Regional Operational Plan No. ROP.CF.1J.2025.33

Operational Plan: Southeast Alaska Summer Crab Pot Survey and Red King Crab Stock Assessment, 2023–2027

by

Adam Messmer

Caitlin Stern

Alex Reich

Zane Chapman

and

Tessa Bergmann

June 2025

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

Symbols and Abbreviations

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

Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

REGIONAL OPERATIONAL PLAN NO. ROP.CF.1J.2025.33

OPERATIONAL PLAN: SOUTHEAST ALASKA SUMMER CRAB POT SURVEY AND RED KING CRAB STOCK ASSESSMENT, 2023–2027

by
Adam Messmer and Zane Chapman
Alaska Department of Fish and Game, Division of Commercial Fisheries, Douglas

Caitlin Stern and Alex Reich
Alaska Department of Fish and Game, Division of Commercial Fisheries, Juneau

and

Tessa Bergmann
Alaska Department of Fish and Game, Division of Commercial Fisheries, Petersburg

Alaska Department of Fish and Game
Division of Commercial Fisheries
802 3rd Street, Douglas, AK 99824

June 2025

The Regional Operational Plan Series was established in 2012 to archive and provide public access to operational plans for fisheries projects of the Divisions of Commercial Fisheries and Sport Fish, as per joint-divisional Operational Planning Policy. Documents in this series are planning documents that may contain raw data, preliminary data analyses and results, and describe operational aspects of fisheries projects that may not actually be implemented. All documents in this series are subject to a technical review process and receive varying degrees of regional, divisional, and biometric approval, but do not generally receive editorial review. Results from the implementation of the operational plan described in this series may be subsequently finalized and published in a different department reporting series or in the formal literature. Please contact the author if you have any questions regarding the information provided in this plan. Regional Operational Plans are available on the Internet at: http://www.adfg.alaska.gov/sf/publications/.

Product names used in this publication are included for completeness and do not constitute product endorsement. The Alaska Department of Fish and Game does not endorse or recommend any specific company or their products.

Adam Messmer and Zane Chapman
Alaska Department of Fish and Game, Division of Commercial Fisheries
802 3rd Street, Douglas, AK 99824, USA

Caitlin Stern and Alex Reich
Alaska Department of Fish and Game, Division of Commercial Fisheries
1255 W. 8th Street, Juneau, AK 99811, USA

and

Tessa Bergmann
Alaska Department of Fish and Game, Division of Commercial Fisheries
16 Sing Lee Alley, Petersburg, AK 99833, USA

This document should be cited as follows:
Messmer, A., C. Stern, A. Reich, Z. Chapman, and T. Bergmann. 2025. Operational plan: Southeast Alaska summer crab pot survey and red king crab stock assessment, 2023–2027. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Operational Plan No. ROP.CF.1J.2025.33, Douglas.

SIGNATURE PAGE

Project Title:	Southeast Alaska Summer Crab Pot Survey and Red King Crab Stock Assessment
Project leader(s):	Adam Messmer
Division, Region, and Area	Commercial Fisheries, Region I, Southeast Alaska
Grant Details/ Project Nomenclature:	
Period Covered	2023–2027
Field Dates:	July–August
Plan Type:	Category II

Approval

Title	Name	Signature	Date
Project leader	Adam Messmer		
Biometrician	Katie Palof		
Research Coordinator	Jan Rumble		

TABLE OF CONTENTS

Page

TABLE OF CONTENTS(Continued)

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF APPENDICES (Continued)

PURPOSE

The Alaska Department of Fish and Game conducts annual stock assessment surveys for red king crab (RKC) in Southeast Alaska using a stratified sampling design. The assessment provides abundance indices across seven different areas, status of stock health, and trends in catch per unit effort across size and sex classes. Survey catch per unit effort (CPUE) information is modeled using a three-stage catch survey analysis to produce estimates of mature and legal male red king crab biomass, which are used to manage the commercial fishery. Survey CPUE by size and sex class are compared to long-term average values to determine stock health.

Keywords: Pot survey, red king crab, *Paralithodes camtschaticus*, Southeast Alaska

OBJECTIVES

1. Capture and collect biological information on red king crab (RKC) from seven specific survey areas throughout the northern portion of Southeast Alaska for model-based biomass estimation.
2. Determine guideline harvest level (GHL) for the upcoming commercial RKC season, and set personal use annual bag and possession limits for the region.
3. Capture and collect biological information on Tanner, Dungeness crab, and golden king crab.
4. Maintain long-term data set on bottom temperature, using HOBO temperature tidbits, for future climate analysis and comparisons.
5. Tag male RKC and with recaptured crab to estimate growth increments and movement in Pybus Bay, Gambier Bay, Peril Strait, Seymour Canal, and Excursion Inlet.

BACKGROUND

The survey is currently conducted in the northern part of Southeast Alaska in 8 survey areas: Lynn Sisters, Juneau (including Barlow Cove), Port Frederick, Pybus Bay, Gambier Bay, Seymour Canal, Peril Strait, and Excursion Inlet (Figure 1). Previously surveyed areas included Holkham Bay and Port Frederick; these areas were excluded from the survey beginning in 2015. Starting in 2023, Peril Strait was surveyed on a biennial basis. Peril Strait has shown little improvement in CPUE for most sex/size classes for almost 20 years. The Alaska Department of Fish and Game (ADF&G) has decided to allocate more survey resources towards Pybus Bay, Gambier Bay and Seymour Canal during the years in which Peril Strait is not surveyed. Within Port Frederick, personal use and commercial fishermen have noticed an increase in RKC catch, and the department has decided to begin sampling the area again in 2025.

Approximately 28 to 196 pots are set in each survey area, depending on the size of the area and time needed to sample the pots. Location codes exist for each survey area, including those areas no longer surveyed but included in the historical data set (Table 1). Mature male crab catch information is used to produce population estimates for each surveyed area. Population is estimated using a three-stage catch survey analysis model that tracks three recruit categories (classified using size and shell condition; Tables 2 and 3) of male crabs over the range of survey years, which in most areas is from 1979 to present, to estimate the current abundance of mature and legal male crab in each area.

In addition to estimating abundance, other factors that contribute to the overall health of the population are examined, including CPUE of juvenile male and female crab, egg condition, clutch fullness, size distributions, and other factors. Risk-neutral and low-risk harvest rates are applied

and used to determine the regional GHL. The risk-neutral option uses equilibrium harvest rates, and the low-risk option uses the average harvest rates for years in which the mature male biomass increased within each survey area (Palof and Stratman 2022). The regional GHL is compared to a regulatory threshold of 200,000 pounds (5 AAC 34.113), which is the minimum level for the commercial fishery to open in November. Survey results are also used to set bag and possession limits in the RKC personal use fishery and to determine whether any personal use closures are necessary in survey areas.

METHODS

POT LOCATIONS

Pot locations are selected within 5 density strata through a stratified random sampling design. The number of pots within each stratum is determined using a Neyman allocation based on the variance of total crab CPUE survey estimates by stratum between 2021 and 2023, which is updated using new data every 3 years (Cochran 1977). A minimum of 3 pots are assigned to each stratum to ensure adequate data collection for future years. The number of pots assigned to strata 4 and 5 in each area is set to be >60%. The pot allocation for survey areas was updated for the 2025 survey season to accommodate the biennial survey schedule for Peril Strait and allocate more pots to other survey areas. The next update is scheduled for 2028. The total number of pots within each survey area is determined based on logistics and time that the crew can efficiently sample and set pots. The strata boundaries were based on past abundances of both male and female RKC (Clark 2008). Exact pot locations for each area are determined using ArcGIS Pro software to assign randomly generated locations within each stratum. Details of pot locations for each survey year are presented, starting with the 2025 information in Appendix E. Extra pot locations for each area are provided, in the event that there are conflicts with gear from concurrent fisheries in the vicinity or if set locations are otherwise unattainable.

SETTING AND PULLING

Pots will be set between 1200 and 1800 hours and pulled between 0700 and 1300 hours. Soak times will range from 18–20 hours; pots with soak times greater than 20 hours and up to 28 hours will be sampled with a note in the comments that they exceeded the 20-hour soak time. Pots with a soak longer than 28 hours will not be sampled, and all contents of the pot will be released at sea. Setting and pulling times will be recorded for each pot on the Crab Pot Set Form (Appendix C1).

SOAK TIME

Currently, there is no catch-soak time curve information for RKC in Southeast Alaska. The current soak times are based on catch-soak time curves generated for RKC in the Bering Sea and have been adjusted to reflect local crab densities, which show large variations due to non-standard soak times (Briand et al. 2001). An internal review of past RKC survey data indicates that decreasing the soak time below 18 hours or increasing it above 20 hours resulted in a significant decrease or increase in mature male CPUE, respectively.

POT GEAR AND BAIT

Conical king crab pots with an 88-inch diameter and closed escape rings will be used for the survey. Pots will be baited with frozen, winter-caught Alaska bait herring (preferably caught the same year as the current survey) and chopped within 24 hours of use. Two bait containers will be

used for each pot placed on opposite sides of the pot and loosely filled with chopped herring. The bait jar will be suspended so that the top of the bait jar is approximately the same height as the bottom of the pot cone and about halfway between the cone and the exterior webbing. The bio-twine (30-thread untreated cotton twine) will be replaced on all pots prior to setting gear on the first day of the Juneau Area and Barlow Cove survey (Leg I of the survey).

HOBO tidbit temperature loggers will be individually attached to a numbered buoy tag and to all pots with zip ties during the first set on each leg of the survey. Tidbits should be attached to pots so that the buoy tag number is facing out and visible to the crew on deck. All tidbits should be removed from the pots at the time each pot comes aboard for the last time and the information downloaded at the end of each survey leg. Temperature logger protocols are found in Appendix B.

The vessel crew is responsible for setting and pulling the gear. Biologists are available to help set and pull gear at the request of the deck supervisor or captain.

At the end of each trip, the biological crew will scrub and clean all survey gear, including tables, bait chopper, bait jars, mats, and baskets. All gear removed from the supply tote will be cleaned and returned to the tote.

DATA COLLECTION

Pot Condition and Substrate:

When a pot is pulled, its condition and proper fishing status will be recorded using the Crab Specimen Form (Appendix C2). Any evidence that the pot: 1) was on its side, 2) had holes in mesh webbing, 3) had empty bait jars, or 4) had errors in closing will be noted along with the sediment type found on the pot (Table 4). Holes or other features that would allow small crabs to escape will be repaired before the pot is used again. Pots will be emptied onto a sampling table. Commercially important bycatch species will be counted. Non-commercially important species will be counted as time allows, and numbers will be estimated when species counts are high. These numbers will be recorded, and then these animals will be returned to the sea (Table 5). All captured *Pycnopodia helianthoides* will be measured in millimeters from tip of an arm to the tip of the arm directly across and recorded, and yelloweye rockfish *Sebastes ruberrimus* will be returned to the water via a deepwater release device to 100 ft. All king, Tanner, and Dungeness crabs will be retained for collection of biological information before being returned to the sea.

Biological Information:

The carapace length (CL) of all king crab and carapace widths (CW) of Tanner and Dungeness crabs will be measured with Vernier calipers to the nearest millimeter, using the standard biological measurement for that species (Figure 2); shell condition of crabs will also be assessed (Table 2). Tanner crab with shell condition between three and four will be designated as shell four, due to the timing of this survey relative to the molt; these are skip molts and will be more observably shell four during the fall crab pot survey. Male RKC recruit classes (Table 3) are visually assessed and all legal (greater than 7.0 in CW) and pre-recruit sized RKC will be measured first and should be given priority above all other size/sex class and species. Male RKC measuring 138–155-mm CL will be checked for legality using a seven-inch crab gauge.

If there are pots with high numbers of crab, a maximum of approximately 100 crab (50 minimum for male crab) should be sampled. If there is high variability in clutch size, as many females as possible will be sampled. The scientific lead on each leg will determine if and at what rate to sub-sample using the following criteria:

- Tanner crab males and females will always be subsampled before RKC are subsampled;
- female RKC will be sub-sampled second but every effort must be made to separate juvenile females and mature females prior to subsampling, as this could affect analyses;
- small male RKC will be sub-sampled last.

Leg condition is no longer gathered; this data collection was discontinued in 2023. For each crab, abnormalities in the carapace and the presence of any parasites or diseases will be noted (Table 6). If *Briarosaccus* spp. is found on a specimen (Figure 3), do not release the live crab back into the water. Freeze the infected crab so that the parasite will be killed and not spread.

For all female crabs, the percent clutch fullness will be estimated in 10% increments and the development and condition of the eggs will be noted according to the reproductive codes (Table 7).

Chela heights of adult male Tanner crab will be measured to monitor any changes in the size at functional maturity (point when mature males are "large clawed"). For each survey area, a total of 150 male Tanner crab are randomly sampled until target numbers are achieved within each of six size groups and measured for biological carapace width (to the nearest 1 mm) and right chela height, (also to the nearest 1 mm) using Vernier calipers (Jadamec et al, 1999; Table 8; Figure 4; Appendix C3).

Individual crab weights will not be measured to increase sampling efficiency.

DATA INTEGRITY

Data will be recorded on standard data sheets (Appendix C1 and C2) and entered into the Zander database onboard the vessel by the biological survey staff. Once the data is entered, datasheets are marked with the initials of the person entering the data (EB: initials). The database is then re-checked against the datasheets for errors, by a different biological staff. The datasheets are marked with the initials of the person verifying the data (VB: initials). This should be completed before disembarking from the vessel to ensure efficient analysis of the data. All data are housed in OceanAK, a relational database available via intranet to ADF&G researchers and managers statewide (subject area: Region 1–Invertebrates–Surveys–Crab). Raw datasheets are archived.

LOST POT PROTOCOL

If a pot is lost (buoy is not visible), a retrieval pot (with biotwine cut, escape rings opened, and tidbit removed) will be set next to the lost pot with a pot saver attached to the floating line just above the bridle. An extra line should be placed on the retrieval pot, depending on depth, to allow the vessel to adequately circle the lost pot a minimum of four times. The line from the retrieval pot should be left in the block and tied off to a cleat until four rotations are complete before the retrieval pot is hauled. The skipper should make every attempt to keep the line at ninety degrees to the boat. This process should be repeated a second time if the pot is not retrieved on the first attempt, if time allows.

TAGGING MALE RED KING CRAB

Male RKC will be tagged in an effort to determine growth increments of different size classes and movement patterns in Pybus Bay, Gambier Bay, Peril Strait, Seymour Canal, and Excursion Inlet. Male RKC from three recruit size classes (juvenile, pre-recruit, and recruit) will be tagged using a numbered double T-bar tag in the isthmus muscle. All captured crab are examined for previous tags with the tag number recorded and the tag left in place. Tagging instructions are found in Appendix A.

VOLUNTEERS

Occasionally, volunteers such as graduate students or National Park Service employees join the crew for an RKC survey leg. They typically assist with setting and pulling gear and/or sorting crab species once they have been briefed by both the boat and scientific crew. Prior to boarding the R/V Medeia, all volunteers must be approved by the Crab Group staff and complete the "Volunteer Agreement" form in Appendix C4.

VESSEL

The State of Alaska owned research vessel, R/V *Medeia*, is used to conduct the annual RKC survey. This 110-foot vessel, built in 1982 from iron, steel, and alloy, has a net capacity of 246 tons. It currently resides at Harris Harbor in Juneau, Alaska. The vessel crew consists of four positions: Boat Officer IV, Boat Officer III, Boat Officer II, and Boat Officer I.

DATA ANALYSIS

All data are entered in Zander and stored in OceanAK, ADF&G's database. Data analyses are done using the most updated version of R[1]. After the completion of each survey area, the data from the survey area is uploaded and stored into OceanAK

SURVEY CATCH PER UNIT OF EFFORT

Data, including sex and size, are collected for all RKC in each pot. Based on the sex and size designations, crab are classified into recruit classes. Males are classified based on size and shell conditions according to Table 3. Females are classified as either large and mature or small and immature based on both size and presence of physical maturity (Donaldson & Byersdorfer 2005). A CPUE is calculated for each recruit class in each pot, with the goal of computing an average CPUE for each survey area. Only pots that are classified as "normal" are included in this analysis. Abnormal pots are removed to prevent bias (refer to Table 4 for abnormal pots designations).

Due to the stratified design of the survey, the average area CPUE must be calculated as a weighted average, including both the number of pots sampled in each stratum and the area of each stratum. Catch in each pot is weighted by a multiplier of the area of each stratum divided by the number of pots sampled in that stratum in the current year. Once each pot's catch is weighted, an average CPUE for each recruit class is computed for each survey area. Weighting the CPUE is essential due to the stratified design of the survey and differential sample size in each stratum.

[1] The R project for statistical computing. Version 4.5.0. Vienna, Austria. https://www.R-project.org/ (accessed April 14, 2025).

STOCK HEALTH DETERMINATION

Historically, the weighted CPUEs and survey data calculated for each recruit class have been used to help determine the overall stock health for each survey area. This is done by comparing the current year's data to long-term and short-term benchmarks (Siddon et al. 2009). This method for evaluating stock health is repeatable and objective; additionally, it has also been used to assess Tanner crab in Southeast Alaska. The following metrics are examined to evaluate stock health: mature female clutch fullness and CPUE, juvenile female CPUE, pre-recruit CPUE, recruit CPUE, and post-recruit CPUE. These metrics are each weighted equally and provide a range of indicators for the population.

All the metrics except mature female clutch fullness are calculated using weighted CPUE from the survey. For the long-term trends, the current year's metric is compared, using a t-test, to the long-term mean calculated from baseline years (1993–2007). This specific time-period, from 1993 to 2007, was established in 2008 and was found to characterize the best combination of the most representative data quality available (Siddon et al. 2009). If the current year is significantly above the long-term mean, it is scored +1, if not different from the mean it is scored 0, and if significantly lower than the mean it is scored -1. The short-term trends are examined by performing a linear regression on the last four years of data for each metric. The significance of these regressions is then scored similarly to the long-term trends, with a positive trend having a score of 0.25, no trend having a score of 0, and a negative trend having a score of -0.25. The area scores are a sum of all the long-term and short-term scores for each metric into one score for each area. Scores less than -4.50 are considered poor, between -4.25 and -1.75 below average, between -1.50 and 1.50 moderate, between 1.75 and 4.25 above average, and above 4.50 is healthy.

Mature female clutch fullness is evaluated by calculating the mean proportion of mature females in each pot with a clutch fullness of < 25% (i.e. very small clutches). The level allows for human error in assessing clutch fullness to the nearest 10% on the survey, because low clutches (<25%) are noticeably low.

STOCK ASSESSMENT

Red king crab biomass, both mature and legal, is estimated using a catch-survey analysis model (CSA) which relies on inputs from both the survey and the fishery (in years when the fishery was open).

Model inputs

Inputs from the survey data include weighted CPUE of pre-recruits, recruits, and post-recruits by survey area, mid-date for the survey, and average weight (using the established length-weight relationships) of pre-recruits, recruits, and post-recruits. The mid-date for the survey is the middle date for the pots set in each survey area. If the area is surveyed an even number of days, the date used would be the first day of the second half of the survey for that area. For example, if an area were surveyed for four days, the date used would be the date for day three.

The average weight of male RKC crab in each survey year is calculated from the length composition collected on the survey using a survey area specific length-weight relationship. These relationships were established from both fishery and survey data (1996–2002; Clark et al. 2003). A summary of the relationships for each area is provided in Table 9.

Inputs from the fishery include catch in crab numbers and the mid-date of the fishery, both of which are obtained from the commercial fish ticket database. Additionally, personal use catches are obtained from the regional and Juneau area personal use permits. Personal use permits and harvest reporting for all of Southeast Alaska have been required since July 1, 2018. The mid-date for the fishery is computed as the sum of the days in the season, the ratio of the catch for that day, divided by the total catch for the area and season (Clark et al. 2003).

The model

A CSA model is used to estimate mature and legal abundance of RKC for each of the surveyed areas. This analysis type was initially developed in 1983 (Collie and Sissenwine 1983) and adapted to crab abundance estimation in the 1990s (Kruse and Collie 1991; Zheng et al. 1997; Collie and Kruse 1998). Starting in 1994, a two-stage model was used to estimate abundance of red king crab in Southeast Alaska (Woodby 1994); this evolved to a three-stage model (Collie and DeLong 1998) using pre-recruits, recruits, and post-recruits in 2002 (Clark et al. 2003).

This type of model estimates the abundance of a population by comparing the changes in survey catches to the number of crabs removed through commercial and personal use effort. In a three-stage model, pre-recruits are estimated every year and recruits are related to the number of pre-recruits that survive and molt to become recruits (Eq. 1). Post-recruits are estimated from the recruits and post-recruits in the previous year and the fishery removals that occur between the survey years (Eq. 2). Errors are associated with both survey and fishery catch and are assumed to be log-normally distributed (Eq. 3). A constant instantaneous natural mortality rate of 0.32 is used; this translates to an annual natural mortality of 27% (Woodby 1994).

Equations depicted below are modified from those previously published (Woodby 1994; Clark et al. 2003).

These are the two processes described in the three-stage CSA model:

$$R_{yr+1} = \mu A_{yr} \tag{1}$$

$$P_{yr+1} = \left(R_{yr} + P_{yr}\right)e^{Mt_{yr}} - qC_{yr}e^{Ml_{yr}} \tag{2}$$

Where:

R_{yr+1} = relative abundance of recruit crab in year +1

A_{yr} = relative abundance of pre-recruit crab in year *yr*

μ = proportional constant, a function of the relative catchability of pre-recruit and recruit crab, along with the survival and probability of molting from pre-recruit to recruit crab

P_{yr+1} = relative abundance of post-recruit crab in year +1

C_{yr} = total harvest (in number of crabs) in year *yr*

t_{yr} = time interval between surveys (in years)

l_{yr} = time lag between the midpoint of the fishery in year *yr* and the survey in year *yr +1*

q = catchability coefficient relating relative abundance measured as catch per pot in the survey to absolute abundance of crab in the area

M = instantaneous natural mortality coefficient

The observed catches in the survey are the relative abundances with lognormally distributed measurement error:

$$\tilde{A}_{yr} = A_{yr} e^{\tau_{yr}} \quad (3)$$

$$\tilde{R}_{yr} = R_{yr} e^{\upsilon_{yr}}$$

$$\tilde{P}_{yr} = P_{yr} e^{\omega_{yr}}$$

Where:

$\tau_{yr}, \upsilon_{yr,}$ and ω_{yr} = normal deviates

The values of $A_{yr,}$ $R_{yr,}$ and P_{yr} are estimated by minimizing the squared deviation of the log of the estimated values and observed values. The squared deviations are weighted to take into account differences in survey methods throughout the years. This was established in 2002 (Clark et al. 2003) without much documentation and should be revisited in the future. Currently, weightings are 1 for 1979–1985 (fixed station surveys), 2 for 1986–1991 (random station by sometimes mixed fall/summer surveys), and 3 for 1993 to present, unless significant changes have occurred since then (exceptions include the Juneau area and Peril Strait). Minimizing the sum of the weighted squared deviations was performed using the "optim" function in the most recent version of R.

Model output

The CSA model computes an estimated relative index value for each of the three recruit classes (pre-recruit, recruit, and post-recruit), which is then scaled (using q which is estimated in the model) to a number of male crab for each recruit class. The number of crab in each recruit class is converted to a biomass (lb) using the average weight of all three recruit classes from the survey (using the length-weight relationship established for each area). For each survey area, the biomass of both legal (recruits and post-recruits) and mature (all three male recruit classes) is reported. These are summarized annually in the Southeast Alaska red king crab stock assessment memo prepared by the biometrics team.

REGIONAL ESTIMATION

Red king crab are managed regionally in Southeast Alaska; the biomass estimates from all surveyed areas are summed to produce a regional estimate of RKC biomass. This is then extrapolated to those areas that are not surveyed, using previous catch data. The total regional biomass of legal and mature male red crab combines both the survey and non-survey biomass estimates. This is reported annually in the Southeast Alaska RKC stock assessment memorandum, as well as being used for scenarios for setting GHLs.

STAFF AND RESPONSIBILITIES

- Adam Messmer, Fishery Biologist III (Lead King/Tanner Biologist/Scientific Crew Lead)
- Zane Chapman, Fishery Biologist II (Scientific Crew Lead)
- Tessa Bergmann, Fishery Biologist I (Scientific Crew Lead)
- Caitlin Stern, Biometrician III (Biometric Review)
- Alex Reich, Biometrician II (Biometric Review)

Logistics and Field Studies

Adam Messmer and Zane Chapman will have the primary responsibilities associated with logistics and field studies.

Database Integrity

Adam Messmer and Zane Chapman will have the primary responsibilities associated with data entry and database integrity queries and will be assisted by field crews.

Data Analysis

Alex Reich and Caitlin Stern will have the primary responsibility for catch-survey modeling. Adam Messmer will assist with matrix analyses and weight calculations as needed.

Stock Assessment/Management Report

An annual regional information report (RIR) will be published with Katie Palof, Alex Reich, and Caitlin Stern having primary responsibilities associated with analysis of survey results and assessment and Adam Messmer having primary responsibilities associated with the commercial fishery and personal use fishery management recommendations and resulting decision.

Calendar of Activities

Dates	Activity	Personnel
April/May	Define pot survey locations in ArcGIS	FB III and FB II
May/June	Project and Operation Planning	FB III and FB II
April to June	Purchase, prepare, and stage survey gear	FB III and FB II
June to August	Conduct three legs of at-sea surveys	All
July to September	Compile and edit red king crab survey data and submit to biometrics for stock assessment report	Biometrician, FB III, and FB II
July	Review and determine bag and possession limits for Section 11-A personal use fishery.	All
August/September	Stock assessment analysis of catch survey data.	Biometrician
September	Review catch survey data and conduct commercial fishery management for season.	All
September	Management announces potential season and GHLs	Management staff

REFERENCES CITED

Briand, G., S. C. Matulich, and R. C. Mittelhammer. 2001. A catch per unit effort-soak time model for the Bristol Bay red king crab fishery, 1991-1997. Canadian Journal of Fisheries and Aquatic Sciences 58.2 (2001): 334-341.

Clark, J. E., T. Koeneman, C. A. Botelho, S. Merkouris, and D. Woodby. 2003. Estimation of red king crab (*Paralithodes camtschaticus*) abundance and available harvest in Southeast Alaska for the 2001/2001 season using a pot survey. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 1J03-25, Douglas.

Clark, J. E. 2008. Restratification of the red king crab stock assessment survey in Southeast Alaska. Alaska Department of Fish and Game, Fishery Data Series No. 08-54, Anchorage.

Cochran, W. G. 1977. Sampling Techniques, 3rd edition. John Wiley & Sons, Inc., New York, NY.

Collie, J. S., and M. P. Sissenwine. 1983. Estimating population size from relative abundance data measured with error. Canadian Journal of Fisheries and Aquatic Sciences. 40:1871-1879.

Collie, J. S., and A. K. DeLong. 1998. Development of a three-stage catch-survey analysis. Report to the Alaska Department of Fish and Game. Graduate School of Oceanography. University of Rhode Island. Narragansett, RI.

Collie, J. S., and G. H. Kruse. 1998. Estimating king crab *Paralithodes camtschaticus* abundance from commercial catch and research survey data. Canadian Special Publications in Fisheries and Aquatic Sciences. 125:73-83.

Donaldson, W. E., and S. C. Byersdorfer. 2005. Biological Field Techniques for lithodid crabs. Alaska Sea Grant College Program, University of Alaska Fairbanks.

Jadamec, L. S., W. E. Donaldson, and P. Cullenberg. 1999. Biological Field Techniques for Chionoecetes Crabs. Alaska Sea Grant College Program, University of Alaska Fairbanks.

Kruse, G. H. and J. S. Collie. 1991. Preliminary application of a population size estimation model to the Bristol Bay stock of red king crabs. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division, Regional Information Report 5J91-09. Juneau.

McCaughran, D. A., and G. C. Powell. 1977. Growth Model for Alaska King Crab *Paralithodes camtschatica*. Journal of the Fisheries Board of Canada 34:989-995.

Palof, K., and J. Stratman. 2022. 2021 Southeast Alaska red king crab stock assessment and management plan for the 2021/2022 season. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 1J22-02, Douglas.

Siddon, C., J. Bednarski, and G. Bishop. 2009. Southeast Alaska Tanner crab 2006 stock assessment and recommendations for the 2007 commercial fishery. Alaska Department of Fish and Game, Fishery Data Series No. 09-18, Anchorage.

Woodby, D. 1994. Population sizes and harvest rates of red king crabs in southeast Alaska, 1993. Alaska Department of Fish and Game, Commercial Fisheries Management and Development Division. Regional Information Report No. 1J94-20, Juneau.

Zheng, J., M. C. Murphy, and G. H. Kruse. 1997. Application of a catch-survey analysis to blue king crab stocks near Pribilof and St. Matthew Islands. Alaska Fishery Research Bulletin 4(1):62–74.

TABLES AND FIGURES

Table 1.–Southeast Alaska red king crab survey location codes.

Survey area	Location code
Barlow Cove	1
Deadman Reach	4
Excursion Inlet	9
Gambier Bay	15
Juneau	23
Lynn Sisters	26
Pybus Bay	37
Seymour Canal	39

Table 2.–Southeast Alaska red king crab survey shell age criteria.

Shell condition	Shell age	Description
1, soft	0–2 weeks	Shells very soft and flaccid, lose shape when out of water. Similar in texture to wet leather. Lack of careful handling will cause shell to lose shape.
2, light	2–8 weeks	Shiny ventral surface of coax and exoskeleton. Few or no scratches, pits or epibionts presents. Dactyls and spines sharp with no wear present. Legs easily compressed when pinched because legs contain little muscle tissue. Merus flexible and does not crack when bent. Chela depressible.
3, new	2–20 months	Coxa and ventral surface of exoskeleton dull. Legs mostly full of muscle tissue, meri not easily compressed by pinching and will crack if bent. Spines and dactyls may show slight wear.
4, old	21–36 months	Skip molts. Distal portion of ventral coax partially or totally covered with grown scratching. Legs full of muscle tissue, meri not easily compressed. Epifauna almost always present.
5, very old	>36 months	Double skip molts. Distal portion of ventral coax densely covered with dark scratching. Legs full of muscle tissue, meri not easily compressed when pinched. Tips of dactyls worn, rounded and dark. Carapace frequently covered with fouling organism to greater extent than with old-shell crabs.

Note: Table adapted from Donaldson and Byersdorfer (2005).

Table 3.–Southeast Alaska red king crab survey male crab recruit class descriptions.

Recruit status	Carapace length (CL)	Shell condition
Juvenile	≤128 mm	Any
Pre-recruit	Between 129 and 144 mm	Any
Recruit	Between 145 and 160 mm	1, 2, or 3
Post recruit	If greater than 161 mm	1, 2, or 3
Post recruit	If between 145 and 160 mm	4 or 5

Note: Descriptions adapted from McCaughran and Powell (1977).

Table 4.–Southeast Alaska crab survey codes for pots to describe debris, substrate, pot condition, type, dimensions, escape device, and bait.

Code	Debris	Substrate	Pot condition	Pot type	Pot dimensions	Escape device	Bait
0	[a]	Unknown	[a]	[a]	[a]	[a]	[a]
1	Large brown kelp	Mud	Normal	Pyramid	4’ diameter	None/closed rings	No bait
2	Mussels	Mud/gravel	Not baited	Cone	5–5’11” diameter	king (4, 6 ¼ in rings)	Jar & hanging
3	Shells	Mud/clay	Lost	Square	6–6’11” diameter	king (9 in stretch mesh)	Jar only
4	Woody debris	Mud/shell	Door open	Dungeness	7–7’11” diameter	Tanner (4, 4 ¾ inch rings)	hanging only
5	Hair kelp	Mud/soft	Broken webbing	[a]	7x7	Tanner (7 in stretch mesh)	[a]
6	Barnacles	Mud/hard	Upside down	[a]	8x8	Dungeness (2, 4 ⅜ in rings)	[a]
7	Sponges	Clay	Collapsed tunnel	[a]	9x9	[a]	[a]
8	[a]	Sand	Not on bottom	[a]	[a]	[a]	[a]
9	[a]	Gravel	Pot open/broken	[a]	[a]	[a]	[a]
10	[a]	Boulder	Lost pot contents	[a]	[a]	[a]	[a]
11	[a]	Cobble	[a]	[a]	[a]	[a]	[a]
12	[a]	Rock	[a]	[a]	[a]	[a]	[a]
13	[a]	Hard	[a]	[a]	[a]	[a]	[a]
14	[a]	Soft	[a]	[a]	[a]	[a]	[a]
15	[a]	Shell	[a]	[a]	[a]	[a]	[a]
16	[a]	Coral	[a]	[a]	[a]	[a]	[a]
17	[a]	Mixed	[a]	[a]	[a]	[a]	[a]
18	[a]	Silt	[a]	[a]	[a]	[a]	[a]
19	[a]	Barnacle	[a]	[a]	[a]	[a]	[a]
20	[a]	Mussels	[a]	[a]	[a]	[a]	[a]

[a] code not used

Table 5.–Southeast Alaska red king crab survey bycatch species code list.

Species code	Species	Species code	Species
110	Pacific cod	850	Scallop
127	Yellowfin Sole	892	Red sea urchin
129	Starry Flounder	894	California sea cucumber
130	Lingcod	910	Dungeness crab
145	Yelloweye rockfish	921	Red king crab
147	Quillback rockfish	922	Blue king crab
200	Halibut	923	Golden king crab
270	Pollock	931	Tanner crab
710	Sablefish	964	Coonstripe shrimp
870	Octopus	965	Spot shrimp
363	Neptunea species	381	Pychnopodia

Table 6.–Southeast Alaska red king crab survey parasite condition codes.

Code	Parasite
1	None
2	Briarosaccus, single scar
3	Briarosaccus, double scar
4	Briarosaccus, single externa
5	Briarosaccus, double externa
6	Bitter crab, *Hematodinium*
7	Microsporidian
8	Nemertean worms

Table 7.–Southeast Alaska red king crab survey female reproductive condition codes.

Code	Clutch condition	Egg development
1	Normal	Eyed eggs
2	<20% dead eggs in the clutch	Uneyed eggs
3	>20% dead eggs in the clutch	No eggs
4	Barren with silky setae	NA
5	Barren with matted setae and empty egg cases	NA

Note: Codes are from Donaldson and Byersdorfer (2005). NA indicates not applicable.

Table 8.–Southeast Alaska red king crab survey sample goals by carapace width range category for male Tanner crab chela height measurements.

Carapace width	Sample goal
<106	25
106–114	25
115–122	25
123–131	25
132–152	25
>152	25

Table 9.–Southeast Alaska red king crab survey length-weight conversion formula coefficients.

Area	Intercept	Slope
Pybus Bay	-7.383	3.06
Gambier Bay	-6.695	2.92
Seymour Canal	-6.438	2.87
Peril Strait	-7.18	3.02
Juneau	-7.23	3.03
Lynn Sisters	-7.42	3.07
Excursion Inlet	-7.67	3.12

Note: Formula is weight (lb) = exp[Intercept + slope*ln(carapace length)] *(2.2/1000).

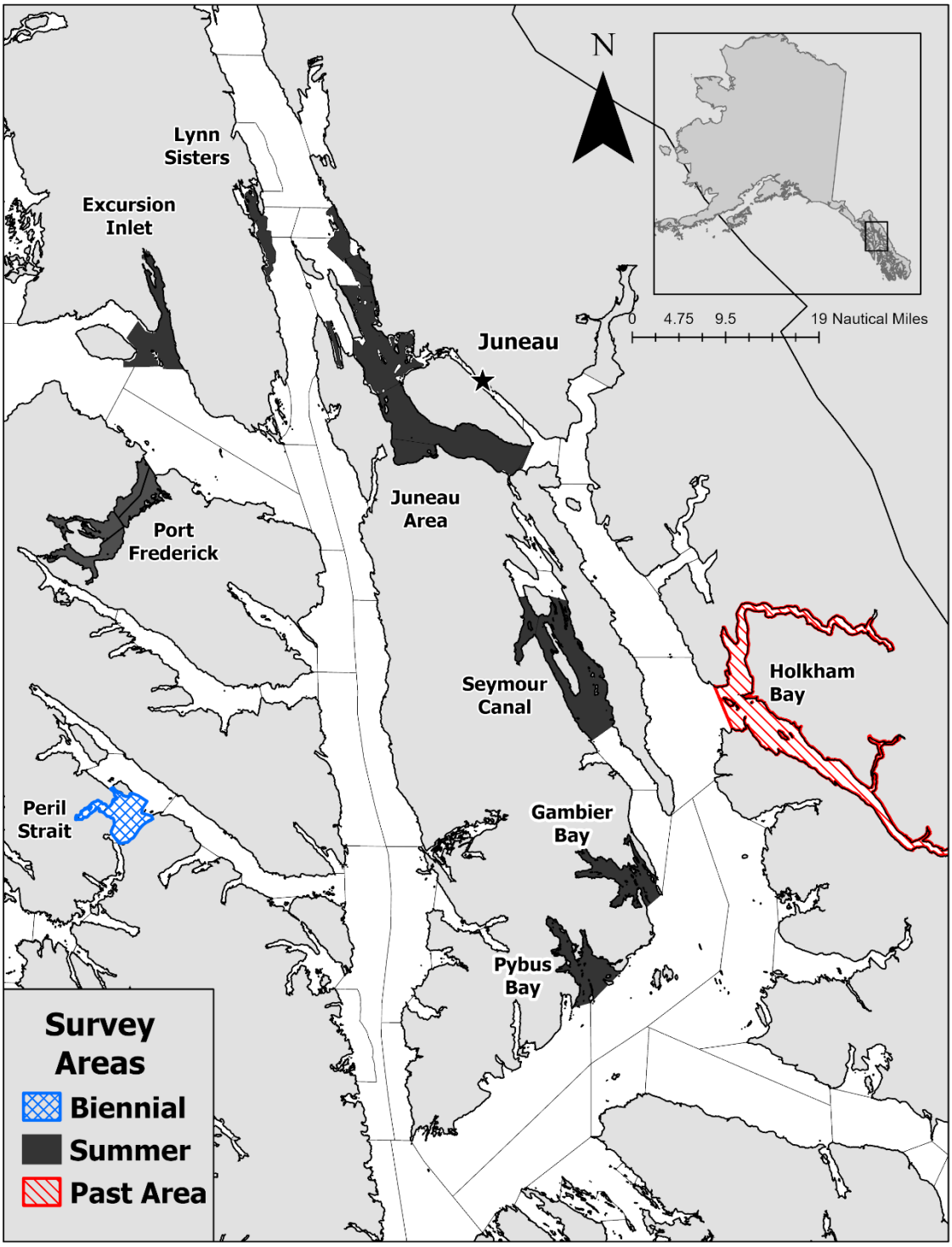


Figure 1.–Southeast Alaska summer crab pot survey areas.

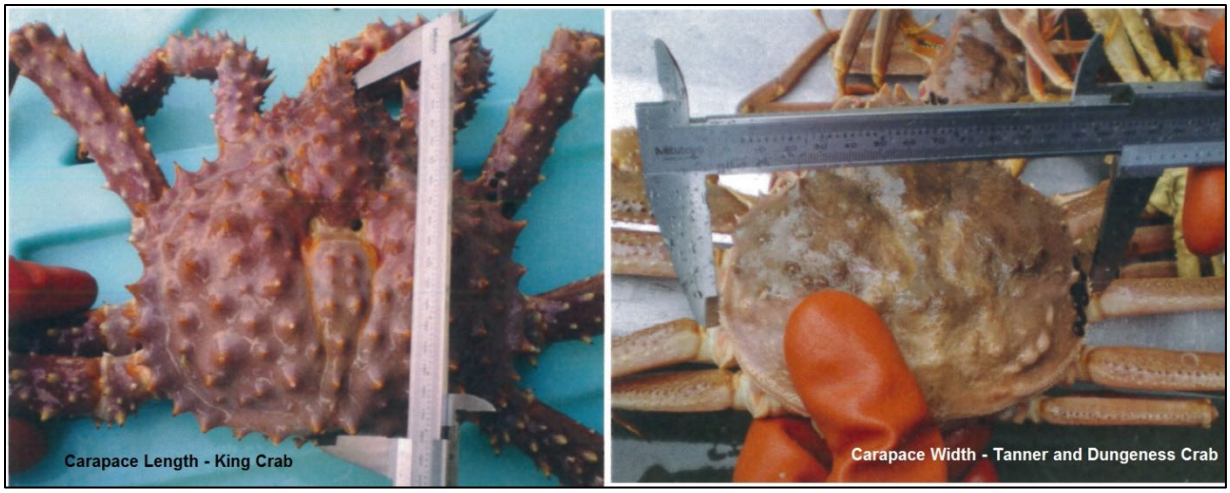


Figure 2.–Crab carapace measurements, left: measuring carapace length, all king crab and right: measuring carapace width applicable to both Tanner (pictured) and Dungeness crab.

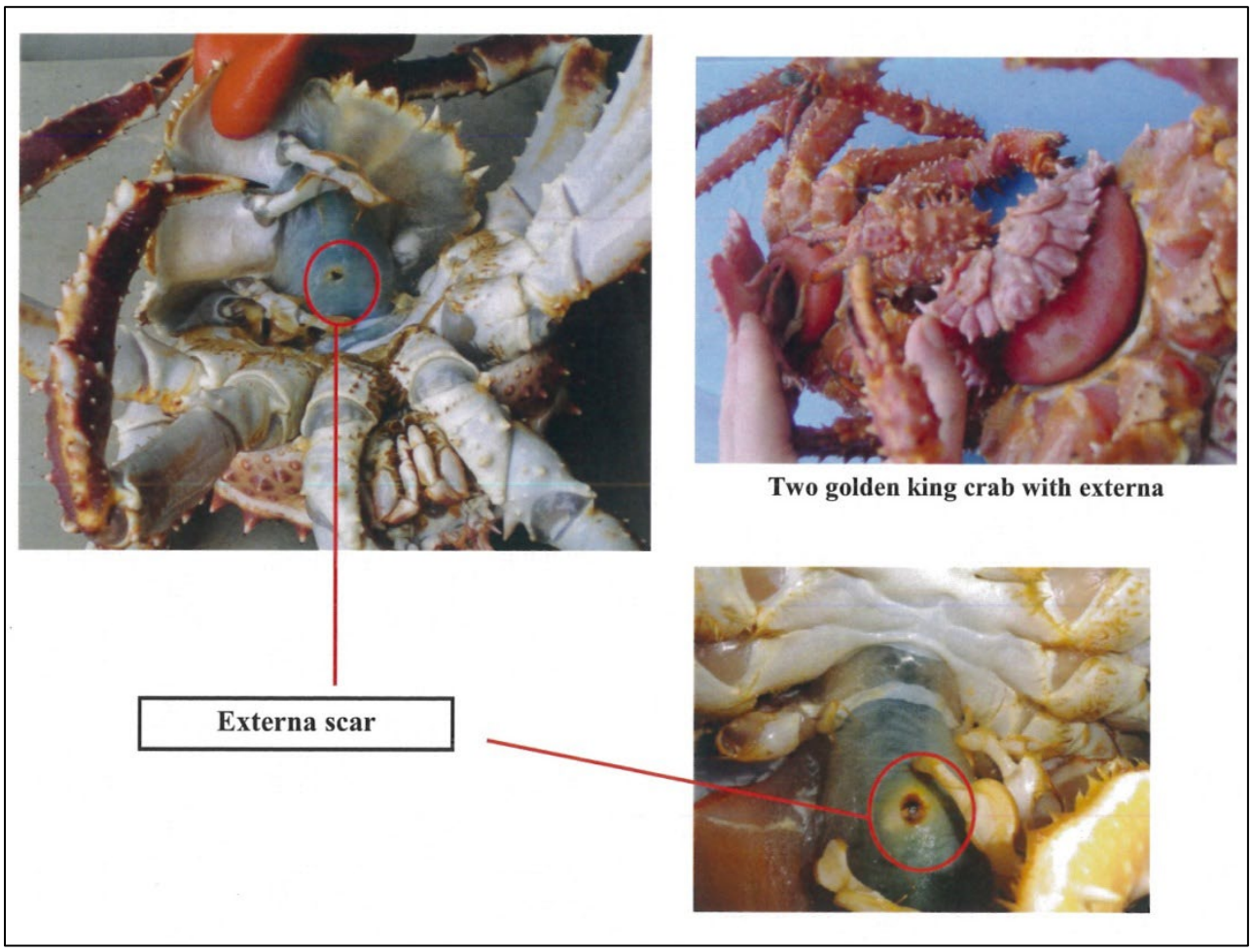


Figure 3.–*Briarosaccus* externa and externa scars on red and golden king crab.

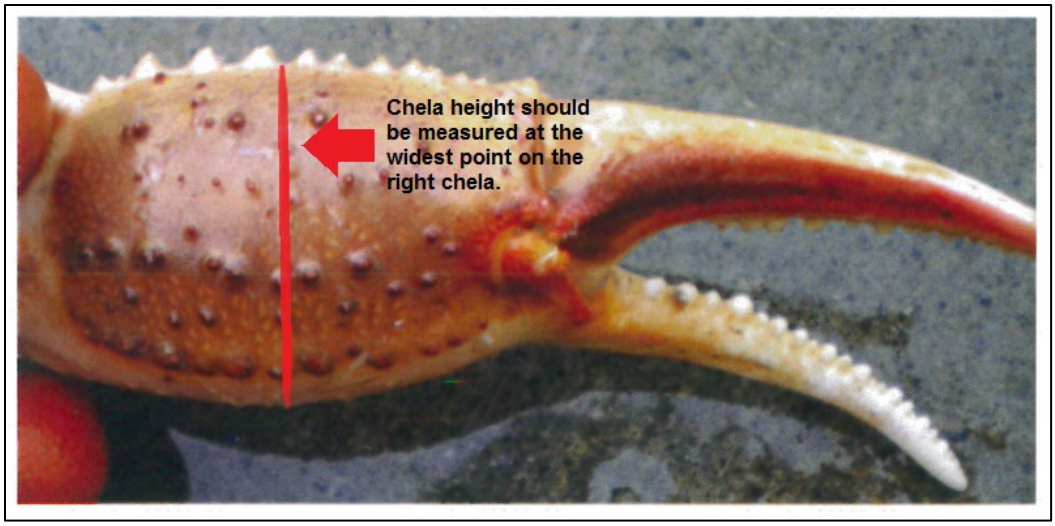


Figure 4.–Chela height measurement location for male Tanner crab, right claw.

APPENDIX A: INSTRUCTIONS FOR TAGGING RED KING CRAB

Male red king crab (RKC) will be tagged to determine growth increments of different size classes and movement patterns in Pybus Bay, Gambier Bay, Peril Strait, Seymour Canal, and Excursion Inlet. Male RKC from three recruit size classes (juvenile, pre-recruit, and recruit) will be tagged using a numbered double T-bar tag in the isthmus muscle. These size classes include carapace lengths ranging from 112-160 mm. Tag numbers will be recorded on the specimen form (Appendix C) and, if a crab previously tagged is recaptured in a pot, "recap" will be noted in the comments section of the form.

Survey areas	Recruit status	Goal	Number tagged
Pybus/Gambier Seymour/Excursion Peril Strait	Juvenile 112–129 mm	50	
	Pre-Recruit 130–144 mm	50	
	Legal (recruit & post) >144 mm	50	

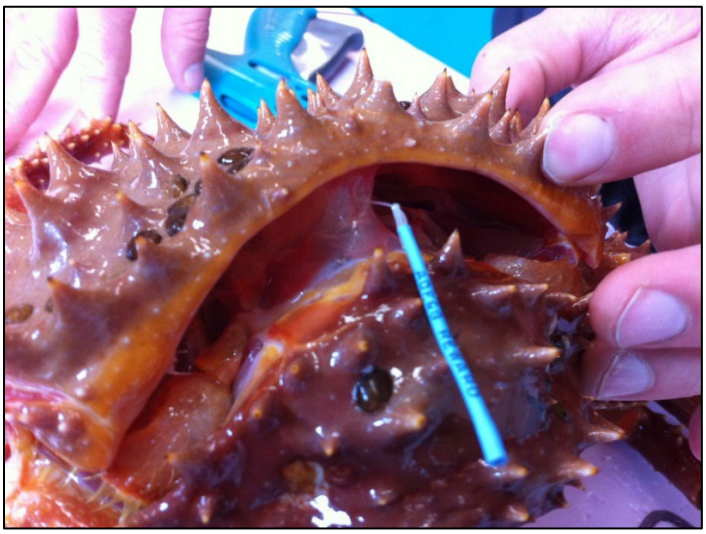
Instructions for Tagging RKC

Load tags vertically into the top of the tagging gun and make sure tags are not twisted together. Tags will need to be checked after each crab is tagged to ensure they will be properly released from the tagging gun.

Place the RKC posteriorly facing you and gently lift the back of the carapace to expose the isthmus muscle, a white hollow pillar muscle. Insert the needle of the tag gun into the center of the isthmus muscle and punch the tag in. Gently pull on the double T-bar tag to ensure the tag is securely placed. If a crab is tagged in the wrong place and/or starts bleeding (white liquid) do NOT attempt to tag again, release the crab into the water and start over with a new specimen. Once a crab is tagged, the tag number is recorded on the crab specimen form and the crab is gently released back into the water.

If a crab tag is recaptured during the survey, write the tag number and a note stating "recap" in the comments section of the crab specimen form.

Appendix A2.–T-bar tag inserted into the isthmus muscle of a king crab specimen.



APPENDIX B: HOBO WATER TEMPERATURE DATA LOGGER INSTRUCTIONS

1) One logger for each pot will be deployed on the first day of setting per trip.
2) Activate logger using optical USB base station attached to computer (Figure B3).
    a. Name will be a unique number that matches the buoy number of the pot to which the logger will be attached
    b. Time interval: 1 hour
3) One temperature logger will be placed on each deployed pot with a cable tie near the tunnel of the pot with buoy number facing out.
4) Write in comments column of skipper form, 'Tidbit # X' (where X is the number of the tidbit). This should be done by the crewmember in the wheelhouse documenting coordinates and associated data during the setting of pots each day.
5) Temperature loggers will be downloaded at the end of each leg, saved in Excel, and transferred to a file on the desktop of the R/V Medeia computer.
6) Files will be saved on a memory stick (or other media) aboard vessel; leave backup copy aboard R/V Medeia computer.
7) Files will be saved to: CF…Shellfish\Temperature\current year.
8) Detailed Data Download Instructions:
    a. Files will be saved using the .dtf format and subsequently exported to a .txt format.
    b. Export file:
        i. File → Export → Custom.
        ii. Date format: Month/Day/Year
        iii. Date/Time Separator: Tab
        iv. Time Format: Hr:Min:Sec
        v. Data Separator: Tab
        vi. Highlight "Temperature (*C)" only.
    c. Save file as the tidbit number:
        i. For example, Tidbit #8 should be saved as **8.txt**
    d. Open .txt file in Excel:
        i. File → Open (Do not double click the text file to open).
        ii. Select "Finish" on the import menu.
    e. Return to **Step a** and repeat for each Tidbit.
    f. To be done post survey:
        i. Within the Zander application click on "import Temperature Data"
        ii. Click "Edit Temperature Data"
        iii. Set the Discard Temperatures within X minutes to 30 minutes
        iv. Import all the excel files from the entire leg by choosing all the excel files, the app will produce an average temperature for each pot at each location
        v. Look through the results and check the temperature variance for each pot location, if greater than 2 check the raw data for any outliers
        vi. If outlier occurs, check the raw data for the correct pot data or adjust the cutoff to remove the outlier.
        vii. Delete all temperature data that does not correspond to time the pot was in the water.

-continued-

viii.

ix. Do not include data that is within 15 minutes of pot set time (e.g., if pot is set at 1200hrs and there is a temperature reading at 1210hrs delete data point).

x. Query Zander for skipper data, cut and paste into “Temperature Database” file on desktop.

xi. Cut and paste temperature data in columns next to skipper data.

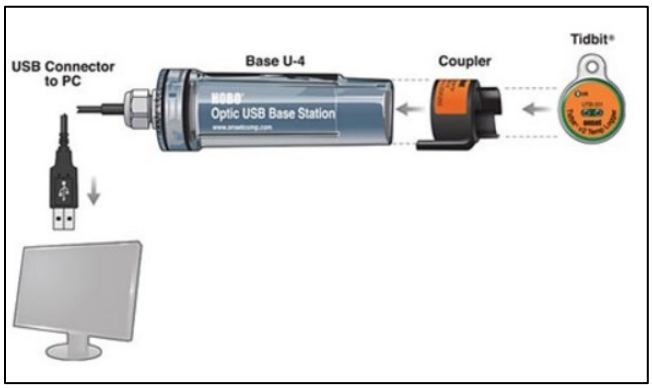
xii. Copy down skipper data to match temperature data.

xiii. Copy next line of skipper data (i.e., next pot) into “Temperature Database”

xiv. Repeat steps i-vi until all temp data is entered.

Appendix B2.–HOBO water temperature data logger device.

Appendix B3.–Optic USB base station attached to computer.



APPENDIX C: SURVEY DATA FORMS

Appendix C1.–Crab Pot Set Form.

CRAB POT SET FORM

Year_____ Project_____ Trip #_____ Vessel name_____

* Pot type: **S** = Square (7x7) **C** = Cone **P** = Pyramid **D** = Dungeness

Location name_____ Location code_____ Recorders name_____

Stratum	Pot # (order)	Pot type *	Buoy #	Depth (fathoms)	Set Gear			Lift Gear			Latitude/Longitude												Tidbit # (if used)	Comments
					Month	Date	Time (military)	Month	Date	Time (military)	Deg. N	Minutes to 1000th					Deg. W	Minutes to 1000th						
											(Examples below)						(Examples below)							
											55	2	0.	6	0	5	131	5	1.	2	7	0		

Appendix C2.–Crab Survey Specimen and Incidental Species Form.

CRAB SURVEY SPECIMEN Date_____ Page_____ of _____

Year _____ Project _____ Trip #_____ Recorder _____

Location_____ Pot # (Order)_____ Buoy#_____

Pot Condition	Substrate	Debris

Incidental Species

#				
Species				

Specimen #	Subsample Rate	910 Dung. 921 RKC 922 BKC 923 GKC 931 Bairdi Species Code	Sex	Size (mm)	Weight (gms)	Legal Size	Shell Condition	Abnormal carapace = 4	Female Egg Data: % Clutch Fullness	Development	Condition	Parasite	Blackmat 1= Present	Tag #	Comments
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															
21															
22															
23															
24															
25															
26															
27															
28															
29															
30															
31															
32															
33															
34															
35															
36															
37															
38															
39															
40															
41															
42															
43															
44															
45															
46															
47															
48															
49															
50															

Appendix C3.–Tanner Crab Chela Height Size Category Tally Sheet.

Male Tanner crab chela heights: This tally sheet can be printed used to track the number of male Tanner crab of each size category to be sampled in the field. Throughout the day, collect chela height for carapace length categories listed below:

Carapace size	**<106**	**106-114**	**115-122**	**123-131**	**132-152**	**>152**
Sample number	**25**	**25**	**25**	**25**	**25**	**25**

Carapace size	**<106**	**106-114**	**115-122**	**123-131**	**132-152**	**>152**
Sample number	**25**	**25**	**25**	**25**	**25**	**25**

Appendix C4.–Volunteer Agreement Form.

VOLUNTEER AGREEMENT – Alaska Department of Fish & Game

This agreement is entered into between the State of Alaska Department of Fish and Game (State) whose address is

_____ and

Volunteer Name	Address	Phone
_____	_____	_____

WHEREAS, the volunteer desires to participate as an unpaid worker alongside, but not displacing, state employees, as follows:

Division: _____ Region:_____

Location: _____ Dates: _____ to _____

Description of Project and Duties:

Questions marked with * are considered high risk and must be approved by the Division Director or Designee if 'Yes' is checked.**

*** ***Is the Volunteer a minor under the age of 18?*** ☐ Yes ☐ No

If 'Yes' is checked above, please state the age of the minor volunteer _____

Parent(s) of the minor volunteer have read/will comply with the department's SOP No. III-524 ☐ Yes ☐ No

*** ***Will activities require use or carrying of firearms and/or ammunition?*** ☐ Yes ☐ No

If 'Yes' is checked above, the volunteer MUST complete the State of Alaska Volunteer Qualification Inquiry - Firearm Possession form and attach it to this form. In accordance with the Federal Omnibus Consolidated Appropriations Act of 1997 (PL 104-208), anyone convicted of a misdemeanor crime of domestic violence may not perform duties that require the use of or access to firearms and/or ammunition.
Further, if 'Yes' is checked above, the volunteer MUST provide proof of training in firearm safety in the form of a certificate or other documentation reflecting completion of a formal class.

Will activities require travel in or operation of a state vehicle? ☐ Yes ☐ No
If 'Yes', indicate below:

Travel in: ☐ highway vehicle ☐ off-road vehicle ☐ small boat ☐ large boat ☐ aircraft*

*** ***Operate:*** ☐ highway vehicle* ☐ off-road vehicle* ☐ small boat*

Describe below the justification for and the limited circumstances under which the volunteer is authorized to operate a state vehicle or travel in a state aircraft:

*As a general rule, volunteers are *not* authorized to drive state vehicles, operate small boats, or travel in state aircraft. Under certain circumstances and with pre-approval, limited operation of state equipment or travel in state aircraft when necessary to further the volunteer's project/assignment may be allowable. Such use should be kept to a minimum and is allowable only if specified on this agreement form, approved by the regional supervisor (or equivalent), and only if the volunteer is properly licensed and trained to operate such vehicle/equipment. For additional details, see the following ADF&G Standard Operating Procedures: III-524, Volunteer Workers; III-004 Aircraft-Authorized Passengers; II-091 State-Owned Vehicles, Vessels, and Equipment.

SOP III-524 Form, Rev 5/15/2015 Page 1 of 2

-continued-

WHEREAS, the State desires to allow the volunteer to participate in said program.

NOW, THEREFORE, the parties agree as follows:

The Volunteer agrees to participate without compensation for his/her activities in the Program under the direct supervision of state employee _____ (ADF&G Supervisor).

- For the duration of the Volunteer's participation in the program, the State agrees to provide to the volunteer medical coverage and disability compensation, in amounts comparable to that afforded employees under the Alaska Workers' Compensation Act (AWCA), if the volunteer suffers injury, illness or death that arises out of, and occurs while acting within the course and scope of performance of his/her volunteer duties. It is agreed that weekly compensation for disability or death will be based on the minimum rate of compensation under AS 23.30.175. It is agreed that compensation or medical coverage will not be provided when the volunteer may be eligible for coverage by any other health or disability policy, insurance, payment or benefit, (inc. Medicaid, Medicare, Social Security, or pension) or workers' compensation coverage by another employer. Disputes regarding payment of compensation and medical benefits under this agreement are agreed to be decided by the Alaska Workers' Compensation Board without stipulating to the Board's jurisdiction. The State is not subject to AWCA penalty, interest, Second Injury Fund (SIF), or other payment in regard to the volunteer.
- The State agrees to defend, indemnify, and hold harmless the Volunteer in the same manner and to the same extent the State protects its employees from any claim, demand, suit for property damages or personal injury including death allegedly caused by the Volunteer's activities if the Volunteer: a) at the time of the occurrence was acting in good faith within the course and scope of his/her volunteer duties in accordance with the directions of the supervisor; b) the volunteer provides immediate notice to the State of any claim; and c) the volunteer cooperates in the defense and does not stipulate to any judgment or settlement without the State's approval.
- The volunteer understands the State does not insure loss or physical damage to its employee's personal vehicle, equipment, or other personal property used while performing state work; nor will the State provide property insurance coverage for loss or physical damage to any volunteer's personal vehicle, equipment, or other personal property used while performing his/her volunteer duties.
- In consideration of the benefits received from participation in the program and the protection offered by this agreement, the volunteer: 1) accepts the remedy provided by the State, and dispute resolution by the Alaska Workers' Compensation Board, as his/her sole legal remedy from the State if the volunteer suffers injury, illness or death arising out of, and occurring while acting within the course and scope of, his/her volunteer duties; 2) transfers his/her right to recover from others who may be responsible for the injury, illness, or death to the State and/or its assigns upon payment of compensation or medical expenses by the State; and 3) agrees to cooperate and to do everything necessary to enable the State and/or its assigns to enforce the right to recover from others.

The Agreement is effective on the day when signed by the person designated below as the Regional Supervisor and filed with the Division of Risk Management. The Alaska Department of Fish and Game agrees to provide transportation to/from _____ and _____. The following provisions (lodging, food, camp and sampling supplies, etc.) will be supplied:
_____.

The volunteer acknowledges he/she has read this agreement, understands it, and agrees to be bound by its terms.

Person to be notified in event of serious illness or accident:

Name	Address	Phone	Relationship
_____	_____	_____	_____

SIGNATURES:

Volunteer: _____ **Date** _____
(or parent of minor volunteer)

ADF&G Supervisor: _____ **Date** _____

Regional Supervisor: _____ **Date** _____

Questions marked with * on page 1 are considered high risk and must be approved by the Division Director or Designee if 'Yes' is checked.**

Division Director or Designee: _____ **Date** _____
(Designee must be equivalent to Assistant Director or Division Operations Manager)

When complete, send the form to divisional headquarters office for distribution as described below.

Original or email: State of Alaska (SOA) Division of Risk Management by e-mail; Copies: ADF&G divisional headquarters, Volunteer, DAS Director when Division Director approval is needed.

SOP III-524 Form, Rev 5/15/2015 Page 2 of 2

Appendix C5.–Instructions for transferring pot coordinate data to R/V *Medeia* navigational computers.

Medeia computer

- Open "Site 200X.txt file.
- Open "Medeia template" file.
- Cut and paste lat/long into appropriate columns from text file to template file.
    - The lat/long column order is reversed in the template file. Make sure "latitude" is before "longitude" in the template file or Maptech will not recognize it.
- Cut and paste "strata" into "Notes/Strata" column.
- Enter name. This entry must start with 48sgw for Maptech to recognize it.
- Individually name each pot location an (e.g., 48sgwHolkham 1, 48sgwHolkham 2, 48sgwHolkham 3,….).
- Save as "marks32.txt" (This is the only file name Maptech recognizes).

Maptech

- Open Maptech (on Medeia wheelhouse computer).
- File> Import from File and browse for the folder where the "marks32" file is located.
- Select all marks for the site and import. It will give the number of marks imported successfully.
- Check the chart to make sure pot locations have in fact shown up in the appropriate spot.
- Repeat procedure for each site text file.
- Overwrite the "marks32" file each time.
- A detailed explanation of the Maptech import/export format in R:/>…… /Tanner pot location maps /Transfer to Medeia> Maptech export format explanation.

Maxsea

- The Skipper of the Medeia will import pot locations from Maptech to Maxsea once they have created routes between pots.

APPENDIX D: 2025 SURVEY INFORMATION

Appendix D1.–2025 summer crab survey schedule.

The red king crab survey is composed of three legs conducted on the R/V Medeia. If any staffing changes occur mid-trip, due to illness or otherwise, the project leaders (Adam Messmer, Tessa Bergmann, and Zane Chapman) must be notified immediately.

R/V *Medeia* Vessel Crew

Position	Title	Crew
Captain	Boat Officer IV	Cedar Stark
Engineer	Boat Officer III	Jacob Eberhardt
First Mate	Boat Officer II	Jensina Sundberg
Cook/Mate	Boat Officer I	Katy Hamilton

Leg 1: Juneau Area, Barlow Cove, and Port Frederick (15 days)
Dates: July 6–July 20, 2025
Vessel: R/V *Medeia*
Biologists: 7/6-7/12; P.I. Zane Chapman, Joe Stratman, Alex Reich, and Adrienne Bosworth.
7/12-7/20; P.I. Adam Messmer, Tessa Bergmann, and Kalli Brettrager.

Date	Day	Morning task	Afternoon task	# of Pots
7/6	Sun		Set pots Oliver's Inlet	28
7/7	Mon	Pull pots	Set pots Young's Bay/Pt. Hilda	28
7/8	Tue	Pull pots	Set pots Outer Pt./Young's Bay	28
7/9	Wed	Pull pots	Set pots Outside Auke Bay/Portland Trench	28
7/10	Thur	Pull pots	Set pots Auke Bay/Portland Trench	28
7/11	Fri	Pull pots	Set pots Lower Favorite Ch.	28
7/12	Sat	Pull pots	Set pots Eagle River/ Upper Favorite Ch.	28
7/13	Sun	Pull pots	Set pots Barlow Cove	28
7/14	Mon	Pull pots	Run Port Frederick	
7/15	Tue	Run Excursion	Set Port Frederick	28
7/16	Wed	Pull pots	Set Port Frederick	28
7/17	Thur	Pull pots	Run/Set Excursion	28
7/18	Fri	Pull pots	Set Excursion	28
7/19	Sat	Pull pots	Run to Juneau	
7/20	Sun	Run Juneau		

-continued-

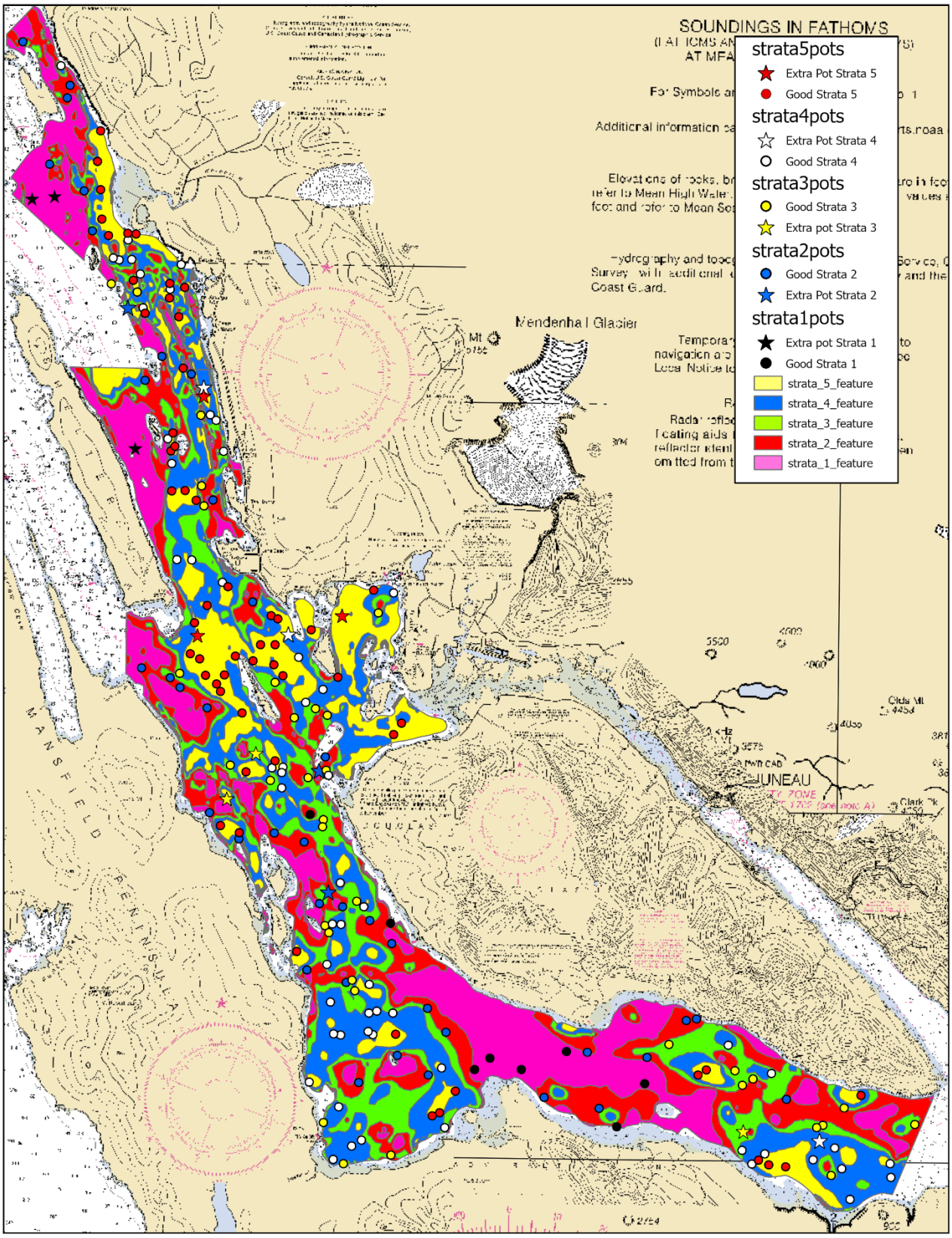
Leg 2: Lynn Sisters, Pybus Bay, Gambier Bay, and Seymour Canal (11 days)
Dates: August 3–August 13, 2025
Vessel: R/V *Medeia*
Biologists: P.I. Tessa Bergmann, Zane Chapman, and Adam Messmer.

Appendix D1.–Page 2 of 2.

Date	Day	Morning Task	Afternoon Task	# of Pots
8/3	Sun	Run to Lynn Sisters	Set pots Lynn Sisters	28
8/4	Mon	Pull pots		
8/5	Tue	Run to Pybus	Set pots Pybus	28
8/6	Wed	Pull pots	Set pots Pybus	28
8/7	Thur	Run to Gambier	Set pots Gambier	28
8/8	Fri	Pull pots	Set pots Gambier	28
8/9	Sat	Pull pots	Set pots Gambier	25
8/10	Sun	Pull pots	Set pots Seymour	28
8/11	Mon	Pull pots	Set pots Seymour	28
8/12	Tue	Pull pots	Set pots Seymour	15
8/13	Wed	Pull pots	Run to Juneau	

APPENDIX E: 2025 JUNEAU SURVEY AREA POT LOCATIONS

Appendix E1.–2025 Juneau Area red king crab survey pot locations.



Appendix E2.–2025 pot location coordinates for Juneau survey area with strata and status.

Strata	Latitude	Longitude	Status
1	58.52305	-134.913	Extra
1	58.52412	-134.897	Extra
1	58.43031	-134.836	Extra
1	58.20406	-134.578	Primary
1	58.20696	-134.523	Primary
1	58.19522	-134.468	Primary
1	58.19994	-134.555	Primary
1	58.25413	-134.649	Primary
1	58.29439	-134.708	Primary
1	58.17893	-134.487	Primary
1	58.19979	-134.588	Primary
2	58.31074	-134.702	Extra
2	58.26535	-134.694	Extra
2	58.48293	-134.843	Extra
2	58.5611	-134.889	Primary
2	58.37358	-134.751	Primary
2	58.46492	-134.818	Primary
2	58.25997	-134.683	Primary
2	58.20465	-134.643	Primary
2	58.2051	-134.466	Primary
2	58.284	-134.711	Primary
2	58.2136	-134.609	Primary
2	58.34105	-134.801	Primary
2	58.52637	-134.876	Primary
2	58.23171	-134.68	Primary
2	58.5658	-134.887	Primary
2	58.19429	-134.67	Primary
2	58.23618	-134.708	Primary
2	58.26106	-134.7	Primary
2	58.5115	-134.869	Primary
2	58.34816	-134.829	Primary
2	58.21975	-134.432	Primary
2	58.24647	-134.648	Primary
2	58.18971	-134.539	Primary
2	58.45584	-134.83	Primary
2	58.33364	-134.782	Primary
2	58.53615	-134.901	Primary
2	58.28716	-134.733	Primary

-continued-

Strata	Latitude	Longitude	Status
2	58.41147	-134.78	Primary
2	58.45849	-134.797	Primary
2	58.28478	-134.758	Primary
2	58.1859	-134.5	Primary
2	58.25505	-134.664	Primary
2	58.20675	-134.508	Primary
2	58.5818	-134.921	Primary
2	58.21912	-134.439	Primary
2	58.31595	-134.697	Primary
2	58.19742	-134.621	Primary
2	58.22238	-134.622	Primary
2	58.19003	-134.367	Primary
2	58.34472	-134.808	Primary
2	58.29451	-134.779	Primary
3	58.29974	-134.767	Extra
3	58.31688	-134.747	Extra
3	58.17774	-134.397	Extra
3	58.22866	-134.674	Primary
3	58.29244	-134.698	Primary
3	58.18045	-134.341	Primary
3	58.41666	-134.788	Primary
3	58.20045	-134.404	Primary
3	58.16169	-134.335	Primary
3	58.18696	-134.326	Primary
3	58.37019	-134.661	Primary
3	58.19515	-134.398	Primary
3	58.33161	-134.696	Primary
3	58.30817	-134.709	Primary
3	58.31094	-134.696	Primary
3	58.30689	-134.736	Primary
3	58.23264	-134.676	Primary
3	58.2502	-134.693	Primary
3	58.25283	-134.696	Primary
3	58.34636	-134.802	Primary
3	58.19747	-134.391	Primary
3	58.26215	-134.674	Primary

-continued-

Strata	Latitude	Longitude	Status
3	58.44315	-134.79	Primary
3	58.17949	-134.346	Primary
3	58.28985	-134.699	Primary
3	58.16727	-134.646	Primary
3	58.34366	-134.734	Primary
3	58.49173	-134.855	Primary
3	58.16387	-134.68	Primary
3	58.33404	-134.705	Primary
3	58.33057	-134.72	Primary
3	58.4093	-134.787	Primary
3	58.31243	-134.765	Primary
3	58.17907	-134.695	Primary
3	58.4888	-134.837	Primary
3	58.18106	-134.276	Primary
3	58.21003	-134.451	Primary
4	58.45355	-134.788	Extra
4	58.17455	-134.343	Extra
4	58.36162	-134.725	Extra
4	58.22114	-134.658	Primary
4	58.34122	-134.7	Primary
4	58.30415	-134.728	Primary
4	58.43419	-134.813	Primary
4	58.22426	-134.691	Primary
4	58.17076	-134.398	Primary
4	58.1528	-134.321	Primary
4	58.31161	-134.735	Primary
4	58.17044	-134.675	Primary
4	58.21202	-134.684	Primary
4	58.38904	-134.805	Primary
4	58.31188	-134.727	Primary
4	58.21237	-134.661	Primary
4	58.50837	-134.844	Primary
4	58.38081	-134.772	Primary
4	58.19962	-134.378	Primary
4	58.48298	-134.832	Primary
4	58.22032	-134.664	Primary

-continued-

Appendix E2.–Page 4 of 6.

Strata	Latitude	Longitude	Status
4	58.16535	-134.687	Primary
4	58.44136	-134.779	Primary
4	58.18515	-134.684	Primary
4	58.23832	-134.694	Primary
4	58.57311	-134.894	Primary
4	58.44331	-134.783	Primary
4	58.16943	-134.382	Primary
4	58.25341	-134.69	Primary
4	58.16748	-134.348	Primary
4	58.26011	-134.668	Primary
4	58.50077	-134.85	Primary
4	58.30909	-134.695	Primary
4	58.50148	-134.854	Primary
4	58.2124	-134.689	Primary
4	58.25346	-134.684	Primary
4	58.35319	-134.717	Primary
4	58.16565	-134.391	Primary
4	58.17794	-134.609	Primary
4	58.49008	-134.813	Primary
4	58.30985	-134.728	Primary
4	58.21009	-134.409	Primary
4	58.16113	-134.293	Primary
4	58.49939	-134.806	Primary
4	58.17271	-134.668	Primary
4	58.23108	-134.664	Primary
4	58.22047	-134.647	Primary
4	58.4298	-134.773	Primary
4	58.26897	-134.685	Primary
4	58.16414	-134.327	Primary
4	58.3363	-134.712	Primary
4	58.20016	-134.612	Primary
4	58.501	-134.841	Primary
4	58.21347	-134.664	Primary
4	58.37782	-134.65	Primary
4	58.38888	-134.794	Primary
4	58.16629	-134.293	Primary
4	58.19413	-134.705	Primary
4	58.42495	-134.81	Primary
4	58.17197	-134.333	Primary
4	58.4957	-134.835	Primary

-continued-

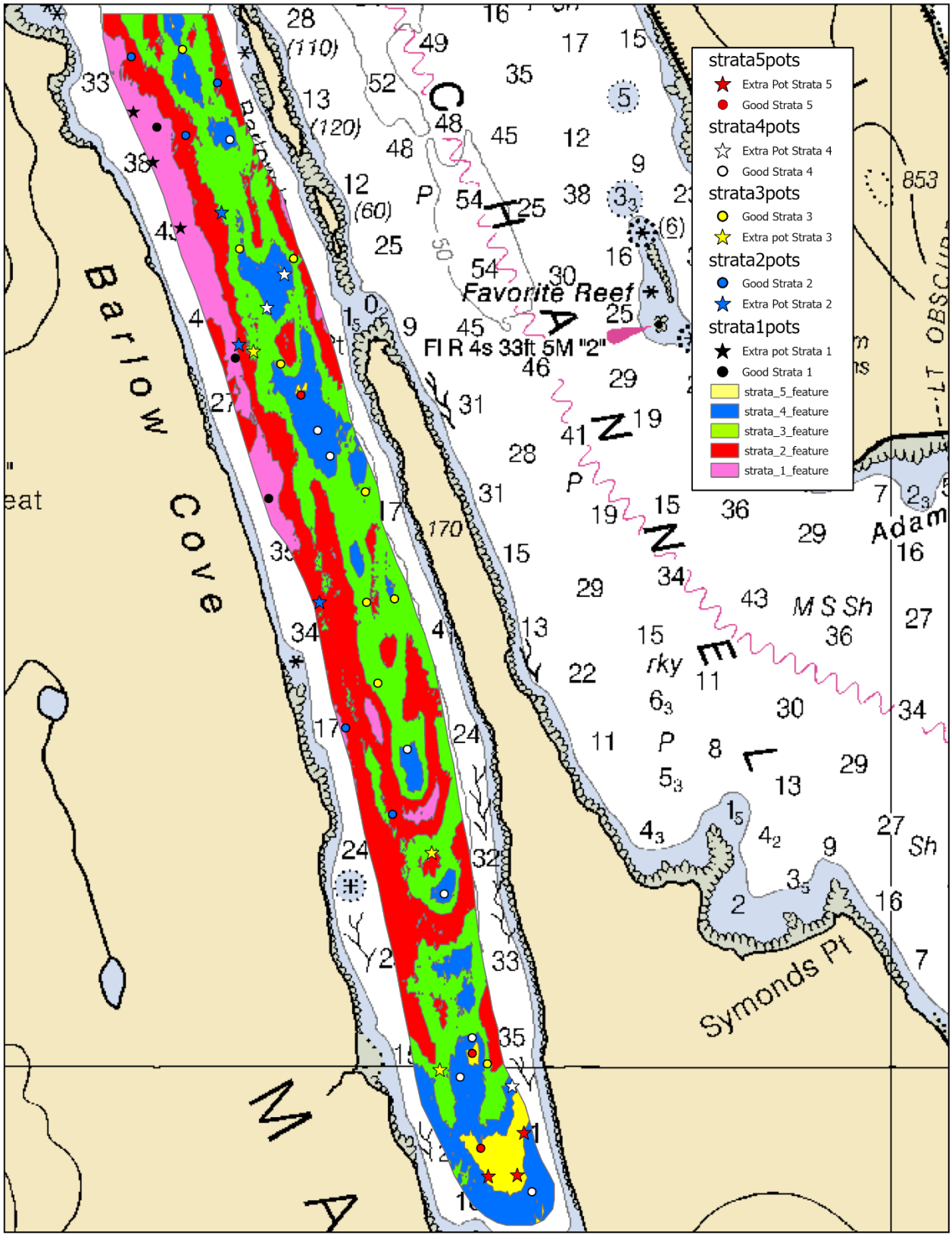
Strata	Latitude	Longitude	Status
5	58.45031	-134.788	Extra
5	58.36893	-134.687	Extra
5	58.3607	-134.789	Extra
5	58.43633	-134.809	Primary
5	58.24302	-134.716	Primary
5	58.20072	-134.424	Primary
5	58.19158	-134.602	Primary
5	58.30994	-134.754	Primary
5	58.47981	-134.807	Primary
5	58.51089	-134.844	Primary
5	58.53745	-134.867	Primary
5	58.35774	-134.734	Primary
5	58.35199	-134.788	Primary
5	58.36543	-134.792	Primary
5	58.36852	-134.737	Primary
5	58.41492	-134.8	Primary
5	58.54901	-134.865	Primary
5	58.35317	-134.762	Primary
5	58.41119	-134.792	Primary
5	58.51594	-134.863	Primary
5	58.5269	-134.864	Primary
5	58.36342	-134.709	Primary
5	58.48093	-134.831	Primary
5	58.28963	-134.771	Primary
5	58.48682	-134.814	Primary
5	58.36744	-134.733	Primary
5	58.34577	-134.783	Primary
5	58.37197	-134.783	Primary
5	58.35022	-134.735	Primary
5	58.3792	-134.768	Primary
5	58.49093	-134.803	Primary
5	58.34262	-134.775	Primary
5	58.35386	-134.795	Primary
5	58.49229	-134.813	Primary
5	58.33194	-134.757	Primary
5	58.37865	-134.665	Primary

-continued-

Appendix E2.–Page 6 of 6.

Strata	Latitude	Longitude	Status
5	58.51051	-134.838	Primary
5	58.42967	-134.811	Primary
5	58.1654	-134.379	Primary
5	58.50988	-134.858	Primary
5	58.16467	-134.367	Primary
5	58.46063	-134.803	Primary
5	58.49322	-134.84	Primary
5	58.43133	-134.808	Primary
5	58.28715	-134.757	Primary
5	58.21262	-134.645	Primary
5	58.32469	-134.649	Primary
5	58.19881	-134.43	Primary
5	58.34582	-134.689	Primary
5	58.18222	-134.618	Primary
5	58.34605	-134.77	Primary
5	58.3461	-134.728	Primary
5	58.41462	-134.809	Primary
5	58.35155	-134.75	Primary
5	58.32901	-134.643	Primary
5	58.31423	-134.733	Primary
5	58.16718	-134.386	Primary
5	58.35756	-134.745	Primary
5	58.3399	-134.773	Primary
5	58.19173	-134.314	Primary
5	58.18343	-134.613	Primary

Appendix E3.–2025 Barlow Cove summer crab survey pot locations.

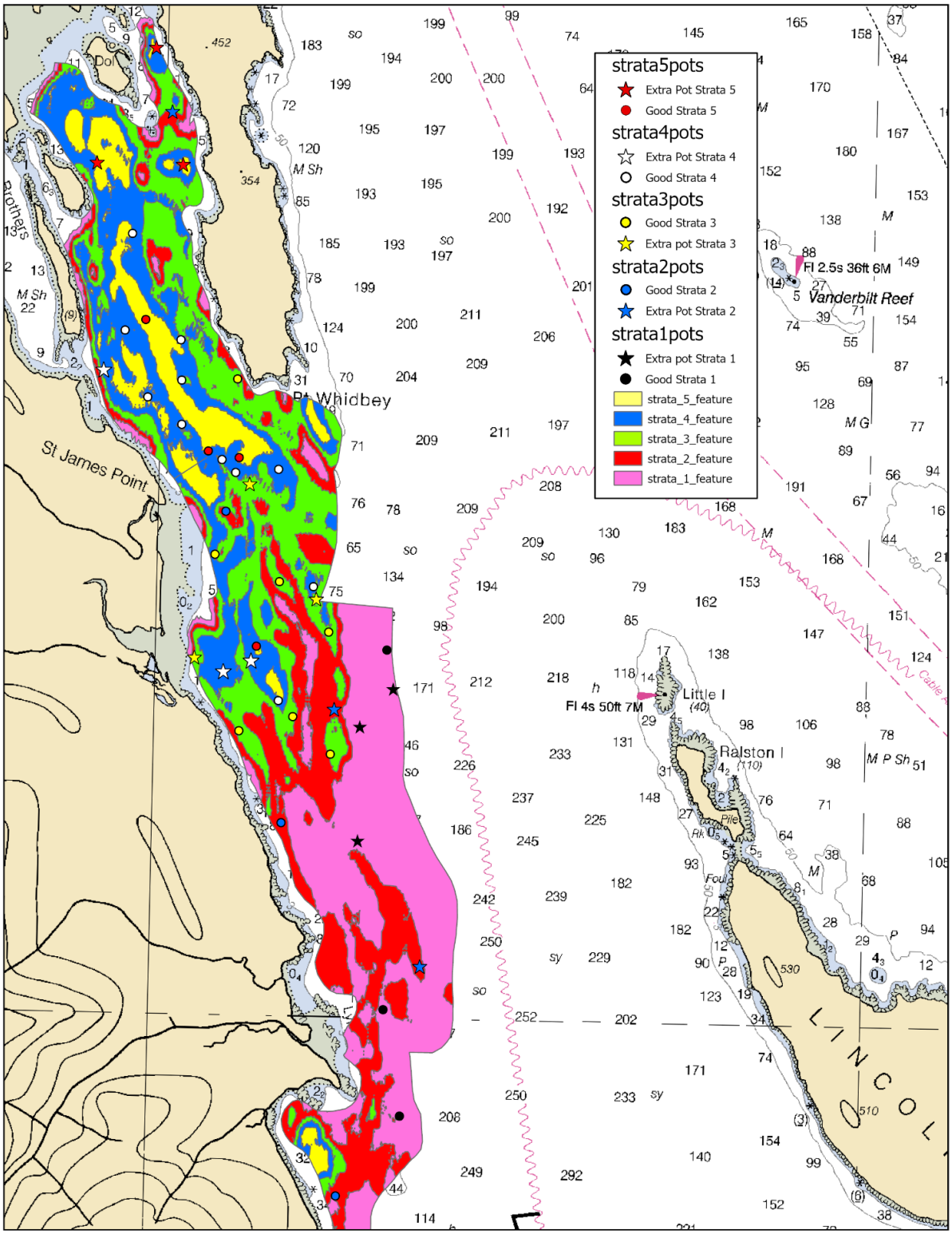


Appendix E4.–2025 pot location coordinates for Barlow Cove area with strata and status.

Strata	Latitude	Longitude	Status
1	58.39343	-134.924	Extra
1	58.39028	-134.922	Extra
1	58.36915	-134.908	Primary
1	58.37796	-134.912	Primary
1	58.39246	-134.921	Primary
2	58.38712	-134.914	Primary
2	58.36265	-134.902	Primary
2	58.3493	-134.893	Primary
2	58.35474	-134.899	Primary
2	58.39523	-134.914	Primary
2	58.39196	-134.918	Primary
2	58.39688	-134.924	Primary
3	58.3784	-134.91	Extra
3	58.3469	-134.888	Extra
3	58.36955	-134.896	Primary
3	58.35754	-134.895	Primary
3	58.38421	-134.905	Primary
3	58.38482	-134.912	Primary
3	58.33361	-134.882	Primary
3	58.3776	-134.907	Primary
3	58.36284	-134.893	Primary
3	58.36263	-134.896	Primary
3	58.39735	-134.918	Primary
4	58.38324	-134.906	Extra
4	58.38114	-134.908	Extra
4	58.33223	-134.879	Extra
4	58.33279	-134.885	Primary
4	58.32557	-134.876	Primary
4	58.34431	-134.887	Primary
4	58.37341	-134.902	Primary
4	58.33525	-134.884	Primary
4	58.39169	-134.913	Primary
4	58.35339	-134.891	Primary
4	58.37182	-134.901	Primary
4	58.32656	-134.882	Extra
4	58.32664	-134.878	Extra
4	58.32833	-134.883	Primary
5	58.33428	-134.884	Primary
5	58.37565	-134.904	Primary

APPENDIX F: 2025 LYNN SISTERS SURVEY AREA POT LOCATIONS

Appendix F1.–2025 Lynn Sisters summer crab survey pot locations.



Appendix F2.–2025 pot location coordinates for Lynn Sisters survey area with strata and status.

Strata	Latitude	Longitude	Status
1	58.54026	-135.111	Extra
1	58.53557	-135.118	Extra
1	58.52165	-135.118	Extra
1	58.50109	-135.111	Primary
1	58.54503	-135.112	Primary
1	58.48814	-135.107	Primary
2	58.53766	-135.124	Extra
2	58.61022	-135.165	Extra
2	58.50645	-135.103	Extra
2	58.47821	-135.122	Primary
2	58.52368	-135.136	Primary
2	58.56156	-135.151	Primary
3	58.56494	-135.145	Extra
3	58.55106	-135.129	Extra
3	58.54364	-135.157	Extra
3	58.53664	-135.134	Primary
3	58.53214	-135.125	Primary
3	58.54705	-135.126	Primary
3	58.5531	-135.138	Primary
3	58.55627	-135.153	Primary
3	58.53476	-135.146	Primary
3	58.57772	-135.148	Primary
4	58.57853	-135.18	Extra
4	58.54338	-135.144	Extra
4	58.54201	-135.15	Extra
4	58.53855	-135.137	Primary
4	58.59525	-135.174	Primary
4	58.58343	-135.175	Primary
4	58.58235	-135.162	Primary
4	58.57528	-135.169	Primary
4	58.56785	-135.152	Primary
4	58.57745	-135.162	Primary
4	58.57202	-135.161	Primary
4	58.55259	-135.13	Primary
4	58.5663	-135.148	Primary
4	58.56682	-135.138	Primary
5	58.60378	-135.162	Extra
5	58.60381	-135.183	Extra
5	58.618	-135.169	Extra

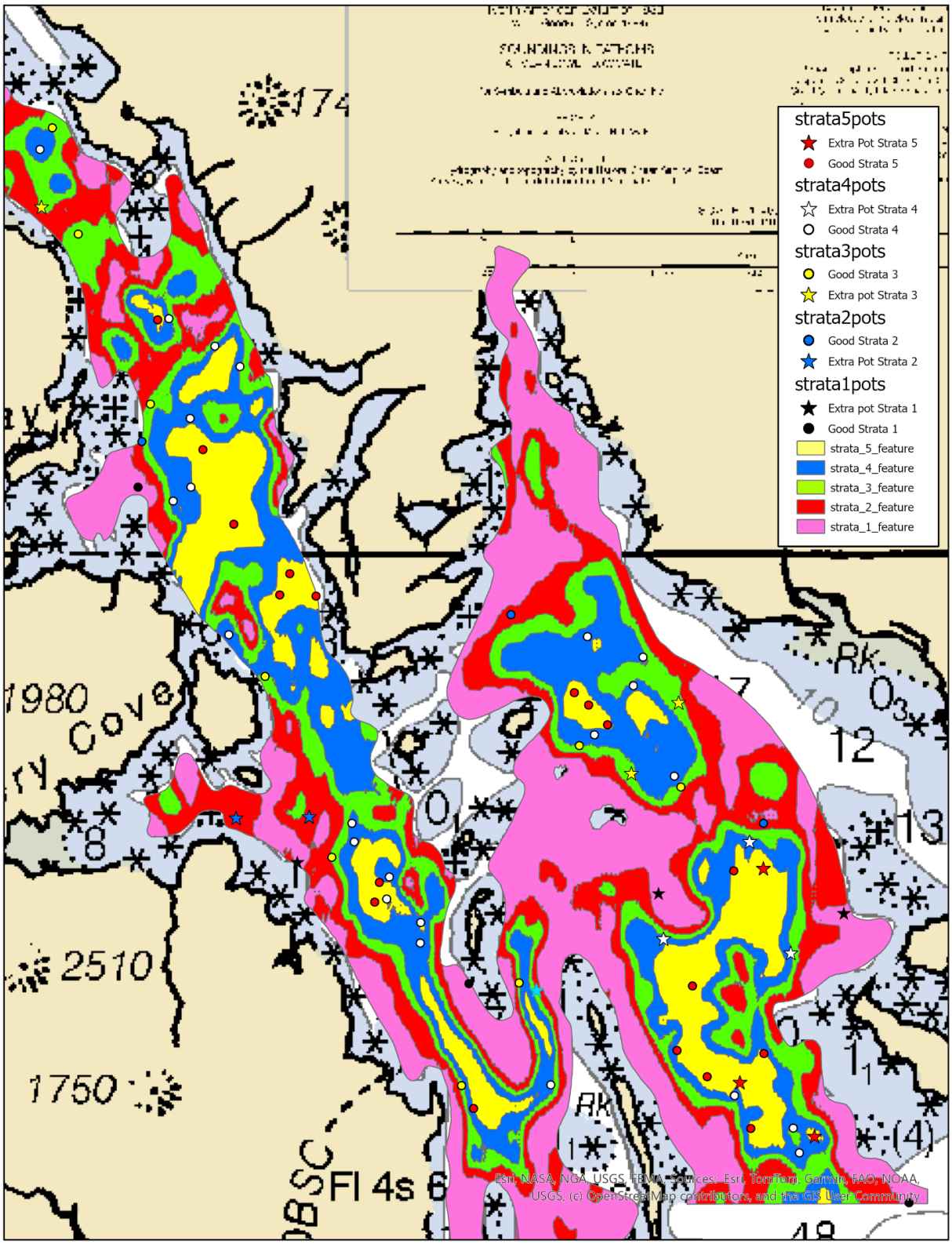
-continued-

Appendix F2.–Page 2 of 2.

Strata	Latitude	Longitude	Status
5	58.56812	-135.148	Primary
5	58.58473	-135.17	Primary
5	58.54515	-135.143	Primary
5	58.56887	-135.155	Primary

APPENDIX G: 2025 PYBUS BAY SURVEY AREA POT LOCATIONS

Appendix G1.–2025 Pybus Bay summer crab survey pot locations.



Appendix G2.–2025 pot location coordinates for Pybus Bay area with strata and status.

Strata	Latitude	Longitude	Status
1	57.30444	-134.12	Extra
1	57.30151	-134.057	Extra
1	57.29963	-134.024	Extra
1	57.27233	-134.013	Primary
1	57.293	-134.09	Primary
1	57.33978	-134.148	Primary
2	57.29237	-134.078	Extra
2	57.30872	-134.118	Extra
2	57.30861	-134.13	Extra
2	57.34405	-134.147	Primary
2	57.32776	-134.082	Primary
2	57.30811	-134.038	Primary
3	57.31281	-134.061	Extra
3	57.36614	-134.164	Extra
3	57.31948	-134.053	Extra
3	57.32194	-134.125	Primary
3	57.36359	-134.158	Primary
3	57.30491	-134.114	Primary
3	57.28336	-134.091	Primary
3	57.31543	-134.07	Primary
3	57.29305	-134.081	Primary
3	57.31153	-134.053	Primary
3	57.3476	-134.145	Primary
3	57.37358	-134.163	Primary
4	57.30637	-134.041	Extra
4	57.29722	-134.056	Extra
4	57.29588	-134.034	Extra
4	57.33847	-134.141	Primary
4	57.34626	-134.138	Primary
4	57.28244	-134.043	Primary
4	57.32105	-134.061	Primary
4	57.30637	-134.11	Primary
4	57.29876	-134.098	Primary
4	57.28344	-134.075	Primary
4	57.30097	-134.104	Primary
4	57.27937	-134.033	Primary
4	57.32587	-134.132	Primary
4	57.30304	-134.104	Primary

-continued-

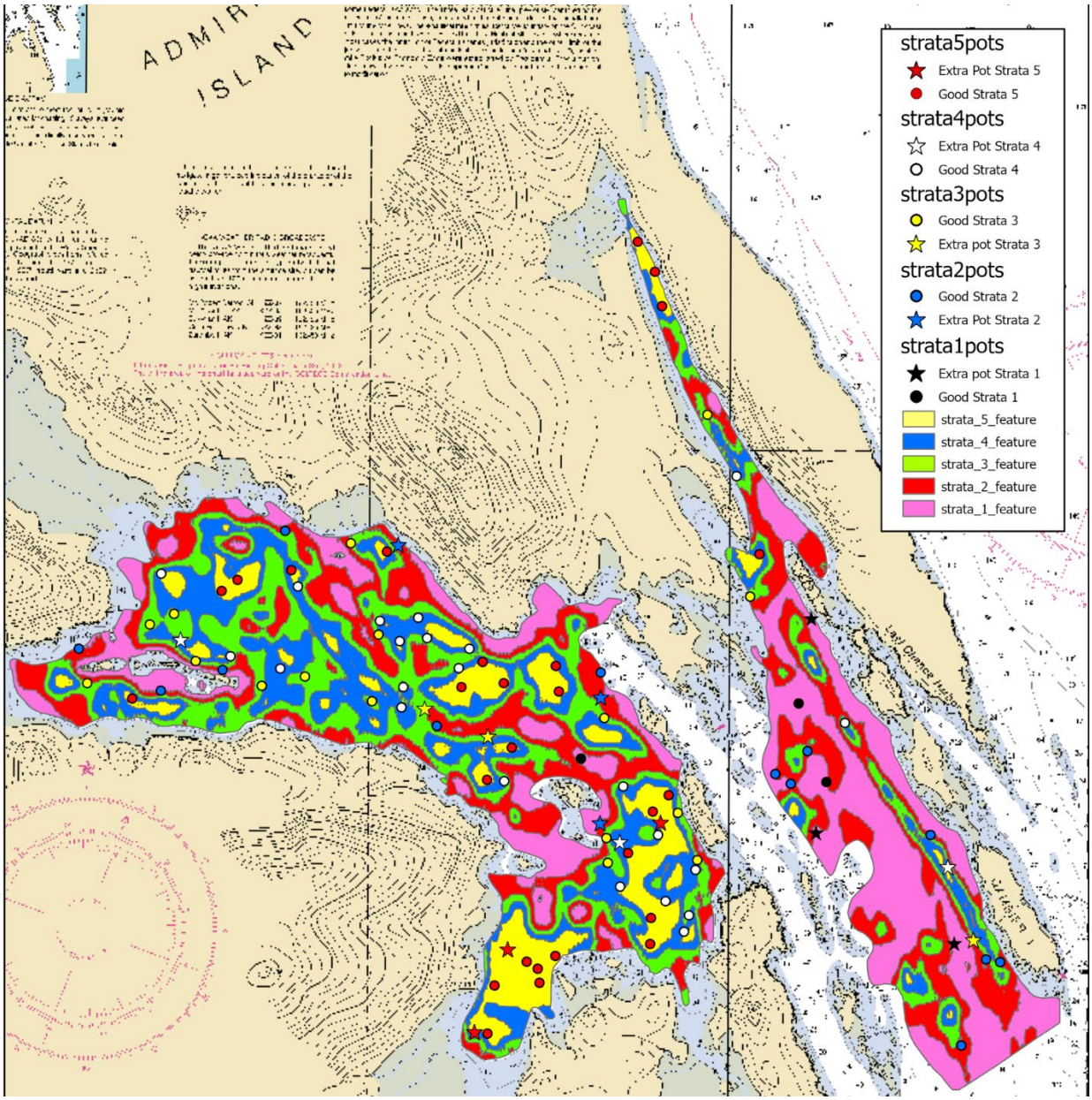
Appendix G2.–Page 2 or 3.

Strata	Latitude	Longitude	Status
4	57.35564	-134.142	Primary
4	57.2968	-134.098	Primary
4	57.35304	-134.134	Primary
4	57.31643	-134.068	Primary
4	57.32376	-134.059	Primary
4	57.31255	-134.054	Primary
4	57.30809	-134.11	Primary
4	57.35111	-134.13	Primary
4	57.27702	-134.032	Primary
4	57.33976	-134.138	Primary
4	57.32568	-134.069	Primary
4	57.37157	-134.165	Primary
5	57.28368	-134.042	Extra
5	57.2786	-134.029	Extra
5	57.30385	-134.038	Extra
5	57.31924	-134.069	Primary
5	57.28123	-134.089	Primary
5	57.28671	-134.053	Primary
5	57.35551	-134.144	Primary
5	57.27933	-134.041	Primary
5	57.33162	-134.121	Primary
5	57.3295	-134.117	Primary
5	57.32961	-134.123	Primary
5	57.33628	-134.131	Primary
5	57.32041	-134.071	Primary
5	57.30068	-134.106	Primary
5	57.30361	-134.044	Primary
5	57.28423	-134.048	Primary
5	57.3433	-134.136	Primary
5	57.31739	-134.066	Primary
5	57.2864	-134.038	Primary
5	57.30253	-134.105	Primary
5	57.29277	-134.051	Primary

-continued-

APPENDIX H: 2025 GAMBIER BAY SURVEY AREA POT LOCATIONS

Appendix H1.–2025 Gambier Bay summer crab survey pot locations.



Appendix H2.–2025 pot location coordinates for Gambier Bay area with strata and status.

Strata	Latitude	Longitude	Status
1	57.4385	-133.864	Extra
1	57.45223	-133.896	Extra
1	57.47893	-133.897	Extra
1	57.46833	-133.9	Primary
1	57.46134	-133.951	Primary
1	57.45855	-133.894	Primary
2	57.48788	-133.993	Extra
2	57.46899	-133.946	Extra
2	57.45333	-133.946	Extra
2	57.4624	-133.898	Primary
2	57.47475	-134.067	Primary
2	57.48957	-134.019	Primary
2	57.47221	-134.034	Primary
2	57.42577	-133.862	Primary
2	57.45954	-133.906	Primary
2	57.43651	-133.857	Primary
2	57.4721	-133.946	Primary
2	57.46537	-133.984	Primary
2	57.45203	-133.87	Primary
2	57.45835	-133.902	Primary
2	57.46958	-134.048	Primary
2	57.43623	-133.853	Primary
3	57.46751	-133.987	Extra
3	57.46408	-133.972	Extra
3	57.43893	-133.86	Extra
3	57.47047	-134.065	Primary
3	57.44843	-133.944	Primary
3	57.47023	-134.025	Primary
3	57.48804	-134.004	Primary
3	57.47327	-134.04	Primary
3	57.47672	-133.997	Primary
3	57.47916	-134.045	Primary
3	57.48163	-133.911	Primary
3	57.50428	-133.922	Primary
3	57.45149	-133.945	Primary
3	57.45467	-133.928	Primary
3	57.44879	-133.924	Primary
3	57.4778	-134.051	Primary

-continued-

Strata	Latitude	Longitude	Status
3	57.46643	-133.945	Primary
3	57.47142	-134.015	Primary
3	57.46841	-133.999	Primary
4	57.44802	-133.866	Extra
4	57.47592	-134.043	Extra
4	57.45098	-133.941	Extra
4	57.46593	-133.889	Primary
4	57.44363	-133.931	Primary
4	57.47393	-134.032	Primary
4	57.48265	-134.016	Primary
4	57.43988	-133.927	Primary
4	57.47589	-133.993	Primary
4	57.45853	-133.968	Primary
4	57.44542	-133.941	Primary
4	57.47242	-134.02	Primary
4	57.47255	-133.979	Primary
4	57.47629	-133.986	Primary
4	57.48413	-134.048	Primary
4	57.44758	-133.924	Primary
4	57.47882	-133.988	Primary
4	57.46762	-133.992	Primary
4	57.44189	-133.925	Primary
4	57.47839	-133.997	Primary
4	57.47497	-133.977	Primary
4	57.47017	-133.992	Primary
4	57.49664	-133.915	Primary
4	57.45188	-133.933	Primary
4	57.45795	-133.941	Primary
5	57.44802	-133.866	Extra
5	57.47592	-134.043	Extra
5	57.45098	-133.941	Extra
5	57.46593	-133.889	Primary
5	57.44363	-133.931	Primary
5	57.47393	-134.032	Primary
5	57.48265	-134.016	Primary
5	57.43988	-133.927	Primary
5	57.47589	-133.993	Primary
5	57.45853	-133.968	Primary
5	57.44542	-133.941	Primary
5	57.47242	-134.02	Primary

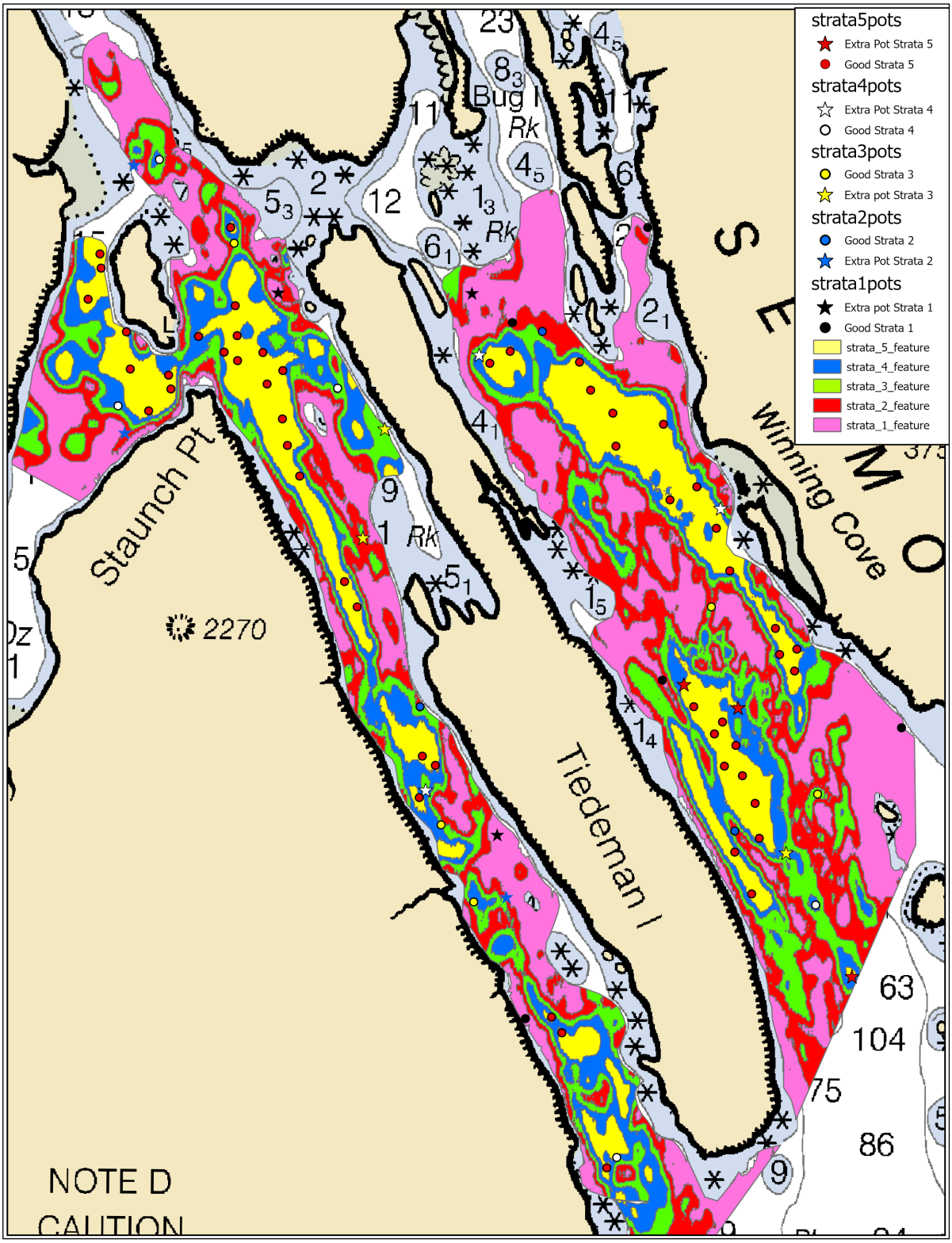
-continued-

Appendix H2.–Page 3 of 3.

Strata	Latitude	Longitude	Status
5	57.47255	-133.979	Primary
5	57.47629	-133.986	Primary
5	57.48413	-134.048	Primary
5	57.44758	-133.924	Primary
5	57.47882	-133.988	Primary
5	57.46762	-133.992	Primary
5	57.44189	-133.925	Primary
5	57.47839	-133.997	Primary
5	57.47497	-133.977	Primary
5	57.47017	-133.992	Primary
5	57.49664	-133.915	Primary
5	57.45188	-133.933	Primary
5	57.45795	-133.941	Primary
5	57.44962	-133.939	Primary
5	57.4707	-133.969	Primary
5	57.52578	-133.938	Primary
5	57.4627	-133.967	Primary
5	57.45865	-133.972	Primary

APPENDIX I: 2025 SEYMOUR CANAL SURVEY AREA POT LOCATIONS

Appendix I1.–2025 Seymour Canal summer crab survey pot locations.



Appendix I2.–2025 pot location coordinates for Seymour Canal area with strata and status.

Strata	Latitude	Longitude	Status
1	57.88709	-134.228	Extra
1	57.81468	-134.171	Extra
1	57.88721	-134.179	Extra
1	57.88329	-134.169	Primary
1	57.89621	-134.135	Primary
1	57.82939	-134.07	Primary
1	57.7901	-134.164	Primary
1	57.83554	-134.13	Primary
2	57.86813	-134.266	Extra
2	57.80635	-134.169	Extra
2	57.90403	-134.264	Extra
2	57.81543	-134.112	Primary
2	57.88214	-134.161	Primary
2	57.83177	-134.191	Primary
3	57.85431	-134.206	Extra
3	57.81252	-134.099	Extra
3	57.86893	-134.201	Extra
3	57.84543	-134.118	Primary
3	57.80565	-134.177	Primary
3	57.89363	-134.239	Primary
3	57.81596	-134.186	Primary
3	57.82042	-134.091	Primary
4	57.85861	-134.116	Extra
4	57.87894	-134.177	Extra
4	57.8206	-134.19	Extra
4	57.87436	-134.212	Primary
4	57.77158	-134.141	Primary
4	57.90476	-134.258	Primary
4	57.87171	-134.268	Primary
4	57.80558	-134.091	Primary
5	57.79602	-134.082	Extra
5	57.83192	-134.111	Extra
5	57.835	-134.125	Extra
5	57.83689	-134.097	Primary
5	57.81444	-134.106	Primary
5	57.8228	-134.11	Primary
5	57.86148	-134.122	Primary
5	57.88597	-134.275	Primary
5	57.87591	-134.255	Primary
5	57.85973	-134.129	Primary
5	57.87482	-134.23	Primary
5	57.87944	-134.169	Primary

-continued-

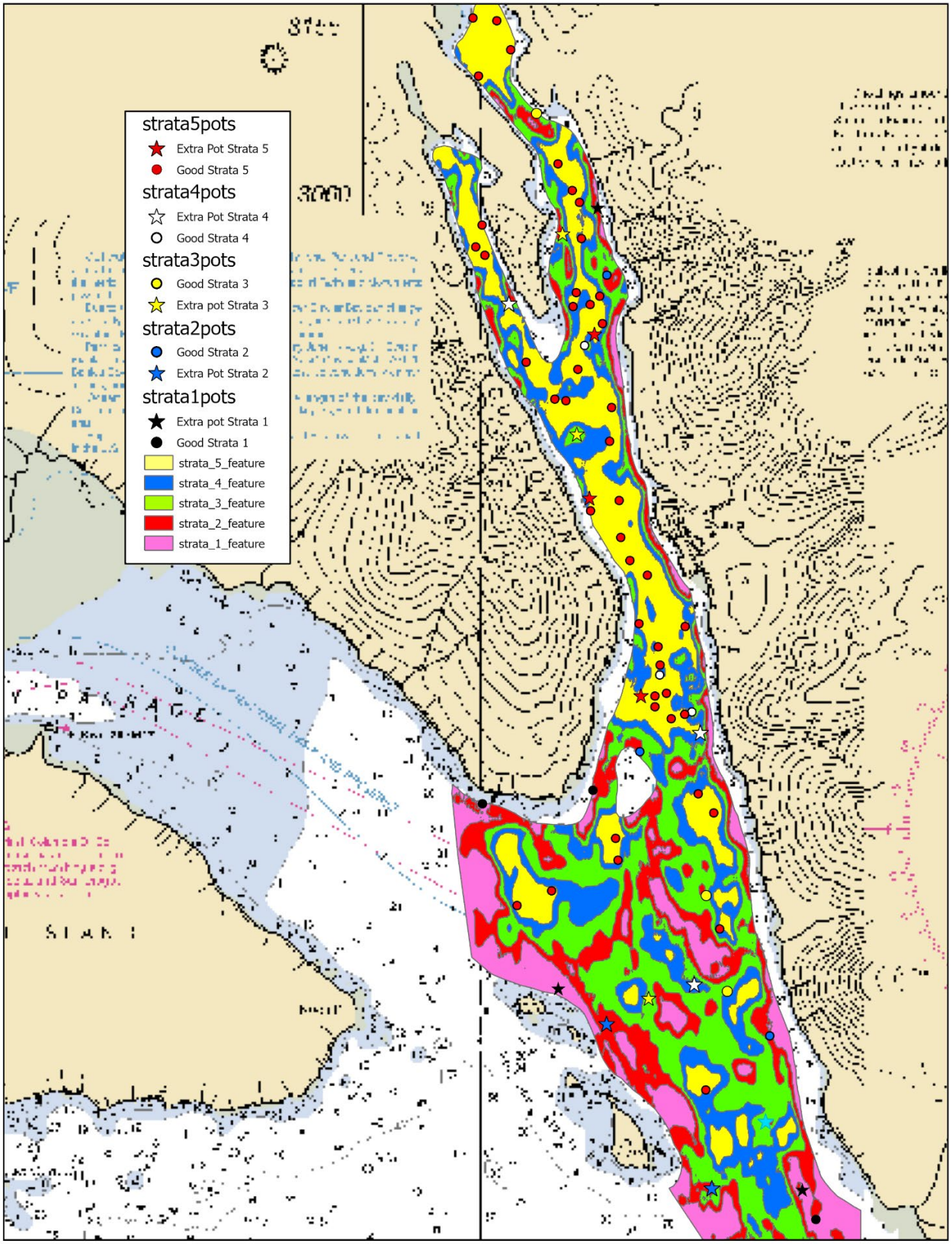
Strata	Latitude	Longitude	Status
5	57.8391	-134.101	Primary
5	57.82515	-134.19	Primary
5	57.82838	-134.117	Primary
5	57.85028	-134.113	Primary
5	57.87791	-134.238	Primary
5	57.81958	-134.191	Primary
5	57.84508	-134.207	Primary
5	57.86983	-134.13	Primary
5	57.88128	-134.238	Primary
5	57.89204	-134.273	Primary
5	57.80701	-134.107	Primary
5	57.81912	-134.107	Primary
5	57.87806	-134.152	Primary
5	57.83204	-134.122	Primary
5	57.87434	-134.149	Primary
5	57.82407	-134.115	Primary
5	57.83981	-134.096	Primary
5	57.87405	-134.254	Primary
5	57.78822	-134.155	Primary
5	57.86661	-134.225	Primary
5	57.77016	-134.143	Primary
5	57.87018	-134.226	Primary
5	57.89576	-134.24	Primary
5	57.87667	-134.265	Primary
5	57.82998	-134.115	Primary
5	57.84847	-134.21	Primary
5	57.86255	-134.222	Primary
5	57.88164	-134.266	Primary
5	57.87128	-134.143	Primary
5	57.82685	-134.112	Primary
5	57.88112	-134.248	Primary
5	57.84257	-134.102	Primary
5	57.87904	-134.231	Primary
5	57.86684	-134.142	Primary
5	57.89014	-134.272	Primary
5	57.81256	-134.112	Primary

-continued-

Strata	Latitude	Longitude	Status
5	57.79032	-134.158	Primary
5	57.82393	-134.187	Primary
5	57.87783	-134.174	Primary
5	57.88529	-134.238	Primary
5	57.85596	-134.117	Primary
5	57.8711	-134.26	Primary
5	57.87666	-134.226	Primary
5	57.87907	-134.241	Primary

APPENDIX J: 2025 EXCURSION INLET SURVEY AREA POT LOCATIONS

Appendix J1.–2025 Excursion Inlet summer crab survey pot locations.



Appendix J2.–2025 pot location coordinates for Excursion Inlet area with strata and status.

Strata	Latitude	Longitude	Status
1	58.34539	-135.477	Extra
1	58.46735	-135.465	Extra
1	58.31388	-135.404	Extra
1	58.37643	-135.466	Primary
1	58.37428	-135.499	Primary
1	58.30923	-135.4	Primary
2	58.33987	-135.462	Extra
2	58.31413	-135.431	Extra
2	58.32457	-135.415	Extra
2	58.338	-135.414	Primary
2	58.45685	-135.462	Primary
2	58.38247	-135.452	Primary
3	58.34385	-135.45	Extra
3	58.43203	-135.471	Extra
3	58.46328	-135.475	Extra
3	58.48208	-135.483	Primary
3	58.35995	-135.433	Primary
3	58.34493	-135.426	Primary
4	58.34605	-135.436	Extra
4	58.45241	-135.491	Extra
4	58.3854	-135.434	Extra
4	58.44587	-135.469	Primary
4	58.38863	-135.437	Primary
4	58.39445	-135.446	Primary
5	58.44765	-135.466	Extra
5	58.39118	-135.452	Extra
5	58.42205	-135.467	Extra
5	58.36888	-135.46	Primary
5	58.46465	-135.499	Primary
5	58.42009	-135.467	Primary
5	58.45997	-135.499	Primary
5	58.47009	-135.473	Primary
5	58.45226	-135.467	Primary
5	58.43749	-135.478	Primary
5	58.48792	-135.5	Primary
5	58.41231	-135.455	Primary
5	58.49696	-135.502	Primary
5	58.37583	-135.435	Primary
5	58.44217	-135.471	Primary

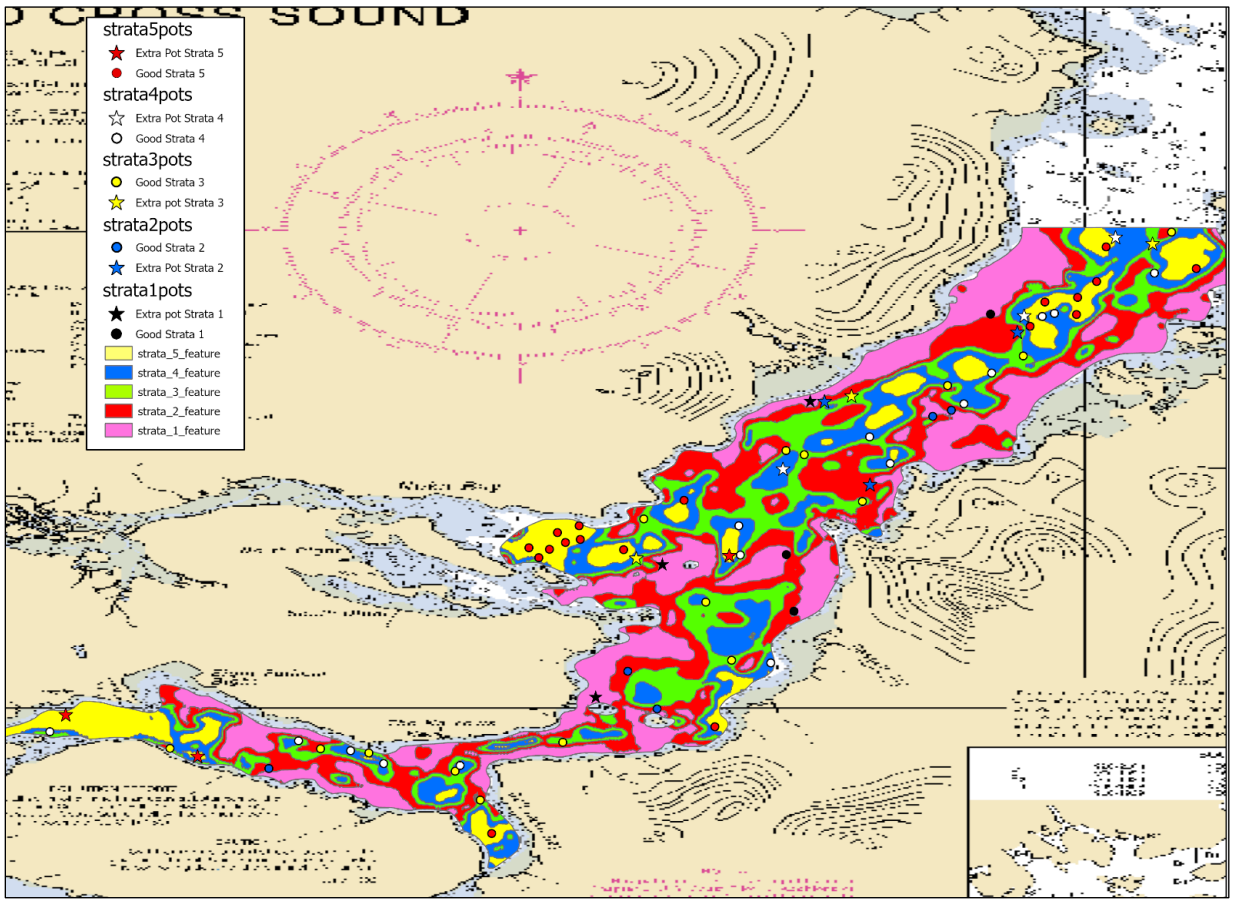
-continued-

Strata	Latitude	Longitude	Status
5	58.36549	-135.459	Primary
5	58.49649	-135.495	Primary
5	58.44931	-135.463	Primary
5	58.39881	-135.447	Primary
5	58.35469	-135.429	Primary
5	58.38762	-135.443	Primary
5	58.38943	-135.448	Primary
5	58.47424	-135.477	Primary
5	58.35838	-135.489	Primary
5	58.45356	-135.464	Primary
5	58.38826	-135.439	Primary
5	58.32951	-135.433	Primary
5	58.40202	-135.439	Primary
5	58.43094	-135.461	Primary
5	58.45412	-135.471	Primary
5	58.41594	-135.458	Primary
5	58.43623	-135.461	Primary
5	58.39155	-135.444	Primary
5	58.40242	-135.453	Primary
5	58.46259	-135.47	Primary
5	58.43724	-135.474	Primary
5	58.49202	-135.491	Primary
5	58.46822	-135.47	Primary
5	58.36067	-135.479	Primary
5	58.44329	-135.486	Primary
5	58.46124	-135.501	Primary
5	58.39111	-135.448	Primary
5	58.45193	-135.472	Primary
5	58.42168	-135.459	Primary
5	58.37286	-135.43	Primary
5	58.41	-135.45	Primary
5	58.396	-135.446	Primary

-continued-

APPENDIX K: 2025 PORT FREDERICK SURVEY AREA POT LOCATIONS

Appendix K1.–2025 Port Frederick summer crab survey pot locations.



Appendix K2.–2025 pot location coordinates for Port Frederick area with strata and status.

Strata	Latitude	Longitude	Status
1	58.00295	-135.627	Extra
1	58.07967	-135.571	Extra
1	58.03734	-135.609	Extra
1	58.02515	-135.575	Primary
1	58.10211	-135.524	Primary
1	58.03982	-135.577	Primary
2	58.07954	-135.567	Extra
2	58.09752	-135.517	Extra
2	58.05798	-135.555	Extra
2	57.98436	-135.711	Primary
2	58.00961	-135.618	Primary
2	58.07563	-135.539	Primary
2	58.07724	-135.534	Primary
2	57.99981	-135.611	Primary
3	58.08101	-135.56	Extra
3	58.12045	-135.482	Extra
3	58.03893	-135.616	Extra
3	58.05359	-135.558	Primary
3	57.98959	-135.737	Primary
3	57.9912	-135.635	Primary
3	57.98842	-135.685	Primary
3	58.04903	-135.614	Primary
3	58.01242	-135.591	Primary
3	58.0657	-135.573	Primary
3	58.12345	-135.477	Primary
3	58.09131	-135.516	Primary
3	57.98367	-135.663	Primary
3	58.06683	-135.577	Primary
3	58.08365	-135.535	Primary
3	58.02746	-135.598	Primary
3	57.97621	-135.656	Primary
3	57.98946	-135.698	Primary
4	58.06206	-135.578	Extra
4	58.10178	-135.516	Extra
4	58.12212	-135.492	Extra
4	57.98901	-135.69	Primary

-continued-

Appendix K2.–Page 2 of 2.

Strata	Latitude	Longitude	Status
4	58.0634	-135.55	Primary
4	58.08684	-135.524	Primary
4	58.04733	-135.589	Primary
4	58.07033	-135.556	Primary
4	58.07892	-135.531	Primary
4	57.98567	-135.682	Primary
4	57.99395	-135.768	Primary
4	58.11279	-135.482	Primary
4	58.10238	-135.508	Primary
4	58.10157	-135.511	Primary
4	57.98511	-135.662	Primary
4	58.01173	-135.581	Primary
4	57.99158	-135.704	Primary
4	58.03967	-135.589	Primary
5	57.98758	-135.73	Extra
5	57.99836	-135.764	Extra
5	58.03962	-135.592	Extra
5	58.04105	-135.619	Primary
5	57.99516	-135.596	Primary
5	58.04122	-135.639	Primary
5	58.11956	-135.494	Primary
5	58.04379	-135.631	Primary
5	58.04725	-135.631	Primary
5	58.11066	-135.497	Primary
5	58.10651	-135.502	Primary
5	58.114	-135.471	Primary
5	58.10528	-135.51	Primary
5	58.04552	-135.636	Primary
5	58.04155	-135.644	Primary
5	58.03906	-135.641	Primary
5	58.05386	-135.604	Primary
5	58.10207	-135.502	Primary
5	57.96753	-135.654	Primary
5	58.099	-135.514	Primary
5	58.04296	-135.634	Primary