

Regional Information Report No. 1J10-18

**Golden King Crab Observer Program Summary
Report, 1999/00 through 2008/09 Seasons**

by

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and

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November 2010

Alaska Department of Fish and Game

Division of Commercial Fisheries



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Weights and measures (metric)		General		Measures (fisheries)	
centimeter	cm	Alaska Administrative Code	AAC	fork length	FL
deciliter	dL			mid-eye-to-fork	MEF
gram	g	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	mid-eye-to-tail-fork	METF
hectare	ha			standard length	SL
kilogram	kg			total length	TL
kilometer	km	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.		
liter	L		@		
meter	m	at		Mathematics, statistics	
milliliter	mL	compass directions:		<i>all standard mathematical signs, symbols and abbreviations</i>	
millimeter	mm	east	E	alternate hypothesis	H _A
		north	N	base of natural logarithm	<i>e</i>
Weights and measures (English)		south	S	catch per unit effort	CPUE
cubic feet per second	ft ³ /s	west	W	coefficient of variation	CV
foot	ft	copyright	©	common test statistics	(F, t, χ^2 , etc.)
gallon	gal	corporate suffixes:		confidence interval	CI
inch	in	Company	Co.	correlation coefficient	
mile	mi	Corporation	Corp.	(multiple)	R
nautical mile	nmi	Incorporated	Inc.	correlation coefficient	
ounce	oz	Limited	Ltd.	(simple)	r
pound	lb	District of Columbia	D.C.	covariance	cov
quart	qt	et alii (and others)	et al.	degree (angular)	°
yard	yd	et cetera (and so forth)	etc.	degrees of freedom	df
		exempli gratia	e.g.	expected value	<i>E</i>
Time and temperature		(for example)		greater than	>
day	d	Federal Information Code	FIC	greater than or equal to	≥
degrees Celsius	°C	id est (that is)	i.e.	harvest per unit effort	HPUE
degrees Fahrenheit	°F	latitude or longitude	lat. or long.	less than	<
degrees kelvin	K	monetary symbols		less than or equal to	≤
hour	h	(U.S.)	\$, ¢	logarithm (natural)	ln
hour	h	months (tables and figures): first three letters	Jan, ..., Dec	logarithm (base 10)	log
minute	min	registered trademark	®	logarithm (specify base)	log ₂ , etc.
second	s	trademark	™	minute (angular)	'
		United States (adjective)	U.S.	not significant	NS
Physics and chemistry		United States of America (noun)	USA	null hypothesis	H ₀
all atomic symbols		U.S.C.	United States Code	percent	%
alternating current	AC	U.S. state	use two-letter abbreviations (e.g., AK, WA)	probability	P
ampere	A			probability of a type I error	
calorie	cal			(rejection of the null hypothesis when true)	α
direct current	DC			probability of a type II error	
hertz	Hz			(acceptance of the null hypothesis when false)	β
horsepower	hp			second (angular)	"
hydrogen ion activity (negative log of)	pH			standard deviation	SD
parts per million	ppm			standard error	SE
parts per thousand	ppt, ‰			variance	
volts	V			population	Var
watts	W			sample	var

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ABSTRACT

Observing onboard commercial golden king crab vessels during the golden king crab fishery in Southeast Alaska was initiated during the 1999/00 season, with the purpose of collecting data from management areas that were not being sampled dockside. Operators of vessels with observers onboard were asked to close the escape rings, or 9-in stretch mesh panel, of up to 35 of their pots. This program currently provides the only opportunity to collect data on sublegal and female golden king crabs, and to describe precise locations and depth of capture by size and sex class. To date, a total of 40,261 crabs have been measured in 7 management areas; during the 2008/09 season, 6 trips were conducted in 5 management areas, and 5,505 crabs were measured.

Key words: Golden king crab, *Lithodes aequispinus*, Southeast Alaska, observer program, stock assessment

INTRODUCTION

Golden king crabs, *Lithodes aequispinus*, (GKC) are harvested from deep waters, between 100 and 350 fathoms, in northern Southeast Alaska (Figure 1); although lesser numbers are harvested from southern Southeast Alaska (Figure 2). GKC commercial fishing grounds are located at the confluences of large straits and sounds, and the three most important grounds are respectively, the confluences of Icy Strait, Lynn Canal, and Chatham Strait; of Chatham Strait and western Frederick Sound, and of Stephens Passage and Frederick Sound. From the fishermen's perspective, golden king crab fishing conditions are more demanding than for red king crab, *Paralithodes camtschaticus*, or the Tanner crab, *Chionoecetes bairdi*, fisheries, because the golden king crab grounds are more exposed to adverse weather conditions, located in greater depths, and subject to stronger tidal exchanges and heavy currents.

Commercial vessels participating in the golden king crab fishery are primarily salmon tenders, salmon purse seine vessels, and a few large drift gillnet boats. Fishing gear has gradually evolved from side-loading king crab pots (7-ft x 7-ft x 30-in) to the top loading conical or pyramid-style pots, which are most commonly used at present. However, because of the challenging fishing conditions fishermen prefer heavier gear, and use different buoy line and buoy trains. Soak times are generally longer for GKC, 24–48-hrs compared to 18–24-hrs for RKC or Tanner crab fishing.

Management of the commercial GKC fishery is based on a management plan and policies that have been reviewed and approved by the Alaska Board of Fisheries. There are six primary elements of the management plan: 1) a season that opens concurrently with the Tanner crab fishery, 2) male-only harvest, 3) minimum legal carapace width of 7 inches, 4) vessel limit of 100 pots, 5) seven separate management areas, and 6) guideline harvest ranges based on historic harvest levels (Hebert et al. 2008).

There is no fishery-independent stock assessment program for golden king crab in Southeast Alaska. Stock assessment consists of a triennial evaluation of four types of fishery-dependent information: fish tickets, logbooks, dockside sampling and onboard observer sampling. Stock status is determined as a result of this evaluation. Based on stock status, guideline harvest levels within the regulatory guideline harvest range are determined and targeted inseason by managers.

OBJECTIVES

The golden king crab observer program was initially established during the 1999/2000 season, but discontinued after the 2003/04 season. The primary objectives were gathering data on the fishing grounds, specifically in areas lacking biological data. The program was reinstated beginning in the 2005/06 season with expanded objectives, which follow:

1. Describe the size and sex composition of golden king crab captured in a legal crab pot.

2. Describe the size and sex composition of golden king crab captured in a crab pot with the escape rings closed.
3. Describe the bycatch species composition in the golden king crab fishery.
4. Describe fishing methods common in the golden king crab fishery, including bait, gear, and soak times.
5. Describe the commercial fishing grounds within each management area.
6. Describe ontogenetic depth distribution of golden king crab.
7. Describe any periodicity in golden king crab life history.
8. Obtain data on chela height allometry for golden king crab to define Southeast Alaska and management area-specific size at maturity.

METHODS

ADF&G employees are placed onboard volunteer vessels during the commercial GKC fishery to sample crabs. Methods are detailed elsewhere (Messmer et al. 2010).

RESULTS

From 1999/00 through 2003/04 seasons, 24 observer trips were conducted with 18,438 crab sampled from 1,713 pots (Table 1). Beginning in the 2006/07 season, the observer program was reinstated, since then 22 trips have been conducted with 40,261 crab sampled from 3,806 pots.

During the 2006/07 season, nine observer trips were conducted over 54 days in five management areas: Frederick Sound, North Stephens Passage, Mid Chatham Strait, Northern, and Icy Strait. Observers included; Scott Kelly, Kyle Hebert, Gretchen Bishop, Julie Bednarski, Chris Siddon, Adam Messmer and Karla Bush (Table 2). A total of 11,711 crab were sampled from 828 pots in 2007 and 77% of the crabs sampled were measured for biological data.

During the 2007/08 season, seven observer trips were conducted over 48 days in six management areas: Frederick Sound, North Stephens Passage, Mid Chatham Strait, Lower Chatham Strait, Northern, and Icy Strait. Observers included; Julie Bednarski, Chris Siddon, Adam Messmer and Karla Bush (Table 2). A total of 11,598 crabs were sampled from 784 pots in 2008 and 82% of the crabs sampled were measured for biological data.

During the 2008/09 season, six observer trips were conducted over 24 days in five management areas: Mid-Chatham, North Stephens Passage, Northern, Lower Chatham and Icy Strait. Observers included; Julie Bednarski, Chris Siddon, Adam Messmer and Karla Bush (Table 2). A total of 5,505 crabs were sampled from 589 pots in 2009 and 95% of the crabs sampled were measured for biological data.

DISCUSSION

Data from the observer program provides the only biological information collected on sublegal, and female GKC, and with time, should provide life history insights. The size composition data collected while observing has the advantage of including prerecruit males, and as such lengthens the predictive horizon for stock assessment. In addition to size composition, chela height data is collected, which will allow determination of the size of GKC maturity, both throughout the Southeast region, and by management area. Other data collected includes pot locations, depth, bycatch, soak time, and gear configuration. Data on GKC distribution by size and sex class could be useful for determining survey strata boundaries and methods in the future. Data on fishing

methods and gear should prove useful to managers, as they assess the impacts to the fishery of proposed management measures.

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TABLES AND FIGURES

Table 1.—Effort distribution by management area in the golden king crab onboard observer program for Southeast Alaska, 1999/00–2008/09 commercial seasons.

Management area	Season	Observed pot pulls	Number in observed pot pulls	
			Crab captured	Crab measured
East Central	1999/00	116	1,360	1,360
	2000/01	48	561	555
	2001/02	278	3,168	3,014
	2002/03	92	2,380	1,259
	2003/04	328	4,297	3,685
	2006/07	303	6,735	4,824
	2007/08	80	2,183	1,931
	2008/09	0	0	0
Total		1,245	20,684	16,628
Mid-Chatham	1999/00	122	1,089	1,089
	2000/01	186	1,004	1,004
	2001/02	76	1,189	1,126
	2002/03	69	973	729
	2006/07	99	1,948	1,387
	2007/08	312	6,227	5,009
	2008/09	63	1,563	1,541
	Total		927	13,993
Northern	2000/01	111	543	540
	2003/04	20	95	95
	2006/07	250	1,395	1,293
	2007/08	152	1,639	1,114
	2008/09	101	1,393	1,391
Total		634	5,065	4,433
Southern	1999/00	49	389	389
Lower Chatham	1999/00	28	299	279
	2000/01	104	606	609
	2007/08	125	638	638
	2008/09	161	1,778	1,772
Total		418	4,867	3,298
Icy Strait	2002/03	74	482	482
	2006/07	126	1,170	1,170
	2007/08	77	474	450
	2008/09	80	300	299
Total		357	2,426	2,401
North Stephens	2006/07	50	463	391
	2007/08	38	437	366
	2008/09	88	471	470
Total		176	1,371	1,227
Region totals		3,806	48,795	40,261

Table 2.—Summary of onboard observer trips conducted during the Southeast Alaska golden king crab fishery during 2006/07, 2007/08, 2008/09 seasons.

Season	Trip no.	Location	ADF&G Observer	Days at sea
2006/07	1	Icy Strait/Northern	Chris Siddon	8
	2	Icy Strait	Gretchen Bishop	4
	3	East Central	Julie Bednarski	8
	4	East Central	Adam Messmer	10
	5	Northern	Scott Kelly	2
	6	Northern	Kyle Hebert	2
	7	Northern	Karla Bush	6
	8	North Stephens	Adam Messmer	5
	9	Mid-Chatham	Adam Messmer	9
Total				54
2007/08	1	Icy Strait/Northern	Chris Siddon	6
	2	East Central	Adam Messmer	5
	3	Icy Strait/Northern/ Mid-Chatham	Julie Bednarski	8
	4	North Stephens	Karla Bush	4
	5	Mid-Chatham	Adam Messmer	8
	6	Mid-Chatham	Julie Bednarski	9
	7	Lower Chatham	Adam Messmer	8
Total				48
2008/09	1	Icy Strait/Northern	Adam Messmer	9
	2	Northern	Julie Bednarski	7
	3	Mid-Chatham	Chris Siddon	7
	4	North Stephens	Karla Bush	3
	5	North Stephens	Karla Bush	1
	6	Lower Chatham	Adam Messmer	2
Total				29

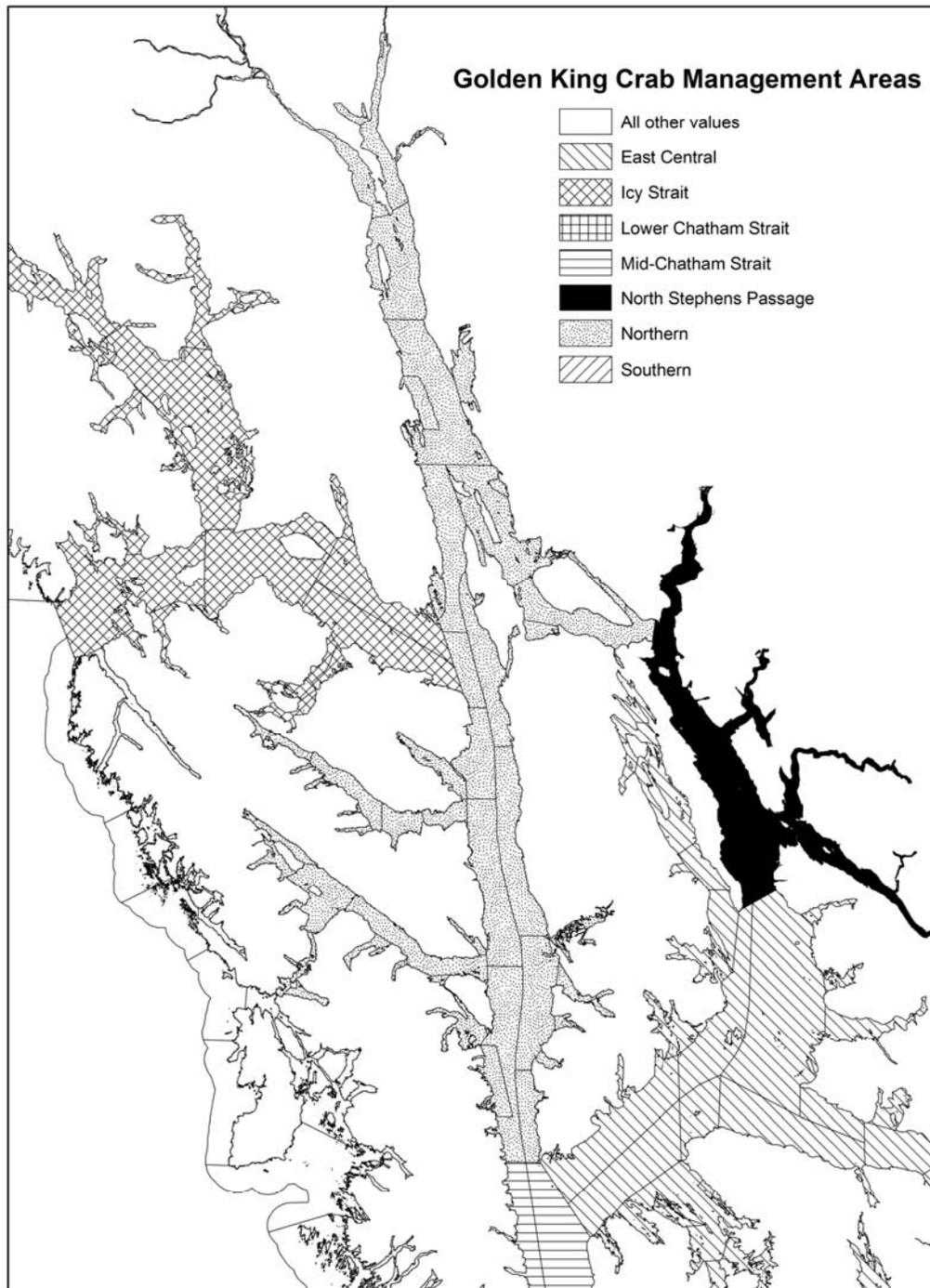


Figure 1.—Management area boundaries for the golden king crab fishery in Northern Southeast Alaska.

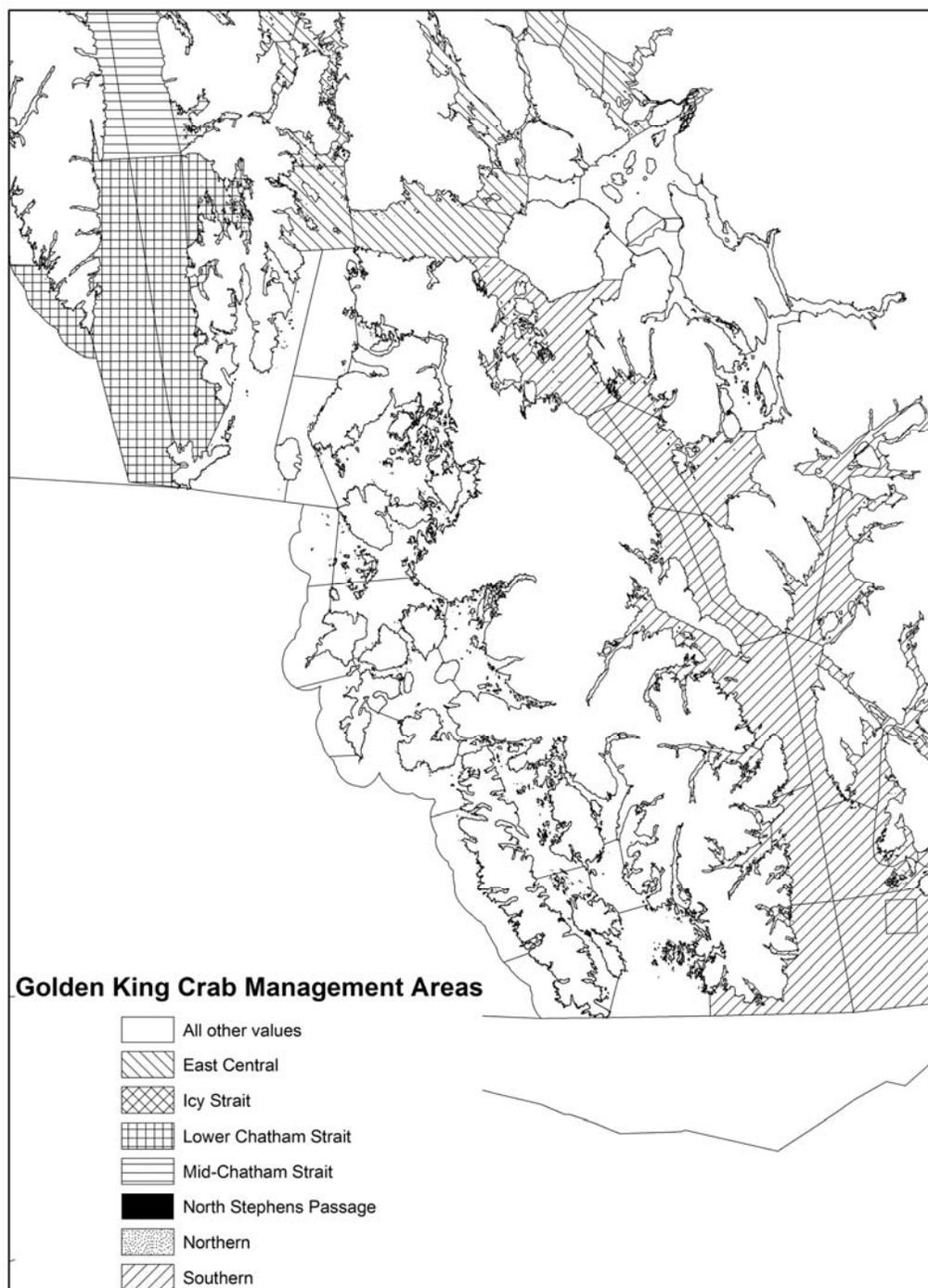


Figure 2.—Management area boundaries for the golden king crab fishery in Southern Southeast Alaska.