratum 3 CPUE: station 22, which was located close to station 309, at 81 crab per pot lift; station 41, in the vicinity of Pinnacle Island, at 70 crab per pot lift; and station 51, also in the vicinity of Pinnacle Island, at 58 crab per pot lift. All 15 of the stations in Stratum 2 at which station CPUE of females exceeded the overall Stratum 2 CPUE were located south of and close to St. Matthew Island or in the vicinity of Pinnacle Island (Figure 11).

Catch of female blue king crab was largely restricted to stations at depths ≤60 m, and CPUE of females was highest at stations 20–40 m in depth (Table 3). Stations fished at depths of 20–40 m accounted for 97% of the ovigerous females captured during the survey, whereas 98% of the barren mature females with matted setae were captured at stations 41–60 m in depth. Catch of females was positively associated with bottom temperature, with a CPUE of only 0.2 crab per pot lift at the stations with bottom temperatures of -1.1–0.0 °C and a CPUE of 35.4 crab per pot lift at the stations with bottom temperatures of 4.1–5.9 °C (Table 4). Ovigerous females were associated with the warmest waters fished; 99% were captured at the stations with bottom temperatures of 4.1–5.9 °C. Barren mature females with matted setae were associated with colder temperatures; 53% were captured at stations with bottom temperatures of 2.1–4.0 °C, and 41% were captured at stations with bottom temperatures of 0.1–2.0 °C.

Mature females made up 92% of the females captured during the survey (Table 2). Only in Stratum 1, where the catch of females was low (Table 2) and spatially intermittent (Figure 11), did the catch of immature females exceed the catch of mature females (Figure 12). Nearly all the females captured in Stratum 3 were ovigerous (out of the 2,090 females captured in Stratum 3, only 4 were mature and barren with matted setae and only 10 were immature), and 83% of all ovigerous females captured during the survey were captured in Stratum 3 (Table 2, Figure 12). Mature females accounted for 86% of the females captured in Stratum 2, with most (75%) of those barren with matted setae. Of the 431 ovigerous females that were captured in Stratum 2, 92% were captured at the 4 stations (stations 21, 22, 147, and 148) closest to Stratum 3 stations, with one station alone (station 22) accounting for 75% of the ovigerous females captured in Stratum 2. The majority (85%) of the ovigerous females were scored as carrying uneyed eggs, with the 15% recorded as carrying eyed eggs all captured in Stratum 3. Clutch sizes of most ovigerous females were scored as either ½ full (26%), ¾ full (54%), or full (16%). Clutch sizes of the remaining ovigerous females were scored as either ¼ full (2.5%) or trace to $^{1}/_{8}$ full (1.9%).

Snow Crab

A total of 11,954 snow crab (7,212 males, 4,738 females, and 4 of unknown sex) were captured during the 2013 survey, making snow crab the most commonly captured animal during the survey. Snow crab were captured at 133 stations during the survey, largely at the margins of the area surveyed in Stratum 1 (Figure 13, Appendix C1). Trends in the catch of snow crab by depth (Table 3) and bottom temperature (Table 4) were essentially opposite of those evident for blue king crab. No snow crab were captured at the shallowest (20–40 m) stations fished, CPUE of snow crab increased with increasing depth zone of stations, and snow crab were nearly absent at the stations with bottom temperatures >2.0 °C. Also in contrast to the catch of blue king crab, within-stratum CPUE of snow crab males (Table 5) and females (Table 6) was highest in Stratum 1, with few snow crab (2% of the total snow crab catch) captured in Stratum 2 and no snow crab captured in Stratum 3.

Regardless of survey stratum, most snow crab males (93% of the males in Stratum 1 and 98% in Stratum 2) captured during the survey were undersized, and only 12% of the legal-size males that were captured and measured for CW were ≥102 mm CW (Table 5). Seventy-two percent (72%) of the female snow crab captured during the survey were reproductively mature (Table 6), and 94% of the mature 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 measured male snow crab by shell condition and of measured female snow crab by reproductive maturity status in Strata 1 and 2 are provided in Figure 14.

Of the snow crab that were captured during the survey and that exhibited external signs consistent with bitter crab syndrome (e.g., milky hemolymph and color changes of the shell and joints), 139 were collected, frozen, and submitted to Dr. P. Jensen and C. Lang at the NMFS Alaska Fisheries Science Center (AFSC) Fisheries Resources Pathobiology laboratory, where they were tested for bitter crab syndrome using polymerase chain reaction (PCR) techniques. Of these 139 crab, 119 tested positive for the presence of the parasitic dinoflagellate *Hematodinium* that causes bitter crab syndrome (C. Lang, Fisheries Resource Pathology Team, NMFS-AFSC, Seattle, WA; personal communication). Of the 119 crab testing positive for *Hematodinium* presence, 45 were undersize males (50–78 mm CW), 20 were legal males (79–107 mm CW), and 54 were females (48–78 mm CW). Crab with bitter crab syndrome were captured at 43 stations (stations 2, 6, 15, 23, 27–30, 44, 45, 55, 56, 62–64, 72, 73, 88, 96, 97, 108, 109, 117–119, 129,

130, 134–138, 141, 142, 157, 168, 173, 177–179, 183, 184, and 188), representing one third of the stations capturing snow crab in Strata 1 and 2.

Other Commercial Crab Species

In addition to the blue king crab and snow crab captured during the 2013 survey, 23 other crab representing three species that are or have been commercially fished in the Bering Sea were captured: 14 Tanner crab, 7 red king crab, and 2 hair crab. The survey catch of Tanner crab consisted of 6 sublegal males (61–102 mm CW), 2 immature females (63–71 mm CW), 5 barren mature females with clean setae (57–80 mm CW), and 1 barren mature female with matted setae (57 mm CW). Tanner crab were captured only at Stratum 1 stations south and west of St. Matthew Island (Figure 15). All red king crab captured during the survey were males and were of sizes (140–170 mm CL) that exceeded the CL proxy sizes used to identify legal-size males with respect to the commercial red king crab fisheries in the Bristol Bay Area (135 mm CL; Zheng and Siddeek 2013) and the Pribilof District (139 mm CW; Foy 2013). Five of the red king crab were captured at two stations in the shallow (≤40 m) waters just south of the eastern end of St. Matthew Island (Figure 15). The two hair crab, a 75 mm CL new-shell legal male and a 59 mm CL female with no spermathecal plugs and in new-pliable shell condition, were both captured in the same pot at a station in the shallow (≤40 m) waters just north of St. Matthew Island (Figure 15), and they began to mate after they were placed in a seawater-filled tote on the vessel.

Additionally, 15 crab that were identified as Tanner x snow hybrids were captured: 4 males and 1 female that would be considered Tanner crab, and 7 males and 3 females that would be considered snow crab under the identification criteria of 5 AAC 35.521. Only one of the captured hybrids (a 114 mm CW male) would be considered legally retainable in the Bering Sea Tanner crab commercial fishery west of long 166°00'W, and three of the captured hybrids (82–103 mm CW males) would be considered legally retainable in the Bering Sea snow crab commercial fishery. The four female hybrids that were captured ranged in size from 68 mm to 82 mm CW, and only one, a 77 mm CW female that would be considered a Tanner crab under the identification criteria of 5 AAC 35.521, carried a clutch of eggs that was scored as trace to $^{1}/_{8}$ full.

Comparison with the 1995–2010 Surveys for 96 Stations Fished In-Common

Each of the 96 survey stations that were fished in-common during the 1995–2010 St. Matthew Island blue king crab surveys (65 in Stratum 1 and 31 in Stratum 2; Figure 3) were also fished during the 2013 survey. 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.

Note that comparability of the 2013 survey results from the 96 in-common stations with the 1995–2010 survey results may have been affected by the timing of the 2013 survey relative to the previous surveys and by the use of new survey gear in 2013. During the 1995–2010 surveys, the 96 in-common stations were sampled from late July or early August to mid-August, whereas the 2013 survey sampled those stations approximately one month later in the year, during early- to mid-September (Table 7). It is possible that this delay affected comparability of the 2013

survey with previous surveys due to seasonal changes in crab distribution and availability of crab to the survey gear. Additionally, three sets of pots have been used during the survey's history, with the changes made between the 1995 and 1998 surveys and between the 2010 and 2013 surveys (Appendix A1). Although the pots used in the 2013 survey were the same size as those used in the 1998–2010 surveys and were designed to be as similar as possible to the 1998–2010 survey pots with respect to their fishing characteristics, it is nonetheless possible that the size selectivity and catchability of crab by the new pots used in 2013 was different from the pots used in the previous surveys[3].

Catch of male and female blue king crab and CPUE of male, legal male, sublegal male, and female blue king crab at the 96 in-common stations during the 1995–2013 surveys are presented in Table 7. Trends in the CPUE of legal males, sublegal males, and females during the 1995–2013 surveys at the 96 in-common stations are presented graphically in Figure 16. All seven of the triennial surveys performed during 1995–2013 produced a similar spatial trend in catch of legal males at the in-common stations in that, within survey years, the CPUE at the nearshore Stratum 2 stations was higher than at the offshore Stratum 1 stations. The CPUE of legal males for all 96 of the in-common stations during the 2013 survey was lower than during the previous two triennial surveys, roughly one-half of the CPUE during the 1995 and 1998 surveys, and higher than only the CPUE during the 2004 survey. The CPUE of legal males at the 65 in-common stations within Stratum 1 during the 2013 survey was markedly lower (34% of or less) than the CPUE during the 1995, 1998, 2001, 2007, and 2010 surveys at those stations, and catch of legal males in 2013 was more concentrated within Stratum 2 than during previous surveys. Seventy-six percent (76%) of the legal males captured at the 96 in-common stations in 2013 were captured at the 31 stations in Stratum 2, whereas in previous surveys that percentage has ranged from 38% in 1998 to 60% in 2004. CPUE of sublegal males at the 96 in-common stations also declined from 2010 to 2013, with the 2013 CPUE of sublegal males exceeding only that in 2004. Catch of female blue king crab, which has been largely restricted to the 31 in-common stations in Stratum 2 in 1995–2013, also showed a decline of roughly 20% from 2010 to 2013. Although CPUE of females in the 31 Stratum 2 stations during the 2013 survey was at least twice as high as in the 2001–2007 surveys, it was less than one-half of the 1995 and 1998 values.

The size distribution of male blue king crab captured at the 96 in-common stations in 2013 showed a slight shift in modal size range to 126–130 mm CL from the mode at 121–125 mm CL in 2010 size distribution (Figure 17). Legal males accounted for 50% of the males captured in 2013, a slight increase from 46% in 2010 but a lower percentage than during the 1998–2004 surveys (60–63%). The percentage of males ≥105 mm CL in 2013 was, at 74%, slightly lower than in previous surveys; that percentage in previous surveys ranged from 77% in 1995 to 85% in 1998 and 2004. Mature females accounted for 78% of the female blue king crab captured at the 96 in-common stations in 2013, the same percentage as in 2010, comparable to the percentages in 1995–2001 (74–82%) but higher than the percentages in 2004 and 2007 (46-48%). Barren females with matted setae accounted for 93% of the mature females captured at the 96 in-common stations in 2013. Except for the 2004 survey, 97–99% of the mature females captured at the 96 in-common stations during the previous triennial surveys were barren with

[3] An attempt was made to estimate size selectivity and catchability of blue king crab by the new pots used in the 2013 survey relative to the old pots used in the 1998–2010 surveys by conducting paired fishing trials of the old and new pots within the survey area during two days of the last week of the 2013 survey period. However, results from those paired fishing trials are not presented due to the effect of pot type (new versus old) being confounded with the effect of pot location within the spatial array of pots fished during the trials.

matted setae; during the 2004 survey, 80% of the mature females were barren with matted setae. Of the females captured in 2013, 72% 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). That percentage is close to the percentage in 2010 (71%), lower than the percentages in 1995–2001 (81–84%), and higher than the percentages in either 2004 (46%) or 2007 (59%).

The catch of snow crab at the 96 in-common stations has varied widely among the seven surveys conducted during 1995–2013 (Table 8). Total catch of snow crab at the 96 in-common stations during the 2013 survey was comparable to that in 2010 and 4 times greater than in 2004 but was only 15–38% of the catch in 1995–2001 and 2007. As in previous surveys, only a small portion (4%) of the snow crab captured at the 96 stations in 2013 were captured at the 31 stations within survey Stratum 2. A preponderance of undersize males in the catch of males and a larger contribution of females to the total catch were two notable features in the 2013 catch composition of snow crab at the 96 in-common stations. The catch of undersize males in 2013 was 10 times greater than the catch of legal males, whereas the catch of undersize males was less than the catch of legal males during the 1995–2010 surveys. Females in 2013 accounted for a larger portion (31%) of the snow crab captured than in any previous survey; during the 1995–2010 surveys, the percentage of females in the snow crab catch ranged from <1% in 1995 to 16% in 2001.

SPECIAL PROJECT RESULTS

Stratum 4 (NMFS Station R-24) Survey

Depths fished by the 20 stations in Stratum 4 ranged from 36 to 67 m, and bottom temperatures recorded at stations, averaged over the pot soak time, ranged from -0.5 to 4.4 °C (Figure 19, Appendix C2). Blue king crab and snow crab were the only commercially exploited crab species captured at the Stratum 4 stations. Including the commercially exploited crab species, 30 taxa were captured and identified during the Stratum 4 survey, with the catch of blue king crab ranking as highest, followed in descending order by circumboreal toad crab, unidentified brittle stars (Class Ophiuroidea), Pacific cod *Gadus macrocephalus*, fuzzy hermit crab *Pagurus trigonocheirus*, and snow crab (Appendix D2).

During the Stratum 4 survey, 378 male and 14 female blue king crab were captured (Table 9). Blue king crab were captured at 18 of the 20 stations fished, with males captured at each of those 18 stations and females captured at only 5 (Figure 20a). Captured male blue king crab ranged in size from 57 mm to 148 mm CL, with a modal size range of 111–115 mm CL (Figure 21). The majority (76%) of males were undersized, and 55% of the undersized males were ≥105 mm CL. The 2 mature female blue king crab that were captured measured 89 mm and 92 mm in CL, and both were barren with matted setae. The 12 immature female blue king crab ranged in size from 62 mm to 83 mm CL.

The CPUE of male blue king crab in Stratum 4 (4.8 crab per pot lift; Table 9) was nearly twice the Stratum 1 CPUE of males (2.5 crab per pot lift; Table 1), but less than one-third of the Stratum 2 CPUE of males (15.5 crab per pot lift; Table 1). The Stratum 4 CPUE of legal male blue king crab (1.2 crab per pot lift) was close to the Stratum 1 CPUE (1.0 crab per pot lift) but far below the Stratum 2 CPUE (8.8 crab per pot lift). Eight stations (stations 401, 405, 406, 408, 409, 411, 412, and 415), all but one (station 401) of which were clustered about the center of NMFS trawl survey station R-24 (Figure 20a), accounted for 344 (91%) of the males captured during the Stratum 4 survey (Appendix C2). The station CPUE of males at those 8 stations

ranged from 6 to 16 crab per pot lift, and the CPUE of males for the 8 stations pooled was 11.0 crab per pot lift. Those 8 stations also accounted for 84 (91%) of the 92 legal males captured during the Stratum 4 survey, and the station CPUE of legal males at those 8 stations ranged from 2 to 6 crab per pot lift, with CPUE of 2.7 legal male crab per pot lift for the 8 stations pooled. Depths fished by those 8 stations (36–61 m) nearly spanned the depths of all stations in Stratum 4, and all were among the 13 Stratum 4 stations with average recorded bottom temperatures of 2.1–4.0 °C. In contrast to those 8 stations, at the 10 stations located on the northernmost row and two easternmost columns of the Stratum 4 grid, the station CPUE of males ranged from 0 to 1 crab per pot lift (Figure 20a); the CPUE of males for the 10 stations pooled was 0.4 crab per pot lift.

Ten Stratum 1 stations sampled during the 2013 St. Matthew Island blue king crab survey were also located inside of the boundaries of NMFS EBS trawl survey station R-24 (Figure 4) and were fished during 21–25 September, concurrent with the 20–25 September special project survey of Stratum 4. Although the density of the 10 Stratum 1 stations within NMFS EBS trawl survey station R-24 was lower than the density of the Stratum 4 stations, the results for blue king crab from those 10 stations (Table 10) were similar to the results from the Stratum 4 survey. Blue king crab were captured at 8 of the 10 stations, with males captured at 8 stations and females captured at 3 (Figure 20b). In total, 200 male and 13 female blue king crab were captured. The portion of males that were undersized (78%) and the portion of undersized males that were ≥105 mm CL (55%) were nearly identical to those in the Stratum 4 survey. Likewise, as during the Stratum 4 survey, most (11) of the females captured were immature, and the 2 mature females captured were barren with matted setae. The CPUE of males at the 10 stations was 5.0 crab per pot lift and the CPUE of legal males was 1.1 crab per pot lift, essentially the same as for the Stratum 4 survey. Highest catches of males occurred at 3 stations (stations 170, 171, and 181) clustered near the center of NMFS EBS trawl survey station R-24 (Figure 20b), and the catch of males (181 crab) and of legal males (36 crab) at those 3 stations accounted for 91% of the total male catch and 80% of the total legal male catch at the 10 stations (Appendix C1). The station CPUE of males at those 3 stations ranged from 8 to 26 crab per pot lift, and the CPUE of males for the 3 stations pooled was 15.1 crab per pot lift. For legal males at those 3 stations, the station CPUE ranged from 1 to 6 crab per pot lift and was 3.0 crab per pot lift for the 3 stations pooled. At the 3 northernmost and 3 easternmost of the 10 stations, the station CPUE of males ranged from 0 to 2 crab per pot lift (CPUE = 0.5 crab per pot lift for the 6 stations pooled), and the station CPUE of legal males ranged from 0 to 1 crab per pot lift (CPUE = 0.2 crab per pot lift for the 6 stations pooled).

Only 50 snow crab were captured during the Stratum 4 survey: 1 legal male, 31 sublegal males, and 18 females (Appendix C2). Two snow crab, both captured at station 417, that exhibited external signs consistent with bitter crab syndrome were collected, frozen, and submitted to Dr. P. Jensen and C. Lang at the NMFS AFSC Fisheries Resources Pathobiology laboratory, where they were tested for bitter crab syndrome using PCR techniques. One of those, a 53 mm CW female, tested positive for the presence of *Hematodinium* (C. Lang, Fisheries Resource Pathology Team, NMFS-AFSC, Seattle, WA; personal communication).

Tagging and Release of Legal Male Blue King Crab

Of the 2,634 legal male blue king crab that were captured during the 2013 St. Matthew Island blue king crab pot survey and Stratum 4 survey special project, 1,209 were tagged and released, representing 46% of all legal males that were captured (Table 11, Appendices C1–C2). Legal

males were tagged and released from 97% of the 157 stations in Strata 1–4 where at least 1 legal male was captured. By stratum, legal males were tagged and released at 98% of the stations in Stratum 1 where at least 1 legal male was captured, 100% in Stratum 2, 80% in Stratum 3, and 92% in Stratum 4. The number of legal males tagged and released per station at those stations ranged from 1 to 25, and the tagging rate (number of legal males tagged per number of legal males captured, expressed as a percentage) ranged from 10% to 100%. The within-stratum tagging rate was highest (87%) in Stratum 4, although those animals represented only 7% of all tagged and released legal males. Although 62% of all the tagged and released legal males were tagged and released in Stratum 2, the within-stratum tagging rate was lowest (36%) in Stratum 2. Legal males were tagged and released throughout the range of depths at which legal males were captured during the survey (Appendix C1) and the special project survey of Stratum 4 (Appendix C2), with 2% of the tag releases occurring at stations 20–40 m deep, 60% at stations 41–60 m deep, 18% at stations 61–80 m deep, and 20% at stations 81–109 m deep.

ADF&G announced on 2 October 2013 that the St. Matthew Island blue king crab commercial fishery would not open for the 2013/14 season (Fitch 2013). Hence there were no recoveries of the tagged blue king crab during the 2013/14 the St. Matthew Island blue king crab commercial fishery season. No tagged blue king crab were recovered during other Bering Sea fisheries that were prosecuted in the 2013/14 season.

Reference Oceanographic Data Collection

Locations and dates of deployment of the 3 data loggers deployed at 7 locations during the 2013 survey and the special project Stratum 4 survey are shown in Appendix E1. Profiles of depth and temperature data recorded by the three data loggers while deployed at the 7 locations are presented in Appendices E2–E8. Dissolved oxygen and pH recordings are not presented in this report.

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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 2013 St. Matthew Island blue king crab pot survey.

							Legal					Sublegal				
Stratum	Stations	Pots	Sample dates	Total males	CPUE	(CV)	Recruit	Post-Recruit	Subtotal	CPUE	(CV)	<105 mm CL	≥105 mm CL	Subtotal	CPUE	(CV)
1	120	479	9/3 - 10/1	1,212	2.5	(2.39)	226	232	458	1.0	(1.67)	386	367	754[a]	1.6	(3.12)
2	59	236	9/7 - 9/19	3,664	15.5	(1.24)	530	1,544	2,074	8.8	(1.46)	734	856	1,590	6.7	(1.20)
3	10	39	9/17 - 9/28	30	0.8	(0.98)	5	5	10	0.3	(1.15)	11	9	20	0.5	(1.06)
Total	189	754	9/3 - 10/1	4,906	–	–	761	1,781	2,542	–	–	1,131	1,232	2,364[a]	–	–

[a] Includes 1 undersize male without recorded data on carapace length.

Table 2.–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 2013 St. Matthew Island blue king crab pot survey.

							Mature					Immature		
Stratum	Stations	Pots	Sample dates	Total females	CPUE	(CV)	Ovigerous	Matted Setae	Subtotal	CPUE	(CV)	Subtotal	CPUE	(CV)
1	120	479	9/3 - 10/1	51	0.1	(5.06)	0	14	14	<0.1	(4.74)	37	0.1	(5.62)
2	59	236	9/7 - 9/19	1,989	8.4	(2.06)	431	1,271	1,702	7.2	(2.21)	287	1.8	(2.21)
3	10	39	9/17 - 9/28	2,090[a]	52.5	(1.92)	2,075	4	2,079	52.2	(1.93)	10	0.3	(1.41)
Total	189	754	9/3 - 10/1	4,130[a]	–	–	2,506	1,289	3,795	–	–	334	–	–

[a] Includes 1 female without recorded data on reproductive condition.

Table 3.–Catch per unit effort (CPUE = number of crab per pot lift) of blue king crab and snow crab, with coefficient of variation of station CPUE in parentheses, by depth zone during the 2013 St. Matthew Island blue king crab pot survey.

		Blue king crab			
Depth (m)	Stations	Total	Males	Females	Snow crab
20–40	16	39.4 (2.10)	0.9 (0.74)	38.5 (2.14)	0.0 –
41–60	45	28.7 (1.23)	19.7 (1.08)	9.0 (1.79)	2.4 (3.49)
61–80	74	2.6 (1.99)	2.4 (1.99)	0.2 (2.40)	11.7 (1.70)
81–109	54	2.7 (1.41)	2.7 (1.42)	0.0 (7.35)	37.1 (1.45)

Table 4.–Catch per unit effort (CPUE = number of crab per pot lift) of blue king crab and snow crab, with coefficient of variation of station CPUE in parentheses, by bottom temperature zone during the 2013 St. Matthew Island blue king crab pot survey.

		Blue king crab			
Temperature (°C)	Stations	Total	Males	Females	Snow crab
-1.1–0.0	74	2.7 (1.71)	2.6 (1.72)	0.2 (2.01)	18.9 (1.74)
0.1–2.0	69	9.5 (2.45)	7.1 (2.07)	2.4 (3.98)	21.8 (2.02)
2.1–4.0	17	37.7 (1.00)	25.2 (0.87)	12.6 (1.49)	0.4 (3.61)
4.1–5.9	18	36.9 (2.12)	1.4 (1.18)	35.4 (2.20)	0.0 –

Table 5.–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 2013 St. Matthew Island blue king crab pot survey.

							Legal							
Stratum	Stations	Pots	Sample dates	Total males	CPUE	(CV)	≥102 mm CW	<102 mm CW	Subtotal	CPUE	(CV)	Sublegal	CPUE	(CV)
1[a]	120	479	9/3 - 10/1	7,042[b]	14.8	(1.45)	55	415	475[c]	1.0	(2.08)	6,543	13.7	(1.50)
2	59	236	9/7 - 9/19	170	0.7	(2.64)	0	3	3	0.0	4.36	167	0.7	(2.66)
3	10	39	9/17 - 9/28	0	0.0	–	0	0	0	0.0	–	0	0.0	–
Total[a]	189	754	9/3 - 10/1	7,212[b]	–	–	55	418	478[c]	–	–	6,710	–	–

[a] Totals do not include 4 snow crab without sex recorded.

[b] Includes 24 males without legal status recorded.

[c] Includes 5 legal males without carapace width recorded.

Table 6.–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 2013 St. Matthew Island blue king crab pot survey.

Stratum	Stations	Pots	Sample dates	Total females	CPUE	(CV)	Mature	CPUE	(CV)	Immature	CPUE	(CV)
1[a]	120	479	9/3 - 10/1	4,685	9.8	(2.29)	3,397	7.1	(2.60)	1,288	2.7	(1.89)
2	59	236	9/7 - 9/19	53	0.2	(3.42)	1	0.0	(7.68)	52	0.2	(3.43)
3	10	39	9/17 - 9/28	0	0.0	–	0	0.0	–	0	0.0	–
Total[a]	189	754	9/3 - 10/1	4,738	–	–	3,398	–	–	1,340	–	–

[a] Totals do not include 4 snow crab without sex recorded.

Table 7.–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 seven triennial St. Matthew Island pot surveys, 1995–2013, 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	8/3 - 8/19	2,158	8.3	(1.28)	4.3	(1.30)	4.0	(1.41)	27	0.1	(4.19)
	1998	8/2 - 8/16	3,167	12.2	(0.58)	7.6	(0.54)	4.5	(0.80)	128	0.5	(2.35)
	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 - 8/9	2,083	8.0	(0.83)	3.5	(0.94)	4.5	(0.83)	26	0.1	(2.37)
	2013	9/3 - 9/20	770	3.0	(2.33)	1.2	(1.48)	1.8	(3.20)	27	0.1	(6.00)
	Average:	8/2 - 8/20	1,727	6.6	(1.20)	3.5	(1.06)	3.1	(1.53)	41	0.2	(3.38)
2	1995	8/4 - 8/12	2,911	23.5	(0.91)	11.0	(1.04)	12.4	(0.85)	1,518	12.2	(2.59)
	1998	8/6 - 8/16	2,090	16.9	(0.57)	9.7	(0.68)	7.1	(0.78)	1,909	15.4	(0.88)
	2001	7/25 - 8/6	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	9/7 - 9/19	1,702	13.7	(1.22)	7.5	(1.42)	6.2	(1.25)	719	5.8	(2.19)
	Average:	8/5 - 8/17	1,796	14.5	(0.87)	7.7	(1.00)	6.7	(0.92)	830	6.7	(1.97)
1 & 2, pooled	1995	8/3 - 8/19	5,069	13.2	(1.25)	6.5	(1.31)	6.7	(1.27)	1,545	4.0	(4.66)
	1998	8/2 - 8/16	5,257	13.7	(0.60)	8.3	(0.62)	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	(1.13)	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	4,188	10.9	(1.06)	5.0	(1.28)	5.9	(0.98)	890	2.3	(3.91)
	2013	9/3 - 9/20	2,472	6.4	(1.88)	3.2	(2.13)	3.2	(2.09)	746	1.9	(3.94)
	Average:	8/2 - 8/21	3,540	9.2	(1.14)	4.9	(1.24)	4.3	(1.29)	871	2.3	(3.57)

[a] Total includes 2 males without legal status recorded.

Table 8.–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 seven triennial St. Matthew Island pot surveys, 1995–2013, 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	8/3 - 8/19	11,469	44.1	(1.89)	30.3	(1.93)	13.8	(2.03)	5	<0.1	(5.77)
	1998	8/2 - 8/16	26,519	102.0	(0.72)	92.3	(0.74)	9.7	(0.98)	192	0.7	(5.91)
	2001	7/25 - 8/16	23,276[a]	89.5	(0.79)	45.4	(0.81)	44.1	(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 - 8/9	3,295[c]	12.7	(1.07)	9.0	(1.41)	3.6	(1.79)	355	1.4	(3.96)
	2013	9/3 - 9/20	2,900[d]	11.2	(1.64)	1.1	(2.19)	10.0	(1.72)	1,330	5.1	(1.95)
	Average:	8/2 - 8/20	11,150	42.9	(1.18)	30.2	(1.30)	12.7	(1.77)	945	3.6	(3.72)
2	1995	8/4 - 8/12	1	<0.1	(5.57)	<0.1	(5.57)	0.0	-	0	0.0	-
	1998	8/6 - 8/16	1,337	10.8	(1.67)	8.9	(1.74)	1.9	(1.60)	36	0.3	(4.21)
	2001	7/25 - 8/6	765	6.2	(2.79)	2.2	(2.65)	4.0	(2.88)	261	2.1	(2.95)
	2004	7/30 - 8/12	17	0.1	(4.66)	0.1	(5.14)	0.0	(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	(2.50)
	2010	7/31 - 8/16	60	0.5	(2.33)	0.2	(2.71)	0.3	(2.34)	22	0.2	(3.05)
	2013[e]	9/7 - 9/19	130	1.0	(2.26)	0.0	(3.87)	1.0	(2.28)	37	0.3	(3.15)
	Average:	8/5 - 8/17	1,796	4.9	(2.99)	3.3	(3.33)	1.7	(2.48)	61	0.5	(3.17)
1 & 2, pooled	1995	8/3 - 8/19	11,470	29.9	(2.39)	20.5	(2.44)	9.3	(2.56)	5	<0.1	(7.03)
	1998	8/2 - 8/16	27,856	72.5	(1.03)	65.3	(1.06)	7.2	(1.22)	228	0.6	(6.15)
	2001	7/25 - 8/16	24,041[a]	62.6	(1.13)	31.5	(1.16)	31.2	(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	3,355[c]	8.7	(1.44)	6.2	(1.82)	2.5	(2.19)	377	1.0	(4.56)
	2013[e]	9/3 - 9/20	3,030[d]	7.9	(2.00)	0.7	(2.72)	7.1	(2.09)	1,367	3.6	(2.39)
	Average:	8/2 - 8/21	11,762	30.6	(1.53)	21.5	(1.68)	9.1	(2.16)	1,007	2.6	(4.28)

[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] Includes 24 males without legal status recorded.

[e] Totals do not include 2 crab without sex recorded.

Table 9.–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 at the 20 Stratum 4 stations fished during 20–25 September 2013 as a special project concurrent with the 2013 St. Matthew Island blue king crab pot survey.

Sex-size class	Number	CPUE	(CV)
Total males	378	4.8	(1.20)
Legal males	92	1.2	(1.33)
Legal, recruit males	59	0.8	(1.44)
Legal, post-recruit males	33	0.4	(1.51)
Sublegal males	286	3.6	(1.25)
Sublegal males < 105 mm CL	127	1.6	(1.46)
Sublegal males ≥ 105 mm CL	159	2.0	(1.22)
Total females	14	0.2	(2.23)
Mature females	2	<0.1	(4.47)
Immature females	12	0.2	(2.56)

Table 10.–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 at the 10 Stratum 1 stations inside NMFS EBS trawl survey station R-24 during 21–25 September 2013 for the 2013 St. Matthew Island blue king crab pot survey.

Sex-size class	Number	CPUE	(CV)
Total males	200	5.0	(1.65)
Legal males	45	1.1	(1.57)
Legal, recruit males	23	0.6	(1.25)
Legal, post-recruit males	22	0.6	(1.97)
Sublegal males	155	3.9	(1.69)
Sublegal males < 105 mm CL	69	1.7	(1.92)
Sublegal males ≥ 105 mm CL	86	2.2	(1.59)
Total females	13	0.3	(2.64)
Mature females	2	<0.1	(2.11)
Immature females	11	0.3	(2.86)

Table 11.–Number of stations at which legal-size male blue king crab were captured and at which legal males were tagged, and number of legal males captured and tagged by survey stratum during the 2013 St. Matthew Island blue king crab pot survey and during the special project conducted in Stratum 4 concurrent with the survey.

	Number of stations		Number of crab	
Stratum	Captured	Tagged	Captured	Tagged
1	83	81	458	372
2	57	57	2,074	750
3	5	4	10	7
4	12	11	92	80
Total	157	153	2,634	1,209

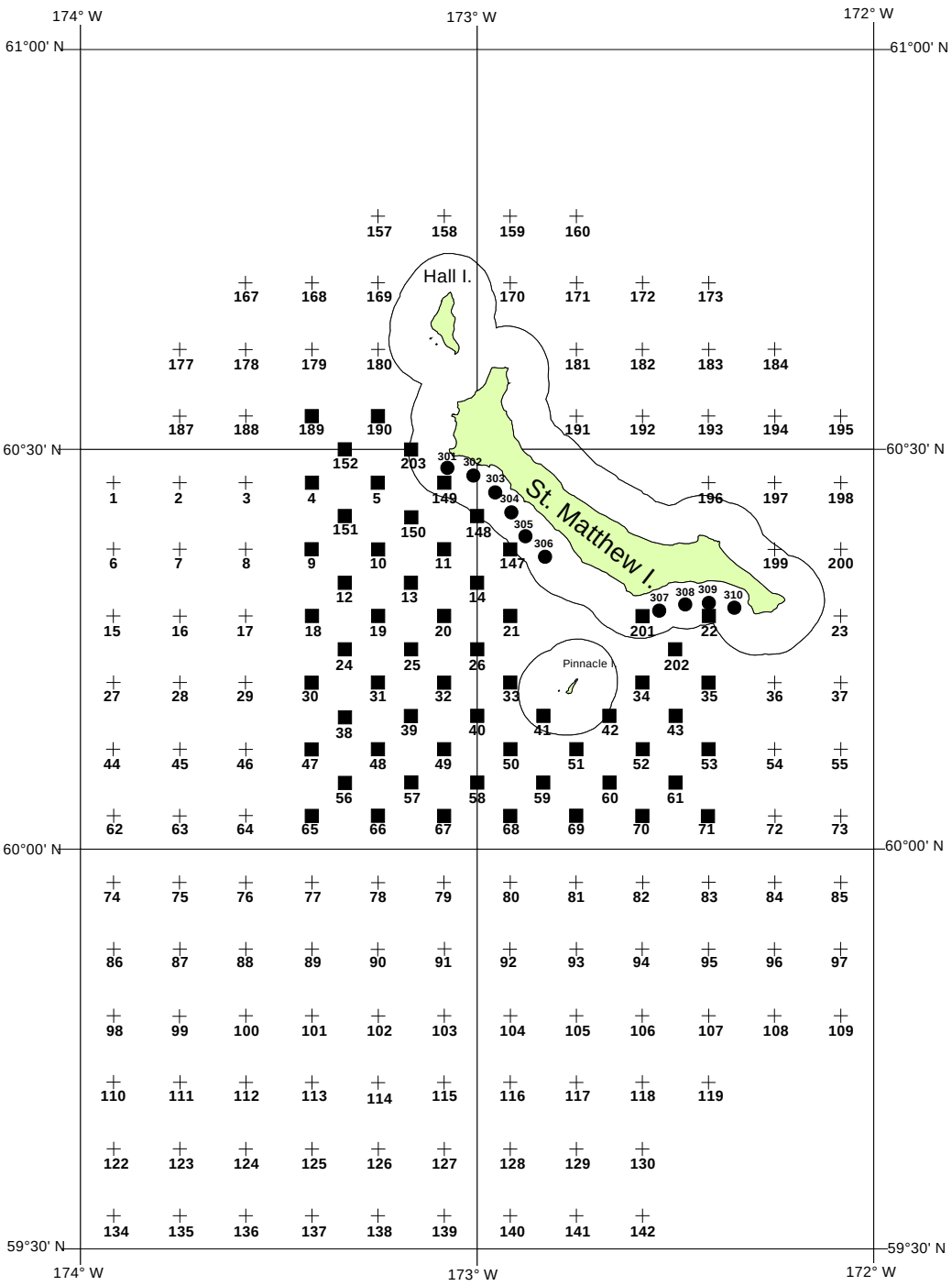


Figure 1.–Survey station layout (midpoint of station locations labeled by station number) for the stations fished during the 2013 St. Matthew Island blue king crab pot survey. Stratum 1 stations are denoted by crosses, Stratum 2 stations by filled squares, and Stratum 3 stations by filled circles.

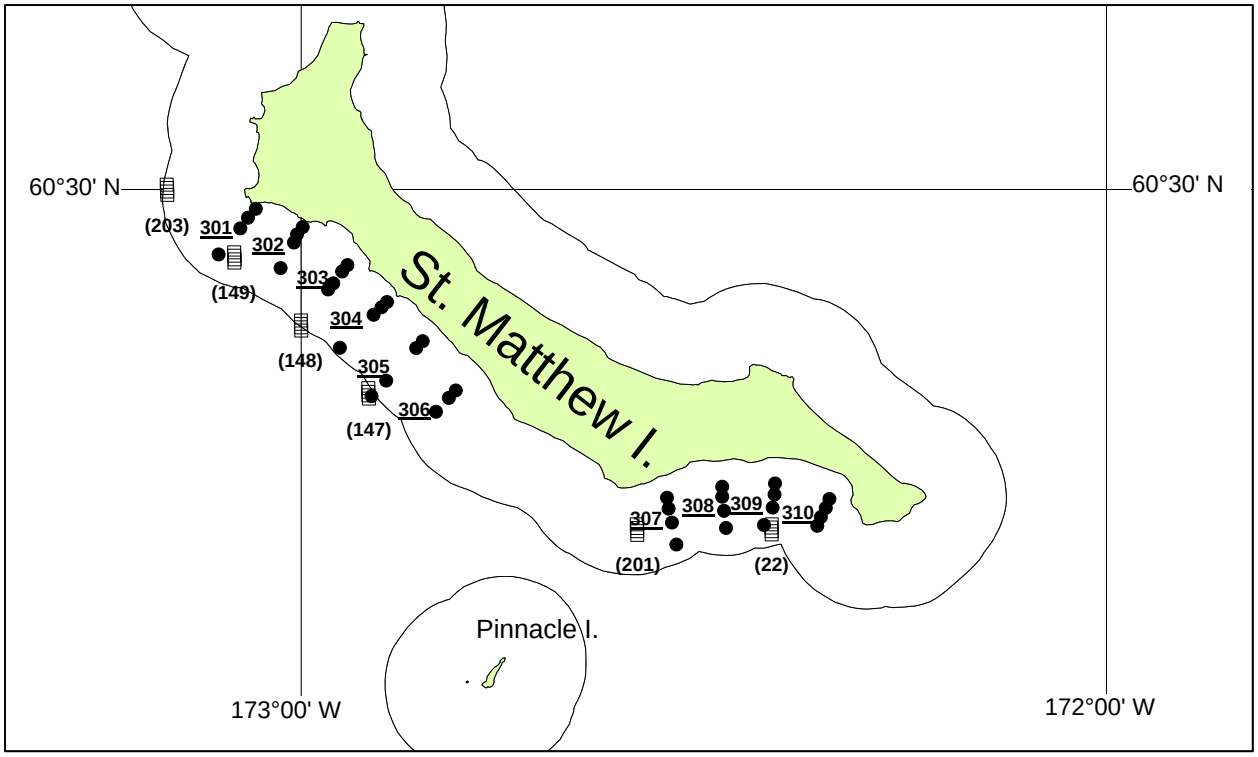


Figure 2.–Location and orientation of pots within Stratum 3 stations (filled circles, with station numbers underlined) and of pots within adjacent Stratum 2 stations (overlapping open squares, with station numbers in parentheses) fished during the 2013 St. Matthew Island blue king crab pot survey.

Note: See Figure 1 for the layout of all 189 stations fished during the survey.

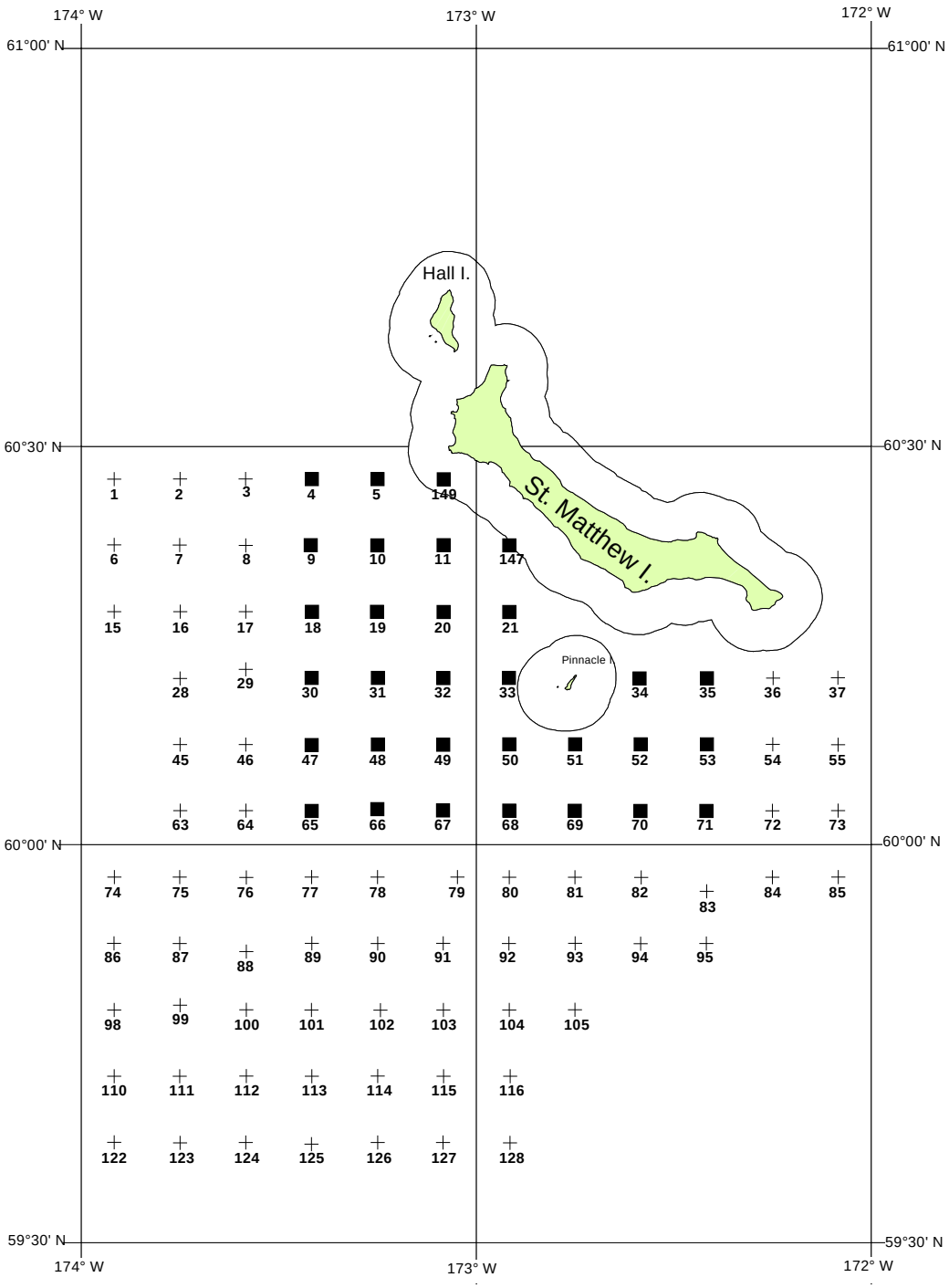


Figure 3.–Location of the 96 stations fished in-common during the seven triennial St. Matthew Island blue king crab surveys, 1995–2013, with station numbers labeled below. The 65 in-common stations located within survey Stratum 1 are denoted by crosses and the 31 in-common stations located within survey Stratum 2 are denoted by filled squares.

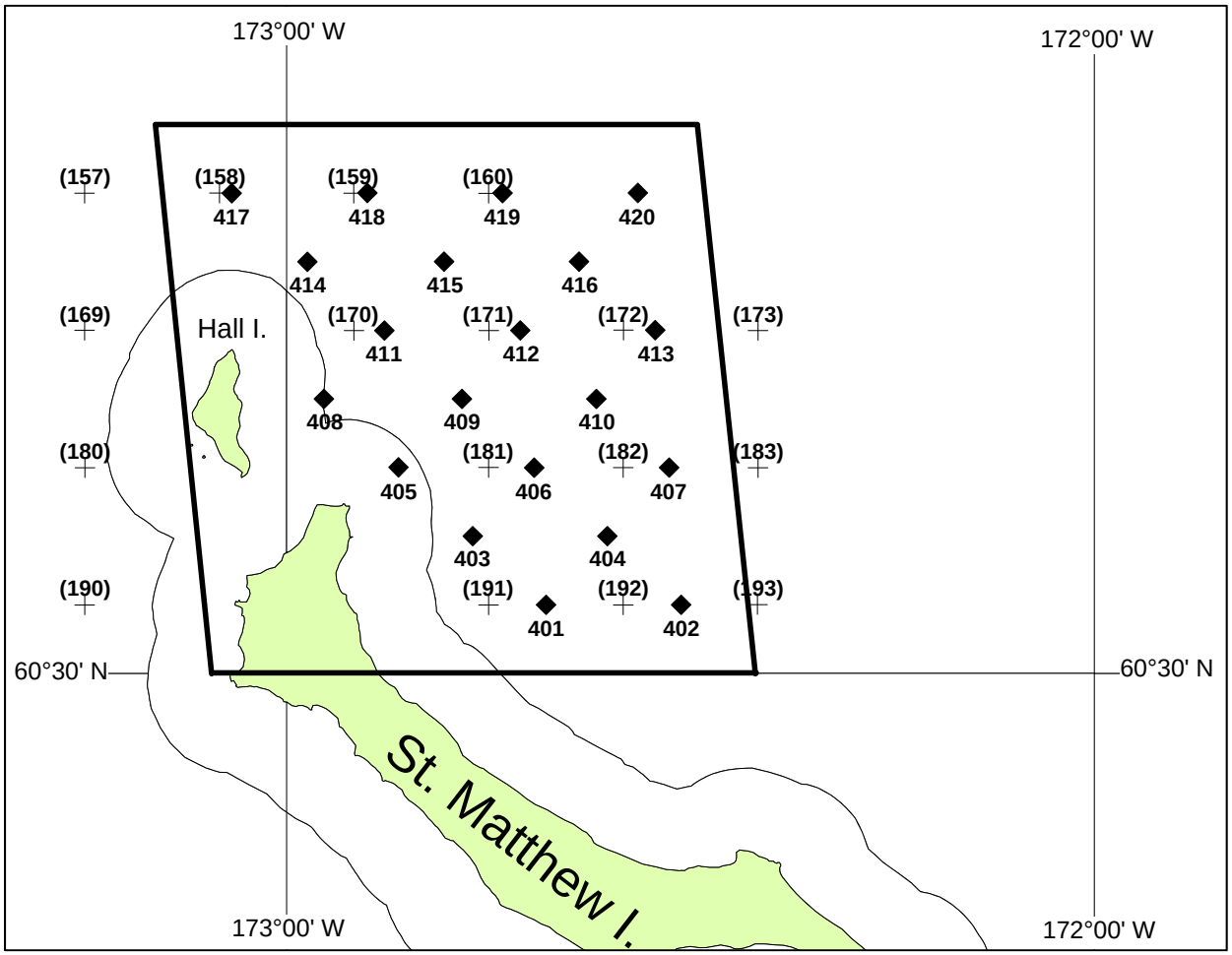


Figure 4.–Midpoint locations of the 20 Stratum 4 stations (denoted by filled diamonds and labeled below with station numbers) fished as a special project concurrent with the 2013 St. Matthew Island blue king crab pot survey and midpoints of 2013 standard survey stations (denoted by crosses and labeled above with station numbers in parentheses) fished inside or adjacent to NMFS EBS trawl survey station R-24. Polygon outlined in bold denotes boundaries of NMFS EBS trawl survey station R-24.

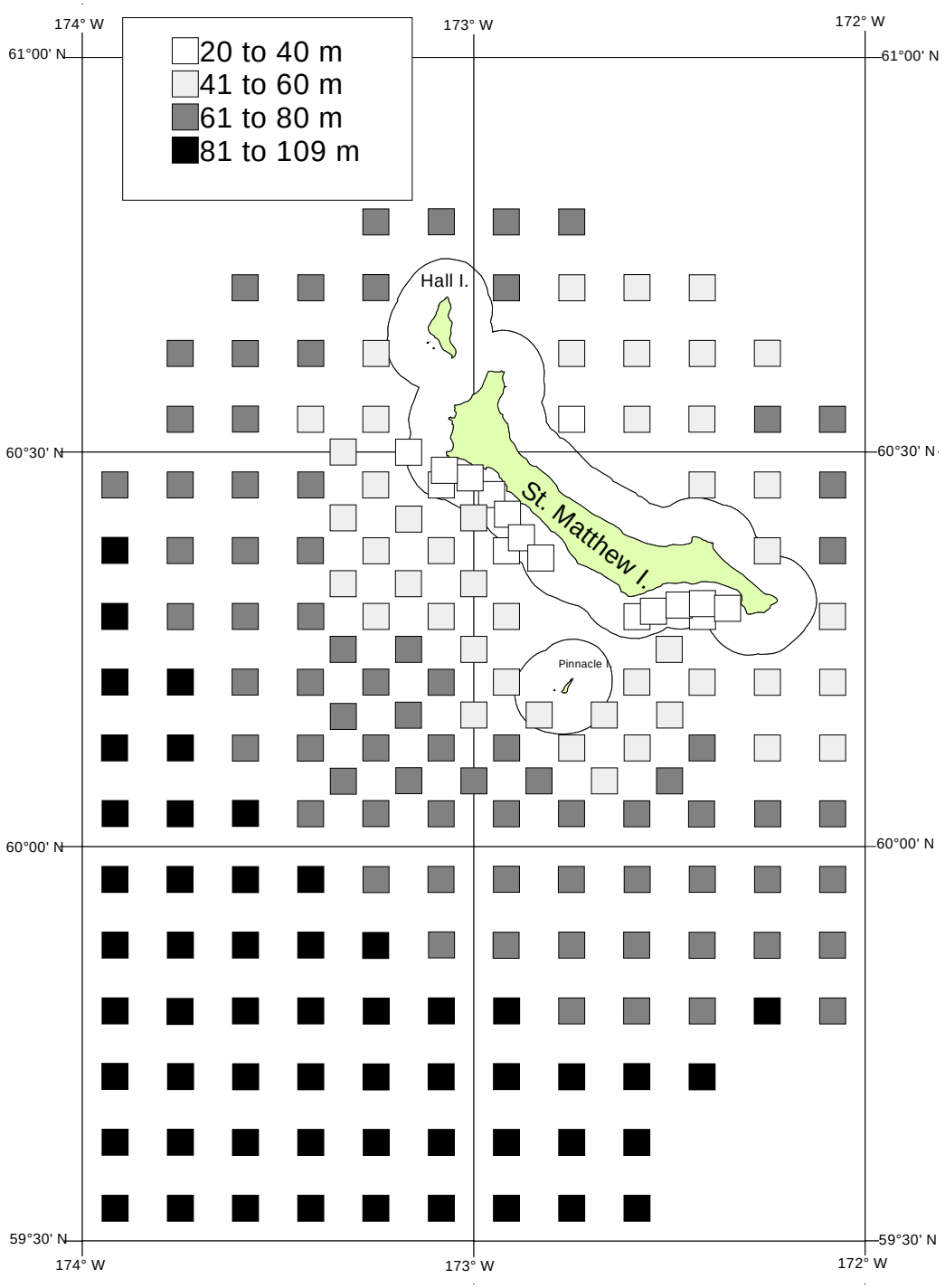


Figure 5.–Depths of survey stations fished during the 2013 St. Matthew Island blue king crab pot survey.

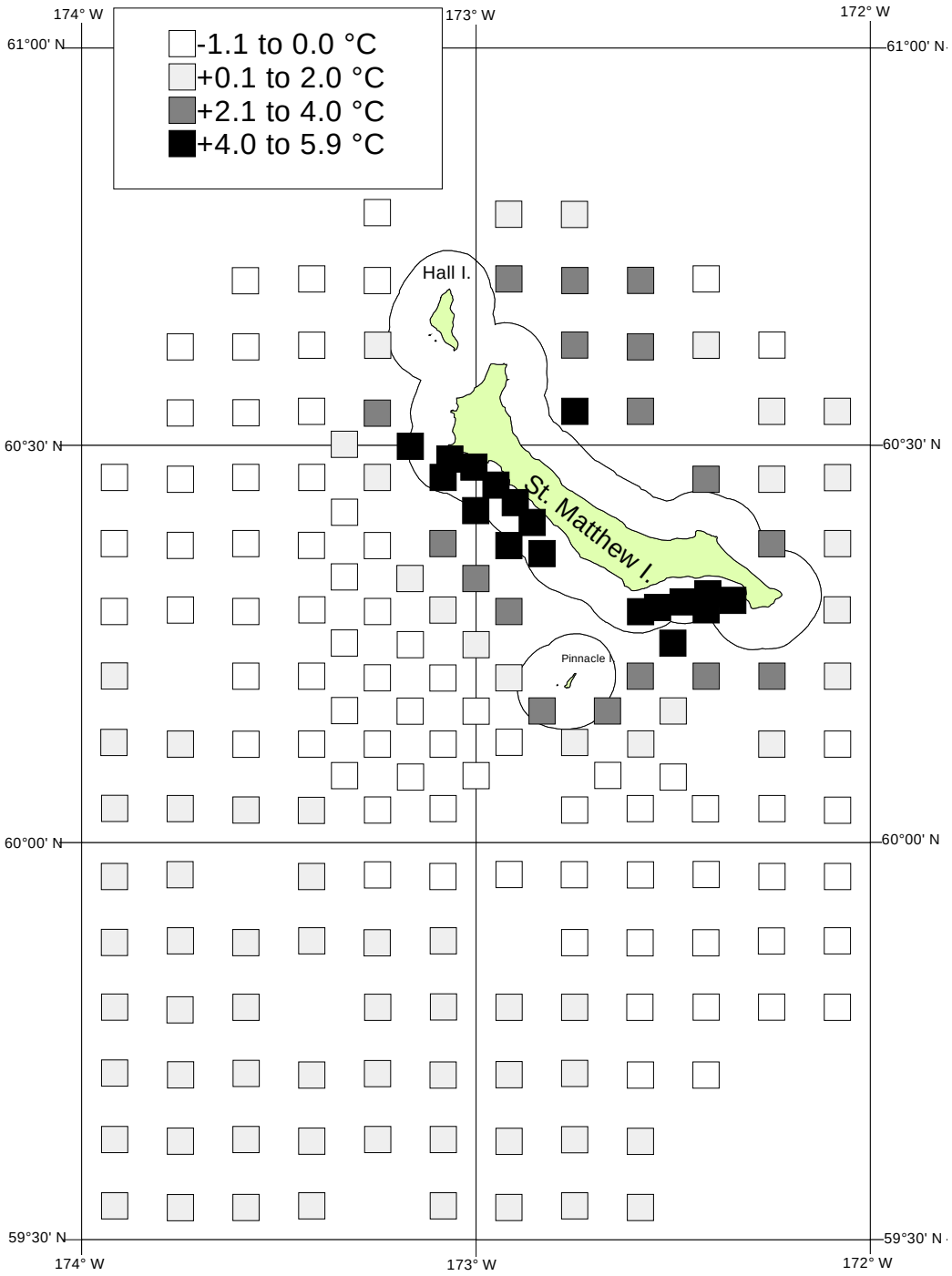


Figure 6.–Average bottom temperatures recorded at 178 survey stations during the 2013 St. Matthew Island blue king crab pot survey.

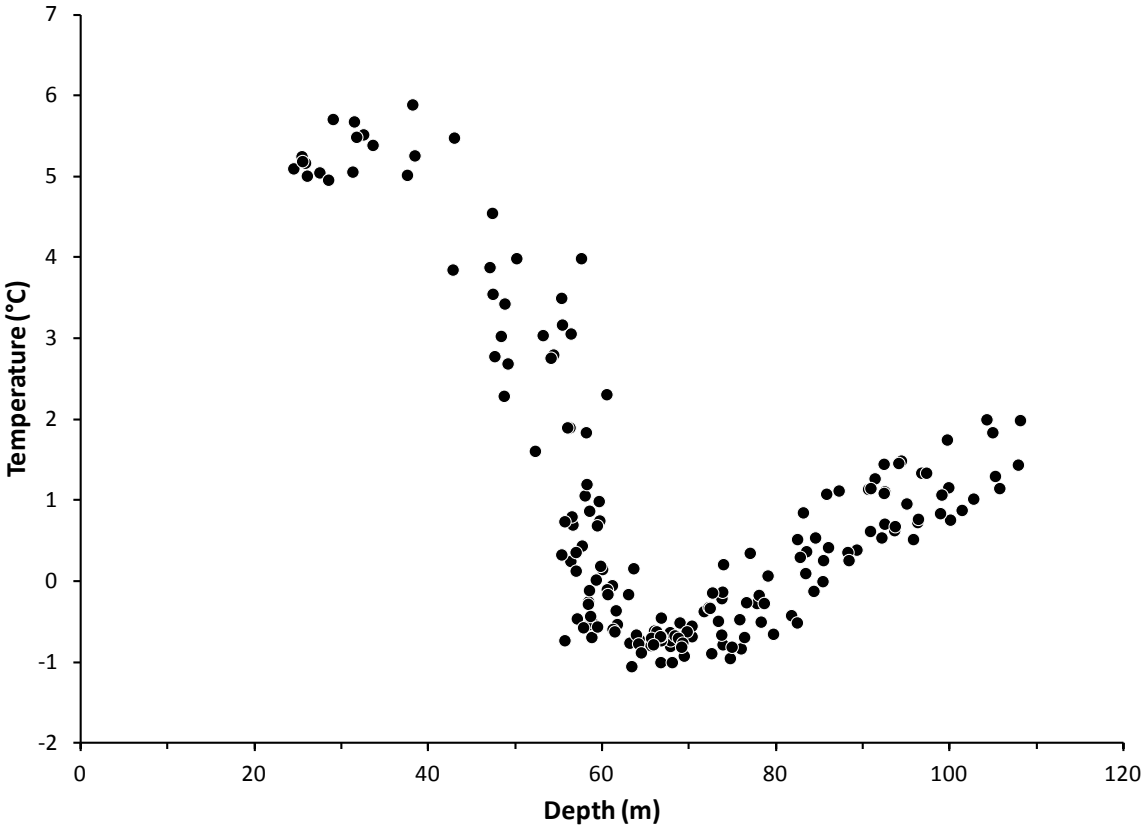


Figure 7.–Average bottom temperatures plotted against average depths recorded by data loggers deployed in one pot at each of 178 stations fished during the 2013 St. Matthew Island blue king crab pot survey.

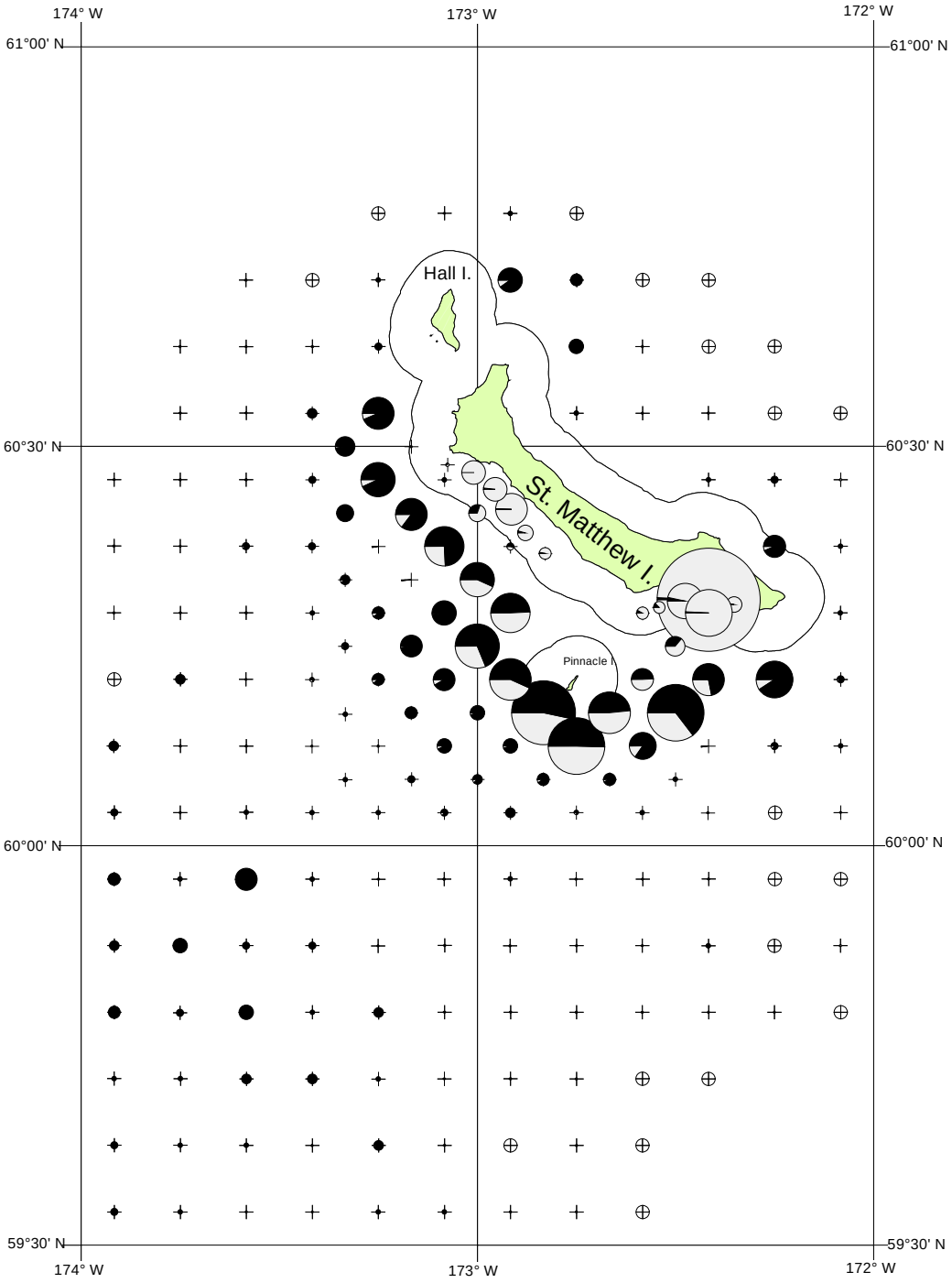


Figure 8.–Catch per unit effort (CPUE = number of crab per pot lift) of male (black portion of filled circles) and female (gray portion of filled circles) blue king crab at each station during the 2013 St. Matthew Island blue king crab pot survey. Areas of filled circles are proportional to the station CPUE of blue king crab, with the largest circle representing a CPUE of 339 crab per pot lift, crosses denoting station centers, and circled crosses identifying stations that captured no blue king crab.

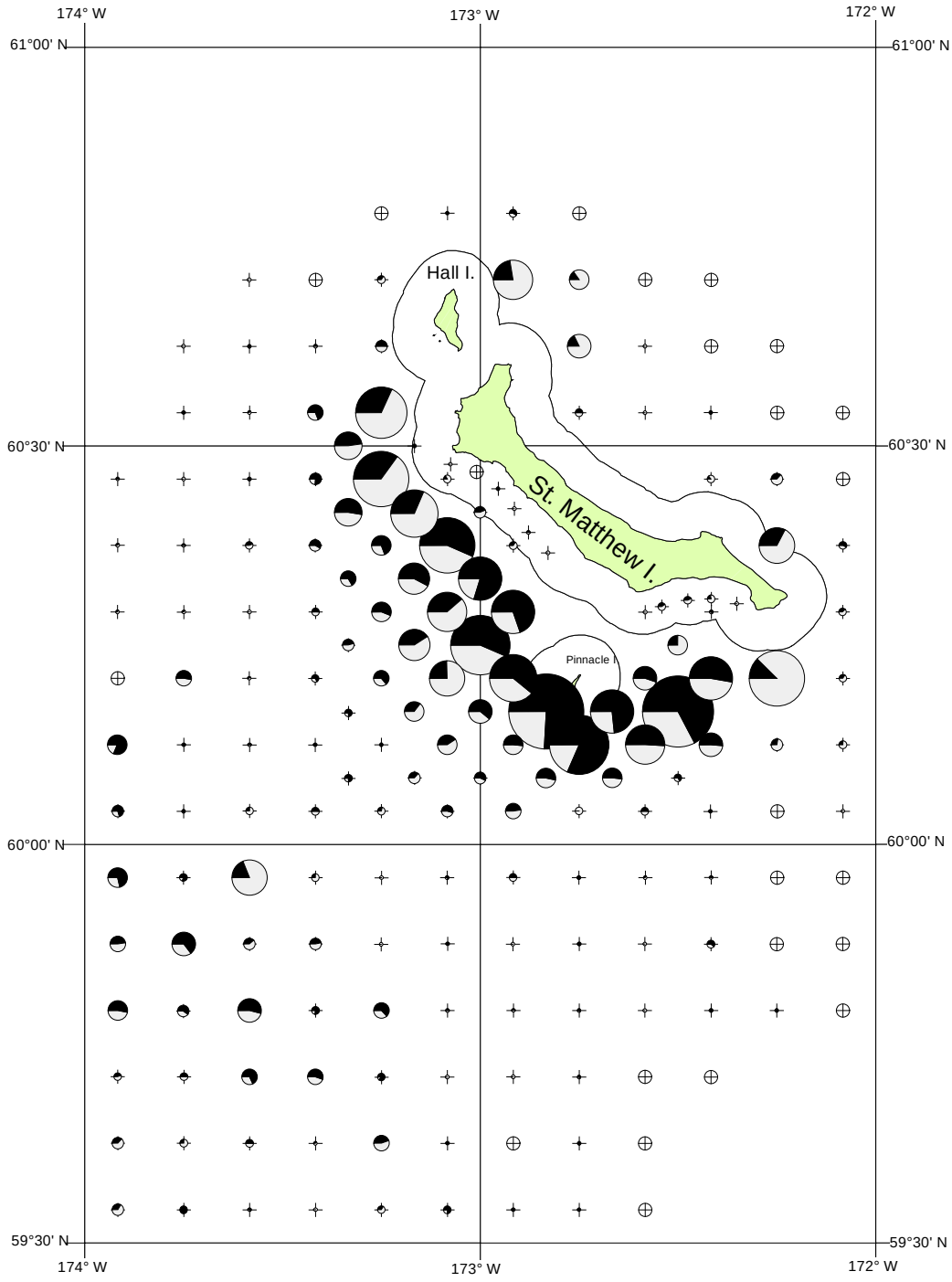


Figure 9.–Catch per unit effort (CPUE = number of crab per pot lift) of legal male (black portion of filled circles) and undersize male (gray portion of filled circles) blue king crab at each station during the 2013 St. Matthew Island blue king crab pot survey. Areas of filled circles are proportional to the station CPUE of male blue king crab, with the largest circle representing a CPUE of 80 crab per pot lift, crosses denoting station centers, and circled crosses identifying stations that captured no male blue king crab.

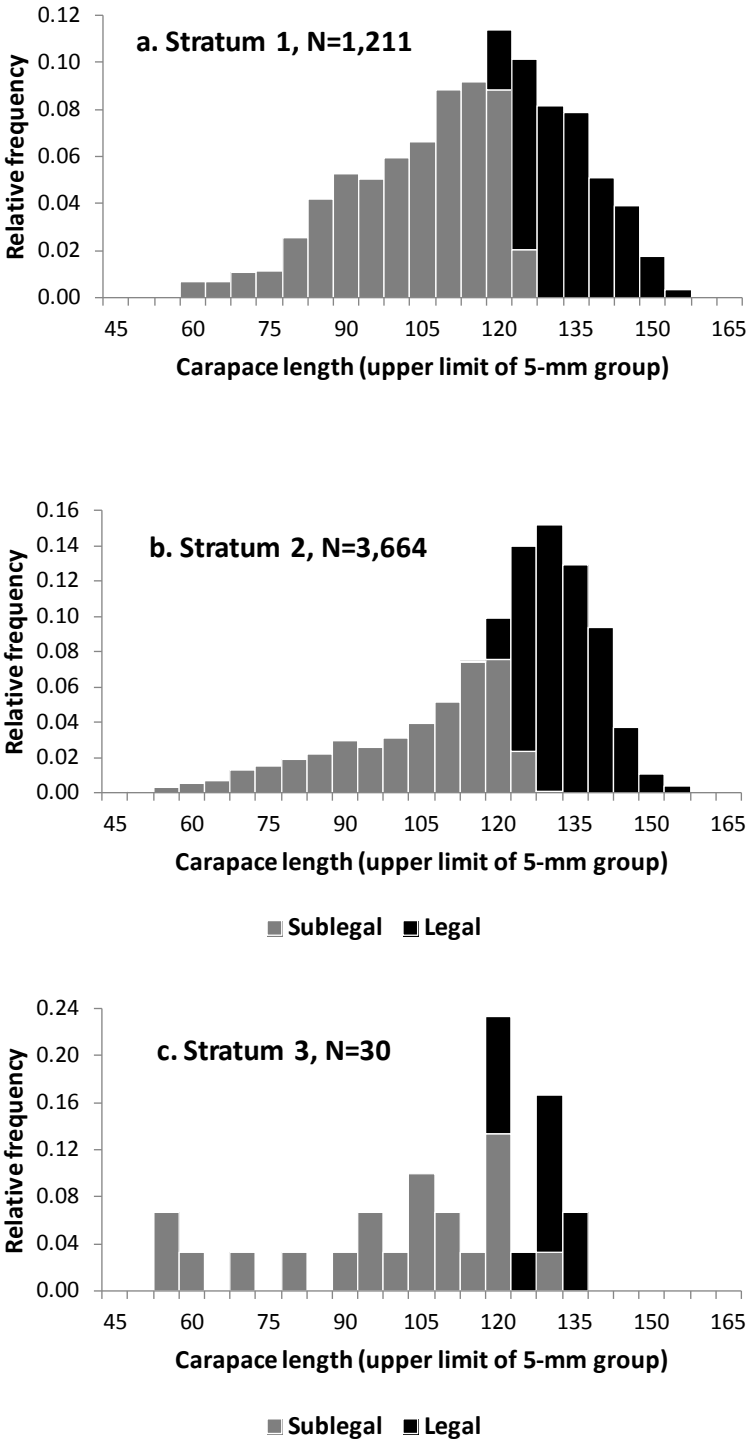


Figure 10.–Relative size frequency distributions of male blue king crab captured during the 2013 St. Matthew Island blue king crab pot survey by legal status in Strata 1 (a), 2 (b), and 3 (c).

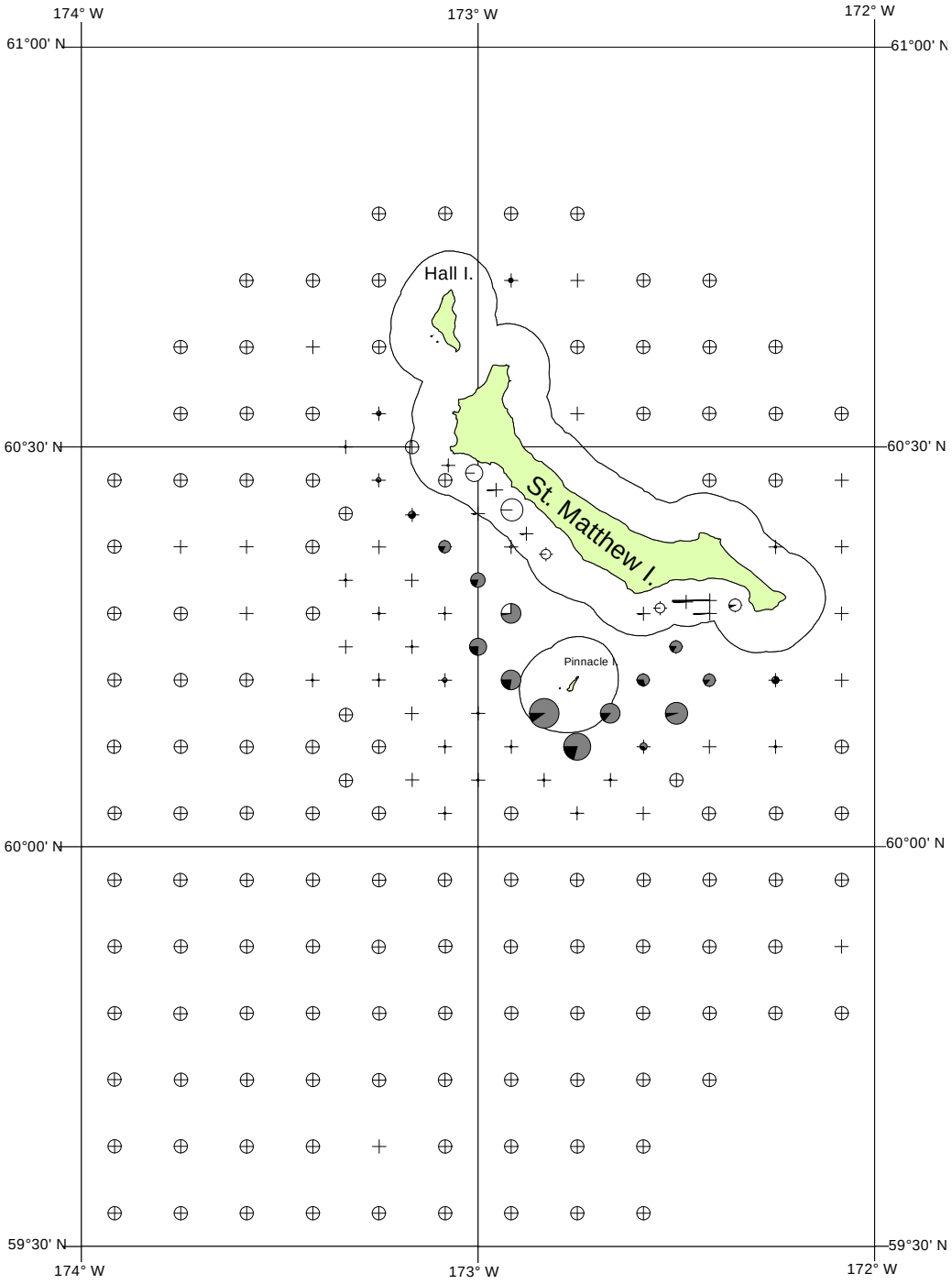


Figure 11.–Catch per unit effort (CPUE = number of crab per pot lift) of ovigerous females (white portion of circles), mature barren females with matted setae (gray portion of circles), and immature female (black portion of circles) blue king crab at each station during the 2013 St. Matthew Island blue 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 337 crab per pot lift, crosses denoting station centers, and circled crosses identifying stations that captured no female blue king crab.

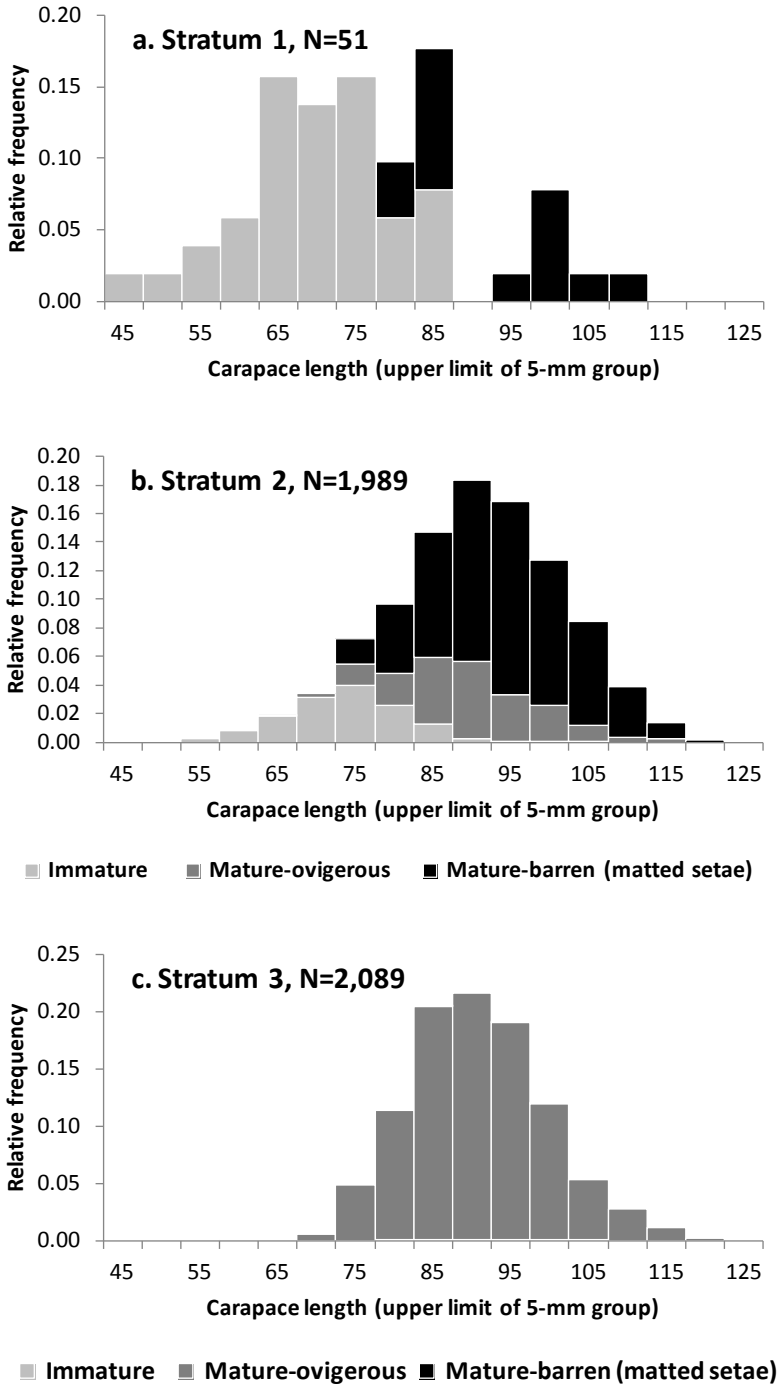


Figure 12.–Relative size frequency distributions of female blue king crab captured during the 2013 St. Matthew Island blue king crab pot survey by reproductive condition in Strata 1 (a), 2 (b), and 3 (c).

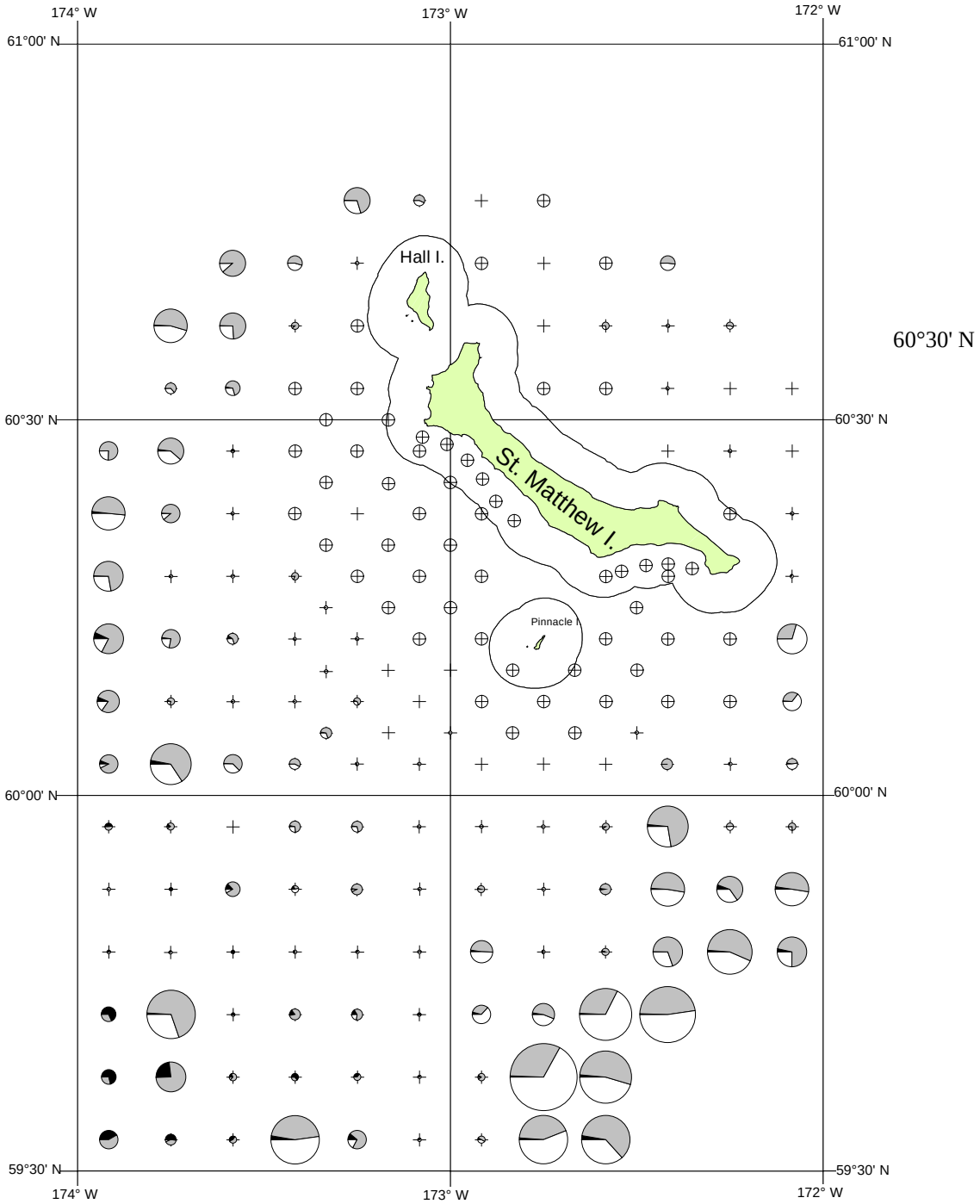


Figure 13.–Catch per unit effort (CPUE = number of crab per pot lift) of legal male (black portion of circles), undersize male (gray portion of circles), and female (white portion of circles) snow crab at each station during the 2013 St. Matthew Island blue king crab pot survey. Areas of filled circles are proportional to the station CPUE of snow crab at a station, with the largest circle representing a CPUE of 240 crab per pot lift, crosses denoting station centers, and circled crosses identifying stations that captured no snow crab.

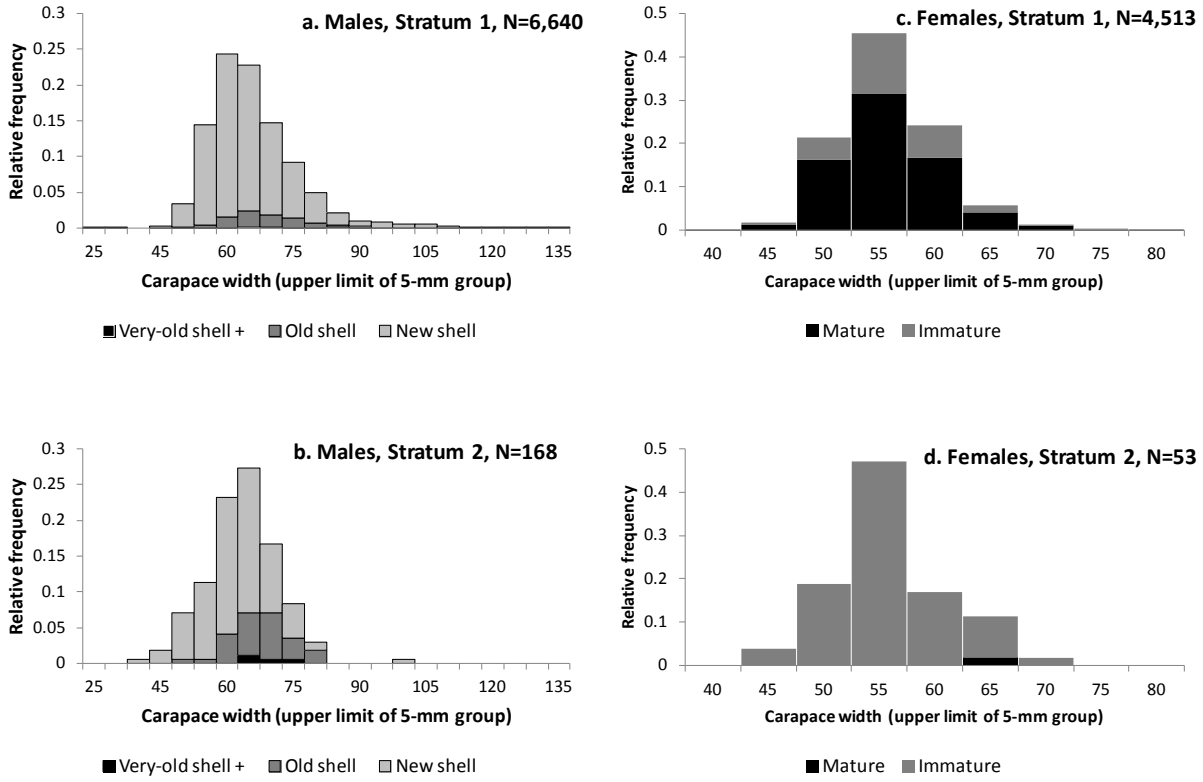


Figure 14.–Relative size frequency distributions of male snow crab captured during the 2013 St. Matthew Island blue king crab pot survey by shell condition in Strata 1 (a) and 2 (b) and of female snow crab captured during the survey by reproductive maturity in Strata 1 (c) and 2 (d).

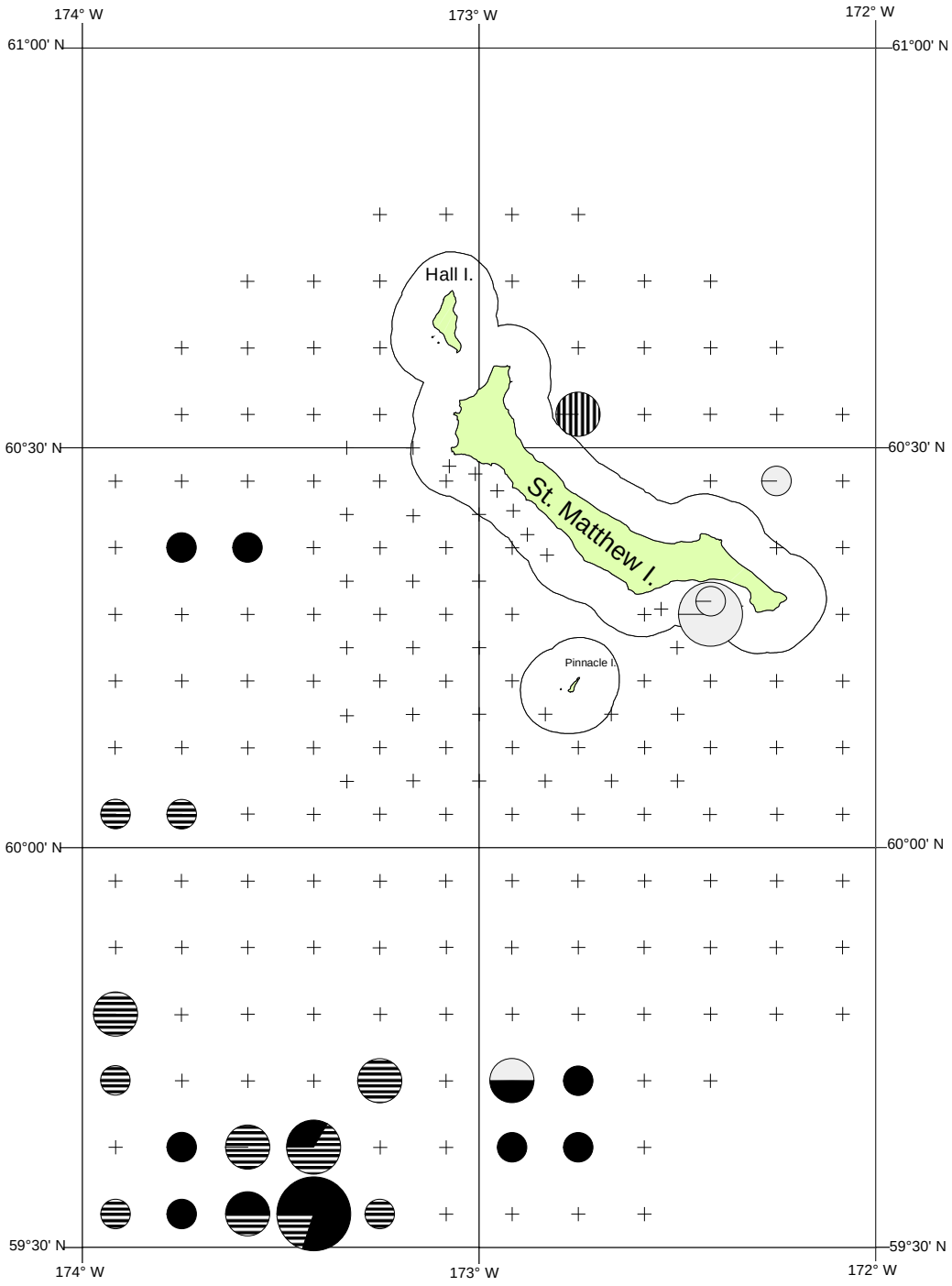


Figure 15.–Catch per unit effort (CPUE = number of crab per pot lift) of red king crab (gray portion of circles), Tanner crab (black portion of circles), Tanner x snow hybrid crab (horizontally striped portion of circles), and hair crab (vertically striped portion of circles) at each station during the 2013 St. Matthew Island blue king crab pot survey. Areas of filled circles are proportional to the station CPUE, with the largest circle representing 1.25 crab per pot lift and crosses denoting station centers.

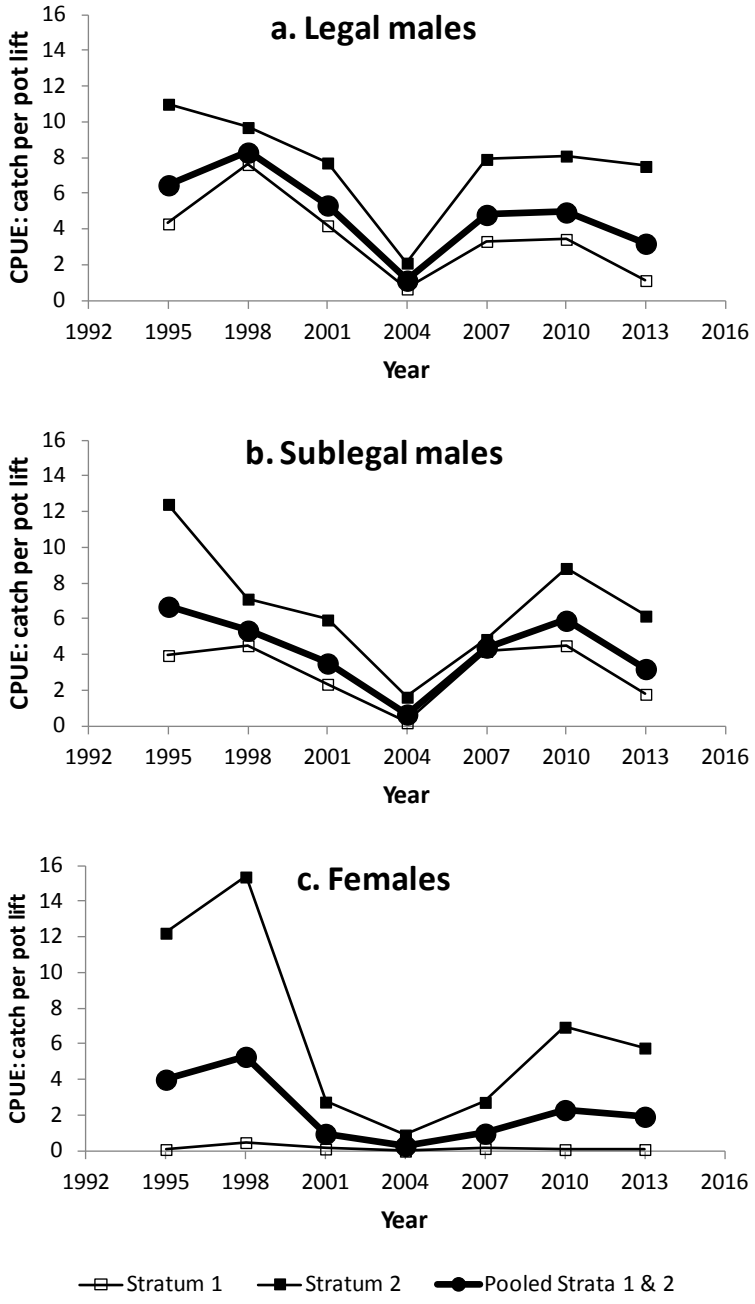


Figure 16.–Catch per unit effort (CPUE = number of crab per pot lift) of legal male (a), undersize male (b), and female (c) blue king crab during the 1995–2013 triennial St. Matthew Island blue king crab pot surveys for the survey stations that were fished in-common each survey year within survey Stratum 1 (260 pot lifts at 65 in-common stations), survey Stratum 2 (124 pot lifts at 31 in-common stations), and the pooled Strata 1 and 2 (384 pot lifts at all 96 in-common stations).

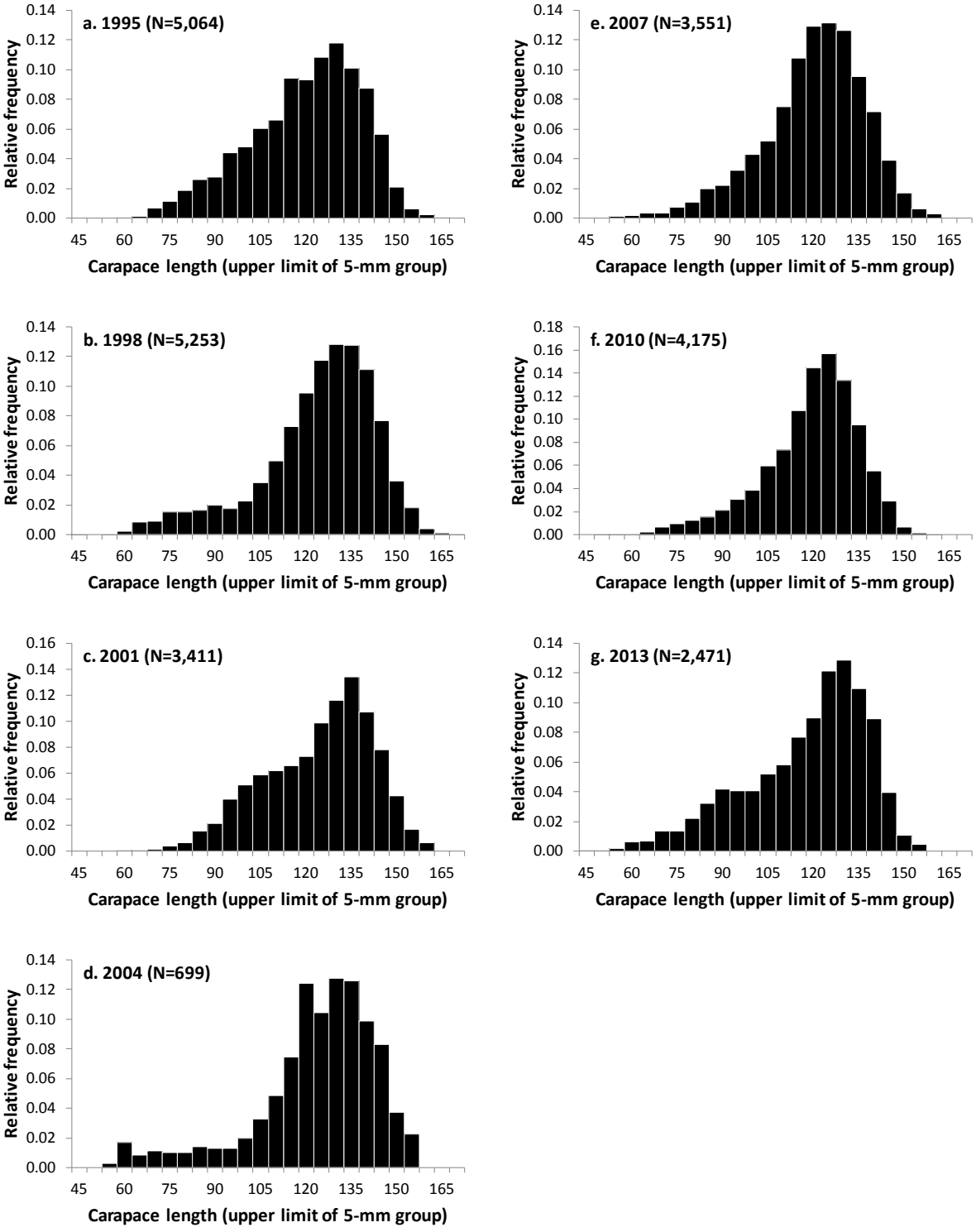


Figure 17.–Relative frequency size distributions of male blue king crab captured during the 1995–2013 triennial St. Matthew Island blue king crab surveys at the 96 stations that were fished in-common in all survey years.

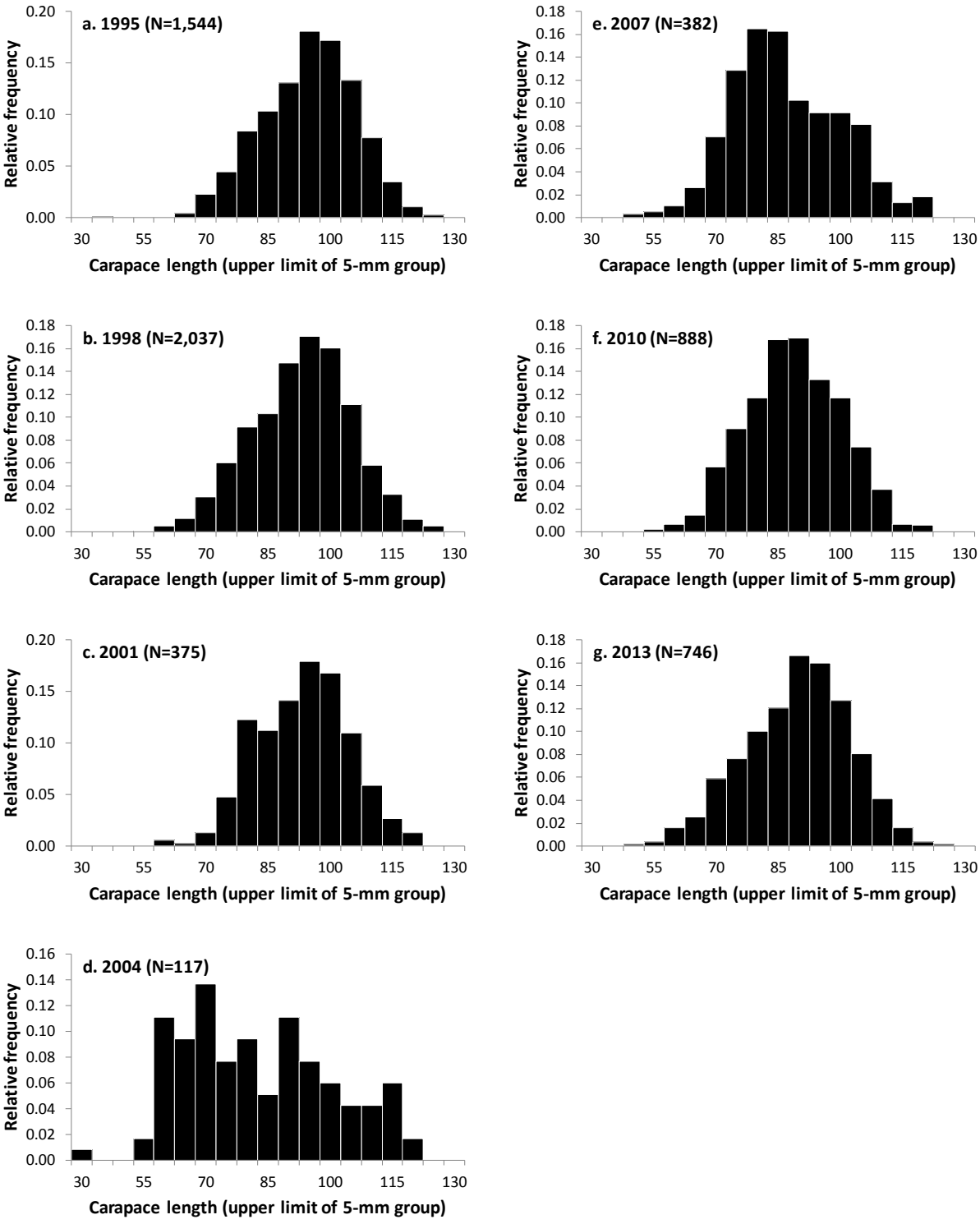
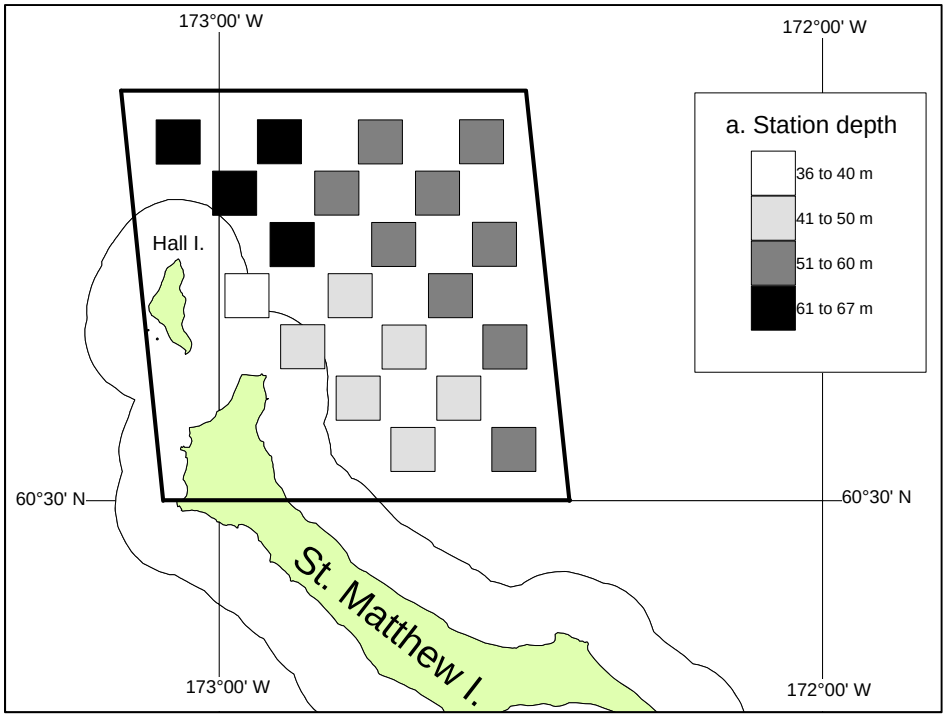


Figure 18.–Relative frequency size distributions of female blue king crab captured during the 1995–2013 triennial St. Matthew Island blue king crab surveys at the 96 stations that were fished in-common in all survey years.



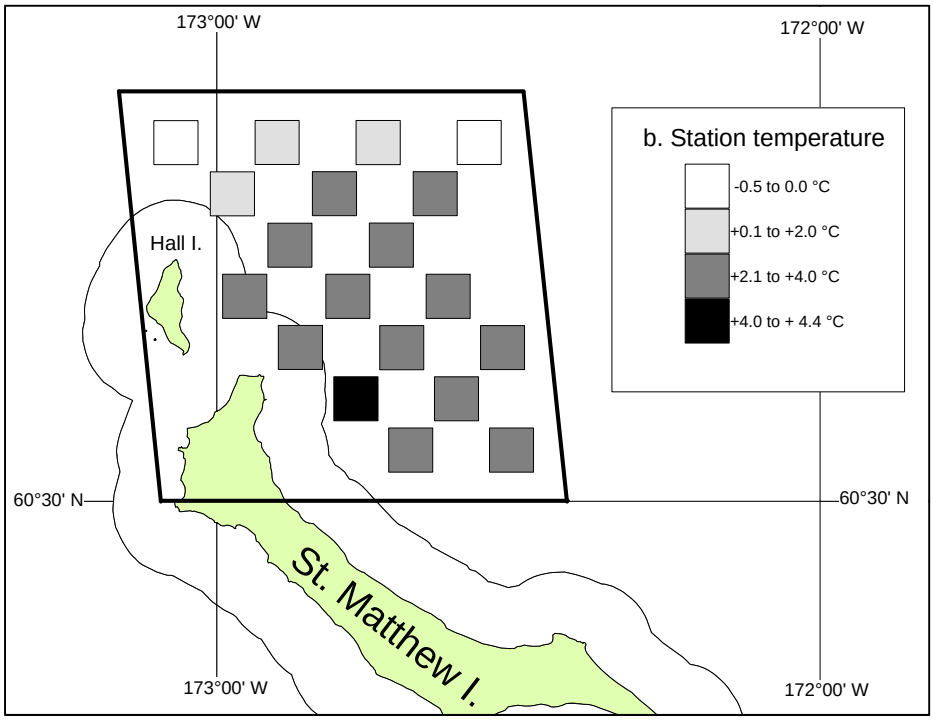
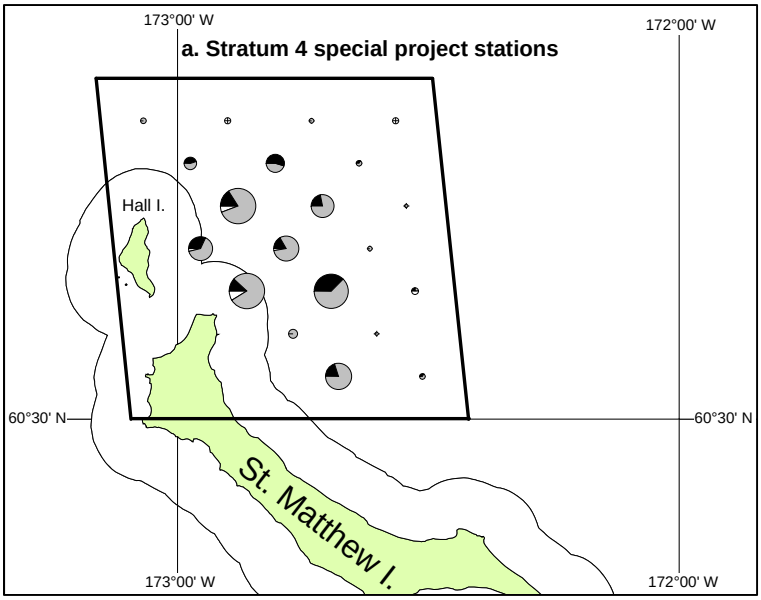


Figure 19.–Depths (a) and average bottom temperatures (b) recorded at stations fished in Stratum 4 as a special project concurrent with the 2013 St. Matthew Island blue king crab pot survey. Polygon outlined in bold denotes boundaries of NMFS EBS trawl survey station R-24.



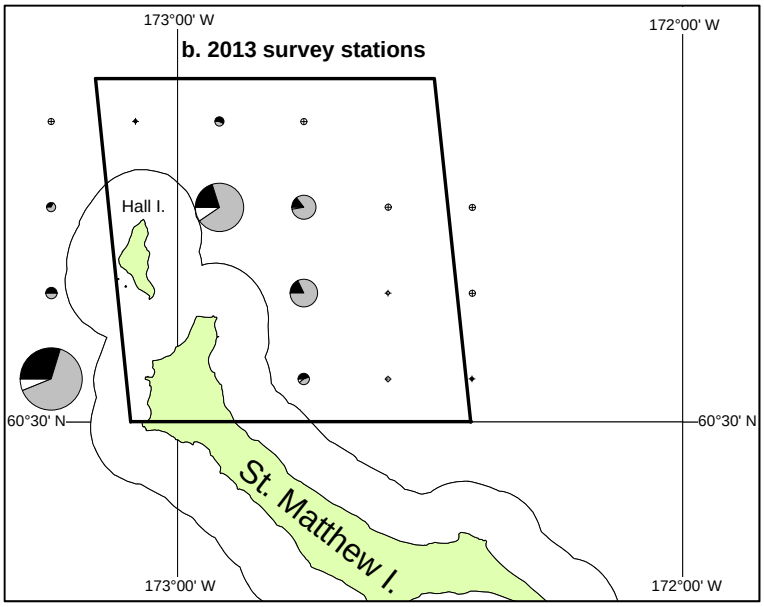


Figure 20.–Catch per unit effort (CPUE = number of crab per pot lift) of legal male (black portion of circles), undersize male (gray portion of circles), and female (white portion of circles) blue king crab at (a) each station fished in Stratum 4 as a special project concurrent with the 2013 St. Matthew Island blue king crab pot survey and (b) 2013 survey stations inside or adjacent to NMFS EBS trawl survey station R-24. Areas of filled circles are proportional to the station CPUE of blue king crab, with the largest circle representing a CPUE of 45 crab per pot lift, crosses denoting station centers, and the polygon outlined in bold denoting boundaries of NMFS.

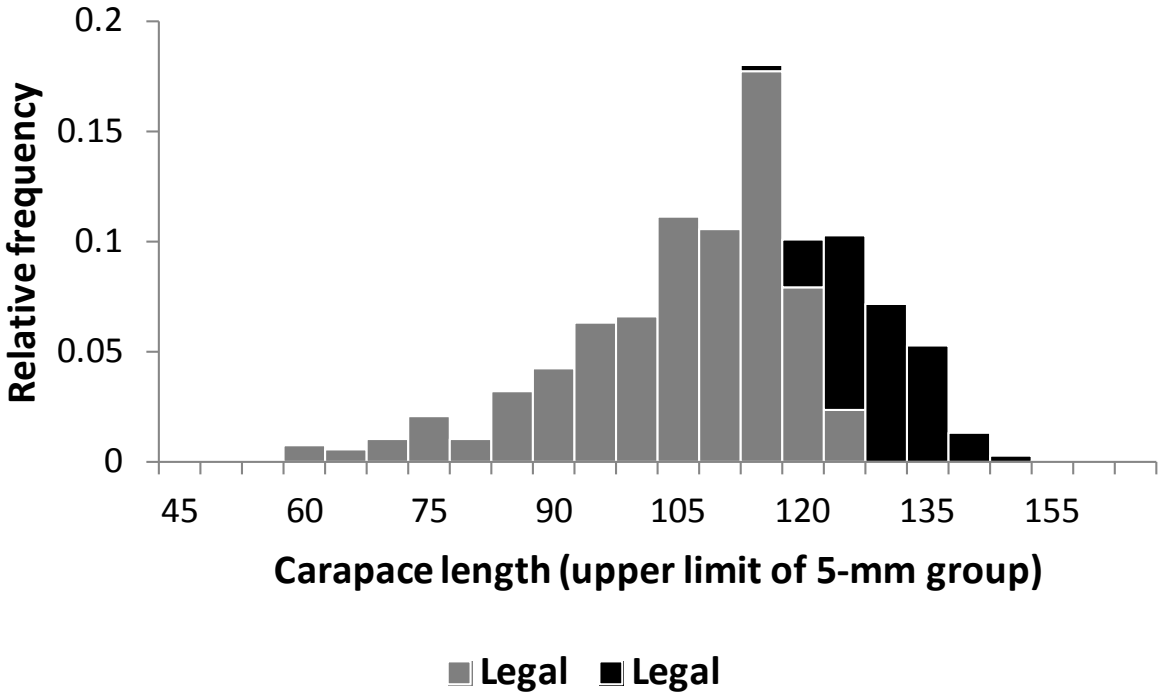


Figure 21.–Relative size frequency distribution by legal status of male blue king crab captured in Stratum 4 during the special project performed concurrent with the 2013 St. Matthew Island blue king crab pot survey.

APPENDIX A. DESCRIPTION OF KING CRAB POTS FISHED IN THE 2013 ST. MATTHEW ISLAND BLUE KING CRAB SURVEY AND COMPARISON WITH POTS USED IN THE 1995–2010 TRIENNIAL SURVEYS

Appendix A1.–Description of the rectangular king crab pots fished during the 2013 St. Matthew Island blue king crab pot survey and comparison with the pots fished during the 1995–2010 triennial St. Matthew Island blue king crab pot surveys.

Survey	2013	1998 – 2010[a]	1995[b]
Pot O.D.[c]	7 ft x 7 ft x 34 in (2.1 m x 2.1 m x 0.9 m)	7 ft x 7 ft x 34 in (2.1 m x 2.1 m x 0.9 m)	7 ft x 7 ft x 2.5 ft (2.1 m x 2.1 m x 0.8 m)
Web, pot body	Tarred, 96 thread 2.5 in (6.4 cm), stretched	Tarred, 96 thread 2.75 in (7.0 cm), stretched	Tarred[d] 5 in (12.7 cm), stretched
Web, tunnel	Non-tarred, 60 thread 2.5 in (6.4 cm), stretched	Non-tarred, 60 thread 2.75 in (7.0 cm), stretched	Non-tarred[d] 4 in (10.2 cm), stretched
Tunnel eye I.D.[e]	9 x 36 in (22.9 cm x 91.4 cm)	8 in[f] x 36 in (20.3 cm x 91.4 cm)	7 in x 35 in (17.8 cm x 88.9 cm)
Tunnel eye (orientation)	Tunnel eye top tilted towards outside of pot relative to tunnel eye bottom, with top 4 in (10.2 cm) higher than bottom (rise:run = 2:1)	Tunnel eye top tilted towards outside of pot relative to tunnel eye bottom, with top >4 in (10.2 cm) higher than bottom (rise:run >2:1)	Not described
Door type	Lift-in, with retainer bar	Swing-out, no retainer bar	Not described

[a] Sources for pot dimensions, web, and tunnel eye dimensions are:
Blau, S. F., and L. J. Watson. 1998. Project operational plan: 1998 St. Matthew Island blue king crab project. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 4K98-49, Kodiak.
Gish, R. K., and V. A. Vanek. 2010. Project operational plan for the 2010 St. Matthew Island blue king crab survey. Alaska Department of Fish and Game, Regional Information Report 4K10-12, Kodiak.
Watson, L. J. 2004. Project operational plan for the 2004 triennial St. Matthew Island blue king crab survey. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 4K-04-26, Kodiak.
Watson, L. J. 2007. Project operational plan for the 2007 St. Matthew Island blue king crab survey. Alaska Department of Fish and Game, Regional Information Report No. 4K07-8, Kodiak.
Watson, L. J., and D. Pengilly. 2001. Project operational plan for the 2001 St. Matthew Island blue king crab tagging survey. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 4K-01-41, Kodiak.

[b] Source:
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 No. 4K96-27, Kodiak.

[c] Outside dimensions.

[d] Thread count of twine not described.

[e] Inside dimensions.

[f] Inside height dimension given in reports as 8 in (20.3 cm) is nominal. Measurements of inner height recorded in 2013 were 8.25 in (21.0 cm) in approximately 80% of the tunnel eyes and 8.75 in (22.2 cm) in approximately 20% of the tunnel eyes, but the percentages of each type of tunnel eye present in the pots fished in each survey are not known.

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

Appendix B1.–Comparison of depths recorded from the echo sounder at the setting of the first and fourth pot in the 4-pot stations fished in strata 1 and 2 during the 2013 St. Matthew Island blue king crab survey with the depths recorded by data loggers deployed in the second or third pot set at the same station.

	Depth (m) from echo sounder[a]			Depth (m) from logger[b]		
Station	Station Min	Station Ave	Station Max	Logger Min	Logger Ave	Logger Max
1	79	79	79	79	79	79
2	72	72	72	69	70	70
3	65	66	67	65	65	66
4	61	61	61	60	60	61
5	52	53	54	52	53	54
6	83	83	83	83	83	84
7	74	75	76	75	76	76
8	67	67	67	66	67	67
9	61	61	61	62	62	63
10	57	57	57	56	56	57
11	50	50	50	49	50	50
12	61	61	61	59	60	60
13	57	57	57	55	56	56
14	50	50	50	50	51	51
15	89	89	89	86	86	87
16	79	79	79	76	77	77
17	70	71	72	70	70	70
18	65	65	65	64	65	65
19	61	61	61	58	59	59
20	57	57	57	59	59	60
21	48	49	50	47	48	48
22	37[c]	39[c]	41[c]	39	39	39
23	59	59	59	57	58	58
24	65	65	65	64	65	65
25	59	60	61	60	60	60
26	57	57	57	59	59	59
27	92	92	92	89	89	90
28	85[d]	85[d]	85[d]	–	–	–
29	76	77	78	77	77	77
30	70	70	70	67	67	68
31	65	65	65	61	62	62
32	59	59	59	61	61	62
33	57	57	57	56	57	57
34	50	50	50	48	48	48
35	57	57	57	58	58	59

-continued-

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Station	Depth (m) from echo sounder[a]			Depth (m) from logger[b]		
	Station Min	Station Ave	Station Max	Logger Min	Logger Ave	Logger Max
36	56	57	57	55	56	57
37	57[d]	57[d]	57[d]	57	58	59
38	68	69	70	69	70	70
39	65	65	65	62	63	63
40	61	61	61	59	59	60
41	57	57	57	56	56	57
42	56	57	57	55	55	55
43	57	58	59	56	56	57
44	94	94	94	92	93	93
45	89	89	90	89	89	89
46	79	79	79	79	79	80
47	72	73	74	73	73	74
48	68	69	70	67	68	68
49	65	65	65	66	66	67
50	61	61	61	62	62	63
51	59[d]	59[d]	59[d]	57	57	58
52	59	59	59	56	57	58
53	61	61	61	–	–	–
54	59	60	61	58	59	60
55	61	62	63	59	60	61
56	74	74	74	72	73	73
57	70	70	70	67	67	67
58	67	67	67	63	64	64
59	63	63	63	–	–	–
60	61	62	63	58	59	60
61	63	63	63	61	61	62
62	96	97	98	94	94	95
63	92	92	92	91	92	92
64	85[d]	85[d]	85[d]	83	83	84
65	78	78	78	74	75	75
66	74	75	76	72	73	73
67	70	70	70	69	69	70
68	67	67	67	–	–	–
69	65	65	65	64	64	64
70	65	65	65	65	65	65

-continued-

Station	Depth (m) from echo sounder[a]			Depth (m) from logger[b]		
	Station Min	Station Ave	Station Max	Logger Min	Logger Ave	Logger Max
71	68	68	68	69	69	69
72	67	67	68	67	68	68
73	67[d]	67[d]	67[d]	66	66	67
74	99	99	99	97	97	97
75	96	96	96	93	93	94
76	90	90	90	–	–	–
77	81	82	83	83	84	84
78	78	78	79	77	77	78
79	76	76	76	73	73	74
80	70	71	72	70	71	71
81	72	72	72	68	69	69
82	70	71	72	70	70	70
83	72[d]	72[d]	72[d]	73	73	74
84	72	72	72	71	71	72
85	70	70	70	68	69	69
86	103	103	103	99	100	100
87	99	99	99	97	97	97
88	96	96	96	94	94	95
89	92	92	92	90	90	90
90	83	83	83	84	84	85
91	79	80	81	78	78	78
92	79	79	79	–	–	–
93	78	78	78	74	75	75
94	78	78	78	74	75	75
95	78	78	78	74	74	74
96	76	76	76	74	75	75
97	74	74	74	75	76	76
98	105	105	105	102	102	102
99	103	103	103	100	100	100
100	98	98	98	96	97	97
101	96	96	96	–	–	–
102	89	89	89	86	87	87
103	87	87	87	86	86	86
104	85	86	87	84	84	84
105	81	81	81	80	80	80

-continued-

	Depth (m) from echo sounder[a]			Depth (m) from logger[b]		
Station	Station Min	Station Ave	Station Max	Logger Min	Logger Ave	Logger Max
106	81[e]	81[e]	81[e]	79	79	79
107	79	79	79	78	79	79
108	79	79	79	80	80	81
109	78	78	78	76	77	77
110	107	107	107	106	106	106
111	103	103	103	103	104	104
112	101	101	101	100	100	100
113	99	99	99	95	96	96
114	96	96	96	93	93	93
115	92	93	94	93	93	94
116	89	89	90	88	88	88
117	89	89	89	85	85	86
118	85	85	85	85	85	86
119	83	83	83	82	83	83
122	109	109	109	108	109	109
123	105	106	107	106	107	107
124	103	103	103	100	101	101
125	101	101	101	98	98	98
126	98	99	99	97	98	98
127	96	97	98	95	95	95
128	94	94	94	91	92	92
129	89	89	89	86	87	87
130	85	86	87	83	84	84
134	110	110	110	109	109	109
135	107	108	109	105	105	105
136	105	105	105	105	106	106
137	101	102	103	100	100	101
138	99	100	101	–	–	–
139	98	98	98	95	95	95
140	96	96	96	93	93	93
141	92	92	92	92	92	93
142	90	90	90	91	91	92
146	45	45	45	17	21	24
147	35	36	37	38	39	39
148	41	42	43	43	44	44

-continued-

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Station	Depth (m) from echo sounder[a]			Depth (m) from logger[b]		
	Station Min	Station Ave	Station Max	Logger Min	Logger Ave	Logger Max
149	34	35	37	34	34	35
150	52	52	52	–	–	–
151	59	59	59	59	59	60
152	59	59	59	58	58	59
157	68	68	68	67	68	68
158	67	67	68	–	–	–
159	61	62	63	60	61	61
160	59	59	59	60	60	61
167	70	70	70	68	69	69
168	68	68	68	66	67	67
169	65	65	65	63	64	64
170	61	62	63	61	61	62
171	52	52	52	49	49	50
172	56	56	56	53	54	54
173	57	58	59	57	58	58
177	76	76	76	74	75	75
178	68	68	68	69	70	70
179	63	63	63	61	62	62
180	59	59	59	58	59	59
181	43	43	43	43	44	44
182	52	52	52	49	50	50
183	56	57	57	57	57	57
184	61	61	61	59	59	60
187	72	72	72	71	71	71
188	67	67	67	67	68	68
189	61	61	61	59	59	60
190	50	50	50	48	48	49
191	37	37	37	38	38	39
192	48	48	48	49	49	50
193	56	56	56	–	–	–
194	61	61	61	60	60	61
195	63	63	63	64	64	65
196	56[d]	56[d]	56[d]	55	55	56
197	59	59	59	57	57	58
198	63	63	63	60	61	61

-continued-

	Depth (m) from echo sounder[a]			Depth (m) from logger[b]		
Station	Station Min	Station Ave	Station Max	Logger Min	Logger Ave	Logger Max
199	59	59	59	57	57	58
200	61	61	61	60	60	61
201	32[c]	32[c]	34[c]	32	33	33
202	48	49	50	47	48	49
203	30	32	34	33	33	34

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

[c] Depths were recorded from the vessel's echo sounder at the setting of each of the four pots in the station.

Appendix B2.–Comparison of depths recorded from the echo sounder at the setting of each pot in the 4-pot stations fished in Stratum 3 during the 2013 St. Matthew Island blue king crab survey, with the depths recorded by data loggers deployed in the second or third pot set at the same station.

Station	Pot in station[a]	Depth (m) from echo sounder[b]	Depth (m) from logger[c]		
			Logger Min	Logger Ave	Logger Max
301	1	20	–	–	–
	2	26	28	29	30
	3	31	–	–	–
	4	37	–	–	–
302	1	20	–	–	–
	2	26	27	28	29
	3	31	–	–	–
	4	37	–	–	–
303	1	20	–	–	–
	2	26	26	26	27
	3	31	–	–	–
	4	37	–	–	–
304	1	20	–	–	–
	2	26	24	25	26
	3	31	–	–	–
	4	37	–	–	–
305	1	20	–	–	–
	2	26	26	27	28
	3	31	–	–	–
	4	37	–	–	–
306	1	20	–	–	–
	2	26	–	–	–
	3	31	31	32	32
	4	37	–	–	–
307	1	37	–	–	–
	2	31	32	32	32
	3	26	–	–	–
	4	20	–	–	–

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Station	Pot in station[a]	Depth (m) from echo sounder[b]	Depth (m) from logger[c] Logger Min	Logger Ave	Logger Max
308	1	20	–	–	–
	2	26	–	–	–
	3	31	29	30	30
	4	37	–	–	–
309	1	37	–	–	–
	2	31	–	–	–
	3	26	26	26	27
	4	20	–	–	–
310	1	20	–	–	–
	2	26	26	27	27
	3	31	–	–	–
	4	37	–	–	–

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

Appendix B3.–Comparison of depths recorded from the echo sounder at setting of the first and fourth pot in the 4-pot stations fished in Stratum 4 during the special project conducted in conjunction with the 2013 St. Matthew Island blue king crab survey with the depths recorded by data loggers deployed in the second or third pot set at the same station.

	Depth (m) from echo sounder[a]			Depth (m) from logger[b]		
Station	Station Min	Station Ave	Station Max	Logger Min	Logger Ave	Logger Max
401	43	43	43	41	41	42
402	52[c]	52[c]	52[c]	51	51	52
403	41	41	41	40	41	41
404	48	48	48	48	49	49
405	45[c]	45[c]	45[c]	46	47	47
406	46	46	46	47	48	48
407	54	54	54	55	55	56
408	35	36	37	35	36	37
409	45[c]	45[c]	45[c]	43	43	44
410	52[c]	52[c]	52[c]	51	52	52
411	61[c]	61[c]	61[c]	60	61	62
412	52	52	52	50	51	51
413	56	56	56	–	–	–
414	63	64	65	66	67	67
415	56	56	56	55	55	56
416	56	57	57	55	55	56
417	68	68	68	66	66	67
418	–	–	–	61	62	62
419	59[c]	59[c]	59[c]	57	57	58
420	59	59	59	58	59	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 the data loggers were corrected for the height of the data logger above the ocean floor due to its position in the deployed pot by adding 0.8 m.

[c] Depth was recorded from the vessel's echo sounder at only the setting of first of the four pots in the station.

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

Appendix C1.–Details on the stations fished during the 2013 St. Matthew Island blue king crab pot survey, catch (number of crab) of blue king crab per station, and catch of snow crab per station; numbers in parentheses in the column for legal male blue king crab are the number of legal male blue king crab that were tagged and released at the station.

										Blue King Crab				Snow Crab		
		Location		Lift	Soak	Depth	Temperature (°C)			Male				Male		
Station	Stratum	Lat N	Long W	Date	(hrs)	(m)	Avg	Min	Max	Legal		Sublegal	Female	Legal	Sublegal	Female
1	1	60.46	173.92	9/12	30	79	-0.5	-0.6	-0.3	1	(1)	1	0	0	72	23
2	1	60.46	173.75	9/12	30	70	-0.8	-0.9	-0.7	0	(0)	1	0	4	109	71
3	1	60.46	173.58	9/12	30	65	-0.9	-0.9	-0.8	1	(1)	0	0	1	1	0
4	2	60.46	173.42	9/12	30	60	-0.6	-0.7	-0.4	13	(13)	4	0	0	0	0
5	2	60.46	173.25	9/13	33	53	1.6	0.7	2.9	67	(25)	125	14	0	0	0
6	1	60.38	173.92	9/12	31	83	-0.5	-0.7	-0.2	1	(1)	2	0	5	123	121
7	1	60.38	173.75	9/12	33	76	-0.8	-0.8	-0.8	1	(1)	1	1	1	100	13
8	1	60.38	173.58	9/12	31	67	-0.8	-0.9	-0.7	4	(4)	5	1	0	8	3
9	2	60.38	173.42	9/12	31	62	-0.6	-0.7	-0.4	7	(7)	5	0	0	0	0
10	2	60.38	173.25	9/13	29	56	-0.7	-0.8	-0.4	25	(20)	11	1	0	1	0
11	2	60.38	173.08	9/14	33	50	3.4	2.0	4.1	109	(25)	84	67	0	0	0
12	2	60.33	173.33	9/12	31	60	-0.7	-0.8	-0.5	12	(10)	6	2	0	0	0
13	2	60.33	173.17	9/14	34	56	0.3	-0.3	1.4	45	(20)	33	1	0	0	0
14	2	60.33	173.00	9/14	31	51	4.0	2.8	4.5	95	(25)	24	91	0	0	0
15	1	60.29	173.92	9/11	31	86	0.0	-0.1	0.0	1	(1)	2	0	1	150	58
16	1	60.29	173.75	9/11	31	77	-0.5	-0.7	-0.4	1	(1)	2	0	0	8	1
17	1	60.29	173.58	9/11	31	70	-0.8	-0.8	-0.7	0	(0)	2	1	0	3	4
18	2	60.29	173.42	9/11	30	65	-0.8	-0.8	-0.7	2	(2)	2	0	0	10	2
19	2	60.29	173.25	9/16	33	59	-0.6	-0.7	-0.4	19	(17)	15	4	0	0	0
20	2	60.29	173.08	9/14	30	59	0.9	0.3	1.4	39	(25)	62	2	0	0	0
21	2	60.29	172.92	9/14	30	48	3.9	2.8	4.9	85	(25)	37	126	0	0	0
22	2	60.29	172.42	9/18	29	39	5.3	4.7	5.7	2	(2)	1	325	0	0	0
23	1	60.29	172.08	9/20	30	58	0.4	-0.1	1.6	3	(3)	5	1	0	2	8
24	2	60.25	173.33	9/11	30	65	-0.7	-0.8	-0.5	5	(5)	6	1	0	2	0
25	2	60.25	173.17	9/16	33	60	0.0	-0.4	0.3	33	(22)	48	2	0	0	0
26	2	60.25	173.00	9/16	31	59	1.2	0.4	2.7	122	(25)	94	98	0	0	0
27[a]	1	60.21	173.92	9/11	31	89	0.3	-0.1	0.5	0	(0)	0	0	3	95	12
28	1	60.21	173.75	9/11	32	85	–	–	–	10	(8)	9	0	2	63	18
29	1	60.21	173.58	9/11	32	77	-0.7	-0.8	-0.4	1	(1)	2	0	3	18	9
30	2	60.21	173.42	9/11	32	67	-0.7	-0.7	-0.6	4	(4)	2	3	0	7	3
31	2	60.21	173.25	9/15	32	62	-0.6	-0.7	-0.5	16	(12)	9	3	0	2	1
32	2	60.21	173.08	9/16	32	61	-0.2	-0.4	0.2	22	(14)	68	8	0	0	0
33	2	60.21	172.92	9/16	30	57	1.9	1.1	3.4	98	(25)	63	123	0	0	0
34	2	60.21	172.58	9/17	30	48	3.6	3.3	4.3	27	(19)	22	51	0	0	0
35	2	60.21	172.42	9/19	31	58	4.0	3.5	4.4	70	(25)	63	52	0	0	0
36	1	60.21	172.25	9/20	32	56	3.5	3.0	3.9	25	(23)	176	20	0	0	0
37[b]	1	60.21	172.08	9/20	30	58	0.1	-0.2	0.5	3	(2)	6	1	0	59	142
38	2	60.16	173.33	9/10	31	70	-0.7	-0.7	-0.6	3	(3)	1	0	0	4	5
39	2	60.17	173.17	9/15	31	63	-0.5	-0.6	-0.3	12	(10)	22	1	0	1	0
40	2	60.17	173.00	9/16	29	59	-0.4	-0.6	-0.2	25	(23)	16	2	0	0	1
41	2	60.17	172.83	9/17	35	56	3.2	2.1	4.4	243	(25)	77	281	0	0	0
42	2	60.17	172.67	9/17	31	55	2.8	1.4	3.7	94	(25)	34	137	0	0	0
43	2	60.17	172.50	9/19	34	56	0.7	0.6	0.8	198	(25)	96	161	0	0	0
44	1	60.13	173.92	9/10	32	93	0.5	0.5	0.6	22	(20)	5	0	8	97	19
45	1	60.12	173.75	9/10	32	89	0.4	0.2	0.4	2	(2)	0	0	1	14	4

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		Location		Lift	Soak	Depth	Temperature (°C)			Blue King Crab Male				Snow Crab Male		
Station	Stratum	Lat N	Long W	Date	(hrs)	(m)	Avg	Min	Max	Legal		Sublegal	Female	Legal	Sublegal	Female
46	1	60.12	173.58	9/10	31	79	-0.3	-0.5	0.0	1	(1)	1	0	0	10	1
47	2	60.12	173.42	9/10	31	73	-0.3	-0.5	-0.2	1	(1)	0	0	0	11	0
48	2	60.13	173.25	9/10	31	68	-0.7	-0.7	-0.4	2	(1)	0	0	1	14	7
49	2	60.13	173.08	9/15	31	66	-0.7	-0.8	-0.5	15	(11)	22	3	0	0	1
50	2	60.13	172.92	9/17	34	62	-0.4	-0.8	0.1	19	(18)	18	2	0	0	0
51	2	60.13	172.75	9/17	32	57	0.8	-0.2	2.3	191	(25)	43	230	0	0	0
52	2	60.13	172.58	9/19	33	57	0.3	0.0	0.4	54	(25)	52	19	0	0	0
53	2	60.13	172.42	9/19	31	61	–	–	–	22	(17)	21	1	0	0	0
54	1	60.13	172.25	9/20	32	59	1.1	0.6	1.4	3	(3)	8	2	0	0	0
55	1	60.13	172.08	9/20	31	60	-0.5	-0.7	-0.2	1	(1)	3	0	1	30	57
56	2	60.08	173.33	9/15	29	73	-0.3	-0.4	-0.1	3	(2)	1	0	1	22	10
57	2	60.08	173.17	9/15	30	67	-0.6	-0.7	-0.6	4	(4)	7	1	0	1	0
58	2	60.08	173.00	9/15	31	64	-0.8	-0.8	-0.7	9	(6)	7	2	0	7	0
59	2	60.08	172.83	9/17	33	63	–	–	–	17	(12)	15	3	0	0	0
60	2	60.08	172.67	9/19	32	59	-0.3	-0.4	-0.1	15	(12)	14	2	0	0	0
61	2	60.08	172.50	9/19	32	61	-0.1	-0.2	0.0	6	(4)	3	0	0	2	0
62	1	60.04	173.92	9/10	32	94	0.7	0.6	0.7	12	(8)	5	0	7	97	8
63	1	60.04	173.75	9/10	33	92	0.6	0.5	0.7	2	(1)	0	0	12	245	134
64	1	60.04	173.58	9/10	33	83	0.5	0.3	0.8	2	(2)	6	0	1	63	38
65	2	60.04	173.42	9/9	31	75	0.2	0.2	0.3	2	(1)	2	0	0	27	20
66	2	60.04	173.25	9/15	30	73	-0.4	-0.5	-0.3	2	(2)	5	0	1	7	2
67	2	60.04	173.08	9/15	30	69	-0.7	-0.8	-0.4	6	(5)	5	2	0	3	0
68	2	60.04	172.92	9/15	30	67	–	–	–	9	(5)	10	0	0	1	0
69	2	60.04	172.75	9/8	31	64	-1.1	-1.1	-1.0	0	(0)	5	2	0	0	1
70	2	60.04	172.58	9/8	32	65	-0.7	-1.0	0.0	3	(3)	3	1	0	1	0
71	2	60.04	172.42	9/8	31	69	-1.0	-1.1	-0.9	3	(3)	0	0	0	44	0
72	1	60.04	172.25	9/20	31	68	-0.7	-0.8	-0.7	0	(0)	0	0	0	1	8
73	1	60.04	172.08	9/20	31	66	-0.8	-0.9	-0.7	0	(0)	1	0	1	14	17
74	1	59.96	173.92	9/9	32	97	0.8	0.7	0.8	20	(18)	8	0	9	10	0
75	1	59.96	173.75	9/9	31	93	0.7	0.7	0.7	4	(2)	1	0	3	20	2
76	1	59.96	173.58	9/9	31	90	–	–	–	16	(13)	69	0	0	0	1
77	1	59.96	173.42	9/9	31	84	0.3	0.1	0.4	1	(1)	3	0	1	21	8
78	1	59.96	173.25	9/8	31	77	-0.3	-0.3	-0.2	0	(0)	1	0	1	29	12
79	1	59.96	173.08	9/8	31	73	-0.1	-0.3	0.0	2	(2)	1	0	0	3	2
80[b]	1	59.96	172.92	9/8	31	71	-0.6	-0.7	-0.6	2	(1)	2	0	0	2	2
81	1	59.96	172.75	9/8	32	69	-0.6	-0.9	-0.3	1	(1)	0	0	0	4	0
82	1	59.96	172.58	9/8	32	70	-0.9	-1.0	-0.8	1	(1)	2	0	0	23	2
83	1	59.96	172.42	9/8	32	73	-0.9	-1.0	-0.7	1	(1)	1	0	6	262	102
84	1	59.96	172.25	9/20	31	71	-0.6	-0.7	-0.4	0	(0)	0	0	0	8	9
85	1	59.96	172.08	9/20	31	69	-0.7	-0.8	-0.7	0	(0)	0	0	0	18	6
86	1	59.88	173.92	9/9	32	100	0.8	0.8	0.9	10	(10)	11	0	0	5	0
87	1	59.88	173.75	9/9	33	97	0.7	0.7	0.8	33	(20)	18	0	2	0	0
88	1	59.88	173.58	9/9	33	94	0.6	0.6	0.7	5	(4)	8	0	8	48	5
89	1	59.88	173.42	9/9	33	90	0.4	0.3	0.5	7	(6)	8	0	4	7	13
90	1	59.87	173.25	9/7	32	84	0.4	0.3	0.5	0	(0)	1	0	1	37	3

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										Blue King Crab				Snow Crab		
		Location		Lift	Soak	Depth	Temperature (°C)			Male				Male		
Station	Stratum	Lat N	Long W	Date	(hrs)	(m)	Avg	Min	Max	Legal		Sublegal	Female	Legal	Sublegal	Female
91	1	59.88	173.08	9/7	32	78	0.4	0.3	0.5	3	(2)	0	0	0	6	1
92	1	59.87	172.92	9/7	32	79	–	–	–	0	(0)	1	0	1	24	0
93	1	59.88	172.75	9/7	32	75	-0.1	-0.2	0.0	1	(0)	0	0	0	2	0
94	1	59.88	172.58	9/7	32	75	-0.2	-0.3	-0.2	0	(0)	1	0	1	42	1
95	1	59.87	172.42	9/7	32	74	-0.5	-0.7	-0.3	3	(3)	2	0	3	133	123
96	1	59.88	172.25	9/30	29	75	-0.7	-0.8	-0.6	0	(0)	0	0	11	113	66
97	1	59.88	172.08	9/30	29	76	-1.0	-1.0	-0.9	0	(0)	0	1	6	123	117
98	1	59.79	173.92	9/4	29	102	0.9	0.7	1.0	19	(14)	17	0	4	5	0
99	1	59.79	173.75	9/4	26	100	0.8	0.5	0.9	9	(8)	6	0	1	3	0
100	1	59.79	173.58	9/5	31	97	0.5	0.5	0.6	21	(16)	18	0	7	2	1
101	1	59.79	173.42	9/5	30	96	–	–	–	7	(7)	2	0	1	7	1
102	1	59.79	173.25	9/6	29	87	0.4	0.3	0.7	12	(8)	7	0	2	5	0
103	1	59.79	173.08	9/6	29	86	0.3	0.2	0.4	1	(1)	1	0	0	5	6
104	1	59.79	172.92	9/6	29	84	0.1	0.0	0.2	1	(1)	1	0	3	59	61
105	1	59.79	172.75	9/7	31	80	0.1	-0.1	0.3	2	(2)	1	0	1	4	1
106	1	59.79	172.58	9/7	31	79	-0.2	-0.2	-0.1	0	(0)	2	0	1	19	0
107[b]	1	59.79	172.42	9/7	31	79	-0.3	-0.4	-0.2	1	(1)	0	0	1	152	67
108	1	59.79	172.25	9/30	29	80	-0.7	-0.7	-0.6	1	(1)	0	0	5	236	186
109	1	59.79	172.08	9/30	29	77	-0.8	-0.9	-0.8	0	(0)	0	0	7	144	50
110	1	59.71	173.92	9/4	28	106	1.3	1.1	1.4	4	(4)	5	0	39	18	0
111[c]	1	59.71	173.75	9/4	27	104	1.0	1.0	1.1	2	(2)	2	0	5	378	166
112	1	59.71	173.58	9/5	31	100	1.1	0.9	1.2	15	(14)	7	0	5	4	0
113	1	59.71	173.42	9/5	30	96	1.0	0.8	1.1	11	(9)	9	0	5	28	1
114	1	59.71	173.25	9/6	30	93	1.1	1.0	1.2	6	(4)	1	0	8	30	11
115	1	59.71	173.08	9/6	29	93	1.1	0.8	1.3	0	(0)	2	0	1	1	0
116	1	59.71	172.92	9/6	29	88	1.1	0.1	1.5	0	(0)	1	0	4	33	64
117	1	59.71	172.75	10/1	36	85	0.5	0.5	0.7	2	(2)	1	0	4	80	66
118	1	59.71	172.58	9/30	31	85	-0.1	-0.3	0.0	0	(0)	0	0	4	175	375
119	1	59.71	172.42	9/30	30	83	-0.4	-0.4	-0.4	0	(0)	0	0	4	320	356
122	1	59.63	173.92	9/4	28	109	1.4	1.4	1.5	4	(3)	7	0	47	19	0
123	1	59.63	173.75	9/4	28	107	1.2	1.0	1.4	1	(1)	3	0	47	157	1
124	1	59.63	173.58	9/5	31	101	1.2	1.1	1.3	3	(3)	3	0	3	11	2
125	1	59.63	173.42	9/5	31	98	1.3	1.2	1.4	1	(1)	2	0	9	5	0
126	1	59.63	173.25	9/6	30	98	1.3	1.3	1.6	8	(8)	10	1	7	13	0
127	1	59.63	173.08	9/6	30	95	1.5	1.4	1.5	2	(1)	0	0	4	7	0
128	1	59.63	172.92	9/6	30	92	1.2	0.9	1.5	0	(0)	0	0	1	10	1
129	1	59.63	172.75	10/1	35	87	1.1	0.8	1.3	1	(1)	0	0	6	310	644
130	1	59.63	172.58	9/30	31	84	0.9	0.8	0.9	0	(0)	0	0	8	296	254
134	1	59.54	173.92	10/1	31	109	2.0	1.9	2.1	5	(4)	10	0	43	61	0
135	1	59.54	173.75	10/1	32	105	2.0	1.9	2.1	4	(3)	0	0	16	13	2
136	1	59.54	173.58	10/1	32	106	1.8	1.8	1.9	2	(1)	1	0	5	9	1
137	1	59.54	173.42	10/1	33	100	1.8	1.7	1.8	0	(0)	1	0	13	219	254
138	1	59.54	173.25	10/1	34	100	–	–	–	3	(1)	6	0	9	59	14

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		Location		Lift	Soak	Depth	Temperature (°C)			Blue King Crab				Snow Crab		
										Male				Male		
Station	Stratum	Lat N	Long W	Date	(hrs)	(m)	Avg	Min	Max	Legal		Sublegal	Female	Legal	Sublegal	Female
139	1	59.54	173.08	10/1	34	95	1.5	1.5	1.5	3	(2)	1	0	1	2	0
140	1	59.54	172.92	10/1	34	93	1.5	1.4	1.5	1	(1)	0	0	2	12	10
141[b]	1	59.54	172.75	9/30	32	92	1.3	1.0	1.3	1	(1)	0	0	6	214	281
142	1	59.54	172.58	9/30	32	91	1.1	1.1	1.2	0	(0)	0	0	13	294	178
146[d]	2	60.25	172.83	9/16	31	21	4.4	3.4	5.3	0	(0)	4	1	0	0	0
147	2	60.37	172.92	9/14	32	39	5.9	5.3	6.2	2	(2)	4	5	0	0	0
148	2	60.42	173.00	9/14	32	44	5.5	5.0	6.1	7	(6)	9	37	0	0	0
149	2	60.46	173.08	9/13	30	34	5.4	4.7	6.3	1	(1)	5	0	0	0	0
150	2	60.42	173.17	9/13	30	52	–	–	–	46	(20)	101	25	0	0	0
151	2	60.42	173.33	9/13	34	59	-0.1	-0.8	0.4	31	(23)	28	0	0	0	0
152	2	60.50	173.33	9/13	32	58	0.4	-0.2	1.7	31	(20)	34	2	0	0	0
157	1	60.79	173.25	9/25	29	68	-1.0	-1.1	-0.9	0	(0)	0	0	1	115	49
158	1	60.79	173.08	9/25	29	67	–	–	–	1	(0)	0	0	0	25	19
159	1	60.79	172.92	9/25	29	61	0.2	-0.6	1.5	4	(3)	3	0	0	1	0
160	1	60.79	172.75	9/24	34	60	1.0	-0.1	2.7	0	(0)	0	0	0	0	0
167	1	60.71	173.58	9/26	32	69	-0.8	-0.9	-0.7	0	(0)	2	0	0	161	21
168	1	60.71	173.42	9/26	32	67	-0.6	-0.7	-0.5	0	(0)	0	0	0	43	36
169	1	60.71	173.25	9/25	29	64	-0.2	-0.6	0.2	2	(1)	4	0	0	3	0
170	1	60.71	172.92	9/24	31	61	2.3	1.7	3.2	23	(19)	80	11	0	0	0
171	1	60.71	172.75	9/23	30	49	2.3	1.8	3.9	5	(5)	28	1	0	1	0
172	1	60.71	172.58	9/23	29	54	3.0	2.9	3.1	0	(0)	0	0	0	0	0
173	1	60.71	172.42	9/23	29	58	-0.5	-0.7	0.1	0	(0)	0	0	0	28	26
177	1	60.63	173.75	9/26	33	75	-0.8	-0.8	-0.7	0	(0)	1	0	2	132	112
178	1	60.62	173.58	9/26	33	70	-0.5	-0.7	-0.4	2	(2)	0	0	1	115	41
179	1	60.62	173.42	9/26	32	62	-0.1	-0.4	0.5	1	(1)	1	1	0	17	2
180	1	60.62	173.25	9/25	29	59	1.8	0.8	3.2	5	(2)	5	0	0	0	0
181	1	60.63	172.75	9/22	30	44	3.9	3.3	5.1	8	(8)	37	0	0	1	0
182	1	60.63	172.58	9/22	29	50	2.7	2.5	2.8	0	(0)	1	0	0	16	6
183	1	60.62	172.42	9/23	29	57	1.9	0.4	2.5	0	(0)	0	0	0	7	4
184	1	60.63	172.25	9/23	29	59	-0.3	-0.7	0.1	0	(0)	0	0	0	11	9
187	1	60.54	173.75	9/26	33	71	-0.7	-0.7	-0.6	3	(3)	0	0	0	26	15
188	1	60.54	173.58	9/26	34	68	-0.5	-0.5	-0.4	1	(1)	2	0	2	44	19
189	2	60.54	173.42	9/13	32	59	-0.5	-0.7	0.2	18	(14)	8	0	0	0	0
190	2	60.54	173.25	9/13	31	48	2.8	0.9	4.4	53	(20)	114	11	0	0	0
191	1	60.54	172.75	9/22	30	38	5.0	4.2	5.3	4	(4)	4	1	0	0	0
192	1	60.54	172.58	9/22	31	49	3.0	2.7	3.4	0	(0)	2	0	0	0	0
193	1	60.54	172.42	9/21	32	56	–	–	–	1	(1)	0	0	0	7	3
194	1	60.54	172.25	9/21	32	60	0.7	0.3	1.4	0	(0)	0	0	0	0	1
195	1	60.54	172.08	9/21	32	64	0.2	-0.4	0.4	0	(0)	0	0	0	0	1
196	1	60.46	172.42	9/21	31	55	2.8	1.1	4.7	1	(1)	6	0	0	1	0
197	1	60.46	172.25	9/21	31	57	0.7	0.5	1.3	4	(4)	7	0	0	4	2
198	1	60.46	172.08	9/21	32	61	0.2	-0.3	0.8	0	(0)	0	1	0	1	0
199	1	60.37	172.25	9/21	30	57	3.1	1.4	4.8	29	(18)	60	6	0	0	0

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										Blue King Crab				Snow Crab		
		Location		Lift	Soak	Depth	Temperature (°C)			Male				Male		
Station	Stratum	Lat N	Long W	Date	(hrs)	(m)	Avg	Min	Max	Legal		Sublegal	Female	Legal	Sublegal	Female
200	1	60.38	172.08	9/21	32	60	0.8	0.4	1.2	4	(4)	3	1	0	7	3
201	2	60.29	172.58	9/18	29	33	5.5	5.1	5.8	0	(0)	3	35	0	0	0
202	2	60.25	172.50	9/19	30	48	4.6	4.2	4.8	7	(6)	21	50	0	0	0
203	2	60.50	173.17	9/13	31	33	5.5	4.7	6.2	3	(3)	0	0	0	0	0
301	3	60.48	173.08	9/27	28	20–37	5.0	4.8	5.1	0	(0)	1	3	0	0	0
302	3	60.47	173.01	9/27	28	20–37	5.1	4.9	5.2	0	(0)	0	103	0	0	0
303	3	60.45	172.95	9/27	28	20–37	5.2	4.9	5.3	2	(2)	0	104	0	0	0
304	3	60.42	172.91	9/27	29	20–37	5.1	5.0	5.3	0	(0)	1	174	0	0	0
305	3	60.39	172.88	9/28	29	20–37	5.0	5.0	5.0	1	(0)	1	43	0	0	0
306[a]	3	60.37	172.83	9/28	29	20–31	5.1	5.0	5.2	0	(0)	1	28	0	0	0
307	3	60.30	172.54	9/18	29	20–37	5.7	5.3	5.8	2	(1)	3	35	0	0	0
308	3	60.31	172.48	9/18	29	20–37	5.7	5.4	5.9	3	(3)	4	195	0	0	0
309	3	60.31	172.42	9/18	31	20–37	5.3	4.8	5.7	2	(1)	7	1,346	0	0	0
310	3	60.30	172.35	9/18	33	20–37	5.1	4.7	5.4	0	(0)	2	59	0	0	0

[a] Catch of blue king crab and snow crab is from only three pots fished at the station.

[b] Catch of snow crab at the station does not include 1 crab for which sex was not recorded.

[c] Catch of male snow crab at the station does not include 24 males for which size and legal status were not recorded.

[d] Data from this station are not presented in Results due to uncertainties resulting from the depth data recorded at this station; see Methods and Appendix B1.

Appendix C2.–Details on the stations fished in Stratum 4 during the special project conducted in conjunction with the 2013 St. Matthew Island blue king crab pot survey, catch (number of crab) of blue king crab per station, and catch of snow crab per station. Numbers in parentheses in the column for legal male blue king crab are the number of legal male blue king crab that were tagged and released at the station.

										Blue King Crab				Snow Crab		
		Location		Lift	Soak	Depth	Temperature (°C)			Male				Male		
Station	Stratum	Lat N	Long W	Date	(hrs)	(m)	Avg	Min	Max	Legal		Sublegal	Female	Legal	Sublegal	Female
401	4	60.54	172.68	9/22	31	41	3.3	3.1	4.3	8	(8)	32	0	0	0	0
402	4	60.54	172.51	9/21	31	51	2.8	2.3	3.2	1	(1)	2	0	0	1	0
403	4	60.58	172.77	9/22	30	41	4.4	3.6	5.1	0	(0)	6	0	0	2	0
404	4	60.58	172.60	9/22	29	49	2.9	2.7	3.1	0	(0)	1	0	0	3	0
405	4	60.63	172.86	9/24	30	47	3.4	2.6	5.1	8	(6)	54	6	0	0	0
406	4	60.62	172.69	9/22	29	48	3.3	3.1	3.5	24	(23)	40	0	0	0	0
407	4	60.63	172.53	9/23	29	55	2.4	2.0	2.8	1	(1)	1	2	0	1	0
408[a]	4	60.67	172.95	9/25	30	36	3.5	2.4	4.2	8	(8)	16	1	0	0	0
409	4	60.67	172.78	9/24	31	43	2.3	1.9	3.0	6	(6)	29	1	0	0	0
410	4	60.67	172.62	9/23	28	52	3.0	2.8	3.1	0	(0)	2	0	0	0	0
411	4	60.71	172.88	9/24	32	61	2.4	1.8	3.1	11	(6)	54	4	0	0	0
412	4	60.71	172.71	9/23	29	51	3.4	2.3	3.7	7	(6)	25	0	0	0	0
413	4	60.71	172.54	9/23	29	56	–	–	–	0	(0)	1	0	0	0	0
414	4	60.75	172.97	9/25	30	67	2.0	1.2	2.9	5	(4)	6	0	0	0	0
415	4	60.75	172.81	9/24	33	55	2.1	1.5	2.8	12	(11)	10	0	0	0	0
416	4	60.75	172.64	9/24	35	55	3.2	2.9	3.5	1	(0)	2	0	0	0	0
417	4	60.79	173.07	9/25	29	66	0.0	-0.8	0.6	0	(0)	3	0	0	15	8
418	4	60.79	172.90	9/25	30	62	0.2	-0.4	1.2	0	(0)	0	0	0	2	6
419	4	60.79	172.73	9/24	34	57	1.2	0.7	2.8	0	(0)	2	0	0	0	0
420	4	60.79	172.57	9/24	34	59	-0.5	-0.8	0.8	0	(0)	0	0	1	7	4

[a] Catch of blue king crab and snow crab is from only three pots fished at the station.

APPENDIX D. SURVEY AND SPECIAL PROJECT CATCH COMPOSITION

Appendix D1.–Catch composition from all 760 pots fished at all 190 stations during the 2013 St. Matthew Island blue king crab pot survey, with taxa ranked by number captured.

Catch Composition–2013 St. Matthew Island Survey		
Common Name	Scientific Name	Number
snow crab	*Chionoecetes opilio*	11,954
blue king crab	*Paralithodes platypus*	9,036
circumboreal toad crab	*Hyas coarctatus*	8,766
fuzzy hermit crab	*Pagurus trigonocheirus*	1,907
Pacific cod	*Gadus macrocephalus*	1,122
brittle star unidentified	Class Ophiuroidea	707
longfinger hermit crab	*Pagurus rathbuni*	191
walleye pollock	*Theragra chalcogramma*	191
great sculpin	*Myoxocephalus polyacanthocephalus*	159
Arctic whelk	*Colus kroyeri*	63
Pacific lyre crab	*Hyas lyratus*	62
Alaska skate	*Bathyraja parmifera*	60
sand dollar unidentified	Order Clypeasteroida	55
Pacific halibut	*Hippoglossus stenolepis*	54
Aleutian hermit crab	*Pagurus aleuticus*	49
angled buccinum (or angular whelk)	*Buccinum angulosum*	44
sunrise jellyfish	*Chrysaora melanaster*	44
knobby six-rayed star	*Leptasterias polaris*	42
silky buccinum (or ladder whelk)	*Buccinum scalariforme*	26
rose sea star	*Crossaster papposus*	26
jellyfish unidentified	Class Scyphozoa	24
golden beringius snail	*Beringius* sp.	22
flatfish unidentified	Order Pleuronectiformes	20
Neptune snail unidentified	*Neptunea*	17
Arctic star	*Leptasterias arctica*	16
hybrid Tanner crab	*Chionoecetes*	15
Tanner crab	*Chionoecetes bairdi*	14
hermit crab unidentified	Family Paguridae	13
starfish unidentified	Class Asteroidea	13
Leptasterias six-armed star unidentified	*Leptasterias*	13
snail unidentified	Class Gastropoda	13
lyre buccinum (or sinuous whelk)	*Buccinum plectrum*	12
yellowfin sole	*Limanda aspera*	11
depressed scale worm	*Eunoe depressa*	11
Pribilof neptune (or Pribilof whelk)	*Neptunea pribiloffensis*	11
polar whelk	*Buccinum polare*	11
black mussel	*Musculus niger*	10
red king crab	*Paralithodes camtschaticus*	7
arrowtooth flounder	*Atheresthes stomias*	7

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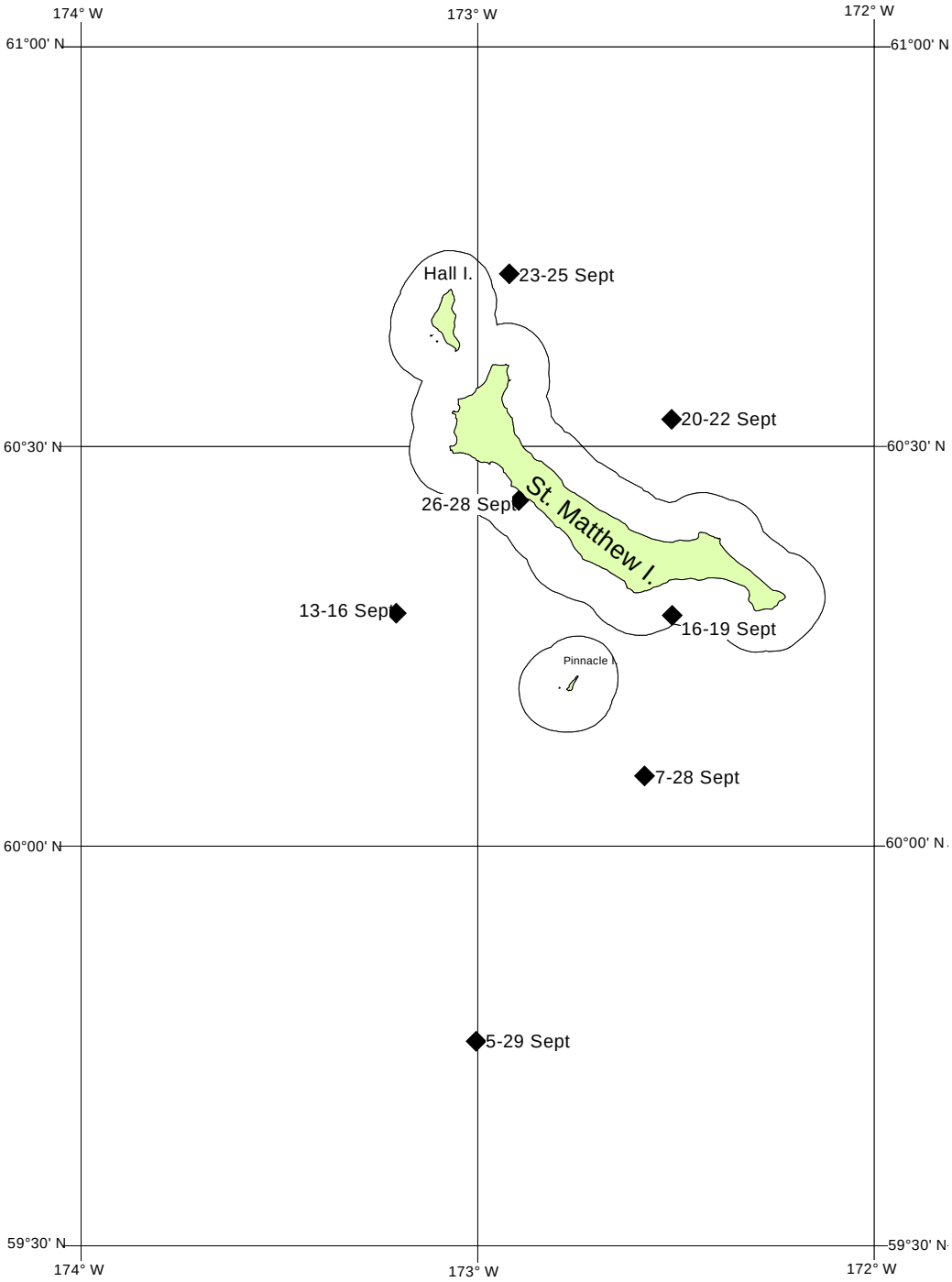
Common Name	Scientific Name	Number
helmet whelk	*Clinopegma magnum*	7
basket star	*Gorgonocephalus eucnemis*	6
splendid hermit crab	*Labidochirus splendescens*	5
fish unidentified	*fish unidentified*	4
hairy hermit crab (or “Dirty Harry” hermit)	*Pagurus capillatus*	4
fat whelk	*Neptunea ventricosa*	4
common mud star	*Ctenodiscus crispatus*	4
sea anemone unidentified	*Order Actiniaria*	4
empty bivalve shells	*Class Bivalvia*	4
Greenland halibut (or Greenland turbot)	*Reinhardtius hippoglossoides*	3
Irish lord	*Hemilepidotus sp.*	3
salmon snailfish	*Careproctus rastrinus*	3
northern neptune	*Neptunea heros*	3
hair crab	*Erimacrus isenbeckii*	2
bigmouth sculpin	*Hemitripterus bolini*	2
snailfish unidentified	*Family Liparidae*	2
giant octopus	*Octopus dofleini*	2
Henricia sea star unidentifed	*Henricia sp.*	2
worm unidentified	*Class Polychaeta*	2
sponge unidentified	*Phylum Porifera*	2
sea onion	*Boltenia ovifera*	2
Neptunea snail eggs	*Neptunea eggs*	2
hairy cockle	*Clinocardium ciliatum*	2
little neptune	*Neptunea borealis*	2
frilled whelk	*Volutopsius trophonius*	2
yellow Irish lord	*Hemilepidotus jordani*	1
humpy shrimp	*Pandalus goniurus*	1
whiteknee hermit crab	*Pagurus dalli*	1
green sea urchin	*Strongylocentrotus droebachiensis*	1
oblique whelk	*Colus hypolispus*	1
Hind's scallop (or reddish scallop)	*Chlamys rubida*	1
tumid sea star	*Henricia tumida*	1
Ceramaster cookie star unidentified	*Ceramaster sp.*	1
sun sea star unidentified	*Solaster sp.*	1
hydroid unidentified	*Order Hydroida*	1
bryozoan unidentified	*Phylum Bryozoa*	1

Appendix D2.–Catch composition from all 80 pots fished at the 20 Stratum 4 stations during the special project conducted concurrent with the 2013 St. Matthew Island blue king crab pot survey, with taxa ranked by number captured.

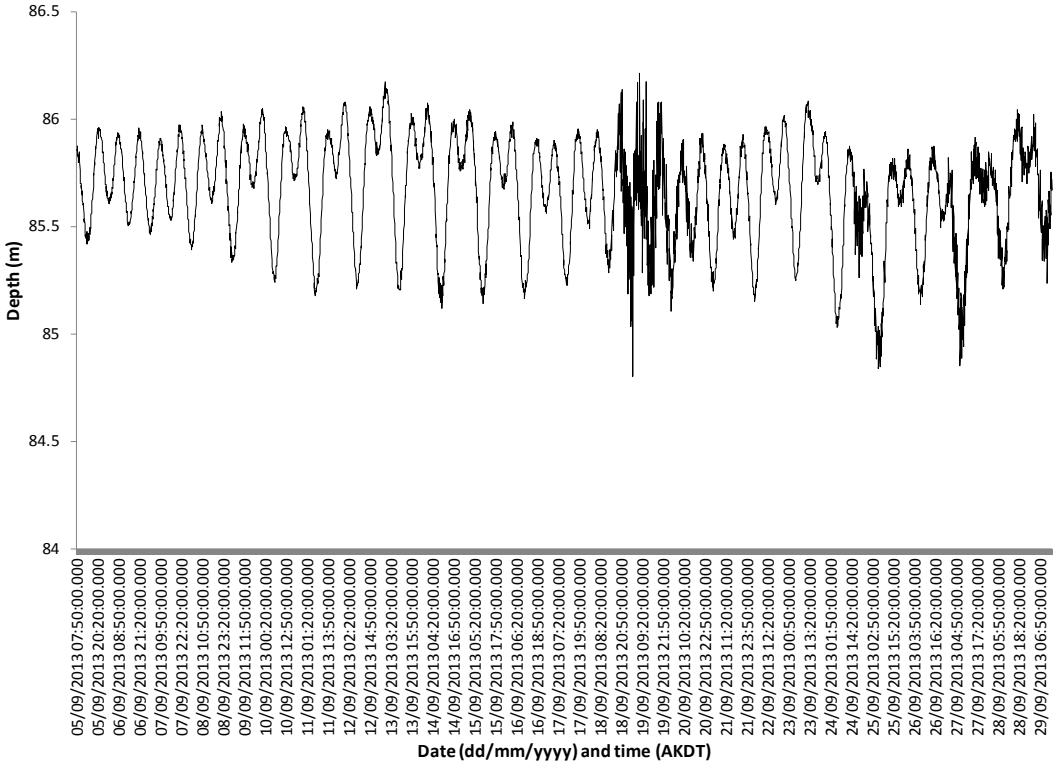
Catch Composition–Special Project (Stratum 4)		
Common Name	Scientific Name	Number
blue king crab	*Paralithodes platypus*	392
circumboreal toad crab	*Hyas coarctatus*	198
brittle star unidentified	Class Ophiuroidea	143
Pacific cod	*Gadus macrocephalus*	132
fuzzy hermit crab	*Pagurus trigonocheirus*	68
snow crab	*Chionoecetes opilio*	50
yellowfin sole	*Limanda aspera*	19
sunrise jellyfish	*Chrysaora melanaster*	18
knobby six-rayed star	*Leptasterias polaris*	17
great sculpin	*Myoxocephalus polyacanthocephalus*	16
longfinger hermit crab	*Pagurus rathbuni*	13
golden Beringius snail	*Beringius* sp.	13
walleye pollock	*Theragra chalcogramma*	7
Pacific halibut	*Hippoglossus stenolepis*	5
Alaska skate	*Bathyraja parmifera*	4
jellyfish unidentified	Class Scyphozoa	4
Pacific lyre crab	*Hyas lyratus*	3
snail unidentified	Class Gastropoda	3
flatfish unidentified	Order Pleuronectiformes	2
black mussel	*Musculus niger*	2
angled buccinum (or angular whelk)	*Buccinum angulosum*	2
fat whelk	*Neptunea ventricosa*	2
worm unidentified	Class Polychaeta	1
hermit crab unidentified	Family Paguridae	1
hairy hermit crab (or “Dirty Harry” hermit)	*Pagurus capillatus*	1
northern neptune	*Neptunea heros*	1
helmet whelk	*Clinopegma magnum*	1
lyre buccinum (or sinuous whelk)	*Buccinum plectrum*	1
rose sea star	*Crossaster papposus*	1
Arctic star	*Leptasterias arctica*	1

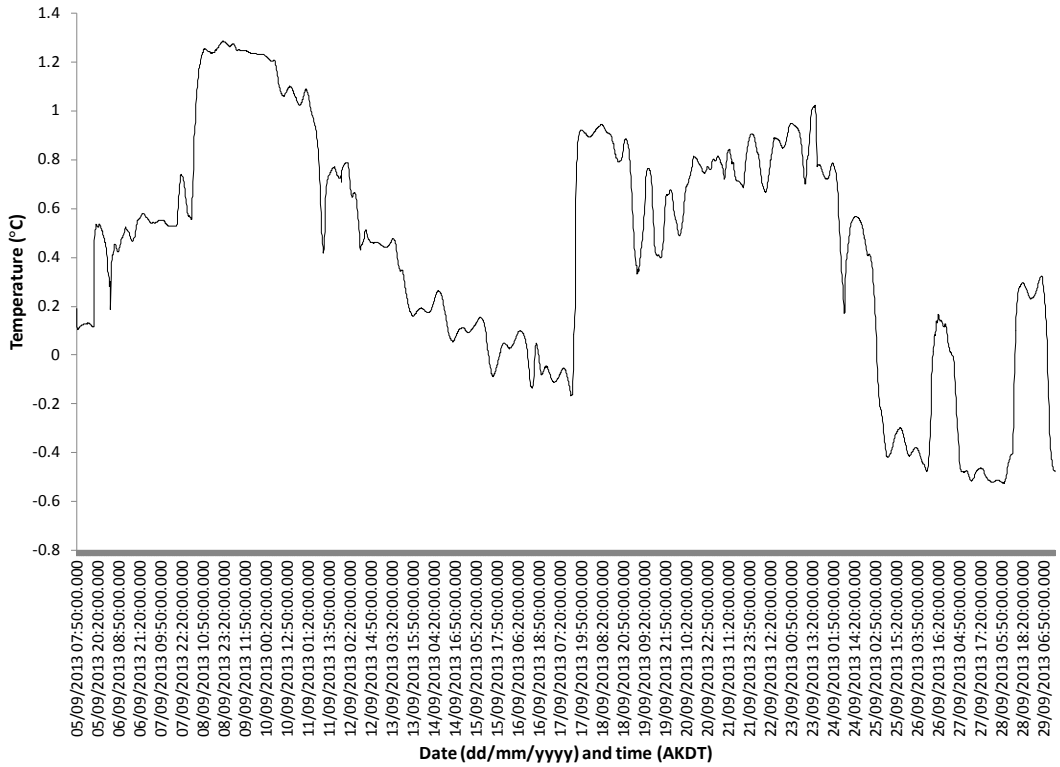
APPENDIX E. REFERENCE DEPTH AND TEMPERATURE DATA

Appendix E1.–Locations (filled diamonds) of data loggers deployed in unfished pots during the 2013 St. Matthew Island blue king crab pot survey for recording of reference oceanographic data, labeled with dates of deployment at location.

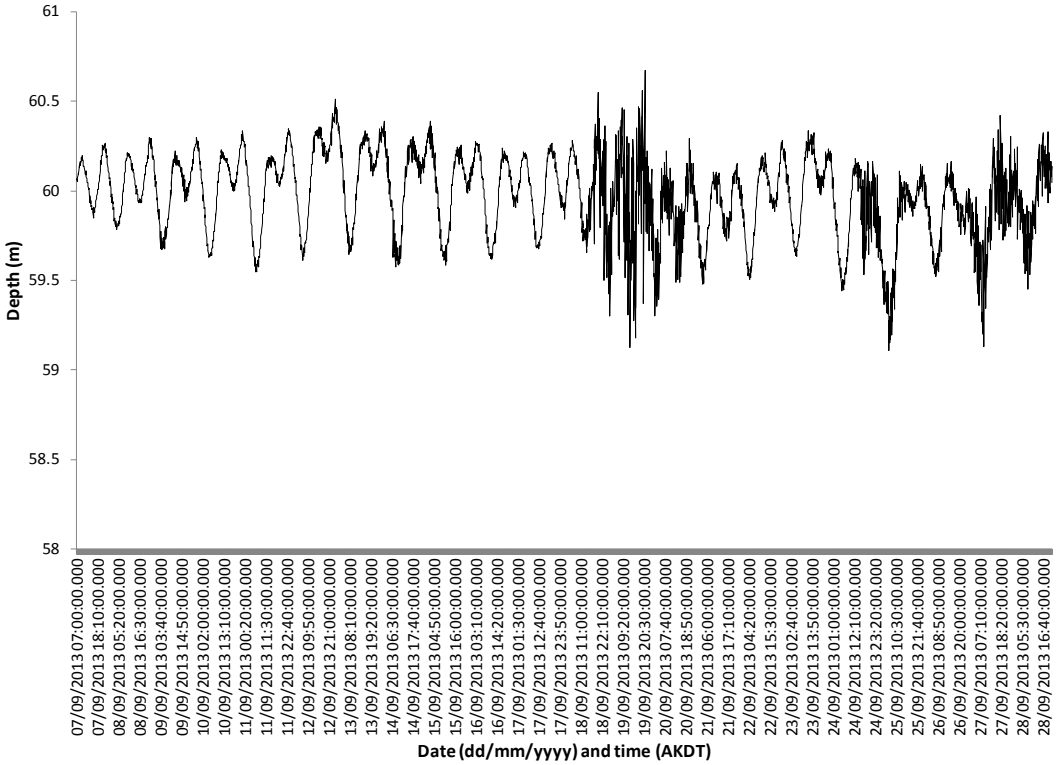


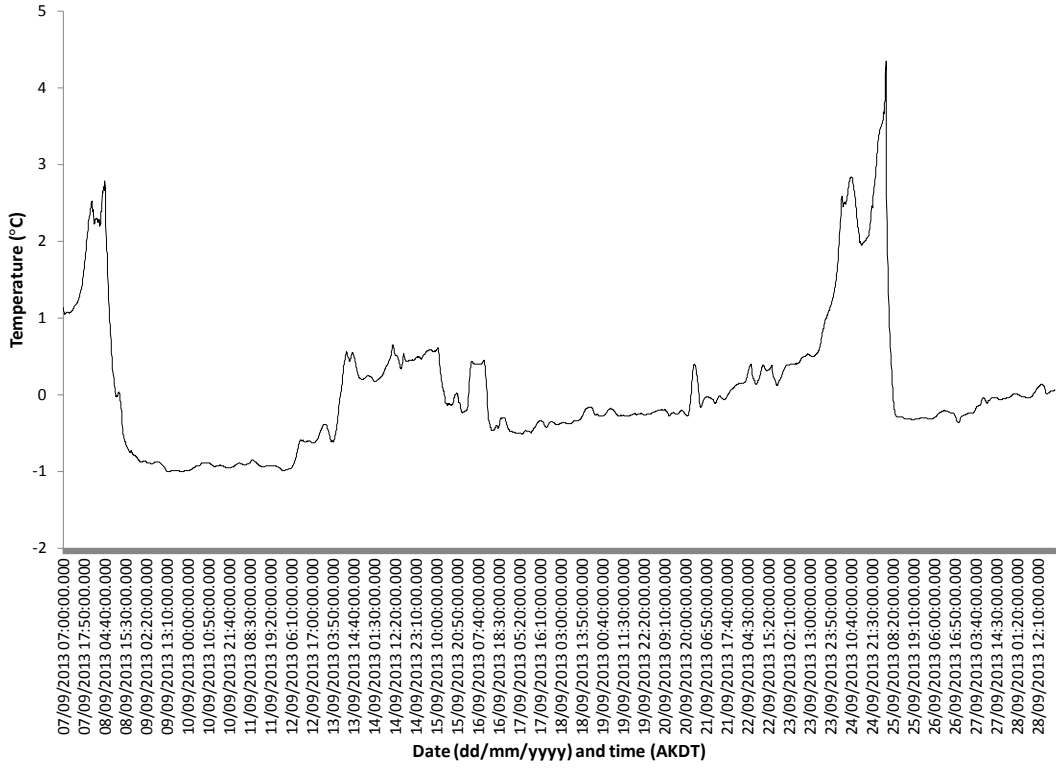
Appendix E2.–Depths and temperatures recorded every 10 min for a period of 582 h by data logger at lat 59°45.36'N, long 173°00.25'W during 5–29 September 2013 (see Appendix E1).



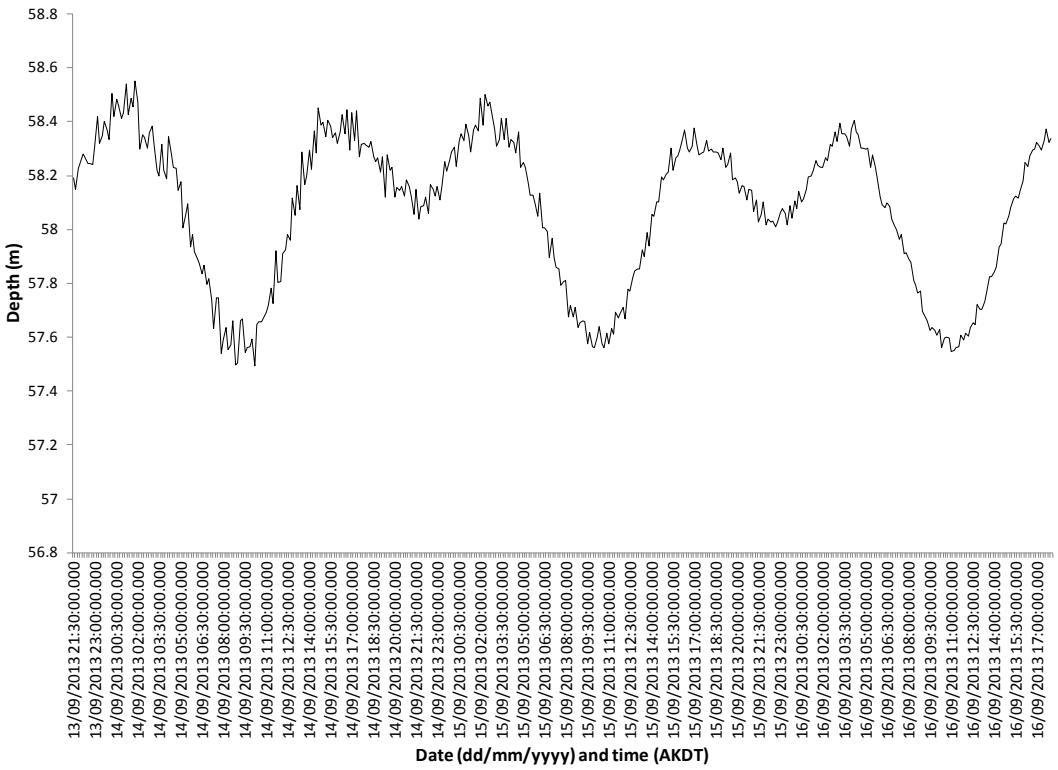


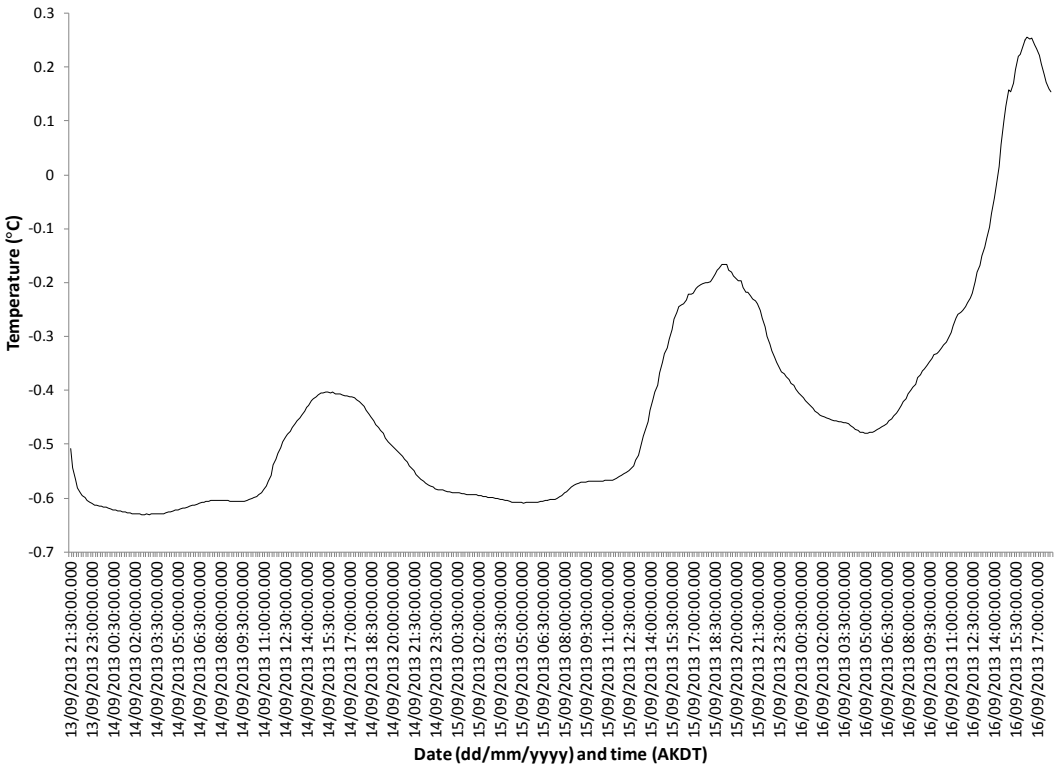
Appendix E3.–Depths and temperatures recorded every 10 min for a period of 518 h by data logger deployed at lat 60°05.27'N, long 172°34.76'W during 7–28 September 2013 (see Appendix E1).



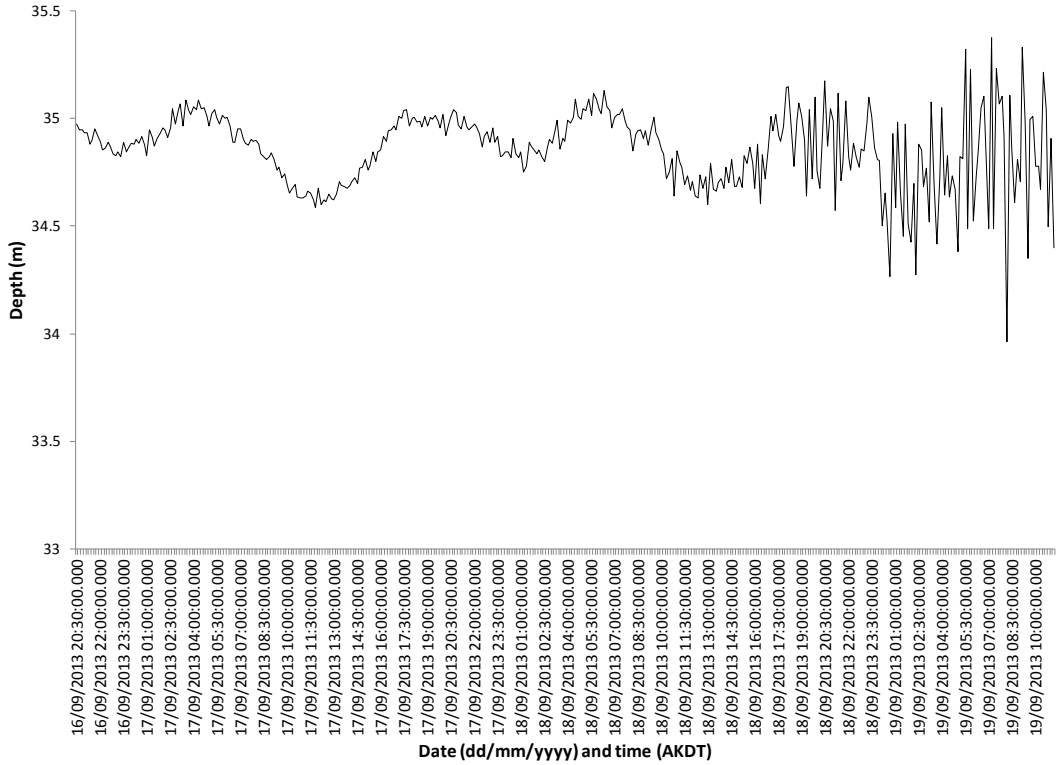


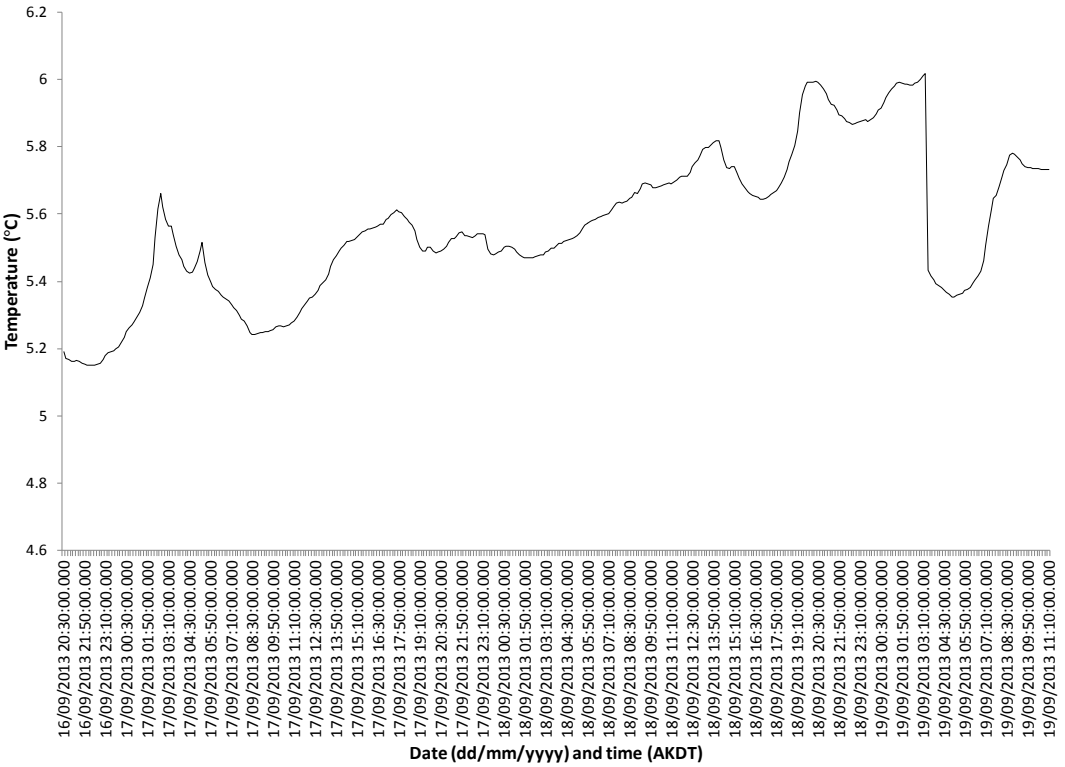
Appendix E4.–Depths and temperatures recorded every 10 min for a period of 69 h by data logger deployed at lat 60°17.49'N, long 173°12.31'W during 13–16 September 2013 (see Appendix E1).



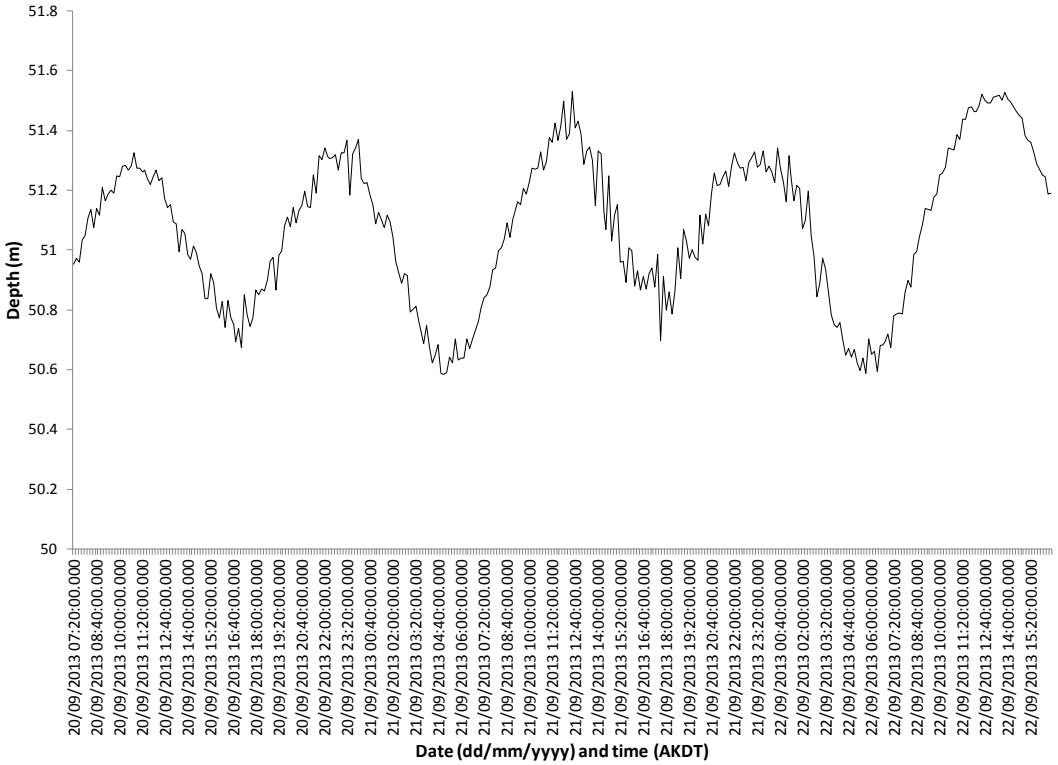


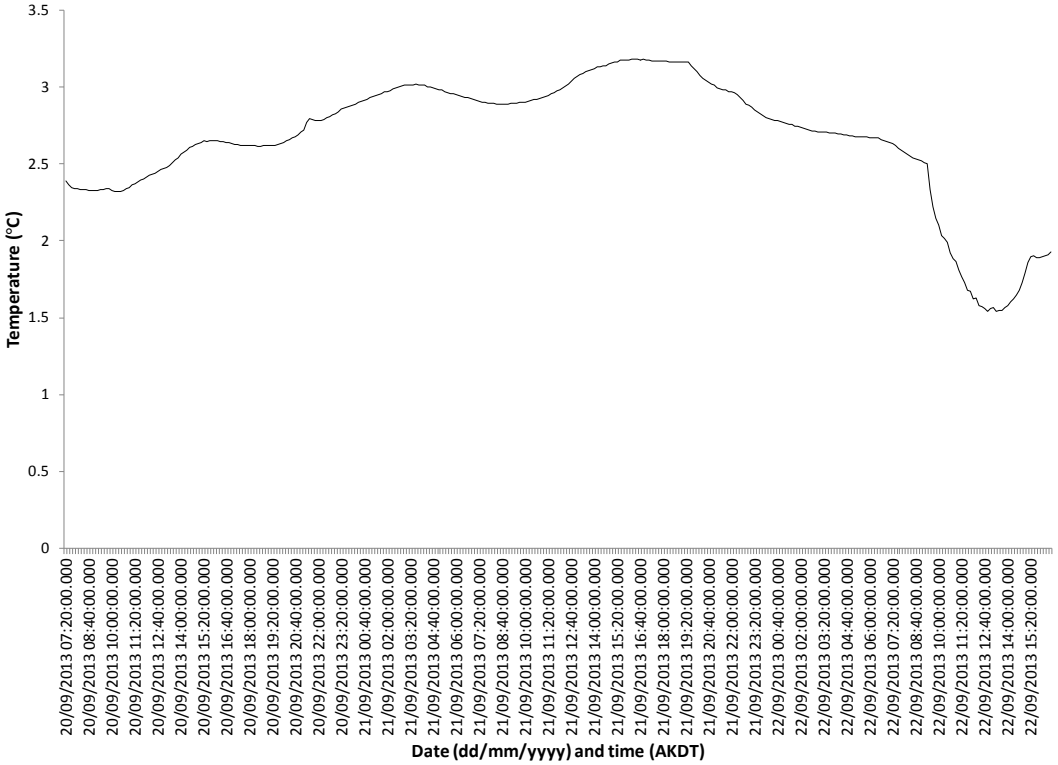
Appendix E5.–Depths and temperatures recorded every 10 min for a period of 63 h by data logger deployed at lat 60°17.33'N, long 172°30.59'W during 16–19 September 2013 (see Appendix E1).



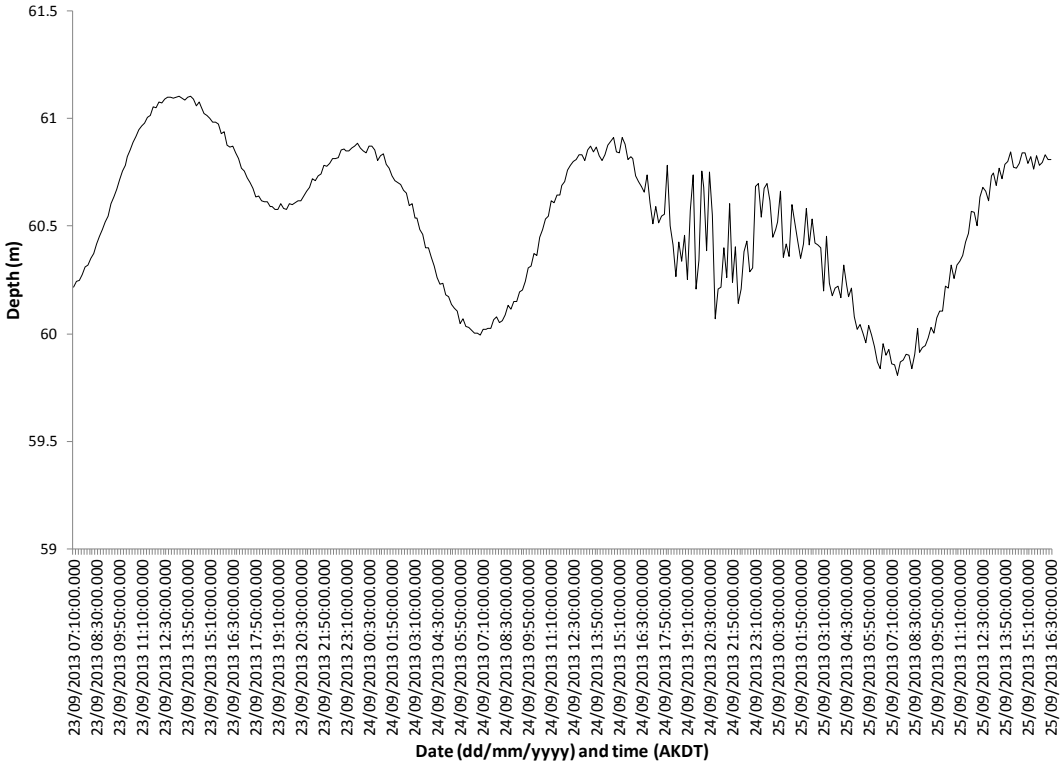


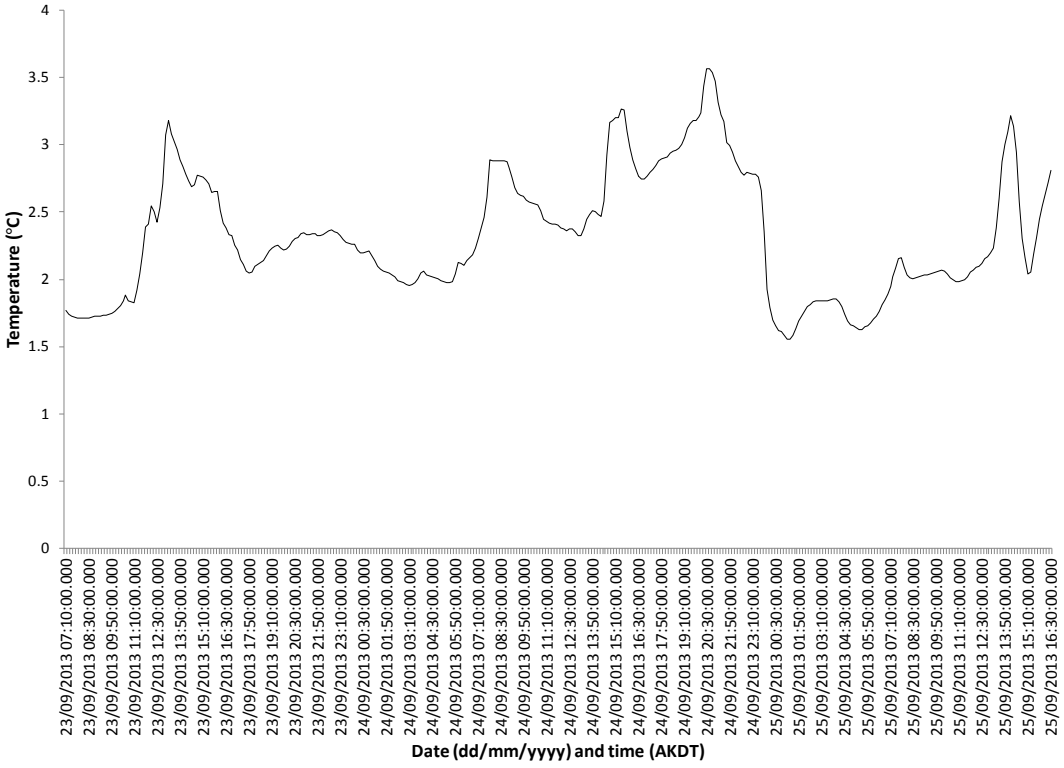
Appendix E6.–Depths and temperatures recorded every 10 min for a period of 57 h by data logger deployed at lat 60°32.04'N, long 172°30.65'W during 20–22 September 2013 (see Appendix E1).





Appendix E7.–Depths and temperatures recorded every 10 min for a period of 57 h by data logger deployed at lat 60°42.96'N, long 172°55.23'W during 23–25 September 2013 (see Appendix E1).





Appendix E8.–Depths and temperatures recorded every 10 min for a period of 49 h by data logger deployed at lat 60°25.95'N, long 172°53.78'W during 26–28 September 2013 (see Appendix E1).