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Dungeness Crab Pot Survey and Spatial Monitoring of Sea Otter Bycatch in Ugak Bay, the Trinity Islands, and Alitak Bay in the Kodiak Area, 2014

by

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February 2016

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

Symbols and Abbreviations

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Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

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DUNGENESS CRAB POT SURVEY AND SPATIAL MONITORING OF SEA OTTER BYCATCH IN UGAK BAY, THE TRINITY ISLANDS, AND ALITAK BAY IN THE KODIAK AREA, 2014

by

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ABSTRACT

Alaska Department of Fish and Game (ADF&G) conducted a pot survey for Dungeness crab *Metacarcinus magister* in the Kodiak Area during August–September 2014 and collaborated with U.S. Fish and Wildlife Service (USFWS) to evaluate sea otter *Enthydra lutris kenyoni* bycatch in the Kodiak Area Dungeness crab fishery by concurrently performing transect surveys for sea otters and monitoring their presence and interaction with survey pot gear. A total of 650 pot lifts were performed using commercial Dungeness crab pots fished in 3 areas important for the Kodiak Area commercial Dungeness crab fishery: Ugak Bay (300 pot lifts), Alitak Bay (250 pot lifts), and the Trinity Islands (100 pot lifts). One-half of the pots fished in each area were fished with the escape rings closed. A total of 3,272 Dungeness crab were captured during the pot survey. Catch per pot lift (CPUE) of sublegal males and females by pots with closed escape rings was significantly ($P \leq 0.004$) higher than by pots with open escape rings; the effect of escape ring configuration on CPUE of legal males was not significant ($P = 0.337$). The CPUE of each sex-size class varied significantly ($P < 0.0001$) among survey areas, with CPUE of total Dungeness crab higher in Alitak Bay and the Trinity Islands than in Ugak Bay and the CPUE of legal males highest in Ugak Bay and lowest in Alitak Bay. CPUE of sublegal males and legal males varied significantly ($P < 0.0001$) by depth stratum, with highest CPUE at depths of 1–20 m. Size of crab captured by survey pots with closed escape rings and by pots with open escape rings varied significantly ($P < 0.0001$) among survey areas for both males and females; mean size of males captured by pots with either escape ring configuration was largest in Ugak Bay. A total of 2,209 male Dungeness crab were tagged during the pot survey, of which 132 were recovered during the 2014 and 2015 commercial fisheries; 108 recoveries provided data on movement and 18 recoveries provided data on molting growth increment. A trawl survey for Dungeness crab was attempted in each survey area, but area-swept abundance estimates of Dungeness crab from the trawl survey were judged unreliable. Fifteen sea otter transect surveys totaling 165 km in length were performed in the survey areas and 11 sea otters were counted. An additional 3 sea otters were observed during setting and pulling of pot survey gear. No interactions of sea otters with fishing gear were observed and no sea otters were captured by the pots fished during the survey. Results indicate that it is unlikely that removals of sea otters due to bycatch during the commercial Kodiak Dungeness crab fishery would reach the potential biological removal rate for the Southwest Alaska stock.

Key words: Dungeness crab, *Metacarcinus magister*, northern sea otter, *Enhydra lutris kenyoni,* pot, bycatch, Ugak Bay, Trinity Islands, Alitak Bay, Kodiak, Alaska

INTRODUCTION

Dungeness crab *Metacarcinus magister* have been commercially harvested in the Kodiak Area since 1962. The fishery is managed by the Alaska Department of Fish and Game (ADF&G) with restrictions only on the fishery season dates, crab size, and sex (Sagalkin and Spalinger 2011). The Kodiak Area Dungeness crab commercial pot fishery is open from May 1 through December 30 except for the south end of Kodiak Island, which is open from June 15 through December 30 (5 AAC 32.410). There were 3 statistical areas, 525701 (Ugak Bay), 545601 (Trinity Islands), and 545632 (Alitak Bay; Figure 1) that together accounted for 70% of the commercial Dungeness crab harvest in the Kodiak Area during 2009–2013 (ADFG, fish ticket database[1]). However, the annual harvest from each of those 3 areas has declined since 2009–2010 (Figure 2). Little information is available on the current condition of the Dungeness crab stocks in the Kodiak Area, as the last Dungeness crab survey was performed in 1986 (Hicks 1987). A project for providing data on the distribution, sex ratios, size composition, movement, growth, and female reproductive condition of Kodiak Area Dungeness crab has been identified as an ADF&G Westward Region priority for funding since 2001 (ADF&G 2001, 2014).

[1]Statewide electronic fish ticket database [Internet]. 1985 – 2015. Juneau, AK: Alaska Department of Fish and Game, Division of Commercial Fisheries. (cited June 16, 2015). [URL not publically available as some information is confidential]

The Southwest Alaska stock of northern sea otter *Enhydra lutris kenyoni* occupies the Alaska Peninsula and Bristol Bay coasts, and the Aleutian, Pribilof, Barren, and Kodiak islands (Figure 3), and is estimated to be approximately 54,771 animals based on the 2013 southwest stock assessment report (USFWS 2013a). The last 3 surveys from Kodiak Island indicated a stable or slightly increasing population; the adjusted population estimates for 1994, 2001, and 2004 were 9,817 (±2,637), 5,894 (±1,342), and 11,005 (±2,138), respectively. In 2005, the U.S. Fish and Wildlife Service (USFWS) listed the Southwest Alaska distinct population segment (SW Alaska DPS) of northern sea otter as threatened under the Endangered Species Act. The potential biological removal (PBR; Wade and Angliss 1997), which is the maximum number of animals (not including natural mortality) that can be removed from the stock while allowing the stock to reach its optimum sustainable population size, for the SW Alaska DPS of sea otters is 450 sea otters per year (USFWS 2013a). The Recovery Plan for the SW Alaska DPS stock cites incomplete information regarding the level and incidence of bycatch in directed fisheries. It is known that shallow-water pot fisheries have potential to entrap otters USFWS (2013b): Hatfield et al. (2011) documented California sea otters *E. l. nereis* as being caught and drowned in fishing pots and traps. Furthermore, incidental bycatch mortality of listed California sea otters was likely a contributing factor in the population decline from the mid-1970s through the early 1980s (Estes et al. 2003).

As sea otter populations continue to increase in the Kodiak Island waters, the potential of sea otter interactions with fishing gear during the Dungeness crab fishery increases. Anecdotal information suggests that sea otter bycatch in the Dungeness crab fishery has occurred in the Kodiak Area, but there is little information regarding the level and incidence. The Marine Mammal Protection Act (MMPA; Section 118) requires that fishermen report to National Marine Fisheries Service (NMFS) when a marine mammal has been killed or injured by a commercial fishery operation. Dungeness crab fishermen in Kodiak have not reported sea otter bycatch and, with no commercial fishery observer program, bycatch data are nonexistent. It is unclear whether the lack of reporting is due to a low rate of bycatch, to lack of familiarity or misunderstanding of reporting requirements, or to a fear by commercial fishermen of prosecution. Regardless of the cause, the lack of reporting makes assessing the true impact of sea otter bycatch by commercial fisheries difficult. In a collaborative effort between ADF&G and USFWS, we conducted Dungeness crab pot surveys on the east and south sides of Kodiak Island using an ADF&G research vessel. The goal was to assess Dungeness crab population distribution and abundance and to assess the potential for sea otter bycatch and interactions with commercial Dungeness crab pot gear. Our approach was to conduct a pot survey in areas of historically high fishing effort and collect data on Dungeness crab distribution, relative abundance, catch per unit effort (CPUE), size, sex, shell condition, reproductive condition, movements, and growth and concurrently monitor sea otter bycatch, spatial distribution, behavior, and interactions with fishing gear during the survey.

OBJECTIVES

The objectives of this study of Dungeness crab and sea otter bycatch were the following:

1) Obtain data on distribution, relative stock abundance, CPUE, size and sex composition, shell condition, and reproductive status of Dungeness crab in Ugak Bay (statistical area 525701), the Trinity Islands (statistical area 545601) and Alitak Bay (statistical area 545632).
2) Document sea otter bycatch during the survey and estimate the catch per pot lift of sea otters in the surveyed areas.
3) Document sea otter presence, abundance, sex composition, behavior, and interactions with Dungeness crab pot gear by conducting observations in each survey area.
4) Determine Dungeness crab movements and growth increments through tagging male Dungeness crab during the survey and recovering tagged crab in the commecial fishery.

METHODS

SURVEY DESIGN

The 39-day pot survey was conducted aboard the ADF&G R/V *K-Hi-C* between August 5 and September 27, 2014, in Ugak Bay, the Trinity Islands, and Alitak Bay in the Kodiak area (Figure 1). The survey areas were located inside state waters between 56°15' to 58°30' N latitude and 155°00' to 152°10' W longitude, within ADF&G statistical areas 525701, 545601, and 545632. Specific bays within each study area were systematically sampled using commercial Dungeness crab pots.

POT SURVEY

In each of the 3 main survey areas, sampling locations were identified and systematically fished using commercial Dungeness crab pots. The sampling locations, designated by bay or landmark, are areas of Dungeness crab habitat, as identified through ADF&G commercial harvest reports. In Ugak Bay, 100 pots that were fished were divided into 2 groups of 50 pots: Group A and Group B. The deployment and retrieval of Groups A and B occurred on different days, so that only 50 pots were lifted on any given day within the main survey area for a total of 300 pot lifts. (i.e., 50 pots in 6 sampling locations) (Appendix A). Due to logistic difficulties of transporting 100 pots to the south end of Kodiak Island for the Trinity Island portion of the survey, only a total of 50 pots were used in that area where 25 pots were deployed and retrieved on different days in 4 sampling locations for a total of 100 pot lifts. Due to a break in the survey that resulted in the ability to move the full complement of pots to Alitak Bay, 50 pots were fished in 5 sampling locations for a total of 250 pot lifts. The pots within each sampling location were soaked for an average of 72 hours before they were retrieved, rebaited, and redeployed to a different sampling location.

Within each sampling location, pots were set along 5 predetermined transects perpendicular to the shoreline and spanning the width of the head of the bay. Transect locations were based on maps of the survey areas (Appendices B1–B9). Each individual transect consisted of 10 pots per string set at approximately 5 m depth intervals between a minimum depth of 1 m to a maximum depth of 50 m (Appendices C1-C3). An exception was made in the Trinity Islands area where depths were more uniform, and 5 transects consisting of only 5 pots per string were spread out to cover a larger area (Appendix B7–B8). For analysis, these pots were classified into 3 depth strata (≤ 20.0 m, 20.1–35.0 m, and 35.1–50.5 m). Placement of pots were adjusted based on the

bathymetry, shape of the shoreline, or obstacles (e.g., other Dungeness crab fishing gear in the area), with a goal of a minimum of 200 m distance between survey pots to minimize gear interaction. Each stainless steel mesh pot used in the survey measured 38.5 in (98 cm) in diameter and 12 in (30 cm) in height and conformed to the definition for legal commercial Dungeness crab pots (5 AAC 32.050 (b)). Requirements for escape mechanisms (5 AAC 39.145 (1)) and for gear marking (5 AAC 32.051) included having 2 tunnels with tunnel-eye openings measuring 4 in (10 cm) in height and 8 in (20 cm) in width, 2 circular 4⅜ in (11 cm) inside-diameter escape rings on the upper half of the vertical plane of the pot on opposing sides of the pot, the pot lid tie-down straps secured by a loop of untreated, biodegradable, 60 thread 100% cotton twine, and an individually-numbered pot buoy tag. Tunnel eyes on each pot were fitted with a trigger device to keep crab in the pot. For the purposes of retaining under-sized crab during the survey, half of the pots had their escape rings closed. An equal number (25 each) of open- and closed-ring pots were set in each location using a random number generator to determine which ring configuration would be deployed for any specific pot deployment. Each pot was assigned a sequential pot number (SPN) when deployed that ran consecutively from the start of the survey (SPN 1) to the end of the survey. The SPN, bay or general location, buoy ID number, date, time, depth to the nearest 0.1 m, latitude and longitude were recorded for each pot fished.

The first sampling location in the survey, Ugak Bay (statistical area 525701; Figure 1), was surveyed August 6 through August 17, 2014 (Appendix A). Within Ugak Bay, there were 6 sampling locations: Pashagshak Bay, Portage Bay, Saltery Cove, Hidden Basin, Eagle Harbor, and Gull Point (Appendices B1–B6). Departure delays and poor weather prevented reaching the first sampling location, Pashagshak Bay, until late on August 5, delaying the start of the survey. A total of 300 lifts were completed in Ugak Bay. Dates, locations, depths fished, and catch for each pot are detailed in Appendix C1. A minimum distance of 200 m between pots to minimize gear interaction was easily met in Pashagshak, where the gradual slope of the bathymetry from the head of the bay out to 50 m depth required transects of approximately 7 km in length (Appendix B1).

In Portage Bay and Saltery Cove, commercial pot gear that had already been set, made it difficult to follow to the proposed sampling design. Additionally, Portage Bay had a prominent sea mount in the center of the mouth of the bay that disrupted the uniformity of the pot transects (Appendix B2) and Saltery Cove bathymetry consisted of a long shallow sill in the middle of the cove extending out into the body of Ugak Bay, which increased in depth rapidly past 20 m (Appendix B3). In order to distribute the pots across the 5 m depth bins and maintain a minimum 200 m spacing between pots in the steeper slope of Saltery Cove, the string ends were staggered and a sixth transect was added.

Hidden Basin has a very shallow, narrow entrance leading into a large and deep basin fed by numerous freshwater sources and surrounded by rugged mountains. The bowl-shaped bathymetry and the presence of many commercial fishing pots in the basin made following straight transect lines virtually impossible (Appendix B4). The primary focus was to distribute the survey pots across the 50 m depth range. Maintaining the 200 m minimum pot spacing was not feasible due to the geographically compact survey area.

Eagle Harbor proved to be the most challenging location to set pot gear due to the extremely narrow shelf of seabed that sloped steeply outside the 25–30 m isobaths (Appendix B5). Maintaining the target 200 m pot spacing was not attainable, and even after creating 7 transects,

more than 10 pots were left to set. The remaining 10 pots were set north and south of the main transects to determine the extent of Dungeness habitat in this location.

Gull Point had a large amount of commercial Dungeness crab fishing gear set prior to sampling. With the relatively uniform bathymetry there were no difficulties establishing 5 evenly spaced transects across the breadth of the bight, though to avoid interactions with existing commercial gear, the shallower pots were set in a less regular arrangement (Appendix B6). Our first weather-delay day of the survey occurred while the Gull Point pots were set, resulting in an additional 24-hour soak time on these pots relative to the other Ugak Bay samples.

The Trinity Islands (statistical area 545601; Figure 1) were surveyed August 18 through August 27, 2014 (Appendix A), completing 4 sampling locations between Tugidak Island and Sitkinak Island out to the 3-mile State waters boundary which marked the southern boundary of the statistical management area (Appendices B7-B8). In the Trinity Islands, half the number of pots (50 rather than 100) were used in the survey. With a delayed start plus a weather day, moving the full complement of 100 pots from Ugak Bay to the Trinity Islands would have required 2 full days of travel. From the available depth data, the Tugidak and Sitkinak bights were known to be generally shallow, extending out to the 3-mile State waters boundary where the maximum depth only exceeded 25 m in 1 small area. Unable to set pots in all the depth bins out to 50 m, the survey covered the 5 m increment depths with 50 pots. The 50 pots were split between 2 sampling locations with 25 pots at each, using the same 5 transects employed so far in the survey, with each transect receiving 5 pots instead of 10. The first 25-pot set in the eastern-most end of the Sitkinak bight (Sitkinak 1; Appendix B7) was in the only area south of the Trinity Islands with rocky bottom, kelp beds, and depths in excess of 25 m. The transects were adjusted in order to avoid some hard bottom and large kelp beds, while staying within the 3-mile State waters boundary.

The second 25-pot set made in the Trinity Islands was at the western-most end of the Tugidak Bight (Tugidak 1; Appendix B8). A series of 5 transects perpendicular to the beach were made, extending from near the shoreline out to the 3-mile State waters boundary line to the south. The deepest pots were along the 3-mile boundary line, but none were deeper than 22 m. With no obstructions and a uniform slope to the bathymetry, pots were set in straight strings with uniform spacing. The bottom was generally sandy and appeared to be good Dungeness crab habitat. The second Tugidak Bight set (Tugidak 2; Appendix B8) occurred northeast of the first transects in sandy habitat and depths less than 21 m.

Alitak Bay (statistical area 545632, Figure 1) was surveyed from September 17 to September 25, 2014 (Appendix A), completing 5 sampling locations (Appendix B9). Weather and travel delayed the schedule by 2 days. The proposed sampling locations in Kempff Bay and the outer Alitak Beach were determined to be unsuitable Dungeness crab habitat, due to deep sloping habitat (> 30 m). Thus effort was concentrated on the Alitak Shoals off Cape Alitak where nearly all the commercial fishing effort was located. The first set was on the western margin of the Alitak Shoals (Alitak 1, Appendix B9), where 5 straight transects with relatively uniform pot distribution were created, covering the prescribed depth bins. A steep edge at the margin of the shoals made positioning some of the pots challenging.

The second group of 50 pots were set down the center of the Alitak Shoals (Alitak 2, Appendix B9). A generally east-west running slope to the margin of the shoal meant that the north-south transects effectively followed isobaths. Pots were set across the range of depths, though a greater

number of pots were set in the mid-depths because of the bathymetry of the area. The third sampling location was located at the southern half of the eastern edge of the Alitak Shoal (Alitak 3, Appendix B9). All the depths in this sampling location were 29 m or deeper. The fourth and fifth sampling locations in Alitak Bay followed the beach northeast towards the entrance to Lazy Bay along Tanner Head (Alitak 4 and 5; Appendix B9). This was a narrow and steeply sloping area requiring pot sets closer together than our goal of 200 m minimum distance. Transects were limited to depths shallower than 25 m deep due to the lack of buoy line available for the pots.

TRAWL SURVEY

A small trawl net was used to augment the pot survey data on relative abundance, distribution, and size distribution of Dungeness crab in each survey area. The net measured 4.9 m long with 4.5 m footrope (width of net), 2 6.8 kg trawl doors, and net body and cod-end composed of 3.0 cm mesh. It has previously proven to be a useful gear type for catching Dungeness crab of all sizes including smaller crab that are less likely to go into a crab pot or which readily escape through the pot mesh (Worton et al. 2010). Trawling occurred only after pot fishing was completed (Appendix A). A total of 3 starting locations were randomly selected from the 50 pot locations within each bay or location. These locations were the starting locations of the 3 trawl tows. The net was towed for approximately 0.5 nmi (0.93 km) following a depth isobath. A total of 32 trawl hauls were completed during this study. Location, heading, trawling start/stop time, depth, towline scope, gear performance, and weather conditions were recorded for each tow (Appendix D1). The area of each sampling location was calculated from a minimum convex polygon drawn around the outer most pot locations in each sampling location using GIS software (ArcMap, ESRI 10.1). Based on the assumption that the trawled paths were randomly distributed with respect to the distribution of crab, the population abundance was estimated from the trawl catch using the area-swept method (Alverson and Pereyra 1969). Abundance estimate calculation methods are described in Worton and Tschersich (2014).

CATCH SAMPLING

All the catch in the Dungeness crab pots and trawl hauls were enumerated by species and biological data (size, legal status, sex, shell condition, and reproductive status of females) were recorded from each Dungeness crab. The pot data provided CPUE for Dungeness crab and sea otter bycatch, while the trawl data were used to determine an area swept estimate of abundance of Dungeness crab. All Dungeness crab were measured to the nearest 0.1 mm and shell condition, sex, and reproductive status were determined and recorded. Carapace width (CW) of Dungeness crab was taken from the greatest width cross the carapace, not including the anterolateral spines, and legal (≥ 165 mm CW) and sublegal (< 165 mm CW) status of males was recorded. Shell condition was determined through visual inspection of the carapace (Worton and Tschersich 2014). Clutch fullness of mature female Dungeness crab was determined by examining the percent of clutch fullness relative to the abdominal flap (Worton and Tschersich 2014). Embryo development was noted by the presence or absence of eyed eggs, and clutch condition was recorded as the proportional amount of dead eggs present or condition of the setae on the pleopods. Other commercially important crab, such as Tanner crab *Chionoecetes bairdi,* were enumerated and measured. Tanner crab CW was measured to the nearest 1 mm across the carapace at the widest part perpendicular to the medial line, inside the lateral spines (Jadamec et al. 1999).

The CPUE for Dungeness crab was summarized by sex, legal status, and total crab for each survey area, depth stratum, and pot escape ring configuration. Size frequency and shell condition by sex and legal status and reproductive condition of females were summarized by survey area. Analysis of variance (ANOVA) was used to test the effects of survey area, depth stratum, and escape ring configuration on the crab CPUE for sublegal males, legal males, females, and total crab. Prior to performing the ANOVA of effects on CPUE, the raw catch-per-pot data were transformed by adding 1 to the catch-per-pot and taking the natural logarithm of that sum; that transformation resulted in model residuals that more closely conformed with the assumed normal distribution. Differences among survey areas in mean size (CW) of males and females were tested by ANOVA ($\alpha = 0.05$), followed by Fisher's least-significant-difference test for the significance ($\alpha = 0.05$) of pairwise differences between means. Due to the effects of the configuration of escape rings (closed or open) on the size of crab retained by the pots, ANOVAs of the size data from pots with closed rings were performed separately from the data from pots with open rings.

TAGGING

Male Dungeness crab ≥ 130 mm CW (the approximate size at 1 molt growth increment from legal size; Worton et al. 2010) determined to be in good condition were tagged at the posterior margin of the epimeral suture immediately posterior to the third walking leg on the right hand side of the carapace using a Floy double T-bar anchor tag. All crab meeting those criteria were tagged up to a goal of 1,000 tagged crab per survey area. Tagged Dungeness crab were measured to the nearest 0.1 mm CW and shell condition, tag number, and general condition after tagging were recorded prior to returning the crab to the capture location.

Tag recovery

Through the ADF&G dockside sampling program at the port of Kodiak, efforts were made to recover tagged crab during the 2014 and 2015 Dungeness crab fishery seasons by posting flyers at the ADF&G office and at the fishery processor plants. Fishermen were asked to record the location, depth, and date of capture for any tagged crab. Tagged legal crab recaptured by the fisherman were measured to the nearest 0.1 mm CW and shell condition determined by dockside sampling staff. Tagged sublegal crab were measured and scored for shell condition by the fisherman when possible and returned to sea.

Tag recovery data from the 2014 and 2015 seasons were summarized by location and date of release and recapture and were mapped for determination of spatial and temporal movement patterns. Straight-line distance and direction of travel between release and recovery sites were determined for crab with locations recorded at recovery using ArcGIS (ESRI 10.3) and mapped. Bathymetry data for each area (http://maps.ngdc.noaa.gov/) were mapped to determine general depth ranges for each survey location and overlaid with tag recovery data for comparison. A simple interpolation, inverse distance weighted algorithm (ESRI 10.3), was applied to fill in the depth data gaps. Crab with data on shell condition and CW recorded at recovery were scored as having molted between release and recovery. Growth increments were determined as the difference between CW at recovery and CW at release for molted crab that were recovered with reliable CW measurements. The dependence of growth increment on premolt CW (i.e., CW at time of tag release) was examined and tested by a linear size regression analysis. The growth increment data collected during this study were compared to growth increment data collected

during tagging studies conducted in Kodiak during 1970–1974 and 1986 that have been reported on by Worton et al. (2010).

SEA OTTER SURVEY

A dedicated vessel-based sea otter survey was conducted approximately every 7 days in each location the pots were fished and in the surrounding coastline of each survey area to document the presence of sea otters (Appendices A and B). Total number, group sizes (e.g., "1 group of 20, 1 group of 25, and 3 single otters"), sex, and behavior of sea otters, the number of sea otters in the vicinity of the survey gear, and any sea otter interactions with the gear were recorded and summarized by survey area, sex, and age group. Any human disturbances of sea otters made by the vessel or observer during the observations and any injuries or mortalities were noted by the observer on the vessel.

The ability to detect potential for sea otter bycatch and to estimate sea otter CPUE for CPUE values > 0 in each surveyed area was evaluated by calculating the CPUE that would be needed to reach the PBR (450 sea otters per year) during the commercial Dungeness crab fishery as a benchmark. Annual fishery effort during the 1992–2013 Kodiak Area Dungeness crab fishery seasons ranged from a high of 220,076 pot lifts in the 1992 season to a low of 19,597 pot lifts in the 2013 season (Worton and Tschersich 2014); fishery effort in the 2014 Kodiak Area Dungeness crab fishery seasons was 35,960 pot lifts (ADF&G fish ticket database). Hence the sea otter CPUE during the Kodiak Area Dungeness fishery that would be needed to reach the PBR in any one of the 1992–2013 fishery seasons ranges from a low of 0.0020 for the 1992 season to a high of 0.0230 for the 2013 season; the sea otter CPUE that would be needed to reach the PBR in the 2014 season was 0.0125. Under the assumptions that the pot lifts within each survey area are independent with respect to the sea otter catch, that the CPUE of sea otters is < 1, and that the catch of sea otters in the pot lifts within each survey area follows a binomial distribution with probability of "success" (p) equal to the true CPUE of sea otters during the 2014 commercial fishery and the number of "trials" (n) equal to the number of pot lifts performed in the surveyed area, the probability that at least 1 sea otter is captured by the pots fished in a survey area is equal to $1 - (1 - \text{CPUE})^{(\text{number of pot lifts})}$. Those probabilities are plotted for CPUE values ranging from 0.002 to 0.023 and the 300 pot lifts performed in Ugak Bay, the 250 pot lifts performed in Alitak Bay, and the 100 pot lifts in the Trinity Islands in Figure 4. Note that the probability under those assumptions that at least 1 sea otter would be captured by the 300 pot lifts performed in Ugak Bay is ≥ 0.90 if the true sea otter CPUE was ≥ 0.008 and that the probability that at least 1 sea otter would be captured by the 250 pot lifts performed in Alitak Bay is ≥ 0.90 if the true sea otter CPUE was ≥ 0.009. On the other hand, with only 100 pot lifts performed in the Trinity Islands, the probability that at least 1 sea otter would be captured by the 100 pot lifts performed in that survey area is ≥ 0.90 only if the true sea otter CPUE was ≥ 0.023. Hence the small sample size of pot lifts performed during the survey of the Trinity Islands provided limited power for detecting potential bycatch of sea otters and low relative precision in estimation of CPUE over the range of CPUE values that were considered here (0.002–0.023).

The CPUE of sea otters for each survey area was estimated by the number of sea otters captured divided by the number of pot lifts performed. A 90% confidence interval for the CPUE of sea otters in each area surveyed was estimated using the method for calculating a conservative $100(1-\alpha)\%$ confidence interval ($\alpha = 0.10$) for the proportion parameter of a binomial distribution provided in Hahn and Meeker (1991). To further assess the plausibility of values of sea otter

CPUE in the range of 0.002–0.023 in each survey area, we also computed the probabilities from the assumed binomial distribution that $P(X \leq x; n, p)$ for values of n = 300, 250, and 100 and values of p = 0.020–0.023 in increments of 0.001; in this context, X is a binomially-distributed random variable representing the possible number of sea otters that could be captured in a survey area, x is the actual observed number of sea otters captured in a survey area, n is the number of pot lifts performed in a survey area (300 in Ugak Bay, 250 in Alitak Bay, and 100 in the Trinity Islands), and p is a candidate value of the true CPUE of sea otters.

TEMPERATURE AND SALINITY DATA COLLECTION

Surface temperature (°C) and salinity (ppt) were recorded at each pot survey sampling location approximately 1 m below the surface. An Onset HOBO™ temperature datalogger was deployed in the 1st and 50th pot within each sampling location and was programmed to record temperatures every hour. During trawling, a datalogger was attached to the headrope of the net during each deployment and temperature was recorded every minute.

RESULTS

POT SURVEY

Ugak Bay

From the 300 pot lifts completed in Ugak Bay, a total of 1,127 Dungeness crab, comprising 567 sublegal males, 344 legal males, and 216 females, were captured (Table 1). The CPUE was 5.2 for the sublegal males in pots with closed escape rings in depths of 1–20 m (depth stratum 1). Males ranged in size from 126 mm to 202 mm CW, and females ranged in size from 114 mm CW to 177 mm CW (Figure 5). For both females and males, the smaller size classes were greatest in the pots with closed escape rings. Males were mostly in old shell and very old shell condition (Figure 6), and the majority of females were in very old shell condition (Figure 7). The largest males (195.8–202.4 mm CW) in the survey were captured in Ugak Bay at depths > 37 m.

Pashagshak Bay had a large number of Dungeness crab, specifically sublegal males, in depths < 20 m (Figure 8; Appendix C1). Of the total catch of 175 male crab, 152 were sublegal and 23 were legal. Only 5 immature female and 27 mature female Dungeness crab were captured in a total Dungeness crab catch of 207 animals (Figure 8; Appendix C1). No crab were found in depths > 25 m in the outer reaches of the bay. In Portage Bay only 41 Dungeness crab were caught, only 1 of which was a female crab; all were shallower than 25 m (Figure 9; Appendix C1). In Saltery Cove, 174 Dungeness crab were caught, of which 124 were males and 50 were females in waters shallower than 25 m (Figure 10; Appendix C1). A total of 44 of the 50 pots set in Hidden Basin captured a total of 425 Dungeness crab, comprising 161 sublegal males, 168 legal males (7 of the largest males), and 96 mature females, 1 with extruded eggs (Figure 11; Appendix C1). Hidden Basin was the only location in the survey where a large number of Dungeness crab (216) in depths > 25 m were captured and where Tanner crab were also captured. In Eagle Harbor, 95 Dungeness crab were captured, comprising 93 male crab and 2 females; the set north and south of the main transects had no crab (Figure 12; Appendix C1). In Gull Point, all 185 Dungeness crab, consisting of 150 males and 35 females, were captured in depths < 25 m, except for 1 sublegal male crab captured at 26.4 m (Figure 13; Appendix C1).

The Trinity Islands

The 100 pots fished in the Trinity Islands captured a total of 635 Dungeness crab, comprising 530 sublegal males, 66 legal males, and 39 mature females (Table 1). The highest CPUE was 10.0 for sublegal males in pots with closed escape rings in depth stratum 1, while legal crab CPUE was only 1.1. Male crab sizes ranged from 135 mm CW to 184 mm CW with the majority captured in pots with closed escape rings (Figure 5). Males were mainly in old shell condition (Figure 6). The few females that were captured ranged in size from 134 mm to 167 mm CW (Figure 5) and were mainly in old shell condition, although 1 crab in soft shell condition was captured (Figure 7).

The east end of Sitkinak bight (Sitkinak 1) was not very productive for Dungeness crab, and pots in those transect caught 21 crab, all of which were male (Figure 14, Appendix C2). Sitkinak 2 was shallower with a more consistently sandy bottom creating better Dungeness crab habitat (Appendix B7). All but 2 pots had Dungeness crab in them for a total catch of 340 crab, 304 of which were male and 36 were female. The first 25-pot set at the western-most end of the Tugidak Bight (Tugidak 1) caught 101 Dungeness crab, all of which were males; 79 of the 101 Dungeness crab came from just 3 pots (Figure 15, Appendix C2). The second Tugidak Bight set (Tugidak 2) occurred northeast of the first transects and caught 173 Dungeness crab, of which 170 were males and 3 were females.

Alitak Bay

The 250 pots fished in Alitak Bay captured a total of 1,510 crab, of which 826 were sublegal males, 69 were legal males, and 615 were mature females (Table 1). The highest CPUE, for any sex-size class, pot configuration, and depth stratum was 11.1 for sublegal males for closed escape rings in depth stratum 1. Alitak Bay male crab sizes ranged from 122 m to 195 mm (Figure 5), the majority sublegal. The largest number of female crab captured in this study was in Alitak Bay, ranging from 121 mm to 171 mm CW (Figure 5). For both males and females, pots with closed escape rings captured more crab. Both males and females were mainly in old shell condition (Figures 6 and 7), except for 24 females in soft shell condition and 1 molting female which were also captured.

A total of 499 Dungeness crab were caught in the first sampling location (Alitak 1), 348 of which were males and 151 were females; 7 females had extruded eggs (Figure 16, Appendix C3). Most crab were captured from pots set on top of the shoals in water shallower than 25 m. The catch was relatively uniform in pots for the second set on the Alitak shoals (Alitak 2). Pots set at the deep margin of the shoals had no crab. The Alitak 2 pots captured a total of 568 Dungeness crab, of which 340 were males and 228 of were females. In the third sampling location on the eastern edge of the Alitak Shoal (Alitak 3), at depths of 29 m or deeper, there was a relatively uniform distribution of crab, with abundant females throughout the area. Those pots caught 283 Dungeness crab, of which 71were males and 212 were females. At the fourth sampling Alitak sampling location (Alitak 4), 109 Dungeness crab were caught, of which 105 were males and 4 were females. The last area sampled in Alitak Bay (Alitak 5) was a less productive area for crab as a total of only 52 Dungeness crab were caught, of which 31 were males and 21 were females. For the most part, only those pots set near the beach in the shallowest water produced Dungeness crab (Figure 16; Appendix C3).

Pot Survey Data Analysis

Sublegal males accounted for more than half of the total Dungeness crab captured in each survey area and the catch of legal males was greater than the catch of females in all survey areas except Alitak Bay (Table 1). Over all depth strata and pots fished, CPUE for total crab was highest in the Trinity Islands (6.4), followed by Alitak Bay (6.0), and lowest in Ugak Bay (3.8). Sublegal male CPUE was also highest in the Trinity Islands (5.3) and lowest in Ugak Bay (1.9), with the CPUE in Alitak Bay at 3.3. Legal male CPUE showed less variation across survey areas: highest in Ugak Bay (1.1), lowest in Alitak Bay (0.3), and with the CPUE in the Trinity Islands (0.7) at the midpoint between the CPUEs for the other 2 areas. Female CPUE in Alitak Bay (2.5) was markedly higher than in either Ugak Bay (0.7) or in the Trinity Islands (0.4). Over all survey areas and pots fished, CPUE of each sex-size class considered was highest in depth stratum 1 and was lowest for total, sublegal male, and female crab in depth stratum 3. Total crab CPUE was 2.6 times higher in depth stratum 1 (8.1) than in depth stratum 2 (3.1) and CPUE of sublegal males was nearly 4 times higher in depth stratum 1 (5.5) than in depth stratum 2 (1.4). The decline in CPUE of females from depth stratum 1 to depth stratum 2 was less marked, from 1.6 to 1.3. Depth stratum 1 was the only depth stratum in which legal male CPUE (1.1) exceeded 1.0, with the CPUE in depth strata 2 and 3 at 0.4 and 0.6, respectively. For all survey areas and depth strata combined, the CPUE of total crab and females was more than 3 times higher in the pots fished with escape rings closed (7.7 for total crab and 2.1 for females) than in the pots with escape rings open (2.4 for total crab and 0.6 for females). Sublegal male CPUE in pots fished with rings closed (4.8) was more than 4 times higher than in pots with open rings (1.1). In contrast, legal male CPUE in pots with closed rings (0.8) was only slightly greater than in pots with open rings (0.7). Trends in CPUE relative to survey area, depth stratum, and open or closed configuration of escape rings within each two-way combination of survey area, depth stratum, and escape ring configuration for total crab, sublegal males, legal males, and females are provided in Figures 17–20.

Survey area was a significant ($P < 0.0001$) effect in the ANOVAs of the transformed CPUE data for sublegal males, legal males, females, and total crab (Table 2). The effect of depth stratum was significant ($P < 0.0001$) for sublegal males, legal males, and total crab, but was not significant ($P = 0.058$) for females. The effect of open or closed ring configuration was significant ($P \leq 0.004$) for sublegal males, females, and total crab, but was not significant for legal males ($P = 0.337$). Interactions between the effects of survey area, depth stratum, and ring configuration were also significant in several cases. The significant ($P \leq 0.017$) interaction between area and ring configuration for sublegal males, females, and total crab and the significant ($P \leq 0.038$) interaction between depth stratum and ring configuration for sublegal males and total crab presents problems for assessing the effects of survey area and depth stratum on CPUE. Within each combination of survey area and depth stratum, the CPUE of total crab in pots with escape rings closed was higher than the CPUE of total crab in pots with escape rings open, ranging from 1.1 times higher in depth stratum 3 of Ugak Bay to 4.3 times higher in depth stratum 1 of Alitak Bay (Table 1, Figure 17). Differences in CPUE between pots with rings open and rings closed were greatest for sublegal males, with ratios of CPUE for rings closed to CPUE for rings open ranging from 2.3 for depth stratum 3 in Alitak Bay to 5.6 for depth stratum 1 in Alitak Bay.

Given the large and significant effect of ring configuration on CPUE for most sex-size classes and the interactions between ring configuration and the other effects of interest, ANOVAs were

performed to test the effects of survey area and depth stratum on the transformed CPUE data using only the data from pots with escape rings closed. Using that reduced data set, the effect of survey area was significant ($P < 0.0001$) for sublegal males, legal males, females, and total crab, and the effect of depth stratum was significant ($P < 0.0001$) for sublegal males, legal males, and total crab, but was not significant ($P = 0.091$) for females (Table 2). Interactions between survey area and depth stratum were not significant ($P \geq 0.152$) for sublegal males, legal males, females or total crab in the pots fished with closed rings. Trends in CPUE for the pots with closed rings relative to survey area and depth stratum (Figures 17–20) were similar to the trends in CPUE for all pots fished. Over all depth strata, CPUE of total crab in pots with closed rings was highest in Alitak Bay (9.9) and the Trinity Islands (9.7) and lowest in Ugak Bay (5.2). Sublegal male CPUE in pots with closed rings was highest in the Trinity Islands (8.3), lowest in Ugak Bay (2.9), and intermediate in Alitak Bay at 5.7. Legal male CPUE in pots with closed rings was highest in Ugak Bay (1.2), slightly lower in the Trinity Islands (0.9), and lowest in Alitak Bay (0.3). Female CPUE in pots with closed rings was highest in Alitak Bay (3.9), markedly lower in Ugak Bay (1.1), and lowest in the Trinity Islands (0.5). Over all survey areas and all pots fished with closed rings, CPUE of total crab and sublegal males was highest in depth stratum 1 (11.4 for total crab and 8.0 for sublegal males) and lowest in depth stratum 3 (2.6 for total crab and 0.7 for sublegal males). Total crab CPUE in pots with closed rings was 2.3 times higher in depth stratum 1 (11.4) than in depth stratum 2 (5.2) and CPUE of sublegal males was 3.5 times higher in depth stratum 1 than in depth stratum 2 (2.6). Female CPUE in pots with closed rings was greatest in depth stratum 1 (2.2) and depth stratum 2 (2.3) and lowest in depth stratum 3 (1.3). Legal male CPUE in depth stratum 1 (1.2) was roughly double the CPUE in either depth stratum 2 (0.4) or depth stratum 3 (0.6) in the pots fished with closed rings.

Within survey areas, sublegal males < 165 mm CW as a proportion of all Dungeness crab captured in pots with escape rings closed (70%, 90%, and 96% in Ugak Bay, the Trinity Islands, and Alitak Bay, respectively) was higher than in pots with escape rings open (44%, 86%, and 76%), and mean CW of males captured in pots with closed rings was lower than for those captured in pots with open rings (Figures 5 and 21, Table 3). Most of the females captured were < 165 mm CW regardless of escape ring configuration (Figure 5), with the percentage of females ≥ 165 mm CW exceeding 10% only in Ugak Bay (11% in pots with rings closed and 14% in pots with rings open). Trends in mean CW relative to survey area showed some similar features for both sexes and for both configurations of escape rings, with the lowest values in either Alitak Bay or the Trinity Islands and the highest values in either Ugak Bay or the Trinity Islands (Table 3, Figures 21 and 22). Survey area was a significant effect ($P < 0.0001$) for CW of the males and the females captured by pots with closed escape rings and by pots with open rings (Table 3). In the post-hoc comparisons of survey areas, mean CW of males in Ugak Bay was significantly ($P < 0.001$) greater than in either Alitak Bay or the Trinity Islands regardless of the escape ring configuration of pots fished (Table 3); although the mean CW of males in Alitak Bay was significantly ($P < 0.001$) lower than in the Trinity Islands for pots with closed escape rings, the difference between Alitak Bay and the Trinity Islands in mean CW of males was not significant ($P = 0.575$) for pots with open escape rings.

Mean CW of females in Ugak Bay was significantly ($P < 0.001$) greater than the mean for Alitak Bay regardless of the escape ring configuration of pots fished, but differences between the means for Ugak Bay and the Trinity Islands were not significant for either pots with escape rings closed ($P = 0.500$) or for pots with escape rings open ($P = 0.229$). The mean CW of females for the

Trinity Islands was significantly ($P < 0.001$) greater than the mean for Alitak Bay in the comparison of females captured in pots with closed escape rings, but the difference between the means for the Trinity Islands and Alitak Bay was not significant ($P = 0.091$) in the comparison of females captured in pots with open rings.

Bycatch in the pot survey

All bycatch captured in pots was sorted to species and enumerated (Appendix E1). In Ugak Bay, the sunflower seastar *Pychnopodia helianthoides* was predominant in the pot bycatch (216). A total of 61 Tanner crab were captured exclusively in Hidden Basin, while flatfish, such as yellowfin sole *Limanda aspera*, was found mostly in the deepest pots. The Trinity Islands had little bycatch in comparison, with only 12 hairy triton *Fusitriton oregonensis* and 11 sunflower seastars captured. Alitak Bay had the greatest numbers and diversity of bycatch. Hairy triton was the predominant species (743), with yellowfin sole (378) and sunflower seastars (298) also found in large numbers.

TRAWL SURVEY

Ugak Bay

A total of 18 randomly located trawl tows were conducted in Ugak Bay, capturing a total of 89 Dungeness crab (Table 4; Appendices B1–B6). Shallow tows along the beach in Pashagshak Bay and Gull Point captured the majority (62) of the crab. In Saltery Cove, 3 trawl tows caught a total of 6 Dungeness crab; 5 of those crab, including the smallest crab (13.4 mm CW) captured during the survey, were captured in a single tow in shallow water parallel to the beach at an average depth of 10 m. The net was damaged on the second tow and some portion of the catch lost. Tow 2 was not repeated, but the third tow was completed. In Hidden Basin, only 3 Dungeness crab were captured, whereas in Eagle Harbor, a total of 13 Dungeness crab were captured. The male Dungeness crab captured in the Ugak Bay trawl tows, ranged from 81 mm CW to 194 mm CW and were both in new- and old-shell condition (Figure 23). Female crab sizes ranged from 13 mm to 178 mm in new-, old-, and very-old-shell condition (Figure 24).

The Trinity Islands

Very few Dungeness crab were caught in the trawl samples relative to the pot samples in the Trinity Islands. A total of 6 trawl tows were completed (Table 4; Appendices B7–B8), with only a single old-shell, sublegal 138 mm CW male crab caught from the Tugidak Bight area (Figure 23 and 24).

Alitak Bay

A total of 8 trawl tows were completed in Alitak Bay, capturing only 5 crab (Table 4; Appendix B9). In Alitak 1 and 2, 3 trawl tows caught a total of 5 Dungeness crab and in Alitak 4, 2 trawl tows caught no Dungeness crab, and the third trawl tow resulted in the net catching on an object on the sea floor and the tow was aborted. The net was damaged beyond repair, making it impossible to sample the remaining locations (Alitak 3 and 5). Male crab captured ranged from 130 mm CW to 158 mm CW and were in old-shell condition (Figure 23). The females ranged from 105 mm CW to 148 mm CW (Figure 24). Although most were in old-shell condition, 1 soft-shell female crab was captured.

Trawl Survey Data Analysis

Area-swept population abundance estimates were calculated from trawl catch for all Dungeness crab by sex and legal status for each sampling location and for each survey area (Table 4). Ugak Bay had the highest abundance estimate at 35,332 crab with 95% CI (32,430, 38,234) for the total surveyed area of 29.39 km^2. Juvenile females were estimated as being the most abundant component of the Ugak Bay population at 14,253 crab, whereas the legal crab abundance estimate was only 527 crab. The Trinity Islands had a total crab estimate of 530 for the total surveyed area of 68.47 km^2 and the Alitak Bay estimate was only 1,402 crab for the total surveyed area of 33.34 km^2.

Bycatch in the trawl survey

All bycatch captured in the trawl was sorted to species and enumerated (Appendix E2). Jelly fish (Class: Scyphozoa) dominated the overall catch. Flatfish were the second most abundant group in all areas which included, in decreasing order of catch frequency, rocksole *Lepidopsetta sp.*, butter sole *Isopsetta isolepis*, and sand sole *Psettichthys melanostictus.*

TAGGING AND TAG RECOVERIES

A total of 2,211 Dungeness crab were tagged and released in the 3 survey areas (725 in Ugak, 596 in the Trinity Islands, and 890 in Alitak Bay) of which 1,845 were sublegal males, 363 were legal males, and 2 were inadvertently-tagged females (Table 5). Tagged crab ranged in size from 122.2 mm CW to 202.4 mm CW. There were 132 tagged crab, all of them males, recovered (Table 5); all but 3 that were captured in subsistence pots were captured during the commercial fishery. Tag recoveries occurred between August 20 and December 26, 2014 and between May 27 and September 16, 2015. Days at large between tagging and recapture ranged from 12 to 391 days. Of the 725 crab tagged in Ugak Bay, 121 (17%) were recaptured, with 77 (11%) of the recaptures occurring in 2014 and 44 (6%) occurring in 2015. Only 1 (< 1%) of the 596 crab in the Trinity Islands were recovered and 10 (1%) of the 890 crab tagged in Alitak Bay were recovered. All recoveries of crab tagged in the Trinity Islands and Alitak Bay were recovered in 2015. Recovery rates during 2014 of males tagged as legal crab in Ugak Bay were higher (68/233 = 29%) than for those tagged as sublegal crab (9/491 = 2%); recovery rates during 2015 of the males tagged in Ugak Bay were also higher for those tagged as legal crab (31/233 = 13%) than for those tagged as sublegal crab (13/491 = 3%). Although the number of males tagged as legal crab in the Trinity Islands and Alitak Bay (131) was only one-tenth of the number that were tagged as sublegal crab (1,354), all 11 of the tagged males recovered in the Trinity Islands and Alitak Bay were tagged as legal crab.

Reliable data on recovery location were recorded for 108 of the tagged crab that were recovered, 68 of which were recovered in 2014 (Figures 25–26) and 40 of which were recovered in 2015 (Figures 27–30). All recaptures of crab tagged in Ugak Bay occurred within the same survey sampling location where the crab were initially tagged (Figures 25–29). The tagged crab that were recovered with data on recovery location and depth (N = 16) were tagged and recovered at depths < 25 m. When comparing locations of tagged crab recovered to known bathymetry of the area most crab fall into this depth range (< 25 m; Figures 25–30), except in Hidden Basin, where it appears that 88% (36 of 41) of the crab recaptured in September and October of 2014 were found in depths > 25 m (Figure 25). Average distance between release and recapture locations was 1.12 km (N = 108), with a minimum distance of 0.07 km in Ugak Bay and maximum

distance of 15.49 km in the Trinity Islands (Figure 30). The difference between average movement distances in Ugak Bay in 2014 (mean = 0.84 km, SD = 0.06) and in 2015 (mean = 1.59 km, SD = 0.40) was not significant (t = -1.89, df = 40, P = 0.066) for a two-tailed t-test. There were 13 occasions when more than 1 tagged crab was recaptured in a single pot and 2 crab that were originally captured together in the same pot during the survey were recaptured together in the same pot during the fishery. Multiple recaptures of the same tagged crab were common: 1 crab was recovered in 2014 and again in 2015, 3 crab were each recovered twice during the 2015 fishery, and 1 crab was recaptured 3 times (in May, August, and September) during the 2015 fishery.

Growth Data

Of the 132 tagged crab that were recovered, 86 were recovered with sufficient data to determine if they had molted between release and recovery. Of those, 65 were determined to have not molted (36 were recovered in 2014 and 29 were recovered in 2015) and 21 were determined to have molted (2 were recovered in 2014 and 19 were recovered in 2015). Of those that had molted, 18 had reliable CW measurements recorded at recovery that allowed for estimation of growth increment. Sizes recorded at tagging for those 18 ranged from 133.8 mm to 164.9 mm CW (mean = 150.5, SD = 7.02) and sizes recorded at recovery ranged from 165.7 mm to 192.5 mm CW (mean = 179.3, SD = 8.13). Growth increments for those 18 ranged from 19.8 mm to 33.9 mm CW (mean = 28.9, SD = 4.10; Figure 31). Growth increment showed no linear correlation with premolt CW ($r < 0.001$) and the linear regression for growth increment on premolt CW was not significant (P = 0.999, Figure 31). The comparison of these growth increment data with the growth increment data collected from Kodiak during 1970–1974 and 1986 (Worton et al. 2010) was limited to only males tagged and released with CW within the range of 133–165 mm because comparisons among data sets on growth increment can be affected by differences in the size range of animals studied (Wainwright and Armstrong 1993). There are data from 46 males in the 1970–1974 and 1986 data with premolt CW within the range of 133–165 mm. For those 46 males, premolt sizes range from 145 mm to 164 mm CW (mean = 158.5, SD = 4.99) and growth increments range from 12 mm to 33 mm (mean = 26.8, SD = 4.66). A two-tailed t-test for the 2.1 mm difference between the mean of the growth increments collected during this study and the mean of the growth increments collected during 1970–1974 and 1986 was not significant (t = 1.591, df = 62, P = 0.117).

SEA OTTER SURVEY

A total of 17 designated sea otter transect surveys (area observations or beach surveys) were conducted throughout the course of the study: 6 in Ugak Bay, 9 around the Trinity Islands, and 2 in Alitak Bay Survey (Appendices B1–B5, B7–B9). Other sea otter observations were made on 6 additional occasions while setting or pulling pots (Table 6). A total of 165.0 km were traveled when conducting designated surveys. Approximately 60% of the surveys were done with no precipitation while the remaining surveys were completed in rain or fog and drizzle. Sea states were predominantly ripples to large wavelets, with occasional waves to 2.5 m. Visibility during the surveys ranged from 0.8 to 16 km. A total of 14 otters were seen: 9 adults and 2 pups during transect surveys that were included in the density estimates and 3 adults during setting or pulling pots that were not included in the density estimates (Table 6). In Ugak Bay, 37.7 km of transects were completed and 2 otters (both adults) were observed during the transect survey for a density of 0.05 otters/km. The Trinity Islands had 102.0 km of transect surveyed, with a total of 6 otters

(5 adults and 1 pup) observed for a density of 0.06 otters/km of transect. Alitak Bay had 25.3 km of transect surveyed and 3 otters (2 adults and 1 pup) were seen for a density of 0.12 otters/km of transect. Total otter density of the 3 areas equaled 0.07 otters/km of transect. Locations of sea otter observations are shown in Figures 8, 10, 15, and 16.

SEA OTTER BYCATCH AND GEAR INTERACTIONS

A total of 650 pots lifts were performed at an average depth of 24.1 m (SD = 12.7), with a minimum depth of 1.2 m and a maximum depth of 50.5 m. Soak time was approximately 3 days. Although sea otters were observed in the vicinity of the fishing gear, no sea otter bycatch, no interactions of sea otters with the fishing gear, and no interactions of sea otters with the crab captured during the survey were observed throughout the study. Additionally, only 4 instances of human disturbance by the presence of the vessel were observed, none of which occurred while setting or pulling of pots during the survey. These disturbances were classified as slight to moderate and included diving avoidance and avoidance.

From the 0 sea otters captured by all the pots fished during the surveys of each area, the estimated CPUE of sea otters in each survey area was 0, with 90% confidence intervals for CPUE of 0.0000 to 0.0099 in the Ugak Bay survey area and 0.0000 to 0.0119 in the Alitak Bay survey area. The probability that 0 sea otters would be captured in the 300 pot lifts performed in Ugak Bay is ≤ 0.09 if the true sea otter CPUE was ≥ 0.008, and is ≤ 0.05 if the true sea otter CPUE was ≥ 0.010 (Figure 32). The probability that 0 sea otters would be captured in the 250 pot lifts performed in Alitak Bay is ≤ 0.10 if the true sea otter CPUE was ≥ 0.009, and is ≤ 0.05 if the true sea otter CPUE was ≥ 0.012. With only 100 pot lifts performed, the 90% confidence interval for sea otter CPUE in the Trinity Islands survey area was broader at 0.0000 to 0.0295 and the probability that 0 sea otters would be captured in the Trinity Islands survey area was ≤ 0.10 only for sea otter CPUE ≥ 0.023.

TEMPERATURE AND SALINITY DATA

Bottom water temperatures were recorded from both the pot and trawl survey and surface temperatures and salinity were taken throughout the survey areas from depths between 1.4 m and 50.5 m. Average bottom temperatures ranged from 8.0°C (Saltery Cove at 41.6 m) to 15.1°C (Eagle Harbor at 3.3 m, Appendix F1). Temperatures were higher at shallower depths (e.g., Trinity Islands; Figure 33 and Appendix F1). Surface water temperatures ranged from 11.5°C to 14.9°C, with salinities ranging from 28.8 ppt to 32.2 ppt; the lowest salinities were recorded in Hidden Basin.

DISCUSSION

Our survey attempted to emulate the commercial Dungeness crab fishery by performing 650 pot lifts using commercial Dungeness pots that were fished at depths (1–50 m) and locations of known Dungeness crab habitat during a period typical for the commercial fishery in the 3 areas with the highest historic commercial harvests and effort. Although a pot soak time average of 3 days was a shorter duration than seen in the fishery (9 days, ADF&G unpublished data 2011–2015), it appeared to be sufficient for catching Dungeness crab (3,272 captured), while still allowing time to fish each survey area.

With little information available on the extent of Dungeness crab habitat within each study area prior to the survey, necessary changes in the original survey design were made to adjust to actual

fishing conditions. In some cases, such as in Ugak Bay, transects had to be slightly altered by staggering pot locations or distances between pots so as to avoid commercial fishing gear or steep slopes and rocky obstructions that are unsuitable habitat for Dungeness crab. Occasionally, steep slopes prevented us from reaching the deepest depth strata (36–50 m). The Trinity Islands survey area posed a unique problem, where Dungeness crab habitat extended beyond the boundary of the survey area and depths were never greater than 22 m. Adjusting the sampling design to 5-pot strings and spreading out the pots across 10 transects allowed sufficient fishing effort and coverage for this sampling location. In the Alitak Bay survey area, the Dungeness crab habitat was restricted to the Alitak Shoals at the entrance to Alitak Bay (approximately 39.8 km^2), where concurrently all the commercial fishery effort was focused. Changes in sampling locations were made to effectively cover the entire shoal, while sampling all depth strata. In addition to adjusting the sampling design, survey schedule changes were made. Weather delays, complicated logistics, poor anchorages, and long travel times to shelter from exposure to hazardous open ocean conditions caused delays and affected the number of pots that could fished in the Trinity Islands. Although a smaller number of pots were fished in this area, it did not appear to affect the CPUE of Dungeness crab, which was highest in the Trinity Islands and Alitak Bay. Despite the necessary changes in the pot survey design and schedule changes, the 3 important areas for the commercial Kodiak Dungeness crab fishery were successfully fished, accomplishing objective 1 of this study.

Total Dungeness crab CPUE during the pot survey varied significantly ($P < 0.0001$) with depth stratum during our survey and the results confirmed that Dungeness crab habitat was mainly restricted to small areas of shallow (≤ 25 m), sandy-mud bottoms, near fresh water outlets, in sometimes brackish water. In Ugak Bay, habitat is restricted to small areas at the heads of each bay, while the expansive flat shallow sandy-mud bottom off the Trinity Islands was the largest area of Dungeness crab habitat that was sampled (68.47 km^2), historically producing the highest fishery harvests in the Kodiak Area. Habitat preferences of Dungeness crab have been related to life stages of Dungeness crab, with specific habitat preferences for young of the year crab and for females during larval release (Dinnel et al. 1987; Stevens 1982), and in this study the smallest crab were found when trawling at depths averaging 10 m whereas the largest adult males were captured at deeper depths (36–50 m).

Total Dungeness crab CPUE during the pot survey varied significantly ($P < 0.0001$) across the 3 survey areas, with highest CPUE for total Dungeness crab occurring in the Trinity Islands and Alitak Bay survey areas at the south end of Kodiak Island. Legal male CPUE varied significantly ($P < 0.0001$) across survey areas, with highest CPUE in the Ugak Bay survey area and lowest CPUE in the Alitak Bay survey area. That trend across survey areas in legal male CPUE follows the same trend as the level of harvest during the 2014 commercial fishery (Figure 2): highest harvest in statistical area 525701 (Ugak Bay) and lowest harvest in statistical area 545632 (Alitak Bay). The CPUE of sublegal males also varied significantly ($P < 0.0001$) across survey areas and was highest in the Trinity Islands survey area and lowest in the Ugak Bay survey area. The trend in CPUE of sublegal males, coupled with the size composition of males during the pot survey (Figure 5), suggests that the potential for post-2014 recruitment of legal males is greater in the Trinity Islands area than in the Ugak Bay area. The August – September survey was conducted within the period that the 2014 commercial fishery was being prosecuted (Figure 2). High annual exploitation rates (83% to 100%) on legal males have been estimated for other West Coast Dungeness fisheries (Bishop et al. 2010; Hankin et al. 1997; Smith and Jamieson 1989). Hence, the time surveyed in an area relative to the timing of removals of legal males by the

commercial fishery may have affected the CPUE of legal males and the male size composition within areas during our survey. In that regard, Ugak Bay area was surveyed in early August, after roughly one-half of the 2014 commercial catch from that area had already been harvested (Figure 2). On the other hand, although the Alitak Bay area was not surveyed until late September, there were no commercial harvests from the Alitak Bay area prior to September during the 2014 season.

The concordant trends over the 3 areas surveyed in legal male CPUE during the 2014 survey and in commercial harvest during 2014 suggest that variation in harvest across areas during 2014 was due to variation in legal male abundance. Annual commercial Dungeness crab harvests during 2007–2014 varied by an order of magnitude in each of the 3 statistical areas surveyed, with the highest harvests occurring from 2008 to 2010 (Figure 2). If it is assumed that annual variation in harvest within areas is due to annual variation in abundance of legal males, then those harvest trends would suggest that annual abundance of legal males in those areas has varied by an order of magnitude during 2007–2014 and that legal male abundances in the Trinity Islands and Alitak Bay areas during recent years have been substantially lower than during 2008–2010. However, that assumption cannot be tested without data from regularly-performed stock assessment surveys that provide an index of legal male abundance and note that our survey was the first performed in the Kodiak area since 1986. Additionally, regularly-performed stock-assessment surveys that also provide an index of the abundance of sublegal males at sizes within 1 molt of legal size are essential for understanding the dynamics of the Kodiak fishery because Dungeness crab fisheries in other areas in Alaska are known to be highly dependent upon annual recruitment (Stratman et al. 2014).

Results of this study confirm that the escape rings required in regulation for pots used in the commercial fishery are highly effective in reducing the bycatch of sublegal males and females while retaining the catch of legal males, even with short soak times of 3 days (Figures 18–20). Although escape rings decrease the overall bycatch of female crab, larger females were still retained by pots with escape rings (Figure 5). A study in Southeast Alaska also showed considerably higher CPUE for sublegal Dungeness crab in pots with closed escape rings relative to pots with open escape rings (Bishop et al. 2010). Because the closed escape ring configuration highly influences CPUE and sizes of crab captured, future stock assessment surveys utilizing pot gear with both open and closed escape rings must be designed to allow for estimation of the effects of ring configuration.

Although beam trawls have proven successful in other studies for catching Dungeness crab (Stevens et al. 1982), our bottom trawl net proved to be an inefficient method for capturing Dungeness crab at certain depths, as reflected in the low catches. Confounding issues of weather and net damage also prevented us from accomplishing all trawl tows in the Trinities and Alitak Bay and adequately sampling those areas. Given those considerations, we believe that the area-swept abundance estimates from the trawl survey under-estimate the abundance of Dungeness crab within survey areas. That underestimation is apparent in the area-swept estimates of legal males: the estimate for legal males in the Ugak Bay area was only 567 crab, whereas 344 legal males were captured during the pot survey of Ugak Bay, and the estimates for legal males in both the Trinity Islands and Alitak Bay areas were both 0, whereas legal males were captured during the pot surveys of both areas. Of the tows completed, the bycatch species captured in the trawl indicated the net was tending bottom, but the lack of crab captured suggests Dungeness crab were not ubiquitous throughout the survey areas and at all depths. The trawl net, however, did

capture smaller crab (minimum CW = 13 mm) than the pots (minimum CW = 114 mm CW). In other Dungeness crab habitat studies in which trawl nets and pots were employed to capture crab, trawls captured the widest size range of crab, but few large crab compared to crab pots (Dinnel et al. 1987). Although a poor method for sampling adult Dungeness crab, the trawl net has been shown to be useful for capturing juvenile crab (Worton et al. 2010).

Tagging data suggests Dungeness crab have a high affinity for pot gear and specific habitats as individuals were captured repeatedly during the fishery, with tag returns at 11% in the first year in Ugak Bay. Movements between capture and recapture locations were not extensive (0.07–15.49 km, mean = 1.12 km). Movements from depths < 25 m to deeper water appear to be seasonal, as they were only observed at 1 location in recaptures that occurred in September–October. Because Dungeness habitat is restricted to sandy mud substrates, any movement may be limited by suitable habitat. More data are needed to determine if seasonal movements to deeper locations are a common occurrence in other areas.

Growth increment has been shown to vary with premolt CW in Dungeness crab (Wainwright and Armstrong 1993), but there was no significant ($P = 0.999$) relationship between growth increment and premolt CW in the data obtained from tagging of male Dungeness crab during this study. The lack of relationship between growth increment and premolt CW in our data is likely attributable to the limited range in premolt CW (133.8–164.9 mm) and small sample size of recaptured crab. The mean growth increment estimated for male Dungeness from our tagging study (28.9 mm CW) was greater than that estimated for males that were tagged with comparable CW measurements in 1970–1974 and 1986 (26.8 mm CW), but the difference was not statistically significant ($P = 0.117$).

Surprisingly few sea otters were observed in the areas surveyed, and on the eastside of Kodiak Island in general, given the extent of Dungeness crab habitat and potential food resources available. Although listed as endangered, the current increasing trend of abundance in the Northeast of Kodiak looks favorable for the northern sea otter (USFWS 2013a). Sea otter bycatch has occurred in the California Dungeness crab fishery (Hatfield et al. 2011) and the incidence of sea otter bycatch and gear interaction could increase with increasing numbers of otters in an area. Anecdotal reports from the historically popular Dungeness crab fishing areas of Southeast Alaska suggest that incidence of sea otter interactions with fishing gear has increased with increasing numbers of sea otters and decreasing Dungeness crab resources (Joseph Stratman, ADF&G, personal communication). The presently poor data on sea otter bycatch during Kodiak commercial fisheries and reliance on only anecdotal reports precludes estimation of total sea other bycatch during the commercial Kodiak Dungeness crab fishery. However, the results of our survey indicated that rates of sea otter bycatch during 2014 by commercial Dungeness crab pots fished in 3 historically most-important statistical areas for the Kodiak area fishery were lower than the rate needed to attain the PBR for the Southwest Alaska distinct population segment during the 2014 Kodiak Dungeness crab fishery. No sea otter interactions were observed with pot gear and no sea otters were captured by any of the 650 pot lifts performed during our survey. With 35,960 pot lifts performed during the 2014 season, the sea otter bycatch rate needed to attain the PBR of 450 sea otters is a CPUE of 0.0125. In the survey area that was sampled with the largest number of pot lifts (the Ugak Bay survey area with 300 pot lifts) the catch of 0 sea otters results in a low probability ($P < 0.05$) for all potential sea otter bycatch rates of CPUE ≥ 0.010. Similar studies employing a larger number of pot lifts, would be needed to increase the precision of sea otter CPUE estimates. Additionally, a comprehensive

outreach program among USFWS, ADF&G, and commercial fisherman could prove useful to educate fisherman and assist in quantifying true sea otter bycatch historically and during ongoing fisheries.

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TABLES

Table 1.–Catch per pot of Dungeness crab (CPUE) by sex and legal status for each survey area, pot escape ring configuration by depth stratum and total pots fished, 2014.

Survey area	Escape rings	Depth stratum	Total pots (N)	Sublegal males			Legal males			Females			Total crab				
				CPUE	SD	Total No.	CPUE	SD	Total No.	CPUE	SD	Total No.	CPUE	SD	Total No.	Min.	Max.
Ugak Bay	Closed	1	77	5.2	6.75	397	1.6	1.89	123	1.6	3.69	121	8.3	8.63	641	0	41
		2	47	0.6	1.44	26	0.6	1.75	28	0.6	1.72	29	1.7	4.50	83	0	21
		3	26	0.7	1.52	18	1.4	3.08	35	0.3	0.75	8	2.4	4.87	61	0	17
	Open	1	59	1.8	3.33	105	1.4	1.88	82	0.5	1.30	27	3.6	5.02	214	0	25
		2	55	0.2	0.78	11	0.5	1.69	29	0.2	0.69	12	0.9	2.72	52	0	15
		3	36	0.3	0.70	10	1.3	3.21	47	0.5	1.80	19	2.1	5.06	76	0	20
	Total		300	1.9	4.29	567	1.1	2.19	344	0.7	2.24	216	3.8	6.40	1,127	0	41
Trinity Islands	Closed	1	37	10.0	9.17	369	1.1	1.54	41	0.5	1.02	19	11.6	10.30	429	0	33
		2	9	5.1	6.94	46	0.7	1.12	6	0.6	1.01	5	6.3	8.43	57	0	22
		3	4	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	0	0
	Open	1	29	3.1	5.51	91	0.5	1.09	15	0.3	0.59	8	4.0	6.14	114	0	27
		2	18	1.3	2.68	24	0.2	0.43	4	0.4	1.04	7	1.9	3.93	35	0	13
		3	3	ND	ND	0	ND	ND	0	ND	ND	0	ND	ND	0	0	0
	Total		100	5.3	7.66	530	0.7	1.22	66	0.4	0.87	39	6.4	8.72	635	0	33
Alitak Bay	Closed	1	47	11.1	9.29	524	0.5	0.83	25	4.7	6.49	219	16.3	13.79	768	0	47
		2	37	4.1	6.57	152	0.1	0.28	3	5.0	7.82	184	9.2	11.39	339	0	37
		3	41	0.9	1.33	35	0.1	0.33	5	2.1	3.43	86	3.1	4.05	126	0	13
	Open	1	34	2.0	3.12	67	0.5	1.33	17	1.3	2.00	45	3.8	5.50	129	0	22
		2	34	0.9	1.65	29	0.3	0.63	10	1.0	1.62	33	2.1	2.94	72	0	13
		3	57	0.3	1.11	19	0.2	0.62	9	0.8	1.73	48	1.3	2.85	76	0	15
	Total		250	3.3	6.34	826	0.3	0.75	69	2.5	4.80	615	6.0	9.71	1,510	0	47
Total areas	Closed		325	4.8	7.36	1,567	0.8	1.66	266	2.1	4.58	671	7.7	10.15	2,504	0	47
	Open		325	1.1	2.74	356	0.7	1.69	213	0.6	1.46	199	2.4	4.39	768	0	27
	All rings	1	283	5.5	7.51	1,553	1.1	1.63	303	1.6	3.70	439	8.1	9.91	2,295	0	47
		2	200	1.4	3.75	288	0.4	1.29	80	1.4	3.94	270	3.2	6.71	638	0	37
		3	167	0.5	1.17	82	0.6	2.03	96	1.0	2.25	161	2.0	4.04	339	0	20

Note: Depth stratum 1, ≤ 20 m; Depth stratum 2, 20.1 m – 35.0 m; Depth stratum 3, 35.1 – 50.5 m.
ND = no data.

Table 2.–Analysis of variance (ANOVA) results of the effect of survey area, depth stratum, and escape ring configuration on the transformed CPUE for sublegal males, legal males, females, and total Dungeness crab captured during the 2014 surveys.

Transformed CPUE		Sublegals				Legals				Females				Total crab			
Source	df	SS	MS	F-ratio	P	SS	MS	F-ratio	P	SS	MS	F-ratio	P	SS	MS	F-ratio	P
Area	2	13.55	6.77	9.71	<0.0001[a]	8.45	4.22	13.88	<0.0001[a]	31.25	15.63	32.39	<0.0001[a]	24.97	12.48	11.39	<0.0001[a]
Depth Stratum	2	68.91	34.45	49.38	<0.0001[a]	7.45	3.73	12.24	<0.0001[a]	2.76	1.38	2.86	0.058	74.31	37.15	33.88	<0.0001[a]
Rings	1	21.19	21.19	30.36	<0.0001[a]	0.28	0.28	0.92	0.337	4.01	4.01	8.32	0.004[a]	22.15	22.15	20.20	<0.0001[a]
Area*Depth Stratum	4	6.23	1.56	2.23	0.064	2.94	0.74	2.42	0.047[a]	1.39	0.35	0.72	0.577	11.43	2.86	2.61	0.035[a]
Area*Rings	2	5.72	2.86	4.10	0.017[a]	0.29	0.15	0.48	0.619	3.99	1.99	4.13	0.017[a]	9.49	4.75	4.33	0.014[a]
Depth Stratum*Rings	2	9.49	4.74	6.80	0.001[a]	0.38	0.19	0.63	0.535	0.63	0.32	0.66	0.519	7.21	3.60	3.29	0.038[a]
Area*Depth Stratum*Rings	4	2.47	0.62	0.89	0.472	0.21	0.05	0.18	0.951	0.50	0.12	0.26	0.906	1.29	0.32	0.30	0.882
Error	632	440.95	0.70			192.37	0.30			304.93	0.48			692.99	1.10		

Transformed CPUE for closed rings

		Sublegals				Females				Total crab			
Source	df	SS	MS	F-ratio	P	SS	MS	F-ratio	P	SS	MS	F-ratio	P
Area	2	17.89	8.94	9.18	<0.0001[a]	28.65	14.3	20.87	<0.0001[a]	31.75	15.88	11.29	<0.0001[a]
Depth Stratum	2	68.52	34.26	35.15	<0.0001[a]	3.32	1.66	2.42	0.091	67.66	33.83	24.06	<0.0001[a]
Area*Depth Stratum	4	6.59	1.65	1.69	0.152	1.37	0.34	0.50	0.735	8.06	2.02	1.43	0.223
Error	316	308	0.98			216.94	0.69			444.25	1.41		

Note: df, degrees of freedom; SS, sum of squares; MS, mean square; F-ratio, F statistic; P, probability level.

[a] Significant relationships ($P < 0.05$).

Table 3.–Analysis of variance (ANOVA) results and corresponding post hoc Fisher's Least-Significant-Difference Test of the effects of survey area and escape ring configuration on carapace width size of male and female Dungeness crab captured during the 2014 surveys.

Male Dungeness crab

Rings closed

Source	SS	df	MS	F-ratio	P
Area	23905.13	2	11952.57	133.52	<0.0001[a]
Error	163725.98	1829	89.52		

Least squares means (LSM)

Area	LSM	SE	N
Alitak Bay	152.76	0.35	743
Trinity Is.	155.86	0.44	462
Ugak Bay	161.12	0.38	627

Fisher's Least-Significant-Difference Test.
Matrix of pairwise comparison probabilities:

Area	Alitak	Trinity	Ugak
Alitak	1	ND	ND
Trinity	0	1	ND
Ugak	0	0	1

Rings open

Source	SS	df	MS	F-ratio	P
Area	12221.98	2	6110.99	62.93	<0.0001[a]
Error	54961.29	566	97.11		

Least squares means (LSM)

Area	LSM	SE	N
Alitak Bay	160.19	0.80	151
Trinity Is.	159.54	0.85	134
Ugak Bay	169.14	0.59	284

Fisher's Least-Significant-Difference Test.
Matrix of pairwise comparison probabilities:

Area	Alitak	Trinity	Ugak
Alitak	1	ND	ND
Trinity	0.575	1	ND
Ugak	0	0	1

Female Dungeness crab

Rings closed

Source	SS	df	MS	F-ratio	P
Area	3744.92	2	1872.46	28.05	<0.0001[a]
Error	44594.36	668	66.76		

Least squares means (LSM)

Area	LSM	SE	N
Alitak Bay	147.19	0.37	489
Trinity Is.	153.53	1.67	24
Ugak Bay	152.32	0.65	158

Fisher's Least-Significant-Difference Test.
Matrix of pairwise comparison probabilities:

	Alitak	Trinity	Ugak
Alitak	1	ND	ND
Trinity	0	1	ND
Ugak	0	0.5	1

Rings open

Source	SS	df	MS	F-ratio	P
Area	1877.59	2	938.79	13.43	<0.0001[a]
Error	13704.93	196	69.92		

Least squares means (LSM)

Area	LSM	SE	N
Alitak Bay	151.48	0.75	126
Trinity Is.	155.35	2.16	15
Ugak Bay	158.28	1.10	58

Fisher's Least-Significant-Difference Test.
Matrix of pairwise comparison probabilities:

	Alitak	Trinity	Ugak
Alitak	1	ND	ND
Trinity	0.091	1	ND
Ugak	0	0.229	1

Note: df, degrees of freedom; SS, sum of squares; MS, mean square, F-ratio, F statistic; P, probability level.
[a] Significant relationships ($P < 0.05$).
ND = no data.

Table 4.–Total number of Dungeness crab captured by the trawl and calculated abundance estimates by sex and legal status for each sampling location within each sampling area, 2014.

Survey area	Sampling location	Tow distance (km)			Area of sampling location (km^2)	Number captured					Abundance estimates						
						Males		Females		Total	Juvenile	Legal males	Juvenile	Adult	Total	95% CI	
		1	2	3		Sublegal	Legal	Juvenile	Adult	crab	males	(> 164 mm)	females	females	crab	Lower	Upper
Ugak Bay	Eagle Harbor	0.45	0.51	0.47	0.82	6	0	2	5	13	522	0	189	435	1,145	975	1,316
Ugak Bay	Gull Pt Lagoon	0.57	0.47	0.94	4.90	10	1	17	9	37	3,900	390	6,562	2,593	13,446	11,459	15,433
Ugak Bay	Hidden Basin	0.49	0.75	0.99	2.02	1	1	0	1	3	137	137	0	137	411	286	535
Ugak Bay	Pashagshak Bay	0.48	1.03	0.52	10.31	11	0	9	5	25	7,600	0	6,511	3,259	17,371	15,284	19,457
Ugak Bay	Portage Bay	0.53	0.58	1.36	3.50	2	0	3	0	5	362	0	543	0	905	685	1,124
Ugak Bay	Saltery Cove	0.95	0.94	0.85	7.84	1	0	2	3	6	224	0	448	698	2,055	1,881	2,228
Total Ugak Bay					29.39	31	2	33	23	89	12,745	527	14,253	7,122	35,332	32,430	38,234
Trinity Islands	Sitkinak 1	0.89	0.94	0.47	18.57	0	0	0	0	0	0	0	0	0	0	ND	ND
Trinity Islands	Sitkinak 2	ND	ND	ND	13.28	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trinity Islands	Tugidak 1	0.91	0.93	0.93	18.43	1	0	0	0	1	530	0	0	0	530	471	589
Trinity Islands	Tugidak 2	ND	ND	ND	18.19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Trinity Islands					68.47	1	0	0	0	1	530	0	0	0	530	471	589
Alitak Bay	Alitak 1	0.94	0.96	0.94	9.97	2	0	0	2	4	553	0	0	553	1,107	936	1,277
Alitak Bay	Alitak 2	0.74	0.94	0.92	9.54	0	0	0	1	1	0	0	0	295	295	251	340
Alitak Bay	Alitak 3	ND	ND	ND	4.53	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Alitak Bay	Alitak 4	0.79	0.9	ND	7.20	0	0	0	0	0	0	0	0	0	0	ND	ND
Alitak Bay	Alitak 5	ND	ND	ND	2.10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total Alitak Bay					33.34	2	0	0	3	5	553	0	0	849	1,402	1,226	1,578

ND = no data.

Table 5.–Number of Dungeness crab by sex and legal status tagged in each sampling location and number of subsequent tags recovered during the 2014 and 2015 fisheries.

Tagging location	Number of crab tagged				2014 Tag returns		2015 Tag returns		
	Males		Female	Total	Males		Males		Total
	Sublegal	Legal	adult	tagged	Sublegal	Legal	Sublegal	Legal	returns
Eagle Harbor	60	28	0	88	0	2	0	2	4
Gull Point	88	61	1	150	1	10	1	8	20
Hidden Basin	90	72	0	162	4	39	5	9	57
Pashagshak Bay	146	21	0	167	1	2	5	8	16
Portage Bay	21	18	0	39	1	1	1	1	4
Saltery Cove	86	33	0	119	2	14	1	3	20
Total Ugak Bay	491	233	1	725	9	68	13	31	121
Sitkinak 1	18	3	0	21	0	0	0	0	0
Sitkinak 2	254	50	0	304	0	0	0	1	1
Tugidak 1	97	4	0	101	0	0	0	0	0
Tugidak 2	161	9	0	170	0	0	0	0	0
Total Trinity Islands	530	66	0	596	0	0	0	1	1
Alitak 1	324	19	0	343	0	0	0	4	4
Alitak 2	318	21	0	339	0	0	0	3	3
Alitak 3	57	14	1	72	0	0	0	2	2
Alitak 4	97	8	0	105	0	0	0	1	1
Alitak 5	28	3	0	31	0	0	0	0	0
Total Alitak Bay	824	65	1	890	0	0	0	10	10
Overall Total	1,845	364	2	2,211	9	77	13	42	132

Table 6.–Sea otter survey observation summary for Ugak Bay, the Trinity Islands, and Alitak Bay, 2014.

Date	Area	Survey location	Activity (1-4)[a]	Area radius surveyed (m)	Travel distance (km)	Total area (km^2)	Location		No. per group	Adult	Pup	Density otters/km	Human disturbance[b]	Response behavior[c]
							N latitude	W longitude						
8/8/2014	Ugak	Saltery Cove	3	300	7.09	4.26	ND	ND	0	0	0	0	ND	ND
8/8/2014	Ugak	Hidden Basin	3	300	5.69	3.41	ND	ND	0	0	0	0	ND	ND
8/8/2014	Ugak	Portage Bay	3	300	6.17	3.70	ND	ND	0	0	0	0	ND	ND
8/8/2014	Ugak	Pashagshak Bay	3	300	11.22	6.73	57.4397	152.5051	1	1	0	0.09	0	7
8/9/2014	Ugak	Saltery Cove	1	200	ND	0.10	57.4873	152.7738	1	1	0	ND	2	8
8/9/2014	Ugak	Pashagshak Bay	2	300	ND	0.11	57.4397	152.5051	1	1	0	ND	0	0
8/12/2014	Ugak	Eagle Harbor	3	300	0.09	12.33	ND	ND	0	0	0	ND	ND	ND
8/14/2014	Ugak	Shark Point	3	300	7.46	4.48	57.444	152.543	1	1	0	0.13	0	0
Ugak Bay Total					37.7	35.12				4	0	0.05		
8/18/2014	Trinity	SW Sitkinak Is.	3	300	14.17	30.18	ND	ND	0	0	0	ND	ND	ND
8/19/2014	Trinity	SE Sitkinak Is.	3	300	27.41	16.45	ND	ND	0	0	0	0	ND	ND
8/19/2014	Trinity	Tugidak Lagoon	4	100	6.30	1.26	56.5422	154.4407	1	1	0	0.16	1	8
8/20/2014	Trinity	Tugidak Passage	4	100	4.28	0.86	ND	ND	0	0	0	0	ND	ND
8/20/2014	Trinity	Tugidak Lagoon	3	200	9.19	3.67	56.5505	154.4719	2	1	1	0.22	2	8
8/21/2014	Trinity	S Sitkinak Is.	3	300	18.11	10.87	ND	ND	0	0	0	0	ND	ND
8/21/2014	Trinity	Tugidak Passage	3	300	7.87	4.72	56.546	154.411	1	1	0	0.13	1	1
8/22/2014	Trinity	Tugidak Bight	3	300	14.15	8.49	56.4968	154.4979	1	1	0	0.07	0	0
8/26/2014	Trinity	Tugidak Passage	3	300	0.50	0.30	56.5257	154.4196	1	1	0	2.00	0	0
Trinity Island Total					102.0	89.96				5	1	0.06		
9/20/2014	Alitak	Alitak Shoals	2	300	ND	32.20	56.8383	154.29	1	1	0	ND	0	0
9/23/2014	Alitak	Cape Alitak	4	300	1.37	0.82	56.8511	154.3021	1	1	0	0.73	0	0
9/25/2014	Alitak	Low Cape	3	300	23.89	14.33	56.9504	154.5266	2	1	1	0.08	0	0
Alitak Bay Total					25.26	47.36				3	1	0.12		
Grand Total					165.0	172.44				12	2	0.07		

[a] Setting pots = 1; Pulling pots = 2; Transect surveys used in density estimation; Area observations = 3; Beach survey = 4.
[b] No disturbance = 0; Slight disturbance = 1; Moderate disturbance = 2; Severe disturbance = 3.
[c] Avoidance = 1; Feeding = 7; Diving Avoidance = 8.
ND = no data.

FIGURES

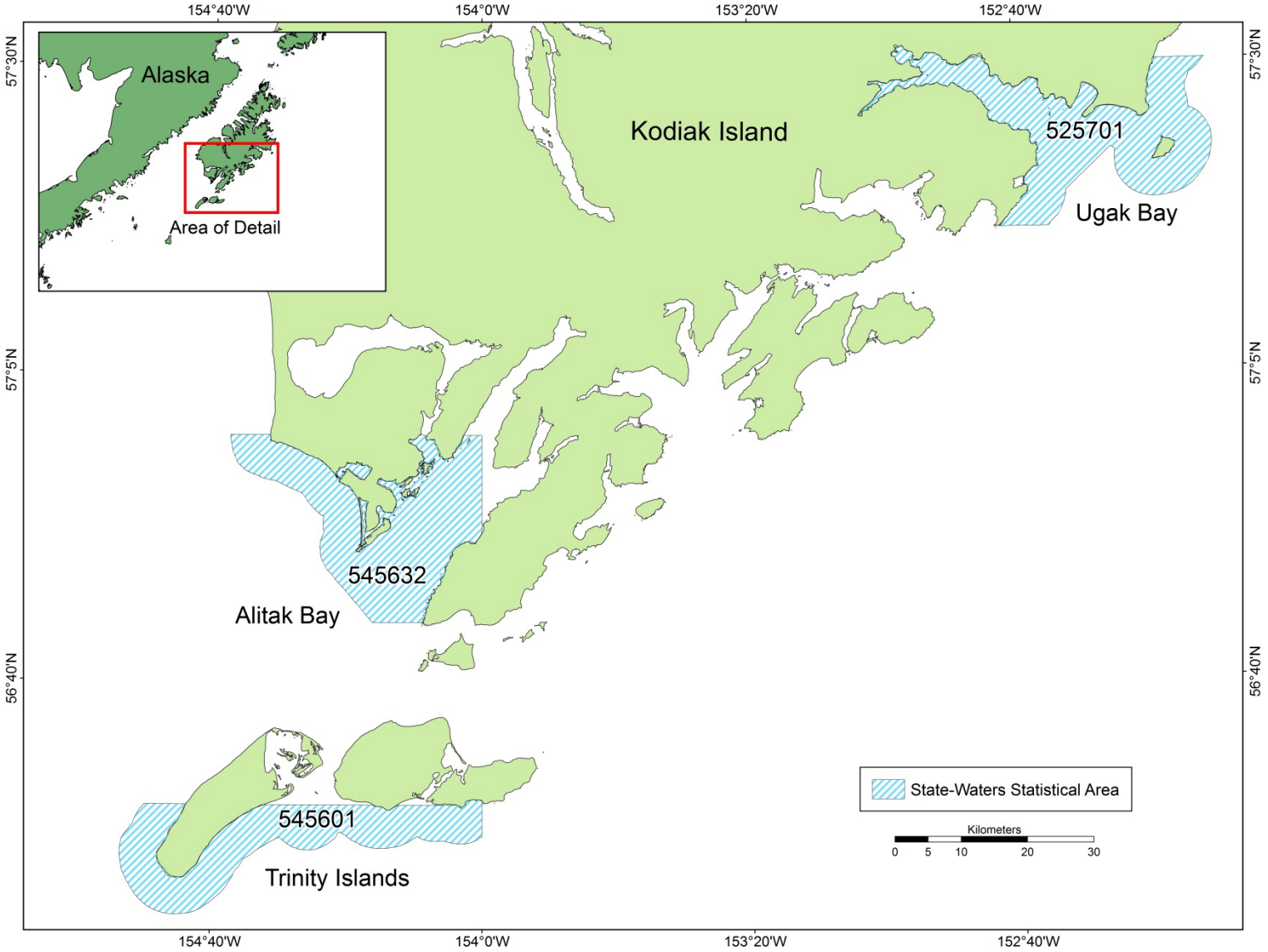


Figure 1.–Survey areas in Ugak Bay, Alitak Bay, and the Trinity Islands in the Kodiak Management Area, 2014.

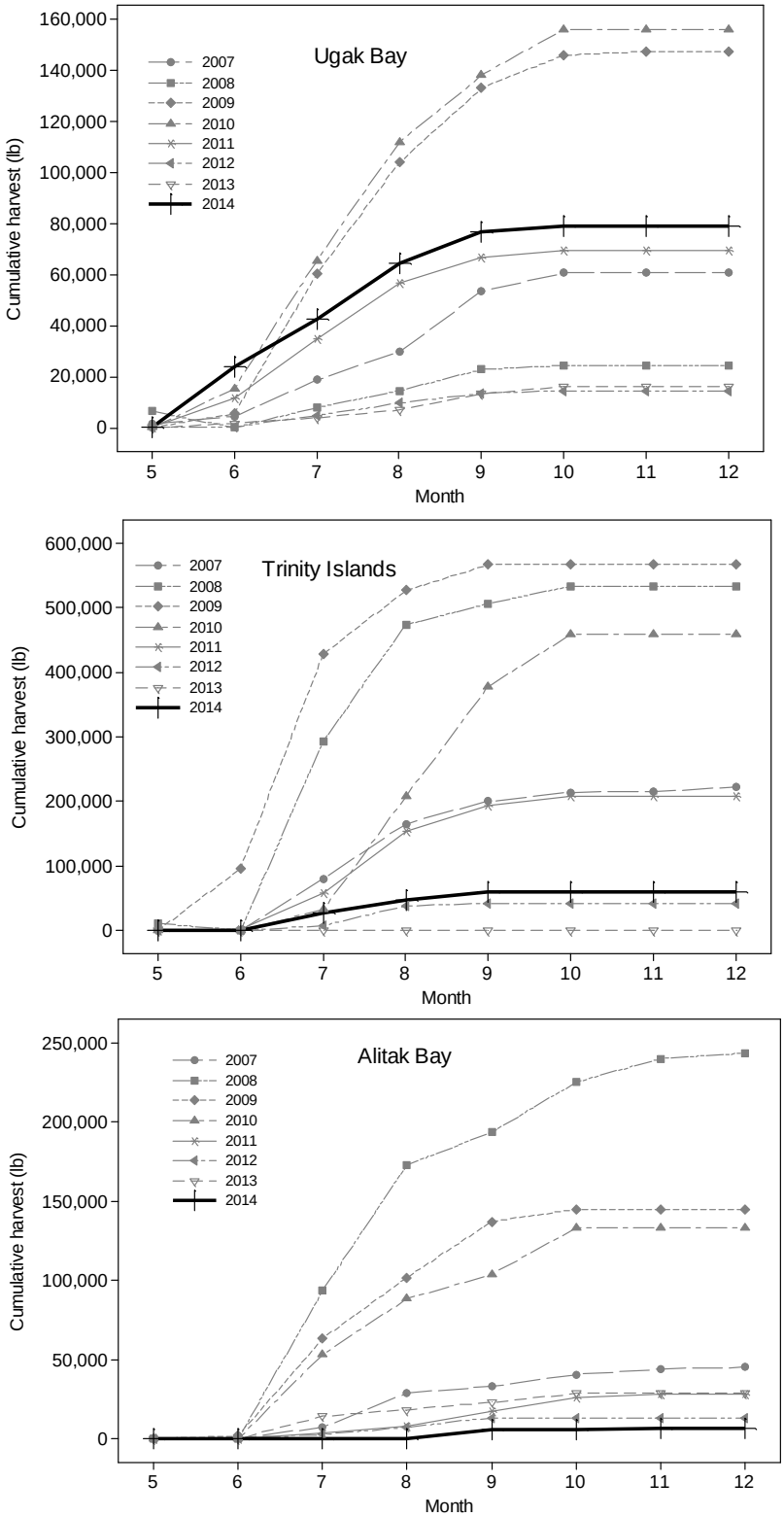


Figure 2.–Total cumulative commercial fishery harvest (lb) by month of Dungeness crab from statistical areas 525701 (Ugak Bay), 545601 (the Trinity Islands), and 545632 (Alitak Bay) from 2007 to 2014.

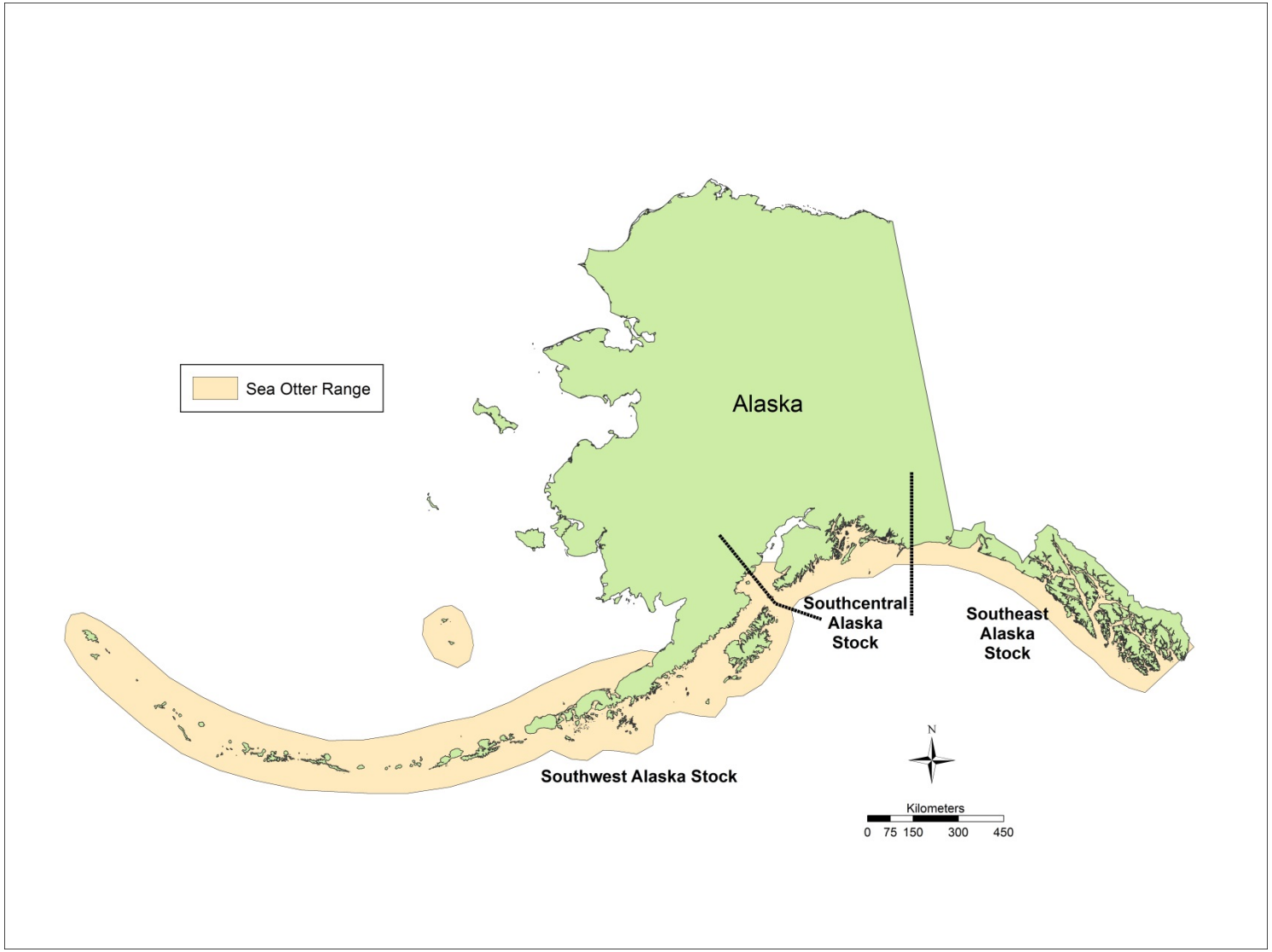


Figure 3.–Distribution of the Northern sea otter stocks in Alaska.

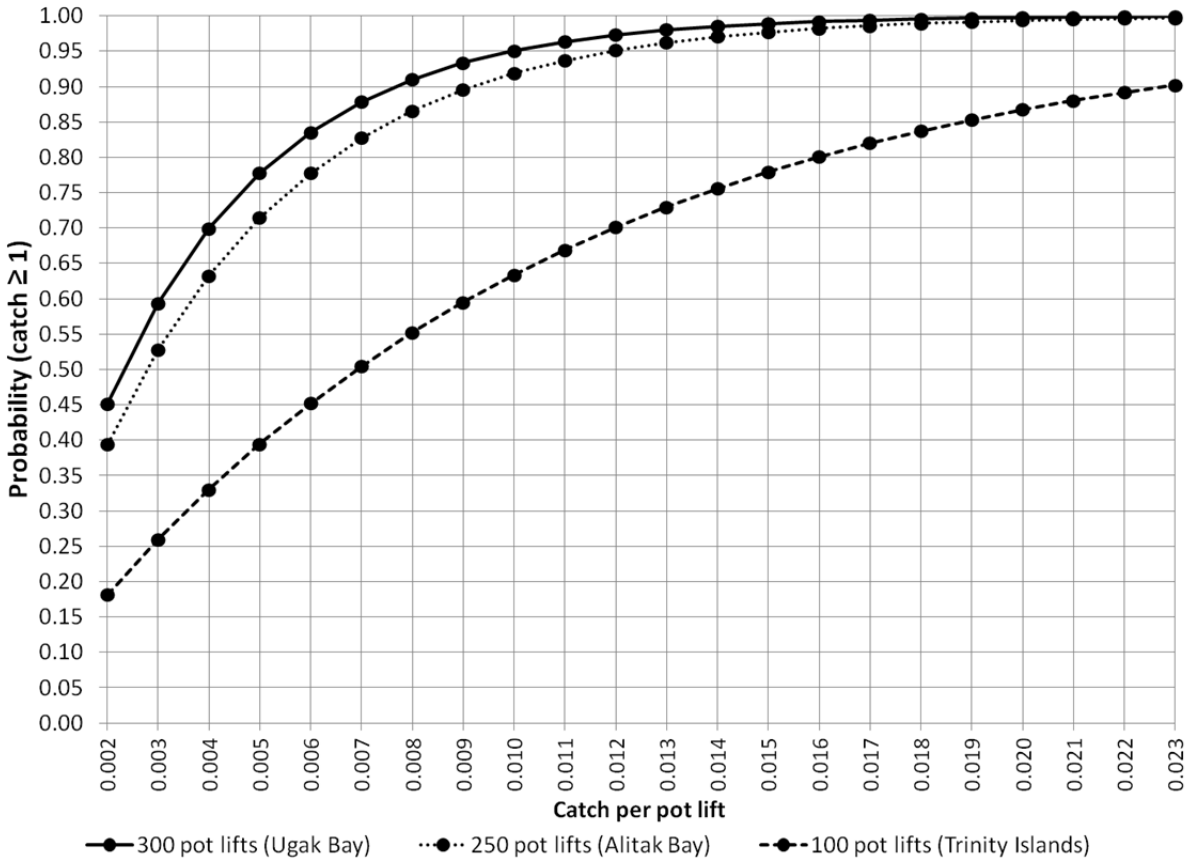


Figure 4.–Probability of at least 1 sea otter captured by 300, 250, and 100 pot lifts for catch per pot lift (CPUE) values of 0.002 to 0.023 assuming number of captures has a binomial distribution with parameters n = number of pot lifts and p = CPUE.

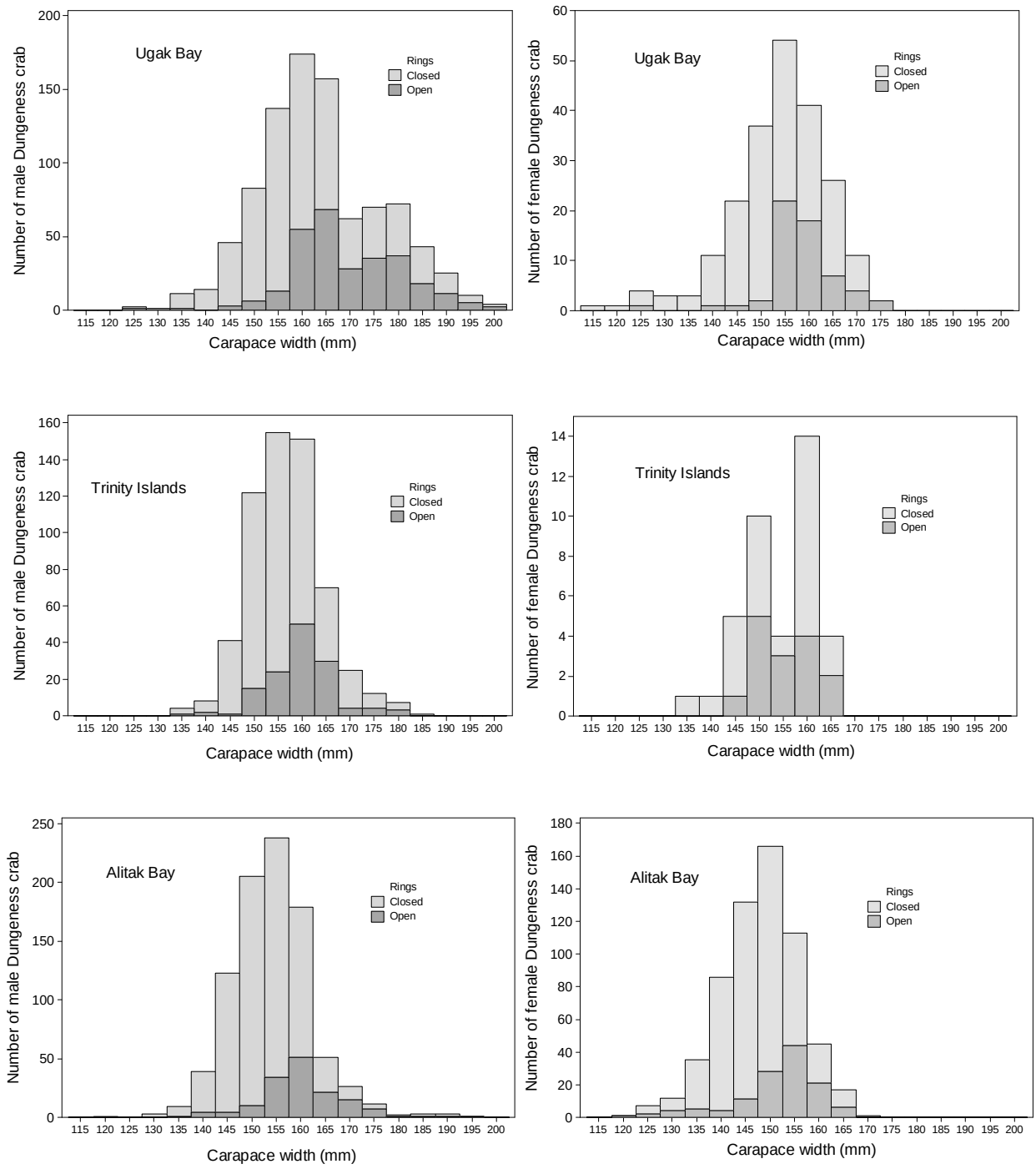


Figure 5.–Size frequency distributions of male and female Dungeness crab carapace width (5 mm midpoint bins) in pots with closed and open escape rings from Ugak Bay, the Trinity Islands, and Alitak Bay, 2014.

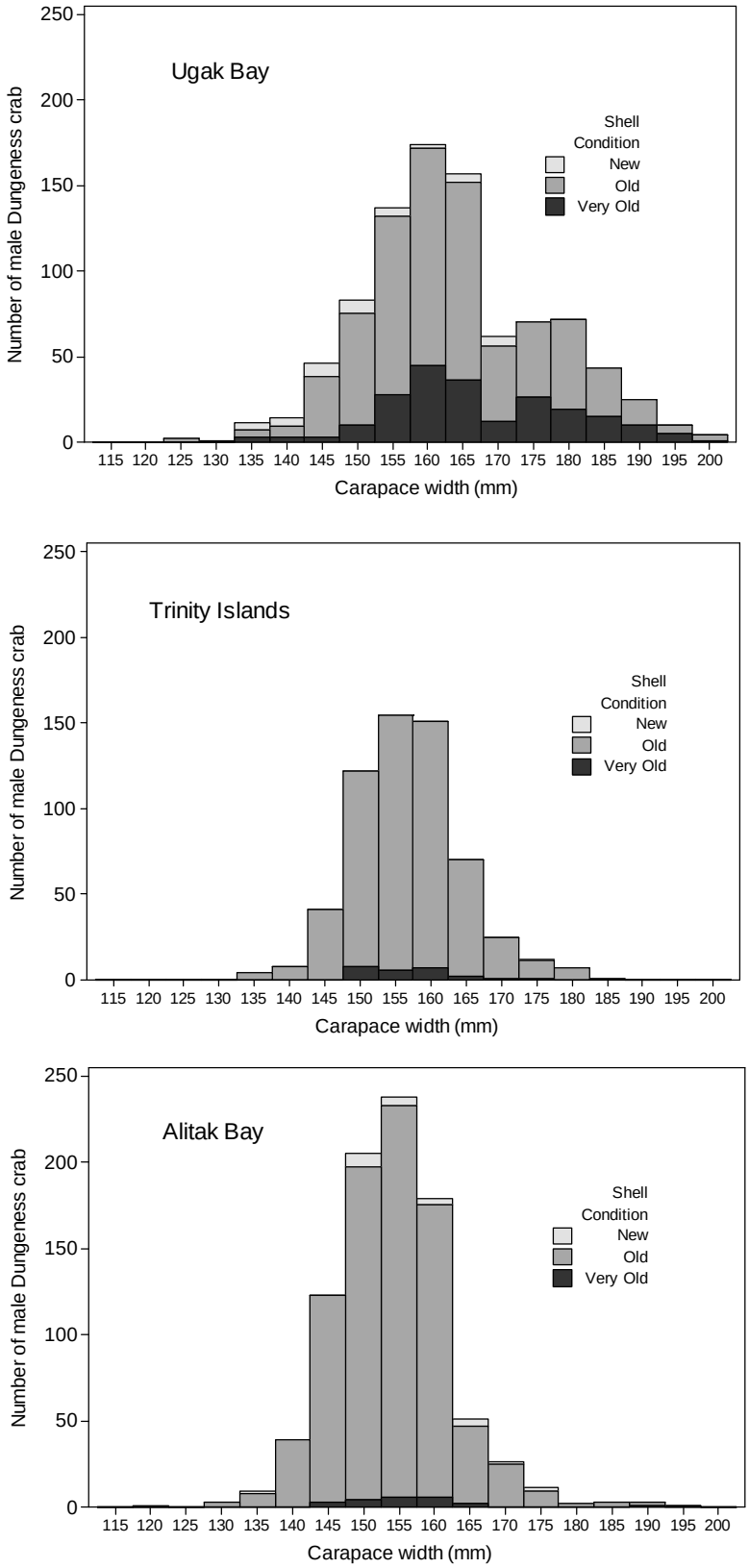


Figure 6.–Number of male Dungeness crab by carapace width (5 mm midpoint bins) and shell condition captured in pots from Ugak Bay, the Trinity Islands, and Alitak Bay, 2014.

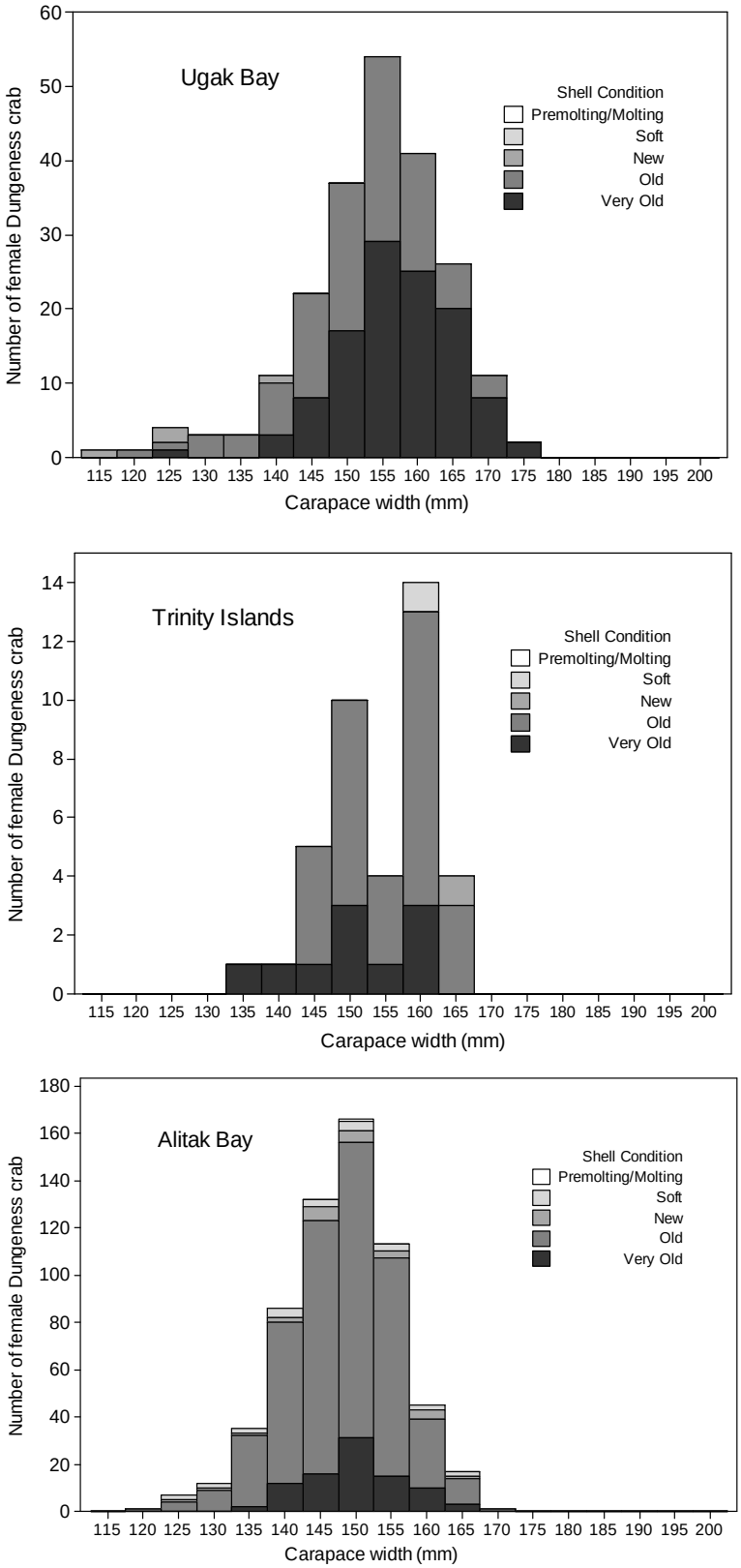
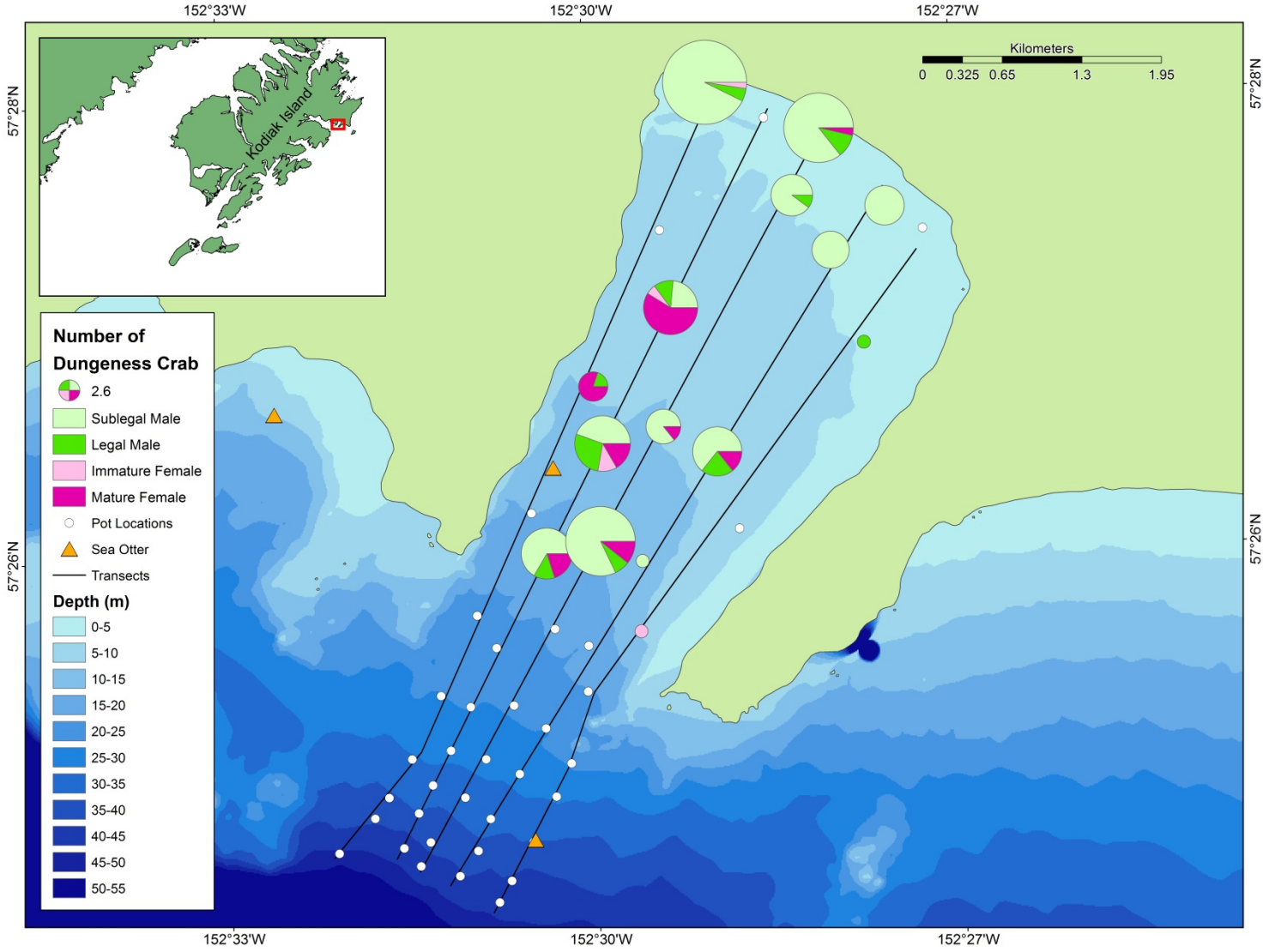
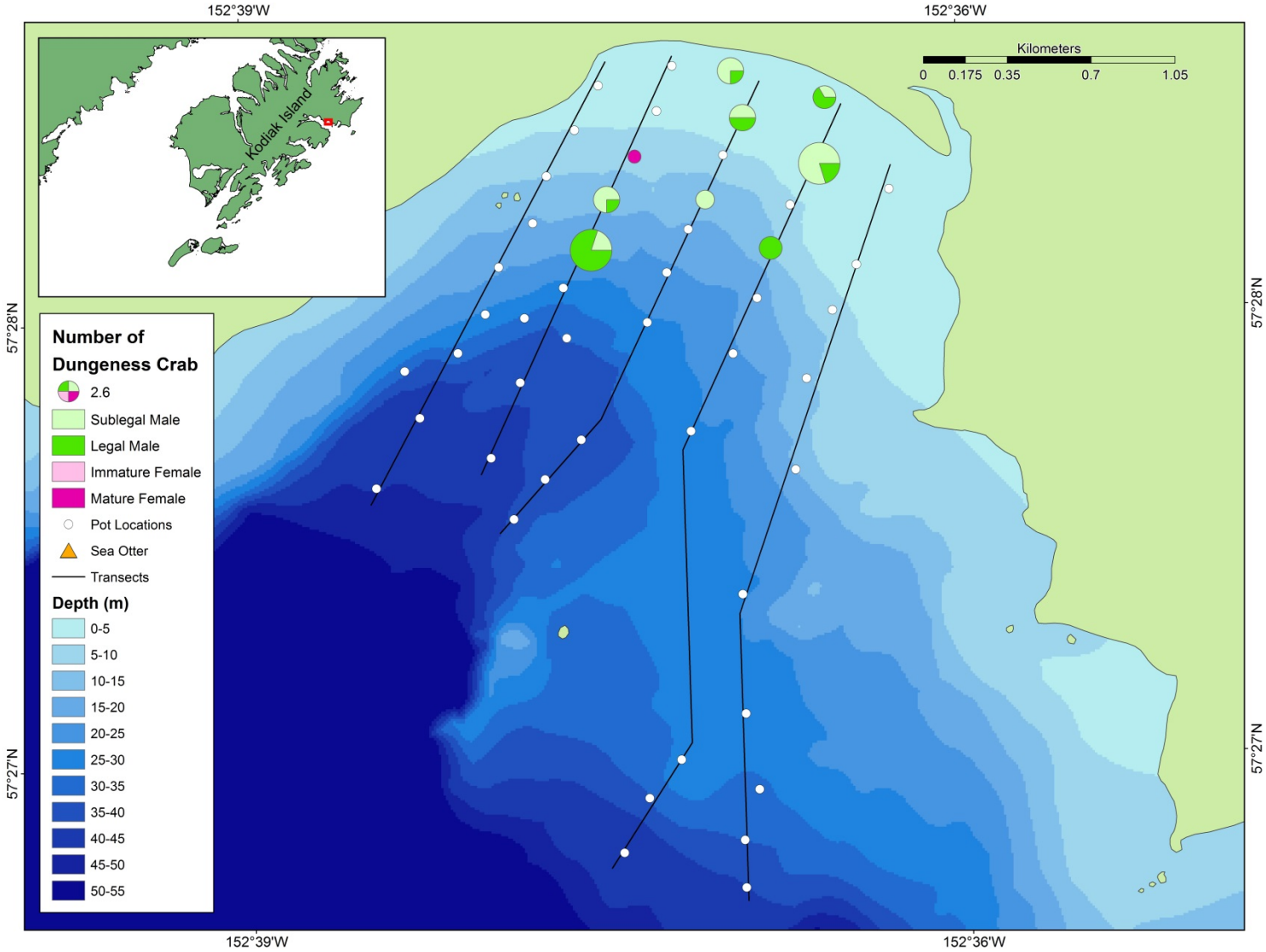


Figure 7.–Number of female Dungeness crab by carapace width (5 mm midpoint bins) and shell condition captured in pots from Ugak Bay, the Trinity Islands, and Alitak Bay, 2014.



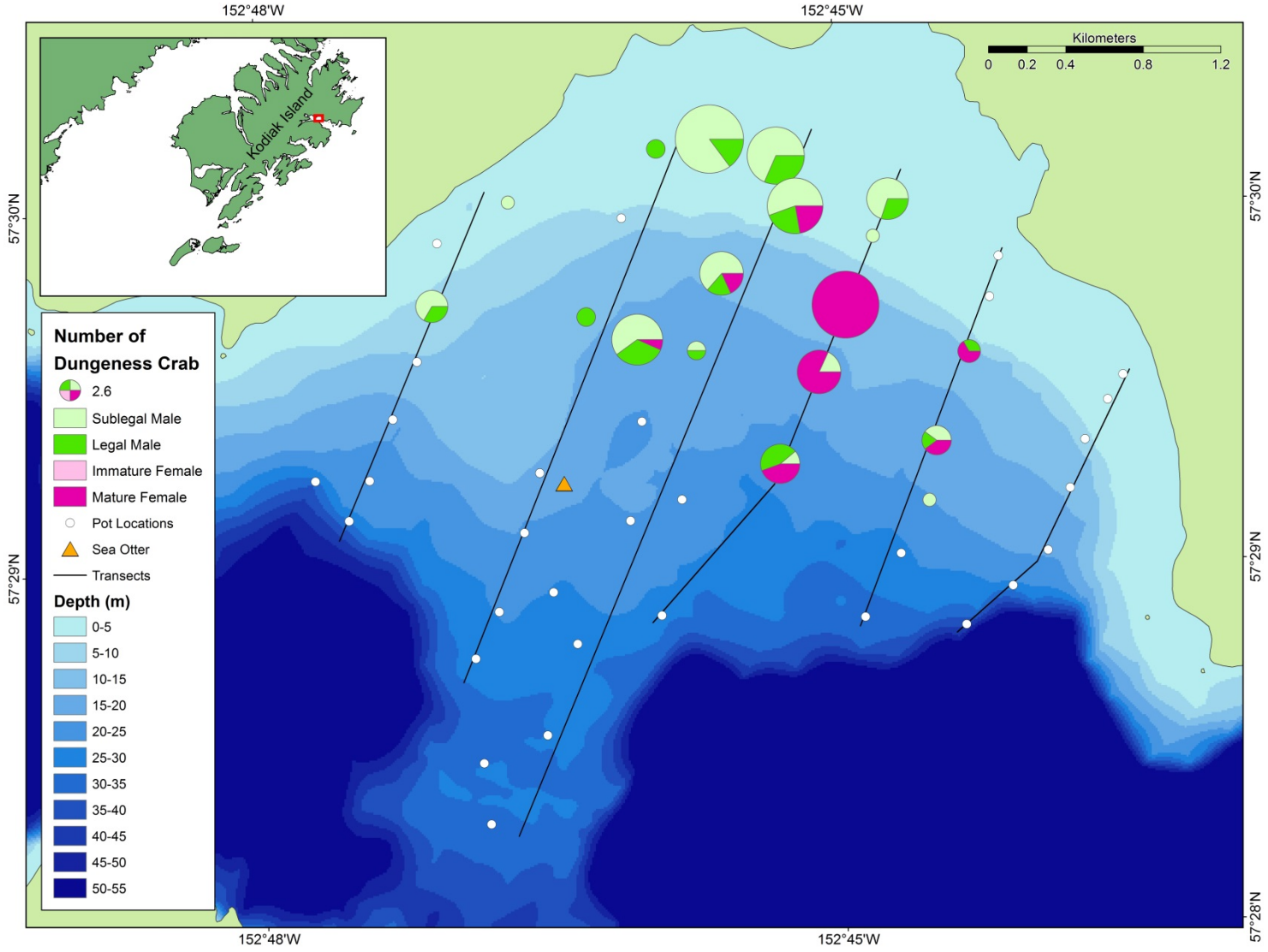
Bathymetry data, NOAA, NCEI.

Figure 8.–Number of Dungeness crab captured by sex and legal status and sea otters observed during the pot survey in Pashagshak Bay sampling location within the Ugak Bay survey area, 2014.



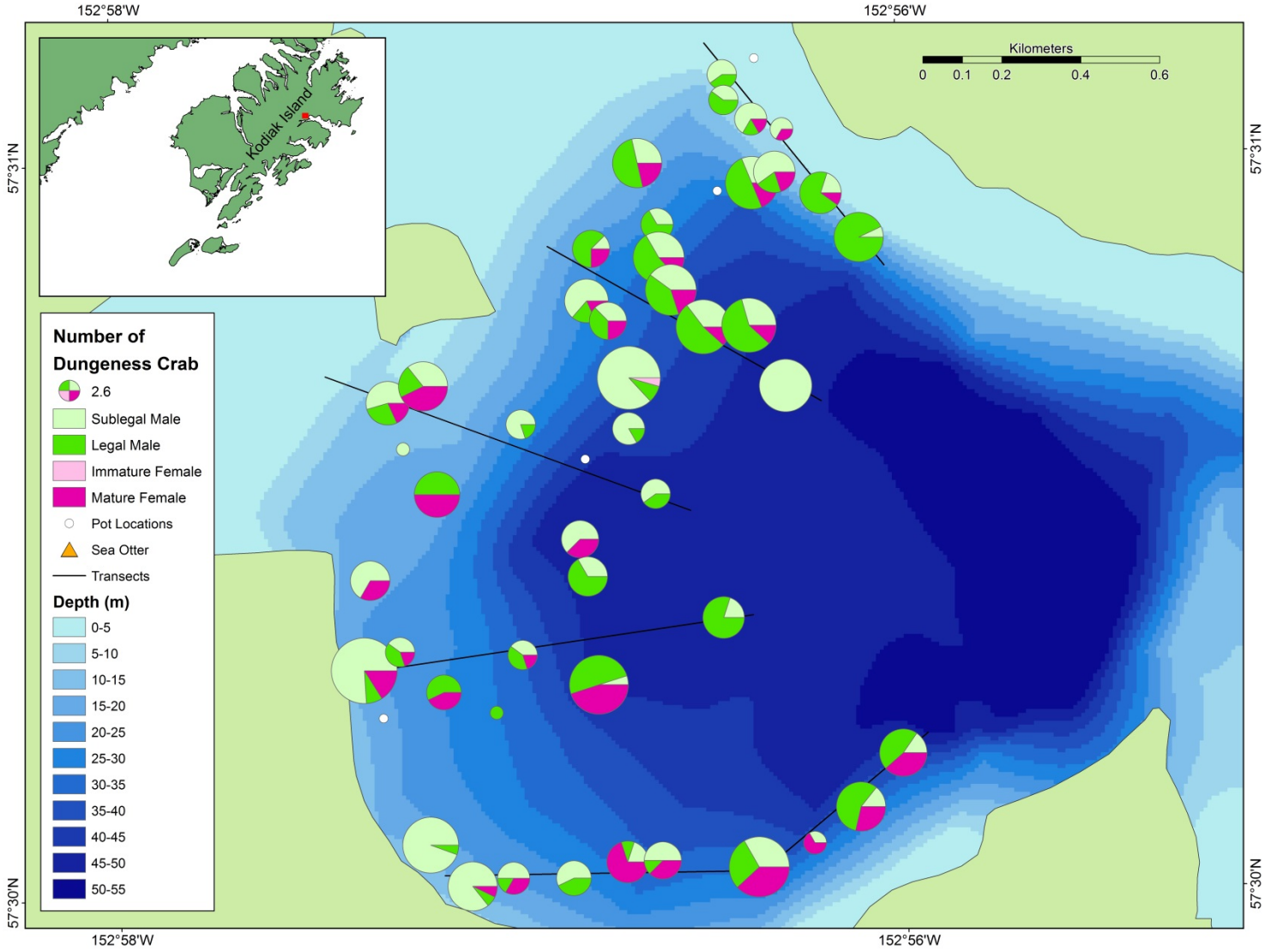
Bathymetry data, NOAA, NCEI.

Figure 9.–Number of Dungeness crab captured by sex and legal status and sea otters observed during the pot survey in Portage Bay sampling location within the Ugak Bay survey area, 2014.



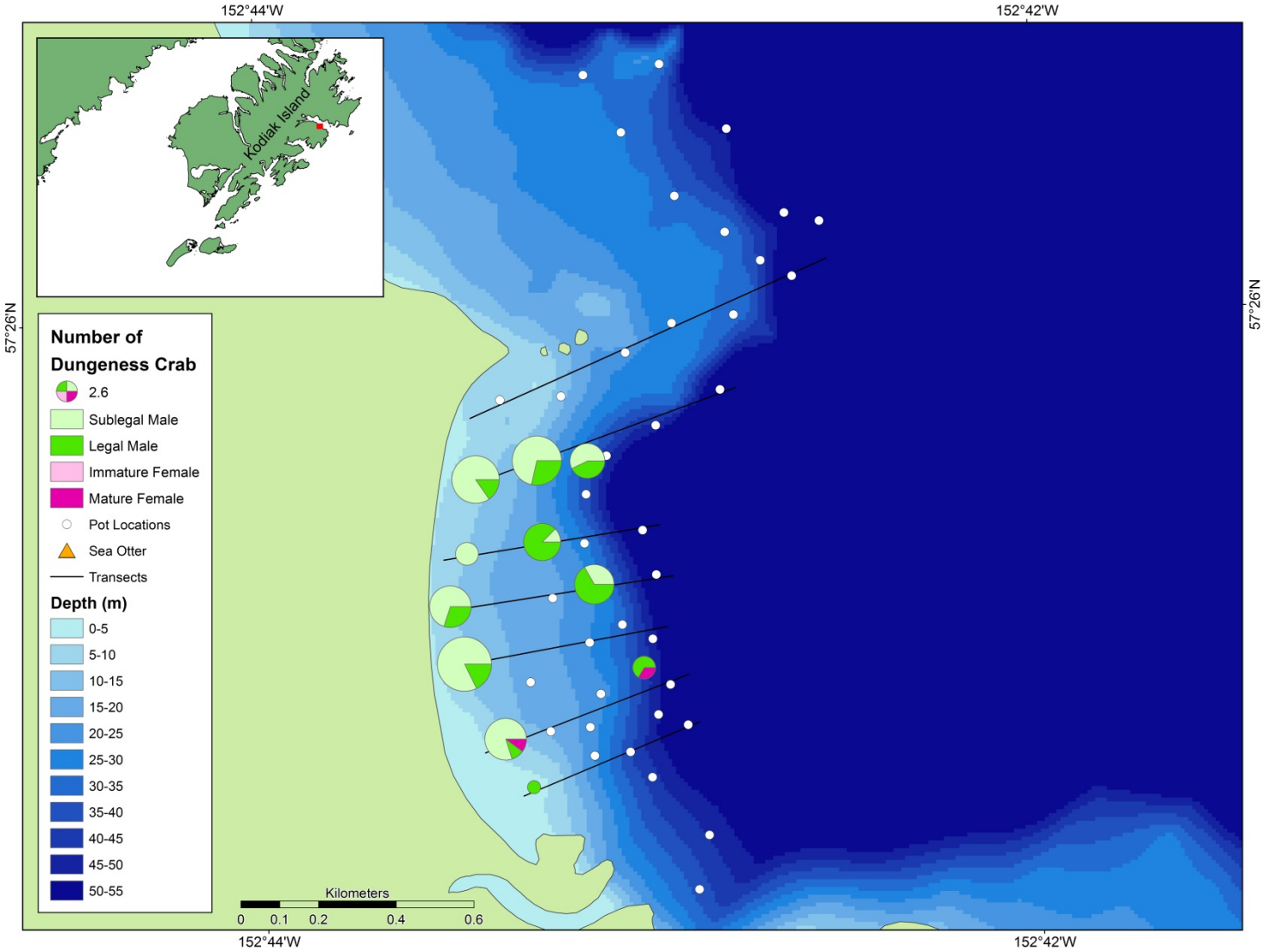
Bathymetry data, NOAA, NCEI.

Figure 10.–Number of Dungeness crab captured by sex and legal status and sea otters observed during the pot survey in Saltery Cove sampling location within the Ugak Bay survey area, 2014.



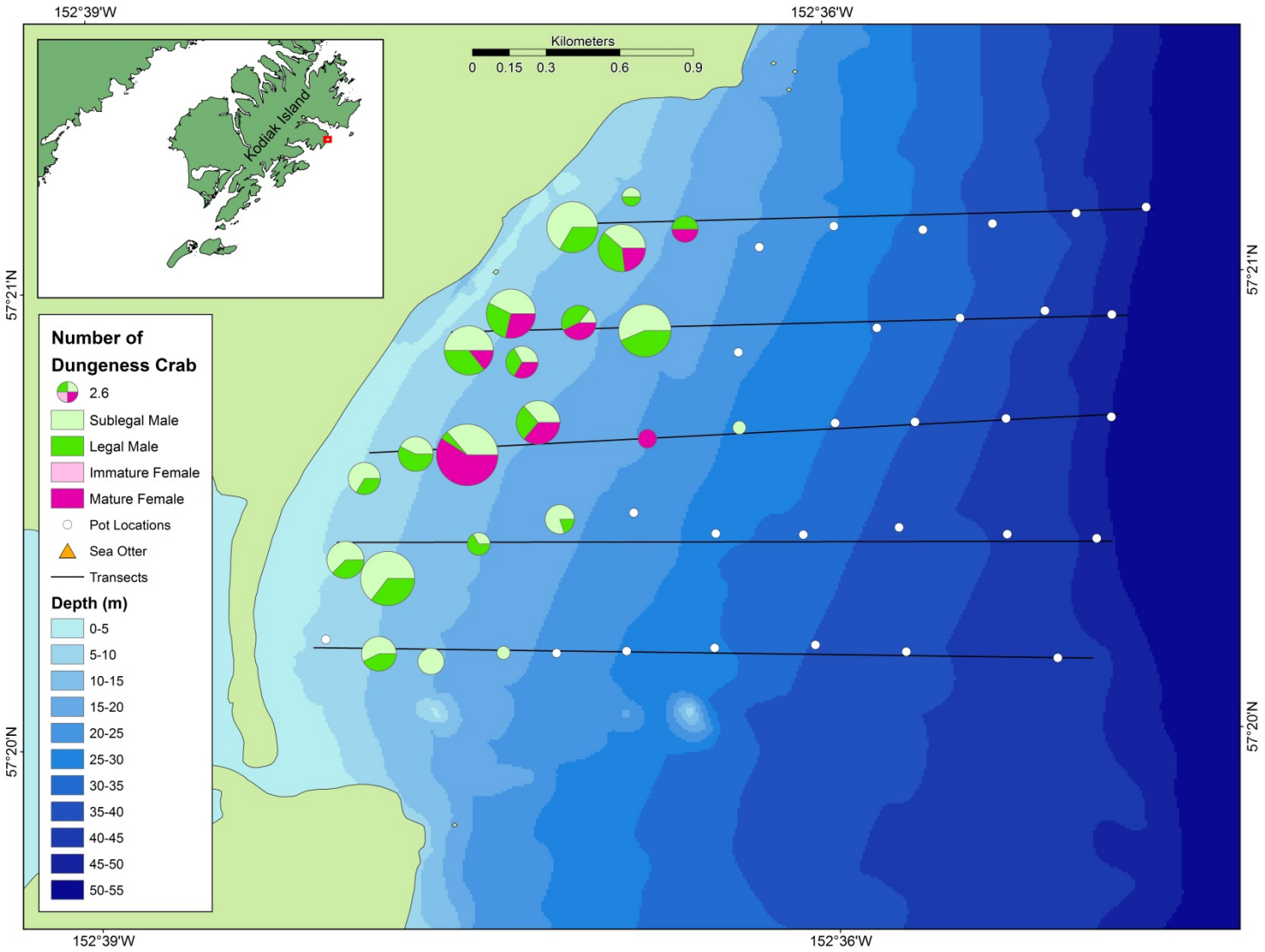
Bathymetry data, NOAA, NCEI.

Figure 11.–Number of Dungeness crab captured by sex and legal status and sea otters observed during the pot survey in Hidden Basin sampling location within the Ugak Bay survey area, 2014



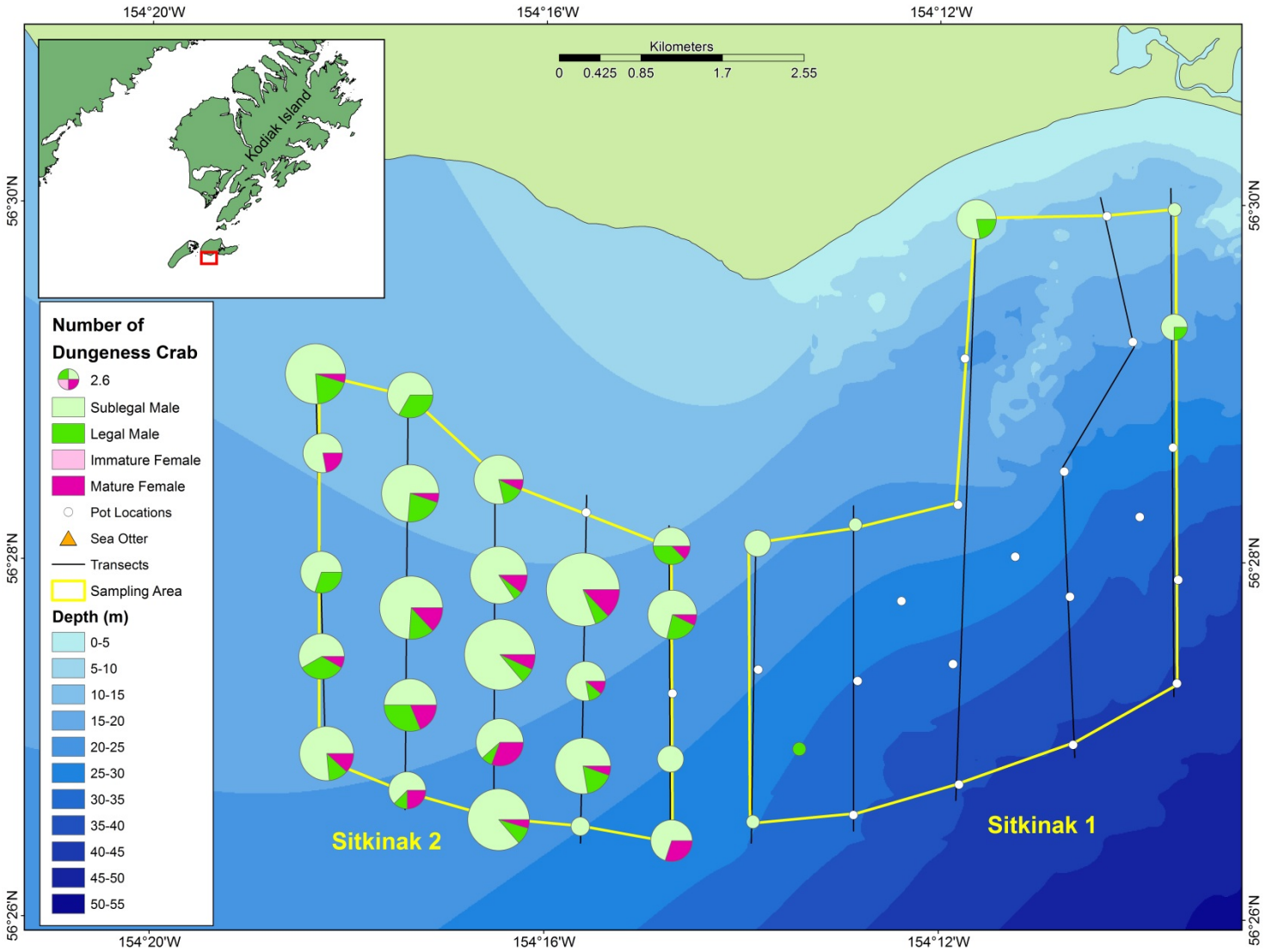
Bathymetry data, NOAA, NCEI.

Figure 12.–Number of Dungeness crab captured by sex and legal status and sea otters observed during the pot survey in Eagle Harbor sampling location within the Ugak Bay survey area, 2014.



Bathymetry data, NOAA, NCEI.

Figure 13.–Number of Dungeness crab captured by sex and legal status and sea otters observed during the pot survey in Gull Point sampling location within the Ugak Bay survey area, 2014



Bathymetry data, NOAA, NCEI.

Figure 14.–Number of Dungeness crab captured by sex and legal status and sea otters observed during the pot survey in the Sitkinak Island sampling location within the Trinity Islands survey area, August, 2014.

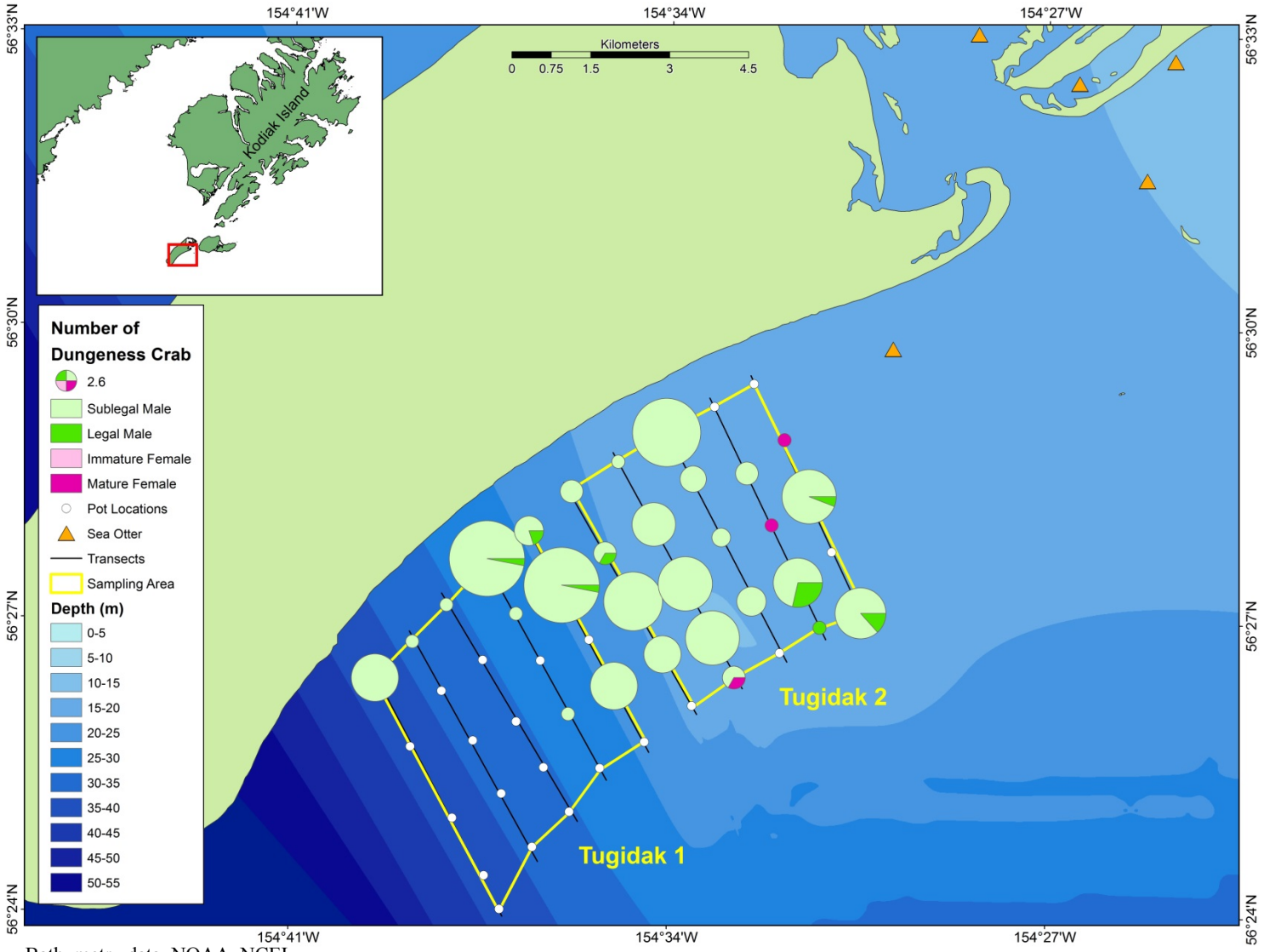
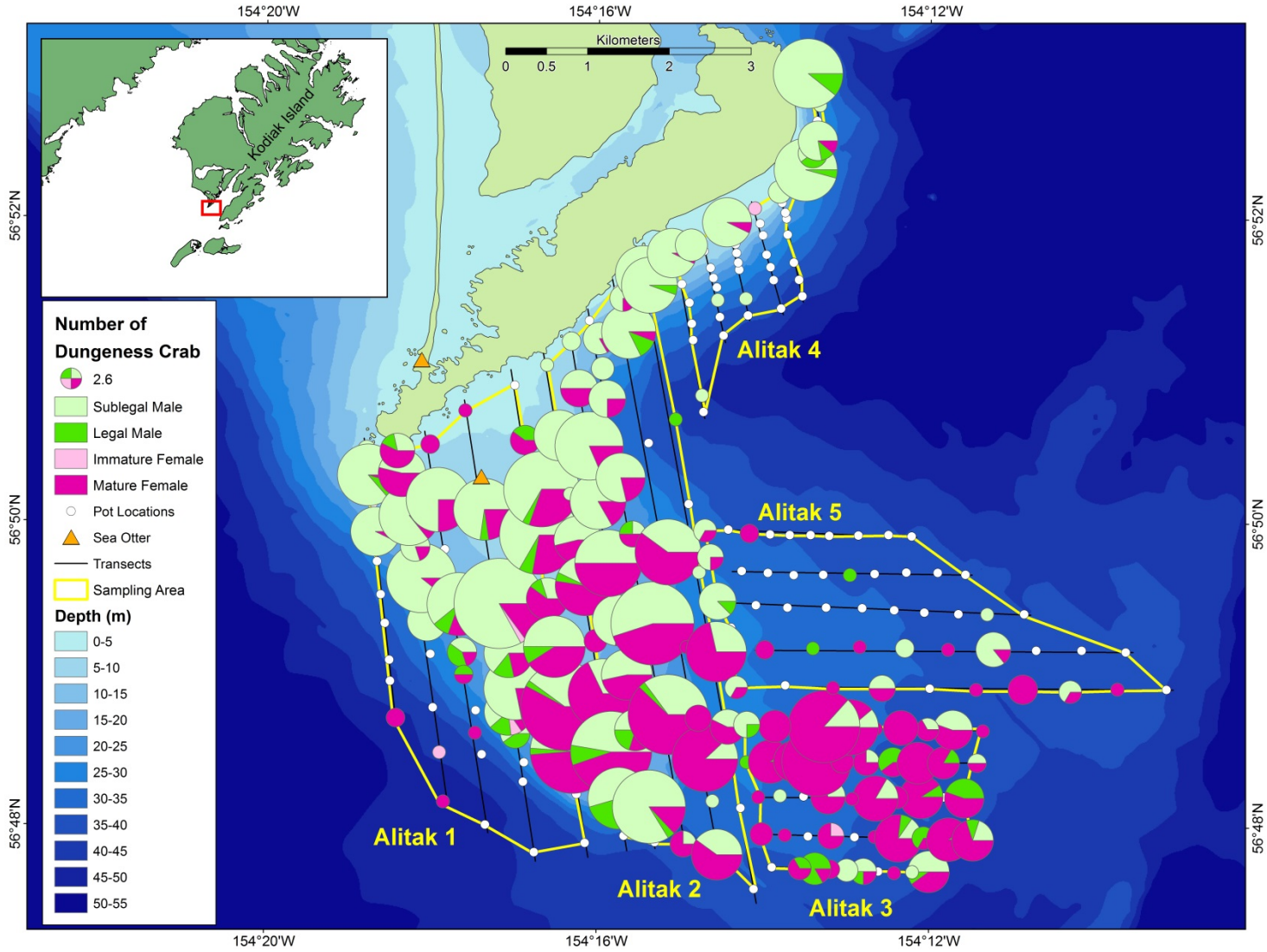


Figure 15.–Number of Dungeness crab captured by sex and legal status and sea otters observed during the pot survey in the Tugidak Island sampling location within the Trinity Islands survey area, August, 2014.



Bathymetry data, NOAA, NCEI.

Figure 16.–Number of Dungeness crab captured by sex and legal status and sea otters observed during the pot survey in the Alitak Bay survey area, September, 2014.

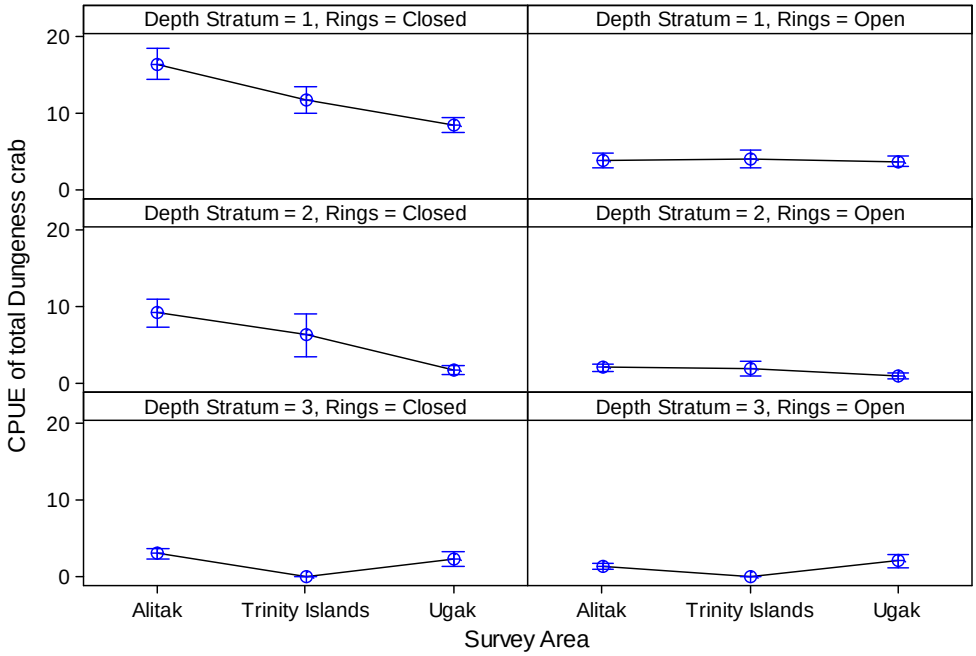


Figure 17.–Interval plot of catch per pot (CPUE) of total Dungeness crab by survey area for depth stratum 1 (< 20.0 m), 2 (20.1 – 35.0 m), and 3 (35.1 – 50.5 m) and escape ring configuration (closed, open) (panel variables). Error bars are 1 SE from the mean.

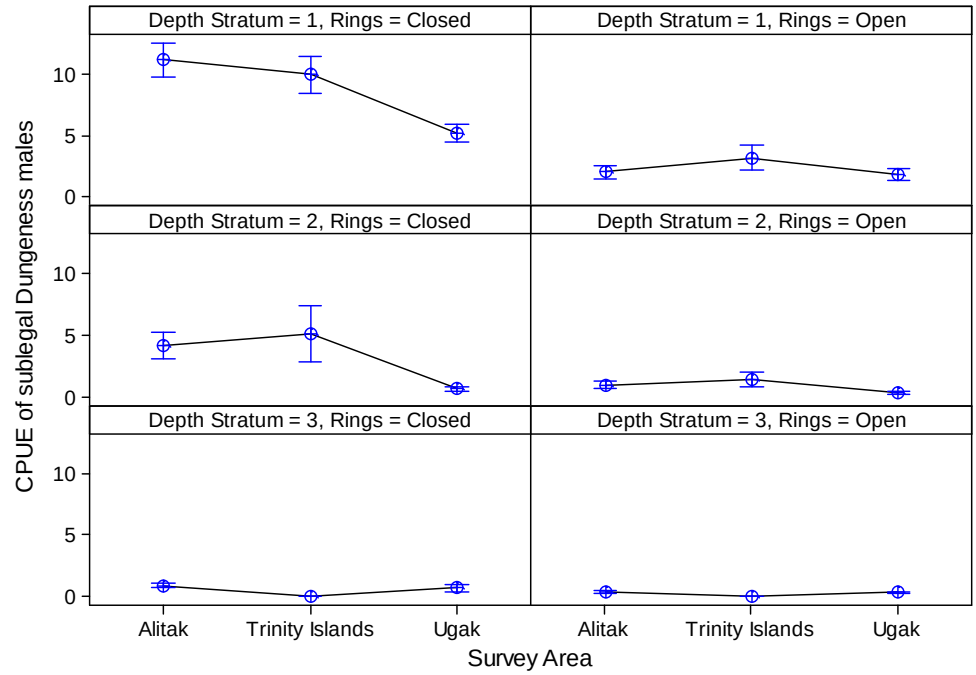


Figure 18.–Interval plots of catch per pot (CPUE) of sublegal males Dungeness crab by survey area for each depth stratum 1 (< 20.0 m), 2 (20.1 – 35.0 m), and 3 (35.1 – 50.5 m) and escape ring configuration (closed, open) (panel variables). Error bars are 1 SE from the mean.

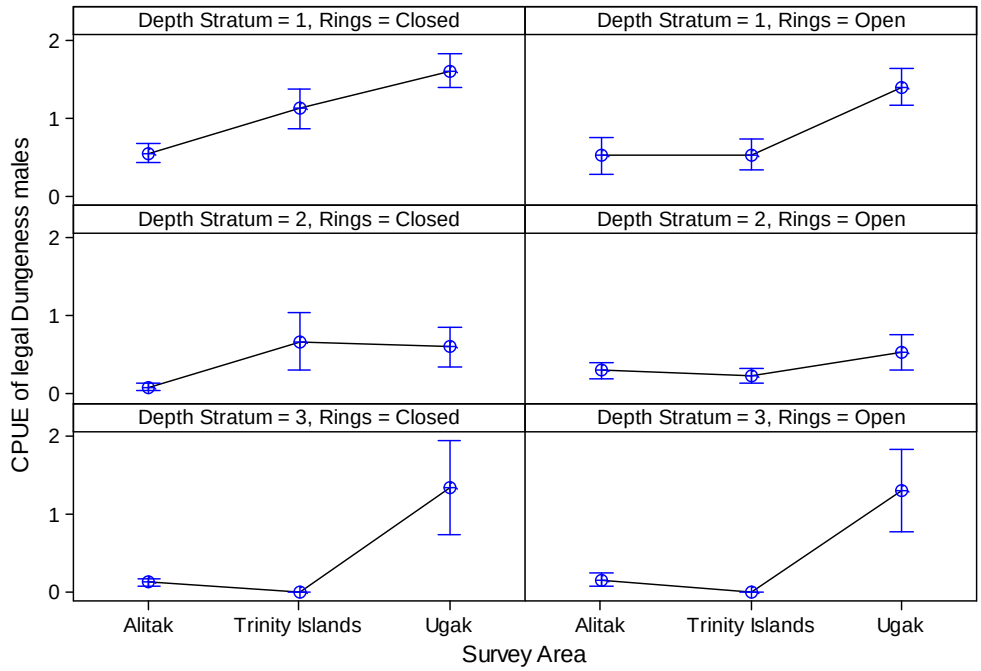


Figure 19.–Interval plot of catch per pot (CPUE) of legal male Dungeness crab by survey area for each depth stratum 1 (< 20.0 m), 2 (20.1 – 35.0 m), and 3 (35.1 – 50.5 m) and escape ring configuration (closed, open) (panel variables). Error bars are 1 SE from the mean.

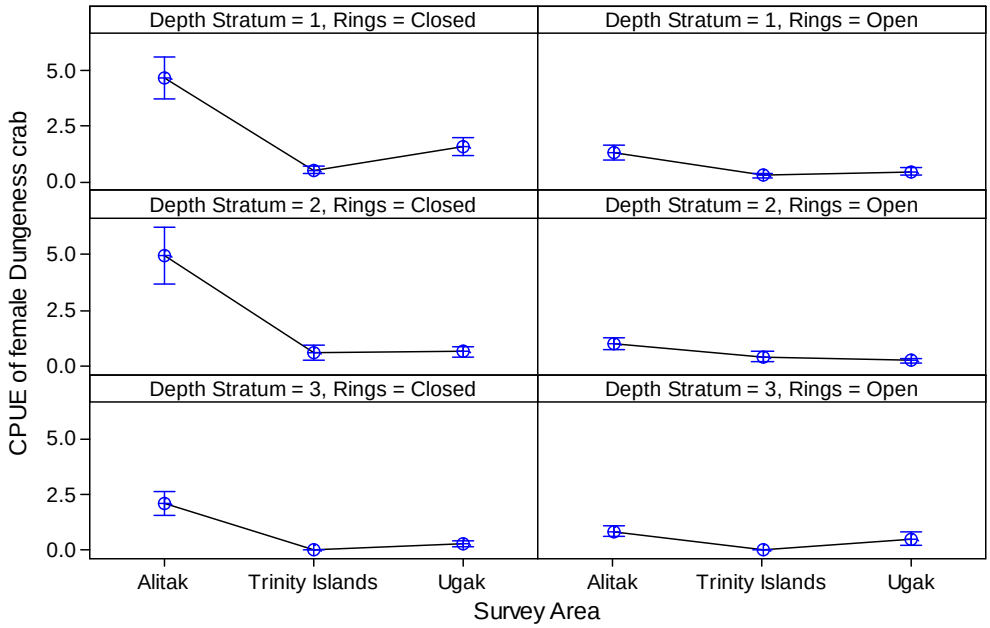


Figure 20.–Interval plot of catch per pot (CPUE) of female Dungeness crab by survey area for each depth stratum 1 (< 20.0 m), 2 (20.1 – 35.0 m), and 3 (35.1 – 50.5 m) and escape ring configuration (closed, open) (panel variables). Error bars are 1 SE from the mean.

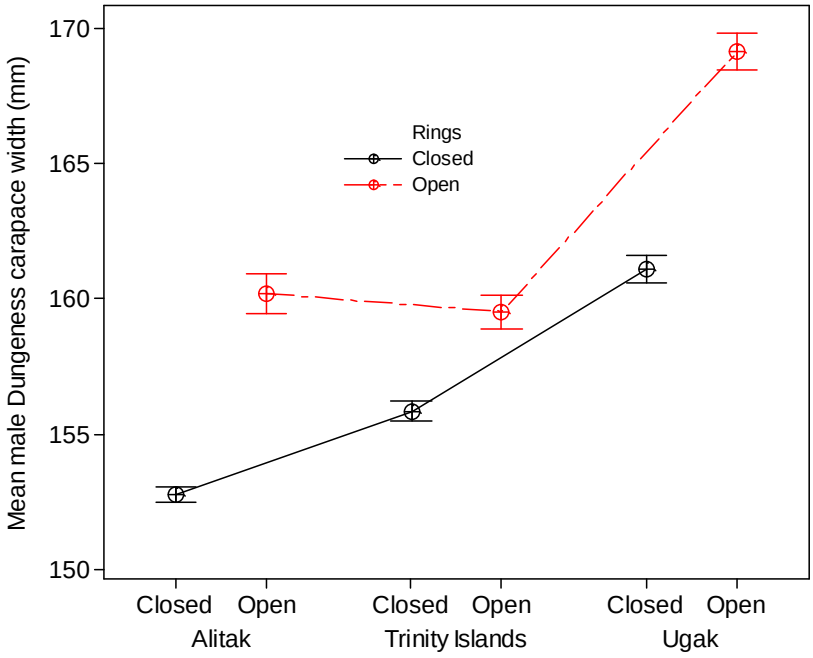


Figure 21.–Mean male Dungeness crab carapace width (mm) by survey area and escape ring configuration. Error bars are 1 SE from the mean.

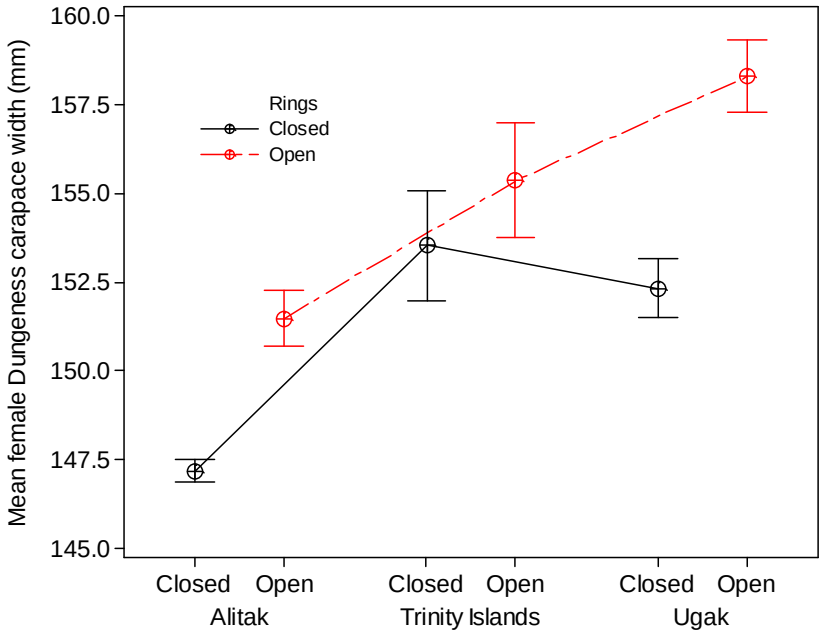


Figure 22.–Mean female Dungeness crab carapace width (mm) by survey area and escape ring configuration. Error bars are 1 SE from the mean.

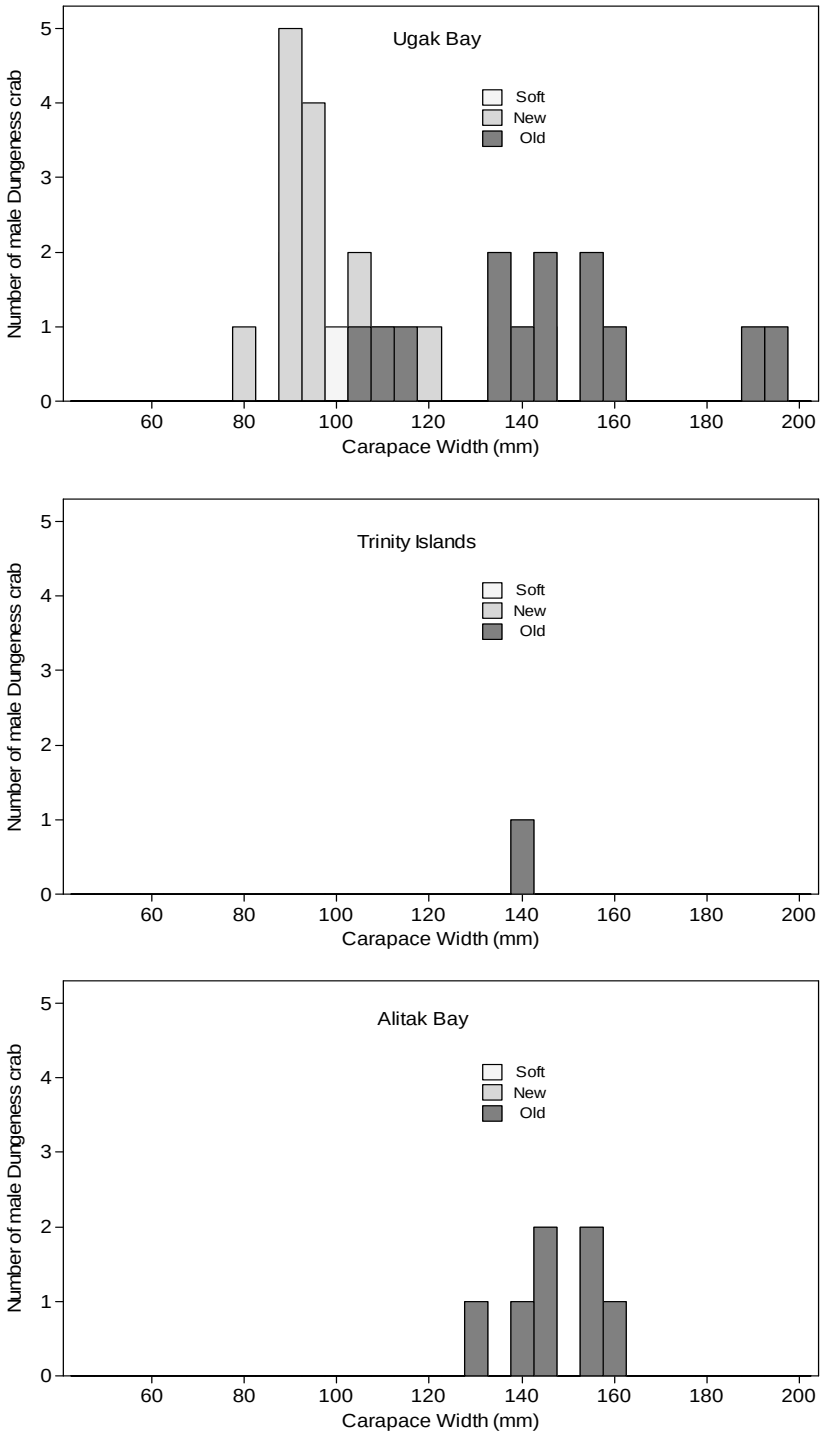


Figure 23.–Number of male Dungeness crab by carapace width (5 mm midpoint bins) and shell condition captured by the trawl tows in Ugak Bay, the Trinity Islands, and Alitak Bay survey areas, 2014.

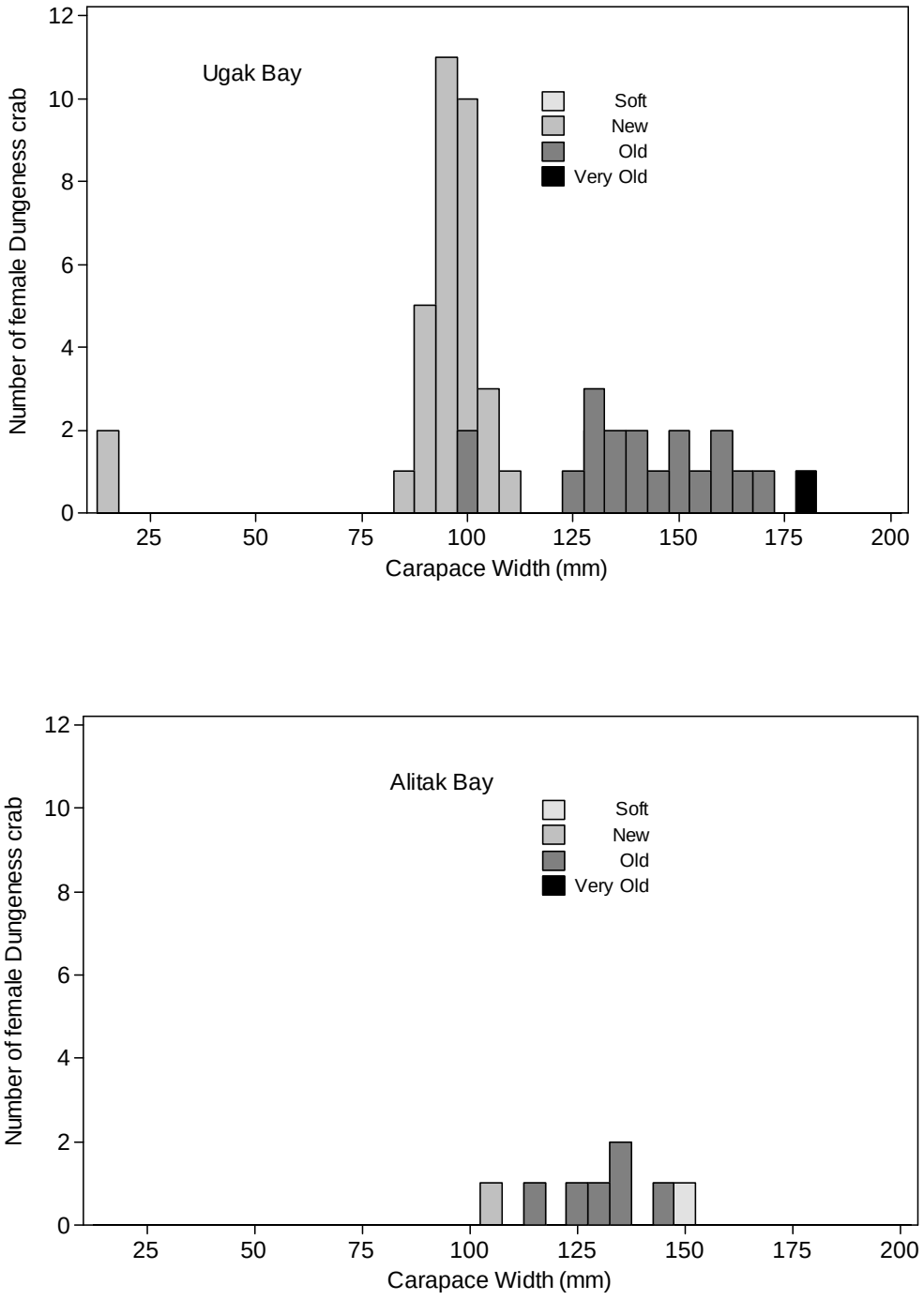
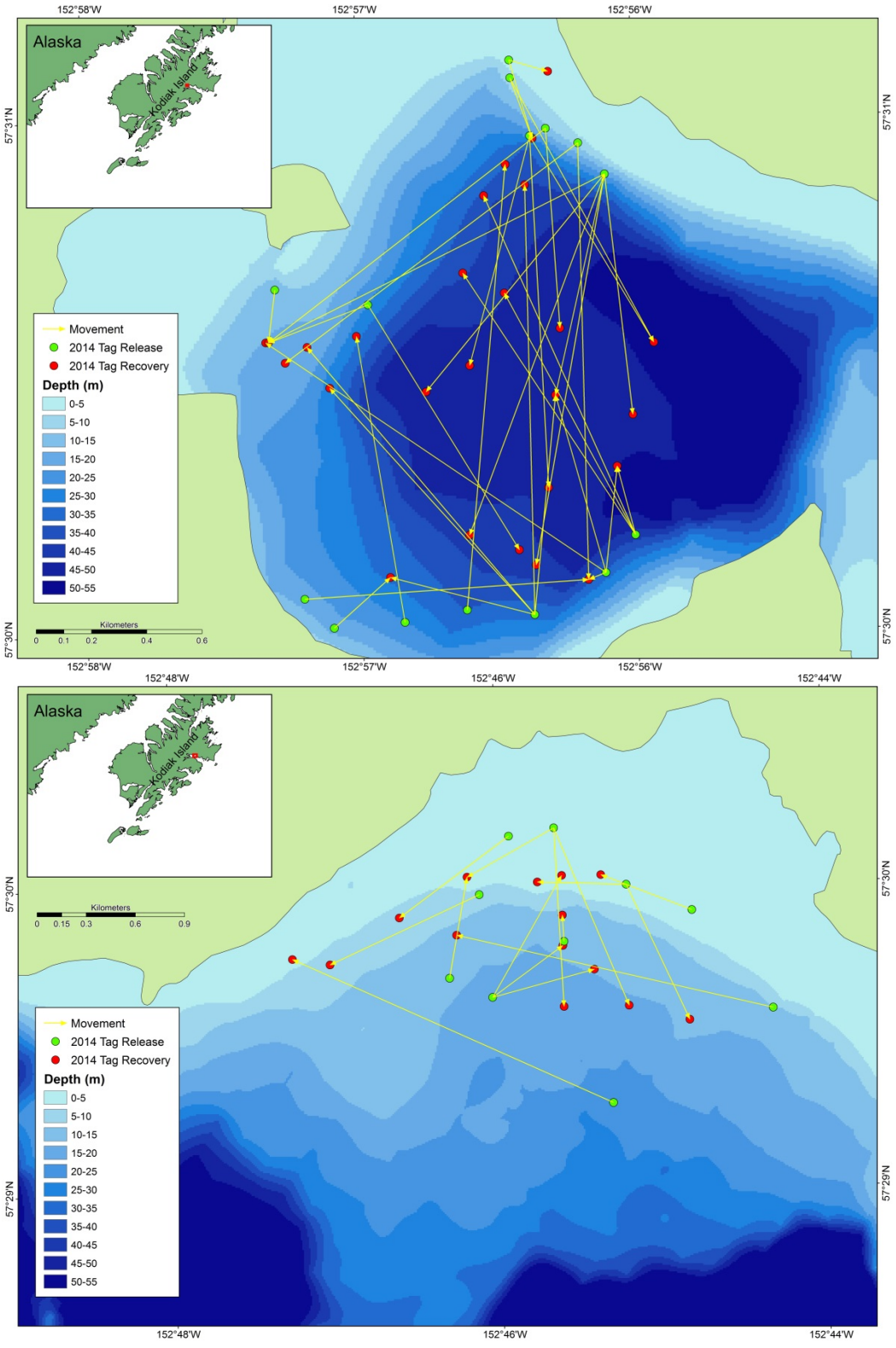
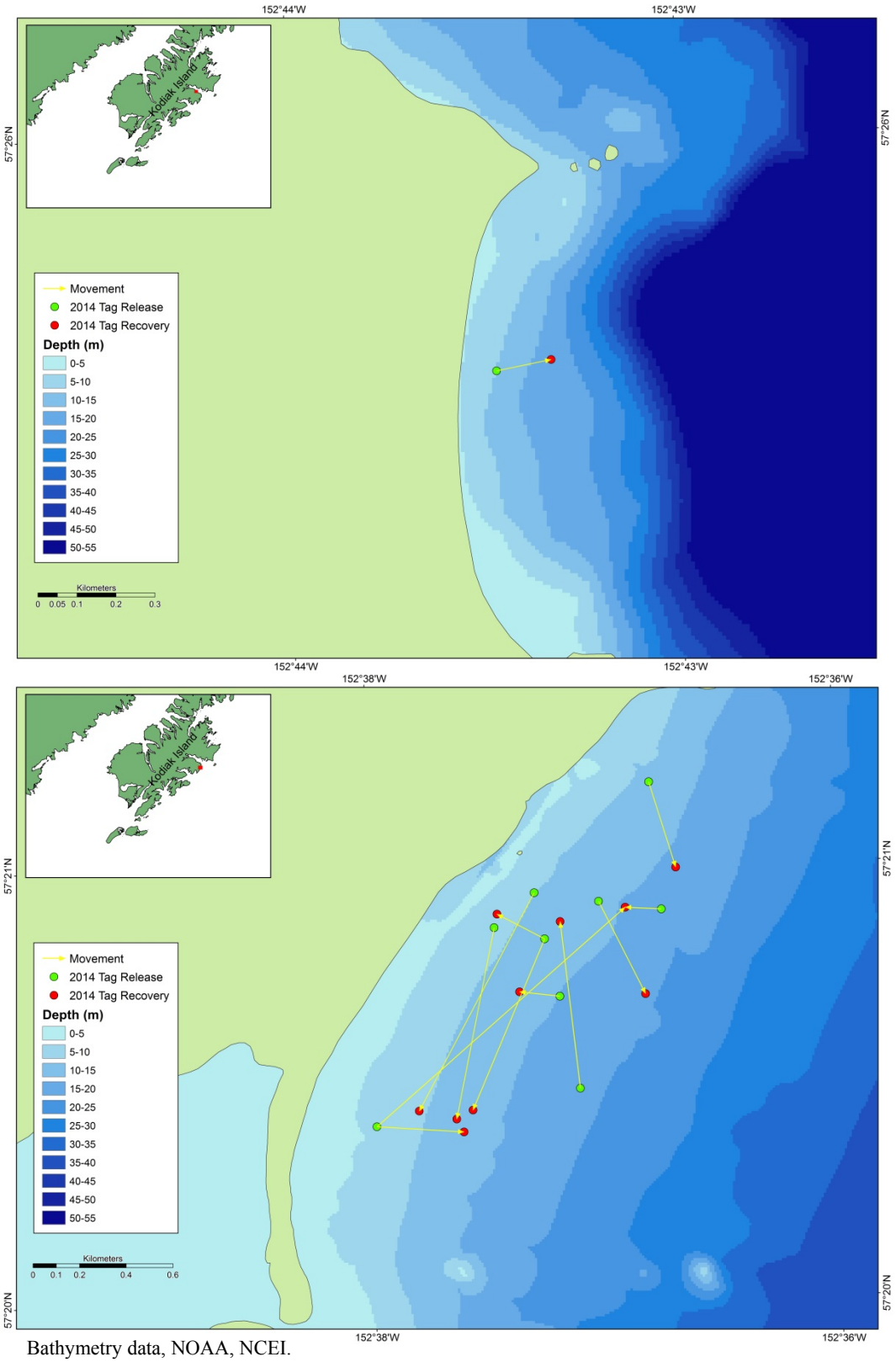


Figure 24.–Number of female Dungeness crab by carapace width (5 mm midpoint bins) and shell condition captured by the trawl tows in Ugak and Alitak Bay survey areas, 2014.



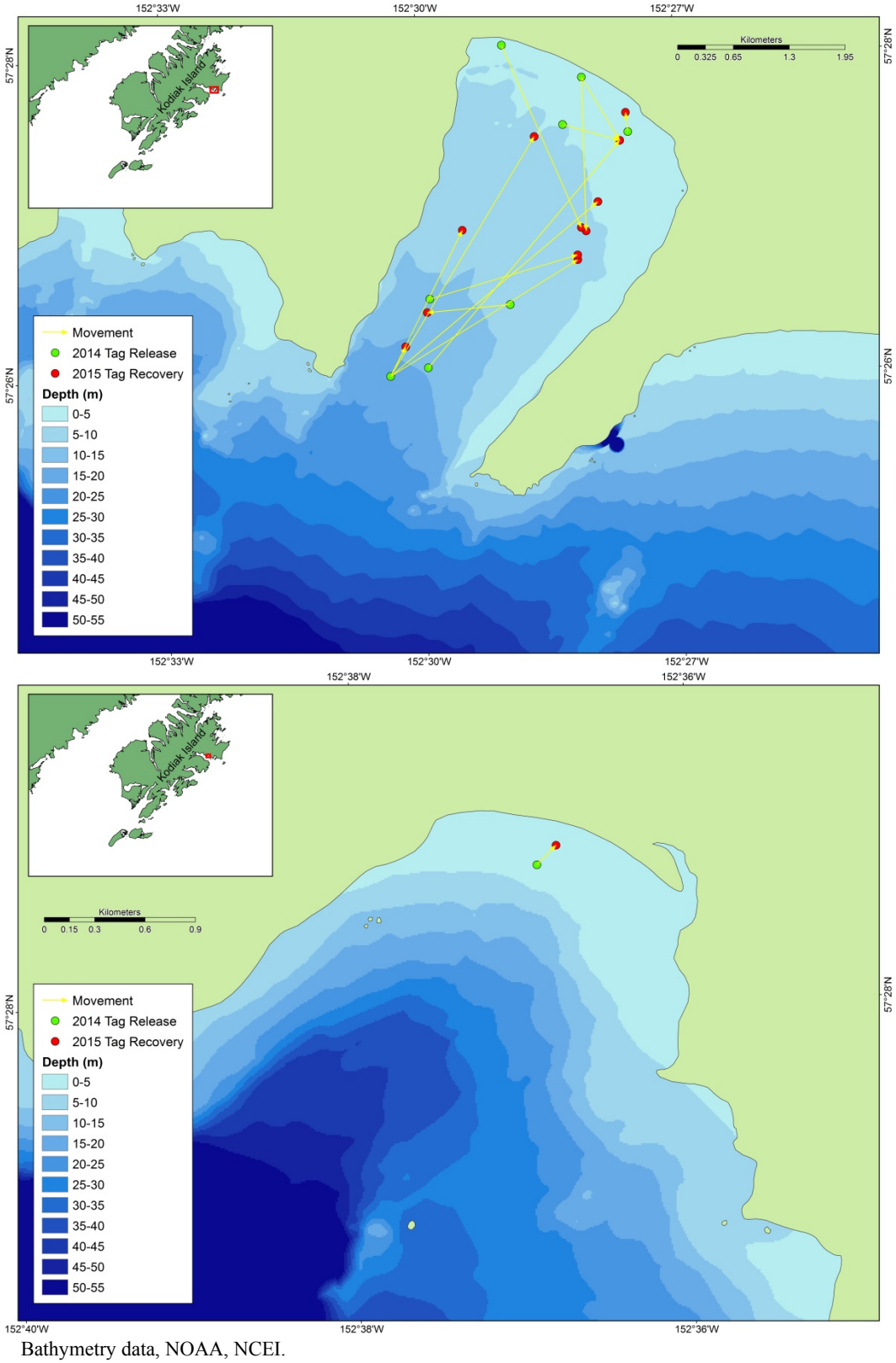
Bathymetry data, NOAA, NCEI.

Figure 25.–Release and recovery locations of Dungeness crab tagged in Hidden Basin (top; N = 41) and Saltery Cove (bottom; N = 15) of the Ugak Bay survey area and recovered with location data in 2014.



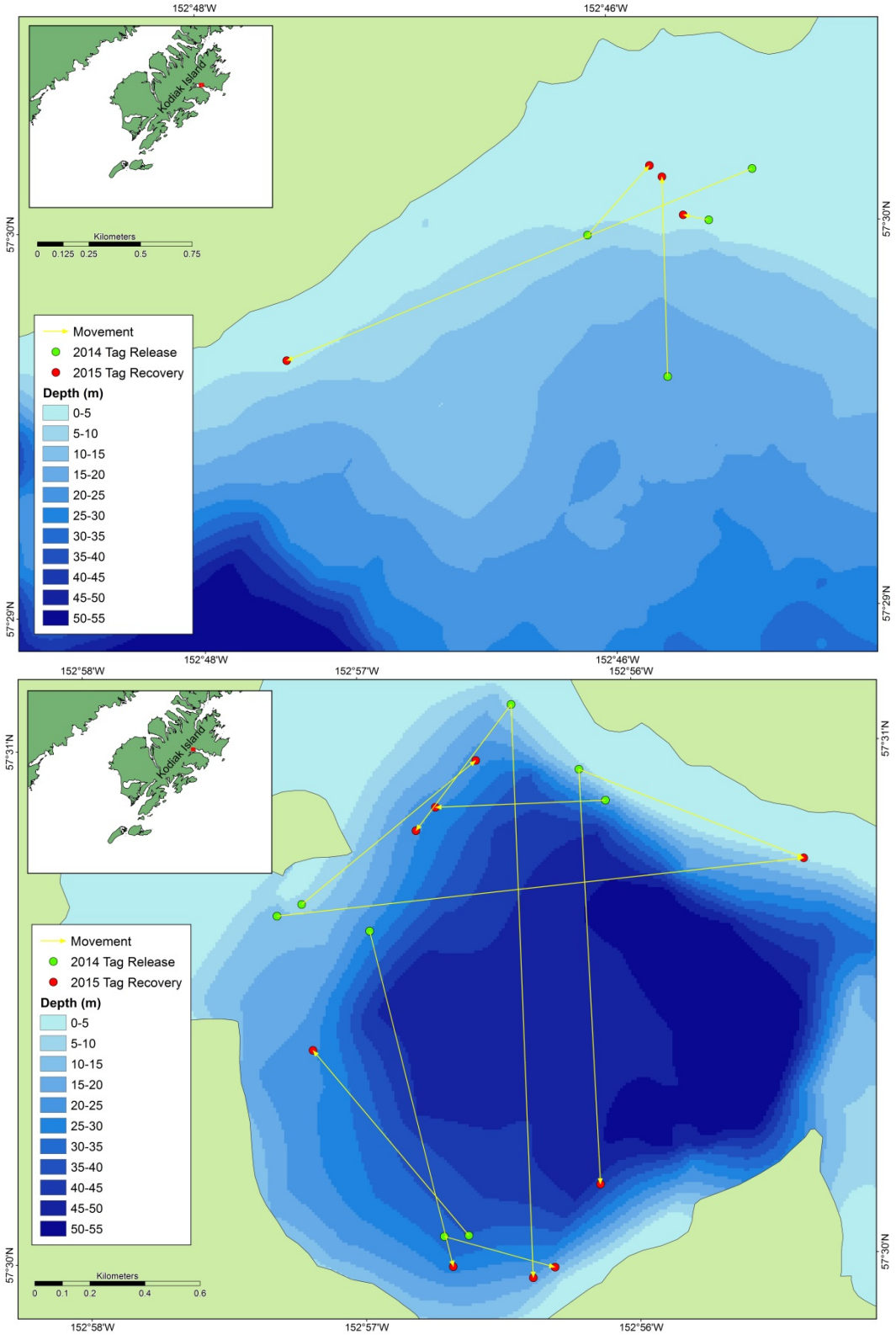
Bathymetry data, NOAA, NCEI.

Figure 26.–Release and recovery locations of Dungeness crab tagged in Eagle Harbor (top; N = 1) and Gull Point (bottom; N = 11) of the Ugak Bay survey area and recovered with location data in 2014.



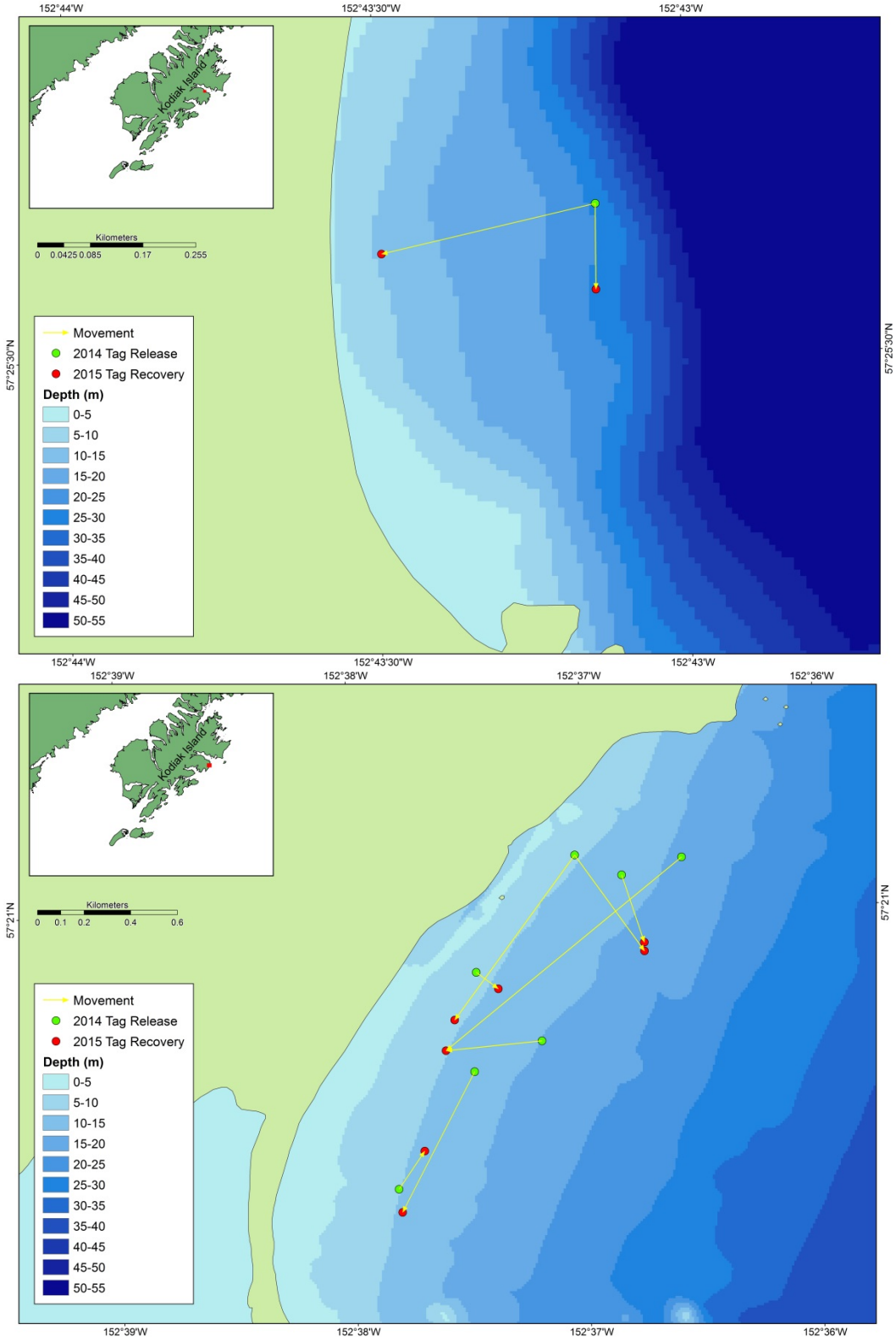
Bathymetry data, NOAA, NCEI.

Figure 27.–Release and recovery locations of Dungeness crab tagged in Pashagshak Bay (top; N = 13) and Portage Bay (bottom; N = 1) of the Ugak Bay survey area and recovered with location data in 2015.



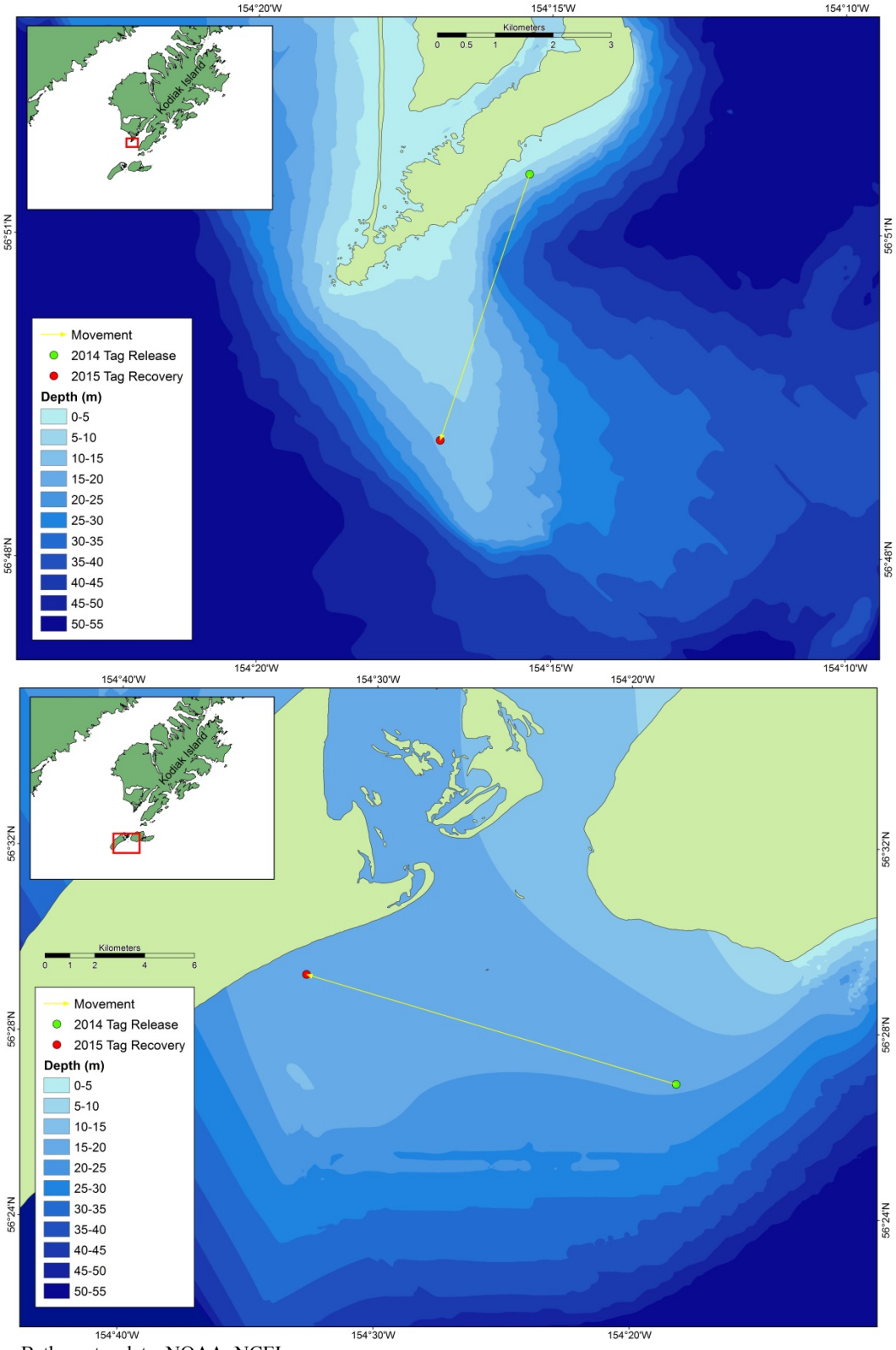
Bathymetry data, NOAA, NCEI.

Figure 28.–Release and recovery locations of Dungeness crab tagged in Saltery Cove (top; N = 4) and Hidden Basin (bottom; N = 10) of the Ugak Bay survey area and recovered with location data in 2015.



Bathymetry data, NOAA, NCEI.

Figure 29.–Release and recovery locations of Dungeness crab tagged in Eagle Harbor (top; N = 2) and Gull Point (bottom; N = 8) of the Ugak Bay survey area and recovered with location data in 2015.



Bathymetry data, NOAA, NCEI.

Figure 30.–Release and recovery locations of Dungeness crab tagged in the Alitak Bay (top; N = 1) and the Trinity Islands (bottom; N = 1) survey areas and recovered with location data in 2015.

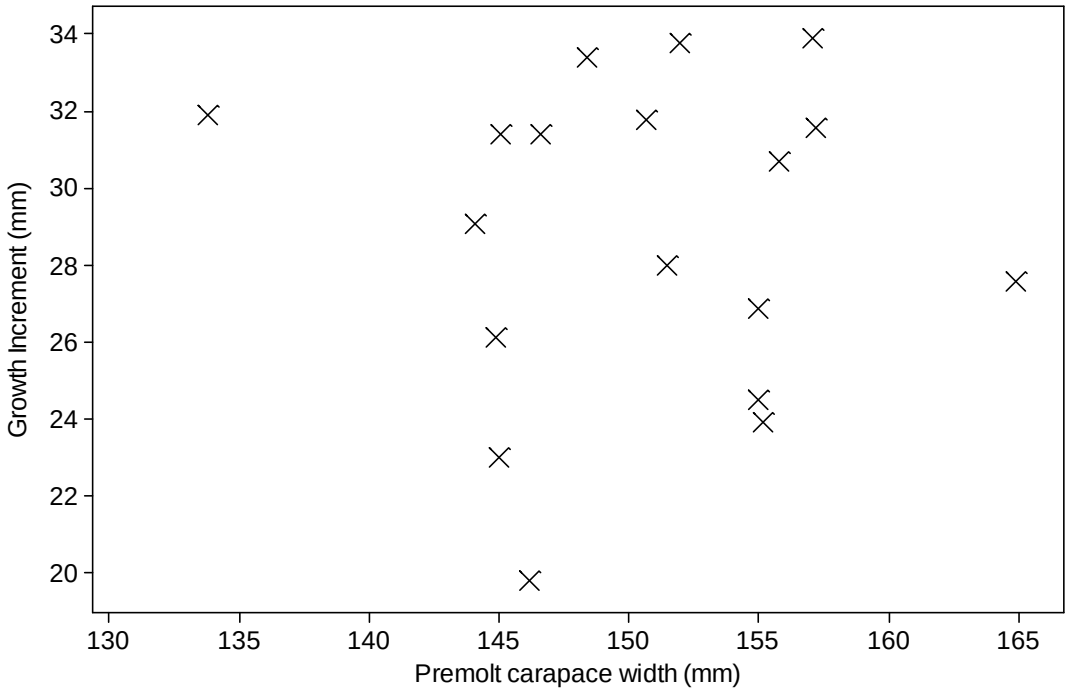


Figure 31.–Growth increment (mm) by premolt carapace width (mm) of tagged Dungeness crab recaptured in the Kodiak Area Dungeness crab fishery, 2015.

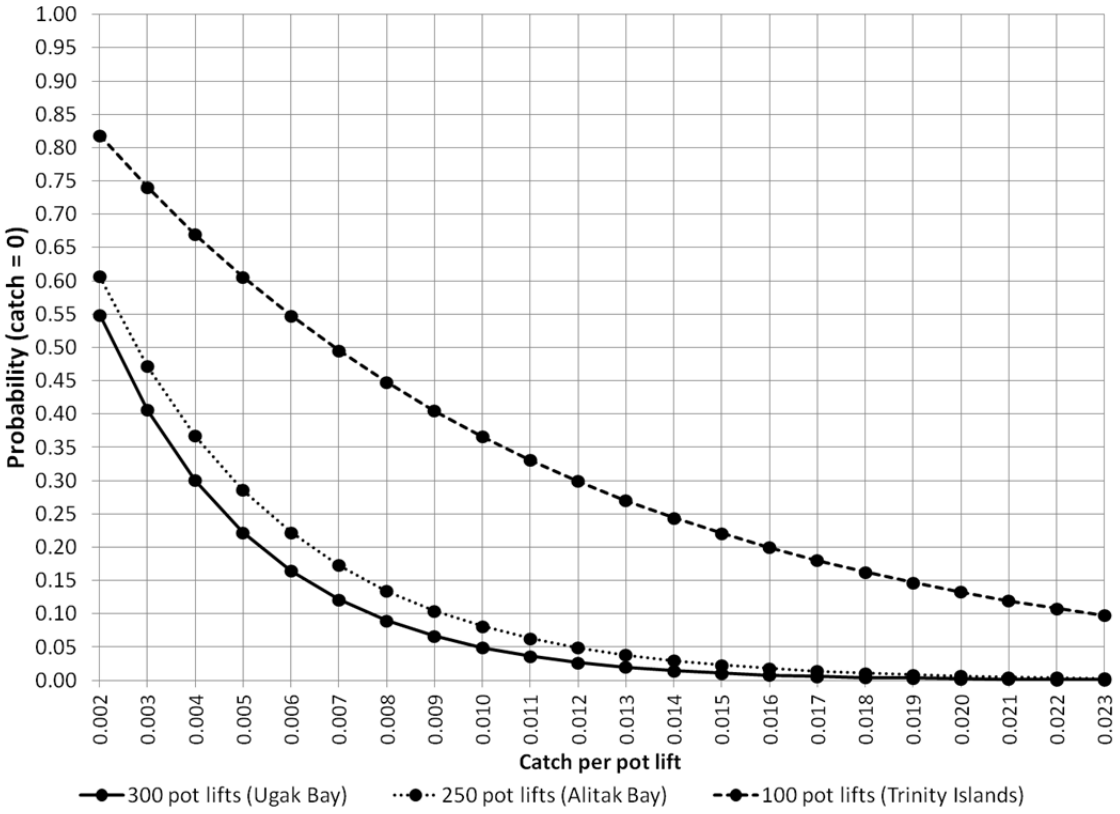


Figure 32.–Probability of 0 sea otters captured by 300, 250, and 100 pot lifts the for catch per pot lift (CPUE) values of 0.002 to 0.023 assuming number of captures has a binomial distribution with parameters n = number of pot lifts and p = CPUE.

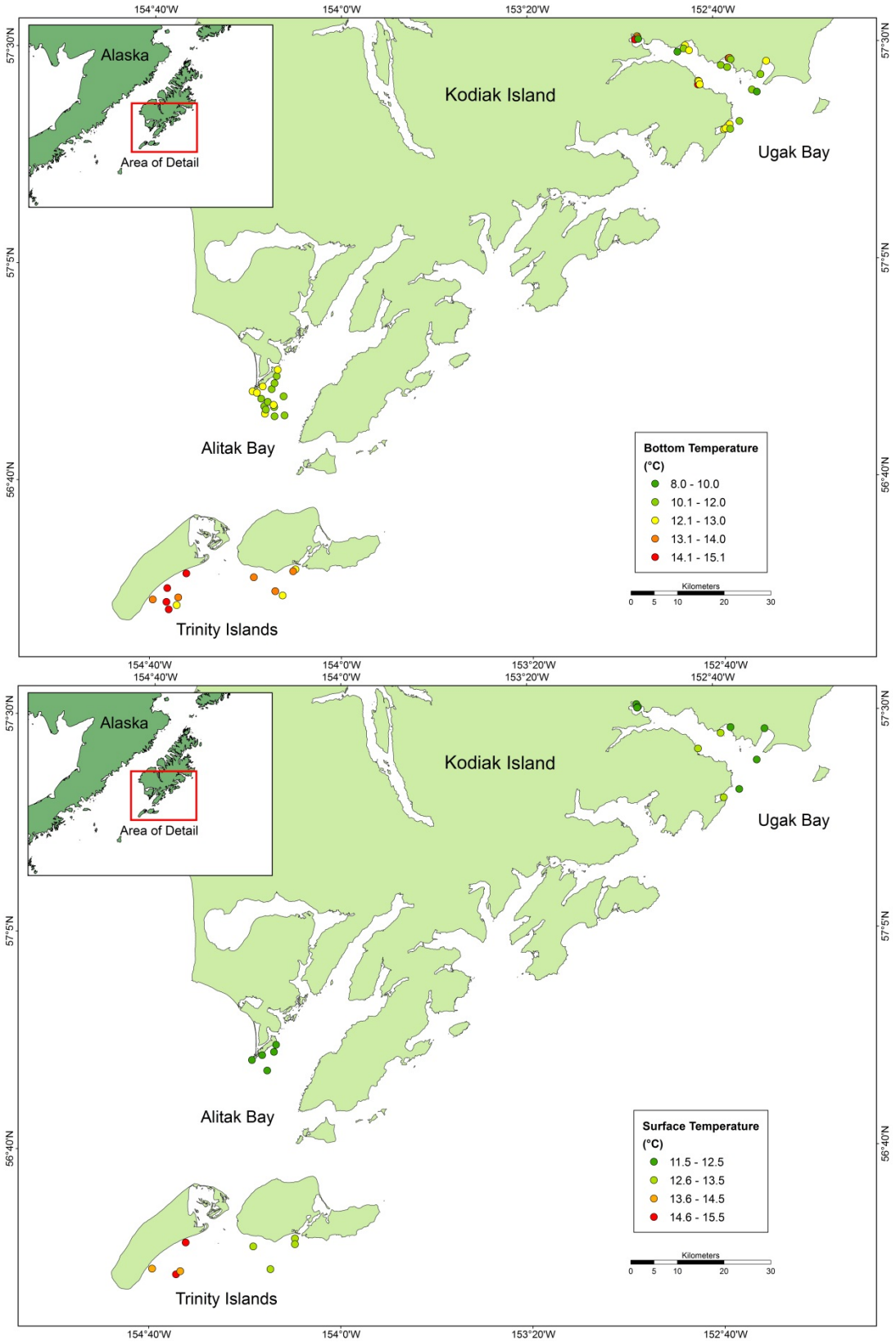


Figure 33.–Bottom temperature (top) and surface temperatures (bottom) recorded during the 2014 Dungeness crab pot and trawl surveys.

APPENDIX A. CALENDAR OF SURVEY ACTIVITIES FROM AUGUST 5–28, AND SEPTEMBER 15–27, 2014.

Appendix A1.–Calendar of survey activities from August 5 to 28, and September 15 to 27, 2014.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	8-Aug	9-Aug
		Travel to Ugak Bay			Sea Otter Survey	
			Set Pashagshak Pots			Retrieve Pashagshak Pots
			Pots From Storage	Set Hidden Basin Pots		
						Set Saltery Cove Pots

10-Aug	11-Aug	12-Aug	13-Aug	14-Aug	15-Aug	16-Aug
		Retrieve Saltery Cove Pots		Sea Otter Survey		Weather Day
Retrieve Hidden Basin Pots		Set Eagle Harbor Pots			Retrieve Eagle Harbor Pots	
Set Portage Bay Pots			Retrieve Portage Bay Pots		Store Pots	
	Trawl Hidden Basin		Set Gull Point Pots			
	Trawl Pasagshak Bay			Trawl Saltery Cove		
				Trawl Portage Bay		

17-Aug	18-Aug	19-Aug	20-Aug	21-Aug	22-Aug	23-Aug
Retrieve Gull Point Pots	Set Sitkinak S1 Pots			Retrieve Sitkinak S1 Pots		
Travel to Trinity Is.				Set Sitkinak S2 Pots		
		Set Tugidak T1 Pots			Retrieve Tugidak T1 Pots	
			Sea Otter Survey	Trawl Sitkinak S1	Set Tugidak T2 Pots	
					Trawl Tugidak T1	

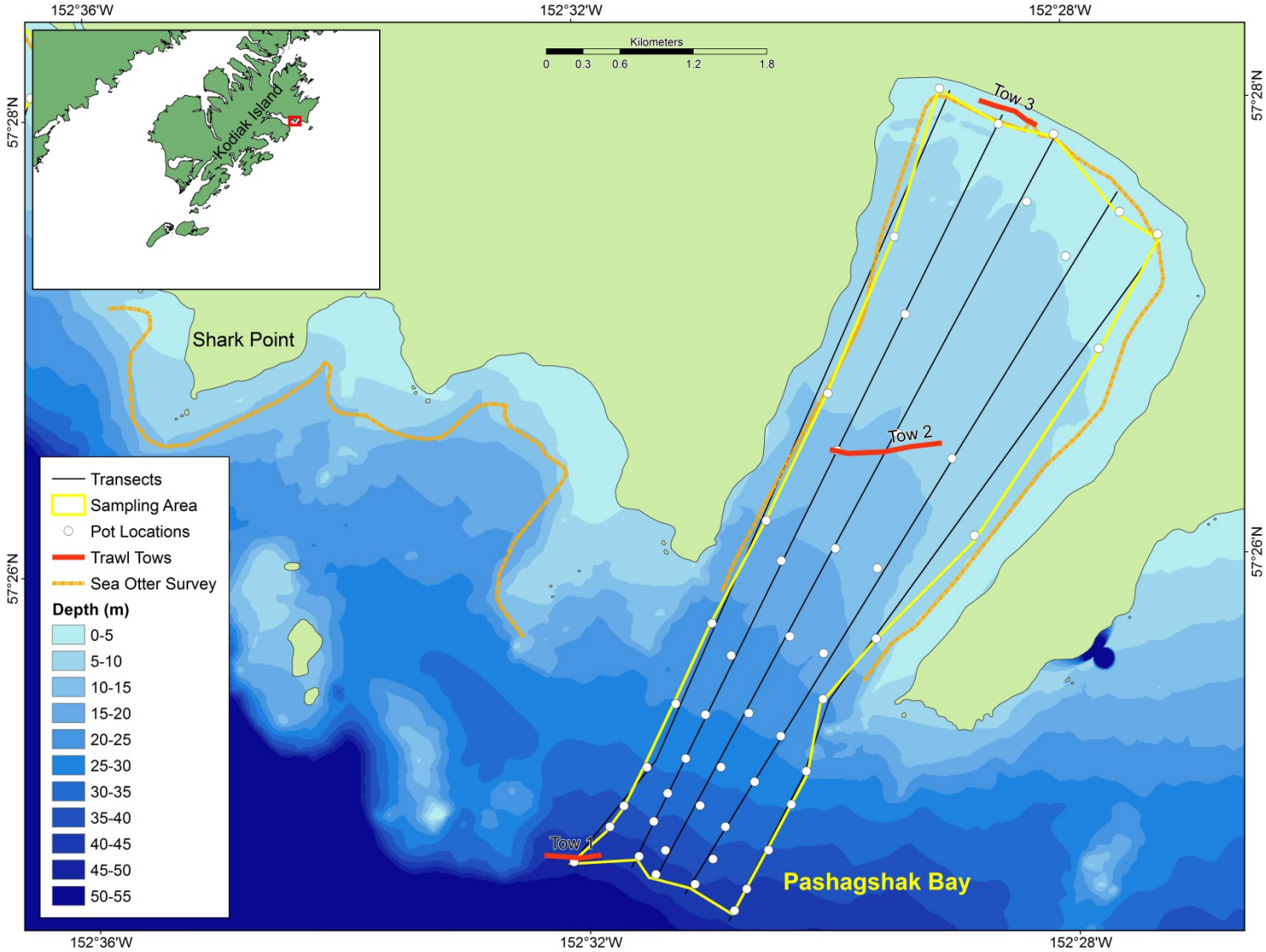
24-Aug	25-Aug	26-Aug	27-Aug	28-Aug	29-Aug	30-Aug
		Retrieve Sitkinak S2 Pots	Store Pots			
		Retrieve Tugidak T2 Pots	Store Pots			
			Travel Back To Port			

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
14-Sep	15-Sep	16-Sep	17-Sep	18-Sep	19-Sep	20-Sep
	Travel to Saltery Cove	Travel to Alitak Bay	Set Alitak 1 Pots			Retrieve Alitak 1 Pots
	Pots from Storage		Pots from Storage	Set Alitak 2 Pots		
				Sea Otter Survey	Weather Day	Set Alitak 3 Pots

21-Sep	22-Sep	23-Sep	24-Sep	25-Sep	26-Sep	27-Sep
		Retrieve Alitak 3 Pots	Sea Otter Survey	Travel to Port		
Retrieve Alitak 2 Pots		Set Alitak 5 Pots		Retrieve Alitak 5 Pots	Weather Day	
Retrieve Alitak 4 Pots			Retrieve Alitak 4 Pots	Trawl Alitak A4		
	Trawl Alitak A1		Pots to Storage			
	Trawl Alitak A2					

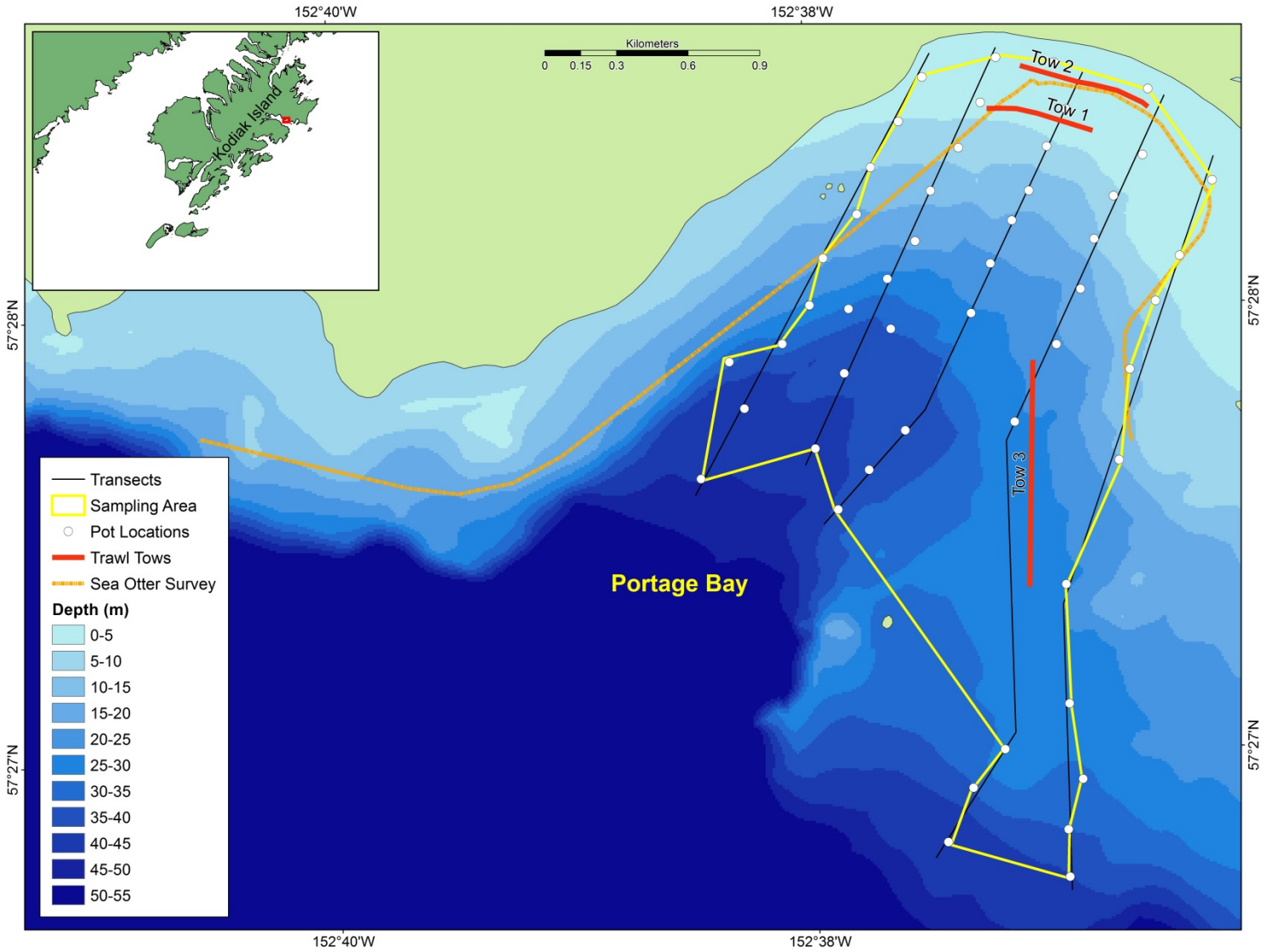
APPENDIX B. SURVEY MAPS

Appendix B1.–Pashagshak Bay sampling location boundary, proposed vessel transects, actual pot and trawl tow locations, and sea otter survey tracks, Ugak Bay survey area, August 2014.



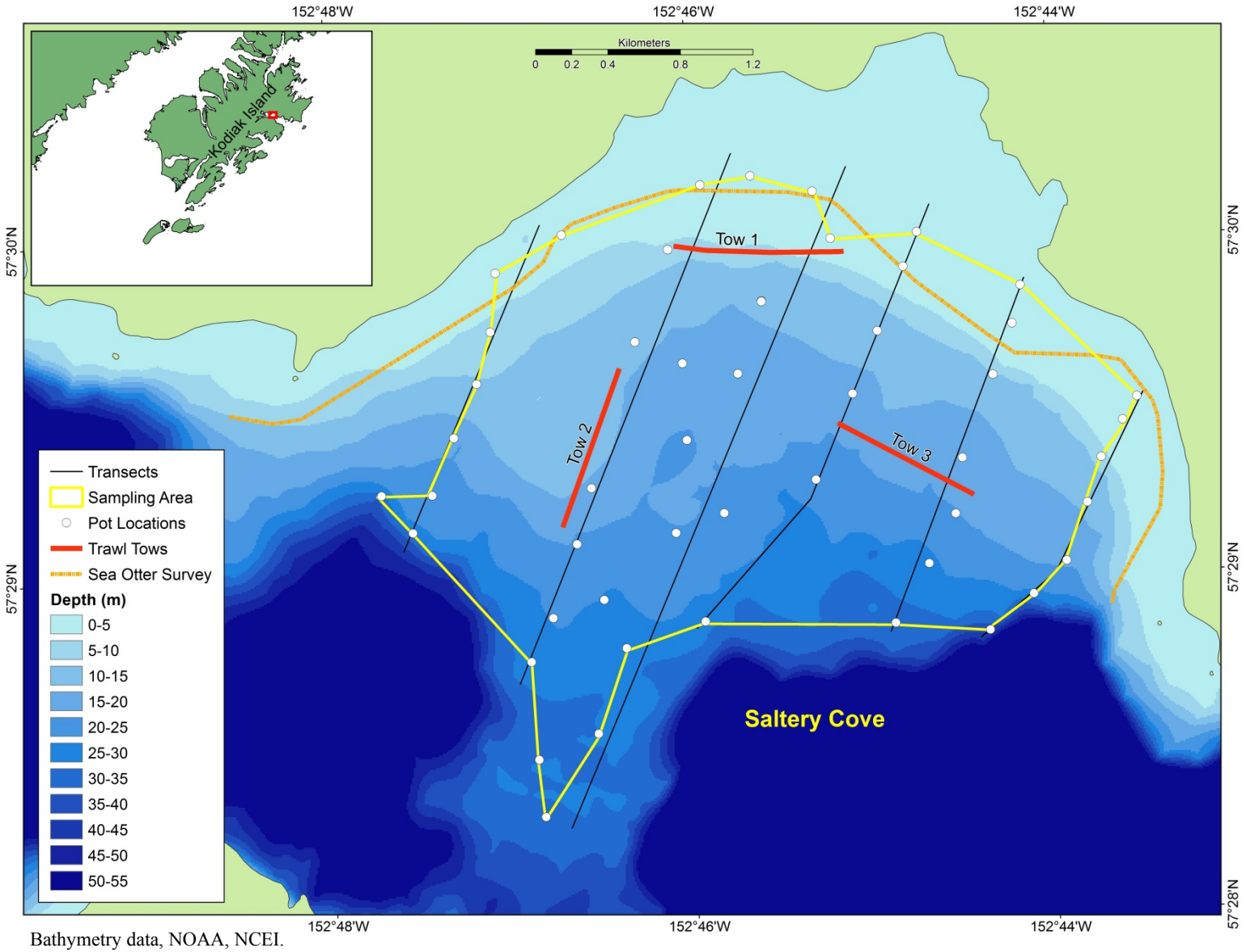
Bathymetry data, NOAA, NCEI.

Appendix B2.–Portage Bay sampling location boundary, proposed vessel transects, actual pot and trawl tow locations, and sea otter survey track, Ugak Bay survey area, August 2014.



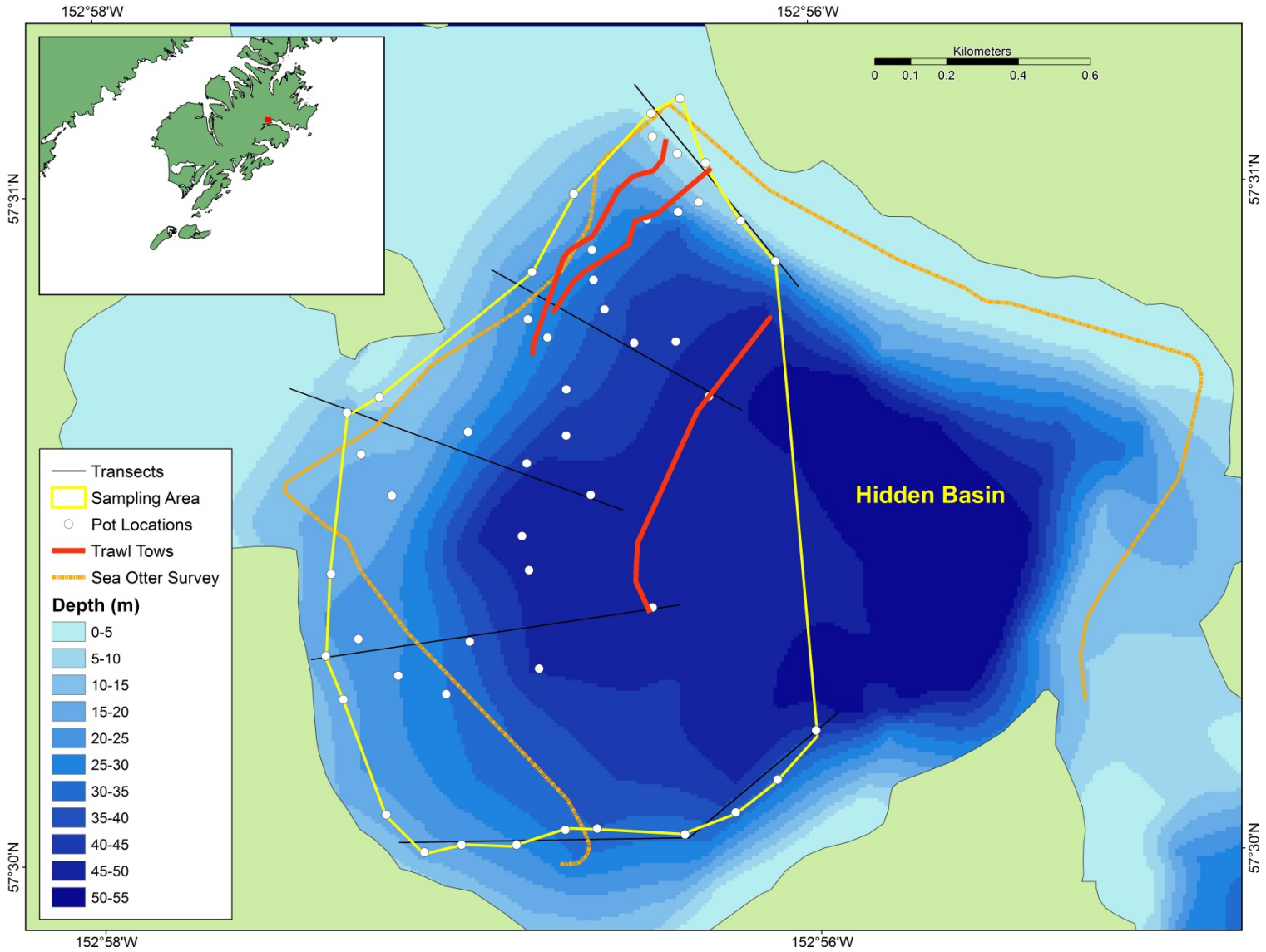
Bathymetry data, NOAA, NCEI.

Appendix B3.–Saltery Cove sampling location boundary, proposed vessel transects, actual pot and trawl tow locations, and sea otter survey track, Ugak Bay survey area, August 2014.



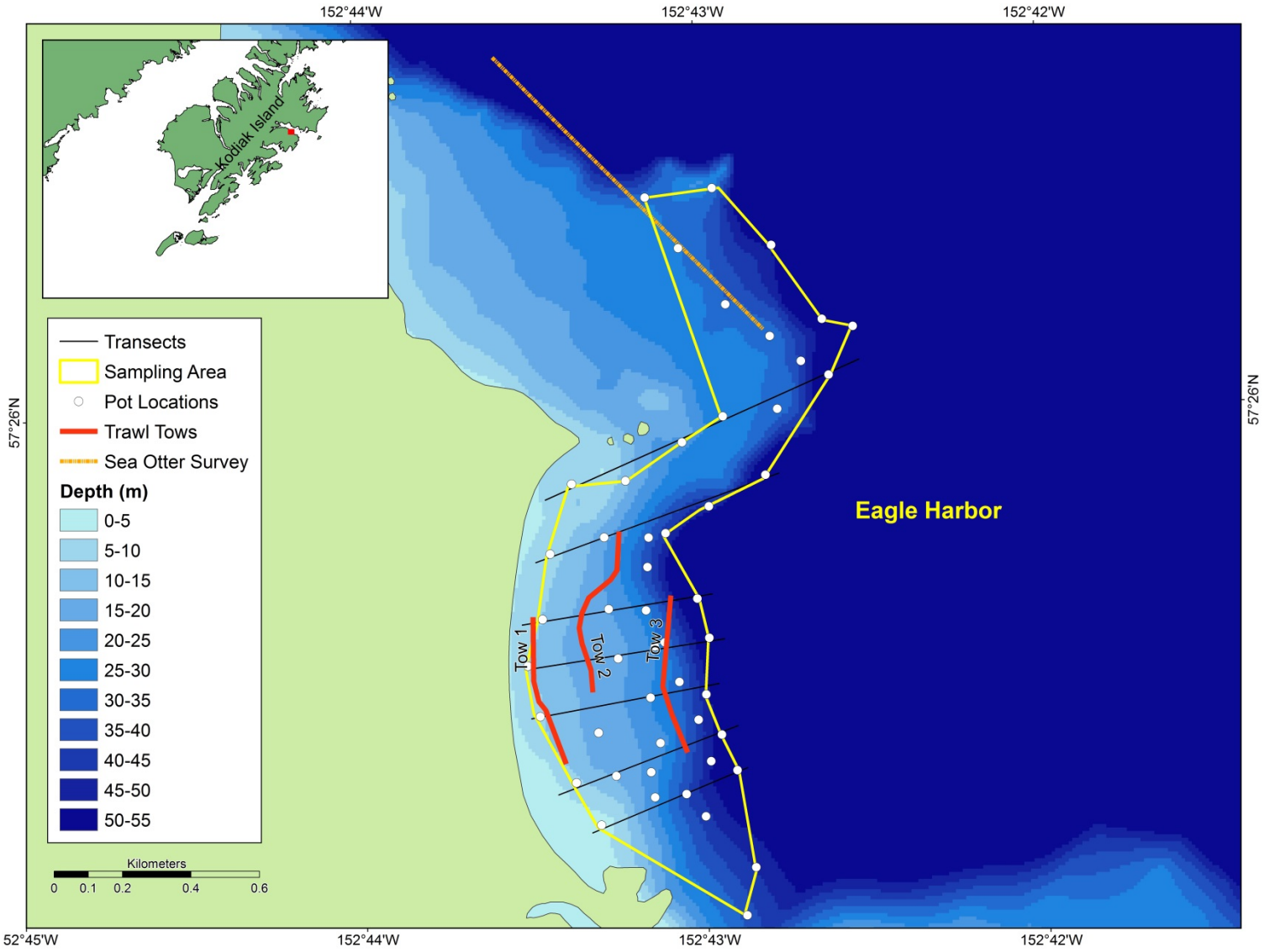
Bathymetry data, NOAA, NCEI.

Appendix B4.–Hidden Basin sampling location boundary, proposed vessel transects, actual pot and trawl tow locations, and sea otter survey track, Ugak Bay survey area, August 2014.



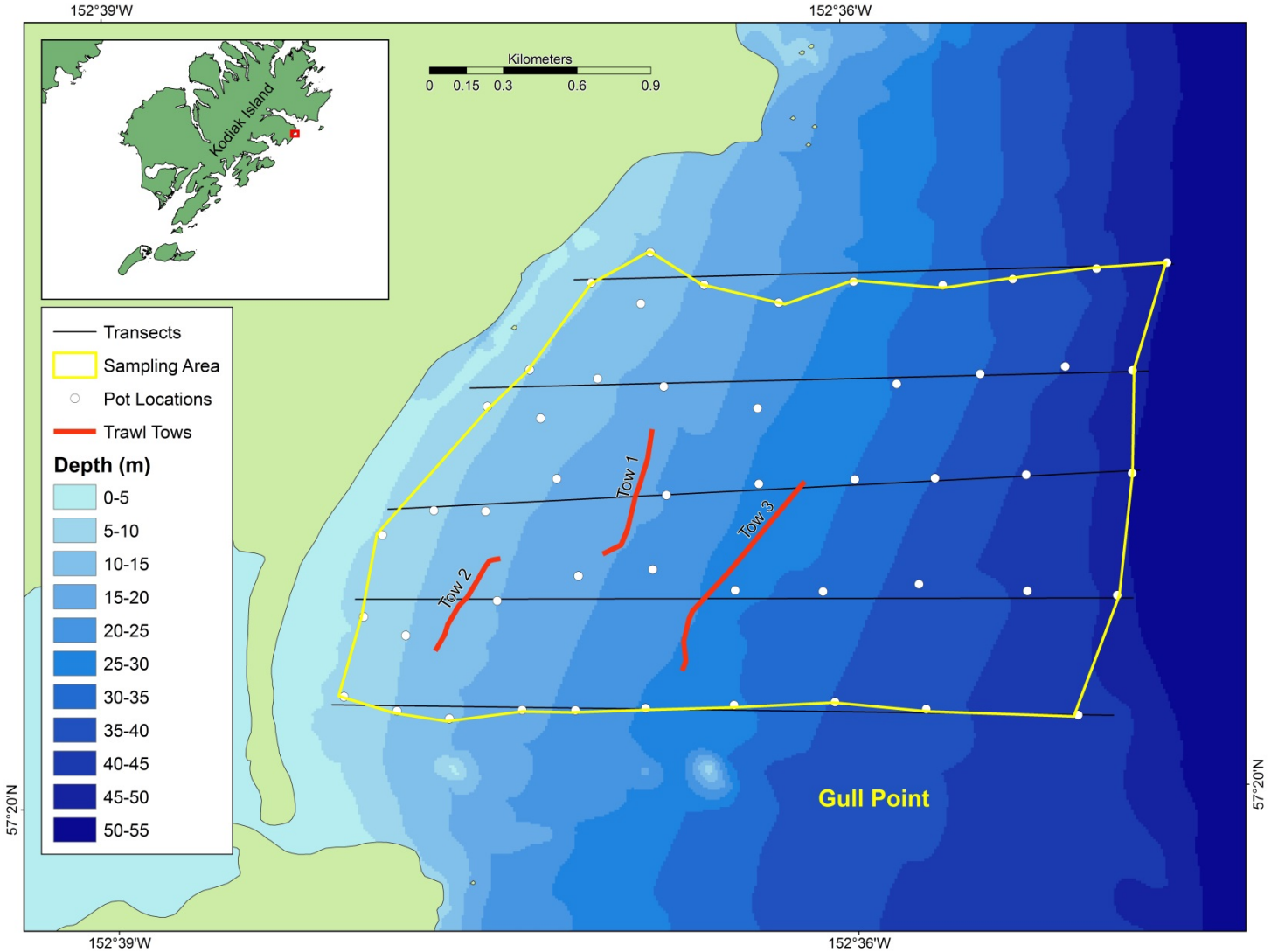
Bathymetry data, NOAA, NCEI.

Appendix B5.–Eagle Harbor sampling location boundary, proposed vessel transects, actual pot and trawl tow locations, and sea otter survey track, Ugak Bay survey area, August, 2014.



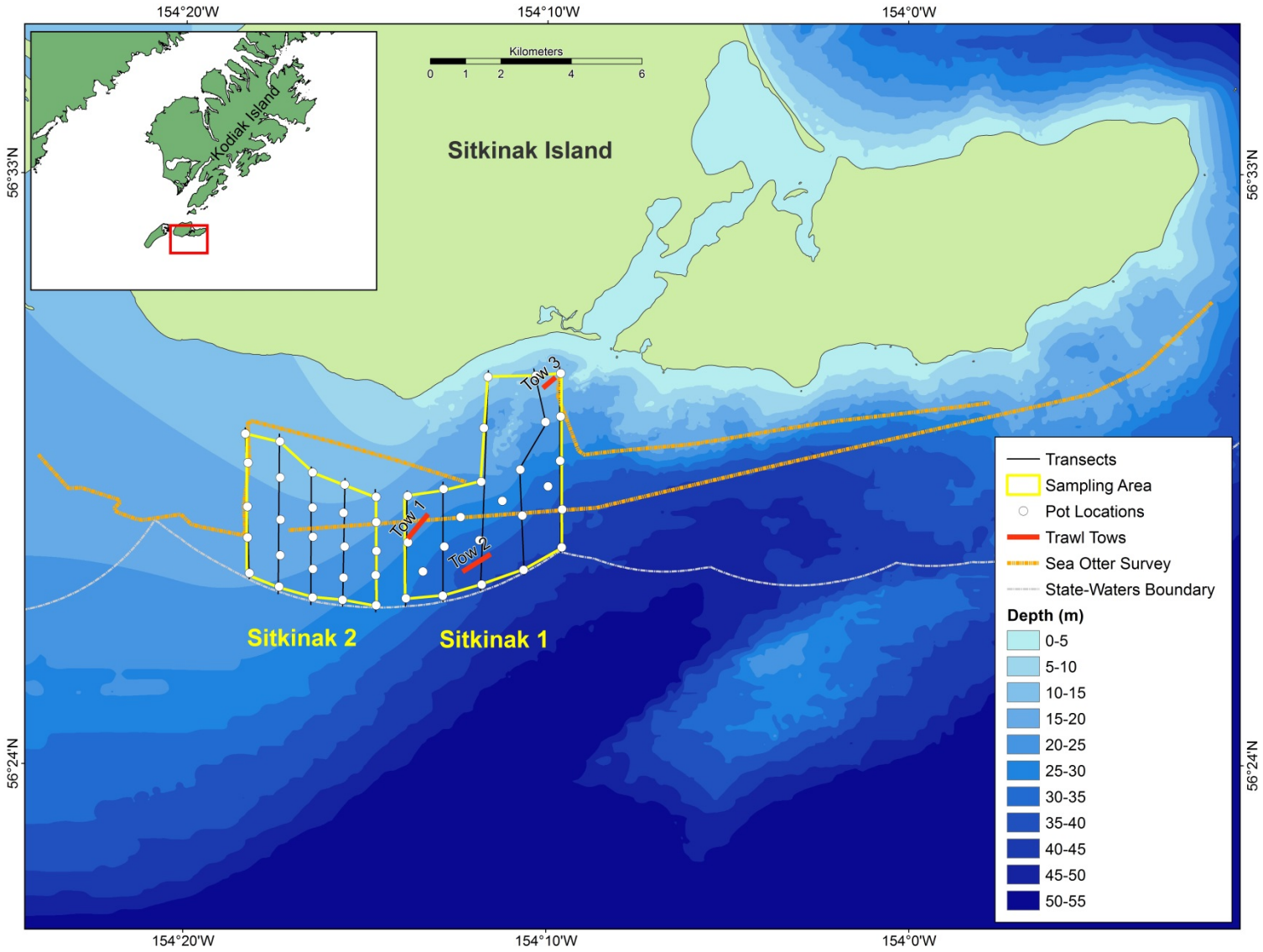
Bathymetry data, NOAA, NCEI.

Appendix B6.–Gull Point sampling location boundary, proposed vessel transects, and actual pot and trawl tow locations, Ugak Bay survey area, August, 2014.



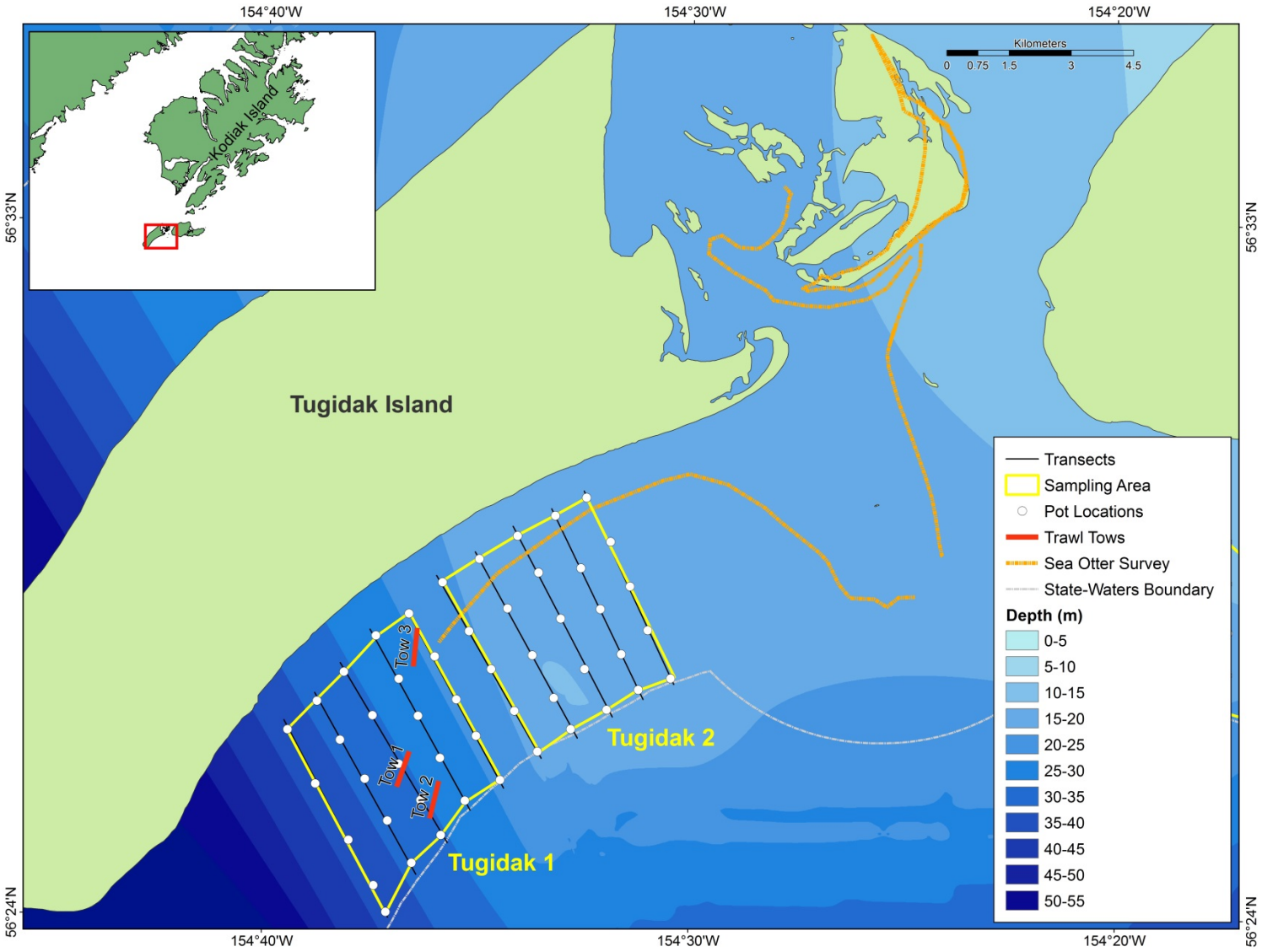
Bathymetry data, NOAA, NCEI.

Appendix B7.–Sitkinak Island sampling location boundary, proposed vessel transects, actual pot and trawl tow locations, and sea otter survey tracks, Trinity Islands survey area, August, 2014.



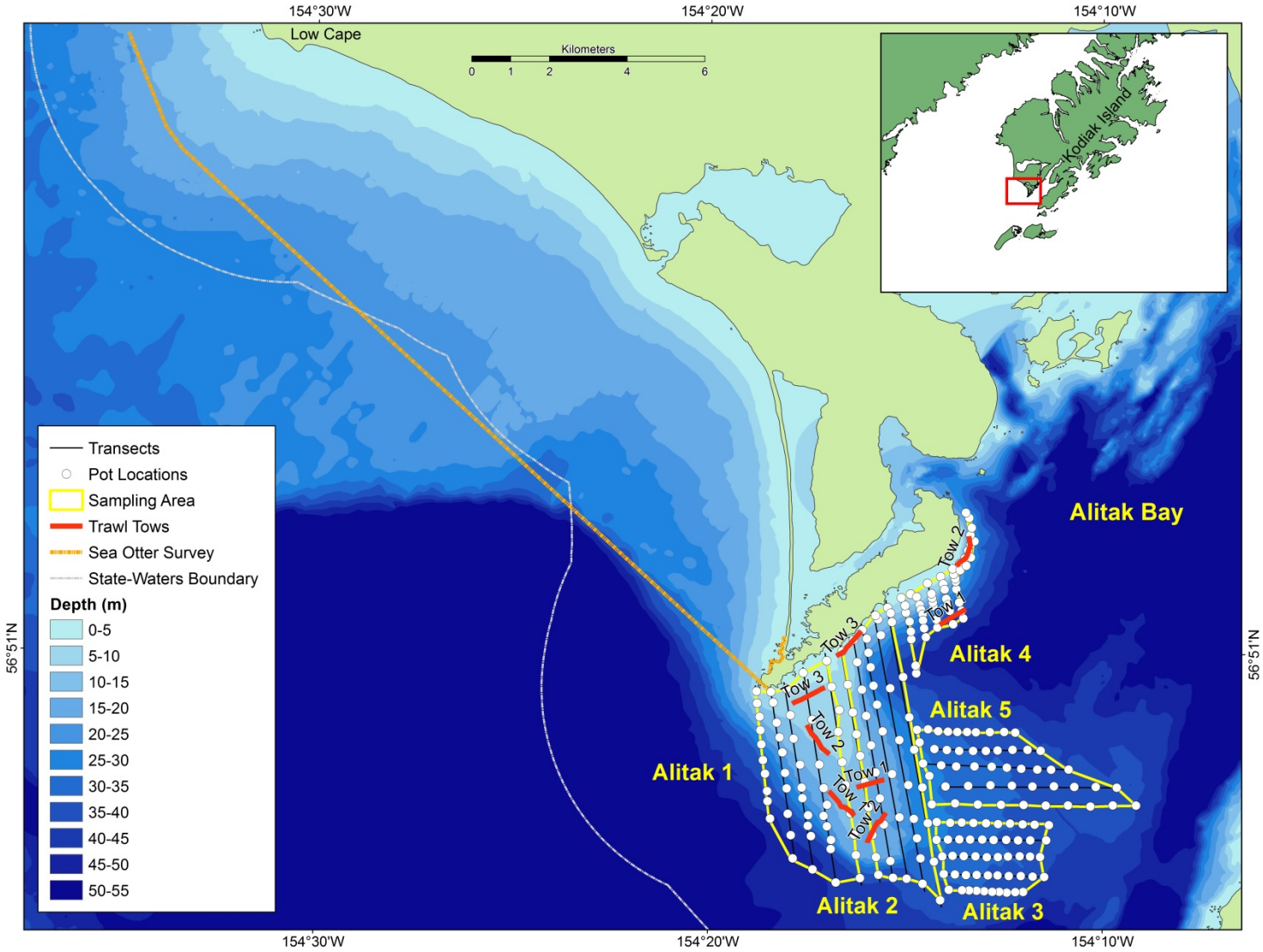
Bathymetry data, NOAA, NCEI.

Appendix B8.–Tugidak Island sampling location boundary, proposed vessel transects, actual pot and trawl tow locations, and sea otter survey tracks, Trinity Islands survey area, August, 2014.



Bathymetry data, NOAA, NCEI.

Appendix B9.–Alitak Bay sampling location boundaries, proposed vessel transects, actual pot and trawl tow locations, and sea otter survey tracks, Alitak Bay survey area, September, 2014.



Bathymetry data, NOAA, NCEI.

APPENDIX C. POT LOCATIONS AND CATCH

Appendix C1.–Sampling locations, escape ring configuration, dates, and depth of pots fished with corresponding numbers of Dungeness crab by sex and legal status captured in the Ugak Bay survey area, 2014.

Sampling location	Sequential pot no.	Escape rings	Date		North latitude	West longitude	Depth (m)	Males		Females	Total crab
			Set	Retrieved				Sublegal	Legal		
Pashagshak Bay	1	Closed	8/6/2014	8/9/2014	57.4677	152.4833	4.9	38	2	1	41
Pashagshak Bay	2	Closed	8/6/2014	8/9/2014	57.4570	152.4899	7.3	0	0	0	0
Pashagshak Bay	3	Closed	8/6/2014	8/9/2014	57.4456	152.4994	11.2	0	1	4	5
Pashagshak Bay	4	Open	8/6/2014	8/9/2014	57.4364	152.5082	16.4	0	0	0	0
Pashagshak Bay	5	Open	8/6/2014	8/9/2014	57.4290	152.5159	22.4	0	0	0	0
Pashagshak Bay	6	Open	8/6/2014	8/9/2014	57.4232	152.5211	27.6	0	0	0	0
Pashagshak Bay	7	Open	8/6/2014	8/9/2014	57.4186	152.5252	33.3	0	0	0	0
Pashagshak Bay	8	Open	8/6/2014	8/9/2014	57.4158	152.5284	39.4	0	0	0	0
Pashagshak Bay	9	Open	8/6/2014	8/9/2014	57.4143	152.5304	43.4	0	0	0	0
Pashagshak Bay	10	Closed	8/6/2014	8/9/2014	57.4118	152.5354	49.1	0	0	0	0
Pashagshak Bay	11	Open	8/6/2014	8/9/2014	57.4121	152.5265	47.9	0	0	0	0
Pashagshak Bay	12	Closed	8/6/2014	8/9/2014	57.4146	152.5244	40.0	0	0	0	0
Pashagshak Bay	13	Open	8/6/2014	8/9/2014	57.4167	152.5224	35.6	0	0	0	0
Pashagshak Bay	14	Open	8/6/2014	8/9/2014	57.4192	152.5199	31.6	0	0	0	0
Pashagshak Bay	15	Closed	8/6/2014	8/9/2014	57.4223	152.5171	28.0	0	0	0	0
Pashagshak Bay	16	Open	8/6/2014	8/9/2014	57.4266	152.5134	23.8	0	0	0	0
Pashagshak Bay	17	Closed	8/6/2014	8/9/2014	57.4335	152.5062	18.6	10	2	3	15
Pashagshak Bay	18	Closed	8/6/2014	8/9/2014	57.4414	152.4983	13.3	8	5	5	18
Pashagshak Bay	19	Closed	8/6/2014	8/9/2014	57.4513	152.4886	8.7	4	2	11	17
Pashagshak Bay	20	Open	8/6/2014	8/9/2014	57.4650	152.4753	5.8	0	0	0	0
Pashagshak Bay	21	Closed	8/6/2014	8/9/2014	57.4642	152.4678	4.8	24	3	1	28
Pashagshak Bay	22	Closed	8/6/2014	8/9/2014	57.4593	152.4717	6.3	9	1	0	10
Pashagshak Bay	23	Closed	8/6/2014	8/9/2014	57.4426	152.4899	11.7	6	0	1	7
Pashagshak Bay	24	Closed	8/6/2014	8/9/2014	57.4343	152.4989	16.8	23	2	3	28
Pashagshak Bay	25	Open	8/6/2014	8/9/2014	57.4279	152.5053	21.9	0	0	0	0
Pashagshak Bay	26	Closed	8/6/2014	8/9/2014	57.4224	152.5111	26.9	0	0	0	0
Pashagshak Bay	27	Closed	8/6/2014	8/9/2014	57.4185	152.5151	32.4	0	0	0	0
Pashagshak Bay	28	Open	8/6/2014	8/9/2014	57.4157	152.5181	36.5	0	0	0	0
Pashagshak Bay	29	Open	8/6/2014	8/9/2014	57.4125	152.5229	44.4	0	0	0	0
Pashagshak Bay	30	Open	8/6/2014	8/9/2014	57.4108	152.5243	50.0	0	0	0	0
Pashagshak Bay	31	Open	8/6/2014	8/9/2014	57.4100	152.5190	47.3	0	0	0	0
Pashagshak Bay	32	Open	8/6/2014	8/9/2014	57.4118	152.5164	41.6	0	0	0	0
Pashagshak Bay	33	Closed	8/6/2014	8/9/2014	57.4141	152.5147	37.4	0	0	0	0
Pashagshak Bay	34	Closed	8/6/2014	8/9/2014	57.4174	152.5106	32.6	0	0	0	0
Pashagshak Bay	35	Closed	8/6/2014	8/9/2014	57.4207	152.5069	28.0	0	0	0	0
Pashagshak Bay	36	Open	8/6/2014	8/9/2014	57.4266	152.5008	21.2	0	0	0	0
Pashagshak Bay	37	Closed	8/6/2014	8/9/2014	57.4328	152.4932	15.4	1	0	0	1
Pashagshak Bay	38	Closed	8/6/2014	8/9/2014	57.4407	152.4827	10.9	10	2	2	14
Pashagshak Bay	39	Open	8/6/2014	8/9/2014	57.4552	152.4666	6.4	8	0	0	8
Pashagshak Bay	40	Open	8/6/2014	8/9/2014	57.4584	152.4591	5.2	3	1	0	4
Pashagshak Bay	41	Closed	8/6/2014	8/9/2014	57.4567	152.4540	5.0	9	0	0	9
Pashagshak Bay	42	Open	8/6/2014	8/9/2014	57.4484	152.4623	6.5	0	1	0	1
Pashagshak Bay	43	Closed	8/6/2014	8/9/2014	57.4350	152.4799	9.9	0	0	0	0
Pashagshak Bay	44	Closed	8/6/2014	8/9/2014	57.4276	152.4936	15.5	0	0	1	1
Pashagshak Bay	45	Closed	8/6/2014	8/9/2014	57.4233	152.5010	23.4	0	0	0	0
Pashagshak Bay	46	Open	8/6/2014	8/9/2014	57.4180	152.5035	28.2	0	0	0	0
Pashagshak Bay	47	Open	8/6/2014	8/9/2014	57.4156	152.5056	33.0	0	0	0	0
Pashagshak Bay	48	Open	8/6/2014	8/9/2014	57.4124	152.5089	38.9	0	0	0	0
Pashagshak Bay	49	Closed	8/6/2014	8/9/2014	57.4095	152.5120	42.9	0	0	0	0

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Sampling location	Sequential pot no.	Escape rings	Date		North latitude	West longitude	Depth (m)	Males		Females	Total crab
			Set	Retrieved				Sublegal	Legal		
Pashagshak Bay	50	Open	8/6/2014	8/9/2014	57.4080	152.5137	47.9	0	0	0	0
Hidden Basin	51	Closed	8/7/2014	8/10/2014	57.5189	152.9393	1.4	0	0	0	0
Hidden Basin	52	Open	8/7/2014	8/10/2014	57.5186	152.9407	6.6	3	2	0	5
Hidden Basin	53	Open	8/7/2014	8/10/2014	57.5180	152.9406	13.1	2	3	0	5
Hidden Basin	54	Closed	8/7/2014	8/10/2014	57.5175	152.9395	18.3	4	1	1	6
Hidden Basin	55	Closed	8/7/2014	8/10/2014	57.5173	152.9382	23.9	2	0	1	3
Hidden Basin	56	Closed	8/7/2014	8/10/2014	57.5159	152.9410	25.6	0	0	0	0
Hidden Basin	57	Closed	8/7/2014	8/10/2014	57.5161	152.9395	34.8	5	8	3	16
Hidden Basin	58	Closed	8/7/2014	8/10/2014	57.5163	152.9385	38.2	5	2	2	9
Hidden Basin	59	Open	8/7/2014	8/10/2014	57.5158	152.9366	42.3	2	7	1	10
Hidden Basin	60	Open	8/7/2014	8/10/2014	57.5148	152.9350	48.1	1	13	0	14
Hidden Basin	61	Open	8/7/2014	8/10/2014	57.5002	152.9518	2.9	12	1	1	14
Hidden Basin	62	Closed	8/7/2014	8/10/2014	57.5012	152.9535	8.1	17	1	0	18
Hidden Basin	63	Closed	8/7/2014	8/10/2014	57.5004	152.9500	12.2	3	1	2	6
Hidden Basin	64	Closed	8/7/2014	8/10/2014	57.5004	152.9475	18.3	3	4	0	7
Hidden Basin	65	Closed	8/7/2014	8/10/2014	57.5007	152.9452	23.3	1	1	7	9
Hidden Basin	66	Closed	8/7/2014	8/10/2014	57.5007	152.9437	28.5	4	1	3	8
Hidden Basin	67	Closed	8/7/2014	8/10/2014	57.5006	152.9396	33.1	7	6	8	21
Hidden Basin	68	Closed	8/7/2014	8/10/2014	57.5011	152.9373	37.5	1	0	2	3
Hidden Basin	69	Open	8/7/2014	8/10/2014	57.5019	152.9353	42.9	2	8	4	14
Hidden Basin	70	Open	8/7/2014	8/10/2014	57.5031	152.9335	47.9	1	6	5	12
Hidden Basin	71	Closed	8/7/2014	8/10/2014	57.5112	152.9551	1.5	6	3	2	11
Hidden Basin	72	Open	8/7/2014	8/10/2014	57.5116	152.9536	7.5	5	3	6	14
Hidden Basin	73	Open	8/7/2014	8/10/2014	57.5102	152.9544	11.4	1	0	0	1
Hidden Basin	74	Closed	8/7/2014	8/10/2014	57.5107	152.9494	21.5	3	2	0	5
Hidden Basin	75	Open	8/7/2014	8/10/2014	57.5099	152.9467	25.9	0	0	0	0
Hidden Basin	76	Open	8/7/2014	8/10/2014	57.5117	152.9448	38.4	0	0	0	0
Hidden Basin	77	Open	8/7/2014	8/10/2014	57.5081	152.9470	31.9	0	0	3	3
Hidden Basin	78	Open	8/7/2014	8/10/2014	57.5106	152.9449	42.4	3	1	0	4
Hidden Basin	79	Open	8/7/2014	8/10/2014	57.5091	152.9438	46.5	0	2	0	2
Hidden Basin	80	Open	8/7/2014	8/10/2014	57.5091	152.9530	18.3	0	6	6	12
Hidden Basin	81	Open	8/7/2014	8/10/2014	57.5052	152.9562	2.4	18	3	4	25
Hidden Basin	82	Open	8/7/2014	8/10/2014	57.5041	152.9554	8.0	0	0	0	0
Hidden Basin	83	Closed	8/7/2014	8/10/2014	57.5072	152.9559	13.9	6	0	3	9
Hidden Basin	84	Closed	8/7/2014	8/10/2014	57.5056	152.9547	18.5	2	2	1	5
Hidden Basin	85	Open	8/7/2014	8/10/2014	57.5046	152.9529	23.4	0	4	3	7
Hidden Basin	86	Open	8/7/2014	8/10/2014	57.5042	152.9507	27.4	0	1	0	1
Hidden Basin	87	Open	8/7/2014	8/10/2014	57.5055	152.9495	31.0	1	2	1	4
Hidden Basin	88	Open	8/7/2014	8/10/2014	57.5048	152.9463	39.5	1	10	9	20
Hidden Basin	89	Closed	8/7/2014	8/10/2014	57.5072	152.9467	42.9	3	6	0	9
Hidden Basin	90	Closed	8/7/2014	8/10/2014	57.5062	152.9410	46.5	1	8	0	9
Hidden Basin	91	Closed	8/7/2014	8/10/2014	57.5166	152.9443	1.9	4	7	3	14
Hidden Basin	92	Open	8/7/2014	8/10/2014	57.5146	152.9463	5.4	1	5	2	8
Hidden Basin	93	Closed	8/7/2014	8/10/2014	57.5135	152.9466	10.6	7	2	2	11
Hidden Basin	94	Closed	8/7/2014	8/10/2014	57.5130	152.9457	18.8	3	3	2	8
Hidden Basin	95	Open	8/7/2014	8/10/2014	57.5152	152.9435	24.2	2	4	0	6

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Sampling location	Sequential pot no.	Escape rings	Date		North latitude	West longitude	Depth (m)	Males		Females	Total crab
			Set	Retrieved				Sublegal	Legal		
Hidden Basin	96	Open	8/7/2014	8/10/2014	57.5144	152.9435	29.5	5	8	2	15
Hidden Basin	97	Closed	8/7/2014	8/10/2014	57.5137	152.9430	31.8	2	6	3	11
Hidden Basin	98	Closed	8/7/2014	8/10/2014	57.5128	152.9416	37.7	3	9	2	14
Hidden Basin	99	Closed	8/7/2014	8/10/2014	57.5129	152.9397	41.1	5	10	2	17
Hidden Basin	100	Open	8/7/2014	8/10/2014	57.5115	152.9382	45.8	0	0	0	0
Saltery Cove	101	Open	8/9/2014	8/12/2014	57.4809	152.7480	32.1	0	0	0	0
Saltery Cove	102	Open	8/9/2014	8/12/2014	57.4838	152.7448	27.2	0	0	0	0
Saltery Cove	103	Open	8/9/2014	8/12/2014	57.4862	152.7423	23.4	1	0	0	1
Saltery Cove	104	Closed	8/9/2014	8/12/2014	57.4890	152.7416	19.2	2	1	2	5
Saltery Cove	105	Open	8/9/2014	8/12/2014	57.4931	152.7386	13.9	0	1	2	3
Saltery Cove	106	Open	8/9/2014	8/12/2014	57.4956	152.7368	6.9	0	0	0	0
Saltery Cove	107	Open	8/9/2014	8/12/2014	57.4975	152.7360	1.2	0	0	0	0
Saltery Cove	108	Closed	8/9/2014	8/12/2014	57.4919	152.7254	3.2	0	0	0	0
Saltery Cove	109	Open	8/9/2014	8/12/2014	57.4908	152.7267	7.2	0	0	0	0
Saltery Cove	110	Closed	8/9/2014	8/12/2014	57.4889	152.7288	13.4	0	0	0	0
Saltery Cove	111	Open	8/9/2014	8/12/2014	57.4867	152.7301	16.1	0	0	0	0
Saltery Cove	112	Closed	8/9/2014	8/12/2014	57.4838	152.7321	21.7	0	0	0	0
Saltery Cove	113	Open	8/9/2014	8/12/2014	57.4822	152.7352	27.6	0	0	0	0
Saltery Cove	114	Closed	8/9/2014	8/12/2014	57.4805	152.7393	33.6	0	0	0	0
Saltery Cove	115	Open	8/9/2014	8/12/2014	57.4757	152.7756	30.1	0	0	0	0
Saltery Cove	116	Closed	8/9/2014	8/12/2014	57.4811	152.7656	27.5	0	0	0	0
Saltery Cove	117	Closed	8/9/2014	8/12/2014	57.4880	152.7551	22.3	1	4	4	9
Saltery Cove	118	Closed	8/9/2014	8/12/2014	57.4923	152.7516	18.1	2	0	9	11
Saltery Cove	119	Closed	8/9/2014	8/12/2014	57.4953	152.7492	13.3	0	0	26	26
Saltery Cove	120	Open	8/9/2014	8/12/2014	57.4985	152.7468	8.6	1	0	0	1
Saltery Cove	121	Open	8/9/2014	8/12/2014	57.5002	152.7454	2.7	7	3	0	10
Saltery Cove	122	Open	8/9/2014	8/12/2014	57.5027	152.7654	3.7	0	2	0	2
Saltery Cove	123	Open	8/9/2014	8/12/2014	57.4995	152.7685	8.8	0	0	0	0
Saltery Cove	124	Open	8/9/2014	8/12/2014	57.4950	152.7716	12.5	0	2	0	2
Saltery Cove	125	Closed	8/9/2014	8/12/2014	57.4878	152.7759	16.8	0	0	0	0
Saltery Cove	126	Open	8/9/2014	8/12/2014	57.4851	152.7773	22.4	0	0	0	0
Saltery Cove	127	Open	8/9/2014	8/12/2014	57.4814	152.7796	28.1	0	0	0	0
Saltery Cove	128	Closed	8/9/2014	8/12/2014	57.4793	152.7817	33.0	0	0	0	0
Saltery Cove	129	Closed	8/9/2014	8/12/2014	57.4857	152.7924	47.5	0	0	0	0
Saltery Cove	130	Open	8/9/2014	8/12/2014	57.4876	152.7953	41.6	0	0	0	0
Saltery Cove	131	Closed	8/9/2014	8/12/2014	57.4876	152.7906	23.6	0	0	0	0
Saltery Cove	132	Open	8/9/2014	8/12/2014	57.4904	152.7885	18.3	0	0	0	0
Saltery Cove	133	Closed	8/9/2014	8/12/2014	57.4931	152.7863	13.3	0	0	0	0
Saltery Cove	134	Closed	8/9/2014	8/12/2014	57.4956	152.7850	8.1	4	2	0	6
Saltery Cove	135	Closed	8/9/2014	8/12/2014	57.4985	152.7844	2.9	0	0	0	0
Saltery Cove	136	Open	8/9/2014	8/12/2014	57.5004	152.7782	3.2	1	0	0	1
Saltery Cove	137	Closed	8/9/2014	8/12/2014	57.5031	152.7607	2.9	23	4	0	27
Saltery Cove	138	Closed	8/9/2014	8/12/2014	57.5023	152.7550	3.3	13	6	0	19
Saltery Cove	139	Closed	8/9/2014	8/12/2014	57.5000	152.7534	8.8	10	4	4	18
Saltery Cove	140	Closed	8/9/2014	8/12/2014	57.5001	152.7586	9.1	5	0	0	5

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Sampling location	Sequential pot no.	Escape rings	Date		North latitude	West longitude	Depth (m)	Males		Females	Total crab
			Set	Retrieved				Sublegal	Legal		
Saltery Cove	141	Closed	8/9/2014	8/12/2014	57.4969	152.7599	14.0	7	2	2	11
Saltery Cove	142	Closed	8/9/2014	8/12/2014	57.4939	152.7673	14.3	9	5	1	15
Saltery Cove	143	Open	8/9/2014	8/12/2014	57.4933	152.7622	16.4	1	1	0	2
Saltery Cove	144	Closed	8/9/2014	8/12/2014	57.4901	152.7670	16.1	0	0	0	0
Saltery Cove	145	Closed	8/9/2014	8/12/2014	57.4865	152.7637	21.0	0	0	0	0
Saltery Cove	146	Open	8/9/2014	8/12/2014	57.4855	152.7681	21.4	0	0	0	0
Saltery Cove	147	Closed	8/9/2014	8/12/2014	57.4823	152.7749	25.6	0	0	0	0
Saltery Cove	148	Open	8/9/2014	8/12/2014	57.4799	152.7729	16.1	0	0	0	0
Saltery Cove	149	Open	8/9/2014	8/12/2014	57.4744	152.7811	30.1	0	0	0	0
Saltery Cove	150	Open	8/9/2014	8/12/2014	57.4716	152.7806	32.6	0	0	0	0
Portage Bay	151	Closed	8/10/2014	8/13/2014	57.4604	152.6410	48.8	0	0	0	0
Portage Bay	152	Closed	8/10/2014	8/13/2014	57.4630	152.6379	43.5	0	0	0	0
Portage Bay	153	Open	8/10/2014	8/13/2014	57.4654	152.6351	36.5	0	0	0	0
Portage Bay	154	Open	8/10/2014	8/13/2014	57.4648	152.6389	33.0	0	0	0	0
Portage Bay	155	Closed	8/10/2014	8/13/2014	57.4668	152.6332	27.2	0	0	0	0
Portage Bay	156	Open	8/10/2014	8/13/2014	57.4686	152.6322	21.5	0	0	0	0
Portage Bay	157	Closed	8/10/2014	8/13/2014	57.4702	152.6297	18.8	0	0	0	0
Portage Bay	158	Open	8/10/2014	8/13/2014	57.4719	152.6287	13.2	0	0	0	0
Portage Bay	159	Closed	8/10/2014	8/13/2014	57.4736	152.6267	8.8	0	0	0	0
Portage Bay	160	Open	8/10/2014	8/13/2014	57.4753	152.6250	4.6	0	0	0	0
Portage Bay	161	Open	8/10/2014	8/13/2014	57.4760	152.6198	3.4	0	0	0	0
Portage Bay	162	Open	8/10/2014	8/13/2014	57.4743	152.6209	7.7	0	0	0	0
Portage Bay	163	Open	8/10/2014	8/13/2014	57.4726	152.6225	11.7	0	0	1	1
Portage Bay	164	Open	8/10/2014	8/13/2014	57.4710	152.6245	16.3	3	1	0	4
Portage Bay	165	Open	8/10/2014	8/13/2014	57.4691	152.6257	23.6	2	8	0	10
Portage Bay	166	Open	8/10/2014	8/13/2014	57.4678	152.6277	28.5	0	0	0	0
Portage Bay	167	Closed	8/10/2014	8/13/2014	57.4667	152.6304	31.2	0	0	0	0
Portage Bay	168	Closed	8/10/2014	8/13/2014	57.4659	152.6275	38.9	0	0	0	0
Portage Bay	169	Closed	8/10/2014	8/13/2014	57.4642	152.6308	42.1	0	0	0	0
Portage Bay	170	Closed	8/10/2014	8/13/2014	57.4614	152.6330	45.9	0	0	0	0
Portage Bay	171	Closed	8/10/2014	8/13/2014	57.4591	152.6315	46.1	0	0	0	0
Portage Bay	172	Open	8/10/2014	8/13/2014	57.4606	152.6292	43.4	0	0	0	0
Portage Bay	173	Closed	8/10/2014	8/13/2014	57.4621	152.6267	39.2	0	0	0	0
Portage Bay	174	Closed	8/10/2014	8/13/2014	57.4664	152.6219	32.5	0	0	0	0
Portage Bay	175	Open	8/10/2014	8/13/2014	57.4683	152.6205	25.8	0	0	0	0
Portage Bay	176	Closed	8/10/2014	8/13/2014	57.4699	152.6189	20.5	0	0	0	0
Portage Bay	177	Open	8/10/2014	8/13/2014	57.4710	152.6177	15.5	2	0	0	2
Portage Bay	178	Open	8/10/2014	8/13/2014	57.4726	152.6164	11.0	0	0	0	0
Portage Bay	179	Open	8/10/2014	8/13/2014	57.4740	152.6149	7.6	2	2	0	4
Portage Bay	180	Open	8/10/2014	8/13/2014	57.4757	152.6157	3.8	3	1	0	4
Portage Bay	181	Open	8/10/2014	8/13/2014	57.4747	152.6092	2.4	1	2	0	3
Portage Bay	182	Closed	8/10/2014	8/13/2014	57.4722	152.6097	7.8	8	2	0	10
Portage Bay	183	Closed	8/10/2014	8/13/2014	57.4707	152.6117	14.0	0	0	0	0
Portage Bay	184	Closed	8/10/2014	8/13/2014	57.4691	152.6132	19.1	0	3	0	3
Portage Bay	185	Closed	8/10/2014	8/13/2014	57.4672	152.6142	23.3	0	0	0	0

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Sampling location	Sequential pot no.	Escape rings	Date		North latitude	West longitude	Depth (m)	Males		Females	Total crab
			Set	Retrieved				Sublegal	Legal		
Portage Bay	186	Open	8/10/2014	8/13/2014	57.4652	152.6159	26.8	0	0	0	0
Portage Bay	187	Open	8/10/2014	8/13/2014	57.4623	152.6190	32.6	0	0	0	0
Portage Bay	188	Closed	8/10/2014	8/13/2014	57.4500	152.6201	37.2	0	0	0	0
Portage Bay	189	Closed	8/10/2014	8/13/2014	57.4486	152.6224	44.1	0	0	0	0
Portage Bay	190	Open	8/10/2014	8/13/2014	57.4466	152.6242	48.2	0	0	0	0
Portage Bay	191	Open	8/10/2014	8/13/2014	57.4452	152.6158	35.8	0	0	0	0
Portage Bay	192	Closed	8/10/2014	8/13/2014	57.4470	152.6158	25.3	0	0	0	0
Portage Bay	193	Closed	8/10/2014	8/13/2014	57.4489	152.6147	35.1	0	0	0	0
Portage Bay	194	Closed	8/10/2014	8/13/2014	57.4517	152.6156	30.1	0	0	0	0
Portage Bay	195	Open	8/10/2014	8/13/2014	57.4562	152.6156	29.2	0	0	0	0
Portage Bay	196	Open	8/10/2014	8/13/2014	57.4608	152.6117	24.1	0	0	0	0
Portage Bay	197	Closed	8/10/2014	8/13/2014	57.4642	152.6108	19.4	0	0	0	0
Portage Bay	198	Closed	8/10/2014	8/13/2014	57.4667	152.6090	14.0	0	0	0	0
Portage Bay	199	Open	8/10/2014	8/13/2014	57.4684	152.6072	9.5	0	0	0	0
Portage Bay	200	Closed	8/10/2014	8/13/2014	57.4712	152.6048	4.4	0	0	0	0
Eagle Harbor	201	Open	8/12/2014	8/15/2014	57.4315	152.7230	4.9	0	0	0	0
Eagle Harbor	202	Closed	8/12/2014	8/15/2014	57.4315	152.7203	10.3	0	0	0	0
Eagle Harbor	203	Closed	8/12/2014	8/15/2014	57.4325	152.7175	16.0	0	0	0	0
Eagle Harbor	204	Open	8/12/2014	8/15/2014	57.4332	152.7155	25.4	0	0	0	0
Eagle Harbor	205	Open	8/12/2014	8/15/2014	57.4333	152.7129	30.3	0	0	0	0
Eagle Harbor	206	Closed	8/12/2014	8/15/2014	57.4342	152.7103	32.3	0	0	0	0
Eagle Harbor	207	Open	8/12/2014	8/15/2014	57.4355	152.7091	36.2	0	0	0	0
Eagle Harbor	208	Closed	8/12/2014	8/15/2014	57.4316	152.7135	42.1	0	0	0	0
Eagle Harbor	209	Open	8/12/2014	8/15/2014	57.4308	152.7163	31.6	0	0	0	0
Eagle Harbor	210	Open	8/12/2014	8/15/2014	57.4301	152.7184	22.2	0	0	0	0
Eagle Harbor	211	Closed	8/12/2014	8/15/2014	57.4301	152.7214	9.8	9	5	0	14
Eagle Harbor	212	Closed	8/12/2014	8/15/2014	57.4296	152.7241	4.8	11	2	0	13
Eagle Harbor	213	Closed	8/12/2014	8/15/2014	57.4279	152.7245	4.7	3	0	0	3
Eagle Harbor	214	Open	8/12/2014	8/15/2014	57.4282	152.7213	13.9	1	7	0	8
Eagle Harbor	215	Closed	8/12/2014	8/15/2014	57.4284	152.7169	25.4	0	0	0	0
Eagle Harbor	216	Closed	8/12/2014	8/15/2014	57.4274	152.7164	25.3	0	0	0	0
Eagle Harbor	217	Open	8/12/2014	8/15/2014	57.4273	152.7186	20.3	0	0	0	0
Eagle Harbor	218	Closed	8/12/2014	8/15/2014	57.4269	152.7209	16.3	0	0	0	0
Eagle Harbor	219	Open	8/12/2014	8/15/2014	57.4267	152.7253	3.7	7	3	0	10
Eagle Harbor	220	Closed	8/12/2014	8/15/2014	57.4254	152.7247	3.8	14	3	0	17
Eagle Harbor	221	Open	8/12/2014	8/15/2014	57.4249	152.7219	7.2	0	0	0	0
Eagle Harbor	222	Closed	8/12/2014	8/15/2014	57.4258	152.7193	18.4	0	0	0	0
Eagle Harbor	223	Open	8/12/2014	8/15/2014	57.4259	152.7166	23.0	0	0	0	0
Eagle Harbor	224	Closed	8/12/2014	8/15/2014	57.4248	152.7159	26.1	0	0	0	0
Eagle Harbor	225	Closed	8/12/2014	8/15/2014	57.4246	152.7189	19.3	0	0	0	0
Eagle Harbor	226	Closed	8/12/2014	8/15/2014	57.4238	152.7211	5.7	0	0	0	0
Eagle Harbor	227	Closed	8/12/2014	8/15/2014	57.4236	152.7230	3.8	8	1	1	10
Eagle Harbor	228	Open	8/12/2014	8/15/2014	57.4225	152.7218	2.0	0	1	0	1
Eagle Harbor	229	Open	8/12/2014	8/15/2014	57.4233	152.7176	18.0	0	0	0	0
Eagle Harbor	230	Closed	8/12/2014	8/15/2014	57.4239	152.7151	32.8	0	0	0	0
Eagle Harbor	231	Closed	8/12/2014	8/15/2014	57.4213	152.7143	16.2	0	0	0	0

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Sampling location	Sequential pot no.	Escape rings	Date		North latitude	West longitude	Depth (m)	Males		Females	Total crab
			Set	Retrieved				Sublegal	Legal		
Eagle Harbor	232	Open	8/12/2014	8/15/2014	57.4201	152.7148	19.7	0	0	0	0
Eagle Harbor	233	Closed	8/12/2014	8/15/2014	57.4357	152.7106	32.3	0	0	0	0
Eagle Harbor	234	Closed	8/12/2014	8/15/2014	57.4376	152.7130	34.9	0	0	0	0
Eagle Harbor	235	Closed	8/12/2014	8/15/2014	57.4391	152.7159	30.6	0	0	0	0
Eagle Harbor	236	Open	8/12/2014	8/15/2014	57.4389	152.7191	29.1	0	0	0	0
Eagle Harbor	237	Open	8/12/2014	8/15/2014	57.4376	152.7176	29.7	0	0	0	0
Eagle Harbor	238	Closed	8/12/2014	8/15/2014	57.4361	152.7153	28.7	0	0	0	0
Eagle Harbor	239	Closed	8/12/2014	8/15/2014	57.4352	152.7132	30.3	0	0	0	0
Eagle Harbor	240	Open	8/12/2014	8/15/2014	57.4346	152.7117	30.8	0	0	0	0
Eagle Harbor	241	Open	8/12/2014	8/15/2014	57.4300	152.7193	17.8	4	3	0	7
Eagle Harbor	242	Closed	8/12/2014	8/15/2014	57.4293	152.7193	18.6	0	0	0	0
Eagle Harbor	243	Open	8/12/2014	8/15/2014	57.4281	152.7195	18.6	0	0	0	0
Eagle Harbor	244	Open	8/12/2014	8/15/2014	57.4272	152.7191	18.9	3	6	0	9
Eagle Harbor	245	Open	8/12/2014	8/15/2014	57.4262	152.7179	20.4	0	0	0	0
Eagle Harbor	246	Open	8/12/2014	8/15/2014	57.4252	152.7170	21.5	0	2	1	3
Eagle Harbor	247	Open	8/12/2014	8/15/2014	57.4241	152.7164	23.0	0	0	0	0
Eagle Harbor	248	Open	8/12/2014	8/15/2014	57.4227	152.7167	21.4	0	0	0	0
Eagle Harbor	249	Open	8/12/2014	8/15/2014	57.4232	152.7192	7.3	0	0	0	0
Eagle Harbor	250	Closed	8/12/2014	8/15/2014	57.4239	152.7194	11.0	0	0	0	0
Gull Point	251	Open	8/13/2014	8/17/2014	57.3372	152.6345	5.7	0	0	0	0
Gull Point	252	Closed	8/13/2014	8/17/2014	57.3367	152.6309	9.5	5	2	0	7
Gull Point	253	Open	8/13/2014	8/17/2014	57.3363	152.6274	13.9	1	3	0	4
Gull Point	254	Closed	8/13/2014	8/17/2014	57.3366	152.6225	16.8	1	0	0	1
Gull Point	255	Closed	8/13/2014	8/17/2014	57.3365	152.6189	21.5	0	0	0	0
Gull Point	256	Closed	8/13/2014	8/17/2014	57.3366	152.6141	26.1	0	0	0	0
Gull Point	257	Open	8/13/2014	8/17/2014	57.3366	152.6081	31.5	0	0	0	0
Gull Point	258	Open	8/13/2014	8/17/2014	57.3366	152.6013	37.2	0	0	0	0
Gull Point	259	Closed	8/13/2014	8/17/2014	57.3363	152.5951	40.8	0	0	0	0
Gull Point	260	Open	8/13/2014	8/17/2014	57.3360	152.5849	46.6	0	0	0	0
Gull Point	261	Open	8/13/2014	8/17/2014	57.3403	152.5821	46.7	0	0	0	0
Gull Point	262	Open	8/13/2014	8/17/2014	57.3405	152.5881	43.3	0	0	0	0
Gull Point	263	Open	8/13/2014	8/17/2014	57.3409	152.5955	38.5	0	0	0	0
Gull Point	264	Open	8/13/2014	8/17/2014	57.3407	152.6020	33.1	0	0	0	0
Gull Point	265	Open	8/13/2014	8/17/2014	57.3408	152.6079	28.3	0	0	0	0
Gull Point	266	Closed	8/13/2014	8/17/2014	57.3416	152.6134	22.4	0	0	0	0
Gull Point	267	Closed	8/13/2014	8/17/2014	57.3414	152.6185	18.0	4	1	0	5
Gull Point	268	Open	8/13/2014	8/17/2014	57.3406	152.6240	14.7	1	2	0	3
Gull Point	269	Closed	8/13/2014	8/17/2014	57.3394	152.6302	9.6	10	7	0	17
Gull Point	270	Closed	8/13/2014	8/17/2014	57.3401	152.6331	6.9	5	3	0	8
Gull Point	271	Closed	8/13/2014	8/17/2014	57.3431	152.6317	5.2	4	2	0	6
Gull Point	272	Open	8/13/2014	8/17/2014	57.3439	152.6281	8.5	3	4	0	7
Gull Point	273	Closed	8/13/2014	8/17/2014	57.3438	152.6247	11.7	8	1	13	22
Gull Point	274	Closed	8/13/2014	8/17/2014	57.3450	152.6198	15.0	4	3	4	11
Gull Point	275	Open	8/13/2014	8/17/2014	57.3443	152.6124	21.6	0	0	2	2
Gull Point	276	Closed	8/13/2014	8/17/2014	57.3446	152.6061	26.4	1	0	0	1
Gull Point	277	Open	8/13/2014	8/17/2014	57.3447	152.5996	31.8	0	0	0	0

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Sampling location	Sequential pot no.	Escape rings	Date		North latitude	West longitude	Depth (m)	Males		Females	Total crab
			Set	Retrieved				Sublegal	Legal		
Gull Point	278	Open	8/13/2014	8/17/2014	57.3447	152.5942	37.1	0	0	0	0
Gull Point	279	Open	8/13/2014	8/17/2014	57.3448	152.5880	41.7	0	0	0	0
Gull Point	280	Closed	8/13/2014	8/17/2014	57.3447	152.5809	48.0	0	0	0	0
Gull Point	281	Open	8/13/2014	8/17/2014	57.3485	152.5807	46.7	0	0	0	0
Gull Point	282	Open	8/13/2014	8/17/2014	57.3487	152.5852	40.9	0	0	0	0
Gull Point	283	Open	8/13/2014	8/17/2014	57.3485	152.5910	36.8	0	0	0	0
Gull Point	284	Closed	8/13/2014	8/17/2014	57.3482	152.5967	31.8	0	0	0	0
Gull Point	285	Closed	8/13/2014	8/17/2014	57.3474	152.6061	23.6	0	0	0	0
Gull Point	286	Open	8/13/2014	8/17/2014	57.3482	152.6124	17.5	9	7	0	16
Gull Point	287	Open	8/13/2014	8/17/2014	57.3486	152.6169	13.7	1	3	3	7
Gull Point	288	Closed	8/13/2014	8/17/2014	57.3490	152.6215	9.9	6	4	4	14
Gull Point	289	Closed	8/13/2014	8/17/2014	57.3477	152.6244	8.3	8	4	2	14
Gull Point	290	Closed	8/13/2014	8/17/2014	57.3472	152.6208	12.0	2	2	2	6
Gull Point	291	Closed	8/13/2014	8/17/2014	57.3521	152.6172	8.7	10	5	0	15
Gull Point	292	Open	8/13/2014	8/17/2014	57.3531	152.6131	12.3	1	1	0	2
Gull Point	293	Closed	8/13/2014	8/17/2014	57.3513	152.6139	13.9	5	5	3	13
Gull Point	294	Open	8/13/2014	8/17/2014	57.3519	152.6096	16.6	0	2	2	4
Gull Point	295	Closed	8/13/2014	8/17/2014	57.3512	152.6045	21.4	0	0	0	0
Gull Point	296	Open	8/13/2014	8/17/2014	57.3519	152.5994	26.2	0	0	0	0
Gull Point	297	Closed	8/13/2014	8/17/2014	57.3517	152.5934	31.8	0	0	0	0
Gull Point	298	Open	8/13/2014	8/17/2014	57.3519	152.5887	36.6	0	0	0	0
Gull Point	299	Closed	8/13/2014	8/17/2014	57.3522	152.5830	42.8	0	0	0	0
Gull Point	300	Closed	8/13/2014	8/17/2014	57.3524	152.5782	50.5	0	0	0	0

Appendix C2.–Sampling locations, escape ring configuration, dates, and depth of pots fished with corresponding numbers of Dungeness crab by sex and legal status captured in the Trinity Islands survey area, 2014.

Sampling location	Sequential pot no.	Escape rings	Date		North latitude	West longitude	Depth (m)	Males		Females	Total crab
			Set	Retrieved				Sublegal	Legal		
Sitkinak 1	301	Open	8/18/2014	8/21/2014	56.4996	154.1603	13.0	1	0	0	1
Sitkinak 1	302	Closed	8/18/2014	8/21/2014	56.4886	154.1604	20.5	3	1	0	4
Sitkinak 1	303	Closed	8/18/2014	8/21/2014	56.4774	154.1605	29.1	0	0	0	0
Sitkinak 1	304	Closed	8/18/2014	8/21/2014	56.4651	154.1596	37.7	0	0	0	0
Sitkinak 1	305	Closed	8/18/2014	8/21/2014	56.4554	154.1598	42.5	0	0	0	0
Sitkinak 1	306	Closed	8/18/2014	8/21/2014	56.4497	154.1773	42.6	0	0	0	0
Sitkinak 1	307	Closed	8/18/2014	8/21/2014	56.4635	154.1779	36.3	0	0	0	0
Sitkinak 1	308	Open	8/18/2014	8/21/2014	56.4751	154.1789	27.7	0	0	0	0
Sitkinak 1	309	Closed	8/18/2014	8/21/2014	56.4872	154.1673	20.2	0	0	0	0
Sitkinak 1	310	Closed	8/18/2014	8/21/2014	56.4990	154.1718	12.3	0	0	0	0
Sitkinak 1	311	Closed	8/18/2014	8/21/2014	56.4986	154.1939	7.1	8	1	0	9
Sitkinak 1	312	Closed	8/18/2014	8/21/2014	56.4857	154.1957	19.0	0	0	0	0
Sitkinak 1	313	Open	8/18/2014	8/21/2014	56.4720	154.1969	26.8	0	0	0	0
Sitkinak 1	314	Open	8/18/2014	8/21/2014	56.4572	154.1976	36.0	0	0	0	0
Sitkinak 1	315	Open	8/18/2014	8/21/2014	56.4459	154.1965	40.0	0	0	0	0
Sitkinak 1	316	Open	8/18/2014	8/21/2014	56.4431	154.2144	37.0	0	0	0	0
Sitkinak 1	317	Open	8/18/2014	8/21/2014	56.4556	154.2137	31.3	0	0	0	0
Sitkinak 1	318	Closed	8/18/2014	8/21/2014	56.4701	154.2142	19.5	1	0	0	1
Sitkinak 1	319	Closed	8/18/2014	8/21/2014	56.4684	154.2308	18.1	4	0	0	4
Sitkinak 1	320	Open	8/18/2014	8/21/2014	56.4566	154.2306	22.8	0	0	0	0
Sitkinak 1	321	Closed	8/18/2014	8/21/2014	56.4424	154.2314	31.0	1	0	0	1
Sitkinak 1	322	Open	8/18/2014	8/21/2014	56.4492	154.2236	30.9	0	1	0	1
Sitkinak 1	323	Open	8/18/2014	8/21/2014	56.4630	154.2064	29.7	0	0	0	0
Sitkinak 1	324	Closed	8/18/2014	8/21/2014	56.4672	154.1872	32.2	0	0	0	0
Sitkinak 1	325	Open	8/18/2014	8/21/2014	56.4709	154.1661	34.0	0	0	0	0
Tugidak 1	326	Closed	8/19/2014	8/22/2014	56.4401	154.6572	6.9	13	0	0	13
Tugidak 1	327	Open	8/19/2014	8/22/2014	56.4285	154.6461	13.6	0	0	0	0
Tugidak 1	328	Open	8/19/2014	8/22/2014	56.4164	154.6330	15.4	0	0	0	0
Tugidak 1	329	Open	8/19/2014	8/22/2014	56.4066	154.6231	19.0	0	0	0	0
Tugidak 1	330	Open	8/19/2014	8/22/2014	56.4009	154.6182	21.2	0	0	0	0
Tugidak 1	331	Open	8/19/2014	8/22/2014	56.4115	154.6082	21.0	0	0	0	0
Tugidak 1	332	Closed	8/19/2014	8/22/2014	56.4206	154.6179	16.7	0	0	0	0
Tugidak 1	333	Closed	8/19/2014	8/22/2014	56.4296	154.6268	15.0	0	0	0	0
Tugidak 1	334	Open	8/19/2014	8/22/2014	56.4380	154.6366	12.0	0	0	0	0
Tugidak 1	335	Open	8/19/2014	8/22/2014	56.4464	154.6458	7.6	1	0	0	1
Tugidak 1	336	Open	8/19/2014	8/22/2014	56.4527	154.6354	8.7	1	0	0	1
Tugidak 1	337	Closed	8/19/2014	8/22/2014	56.4433	154.6240	15.0	0	0	0	0
Tugidak 1	338	Open	8/19/2014	8/22/2014	56.4329	154.6135	15.3	0	0	0	0
Tugidak 1	339	Closed	8/19/2014	8/22/2014	56.4251	154.6050	18.3	0	0	0	0
Tugidak 1	340	Open	8/19/2014	8/22/2014	56.4176	154.5969	20.8	0	0	0	0
Tugidak 1	341	Closed	8/19/2014	8/22/2014	56.4251	154.5876	18.9	0	0	0	0
Tugidak 1	342	Closed	8/19/2014	8/22/2014	56.4342	154.5975	17.3	1	0	0	1
Tugidak 1	343	Closed	8/19/2014	8/22/2014	56.4433	154.6062	16.1	0	0	0	0
Tugidak 1	344	Open	8/19/2014	8/22/2014	56.4513	154.6139	12.8	1	0	0	1
Tugidak 1	345	Closed	8/19/2014	8/22/2014	56.4606	154.6229	7.8	31	2	0	33
Tugidak 1	346	Open	8/19/2014	8/22/2014	56.4654	154.6101	8.3	4	1	0	5
Tugidak 1	347	Closed	8/19/2014	8/22/2014	56.4562	154.5998	12.7	32	1	0	33
Tugidak 1	348	Open	8/19/2014	8/22/2014	56.4469	154.5912	17.2	0	0	0	0
Tugidak 1	349	Closed	8/19/2014	8/22/2014	56.4391	154.5834	17.6	13	0	0	13

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Sampling location	Sequential pot no.	Escape rings	Date		North latitude	West longitude	Depth (m)	Males		Females	Total crab
			Set	Retrieved				Sublegal	Legal		
Tugidak 1	350	Open	8/19/2014	8/22/2014	56.4296	154.5739	20.5	0	0	0	0
Sitkinak 2	351	Closed	8/21/2014	8/26/2014	56.4406	154.2451	29.1	7	0	3	10
Sitkinak 2	352	Open	8/21/2014	8/26/2014	56.4482	154.2453	24.5	4	0	0	4
Sitkinak 2	353	Open	8/21/2014	8/26/2014	56.4543	154.2451	21.8	0	0	0	0
Sitkinak 2	354	Closed	8/21/2014	8/26/2014	56.4617	154.2451	19.4	10	3	1	14
Sitkinak 2	355	Open	8/21/2014	8/26/2014	56.4681	154.2453	16.5	4	3	1	8
Sitkinak 2	356	Closed	8/21/2014	8/26/2014	56.4712	154.2597	14.8	0	0	0	0
Sitkinak 2	357	Closed	8/21/2014	8/26/2014	56.4640	154.2602	17.3	25	2	4	31
Sitkinak 2	358	Open	8/21/2014	8/26/2014	56.4555	154.2597	20.1	7	1	1	9
Sitkinak 2	359	Closed	8/21/2014	8/26/2014	56.4475	154.2601	22.7	14	3	1	18
Sitkinak 2	360	Closed	8/21/2014	8/26/2014	56.4419	154.2606	25.6	2	0	0	2
Sitkinak 2	361	Closed	8/21/2014	8/26/2014	56.4425	154.2744	23.5	19	2	1	22
Sitkinak 2	362	Open	8/21/2014	8/26/2014	56.4497	154.2742	20.6	8	1	4	13
Sitkinak 2	363	Closed	8/21/2014	8/26/2014	56.4579	154.2743	18.4	25	2	2	29
Sitkinak 2	364	Closed	8/21/2014	8/26/2014	56.4653	154.2745	15.8	16	1	2	19
Sitkinak 2	365	Closed	8/21/2014	8/26/2014	56.4742	154.2746	14.1	11	2	1	14
Sitkinak 2	366	Closed	8/21/2014	8/26/2014	56.4821	154.2896	11.2	8	4	0	12
Sitkinak 2	367	Closed	8/21/2014	8/26/2014	56.4729	154.2895	13.6	14	4	1	19
Sitkinak 2	368	Closed	8/21/2014	8/26/2014	56.4622	154.2893	16.6	17	3	3	23
Sitkinak 2	369	Closed	8/21/2014	8/26/2014	56.4532	154.2894	19.0	8	5	3	16
Sitkinak 2	370	Open	8/21/2014	8/26/2014	56.4452	154.2898	21.6	5	1	2	8
Sitkinak 2	371	Open	8/21/2014	8/26/2014	56.4486	154.3035	19.5	13	2	2	17
Sitkinak 2	372	Open	8/21/2014	8/26/2014	56.4577	154.3044	17.2	7	4	1	12
Sitkinak 2	373	Open	8/21/2014	8/26/2014	56.4655	154.3045	14.3	7	3	0	10
Sitkinak 2	374	Open	8/21/2014	8/26/2014	56.4766	154.3044	9.7	7	0	2	9
Sitkinak 2	375	Closed	8/21/2014	8/26/2014	56.4840	154.3056	10.3	16	4	1	21
Tugidak 2	376	Open	8/22/2014	8/26/2014	56.4358	154.5594	20.8	0	0	0	0
Tugidak 2	377	Closed	8/22/2014	8/26/2014	56.4445	154.5685	18.3	8	0	0	8
Tugidak 2	378	Closed	8/22/2014	8/26/2014	56.4535	154.5777	15.5	20	0	0	20
Tugidak 2	379	Open	8/22/2014	8/26/2014	56.4617	154.5865	13.4	2	1	0	3
Tugidak 2	380	Open	8/22/2014	8/26/2014	56.4722	154.5970	8.5	3	0	0	3
Tugidak 2	381	Open	8/22/2014	8/26/2014	56.4773	154.5827	7.9	1	0	0	1
Tugidak 2	382	Closed	8/22/2014	8/26/2014	56.4667	154.5715	13.1	11	0	0	11
Tugidak 2	383	Closed	8/22/2014	8/26/2014	56.4566	154.5616	15.8	17	0	0	17
Tugidak 2	384	Closed	8/22/2014	8/26/2014	56.4474	154.5531	18.2	17	0	0	17
Tugidak 2	385	Open	8/22/2014	8/26/2014	56.4407	154.5464	20.0	2	0	1	3
Tugidak 2	386	Open	8/22/2014	8/26/2014	56.4449	154.5324	20.4	0	0	0	0
Tugidak 2	387	Open	8/22/2014	8/26/2014	56.4537	154.5411	17.4	5	0	0	5
Tugidak 2	388	Open	8/22/2014	8/26/2014	56.4645	154.5507	14.3	2	0	0	2
Tugidak 2	389	Closed	8/22/2014	8/26/2014	56.4744	154.5595	11.8	4	0	0	4
Tugidak 2	390	Open	8/22/2014	8/26/2014	56.4823	154.5678	7.1	27	0	0	27
Tugidak 2	391	Open	8/22/2014	8/26/2014	56.4868	154.5530	6.7	0	0	0	0
Tugidak 2	392	Open	8/22/2014	8/26/2014	56.4755	154.5429	11.7	3	0	0	3
Tugidak 2	393	Open	8/22/2014	8/26/2014	56.4667	154.5351	14.3	0	0	1	1
Tugidak 2	394	Closed	8/22/2014	8/26/2014	56.4569	154.5269	17.1	10	4	0	14
Tugidak 2	395	Open	8/22/2014	8/26/2014	56.4493	154.5201	19.5	0	1	0	1

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Sampling location	Sequential pot no.	Escape rings	Date		North latitude	West longitude	Depth (m)	Males		Females	Total crab
			Set	Retrieved				Sublegal	Legal		
Tugidak 2	396	Closed	8/22/2014	8/26/2014	56.4518	154.5074	18.2	13	2	0	15
Tugidak 2	397	Open	8/22/2014	8/26/2014	56.4622	154.5165	15.8	0	0	0	0
Tugidak 2	398	Closed	8/22/2014	8/26/2014	56.4716	154.5236	13.0	16	1	0	17
Tugidak 2	399	Closed	8/22/2014	8/26/2014	56.4812	154.5313	10.4	0	0	1	1
Tugidak 2	400	Open	8/22/2014	8/26/2014	56.4907	154.5409	6.6	0	0	0	0

Appendix C3.–Sampling locations, escape ring configuration, dates, and depth of pots fished with corresponding numbers of Dungeness crab by sex and legal status captured in the Alitak Bay survey area, 2014.

Sampling	Sequential	Escape	Date		North	West	Depth	Males			Total
location	pot no.	rings	Set	Retrieved	latitude	longitude	(m)	Sublegal	Legal	Females	crab
Alitak 1	401	Closed	9/17/2014	9/20/2014	56.8412	154.3130	12.5	2	0	0	2
Alitak 1	402	Closed	9/17/2014	9/20/2014	56.8384	154.3127	15.8	19	2	1	22
Alitak 1	403	Open	9/17/2014	9/20/2014	56.8354	154.3117	19.2	0	0	0	0
Alitak 1	404	Closed	9/17/2014	9/20/2014	56.8322	154.3113	26.3	13	0	1	14
Alitak 1	405	Closed	9/17/2014	9/20/2014	56.8290	154.3109	34.2	0	0	0	0
Alitak 1	406	Open	9/17/2014	9/20/2014	56.8254	154.3102	33.8	0	0	0	0
Alitak 1	407	Open	9/17/2014	9/20/2014	56.8222	154.3093	39.5	0	0	0	0
Alitak 1	408	Open	9/17/2014	9/20/2014	56.8182	154.3084	40.2	0	0	0	0
Alitak 1	409	Open	9/17/2014	9/20/2014	56.8159	154.3082	45.6	0	0	0	0
Alitak 1	410	Open	9/17/2014	9/20/2014	56.8119	154.3071	50.0	0	0	2	2
Alitak 1	411	Open	9/17/2014	9/20/2014	56.8027	154.2975	49.0	0	0	1	1
Alitak 1	412	Open	9/17/2014	9/20/2014	56.8081	154.2983	48.1	0	0	0	0
Alitak 1	413	Open	9/17/2014	9/20/2014	56.8130	154.2996	43.1	0	0	0	0
Alitak 1	414	Closed	9/17/2014	9/20/2014	56.8189	154.3001	33.5	0	0	0	0
Alitak 1	415	Closed	9/17/2014	9/20/2014	56.8224	154.3008	29.5	9	0	0	9
Alitak 1	416	Closed	9/17/2014	9/20/2014	56.8272	154.3020	24.1	25	0	3	28
Alitak 1	417	Open	9/17/2014	9/20/2014	56.8306	154.3032	18.4	4	0	1	5
Alitak 1	418	Closed	9/17/2014	9/20/2014	56.8340	154.3045	14.5	18	0	3	21
Alitak 1	419	Closed	9/17/2014	9/20/2014	56.8387	154.3060	10.0	6	0	7	13
Alitak 1	420	Closed	9/17/2014	9/20/2014	56.8411	154.3069	6.8	2	1	4	7
Alitak 1	421	Open	9/17/2014	9/20/2014	56.8418	154.3003	6.2	0	0	2	2
Alitak 1	422	Closed	9/17/2014	9/20/2014	56.8358	154.2986	11.1	18	0	6	24
Alitak 1	423	Open	9/17/2014	9/20/2014	56.8303	154.2973	14.2	0	0	0	0
Alitak 1	424	Closed	9/17/2014	9/20/2014	56.8243	154.2945	19.2	15	1	7	23
Alitak 1	425	Open	9/17/2014	9/20/2014	56.8191	154.2938	25.6	2	2	1	5
Alitak 1	426	Open	9/17/2014	9/20/2014	56.8166	154.2934	28.8	0	1	1	2
Alitak 1	427	Closed	9/17/2014	9/20/2014	56.8127	154.2910	34.7	0	0	0	0
Alitak 1	428	Open	9/17/2014	9/20/2014	56.8102	154.2911	37.7	0	0	1	1
Alitak 1	429	Closed	9/17/2014	9/20/2014	56.8079	154.2898	43.7	0	0	0	0
Alitak 1	430	Closed	9/17/2014	9/20/2014	56.8002	154.2890	48.0	0	0	0	0
Alitak 1	431	Closed	9/17/2014	9/20/2014	56.7972	154.2792	46.5	0	0	0	0
Alitak 1	432	Closed	9/17/2014	9/20/2014	56.8049	154.2814	41.3	0	0	0	0
Alitak 1	433	Open	9/17/2014	9/20/2014	56.8070	154.2813	37.4	0	0	0	0
Alitak 1	434	Open	9/17/2014	9/20/2014	56.8102	154.2831	28.0	3	2	0	5
Alitak 1	435	Open	9/17/2014	9/20/2014	56.8126	154.2845	24.4	8	2	3	13
Alitak 1	436	Closed	9/17/2014	9/20/2014	56.8151	154.2830	19.0	17	1	5	23
Alitak 1	437	Open	9/17/2014	9/20/2014	56.8190	154.2844	17.5	9	2	3	14
Alitak 1	438	Closed	9/17/2014	9/20/2014	56.8244	154.2864	12.8	39	0	8	47
Alitak 1	439	Closed	9/17/2014	9/20/2014	56.8347	154.2894	9.7	16	1	5	22
Alitak 1	440	Open	9/17/2014	9/20/2014	56.8456	154.2933	5.5	0	0	1	1
Alitak 1	441	Open	9/17/2014	9/20/2014	56.8483	154.2834	5.3	0	0	0	0
Alitak 1	442	Open	9/17/2014	9/20/2014	56.8423	154.2813	7.1	0	2	3	5
Alitak 1	443	Open	9/17/2014	9/20/2014	56.8250	154.2767	11.4	3	1	6	10
Alitak 1	444	Closed	9/17/2014	9/20/2014	56.8082	154.2716	15.6	21	0	20	41

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Sampling	Sequential	Escape	Date		North	West	Depth	Males			Total
Location	Pot No.	Rings	Set	Retrieved	Latitude	Longitude	(m)	Sublegal	Legal	Females	Crab
Alitak 1	445	Open	9/17/2014	9/20/2014	56.8035	154.2707	23.5	0	0	0	0
Alitak 1	446	Open	9/17/2014	9/20/2014	56.7982	154.2690	42.2	0	0	0	0
Alitak 1	447	Closed	9/17/2014	9/20/2014	56.8131	154.2731	14.8	18	1	26	45
Alitak 1	448	Closed	9/17/2014	9/20/2014	56.8197	154.2752	12.9	11	2	9	22
Alitak 1	449	Closed	9/17/2014	9/20/2014	56.8319	154.2784	9.1	24	2	10	36
Alitak 1	450	Closed	9/17/2014	9/20/2014	56.8370	154.2780	8.6	23	0	10	33
Alitak 2	451	Closed	9/18/2014	9/21/2014	56.8506	154.2769	5.9	1	0	0	1
Alitak 2	452	Closed	9/18/2014	9/21/2014	56.8429	154.2744	7.8	12	1	2	15
Alitak 2	453	Open	9/18/2014	9/21/2014	56.8365	154.2722	9.3	1	0	0	1
Alitak 2	454	Open	9/18/2014	9/21/2014	56.8314	154.2706	10.8	7	0	6	13
Alitak 2	455	Closed	9/18/2014	9/21/2014	56.8264	154.2691	12.0	9	1	11	21
Alitak 2	456	Open	9/18/2014	9/21/2014	56.8204	154.2670	14.0	0	0	3	3
Alitak 2	457	Closed	9/18/2014	9/21/2014	56.8146	154.2654	15.6	9	0	19	28
Alitak 2	458	Closed	9/18/2014	9/21/2014	56.8082	154.2638	16.3	18	3	17	38
Alitak 2	459	Open	9/18/2014	9/21/2014	56.8031	154.2622	17.8	12	7	3	22
Alitak 2	460	Open	9/18/2014	9/21/2014	56.7990	154.2612	38.5	0	0	0	0
Alitak 2	461	Open	9/18/2014	9/21/2014	56.7983	154.2550	41.0	0	0	0	0
Alitak 2	462	Closed	9/18/2014	9/21/2014	56.8022	154.2561	20.5	26	1	4	31
Alitak 2	463	Open	9/18/2014	9/21/2014	56.8106	154.2589	17.3	5	2	3	10
Alitak 2	464	Open	9/18/2014	9/21/2014	56.8166	154.2607	16.9	8	0	7	15
Alitak 2	465	Closed	9/18/2014	9/21/2014	56.8226	154.2625	15.6	11	0	4	15
Alitak 2	466	Closed	9/18/2014	9/21/2014	56.8289	154.2645	13.9	13	0	13	26
Alitak 2	467	Closed	9/18/2014	9/21/2014	56.8356	154.2666	16.0	15	0	3	18
Alitak 2	468	Closed	9/18/2014	9/21/2014	56.8417	154.2684	12.5	22	0	5	27
Alitak 2	469	Open	9/18/2014	9/21/2014	56.8480	154.2705	8.0	4	0	4	8
Alitak 2	470	Open	9/18/2014	9/21/2014	56.8532	154.2721	6.5	2	0	0	2
Alitak 2	471	Open	9/18/2014	9/21/2014	56.8555	154.2684	8.3	0	0	0	0
Alitak 2	472	Open	9/18/2014	9/21/2014	56.8535	154.2665	13.7	5	0	1	6
Alitak 2	473	Closed	9/18/2014	9/21/2014	56.8502	154.2658	16.5	3	0	0	3
Alitak 2	474	Closed	9/18/2014	9/21/2014	56.8469	154.2648	22.5	6	0	2	8
Alitak 2	475	Closed	9/18/2014	9/21/2014	56.8426	154.2636	26.6	0	0	0	0
Alitak 2	476	Closed	9/18/2014	9/21/2014	56.8383	154.2621	21.4	11	0	3	14
Alitak 2	477	Closed	9/18/2014	9/21/2014	56.8321	154.2596	18.6	1	1	2	4
Alitak 2	478	Closed	9/18/2014	9/21/2014	56.8223	154.2556	18.2	22	0	18	40
Alitak 2	479	Closed	9/18/2014	9/21/2014	56.8123	154.2524	21.1	13	1	23	37
Alitak 2	480	Closed	9/18/2014	9/21/2014	56.7981	154.2492	40.1	1	0	3	4
Alitak 2	481	Open	9/18/2014	9/21/2014	56.7970	154.2425	38.9	6	0	9	15
Alitak 2	482	Open	9/18/2014	9/21/2014	56.8028	154.2434	33.6	1	0	0	1
Alitak 2	483	Closed	9/18/2014	9/21/2014	56.8075	154.2449	29.6	3	0	22	25
Alitak 2	484	Open	9/18/2014	9/21/2014	56.8119	154.2463	23.9	0	0	4	4
Alitak 2	485	Open	9/18/2014	9/21/2014	56.8197	154.2487	23.0	0	0	1	1
Alitak 2	486	Closed	9/18/2014	9/21/2014	56.8301	154.2525	23.2	10	0	15	25
Alitak 2	487	Open	9/18/2014	9/21/2014	56.8421	154.2565	34.8	0	0	0	0
Alitak 2	488	Closed	9/18/2014	9/21/2014	56.8543	154.2606	18.2	14	2	1	17
Alitak 2	489	Open	9/18/2014	9/21/2014	56.8579	154.2618	9.6	3	0	1	4
Alitak 2	490	Open	9/18/2014	9/21/2014	56.8588	154.2628	6.5	0	0	0	0
Alitak 2	491	Closed	9/18/2014	9/21/2014	56.8606	154.2577	5.3	18	0	0	18
Alitak 2	492	Closed	9/18/2014	9/21/2014	56.8594	154.2564	11.1	17	1	0	18

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Sampling location	Sequential pot no.	Escape rings	Date		North latitude	West longitude	Depth (m)	Males		Females	Total crab
			Set	Retrieved				Sublegal	Legal		
Alitak 2	493	Open	9/18/2014	9/21/2014	56.8573	154.2559	14.0	0	0	0	0
Alitak 2	494	Open	9/18/2014	9/21/2014	56.8447	154.2511	41.2	0	1	0	1
Alitak 2	495	Open	9/18/2014	9/21/2014	56.8354	154.2484	32.5	0	0	0	0
Alitak 2	496	Open	9/18/2014	9/21/2014	56.8279	154.2462	27.5	1	0	0	1
Alitak 2	497	Closed	9/18/2014	9/21/2014	56.8192	154.2427	28.1	6	0	15	21
Alitak 2	498	Open	9/18/2014	9/21/2014	56.8110	154.2404	29.6	3	0	4	7
Alitak 2	499	Closed	9/18/2014	9/21/2014	56.8021	154.2378	32.4	0	0	0	0
Alitak 2	500	Open	9/18/2014	9/21/2014	56.7932	154.2351	39.2	0	0	0	0
Alitak 3	501	Open	9/20/2014	9/23/2014	56.7952	154.2000	40.5	5	1	4	10
Alitak 3	502	Closed	9/20/2014	9/23/2014	56.7951	154.2033	39.5	1	0	0	1
Alitak 3	503	Open	9/20/2014	9/23/2014	56.7950	154.2069	38.0	0	0	1	1
Alitak 3	504	Open	9/20/2014	9/23/2014	56.7952	154.2101	38.0	0	0	0	0
Alitak 3	505	Closed	9/20/2014	9/23/2014	56.7952	154.2131	37.5	2	1	1	4
Alitak 3	506	Closed	9/20/2014	9/23/2014	56.7953	154.2165	37.2	3	0	0	3
Alitak 3	507	Closed	9/20/2014	9/23/2014	56.7954	154.2197	36.7	0	0	2	2
Alitak 3	508	Open	9/20/2014	9/23/2014	56.7955	154.2228	36.4	1	4	1	6
Alitak 3	509	Open	9/20/2014	9/23/2014	56.7955	154.2259	36.2	0	1	2	3
Alitak 3	510	Closed	9/20/2014	9/23/2014	56.7956	154.2315	35.3	0	0	0	0
Alitak 3	511	Closed	9/20/2014	9/23/2014	56.7992	154.2336	33.6	0	0	3	3
Alitak 3	512	Open	9/20/2014	9/23/2014	56.7991	154.2289	33.6	0	0	1	1
Alitak 3	513	Open	9/20/2014	9/23/2014	56.7990	154.2242	34.2	0	0	0	0
Alitak 3	514	Closed	9/20/2014	9/23/2014	56.7990	154.2196	34.8	0	0	4	4
Alitak 3	515	Closed	9/20/2014	9/23/2014	56.7989	154.2149	35.5	0	0	0	0
Alitak 3	516	Open	9/20/2014	9/23/2014	56.7990	154.2108	36.4	0	0	1	1
Alitak 3	517	Closed	9/20/2014	9/23/2014	56.7988	154.2061	36.7	2	1	10	13
Alitak 3	518	Open	9/20/2014	9/23/2014	56.7988	154.2011	37.9	2	0	1	3
Alitak 3	519	Closed	9/20/2014	9/23/2014	56.7987	154.1961	39.2	1	0	10	11
Alitak 3	520	Closed	9/20/2014	9/23/2014	56.7986	154.1912	40.9	2	1	7	10
Alitak 3	521	Open	9/20/2014	9/23/2014	56.8032	154.1929	39.0	2	2	5	9
Alitak 3	522	Open	9/20/2014	9/23/2014	56.8033	154.1971	38.5	0	0	0	0
Alitak 3	523	Closed	9/20/2014	9/23/2014	56.8034	154.2015	37.5	1	0	10	11
Alitak 3	524	Open	9/20/2014	9/23/2014	56.8033	154.2065	36.5	0	0	3	3
Alitak 3	525	Closed	9/20/2014	9/23/2014	56.8032	154.2107	35.7	2	0	10	12
Alitak 3	526	Open	9/20/2014	9/23/2014	56.8031	154.2154	34.8	0	0	1	1
Alitak 3	527	Open	9/20/2014	9/23/2014	56.8033	154.2202	33.8	2	0	5	7
Alitak 3	528	Open	9/20/2014	9/23/2014	56.8034	154.2251	32.7	0	0	0	0
Alitak 3	529	Closed	9/20/2014	9/23/2014	56.8034	154.2299	31.5	1	0	0	1
Alitak 3	530	Open	9/20/2014	9/23/2014	56.8033	154.2342	30.6	0	0	1	1
Alitak 3	531	Open	9/20/2014	9/23/2014	56.8071	154.2366	29.2	0	1	0	1
Alitak 3	532	Closed	9/20/2014	9/23/2014	56.8072	154.2319	29.9	4	0	10	14
Alitak 3	533	Closed	9/20/2014	9/23/2014	56.8072	154.2270	31.4	0	0	10	10
Alitak 3	534	Closed	9/20/2014	9/23/2014	56.8072	154.2225	32.6	7	0	21	28
Alitak 3	535	Closed	9/20/2014	9/23/2014	56.8072	154.2174	33.8	0	0	3	3
Alitak 3	536	Open	9/20/2014	9/23/2014	56.8071	154.2126	35.0	1	0	3	4
Alitak 3	537	Closed	9/20/2014	9/23/2014	56.8072	154.2072	36.1	3	0	2	5
Alitak 3	538	Closed	9/20/2014	9/23/2014	56.8071	154.2022	37.2	0	0	10	10

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Sampling location	Sequential pot no.	Escape rings	Date		North latitude	West longitude	Depth (m)	Males		Females	Total crab
			Set	Retrieved				Sublegal	Legal		
Alitak 3	539	Closed	9/20/2014	9/23/2014	56.8071	154.1971	38.0	0	1	5	6
Alitak 3	540	Open	9/20/2014	9/23/2014	56.8071	154.1904	36.6	1	0	1	2
Alitak 3	541	Open	9/20/2014	9/23/2014	56.8106	154.1892	38.9	0	0	1	1
Alitak 3	542	Closed	9/20/2014	9/23/2014	56.8107	154.1953	37.8	4	0	5	9
Alitak 3	543	Closed	9/20/2014	9/23/2014	56.8108	154.2003	36.8	1	0	2	3
Alitak 3	544	Open	9/20/2014	9/23/2014	56.8109	154.2056	36.0	0	0	7	7
Alitak 3	545	Open	9/20/2014	9/23/2014	56.8108	154.2107	35.3	0	0	1	1
Alitak 3	546	Closed	9/20/2014	9/23/2014	56.8110	154.2158	34.3	2	0	16	18
Alitak 3	547	Closed	9/20/2014	9/23/2014	56.8110	154.2211	32.5	4	0	26	30
Alitak 3	548	Open	9/20/2014	9/23/2014	56.8111	154.2261	31.3	0	0	0	0
Alitak 3	549	Open	9/20/2014	9/23/2014	56.8111	154.2310	29.5	0	0	6	6
Alitak 3	550	Open	9/20/2014	9/23/2014	56.8112	154.2366	28.6	3	1	0	4
Alitak 4	551	Open	9/21/2014	9/24/2014	56.8455	154.2455	44.1	0	0	0	0
Alitak 4	552	Closed	9/21/2014	9/24/2014	56.8473	154.2458	43.3	1	0	0	1
Alitak 4	553	Open	9/21/2014	9/24/2014	56.8534	154.2476	38.0	0	0	0	0
Alitak 4	554	Closed	9/21/2014	9/24/2014	56.8552	154.2479	33.3	0	0	0	0
Alitak 4	555	Closed	9/21/2014	9/24/2014	56.8575	154.2484	25.3	0	0	0	0
Alitak 4	556	Closed	9/21/2014	9/24/2014	56.8595	154.2499	14.0	0	0	0	0
Alitak 4	557	Open	9/21/2014	9/24/2014	56.8612	154.2503	11.2	0	0	0	0
Alitak 4	558	Closed	9/21/2014	9/24/2014	56.8629	154.2519	4.0	13	0	1	14
Alitak 4	559	Closed	9/21/2014	9/24/2014	56.8638	154.2480	4.0	6	0	0	6
Alitak 4	560	Closed	9/21/2014	9/24/2014	56.8631	154.2455	8.1	0	0	0	0
Alitak 4	561	Open	9/21/2014	9/24/2014	56.8613	154.2442	12.6	0	0	0	0
Alitak 4	562	Closed	9/21/2014	9/24/2014	56.8602	154.2436	20.4	0	0	0	0
Alitak 4	563	Open	9/21/2014	9/24/2014	56.8591	154.2429	28.1	0	0	0	0
Alitak 4	564	Closed	9/21/2014	9/24/2014	56.8578	154.2427	31.8	1	0	0	1
Alitak 4	565	Open	9/21/2014	9/24/2014	56.8559	154.2422	35.5	0	0	0	0
Alitak 4	566	Open	9/21/2014	9/24/2014	56.8539	154.2415	41.1	0	0	0	0
Alitak 4	567	Open	9/21/2014	9/24/2014	56.8561	154.2366	39.1	0	0	0	0
Alitak 4	568	Closed	9/21/2014	9/24/2014	56.8579	154.2370	34.9	1	0	0	1
Alitak 4	569	Open	9/21/2014	9/24/2014	56.8611	154.2384	23.7	0	0	0	0
Alitak 4	570	Open	9/21/2014	9/24/2014	56.8619	154.2386	19.4	0	0	0	0
Alitak 4	571	Open	9/21/2014	9/24/2014	56.8629	154.2389	13.1	0	0	0	0
Alitak 4	572	Closed	9/21/2014	9/24/2014	56.8639	154.2392	9.7	0	0	0	0
Alitak 4	573	Closed	9/21/2014	9/24/2014	56.8663	154.2409	4.1	13	0	1	14
Alitak 4	574	Open	9/21/2014	9/24/2014	56.8678	154.2353	4.6	0	0	1	1
Alitak 4	575	Open	9/21/2014	9/24/2014	56.8662	154.2342	8.4	0	0	0	0
Alitak 4	576	Open	9/21/2014	9/24/2014	56.8649	154.2336	14.9	0	0	0	0
Alitak 4	577	Open	9/21/2014	9/24/2014	56.8627	154.2329	25.5	0	0	0	0
Alitak 4	578	Open	9/21/2014	9/24/2014	56.8614	154.2321	31.1	0	0	0	0
Alitak 4	579	Open	9/21/2014	9/24/2014	56.8600	154.2315	35.0	0	0	0	0
Alitak 4	580	Open	9/21/2014	9/24/2014	56.8569	154.2300	39.4	0	0	0	0
Alitak 4	581	Open	9/21/2014	9/24/2014	56.8582	154.2257	42.5	0	0	0	0
Alitak 4	582	Closed	9/21/2014	9/24/2014	56.8600	154.2264	40.7	0	0	0	0
Alitak 4	583	Closed	9/21/2014	9/24/2014	56.8619	154.2274	35.1	0	0	0	0
Alitak 4	584	Open	9/21/2014	9/24/2014	56.8649	154.2287	24.4	0	0	0	0

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Sampling location	Sequential pot no.	Escape rings	Date		North latitude	West longitude	Depth (m)	Males		Females	Total crab
			Set	Retrieved				Sublegal	Legal		
Alitak 4	585	Closed	9/21/2014	9/24/2014	56.8667	154.2289	17.5	0	0	0	0
Alitak 4	586	Closed	9/21/2014	9/24/2014	56.8674	154.2292	13.5	0	0	0	0
Alitak 4	587	Closed	9/21/2014	9/24/2014	56.8684	154.2298	6.7	0	0	0	0
Alitak 4	588	Closed	9/21/2014	9/24/2014	56.8696	154.2303	4.6	3	0	0	3
Alitak 4	589	Open	9/21/2014	9/24/2014	56.8708	154.2274	4.2	0	0	0	0
Alitak 4	590	Closed	9/21/2014	9/24/2014	56.8721	154.2251	4.4	22	1	0	23
Alitak 4	591	Open	9/21/2014	9/24/2014	56.8739	154.2237	4.1	3	2	0	5
Alitak 4	592	Closed	9/21/2014	9/24/2014	56.8693	154.2271	7.8	0	0	0	0
Alitak 4	593	Open	9/21/2014	9/24/2014	56.8704	154.2245	15.2	0	0	0	0
Alitak 4	594	Closed	9/21/2014	9/24/2014	56.8723	154.2226	15.0	0	0	0	0
Alitak 4	595	Closed	9/21/2014	9/24/2014	56.8753	154.2227	6.1	7	1	1	9
Alitak 4	596	Closed	9/21/2014	9/24/2014	56.8760	154.2211	16.1	0	0	0	0
Alitak 5	597	Open	9/21/2014	9/24/2014	56.8774	154.2228	9.4	0	0	0	0
Alitak 5	598	Closed	9/21/2014	9/24/2014	56.8791	154.2222	11.7	1	0	0	1
Alitak 5	599	Open	9/21/2014	9/24/2014	56.8814	154.2233	12.6	1	1	0	2
Alitak 5	600	Closed	9/21/2014	9/24/2014	56.8826	154.2247	3.4	25	3	0	28
Alitak 5	601	Open	9/23/2014	9/25/2014	56.8153	154.2387	30.2	2	0	1	3
Alitak 5	602	Closed	9/23/2014	9/25/2014	56.8155	154.2289	32.4	0	0	0	0
Alitak 5	603	Open	9/23/2014	9/25/2014	56.8153	154.2193	35.4	0	0	1	1
Alitak 5	604	Open	9/23/2014	9/25/2014	56.8152	154.2094	37.5	2	0	2	4
Alitak 5	605	Closed	9/23/2014	9/25/2014	56.8152	154.1999	38.6	0	0	0	0
Alitak 5	606	Open	9/23/2014	9/25/2014	56.8151	154.1906	39.9	0	0	1	1
Alitak 5	607	Closed	9/23/2014	9/25/2014	56.8151	154.1812	41.6	0	0	5	5
Alitak 5	608	Closed	9/23/2014	9/25/2014	56.8149	154.1717	41.1	2	0	1	3
Alitak 5	609	Open	9/23/2014	9/25/2014	56.8152	154.1622	41.0	0	0	1	1
Alitak 5	610	Open	9/23/2014	9/25/2014	56.8152	154.1524	41.8	0	0	0	0
Alitak 5	611	Open	9/23/2014	9/25/2014	56.8193	154.1606	41.2	0	0	0	0
Alitak 5	612	Open	9/23/2014	9/25/2014	56.8194	154.1695	41.8	0	0	0	0
Alitak 5	613	Closed	9/23/2014	9/25/2014	56.8194	154.1786	41.7	0	0	0	0
Alitak 5	614	Closed	9/23/2014	9/25/2014	56.8195	154.1872	39.9	6	0	1	7
Alitak 5	615	Closed	9/23/2014	9/25/2014	56.8195	154.1962	38.9	0	0	1	1
Alitak 5	616	Closed	9/23/2014	9/25/2014	56.8197	154.2049	37.2	2	0	0	2
Alitak 5	617	Closed	9/23/2014	9/25/2014	56.8198	154.2140	36.7	0	0	1	1
Alitak 5	618	Open	9/23/2014	9/25/2014	56.8196	154.2234	34.6	0	1	0	1
Alitak 5	619	Closed	9/23/2014	9/25/2014	56.8194	154.2330	31.8	0	0	2	2
Alitak 5	620	Closed	9/23/2014	9/25/2014	56.8219	154.2398	30.3	0	0	0	0
Alitak 5	621	Closed	9/23/2014	9/25/2014	56.8247	154.2425	29.9	8	1	0	9
Alitak 5	622	Open	9/23/2014	9/25/2014	56.8243	154.2348	32.0	0	0	0	0
Alitak 5	623	Closed	9/23/2014	9/25/2014	56.8241	154.2285	34.6	0	0	0	0
Alitak 5	624	Closed	9/23/2014	9/25/2014	56.8241	154.2207	36.2	0	0	0	0
Alitak 5	625	Closed	9/23/2014	9/25/2014	56.8240	154.2135	37.3	0	0	0	0
Alitak 5	626	Open	9/23/2014	9/25/2014	56.8238	154.2071	38.6	0	0	0	0
Alitak 5	627	Open	9/23/2014	9/25/2014	56.8236	154.2010	38.8	0	0	0	0
Alitak 5	628	Closed	9/23/2014	9/25/2014	56.8234	154.1942	38.8	0	0	0	0
Alitak 5	629	Closed	9/23/2014	9/25/2014	56.8234	154.1884	40.7	1	0	0	1
Alitak 5	630	Open	9/23/2014	9/25/2014	56.8234	154.1810	41.7	0	0	0	0

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Sampling location	Sequential pot no.	Escape rings	Date		North latitude	West longitude	Depth (m)	Males		Females	Total crab
			Set	Retrieved				Sublegal	Legal		
Alitak 5	631	Open	9/23/2014	9/25/2014	56.8277	154.1928	41.6	0	0	0	0
Alitak 5	632	Closed	9/23/2014	9/25/2014	56.8279	154.1984	40.7	0	0	0	0
Alitak 5	633	Open	9/23/2014	9/25/2014	56.8279	154.2047	38.9	0	0	0	0
Alitak 5	634	Open	9/23/2014	9/25/2014	56.8278	154.2110	37.2	0	0	0	0
Alitak 5	635	Closed	9/23/2014	9/25/2014	56.8277	154.2160	36.9	0	1	0	1
Alitak 5	636	Open	9/23/2014	9/25/2014	56.8277	154.2213	37.2	0	0	0	0
Alitak 5	637	Closed	9/23/2014	9/25/2014	56.8276	154.2273	35.9	0	0	0	0
Alitak 5	638	Closed	9/23/2014	9/25/2014	56.8279	154.2324	34.9	0	0	0	0
Alitak 5	639	Closed	9/23/2014	9/25/2014	56.8281	154.2377	33.3	0	0	0	0
Alitak 5	640	Open	9/23/2014	9/25/2014	56.8296	154.2440	32.0	3	0	1	4
Alitak 5	641	Closed	9/23/2014	9/25/2014	56.8325	154.2451	32.7	2	0	1	3
Alitak 5	642	Closed	9/23/2014	9/25/2014	56.8326	154.2404	35.1	0	0	0	0
Alitak 5	643	Open	9/23/2014	9/25/2014	56.8322	154.2362	36.1	0	0	2	2
Alitak 5	644	Closed	9/23/2014	9/25/2014	56.8321	154.2320	37.1	0	0	0	0
Alitak 5	645	Open	9/23/2014	9/25/2014	56.8320	154.2281	37.9	0	0	0	0
Alitak 5	646	Open	9/23/2014	9/25/2014	56.8320	154.2239	38.5	0	0	0	0
Alitak 5	647	Open	9/23/2014	9/25/2014	56.8319	154.2202	39.1	0	0	0	0
Alitak 5	648	Open	9/23/2014	9/25/2014	56.8320	154.2143	39.8	0	0	0	0
Alitak 5	649	Open	9/23/2014	9/25/2014	56.8321	154.2083	40.8	0	0	0	0
Alitak 5	650	Open	9/23/2014	9/25/2014	56.8319	154.2036	41.2	0	0	0	0

APPENDIX D. TRAWL LOCATIONS

Appendix D1.–Trawl tow summary of area, date, heading, start locations, distance towed, and average depth sampled for each survey area, 2014.

Survey area	Area	Date	Tow no.	Compass heading	Start location		Distance towed (km)	Average depth (m)
					N latitude	W longitude		
Ugak Bay	Hidden Basin	8/11/2014	1	228	57.5170	152.9377	0.61	24.5
Ugak Bay	Hidden Basin	8/11/2014	2	37	57.5122	152.9469	0.74	15.5
Ugak Bay	Hidden Basin	8/11/2014	3	208	57.5134	152.9353	0.93	45.5
Ugak Bay	Pashagshak Bay	8/11/2014	1	313	57.4121	152.5314	0.46	48.0
Ugak Bay	Pashagshak Bay	8/11/2014	2	111	57.4415	152.4993	0.93	13.0
Ugak Bay	Pashagshak Bay	8/11/2014	3	172	57.4668	152.4779	0.52	5.5
Ugak Bay	Saltery Cove	8/14/2014	1	90	57.4997	152.7679	0.95	10.0
Ugak Bay	Saltery Cove	8/14/2014	2	200	57.4937	152.7731	0.93	15.5
Ugak Bay	Saltery Cove	8/14/2014	3	125	57.4898	152.7535	0.85	20.5
Ugak Bay	Portage Bay	8/14/2014	1	285	57.4732	152.6131	0.46	6.4
Ugak Bay	Portage Bay	8/14/2014	2	280	57.4740	152.6092	0.57	2.7
Ugak Bay	Portage Bay	8/14/2014	3	0	57.4561	152.6180	0.95	29.3
Ugak Bay	Eagle Harbor	8/15/2014	1	335	57.4241	152.7238	0.44	3.3
Ugak Bay	Eagle Harbor	8/15/2014	2	186	57.4302	152.7207	0.52	8.6
Ugak Bay	Eagle Harbor	8/15/2014	3	380	57.4244	152.7175	0.46	19.5
Ugak Bay	Gull Point	8/17/2014	1	200	57.3467	152.6134	0.57	18.0
Ugak Bay	Gull Point	8/17/2014	2	25	57.3388	152.6282	0.46	10.5
Ugak Bay	Gull Point	8/17/2014	3	0	57.3379	152.6117	0.95	26.5
Trinity Islands	Sitkinak 1	8/21/2014	1	30	56.4576	154.2307	0.89	21.0
Trinity Islands	Sitkinak 1	8/21/2014	2	44	56.4492	154.2051	0.95	37.0
Trinity Islands	Sitkinak 1	8/21/2014	3	50	56.4958	154.1685	0.46	12.0
Trinity Islands	Tugidak 1	8/22/2014	1	194	56.4356	154.6095	0.91	16.0
Trinity Islands	Tugidak 1	8/22/2014	2	23	56.4211	154.6013	0.93	19.5
Trinity Islands	Tugidak 1	8/22/2014	3	175	56.4623	154.6068	0.95	11.0
Alitak Bay	Alitak 1	9/22/2014	1	320	56.81261	154.27152	0.95	15.5
Alitak Bay	Alitak 1	9/22/2014	2	320	56.8269	154.28231	0.96	11.0
Alitak Bay	Alitak 1	9/22/2014	3	60	56.83842	154.29746	0.95	9.0
Alitak Bay	Alitak 2	9/22/2014	2	330	56.80634	154.26597	0.95	16.0
Alitak Bay	Alitak 2	9/22/2014	3	60	56.84964	154.27893	0.93	8.0
Alitak Bay	Alitak 4	9/25/2014	1	55	56.85673	154.23566	0.80	37.5
Alitak Bay	Alitak 4	9/25/2014	2	22	56.87043	154.22827	0.91	3.3
Alitak Bay	Alitak 4	9/25/2014	ND	60	56.85851	154.24094	ND	28.0

ND = no data.

APPENDIX E. BYCATCH SPECIES FROM POT AND TRAWL SURVEYS

Appendix E1.–Bycatch species captured in pots fished in Ugak Bay, Trinity Islands, and Alitak Bay, 2014.

Common name	Species name	Ugak Bay	Trinity Islands	Alitak Bay	Total
Asteriidae	*Asterias sp.*	7	0	8	15
Butter sole	*Isopsetta isolepis*	0	1	15	16
Decorator crab	Family: Majidae	0	0	2	2
English sole	*Parophrys vetulus*	0	0	2	2
Hairy triton	*Fusitriton oregonensis*	4	15	724	743
Hermit crab	Family: Paguridae	0	3	45	48
Irish lord	*Hemilepidotus sp.*	4	0	1	5
Pacific lyre crab	*Hyas lyratus*	0	0	31	31
Giant Octopus	*Octopus dofleini*	2	0		2
Pacific cod	*Gadus macocephalus*	0	5	15	20
Pacific halibut	*Hippolossus stenolepis*	0	2	17	19
Sunflower seastar	*Pychnopodia helianthoides*	216	11	71	298
Rocksole	*Lepidopsetta sp.*	2	0	0	2
Sand dollar	*Clypeasteroida sp.*	1	0	2	3
Sand sole	*Psettichthys melanostictus*	0	2	4	6
Sculpin	Family: Cottidae	0	1	4	5
Spiny dogfish	*Squalus acanthias*	0	0	1	1
Tanner crab	*Chionoecetes bairdi*	61	0	1	62
Yellowfin sole	*Limanda aspera*	23	0	355	378
Dead Dungeness crab	*Metacarcinus magister*	9	4	3	16
Dead unknown fish		0	0	11	11

Appendix E2.–Bycatch species captured in the trawl tows in Ugak Bay, the Trinity Islands, and Alitak Bay, 2014.

Common name	Scientific name	Ugak Bay	Trinity Islands	Alitak Bay	Total
Alaska plaice	*Pleuronectes quadrituber*	4	0	1	5
Argid shrimp	*Argis dentata*	38	97	31	166
Arrowtooth flounder	*Atheresthes stomias*	1	2	8	11
Asterias purple sea star	*Asterias amurensis*	1	0	2	3
Big mouth Sculpin	*Hemitripterus bolini*	2	0	0	2
Big skate	*Raja binoculata*	1	0	0	1
Butter Sole	*Isopsetta isolepis*	5	52	167	224
Cockle unident.	*Clinocardium*	0	6	0	6
Coonstripe shrimp	*Pandalus hypsinotus*	73	0	0	73
Crangonid shrimp unident.	Family: Crangonidae	11	0	0	11
Dungeness crab	*Cancer magister*	8	0	0	8
Shortfin eelpout	*Lycodes brevipes*	1	0	0	1
English sole	*Parophrys vetulus*	136	0	0	136
Eulachon	*Thaleichthys pacificus*	1	0	0	1
Flathead sole	*Hippoglossoides elassodon*	25	0	0	25
Graceful decorator crab	*Oregonia gracilis*	10	2	1	13
Graceful kelp crab	*Pugettia gracilis*	3	0	0	3
Hair crab	*Erimacrus isenbeckii*	0	0	1	1
Pacific halibut	*Hippoglossus stenolepis*	1	11	4	16
Helmet crab	*Telmessus cheiragonus*	3	0	0	3
Hermit crab unid.	Family: Paguridae	9	27	60	96
Jellyfish unident.	Class: Scyphozoa	841	824	160	1,825
Jellyfish (Large) unid.	Class: Scyphozoa	0	12	0	12
Jellyfish (small) unid.	Class: Scyphozoa	0	270	0	270
Rockfish unident. (juvenile)	*Sebastes sp.*	0	0	1	1
Kelp greenling	*Hexagrammos decagrammus*	3	0	0	3
Longnose Skate	*Raja rhina*	2	0	0	2
Nuttall cockle	*Clinocardium nuttallii*	0	0	10	10
Pacific cod	*Gadus macrocephalus*	1	0	1	2
Pacific lyre Crab	*Hyas lyratus*	13	0	0	13
Pacific sandfish	*Trichodon trichodon*	59	8	1	68
Plain sculpin	*Myoxocephalus jaok*	6	0	0	6
Sunflower sea star	*Pycnopodia helianthoides*	22	2	2	26
Red Irish Lord	*Hemilepidotus hemilepidotus*	1	0	0	1
Rock Sole unid.	*Lepidopsetta sp.*	159	255	140	554
Parma sand dollar	*Echinarachnius parma*	0	1	3	4
Pacific sand lance	*Ammodytes hexapterus*	6	2	2	10
Sand sole	*Psettichthys melanostictus*	110	20	141	271
Sculpin unident.	Family: Cottidae	0	0	1	1
Sea anemone unident.	Order: Actiniaria	73	0	1	74

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Common Name	Scientific Name	Ugak Bay	Alitak Bay	Trinity Islands	Total
Sea urchin unident.	Order: Echinacea	2	0	2	4
Searcher	*Bathymaster signatus*	0	1	0	1
Shorthorn sculpin	*Myoxocephalus scorpius*	2	0	0	2
Pacific staghorn sculpin	*Leptocottus armatus*	82	3	1	86
Starry flounder	*Platichthys stellatus*	9	24	1	34
Sturgeon poacher	*Podothecus accipenserinus*	107	15	22	144
Arctic surf clam	*Mactromeris polynyma*	0	0	1	1
Tanner crab	*Chionoecetes bairdi*	1	3	0	4
Threaded sculpin	*Gymnocanthus pistilliger*	31	0	0	31
Walleye pollock	*Theragra chalcogramma*	205	0	6	211
Yellow Irish lord	*Hemilepidotus jordani*	6	0	0	6
Yellowfin sole	*Limanda aspera*	17	18	0	35

APPENDIX F. TEMPERATURE AND SALINITY DATA

Appendix F1.–Temperature and salinity data recorded by survey tow number and sequential pot number (SPN) during the Dungeness crab pot and trawl surveys by area and location, 2014.

Survey area	Sampling location	Tow no.	SPN	Date		Start Location		Bottom depth (m)	Average pot temp. (°C)	Average trawl temp. (°C)	Surface	
				Set	Pulled	N latitude	W longitude				Temp. (°C)	Salinity
Ugak Bay	Pashagshak Bay	-	1	8/6/20	8/6/2014	57.4677	152.4833	4.9	ND	ND	11.7	31.8
Ugak Bay	Pashagshak Bay	1	11	8/11/20	8/11/2014	57.4121	152.5314	48.0	ND	11.7	ND	ND
Ugak Bay	Pashagshak Bay	2	18	8/11/20	8/11/2014	57.4415	152.4993	13.0	ND	11.7	ND	ND
Ugak Bay	Pashagshak Bay	3	20	8/11/20	8/11/2014	57.4668	152.4779	5.5	ND	12.5	ND	ND
Ugak Bay	Pashagshak Bay	-	50	8/6/201	8/9/2014	57.4080	152.5137	47.9	9.9	ND	11.5	31.8
Ugak Bay	Hidden Basin	-	51	8/7/201	8/10/2014	57.5189	152.9393	1.4	12.4	ND	ND	ND
Ugak Bay	Hidden Basin	-	52	8/7/201	8/7/2014	57.5186	152.9407	6.6	ND	ND	12.1	28.8
Ugak Bay	Hidden Basin	1	55	8/11/20	8/11/2014	57.5170	152.9377	24.5	ND	14.0	ND	ND
Ugak Bay	Hidden Basin	2	53	8/11/20	8/11/2014	57.5122	152.9469	15.5	ND	15.0	ND	ND
Ugak Bay	Hidden Basin	3	60	8/11/20	8/11/2014	57.5134	152.9353	45.5	ND	9.8	12.3	29.3
Ugak Bay	Hidden Basin	-	100	8/7/201	8/7/2014	57.5115	152.9382	45.8	ND	ND	12.2	30.0
Ugak Bay	Saltery Cove	1	123	8/14/20	8/14/2014	57.4997	152.7679	10.0	ND	12.3	ND	ND
Ugak Bay	Saltery Cove	2	124	8/14/20	8/14/2014	57.4937	152.7731	15.5	ND	12.0	ND	ND
Ugak Bay	Saltery Cove	3	118	8/14/20	8/14/2014	57.4898	152.7535	20.5	ND	12.1	ND	ND
Ugak Bay	Saltery Cove	-	130	8/9/201	8/12/2014	57.4876	152.7953	41.6	8.0	ND	ND	ND
Ugak Bay	Portage Bay	-	151	8/10/20	8/13/2014	57.4604	152.6410	48.8	10.6	ND	12.7	31.4
Ugak Bay	Portage Bay	1	182	8/14/20	8/14/2014	57.4732	152.6131	6.4	ND	13.1	ND	ND
Ugak Bay	Portage Bay	2	181	8/14/20	8/14/2014	57.4740	152.6092	2.7	ND	13.9	ND	ND
Ugak Bay	Portage Bay	3	195	8/14/20	8/14/2014	57.4561	152.6180	29.3	ND	11.9	ND	ND
Ugak Bay	Portage Bay	-	200	8/10/20	8/13/2014	57.4712	152.6048	4.4	11.8	ND	11.5	32.1
Ugak Bay	Eagle Harbor	-	201	8/12/20	8/15/2014	57.4315	152.7230	4.9	12.9	ND	13.1	29.5
Ugak Bay	Eagle Harbor	1	227	8/15/20	8/15/2014	57.4241	152.7238	3.3	ND	15.1	ND	ND
Ugak Bay	Eagle Harbor	2	211	8/15/20	8/15/2014	57.4302	152.7207	8.6	ND	12.7	ND	ND
Ugak Bay	Eagle Harbor	3	228	8/15/20	8/15/2014	57.4244	152.7175	19.5	ND	12.4	ND	ND
Ugak Bay	Gull Point	-	251	8/13/20	8/17/2014	57.3372	152.6345	5.7	12.2	ND	12.8	30.0
Ugak Bay	Gull Point	1	286	8/17/20	8/17/2014	57.3467	152.6134	18.0	ND	12.3	ND	ND
Ugak Bay	Gull Point	2	269	8/17/20	8/17/2014	57.3388	152.6282	10.5	ND	12.4	ND	ND
Ugak Bay	Gull Point	2	269	8/17/20	8/17/2014	57.3388	152.6282	10.5	ND	12.4	ND	ND
Ugak Bay	Gull Point	3	256	8/17/20	8/17/2014	57.3379	152.6117	26.5	ND	11.7	ND	ND
Ugak Bay	Gull Point	-	300	8/13/20	8/17/2014	57.3524	152.5782	50.5	10.8	ND	12.5	31.5
Trinity Islands	Sitkinak 2	-	301	8/18/20	8/21/2014	56.4996	154.1603	13.0	12.4	ND	12.7	32.0
Trinity Islands	Sitkinak 2	-	302	8/18/20	8/18/2014	56.4886	154.1604	20.5	ND	ND	13.0	32.0
Trinity Islands	Sitkinak 2	-	375	8/21/20	8/21/2014	56.4840	154.3056	20.8	13.2	ND	13.2	32.2
Trinity Islands	Sitkinak 1	1	320	8/21/20	8/21/2014	56.4576	154.2307	21.0	ND	13.1	ND	ND
Trinity Islands	Sitkinak 1	2	316	8/21/20	8/21/2014	56.4492	154.2051	37.0	ND	12.4	ND	ND

ND = no data.

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Appendix F1.–2 of 2.

Survey area	Sampling location	Tow no.	SPN	Date Set	Date Pulled	Start location N latitude	Start location W longitude	Bottom depth (m)	Average pot temp. (°C)	Average trawl temp (°C)	Surface Temp. (°C)	Surface Salinity (ppt)
Trinity Islands	Sitkinak 1	3	310	8/21/2014	8/21/2014	56.4958	154.1685	12.0	ND	13.9	ND	ND
Trinity Islands	Tugidak 1	-	326	8/19/2014	8/22/2014	56.4401	154.6572	6.9	13.6	ND	14.2	31.9
Trinity Islands	Tugidak 1	1	338	8/22/2014	8/22/2014	56.4356	154.6095	16.0	ND	ND	ND	ND
Trinity Islands	Tugidak 1	2	339	8/22/2014	8/22/2014	56.4211	154.6013	19.5	ND	ND	ND	ND
Trinity Islands	Tugidak 1	3	346	8/22/2014	8/22/2014	56.4623	154.6068	11.0	ND	14.4	ND	ND
Trinity Islands	Tugidak 1	-	350	8/19/2014	8/22/2014	56.4296	154.5739	20.5	12.9	ND	14.7	32.2
Trinity Islands	Tugidak 1	-	351	8/21/2014	8/21/2014	56.4406	154.2451	29.1	ND	ND	12.9	32.0
Trinity Islands	Tugidak 2	-	376	8/22/2014	8/26/2014	56.4445	154.5685	18.3	ND	ND	ND	ND
Trinity Islands	Tugidak 2	-	376	8/22/2014	8/22/2014	56.4358	154.5594	20.8	ND	ND	14.0	31.9
Trinity Islands	Tugidak 2	-	400	8/22/2014	8/26/2014	56.4907	154.5409	6.6	ND	ND	14.9	31.9
Alitak Bay	Alitak 1	-	401	9/17/2014	9/20/2014	56.8412	154.3130	12.5	ND	ND	12.4	30.9
Alitak Bay	Alitak 1	-	446	9/17/2014	9/20/2014	56.7982	154.2690	42.2	12.1	ND	ND	ND
Alitak Bay	Alitak 1	1	447	9/22/2014	9/22/2014	56.8126	154.2715	15.5	ND	11.7	ND	ND
Alitak Bay	Alitak 1	2	443	9/22/2014	9/22/2014	56.8269	154.2823	11.0	ND	11.7	ND	ND
Alitak Bay	Alitak 2	3	451	9/18/2014	9/21/2014	56.8506	154.2769	5.9	12.6	12.1	12.5	30.5
Alitak Bay	Alitak 2	1	478	9/22/2014	9/22/2014	56.8209	154.2589	13.5	ND	11.5	12.1	30.6
Alitak Bay	Alitak 2	2	458	9/22/2014	9/22/2014	56.8063	154.2660	16.0	ND	11.8	ND	ND
Alitak Bay	Alitak 1	3	422	9/22/2014	9/22/2014	56.8384	154.2975	9.0	ND	12.3	ND	ND
Alitak Bay	Alitak 2	-	500	9/18/2014	9/21/2014	56.7932	154.2351	39.2	12.0	ND	ND	ND
Alitak Bay	Alitak 3	-	501	9/20/2014	9/23/2014	56.7952	154.2000	40.5	11.9	ND	ND	ND
Alitak Bay	Alitak 3	-	550	9/20/2014	9/23/2014	56.8112	154.2366	28.6	11.9	ND	ND	ND
Alitak Bay	Alitak 4	-	551	9/21/2014	9/24/2014	56.8455	154.2455	44.1	11.2	ND	ND	ND
Alitak Bay	Alitak 4	1	567	9/25/2014	9/25/2014	56.8567	154.2357	39.1	ND	11.3	11.8	30.9
Alitak Bay	Alitak 4	2	589	9/25/2014	9/25/2014	56.8704	154.2283	42.0	ND	11.5	11.6	30.9
Alitak Bay	Alitak 4	-	600	9/21/2014	9/24/2014	56.8826	154.2247	3.4	12.2	ND	ND	ND
Alitak Bay	Alitak 5	-	601	9/23/2014	9/25/2014	56.8153	154.2387	30.2	12.0	ND	ND	ND
Alitak Bay	Alitak 5	-	650	9/23/2014	9/25/2014	56.8319	154.2036	41.2	11.5	ND	ND	ND

ND = no data.