

**Cooperative Red King Crab Reconnaissance Survey in  
the Adak Area, 2015**

by

**John Hilsinger**

and

**Chris Siddon**

June 2015

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Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



## Symbols and Abbreviations

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

<b>Weights and measures (metric)</b>		<b>General</b>		<b>Mathematics, statistics</b>	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	$H_A$
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	$e$
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, $\chi^2$ , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient	
milliliter	mL	west	W	(multiple)	R
millimeter	mm	copyright	©	correlation coefficient (simple)	r
		corporate suffixes:		covariance	cov
<b>Weights and measures (English)</b>		Company	Co.	degree (angular)	$^\circ$
cubic feet per second	ft <sup>3</sup> /s	Corporation	Corp.	degrees of freedom	df
foot	ft	Incorporated	Inc.	expected value	$E$
gallon	gal	Limited	Ltd.	greater than	>
inch	in	District of Columbia	D.C.	greater than or equal to	≥
mile	mi	et alii (and others)	et al.	harvest per unit effort	HPUE
nautical mile	nmi	et cetera (and so forth)	etc.	less than	<
ounce	oz	exempli gratia	e.g.	less than or equal to	≤
pound	lb	(for example)		logarithm (natural)	ln
quart	qt	Federal Information Code	FIC	logarithm (base 10)	log
yard	yd	id est (that is)	i.e.	logarithm (specify base)	log <sub>2</sub> , etc.
		latitude or longitude	lat or long	minute (angular)	'
<b>Time and temperature</b>		monetary symbols (U.S.)	\$, ¢	not significant	NS
day	d	months (tables and figures): first three letters	Jan, ..., Dec	null hypothesis	$H_0$
degrees Celsius	°C	registered trademark	®	percent	%
degrees Fahrenheit	°F	trademark	™	probability	P
degrees kelvin	K	United States (adjective)	U.S.	probability of a type I error (rejection of the null hypothesis when true)	$\alpha$
hour	h	United States of America (noun)	USA	probability of a type II error (acceptance of the null hypothesis when false)	$\beta$
minute	min	U.S.C.	United States Code	second (angular)	"
second	s	U.S. state	use two-letter abbreviations (e.g., AK, WA)	standard deviation	SD
<b>Physics and chemistry</b>				standard error	SE
all atomic symbols				variance	
alternating current	AC			population sample	Var
ampere	A			sample	var
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				

***REGIONAL OPERATIONAL PLAN CF.5J.2015.02***

**COOPERATIVE RED KING CRAB RECONNAISSANCE SURVEY IN  
THE ADAK AREA, 2015**

by  
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Alaska Department of Fish and Game  
Division of Commercial Fisheries

June 2015

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**SIGNATURE PAGE**

Project Title: Cooperative Red King Crab Reconnaissance Survey in the Adak Area, 2015.

Project leader(s): John Hilsinger and Chris Siddon

Division, Region, and Area:

Commercial Fisheries, Headquarters, Juneau

Project Nomenclature:

Aleutian Islands Crab Research

HQ Shellfish Research

Period Covered: July 1, 2015 to June 30, 2016

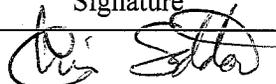
Field Dates: September 1 - 15, 2015, red king crab collections near Adak, Alaska

Plan Type: Category I

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**Approval**

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Title	Name	Signature	Date
Project leader	Chris Siddon		6/22/2015

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## PURPOSE

Alaska Department of Fish and Game (ADF&G) and the Aleutian King Crab Research Foundation (acting on behalf of the Adak Community Development Corporation) will work cooperatively to assess whether the red king crab (*Paralithodes camtschaticus*) resource in the Adak Island area is sufficiently large as of 2015 time to justify developing a full stock assessment survey.

## BACKGROUND

The Aleutian King Crab Research Foundation (Foundation) is a non-profit 501(c)(6) corporation dedicated to improving research and management of Aleutian Islands king crab. Local residents in the Adak area, represented by the Adak Community Development Corporation (a member of the Foundation) have noted what they believe to be a significant increase in the numbers of red king crab near Adak in recent years. Because of the lack of stock assessment information in the area, the Foundation and ADF&G agreed to work cooperatively under Coop Agreement #15-081 to undertake a reconnaissance survey to assess the current status of red king crab.

### *Fishery*

The Adak area once supported a large fishery for red king crab. This fishery started in 1961 and developed rapidly (Fitch, et. al.). Peak harvest occurred in 1964/65 with a harvest of 21 million pounds. Harvest declined over time and by the 1995/96 season was only 39,000 pounds. The fishery was subsequently closed. A catcher processor was allowed to fish the Petrel Bank portion of the area in 1996 and 1997 in order to "... enumerate, tag, and collect biological data from all red king captured..." Portions of the Adak area were opened during the 1998/99 and 2000/01 through 2003/04 seasons. Most of the harvest came from the Petrel Bank area west of the community of Adak.

The red king crab fishery in the area between 171° W. Longitude and 179° W. Longitude (which includes the community of Adak) was not included in the 2005 crab rationalization program. The red king crab fishery in this area has been closed since 1998/99 and no survey work has been done since 2002.

### *Surveys*

ADF&G conducted Commissioner's Permit surveys using commercial fishing boats on the Petrel Bank area during the 2002/03 and 2003/04 seasons, which led to Petrel Bank area fisheries in those years. A pot survey was conducted during 2002 in the area between 171° W. Longitude and 179° W. Longitude. This survey was "...developed in consultation with industry and focused on historically important areas of red king crab abundance in the Adak, Atka, and Amlia Islands areas" (Fitch, et. al. 2014). Catches were very poor. Ten vessels conducted 1,085 pot lifts at 61 stations and captured only four legal male red king crab (Granath, 2003). Three of these four crab were captured near Adak Island (Appendices A, B, and C) in the area covered by this survey.

Petrel Bank area (west of 179 W. Longitude) was surveyed in 2001, 2006, and 2009 (Bowers, et al, 2002, Gish 2007, 2010). The 2009 survey was designed to sample areas surveyed in 2001 and 2006 in order to compare across those years. Catches were reduced from those seen in earlier surveys.

In recent years, however, local residents of Adak have been seeing an increase in numbers of red

king crab and subsistence catches indicate there are some areas of abundance. Because of the history of poor catches and amount of time needed to design a red king crab survey, it is necessary to perform reconnaissance work to determine if the red king crab resource is sufficiently abundant in the Aleutian Islands area to invest the necessary effort to design a complete survey. This reconnaissance survey will provide that information for Adak area and similar future work on Petrel Bank could provide similar information for that area. Survey work described here is the first step in that process.

## **OBJECTIVES**

1. Evaluate and confirm the presence or absence and relative location of red king crab in waters surrounding Adak Island.
2. Quantify relative abundance of legal male, pre-recruit male, juvenile male, and female red king crab.
3. Assess catch results and determine whether red king crab abundance makes a directed red king crab stock assessment worthwhile.

## **METHODS**

Primary purpose of this reconnaissance survey is to determine whether sufficient crab exist around Adak Island to justify developing a scientifically valid stock assessment survey. Therefore, the methodology to be employed is not the same as would be used in a true stock assessment survey. This area has not been surveyed for 13 years; therefore, little information exists on current distribution and abundance of crab. A highly experienced captain is needed to find crab, identify relative abundance and distribution, and obtain information that would be necessary to develop a directed survey. The captain will have a high degree of latitude in pot placement and soak time in order to meet the goal of finding crab. In areas where crab are found, emphasis will be placed on determining the extent of distribution. This necessitates having flexibility to select fishing locations in response to prior results. Therefore, the captain will use personal experience, best available local information, and results of previous pot lifts to determine where to set pots.

**TIMING:** Start date of approximately September 1 in Adak.

### **LENGTH AND SCOPE OF SURVEY:**

1. Vessel charter starts and ends in Adak.
2. Fishing area includes waters adjacent to Adak Island (see Figure 1) with the exception that there will be no transit, entry, or fishing in the Steller sea lion protection zone at the southwest tip of Adak Island.
3. One vessel with at least 80 typically configured red king crab pots.
4. 12 fishing days: 1 day setting gear and 12 days picking gear (960 pots) (see Table 1).
5. Potential for extra fishing days depending on daily cost and results.

### **VESSEL:**

1. Vessel capable of safely carrying 80-100 pots at one time. If no such vessel is available, a smaller vessel may be used but the vessel will be responsible for getting all pots to Adak before starting work.
2. Strong preference for captain with 5 years or more experience in the Aleutian Islands (AI) red king crab fishery, vessel captains with more Aleutian Islands experience will be rated

higher. In any case, captain must have at least 5 years of experience red king crab fishing in Alaska.

3. Vessel must meet all US Coast Guard requirements.
4. Vessel provides food, fuel, bait, and crew as part of bid and agrees to take one ADF&G approved sampler.

**AREAS TO BE COVERED AND RELATIVE EFFORT:**

1. Area covered limited to being within the Adak Non-IFQ area (see Figure 1).
2. From shoreline generally out to 125 fathom contour (see Table 2, Figure 1) unless vessel must fish deeper (potentially out to 160 fathoms) to find crab or to define a concentration of crab.
  - A. Sitkin Sound: 320 pots total (4 days)
    - East – 160 pots (2 days)
    - West – 160 pots (2 days)
  - B. Yoke Bay: 160 pots (2 day).
  - C. South Adak: 80 pots (1 days).
  - D. South side of Kagalaska and Little Tanaga islands: 160 pots (2 days).
  - E. Adak Strait: 160 pots (2 days).
  - F. Kanaga Sound: 80 pots (1 day); pots not set in area may augment another area.
  - G. NOTE: No fishing or transit will occur within the Steller sea lion no transit zone at the southwest tip of Adak Island. This area takes up small portions of the Adak Strait and South Adak areas listed above (see Figure 1).
3. To ensure good geographic coverage, pots will generally be set at least 1/4 mile apart. Pots may be set closer if necessary to better define a concentration of crab as long as that effort does not detract from adequate geographic coverage.
4. Exact number of pots fished in each area will be adjusted to make effort balance out for the survey as a whole.
5. Exact area and effort may be adjusted in consultation with selected vessel captain depending on actual catches. Soak time and number of pots fished per day may be adjusted in order to maximize effectiveness of fishing effort relative to abundance of crab.

**FISHING DETAILS:**

1. Minimum soak time of 6-8 hours; maximum soak time of approximately 24 hours; 80 pots, or more, per day depending on soak time and density of crab. See Table 1.
2. Use normally configured rectangular red king crab pots.
3. Eight to 10 pounds of chopped herring bait per pot.

**DATA:**

1. All data will be recorded on forms provided (Appendix D).
2. Captain will record latitude, longitude, depth, set and retrieval time for each pot set.
3. Upon bringing a pot on board the vessel, sampler and crew will:
  - a. Separate king crab into categories as follows using commercial measuring sticks as necessary:
    - i. Legal male red king crab (>6.5 inches in carapace width)

- ii. Pre-recruit male red king crab (5.5 – 6.5 inches in carapace width).
  - iii. Juvenile male red king crab (<5.5 inches in carapace width).
  - iv. Female red king crab
4. Number of red king crab in each category will be recorded for each pot lift on forms provided.
  5. Top priority is red king crab data collection as follows:
    - a. Number of legal males (6.5 inches and greater in width of shell)
    - b. Number of pre-recruit males (within 1 inch of legal size, i.e., 5.5 to 6.5 inches in width of shell).
    - c. Number of females and juvenile males (< 5.5 inches in width of shell).
    - d. Sub subsample size of legal males (only if time permits).
  6. Counts of Tanner crab and other species will be made only if time permits in the following order of priority:
    - a. Number of legal male crab.
    - b. Notes on relative abundance of sublegal males and females
    - c. Notes on fish.
  7. All crab and fish will be returned to water unharmed (to the extent practicable) after data collection.
  8. Photographs will be taken as necessary to document unique or interesting catches of large numbers of crab, females, juveniles, etc.

## BUDGET

### BUDGET (\$ x 1000):

#### ADF&G

Sampler, travel, and other expenses	<b>\$15.0</b>
-------------------------------------	---------------

#### AKCRF

Line 100 (Personnel)	\$0.0
----------------------	-------

Line 200 (Travel)	\$3.8
-------------------	-------

1 RT Anchorage/Kodiak	@\$0.6 = \$0.6	
-----------------------	----------------	--

1 RT Anchorage/Adak	@\$1.4 = \$1.4	
---------------------	----------------	--

2 RT Anchorage/Juneau	@ \$.35 = \$0.7	
-----------------------	-----------------	--

Hotel and meals - 4 days	@\$225 = \$0.9	
--------------------------	----------------	--

Car rental - 4 days at	@\$0.05 = \$.2	
------------------------	----------------	--

Line 300 (Contractual)	\$181.0
------------------------	---------

Project management contract:	\$14.0	
------------------------------	--------	--

Available for Vessel Charter	\$166.8	
------------------------------	---------	--

Printing, copying	\$0.2	
-------------------	-------	--

Line 400 (Supplies)	\$0.2
---------------------	-------

Paper, ink, sampling materials, notebooks, forms	
--	--

Line 500 (Equipment)	\$0.0
----------------------	-------

<b>AKCRF TOTAL</b>	<b>\$185.0</b>
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<b>PROJECT TOTAL BUDGET</b>	<b>\$200.0</b>
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Note: Travel costs will be constrained within the budget, but details of travel, such as location, may vary depending on the most efficient location for planned meetings.

## SCHEDULE AND DELIVERABLES

ACTIVITY	PRE-COOP AGREEMENT <sup>1</sup>				COOP AGREEMENT PERIOD					
	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC
Draft operational plan	X									
Finalize vessel charter		X	X							
Finalize operational plan		X	X							
Planning meeting with scientists and vessel captain/owners				X						
Make any necessary final changes to operational plan based on meeting				X	X					
Sampler lined up, if not done so already				X	X					
Vessel field work							X			
Data compilation and analysis								X	X	
Draft report									X	
Final report										X

<sup>1</sup> Pre-project planning will take place before the start date of the coop agreement.

Final report will document all methods and results including areas and times fished, catches, etc. Catch data will be compiled, analyzed, and presented as follows:

- a. Total catch by size category and sex, catch by sub area by size category and sex, average catch per pot by area and sub area by size category and sex.
- b. Data will be summarized in both tabular and graphic form

Discussion will include an assessment of stock status relative to the desirability of future stock assessment work.

## **RESPONSIBILITIES**

Principal Investigator – John Hilsinger – Aleutian King Crab Research Foundation

Operational plan, manage AKCRF budget, charter vessel, project coordination, progress reports, co-author Final Report, ensure completion of deliverables on time.

Co-Principal Investigator – Chris Siddon, Alaska Department of Fish and Game, Juneau, Alaska

Project coordination, provide sampler, manage ADF&G budget, data analysis, co-author Final Report.

## **REFERENCES CITED**

Bowers, F.R., W. Donaldson, and D. Pengilly. 2002. Analysis of the January – February and November 2001 Petrel Bank red king crab commissioner’s permit surveys. . Alaska Department of Fish and Game, Regional Information Report No. 4K02-11, Kodiak.

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

Gish, R.K. 2007. The 2006 Petrel Bank red king crab survey. Alaska Department of Fish and Game, Fishery Management Report No. 07-44, Anchorage.

Gish, R.K. 2010. 2009 Petrel Bank red king crab pot survey: results for red king crab. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report No. 4K10-06, Kodiak.

Granath, K. 2003. Analysis of the November 2002 Adak, Atka, and Amlia Islands red king crab commissioner’s permit survey. Alaska Department of Fish and Game, Regional Information Report No. 4K03-33211, Kodiak.

## **TABLES AND FIGURES**

Table 1. Daily fishing pattern.

		Cumulative Pot Lifts
Day 1	Set 80 pots	0
Day 2	Pick 80 pots and reset	80
Day 3	Pick 80 pots and reset	160
Day 4	Pick 80 pots and reset	240
Day 5	Pick 80 pots and reset	320
Day 6	Pick 80 pots and reset	400
Day 7	Pick 80 pots and reset	480
Day 8	Pick 80 pots and reset	560
Day 9	Pick 80 pots and reset	640
Day 10	Pick 80 pots and reset	720
Day 11	Pick 80 pots and reset	800
Day 12	Pick 80 pots and reset	880
Day 13	Pick 80 pots	960

Note: Actual fishing pattern will depend on weather. Number of days may be increased or decreased depending on vessel costs.

Table 2. Distribution of effort by area.

AREA	NUMBER OF POTS	NUMBER OF DAYS
First Day – Set gear		1
Sitkin Sound	320 Total	4
West Sitkin Sound	160	2
East Sitkin Sound	160	2
Yoke Bay	160	2
S. Kagalaska/Little Tanaga	160	2
S. Adak	80	1
Adak Strait	160	2
Kanaga Sound	80	1
TOTAL AREA	960	13 (12 pulling pots)

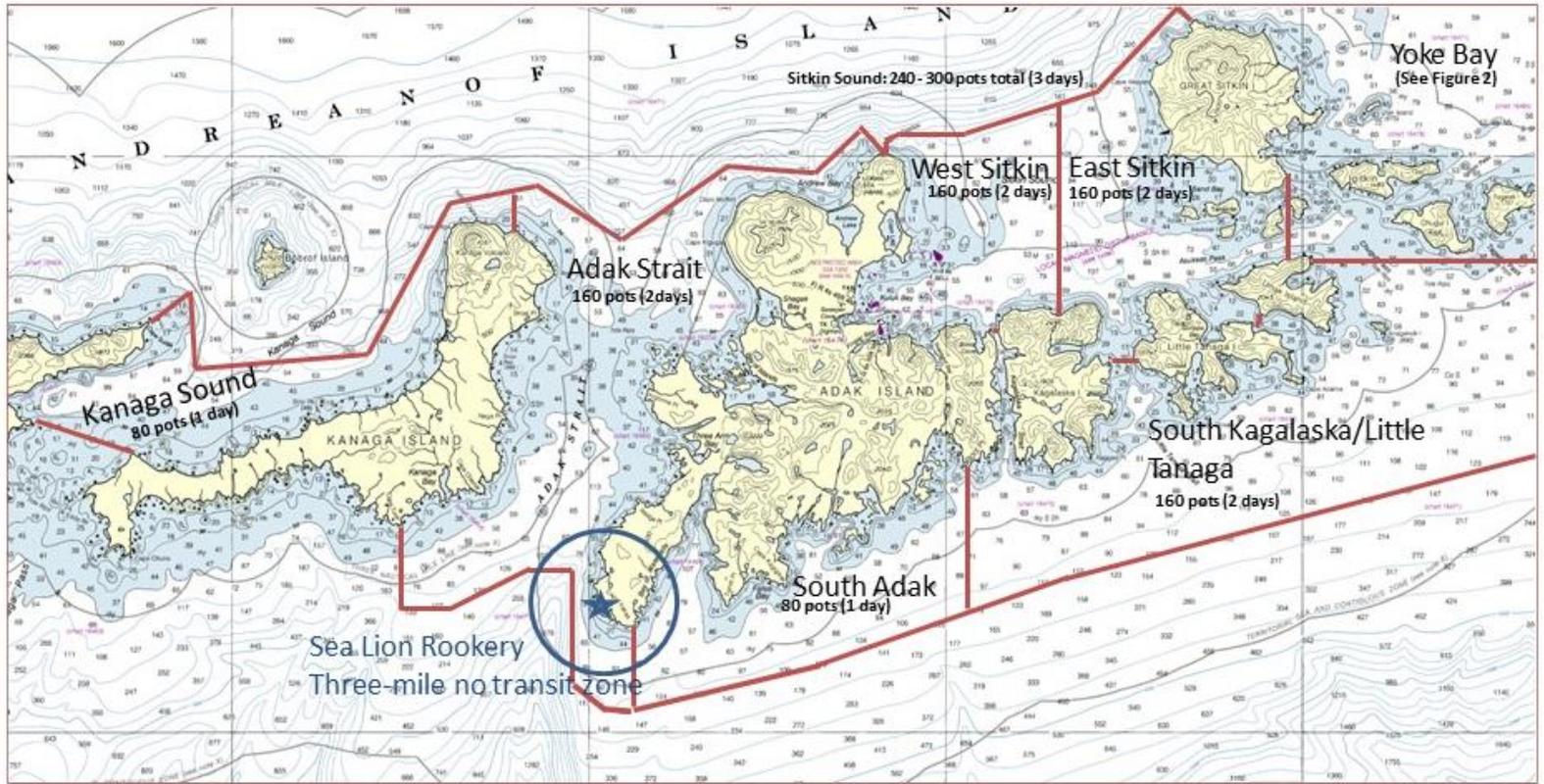


Figure 1. Adak red king crab survey areas, 2015.

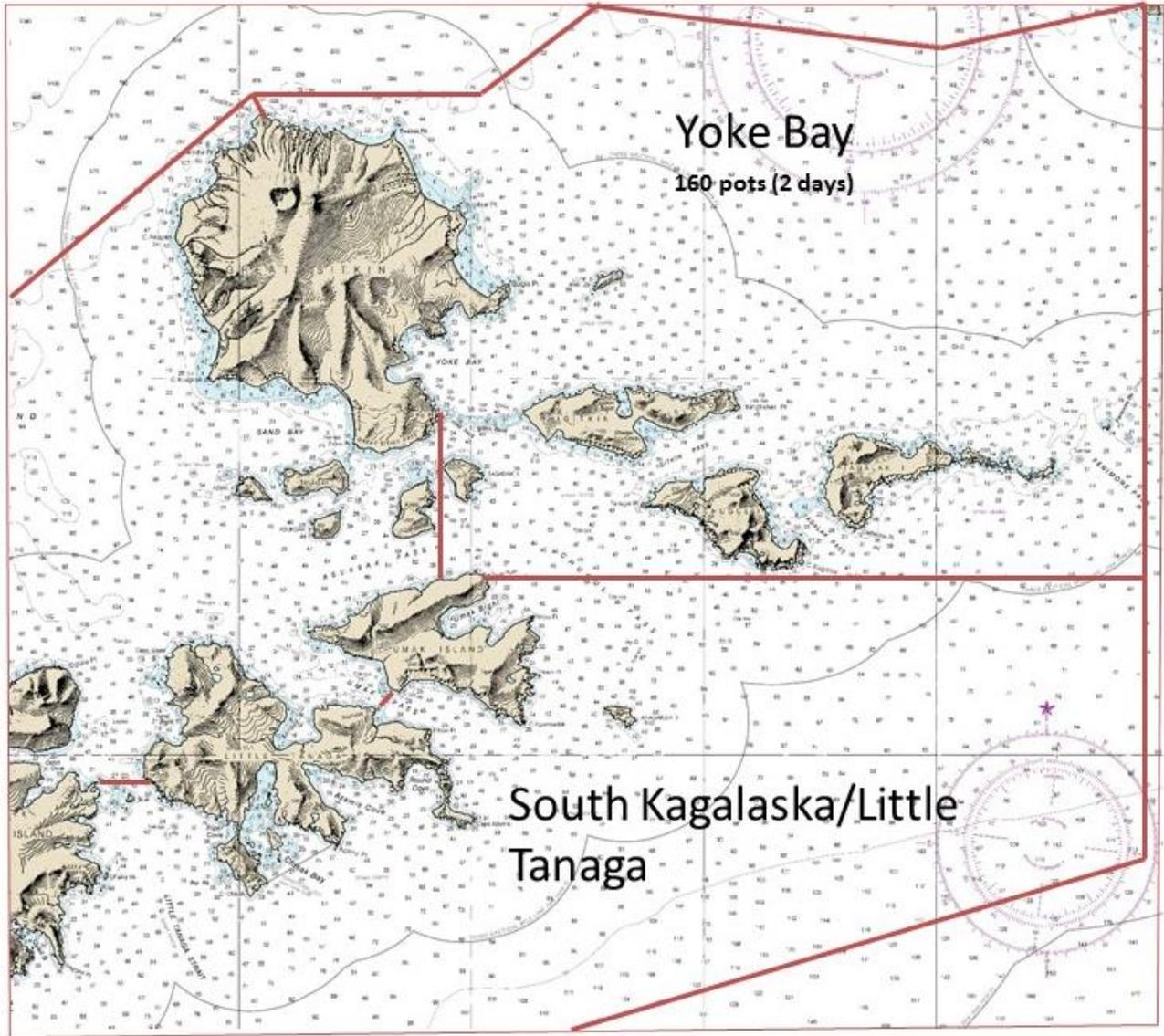


Figure 2. Yoke Bay survey area, 2015.

## **APPENDICES**

Appendix A. Adak Island red king stations, November 2002 (Figure 3 from Granath, 2003).

12

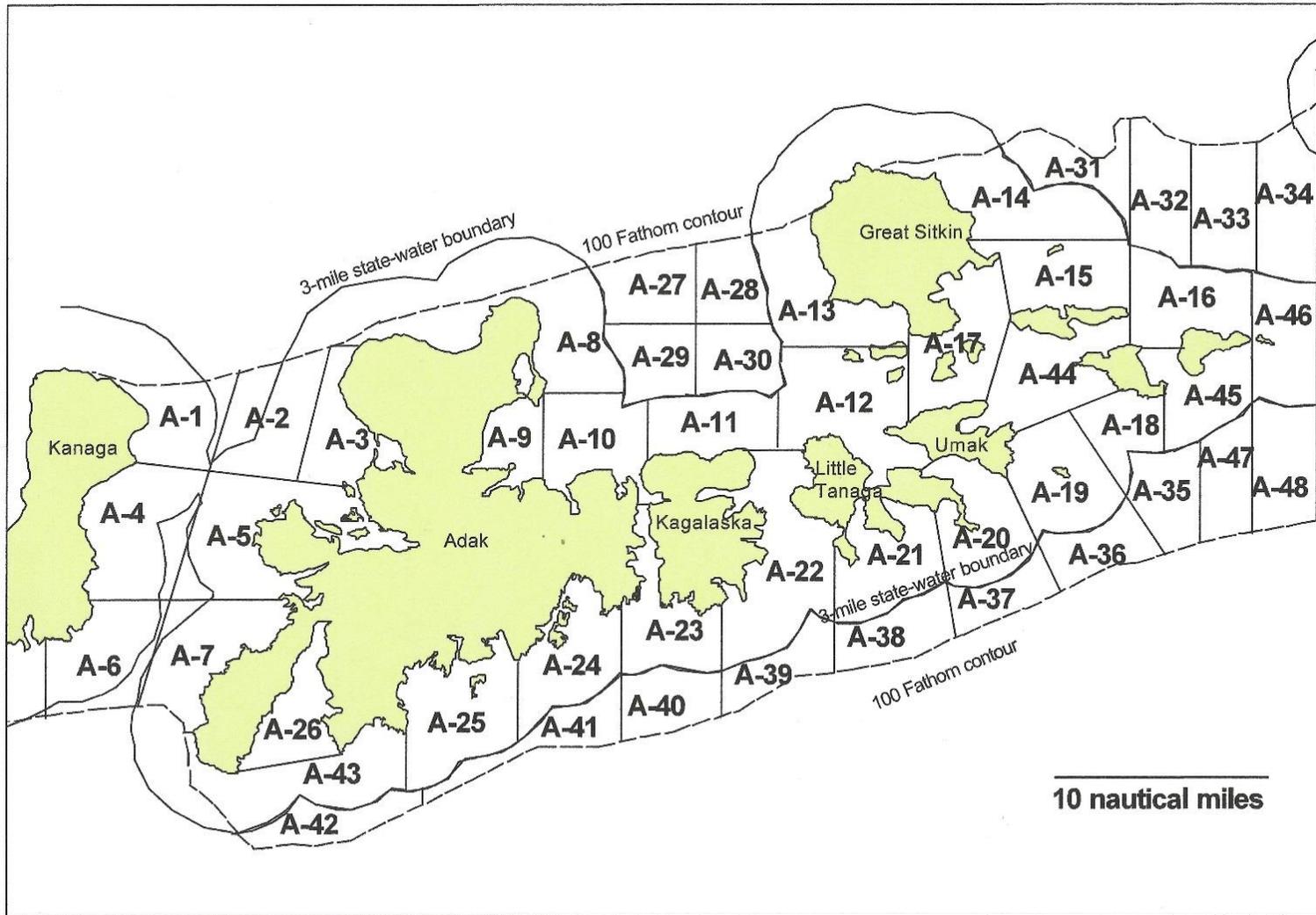


Figure 3. Adak Island red king crab survey stations, November 2002.

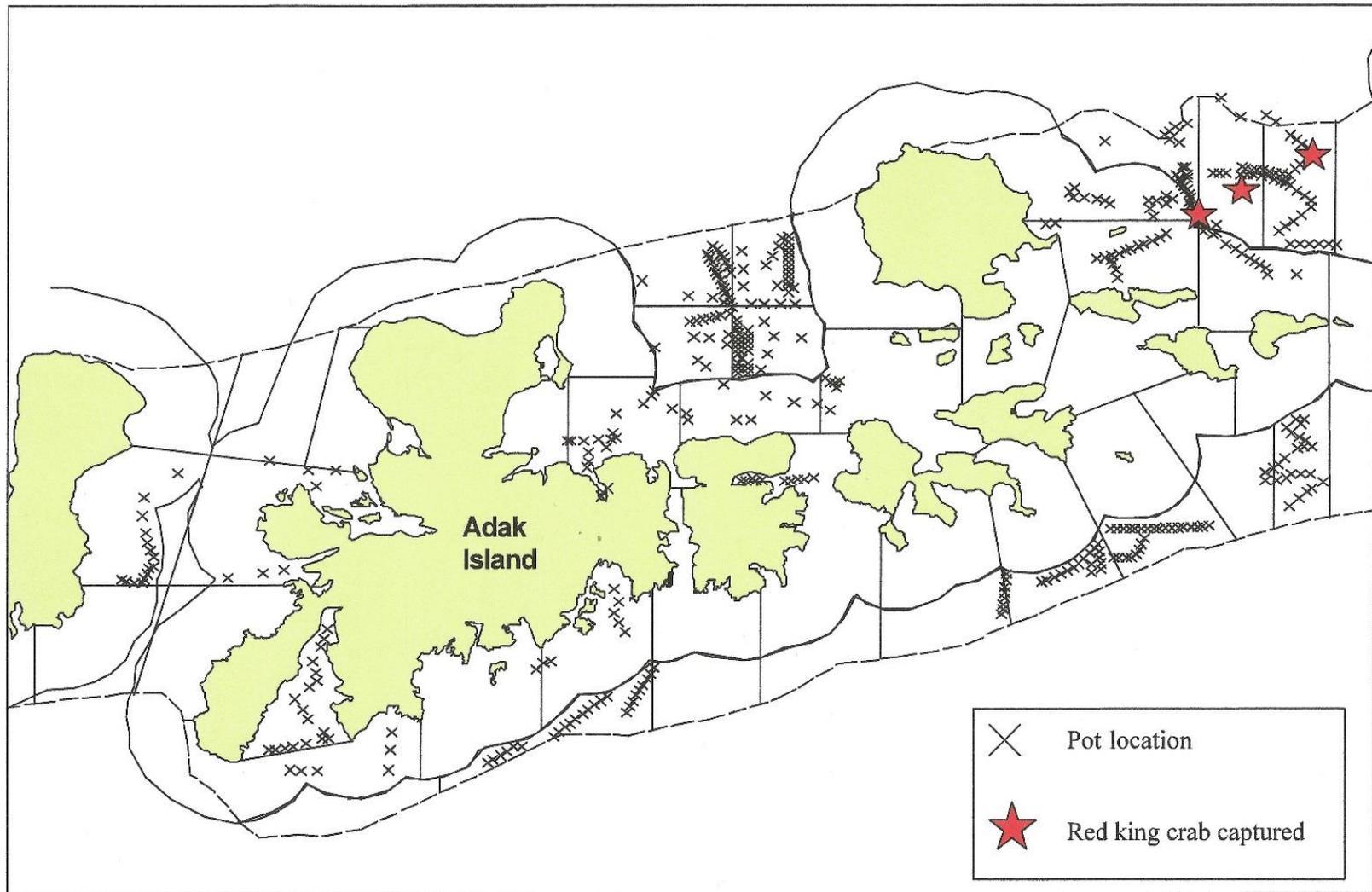


Figure 7. Location of survey pots set in the Adak Island locale, November 2002.

Appendix C. Soak time, depth, and catch information for the November 2002 Adak area red king crab survey (Appendix C Pages 1 and 2 of 4 from Granath, 2003).

Appendix C. Soak time, depth and catch information for the November 2002 Adak, Atka and Amlia Islands red king crab survey.

Adak Island Stations	# Pots	Depth (fathoms)	Soak (hrs.)	Male king crab		Female
				>165mm	<165mm	
A 01	0					
A 02	0					
A 03	0					
A 04	15	53	21	0	0	0
A 05	7	41	24	0	0	0
A 06	0					
A 07	0					
A 08	0					
A 09	0					
A 10	20	66	24	0	0	0
A 11	7	85	26	0	0	0
A 12	6	78	29	0	0	0
A 13	0					
A 14	12	65	27	0	0	0
A 15	19	63	26	0	0	0
A 16	12	61	41	0	0	0
A 17	0					
A 18	0					
A 19	0					
A 20	0					
A 21	0					
A 22	10	44	24	0	0	0
A 23	0					
A 24	8	53	26	0	0	0
A 25	0					
A 26	18	63	22	0	0	0
A 27	25	70	22	0	0	0
A 28	25	69	28	0	0	0
A 29	14	76	40	0	0	0
A 30	25	82	25	0	0	0
A 31	25	66	47	1	0	0
A 32	25	74	39	0	1	0
A 33	25	61	46	2	0	0
A 34	0					
A 35	0					
A 36	25	90	25	0	0	0
A 37	25	90	27	0	0	0
A 38	0					
A 39	0					
A 40	0					
A 41	25	77	45	0	0	0
A 42	0					
A 43	6	64	26	0	0	0
A 44	0					

-Continued-

Appendix C. (page 2 of 4)

Adak Island Stations	# Pots	Depth (fathoms)	Soak (hrs.)	Male king crab		Female
				>165mm	<165mm	
A 45	0					
A 46	0					
A 47	25	76	27	0	0	0
A 48	0					
Total	404			3	1	0
Average		68	30			



## Instructions for Pilot House Log form

This form is based on the standard ADF&G Pilot House Log form (Gish, 2009), which is used to record data related to the location, depth, and soak time of each pot as well as to correlate catch data for the pot to that information. This information is crucial to data analysis and so it must be accurately completed each day gear is set or retrieved.

**Vessel Name:** If not preprinted, enter name of vessel.

**ADF&G Number:** If not preprinted, enter ADF&G number of vessel.

**Captain's Name:** If not preprinted, enter name of captain filling out data forms.

**Page \_\_\_ of \_\_\_:** Pages of this form will be numbered sequentially as they are generated over the course of the survey. When the last page is numbered, that number will be written in the 2nd blank on all pages. For example: if a total of 75 pilot house log pages were used during the survey, 'Page 1 of 75' would be on the first page, and 'Page 75 of 75' would be on the last page.

### Recorded as gear is set:

**Sequential Pot Number:** As pots are set, the captain will number them beginning at '1' and then number each successive pot sequentially as the survey progresses. Sequential pot numbers are unique and will not be reused if a pot is lost.

**Buoy ID:** The identifying numbers and/or letters marked on the trailer buoy of the pot buoy set-up.

**Date:** Date the gear is set, in mm/dd/yy format.

**Time:** The time the gear is set, in local Alaska time and in 24-hour format (0000 – 2359). '0000' is midnight and denotes the beginning of the next day.

**Depth:** The depth in whole fathoms, or to the tenth of a fathom if electronically displayed.

**Bottom Type:** Enter one of five bottom type codes as listed at the bottom of the form.

**Location: North Latitude (N Lat):** Record in degrees and decimal minutes - dd° mm.mm.

**West Longitude (W Long):** Record in degrees and decimal minutes - ddd°mm.mm.

**Logger ID:** If a data logger is used, recode the data logger deck ID number. No more than one logger will be deployed at a station.

### Recorded as gear is retrieved

**Date:** The date the gear is lifted, in mm/dd/yy format.

**Time:** The time the gear is lifted, in local Alaska time and in 24-hour format (0000 – 2359). '0000' is midnight and denotes the beginning of the next day.

**Gear Performance:** Gear performance will be assessed to the best of the captain's ability for every pot lifted. Codes to be used are at the bottom of the form.

**POT LIFT DATA**

Date: \_\_\_\_\_ Vessel Name: \_\_\_\_\_ Fishing Area: \_\_\_\_\_ Page \_\_\_\_\_ of \_\_\_\_\_

Sequential Pot Number	Bouy Number	Photo Number	Number Legal Males	Number Pre-Recruit Males	Number Juvenile Males	Number Females
Notes:						
Notes:						
Notes:						
Notes:						
Notes:						
Notes:						
Notes:						
Notes:						

## Instructions for the Pot Lift Data form

This form is used to record red king crab catches for every pot lifted during the survey. It must be accurately tied to the Pilot House Log by ensuring the correct Sequential Pot Number and Bouy Number are entered for each pot lifted

**Date:** Enter the date in the mm/dd/yy format.

**Vessel Name:** If not preprinted, enter the name of the vessel.

**Fishing Area:** Use the area names from Figures 1 and 2. That is, West Sitkin, East Sitkin, Yoke Bay, South Kagalaska/Little Tanaga, South Adak, Adak Strait, and Kanaga Sound.

**Page \_\_\_ of \_\_\_ :** The pages of this form will be numbered sequentially as they are generated each day over the course of the survey. When the last page for the day is numbered, that number will be written in the 2nd blank on all the pages for that day. For example: A total of 10 Pot Lift Data pages were used on one day during the survey. 'Page 1 of 10' would be on the first page, and 'Page 10 of 10' would be on the last page. The next day's pages would be similarly numbered for that day.

### *Recorded as the gear is picked.*

**Sequential Pot Number:** As pots are set, the captain will number them beginning at '1' and then number each successive pot sequentially over the course of the survey. Sequential pot numbers are unique and will not be reused if a pot is lost. The Sequential Pot Number assigned by the captain should be entered here.

**Buoy ID:** The identifying numbers and/or letters marked on the trailer buoy of the pot buoy set-up.

**Photo Number:** The sampler will take a photo of each pot when it is lifted on deck. The photo number is recorded in this space.

**Number Legal Males:** Number of males >6.5 inches in carapace width will be counted and entered. A 6.5" commercial measuring stick is used if there is doubt whether the animal is legal or not.

**Number Pre-Recruit Males:** A size range of 5.5 to 6.5 inches is used to estimate the abundance of male crabs that are within one molt increment of legal size. Number of males between 5.5" and 6.5" inches in carapace width will be counted and entered. A 5.5" or 6.5" commercial measuring stick is used if there is doubt whether the animal is a pre-recruit or not.

**Number Juvenile Males:** Number of males less than 5.5 inches in carapace width will be counted and entered. A 5" Commercial measuring stick can be used if there is doubt the animal is less than 5.5 inches.

**Number Females:** Number of total females will be counted and entered.

**Notes:** This space provides a place to record items of interest if there is sufficient time. Items of interest might include biological observations, number of legal Tanner crabs, incidental species, etc.