Fishery Management Report No. 08-62

2009 Report to the Alaska Board of Fisheries on Region 1 Shrimp, Crab, and Scallop Fisheries

by

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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.

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)

Measures (fisheries)

fork length	FL
mideye to fork	MEF
mideye to tail fork	METF
standard length	SL
total length	TL

Mathematics, statistics

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

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The Fishery Management Reports series was established in 1989 by the Division of Sport Fish for the publication of an overview of management activities and goals in a specific geographic area, and became a joint divisional series in 2004 with the Division of Commercial Fisheries. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: http://www.sf.adfg.state.ak.us/statewide/divreports/html/intersearch.cfm. This publication has undergone regional peer review.

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TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF TABLES (Continued)

LIST OF FIGURES

ABSTRACT

This report reviews the commercial fisheries for shrimp, Dungeness crab, king crab, Tanner crab and scallops in Region I, which includes Southeast Alaska (Registration Area A) and Yakutat (Registration Area D).

Shellfish harvests in Region I totaled 7.3 million pounds valued at over $17 million during the last completed season. Ranking by value based on the last season when a fishery was conducted, the top five fisheries were Southeast Dungeness crab, Southeast golden king crab, Southeast shrimp pot, Southeast red and blue king crab, and Southeast Tanner crab.

Most of the shellfish fisheries in Region I are fully developed. Some fisheries have been stable or increasing over the past several years (Southeast Dungeness crab and Southeast golden king crab), while others have experienced declines (Southeast red king crab and Southeast Tanner crab). Some stocks have been unable to sustain consistent and significant harvests due to poor market conditions (e.g. Southeast beam trawl shrimp). Some Yakutat stocks are at very low levels and have been designated as collapsed. These include Dungeness crab and Tanner crab, which are in recovery status and will remain closed until signs of recovery are apparent and management plan and stock assessment plans are developed to provide sustainable harvest.

The ability of the department to manage for sustained yields varies among the fisheries due to different levels of development of stock assessment programs and management plans. Only the Southeast red king crab fishery has a history of stock assessment, and a well-developed management plan. Southeast Tanner crab and shrimp pot fisheries and Yakutat scallops, have developing stock assessment programs but no abundance-based management plans. Southeast Dungeness and golden king crab, Yakutat Tanner and Dungeness crab, Yakutat shrimp pot, and Southeast beam trawl shrimp have neither stock assessment programs nor management plans, making them the highest risk fisheries.

Key words: Dungeness crab, *Cancer magister*, red king crab, *Paralithodes camtschaticus*, golden king crab, *Lithodes aequispinus*, Tanner crab, *Chionoecetes bairdi*, spot shrimp, *Pandalus platyceros*, coonstripe shrimp, *Pandalus hypsinotus*, northern shrimp, *Pandalus borealis*, sidestripe shrimp, *Pandalopsis dispar*, weathervane scallop, *Patinopecten caurinus*, Southeast Alaska, Yakutat, Fisheries management, Invertebrate fisheries, Shrimp, Crab, Scallop, Harvest statistics

CHAPTER 1: INTRODUCTION TO SHELLFISH FISHERIES

INTRODUCTION

This report reviews the commercial fisheries for shrimp, Dungeness crab, king crab, Tanner crab and scallops in Region I, which includes Southeast Alaska (Registration Area A) and Yakutat (Registration Area D). Area A encompasses all waters within the Alexander Archipelago and offshore waters from Dixon Entrance to Cape Fairweather, divided into Districts 1 through 16 (Figure1.1). Area D encompasses state waters from Cape Fairweather to Cape Suckling, divided into Districts 81 through 91. Shellfish fisheries in these areas are primarily in state waters; however, the weathervane scallop fishery is managed under state authority, but extends into the Exclusive Economic Zone (EEZ).

This is the first Alaska Board of Fisheries (BOF) meeting where proposals for all Region I shellfish fisheries are considered in one meeting. In previous years, proposals for Dungeness crab, shrimp, and scallops were combined into one meeting held in Southeast Alaska, while king and Tanner crab proposals were considered separately during the statewide king and Tanner crab Board of Fisheries meeting. The reason for including the Southeast king and Tanner crab meeting in the Southeast meeting is to allow for increased participation of stakeholders.

Most of the shellfish fisheries in Region I are fully developed. Some fisheries have been stable or increasing over the past several years (Southeast Dungeness crab and Southeast golden king crab), while others have experienced declines (Southeast red king crab and Southeast Tanner crab). Some stocks have been unable to sustain consistent and significant harvests due to poor market conditions (e.g. Southeast beam trawl shrimp). Some Yakutat stocks are at very low levels and have been designated as collapsed. These include Dungeness crab and Tanner crab, which are in recovery status and will remain closed until signs of recovery are apparent and management plan and stock assessment plans are developed to provide for sustained yields.

Limited entry has played a significant role in harvest and effort trends. All Southeast Alaska shellfish fisheries are currently under limited entry. Recently limited fisheries include Southeast Dungeness crab, Southeast shrimp pot, and Southeast beam trawl shrimp. In contrast, all Yakutat shellfish fisheries except for Weathervane scallops, which recently underwent limited entry for state waters, remain open access.

Shellfish harvests in Region I totaled 7.3 million pounds valued at over $17 million during the last completed season (Table 1.1). Ranking by value based on the last season when a fishery was conducted, the top five fisheries were Southeast Dungeness crab, Southeast golden king crab, Southeast shrimp pot, Southeast red and blue king crab, and Southeast Tanner crab. Ranking by landed poundage, the top five fisheries were Southeast Dungeness crab, Southeast shrimp pot, Southeast Tanner crab, Southeast golden king crab, and Southeast red and blue king crab.

SHELLFISH RESEARCH AND MANAGEMENT

The ability of the department to manage for sustained yields varies among the fisheries due to different levels of development of stock assessment programs and management plans. Only the Southeast red king crab fishery has a history of stock assessment, and a well-developed management plan. Other shellfish fisheries lack either developed management plans or stock assessment programs or both and have higher risks of over-exploitation. Southeast Tanner crab and shrimp pot fisheries and Yakutat scallops, have developing stock assessment programs but no abundance-based management plans. Southeast Dungeness and golden king crab, Yakutat Tanner and Dungeness crab, Yakutat shrimp pot, and Southeast beam trawl shrimp have neither stock assessment programs nor management plans, making them the highest risk fisheries.

Stock assessment surveys currently conducted in Southeast Alaska include an annual red king crab pot survey, an annual Tanner crab pot survey, and an annual shrimp pot survey. Surveys for Tanner crab and pot shrimp are relatively recent additions that have been conducted for twelve years or less. In the Yakutat Area, a triennial scallop dredge and video transect survey has been conducted for two cycles. Short-term surveys that have been conducted in the past include several Southeast Alaska Dungeness crab pot surveys, a pot survey to describe the distribution of bitter crab syndrome in Tanner crab, and a trawl survey to estimate stock abundance and size class composition of northern and sidestripe shrimp in Yakutat Bay, which was conducted on seven occasions, ending in 1984. In 2004, the department conducted a test fishery for Dungeness crab in District 16 and a survey in the Yakutat Area for the sole purpose of collecting evidence to evaluate stock recovery. Catch was extremely low in both areas, revealing that no recovery of the stock was evident. Similarly, in 2004 the department briefly opened the Yakutat Tanner crab fishery with the goal to determine the stock level; however extremely low catches indicated that stock remained in a collapsed status as well.

Dockside sampling and skipper interviews are routinely conducted in Southeast Alaska for all crab and shrimp fisheries. The objectives of dockside sampling are to gather data and information on size frequency, shell condition, average weight, sex (shrimp only), fishing location, effort levels, and estimates of average catch per unit of effort (CPUE). Until onboard observer programs were implemented these data provided the only biological information for those fisheries that lack stock assessment surveys, which include golden king crab, Dungeness crab, and shrimp trawl. The collected information allows assessment of the relative strength of various components (e.g. size, recruits) of the commercially exploited populations, and a qualitative estimate of stock condition. However, for Yakutat shellfish fisheries even basic port sampling has not been systematically conducted. Harvest and effort data is also collected through the fish ticket system for both Yakutat and Southeast Alaska shellfish fisheries.

Onboard observers were placed sporadically on vessels in the golden king crab fishery beginning with the 2000/2001 season and the beam trawl shrimp fishery beginning with the 2001/2002 season. In 2007, the department expanded the golden king crab onboard observer program and has conducted regular sampling since that time. Through this voluntary program, the department obtains information on catch distribution as well as indices of abundance for the non-legal component of the population including pre-recruit and females that are not available for sampling dockside.

Logbook information is collected from the red king, golden king, and Tanner crab fisheries in Southeast Alaska and for the shrimp trawl fisheries in non-traditional areas as well as for the

directed sidestripe shrimp trawl fisheries. This type of information is particularly valuable for management of the crab fisheries, because it provides catch and pot lift information and enhances call-ins used for in-season management.

TASK FORCE STATUS

In 2000, the department began working with the Southeast Alaska King and Tanner Crab Task Force (KTTF). The original intent of this task force was to develop a management plan for Southeast Alaska Tanner crab and develop methods to reduce harvest pressure in core Tanner crab areas. The department and KTTF conduct a joint meeting annually to review stock status of all Southeast Alaska king and Tanner crab and exchange information regarding management activities and plans.

The Southeast Alaska Dungeness Crab Task Force was formed through a charge from the Board in 2000. This task force is currently inactive and the department has not met with a Dungeness crab stakeholder group since the last BOF meeting in 2006.

The Southeast Alaska Pot Shrimp Task Force was formed in 2003 and conducts an annual joint meeting with the department. Goals of this task force are to review pot shrimp stock status and exchange information and ideas to further improve fishery management.

STAFF

All Region I crab, beam trawl shrimp, and scallops fisheries are managed by the regional shellfish management staff. All Region I shellfish stock assessment and research programs are managed by the regional shellfish research staff. The shrimp pot fishery is the only shellfish fishery managed individually by area offices within the region. These fisheries are managed by Area Management Biologists under the supervision of Bill Davidson, Regional Management Coordinator, stationed in Sitka. All other marine fisheries research (non-salmon) and management is under the supervision of Kyle Hebert, Regional Marine Fisheries Supervisor, stationed in Douglas. The regional stock biology staff conducts dockside sampling and skipper interviews with assistance from the shellfish and area management staffs.

SHELLFISH PROJECT STAFF

Name	Title	Job Class	Location
Kyle Hebert	Region I Marine Fisheries Supervisor	Fisheries Biologist IV	Douglas
Bill Davidson	Region I Fisheries Management Coordinator	Fisheries Biologist IV	Sitka
Joe Stratman	Region I Shellfish Management Project Leader	Fisheries Biologist III	Petersburg
Gretchen Bishop	Region I Shellfish Research Project Leader	Fisheries Biologist III	Douglas
Chris Siddon	Shellfish and Dive Fisheries Biometrician	Biometrician III	Douglas
Vacant	Assistant Shellfish Management Biologist	Fisheries Biologist II	Douglas
Julie Bednarski	Assistant Shellfish Research Biologist	Fisheries Biologist II	Douglas
Adam Messmer	Shellfish Research Biologist	Fisheries Biologist I	Douglas
Kellii Wood	Shellfish Technician	Fish & Wildlife Technician IV	Petersburg

CHAPTER 1—TABLES AND FIGURES

Table 1.1–Registration Area A (Southeast Alaska) and Registration Area D (Yakutat) list of shellfish fisheries, harvest, and approximate exvessel values from the last completed season or calendar year.

Area Season	Fishery	Harvest (pounds)	Approximate exvessel Value[a]
Southeast			
2005/2006	Red and blue king crab	209,799	$1,099,000
2007/2008	Tanner crab (*C. bairdi*)	605,062	$1,021,000
2007/2008	Golden king crab	247,302	$2,856,000
2007/2008	Dungeness crab	5,408,355	$11,321,000
2007/2008	Pot shrimp	722,028	$2,014,000
2007/2008	Beam trawl shrimp	38,410	$108,000
	Subtotal	7,230,956	$17,300,000
Yakutat			
2000/2001	Red and blue king crab	*	*
1999/2000	Tanner crab	*	*
1999/2000	Dungeness crab	65,386	$133,000
2007/2008	Pot shrimp	*	*
2004/2005	Otter trawl shrimp	*	*
	Subtotal	*	*
	Grand Total	7,296,342	$17,435,000

[a] This column is calculated from the average price per lb of all tickets having values indicated on them.

* Fewer than 3 vessels were fished during the season; information is confidential.

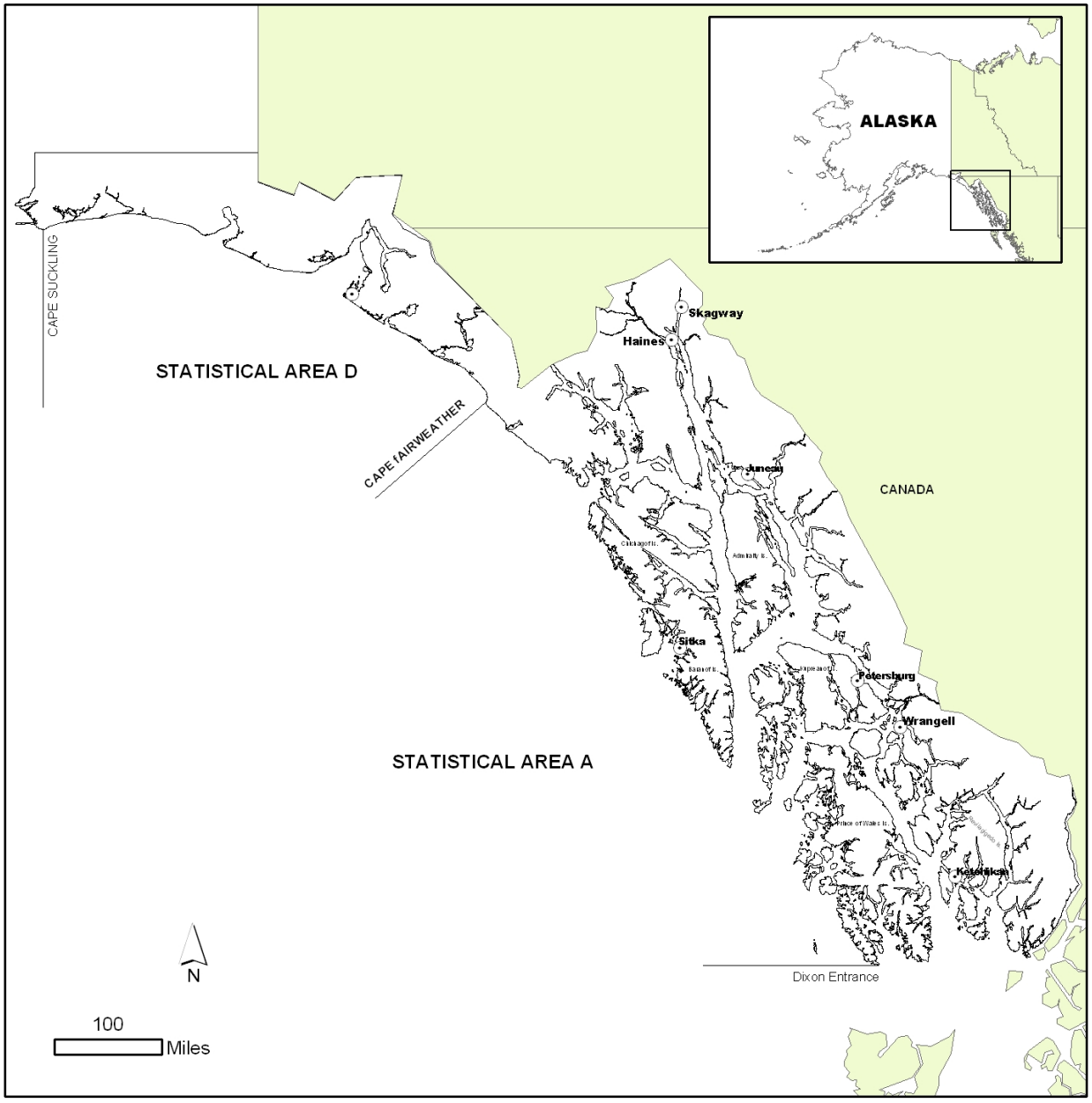

Figure 1.1–Registration Area A (Dixon Entrance to Cape Fairweather) and Registration Area D (Cape Fairweather to Cape Suckling).

CHAPTER 2: SOUTHEAST BEAM TRAWL SHRIMP FISHERY

INTRODUCTION

LIFE HISTORY

The northern shrimp, *Pandalus borealis*, has a circumboreal distribution—from Maine to Southeast Alaska (1964), although its Atlantic cousin is thought to differ at the species or subspecies level (Squires 1992). It is a pelagic species, associated with soft bottoms, and exhibits diurnal vertical migrations to feed on plankton (Barr 1970; Rice et al. 1979) as well as seasonal migrations to shallow water for reproduction. Like most of its genera, this species is a protandric hermaphrodite, and most individuals begin life as males, transitioning to females after reproducing for one or two years (Berkeley 1930; Butler 1964). However, primary females occur at varying prevalence in all populations and there is significant plasticity in the time of transition, which is related to growth rate. At higher growth rate, the species matures as a female at a smaller size; growth rate increases with increasing water temperature and food availability, this latter factor is affected by both food supply and population density (Koeller et al. 2003; Wieland 2004). Besides changes in the size at transition, water temperatures outside their narrow preference (3–6 ºC for *P. borealis*) can cause both delays in oviposition timing and reductions in the number of breeding females (Nunes 1984). Thus, increased water temperature can cause declines in recruitment.

COMMERCIAL FISHERY

The beam trawl fishery in Southeast Alaska has historically targeted primarily northern shrimp *Pandalus borealis* and secondarily larger sidestripe shrimp *Pandalopsis dispar*. Other species incidentally captured and landed in smaller quantities are the coonstripe shrimp (*Pandalus hypsinotus)*, humpy shrimp (*P. goniurus)*, and spot shrimp (*P. platyceros)*.

Productive beam trawl fishing has historically been limited to four major fishing areas in Southeast Alaska. These areas are District 8, portions of Districts 6 (Duncan Canal and Kah Sheets Bay), District 7 (Eastern Channel), and District 10 (Thomas and Farragut Bays), all located in the Petersburg-Wrangell Management Area (Figure 2.1). The concentration of the fishery in these areas has been due to the abundance of the resource, the presence of the major processors, and limited vessel capabilities. Most vessels are less than 60 ft in length, utilize small horsepower engines, do not have refrigerated holds, and have a crew of two or three. One vessel that had fished up until the 1999/00 season had been participating since the inception of the fishery in 1915. Vessels have strived to provide a high quality product through daily deliveries. Most of the participants are residents of Petersburg or Wrangell.

When compared to the more common otter trawl, the beam trawl is a relatively simple gear type in appearance and function. A strong wooden or metal beam acts as a head rope, and metal "shoes" connected directly to each end of the beam act as the breast of the trawl. Thus, rigid members control two important net dimensions: 1) the width of the mouth is determined by the

length of the beam; and 2) the opening height of the net is determined by the height of the metal "shoes." Vessel length limits beam length. Most beam trawls are deployed with a single bridle and fish best on flat substrates. However, they can effectively fish some gradual side slopes and irregular bottoms. When not deployed, the beam trawl is stored on the vessel bulwarks, somewhat compromising the sea-keeping capabilities of the vessel.

Management is based on a closed season designed to prevent fishing on major stocks during the egg-hatch period from March 1 through April 30, guideline harvest levels determined by historic harvests, and three fishing periods in the three major fishing areas plus a fourth fishing period in the Stikine Flats area only. The fishing periods were based upon industry input and are designed to spread out the harvest and processing requirements. Multiple fishing periods also take advantage of growth and recruitment.

FISHERY DEVELOPMENT AND HISTORY

The first documented beam trawl harvest of shrimp in Southeast Alaska occurred in Thomas Bay (located in District 10) in 1915. Floating canneries also located in Thomas Bay processed this harvest. By 1921 five processors were operating. Fleet size, production capacity, and expansion of fishing grounds occurred well into the 1950s. Prior to the development of the Westward Area (Registration Area J) shrimp fisheries in 1959, the beam trawl fishery in Southeast Alaska was the major shrimp fishery in the state. Cook Inlet and Westward Region fisheries dominated the statewide production figures with harvests exceeding 100 million pounds through the 1970s. Cook Inlet and Westward harvests declined after that period and closed prior to the 1982/83 season and the Southeast Alaska beam trawl shrimp fishery was once again the major trawl shrimp fishery in the state.

From 1955 through 1967 annual beam trawl harvests ranged from 1,800,000 to 7,600,000 pounds, with an average of 3,600,000 pounds per year (Table 2.1). The number of vessels participating ranged from 10 to 22. The peak production year was 1958 when 14 vessels caught over 7,600,000 pounds. During the late 1960s and early 1970s harvest and effort declined. Seasonal harvests averaged 916,300 pounds and effort averaged 12 vessels during the 1970s. Through the 1980s the harvest and effort increased to an average of 1,409,500 pounds by an average of 19 vessels. During the 1990s the harvest has averaged 2,674,500 pounds by an average of 34 permit holders. Some of the participants that were involved in the fishery between 1992 and 1997 were speculating on qualification into the limited entry program. Relatively few of the maximum of 51 vessels contributed substantially to the harvest or were dependent upon the fishery for a major portion of their fishing income. The effects of the limited entry program are evident in the 1998/99 fishery when only 24 permit holders participated. Fisheries conducted during the 2000/01 through 2002/03 seasons have averaged 990,000 pounds delivered by an average of 14 active participants worth on average about $280,000 annually. Effort and participation in the fishery continued to decline after the 2002/03 season, mostly due to low prices per pound as a result of large harvests of slightly larger northern shrimp from the Eastern seaboard and the western coast of North America. Regionwide harvest dropped off precipitously in the 2006/07 season after the main buyer of northern shrimp in Petersburg stopped buying after an eighty-year history in the fishery (Table 2.1).

During the 1970s, harvest opportunities occurred in all major fishing areas throughout the year (Table 2.2). As substantial and consistent increases in effort began in 1980, guideline harvest levels were achieved quickly and it became necessary to close major fishing areas by emergency

order. Fishing opportunities were no longer available in major fishing areas throughout the year, especially during the winter months. Typically, the months of May, July, and September received high effort, with each month providing harvests exceeding 500,000 pounds (Table 2.2). Seasonal harvests for the region approached 1,000,000 pounds prior to 1980. In the 1980s harvests increased and averaged 1,400,000 pounds. Harvest and effort in the fishery increased again and averaged about 2,700,000 pounds during the 1990s. Harvests have declined to an average of 740,000 pounds during the first few years of the 21st century.

Prior to 1970 Districts 6 and 10 produced the majority of the beam trawl harvest and District 8 produced relatively low harvests. Harvests from District 10 occurred in Farragut and Thomas Bays, and harvests from District 6 included Duncan Canal and Kah Sheets Bay. With the decline in abundance in District 10, the fishery became almost totally dependent upon District 6 and harvests from District 8 began to increase. From the 1969/70 through the 1978/79 fishing seasons, District 6 harvests averaged almost 600,000 pounds per season while District 8 harvests averaged less than 250,000 pounds per season (Table 2.3). During this ten-season period, harvests from District 8 exceeded harvests from District 6 only once. Regulatory guideline harvest levels were increased in 1978. In the following decade through the 1988/89 season, average shrimp harvests from Duncan Canal were nearly 900,000 pounds, more than double that of the Stikine Flats area (Table 2.4). Three fishing periods were established in regulation in 1989 for the four major fishing areas. During the 1990s, the pattern of high harvests in District 6 relative to District 8 continued, District 6 averaging 1,200,000 pounds per year and District 8 averaging 800,000 pounds (Table 2.5) As price per pound and processing capacity declined in the 21st century, fewer permit holders have found this fishery to be worth the effort, thus harvest and participation from all areas has declined. Since the 1999/2000 season, harvest has largely been dominated by effort in Districts 6 and 8, with very little harvest coming from the non-traditional areas (Table 2.6). The main buyer of northern shrimp in Petersburg stopped buying in June of 2005 after an eighty-year history in the fishery. Since then the few permit holders left participating in the fishery have targeted sidestripe shrimp in District 8 for smaller markets and dockside sales. The modern beam trawl fishery provides for harvest in Districts 3, 5, 6, 7, 8, 9 10, and 11 (Figure 2.2).

REGULATION DEVELOPMENT

Documentation describing shrimp fishing regulations is available since 1924. Regulations prior to that date are unknown. Regulations from 1924 through 1932 primarily concern fishing seasons. Size restriction regulations were first implemented in 1941. During the next decade closed areas were added and from 1947 through 1949, Duncan Canal, now a major shrimp fishing area, was closed to commercial fishing.

The beam trawl fisheries occur primarily in the vicinity of Petersburg and Wrangell. Until recently, most other areas were not significantly constrained by restrictive fishing seasons, fishing periods, or guideline harvest ranges (GHRs).

FISHING SEASONS AND PERIODS

Traditional Northern Shrimp Fisheries

A fishing season from May 1 through March 15 was established by 1924. A similar season has since been in place with some modifications to beginning and ending dates. The season is now

May 1 to February 28. The purpose of the closed period is to protect female shrimp during the egg hatch period when fishing would reduce the reproductive potential of the stock.

As the fishery intensified during the 1980s, the GHR was taken in successively fewer days. In response, three fishing periods were established beginning in 1989. These periods were May 1 through June 30, July 1 through August 31, and September 1 through February 14. A fourth fishing period, December 1 through February 14, was added for Stikine Flats of District 8 only, in 1997. These regulatory periods were established for several reasons: to protect shrimp during the critical egg hatch period, to lengthen the total fishing season in these districts by spreading harvest over a longer period of time, to reduce effort during recruitment and growth periods in the spring and summer months and to increase overall harvest in District 8.

Non-Traditional Northern Shrimp Fisheries

Prior to 1994 all fishing districts in Southeast Alaska, except District 8 and a portion of District 6 (Duncan Canal and Kah Sheets Bay), District 7 (Eastern Channel), and District 10 (Thomas and Farragut Bays), were open throughout the year. During the early 1990s large otter trawling catcher-processors requested permits to fish for shrimp in the region, leading to requests to the commissioner to close shrimp fisheries in outside waters. The controversy surfaced because some members of other fishing organizations felt that trawlers were using a loophole in the regulations to either prospect or target other species, like rockfish. Initial closures were made by either emergency regulation or emergency order. The issue was brought before the BOF and resulted in the closure for Districts 1, 2, 4, and 12 through 16, which had low and sporadic historical effort and harvests.

At the request of industry in 1997, regulations were developed by the BOF to provide additional fishing time during the egg-hatch period in most of the non-traditional areas if their respective guideline harvest levels have not been achieved during the normal fishing time of May through mid-February (Table 2.2). Justification for the change was that these areas required more exploration, time, and expense than the traditional fishing areas, the months of March and April were generally free of commercial and personal use shrimp and crab pots, and weather was improved over the sometimes harsh winter conditions. The additional fishing time period, opened by emergency order only, was from February 15 through April 30. Logbooks were required. This exploratory fishery during the egg hatch period was eliminated at the 2003 meeting of the BOF for consistency with the shrimp pot fishery and because there was limited effort during the exploratory fishery.

Directed Sidestripe Shrimp Fisheries

In 1997, regulations were adopted to provide for directed sidestripe shrimp fisheries by beam trawl only during fishing seasons and periods and in areas established by the commissioner by emergency order. Additional conditions include limiting the vessel from participating at the same time in a directed northern shrimp fishery, a larger minimum mesh size, and mandatory logbook completion. Incidental shrimp species harvest cannot be greater than 10 percent, and fishers must notify the department 2 hrs before landing to allow for biological sampling of the harvest. If necessary, the commissioner may require an onboard observer during fishing operations. The department will evaluate opening a directed sidestripe shrimp fishery on a case-by-case basis. Since the sidestripe shrimp component of the Gulf of Alaska and Southcentral stocks seemed to be the most susceptible to overharvest and stock collapse, these measures were required in Southeast to collect the necessary information needed to manage sidestripe shrimp harvest

conservatively. To date, fishing opportunities have been provided during eight fishing periods in District 8 since the 1997/98 season, during one fishing period in District 6 during the 1997/98 season and once in Section 11-B during the 2001/02 season. Only once during these openings has the upper end of the GHR (50,000 pounds) been reached, requiring an emergency closure prior to the regulatory closure date. Since 2002 sidestripe shrimp have only been harvested during the traditional beam trawl season, and there have been no directed sidestripe fisheries as described in regulation.

SIZE RESTRICTIONS

As early as 1941, regulations specified that not more that 50 percent of the shrimp harvested could be less than three inches total length. These regulations were altered to no more than 25 percent in 1942, and in 1948 the size was changed to less than 2.5-inches total length. By 1952 there were no size regulations and size of shrimp landed was only controlled by industry through price.

By 1979 the Board of Fisheries adopted a policy to discourage the harvest of shrimp less than two years of age. This policy exists today and instructs the department to take action when the fishery targets on segregated schools of small shrimp. Management measures are to optimize the harvest of larger female northern shrimp while minimizing retention of male, transitional, and smaller female shrimp.

In 1997, new regulations in Southeast Alaska defined the minimum average size of shrimp that could be sold. Shrimp taken by beam trawl gear must be at least 150 count per pound. To determine the average count per pound, one sample of at least one pound in weight of unbroken shrimp must be taken from each 500 to 1,000 pounds of shrimp, up to a maximum of 20 samples.

QUOTAS AND GUIDELINE HARVEST RANGES

Traditional Northern Shrimp Fisheries

In 1977, harvest quotas for each of the four major fishing areas (District 8 and portions of Districts 6, 7, and 10) were first established. These quotas were based on historical harvest records with potential adjustment based on stock conditions. Strict quotas were difficult to monitor and regulate. In 1978, quotas were replaced by GHRs that provided more flexibility for inseason management, which was based upon fishery performance and size-class distribution. The fishery continued to intensify through the influx of effort and increased processing capacity. In some districts, specifically Districts 8 and a portion of District 6, the seasonal GHR was achieved early in the fishing season, necessitating an emergency order closure for the remainder of the season.

In 1988 the GHRs were evenly distributed through three fishing periods to lengthen the fishery and to take advantage of growth and recruitment which occurred during the spring and summer months. Guideline harvest ranges for each of the three fishing periods were: a portion of District 6 from 80,000 to 400,000 pounds; a portion of District 7 from 15,000 to 50,000 pounds; a portion of District 10 from 5,000 to 75,000 pounds; and all of District 8 from 25,000 to 175,000 pounds. In 1997, with the addition of a fourth fishing period in District 8 and an increase in the upper GHR from 175,000 to 250,000 pounds, the seasonal harvest potential increased by half a million pounds, increasing the total allowed season harvest to 1.2 million pounds, more than double the previous GHR.

Non-Traditional Northern Shrimp Fisheries

In 1994, seasonal GHRs of 0 to 100,000 pounds were established for Districts 3, 5, 9, and 11 and remaining portions of Districts 6, 7, and 10. In 1997, at the request of industry, the total District 11 GHR was increased and is now more than triple the 1994 GHR. Seasonal GHRs were established by section: 11-A, 11-B, and 11-C from 25,000 to 75,000 pounds in each, and 11-D from 50,000 to 150,000 pounds.

Directed Sidestripe Shrimp Fisheries

With the implementation of the directed sidestripe shrimp fishery in 1997, a limit of 50,000 pounds of shrimp may be taken from any district or section during a season, during that fishery. Participants cannot concurrently participate in a northern shrimp fishery, must use a large mesh net, and complete logbooks.

Spot and Coonstripe Shrimp Bycatch Limits

At the 2003 BOF meeting, the board dealt with a suite of proposals regarding spot and coonstripe bycatch in the beam trawl fishery. The board decided to deal with all of the relevant spot and coonstripe shrimp bycatch in the beam trawl fishery issues in addressing one of the proposals. The trip and seasonal bycatch limits currently in the beam trawl regulations for spot and coonstripe shrimp were spawned from this meeting, and were based on historic harvest of these species in the beam trawl fishery.

GEAR RESTRICTIONS

In 1962 regulations defining a minimum mesh size used in beam trawls were established for a portion of the Petersburg-Wrangell area. By 1969 similar regulations were in place for all areas. In 1997 the minimum mesh size was increased. The current regulatory mesh size is approximately 1.35-inches stretched measure. Due to the relatively low market value of small northern shrimp, many fishers are currently using web between 1.38-inches and 1.50-inches stretched mesh, to reduce their harvest of small northern shrimp.

Under the regulations provided in the directed sidestripe shrimp fishery that was adopted in 1997, shrimp trawl webbing must be a least one and seven-eighths inch stretched measure, or no more than 13 meshes per foot and the head rope may not be longer than the length of the beam plus 10 percent. Trawl web used during the directed sidestripe shrimp fishery was initially required, after the 1997 BOF meetings, to be square hung at the beam selvage (where the mesh is connected to the breastlines of the trawl), the intent being to allow the development of the directed sidestripe shrimp fishery while minimizing the impact on other smaller shrimp species. The regulation further provides that no more than 10 percent of the total pandalid shrimp harvest may be comprised of other species of shrimp. However, during the 2000 BOF meeting this regulation was eliminated, allowing diamond hung meshes to be used for the directed sidestripe shrimp fishery. It is not known what effect this change in net construction has on retention of small shrimp. A minimum mesh size of 2-inch stretched measure may be advisable as a precaution against retention of small shrimp in this fishery.

In 1959 otter trawls were not allowed in the Petersburg-Wrangell area in major locations utilized by the beam trawl fishery. Prior to the 1963/64 fishing season this regulation was altered to the present district boundaries.

In 1980 beam trawling was prohibited in waters of Lituya Bay (District 16) by the Alaska Board of Fisheries and in 1985 the National Park Service prohibited trawling in waters of Glacier Bay. Beginning in mid 1986, trawling was prohibited in the waters of Tenakee Inlet (in District 12). During the 1997 Board of Fisheries meeting, otter trawls were eliminated as a legal gear type in Southeast Alaska, effective May 8, 1998. At the 2006 meeting of the BOF it was clarified that having a spare net onboard a beam trawl vessel is permissible as long as only a single net is fished at any time.

LIMITED ENTRY

The Commercial Fisheries Entry Commission, in response to petitions received from beam trawl permit holders during 1995 and 1996, established January 1, 1997 as the qualification date for limited entry with the four years immediately preceding being the qualification period. Therefore, to be eligible to apply for an entry permit, an individual would have had to be a permit holder during at least one of the years during the qualification period of January 1, 1993 through December 31, 1996. To date currently, 28 permanent and 2 interim entry permits have been issued. Of the permanent permits issued, 4 of these have been cancelled leaving 26 permits active in the fishery. (Commercial Fisheries Entry Commission website, 2008-11-14, B 1405 P-A, Permit Status Report.)

MANAGEMENT CONCERNS

Effort has decreased from 23 permits in the 1999/00 season to 5 permits fished during the 2007/08 season. This decrease has been due in part to low prices at the cannery and a reduction in processing capabilities, or the need to use existing facilities to process product from other fisheries. A portion of this decrease is undoubtedly because the limited entry permit qualification period is over. Also, the main buyer of northern shrimp in Petersburg stopped their shrimp operation in June of 2005. Currently participation in the fishery is very low, with a handful of permit holders targeting sidestripe shrimp for smaller markets and dockside sales. With the implementation of the limited entry program, permits have been and will continue to be purchased by permit holders desiring diversification. If markets improve this fishery may in the future see higher effort levels, more efficient and species-specific gear, and eventual development of non-traditional product forms such as value-added frozen-at-sea shrimp to garner a higher price from a currently undervalued resource. In turn, these changes identify the need to establish a research program for necessary biological information, a more active management program, and the development of a management plan to ensure future conservation goals are achievable.

A preseason review of each season's fish tickets allows for some harvest trend description. Other components of the current management system include inseason harvest monitoring which allows the manager to estimate the initial level of harvest and to make informed decisions about timing of closures relative to the guideline harvest levels established for the different areas. In addition, the manager tracks harvest of spot and coonstripe shrimp bycatch as it relates to the trip and seasonal limits in regulation. Summary of fish ticket totals document the actual, reported harvest levels. While this document does not discuss ADF&G onboard and dockside sampling, these programs are proving fairly useful in determining stock structure and pre-recruit status as well as actual species composition of the harvest. Developing programs, such as the logbook program required for the non-traditional areas and the beam trawl observer trips will allow the department to assess the harvest levels and collect biological information from area fisheries.

Not unlike the management of the pot shrimp fisheries, beam trawl harvest levels are set based on average historical harvest levels, not population estimates. While this fishery has sustained itself for almost 80 years, the size composition of the harvest appears to be changing. The move toward use of larger mesh sizes appears to be focusing more effort on the larger species and larger individual shrimp. Regulation changes may be needed to adequately control the expansion of the fishery and to prevent high-grading of some species of shrimp while dumping the less desirable species or smaller shrimp. Additional regulations to separate traditional northern shrimp and sidestripe fisheries may be necessary to assure adequately conservative management for sidestripe populations.

STOCK ASSESSMENT

The beam trawl fishery stock assessment program in Southeast Alaska is still in its infancy. Although dockside sampling and collection and sexing of shrimp samples has been conducted since 1986, and sporadic sampling by onboard observers was conducted in 2002, to date no fishery-independent survey program has been developed. Furthermore, the decline in market and resulting loss of peeling capacity in Petersburg beginning in 2005 has all but shut down commercial beam trawl production of northern pink shrimp, and eliminated dockside sampling. More information is needed on northern and sidestripe shrimp stock size and life history in Southeast Alaska. Information is also needed on the effects of mesh size and gear configuration on catch size and species composition, what constitutes a sustainable harvest strategy and bycatch and discard levels. The department plans to resume dockside sampling when landings increase.

RECENT SEASONS

TRADITIONAL NORTHERN SHRIMP FISHERIES

Harvest and Effort by Area

Reported harvest from fish tickets and port-sampling data provide the information summarized for the traditional beam trawl fishing areas of Duncan Canal (District 6), Eastern Channel (District 7), the Stikine Flats (District 8) and Thomas and Farragut Bays (eastern District 10). The majority of the commercial harvest reported from District 6 comes from statistical areas 106-42, 106-43 and 106-44, in District 7 from statistical area 107-45, and in District 8 from statistical areas 108-40, 108-50 and 108-60. Thomas and Farragut Bays in District 10 support the majority of harvest in that district.

Since the 1997/98 season, total harvest and number of permits fished have steadily declined (Table 2.1). Declines in total harvest and effort were due to low prices for northern shrimp, a lack of processing priority for northern shrimp, and fewer active participants in the fishery. Harvest was composed primarily of northern shrimp, *Pandalus borealis*, though smaller numbers of small *Pandalopsis dispar* (sidestripe shrimp) and *Pandalus goniurus* (humpy shrimp) were also harvested and sold as northern shrimp. The northern shrimp harvested in Southeast Alaska competed in the marketplace with large harvests of north Atlantic *P. borealis* (thought by some to be a different species), and *P. jordani* (smooth pink shrimp) from British Columbia and Oregon. Over the last few seasons, smaller average size of northern shrimp harvested in Southeast Alaska has further undermined the position of northern shrimp from Southeast Alaska in global markets. This competition from other northern shrimp fisheries in the Pacific Northwest and north Atlantic led to the collapse of the Southeast northern shrimp fishery in 2005

(the 2005/2006 season) when the main buyer in Petersburg shut down its peelers after an eighty year history in the fishery. The last commercial quantities of northern shrimp were purchased in Wrangell in the spring of 2006 (the 2006/07 season). The 2007/08 season had the lowest amount of effort in the history of the fishery (Table 2.1) with a handful of registrants targeting the larger sidestripe shrimp for smaller markets and dockside sales. Most of the effort over the past three seasons has occurred in District 8 (Stikine Flats; Tables 2.6, 2.7, 2.8, and 2.9) where sidestripe shrimp are more prevalent.

Species Composition

The composition of harvest for Districts 6, 7, 8 and 10 has varied over the past 11 seasons. Duncan Canal has supported primarily a northern shrimp fishery, which made up over 99 percent of the species harvested since the 1991/92 season. Eastern Channel is also primarily a northern shrimp fishery, with an average of 94 percent of the harvest made up of northern shrimp, 5 percent sidestripe shrimp and the other species making up the remaining 1 percent. Sidestripe and to a lesser extent coonstripe and spot shrimp have generally occurred in an increasing proportion of the harvest since 1991 from the Stikine Flats. Harvest by species for Stikine Flats averaged 93 percent for northern shrimp, slightly less than 7 percent for sidestripe shrimp, and less than 1 percent for coonstripe and spot shrimp for the 1991/92 through 1996/97 seasons. Proportional harvest by species for the period from 1997 to 2002 has averaged 85 percent northern shrimp, 14 percent sidestripe shrimp, and less than 1 percent for coonstripe and spot shrimp. In 2003/04 season, coonstripe and spot shrimp bycatch limits went into effect in the beam trawl fishery. From the 2003/04 through the 2007/08 seasons combined, pink shrimp have comprised 82% of the harvest, sidestripe shrimp 15%, coonstripe shrimp 2% and spot shrimp 1% in the traditional beam trawl areas.

NON-TRADITIONAL NORTHERN SHRIMP FISHERIES

Beam trawl fishing has occurred at low and sporadic levels outside the Petersburg-Wrangell area since at least the 1969/70 season, with the exception of Blake Channel which had significant harvests in the 1970s, 1980s and early 1990s (Tables 2.3, 2.4 and 2.5). These non-traditional beam trawl fishing areas include District 3, District 5, South Zarembo and Sumner Straits (a portion of District 6), Blake Channel (a portion of District 7), District 9, Upper Frederick Sound (a portion of western District 10) and District 11. These districts and portions of districts are managed with a single fishing season and generic guideline harvest levels not to exceed 150,000 pounds. During the past 3 seasons the only non-traditional area fished was District 3 (Table 2.6) in the 2005/06 season. Harvest and effort data are confidential since fewer than three permits fished District 3 in the 2005/06 season. The statistical area breakdown for the traditional and non-traditional areas is detailed in Table 2.10.

DIRECTED SIDESTRIPE SHRIMP FISHERIES

Over the last three seasons, the beam trawl fishery in Southeast Alaska has continued to transition into a fishery in which a larger percentage of the permit holders target larger sidestripe shrimp rather than northern shrimp. As sidestripe shrimp are fully utilized in the current beam trawl fishery, ADF&G has not approved any requests for directed sidestripe shrimp fisheries in the last three seasons. The last directed sidestripe shrimp fishery occurred in District 8 in June of the 2002/2003 season.

CHAPTER 2–TABLES AND FIGURES

Table 2.1–Registration Area A (Southeast Alaska) shrimp beam trawl harvest, number of permits, number of landings, pounds per permit, and pounds per landing, 1955 to present.

Year/ Season	Harvest in pounds	Number of permits	Landings	Pounds per permit	Pounds per landing
1955	1,777,122	15		118,475	
1956	3,301,598	15		220,107	
1957	2,350,499	10		235,045	
1958	7,605,871	14		543,277	
1959	5,518,843	22		250,857	
1960	3,343,373	21	1,007	159,208	3,320
1961	4,212,300	20	1,394	210,615	3,022
1962	3,884,050	22	1,400	176,548	2,774
1963	3,110,340	20	1,080	155,517	2,880
1964	2,793,101	13	1,092	214,854	2,558
1965	2,941,429	13	1,338	226,264	2,198
1966	3,784,597	14	1,663	270,328	2,276
1967	2,203,753	13	1,105	169,519	1,994
1968/69	2,003,753	12	925	166,979	2,166
1969/70	1,840,727	11	952	167,339	1,933
1970/71	742,404	11	477	67,491	1,556
1971/72	1,050,978	9	592	116,775	1,775
1972/73	797,387	9	421	88,599	1,894
1973/74	674,386	8	460	84,298	1,466
1974/75	1,205,617	20	434	60,281	2,777
1975/76	983,609	12	450	81,967	2,185
1976/77	768,930	14	476	54,924	1,615
1977/78	949,043	10	404	94,904	2,349
1978/79	1,033,325	9	519	114,814	1,990
1979/80	956,927	17	982	56,290	974
1980/81	843,737	21	920	40,178	917
1981/82	919,275	15	524	61,285	1,754
1982/83	1,397,026	15	455	93,135	3,070
1983/84	1,756,533	18	667	97,585	2,633
1984/85	1,294,545	23	811	56,285	1,596
1985/86	429,224	16	252	26,827	1,703
1986/87	2,203,935	16	435	137,746	5,066
1987/88	1,761,636	25	388	70,465	4,540
1988/89	1,675,643	18	527	93,091	3,179

–continued–

Table 2.1–Page 2 of 2.

Year/ Season	Harvest in pounds	Number of permits	Landings	Pounds per permit	Pounds per landing
1989/90	1,813,032	21	645	86,335	2,810
1990/91	2,494,957	23	793	108,476	3,146
1991/92	2,934,341	28	1,036	104,798	2,832
1992/93	2,375,742	41	922	57,945	2,576
1993/94	2,135,500	25	705	85,420	3,029
1994/95	3,223,791	25	814	128,952	3,960
1995/96	3,053,316	48	793	63,611	3,850
1996/97	2,536,985	51	884	49,745	2,869
1997/98	3,051,197	42	983	72,648	3,103
1998/99	2,264,641	24	834	94,360	2,715
1999/00	1,893,815	23	566	82,340	3,346
2000/01	1,413,264	16	543	88,329	2,603
2001/02	903,897	19	358	47,574	2,525
2002/03	1,096,235	13	423	84,326	2,592
2003/04	740,387	10	216	74,039	3,428
2004/05	986,451	8	232	123,306	4,252
2005/06	621,047	8	173	77,631	3,590
2006/07	133,869	7	50	19,124	2,677
2007/08	38,410	5	24	7,682	1,600

Table 2.2–Registration Area A (Southeast Alaska) shrimp beam trawl harvest in thousands of pounds by month and season, 1969/70 to present.

Season	Month												
	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Total
1969/70	326.7	280.2	78.8	129.1	184.7	241.2	119.6	165.2	160.0	100.6	32.4	22.4	1,840.7
1970/71	131.3	105.1	65.4	79.8	49.7	64.3	54.8	59.2	59.9	56.8	*	13.2	742.4
1971/72	139.0	106.3	144.5	106.5	69.7	78.3	101.6	71.1	66.0	121.1	38.7	*	1,051.0
1972/73	168.5	126.4	77.2	*	*	44.7	64.0	46.3	81.6	42.2	6.1	8.5	797.4
1973/74	96.3	124.1	*	*	*	*	59.1	64.8	60.3	29.2	*	8.4	674.4
1974/75	160.9	199.2	202.4	168.0	120.1	61.4	73.9	90.8	104.2	21.6	*	*	1,205.6
1975/76	180.7	130.3	67.2	*	112.3	154.5	73.0	77.8	38.9	46.1	*	6.7	983.6
1976/77	78.8	171.7	120.0	118.8	61.8	37.4	55.2	33.3	65.0	25.7	*	*	768.9
1977/78	73.7	235.3	147.9	166.6	126.2	48.3	29.5	18.7	81.2	21.7	0	0	949.0
1978/79	107.0	130.9	140.6	240.2	112.0	93.1	67.8	36.0	72.3	22.5	8.3	*	1,033.3
1979/80	98.2	154.9	146.6	177.4	104.2	55.1	58.4	39.6	66.3	48.1	*	*	956.9
1980/81	153.8	168.6	164.9	153.7	54.2	30.2	35.5	12.2	33.6	31.6	5.5	0.0	843.7
1981/82	165.1	183.4	124.0	168.8	81.1	52.7	36.5	48.3	33.0	22.3	0.9	3.1	919.3
1982/83	181.1	171.7	168.8	159.4	134.0	50.1	60.7	82.0	152.6	119.8	64.4	52.5	1,397.0
1983/84	436.3	249.0	287.0	218.2	127.5	132.0	83.3	86.9	101.7	16.2	9.0	9.6	1,756.5
1984/85	156.3	252.5	272.5	232.8	132.9	59.5	61.8	49.7	51.9	22.5	*	*	1,294.5
1985/86	125.6	105.3	46.1	23.2	39.1	13.8	31.3	29.8	*	8.4	*	*	429.2
1986/87	294.4	508.2	576.0	446.8	372.0	*	*	*	*	*	*	*	2,203.9
1987/88	634.0	721.0	291.2	90.8	*	*	*	*	*	6.0	*	*	1,761.6
1988/89	647.2	369.0	258.4	137.9	*	2.5	82.8	127.3	37.8	*	*	*	1,675.6
1989/90	473.6	236.2	259.0	173.4	224.3	115.8	*	38.4	167.8	53.4	*	*	1,813.0
1990/91	546.7	336.5	386.5	357.8	293.3	147.4	161.2	148.7	16.8	9.4	17.1	73.4	2,495.0
1991/92	611.6	325.5	887.2	79.1	336.4	219.0	167.2	165.6	114.8	17.1	6.4	15.6	2,934.3
1992/93	469.3	253.7	404.4	295.7	194.5	186.4	136.8	112.4	131.8	65.5	58.3	67.0	2,375.7
1993/94	548.0	215.4	372.0	239.2	121.3	86.9	104.5	100.3	147.4	85.7	112.1	*	2,135.5
1994/95	560.0	266.2	574.6	468.2	196.3	96.9	149.3	188.5	387.0	41.9	231.6	63.5	3,223.8
1995/96	686.6	338.2	522.3	344.7	515.0	66.7	137.8	55.8	62.7	157.9	104.1	61.3	3,053.3
1996/97	782.8	262.2	609.0	162.8	510.3	100.3	73.3	7.6	*	1.4	*	*	2,537.0
1997/98	727.8	237.8	637.6	183.9	677.6	142.2	129.0	261.0	*	41.6	*	0.0	3,051.2
1998/99	524.8	260.8	501.3	317.7	348.7	138.8	102.6	3.4	22.3	15.5	*	*	2,264.6
1999/00	581.9	231.4	385.4	313.2	224.9	64.4	29.3	6.9	3.5	47.1	1.6	4.2	1,893.8
2000/01	486.3	172.6	219.6	185.8	92.0	78.5	118.7	*	25.4	25.9	*	*	1,413.3
2001/02	363.0	149.3	11.3	41.0	97.9	*	93.1	17.9	42.6	9.0	*	0.0	903.9
2002/03	314.4	138.7	*	90.7	147.5	*	129.3	18.4	38.9	110.9	*	0.0	1,096.2
2003/04	336.0	53.1	19.9	15.8	*	136.1	104.1	19.1	24.5	27.4	0.0	0.0	740.4
2004/05	480.0	195.5	*	*	*	76.8	126.0	5.7	12.1	10.8	0.0	0.0	986.5
2005/06	461.8	114.8	11.3	*	5.8	0.0	0.0	4.1	7.5	13.7	0.0	0.0	621.1
2006/07	84.4	23.0	0.0	0.0	*	0.0	0.0	1.6	3.0	21.2	0.0	0.0	133.9
2007/08	*	*	*	0.0	*	*	*	*	*	*	0.0	0.0	38.4

* Fewer than 3 permits were fished; information is confidential.

Table 2.3–Registration Area A shrimp beam trawl fishery harvest in thousands of pounds by season and district, 1969/70 through 1978/79 (Note: * Denotes confidential data, fewer than three permits fished).

District	Season									
	1969/70	**1970/71**	**1971/72**	**1972/73**	**1973/74**	**1974/75**	**1975/76**	**1976/77**	**1977/78**	**1978/79**
1	0	*	*	0	*	*	*	1.6	0	*
2	0	0	0	0	0	1.3	0.1	0	0	0
3	0	*	*	*	0	0	*	*	0	0
4	0	0	0	0	0	0	0	0	0	0
5	*	0	0	0	0	0	*	0	0	0
6: Duncan	865.5	344.4	442.4	450.3	260	973.2	554.2	610.2	669.7	625
6: Sumner	0	0	0	*	0	0	257.6	10.7	*	*
7: Eastern	0	0	0	0	0	0	0	0	0	0
7: Blake	0	38.1	67	35.7	48.7	10.4	14.6	29.2	40.3	140.1
8: Stikine	609.7	158.5	285.7	219.6	323.4	212.4	84.5	85.5	176.0	261.9
9	*	0	0	0	0	0	0	0	0	0
10: Thomas	350.1	198.6	252.3	89.9	*	*	*	27.9	*	3.4
10: Up. Fred	0	*	0	0	0	0	0	0	0	0
11	*	0	0	0	0	*	*	*	*	*
12	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	*	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0
Total	1,840.7	742.4	1051.0	797.4	674.4	1,205.6	983.6	768.9	949.0	1,033.3
Landings	952	477	592	421	460	434	450	476	404	519
Permits	11	11	9	9	8	20	12	14	10	9

* Fewer than 3 permits were fished; information is confidential

Table 2.4–Registration Area A shrimp beam trawl fishery harvest in thousands of pounds by season and district, 1979/80 through 1988/89 seasons (Note: * Denotes confidential data, fewer than three permits fished).

District	Season									
	1979/80	**1980/81**	**1981/82**	**1982/83**	**1983/84**	**1984/85**	**1985/86**	**1986/87**	**1987/88**	**1988/89**
1	*	*	*	*	*	*	*	*	0.0	*
2	1.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
3	*	*	*	*	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
5	*	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0
6: Duncan	427.4	415.0	693.8	1199.6	1,015.4	523.9	235.7	1,645.3	1,225.7	1,043.0
6: Sumner	0.0	*	*	0.0	0.0	17.7	*	*	*	*
7: Eastern	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*
7: Blake	109.8	77.9	31.5	11.8	138.6	101.3	30.6	100.6	75.8	15.9
8: Stikine	405.7	342.5	88.6	51.0	545.0	610.8	160.9	432.4	436.3	590.0
9	0.0	*	0.0	*	*	0.0	0.0	0.0	0.0	0.0
10: Thomas	2.8	0.0	0.0	*	26.3	33.8	*	*	*	*
10: Up. Fred	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	*	*	0.0	0.0	0.0	0.0	0.0	*	0.0
12	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0
15	*	*	*	*	2.0	*	*	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	957.2	843.8	919.6	1,397.5	1,756.8	1,298.3	435.2	2,205.6	1,764.1	1,678.5
Landings	982	920	524	455	667	812	252	435	388	528
Permits	17	21	15	15	18	23	16	16	25	18

* Fewer than 3 permits were fished; information is confidential

Table 2.5–Registration Area A shrimp beam trawl fishery harvest in thousands of pounds by season and district, 1989/90 through 1998/99 seasons.

District	Season									
	1989/90	**1990/91**	**1991/92**	**1992/93**	**1993/94**	**1994/95**	**1995/96**	**1996/97**	**1997/98**	**1998/99**
1	*	*	0.0	0.0	*	*	*	0.0	0.0	0.0
2	0.0	0.0	0.0	*	*	Closed	Closed	Closed	Closed	Closed
3	0.0	80.1	20.4	125.3	18.8	31.6	19.2	69.9	24.2	47.3
4	0.0	0.0	0.0	0.0	0.0	Closed	Closed	Closed	Closed	Closed
5	0.0	0.0	0.0	*	0.0	*	182.0	74.1	11.7	0.0
6: Duncan	1,006.9	1,565.5	1,680.5	1,184.8	829.0	1,406.7	1,355.6	1,285.2	1,250.6	989.1
6: Sumner	0.0	*	0.0	13.8	*	*	0.0	*	0.0	0.0
7: Eastern	17.5	55.5	74.1	42.4	*	232.2	168.1	115.2	174.7	62.7
7: Blake	70.8	40.5	101.5	60.1	50.7	0.0	3.6	8.4	*	0.8
8: Stikine	676.7	652.0	697.9	683.6	834.4	848.5	905.7	611.9	1,347.8	818.8
9	0.0	*	*	19.6	*	0.0	*	*	*	*
10: Thomas	*	*	321.3	148.7	220.2	241.7	239.7	280.8	240.1	*
10: Up. Fred	0.0	0.0	*	0.0	0.0	*	*	28.4	16.9	*
11	0.0	*	9.6	98.0	112.4	295.0	170.3	57.4	13.9	36.2
12	0.0	0.0	*	0.0	0.0	Closed	Closed	Closed	Closed	Closed
13	0.0	0.0	*	0.0	0.0	Closed	Closed	Closed	Closed	Closed
14	0.0	0.0	0.0	0.0	0.0	Closed	Closed	Closed	Closed	Closed
15	*	*	0.0	*	*	Closed	Closed	Closed	Closed	Closed
16	0.0	0.0	0.0	0.0	0.0	Closed	Closed	Closed	Closed	Closed
Total	1,813.0	2,495.0	2934.3	2,375.7	2,139.0	3,223.8	3,053.3	2,537.0	3,051.2	2,269.1
Landings	645	793	1,036	922	705	814	793	884	983	834
Permits	21	23	28	41	25	25	48	51	42	24

* Fewer than 3 permits were fished; information is confidential

Table 2.6–Registration Area A shrimp beam trawl fishery harvest in thousands of pounds by season and district, 1999/90 through 2007/08 seasons.

District	Season								
	1999/2000	**2000/01**	**2001/02**	**2002/03**	**2003/04**	**2004/05**	**2005/06**	**2006/07**	**2007/08**
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
3	*	*	*	*	0.0	0.0	*	0.0	0.0
4	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
5	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6: Duncan	838.9	585.8	222.5	99.9	62.5	484.1	302.7	*	0.0
6: Sumner	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7: Eastern	45.8	89.2	57.7	62.4	35.6	*	*	*	0.0
7: Blake	*	*	*	0.0	0.0	0.0	0.0	0.0	0.0
8: Stikine	704.7	562.3	583.1	790.8	571.2	467.7	300.0	120.6	37.8
9	*	*	5.9	*	0.0	0.0	0.0	0.0	0.0
10: Thomas	247.1	64.1	23.2	*	*	*	*	*	*
10: Up. Fred	*	*	*	*	0.0	0.0	0.0	0.0	0.0
11	26.0	81.9	*	0.0	0.0	0.0	0.0	0.0	0.0
12	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
13	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
14	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
15	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
16	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Total	1,893.8	1,413.3	903.9	1,096.2	740.4	986.5	621.1	133.9	38.4
Landings	566	543	358	423	216	232	173	50	24
Permits	23	16	19	13	10	8	8	7	5

* Fewer than 3 permits were fished; information is confidential

Table 2.7–Registration Area A (Southeast Alaska) shrimp beam trawl harvest and landings by district and month, 2005/06.

Month	Fishery								
	Duncan Canal	Sumner Strait	Eastern Channel	Blake Passage	Stikine Flats	Thomas Bay	All Others Southeast	Total Permits	Total Harvest
May	218,115	0	*	0	240,420	0	0	7	461,841
June	84,618	0	0	0	24,236	*	0	5	**
July	0	0	0	0	11,292	0	0	3	11,292
August	0	0	0	0	*	0	0	*	*
September	0	0	0	0	5,824	0	0	3	5,824
October	0	0	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0	0	0
December	0	0	0	0	2,538	0	*	4	**
January	0	0	0	0	2,200	0	*	4	**
February	0	0	0	0	10,460	0	*	4	**
March	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
April	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed

* Fewer than 3 permits were fished; information is confidential

**Total harvest is confidential, to prevent back-calculation of confidential catch information

Table 2.8–Registration Area A (Southeast Alaska) shrimp beam trawl harvest and landings by district and month, 2006/07.

Month	Fishery								
	Duncan Canal	Sumner Strait	Eastern Channel	Blake Passage	Stikine Flats	Thomas Bay	All Others Southeast	Total Permits	Total Harvest
May	*	0	0	0	79,605	0	0	3	**
June	0	0	0	0	16,377	*	0	3	**
July	0	0	0	0	0	0	0	0	0
August	0	0	0	0	0	0	0	0	0
September	0	0	0	0	0	*	0	*	*
October	0	0	0	0	0	0	0	0	0
November	0	0	0	0	0	0	0	0	0
December	0	0	0	0	1,552	0	0	3	1,552
January	0	0	0	0	3,029	0	0	3	3,029
February	0	0	*	0	*	0	0	3	21,177
March	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
April	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed

* Fewer than 3 permits were fished; information is confidential

**Total harvest is confidential, to prevent back-calculation of confidential catch information

Table 2.9–Registration Area A (Southeast Alaska) shrimp beam trawl harvest and landings by district and month, 2007/08.

Month	Fishery								
	Duncan Canal	**Sumner Strait**	**Eastern Channel**	**Blake Passage**	**Stikine Flats**	**Thomas Bay**	**All Others Southeast**	**Total Permits**	**Total Harvest**
May	0	0	0	0	*	0	0	*	*
June	0	0	0	0	*	*	0	*	*
July	0	0	0	0	*	0	0	*	*
August	0	0	0	0	0	0	0	0	0
September	0	0	0	0	*	0	0	*	*
October	0	0	0	0	*	0	0	*	*
November	0	0	0	0	*	0	0	*	*
December	0	0	0	0	*	0	0	*	*
January	0	0	0	0	*	0	0	*	*
February	0	0	0	0	*	0	0	*	*
March	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
April	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed

* Fewer than 3 permits were fished; information is confidential

Table 2.10–Beam trawl fishing areas and associated statistical areas (districts and all associated statistical areas) for the harvest information from fish tickets for the 1991/92 to 2007/08 seasons.

Type	Management Unit	Fishing area	Statistical areas
Traditional	District 6	Duncan Canal	106-42, 43, 44
	District 7	Eastern Channel	107-45
	District 8	Stikine Flats	108-10, 20, 30, 40, 41, 45, 50, 60
	District 10	Thomas and Farragut Bays	110-11, 12, 13, 14, 15, 16
Non-traditional	District 6	South Zarembo	106-10, 20, 21, 22, 25, 30
		Sumner Straits	106-41
	District 7	Blake Channel	107-10, 20, 30, 35, 40
	District 10	Upper Frederick Sound	110-17, 21, 22, 23, 24, 31, 32, 33, 34
	Districts 3, 5, 9		All statistical areas
	Sections11-A, 11-B, 11-C, 11-D		All statistical areas

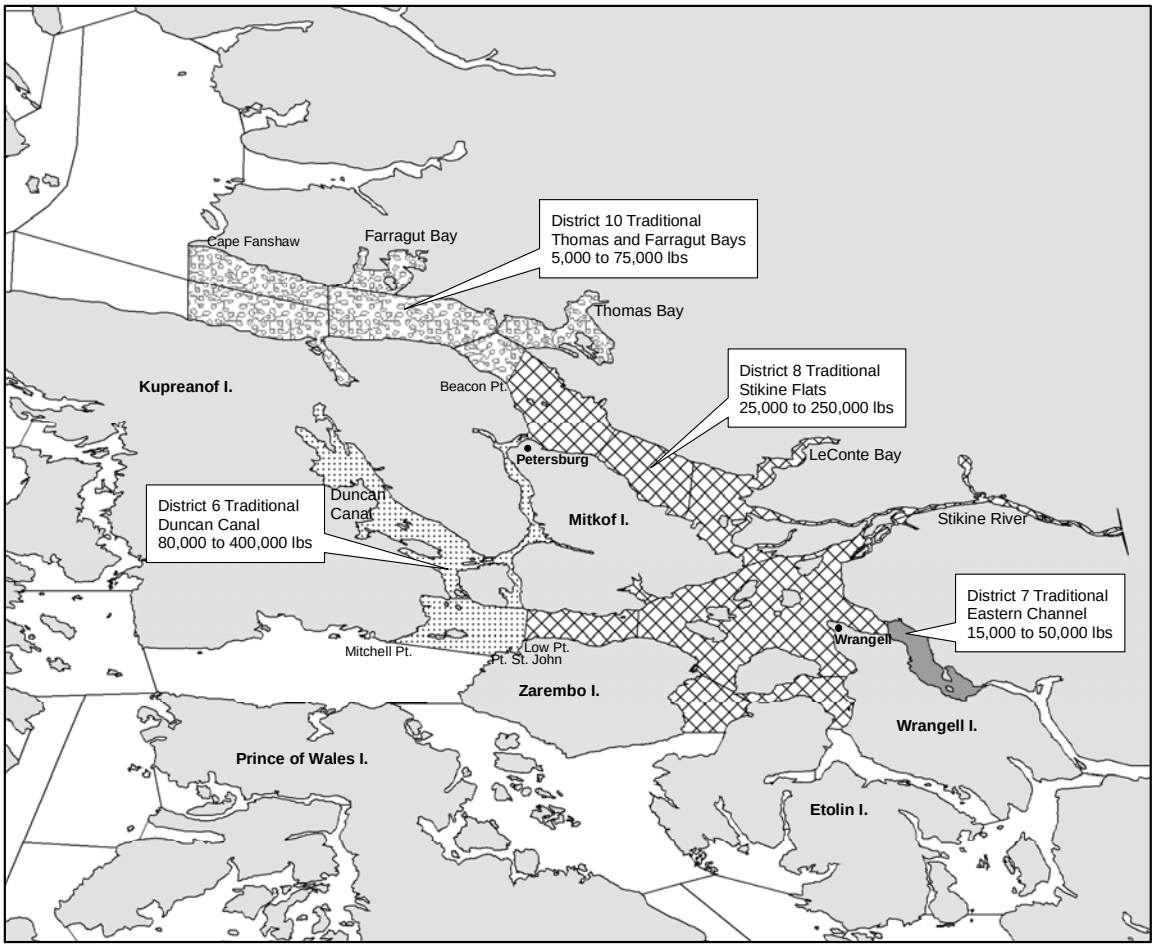

Figure 2.1–Traditional beam trawl shrimp fishery areas and fishing period guideline harvest ranges for Southeast Alaska.

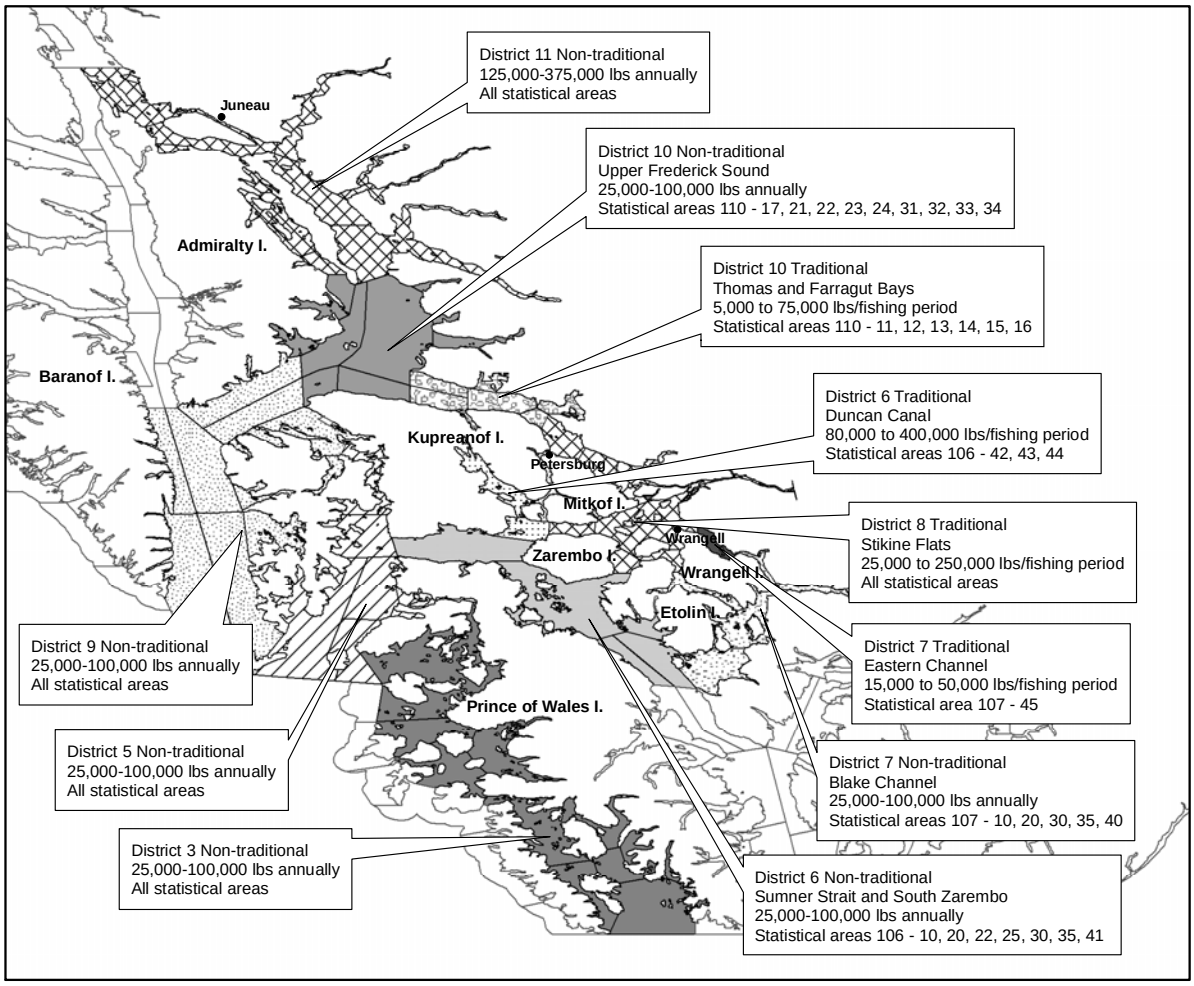

Figure 2.2–Beam trawl shrimp fishery areas and fishing period guideline harvest ranges for Southeast Alaska.

CHAPTER 3: SOUTHEAST SHRIMP POT FISHERY

INTRODUCTION

This chapter describes the life history of spot shrimp and the commercial pot fishery in Southeast Alaska (Registration Area A). A map showing the Southeast Alaska Regulatory Districts and Sections is shown as Figure 3.1. The events characteristic of this fishery are driven by the increasing effort and subsequent limited entry, significant regulatory changes, increasing effort by catcher-processors producing value-added frozen-at-sea products and the developing program for shrimp management and biological research in the region.

LIFE HISTORY

Life history information on spot shrimp, *Pandalus platyceros*–the target species for the shrimp pot fishery in Southeast Alaska–is limited. Thus, much must be inferred from examining life history information from Prince William Sound and British Columbia studies of *P. platyceros* and from North Atlantic studies of congeneric *P. borealis*.

Larvae hatch at night, assisted by the female who moves her pleopods while swimming or clinging to something to expel them. The free-swimming larvae spend up to three months in the plankton. Five larval stages are reported, stages I–IV being zoea and stage V being a megalopa (Price and Chew 1972). Five juvenile stages are reported prior to maturation to a functional, adult male (Berkeley 1930; Haynes 1985).

All pandalid shrimp are protandric hermaphrodites; they mature and spawn first as males, and subsequently transition to females and spawn as females for the remainder of their lives. Spot shrimp are thought to mature sexually after 1.5 years and reproduce as males for an additional one to three seasons in British Columbia (Butler 1964). The transition from male to female occurs during the early spring and summer months of the second or third year of life and the shrimp also grow substantially in this process. However, interannual and spatial variability in the size at which shrimp transition, quantitatively expressed as the length at which 50% are female (L50) has been well-described for *Pandalus borealis* and declines with increased growth rates, as a function of either a substantial decrease in shrimp density or an increase in water temperature (Koeller et al. 2003; Wieland 2004). Females undergo another molt into "breeding dress," characterized by deepened abdominal pleura and elongated setae on the pleopods, in the late summer or fall, after which they extrude mature eggs from their internal ovaries. Eggs are fertilized externally as they are extruded and become attached to the pleopods, where they are carried until fully developed. Near Petersburg, Hynes (Hynes 1930) found an average count of 3,900 eggs per female. In Alaska, eggs may be held until the onset of the spring phytoplankton and zooplankton blooms during late March to mid-May.

Reports of the duration of the female period of spot shrimp life history vary. Females are not thought to survive long after the release of eggs in British Columbia while in Alaska, multiple size classes of female shrimp have been documented during ADF&G surveys (Love and Bishop

2005). This suggests either multiple spawnings of individual females or a protracted and highly variable age at transition; however, the L50 within a year and location of Alaskan shrimp is not correspondingly variable. Two sizes of female spot shrimp have also been reported during some years in Hood Canal (Chew et al. 1974)

Similarly, there is no consensus on the maximum age of spot shrimp and it is likely to be longer in higher latitudes with colder bottom water temperatures. Canadians report a maximum age of five years, while an Alaskan tagging study from Prince William Sound estimated the maximum age at 7 or more years (Butler 1964; Kimker et al. 1996).

There is an ontogenetic change in the habitat of spot shrimp. Juvenile spot shrimp utilize shallow water eelgrass and *Laminarium* or *Agarum* spp. kelp habitats but at a size of approximately 20 mm CL they migrate to rocky habitats including reefs, glass sponge reefs and corals (Chew et al. 1974; Marliave and Roth 1995).

Adult spot shrimp are benthic scavengers as well as predators and undergo diurnal feeding migrations, moving shoreward along the bottom into shallower waters at night and back to deeper waters during the day (Butler 1980).

Spot shrimp are widely distributed within the North Pacific Ocean. They occur from the intertidal to depths of greater than 1,500 ft, from the Korea Strait to the Sea of Japan, along the Siberian east coast, and from Unalaska to San Diego, California (Butler 1964).

The concept of meta-populations may apply to spot shrimp. Although larvae are planktonic and may be widely transported by currents, juveniles and adults are relatively sedentary, tagged adults remain within a mile or two of their release location (Kimker et al. 1996). Larval advection into bays and fjords in Southeast Alaska may depend on prevailing wind patterns and currents and larvae in some inshore waters may experience very small-scale entrainment patterns. Thus, depleted waters could be repopulated by a distant larval "source".

Pandalid shrimp populations are vulnerable from a number of standpoints to water temperatures outside their narrow preference (3–6 ºC for *P. borealis*) with delays in both oviposition timing and in the number of breeding females associated with temperatures outside this range (Nunes 1984). Second, increased water temperatures result in declines in L50—which causes decreased average mature female size and population fecundity. This can result in a decline in recruitment (Koeller et al. 2003).

COMMERCIAL FISHERY

Two species of shrimp, *P. platyceros* and *P. hypsinotus*, are harvested in the shrimp pot fishery of Southeast Alaska. Shrimp harvests in recent years from 2000/01 through the 2007/08 seasons have averaged 921,000 pounds. Generally, there has been a progressive increase in harvest from the 1970s decade when harvests averaged only 21,500 pounds, to 285,000 pounds in the 1980s decade, to 876,000 in the 1990s decade to 921,000 pounds average during recent years (Table 3.1). The greatest portion of the harvest is taken in Districts 1, 3, and 7 which represent 56% of the most recent 10 year average harvests (Table 3.2). Smaller but significant historical harvests have also occurred in Districts 2, 6, 10 and 13 which represent 27% of the most recent 10-year average harvests. Nineteen distinct areas including districts or portions of districts are managed to achieve Guideline Harvest Levels (GHL). Most districts are managed to target spot shrimp, however GHLs in Districts 15 and 16 are based on coonstripe shrimp, and the GHL in District 11 is based on spot and coonstripe shrimp combined.

Vessels used in the shrimp pot fishery range from smaller style gillnet or troll vessels to limit purse seiners. Catcher-processors in the 60-foot keel length range also participate. Gear is standardized by regulation to large or small pots with associated definitions based on pot base perimeter. Gear-specific pot limits of 100 large or 140 small pots and a minimum mesh size to allow passage of a 7/8-inch diameter wooden dowel are in effect. Pot gear, is generally longlined. Pot construction varies in size, shape, weight, and configuration. Gear designs have rapidly changed to increase fishing efficiency. Cone style pots are most commonly used today. Cone pots are constructed using two or three stainless steel rings, the top ring smaller than the bottom, with vertical bars welded between the rings forming six sides, at least three of which contain tunnels. These cone pots are also constructed of either rubber wrapped or "dipped" mild steel. Pots have webbing tightly drawn in on the top with a permanent closure. The bottom web is drawn in with a "pucker string" which is opened during baiting and to empty harvested shrimp from the pot.

The fishing season is October 1–February 28, with a provision for re-opening of districts where the GHL is not taken during the regular season for a summer season of May 15–July 31. However, in productive districts most of the harvest occurs in the first month or week of the fishery. Over the most recent 5-year period 82% of seasonal harvests have taken place by the end of October (Table 3.3).

The product is primarily hand packed frozen at sea whole shrimp for the Japanese sushi market, however small amounts of shrimp also enter the domestic market either as tails, fresh frozen, or fresh. There has been some experimentation with the live shrimp market.

The basis of current management includes the following key features: a closed season to prevent fishing on major stocks during the egg-hatch or growth and recruitment periods, maintenance of a number of age classes of shrimp, maintenance of adequate brood stock for rebuilding of shrimp stocks, minimum mesh size restrictions intended to only capture and retain the larger size segment of the stock, pot standardization of two sizes, a maximum number of pots per vessel, hauling hour restrictions, a guideline harvest level (GHL) for each fishing district, and reporting requirements to ensure timely harvest monitoring and closures.

Regulations have also been adopted for permitting of shrimp floating processors, for reporting and fish ticket requirements for shrimp catcher-processors and catcher-seller vessels. Harvest is recorded and summarized through the ADF&G fish ticket system. In addition to fish ticket data from commercial landings, the department collects biological information to support management of the fishery from a variety of sources. Pre-season surveys, and on-board and dockside sampling are conducted annually; major areas are surveyed and sampled, lesser areas may have sampling only while minor areas may not be sampled. Onboard observing has also been conducted in some years. The pot shrimp stock assessment survey program was described in a recent report (Love and Bishop 2005). Each year ADF&G provides detailed information on the shrimp pot fishery, management activities and research program for all districts of Southeast Alaska in the form of the Southeastern Alaska Pot Shrimp Management Plan.

FISHERY DEVELOPMENT AND HISTORY

Harvest records dating from 1962 indicate that the shrimp pot fishery began with sporadic effort and low harvests through the mid-1970s when the shrimp pot fishery served as a supplemental source of income to other fisheries. Harvests and effort increased through the 1980s, and culminated in the mid-1990s with harvest of almost 1.14 million pounds caught during the

1994/95 season. The maximum number of permits fished was 352 during the 1995/96 season (Table 3.1). During the past several years harvest as well as effort has declined somewhat from a peak period during the early 2000s.

Through the mid-1980s most of the product was sold over the dock to private individuals, restaurants, or other markets without passing through the traditional system of processors established for other fish and shellfish species. Vessels conducting business in this manner are termed "catcher-sellers." Primarily, shrimp tails were sold, and ex-vessel prices were dependent upon the size of the tails or count of tails per pound with the larger shrimp commanding the highest price. Because the fishery was supported by relatively low volumes with moderate prices the fishery remained relatively slow paced. Harvests in the 1980s averaged 285,000 pounds per year, and the average effort was from 84 permits fished (Table 3.1).

From 1990/91 through the 1994/95 fishing seasons the character of the fishery changed. Through these years the number of permits fished increased to 248 and harvests reached in excess of 1.1 million pounds. In October 1994, the first floating processor entered the fishery, and the market product began to change towards unsorted, whole shrimp with a moderate increase in value. This change in market product meant that fishers no longer had to spend time sorting shrimp by size and picking tails on the ground, running to and from markets, or selling their own shrimp, effectively allowing them to spend more time setting and retrieving gear. Many fishers began to rely on this fishery as a significant source of their fishing income. Pot efficiency during this period and the pace of the fishery increased. The first inseason emergency order (EO) was issued in the 1994/95 season to close District 13 in mid-March of 1995. Guideline Harvests Levels (GHL) were first assigned to all districts for fisheries beginning October 1, 1995. The first inseason emergency orders were issued to close Districts 6, 7, and 8 on November 5, District 3 on November 13, and District 1 on January 2 for the 1995/96 season when the guideline harvests levels were reached. Effort in the 1995/96 season peaked for the history of the fishery at 352 permits. The rapid escalation of effort and harvest evoked petitions for limited entry, which was adopted by the Commercial Fisheries Entry Commission (CFEC) in November, 1995. CFEC established the maximum number of permits in the fishery as 332, based on participation during the 1995 calendar year.

Harvests and efforts decreased moderately following implementation of limited entry in 1998, then increased again as many shrimp fishers switched to on-board processing in order to capitalize on high prices for sorted, boxed, whole shrimp frozen-at-sea for the Japanese markets. With so many inexperienced catcher-processors delivering inconsistent quality product, the Alaskan frozen-at sea markets declined in value for a few years following the 1999/00 season, although harvests subsequently regained previous, high levels. The percentage of shrimp landed by catcher-processors peaked at 72% for the 2006/07 season. The Japanese market for whole frozen shrimp declined sharply during the 2007/08 season, leading to increased harvest of shrimp as tailed product for the domestic market.

REGULATION DEVELOPMENT

Throughout most of the development of the shrimp pot fishery, management has been passive with only fish ticket data available to assist managers. As the intensity of the fishery has increased over the years, regulation has been increased in efforts to provide a manageable and sustainable fishery. Seasons have been set to prevent harvesting during the egg hatch period and mesh restrictions were set to allow the escapement of shrimp below approximately 30 mm in

carapace length. Standardization of pots sizes and numbers, as well as adoption of limited entry by CFEC have helped to provide a more orderly fishery, and to derive information on area specific harvest rates. The GHR currently in regulation for each area were initially established as guideline harvest levels based on historical harvests, to prevent uncontrolled expansion of the fishery, but they were not based on information describing stock abundance or stock condition. Current research aims to develop a biologically based index of abundance, by which ADF&G will adjust GHLs to provide for sustainable harvest. Some history on the development of regulations for the pot shrimp fishery is provided in the following sections.

FISHING SEASONS

Prior to 1970, shrimp pot fishing was allowed only during periods when the shrimp trawl fishery was open, (roughly May 1 through February 14). In 1970, pot fishing was allowed throughout the year; this liberal season existed through the 1981/82 fishing season. During the 1982/83 season, fishing was not allowed during May and June in Districts 1 through 8. This closure was intended to protect fecund, female shrimp from exploitation during the egg-hatch period in an attempt to maximize stock reproduction potential. The actual range of egg-hatch probably varies by location throughout the region but can be safely defined as from late February through the middle of May.

For the 1983/84 season the District 1 fishery was restricted by Alaska Board of Fisheries (BOF) actions to a September 1 through April 30 season. This was an allocation for fishers who traditionally used District 1 as a supplemental income source during the fall and winter months. The closure during the late spring and summer provided the important biological benefits of allowing stock recruitment to occur through molting and growth processes.

By the 1986/87 season, major areas (Districts 1, 2, 3, and 7) were open only from October 1 through February 28 which was established for a combination of egg-hatch closure, growth, and allocation for a fall/winter fishing season. The minor areas (Districts 6 and 8) were open from May 1 through February 28 with only an egg-hatch closure in place. All other areas (Districts 4, 5, and 9 through 116) remained open throughout the year without an egg-hatch closure.

In 1997, the BOF adopted a regulatory opening of October 1 and closure of February 28 for all districts. At the 2000 meeting of the Board of Fisheries, a regulation was implemented providing for re-opening of districts where the GHL is not achieved for a summer season from May 15–July 31. This continues the egg hatch closure, allows a regulatory closure of 2 months prior to the October opening, and allows for some areas to be fished during the summer growth period. The current season remains October 1–February 28 in all districts and May 15–July 31 by emergency order.

SIZE RESTRICTIONS

The BOF policy on small shrimp (79-46-FB), primarily developed for the trawl fisheries, also applies to the shrimp pot fishery, however, specific regulations concerning a minimum legal shrimp size have not been developed. A mesh restriction specifying 1.75-inch stretch mesh was established in 1986 to assist in the escapement of shrimp less than 30 mm in carapace length and to reduce the potential for growth over-fishing. This minimum size is similar to that recommended for the Canadian west coast shrimp trap fisheries, (Boutillier 1984) and should provide for some protection for at least two year-classes of small shrimp. Shrimp pots must be entirely covered with net webbing or rigid mesh. However, there is no mesh restriction for

waters of Lituya Bay in District 16. Fleet testimony at the 1997 BOF meeting indicated that significant amounts of small shrimp were being discarded at floating processors. The requirement for mandatory observer coverage implemented at this meeting was, in part, required to document possible discard as well as to verify fish ticket information.

Mesh restrictions have not been totally effective at protecting small shrimp because current regulations do not restrict fishers from picking sets twice during the daily 8:00 AM to 4:00 PM fishing period. Longer soak periods would allow the regulatory mesh size more time to passively sort small shrimp.

QUOTAS AND GUIDELINE HARVEST LEVELS

Prior to the 1983/84 season, a GHL of 125,000 pounds was established for each of Districts 1, 2, 3, and 7, and a GHL of 55,000 pounds for each of Districts 6 and 8. By the 1986/87 season a GHR for Districts 6 and 8 was set to a range of 75,000 to 100,000 pounds and dropped entirely for all other districts. This situation existed until October 1, 1995 when ADF&G implemented GHRs for each district by news release. This action was taken in response to the ongoing trend of increasing harvests in an attempt to maintain the fishery at a sustainable harvest level. For districts with a fairly consistent harvest history, guideline harvest levels were set based on the average harvest for the five fishing seasons, 1990/91 through 1994/95. The District 13 GHR was set based on harvests from only four years since harvests in 1994/95 were nearly double any previous year. For districts with low and intermittent harvests, guideline harvest levels were arbitrarily set at 20,000 pounds. In January of 1997, the BOF adopted regulatory GHRs for each district. Those GHRs were the same as those imposed by emergency order beginning with the 1995/96 season, with the lower end of each range set to zero.

At the 2000 meeting of the BOF the Pot Shrimp Management Plan was developed and put into regulation. This plan addressed guideline harvest levels in several ways. First, it specified that the upper range of the existing GHRs be modified to use a more accurate tail to whole weight conversion factor of 2.0 based on data from shrimp pot collected during the research surveys in Southeast Alaska. The previous conversion factor of 1.67 was developed for sidestripe shrimp, *Pandalopsis dispar*, from Cook Inlet. This higher conversion factor resulted in increased upper limits of the GHR in those districts where historical harvest had been primarily of tails. The new GHRs were implemented beginning with the 2000/01 season following a major effort by ADF&G to verify, correct, and apply the new conversion to the historic fish ticket databases.

Secondly, it specified that for each of Districts 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, and 14 GHRs would be for spot shrimp, while GHRs for Districts 15 and 16 GHRs would refer to coonstripe shrimp, and for District 11 GHRs would be for both spot and coonstripe shrimp. This effectively raised the upper level of the GHR for each district by the proportion of historic harvest that was actually the other species. In most districts this is relatively insignificant however in the case of District 7 it amounts to a 20,000–30,000 pound increase.

Finally, the Pot Shrimp Management Plan specified that District 3 be split into two management areas–Section 3-A, and Sections 3-B and 3-C combined. The GHR for Section 3-A was set at a range of 0–264,000 pounds. Sections 3-B and 3-C were provided GHR of 0–50,000 pounds. These ranges were based upon the perception that shrimp populations in District 3 could support a higher harvest than the historical average. For the spot shrimp districts, no specific GHRs for coonstripe shrimp were set but it was stated that the 'allowable harvest' would be based on the average catch during 1995/96 through 1999/00 seasons.

GHRs were again addressed at the 2006 BOF meeting in Ketchikan. The department had increased some annual Guideline Harvests Levels (GHL) above the upper end of the GHR in regulation based on good stock performance, and lowered GHLs in other areas. The SE Pot Shrimp Task Force was concerned that the department needed greater flexibility to adjust GHLs up as well as down, but within the regulatory GHR. GHRs in regulation were increased in District 2, Section 3-B/C, Districts 4, 6, 8, 10, Tenakee Inlet, and Section 13-C. GHRs were changed in areas where the department had already increased GHLs by EO and in areas where the department considered that there was some future potential to increase GHLs above then existing GHRs.

GEAR RESTRICTIONS

With the exception of the minimum mesh size, no gear restrictions were implemented until the 1976/77 season when a pot limit of 150 pots per vessel was established for Districts 1 through 15. Until October of 1997, the 150 pot limit applied to all portions of Registration Area A. Regulations concerning a maximum tunnel perimeter (15-inch), pot marking requirements, prohibitions against simultaneously fishing shrimp pots and any other type of commercial, sport, or personal use pot, escape mechanisms, and some clarification of mesh requirements had also been developed.

Enforcement problems repeatedly demonstrated the need for clearer definitions of shrimp pot gear. It was also thought that a reduction in pot sizes would slow the fishery and could provide more useful Catch per Unit Effort data to ADF&G if gear was standardized, and if a tiered pot system under consideration by CFEC was implemented. Coupled with the implementation of limited entry, in January, 1997 the Board of Fisheries adopted gear regulations providing for phased implementation of standardized pots. Through September 30, 1998, the number of shrimp pots that could be operated from a registered shrimp fishing vessel was 140 small pots or 100 pots larger than a small pot. If any pot operated from a vessel was larger than a small pot, the total number of pots that could be operated from that vessel was 100 pots.

Effective in October of 1998, a "small pot" was defined as having a bottom perimeter of no more than 124 inches and a "large pot" was defined as having a bottom perimeter of more than 124 inches, but not more than 153 inches. Perimeter measurements were selected over diameter measurements to facilitate enforcement. Further, all pots on board a vessel or operated from a vessel had to be of the same type and of the same size.

Pots may not have more than one bottom, a vertical height of more than 24 inches, and more than 4 tunnel eye openings which individually do not exceed 15 inches in perimeter. The sides of the pot may only be at a right angle to the plane of the bottom of the pot or slanted inward toward the center of the pot in a straight line from the bottom to the top.

Other shrimp pot regulations adopted in 1997 included time limitations for deployment and retrieval of gear from 8:00 AM until 4:00 PM each day, restrictions on carrying pot gear to only the owner of the gear, and unique identification tags for each pot. Unique pot identification tags were issued for a time, however this requirement was made optional in 2003. Pot tags have not been issued since that time.

At the 2006 BOF meeting in Ketchikan, regulations were clarified so that fishermen could only fish all small pots or all large pots in order to improve the quality of harvest rate information reported on fish tickets. Pot marking requirements were modified to provide marked buoys on each end of a longline with more than five pots. This regulation is intended to prevent gear

entanglement and loss in congested fishing areas. In 2006 a new regulation prevented simultaneous registration for the pot shrimp and beam trawl shrimp fisheries.

FLOATING PROCESSORS

Floating processors entered the fishery in 1994. Different practices immediately followed which changed the character of the fishery in several ways. Small fishing boats could deliver on the grounds without spending time for round-trip travel to shore-based plants. The "floaters" could store and transport pots for fishing vessels, and could purchase unsorted, live shrimp. Along with good prices, the pace of the fishery was greatly accelerated. Arrangements for communications between processing vessels and department staff needed to be developed to monitor harvests. Fishing in areas of proximity to processors created more potential for localized depletion of shrimp stocks.

In 1997 the BOF eliminated the ability of floating processors to transport pots for fishing vessels and implemented requirements that included reporting processor location and any changes in location, reporting projected dates of operation, and daily reporting. The only practical way for ADF&G to have verification of daily reporting or to monitor reported discards of small shrimp size classes was to implement mandatory observer coverage, the cost of which is borne by the processor. The last season that a floating processor participated in this fishery was 1998.

CATCHER PROCESSORS

Reporting requirements for shrimp catcher-processors were established at the 2000 BOF meeting, revised at the 2003 meeting, and again revised at the 2006 meeting. Reporting requirements allow ADF&G to regularly track harvest from catcher-processors inseason, since fish tickets are not required until 7 days after landing of product under statewide regulations. A catcher-processor is defined as a vessel that catches and processes their own product on board. Catcher processors cannot buy or process shrimp from another fishing vessel or act as a tender so observers are not required. Regulations in 2003 allowed the department to specify information to be reported during weekly call-in periods by emergency order. Regulations were modified in 2006 so that the department would not need to specify what information would be required by EO each year. Catcher-processor must also report harvests within 72 hours of the closure of a fishing area, and contact the department before fishing in a new fishing area. Regulations require catcher-processors to report harvest on fish tickets for each day fished and for each area fished. Fish tickets are due to the department within 7 days of the closure of an area where the catcher-processor has fished.

CATCHER-SELLERS

Catcher-sellers are vessels that sell unprocessed shrimp to persons not licensed to process shrimp. Regulations require that catcher-sellers issue a fish ticket for the weight of all shrimp on board the vessel before shrimp are removed from the vessel.

LIMITED ENTRY

In April of 1995 the Commercial Fisheries Entry Commission received petitions from more than 70 people from Wrangell, Ketchikan, Craig, and the Tenakee Springs Fish and Game Advisory Committee requesting limitations to the number of participants in the southeast shrimp pot fishery. After the commission obtained and analyzed data concerning the fishery, their proposed

regulations were consistent with what the petitioner's had suggested in that 1995 should not be included in the eligibility time frame. This would have capped the number of limited entry permit holders at 186 which was the highest participation level in any of the four years prior to the original qualification date. The commission held numerous public hearings throughout Southeast Alaska and announced in early November 1995, while fishing was in progress, that they had adopted a limited entry program that would include participation during 1995 toward qualification. At the time, the effort level had increased to 234 fishers. And finally, by law, the commission was required to revise upward to the maximum number of permits to 332 that legally participated in calendar year 1995. In October, 1996 the commissioners adopted a point system for the fishery. By February of 1998 the commission began the process of issuing and denying permits for this fishery. To date, 311 permits have been issued with 56 additional applicants either undergoing hearings or administrative review for additional points or vying for the remaining 21 permits that will be available. Of the 311 permits that were granted, 157 are non-transferable and 154 are transferable (CFEC 2008a).

STOCK ASSESSMENT

The assessment program for spot shrimp was initiated in 1996, and consists of pot surveys, commercial catch sampling from four different sample site types, fish tickets, and voluntary logbooks. The spatial and temporal data coverage is inconsistent, as new programs have been introduced and spatial data coverage has been increased incrementally as funding became available and as the fishery product form and gear evolved.

STOCK ASSESSMENT SURVEY

A preseason pot shrimp pilot survey was conducted in September 1996 in Ernest Sound. Additional areas were added; Cordova Bay (1997), Hoonah Sound (1999), and Tenakee Inlet (2000) (Figure 3.2). In order to minimize variability in catch rates and provide more accuracy when conducting analyses, index set locations and standardized methods were established. The objectives of these surveys are to obtain information on shrimp abundance, define trap selectivity and associated behavior of shrimp attracted to pot gear, develop a survey-based index of abundance, define the size composition of stocks from a variety of areas, and to determine sex ratios, size at first spawning, and female fecundity for both spot and coonstripe shrimp (Love and Bishop 2005; Bishop et al. In Prep.; Bishop et al. In Press).

ON-THE-GROUNDS SAMPLING

On-the-grounds (OTG) sampling began in 1998, with dual objectives of obtaining catch rate information to accurately target GHLs inseason and of collecting sampling data from unsorted shrimp. District 2, Sections 3-A, and 3-B/C, Districts 6, 7, 8, 9, 10, Tenakee, and Section 13-C have been sampled in this way; recent trips have focused on District 2, Sections 3-A and 3-B/C, Districts 6, 7, 9, 10, and Section 13-C (Bishop et al. *in press*).

LOGBOOK PROGRAM

A voluntary logbook program was initiated in 2005 with the objective of collecting size-specific spot shrimp CPUE data from catcher-processors. Participating fishermen provide the Alaska Department of Fish and Game (ADF&G) with definitions of their size categories at the beginning of the season and inseason record their harvest information by shrimp size category on their daily fish tickets. This information is used for analysis of interannual trends in CPUE and

for Leslie depletion estimator modeling to determine harvest rate. Logbook data has been collected from 2005–2007 in all except districts which have seen limited effort (District 4) or been closed during this time period (Districts 15 and 16); however, for many districts there is insufficient data for either analysis, either because of limited effort or limited participation (Bishop et al. *in press*).

DOCKSIDE SAMPLING

Dockside sampling was started in 1997 first in Districts 1, 6, 7, 14, and 16 and gradually expanding into Districts 3, 4, 8, 10, 11 and 15. However, dockside deliveries gradually dwindled as the proportion of the harvest which was processed onboard increased until by 2002 only Districts 6, 7, 8, 11, 14 and 15 were regularly being sampled dockside. By 2007, this had dwindled further to Districts 6, 7, and 8 only, due to shifting or declining harvests in Districts 11, 14, and 15 (Bishop et al. *in press*).

STOCK ASSESSMENT REGIONWIDE OVERVIEW

In general, data availability for spot shrimp stocks in Southeast Alaska is inadequate to estimate shrimp population size, and appropriate harvest rates for sustainable yield. This allows much less reliability in predicting stock changes over time and increases the potential risk for over-harvesting. The recommendations for changes in GHLs made are based on stock status, standardized score, and confidence levels (Table 3.4). A "Poor" designation is associated with a 40% reduction in the GHL. A "Moderate" designation can range from a 0–20% reduction in GHL, and a "Good" designation a 0–20% increase. Decreases in GHLs need to be large enough to be effective, and increases not so large as to produce future declines. In some cases, alternatives are provided. The alternative provides a more risk-prone strategy, but in trade-off requires more data be collected for future analyses. There are also a number of small-GHL districts; those with GHLs ≤20,000 lbs. When stock health provides evidence for decreases in shrimp abundance, the district is recommended to be closed for 3 years, or to implement a rotational fishery of two years of fishing and one closed season, or a fishery one season and closed for two seasons. Details of the 2007 stock assessment by analysis area are provided elsewhere (Bishop et al. *in press*).

RECENT SEASONS

2005/06 SEASON SUMMARY

A detailed 'Pot Shrimp Fishery Management Plan' providing district-specific information and describing management for the season was released in September, 2005 (Davidson et al. 2005). This was followed by a news release to the fleet announcing fishing seasons, fishing periods, lawful gear, vessel registration, GHLs, catcher-processor reporting requirements, fish ticket requirements, logbooks, and other information. The fishery opened on October 1, 2005 targeting a GHL of 939,000 pounds. In comparison with the prior season, GHLs were increased 20% in District 6 and 40% in Tenakee Inlet. The GHL for District 15 was decreased by 25% and District 16 was closed (Table 3.5).

A total of 292 CFEC permits were issued for the 2005 calendar year. A total of 160 fishing vessels and 5 tenders registered for the 2005/06 season. 72 permit holders, 45% of the fishing vessels, were registered as catcher-processors, and there were no floating processors. A total of 143 CFEC permit holders fished and made 2,340 landings.

Total landings for the season were 975,777 pounds, 104% of the season's GHL (Table 3.1 and 3.6). The average pounds per landing was 421 and the average pounds per permit was 6,824. Total landings of spot shrimp were 942,544 pounds; total landings of coonstripe shrimp were 30,871 pounds, 3.2% of the total. CFEC reports total gross earnings of $2,624,072 for the 2005 calendar year (which largely overlaps with the major harvest period in October, November, and December of the 2005/06 season (CFEC 2008b). Landings and value reported on annual operator reports equates to an average ex-vessel price of $2.76/pound. The average annual earnings per permit holder is reported by CFEC as $18,600. Of total pounds landed for the season: 69% was by catcher-processors, 19% by shore-based processors, 7% by catcher-sellers, and 4% by other marketing categories.

The 2005/06 season progressed rapidly with 800,000 pounds and 82% of the season's GHL harvested in October. Another 114,000 pounds was harvested in November bringing cumulative annual pot gear shrimp harvests to 92% of seasonal landings by the close of November (Table 3.6). Landings during the fall-winter season (October 1–February 28) were 99% of total landings, and landings during the summer season (May 15–July 31) were 1% of the total. A historic summary of shrimp harvests by season and district is presented in Table 3.6 shows harvests by district and month for the 2005/06 season, including closure dates for each district, and effort levels by district and by month. The first area to close was Tenakee Inlet after 5 days. This area was followed in turn by Section 13-C after 6 days, District 10 after 8 days, District 2 after 14 days, Section 3-A after 15 days, the Remainder of District 12 after 16 days, District 9 after 19 days, and District 7 and Sections 13-A/B by the end of October (Table3.6). Districts 3-B/C, 8, and 11 closed in November; Districts 1 and 6 closed in December. Districts 5, 14, and 15 remained open until February 28 at the end of the fall-winter season. Additional fishing time was provided only in District 4 in the summer fishing period. By-month participation declined from all 143 permit-holders in October, to 58 permits (40%) in November to 21 permits in December (15%) to 6 permits in January (4%) (Table 3.6).

2006/07 SEASON SUMMARY

A detailed 'Pot Shrimp Fishery Management Plan' providing district-specific information and describing management for the season was released in September, 2006 (Davidson et al. 2006). This was followed by a news release to the fleet announcing fishing seasons, fishing periods, lawful gear, vessel registration, new regulations, GHLs, catcher-processor reporting requirements, fish ticket requirements, logbooks, and other information. The fishery opened on October 1, 2006 targeting a GHL of 853,400 pounds. In comparison with the prior season, GHLs were decreased by 40% in District 1 and 25% in District 14. Districts 15 and 16 were closed for the season. The regional GHL was decreased by around 9% compared with the previous season. (Table 3.5).

A total of 289 CFEC permits were issued by CFEC for the 2006 calendar year. A total of 157 fishing vessels and 4 tenders registered for the 2006/07 season. Similar to the prior season, 71 permit holders, or 45% of the fishing vessels were registered as catcher-processors, and there were no floating processors. A total of 136 CFEC permit holders fished and made 2,029 landings over the course of the season.

The total pounds landed for the season was 937,066, 110% of the season's GHL (Tables 3.1 and 3.7). The average pounds per landing was 462, and the average pounds per permit was 6,890. Total landings of spot shrimp were 915,567 pounds; total landings of coonstripe shrimp were

21,499 pounds, 2.3% of the total. CFEC reports total gross earnings of $2,648,196 for the 2006 calendar year, which equates to a reported average ex-vessel price of $2.79/pound (CFEC website, BITP-A State of Alaska 2008-11-10 Commercial Fisheries Entry Commission Basic Information (Table 3.7). The average annual earnings per permit holder is reported by CFEC as $19,472. Of total pounds landed for the season: 72% was by catcher-processors, 23% by shore-based processors, 5% by catcher-sellers, and 1% by other marketing categories.

The 2006/07 season progressed rapidly, as usual, with 831,000 pounds and 89% of the season's GHL harvested in October. Another 79,000 pounds was harvested in November bringing cumulative annual pot gear shrimp harvests to 97% of the final season's landings by the close of November (3.7). Landings during the fall-winter season (October 1–February 28) were 99% of total landings, and landings during the summer season (May 15–July 31) were 1% of the total, similar to the previous season. A historic summary of shrimp harvests by season and district is presented in Table 3.2. Table 3.7 shows harvests by district and month for the 2006/07 season, including closure dates for each district, and effort levels by district and by month. The first area to close was Tenakee Inlet after 4 days. This area was followed in turn by Section 13-C after 5 days, District 10 after 8 days, the Remainder of District 12 after 12 days, District 9 after 16 days, Section 13-A/B after 17 days, Section 3-A after 18 days, District 11 after 19 days, District 7 after 22 days, and District 8 by October 30 (Table 3.7) Districts 1, 2, 3-B/C, and 6 all closed during November. District 14 remained open until February 28 at the end of the fall-winter season. Additional fishing time was provided in Districts 4 and 5 in the summer fishing period. By-month participation declined from all 136 permit-holders in October, to 47 permits (34%) in November to 3 permits or fewer (2%) from December until the close of both the fall and summer seasons (Table 3.7).

2007/08 SEASON SUMMARY

A detailed 'Pot Shrimp Fishery Management Plan' providing district-specific information and describing management for the season was released in September, 2007 (Davidson et al. 2007). This was followed by a news release to the fleet announcing fishing seasons, fishing periods, lawful gear, vessel registration, GHLs, catcher-processor reporting requirements, fish ticket requirements, logbooks, and other information. The fishery opened on October 1, 2007 targeting a GHL of 835,400 pounds. In comparison with the prior season, GHLs were decreased by 20% each in Sections 3-B/C and in Section 13-C. Districts 15 and 16 remained closed for the season. The regional GHL decreased by around 2% overall (Table 3.5).

A total of 283 CFEC permits were issued by CFEC for the 2007 calendar year. A total of 116 fishing vessels and 4 tenders registered for the 2007/08 season. Permit renewal dropped only 2%, but vessel registration by permit holders dropped by 26% compared with the prior year. Going into the season it was widely known that the Japanese market for boxed, whole-frozen shrimp had collapsed. The number of permit holders registering as catcher-processors declined from 71 to 55 permits or 47% of the fleet. There again were no floating processors. A total of 110 CFEC permit holders fished and made 1,609 landings over the course of the season. (Summary information for the season remains preliminary at this time, but will change only slightly when some fish tickets with incorrect coding are adjusted.)

Total landings for the season were around 722,028 pounds, 86.4% of the season's GHL and 77% of the prior season's harvest (Table 3.1). The harvest is the lowest for the pot shrimp fishery for 15 years since the 1992/93 season. The average pounds per landing was 449 and the average

pounds per permit was 6,564. Total pounds of spot shrimp landed were 702,156; total landings of coonstripe shrimp were 19,872 pounds, 2.8% of the total. CFEC reports total gross earnings of $1,787,934 for the 2007 calendar year, which equates to a reported average ex-vessel price of $2.79/pound, the same as the previous year (CFEC 2008b). The reported ex-vessel value of the fishery declined by 33% from $2.65 million in 2007. The average annual earnings per permit holder is reported by CFEC as $16,555 (85% of the previous year). Of total pounds landed for the season: 57% was by catcher-processors, 34% by shore-based processors, 19% by catcher-sellers. Although the department does not track fisheries products after they are harvested, these trends of decreased catcher-freezer landings and increased catcher-seller and shore-based landings are consistent with a shift in marketing from the whole-frozen Japanese market to frozen or fresh tailed product sold on the domestic market. For the 2007/08 season 59% of shrimp were landed as tails and 41% as whole shrimp, versus 26% landed as tails and 73% as whole shrimp during the 2006/07 season.

The 2007/08 season progressed somewhat more slowly, and was more prolonged than usual, however, the great majority of the harvest still took place in October and November. The October harvest was 515,000 pounds, 71% of the seasonal harvest of 722,000 pounds. November harvests of 91,000 pounds brought harvests to 84% of the season's harvest (Table 3.8). Landings during the fall-winter season (October 1–February 28) were 95% of total landings, and landings during the summer season (May 15–July 31) increased from 1% to 5% of the total, when compared to the previous season. A historic summary of shrimp harvests by season and district is presented inTable 3.8. Harvests by district and month for the 2007/08 season, including closure dates for each district, and effort levels by district and by month is shown in Table 3.8 The first area to close was Tenakee Inlet after 3 days. During the pre-season survey in Tenakee Inlet biologists noted lower catch rates and decreasing geographic distribution of shrimp. The fishery was monitored inseason to corroborate these observations, a decision was made on the fishing grounds to target a reduced GHL, and then managers closed the fishery after three days. Other areas with early October closures were: Section 13-C in 7 days, District 10 in 9 days, the Remainder of District 12 in 10 days, District 9 and Section 13-A/B in 14 days, and District 11 in 15 days in Table 3.8. Section 3-B/C, District 2, and District 7 closed during November. Due to lower than expected harvests and efforts, Districts 2 and 3-B/C were reopened after the initial closures and GHLs were eventually taken during the fall-winter season. Districts 6, 8, and 14 remained open through the end of the fall-winter season until February 28. The GHLs from Districts 6 and 8 were not taken, but managers decided not to re-open those districts for a summer season due to poor fishery performance. District 1, Section 3-A, and Districts 4 and 5 were re-opened for the summer fishery. GHLs were nearly reached in District 1 and Section 3-A by the close of the summer season, but little harvest occurred in District 4 and no harvest in District 5. By-month participation declined from 101 permit-holders in October (92% of the season total), to 58 permits (53%) in November, to 17 permits (15%) in December, followed by decreasing effort until the close of both the fall and summer seasons Table 3.8.

2008/09 SEASON OUTLOOK

A detailed 'Pot Shrimp Fishery Management Plan' providing district-specific information and describing management for the season was released in September, 2008 (Davidson 2008). This was followed by a news release to the fleet announcing fishing seasons, fishing periods, lawful gear, vessel registration, GHLs, catcher-processor reporting requirements, fish ticket requirements, logbooks, and other information. The fishery opened on October 1, 2008 targeting

a reduced GHL of 752,100 pounds (Table 3.5). In comparison with the prior season, GHLs were decreased by 10% overall. GHLs were reduced in seven of nineteen areas managed throughout the region including a 12% reduction following a 20% reduction the prior year in Section 13-C, 20% reductions in District 1, Section 3-A, and District 6, 33% reductions in the Remainder of District 12 and in District 14, and a 40% reduction in Tenakee Inlet following inseason action the previous year of a similar amount. In response to specific area concern the department announced that the West Behm portion of District 1 would close after a limited fishing period, along with an overall reduction in GHL for the District as a whole. Following a 3-year closure District 16 was re-opened for a GHL of 15,000 pounds, with the caveat that this area would be harvested and closed on alternate years, to accommodate a smaller harvest rate, beginning with the next year that harvest took place in the district. Shellfish research biologists had spent considerable time and effort in conducting a pot shrimp program review, including a very thorough re-evaluation, analysis, and re-organization of available stock assessment information. Representatives of fishery management staff also participated in the program review. GHL reductions put in place for the 2008/09 season were in response to a recognized regional pattern of downward trends in many shrimp populations, specific information in some closely monitored populations, and available information in other areas. Further GHL evaluations will continue prior to each season.

For the 2008/09 season CFEC has issued 278 permits. A total of 107 fishing vessels and 6 tenders have registered, including 58 catcher-processors. By the early part of November, 87 vessels have recorded 730 landings for a total of 345,000 pounds of shrimp. Some GHLs have been harvested and closures occurred in Tenakee Inlet after 4 days, Section 13-C after 5 days, the Remainder of District 12 after 9 days, District 9 after 12 days, District 10 after 16 days, and District 11 after 19 days. Effort in November has now declined to around 40–45 boats. The effort level and the pace of this season's fishery is markedly slower than during the previous three years. Only 46% of the season's GHL has been taken at the present time well-below the most recent 5-year average of 82% by the end of October. The shrimp fishery is responding to the combined effects of decreased and changing markets, reduced populations, usual patterns of attrition in effort, fuel cost increases, and inclement weather.

MANAGEMENT CONCERNS

The Southeastern Alaska pot shrimp fishery has a long history and is unique within the State of Alaska. The fishery is highly regulated, yet, there are problems of concern to management, especially based on declining trends of harvests during recent seasons, coupled with trends evident from available stock assessment information. The department will need to manage this resource conservatively in order to ensure an ongoing and sustainable fishery. Some concerns that may not be evident elsewhere in this report, but worthy of mention, include the following:

1) Declining harvests, decreased GHLs, shellfish staff evaluations of specific populations, and very recent trends of increased season length in multiple districts (Table 3.9) all reflect a conclusion that many shrimp populations in the region have begun to decline from recently more robust populations.

2) Changing markets and other factors such as fishing expenses are contributing to declining harvests and decreasing effort.

3) Shifts among processor or marketer categories may lead to reduced levels of inseason reporting, due to fewer catcher-processors, resulting in greater difficulty managing harvests within GHLs.

4) The catcher-processor product shift from sorted, whole-frozen shrimp has lead to decreased voluntary logbooks which had showed great promise for providing high-quality harvest rate (CPUE) data to the department for stock assessment purposes.

5) Subsistence fisheries harvests in Districts 7, 8, 13, and Section 15-A, Personal Use fisheries in all other districts, and sport throughout the region are not monitored. Current harvests and future trends in harvests may represent a significant component of overall harvests–especially in areas near major communities.

6) Outside of the personnel cost for biologists already funded to provide for other commercial fisheries, the commercial shrimp fisheries are allocated $70,000 per year to manage and research a fishery worth $2.7–4.0 million (or more) in ex-vessel value annually.

7) The department is hopeful it will have the resources, personnel, and ability to appropriately respond to population fluctuations in a timely way.

CHAPTER 3—TABLES AND FIGURES

Table 3.1–Registration Area A (Southeast Alaska) shrimp pot fishery harvest, number of landings, and CPUE, 1968/69 season to present. Reported catches include both tailed and whole product of all species captured, expressed in terms of whole pounds with a conversion factor of 2.0.

Season	Harvest (pounds)	Permits	Landings	Pounds per Landing	Pounds per Permit
1968/69	32,373	4	47	689	8,093
1969/70	19,928	3	25	797	6,643
1970/71	12,684	5	27	470	2,537
1971/72	26,727	6	49	545	4,455
1972/73	*	*	*	*	*
1973/74	*	*	*	*	*
1974/75	7,640	7	16	478	1,091
1975/76	19,242	5	29	664	3,848
1976/77	15,716	6	16	982	2,619
1977/78	24,631	10	76	324	2,463
1978/79	21,318	9	35	609	2,369
1979/80	57,878	19	124	467	3,046
1980/81	80,862	31	191	423	2,608
1981/82	157,770	49	381	414	3,220
1982/83	268,680	58	374	718	4,632
1983/84	257,317	93	653	394	2,767
1984/85	299,015	117	781	383	2,556
1985/86	209,211	81	498	420	2,583
1986/87	354,145	83	608	582	4,267
1987/88	369,164	96	688	537	3,845
1988/89	440,615	121	812	543	3,641
1989/90	415,828	110	816	510	3,780
1990/91	562,596	138	1,100	511	4,077
1991/92	823,511	177	1,561	528	4,653
1992/93	676,928	150	1,266	535	4,513
1993/94	918,021	183	1,625	565	5,017
1994/95	1,142,717	248	2,718	420	4,608
1995/96	988,805	352	2,854	346	2,809
1996/97	1,035,344	203	1,996	519	5,100
1997/98	891,119	200	1,766	505	4,456
1998/99	856,284	185	1,839	466	4,629
1999/00	868,520	154	1,378	630	5,640
2000/01	1,063,047	160	1,311	811	6,644
2001/02	1,052,015	169	2,450	429	6,225
2002/03	1,058,348	151	2,695	393	7,009
2003/04	1,132,721	156	2,801	404	7,261
2004/05	1,000,677	149	2,499	400	6,716
2005/06	975,777	143	2,320	421	6,824
2006/07	937,066	136	2,029	462	6,890
2007/08 **	722,028	110	1,609	449	6,564
Avg. 68-79	**21,545**	**7**	**38**		
Avg. 80-89	**285,261**	**84**	**580**		
Avg. 90-99	**876,378**	**199**	**1,810**		
Avg. 00-08	**920,792**	**147**	**2,214**		

* Fewer than 3 permits were fished; information is confidential.
**The 2007/08 data should be considered preliminary.

Table 3.2–Registration Area A (Southeast Alaska) shrimp pot fishery harvest in thousands of pounds by district, 1968/69 season to present. Note: Harvest based on 2.0 conversion tail to whole weight and corrected fish tickets.

	District															
Season	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
1968/69	25.1	*					*									
1969/70	11.9		*													
1970/71	3.7	*						*		*						
1971/72	10.6	14.8					*		*	*						
1972/73		*					*									
1973/74	*	*														
1974/75	4.1	*	*													
1975/76	7.2	11.5	*													
1976/77	*	9.6	*				3.3									
1977/78	5.6	14.1			*		*						*			
1978/79	4.2	6.7	*	*			3.6					*	*			
1979/80	19.0	12.8	*				18.3	*					*	*		
1980/81	15.4	14.8	25.0	*		*	16.6	*	*	*		*	*			
1981/82	26.3	17.5	57.1			9.4	15.6	2.0	4.9	*	*	*	14.6	*		4.7
1982/83	31.0	36.5	84.8	*		7.8	73.9	2.7	9.6	3.9		*	14.9	*		*
1983/84	41.1	22.5	36.6	*	*	7.7	87.2	16.5	*	14.2	*	3.3	21.1			*
1984/85	69.1	50.6	18.5	*	*	6.2	85.4	8.7	*	33.5	*	*	17.1	0.5		*
1985/86	36.7	37.5	71.1	*	*	6.0	23.1	2.8	1.7	13.4	*	0.4	11.1	*	*	*
1986/87	60.9	137.3	48.9		*	2.2	40.6	2.0	5.2	33.1	2.3	3.9	11.0	*	*	*
1987/88	118.5	80.0	27.5	*	*	0.6	50.2	2.8	18.8	29.0	2.3	13.9	21.5	2.0	*	*
1988/89	200.8	62.8	19.8	*	*	8.0	61.5	0.9	6.6	36.4	0.6	10.7	26.8	*		*
1989/90	155.3	68.6	27.0	2.7		8.4	44.2	18.7	*	47.9	*	6.6	30.5			*
1990/91	181.3	78.9	61.8	11.4		10.2	97.6	13.6	5.2	42.8	1.5	16.8	39.8		*	0.8
1991/92	168.6	83.5	274.4	*	*	21.2	123.4	15.3	2.9	49.7	*	12.3	61.2		3.3	4.5
1992/93	160.1	70.0	221.9	4.7	*	24.4	64.5	20.1	9.6	30.5	*	26.8	40.4		1.2	*
1993/94	147.0	120.5	288.6	5.4	*	41.2	120.5	25.3	27.0	36.0	2.1	33.5	61.7	*	1.8	*
1994/95	159.9	76.9	232.0	1.0	21.6	130.2	199.6	30.4	12.1	88.5	3.1	58.9	110.8	2.4	8.9	5.9
1995/96	179.4	90.5	245.1	23.3	34.9	76.0	120.2	9.2	25.9	48.8	23.4	28.3	49.2	17.7	10.1	7.7
1996/97	171.9	82.5	280.9	20.8	24.2	79.0	128.2	29.8	19.5	53.0	20.5	28.6	48.8	4.3	22.2	*
1997/98	142.7	83.0	228.0	10.2	5.9	72.6	127.2	20.0	21.0	39.6	18.3	25.5	41.1	12.2	21.9	*
1998/99	163.2	76.5	225.7	6.1	5.5	68.3	101.9	20.5	18.1	31.8	8.9	30.1	66.8	6.6	22.8	17.6
1999/00	158.6	76.1	237.8	16.6	11.8	70.0	100.9	23.5	18.3	37.9	8.6	26.0	48.0	*	24.7	*

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Table 3.2–Page 2 of 2.

	District															
Season	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
2000/01	161.3	122.0	305.6	20.3	14.3	79.4	116.2	23.5	20.8	46.2	19.8	25.6	47.8	16.5	24.2	*
2001/02	174.2	103.7	320.7	10.4	7.9	71.0	128.8	19.6	18.5	38.4	24.1	36.7	42.3	21.9	18.9	*
2002/03	157.4	89.6	320.8	22.2	19.6	68.3	114.0	24.3	15.9	54.7	19.5	41.8	55.6	19.9	19.6	23.3
2003/04	182.4	96.7	350.1	20.4	17.7	70.0	122.1	22.7	18.2	61.7	22.0	54.4	58.5	19.6	6.9	16.2
2004/05	169.5	88.5	302.9	19.3	21.6	66.5	91.0	19.8	17.9	51.6	21.9	41.4	52.9	21.3	6.3	*
2005/06	176.3	83.1	258.5	18.6	19.3	82.4	87.9	24.9	20.3	53.3	23.6	50.0	57.7	15.8	4.2	closed
2006/07	154.0	99.1	252.7	15.1	10.2	80.7	87.3	23.5	24.1	51.4	23.5	48.6	53.6	13.3	closed	closed
2007/08 **	94.9	89.8	226.8	*	0	36.8	84.8	17.0	17.4	44.2	20.7	31.9	44.4	13.1	closed	closed
10-year Avg. 1998/99–2007/08	**159.2**	**92.4**	**277.9**	**14.9**	**12.8**	**69.3**	**103.2**	**21.9**	**18.9**	**47.1**	**19.2**	**37.4**	**51.7**	**15.2**	**12.8**	**12.7**
Avg. Percent	**16%**	**10%**	**29%**	**2%**	**1%**	**7%**	**11%**	**2%**	**2%**	**5%**	**2%**	**4%**	**5%**	**2%**	**1%**	**1%**

* Fewer than 3 permits were fished; information is confidential.

**The 2007/08 data should be considered preliminary

Table 3.3–Registration Area A (Southeast Alaska) shrimp pot fishery harvest in thousands of pounds by month, 1968/69 season to present. Note: Harvest based on 2.0 conversion tail to whole weight and corrected fish tickets

Season	Month												Total Harvest	Landings	Permits
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.			
1968/69				2.9	4.8	9.4	5.5	*	*				32	47	4
1969/70			*	*	4.6	5.1	*	*	6.5	1.0			20	25	3
1970/71	*	*	3.2	*	3.5	*						*	13	27	5
1971/72	*	*	*	*	*	4.5	11.3	3.8	1.8		*		27	49	6
1972/73	*					*	*		*				*	*	*
1973/74			*		*	*	*		*				*	*	*
1974/75	*	*	*	*	*	*	*			*			8	16	7
1975/76		*	*	*	*	*	*	*	*	*	*		19	29	5
1976/77		*	*	*		*	*			*		*	16	16	6
1977/78	*	*		*	*	*	*	*	*	*	*	*	25	76	10
1978/79	*	*	*				*	5.1	*	*	*	*	21	35	9
1979/80		*		*	1.5	3.0	2.7	16.5	8.3	7.9	*	9.1	58	123	19
1980/81	10.0	3.1	*	*	*	4.2	8.1	6.5	7.2	22.0	9.9	5.9	81	192	32
1981/82	11.4	3.8	5.5	2.7	6.3	14.6	11.7	3.4	6.3	34.4	36.2	20.3	158	381	49
1982/83	25.3	11.7	22.3	13.9	26.5	11.4	*	7.9	3.4	51.5	51.6	39.6	269	373	58
1983/84	44.2	32.4	15.0	13.3	21.3	22.9	24.3	32.5	31.7	8.7	5.9	4.1	257	653	93
1984/85	35.3	34.6	26.5	30.3	40.5	9.9	9.7	31.7	21.1	17.0	20.0	22.2	299	780	117
1985/86	20.3	30.3	25.2	34.7	33.1	31.1	11.1	2.3	4.3	7.3	6.3	2.6	209	498	81
1986/87	54.6	55.6	45.7	55.3	70.1	30.4	12.3	7.0	3.6	7.6	5.0	6.0	354	608	83
1987/88	74.1	56.2	48.8	54.0	62.6	19.1	20.9	10.3	7.3	5.8	5.9	3.8	369	688	96
1988/89	86.6	97.3	68.9	56.1	62.3	23.4	12.3	2.5	5.8	8.1	9.9	7.1	441	836	121
1989/90	87.9	70.7	51.9	53.8	48.6	41.8	11.6	11.1	7.7	10.8	8.8	8.9	416	816	110
1990/91	129.4	76.0	65.1	81.3	105.6	28.5	20.9	3.9	12.6	16.6	12.1	10.4	563	1,100	138
1991/92	226.2	166.0	110.3	104.9	79.4	54.2	18.4	14.3	12.7	10.8	16.8	8.8	823	1,560	177
1992/93	140.5	105.7	91.5	101.8	124.7	34.9	15.4	22.8	8.5	11.3	10.6	8.3	677	1,291	150
1993/94	174.3	194.6	99.2	131.1	130.5	44.5	22.4	25.0	23.2	20.4	26.3	24.4	916	1,650	182
1994/95	184.8	140.4	104.6	179.1	182.4	61.0	30.6	118.2	63.6	19.3	25.1	29.9	1,140	2,687	246
1995/96	463.0	205.3	119.1	73.3	41.4	38.8	8.3	11.3	9.4	6.9	8.4	1.4	987	2,843	351

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Table 3.3.–Page 2 of 2.

Season	Month												Total Harvest	Landings	Permits
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.			
1996/97	795.3	129.7	23.7	18.3	20.7	7.8	4.7	6.0	3.5	3.7	4.5	4.6	1,023	1,988	202
1997/98	757.0	57.9	30.9	3.7	6.8	5.6	7.5	9.4	10.1	*	*		868	1,759	198
1998/99	618.9	128.6	47.8	19.9	25.6	*		16.3	4.1	2.1	3.8	2.9	861	1,833	185
1999/00	639.8	96.9	39.0	33.3	24.5	CLOSED	CLOSED	18.0	8.2	12.2	CLOSED	*	870	1,373	157
2000/01	816.3	153.3	39.4	18.1	13.6	CLOSED	CLOSED	11.7	6.2	4.1	CLOSED	*	1,057	1,302	161
2001/02	841.2	120.9	26.3	17.9	17.3	CLOSED	CLOSED	11.8	9.4	5.3	CLOSED	*	1,047	2,440	172
2002/03	814.4	163.2	34.4	8.6	24.6	CLOSED	CLOSED	6.4	7.5	*	CLOSED	6.9	1,066	2,709	155
2003/04	918.1	154.5	12.4	16.7	8.4	CLOSED	CLOSED	8.4	5.7	8.5	CLOSED	CLOSED	1,133	2,801	156
2004/05	840.9	112.3	17.4	8.7	11.0	CLOSED	CLOSED	4.3	*	3.8	CLOSED	CLOSED	1,001	2,499	149
2005/06	800.2	114.0	21.9	13.1	16.8	CLOSED	CLOSED	2.7	*	*	CLOSED	CLOSED	976	2,320	143
2006/07	830.9	78.8	4.1	5.3	8.4	CLOSED	CLOSED	*	*	*	CLOSED	CLOSED	937	2,029	136
2007/08**	514.7	91.1	16.1	33.4	30.7	CLOSED	CLOSED	16.8	11.6	5.1	CLOSED	CLOSED	722	1,609	110
Avg. Pct. for 2003/04 to 2007/08	**82%**	**12%**	**2%**	**2%**	**2%**			**1%**	**1%**	**0%**			**-**	**-**	**-**

* Fewer than 3 permits were fished; information is confidential.

**The 2007/08 data should be considered preliminary.

Table 3.4–Stock status, and confidence information summarized from standardized scores used to compare among districts and ranges from +1 to -1. The standardized score is calculated as the score divided by the total possible score for a given management unit.

Management Unit	Stock Status	Confidence	Std. Score
District 1	Poor	0.18	-0.54
District 2	Moderate	0.27	-0.07
Section 3-A	Poor	0.41	-0.53
Sections 3-B/C	Moderate	0.25	-0.17
District 4	Poor	0.18	-0.56
District 5	Moderate	0.17	0.00
District 6	Poor	0.41	-0.57
District 7	Moderate	0.66	0.06
District 8	Poor	0.37	-0.51
District 9	Moderate	0.17	-0.19
District 10	Moderate	0.37	-0.21
District 11	Moderate	0.22	0.08
Tenakee	Poor	0.52	-0.77
Remainder of District 12	Poor	0.18	-0.47
Sections 13-A/B	Moderate	0.18	-0.05
Section 13-C	Poor	0.53	-0.57
District 14	Poor	0.21	-0.56
District 15	Unknown	0.15	0.11
District 16	Unknown	0.18	-0.56

Source: (Bishop et al. *in press*)

Table 3.5–Guideline harvest levels for the Southeast Alaska commercial pot shrimp fishery by Area, in pounds whole shrimp from the 2002/03 through 2008/09 season, noting years when GHL changes were implemented. Note: The year when the GHL was changed is highlighted in bold type.

	GHL						
Area	**2008/09**	**2007/08**	**2006/07**	**2005/06**	**2004/05**	**2003/04**	**2002/03**
1	**78,700**	98,400	**98,400**	164,000	164,000	164,000	164,000
2	86,000	86,000	86,000	86,000	86,000	86,000	86,000
3-A	**158,400**	198,000	198,000	198,000	**198,000**	264,000	264,000
3-B/C	40,000	**40,000**	50,000	50,000	50,000	50,000	50,000
4	20,000	20,000	20,000	20,000	20,000	20,000	20,000
5	20,000	20,000	20,000	20,000	20,000	20,000	20,000
6	**68,000**	82,000	82,000	**82,000**	68,000	68,000	68,000
7	78,000	78,000	78,000	78,000	**78,000**	104,000	104,000
8	20,000	20,000	20,000	20,000	20,000	20,000	20,000
9	18,000	18,000	18,000	18,000	18,000	18,000	18,000
10	48,000	48,000	48,000	48,000	**48,000**	36,000	36,000
11	20,000	20,000	20,000	20,000	20,000	20,000	20,000
12-Ten.	**17,000**	28,000	28,000	**28,000**	20,000	20,000	20,000
12-Rem.	**10,000**	15,000	15,000	15,000	15,000	15,000	15,000
13-A/B	15,000	15,000	15,000	15,000	15,000	15,000	15,000
13-C	**30,000**	**34,000**	42,000	42,000	**42,000**	30,000	30,000
14	**10,000**	15,000	**15,000**	20,000	20,000	20,000	20,000
15	Closed	Closed	**Closed**	**15,000**	20,000	20,000	20,000
16	**15,000**	Closed	Closed	**Closed**	**15,000**	20,000	20,000
TOTAL	**752,100**	**835,400**	**853,400**	**939,000**	**937,000**	**1,010,000**	**1,010,000**

Table 3.6–Registration Area A (Southeast Alaska) shrimp pot harvest in thousands of pounds, number of permits, and number of landings by district, by month, and for the 2005/06 season.

Area	Oct	Nov	Dec	Jan	Feb	May	Jun	Jul	Closure Date	Total lbs Harvested	Permits	Landings
1	98,033	65,240	2,984						14-Dec	176,257	39	596
2	83,060								14-Oct	83,060	15	150
3-A	202,186								15-Oct	202,186	32	312
3-B/C	34,996	21,276							25-Nov	56,272	17	138
4	-	*	*	*	*	2,656	*	*	16-Jul	18,579	4	75
5	*	*	*	*	10,784				28-Feb	19,282	4	49
6	73,691	6,997	*						16-Dec	82,396	17	220
7	87,910								30-Oct	87,910	14	254
8	20,422	4,525							6-Nov	24,947	13	113
9	20,252								19-Oct	20,252	6	40
10	53,292								8-Oct	53,292	17	67
11	14,344	*		*					12-Nov	23,620	9	44
Tenakee	36,435								5-Oct	36,435	9	45
R-12	13,521								16-Oct	13,521	6	34
13-A/B	14,082								30-Oct	14,082	9	38
13-C	43,611								6-Oct	43,611	21	63
14	1,808	5,348	3,471	*	2,224				28-Feb	15,845	6	76
15	*	*	1,226		*				28-Feb	4,230	4	36
16	-	-	-	-	-	-	-	-	-	closed	-	-
Harvest	800,261	113,963	21,877	13,137	16,753	2,656	*	*	**Ann. harvest**	975,777	-	-
Permits	143	58	21	6	9	3	*	*	**Ann. permits**	-	143	-
Landings	1,659	435	92	40	59	5	16	15	**Ann. landings**	-	-	2,320

* Fewer than 3 permits were fished; information is confidential.

[a] Reopened by emergency order May 15 to July 31, or until GHL for that area was met.

Table 3.7–Registration Area A (Southeast Alaska) shrimp pot harvest in thousands of pounds, number of permits, and number of landings by district by month, 2006/07 season.[a]

Area	Oct	Nov	Dec	Jan	Feb	May	Jun	Jul	Closure Date	Harvest in Pounds	Permits	Landings
1	117,597	36,364							16-Nov	153,961	40	433
2	71,292	27,818							7-Nov	99,110	26	189
3-A	205,435								18-Oct	205,435	31	355
3-B/C	42,746	*							16-Nov	47,309	15	89
4	-	*		*	*	*	*	*	31-Jul	15,085	3	68
5	*	*	*	*	*				31-Jul	10,216	3	41
6	73,882	6,807							8-Nov	80,689	16	241
7	87,286								22-Oct	87,286	13	192
8	23,465								30-Oct	23,465	13	108
9	24,113								16-Oct	24,113	10	32
10	51,409								8-Oct	51,409	14	73
11	23,529								19-Oct	23,529	4	35
Tenakee	30,032								4-Oct	30,032	9	34
R-12	18,552								12-Oct	18,552	9	39
13-A/B	17,147								17-Oct	17,147	6	19
13-C	36,469								5-Oct	36,469	15	41
14	4,835	1,357	*	*	*				28-Feb	13,259	6	74
15	-	-	-	-	-	-	-	-	-	closed	-	-
16	-	-	-	-	-	-	-	-	-	closed	-	-
Harvest	830,894	78,824	4,122	5,321	8,393	*	*	*	**Ann. harvest**	**937,066**	**-**	**-**
Permits	136	47	3	4	4	*	*	*	**Ann. permits**	**-**	**136**	**-**
Landings	1,680	230	20	19	34	11	20	15	**Ann. landings**	**-**	**-**	**2,029**

* Fewer than 3 permits were fished; information is confidential.

[a] Reopened by emergency order May 15 to July 31, or until GHL for that area was met.

Table 3.8–Registration Area A (Southeast Alaska) shrimp pot harvests in thousands of pounds, number of permits, and number of landings by district by month, 2007/08 season.[a]

Area	Oct	Nov	Dec	Jan	Feb	May	Jun	Jul	Closure date	Total Pounds Harvested	Area Permits	Landings
1	53,588	14,624	972	2,027	*	4,266	8,080	5,124	31-Jul	94,930	23	336
2	65,902	10,021	4,332	9,565					11-Nov, 29-Jan	89,820	14	175
3-A	116,962	31,627	*	*	*	12,544	*	-	31-Jul	182,145	19	302
3-B/C	26,080	2,806	-	*	11,041				5-Nov, 28-Feb	44,703	8	78
4	-	-	-	-	-	-	*		31-Jul	*	*	*
5									31-Jul	0	-	-
6	20,155	8,134	5,492	*	-				28-Feb	36,768	9	133
7	66,780	17,860							28-Nov	84,768	16	224
8	5,334	2,318	1,662	4,778	2,904				28-Feb	16,996	14	110
9	17,404								14-Oct	17,404	4	27
10	44,241								9-Oct	44,241	13	63
11	20,741								15-Oct	20,741	5	30
Tenakee	18,086								3-Oct	18,086	10	27
R-12	12,838								10-Oct	13,646	9	31
13-A/B	13,593								14-Oct	13,593	6	18
13-C	29,395								7-Oct	29,395	14	33
14	3,622	*	*	*	*				28-Feb	13,054	4	59
15	-	-	-	-	-	-	-	-	-	closed	-	-
16	-	-	-	-	-	-	-	-	-	closed	-	-
Harvest	514,721	91,070	16,130	33,381	30,681	16,810	11,611	5,124	**Ann. harvest**	**722,028**	**-**	**-**
Permits	101	58	17	15	11	8	5	3	**Ann. permits**	**-**	**110**	**-**
Landings	1,001	259	58	90	79	54	38	29	**Ann. landings**	**-**	**-**	**1,609**

* Fewer than 3 permits were fished; information is confidential.

[a] 2007/08 season data should be considered preliminary.

[b] Reopened by emergency order May 15 to July 31, or until GHL for that area was met.

Table 3.9–Historical number of days open by area for the Southeast Alaska commercial pot shrimp fishery, 1995/96 through 2007/08 seasons.

Area	2007/08	2006/07	2005/06	2004/05	2003/04	2002/03	2001/02	2000/01	1999/00	1998/99	1997/98	1996/97	1995/96
1	229	47	75	80	49	52	50	41	130	97	38	37	94
2	107	38	14	13	21	30	28	29	34	97	22	30	102
3-A	229	18	15	20	47	41	28	14	12	14	9	14	44
3-B/C	132	47	6	14	14	21	46	15	-	-	-	-	-
4	229	229	213	150	213	151	229	213	230	335	335	333	220
5	229	229	151	222	229	228	229	229	230	335	335	88	164
6	151	39	77	21	24	26	27	51	137	137	34	32	36
7	59	22	30	37	113	39	71	34	55	92	24	20	36
8	151	30	37	37	18	31	35	23	22	29	27	32	36
9	14	16	19	30	24	32	25	32	57	63	70	88	162
10	9	8	8	11	12	16	14	26	30	51	34	60	98
11	15	19	43	43	48	73	116	133	230	335	335	230	266
12-Ten	3	4	5	3	6	6	6	7	9	15	31	49	127
12-R	10	12	16	23	37	31	90	-	-	-	-	-	-
13-A/B	14	17	30	152	152	97	151	151	152	151	69	56	-
13-C	7	5	6	5	5	5	4	5	5	7	10	18	16
14	151	151	151	68	107	110	194	229	230	151	335	365	365
15	closed	closed	151	226	230	129	163	73	178	335	269	365	365
16	closed	closed	closed	151	152	151	66	51	76	264	69	149	365

Note: For recent years, the fall season, Oct. 1–Feb 28 is 151 days. The summer season, May 15–July 31, plus the fall season is generally 229 days.

Note: District 13 was split into two areas beginning in 1996/97, District 3 was split into two areas beginning in 2000/01, and District 12 was split into two areas beginning in 2001/02. Days open before that time is shown where the majority of the harvests took place to better show when new area management began.

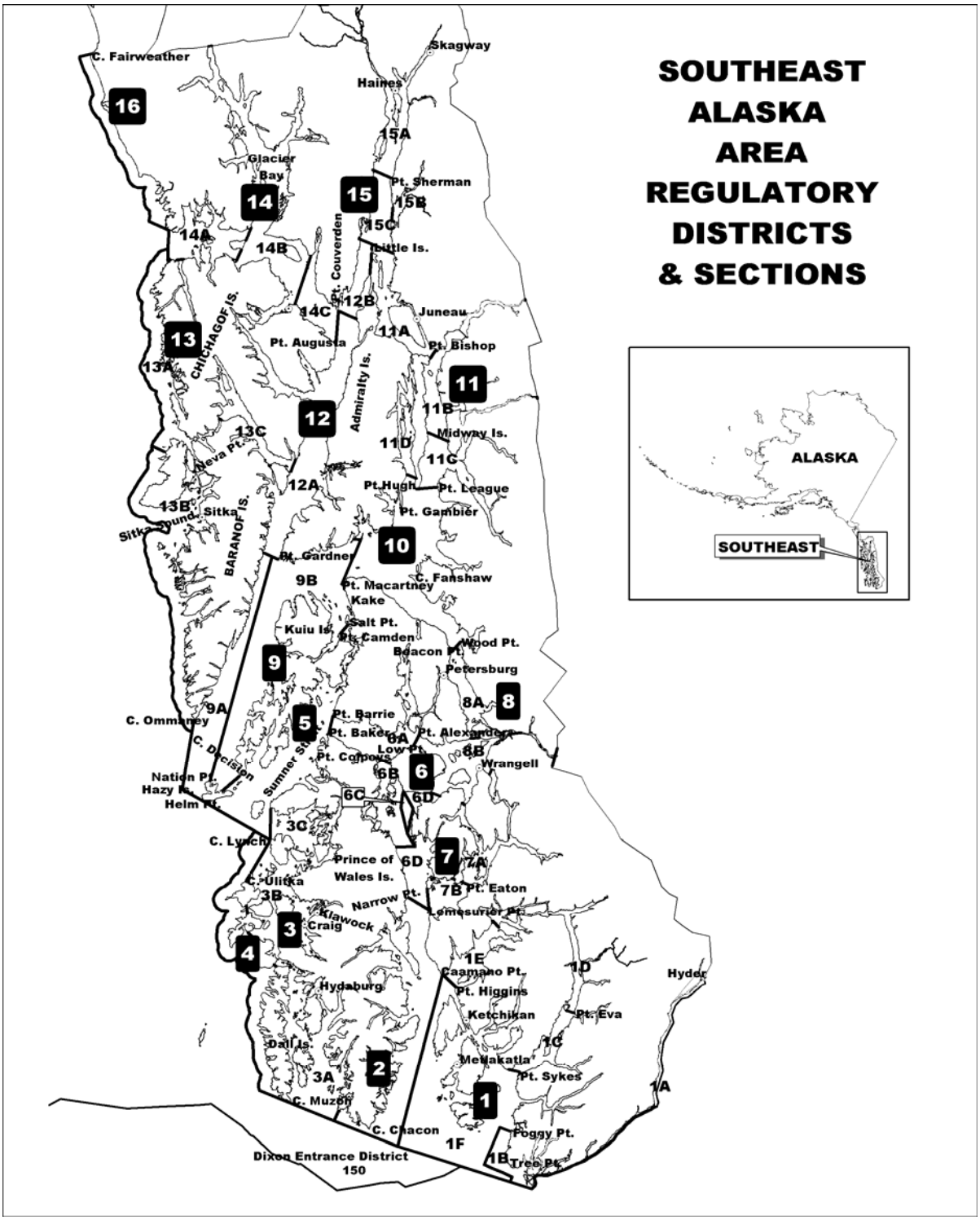

Figure 3.1–Shrimp pot fishery management units in Registration Area A, Southeast Alaska.

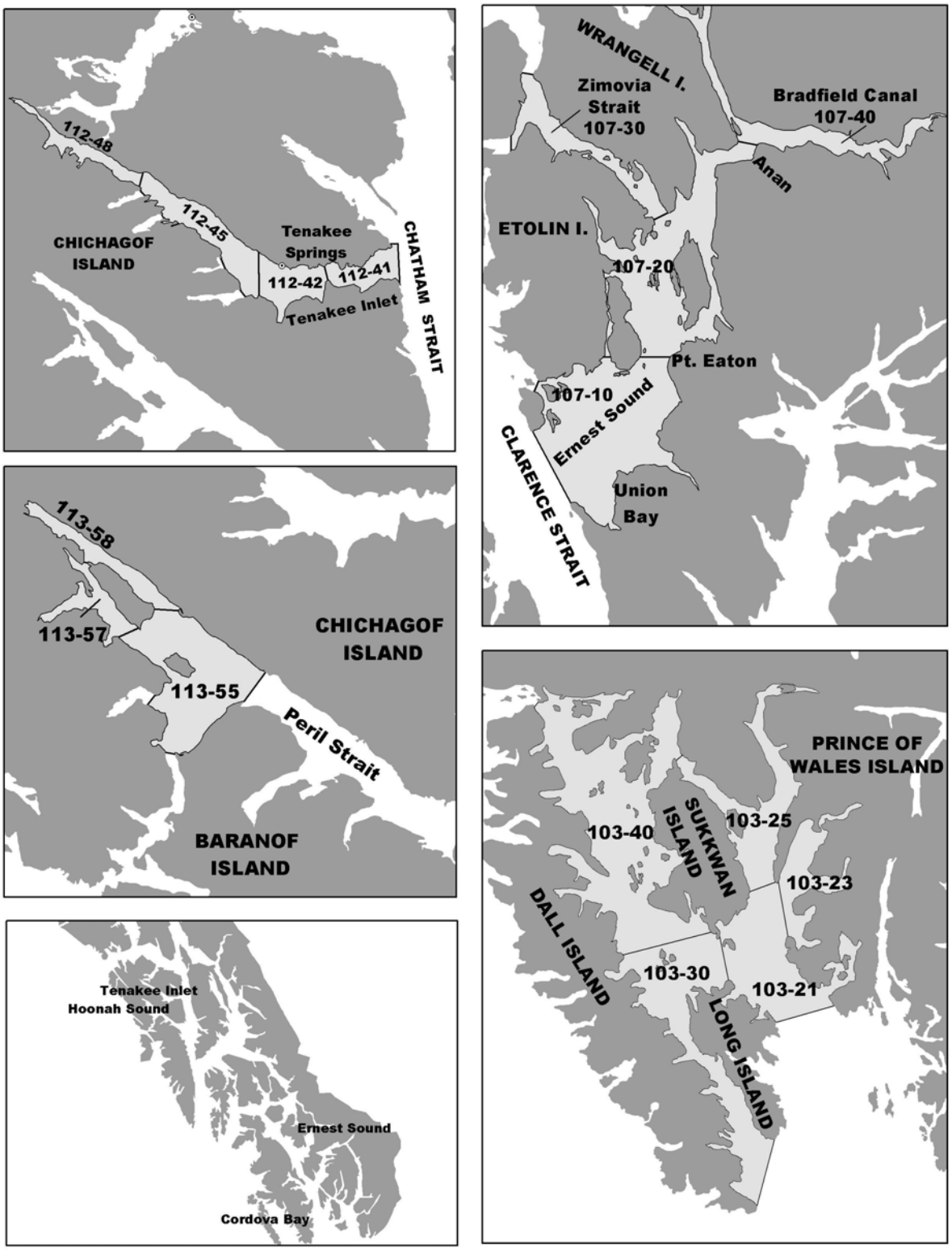

Figure 3.2–Areas currently surveyed for stock assessment of the shrimp pot fishery in Registration Area A, Southeast Alaska.

CHAPTER 4: YAKUTAT SHRIMP OTTER TRAWL FISHERY

INTRODUCTION

COMMERCIAL FISHERY

This report describes the commercial otter trawl fishery for shrimp in the Yakutat Area (Registration Area D) and reviews the history of the fishery and development of management regulations. The report emphasizes the otter trawl fishery; although beam trawls are also legal gear, their reported use has been insignificant. Many otter trawlers that participated in the Yakutat shrimp fishery also utilized shrimp fisheries in other registration areas. In the Yakutat Area, most otter trawl harvest has occurred in waters of Yakutat Bay and Icy Bay. Major processors and markets have been in Kodiak, Seward, Valdez, and Astoria, Oregon.

The most significant historic harvests targeted northern shrimp *Pandalus borealis*, with smaller quantities of sidestripe shrimp *Pandalopsis dispar*, also retained. Other species incidentally captured and landed in much smaller quantities are the coonstripe shrimp *Pandalus hypsinotus*, humpy shrimp *P. goniurus*, and the spot shrimp *P. platyceros*. Northern shrimp are harvested in large volumes but with a relatively low exvessel value. Significant quantities of incidentally captured sidestripe shrimp are normally retained because of their relatively high economic value. The adoption of restrictive monthly guideline harvest levels has forced industry to target the more valuable sidestripe shrimp in lower volumes during recent seasons.

Otter trawls are double-bridled and fish best on smooth, level substrate. They are dynamic trawls that rely on bridle and "otter board" arrangements to deploy, position, and maintain the opening dimensions of the net. Their design and size allows much greater fishing power than beam trawls, other vessel characteristics being equal. Otter trawl vessels are generally large and modern, with large holding or processing capacities and they have high horsepower ratings for their size.

FISHERY DEVELOPMENT AND HISTORY

The first recorded shrimp otter trawl landing from the Yakutat area occurred in 1976 (Table 4.1). During the past 23 seasons, there have only been six seasons when harvests exceeded 100,000 pounds and these all occurred between 1977 and 1987. Harvests are confidential for ten seasons when there were a limited number of boats and landings.

The highest harvest on record was in the 1980/81 season when a harvest exceeding 1,900,000 pounds was reported by 16 vessels making 23 landings (Table 4.1). Most of this volume was harvested in Yakutat Bay during the fall (Table 4.2) by larger vessels that also participated in various shrimp fisheries around Kodiak Island and further westward. Fish ticket data indicate the harvest was comprised of only pink shrimp, but undoubtedly some sidestripe shrimp were also harvested. These northern shrimp (pink shrimp and small sidestripe shrimp) were the

predominate species harvested through the 1987/88 season. No harvest was reported from the 1988/89 and 1989/90 seasons.

There was a small resurgence in the fishery from the 1990/91 through the 1993/94 seasons. Effort and harvests during this period were light, primarily due to restrictive monthly harvest levels, limitation of trawl fisheries to Icy and Yakutat Bays, closures of major portions of Yakutat Bay, and generally more conservative management. These harvests were almost evenly split between northern shrimp and sidestripe shrimp, but the target species was sidestripe shrimp due to their higher value and the restrictive monthly harvest levels. Fishing occurred within, or immediately adjacent to, these two bays (Table 4.3). There were no harvests reported for the 1994/95 through 1998/99 seasons.

The department conducted stock assessment surveys in Yakutat Bay from 1980 through 1984 (Table 4.4). The fall 1980 and spring 1981 surveys were conducted in cooperation with the National Marine Fisheries Service. All subsequent surveys occurred with department vessels, equipment, and personnel. During some years, both spring and fall surveys were completed. Survey results indicated population estimates ranging from 1,840,000 to 6,460,000 pounds of all species of shrimp combined, and an average composition of 70% northern shrimp and 30% sidestripe shrimp. No surveys have been conducted since 1984. The department assumes that harvestable stocks of northern and sidestripe shrimp are present in Icy and Yakutat Bays, but the current abundance of either of these species is unknown.

REGULATION DEVELOPMENT

Initially, the entire Yakutat Area (Registration Area D, between Cape Suckling and Cape Fairweather) was open to trawling and there were no restrictions on season, harvest level, gear, or closed waters. After the intense 1980/81 season was closed by emergency order, regulations were developed in cooperation with the Yakutat Advisory Committee and brought before the board. The resulting regulations were a mixture of biological needs expressed by the department and desires by the community of Yakutat to continue to utilize the local resources through commercial, personal use, and subsistence fisheries. By the 1982/83 season, a 30,000 pounds monthly guideline harvest level, closed waters, and season opening and closing dates were implemented by regulation and emergency orders. In 1993, all waters except Icy Bay and specified areas in Yakutat Bay were closed to trawl fisheries, logbooks were made mandatory, and all participating vessels had to be registered prior to fishing. Gear regulations were liberal.

In 1997, the BOF eliminated trawl shrimp fishing in the contiguous waters of Yakutat Bay east of a line from the westernmost tip of Ocean Cape to the westernmost tip of Point Manby, including the waters of Russell and Nunatak Fjords.

FISHING SEASONS

In 1981 a fishing season from June 21 through February 14, opened and closed by emergency order, was established for Yakutat Bay. The closed period was presumed to be the peak egg-hatch period, based on life history information from other fisheries around the Gulf of Alaska. The closure alleviated gear conflicts during the spring halibut openings. All other waters, including Icy Bay, remained open throughout the year. By 1993, the trawl shrimp fishery was restricted to Icy and Yakutat Bays and since 1997, the fishery has been further restricted to Icy Bay only.

GUIDELINE HARVEST LEVELS

Initial guideline harvest levels were estimated using average abundance per unit surface area from population estimates previously conducted on other Gulf of Alaska shrimp stocks, a preliminary survey conducted in Yakutat Bay by the National Marine Fisheries Service in 1953, and applying a fishing morality of approximately 0.30.

During September 1980, the first population estimate using modern nets and the area swept method was conducted. Another survey was conducted during the spring of 1981 and this information was used to establish a guideline harvest level of 1.28 to 2.0 million pounds for Yakutat Bay for the 1981/82 season. In 1982, the Alaska Board of Fisheries amended the harvest level to 30,000 pounds/month to prevent taking the entire GHL early in the season. This conservative monthly harvest level was also established to provide opportunities for local Yakutat residents to enter the commercial fishery. In 1997, trawl shrimping was eliminated from Yakutat Bay.

In 1997 a trawl shrimp GHR was established for Icy Bay for a harvest between 50,000 and 350,000 pounds for the entire fishing season. Permit holders must contact the department, obtain logbooks, and attach them to the fish ticket at time of delivery.

GEAR RESTRICTIONS

Legal trawl gear is still broadly defined as trawls, including beam and otter trawls, with no restriction to the maximum opening dimensions of the trawl mouths. Board members at the 1997 meeting discussed limiting the gear to beam trawl only, as they had done in Southeast Alaska. During periods specified by emergency order when the fishery targets sidestripe shrimp, there are regulations defining the minimum mesh size that may be used to reduce the bycatch of other shrimp species. Incidental shrimp species retention was limited to 10 percent, by weight of target species.

CLOSED WATERS

A considerable portion of Yakutat Bay, including protected waters in the vicinity of Yakutat and extending to Knight Island, and Russell and Nunatak Fjords were closed to commercial trawling through early 1997. At that point, all waters of Yakutat Bay east of a line from the westernmost tip of Ocean Cape to the westernmost tip of Point Manby were closed to shrimp trawling. The commercial closure protects important subsistence fishing grounds and prevents conflict with growing commercial pot shrimp fisheries in these areas.

MANAGEMENT CONCERNS

Except for the directed sidestripe fishery provisions in regulation, there is no legal trawl gear description in regulation for the traditional northern shrimp fishery. Since the collapse of the northern shrimp market in Southeast Alaska effort has been almost non-existent in the Yakutat area. It is likely that future effort in the fishery will target the larger sidestripe shrimp. Regulation changes may be needed to adequately control the expansion of the fishery and to prevent high-grading of some species of shrimp while dumping the less desirable species or smaller shrimp. Additional regulations to separate traditional northern shrimp and sidestripe fisheries may be necessary to assure adequately conservative management for sidestripe populations.

STOCK ASSESSMENT

Trawl surveys have not been conducted in Registration Area D since September 1984 (Table 4.4), and the current condition of the shrimp stocks is unknown. The biomass in Yakutat Bay averaged from previous survey estimates was 2.4 million pounds of northern and sidestripe shrimp, and current regulations would support a seasonal harvest of up to 270,000 lbs from Yakutat Bay at an 11% harvest rate if this area were open to trawling. Additional shrimp could be harvested from Icy Bay. Sustained harvests would require stock assessment surveys to verify seasonal abundance and new regulations to assure adequate monitoring and reporting of both the harvest of target species and incidental bycatch. If landings increased it could become necessary to incorporate bycatch criteria into the management strategy for this fishery.

RECENT SEASONS

No shrimp were reported taken with trawl gear in the Yakutat Registration Area during the past three seasons. The last harvest of shrimp taken with trawl gear occurred in November of the 2004/05 season (Table 4.2).

CHAPTER 4–TABLES

Table 4.1–Registration Area D (Yakutat) shrimp trawl harvest, number of vessels, number of landings, pounds per vessel, and pounds per landing, 1976/77 to present.

Year/ Season	Harvest in Pounds	Number of Permits	Landings	Pounds per Permit	Pounds per Landing
1976/77	*				
1977/78	0	0	0	0	0
1978/79	0	0	0	0	0
1979/80	*				
1980/81[b]	1,906,6	16	23	119,168	82,899
1981/82	*				
1982/83	141,714	3	7	47,238	20,245
1983/84	426,649	5	10	85,330	42,665
1984/85	*				
1985/86	*				
1986/87	*				
1987/88	40,448	3	6	13,483	6,741
1988/89	0	0	0	0	0
1989/90	0	0	0	0	0
1990/91	*				
1991/92	*				
1992/93	34,875	3	3	11,625	11,625
1993/94	*				
1994/95	0	0	0	0	0
1995/96	0	0	0	0	0
1996/97	0	0	0	0	0
1997/98	0	0	0	0	0
1998/99	0	0	0	0	0
1999/00	0	0	0	0	0
2000/01	0	0	0	0	0
2001/02 [c]	0	0	0	0	0
2002/03	0	0	0	0	0
2003/04	0	0	0	0	0
2004/05	*				
2005/06	0	0	0	0	0
2006/07	0	0	0	0	0
2007/08	0	0	0	0	0

* Fewer than 3 permits were fished; information is confidential.

Table 4.2–Registration Area D (Yakutat) shrimp trawl harvests in thousands of pounds by month and season, 1976/77 to present.

Season	Month												Total
	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	
1976/77	0.0	*	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*
1977/78	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978/79	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979/80	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	*	*
1980/81[a]	0.0	0.0	*	1,350.0	481.9	0.0	0.0	0.0	0.0	0.0	24.3	0.0	1,906.7
1981/82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	*
1982/83	*	*	*	*	*	0.0	0.0	0.0	*	0.0	0.0	0.0	141.7
1983/84	0.0	0.0	0.0	0.0	*	*	0.0	0.0	0.0	0.0	*	128.0	426.6
1984/85	0.0	*	0.0	*	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*
1985/86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	*
1986/87	0.0	0.0	0.0	0.0	0.0	0.0	*	*	0.0	*	154.7	0.0	*
1987/88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	*	0.0	*	0.0	40.5
1988/89	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989/90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990/91	0.0	*	0.0	*	*	0.0	0.0	0.0	0.0	0.0	0.0	*	*
1991/92	0.0	0.0	*	*	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	*
1992/93	0.0	0.0	*	*	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.9
1993/94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	*
1994/95	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1995/96	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1996/97	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1997/98	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1998/99	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1999/00	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2000/01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2001/02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2002/03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2003/04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2004/05	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0
2005/06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2006/07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2007/08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

[a] 1980/1981 season includes 450,000 pounds caught by otter trawl out of Yakutat Bay during the fishery (August 1980), but not reported on fish tickets.

* Fewer than 3 permits were fished; information is confidential.

Table 4.3–Registration Area D (Yakutat) shrimp trawl fishery harvest in thousands of pounds, by season and district, 1979/80 to present.

Season	District				Total	Landings	Permits
	181	183	189	191			
1976/77	*	0	*	0	*		
1977/78	0	0	0	0	0	0	0
1978/79	0	0	0	0	0	0	0
1979/80	0	*	*	0	*		
1980/81	556.8	1349.9	0	0	1906.7	23	16
1981/82	0	*	0	0	*		
1982/83	*	*	0	0	141.7	7	3
1983/84	310.4	*	0	0	426.6	10	5
1984/85	*	*	0	0	*		
1985/86	*	0	0	0	*		
1986/87	*	0	0	0	*		
1987/88	40.5	0	0	0	40.5	6	3
1988/89	0	0	0	0	0	0	0
1989/90	0	0	0	0	0	0	0
1990/91	0	*	*	0	*		
1991/92	0	*	0	0	*		
1992/93	0	*	*	0	34.9	3	3
1993/94	0	*	0	0	*		
1994/95	0	0	0	0	0	0	0
1995/96	0	0	0	0	0	0	0
1996/97	0	0	0	0	0	0	0
1997/98	0	0	0	0	0	0	0
1998/99	0	0	0	0	0	0	0
1999/00	0	0	0	0	0	0	0
2000/01	0	0	0	0	0	0	0
2001/02	0	0	0	0	0	0	0
2002/03	0	0	0	0	0	0	0
2003/04	0	0	0	0	0	0	0
2004/05	*	0	0	0	*		
2005/06	0	0	0	0	0	0	0
2006/07	0	0	0	0	0	0	0
2007/08	0	0	0	0	0	0	0

* Fewer than 3 permits were fished; information is confidential.

Table 4.4–Summary of shrimp research cruises in Yakutat Bay, Alaska.

Begin Date	Vessel	Cruise Number	Gear	Strata	Tows	Shrimp per nm (lbs)	Percent Northern Shrimp	Percent Sidestripe Shrimp	Area Surveyed (nm^2)	Estimated biomass (lbs x 10^6)	Confidence limits of biomass estimate (lbs x 10^6)
March, 1953	*R/V John N. Cobb*	COBB15	20' Beam		26	297.42[a]			Unknown	Unknown	Unknown
September, 1980	*R/V Resolution*	8008	32' NMFS[b]		9	680.56	91	8	50.01	6.46	4.73 to 8.19
March, 1981	*R/V John N. Cobb*	JC81-01	32' NMFS		24	231.00	43	57	105.70	4.38	3.04 to 5.72
August, 1981	*R/V Pandalus*		32' NMFS		22	196.27	72	27	50.01	1.86	1.13 to 2.60
September, 1982	*R/V Resolution*		32' NMFS	2	14	141.53	47	53	50.01	1.43	1.05 to 1.64
September, 1982	*Resolution*		32' NMFS	3	5	206.00	65	35	12.89	0.50	0.30 to 2.13
September, 1984	*R/V Pandulus*		32' NMFS	2	22	181.06	61	38	50.01	1.72	1.31 to 2.13
September, 1984	*R/V Pandulus*		32' NMFS	3	3	230.33	93	7	12.89	0.56	0.24 to 0.89

Source: (Schaefers and Smith 1954)

[a] Figure in pounds of pandalids per trawl hour. Species composition unknown quantitatively. Report suggests a preponderance of sidestripe shrimp.

[b] NMFS gear is an otter trawl.

CHAPTER 5: YAKUTAT SHRIMP POT FISHERY

INTRODUCTION

COMMERCIAL FISHERY

Both spot and coonstripe shrimp are harvested, primarily from rocky habitat located in Yakutat Bay by fishers using baited pot gear, which is either longlined or fished singly from vessels ranging in length from small skiffs up to about 40 ft. In a longline system each pot is attached to the groundline with a snap, similar to that used on longlined snap-on groundfish gear. Pot construction is extremely varied in size, shape, weight and configuration, so it is difficult to describe a "standard" pot. Gear designs have rapidly changed to increase fishing efficiency. One of the most commonly available pots today is a "cone style." This pot is constructed using two rings, the top ring smaller than the bottom, with vertical bars welded between the rings forming six sides, at least three of which contain tunnels. This pot type has webbing tightly drawn in on the top with a permanent closure. The bottom web is drawn in with a "pucker string" which is opened during baiting operations and to empty the pot of its harvest.

Management of the commercial shrimp pot fishery in the Yakutat Area is largely passive, regulations are limited to a closed season to prevent fishing during the egg-hatch period from March 1–April 30, mesh large enough to pass a ¾-in diameter dowel, a pot limit of 30 pots per participant when fishing in Yakutat Bay, and prohibition of trawling in productive areas heavily utilized by the pot fishery. Fish ticket data assists tracking major trends or changes in stock status. The Yakutat area has had a separate section in the regulatory code since 1985.

FISHERY DEVELOPMENT AND HISTORY

The first reported landings occurred in the Yakutat Area during the 1969/70 fishing season. For the next ten seasons, landings occurred during only two seasons. Participation and landings have been fairly consistent since the 1982/83 fishing season, with a peak landing of 29,830 lbs occurring during that season. The peak effort level of 15 permits occurred during the 1995/96 season when 13,418 lbs were landed. Average landings have totaled 8,168 lbs by eight vessels per season since 1982/83. Usually, only the tails are sold by the shrimper to private individuals, restaurants, or other specialty markets without passing through traditional processors. This is a low volume fishery with a relatively high exvessel value. The average price paid for tails has been about $4.14 per pound during recent seasons.

Peak effort and harvests normally occur during May and June. However, activity in this fishery can be highly variable. For example, the peak harvest during the 1982/83 season occurred during the month of September.

REGULATION DEVELOPMENT

Management of the commercial shrimp pot fishery in the Yakutat Area is largely passive, focusing on Yakutat Bay. Regulations specific to Yakutat Bay are limited to a closed season to prevent fishing during the egg-hatch period, a minimum mesh size to retain the larger female

segment of the stock, a maximum number of pots per participant to limit effort, and prohibition of trawling in productive areas heavily utilized by the pot fishery. Fish ticket data assists tracking major trends or changes in stock status. The Yakutat Area has had a separate section in the regulatory code since 1985.

A guideline harvest level (GHL) of 10,000 lbs for the May through September period was established for Yakutat Bay in 1996, in response to increasing effort and higher harvest rates. The GHL was based on historical harvest data, and not on information describing stock abundance or stock condition. In 1997, the BOF adopted separate monthly GHLs for two portions of Yakutat Bay for each month the fishery is open. By doing so, the total seasonal harvest potential was effectively doubled to 20,000 lbs.

FISHING SEASONS

Prior to 1985, the Yakutat Area was open throughout the year. In 1985, a May 1 through February 28 season was established for Yakutat Bay. The closed period coincided with the major egg-hatch period, which was assumed to be similar to that of Southeast Alaska for the spot prawn. In 1997, separate fishing periods were adopted for portions of Yakutat Bay. In the waters running east of a line from the northernmost point of Khantaak Island to Logan Bluff and east of a line from the northernmost point of Khantaak Island to the northernmost point of Doggie Island, the season runs from October 1 through February 28. The remaining waters of Yakutat Bay east of a line from the westernmost tip of Ocean Cape to the westernmost tip of Point Manby are open May 1 through February 28. The remainder of the Yakutat Area outside the bay remains open throughout the year.

SIZE RESTRICTION

The Alaska Board of Fisheries policy on small shrimp discourages harvest of shrimp less than two years of age. A mesh size restriction is used in lieu of specific regulations for a minimum legal size to reduce the harvests of small shrimp. The mesh size assumes passive sorting through minimum mesh webbing minimizes the retention of smaller male, transitional, and female prawns and coonstripe shrimp.

GEAR RESTRICTION

A mesh restriction specifying 1 ½-in stretch measure was established in 1986 for all pots used in Yakutat Bay to reduce the potential for recruitment over-fishing in this area. This regulation provided some protection to approximately one or two-year classes of small shrimp. Prior to 1997, only a portion of the pot was required to have the minimum mesh panels. Current regulations require that the pot be entirely covered with webbing or rigid mesh. At least two opposing sides of the pot must have a webbed panel of 1 1/2 in stretch mesh if a permit holder is fishing inside Yakutat Bay. The 1-1/2 in minimum mesh size allows the retention of smaller shrimp, compared to the Southeast Alaska fishery. The potential impacts on future stock condition will not be understood until size and sex data is collected and analyzed. The smaller mesh risks unintended harvest of smaller spot prawns than are considered appropriate.

A pot limit of 75 pots per vessel was established in 1985 for Yakutat Bay. Even with the relative stability with regard to the number of permit holders up until the 1995/96 season, fleet members considered the number of allowable pots to be more than the fishery could withstand. Current

regulations allow for a limit of 30 pots per vessel inside Yakutat Bay. Along with the pot reduction adopted in 1997, trawling is prohibited within all waters of Yakutat Bay.

There are no pot limits, mesh restrictions, or other harvest-limiting gear regulations for all waters in the Yakutat Registration Area outside of Yakutat Bay. Additional regulatory requirements for commercial shrimp pot gear include maximum tunnel perimeters (15-in), buoy markings, and escape mechanisms.

QUOTAS AND GUIDELINE HARVEST LEVELS

In the mid-1990s, several larger southeast pot shrimp vessels and a floating processor entered the fishery in Yakutat Bay. Although their presence was transitory, it did lead to closure of the commercial fishery in the bay, changing in-season starting and ending dates and implementation of a GHL for the commercial harvest.

During the 1996/97 season, a GHL of 10,000 lbs was set for Yakutat Bay, north and east of a line from Ocean Cape to Point Manby, for the period between May through September. The harvest level for the winter fishery from October 1 through February 28 was unrestricted because potential effort was less in winter than in summer. The GHL capped the harvest at a level commensurate with those historically reported for this fishery and provided some protection against possible local depletion. The summer GHL represented a higher harvest than the prior ten-year seasonal average but was lower than the maximum historical harvests in the early 1980s.

While there had not been a consistent trawl shrimp fishery in Yakutat Bay, surveys in the early 1980s demonstrated harvestable stocks capable of supporting a fishery with a monthly quota of 30,000 lbs. In 1997, the BOF prohibited continuation of trawl shrimping inside Yakutat Bay. This prohibition to trawl gear may maximize availability of coonstripe shrimp to pot gear, but does eliminate harvest of pink and sidestripe shrimp. Coupled with this trawl prohibition, separate monthly GHLs were established for two portions of Yakutat Bay. In waters of Yakutat Bay east of a line running from the northernmost point of Khantaak Island to Logan Bluff and the waters east of line running from the northernmost point of Khantaak Island to the northernmost point of Doggie Island, the monthly GHL is 2,000 lbs for each month the fishery is open. This provides a potential season total of about 10,000 lbs. For the remaining waters of Yakutat Bay that are east of a line running from the westernmost tip of Ocean Cape to the westernmost tip of Point Manby, the monthly GHL is 1,000 lbs for a potential seasonal total of 10,000 lbs.

RECENT SEASONS

A harvest of 7,397 lbs was reported in 2005/06 by 6 permit holders making 74 landings (Table 5.1). Most of the harvest in 2005/06 was reported taken in the month of January with the majority of the harvest reported taken in Icy Bay, statistical area 181-40. Landings were reported though the entire season, except in August and April. A harvest of 752 lbs was reported in 2006/07 by 4 permit holders making 17 landings (Table 5.1). Most of the harvest in 2006/07 was reported taken during the months of October and December with a majority of the harvest reported taken in Yakutat Bay, statistical area 183-10. Landings were also reported through the entire season except in November, January, March and April. The harvest level, number of participants, and the number of landings during the 2007/08 season were light and sporadic compared with previous years (Table 5.1). Though the precise harvest total is confidential due to

fewer than three permits fished, a greater part of the harvest in 2007/08 was reported taken in the month of May in Yakutat Bay, in both statistical areas 183-10 and 183-11; however the overall majority of the harvest throughout the year was reported taken in Yakutat Bay, statistical area 183-11 in the months of May, October, November and December. No dockside sampling or skipper interviews were conducted and no fish ticket size data are available to assist managers.

CHAPTER 5—TABLES

Table 5.1–Registration Area D (Yakutat) shrimp pot fishery harvest, number of landings, and CPUE, 1968/69 to present.

Season	Harvest (lbs)	Number of Permits Fished	Number of Landings	Lbs per Landing	Lbs per permit
1968/69	0	0	0	0	0
1969/70	*	*	*	*	*
1970/71	0	0	0	0	0
1971/72	0	0	0	0	0
1972/73	0	0	0	0	0
1973/74	0	0	0	0	0
1974/75	*	*	*	*	*
1975/76	0	0	0	0	0
1976/77	0	0	0	0	0
1977/78	0	0	0	0	0
1978/79	0	0	0	0	0
1979/80	*	*	*	*	*
1980/81	*	*	*	*	*
1981/82	*	*	*	*	*
1982/83	29,830	4	63	473	7,458
1983/84	13,938	8	33	422	1,742
1984/85	2,475	6	35	70	413
1985/86	6,910	5	33	209	1,382
1986/87	2,421	5	10	242	484
1987/88	2,945	8	45	65	368
1988/89	2,995	6	16	187	499
1989/90	7,148	5	72	99	1,430
1990/91	10,711	7	70	153	1,530
1991/92	7,316	12	78	93	610
1992/93	2,999	4	40	74	750
1993/94	5,916	6	55	107	986
1994/95	5,738	6	64	89	956
1995/96	13,418	15	103	123	848
1996/97	20,862	14	218	96	1,490
1997/98	9,546	10	135	71	955
1998/99	11,833	14	127	93	845
1999/00	4,107	8	76	54	513
2000/01	28,674	13	167	172	2,206
2001/02	16,746	13	152	110	1,288
2002/03	11,943	12	143	84	995
2003/04	4,514	8	57	79	564
2004/05	2,280	5	28	81	456
2005/06	7,397	6	74	100	1,233
2006/07	752	4	17	44	188
2007/08[a]	*	*	*	*	*

[a] Most recent season's data is preliminary.

* Fewer than 3 permits were fished; information is confidential.

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CHAPTER 6: SOUTHEAST ALASKA DUNGENESS CRAB FISHERY

INTRODUCTION

LIFE HISTORY

Dungeness crabs, *Cancer magister*, are members of the highly evolved brachyuran (true crab) infraorder of the subphylum Crustacea. They are commercially significant and widely distributed in coastal waters of the eastern Pacific Ocean from Santa Barbara, California to the Pribilof Islands (Jensen 1995). Dungeness crabs are found throughout Southeast Alaska (Registration Area A), which is near the northern limit of their range, in areas with mud and sand substrate at depths between two and 50 fathoms.

Dungeness life history timing is far less synchronous than for other commercially important northern crab species. The male molt period in Southeast Alaska extends from February through July (Lehman and Osborn 1970; Shirley and Shirley 1988); this is followed by a female molt period in August and September (Shirley and Shirley 1988)which coincides with peak mating timing in late summer through early fall (Shirley and Shirley 1988; Stone and O'Clair 2001), as Dungeness females mate only in the soft shell condition (Hartnoll 1969). After molting and mating, females take approximately a month to harden, and extrude eggs soon thereafter, from October through December (Shirley et al. 1987).

As Dungeness females can store sperm for up to two years (Jensen et al. 1996), mating is not a prerequisite for oviposition and old shell females also extrude eggs, however their clutch sizes decline with each successive oviposition without new sperm reserves (Hankin et al. 1989). Dungeness female fecundity increases with body size up to a maximum of about 2.5 million eggs, however; the high potential fecundity of large females is tempered by a decrease in molt frequency with size, which results in a reduction in relative fecundity (Hankin et al. 1985, 1989). There is evidence for reduced population productivity for this species in Southeast Alaska, as it appears that females at this latitude extrude eggs only on a biannual basis (Swiney et al. 2003). As female Dungeness crabs grow to a large size and exhibit assortative mating behavior (i.e. females are mated only by males one or more molts larger in body size) (Butler 1960; Shirley and Sturdevant 1988), the male-only fishery with a minimum size limit also has the potential of decreasing the relative reproductive contribution of large females. However, analyses conducted in California designed specifically to test the hypothesis that the male-only fishery was resulting in sperm depletion of females found no supporting evidence (Hankin et al. 1997).

Eggs are brooded for a period of approximately 6 months following oviposition and oviparous females aggregate and bury themselves many layers deep in a specific type of sandy sediment that is well-aerated by a high interstitial water flow (O'Clair et al. 1990) and become extremely inactive (Schultz and Shirley 1997); the location of these female aggregations are spatially very consistent between years. Females emerge from the sediment to hatch their eggs in May and June (Shirley et al. 1987), generally coinciding with spring plankton bloom, and egg hatch is an active

process which takes a period of several days, during which time the female actively flaps her abdomen to release the zoeal larvae.

Dungeness larvae spend approximately 3 months in the plankton before transforming into megalopae and settling to the bottom in shallow, sandy, nearshore waters in late August and early September (Herter 2007). The strength of the juvenile year class is thought to largely determine the size of the annual recruitment to the commercial population at age 4 or 5, and is influenced by both nearshore oceanographic processes, which determine the supply of larvae returning to settle, as well as by predation and cannibalism on the newly settled larvae (McConnaughey 1991; Fernandez et al. 1993).

After settlement, Dungeness crabs grow rapidly, molting 11–12 times by age 2 in British Columbia (Butler 1961) and approximately annually thereafter, before beginning to skip molt after they exceed 149 mm CW notch to notch (NTN) in Southeast Alaska (Bishop et al. 2007). Males become functionally mature at a size of 120 mm CW NTN (Shirley and Shirley 1988; Shirley and Sturdevant 1988) and females at a size of 80 mm CW NTN (Shirley and Sturdevant 1988) although the smallest female with eggs in Southeast Alaska is 106 mm CW NTN (Swiney 1999). Males recruit to the fishery at age 4 or 5 and may live to a maximum of 8–10 years (Kondzela 1986; Bishop et al. 2007) however, as the fishery harvests primarily recruit crabs, it is unlikely that many crab live to that age.

COMMERCIAL FISHERY

Southeast Alaska has produced a long-term average of about 2.2 million pounds of Dungeness crabs per season. Ten-year average harvests for the 1970s, 1980s, and 1990s have been respectively 0.65, 2.34, and 3.26, million pounds and 4.7 million from 2000/01–2007/08 seasons.

Although the Southeast Alaska Dungeness crab fishery is under limited entry, and there are 308 current Dungeness crab limited entry permit holders, actual participation is variable. In the past five seasons, an average of 192 permit holders have registered and fished in Southeast Alaska (Table 6.1). Most vessels are below limit seiner length (58 feet), although they range in size from aluminum skiffs to over 90 feet long. Almost all participants use standard, hatbox-shaped pots constructed with steel frames and webbed with stainless-steel wire. The maximum legal gear limit per vessel is 300 pots.

Management is by size sex and season with the added caveat of a provision to close the fishery early under extremely poor recruitment conditions. There are two commercial Dungeness crab fishing seasons, a summer season from June 15 through August 15 and a fall/winter season from October 1 through November 30 or February 28. Most of northern Southeast Alaska has a summer and a fall season closing at the end of November, while southern Southeast Alaska is only open during the fall and winter. The summer season overlaps a portion of the male molting period, which extends into mid-summer, and the female molting and mating period, which peaks in late summer through early fall (Shirley and Shirley 1988; Stone and O'Clair 2001). In June of 2000, a management plan which allows for inseason adjustments to season length in the case of catastrophic recruitment failure was promulgated by the Alaska Board of Fisheries.

Most of the product is marketed as frozen cooked sections, whole-cooked, and live crab during the summer tourist markets in Washington, Oregon, and California. The extensive summer fishery for Dungeness crab in Alaska has been justified on the basis of the overriding economics of the summer fishery as well as by the dangerous winter weather for the small-boat fleet.

Elsewhere on the West Coast, soft shell levels are monitored and must exceed a threshold level prior to the opening of commercial seasons.

FISHERY DEVELOPMENT AND HISTORY

The first commercial harvest of Dungeness crabs from Southeast Alaska occurred in the 1930s. Harvest statistics prior to 1960 were combined into a single total for much of the Gulf of Alaska, so harvest information for Southeast Alaska is not available. Since 1960, commercial Dungeness harvests from Southeast Alaska have averaged 2.47 million pounds per season (Table 6.1).

The Dungeness crab fishery in Southeast Alaska has evolved through four distinct periods since the early 1960s. From the early 1960s through the early 1980s, participation was so low that need for formal regulations and other restrictions were minimal. The 1960s were characterized by a few larger vessels in a directed fishery harvesting 2.2 million pounds per year on the average. This was in response to high market demand caused by low harvests in Washington, Oregon, and California. The principal product was canned crabmeat.

During the 1970s, production in Washington and Oregon rebounded and demand for crab from Southeast Alaska declined. With little or no processor support, fishers had to either sell over the dock to the public or make complicated and risky arrangements to airfreight live crab out of state. Although the summer closure was rescinded, only a few dozen small vessels in the 30-foot to 45-foot range fished primarily during the summer. Harvests for this period averaged 0.61 million pounds by 30 permit holders.

Between 1981/82 and 1990/91 seasons, the fishery underwent sweeping change. Declining crab harvests in Pacific Coast states and changing markets increased demand for Alaskan frozen sections, whole cooked crabs, and air freighted live crabs. More processors began purchasing crab and supporting the fishery through the entire summer season. Harvests during the 1980s increased, averaging 2.5 million pounds per season, and the numbers of participants increased, averaging 173 permit holders. The fishery grew from a small group of 30 to 45-foot vessels to a larger fleet that included skiff-sized vessels up to 30 feet in length. This resulted in the fishery going from being primary for a relatively small number of single-species participants to being a secondary fishery for a larger number of new and often transitory entrants.

Increasing numbers of participants led to a permit moratorium imposed by the Commercial Fisheries Entry Commission (CFEC) in 1991. During the four years of the moratorium, the CFEC first conducted numerous studies and public meetings to evaluate the need for limited entry into this fishery. Subsequently, CFEC convinced the legislature to authorize use of tiered pot limits to accommodate the large number of qualifying participants while limiting the effort to acceptable effort levels. In January 1996, the moratorium period ended and a tiered pot limit form of limited entry was adopted for implementation by June 15, 1997. To date 251 transferable and 46 nontransferable permits have been issued, 16 additional permit holders are vying for the remaining 11 permits to be issued to achieve the maximum of 308 total permits to be issued (B6410P-C State of Alaska 2008-11-11 Commercial Fisheries Entry Commission Limited Fisheries Status Report). The tiered permit system is structured to provide a maximum of 48,750 pots to the fishery.

REGULATION DEVELOPMENT

FISHING SEASONS AND PERIODS

From the early 1930s through 1955, regulations included a prohibition on the taking of females, a minimum size limit for males, and a closed season on the most important grounds for two to four months between May 1 and September 1. Available documentation from that period indicates that molting was thought to occur during the summer. The summer closure was generally acceptable to fishers because of other fishing opportunities in the salmon and halibut fisheries. The summer closure was revoked in the late 1950s.

Since the late 1960s, fishing season closures have been introduced, and then modified, to reduce fishing pressure during sensitive periods in the life history of the species. An example was the closure from March through May in 1976/77 to protect male crabs during their primary molting period. In the 1980s, management staff explored methods and means to further avoid sensitive life history periods to accommodate the increasing effort as the fleet slowly utilized more of the known habitat and range of the crabs. Management staff felt that as more of the available grounds were exploited, there would be fewer unfished stocks to act as reproductive buffers against local depletion in adjacent fishing grounds. Then, beginning in 1985, the commercial fishery was closed between August 16 and September 30 because field observations suggested that it was the major period when females molted and were mated. These field observations were later supported by research done in Southeast Alaska (Shirley and Shirley 1988, Stone and O'Clair 2001). In response to increasingly high effort levels and high harvest rates, the season was further shortened in 1989 by reducing the winter season in northern and central districts to October 1 through November 30. The season remained October 1 through February 28 in southern Districts 1, 2, and Section 13-B. The split seasons have been in effect since this time.

SIZE RESTRICTIONS

From 1924 to 1935, legal harvest of Dungeness crabs was restricted to males over 6 ½-inches in greatest width. From 1936 to 1962, only males over 7 inches in greatest width were legal. Since 1963, the legal size has been 6 ½-inches in shoulder width, measured across the carapace immediately anterior to the tenth anterolateral spines. This measuring point is most often used in jurisdictions throughout the range of this crab, and is used because the large tenth anterolateral spines are often broken or eroded in older shelled crabs.

GEAR DEFINITIONS AND SPECIFICATIONS

Since 1934, trawls have been prohibited in this fishery. Gear was further limited to pots or ring nets in 1954. A pot limit of 300 pots or ring nets was implemented in 1963. Diving gear was included as legal gear in 1966. Nearly all of the commercial harvest is currently taken with pots.

Starting in 1963, Dungeness crab pot buoys were required to display the registration number of the vessel fishing the gear. In 1988, the minimum size of buoy markings was set at 1 ½- inches in height, in numerals at least 1/4-inch wide that contrasted with the color or texture of the buoy.

In 1977, two escape rings 4 3/8-inches in diameter were required in each pot, and a Dungeness pot was defined by its tunnel eye openings, which individually could not exceed 30 inches in perimeter. In 1978, an escape panel secured by a maximum of 120-thread cotton twine was required. A minimum size for buoy numbers of 1 ½- inch high and ¼-inch wide numbers was

implemented in 1989. In 1991, the breaking strap or biodegradable twine for the lid retainers was changed from 120-thread to 60-thread. The intent was to minimize untended ghost fishing of lost or derelict pots. In order to facilitate the enforcement of pot limits, identification tags were required to be attached to every buoy connected to a Dungeness crab pot beginning with the 2001/02 season.

Dungeness gear development has remained static for many years, with little change in configuration, materials, size, and weight to significantly affect pot efficiency. However, trigger-enhancing devices that minimize escapement of crabs through entrance tunnels have been developed and are being installed on commercial gear and some fishers are using larger pots. In order to prevent further increases in pot size, a maximum pot size of 50-inches in diameter was established effective during the 2001/02 season. Future comparisons of historical harvest rates will need to account for the possible enhanced efficiency of pots with the new trigger designs and larger volumes.

OTHER REGULATORY CHANGES

Vessel registration and hold inspection requirements started in 1974. Southeast Alaska was designated a superexclusive registration area in 1983. Hold inspections were rescinded in 1984. A Dungeness crab management plan became effective beginning with the 2001/02 season. The plan calls for early closure of the Southeast Alaska Dungeness crab season when regional catch is projected to be below one of several threshold levels.

MANAGEMENT CONCERNS

SEASON TIMING

The season overlaps with the male molt period, and legal males are harvested prior to mating, putting the burden of reproduction on small males. The prevalence of soft-shelled crabs in the catch and harvest during the summer fishery continues to be high in some areas and seasons. This suggests that production is being lost due to handling mortality. Harvesting legal males prior to reproducing has the potential of creating genetic pressure for crabs to grow more slowly to avoid harvest.

EXCESSIVE HARVEST RATE

Trends in recruit composition of the harvest indicate that the fishery is increasingly dependent on annual recruitment. A smaller portion of strong year classes are carried over to buffer the fishery against the effects of a poor year class.

HIGH EFFORT LEVELS RELATIVE TO AVAILABLE GROUNDS

Conflict between user groups is rising as competitive pressure and gear saturation crowds commercial gear onto grounds traditionally used by non-commercial fishers. This has resulted in commercial closures of numerous small areas around many communities in Southeast Alaska, including (in the order in which they appear in the Commercial Shellfish Fishing Regulations) Juneau, Tenakee Springs, Elfin Cove, Point Baker, Thorne Bay, Gustavus, Ketchikan, Haines, Sitka, Hollis, and Angoon. There are continuing requests for additional commercial closures.

In keeping with a federal law that was passed in 1998, commercial Dungeness crabbing was closed in designated wilderness areas in the Glacier Bay National Park and Preserve beginning

June 15, 1999. Non-wilderness portions of the bay closed to Dungeness crabbing on September 30, 1999. Permit holders were given compensatory pay if they fished in either the Beardslee Islands or Dundas Bay wilderness areas for at least six of the years between 1987 and 1998. Processors were eligible for compensatory pay to offset losses if they purchased crab from these areas during the same time frame.

Lastly, sea otter populations are expanding their range in Southeast Alaska. With their reintroduction to Southeast Alaska in 1965, their expansion has been accompanied by drastic declines in the availability of many economically important invertebrate species, including Dungeness crab. The decline in the Dungeness crab harvest in Districts 3, 4, and 14 is attributed to sea otters, whose populations remained low until 1987 when their populations began to rapidly increase (Pitcher and Imamura 1990). Sea otters are currently expanding their range into important Dungeness crab fishing Districts 5, 6, and 9 as well.

LACK OF FISHERY INDEPENDENT STOCK ASSESSMENT PROGRAM

In response to the Departments concerns over fishery timing excessive fishery capacity and harvest levels, a program of stock assessment pot surveys was initiated. The survey objectives were to describe life history timing of Dungeness crabs in Southeast Alaska and trends in abundance in support of a move towards more abundance-based management. Surveys were conducted in important fishery areas of central and northern Southeast Alaska from 2000–2004. However, the survey program was eliminated due to insufficient resources in 2005.

STOCK ASSESSMENT

The Department has conducted sporadic stock assessment surveys for Dungeness crab from 1987 through 2004 (Figure 6.1). Objectives have varied.

ICY STRAIT SURVEY

In July 1987 and May 1988, the Commercial Fisheries Division of ADF&G conducted a cooperative survey with the Game Division to provide baseline data for an assessment of the effects of sea otters on Dungeness crab populations in the Icy Strait area (Pitcher and Imamura 1990).

STIKINE FLATS SOFT-SHELL TEST FISHING

In the spring of 1996 and 1997, the department conducted preseason assessment surveys of the Dungeness stocks in the Stikine River flats area (Statistical Areas 108-40 and 108-41) of central Southeast Alaska. This stock is a consistently important contributor to the overall Southeast Alaska harvests. Using a random transect experimental survey design and commercially-configured pots with smaller than usual mesh, the department collected size, sex, and shell hardness data over a period of several days during late May, preceding the commercial fishery which began on June 15. After the season opened, staff conducted on-board field observations of commercial fishing operations in the same general area. The goal of these initial projects was to develop a method for estimating the prevalence of sub-legal and legal-sized soft-shelled male crabs that would be vulnerable to handling by the commercial fleet early in the summer season.

KITTIWAKE ONBOARD SAMPLING

ADF&G purchased a small research vessel, the *R/V Kittiwake III* suitable for Dungeness crab surveys in 1998. During the summer and fall fishing periods of the 1999/00 commercial season, the Department conducted on-board sampling of Dungeness crab in the Stikine Flats, Thomas Bay, and Duncan Canal areas.

KITTIWAKE DUNGENESS CRAB SURVEY

A Dungeness crab pot survey program, was conducted from April 2000–June 2004, with 4 major objectives, and multiple goals for each objective:

1.) Investigate the utility of abundance-based management tools in this fishery:

   a. develop pre- and postseason indices of abundance for legal and prerecruit males and determine their utility as predictors of harvest;

   b. use a ratio estimator (Dawe et al. 1993) to model the results of pre and post-season surveys and estimate the population size of Dungeness crab in Stikine Flats, Duncan Canal, Port Camden, Berners Bay, Peril Strait, Tenakee Inlet, and St. James Bay;

2.) Describe Dungeness crab life history and ecology:

   a. describe timing of life history events;

   b. describe interannual variation in crab size and shell age composition by sex;

   c. describe species composition of invertebrates and fish captured in Dungeness crab pots.

3.) Refine pot survey methods for Dungeness crabs:

   a. describe the relationship between crab catch by size and sex and soak time in pots with open and closed escape rings.

4.) Describe growth of Dungeness crabs in Southeast Alaska:

   a. determine molt probability and molt increment for males and females.

DOCKSIDE SAMPLING PROGRAM

Since 1985, commercial Dungeness crab landings in Southeast Alaska have been sampled in the ports of Petersburg, Wrangell, Sitka, Juneau, Ketchikan, and Haines. Goals of the port-sampling program are to describe the size and shell age composition, average weight, and catch rates of Dungeness crab in the commercial fishery. Port samplers measure the crab, determine shell condition, and check for damage to the carapace and legs. From this and knowledge of crab growth the department can determine the recruit or year-class composition of the harvest.

RECENT SEASONS

2005/06 SEASON SUMMARY

The predicted harvest for the 2005/06 season was above threshold relative to the Dungeness management plan so the season length was not curtailed. A total of 3,205,190 pounds were harvested during the summer fishery (76%) and 1,000,290 pounds were harvested during the fall fishery (24%) for a total harvest of 4,205,480 pounds by 189 permit holders (Table 6.1). Districts

6 and 8 had the largest harvests when compared to the other Districts (Table 6.2), with 17 and 23 percent of the harvest, respectively. Harvest from these districts consisted respectively of 92.7 and 90.7 percent recruit crabs (Table 6.3). For the entire 2005/06 season, 0.98 percent of the commercial harvest was sampled. Landed crabs averaged 2.1 pounds and were purchased for an average of $1.21 per pound. Total exvessel value of the 2005/06 fishery was $5,083,088.

2006/07 SEASON SUMMARY

During the 2006/07 fishery 171 permit holders harvested a total of 4,503,970 pounds of Dungeness crab during the normal season (Table 6.1). Seventy-eight percent of the harvest, or 3,496,951 pounds were taken during the summer fishery and the remaining 22%, or 1,007,019 pounds were taken during the fall fishery. District 8 was again a large producer, with 22 percent of the overall harvest and 19 percent of the harvest came from District 11 (Table 6.2). These districts, along with most of the fishing areas, saw in increase in the percent recruit crab from the previous season with 95.2 and 94.8 percent recruit crabs, respectively (Table 6.4). Port sampling efforts sampled 1.02 percent of the total commercial Dungeness crab harvest. Harvested crabs were sold for an average of $1.38 and averaged 2.0 pounds each. Total exvessel value of the 2006/07 fishery was $6,215,479.

2007/08 SEASON SUMMARY

The harvest estimate from the first weeks catch was above threshold and the 2007/08 fishery was not curtailed by the Dungeness management plan. The overall harvest was 5,408,355 pounds and was taken by 193 permit holders (Table 6.1). The summer season's landings totaled 3,597,048 pounds, which was 67 percent of the total harvest. The fall/winter season's landings totaled 1,811,307 pounds, which was 33 percent of the total harvest. Districts 8 and 9 both saw large harvests with 19 and 17 percent of the total harvest, respectively (Table 6.2). The percent of recruit crabs caught in the fishery decreased in most areas, for Districts 8 and 9 the percent recruit crabs was 90.3 and 90.4 respectively (Table 6.5). During the 2007/08 season 0.79 percent of the commercial harvest was sampled. Dungeness crab sold for an average of $2.13, which was a $0.75 increase from the previous season. Total exvessel value of the 2007/08 fishery was $11,321,133.

2008/09 SEASON OUTLOOK

Preliminary harvest figures indicate that approximately 3.75 million pounds of Dungeness crab were harvested during the 2008/09 summer season which is above the ten-year average for summer seasons of 3.3 million pounds. The number of permits reporting harvest for the summer season was 196, right at the ten-year average for summer seasons of 197 permits. Summer harvest in Districts 6, 8, 9 and 11 was 60 percent of the total harvest. The average price per pound for the summer season was $2.25/pound, the highest on record.

CHAPTER 6—TABLES AND FIGURES

Table 6.1–Registration Area A (Southeast Alaska) commercial Dungeness crab fishery catch, effort, and value, 1960 to present.

Year/Season	Number				Pounds per Permit	Pots Lifted	CPUE	Average Weight	Price per Pound
	Permits	Landings	Crabs	Pounds					
1960	NA	NA	NA	1,449,405	NA	NA	NA	NA	NA
1961	NA	NA	NA	671,455	NA	NA	NA	NA	NA
1962	NA	NA	NA	2,985,939	NA	NA	NA	NA	NA
1963	NA	NA	NA	3,296,362	NA	NA	NA	NA	NA
1964	NA	NA	NA	3,996,100	NA	NA	NA	NA	NA
1965	NA	NA	NA	2,392,395	NA	NA	NA	NA	NA
1966	NA	NA	NA	1,968,117	NA	NA	NA	NA	NA
1967	NA	NA	NA	2,033,156	NA	NA	NA	NA	NA
1968	NA	NA	NA	1,900,690	NA	NA	NA	NA	NA
1969/70	24	392	NA	1,149,111	47,880	NA	NA	NA	NA
1970/71	21	380	NA	776,617	36,982	NA	NA	NA	NA
1971/72	22	315	NA	452,681	20,576	NA	NA	NA	NA
1972/73	31	316	NA	599,487	19,338	NA	NA	NA	NA
1973/74	41	483	NA	748,519	18,257	NA	NA	NA	NA
1974/75	55	453	NA	715,249	13,005	NA	NA	NA	NA
1975/76	36	344	285,459	611,621	16,989	NA	NA	2.1	NA
1976/77	25	173	225,217	515,378	20,615	NA	NA	2.3	NA
1977/78	12	87	58,046	127,345	10,612	NA	NA	2.2	NA
1978/79	25	208	345,379	754,759	30,190	NA	NA	2.2	NA
1979/80	37	313	371,670	801,753	21,669	NA	NA	2.2	NA
1980/81	26	227	236,630	521,247	20,048	NA	NA	2.2	NA
1981/82	75	749	1,266,271	2,932,427	39,099	NA	NA	2.3	NA
1982/83	129	1,298	1,551,520	3,662,112	28,388	NA	NA	2.4	NA
1983/84	132	1,536	942,477	2,155,849	16,332	NA	NA	2.3	NA
1984/85	183	1,593	847,824	1,843,521	10,074	NA	NA	2.2	$0.90
1985/86	216	2,077	1,059,747	2,317,045	10,727	159,300	7	2.2	$1.22
1986/87	224	2,330	1,184,771	2,453,055	10,951	232,328	5	2.1	$1.02
1987/88	241	2,746	1,611,101	3,391,699	14,073	279,244	6	2.1	$1.08
1988/89	264	2,683	1,517,105	3,321,734	12,582	248,755	6	2.2	$0.91
1989/90	245	2,096	875,861	1,918,880	7,832	194,239	5	2.2	$1.06
1990/91	243	2,342	1,293,809	2,662,792	10,958	329,916	4	2.1	$1.44
1991/92	318	3,386	2,260,678	4,707,106	14,802	462,425	5	2.1	$1.21
1992/93	245	2,497	1,424,742	3,095,419	12,634	313,522	5	2.2	$0.84
1993/94	198	1,956	1,167,481	2,536,701	12,812	271,474	4	2.2	$0.92
1994/95	184	1,787	927,878	1,921,739	10,444	230,595	4	2.1	$1.10
1995/96	201	2,737	2,176,200	4,404,519	21,913	460,378	5	2.0	$1.62
1996/97	203	2,896	2,406,434	5,005,840	24,659	399,472	6	2.1	$0.96
1997/98	232	4,043	1,921,545	4,062,543	17,511	616,608	3	2.1	$2.18
1998/99	244	3,134	1,132,885	2,329,499	9,547	481,214	2	2.1	$1.47
1999/00	198	2,862	1,611,136	3,280,503	16,568	474,986	3	2.0	$1.64

–continued–

Table 6.1–Page 2 of 2.

Year/Season	Number				Pounds per Permit	Pots Lifted	CPUE	Average Weight	Price per Pound
	Permits	Landings	Crabs	Pounds					
2000/01	199	2,380	1,254,573	2,565,410	12,892	400,616	3	2.0	$1.50
2001/02	209	3,059	2,099,643	4,104,128	19,637	539,636	4	2.0	$1.73
2002/03	220	3,561	3,512,242	7,332,665	33,330	785,936	4	2.1	$1.07
2003/04	209	2,931	2,184,724	4,537,049	21,708	609,085	4	2.1	$1.32
2004/05	199	2,409	2,239,558	4,589,001	23,060	564,558	4	2.0	$1.36
2005/06	189	2,203	2,039,101	4,205,480	22,251	468,400	4	2.1	$1.21
2006/07	171	2,074	2,228,852	4,503,970	26,339	468,426	5	2.0	$1.38
2007/08	193	2,841	2,657,986	5,408,355	28,023	647,401	4	2.0	$2.13
5 year average	192	2,492	2,270,044	4,648,771	24,187	551,574	4	2.0	$1.48

Note: NA= not available

Table 6.2–Catch and effort by district for the commercial Dungeness crab fishery in Registration Area A, 2000 to present.

	Season								
District	**2000/01**	**2001/02**	**2002/03**	**2003/04**	**2004/05**	**2005/06**	**2006/07**	**2007/08**	**Totals**
1	78,743	78,280	132,851	132,229	197,842	118,796	73,614	47,781	107,517
2	63,157	89,828	116,051	91,807	85,253	63,768	68,114	138,147	89,516
3	31,318	41,104	14,791	34,989	25,472	39,704	44,342	40,441	34,020
4	*	*							
5	146,617	373,997	515,881	227,520	85,171	56,731	114,851	204,713	215,685
6	354,436	1,166,696	1,558,903	772,701	826,111	708,441	509,390	696,243	824,115
7	46,745	222,721	422,682	172,638	248,544	190,936	152,375	184,092	205,092
8	613,881	792,040	1,585,850	829,198	652,588	948,483	1,011,573	1,017,894	931,438
9	483,689	434,225	1,207,888	569,142	473,614	316,497	545,360	908,960	617,422
10	378,250	159,149	280,581	188,656	357,632	209,763	309,884	549,674	304,199
11	25,004	275,299	918,015	676,605	570,564	567,509	865,895	484,202	547,887
12	100,012	169,916	223,562	432,395	448,333	380,441	305,700	284,288	293,081
13	171,737	161,796	145,357	118,584	181,038	181,384	251,305	194,512	175,714
14	54,777	100,999	120,304	177,010	336,717	269,926	113,207	282,391	181,916
15	15,166	36,866	89,949	113,575	100,122	153,101	138,360	375,017	127,770
Total	2,563,532	4,102,916	7,332,665	4,537,049	4,589,001	4,205,480	4,503,970	5,408,355	4,655,371

* Fewer than 3 permits were fished; information is confidential.

Table 6.3–Summary of Dungeness crab dockside sampling by fishery area during the 2005/06 commercial season.

Fishery Area	Number Crab Harvested	Percent Harvest Sampled	Number Crab Sampled	Average Carapace Width (mm)	Average Weight (pounds)	Percent Recruits
Behm and Portland Canals	63,938	1.2	750	174.9	2.0	89.6
Prince of Wales, East	28,897	0.3	100	175.3	2.0	93.0
Prince of Wales, West	21,061	0.0	0			
Port Camden, West Kuiu	159,151	0.1	111	178.3	2.1	91.0
Duncan Canal	321,414	1.4	4,399	177.2	2.0	92.7
Ernest Sound, Clarence Strait	125,814	0.6	750	176.4	2.0	90.8
Stikine Flats	460,939	1.1	5,122	177.6	2.1	90.7
East Admiralty, Mainland Bays	356,807	0.6	2,024	176.2	2.0	91.8
Tenakee Inlet	126,534	0.6	700	181.0	2.2	85.1
Peril Strait	108,789	1.3	1,452	182.8	2.2	81.0
Icy Straits	145,394	0.6	811	179.8	2.1	87.2
Lynn Canal	78,492	0.1	92	180.0	2.1	87.8
Thomas and Farragut Bay	41,871	0.4	149	176.6	2.0	92.6

Table 6.4–Summary of Dungeness crab dockside sampling by fishery area during the 2006/07 commercial season.

Fishery Area	Number Crab Harvested	Percent Harvest Sampled	Number Crab Sampled	Average Carapace Width (mm)	Average Weight (pounds)	Percent Recruits
Behm and Portland Canals	36,384	1.5	550	175.5	2.0	83.6
Prince of Wales, East	34,500	0.7	253	176.4	2.0	94.5
Prince of Wales, West	22,849	0.4	100	178.9	2.1	94.0
Port Camden, West Kuiu	335,754	0.7	2,199	174.9	1.9	96.3
Duncan Canal	238,867	1.9	4,583	177.4	2.0	93.5
Ernest Sound, Clarence Strait	101,704	0.2	253	176.4	2.0	94.5
Stikine Flats	488,185	1.6	7,590	175.7	2.0	95.2
East Admiralty, Mainland Bays	534,663	0.7	3,685	177.6	2.0	94.8
Tenakee Inlet	91,708	0.5	500	181.4	2.1	82.7
Peril Strait	134,340	0.8	1,106	181.5	2.1	87.1
Icy Straits	74,868	0.5	400	178.3	2.1	86.6
Lynn Canal	82,604	0.1	50	178.8	2.1	96.0
Thomas and Farragut Bay	52,014	0.9	453	172.7	1.9	94.5

Table 6.5–Summary of Dungeness crab dockside sampling by fishery area during the 2007/08 commercial season.

Fishery Area	Number Crab Harvested	Percent Harvest Sampled	Number Crab Sampled	Average Carapace Width (mm)	Average Weight (pounds)	Percent Recruits
Behm and Portland Canals	23,334	1.7	404	174.4	2.0	73.5
Prince of Wales, East	65,495	0.8	550	178.7	2.1	87.1
Prince of Wales, West	20,239	0.0	0		2.0	
Port Camden, West Kuiu	541,259	0.6	3,213	178	2.0	90.4
Duncan Canal	328,111	1.7	5,697	174.7	2.0	92.0
Ernest Sound, Clarence Strait	128,476	0.1	100	178.9	2.0	89.0
Stikine Flats	497,873	0.6	3,145	178.1	2.0	90.3
East Admiralty, Mainland Bays	369,617	0.7	2,453	177.3	2.1	84.3
Tenakee Inlet	80,773	0.3	250	179.8	2.1	81.2
Peril Strait	121,923	1.1	1,356	183.4	2.2	80.1
Icy Straits	158,624	0.3	474	179.7	2.0	89.4
Lynn Canal	182,883	0.3	550	180.5	2.1	88.3
Thomas and Farragut Bay	139,147	1.3	1,781	177.1	1.9	91.2

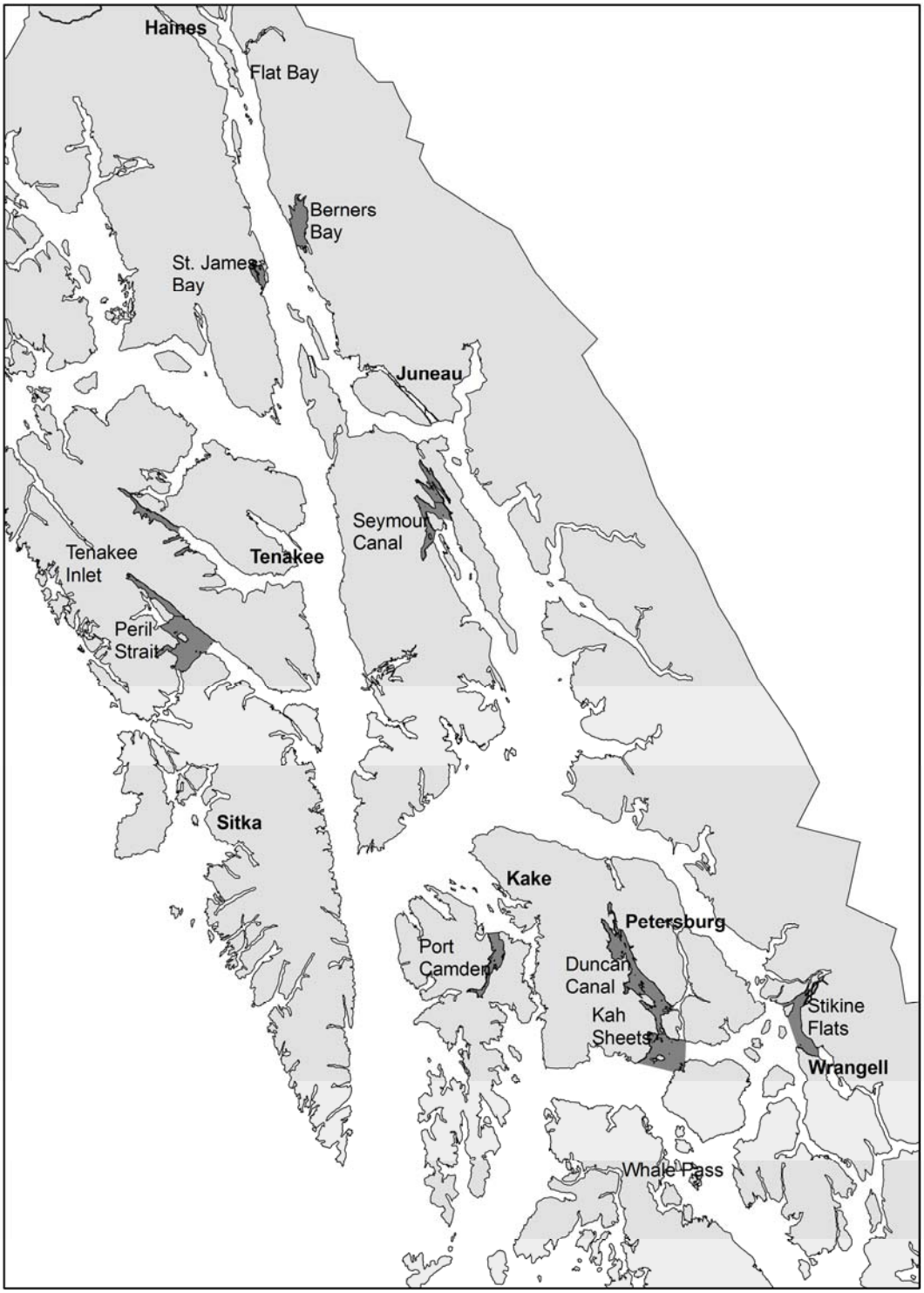

Figure 6.1–Dungeness crab survey locations in Southeast Alaska.

CHAPTER 7: YAKUTAT DUNGENESS CRAB FISHERY

INTRODUCTION

Dungeness crabs, *Cancer magister*, are members of the highly evolved brachyuran (true crab) infraorder of the subphylum Crustacea. They are commercially significant and widely distributed in coastal waters of the eastern Pacific Ocean from Santa Barbara, California to the Pribilof Islands (Jensen 1995).

COMMERCIAL FISHERY

Fishing grounds in Yakutat (Registration Area D) are close to the northern limit of Dungeness crab distribution. Dungeness crabs are widely distributed in Yakutat waters, but tend to concentrate off ocean beaches in two to 10 fathoms. Some of the most productive summer fishing occurs in the shore break of exposed beaches. Although the fishery extends along the entire coast, much of the total harvest is taken from four or five distinct, localized fishing grounds. During the 40 seasons from 1960/61–1999/2000, Yakutat produced a long-term average harvest of about 1.37 million pounds per season but with a downward trend occurring since 1992/03–1993/04 (Table 7.1). Historically, the product was marketed as canned or frozen meat, sections, and whole-cooked, or live crab. More recently, whole cooked or live crab entered the summer tourist markets in Washington, Oregon, and California.

The 1989/90 and 1999/00 fishing seasons were closed early because of indications of low stock abundance shown in fish ticket and dockside sampling information. For the last 8 seasons, starting with the 2000/01 season, the department has kept this fishery closed pending rebuilding of the stock and development of a management and research program designed to provide sustained yields.

Yakutat is a superexclusive registration area for Dungeness crab; a vessel registered to fish in this area cannot register or fish in any other area in Alaska during the same calendar year. The fishery is currently under open entry. Anyone with a permit and license could register a vessel to crab in this area if the fishery were open. During the past decade, up to 67 permits fished in the Yakutat area. For three seasons preceding the closure of the fishery, an average 23 permits were fished. Most participating vessels are 50 feet or larger, with some vessels up to 90 feet in length. As a rule, the fleet is composed of sturdy vessels designed to be operated in near shore rollers and capable of open ocean transit. The 400-pot limit, open ocean conditions, and the remote nature of the fishing grounds favor vessels typical of Dungeness crab fisheries in the Pacific Northwest. In fact, most of the vessels fishing the more remote western and eastern grounds have homeports in the Pacific Northwest. Almost all participants use standard, hatbox-shaped pots constructed with steel frames and webbed with stainless steel wire.

FISHERY DEVELOPMENT AND HISTORY

Through much of its history, from the mid-1920s to the mid-1960s, Southeast Alaska and Yakutat were managed as a single unit. Prior to the 1960s, harvests from much of the Gulf of

Alaska were combined into a single total; Yakutat contributions were significant, but the exact percentages are unavailable.

Since the early 1960s, the fishery in the Yakutat area has evolved through two major periods. Between the early 1960s and the 1981/82 season, the landings and participants fluctuated widely (Table 7.1). Until the early 1980s, demand for Dungeness crab from Yakutat was generally inversely related to the availability of crab from Washington, Oregon, and California and highly dependent on the willingness of one or two major processors to purchase crab during the summer. The fishery was market driven.

Between the 1981/82 and 1995/96 seasons, effort and participation generally increased. As the preferred product form changed from frozen or canned meat to air-freighted live crab, there was increasing interest from processors to handle Dungeness crab. For many crabbers from the Pacific Northwest, the Yakutat summer fishery was attractive because their home waters are closed during the summer. The rising demand in the early 1980s coincided with the entry of a huge recruit class into the fishery and a decline in harvests from Washington, Oregon, and California. The recruit year class supported increasing fishing effort through the next two seasons and set the pattern for development of the fishery, which is driven by stock abundance.

REGULATION DEVELOPMENT

The documented regulatory history of this fishery started in 1924. Most management jurisdictions within the range of this species employ passive management measures such as size limits, restricting harvest to males, and specifying a season that avoids known sensitive molting and mating periods. In Yakutat, this management triad, called 3-S management (size, sex, and season), is actually 2-S management since the summer fishery occurs while males and females are molting and mating. The current May 15 to July 15 opening is a compromise developed over many years to avoid the major molts to the extent possible, while recognizing economic returns. There are few alternatives to a summer season in Yakutat because the most productive grounds are exposed to extreme weather conditions in the winter. Both classical 3-S and modified 2-S management usually does not effectively manage intensive, highly competitive fisheries.

There are more active management alternatives to the 2-S methods currently used. Some of these, such as harvest rates or guideline harvest levels based on stock assessment surveys, could structure harvest to protect weak stock segments or soft-shell crabs while optimizing exploitation rates and product quality. Additional management measures must be in place before re-opening this fishery.

FISHING SEASONS AND PERIODS

For most years and seasons before 1975/76, the fishery was open all year. The accounting period started on January 1 and ended on December 31. In 1975, following eight consecutive years of harvests between one and two million pounds and a rapid rise in the number of fishing vessels; the season was shortened to May 16 through February 28, 1976. It was then closed in the summer by emergency order because large numbers of soft-shelled crab were observed in the landed harvest. It was a season notable only because it marked the advent of short seasons and inseason management of the fishery based on stock conditions.

The 1976/77 season started on June 1, with a scheduled closure on February 28, 1977. The season opening and closing dates remained the same through the 1981/82 season, although

several intervening seasons were closed by emergency order when large numbers of soft-shells were sampled at the dock. The season changed again in 1982, to May 1 through February 28, 1983. Each season from 1982/83 through 1984/85 was closed by emergency order at some point in the summer due to increasing numbers of soft shells in the landed harvest. In 1985, a split season was implemented from May 1 through July 14, and November 1 through February 28, 1986. Management of the summer fishery focused on avoiding major male molts, which frequently start on the western grounds around Icy Bay and move eastward through the summer. The summer season was generally tailored to start after the major molt on the western grounds, and end before the major molt in the Yakutat Bay stocks. By 1986, it was evident that the May 1 opening was too early and the season was shortened to start on May 15. For each season since, the summer segment of the season has started on May 15 and ended on July 14, and the winter segment has started on November 1 and ended on February 28. The timing of the winter segment was intended to provide a fishery for local residents fishing in Yakutat Bay.

Although there were no proposals before the Alaska Board of Fisheries at their January 1997 meeting to deal specifically with Yakutat stock status, they directed the department to take action. In the first three weeks of the 1997/98 season, a large portion of the harvest was recruit size crab coupled with low abundance, together indicative of poor stock condition. An emergency order closure was issued for June 13, 1997 to foster recovery of the stock. By also closing the winter portion of the fishery, it was thought that there would be an accrual of benefits from the summer closure. However, the 1998/99 fishery indicated further recruitment failure and overall low stock abundance. On June 9, 1998 the fishery was closed early for the second consecutive season. And on June 15, 1999, the fishery was closed by emergency order for a third season. At the January 2000 meeting of the Alaska Board of Fisheries in Juneau it was designated as a collapsed and recovering fishery and closed indefinitely.

SIZE RESTRICTIONS

From 1924 to 1935, the legal size of male crabs was 6 ½-inches in greatest width of carapace or "tip to tip" width. This changed in 1936 to 7 inches and remained unchanged until 1963, when the measurement was redefined as 6 ½ inches in width, measured immediately anterior to the tenth anterolateral spines. This was essentially the equivalent of a 7-inch total shell width measurement but more consistent since damage to the tips of the tenth anterolateral spines is common, particularly in older shell crabs. This measurement standard, termed "shoulder width," or "notch to notch" width has been in effect since then.

GEAR RESTRICTIONS

In 1934, trawls were prohibited. Only pots or ring nets were allowed from 1954 to 1965. A gear limit of 300 pots or ring nets was implemented in 1963. In 1966, diving gear was legalized. The legal limit for pots and ring nets was raised to 600 pots in 1968. In 1995 the legal limit for pots was reduced to 400. This limit continues to the present. Two escape rings with a minimum inside diameter of 4 3/8-inches were first required in 1976. The intent of escape rings is to permit the escape of sublegal males and females, which are usually smaller than legal males. In 1977, a Dungeness pot was defined as a pot with tunnel eye openings, which individually do not exceed 30 inches in perimeter. A biodegradable natural fiber-breaking strap for the pot tiedown has been required since 1978. Originally specified for a maximum of 120-thread, it was reduced in 1990 to 30-thread, then increased in 1991 to 60-thread.

OTHER REGULATIONS

Registration and hold inspections were required starting in 1974. In midsummer 1983, Yakutat was designated a superexclusive registration area and vessels registering to fish in Yakutat were prohibited from fishing in any other area in Alaska for the calendar year. The hold inspection requirement was rescinded in 1984, although registration was still required. In the same year, the area between Sitkagi Bluffs and Cape Yakataga, the western half of the Yakutat fishing district, was designated a non-exclusive area. The partial non-exclusive area was difficult to enforce and other problems led to redesignation of the entire Yakutat fishing district as a superexclusive registration area in 1985. In 1986, Yakutat was designated as Registration Area D, distinct and separate from Southeast Alaska (Registration Area A).

MANAGEMENT CONCERNS

The Yakutat Dungeness crab fishery was designated as collapsed at the 2000 BOF meeting. Although ADF&G has not yet established a policy on re-opening of collapsed fisheries, it is apparent that re-opening must be a stepwise process. The first step is to demonstrate stock recovery.

Once recovery is demonstrated full re-opening of the fishery must be contingent upon funding of a well-developed management and research program designed to provide sustained yields. This would include a preseason pot survey, inseason port sampling based in Yakutat, and a management program with associated biometric support based out of Juneau and would require significant long-term funding.

STOCK ASSESSMENT

Assessment of this fishery has been minimal, biological data is limited to dockside sampling of the landed harvest for size frequency information, and to harvest data reported through the fish ticket system. The wide range of landing ports, as far away as Cordova, and very sporadic deliveries make it difficult to schedule dockside sampling of deliveries. The remoteness of many of the grounds complicates understanding the effects of the fishery on crab stocks. Determining stock composition and abundance would require a much more extensive research and management program. A brief commercial methods survey was conducted in the spring of 2004 with no appreciable stock recovery found (Table 7.2).

RECENT SEASONS

The commercial Dungeness fishery in Yakutat has been closed since the 1999/2000 season.

CHAPTER 7—TABLES

Table 7.1–Registration Area D (Yakutat) commercial Dungeness crab fishery catch, effort, and value, 1960 to present.

Year/Season	Number				Pounds per Permit	Pots Lifted	CPUE	Average Weight
	Permits	Landings	Crabs	Pounds				
1960	NA	NA	NA	543,762	NA	NA	NA	NA
1961	NA	NA	NA	1,023,545	NA	NA	NA	NA
1962	NA	NA	NA	937,051	NA	NA	NA	NA
1963	NA	NA	NA	1,383,298	NA	NA	NA	NA
1964	NA	NA	NA	637,140	NA	NA	NA	NA
1965	NA	NA	NA	910,278	NA	NA	NA	NA
1966	NA	NA	NA	528,060	NA	NA	NA	NA
1967	NA	NA	NA	2,031,460	NA	NA	NA	NA
1968	NA	NA	NA	2,096,119	NA	NA	NA	NA
1969/70	11	107	522,840	1,223,240	111,204	NA	NA	2.3
1970/71	10	83	661,629	1,508,561	150,856	NA	NA	2.3
1971/72	7	88	524,208	1,212,198	173,171	NA	NA	2.3
1972/73	9	85	NA	1,992,574	221,397	NA	NA	NA
1973/74	27	236	NA	2,347,752	86,954	NA	NA	NA
1974/75	22	154	NA	1,031,573	46,890	NA	NA	NA
1975/76	17	113	264,426	579,908	34,112	NA	NA	2.2
1976/77	7	32	230,886	537,543	76,792	NA	NA	2.3
1977/78	3	12	54,449	131,052	43,684	NA	NA	2.4
1978/79	12	122	796,823	1,799,403	149,950	NA	NA	2.3
1979/80	21	87	613,725	1,436,923	68,425	NA	NA	2.3
1980/81	10	73	411,293	895,220	89,522	NA	NA	2.2
1981/82	28	169	1,323,791	3,228,301	115,296	NA	NA	2.4
1982/83	35	346	2,046,436	5,160,135	147,432	NA	NA	2.5
1983/84	67	511	1,110,413	2,666,383	39,797	NA	NA	2.4
1984/85	39	236	325,420	774,828	19,867	NA	NA	2.4
1985/86	32	175	172,166	371,237	11,601	66,258	2.6	2.2
1986/87	22	116	363,764	755,912	34,360	49,248	7.4	2.1
1987/88	28	220	1,257,033	2,725,040	97,323	135,919	9.2	2.2
1988/89	32	253	1,549,275	3,494,368	109,199	186,574	8.3	2.3
1989/90	29	227	712,424	1,701,859	58,685	124,857	5.7	2.4
1990/91	36	327	867,031	2,101,676	58,380	177,984	4.9	2.4
1991/92	67	506	1,133,583	2,853,322	42,587	252,606	4.5	2.5
1992/93	49	265	541,961	1,392,700	28,422	176,345	3.1	2.6
1993/94	44	253	352,151	815,969	18,545	119,496	2.9	2.3
1994/95	47	251	393,371	915,523	19,479	108,923	3.6	2.3
1995/96	46	277	239,602	557,528	12,120	95,419	2.5	2.3
1996/97	27	155	111,930	244,825	9,068	42,362	2.6	2.2
1997/98	30	87	74,810	156,072	5,202	34,177	2.2	2.1
1998/99	29	92	62,525	121,478	4,189	26,178	2.4	1.9
1999/00	10	52	31,966	65,386	6,539	14,630	2.2	2.0
2000-2008	FISHERY CLOSED							

Note: NA = not available

Table 7.2–Distribution of pot lifts, number of pots sampled, and number of crabs caught in the 2004 survey of commercial Dungeness crab grounds in Yakutat, Registration Area D.

			Number of Pots		Number of Crabs in Sampled Pots			
Statistical area name	**Statistical Area**	**Dates Surveyed**	**Set**	**Sampled**	**Sublegal Males**	**Legal Males**	**Females**	**Legal Males Per Pot**
N. of Cape Fairweather	181-10	5/-5/21	191	48	5	1	1	0.02
N. of Alsek River to N. of Yakutat Bay	181-60	5/-5/22	252	215	10	16	31	0.07
Yakutat Bay	183-10	5/24-5/25	31	31	0	0	0	0.00
Between Icy Bay and N. of Yakutat Bay	181-50	5/23	70	70	1	46	0	0.66
Icy Bay	181-40	5/23	81	81	16	32	1	0.40
Total			605	425	32	95	33	0.22

CHAPTER 8: SOUTHEAST ALASKA RED AND BLUE KING CRAB FISHERY

INTRODUCTION

This report presents an overview of the commercial red and blue king crab fishery in Southeast Alaska (Registration Area A) with emphasis on the last 3 fishing seasons, 2005/06, 2006/07, and 2007/08. Information is presented on historical harvest and effort, regulation development, research results, and stock assessment.

Red king crabs, *Paralithodes camtschaticus*, are taken primarily in the protected bays, inlets, and adjacent shorelines of straits and sounds in Southeast Alaska north of Petersburg; few red king crabs are caught from the southern portion of Southeast Alaska. Red king crabs generally inhabit depths of less than 200 fathoms and historically, important red king crab fishing grounds have included Gambier Bay, Pybus Bay, Seymour Canal, the Juneau Area, Lynn Canal, Holkham Bay, Excursion Inlet, Port Frederick, and Peril Strait (Figure 8.1). Small quantities of blue king crab, *P. platypus*, are harvested incidentally during the red king crab fishery as well as during the golden king crab, *Lithodes aequispinus*, and Tanner crab, *Chionoecetes bairdi*, fisheries.

Commercial vessels participating in the red king crab fishery are primarily salmon tenders, salmon purse seine vessels, and larger drift gillnet boats. Fishing gear has evolved to include both side-loading king crab pots (7 ft x 7 ft x 30 inch) and top-loading pyramid or conical-style pots with 5-ft to 8-ft bases.

Management of the commercial red king crab fishery is based on a conservative management plan and policies that have been reviewed and approved by the Alaska Board of Fisheries (BOF). This management plan consists of the following protocols:

1. seasons that avoid fishing during the sensitive life history stages of molting, mating, and growth;
2. only male crab with a minimum legal carapace width of 7 inches can be taken;
3. limits of 20 to 50 pots per vessel, depending on stock abundance; and,
4. guideline harvest levels (GHLs) based on conservative harvest rates and stock assessment survey results.

FISHERY DEVELOPMENT AND HISTORY

COMMERCIAL FISHERY HISTORY

Commercial king crab fishing in Southeast Alaska waters was initially documented in 1960 when a small harvest occurred in the Petersburg/Wrangell Management Area. From 1962 through 1968, harvests ranged widely from about 100,000 pounds to more than 2 million pounds in 1968, with 7–9 permit holders participating until 1968 when effort increased to 19 permit holders (Table 8.1). In 1969, effort increased to 39 permit holders but the resulting harvest declined to 1,899,930 pounds. These high harvests were due to liberal gear and season

regulations, a smaller minimum legal size (6.5 inches), harvests that included a combination of red, golden, and blue king crab, and the lack of reasonable guideline harvest levels (GHLs).

In 1970 the department began collecting information on the species composition of the commercial king crab harvest in Southeast Alaska through the dockside sampling and skipper interview programs. From 1970/71 through the 1975/76 seasons, harvests averaged 539,742 pounds of red king crab and effort averaged 24 permit holders (Table 8.1). The first emergency order closure occurred in January 1971 when the harvest for the 1970/71 fishing season totaled only 389,373 pounds after 4.5 months of fishing by 20 permit holders. The minimum legal size was subsequently increased to 7 inches in carapace width during the 1971 board meeting.

Accurate species composition information was required on fish tickets beginning in January 1976. From the 1976/77 through the 1984/85 fishing seasons, the number of permit holders increased from about 34 to more than 90 and harvests averaged 407,384 pounds of red king crab. The average exvessel value of the red king crab harvest during this period was approximately $1.0 million (adjusted to the 1990 consumer price index). The peak harvest of 658,087 pounds was taken by 39 permit holders during the 1979/80 season. Fishing effort peaked during the 1983/84 season when 97 permit holders caught only 280,681 pounds of red king crab (Table 8.1). During the 1984/85 season, 95 permit holders caught 270,495 pounds during a 7-day fishery in October. The commercial fishery was then closed for eight consecutive fishing seasons (1985/86 through 1992/93) when department survey results indicated low stock abundance. The fishery was reopened for the 1993/94 season after department survey data indicated red king crab stocks had rebuilt to levels sufficient to support a commercial harvest above the minimum threshold of 300,000 pounds. The fishery continued during the next four seasons, with an average harvest of about 300,000 pounds by about 79 permit holders. Declines in the abundance of legal crab in Pybus Bay, Gambier Bay, and Peril Strait resulted in an allowable harvest below the minimum regulatory threshold level of 300,000 pounds for the 1998/99 and 2000/01 fishing seasons; hence the fishery was closed. The harvest over the last three open seasons has averaged 212,400 pounds. Beginning with the 2002/03 season, the minimum threshold was reduced to 200,000 pounds. The fishery was closed during the 2004/05, 2006/07, 2007/08, and 2008/09 seasons due to estimates of allowable harvest that fell below the threshold.

EXPERIMENTAL FISHING

In 1976 the department received funds to survey portions of Southeast Alaska that were not normally fished by the commercial fleet. The purpose was to find additional stocks to help support the commercial fishery. Three commercial fishers were contracted to fish for 10 days each in Districts 3 and 4 during February and March. February and March were selected because of the propensity for crab stocks to congregate in bay areas during egg-hatch, molting, and mating in the late winter and spring months. While some small isolated stocks of red king crab were identified, the numbers of legal crab available were very few and insufficient to support a commercial fishery. Catch rates were less than 0.01 legal crabs per pot.

During the winter 1988 meeting, the Board of Fisheries provided regulations allowing for experimental fishing in non-traditional areas by commercial king crab permit holders. These regulations required mandatory logbook completion. This experimental fishing effort was an attempt to find new and significant stocks to reach the threshold and reopen the commercial fishery. During the 1988/89 and 1989/90 seasons, the department issued experimental permits to 19 permit holders who fished at various times from July through January. Of the 19 permits

issued, 7 resulted in landings. The total number of pounds landed was 2,061. Thirty-six subdistricts were fished, with harvests reported from ten subdistricts. After two seasons of exploratory fishing, it was obvious that interest in these fisheries was low, catches were poor, and no major unexploited populations of either species had been found. Also, flagrant abuses of permit conditions and violations of regulations had occurred. As a result, the board decided during its winter meeting in 1990 to revoke the regulations that provided for these fisheries.

REGULATION DEVELOPMENT

FISHING SEASONS

From 1961 through 1968 there was no closed season for the commercial king crab fishery. Prior to the 1969/70 fishing season, a closed season was established from March 16 through August 14. A fishing season of September 1 through January 31 was established in 1971 to provide a closure during the molting and mating season, during a portion of the aggregation period prior to the molting and mating season, and during the major growth period when meat recovery rates are low. The current regulatory season extends from November 1 through January 24. From 1979 through 1999 the open fishing period was set preseason based on estimates of population size and predicted fishing effort necessary to achieve the GHL. Section 11-A has been managed for a separate GHL beginning with the 1996/97 season. Inseason harvest tracking to achieve the GHL with closure by emergency order has been conducted since 2001/02 when the fishery length was 12 days. In 2002/03 and 2003/04 the fishery was closed after respectively 8 and 4 fishing days and the fishery was not opened during the 2004/05 season. The 2005/06 season was open for four days in the surveyed areas and for 13 days in Section 11-A and the non-surveyed areas. The fishery has been closed to commercial fishing since the 2006/07 season.

SEX AND SIZE LIMITS

From its inception, the king crab fishery has been restricted to harvesting only male crab in order to protect the reproductively important female crab. From 1961 through 1968, a minimum legal size of 6.5 inches in carapace width was in place. The minimum legal carapace width was increased to 7 inches in 1969 following apparent stock declines. This size limit was based on growth and size at maturity information collected from Gulf of Alaska red king crab stocks and the size frequency distribution of Southeast Alaska stocks. The larger minimum size limit was implemented to increase reproductive potential by providing additional protection to mature male crabs for approximately two seasons prior to recruitment to the fishery.

A regulation was adopted in 1990 allowing the harvest of any king crab infected with the parasitic barnacle *Briarosaccus callosus*, regardless of the sex or size of the crab. Crabs infected with this parasite are incapable of reproduction and experience reduced growth. Removal of infected crabs may improve stock reproduction and growth by decreasing the incidence of infection and reducing the population size of the parasite.

QUOTAS AND GUIDELINE HARVEST RANGES

A quota of 1.5 million pounds was provided for king crab (all species combined) in 1970. Separate red and golden king crab fisheries were recognized with the adoption of distinct seasons and quotas in 1971. From 1971 through the 1978/79 season, the red king crab quotas, guideline harvest ranges (GHR), or guideline harvest levels (GHLs) were based upon historic harvest and limited size distribution information obtained from the dockside sampling program. The first red

king crab quota was set in 1971 at 400,000 pounds per season. This was increased to 600,000 pounds in 1974, and then reduced to 400,000 pounds in 1977.

Quotas were replaced by GHRs after 1977. The first GHR of 200,000 to 400,000 pounds was established in 1978. The GHR was increased to 300,000 to 600,000 pounds in 1979 based on industry recommendations. Since the 1980/81 season, allowable catches, expressed as either GHLs or GHRs, have been based on results from the red king crab index of abundance survey. The available harvest surplus is currently computed using a harvest rate approach. Beginning in 1988 a threshold of 300,000 pounds surplus legal sized crab had to be available before the commercial fishery would be opened. In 2002 this threshold was reduced to 200,000 pounds by the Board of Fisheries in response to an industry proposal.

FISHING GEAR

There were no restrictions on the amount or type of gear that could be fished by a vessel participating in the king crab fishery from 1961 through 1967. A limit of 40 pots per vessel was established for Southeast Alaska waters in 1968. The maximum number of pots per vessel was increased to 60 in 1974 and to 100 in 1978. This limit continued through the 1987/88 season. In 1988, the board required a 40-pot limit per vessel for GHLs between 300,000 and 400,000 pounds and a 100-pot limit for GHLs above 400,000 pounds. Based on information provided by the department, the board reduced the 40-pot limit to 20 pots in 1993. Current regulations provide for 20 to 50 pots per vessel based on a "sliding scale" system, which depends upon the allowable surplus harvest or GHL.

To reduce the capture of sublegal crab, all pots must have either 9.5-inch stretch mesh along one panel or have four 6.25-inch escape rings. In order to reduce "ghost fishing" by lost pots, regulations require degradable twine or a timed galvanic release device that will allow caught crabs to escape after a short period of time. Tunnel height on standard side loading pots must be a minimum of 8 inches in the vertical dimension. There are restrictions on pot storage before and after fishing seasons and each stored pot, or stack of pots, must be buoyed and marked. Ring nets were eliminated as legal gear for king crab in 1990. Marking requirements for pot buoys include sequentially numbered stickers, which are purchased from the department.

MANAGEMENT PLAN

At the 1993 statewide shellfish meeting, the board adopted a comprehensive management plan for red king crab in Southeast Alaska. This management plan was designed to be consistent with the board's policy on "King and Tanner Crab Resource Management." Major elements of the plan include the following:

1. provisions to maintain an adequate abundance of various size classes of males and females necessary to provide for sustained harvests and stock conservation;
2. application of a harvest rate based on both legal males and mature males;
3. a guideline harvest level based on stock conditions for each fishing district;
4. a minimum harvest threshold of legal males;
5. conduct of an orderly fishery; and
6. conservative management when information is lacking.

Additional elements used to manage the fishery are included in regulations concerning allocation between commercial and personal use fishers in Section 11-A, lawful gear, and closed waters. A mandatory call-in program was implemented for all seasons after success with a voluntary call-in program in 2001/02 season.

LIMITED ENTRY

A limited entry program was established for the king and Tanner crab pot fisheries in Southeast Alaska by the Commercial Fisheries Entry Commission (CFEC) in January 1984. The CFEC adopted a maximum effort level of 61 permits for the red king crab fishery. Currently there are 66 permits eligible to participate in the red king crab fishery. Some of these permits may not be eligible to fish after the adjudication process is completed.

MANAGEMENT CONCERNS

PERSONAL USE HARVEST

Accurate harvest data from all users is important to the management of the fishery. Estimates of personal use red and blue king crab harvest come from three sources in Southeast Alaska: the Statewide Harvest Survey, Dockside Creel Census, and Personal Use Permits. Personal Use Permits are required in only the Section 11-A personal use permit area around Juneau and although they provide the best available data, it is thought that underreporting does occur and harvests are underestimated. Outside of the 11-A permit area and Juneau king crab management area bag limits are six crab per person per day which may lead to significant removals in some areas. The best estimates of harvest for areas outside of 11-A come from the Statewide Harvest Survey and Dockside Creel Census information. Both these sources consistently underestimate total harvest. A region-wide system needs to be established to provide reliable estimates of personal use harvest from all areas in order to effectively manage the stock.

STOCK ASSESSMENT

STOCK ASSESSMENT SURVEYS

The department has conducted a survey of red king crab abundance in Southeast Alaska since 1979. The survey provides an index of crab abundance by recruit class in terms of crabs per pot per day. The survey is conducted in Districts 10 through 15 in areas where the majority of the red king crab harvest occurs (Figure 8.1). Crab population size is estimated with a 3-stage catch survey model, which uses a time series of survey catch rate and harvest data (commercial and personal use). This model, in use since 1993, provides annual estimates of the population biomass of legal and mature male crab since 1979 for each major production area.

The method for determination of the GHL from the catch survey biomass estimates is described in detail in a 2003 report (Clark 2003). A maximum harvest rate of the lesser of 20% of mature or 50% of legal has been used since the fishery re-opened in 1993.

The trend in all districts has been a decline in abundance of legal males from peaks in the late 1970s and early 1980s to a low extending from 1985 to 1990. Abundance then increased in the early 1990s to levels that were considered adequate to support a sustainable fishery from 1993/94 through 1997/98. Over the last three years there has been a consistent and steep decline in overall biomass. Current legal and mature biomasses are at the lowest levels since the fishery was re-opened in 1993 (Figure 8.2).

Significant improvements, resulting in successive decreases in the coefficient of variation (CV) of catch per unit effort (CPUE) data, have been implemented over the 30-year survey time series (Clark 2008). These include a move from fixed to random pot locations in 1986, development of strata (also in 1986), a gradual shift from square to cone pots over the period 1995–1999, and most recently, restratification of the survey to redefine strata boundaries based upon the CPUE of legal, sublegal, and female red king crab in 2005. A detailed timeline and methods of survey development has been detailed elsewhere (Clark 2003; Clark 2008,*in press*).

Refinements to the survey implemented in 2008 included the removal of a day in Seymour Canal because of invariable and low CPUE, the addition of a day in Holkham Bay, and moving the Rodman Bay survey area onto a triennial schedule (also to account for an extremely invariable and low CPUE).

RECENT COMMERCIAL SEASONS

2005/06 SEASON SUMMARY

The 2005/06 fishery opened on November 1, 2005 with a GHL of 200,000 pounds. A 20-pot limit per vessel restriction was in effect because the GHL was less than 400,000 pounds. The fishery was managed with area-specific harvest objectives in Section 11-A, survey areas, and non-survey areas. Section 11-D including all waters of Seymour Canal, Port Frederick, and portions of 11-A near Juneau were closed to commercial fishing.

The survey area which had a harvest objective of 76,000 pounds closed first by emergency order at 7:00pm on November 4, 2005. The non-surveyed areas and Section 11-A had harvest objectives of 65,000 and 59,000 pounds respectively. Both Section 11-A and the non-surveyed areas closed at 7:00pm on November 13, 2005. A total of 58 permit holders made 113 landings totaling 209,799 pounds (Table 8.1). Over half of the harvest came from District 11 followed by Districts 10 and 15 (Table 8.2).

Based on samples from 58 vessels, the average size was 163.7 mm in carapace length (Table 8.3) and the average weight was 8 pounds per crab (Table 8.4). Approximately 29.6% of the landed crab recruited to the fishery in 2005, and 41.2% recruited the prior year (Table 8.5)

2006/07 SEASON SUMMARY

The 2006/07 season did not open to commercial fishing. Catch-survey analysis resulted in an estimate of available harvest of 81.500 pounds, which is well below the minimum 200,000 pound threshold of legal male red king crab established by regulation.

2007/08 SEASON SUMMARY

The estimate of available harvest, based on the 2007 stock assessment survey results was 22,323 pounds. This estimate did not meet the 200,000 pound threshold and the commercial fishery remained closed for the 2007/08 season.

2008/09 SEASON OUTLOOK

Analyses of the results of the 2008 stock assessment survey estimated the allowable surplus harvest, or GHL, at 0 pounds when harvest rates of mature male red king crab biomass by area are adjusted according to stock health (Table 8.5 and 8.6). Therefore, the commercial fishery did not open for the third consecutive season.

CHAPTER 8—TABLES AND FIGURES

Table 8.1–Red king crab harvest, number of landings, and number of permits in Registration Area A (Southeast Alaska) by year or season, 1960 to present. The data from 1960–1969 include all three species of king crab (red, blue, and golden) from all of Southeast Alaska including Yakutat. Yakutat king crab is included in the 1969/70 season.

Year/Season[a]	Total catch	Number of landings	Number of permits
1960	3,424		
1961	*	*	*
1962	1,289,550		8
1963	1,112,200		8
1964	820,530		9
1965	579,300		7
1966	105,899		8
1967	599,078		7
1968	2,199,722		19
1969	1,899,930	122	39
1969/70	1,438,226	401	33
1970/71	389,373	150	20
1971/72	670,645	183	19
1972/73	528,025	198	19
1973/74	758,103	234	29
1974/75	535,534	201	46
1975/76	356,771	170	32
1976/77	328,145	174	35
1977/78	234,494	138	34
1978/79	443,639	165	34
1979/80	658,087	229	39
1980/81	532,674	193	35
1981/82	524,240	172	46
1982/83	412,474	114	58
1983/84	280,681	119	97
1984/85	270,495	121	95
1985–1992		Fishery Closed	
1993/94	202,384	180	83
1994/95	256,267	246	84
1995/96	357,815	203	73
1996/97	428,540	217	79
1997/98	308,322	187	76
1998/99		Fishery Closed	
1999/00	289548	215	77
2000/01		Fishery Closed	
2001/02	296,967	177	77
2002/03	233,630	154	75
2003/04	193,759	93	67
2004/05		Fishery Closed	
2005/06	209,799	113	58
2006–2008		Fishery Closed	

***** Fewer than 3 permits were fished; information is confidential.

[a] Data for years 1960 through the 1969/70 season are taken directly form the last board report.

[b] Total landings are the number of unique fish tickets reporting king crab landings in any combination in a season.

[c] Total permits are the number of unique CFEC numbers the made landings in a season.

Table 8.2–Red king crab harvest in thousands of pounds by district and season in Registration Area A (Southeast Alaska), 1969/70 to present.

Season	District															
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**Total**
1970/71						*		*	45.8	116.4	119.6	*	*	*	53.8	389.4
1971/72								*	*	197.6	259.4	*	95.8	*	*	670.6
1972/73	*					*		16.8	*	223.8	103.6	*	40.0	*		528.0
1973/74					*	*	*	*	21.2	365.1	120.7	*	98.7	87.1	*	758.1
1974/75	*					*	*	8.3	27.9	124.5	74.1	60.2	101.2	128.8	8.5	535.5
1975/76					*	*		15.5	*	30.4	35.1	53.4	95.8	116.1	*	356.8
1976/77			*		*	*		16.7	17.5	49.3	82.0	*	*	63.8	24.7	328.1
1977/78	*				*	*		*		43.1	64.5	*	*	18.5	*	234.5
1978/79								*		118.5	122.9	14.1	112.5	40.2	28.9	443.6
1979/80	*				*	*	*	*	*	168.4	220.2	39.5	79.4	89.1	11.8	658.1
1980/81	*					*	*	27.4	*	163.7	179.2	*	73.4	*	39.9	532.7
1981/82					*	*	*	*	*	114.4	135.4	32.7	116.7	32.8	52.8	524.1
1982/83					7.3		*	*	*	77.4	53.8	98.0	70.8	79.5	20.5	412.6
1983/84	*		*		*	*	*		*	79.5	35.2	30.2	46.7	50.8	1.9	280.7
1984/85	*		*						*	58.7	89.0	14.2	51.9	48.9	6.2	270.5
1985 through 1992								Fishery Closed								
1993/94						*		*	2.4	29.6	76.9	38.9	22.7	10.3	20.9	202.4
1994/95					*			*	*	69.5	113.5	24.8	21.8	13.4	6.6	256.3
1995/96								*	*	169.7	142.2	*	13.1	18.5	6.3	357.8
1996/97								*	1.5	176.7	206.2	2.2	18.3	18.0	*	428.5
1997/98									1.4	76.7	184.2	*	*	25.3	8.0	308.3
1998/99								Fishery Closed								
1999/00								*	*	43.5	191.9	11.7	*	32.9	9.3	289.5
2000/01								Fishery Closed								
2001/02									*	83.0	147.9	5.9	*	41.6	15.5	297.0
2002/03									*	69.2	96.1	10.0	*	41.6	11.4	233.6
2003/04									*	64.0	98.2	4.1	0.0	19.8	7.5	193.8
2004/05								Fishery Closed								
2005/06								*	1.3	67.8	109.9	5.7	*	4.9	16.7	209.8
2006/07								Fishery Closed								
2007/08								Fishery Closed								

* Fewer than 3 permits were fished; information is confidential.

Table 8.3–Summary of commercial red king crab length frequency and shell condition data collected during dockside sampling in Registration Area A (Southeast Alaska), 1970/71 to present.

	Number of sampled		Carapace length (mm)			Recruitment				
Season	Boats	Crab	Average	Range	Recruits[a]	%PR+1[b]	%PR+2[c]	%PR+3[d]	%PR+4[e]	Skip molts[f]
1970/71	29	2,264	161	138–201	40.2	39.6	18.3	1.9	0	28.5
1971/72	10	742	160.2	134–203	47.7	33	14.9	4.1	0.3	24.4
1972/73	30	3,032	158.7	133–205	53.5	32.5	11.5	2.4	0.1	20.5
1973/74	15	1,438	161.6	140–208	27.6	52.5	17.6	2.1	0.2	39.7
1974/75	20	2,181	166.3	137–200	27.6	47.4	21.3	3.8	0	18.6
1975/76	21	1,969	160.3	135–207	49	29.6	16.6	4.7	0.2	22.2
1976/77	18	1,460	160.6	115–204	50.1	33	11.9	4.5	0.6	21.4
1977/78	32	3,161	156.7	136–203	29.7	40.2	20.4	9.5	0.2	67.9
1978/79	18	1,712	155.4	137–202	61.5	28.7	8.5	1.1	0.1	22.9
1979/80	30	3,082	156.1	137–193	55.5	31	11.6	1.9	0	29.1
1980/81	49	4,103	156.3	134–196	53	34.7	10.8	1.4	0	29.5
1981/82	37	3,425	158.8	123–199	47.1	35	15.4	2.5	0	30.6
1982/83	30	2,821	159.4	137–200	46	33.6	15.5	4.9	0	30.5
1983/84	42	3,521	158.4	137–196	51.9	33.9	11.7	2.6	0	24.9
1984/85	36	3,641	159.6	139–196	48.3	37.9	12.3	1.5	0	22.6
1985–1992					Fishery Closed					
1993/94	116	8,601	162.9	103–209	30.5	46.5	19.4	3.6	0	30.3
1994/95	124	7,974	162.8	90–209	34.5	33.1	23.4	9	0.1	36.9
1995/96	73	5,882	159.4	96–204	56.2	30.1	9.5	4.2	0.1	17.8
1996/97	132	7,744	161.5	113–212	38.6	44	12.9	4.4	0.2	28.8
1997/98	111	5,919	164.4	122–207	28.2	44	23.4	4.5	0	33.6
1998/99					Fishery Closed					
1999/00	136	6,320	161.1	135–199	44.5	29.7	17.9	7.9	0.1	34.1
2000/01					Fishery Closed					
2001/02	105	5,162	160.1	135–195	40.4	43	15.2	1.4	0	31.4
2002/03	66	3,217	161.4	138–194	41.4	37.7	18.4	2.5	0	28.5
2003/04	53	2,619	159.9	138–195	49.4	34.6	13.7	2.3	0	23.6
2004/05					Fishery Closed					

–continued–

Table 8.3–Page 2 of 2.

	Number of sampled		Carapace length (mm)			Recruitment				
Season	**Boats**	**Crab**	**Average**	**Range**	**Recruits[a]**	**%PR+1[b]**	**%PR+2[c]**	**%PR+3[d]**	**%PR+4[e]**	**Skip molts[f]**
2005/06	58	2873	163.7	139–206	29.6	41.2	24.9	4	0.2	38.0
2006/07	Fishery Closed									
2007/08	Fishery Closed									

[a] Recruits = all new and soft shell crab ³145 mm and £161 mm carapace length.

[b] PR + 1 = all new and soft shell crab ³162 mm and £178 mm, and old shell crab ³145 mm and £161 mm, carapace length.

[c] PR + 2 = all new and soft shell crab ³179 mm and £195 mm, and old crab ³162 mm and £178 mm, and very old ³145 mm and £161 mm, carapace length.

[d] PR + 3 = all new and soft shell crab ³196 mm and all old ³179 mm and £195 mm, and very old ³162 mm and £178 mm, carapace length.

[e] PR + 4 = all old and very old where carapace length ³196 mm.

[f] Skip molts = all old and very old crab.

Table 8.4–Summary of commercial red king crab CPUE and average weight data collected during dockside sampling and interviews in Registration Area A (Southeast Alaska), 1970/71 to present.

Season	Number			Average Catch/pot	Range of Catch/pot	Weight (pounds)		Estimated No. Crab Caught	Percent Catch Sampled
	Boats interviewed	Pots	Crab			Average	Range		
1970/71	1					8.6		45,276	5
1971/72									
1972/73									
1973/74									
1974/75									
1975/76	2					8.4	7.5–9.2	42,523	4.6
1976/77	5					8	7.3–10.1	40,865	3.6
1977/78	15					7.5	6.9–9.8	31,391	10.1
1978/79	8					7.2	6.3–8.7	61,788	2.8
1979/80	4					7.4	6.6–7.9	88,931	3.5
1980/81	41	5,345	29,897	5.6	1.0–14.5	7.2	6.4–8.2	74,292	5.5
1981/82	19	600	900	1.5		7.2	6.5–8.7	72,692	4.7
1982/83	23	1,542	6,449	4.2	1.3–7.6	7.7	6.6–8.5	52,388	5.4
1983/84	29	3,693	4,165	1.1	0.2–4.3	7	5.5–8.5	40,034	8.8
1984/85	27	1,334	3,893	2.9	1.6–6.3	7.4	6.7–8.5	35,826	10.2
1985–1992					Fishery Closed				
1993/94	114	10,158	17,749	1.8	0.0–6.2	8.1	5.8–9.6	25,110	34.3
1994/95	120	9,087	15,063	1.7	0.0–7.8	8	6.2–10.3	31,914	25
1995/96	73	5,350	16,676	3.1	0.5–9.6	7.5	5.5–8.7	47,900	12.3
1996/97	129	11,958	36,449	3.1	0.4–11.5	7.8	6.3–9.6	54,662	14.2
1997/98	111	8,236	24,079	2.9	0.3–12.0	8.3	5.7–9.8	37,103	16
1998/99					Fishery Closed				
1999/00	136	12,003	26,733	2.2	0.2–18.4	7.6	5.5–10.0	38,098	16.6
2000/01					Fishery Closed				
2001/02	105	8,445	27,709	3.3	0.4–10.0	7.7	6.1–8.6	38,819	13.3
2002/03	66	4,213	14,489	3.4	0.5–10.8	7.9	6.6–9.2	29,686	10.8
2003/04	53	3,350	16,666	5	1.4–14.5	7.7	6.3–8.9	25,262	10.4
2004/05					Fishery Closed				
2005/06	58	5,261	20,054	3.8	0.9–10.4	8	7.0–9.8	26,192	11
2006/07					Fishery Closed				
2007/08					Fishery Closed				

Table 8.5–Red king crab stock status by survey area. Matrix of stock status determination and scores for all size/sex classes of red king crab for the 2007/08 commercial season. Bold and bold-underlined entries represent positive and negative indicators (scores) of stock status, respectively. The long-term average is defined from 1993–2007. Short-term trends are based on individual regression analyses over the past 4 years (including the current year). Total score is the sum of scores (+1, 0, -1 for long-term; +.25, 0, -.25 for short-term) for each response variable. Stock status is defined by the total score: < -1.5 = Poor, -1.5 to 1.5 = Moderate, and > 1.5 = Healthy.

			Pybus Bay		Gambier Bay		Seymour Canal		Peril Straits	
Data type	**Sex/size class**	**Analysis type**	**% Baseline**	**Score**	**% Baseline**	**Score**	**% Baseline**	**Score**	**% Baseline**	**Score**
Clutch <25%	Large/mature female	l-t avg.	-100%	1	-100%	1	-100%	1	-100%	1
		s-t trend.	No trend	0	No trend	0	No trend	0	No trend	0
CPUE	Large/mature female	l-t avg.	-65%	-1	-74%	-1	-99%	-1	-52%	-1
		s-t trend	Sig. dec.	-0.25	No trend	0	No trend	0	No trend	0
	Small/immature female	l-t avg.	-93%	-1	-86%	-1	-100%	-1	-63%	-1
		s-t trend	Sig. dec.	-0.25	No trend	0	No trend	0	No trend	0
	Juvenile males	l-t avg.	-41%	-1	-72%	-1	-100%	-1	-63%	-1
		s-t trend	Sig. dec.	-0.25	No trend	0	No trend	0	No trend	0
	Prerecruit males	l-t avg.	-29%	0	-47%	-1	-100%	-1	-63%	-1
		s-t trend	No trend	0	No trend	0	No trend	0	No trend	0
	Recruit males	l-t avg.	-27%	0	-47%	-1	-98%	-1	-27%	0
		s-t trend	No trend		No trend	0	No trend	0	No trend	0
	Postrecruit males	l-t avg.	5%	0	52%	0	-97%	-1	-17%	0
		s-t trend	No trend		No trend	0	No trend	0	No trend	
	***2006 Stock status**		Moderate		Healthy		Poor		Moderate	
	***2006 Harvest rate**		10%		20%		0%		10%	
	***2007 Stock status**		Moderate		Moderate		Poor		Poor	
	***2007 Harvest rate**		10%		10%		0%		0%	
	2008 Total Score		-2.75		-4.00		-5.00		-3.00	
	2008 Stock status		Poor		Poor		Poor		Poor	
	2008 Harvest rate		0%		0%		0%		0%	

–continued–

Table 8.5–Page 2 of 2.

Data type	Sex/size class	Analysis type	Juneau Area		Lynn Sisters		Excursion Inlet		Port Frederick		Holkham Bay	
			% Baseline	Score	% Baseline	Score	% Baseline	Score	% Baseline	Score	% Baseline	Score
Clutch <25%	Large/mature female	l-t avg.	-50%	1	-100%	1	-100%	1	-69%	1	NA	NA
		s-t trend	No trend	0	No trend	0	No trend	0	No trend	0	NA	NA
CPUE	Large/mature female	l-t avg.	-83%	-1	-76%	-1	-30%	0	-55%	-1	NA	NA
		s-t trend	Sig. dec.	-0.25	No trend	0	No trend	0	No trend	0	NA	NA
	Small/immature female	l-t avg.	-88%	-1	-91%	-1	-72%	-1	-63%	-1	NA	NA
		s-t trend	No trend	0	No trend	0	Sig. dec.	-0.25	No trend	0	NA	NA
	Juvenile males	l-t avg.	-81%	-1	-75%	-1	-79%	-1	-63%	-1	NA	NA
		s-t trend	No trend	0	No trend	0	Sig. Dec.	-0.25	No trend	0	NA	NA
	Prerecruit males	l-t avg.	-53%	-1	20%	0	-66%	-1	-44%	-1	-94%	-1
		s-t trend	Sig. dec.	-0.25	No trend	0	No trend	0	No trend	0	No trend	0
	Recruit males	l-t avg.	-62%	-1	11%	0	-34%	0	-42%	0	-92%	-1
		s-t trend	Sig. dec.	-0.25	No trend	0	No trend	0	No trend	0	Sig. dec.	-0.25
	Postrecruit males	l-t avg.	12%	0	9%	0	-61%	-1	-3%	0	-97%	-1
		s-t trend	Sig. dec.	-0.25	No trend	0	No trend	0	No trend	0	Sig. dec.	-0.25
***2006 Stock status**			Moderate		Healthy		Moderate		Poor		NA	
***2006 Harvest rate**			10%		20%		10%		0%		NA	
***2007 Stock status**			Poor		Moderate		Poor		Poor		Poor	
***2007 Harvest rate**			0%		10%		0%		0%		0%	
2008 Total Score			-5.00		-2.00		-3.50		-3.00		-3.5	
2008 Stock status			Poor		Poor		Poor		Poor		Poor	
2008 Harvest rate			0%		0%		0%		0%		0%	

Note: low % and sig. Dec. are "good" for clutch fullness < 25%

* Previous baseline used (1993–2002)

Table 8.6–Summary of commercial catch GHL calculations for 8 of the 9 surveyed areas and other areas with stock status for the 2007/08 season. See Table 8.5 for a more detailed look at assessment for Healthy, Moderate, and Poor stock status.

Survey Area	Biomass of Legal Crab	Biomass of Mature Crab	Status of Stock	Mature Harvest Rate	Legal Harvest Rate	Total GHL	Personal Use Catch	2008 Commercial GHL	2007 Actual Commercial Catch	1993-2003 Average Catch
Pybus Bay	87,517	122,529	Poor	0%	0%	0	0	0	0	48,776
Gambier Bay	47,666	59,431	Poor	0%	0%	0	0	0	0	19,366
Seymour Canal	22,283	22,770	Poor	0%	0%	0	0	0	0	60,941
Peril Strait	51,791	68,845	Poor	0%	0%	0	0	0	0	10,756
Juneau Area	250,415	331,517	Poor	0%	0%	0	0	0	0	40,165
Lynn Sisters	35,722	50,664	Poor	0%	0%	0	0	0	0	9,034
Excursion Inlet	27,745	57,043	Poor	0%	0%	0	0	0	0	16,368
Port Frederick	18,338	22,553	Poor	0%	0%	0	0	0	0	6,579
Other Areas	289,518	393,182					0	0	0	81,341
Blue King Crab	5,750	7,808						0	0	2,040
Total	836,744	1,136,343			0%			0	0	295,366

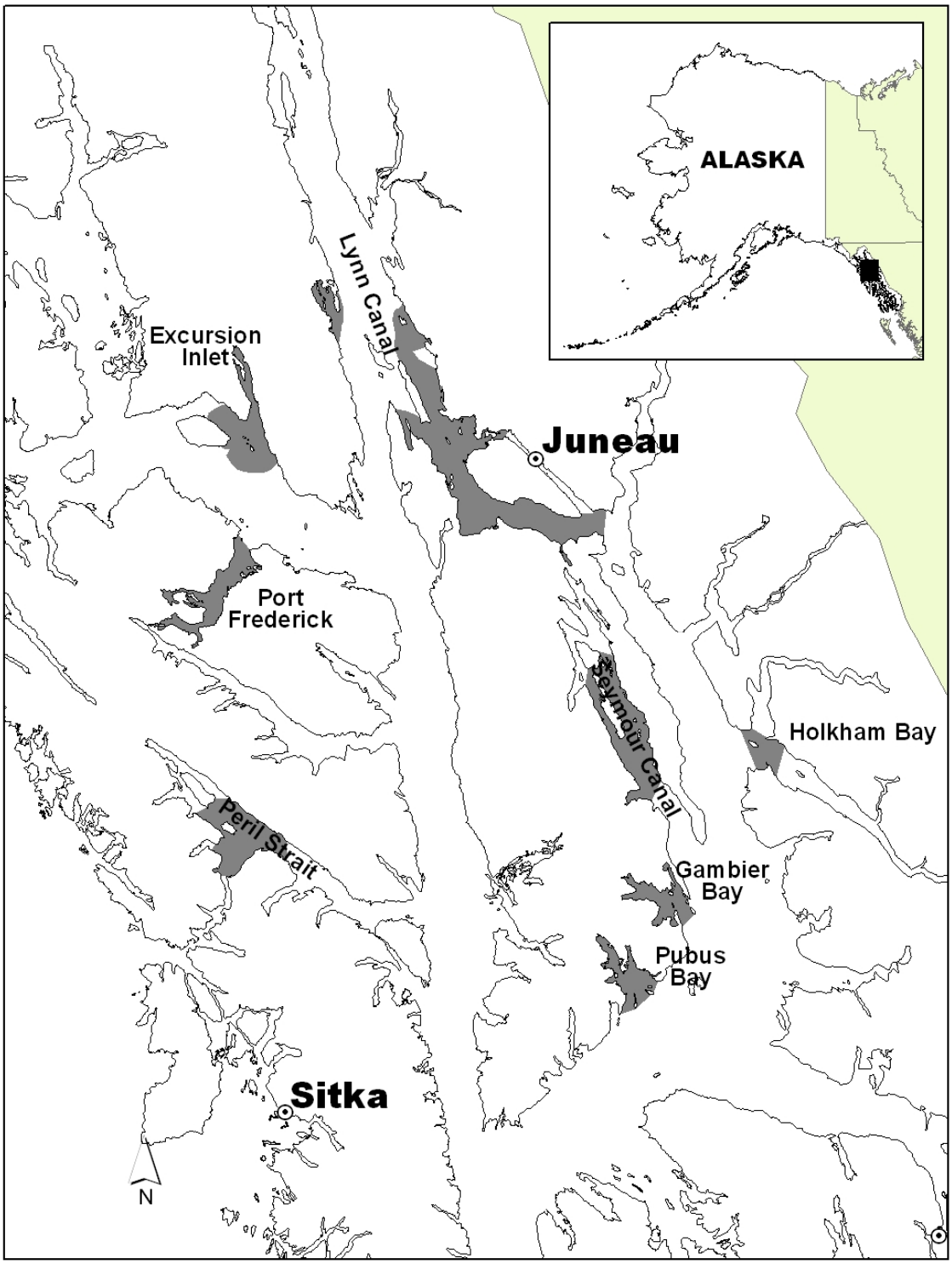

Figure 8.1–Map showing red king crab survey areas in Southeast Alaska.

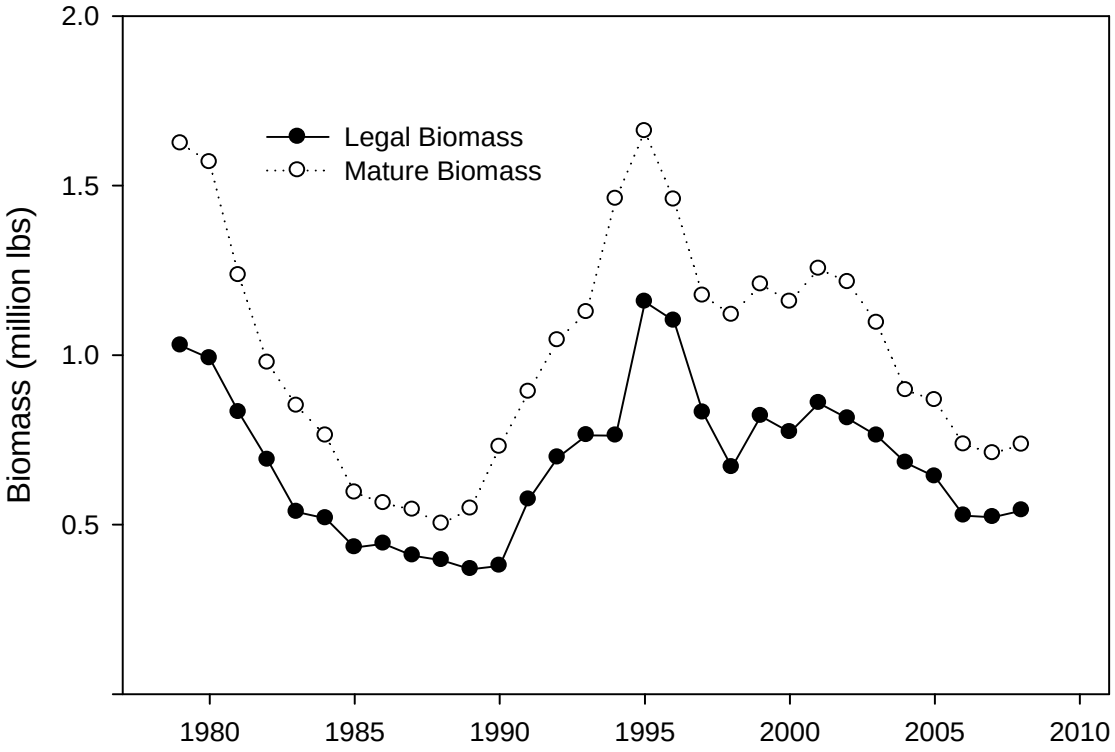

Figure 8.2–Total estimated biomass from surveyed areas only. Does not include Holkham Bay or "Other" areas. Reference lines are averages for the current (1993–2002), historic (1979–2007), and modern (1993–2007) time-periods.

CHAPTER 9: SOUTHEAST ALASKA GOLDEN KING CRAB FISHERY

INTRODUCTION

This report presents an overview of the commercial golden king crab fishery in Southeast Alaska (Registration Area A) with emphasis on the 2005/06 fishing season and an outlook for the 2008/09 season. Information is presented on historical harvest and effort, regulation development, and available dockside sampling data. Stock assessment surveys are not conducted for this fishery, but stock status is assessed using fishery logbook, dockside sampling, and onboard observer data.

LIFE HISTORY

Golden king crabs, *Lithodes aequispinus*, are distributed from the deeper waters, between 100 and 350 fathoms, of northern Southeast Alaska. Few golden king crabs are harvested from the southern portion of Southeast Alaska although their range extends to British Columbia (Butler and Hart 1962). Important golden king crab fishing grounds are located at the confluence of Icy Strait, Lynn Canal, and Chatham Strait; where Chatham Strait and the western portion of Frederick Sound meet; and where Stephens Passage and Frederick Sound meet (Figures 9.1 and 9.2)

The biology of golden king crabs is poorly understood, but they are thought to have a 24-month reproductive cycle (Otto and Cummiskey 1985), asynchronous timing of mating and molting (McBride et al. 1982; Otto 1984; Sloan 1985) and large yolk-rich eggs with low fecundity—about 30,000 (Jewett et al. 1985). Relatively long-lived, golden king crab males in Southeast Alaska become sexually mature at a size of approximately 118 mm CL (Otto 1984; Jewett et al. 1985; Koeneman and Buchanan 1985). Extrapolating the juvenile growth data of Paul and Paul forward (Paul and Paul 2001) this size is approximately 8 years of age. Golden king crab in Southeast Alaska enter the fishery at 178 mm CW, which corresponds to 150.6 mm CL (using the length-width relationship of $CL = 44.336 + .8875 * CW$ from (Koeneman and Buchanan 1985). Adult male molt increment is probably the only parameter that has been well-described for this species in Southeast Alaska, where it is estimated as 16.4 mm CL (Koeneman and Buchanan 1985). Using this molt increment, the legal size is between two and three molts from the mature size; since molt frequency is only slightly more than 12 months at this size this means that male golden king crabs in Southeast Alaska have in excess of two years to contribute to the reproductive potential of the population before they begin to be exploited at about 10.5 years of age. From the legal size of 156.6 mm CL to the maximum observed size in the fishery of 215 mm CL is 4 molts. Since the molt frequency begins to decline at sexual maturity, it is likely to take well in excess of 4 years to reach this maximum size. Using a molt frequency of 48 months, the maximum age would be approximately 18.5 years of age.

COMMERCIAL FISHERY

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 to include side-loading king crab pots (7-ft x 7-ft x 30-in) and top loading conical or pyramid-style pots. Because of challenging fishing conditions, fishers prefer heavier gear, and use different line and buoy train set-ups. Soak times are generally longer compared to red king or Tanner crab fishing.

Management of the commercial golden king crab fishery is based on a management plan and policies that have been reviewed and approved by the Alaska Board of Fisheries. Primary elements of the management plan are as follows:

- Seasons that open concurrently with the Tanner crab fishery
- The harvest of only male crabs with a minimum legal carapace width
- Gear limits of 100 pots per vessel
- Separate stock management (7 fishing areas)
- Guideline harvest ranges based on historic harvest levels by fishing area that consider stock dynamics (level of recruitment)

FISHERY DEVELOPMENT AND HISTORY

COMMERCIAL FISHERY HISTORY

ADF&G began collecting species composition information from the commercial king crab harvest in Southeast Alaska in 1970. For information on the harvest levels before this time, see the report about red and blue king crabs in Southeast Alaska. Reliable golden king crab harvest data has been available since the 1972/73 fishing season. From the 1972/73 through the 1979/80 seasons, harvest ranged from about 32,000 to almost 178,000 lbs by 20 or fewer permit holders (Table 9.1). Effort and harvest increased significantly after the 1979/80 fishing season.

During the 1980/81 through 1989/90 seasons, the average number of permits fished was 65 with a high of 124 (Table 9.1). This effort level resulted in an average harvest of 824,383 lbs. At current prices, this would be worth about $3.3 million. These relatively high harvests coincided with 4 years of good recruitment starting in 1983 and ending by 1988. Fishing effort peaked during the 1984/85 season when 124 permits fished for a harvest of 848,818 lbs. The harvest peaked 2 seasons later during the 1986/87 season when only 51 permits fished for a harvest of 1,016,011 lbs. Although effort and harvest declined through the 1995/96 season when only 16,000 lbs was harvested they have increased since then in response to increasing recruitment.

The development of the golden king crab fishery in Southeast Alaska occurred in 5 phases. Initial development (first phase) occurred from in 1960 through the 1971/72 fishing season. This development phase was characterized by fishermen determining which fishing methods, gear types, depth ranges, geographic areas, and other factors yielded adequate harvests of golden king crab. Also during this phase, processing facilities developed product forms and studied marketing potential. Prices and effort were generally low. Harvest fluctuated, probably because red king crab was the primary target species during this phase. The entire fishery was managed as a single stock. Basic regulations included establishing a quota, gear limits, size limits, and

other regulatory needs. These initial regulations were based on a short history of commercial exploitation, little scientific information, and experiences in other Alaska king crab fisheries. Many of these initial regulations changed dramatically as better information became available.

The second phase occurred during the 1972/73 through 1979/80 seasons and was characterized by relatively low effort levels but generally increasing harvest. Additional knowledge on gear requirements, fishing techniques, and geographic distribution of the species became available. Exvessel prices continued to be low. Due to concentrated effort and resulting harvest, it was necessary to reduce fishing time in District 10, and eventually to eliminate the year-round season.

The third phase began with the 1980/81 fishing season and ended with the 1984/85 fishing season. Effort gradually increased from 30 to 124 permits fished. A significant portion of the effort increase can be attributed to the evolving limited entry program for king and Tanner crabs in Southeast Alaska. Knowledge on gear design and fishing techniques developed to a point where it was sufficient to harvest the available stock throughout the range in Southeast Alaska. Fishing occurred throughout the year in some areas. This phase is important because it showed consistently increasing harvest that led to a liberalization of some regulations. Specifically, quotas used to manage the fishery were increased due to industry interactions with the Alaska Board of Fisheries and the gear limit was increased to 100 pots per vessel. Although fishing effort and resulting harvest were increasing, scientific information sufficient to properly manage stocks was not available.

The fourth phase began with the 1985/86 fishing season and extended through the 1995/96 fishing season. The peak harvest of slightly more than one million lbs occurred during the 1986/87 season and has declined since due to lack of recruitment and overexploitation. The fishery was separated into 5 management areas with guideline harvest ranges established in each area in an attempt to prevent further overexploitation in any single area or serial depletion of a number of fishing areas. The department has used emergency order authority to close the fishery early each season, when data indicated that substantial recruitment had not entered the fishery and stocks were not strong enough to support significant harvest. The effort and harvest declined for 7 seasons, to a low of 15,718 lbs in 1995/96.

The fifth, and current phase, began with the 1996/97 fishing season. Effort increased in response to improved prices with the development of a live market and harvest increased as a result of increases in the availability of recruit size crab. Anecdotal information from pot shrimp fishers in Frederick Sound and Clarence Strait during previous years indicated a very significant increase in the number of small golden king crab. By the 1996/97 season the small crabs had grown to legal size, surviving at relatively high levels. Recruitment has remained fairly high since 1996/97 leading a slow but consistent increase in seasonal harvest. A harvest history by month and by District and is provided below (Table 9.2 and Table 9.3).

REGULATION DEVELOPMENT

FISHING SEASONS

Regulation development in the golden king crab fishery has generally paralleled that of the red king and Tanner crab fisheries. The limited biological information on golden king crab life history timing in Southeast Alaska suggests that molting and mating may occur throughout the year, with a slight peak in molt timing in late spring and early summer. Soft-shelled crabs,

however, are frequently caught during the fishery starting in February. The presence of eggs in all stages of development throughout the year also supports the conclusion of no distinct molting or mating period. As a result, fishing seasons have been liberal. From 1961 through 1968 there was no closed season. Closures have been primarily established to provide fair start opportunities during red king crab and Tanner crab fisheries. Fishing has started on dates ranging from August 1 through mid-February. The fishery currently starts on the day with most favorable tides between February 10 and 17, concurrently with the start of the commercial Tanner crab fishery, and continues until the season is closed by emergency order due to resource conservation concerns or the attainment of established guideline harvest levels. In recent seasons, the fishery has closed between February and December, depending upon effort, harvests, harvest rates, and recruitment levels.

SEX AND SIZE LIMITS

From its inception, the golden king crab fishery has been restricted to harvesting only male crabs in order to protect the reproductively important females. From 1961 through 1968, a minimum legal size of 6 ½ inches in carapace width (CW) was in place. The minimum legal size was established to protect sexually mature male king crabs from harvest during the early years of sexual maturity. The minimum legal size was increased to 7 in or 178 mm CW in 1969. This corresponds to a carapace length of 151 mm (Koeneman and Buchanan 1985). This size limit was based on growth and size at maturity information collected from Gulf of Alaska red king crab stocks. The larger minimum size limit was implemented to increase reproductive potential by providing additional protection to mature male crab. In 1993, the BOF developed a regulation allowing the department to open a fishery on male golden king crabs 6 ½ in or greater in carapace width by emergency order in the Cape Ommaney and Clarence Strait areas.

A general standard of 'size at maturity plus two molts of growth' has been used to establish size limits for king crabs in Alaska (Otto 1984). This provides for several years of reproductive participation prior to commercial harvest. While size at maturity has not been directly determined for Southeastern Alaska, it has been variously estimated that golden king crab males mature at a minimum size of 114 mm carapace length (CL) in British Columbia (Jewett, Sloan et al. 1985), 110 mm CL in Prince William Sound (Paul and Paul 2001), and 130 mm CL in the Southern Bering Sea (Somerton and Otto 1986). Size at maturity decreases with latitude in the Bering Sea; this is thought to be a function of slower growth with colder water temperature. After two molts a 110 mm CL crab in Southeast Alaska would achieve a size of 151 mm CL or 178 mm CW and a 130 mm CL crab would achieve a size of 165 mm CL or 186 mm CW (Koeneman and Buchanan 1985). However some crabs of this size range will skip a molt. So if male golden king crabs in Southeast Alaska mature at 110 mm CL then the legal size complies will with the standard of 'size at maturity plus 2 molts' but if the size at maturity is 130 mm CL as in the Southern Bering Sea then the current 7-in (178 mm CW) size limit is slightly under the standard.

In 1990, a regulation was adopted allowing the harvest of any king crab infected with the parasitic barnacle, *Briarosaccus callosus*, regardless of the sex or size of the crab. Crabs infected with this parasite are incapable of reproduction and may experience reduced growth (Hawkes, Meyers et al. 1986; Hawkes, Meyers et al. 1986; Hawkes, Meyers et al. 1987). Removal of infected crabs may improve stock reproduction and growth.

QUOTAS AND GUIDELINE HARVEST RANGES

In 1970, a quota of 1.5 million lbs was provided for king crabs (all species combined). In 1971, separate red and golden king crab fisheries were recognized with the adoption of distinct seasons, and a quota of 600,000 lbs was established for the golden king crab fishery. This quota remained in regulation through 1977. After 1977, guideline harvest ranges (GHRs) replaced quotas. The first GHR of 50,000 to 200,000 lbs was established in 1978. The GHR was increased to 200,000 to 500,000 lbs in 1981 based on industry recommendations. This GHR remained in regulation through the 1986/87 fishing season. When stocks were strong and prices good, the GHRs were often exceeded from 1980 through 1998 because the department monitored the fishery primarily by fish tickets. Seasons were closed when the fish ticket data neared the GHR set preseason. Relying solely on fish ticket data, however, may not include crabs caught and delivered in the prior week or crabs caught and still held on the vessels. Also, any crabs caught in unpulled and fished crab pots are excluded. This combination of factors led to reduced ability to manage for a GHR inseason.

Due to the propensity of the fleet to concentrate fishing effort only in the most productive fishing grounds, and in order to prevent overexploitation on any single fishing ground, separate GHRs were established in 1987. Initially only 3 areas (Frederick Sound, Icy Strait, and Lower Chatham Strait) were assigned GHRs. The following five defined fishing areas and GHRs existed in regulation until 2005:

- Frederick Sound Area: 0 to 250,000 lbs
- Icy Strait Area: 0 to 200,000 lbs
- Chatham Strait Area: 0 to 150,000 lbs
- Cape Ommaney Area: 0 to 50,000 lbs
- Clarence Strait Area: 0 to 25,000 lbs

From the 2001/02 season through the 2004/05 season the original 5 management were managed as 7; Frederick Sound and Icy Strait areas were split and managed as two sub areas each with their own GHRs as follows:

- Frederick Sound Area (all waters of Section 11-D (Seymour Canal), all waters of District 10, all waters of District 9 east of a line from Kingsmill Point to Point Gardner, all waters of District 8 north of the latitude of Blaquiere Point, all waters of Section 6-A, and all waters of District 5 north of the latitude of Point Baker). GHR is 0 to 225,000 lbs.
- North Frederick Sound Sub area (all waters of Sections 11-B and 11-C). GHR is 0 to 25,000 lbs.
- Icy Strait Area (all waters of Sections 11-A, 13-C and 13-A in Peril Straits east of Point Kakul, and Districts 12 and 15). GHR is 0 to 110,000 lbs.
- West Icy Strait Sub area (all waters of District 14). GHR is 0 to 90,000 lbs.
- Chatham Strait Area: GHR is 0 to 150,000 lbs.
- Cape Ommaney Area: GHR is 0 to 50,000 lbs.
- Clarence Strait Area: GHR is 0 to 25,000 lbs.

At the 2005 Board of Fisheries meeting, the two sub areas that had been unofficially managed separately were officially added as distinct management areas. Secondly the areas formerly managed as the Icy Strait Area and West Icy Strait Sub area had their GHRs altered to more accurately represent historic harvests. Lastly, all seven areas were renamed. Since the 2005/06 season the area names (Figures 9.1 and 9.2) and associated GHRs are as follows:

- East Central Area: 0 to 225,000 lbs
- North Stephens Passage Area: 0 to 25,000 lbs
- Northern Area: 0 to 145,000 lbs
- Icy Strait Area: 0 to 55,000 lbs
- Mid Chatham Strait Area: 0 to 150,000 lbs
- Lower Chatham Strait Area: 0 to 50,000 lbs
- Southern Area 0 to 25,000 lbs

FISHING GEAR

From 1961 through 1967 there were no restrictions on the amount or type of gear that could be fished by a vessel participating in the king crab fishery. In 1968, a limit of 40 pots per vessel was established for Southeast Alaska waters. The maximum number of pots per vessel was increased to 60 in 1974 and to the current 100 in 1978.

There is no minimum mesh size requirement for king crab pots although four 6-¼ in escape rings or a panel of 9-in stretch mesh must be installed on every king crab pot. Regulations also require biodegradable twine or a timed galvanic release device in case the pot is lost. The rigid tunnel eye openings for standard side loading pots must be no less than five inches in any one dimension with tunnel eye opening perimeters that individually are more than 36 inches. There are restrictions on pot storage before and after fishing seasons and each pot must be independently buoyed and marked. Ring nets were eliminated as legal gear for king crab in 1990. Over the past ten years, as the fishery has intensified and season length has decreased, the popularity of cone pots in the fishery has increased. They are more easily moved between areas and for the now frequent shorter soak times are said to be fairly competitive with the more traditional square pots. A recent estimate of pot type fished in the 2007/08 fishery noted that 90% of the pots fished were cone-type pots.

LIMITED ENTRY

In January 1984 the Commercial Fisheries Entry Commission (CFEC) established a limited entry program for the king and Tanner crab pot fisheries in Southeast Alaska. The CFEC adopted a maximum effort level of 57 permits for the golden king crab fishery. Currently there are 60 possible permits eligible to participate in the golden king crab fishery. Some of these permits may not be eligible to fish once the adjudication process is completed.

MANAGEMENT CONCERNS

Fish tickets, logbooks and dockside sampling data provide a postseason analysis of stock condition, and a limited estimate of future stock condition. To date these three data sources have been used to adjust GHLs. For the last six seasons the GHLs have been set at three year

intervals. It is likely that future stock analysis will include more information on the female and sublegal components of the stocks since the resurgence of the onboard observer program. Catch rates in the fishery have been stable over the past three seasons. Catch rates improved in all areas in the 2007/08 season, resulting in the highest catch per landing in the history of the fishery (Table 9.1).

Currently the fishery is managed through twice weekly call-ins of logbook data. Compliance with the call-in requirement is good, but most vessels still rely on unreliable cellular communications to relay logbook data. The department is considering increasing the frequency of these call-ins to more accurately stay apprised of progress towards GHLs, catch rates, and the movement of the fleet. Secondly, with the 100 pots currently allowed in the fishery it is difficult to allow enough lead time for fishery area closures in consideration of tides and weather. This has often led to exceeding fishery area GHLs. Management of the fishery would improve if the pot limits were reduced. Lastly, there has been pressure recently to increase GHRs in light of healthy fisheries over the past nine seasons. With increased GHRs there will be more pressure brought to bear to increase GHLs to perhaps unsustainable levels. This fishery has already gone through a decade of high harvests in the 1980s, which were followed by seasons of much reduced harvest in the mid-1990's (Table 9.1). Despite current indications of a healthy fishery with consistent harvests, any future increase in GHRs should base its support only on stock status data.

STOCK ASSESSMENT

Stock status is determined and GHLs are set on a triennial basis, using fish ticket, logbook, dockside sampling, and onboard observer information. To date, GHLs have been determined by qualitative trend detection in these data but development of a more repeatable stock status determination matrix and associated decision rules is ongoing. The last stock status determination and GHL-setting occurred for the 2005/06 season and analyses are currently underway for a triennial update for the 2008/09 season.

LOGBOOK

Since the 1999/00 season, the department has required vessels participating in the golden king crab fishery to maintain a logbook of their catch throughout the season. Information in the logbooks includes; date, area description (including statistical area), number of pot lifts, number of legal crab (golden and blue), and type of gear used. Logbook information is used for monitoring harvest inseason to target GHLs, CPUE estimation, and depletion estimator modeling of harvest rate.

DOCKSIDE SAMPLING

Department personnel have sampled dockside deliveries of golden king crab, for carapace length, and shell condition at various ports throughout the region since 1970 (Table 9.54). Length frequency data are used to monitor recruitment trends and the relative contribution of various recruit-classes of crab. Department personnel began collecting average weight data dockside in 1975; this data provides additional insight into stock dynamics. In 1985, skipper interviews were initiated to provide an estimate of catch per unit of effort (CPUE).

OBSERVER PROGRAM

The department reinstated a program of deploying observer's onboard volunteer vessels to sample the catch of golden king crab, when funding became available beginning in the 2006/07 season. Vessels with observers were asked to close the escape rings, or 9-in stretch mesh panel, on 10 of their pots. This program provides data on the commercial catch rate of sublegal and female golden king crabs in the fishery and may provide a useful index of prerecruit abundance. During the 2006/07 season, 9 observer trips were conducted over 57 days in 5 management areas: East Central, North Stephens Passage, Mid Chatham Strait, Northern, and Icy Strait.

During the 2007/08 season, 7 observer trips were conducted over 48 days in 5 management areas: East Central, Mid Chatham Strait, Lower Chatham Strait, Northern, and Icy Strait.

RECENT SEASONS

2005/06 SEASON SUMMARY

The department announced new guideline harvest levels by fishing area prior to the 2005/06 season through a news release. Harvest was monitored through twice weekly call-ins of logbook data. At the 2005 Board of Fisheries meeting the sub areas previously named North Frederick and West Icy were officially made into distinct fishery areas and were renamed North Stephens Passage and Icy Strait respectively. Prior to the start of the 2005/06 season, these two new areas joined the newly named East Central, Northern, Mid Chatham, Lower Chatham and Southern areas to form the seven fishery areas in the Southeast golden king crab fishery. Another change made at the 2005 Board of Fisheries meeting was to change the start date of the Tanner and golden king crab fisheries to the most favorable Juneau tides between February 10 and February 17. The 2005/06 season started on February 15, 2006.

As GHLs in each of the seven fishery areas were achieved, fishing seasons were closed by area using emergency orders. The earliest closure was of the East Central and Northern areas on April 8. Icy Strait closed shortly after on April 10. The Mid Chatham Strait area closed October 16 and the North Stephens Passage area closed on October 26. The last areas to close were the Lower Chatham Strait and Southern areas on December 31. During the season, 37 permit holders fished and a total of 563,615 lbs of golden king crabs were caught from all fishing areas (Table 9.1). Most of the harvest occurred during February, March, and April (Table 9.2). East Central, Northern, Mid Chatham Strait, and Icy Strait produced the majority of the harvest (Tables 9.4–9.10).

Dockside sampling data from commercial landings indicated that an overall 40.2 percent of the crabs were recruit crabs and the average size was 169.6 mm in carapace length (Table 9.4). About 40.9 percent of the crabs landed were postrecruit 1s (Table 9.4).

2006/07 SEASON SUMMARY

The start date for the 2006/07 season was February 10, 2007. The department announced guideline harvest levels by fishing area for the 2006/07 season through a news release. Harvest was monitored through twice weekly call-ins of logbook data. Fishing seasons were closed by area using emergency orders. The earliest closure was the Icy Strait area on March 2, followed by the Northern area on March 15. The East Central area closed on April 8, and the North Stephens Passage area closed on May 19. Effort subsided after the start of summer salmon fisheries. The Mid Chatham area closed on September 25. The last areas to close were the Lower Chatham Strait

and Southern areas on December 5. During the season, 34 permit holders fished and a total of 580,101 lbs of golden king crab were caught from all fishing areas (Table 9.1). Most of the harvest occurred during February, March, and April (Table 9.2). East Central, Northern, Mid Chatham Strait, and Icy Strait produced the majority of the harvest (Tables 9.5–9.11).

Dockside sampling data from commercial landings indicated that 36.4 percent of the crabs were recruit crabs and the average size was 170.0 mm in carapace length (Table 9.4). About 40.1 percent of the crabs landed were post recruit 1s (Table 9.4).

2007/08 SEASON SUMMARY

The 2007/08 golden king crab fishery opened concurrent with the commercial Tanner crab fishery on February 14, 2008. The start date had originally been set for February 12, 2008 but the season was delayed for 48 hours due to adverse weather conditions. The department and the King and Tanner Task Force had previously jointly established criteria by which the golden king crab fishery could be delayed or extended due to bad weather. The criteria stipulated winds 40 knots or higher throughout the region in the 3-4 days preceding the start of the fishery. The department felt that these criteria had been met and that a delay to the start of the fishery was warranted. The department also consulted with National Oceanic and Atmospheric Administration (NOAA) meteorologists, Alaska Wildlife Troopers (AWT), the US Coast Guard (USCG), the King and Tanner task force (KTTF), and crab permit holders and processors on the decision to delay the start date of both fisheries. Harvest was monitored through twice weekly call-ins of logbook data. Catch rates were generally better than they had been the two previous seasons, and this led to earlier closures in some areas. Fishing seasons were closed by area using emergency orders. The earliest closure was Icy Strait on March 2, followed closely by the Northern Area on March 3 and the East Central Area on March 6. North Stephens Passage closed on March 21. Mid Chatham Strait closed on May 2. The last areas to close were Lower Chatham Strait on September 10 and Southern on September 28. During the season, 33 permit holders fished and a total of 638,582 lbs of golden king crabs were caught from all fishing areas (Table 9.1). Most of the harvest occurred during February and March (Table 9.2). East Central, Northern, Mid Chatham Strait, and Icy Strait produced the majority of the harvest (Tables 9.5–9.11).

Dockside sampling data from commercial landings indicated that 40.1 percent of the crabs were recruit crabs and the average size was 169.2 mm in carapace length. About 38.6 percent of the crabs landed were post recruit 1s (Table 9.4).

2008/09 OUTLOOK

Because this fishery lacks fishery-independent survey information, trends in stock abundance are sometimes difficult to detect. Annually varying GHLs with little justification can confuse rather than enhance detection of trends. For this reason, the department decided to begin applying GHLs for a three-year period prior to the start of the 2003/04 season, using the same GHLs as were used in the 2002/03 season. This strategy was discussed at the 2003 King and Tanner Crab Task Force meeting. This triennial strategy was used again prior to the start of the 2005/06 season. This strategy will likely be repeated again prior to the 2008/09 season. The newly reinstituted onboard observer program is beginning to supply data on the sublegal and female component of the stock. These data may in the future allow the department to adjust the GHLs annually.

CHAPTER 9—TABLES AND FIGURES

Table 9.1–Golden king crab commercial harvest, number of landings, number of permits, and pounds per landing in Registration Area A by season (October through September), 1972/73 to present.

Season	Total Harvest (lbs)	Number of Landings	Number of Permits	Pounds per Landing
1972/73	177,544	85	12	2,089
1973/74	71,783	38	11	1,889
1974/75	32,332	28	9	1,155
1975/76	68,842	33	7	2,086
1976/77	75,046	30	6	2,502
1977/78	83,407	54	14	1,545
1978/79	52,476	66	10	795
1979/80	167,823	82	20	2,047
1980/81	704,622	158	30	4,460
1981/82	653,042	255	54	2,561
1982/83	804,437	283	70	2,843
1983/84	973,100	307	89	3,170
1984/85	848,818	277	124	3,064
1985/86	698,249	211	61	3,309
1986/87	1,016,011	222	51	4,577
1987/88	949,205	235	56	4,039
1988/89	968,296	228	59	4,247
1989/90	632,872	260	63	2,434
1990/91	426,882	221	40	1,932
1991/92	229,242	154	33	1,489
1992/93	103,781	80	18	1,297
1993/94	30,318	51	13	594
1994/95	39,344	65	19	605
1995/96	15,845	40	11	396
1996/97	67,164	62	16	1,083
1997/98	244,484	87	18	2,810
1998/99	367,782	105	30	3,503
1999/00	560,427	143	46	3,919
2000/01	530,765	189	45	2,808
2001/02	609,510	211	45	2,889
2002/03	562,384	189	48	2,976
2003/04	557,277	145	45	3,843
2004/05	566,174	130	42	4,355
2005/06	563,615	151	37	3,733
2006/07	580,101	141	34	4,114
2007/08	638,582	108	33	5,913

Table 9.2–Commercial golden king crab harvest (in thousands of pounds) in Registration Area A by season (October through September) and month, 1972/73 to present.

Season	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
1972/73	27.6	36.5	18.6	18.1	22.1	0.0	7.6	*	*	*	*	13.9
1973/74	4.4	*	0.0	*	12.2	8.7	24.8	0.0	0.0	0.0	0.0	5.0
1974/75	3.7	8.1	*	*	0.0	*	*	0.0	0.0	0.0	0.0	*
1975/76	*	*	*	*	*	13.2	1.7	*	0.0	0.0	*	*
1976/77	*	9.1	*	*	*	9.1	7.5	*	0.0	0.0	0.0	*
1977/78	*	*	*	14.2	10.0	11.7	14.3	0.0	0.0	0.0	0.0	*
1978/79	8.7	4.4	8.7	9.7	5.9	5.9	3.7	*	0.0	0.0	*	3.3
1979/80	4.7	8.2	4.9	9.0	16.5	34.8	44.9	10.4	*	8.8	0.0	18.7
1980/81	36.2	43.2	18.2	79.3	178.2	171.0	87.7	*	*	*	*	14.0
1981/82	43.0	41.7	44.0	17.9	65.8	80.9	70.7	20.9	82.0	70.0	55.8	60.4
1982/83	174.1	77.5	58.7	0.0	115.8	168.3	15.0	46.8	27.5	36.6	59.8	24.1
1983/84	23.7	50.6	11.0	33.7	152.7	303.5	287.8	53.4	32.2	11.0	6.9	6.6
1984/85	166.9	250.8	19.9	*	117.8	172.5	22.3	19.6	24.9	*	19.1	11.9
1985/86	39.9	53.8	41.1	32.1	241.0	249.1	8.6	*	14.7	*	*	*
1986/87	147.5	80.2	46.3	326.2	136.5	70.5	67.9	39.3	39.0	*	27.8	17.3
1987/88	13.2	15.2	10.3	264.6	297.4	80.2	64.0	79.0	63.8	29.3	20.1	12.2
1988/89	*	*	*	*	220.9	329.2	122.6	101.1	63.0	44.3	41.8	35.0
1989/90	78.8	31.8	6.5	5.9	71.1	145.3	68.2	60.3	55.7	42.2	23.3	43.7
1990/91	51.3	14.0	8.4	*	38.1	89.3	67.9	60.0	52.0	14.3	*	11.6
1991/92	18.7	17.7	16.0	10.8	8.7	48.0	56.2	29.6	*	*	*	*
1992/93	*	*	*	*	2.9	28.2	22.3	13.9	8.6	*	*	0.0
1993/94	0.0	0.0	0.0	0.0	2.6	9.1	13.1	5.6	0.0	0.0	0.0	0.0
1994/95	0.0	0.0	0.0	0.0	6.3	14.5	15.2	3.4	0.0	0.0	0.0	0.0
1995/96	0.0	0.0	0.0	0.0	2.3	*	5.0	*	*	0.0	0.0	0.0
1996/97	0.0	0.0	0.0	0.0	6.5	26.0	12.6	13.4	8.8	0.0	0.0	0.0
1997/98	0.0	0.0	0.0	0.0	14.5	81.0	95.2	40.3	*	0.0	0.0	0.0
1998/99	0.0	0.0	0.0	0.0	67.4	226.0	57.5	8.7	8.1	0.0	0.0	0.0
1999/00	0.0	0.0	0.0	0.0	256.0	237.1	51.3	13.8	*	0.0	0.0	0.0
2000/01	0.0	0.0	0.0	0.0	201.2	156.3	120.7	36.1	12.7	*	0.0	0.0
2001/02	0.0	0.0	0.0	0.0	205.9	259.6	106.6	32.2	5.3	0.0	0.0	0.0
2002/03	0.0	0.0	0.0	0.0	264.4	243.6	25.0	16.0	10.1	*	0.0	*
2003/04	0.0	*	0.0	0.0	411.1	98.3	18.8	10.1	*	*	*	*
2004/05	0.0	0.0	0.0	0.0	356.0	147.1	20.1	18.3	10.5	*	*	*
2005/06	*	*	*	0.0	195.8	244.0	43.1	15.6	*	0.0	*	*
2006/07	*	*	0.0	0.0	259.0	227.2	37.6	22.1	*	0.0	0.0	*
2007/08	0.0	0.0	0.0	0.0	476.6	99.4	35.0	*	*	*	*	*

* Fewer than 3 permits were fished; information is confidential.

Table 9.3–Commercial golden king crab harvest (in thousands of pounds) in Registration Area A by district and season (October through September), 1972/73 to present.

Season	District															Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1972/73								*	1.5	128.6	19.0	*		*	*	177.5
1973/74										50.4	17.1			*	*	71.8
1974/75								*	17.2	14.4	*				*	32.3
1975/76								*		*		*	*	*	*	68.8
1976/77									*	*	*	*			*	75.0
1977/78								*	*	74.4	7.3	*	*		*	83.4
1978/79										39.5	6.7	1.3		*	*	52.5
1979/80								*		61.3	21.8	61.8		*	21.5	167.8
1980/81								1.2	*	204.6	29.8	169.7	*	236.9	55.9	704.6
1981/82								6.1	48.8	248.2	48.8	92.9	6.2	152.6	49.4	653.0
1982/83						13.9	*	*	109.3	186.5	44.6	228.7	12.9	151.7	39.3	804.4
1983/84						3.2	*	5.4	135.4	222.7	24.6	438.2	*	46.5	91.7	973.1
1984/85		*				*	14.1	*	192.3	375.9	34.5	153.3	2.5	52.8	13.7	848.8
1985/86	*	*				18.2	*	4.6	234.0	324.4	35.6	23.3	*	24.8	25.5	698.2
1986/87	*					10.1	*	*	609.3	298.8	43.8	*		1.5	16.2	1,016.0
1987/88						*	*	*	298.0	318.6	36.9	195.7		16.4	67.0	949.2
1988/89						*	*	10.3	413.6	338.8	9.1	140.5		37.5	12.0	968.3
1989/90	*					*		*	231.3	146.1	6.9	206.0		30.2	9.2	632.9
1990/91						*		*	213.3	83.2	18.5	82.9		19.4	8.7	426.9
1991/92						*	*	*	137.8	13.1	21.0	38.1		9.2	4.0	229.2
1992/93						*		*	74.7	6.7	11.2	*		*		103.8
1993/94									15.9	3.8	5.6	*		*		30.3
1994/95						*			22.3	*	9.0	2.8		*	*	39.3
1995/96									10.3		3.1	*		*		15.8
1996/97						*		*	*	3.9	15.7					67.2
1997/98						*	*	*	150.9	18.6	21.0	13.0		*	*	244.5
1998/99		*				*	*	*	190.8	57.8	13.1	37.4		52.1	*	367.8
1999/00						*	*	*	236.0	168.1	11.8	34.6		101.1		560.4
2000/01						*	*		246.4	114.6	11.6	104.5	*	41.2	2.9	530.8
2001/02						*	*		174.4	218.5	23.4	121.0	*	50.1	9.9	609.5
2002/03		*				*	*		156.8	153.5	35.6	165.8	*	45.1	*	562.4
2003/04	*	*				*	*		184.0	104.9	38.6	144.4	*	53.0	17.0	557.3
2004/05	*	*				*	*		214.9	108.4	48.5	102.7	*	62.8	9.3	556.2
2005/06	*	*				*	*		195.8	126.5	14.4	116.7	*	161.3	18.1	563.6
2006/07	*	*				*	*	*	156.7	183.4	33.5	138.1	*	71.1	8.0	580.1
2007/08	*	*				*	*		180.3	178.3	54.9	144.9	*	58.4	11.2	638.6

* Fewer than 3 permits were fished; information is confidential.

Table 9.4–Commercial golden king crab size frequency and shell condition data collected during dockside sampling in Registration Area A (Southeast Alaska) by season, 1969/1970 to present.

	Number of		Carapace Length (mm)		Percent Recruitment					
Season	Boats Sampled	Crabs Sampled	Average	Range	Recruits	%PR+1	%PR+2	%PR+3	%PR+4	% Skip Molts
1969/1970	4	72	173.5	154-202	30.6	44.4	22.2	2.8	0.0	12.5
1970/1971	18	1,138	174.6	142-214	25.6	49.0	20.7	4.0	0.7	12.2
1971/1972	21	1,705	175.1	150-211	19.9	47.6	27.4	5.1	0.1	23.5
1972/1973	11	1,040	174.7	149-208	24.3	50.2	21.6	3.9	0.1	13.0
1973/1974	8	604	173.0	146-210	26.8	39.4	28.8	4.7	0.3	28.8
1974/1975	2	201	169.5	151-204	40.3	47.8	10.0	2.0	0.0	11.9
1975/1976	9	837	172.2	145-208	35.1	43.2	18.5	3.1	0.1	10.7
1976/1977	2	153	168.8	152-205	46.4	39.2	12.4	2.0	0.0	16.3
1977/1978	7	678	169.9	149-201	23.0	36.5	31.4	9.1	0.0	59.2
1978/1979	6	498	171.0	145-201	35.4	39.6	23.2	1.8	0.0	20.6
1979/1980	6	478	169.8	145-203	37.7	35.6	19.0	7.6	0.2	32.8
1980/1981	20	1,354	171.6	149-206	31.7	45.8	18.6	3.9	0.0	20.2
1981/1982	6	533	176.4	148-214	24.1	43.8	23.9	7.4	1.0	18.2
1982/1983	18	1,567	169.8	146-204	35.7	43.1	17.7	3.5	0.1	24.0
1983/1984	10	703	169.6	150-196	40.9	41.3	15.2	2.6	0.0	15.8
1984/1985	12	1,368	165.3	148-196	58.3	31.9	9.0	0.7	0.0	16.0
1985/1986	17	1,765	166.6	148-198	51.1	40.4	7.7	0.8	0.0	12.4
1986/1987	43	4,609	168.0	143-210	42.2	41.4	13.1	3.3	0.0	22.5
1987/1988	63	5,408	173.4	148-214	20.9	48.1	24.4	6.7	0.0	26.4
1988/1989	76	7,120	172.7	142-210	25.8	46.5	23.7	4.0	0.0	24.0
1989/1990	86	7,880	176.7	146-211	16.5	45.9	31.4	6.2	0.1	22.4
1990/1991	80	7,108	175.4	147-214	23.0	40.5	28.3	8.0	0.2	24.7
1991/1992	61	5,157	172.8	146-213	31.2	38.2	22.1	8.2	0.4	26.9
1992/1993	18	1,454	171.8	148-211	35.0	40.9	18.6	5.5	0.1	20.5
1993/1994	13	1,080	171.1	133-206	30.7	52.7	14.2	2.4	0.0	16.2
1994/1995	13	1,037	171.1	137-208	34.0	43.6	16.9	5.4	0.2	22.1
1995/1996	15	351	172.2	146-208	36.1	40.5	19.7	3.8	0.0	12.7
1996/1997	19	1,585	165.9	143-206	54.6	33.8	10.2	1.4	0.0	16.0
1997/1998	31	2,390	166.1	147-212	37.9	45.3	15.1	1.7	0.0	34.6

–continued–

Table 9.4–Page 2 of 2.

	Number of		Carapace Length (mm)		Percent Recruitment					
Season	**Boats Sampled**	**Crabs Sampled**	**Average**	**Range**	**Recruits**	**%PR+1**	**%PR+2**	**%PR+3**	**%PR+4**	**% Skip Molts**
1998/1999	35	2,401	166.7	145-210	46.3	44.0	8.8	1.0	0.0	20.4
1999/2000	59	4,154	166.9	138-203	45.5	45.0	9.2	0.3	0.0	18.4
2000/2001	85	5,717	168.9	143-206	34.9	45.9	18.1	1.2	0.0	25.8
2001/2002	71	4,858	171.2	148-210	35.7	42.1	19.1	3.0	0.0	17.7
2002/2003	76	5,494	169.7	137-204	39.5	43.2	15.9	1.5	0.0	14.3
2003/2004	60	2,854	170.5	145-206	39.2	41.1	16.7	3.0	0.1	16.7
2004/2005	63	3,097	168.9	147-210	39.2	38.7	18.1	3.1	0.3	18.0
2005/2006	65	3,211	169.6	138-214	40.2	40.9	16.3	2.2	0.1	8.6
2006/2007	66	3,358	170.0	148-205	36.4	40.1	19.3	3.7	0.2	16.9
2007/2008	39	2,074	169.2	148-210	40.1	38.6	17.3	3.3	0.4	15.7

[a] Recruits = all new and soft shell crabs ≥ 151 mm and ≤ 167 mm carapace length.

[b] PR +1 = all new and soft shell crabs ≥ 168 mm and ≤ 184 mm, and old shell crabs ≥ 151 mm and ≤ 167 mm, carapace length.

[c] PR +2 = all new and soft shell crabs ≥ 185 mm and ≤ 201 mm, and old crabs ≥ 168 mm and ≤ 184 mm, and very old ≥ 151 mm and ≤ 167 mm, carapace length.

[d] PR +3 = all new and soft shell crabs ≥ 202 mm and all old ≥ 185 mm and ≤ 201 mm, and very old ≥ 168 mm and ≤ 184 mm, carapace length.

[e] PR +4 = all old and very old where carapace length ≥ 202 mm.

[f] Skip molts = all old and very old crab.

Table 9.5–Golden king crab commercial harvest, number of landings, number of permits, and pounds per landing in the East Central management area by season (October through September), 1971/72 to present.

Season	Total Harvest (lbs)	Number of		Pounds per Landing
		Landings	Permits	
1971/72	148,391	49	5	3,028
1972/73	130,544	61	7	2,140
1973/74	50,393	21	6	2,400
1974/75	28,296	22	8	1,286
1975/76	*	*	*	*
1976/77	*	*	*	*
1977/78	74,465	40	6	1,862
1978/79	41,042	39	6	1,052
1979/80	64,257	32	7	2,008
1980/81	213,212	48	10	4,442
1981/82	251,930	85	10	2,964
1982/83	211,995	61	21	3,475
1983/84	254,407	78	23	3,262
1984/85	397,881	92	42	4,325
1985/86	392,323	71	23	5,526
1986/87	449,202	61	22	7,364
1987/88	393,464	48	25	8,197
1988/89	491,786	83	35	5,925
1989/90	184,111	90	37	2,046
1990/91	143,597	97	19	1,480
1991/92	38,487	35	12	1,100
1992/93	16,248	19	7	855
1993/94	10,277	13	4	791
1994/95	9,656	12	4	805
1995/96	*	*	*	*
1996/97	12,994	23	9	565
1997/98	76,803	27	11	2,845
1998/99	160,072	29	17	5,520
1999/00	299,585	47	21	6,374
2000/01	196,810	61	25	3,226
2001/02	267,637	99	29	2,703
2002/03	226,905	72	23	3,151
2003/04	233,655	53	24	4,409
2004/05	259,178	52	25	4,984
2005/06	249,330	65	16	3,835
2006/07	243,675	57	18	4,275
2007/08	247,302	29	14	8,527

* Fewer than 3 permits were fished; information is confidential.

Table 9.6–Golden king crab commercial harvest, number of landings, number of permits, and pounds per landing in the North Stephens management area by season (October through September), 1971/72 to present.

Season	Total Harvest (pounds)	Number of		Pounds per Landing
		Landings	Permits	
1971/72	*	*	*	*
1972/73	*	*	*	*
1973/74	16,961	10	4	1,696
1974/75	*	*	*	*
1975/76				
1976/77	*	*	*	*
1977/78	7,349	10	6	735
1978/79	*	*	*	*
1979/80	17,748	21	6	845
1980/81	*	*	*	*
1981/82	41,994	28	7	1,500
1982/83	28,324	15	7	1,888
1983/84	16,674	14	10	1,191
1984/85	29,573	21	16	1,408
1985/86	26,432	28	11	944
1986/87	37,608	20	12	1,880
1987/88	16,280	19	11	857
1988/89	7,965	17	7	469
1989/90	5,450	18	6	303
1990/91	16,359	32	10	511
1991/92	20,377	32	11	637
1992/93	10,750	25	9	430
1993/94	5,548	30	8	185
1994/95	8,932	35	12	255
1995/96	2,960	23	10	129
1996/97	15,556	27	10	576
1997/98	19,888	16	6	1,243
1998/99	*	*	*	*
1999/00	11,678	18	11	649
2000/01	11,563	27	11	428
2001/02	23,335	22	10	1,061
2002/03	26,085	16	7	1,630
2003/04	19,619	26	10	755
2004/05	18,580	29	8	640
2005/06	16,366	12	2	1,364
2006/07	19,450	16	6	1216
2007/08	28,540	9	7	3171

* Fewer than 3 permits were fished; information is confidential.

Table 9.7–Golden king crab commercial harvest, number of landings, number of permits, and pounds per landing in the mid Chatham Strait management area by season (October through September), 1974/75 to present.

Season	Total Harvest (pounds)	Number of		Pounds per Landing
		Landings	Permits	
1974/75	*	*	*	*
1975/76				
1976/77				
1977/78				
1978/79				
1979/80				
1980/81				
1981/82	*	*	*	*
1982/83	89,870	22	9	4,085
1983/84	78,271	12	4	6,523
1984/85	112,704	24	11	4,696
1985/86	163,694	37	13	4,424
1986/87	412,789	86	16	4,800
1987/88	181,679	39	8	4,658
1988/89	224,211	42	7	5,338
1989/90	184,327	44	6	4,189
1990/91	111,348	42	5	2,651
1991/92	52,419	29	5	1,808
1992/93	*	*	*	*
1993/94	*	*	*	*
1994/95	*	*	*	*
1995/96	*	*	*	*
1996/97	*	*	*	*
1997/98	70,709	19	4	3,722
1998/99	73,934	17	5	4,349
1999/00	79,208	28	6	2,829
2000/01	126,579	34	10	3,723
2001/02	113,426	43	10	2,638
2002/03	78,284	47	15	1,666
2003/04	55,107	33	7	1,670
2004/05	61,841	20	4	3,092
2005/06	81,463	28	5	2,909
2006/07	78,047	31	5	2,518
2007/08	88,095	26	7	3,388

* Fewer than 3 permits were fished; information is confidential.

Table 9.8–Golden king crab commercial harvest, number of landings, number of permits, and pounds per landing in the Northern management area by season (October through September), 1971/72 season to present.

Season	Total Harvest (pounds)	Number of		Pounds per Landing
		Landings	Permits	
1971/72	*	*	*	*
1972/73	*	*	*	*
1973/74	*	*	*	*
1974/75	*	*	*	*
1975/76	*	*	*	*
1976/77	*	*	*	*
1977/78	*	*	*	*
1978/79	6,835	17	5	402
1979/80	85,568	28	11	3,056
1980/81	247,940	73	18	3,396
1981/82	154,018	78	27	1,975
1982/83	271,729	92	33	2,954
1983/84	537,907	139	43	3,870
1984/85	170,458	70	49	2,435
1985/86	57,730	30	16	1,924
1986/87	43,773	27	12	1,621
1987/88	271,422	101	30	2,687
1988/89	153,588	65	21	2,363
1989/90	213,443	88	21	2,425
1990/91	91,963	52	18	1,769
1991/92	42,542	33	10	1,289
1992/93	2,960	9	4	329
1993/94	*	*	*	*
1994/95	3,669	10	6	367
1995/96	*	*	*	*
1996/97				
1997/98	14,619	10	5	1,462
1998/99	40,208	18	6	2,234
1999/00	34,706	10	6	3,471
2000/01	108,058	53	18	2,039
2001/02	131,277	56	19	2,344
2002/03	178,938	60	22	2,982
2003/04	181,154	47	23	3,854
2004/05	142,449	36	20	3,957
2005/06	142,455	58	19	2,456
2006/07	152,145	38	15	4,004
2007/08	184,227	36	17	5,117

* Fewer than 3 permits were fished; information is confidential.

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Table 9.9–Golden king crab commercial harvest, number of landings, number of permits, and pounds per landing in the Icy Strait management area by season (October through September), 1971/72 season to present.

Season	Total Harvest (pounds)	Number of		Pounds per Landing
		Landings	Permits	
1971/72	*	*	*	*
1972/73	*	*	*	*
1973/74	*	*	*	*
1974/75				
1975/76	*	*	*	*
1976/77				
1977/78				
1978/79	*	*	*	*
1979/80	*	*	*	*
1980/81	236,890	26	10	9,111
1981/82	152,441	50	23	3,049
1982/83	151,715	72	32	2,107
1983/84	46,514	48	28	969
1984/85	52,811	34	24	1,553
1985/86	24,827	19	9	1,307
1986/87	1,455	10	7	146
1987/88	16,356	16	12	1,022
1988/89	37,496	21	7	1,786
1989/90	30,168	21	11	1,437
1990/91	19,350	18	9	1,075
1991/92	*	*	*	*
1992/93	*	*	*	*
1993/94	*	*	*	*
1994/95	*	*	*	*
1995/96	*	*	*	*
1996/97				
1997/98	*	*	*	*
1998/99	52,127	22	4	2,369
1999/00	101,111	21	14	4,815
2000/01	41,221	25	10	1,649
2001/02	50,080	25	8	2,003
2002/03	45,106	39	16	1,157
2003/04	53,049	22	12	2,411
2004/05	62,843	24	13	2,619
2005/06	61,206	35	13	1,749
2006/07	71,058	26	13	2,733
2007/08	58,325	26	14	2,243

* Fewer than 3 permits were fished; information is confidential.

Table 9.10–Golden king crab commercial harvest, number of landings, number of permits, and pounds per landing in the Lower Chatham management area by season (October through September), 1971/72 season to present.

Season	Total Harvest (pounds)	Number of		Pounds per Landing
		Landings	Permits	
1974/75	*	*	*	*
1975/76				
1976/77				
1977/78				
1978/79				
1979/80				
1980/81				
1981/82	*	*	*	*
1982/83	19,124	4	7	4,781
1983/84	30,756	4	9	7,689
1984/85	61,644	10	13	6,164
1985/86	*	*	*	*
1986/87	47,136	7	17	6,734
1987/88	54,264	7	21	7,752
1988/89	46,076	4	14	11,519
1989/90	8,208	2	4	4,104
1990/91	44,260	4	24	11,065
1991/92	61,007	5	31	12,201
1992/93	20,193	2	8	10,097
1993/94	*	*	*	*
1994/95				
1995/96				
1996/97				
1997/98	23,013	2	7	11,507
1998/99	14,694	2	7	7,347
1999/00	25,407	5	19	5,081
2000/01	37,560	4	14	9,390
2001/02	11,848	6	14	1,975
2002/03	5,630	2	9	2,815
2003/04	*	*	*	*
2004/05	*	*	*	*
2005/06	*	*	*	*
2006/07	*	*	*	*
2007/08	14,935	9	3	1,659

* Fewer than 3 permits were fished; information is confidential.

Table 9.11–Golden king crab commercial harvest, number of landings, number of permits, and pounds per landing in the Southern management area by season (October through September), 1982/83 season to present.

Season	Total Harvest (pounds)	Number of		Pounds per Landing
		Landings	Permits	
1982/83	15,960	12	4	1,330
1983/84	*	*	*	*
1984/85	21,594	22	5	982
1985/86	25,232	24	4	1,051
1986/87	*	*	*	*
1987/88	*	*	*	*
1988/89	*	*	*	*
1989/90	*	*	*	*
1990/91				
1991/92	*	*	*	*
1992/93	*	*	*	*
1993/94				
1994/95	*	*	*	*
1995/96	*	*	*	*
1996/97	*	*	*	*
1997/98	*	*	*	*
1998/99	*	*	*	*
1999/00	*	*	*	*
2000/01	*	*	*	*
2001/02	*	*	*	*
2002/03	*	*	*	*
2003/04	*	*	*	*
2004/05	*	*	*	*
2005/06	*	*	*	*
2006/07	*	*	*	*
2007/08	*	*	*	*

* Fewer than 3 permits were fished; information is confidential.

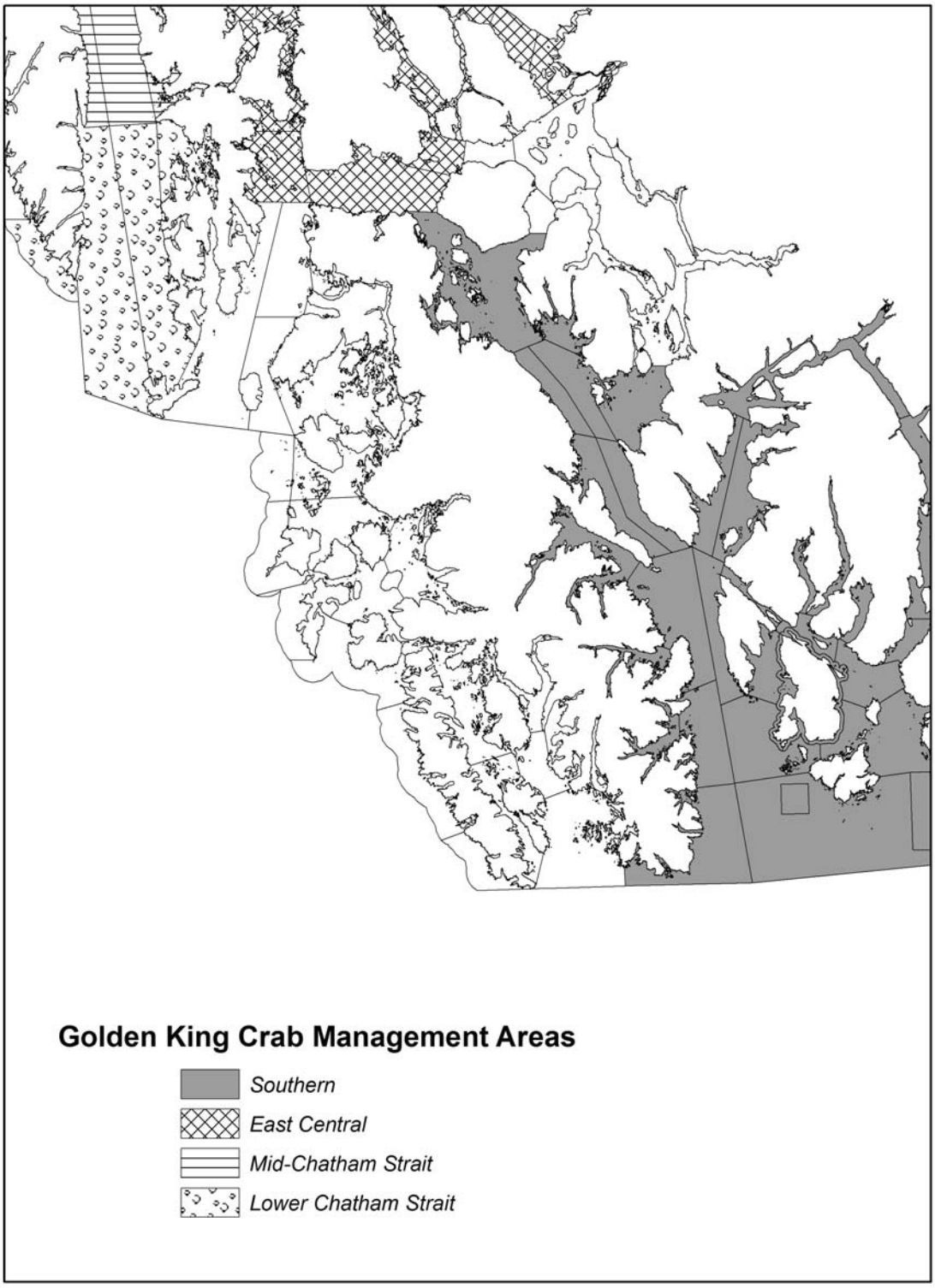

Figure 9.1–Map showing southern golden king crab (GKC) management area boundaries in Southeast Alaska, Registration Area A.

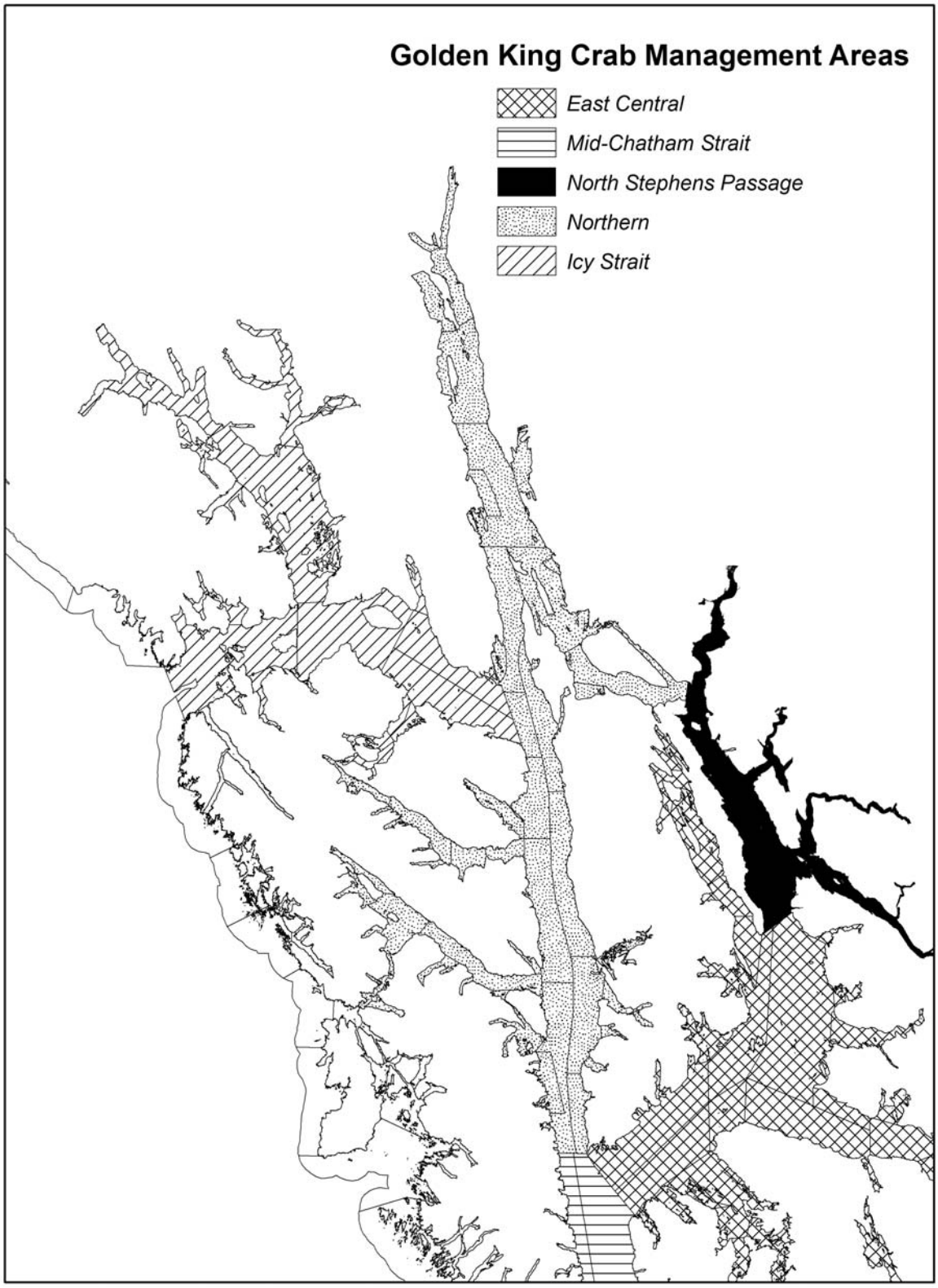

Figure 9.2–Map showing northern golden king crab (GKC) management area boundaries in Southeast Alaska, Registration Area A.

CHAPTER 10: YAKUTAT RED AND BLUE KING CRAB FISHERY

INTRODUCTION

This section describes the commercial red and blue king crab fisheries in the Yakutat area (Registration Area D). Red king crab, *Paralithodes camtschaticus*, and blue king crab, *P. platypus*, are harvested in small numbers during a season from October 24 through December 31. Harvest is limited by low abundance of both species in the Yakutat area.

Registration Area D is a non-exclusive area and the king crab fishery is not under license limitation. Depending on the circumstances in other crab fisheries in the state, the fishery attracts skiffs as well as an occasional Bering Sea-class crabber. Most of the participating vessels are small vessels locally based in Yakutat. Fishing effort is limited by severe winter weather in Yakutat Bay and its associated fjords.

The current red and blue king crab management approach is to avoid fishing during sensitive life history stages, to harvest only male crabs, and to require separate minimum legal carapace widths of 7 in for red king crab and 6.5 in for blue king crab.

FISHERY DEVELOPMENT AND HISTORY

Harvest and effort in this fishery has been relatively low and intermittent. Since 1972, there have been reported harvests during 21 seasons, with a maximum of 4 participating vessels, and resulting harvests have averaged only 3,000 pounds. The highest seasonal harvest on record totals less than 20,000 pounds during the 1980/81 season. Both red and blue king crabs have been landed. The harvest peak in the 1980s is of primarily red king crabs while more recent seasons harvests, peaking in the early 1990s have consisted of a larger proportion of blue king crabs.

REGULATION DEVELOPMENT

FISHING SEASONS

Starting in 1962, a legal season throughout the entire calendar year was established by regulation. This season was established as January 1 through December 31. In 1969 the season was shortened to August 15 to March 15. In 1970 the season length was tied into a maximum harvest of 1.5 million pounds combined from Registration Areas A and D. In 1971 the season was from September 1 through January 31 or until 400,000 pounds of red king crabs were taken in areas A and D combined. The season remained the same but the harvest ceiling was raised to 600,000 pounds in 1974. The season was shortened in 1981 to October 1 to January 31 and in 1983 to November 15 to January 24. In 1984 the season was changed to October 10 to January 24 and once more in 1985 to November 15 to January 24. Finally, the existing fishing season of October 24 to December 31 was established at the March 1999 meeting of the Alaska Board of Fisheries and became effective in August of 1999, in time for the 1999/00 season that opened on October 24, 1999.

SEX AND SIZE LIMITS

From its inception, this fishery has been restricted to harvesting only male crabs in order to protect the reproductively important female crabs. The minimum legal size was 6 1/2 inches in carapace width from 1960 to 1971, and changed to 7 inches beginning in 1972. The limit was lowered back to 6 1/2 inches in 1979 for blue king crab in response to information from other locations in the state, which indicated that growth and size at maturity were smaller for this species than for red or brown king crabs.

QUOTAS AND GUIDELINE HARVEST RANGES

In 1970, a quota of 1.5 million pounds was provided for king crabs, all species (red, blue, and golden) combined, for Southeast Alaska and Yakutat. The first red and blue king crab quota was set in 1971 at 400,000 pounds per season for Southeast Alaska and Yakutat, combined. This was increased to 600,000 pounds in 1974, and then incorporated into a Guideline Harvest Range (GHR) of 300,000 to 600,000 pounds in 1979. In 1982, the current GHL of 40,000 pounds was established specifically for Registration Area D. Harvest has never approached this level however.

FISHING GEAR

Starting in 1962, only pots could be used in the Yakutat king crab fishery. In 1969, pot storage requirements were developed. Buoys were required to display the license number of the vessel operating the gear. In 1971 a limit of 40 pots per vessel was established for Yakutat waters. The maximum number of pots per vessel that could be set in Yakutat Bay was increased to 60 in 1974, and to 100 in 1976. Rigid tunnels were required with a minimum size of 5 inches in one dimension and a total perimeter greater than 30 inches. In 1978 an escape panel, sewn with no greater than 120-cotton or linen thread, was required to minimize ghost fishing of lost gear. Buoy stickers for pots fished in Yakutat Bay were implemented in 1979 and pot storage was permitted in waters less than 25 fathoms, with doors open and bait removed.

In-water gear storage was not allowed from May 1 to August 31 in 1981 and 1982. Side-loading pots were prohibited in Yakutat waters beginning in January 1, 1983. Pot storage requirements were changed so that all gear needed to be removed from the water within 7 days of the closure of the 1983/84 season. Starting in 1985, pot gear could not be used for 14 days prior to the season opening date by crabbers intending to fish for red and blue king crabs. Pots could be stored all year in waters of Russell Fjord. In 1988 escape panels were required to be fastened with no greater than 30-count thread.

RECENT SEASONS

The Yakutat red and blue king crab season was open from October 24 to December 31 during each of the past eight seasons. The GHL was not achieved and it was not necessary to use emergency order authority to close any of the past three fishing seasons. The average harvest in the 1990s was approximately 3,000 pounds. There were some seasons when no harvests were reported (Table 10.1). The harvest since the 2000/01 season has ranged from 391 pounds in 2000/01 to 0 pounds for the past eight seasons. While 3 permit holders delivered crab during the 2000/01 season, no vessels have registered since. Stock assessment surveys are not conducted in the Yakutat area.

2008/09 SEASON OUTLOOK

Fishing opportunities are provided by regulation. Past fishing efforts and harvests have been limited, and resulted in harvests far below the GHL. Despite the fact that the season has remained open, there has been no effort or harvest since the 2000/01 season. It may be necessary to declare this fishery collapsed.

CHAPTER 10—TABLES

Table 10.1–Red and blue king crab harvest (combined), number of permits and number of landings by season in Registration Area D, 1972/73 to present.

Season	Harvest (pounds)	Permits	Landings
1972/73	*	1	*
1973/74		No Harvest	
1974/75	*	1	*
1975/76		No Harvest	
1976/77		No Harvest	
1977/78	*	2	*
1978/79	*	1	*
1979/80	13,915	4	17
1980/81	18,652	3	5
1981/82	*	2	*
1982/83	4,118	4	14
1983/84	1,248	4	4
1984/85		No Harvest	
1985/86	*	2	*
1986–1990		No Harvest	
1990/91	*	2	*
1991/92	1,216	3	*
1992/93	*	2	*
1993/94	7,378	3	8
1994/95	2,174	3	7
1995/96	4,276	3	18
1996/97	4,467	3	17
1997/98	4,208	3	13
1998/99	2,053	4	10
1999/00	*	1	*
2000/01	391	3	4
2001–2008		No Harvest	

* Fewer than 3 permits were fished; information is confidential.

CHAPTER 11: SOUTHEAST ALASKA PERSONAL USE RED AND BLUE KING CRAB FISHERY

INTRODUCTION

This chapter discusses the Southeast Alaska personal use king crab fishery, with special attention focused on the Section 11-A (Juneau Area) personal use fishery (Figure 11.1). Harvest and management actions in the commercial fishery are also discussed as they relate to the personal use fishery. This report provides background information on general regulation development, recent allocation guidelines, management tools available, recent management actions, and catch and effort statistics.

The personal use king crab fishery developed from the subsistence fishery. Current management of the Southeast Alaska stocks is accomplished using a mixture of commercial and personal use regulations (Table 11.1). The Section 11-A fishery is conducted according to a management and allocation plan adopted by the Alaska Board of Fisheries during the 1995/96 meeting cycle and modified in subsequent Board of Fisheries sessions. Commercial fish ticket data are available to determine commercial harvests. Personal use permits in Section 11-A, creel census data, sport fishery mail-out survey data, and phone survey results provide estimates of the non-commercial harvest of the king crab resource.

Initially, non-commercial king crab fishing by Alaska residents occurred under subsistence regulations. Regulation changes affecting the non-commercial fishery occurred in various portions of the commercial, subsistence, and personal use regulations. The changes involve urban and rural preference in subsistence regulations, development of the personal use regulations, closed waters in the commercial regulations, and development of the management and allocation plan in the commercial regulations. Prior to 1988, the urban versus rural definitions occurred in the subsistence regulations. In Southeast Alaska the cities of Juneau, Sitka, and Ketchikan were classified as urban areas with all other locations classified as rural areas. The Alaska Board of Fisheries subsequently provided for a personal use fishery in the urban areas to replace the lost subsistence opportunities. Personal use fishing under 5 AAC 77.001(f), means "the taking, attempting to take or possession of finfish, shellfish or aquatic plants by an individual for consumption as food or use as bait by that individual or his immediate family."

The Alaska Board of Fisheries has not recognized customary and traditional subsistence use of king crab resources in Southeast Alaska. Currently all non-commercial utilization occurs under personal use regulations. Given the limited king crab resource available, there has been no allocation for sport users.

In Section 11-A, present management provides for a split in the available harvest among more than 3,000 personal use households and approximately 30 commercial permit holders. Personal use harvests in Section 11-A peaked in 2003/04 with a harvest of 11,963 crabs; a similar harvest level of 10,799 crabs was achieved in 1993/94 but the long-term average is 6,601 crabs. Continued controversy between personal and commercial uses centers on the harvest allocation and fishing area.

FISHERY DEVELOPMENT AND HISTORY

SECTION 11-A

Management and Harvest Trends

There is no reliable data on personal use king crab harvests prior to the 1993 season. Since that time, personal use harvests have been estimated by returns from the statewide mail out sport fish survey (SWHS) and creel survey programs. In Section 11-A, harvests are also monitored by a personal use permit program and by periodic phone surveys. These data indicate that the personal use harvest in the Section 11-A area increased significantly from the late 1980s to 10,799 crabs in the 1993/94 season (Table 11.2). Restrictions in the number of crabs per person and pots per boat and resumption of commercial fishing in the area resulted in a decrease in personal use harvest to 5,540 crabs by the 1995/96 season. An allocation plan was implemented in 1996/97. Recent increases in personal use harvests to 11,963 crabs in the 2003/04 season are due to an increase in the abundance of legal red king crabs in the Juneau Area and commercial fishery closures and reallocation to personal use fishers. Documented personal use harvests in other areas of the region peaked at 5,295 crabs in the 1998/99 season, but the recent closure of the Peril Strait area has resulted in these harvests declining to about 15 percent of the peak harvest.

The region wide commercial fishery reopened in the 1993/94 season and was closed for the 1998/99, 2000/01, 2004/05, and 2006-2008 seasons. From 1993/94 through 2005/06, an average of 21 permits participated in the commercial fishery in Section 11-A and 75 total permits in the Southeast Region as a whole. There was a dramatic increase in effort and catch rates in the 2001/02 through 2003/04 Section 11-A fisheries, with 29 and 31, and 30 permits fishing in the Juneau area. The commercial fishery has accounted for about 36 percent of the total harvest in Section 11-A for years when the commercial fishery was opened. Region-wide the commercial fishery has accounted for about 76 percent of the total harvest in years when the commercial fishery was opened.

Personal Use Permits and Daily Bag Limits

Permit procedures and daily possession limits have been revised each season in an effort to more precisely achieve allocation objectives (Table 11.3). In the 1996/97 season, separate summer and winter individual permits were issued for the personal use king crab fishery. A daily bag and possession limit of three crabs per individual was implemented with no seasonal limit. In the 1997/98 season, household permits replaced individual permits to simplify the permitting and reporting process. The daily bag and possession limit was decreased to two crabs per person in order to keep the fishery open for the entire season. A combined summer/winter limit of 20 crabs per household permit, or 10 crabs per household when the household was a single person, was put in effect for the 1998/99 fishery. The purpose of the seasonal bag limit was to ensure that anyone wanting to fish in the winter season could do so without fear that the season would close early. This same type of permit has been used since the 1999/00 season.

No inseason adjustments to daily and seasonal limits were made in the 2004/05 season although allocation goals changed. The summer fishery opened with a daily limit of two crabs per person and a seasonal limit of 20 crabs per household. It was determined in early September that the available harvest for the commercial fishery did not meet the 200,000 lb regionwide threshold level and the fishery would not open [5 AAC 34.113]. The allowable commercial harvest for

Section 11-A was then reallocated to the personal use fishery. This allowed the summer personal use fishery to stay open for the entire season, closing on September 30, 2004. The winter fishery re-opened on October 1, 2004 with a daily limit of one crab per permit and a seasonal limit of 20 crabs per household (Table 11.3).

The total number of summer permits issued increased from the 1997 season to the 2004 season (Table 11.4). The increase from 1,266 in 1997 to 2,303 permits in 2004 equates to a 182 percent increase in permit numbers. The number of permits returned ranges from 66.1 percent of the issued permits in the 1997/98 season to 93.8 percent in the 2001/02 season and averaged 74 percent over the last 3 years. Total personal use harvest is estimated by expanding the reported catch rates on returned permits across half of the non-returned permits (assuming that the other half was permits with no harvest). The total estimated personal use harvests range from 2,541 crabs to 11,963 crabs (Table 11.4). The majority of crabs are harvested by pot gear in the summer season, with 5 to 19 percent of the winter harvest being taken by divers and up to 20 percent with rings.

Guideline Harvest Level, Harvest, and Gear

For the Juneau area, the total allowable harvest has ranged from 4,299 crabs in the 2006/07 season to nearly 18,000 crabs in 2001/02 (Table 11.5). The ability to accurately attain the allocated harvest varies and generally requires intensive management oversight. Personal use harvests have ranged from 87 percent to 174 percent of the specified allocation. The total harvest in the summer fishery has been within two percent of the total 1996/97 through 2007/08 allocation. The total winter personal use harvest for 1996/97 through 2006/07 seasons has exceeded its allocation by less than one percent.

Management Considerations

Management of both the personal use and commercial fisheries in Section 11-A requires significant staff effort and resources to achieve target harvest levels. This is due to a number of factors, including increasing interest in personal use fishing, increases in commercial effort and intensity in Section 11-A, and allocation guidelines that are difficult to achieve. For example, management of the 2003/04 fisheries required 1 phone survey in the summer and another 3 in the winter to monitor harvests in the personal use fishery, staff time to monitor commercial catch rate and estimate cumulative catch from the daily call-in program for boats in Section 11-A, two aerial surveys to monitor the distribution of effort, and intensive oversight of fish ticket data and tender reports. The development of computer generated permits and e-mail surveys in the Section 11-A fishery has reduced staff workload for this fishery in the last three seasons.

Personal use effort is variable and depends on weather and catch rates. The mild weather in October and November of 1997 resulted in a large amount of effort in the beginning of the winter fishery and an early closure on December 29 instead of March 31. Because permits are required to be returned at the end of the season with catch and effort information completed, these data are not available to assist with inseason management. In order to obtain inseason catch estimates and determine if the harvest is approaching the allocation, the department has used three methods of estimation: dockside creel surveys conducted by the sport fish division for the summer fishery only, random phone surveys and most recently email surveys. All types of surveys provide inseason information for use in emergency order closures.

The reallocation of commercial harvest to the personal use fisheries when the regionwide commercial fishery is not opened significantly increases the complexity of attaining allocation goals. The red king crab survey is conducted from mid-June through July. These data are entered into a database, reviewed and checked for errors, and then input into a catch-survey analysis to estimate the abundance of different segments of the population in nine separate areas. Overall stock condition, catch history, and a number of other factors may lead to adjustments to target harvests from these areas. The determination of the allowable harvest for the commercial fishery is usually made in late August or early September. Because over 50 percent of the summer personal use harvest occurs in July and over 90 percent by the end of August, meaningful adjustments in either possession or gear limits to harvest additional crabs are not possible. However, management of the winter personal use fishery to harvest the relatively small number of additional crabs is relatively straightforward.

In 1994/95, 31 commercial boats harvested almost 6,089 crabs in 17 days. Effort decreased to only 6 boats harvesting 673 crabs in 4 days by the following year. This increased to 16 boats harvesting 11,173 crabs in 9 days in 1999/00. This season was characterized by a number of boats retaining their crabs onboard until a closure was announced and unobserved increases in effort and harvest rates in the last days of the fishery. This resulted in harvests totaling over two times the target GHL for Section 11-A. In the 2003/04 commercial fishery, a total of 30 boats aggressively fished for the GHL of 6,462 crabs. Management actions including multiple aerial surveys, and daily call-in of logbook data, resulted in accurate projection of a closure date and a commercial harvest that was only 536 crabs over the GHL in a four-day fishery. During the 2005/06 season 24 permits fished for 13 days and harvested 98.6 of the total allocation.

OTHER AREAS

Management and Harvest Trends

Personal use harvests in waters outside of Section 11-A are poorly documented and almost certainly underestimated. Currently, the only source of information is the Sport Fish Division statewide harvest survey. This survey is sent annually to a randomly selected sample of 14,000 residents and non-residents who purchase fishing licenses. A comparison of the SWHS with the Section 11-A personal use permit suggests that it underestimates the annual personal use harvest by almost 200% (Table 11.6). Assuming that this holds true for other areas of Southeast Alaska, the average annual king crab SWHS personal use harvest estimate of 6,216 crabs can be expanded to 12,867 crabs which, using an average weight of 7.5 lbs, results in an average region-wide annual personal use harvest of approximately 96,503 lbs of red, blue, and golden king crab.

Over the years, various personal use closures have been implemented in areas where the survey indicates that stock status is poor. These are always associated with simultaneous commercial closures of the area (Table 11.1). The first such personal use closures were of Pybus Bay and Peril Strait areas in October of 1998. Pybus Bay re-opened in October of 1999, but Peril Strait remained closed. Subsequently in September of 2000 both Pybus Bay and Seymour Canal areas closed, and Peril Strait remained closed. In 2001 Pybus Bay, Seymour canal, and Deadman Reach-Ushk Bay re-opened on September 6, 2001 while Rodman Bay remained closed. In 2002 Rodman Bay remained closed. In September of 2003 Peril Strait and Port Frederick closed to personal use fishing. In September of 2004 Seymour Canal also closed to personal use king crab fishing and Peril Strait and Port Frederick remained closed. Port Frederick and Seymour Canal have remained closed due to poor stock status ever since. Peril Strait re-opened for the winter

seasons in 2005/06 and 2006/07. Due to poor stock status in all surveyed areas, the personal use fishery was closed regionwide on October 1, 2007 and has remained closed.

In some areas, such as Deadman Reach of Peril Strait, personal use harvests may exceed commercial harvests and are partially responsible for declines in abundance. A better understanding the impacts of personal use fisheries on areas outside of the Juneau area is pivotal for more responsive management of these stocks.

REGULATION DEVELOPMENT

The regulatory structure and allocation guidelines used in the management of the commercial and personal use fisheries in Southeast Alaska have significantly increased in complexity in recent years. This has occurred concurrently with increasingly detailed management of these fisheries by time and area (Table 11.1). Prior to 1970, there were no time or area closures and regulations were limited to size, sex, and gear restrictions. From 1970 through the 1984/85 seasons, the number of days opened to commercial harvests was successively reduced and some of the waters near Juneau were closed to the commercial fishery. Personal use harvests were limited to 6 crabs per person per day in 1971 and personal use gear was to be clearly marked.

The commercial fishery was closed from the 1985/86 through 1992/93 seasons due to low regionwide stock abundance. A moratorium was imposed on new permits beginning in 1985/86 and commercial regulations were altered to reflect a more conservative approach to management of the commercial fishery. Restrictive conservation measures were discussed, but not implemented in the subsistence or personal use fisheries. However, personal use gear was limited to 5 pots per person or 10 pots per vessel in 1985/86. When survey data indicated that stocks were once again strong enough to support commercial fishing, the allocation controversy intensified. In 1993 additional portions of Section 11-A were closed to commercial fishing by emergency order by direction of Commissioner Rosier. In 1995, the portions of Section 11-A initially closed by emergency order were added into the commercial fishing regulations. However, the controversy over stock strength and allocation of Juneau area king crab stocks persisted, even as stocks increased to high levels. Prior to the 1995/96 season, bag limits were reduced from six to three crab per person in Sections 15-C and 12-B which are located in the southern part of Lynn Canal just outside of the 11-A permit area. This reduction in bag limits was expanded to include Berners Bay, Section 15-B, in 2005/06.

The Alaska Board of Fisheries initiated a management and allocation plan for red king crab in Section 11-A, beginning with the 1996/97 season. Commercial Fishing Regulation 5 AAC 34.111 allocated 45 percent of the available harvest to the commercial fishery with a season from November 1 until closed by emergency order, 46 percent to the summer personal use fishery from July 1 to September 30, and 9 percent to the winter personal use fishery from October 1 to March 31. One of the reasons the board separated personal use allocation into summer and winter seasons was to provide crabs for dive fishers who traditionally harvest during the winter when crabs migrate into shallow waters. This allocation plan was revised in March 1999 to an allotment of 40 percent, 50 percent, and 10 percent of the available harvest to the commercial, summer personal use, and winter personal use fisheries respectively. The entire commercial fishery share was to be reallocated to the personal use fishery if the regionwide commercial fishery was not opened (5 AAC 34.111 Section 11-A Red and Blue King Crab Management and Allocation Plan (b)(4)).

All of Southeast Alaska has been closed by the department to both commercial and personal use harvests since the fall of 2007 due to low abundance of both legal and non-legal segments of the red king crab stocks. The red king crab stock assessment survey provides information on the abundance and overall condition of all segments of the red king crab populations in nine principal areas of harvests.

STOCK ASSESSMENT

The annual Guideline Harvest Level (GHL) for Section 11-A is based on estimates of red king crab abundance derived from the annual stock assessment survey which is described above in Chapter 8. A total of over 2,500 survey pots have been set in the Juneau area (including Barlow Cove and Eagle River areas) since 1979. Currently, approximately 150 pots are set each year to measure the relative abundance of both legal and non-legal red king crab. An estimate of the total abundance of legal and mature male crabs is obtained from the survey catch data. The target harvest rate for red king crab in Southeast Alaska is set as 20 percent of the mature abundance (which is approximately 30 percent of the legal abundance) (Clark 2003). This quantity of crabs is then allocated to the commercial, summer personal use, and winter personal use fisheries based on the regulatory allocation guidelines established by the Alaska Board of Fisheries [Title 5 Alaska Administrative Code 34.111].

Because red king crab personal use fisheries in other areas of Southeast Alaska are passively managed by size, sex, season and a bag limit, GHLs are not established. Instead, the estimated personal use harvest from the previous season, from the statewide harvest survey, is subtracted from the total allowable harvest estimated by catch survey modeling to obtain the commercial allowable harvest (Clark 2003).

Information on red king crab stock status by management area is provided above and trends in legal and mature stock abundance of red king crab in Section 11-A below (Figure 11.2).

RECENT SEASONS

The personal use red and blue king crab fishery has been closed in all areas of Southeast Alaska since October 1, 2007. The fishery may re-open once the results from the 2009 summer stock assessment survey are complete.

CHAPTER 11—TABLES AND FIGURES

Table 11.1–Abbreviated history of regulatory changes and management actions concerning time and area closures in the commercial and personal use red and blue king crab fisheries in Section 11-A and other Southeast Alaska areas.

Season	Personal Use in 11-A	Personal Use in Other Southeast Areas	Commercial fishery in 11-A	Commercial fishery in other Southeast Areas
Before 1970	No closed times and areas		No closed times and areas	
1970 – 1979/1980	Seasonal closure first established in 1974/75. Seasons ranged from July 1 - January 31 to July 1 to March 31 (1979/1980). Possession limit of 6 crabs per person (1979/1980) for all SE Alaska.		Seasons ranged from August 1 to June 30 (1969 season) to September 1 to December 18 (1979/1980 season). Some areas were closed early. Gastineau Channel closed in 1978/79.	
1980/1981 – 1984/1985	Season established as July 1 - March 31. Possession limit of 6 crabs per person.		Seasons gradually reduced from 114 days (September 1 to December 24 1980) to 7 days (October 10 to October 17 1984). Auke Bay and Gastineau Channel remain closed.	
1985/1986 – 1992/1993	Season remained July 1 - March 31. Possession limit remained 6 crabs per person. Gear limited to 5 pots per person and 10 pots per vessel (1985/1986).		No traditional commercial fishery.	
1993/1994	Waters deeper than 100 feet closed from Oct. 4 - March 31.	No change from 1992/1993	Opened Nov. 1 - Nov. 9 1993. Juneau area[a] closed to all commercial fishing.	Opened Nov. 1 - Nov. 9 and Nov. 27 - Dec. 3 1993. Pybus Bay and Port Frederick closed
1994/1995	Personal use closure in Juneau area[a] from Oct. 25 to end of season.	No change from 1993/1994	Opened Nov. 1 - Nov. 18 1994. Juneau area[a] closed.	Opened Nov. 1 - Nov. 18 1994. No area closures
1995/1996	Possession limited to 3 crabs per person and 4 pots per person and vessel.	Possession limited to 3 crabs per person and 4 pots per person and vessel in areas 12-B and 15-C.	Opened Nov. 1 - Nov. 5, 1995. Juneau area[a] closed.	Opened Nov. 1 - Nov. 17 1995. No area closures.

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Table 11.1–Page 2 of 4.

Season	Personal Use in 11-A	Personal Use in Other Southeast Areas	Commercial fishery in 11-A	Commercial fishery in other Southeast Areas
1996/1997	Allocation guidelines established. Personal use permit required. Winter fishery closed March 7, 1997.	No change from 1995/1996	Allocation guidelines established. Commercial fishery opened Nov. 1 - Nov. 11, 1996. Juneau area[a] closed.	Opened Nov. 1 - Nov. 20 1996. No area closures.
1997/1998	Possession limited to 2 crabs per person. Summer fishery closed August 16 and winter fishery closed December 29. Household permit required.	No change from 1996/1997	Opened Nov. 1 - Nov. 12 1997. Juneau area[a] closed.	Opened Nov. 1 - Nov. 15 1997. Fishing in Pybus Bay and Gambier Bay limited to 4 days and 8 days respectively.
1998/1999	2 crabs per person limit. Seasonal limit of 10/20 crabs per individual/ household.	Pybus Bay and Peril Strait areas closed October 1 1998.	No commercial fishery.	No commercial fishery
1999/2000	2 crabs per person limit. Seasonal limit of 10/20 crabs per individual/ household. Winter fishery closed February 29, 2000.	Pybus Bay reopened October 19, 1999. Peril Strait areas remained closed.	Opened Nov. 1 - Nov. 10 1999. Juneau area[a] closed.	Opened Nov. 1 - Nov. 13 1999. Fishing in Pybus Bay and Gambier Bay limited to 4 days. Peril Strait Area closed
2000/2001	Harvest reallocation from commercial to personal use resulted in final summer limits of 3 crabs per person and 20/40 crabs per individual/household on August 4. Limits decreased to 2 crabs per person and 10/20 Crabs per individual/household for winter Fishery.	Pybus Bay and Seymour Canal closed September 22, 2000. Peril Strait area remained closed.	No commercial fishery.	No commercial fishery

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Table 11.1–Page 3 of 4.

Season	Personal Use in 11-A	Personal Use in Other Southeast Areas	Commercial fishery in 11-A	Commercial fishery in other Southeast Areas
2001/2002	2 crab per person limit. Seasonal limit of 10/20 crabs per individual/household. Winter fishery closed March 31, 2002.	Pybus Bay, Seymour Canal, and Deadman Reach-Ushk Bay re-opened September 6, 2001, Rodman Bay remained closed.	Opened Nov. 1 – Nov 6, 2001. Juneau area[a] closed.	Opened Nov. 1 – Nov. 12 2001 with Seymour and Peril Strait excluding Rodman Bay closing Nov. 7, Rodman Bay closed entire season.
2002/2003	Summer fishery 2 crab per person limit, Seasonal limit of 20 crabs per household. Closed August 30, 2002. Winter fishery 1 crab per permit limit, seasonal limit of 20 crabs per household. Closed March 2, 2003.	Rodman Bay remained closed.	Opened Nov. 1 - Nov. 4, 2002. Juneau area[a] closed.	Opened Nov. 1 - Nov. 8, 2002 with Seymour Canal and Peril Strait closing Nov. 7, Rodman Bay closed entire season.
2003/2004	Summer fishery 2 crab per person limit, seasonal limit of 20 crabs per household. Closed September 7, 2003. Winter fishery 1 crab per permit limit, season limit of 20 crabs per household. Closed March 11, 2004.	Rodman closure expanded to all of Peril Strait and Port Frederick closed on September 14, 2003.	Opened Nov. 1 - Nov. 4 2003. Juneau area[a] closed.	Opened Nov. 1 – Nov 5 2003. Peril Strait and Port Frederick closed for entire season. Seymour Canal closed Nov. 4, all other areas closed Nov. 5, 2003.
2004/2005	Summer fishery 2 crab per person limit, seasonal limit of 20 crabs per household. Harvest reallocation of the commercial quota to personal use results in no early closure. Winter fishery, 1 crab per permit, 20 crabs per household. Closed March 31, 2005.	Peril Strait and Port Frederick remained closed. Seymour Canal closed Sept. 12, 2004	No commercial fishery	No commercial fishery

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Table 11.1–Page 4 of 4.

Season	Personal Use in 11-A	Personal Use in Other Southeast Areas	Commercial fishery in 11-A	Commercial fishery in other Southeast Areas
2005/2006	Summer fishery 2 crab per person limit, seasonal limit of 20 crabs per household. Winter fishery, 1 crab per permit, 20 crabs per household. Closed March 31, 2006	Peril Strait, Port Frederick, and Seymour Canal remained closed. Peril Strait re-opened Nov. 1, 2005 – March 31, 2006. Bag limits reduced from 6 to 3 crab in Berners Bay, Aug. 14, 2005.	Opened Nov. 1 – Nov 13, 2005. Juneau area[a] closed.	Opened Nov. 1 – Nov. 4, 2005. Port Frederick and Seymour Canal closed for the entire season.
2006/2007	Summer fishery 2 crab per person limit, seasonal limit of 20 crabs per household. Closed Sept. 17, 2006. Winter fishery, 1 crab per permit, 6 crabs per household. Closed March 31, 2007.	Peril Strait, Port Frederick, and Seymour Canal remained closed. Peril Strait re-opened Nov. 1, 2006 – March 31, 2007.	No commercial fishery	No commercial fishery
2007/2008	Summer fishery 2 crab per person limit, seasonal limit of 10 crabs per household. Closed July 14, 2007. No winter fishery.	Peril Strait, Port Frederick, and Seymour Canal remained closed. All other areas closed until further notice Oct. 1, 2007.	No commercial fishery	No commercial fishery
2008/2009	Fishery closed until further notice.	Fishery closed until further notice.	No commercial fishery	No commercial fishery

[a] Juneau Area defined as Gastineau Channel, Barlow Cove, and waters enclosed by a line from Outer Point on Douglas Island across Stephens Passage to the mouth of Bear Creek on Admiralty Island extending north to Symonds Point and across Saginaw Channel to the Southeast tip of Shelter Island and extending north to south tip of Halibut Cove, across Favorite Channel to south entrance of Amalga Harbor (See Figure 11.1).

Table 11.2–Estimated number of red and blue king crab caught in the personal use and commercial fisheries and number of commercial permits fished in Section 11-A and elsewhere in Southeast Alaska, Registration Area A.

Season	Personal use Harvest in Section 11-A	Personal use Harvest in Other Southeast Areas	Commercial Fishery Harvest in Section 11-A	Number of Commercial Permits Fished in Section 11-A	Commercial Fishery Harvest in Other Southeast Areas	Total number of Commercial Permits Fished in Southeast Alaska
1988/89	665	1,130	0	0	0	0
1989/90	2,228	1,130	0	0	0	0
1990/91	2,361	1,130	0	0	0	0
1991/92	2,972	1,130	0	0	0	0
1992/93	6,835	1,625	0	0	0	0
1993/94	10,799	2,806	4,153	19	23,314	83
1994/95	7,139	2,855	6,089	31	29,558	84
1995/96	5,540	3,253	673	6	50,988	73
1996/97	6,989	2,209	2,842	11	55,302	79
1997/98	6,390	3,208	2,830	12	36,764	76
1998/99	6,967	5,295	0	0	0	0
1999/00	8,994	862	11,173	16	27,061	77
2000/01	9,455	737	0	0	0	0
2001/02	9,611	2,970	8,525	29	31,022	76
2002/03	9,076	521	5,165	31	24,905	75
2003/04	11,963	1,140	6,987	30	18,424	67
2004/05	10,178	476	0	0	0	0
2005/06	10,406	829	7,079	24	19,296	58
2006/07	7,518	1,051	0	0	0	0
2007/08	2,541	349	0	0	0	0
2008/09	0	0	0	0	0	0

Table 11.3–Openings, closures, and fishery regulations by season for the red and blue king crab personal use fishery in Section 11-A from 1996–2008.

Season	Type of Permit	Daily Limit	Season Limit	Closure Date
1996/97 Summer	Individual	3 Crabs/Person	No Limit	August 30, 1996
1996/97 Winter	Individual	3 Crabs/Person	No Limit	March 7, 1997
1997/98 Summer	Seasonal Household	2 Crabs/Person	No Limit	August 16, 1997
1997/98 Winter	Seasonal Household	2 Crabs/Person	No Limit	December 29, 1997
1998/99 Summer	Seasonal Household	2 Crabs/Person	10/20 Crabs per Individual/ Household for Summer and Winter Season	September 30, 1998[a]
1998/99 Winter	Seasonal Household	2 Crabs/Person		March 31, 1999[b]
1999/00 Summer	Seasonal Household	2 Crabs/Person	10/20 Crabs per Individual/ Household for Summer and Winter Season	September 30, 1999[a]
1999/00 Winter	Seasonal Household	2 Crabs/Person		February 29, 2000
2000/01 Summer (July 1 - July 19)	Summer Household	1 Crabs/Person	5/10 Crabs per Individual/Household in Summer	
2000/01 Summer (July 20 - Aug. 3)	Summer Household	2 Crabs/Person	10/20 Crabs per Individual/Household in Summer	
2000/01 Summer (Aug. 4 -Sept. 30)	Summer Household	3 Crabs/Person	20/40 Crabs per Individual/Household in Summer	September 30, 2000[a]
2000/01 Winter	Winter Household	2 Crabs/Person	10/20 Crabs per dividual/Household in Winter	March 31, 2001[b]
2001/02 Summer	Summer Household	2 Crabs/Person	10/ 20 Crabs per Individual/Household in Summer	September 30, 2001[a]
2001/02 Winter	Winter Household	2 Crabs/Person	10/20 Crabs per Individual/Household in Winter	
2002/03 Summer	Summer Household	2 Crab/Person	20 Crab per Household	August 30, 2002
2002/03 Winter	Winter Household	1 Crab/Permit	20 Crab per Household	March 2, 2003
2003/04 Summer	Summer Household	2 Crab/Person	20 Crab per Household	September 4, 2003
2003/04 Winter	Winter Household	1 Crab/Permit	20 Crab per Household	March 11, 2004
2004/05 Summer	Summer Household	2 Crab/Person	20 Crab per Household	September 30, 2004[a]
2004/05 Winter	Winter Household	1 Crab/Permit	20 Crab per Household	March 31, 2005[b]
2005/06 Summer	Summer Household	2 Crab/Person	20 Crab per Household	September 30, 2005[a]
2005/06 Winter	Winter Household	1 Crab/Permit	20 Crab per Household	March 31, 2006[b]
2006/07 Summer	Summer Household	2 Crab/Person	20 Crab per Household	September 17, 2006
2006/07 Winter	Winter Household	1 Crab/Permit	6 Crab per Household	March 31, 2007[b]
2007/08 Summer	Summer Household	2 Crab/Permit	10 Crab per Household	July 14, 2007
2007/08 Winter			Season Closed	
2008/09			Season Closed	

[a] September 30 is the regulatory closing date for the Summer Red King Crab Personal Use Fishery.

[b] March 31 is the regulatory closing date for the Winter Red King Crab Personal Use Fishery.

Table 11.4–Number of permits issued and returned, total reported harvest of returned permits, and percent of harvest by type of gear in the Section 11-A red and blue king crab personal use fishery by season.

Season	Permits Issued	Permits Returned	Percent Returned	Reported Harvest	Estimated Harvest	Percent by gear		
						Pot	Dive	Ring Net
1996/97 Summer	1,474	1,215	82.40%	5,193	5,693	99.4%	0.3%	0.3%
1996/97 Winter	643	385	59.9%	1,036	1,296	78.7%	18.5%	2.8%
1996/97 Total	2,117	1,600	75.6%	6,229	6,989			
1997/98 Summer	1,266	840	66.4%	4,632	5,567	99.5%	0.3%	0.2%
1997/98 Winter	152	98	64.5%	677	823	93.4%	5.1%	1.5%
1997/98 Total	1,418	938	66.1%	5,309	6,390			
1998/99 Summer	1,404	1,181	84.1%	4,964	5,392	99.7%	0.2%	0.1%
1998/99 Winter	245	213	86.9%	1,472	1,575	75.9%	14.2%	9.9%
1998/99 Total	1,649	1,394	84.5%	6,436	6,967			
1999/00 Summer	1,660	1,367	82.3%	6,212	6,813	99.7%	0.0%	0.3%
1999/00 Winter	249	196	78.7%	1,949	2,181	80.8%	9.6%	9.6%
1999/00 Total	1,909	1,563	81.9%	8,161	8,994			
2000/01 Summer	1,751	1,595	91.1%	6,424	6,724	99.6%	0.2%	0.2%
2000/01 Winter	277	246	88.8%	2,578	2,731	72.1%	10.7%	17.2%
2000/01 Total	2,028	1,841	90.8%	9,002	9,455			
2001/02 Summer	1,793	1,688	94.1%	6,988	7,199	99.7%	0.2%	0.1%
2001/02 Winter	285	261	91.6%	2,310	2,412	74.1%	13.4%	12.5%
2001/02 Total	2,078	1,949	93.8%	9,298	9,611			
2002/03 Summer	2,166	1,990	91.9%	7,025	7,322	99.8%	0.1%	0.1%
2002/03 Winter	872	690	79.1%	1,571	1,754	71.7%	15.1%	13.2%
2002/03 Total	3,038	2,680	88.2%	8,596	9,076			
2003/04 Summer	2,231	2,073	92.9%	10,248	10,624	99.3%	0.2%	0.5%
2003/04 Winter	1,082	977	90.3%	1,274	1,339	77.2%	13.2%	9.6%
2003/04 Total	3,313	3,050	92.1%	11,522	11,963			
2004/05 Summer	2,303	2,096	91.0%	8,292	8,682	99.6%	0.2%	0.2%
2004/05 Winter	921	833	90.4%	1,425	1,496	63.0%	16.6%	20.4%
2004/05 Total	3,224	2,929	90.8%	9,717	10,178			
2005/06 Summer	2,152	1,694	78.7%	8,202	9,179	99.6%	0.0%	0.4%
2005/06 Winter	860	713	82.9%	1,122	1,227	72.9%	9.0%	18.1%
2005/06 Total	3,012	2,407	79.9%	9,324	10,406			
2006/07 Summer	2,046	1,397	68.3%	5,857	6,961	99.9%	0%	0.1%
2006/07 Winter	679	458	67.5%	466	557	68.2%	13.7%	18.1%
2006/07 Total	2,725	1,855	68.1%	6,323	7,518			
2007/08 Summer	1,250	909	72.7%	2,194	2,541	99.7%	0.3%	0%
2007/08 Winter	0	0		0		0	0	0
2007/08 Total	1,250	909	72.7%	2,194	2,541			
2008/09 Total	0	0		0		0	0	0

[a] Allocation guidelines established by the Alaska Board of Fisheries in October 1995 as 45% Commercial, 46% Summer Personal Use, and 9% Winter Personal Use.

[b] Allocation guidelines revised by the Alaska Board of Fisheries in March 1999 as 40% Commercial, 50% Summer Personal Use, and 10% Winter Personal Use. If there is no commercial fishery, total allowable harvest is reallocated to personal use fisheries as 80% summer and 20% Winter Personal Use.

Table 11.5–Total allowable harvest, allocations, and estimated harvest of red and blue king crab in terms of number of crab for the personal use and commercial fisheries of Section 11-A, Southeast Alaska, Registration Area A.

	Commercial Fishery		Summer Personal Use Fishery		Winter Personal Use Fishery		Total Allowable Harvest	
Season	Allocation	Estimated Harvest	Allocation	Estimated Harvest	Allocation	Estimated Harvest	Goal	Estimated Harvest
1996/1997[a]	3,825	2,842	3,900	5,693	765	1,296	8,490	9,831
1997/1998[a]	3,750	2,830	3,800	5,567	750	823	8,300	9,220
1998/99[a]	6,533	0	6,678	5,392	1,307	1,575	14,518	6,967
1999/2000	4,964	11,173	6,200	6,813	1,241	2,181	12,405	20,167
2000/01	4,140	0	5,176		1,035			0
2000/01 Reallocation[b]	0	0	8,626	6,724	1,725	2,731	10,351	9,455
2001/02	7,189	8,525	8,986	7,199	1,797	2,412	17,972	18,136
2002/03	4,503	5,165	5,600	7,322	1,100	1,754	11,203	14,241
2003/04	6,462	6,987	8,078	10,624	1,616	1,339	16,156	18,950
2004/05	3,868	0	4,836		967			0
2004/05 Reallocation[b]	0	0	7,737	8,682	1,934	1,496	9,671	10,178
2005/06	7,161	7,079	8,952	9,179	1,790	1,227	17,903	17,485
2006/07	1,720	0	2,149		430			0
2006/07 Reallocation[b]	0	0	3,439	6,961	860	557	4,299	7,518
2007/08	0	0	0	2,541	0	0	0	2,541
2008/09	0	0	0	0	0	0	0	0

[a] Allocation guidelines established by the Alaska Board of Fisheries in October 1995 as 45% Commercial, 46% Summer Personal Use, and 9% Winter Personal Use.

[b] Allocation guidelines revised by the Alaska Board of Fisheries in March 1999 as 40% Commercial, 50% Summer Personal Use, and 10% Winter Personal Use. If there is no commercial fishery, total allowable harvest is reallocated to personal use fisheries as 80% summer and 20% Winter Personal Use.

Table 11.6–Summary of Southeast Alaska personal use king crab harvest in numbers by area during 1993–2008. Information is based on ADF&G Sport Fish Division Statewide Harvest Survey (SWHS) estimates and those results are compared with creel census and personal use permit estimates for Section 11-A of the Juneau SWHS area E only.

	Data source			
	Statewide harvest survey		Creel census	Personal use permit
Year	Other areas	Juneau area	Section 11-A	Section 11-A
1993	2,806	9,130		
1994	2,855	7,236		
1995	3,253	5,167		
1996	2,209	2,669		6,989
1997	3,208	2,808		6,390
1998	5,295	1,601		6,967
1999	862	6,187	6,442	8,994
2000	737	4,371	5,974	9,455
2001	2,970	5,564	5,605	9,611
2002	521	2,677	5,216	9,076
2003	1,140	6,562	9,587	11,963
2004	476	3,761	6,093	10,178
2005	829	5,634	6,880	10,406
2006	1,051	3,432	5,759	7,518
2007	349	4,093	2,093	2,541
2008	0	0	0	0
Average	1,785	4,431	5,365	7,699

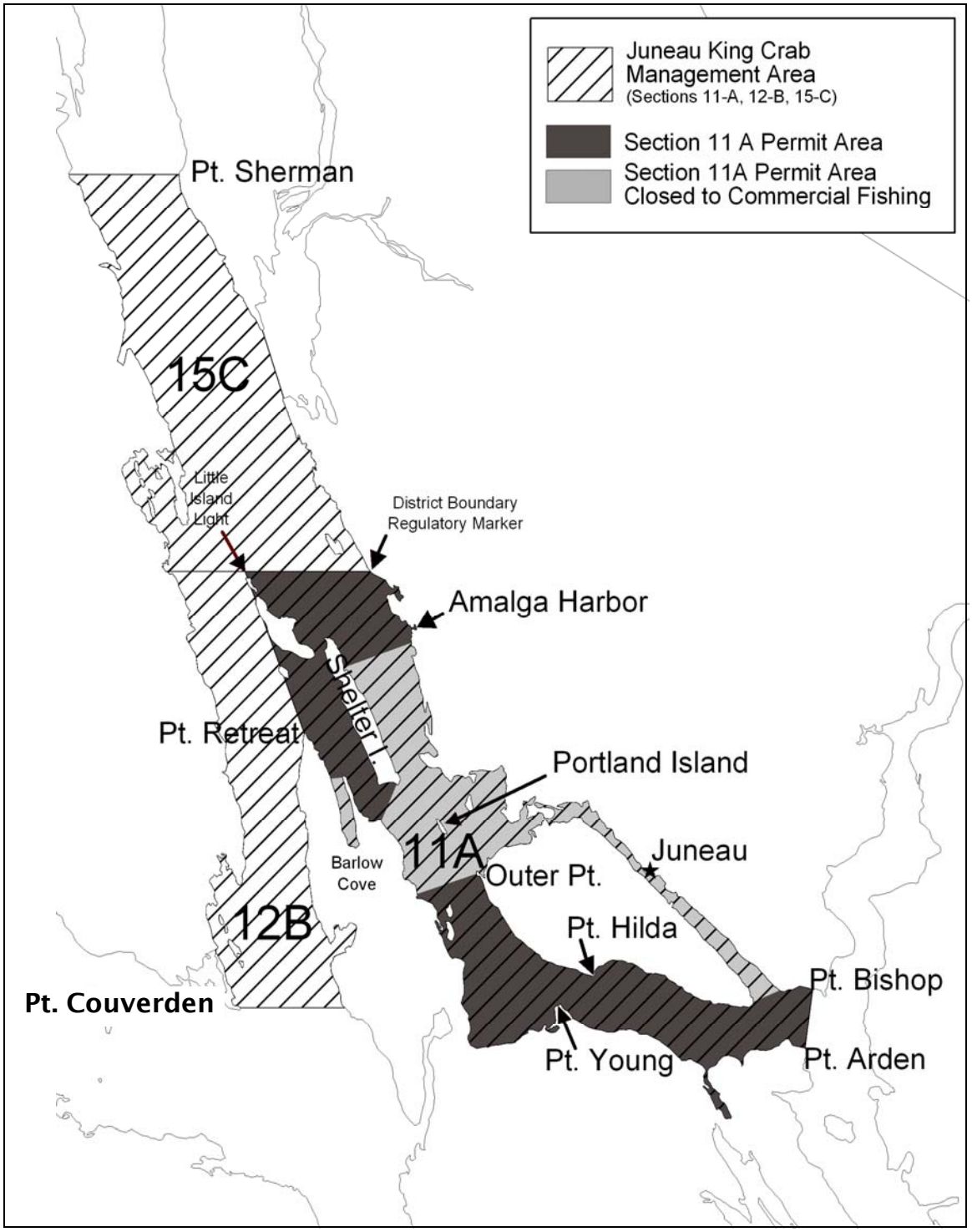

Figure 11.1–The Juneau king crab management area including the Section 11-A permit area and waters closed to commercial fishing.

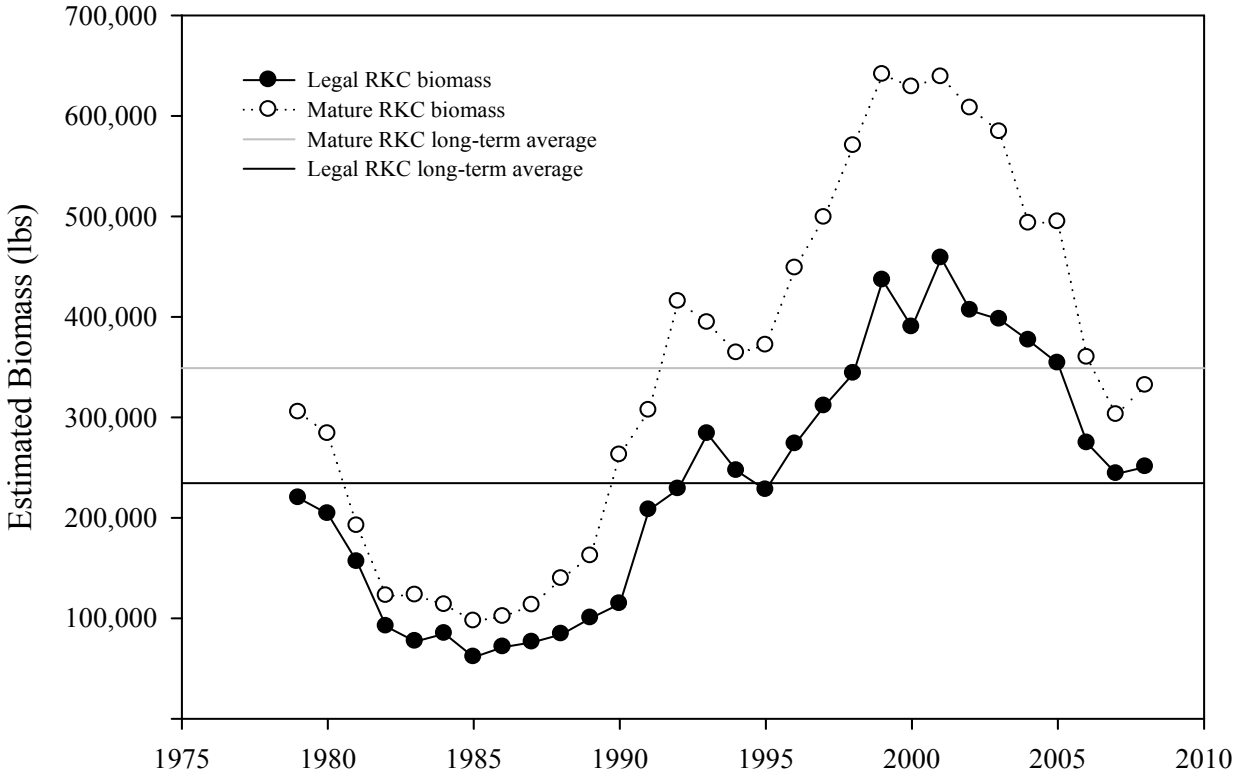

Figure 11.2–Trends in red king crab mature and legal population size from catch survey modeling in the Juneau area, Section 11-A.

CHAPTER 12: SOUTHEAST ALASKA TANNER CRAB FISHERY

INTRODUCTION

LIFE HISTORY

Early life history information on Tanner crab, *Chionoecetes bairdi* is summarized from (Jadamec et al. 1999). The Tanner crab embryos are hatched in late winter through early summer. They are suspended in the water column for about two months through three stages of molts and settle at 6 to 7 mm carapace width (CW) as megalops. This stage can last from 1 month to a year. The megalops migrate to the ocean floor where they molt into its first instar around 3.5 mm CW. The females are estimated to complete 12 instars in about 5 yrs before they terminally molt to maturity and males are estimated to complete as many as 18 instars before they molt to maturity at 6 years (Donaldson et al. 1981).

The first time mating females (pubescent) terminally molt to maturity and mate with smaller males in shallow water, January to May. Females that have reproduced once (primiparous) and more than once (multiparous), mate in deeper water with larger males (April to May). The multiparous female form mating aggregations, which large males migrate towards (Stevens et al. 1994).

Male Tanner crabs become reproductively mature at a size of 80 mm CW (Paul 1992) but the size of functional reproductive maturity is probably closer to 100 mm CW (Stone, Masuda et al. 2003) and L_{50}, the size at which 50% of the males are morphometrically mature or large clawed in Southeast Alaska is 138 mm. Recently, Tamone et al. (2007) provided evidence that these large males were terminal molts, indicating final growth once the males become large clawed. It is important for large clawed males to be present in the population because it is likely the quality of sperm reserves in small males is reduced. Studies on snow crabs, *Chionoecetes opilio*, suggest that a disproportionate relative abundance of small to large males can cause variability in primiparous female sperm reserves, indicating a reduction in large males may decrease the quality of the sperm reserves rather than the number of females not receiving sperm (Rondeau and Sainte-Marie 2001; Sainte-Marie et al. 2002).

DISTRIBUTION

Although, Tanner crabs are a widely distributed brachyuran (true) crab that inhabits temperate and subarctic waters of the eastern Pacific Ocean from northern California to the Bering Sea. In Southeast Alaska, it is likely the Tanner crab stocks are comprised of several distinct populations within limited geographic areas where most settled crabs make localized movements (Figure 12.1). For example the entrance into the Glacier Bay is composed mostly of bedrock and it considered a natural habitat barrier for crabs (Taggart et al. 2008 *in review*). Radio tagged male Tanner crabs made large movements within Glacier Bay, but their general movements were local (Taggart et al. 2008 *in review*). Other tagging studies have revealed more localized movements in male crabs. In the Kodiak area, a six year tagging study found male Tanner crabs movement

contained within several defined geographic areas, irrespective of time of release to capture (one month to 3.8 years) (Donaldson 1985). In fjord habitats of eastern Canada, movements of male snow crabs were restricted by local geomorphology (Brethes and Coulombe 1989; Taylor 1992). In the double fjord system of Bonne Bay, Newfoundland radio-tagged male snow crabs moved several miles in a few days, but generally favored the same spots year to year (Conan et al. 1995).

COMMERCIAL FISHERY

The male-only Tanner crab fishery starts in mid-February, occurring primarily in the more northern waters of Southeast Alaska. Recently, the most productive fishing grounds have been classified as "core" while the less productive fishing grounds are classified as "non-core" areas. In order to redistribute effort back into less productive fishing areas, different preseason lengths have been set for core and non core areas; this is a significant departure from the historic regional approach to Southeast Tanner crab management.

The policy objectives for biological concerns of this fishery are to minimize sorting of juveniles and females, to avoid fishing during molting periods and to continue reproductive viability. These objectives are addressed by the regulations governing gear, season and the legal size limit. Escape rings or panels of large mesh to permit the escapement of female and sublegal crabs are required in regulation for Tanner crab pots. Also in regulation, the fishery starts in mid-February and male Tanner crabs molt in late March and early April (Stone 1999). Finally, only male Tanner crab 140 mm (5½ in) or greater in carapace width can be legally harvested, allowing males at least 1 to 2 years of breeding before entering the fishery.

The principal management objective of the fishery is to attain the allowable harvest level. Historically, when inseason management was still possible, a rough harvest rate of 60% of legal crabs was targeted by inseason depletion modeling of catch rate data. A "guideline harvest level" (GHL) of 2 million lbs has been in effect since the 1999/00 season.

The Tanner crab fishery is generally pursued as a secondary, though seasonally important, source of income. Vessels used in the Tanner crab fishery range from smaller vessels from 35–50 ft in length, to limit purse-seiners and a few larger vessels up to about 80 ft. Smaller boats generally participate in the ring net fishery. Almost all the pot vessels have live-tanking capability.

Currently, lighter cone or pyramid nesting pots that occupy less deck space are used more often than the heavier, seven by seven ft stacking pots, which were originally designed for king crab in the Bering Sea fisheries.

FISHERY DEVELOPMENT AND HISTORY

COMMERCIAL FISHERY HISTORY

Pot Fishery

Although Tanner crab landings have been reported in Southeast Alaska since the early 1960s, they were not deliberately targeted until the early 1970s. Well into the mid-1970s, crab fishers commonly discarded Tanner crabs incidentally caught with red king crab.

The harvest of Tanner crab in Southeast Alaska in the 1970s averaged 1.5 million pounds (Table 12.1). The 1970s were characterized by gradual fishery development and corresponding managerial response. Seasons during the 1970s averaged 9.7 months in length. Historically, most

of the harvest from the major fishing grounds was taken from January through April of each year regardless of the length of the season (Table 12.2).

Southeast Tanner crab harvest in the 1980s averaged 1.6 million pounds. As fishing pace increased over this period, season length shortened to an average of 1.6 months. During the 1981/82 season, when 74 vessels landed a record 3.3 million pounds between December 1, 1981 and April 16, 1982 about two-thirds of this total was reportedly caught in Icy Strait, where the previous long-term average harvest had been about 0.73 million pounds. Increasing demand for Tanner crab product, an earlier season opening in Southeast Alaska than in other registration areas to the north and west, open registration, and the record landing in 1981/82 attracted 97 vessels to the fishery in the 1982/83 season. Many larger crab vessels on their way to Kodiak and Bering Sea fisheries fished in Southeast Alaska first. The 1982/83 season was closed after two weeks by an emergency order based on onboard observer catch rate information collected during the first few weeks of the fishery from the Icy Strait fishing grounds. Both the fishing effort and exploitation rates were extremely high. Management could not respond effectively to the huge influx of effort into the Icy Strait fishery. Although the fishery was closed by emergency order after the shortest season on record up to that time, the stocks were depressed in District 14 for many subsequent years. There was no fishery in calendar year 1983. During the BOF shellfish meeting early in the year the board changed the season opening date in Southeast Alaska to February 10 in order to match the rest of the state. This action, in itself, discouraged larger vessels from fishing in Southeast Alaska during the 1983/84 season because more lucrative grounds to the north and west would be opening at the same time.

Inseason management in the 1980s was conducted using depletion modeling. In this method, declines in the catch rate from fish ticket data were used to estimate exploitation rate (the percent of legal crab harvested) inseason. The fishery was then closed after the target exploitation rate was achieved. This method relies on multiple landings by the same vessel during the course of a season. Vessels land crab about once per week, so this management strategy is best applied to fisheries of at least 21 days in length. The limitation of this method was the speed at which catch data could be obtained from the fleet and inseason management of seasons shorter than 21 days was problematic. The last season in which a fishery lasted 21 or more days was 1989/90. The 1990/91 season, which opened for 18 days, was barely long enough to allow this kind of management.

The harvest of Tanner crab in the 1990s increased to an average of 2.0 million pounds. During this period, the fishery continued to intensify and seasons further shortened to an average of 11.1 days. In association with these shortened seasons, effort became increasingly concentrated on the most productive fishing grounds. Many marginal grounds were ignored as searching for productive areas became increasingly difficult to justify economically with a very short season. Limiting preseason prospecting to more than 30 days in advance of the fishery exacerbated this concentration of effort. Nonetheless, the fleet adapted to short seasons in many ways. The use of tenders, the frequency of leasing larger vessels, crew size, pot pulling frequency, and bait volumes all increased. Thus, the fishery continued to intensify despite the extremely short seasons. The only factor that mitigated the intensity of this fishery was the increasing GHL of the golden king crab fishery.

During the 1990s, inseason management by depletion modeling was no longer possible because the seasons were too short. Thus, beginning with the 1995/96 season, the closure date was announced preseason based upon the estimated length of time to harvest 2 million pounds if

stock abundance was average. Recognizing the risk of this harvest strategy, the department initiated a Tanner crab stock assessment survey in 1997. The goal of the survey is to establish preseason GHLs based on catch-survey estimates of stock biomass. The objective of setting and targeting abundance-based preseason GHLs is to allow harvest to be maximized while minimizing the risk of recruitment failure.

The harvest of Tanner crab in Southeast Alaska since the 1999/00 season has averaged 0.9 million pounds. During this period, the season length has averaged 5.56 days.

Ring Net Fishery

With the beginning of the pot permit moratorium on January 1, 1984, newcomers who wished to commercially harvest Tanner crab were limited to ring net gear, which was also defined in the regulations as legal gear. New ring net permits could be obtained because the permit moratorium only limited issuance of permits for pot gear. Use of ring nets is most attractive when the abundance and price of crab is high because their efficiency is limited and their use is labor intensive.

The number of ring net crab fishers reporting landings increased from five in the 1984/85 season to peak at 92 in the 1989/90 season, and gradually declining to 44 by the 1993/94 season. The total climbed again to 110 for the 1999/00 season in expectation of higher prices. The number of ring net fishers has gradually declined to an average of 21 in the past five seasons (Table 12.1).

Total ring net harvest increased from 1,451 pounds in the 1984/85 season to 101,045 pounds, or 5.0 percent of the total harvest, during the 1989/90 season. During the 1990 winter meeting, the board passed a number of restrictive regulations intended to cap the ring net portion of the total Tanner harvest at a maximum of four percent. Since adoption of these restrictions, ring net harvests were consistently below this level until recent years. Ring net harvest in the 1990s fluctuated between 33,544 and 89,211 pounds, exceeding the four percent cap in the 1996/97, 1999/00, and 2000/01 seasons respectively at 4.3%, 5.2%, and 5.7% of the total harvest. To avoid again exceeding the 4% regulatory limit, the ring net season was shortened to 5 days relative to a 6-day pot season for the 2001/02 season. As effort in the ring net fishery has declined in recent seasons, so has the overall harvest and percent of total harvest. For the five most recent seasons, average harvest in the ring net fishery is 16,823 pounds which represents just over 2% of the total harvest.

Experimental Fishing

Exploratory Tanner Crab Fisheries

In 1988, in response to shorter seasons and requests by crab fishers, the board adopted regulations for exploratory Tanner and red king crab fisheries so the fishing fleet could help the department assess the status of small stocks that were not fished during the short, regular seasons. In areas from which low harvests or no landings had been reported during the regular fishery, fishing was allowed from July 1 through March 31, under conditions of a special permit. The board also established procedures for managing these fisheries.

In general, these fisheries were scheduled during periods of the year to minimize overlapping with traditional fisheries for red king and Tanner crab. A major assumption was that these fisheries would be of such low intensity that mortality associated with fishing during known molting and mating periods would be minimal. Special permits and logbooks were required

because the primary purpose of this fishery was to provide assessments from areas that were not surveyed by the department.

After two seasons of exploratory fishing, it was obvious that interest in these fisheries was low, harvests were poor, and no major unexploited populations had been found. Also, flagrant abuses of permit conditions and violations of regulations had occurred. As a result, the board decided during its winter meeting in 1990 to revoke the regulations that provided for these fisheries.

Deepwater Chionoecetes *Species Fisheries*

Upon request by crab fishers interested in exploratory fishing for deepwater species related to *Chionoecetes bairdi*, the department issued permits for *C. tanneri* and managed a fishery by emergency order from September 16, 1983 through October 31, 1983, and December 5, 1983 through January 24, 1984. Harvest levels did not support development of an economically viable fishery at that time. Requests for permits for *C. tanneri* and *C. angulatus* recurred in 1995, permits were issued for the period from March 5, 1995 through April 30, 1995, and the fishery was managed by emergency order. The fleet expended more effort and more areas were fished, but results were discouraging. The number of crab per pot, pots pulled per hour, and crab meat-fullness were low, precluding the development of a viable fishery. A single permit was issued in 2000, once again with minimal harvest. Interest in this fishery was again expressed in 2003 and a permit was issued, however, no fishing was conducted.

Bitter Crab Syndrome

During the 1984/85 season processors handling crab from the extreme north end of Southeast Alaska, notably Lynn Canal, were receiving complaints from consumers of bitter tasting meat from some section-packed crab. Most management staff thought it was associated with a normal pre-molt condition in Tanner crab since the fishery during that historical period partially extended into the initial phases of the annual molt in some areas. However, a few samples of crab blood collected during the 1985/86 season revealed that the bitterness was closely correlated with presence and concentration of a systemic parasite. This systemic parasite is a highly specialized dinoflagellate of the genus *Hematodinium* (Meyers, Short et al. 1990).

Symptoms associated with bitter crab disease (BCD) had been reported since at least the early 1980s, with some anecdotal references to off-tasting Tanner crabs dating back to the mid-1970s. It has since been reported from most major fishing grounds in Southeast Alaska and sporadically from other areas as well (Meyers 1991). Its definitive identification in Bering Sea Snow crab C. opilio stocks, with its economic implications, has accelerated research on Hematodinium.

Hematodinium infects all sizes and both sexes of Tanner crab and seems to kill them within one to 1.5 years. It severely reduces the vitality and reproductive capacity of crabs, with egg clutches of infected females being greatly reduced in size (Meyers 1993). The mechanism and seasonal timing of transmission remains unknown (Eaton, Love et al. 1991; Love 1991; Love, Rice et al. 1993). The disease may be spread by free-living, infective spores released by dying crabs, or vegetative stage organisms passively transmitted during periods of crab aggregation, such as immediately before and during seasonal mating periods.

Crabs in later stages of infection cannot be marketed because of the astringent taste and soft, chalky texture of the meat. These crabs can be identified on the fishing grounds by external symptoms such as the abnormal pink or pale coloration of their abdomens and the ventral sides of their walking legs. Infected crabs continue to be transported out of the areas in which they are

caught because of the regulatory requirement to retain infected crabs. This appears to have contributed to the spread of this disease.

Currently, the season occurs during a period that is generally felt to be the time of optimum meat condition in the majority of heavily fished stocks. Unfortunately, the season also occurs during a period when crabs infected during the previous year have developed advanced symptoms of the disease, including the characteristic bitter taste.

Sorting rates reportedly as high as 80% from some areas, and recent increases in reported pounds of dead loss (mostly attributable to disposed diseased crab) or specifically indicated bitter crab, simply suggest the actual magnitude of the problem. There are no industry-wide standards, procedures, or regulations for safe disposal of infected crabs. Control measures are limited to voluntary retention of bitter crab for later disposal in upland landfills, heat or chemical disinfections before marine disposal, or hard freezing before marine disposal. Viability of the resource is still being risked by continuing transport and handling of infected crab.

The state has attempted or considered regulatory means to minimize the risks associated with catch and retention of infected crabs. Part of District 15 was closed in l988 to prevent fishing on crabs heavily infected with bitter crab disease. This resulted in reduced fishing opportunity for golden king crab and a total closure has not been imposed on the fishery since then.

In the 1992/93 season, product transfer restrictions were imposed on vessels fishing in District 15. Any Tanner crabs caught in District 15 could only be shipped live out of the District if they were transferred onto tenders within the District and water from holding tanks on the tenders were not discharged while the crabs were being transported to on-shore processors located in other districts. This requirement was intended to reduce handling of bitter crab and minimize the risk of spreading the infection to stocks between high incidence districts and processors. Enforcement of the restriction was difficult. There have been no similar restrictions to fishing in District 15 since that season.

A very general proposal for development of a fishery to evaluate the feasibility of an earlier season to improve marketability of bitter crab was approved by the board in 1990. The plan was repealed at the following Board of Fisheries meeting because it was determined that this fishery would not be manageable and would not provide the information for which it was intended.

The bitter crab problem does not appear to be diminishing. High percentages of bitter crab, in excess of 40% are observed from some districts and the parasite appears to be expanding its distribution to heretofore-uninfected areas.

REGULATION DEVELOPMENT

The first regulations pertaining specifically to Tanner crabs were adopted in 1954. Prior to 1954, there was no formal recognition of a commercial fishery for Tanner crab in Southeast Alaska.

FISHING SEASONS AND PERIODS

The season for Tanner crab in Southeast Alaska was first set in 1963 at January 1 through December 31. The season was shortened in some areas in 1969, largely to facilitate management of the red king crab fishery. In 1974 the season was closed by emergency order on May 15.

In 1974, the season starting date was changed to September 1. During much of the 1970s the season started on September 1 and closed by emergency order in April or early May. In 1981 the

season started on December 1, 1981 and was closed on April 16, 1982 by emergency order after a record harvest of over 3.0 million pounds. In 1982 the season was closed by emergency order in mid-December after two weeks of fishing, because of unprecedented effort and heavy concentration in District 14. In early 1983 the season starting date was changed to February 10.

In 1987 the season starting date was changed to January 15, in part to be consistent with the opening date in most of the rest of the state. The season changed again in 1989, starting on February 15, to reduce conflict with the January food and bait herring fishery in which many crab fishers participated or tendered herring. Between 1989 and 2005 the season start date was February 15 and the length of the season was progressively shortened to about a week.

Starting with the 2003/04 season, the department began setting different season lengths in "core" and "non-core" areas. Core areas were defined as those areas that have high levels of effort and Tanner crab catch or significant red king crab populations. Non-core areas have extended fishing time to allow for exploratory fishing into non-traditional fishing grounds. The fishery has been open in core fishing areas from four to six days with an additional four to five days of fishing time in non-core areas. The season start date for Tanner was changed at the 2005 BOF meeting to the smallest Juneau tidal range between February 10 and February 17. This was intended to minimize gear loss in the golden king crab fishery which opens concurrently with the Tanner fishery.

SEX AND SIZE LIMITS

A minimum size of 5½ inches (140 mm) or greater in carapace width was implemented in 1976 for males and persists to the present. This size permits nearly all males at least one, and possibly two seasons of reproductive activity prior to attaining legal size.

QUOTAS AND GUIDELINE HARVEST RANGES

A Guideline Harvest Level (GHL) of 1,750,000 pounds was first set in 1976. It was revised downward to a GHR of 750,000 to 1,500,000 pounds in 1978. In 1979 the GHR was revised to 750,000 to 2,500,000 pounds. In response to locally high harvest rates and the subsequent effects on the stocks in Icy Strait in the early 1980s, the GHR was then revised downward to between 0 and 2 million pounds in 1985. This range was sufficient to provide a relatively stable harvest until the 1997/98 season when an unanticipated shift in effort to non-traditional fishing grounds south of Petersburg and west of Wrangell pushed the total season harvest to over 2.7 million pounds. If the increased harvest from non-traditional grounds were discounted from the total harvest, the harvest from traditional districts would have totaled a little more than 2.0 million pounds. Following the Board of Fisheries meeting in 1990, the GHL was changed to a maximum allowable harvest of 2.0 million pounds. At the 1999 Board of Fisheries meeting, the maximum allowable harvest was changed to a guideline harvest level of 2.0 million pounds. Although the average Tanner crab harvest in Southeast Alaska for the 1990s was 2.0 million pounds, harvest since the 1999/00 season has averaged 0.9 million pounds. Simultaneous declines in survey catch rate data indicates that this is due to real declines in abundance. This suggests that although it is probably an attainable harvest level when recruitment is strong, 2 million pounds is not a sustainable annual harvest level.

INSEASON MANAGEMENT TOOLS

Daily harvest logbooks have been mandatory since the start of the 1993/94 season. Logbooks were one of the last remaining options left to managers trying to conduct inseason management. At the 1996 meeting of the BOF the department was directed to assess the feasibility of using daily radio reports of catch and effort from all crab pot fishers in the 1995/96 and 1996/97 seasons to support continuing inseason management based on real-time catch data. The reporting requirement was dropped after two seasons due to technological challenges and low compliance. At the 2002 meeting of the BOF a regulation was established giving the department the authority to require inseason reporting of Tanner crab logbook data. Cell and satellite phone technology have now advanced to the point where the marine operator was discontinued in 2004, having been deemed unnecessary by the United States Coast Guard. Inseason reporting of logbook data has not been required since the 2003/04 season.

FISHING GEAR

Pots

Gear restrictions, first imposed in 1954, permitted use of pots or trawl gear to harvest Tanner crab. Ring nets were added as legal gear in 1960. Scuba diving gear was legalized in 1966. Shrimp beam trawls were specified as legal gear and diving was rescinded in 1969. Although legal, trawl gear was rarely, if ever, used in this fishery during this period. Tanner crab pot gear was further restrictively defined in 1969, with four-inch tunnel heights and buoys having to be marked with the vessel registration number preceded by the letter "T." The next major changes occurred in 1973 when in-water storage restrictions were adopted, the "T" part of the buoy-marking requirement was dropped, and a pot limit of 60 was implemented for all inside waters. In 1974, tunnel heights were increased to five inches.

A major revision of the shellfish regulations was undertaken in 1975. Starting in 1976, escape panels incorporating a biodegradable seam have been required. In Southeast Alaska, south of the latitude of Cape Fairweather, Tanner crab pots had to have an entire vertical seam laced with biodegradable twine. In 1977 a 100-pot limit was put into effect in Southeast Alaska. Trawl gear was dropped as legal gear in 1977 leaving only pots and ring nets as options. In 1978 the vertical seam requirement was modified to be more flexible and applicable to different types of gear and tunnel eye definitions were clarified. Buoy stickers have been required since 1979 to facilitate enforcement of pot limits. In 1985, two 4 3/4 inch diameter escape rings were required in each Tanner crab pot to reduce retention and sorting of small males and females and a moratorium on new pot permits was implemented. In 1987 escape rings were to be located within eight inches of the bottom of pots. Due in part to shorter soak times becoming prevalent in the fishery, the escape ring requirement was repealed in 1988. At the 1996 meeting of the BOF the department had recommended reducing the pot limit to 50. The BOF adopted an 80-pot limit; this was implemented starting in the 1997 season.

At the 2002 meeting of the BOF escape rings or panels of large mesh to permit the escapement of female and sublegal Tanners were again required in Tanner crab pots in Registration Area A only.

Ring nets

Between the mid-1980s and 1990 use of ring nets grew because pot permits were under moratorium. In 1990 the board adopted a comprehensive set of regulations to control the increasing use of ring net gear by people who did not receive limited entry permits for the pot fishery. The number of ring nets was limited to 20 per vessel, and ring net marking requirements were defined. Ring nets were also defined in more detail, with limits set on their size, and longlining of ring nets was prohibited. The allowable ring net harvest was capped at four percent of the total harvest. Vessels could not concurrently be registered for both ring nets and pots. Wording was incorporated to prevent use of ring net gear to conduct preseason test fishing under the guise of subsistence or personal use fishing.

GEAR STORAGE AND OPERATION OF OTHER POT GEAR

Since 1981 in-water pot storage was permitted for 72 hours after the season closure. In 1984 fishing with pots or storing pots in the water during the 10 days before the start of the season was prohibited. In 1985, the preseason fishing prohibition was lengthened to 14 days. Also in 1985 post-season pot storage was extended to seven days after closure of the entire registration area or 72 hours after closure of a portion of the area. Starting in 1986 a 10-day preseason, in-water storage period was allowed with some restrictions. Since 1987 preseason gear storage for a period of 10 days before the start of the season has been permitted under some conditions.

Beginning with the 1999/00 season, vessels and persons registered for the commercial Tanner crab fishery could not fish with any commercial, sport, subsistence, or personal use gear except for commercial Dungeness and shrimp pot gear for 30 days prior to the start of the season.

LIMITED ENTRY

In response to a request by locally based vessel operators and processors, the Commercial Fisheries Entry Commission (CFEC) initiated a permit moratorium for the king and Tanner crab fisheries in Southeast Alaska on January 1, 1984.

The CFEC instituted a complex system of combined permits for the three species of king crab and Tanner crab. The full impact of the moratorium was not felt until the 1985/86 season because many prospective entrants to the 1984/85 fishery had exercised the two-year option on permit renewals and obtained their permits prior to January 1, 1984, which was the cutoff date for the moratorium on new permit issuance. Moreover, the CFEC was forced by their regulatory guidelines to set the maximum number of permits to be allowed at 83, which was a relatively high level. This has proved to have long-term implications, such as progressively shortened seasons as the efficiency of the fleet improved.

The Tanner crab pot fishery in Southeast Alaska was the first Tanner fishery in the state to be placed under limited entry. As of October 2008, a total of 87 permits have been issued, of those 69 are permanent permits, and an additional 18 are interim-use permits that are still being evaluated for inclusion under the permanent 83-permit limit. Ring net gear (CFEC permit category T10) is also legal in Southeast Alaska and is not under limitation.

REGISTRATION AND DELIVERY REQUIREMENTS

In 1974, Southeast Alaska and Yakutat were combined into a single nonexclusive registration area. In 1975 preseason hold inspections and vessel registrations were required. A preseason

registration deadline was in effect in 1978. A registration deadline of 30 days prior to the season start was implemented in 1979. Also in 1979, the hold inspection requirement was dropped because it was considered unnecessary in Southeast Alaska and Yakutat.

Southeast Alaska was designated a superexclusive registration area during the spring BOF meeting in 1985. This was in reaction to the 1982/83 season and was intended to discourage operators of larger vessels, whose primary sources of income were from crab fisheries in other registration areas, from fishing in Southeast Alaska. Vessels registered to fish for Tanner crab in Southeast Alaska cannot fish in any other registration area in Alaska for Tanner crab during the same registration year (August 1–July 31).

In 1986 the BOF adopted a regulation to restrict the boundaries of Registration Area A to those waters of the state between Dixon Entrance and Cape Fairweather. A new registration area, Registration Area D, was established for those waters between Cape Fairweather and Cape Suckling. Major restructuring of the Alaska Administrative Code was necessary to accommodate this change, which was first published in the 1988 shellfish regulation book.

It is unclear when the 30-day registration deadline was repealed but it was put back into regulation beginning in 2000.

In 1981 crab had to be delivered within 24 hours of the close of the season. In 1983 fishers had 72 hours to deliver crabs after the season closure. In 1986 this period was shortened to 24 hours.

MANAGEMENT CONCERNS

MANAGEMENT PLAN

There is currently no management plan or harvest strategy outlined in regulation for Southeast Alaska Tanner crab stocks. A GHL of two million pounds is set in regulation, although it has not been reached since the 1998/99 season. Declines in survey abundance during the past ten years indicate that current stocks can not sustainably support a harvest of this size.

Recent advances in stock assessment survey modeling have created the opportunity for abundance based management approaches. Biological thresholds for critical stock components should be set along with identifying appropriate harvest levels for varying stock sizes. Establishing a management plan in regulation with a long-term harvest rate policy would benefit both the stock and fishery for future years

FISHING EFFORT

Current pot limits for the fishery are set at 80 pots per vessel and although vessel effort has declined in recent years, it is not possible to manage the fishery in-season given the quick pace of the fishery. Therefore, season length is set prior to the season opening based on historical effort and estimated time needed to reach the GHL. This approach increases the chances of exceeding the GHL when effort is high and not reaching the GHL when effort is low. Weather and tides also influence the pace of the fishery and without in-season management; managers can not take these factors into consideration. Other regions of the state have adapted to the quickening pace of Tanner fisheries by lowering pot limits based on targeted GHLs and in some cases have gone to daylight fishing hours which limits when pots can be set and retrieved. These measures along with mandatory or voluntary daily call-ins have allowed managers in those areas to use real-time fishery data to manage the fisheries in-season.

STOCK ASSESSMENT

Over the past decade, Tanner crab stock analyses have changed as survey methods changed and the quantity and quality of data have improved (Bednarski et al. 2008). Prior to 1997, stock assessments were based solely on trends in CPUE and effort data from logbooks and fish tickets and dockside sampling data. Analyses were based on simple summary statistics and trends (Clark et al. 2001). From 1997 through 2006, stock health and estimates of relative abundance were examined using data from the Tanner crab survey (TCS) and the RKCS, while commercial logbook data was used to estimate commercial harvest rates and the time required to catch the harvestable surplus of Tanner crab. In the 2007 season, the department started estimating the population size and harvestable surplus with depletion modeling and catch-survey analyses (CSA (Siddon et al. In Prep.) and in the 2008 season used only (CSA) to estimate population size. A harvest rate of 20% of mature or a maximum of 50% of legal males is used, which is consistent with harvest strategies used elsewhere in the state (Zheng and Kruse 1999). As with the red king crab survey, improvements to the survey and modeling methods will continue as the time-series increases.

STOCK ASSESSMENT SURVEY

Surveys are conducted in 13 separate areas throughout southeastern Alaska (Figure 12.2). Six areas are surveyed to explicitly target Tanner crab, and 9 areas are designed to target red king crab, but have Tanner crab as a significant bycatch. Two of the areas (Stephens Passage/Juneau and Holkham Bay) are sampled on both surveys and largely overlap. Surveyed areas correspond with commercial fishing grounds that account for over 65% of the total Tanner crab harvest (25-year average). Survey methods for both the TCS and the RKCS are similar. Each area is divided into 1–5 strata based on the density of the target species (e.g., red king crab for the red king crab survey). Surveys are conducted as a random stratified sampling design with the number of pots (the sampling unit) allocated as a function of crab density and strata area. A few changes for both surveys have occurred over time, but there is little evidence that they bias the interpretation of survey results. Details regarding TCS, RKCS, and pot location generation methods are documented elsewhere (Bednarski et al. 2008). Differences between the TCS and RKCS methods include: different sampling dates, and bait. The TCS is conducted in the fall (October), whereas the RKCS is conducted in the summer (June–July). The Tanner crab survey uses an additional ½ of a round pink salmon as hanging bait.

DOCKSIDE SAMPLING AND ONBOARD SAMPLING PROGRAM

Dockside sampling is conducted inseason and separate sampling goals are set for each of 3 major areas. These areas are: the Icy Strait Area which consists of District 14, the Lynn Canal/ Upper Stephens Passage Area which is combined Districts 11 and 15, the Frederick Sound/Lower Stephens Passage Area, consisting of the combined Districts 8, 9, and 10, and Other Grounds which includes all other areas. Size and shell condition data are taken for legal male crab as they are delivered to processors. Average weight of crabs from each sampled delivery is determined. Skippers are interviewed to collect fishing location and effort information. From width and shell age frequency information, the recruit composition of the harvest can be determined.

Limited onboard sampling was conducted sporadically in the 1980s to collect specific inseason information needed for management. Since then, available personnel have concentrated more on collecting dockside sampling information.

LOGBOOK AND MANDATORY REPORTING PROGRAMS

In 1994, logbooks became mandatory for permit holders fishing pot, but not ring net gear; together with fish tickets (commercial harvest reports) logbooks provide fisherman's information on catch and pot lifts for each day, statistical area, and vessel in the fishery.

STOCK ASSESSMENT REGIONWIDE OVERVIEW

Southeast Region Shellfish Research staff recommended that the commercial Tanner crab fishery in Southeast Alaska be closed for the 2008 season. The rationale for this recommendation was as follows:

- Continued deterioration of stock health (Figure 12.3).
- 2006/07 commercial catch exceeded the harvestable surplus by 168,000 pounds.
- Estimated harvestable surplus is below any harvest level since 1970/71 (Table 12.3).
- Number of "poor" areas increased from 4 to 6 between 2006 and 2007.
- Six of 14 survey areas are designated as poor stock status (Table 12.4, Table 12.5)
- Glacier Bay accounts for 30% of total biomass, yet is restricted to limited access permit holders.
- Continued harvest on small population will inhibit regionwide recovery.
- The harvestable surplus is further reduced by unmarketable bitter crab in the Stephens Passage survey area.

RECENT SEASONS

2005/06 SEASON SUMMARY

The 2005/06 season opened at 12:00 noon AST, on February 15, 2006. In a preseason news release, the department set the season length at five days in 'core' fishing areas which closed at 12:00 noon on February 20, 2006. The 'non-core' fishing areas closed after 10 days on February 25, 2006. Section 11-A was opened for only four fishing days and closed on February 19, 2006. Port Camden and Holkham Bay were closed for the duration of the season due to low stock abundance in those areas. District 16 was also closed for rebuilding in the 2005/06 commercial Tanner crab season.

A total of 886,521 pounds of Tanner crab were caught by 72 permit holders. The major discard class was bitter crab, which accounted for 53,084 pounds followed by deadloss which totaled 3,358 pounds. It was probable that the actual bitter crab catch was much higher, since an unknown amount were sorted and discarded on the fishing grounds. At $1.42/pound, marketable product had a total exvessel value of $1.26 million.

Of the 72 permits that participated in the fishery, 53 were pot permits and the remaining 19 were for ring nets. Pot gear accounted for 97.7% of the total harvest or 866,037 pounds while ring net fishers caught at total of 20,484 pounds (Table 12.1).

A summary of the harvest by fishing area indicated that about 829,822 pounds (93.6%) of the total season's harvest was taken from the three major fishing areas; Icy Strait, Lynn Canal/Stephens Passage, and Frederick Sound (Table 12.6).

Port Sampling Data

Port sampling information summarized for the registration area indicated that the overall size of crab harvested averaged 151.6 mm CW, or 2.5 pounds, up slightly from the previous season (Tables 12.7 and 12.8). The percent of the catch that was newly recruited crabs was 73.7%, up from the previous season's 65.4% and slightly lower than the 1996/97 high of 77.5% (Table 12.7). Catch per unit effort was estimated at 16.5 crabs per pot, the highest since the 1997/98 fishery (Table 12.8).

Crabs from Icy Strait had an average size of 151 mm CW or 2.5 lb. The percent recruit of 83.6% was higher than the previous season and the percent of post-recruits was half of the previous season at 16.1% (Tables 12.9 and 12.10). Crabs in Lynn Canal were similar in size, with an average size of 153.1 mm CW or 2.5 lb and had a similar percent recruit of 69.4% to recent seasons (Tables 12.11 and 12.12). Lynn Canal percent recruit was also lower than any other area. This consistently low percentage of recruit of Lynn Canal relative to other areas may be explained by relatively low fishing pressure due to a lack of fleet interest because of the high percentage of bitter crab in the area. Average size for Frederick Sound area Tanners was 152.7 mm CW or 2.5 lb, similar to the previous seasons, while percent recruit was lower at 71.8%, than the previous seasons (Tables 12.13 and 12.14).

2006/07 SEASON SUMMARY

The 2006/07 season opened at 12:00 noon AST, on February 10, 2007. The season closed after six days in the 'core' fishing areas on February 16, 2007 and after eleven days in the 'non-core' areas on February 21, 2007. Three 'reduced-season' areas of Port Camden, Holkham Bay, and Section 11-A areas were open for only five days and closed on February 15, 2006. District 16 remained closed for the 2006/07 commercial Tanner crab season.

At the end of both the 'core' and 'non-core' fishing periods, 862,821 pounds of marketable crab, plus 65,079 pounds of deadloss, for a total of 927,900 pounds had been caught. As in the past, the major discard class was bitter crab, which accounted for 62,476 pounds of the total deadloss. It is probable that a large amount of the bitter crab was sorted and discarded on the fishing grounds but not reported as 'discard at sea'. At almost $1.67/pound, marketable product was worth at least $1,440,911 exvessel. The economic loss represented by the deadloss was conservatively set at $108,682.

Harvest in the first 5-days of the fishery, the core period, totaled 915,924 or 98.7% of the total. In the last five days of the fishery, the 'non-core period', an additional 11,976 pounds of Tanner crab were harvested. Spatially, approximately 839,084 pounds or 90.4% of crab were harvested in the 'core' areas while 88,816 pounds or 9.6% were from 'non-core' areas.

A total of 76 pot and ring net permits reported landings during the season. The 57 pot permit crab fishers landed 911,515 pounds of crab, of which 847,115 pounds were marketable. A total of 16,385 pounds, or about 1.8% of the total Tanner crab harvest, was reported landed by 19 ring net permit holders. Marketable crab comprised 15,706 pounds of the total ring net harvest and 679 pounds were dead loss, of which 552 pounds were due to bitter crab.

A summary of the harvest by fishing area indicated that about 811,130 pounds or 87% of the total season's harvest was taken from the three major fishing areas; Icy Strait, Lynn Canal/Stephens Passage, and Frederick Sound (Table 12.6).

Port Sampling Data

The overall percentage of crabs harvested that were recruits decreased to 69.2%, while the average size stayed the same at 152.4 mm CW or 2.5 pounds during the 2007 season (Tables 12.7 and 12.8). Catch per unit effort was estimated at 12.5 crabs per pot, down from the previous two seasons (Table 12.8).

The average crab size in the Icy Strait area, at 153.7 mm CW and 2.6 pounds was up from the previous season, and percentage of crabs that were recruits was down from the previous season at 76.6% (Tables 12.9 and 12.10). The average size of crabs in Lynn Canal remained small at 152.9 mm CW or 2.4 pounds, while the percentage of recruit remained the same at 69.1% (Tables 12.11 and 12.12). Frederick Sound area crabs were also virtually unchanged in size from the previous season at 153.2 mm CW and 2.6 pounds, although the percent recruit continued to decrease to 67.3% (Tables 12.13 and 12.14).

2007/08 SEASON SUMMARY

The 2007/08 season was set to open at 12:00 noon AST, on February 12, 2008. The season start date was subsequently delayed two days due to bad weather forecasted throughout the region in the 3-4 days preceding the start of the fishery and the fishery opened on February 14, 2008. The season closed in 'core' fishing areas after six days on February 20, 2008 and closed in 'non-core' areas after eleven days on February 25, 2008. District 16 remained closed for the 2007/08 Tanner crab season.

As preseason survey information indicated that stocks remained low the season length was again set conservatively and harvest was not expected to reach the two million pound GHL. Season length was set to target a 987,000 pound GHL. Daily logbooks remained mandatory and fishers were required to submit logbooks to the Department with each fish ticket.

A total of 605,062 pounds of crab were harvested during the 2008 season. This consisted of 567,739 pounds of marketable commercial; 394 pounds of personal use; 2,010 pounds of dead loss; and 34,919 pounds of bitter crab. As in the past, an unknown additional amount of bitter crab were sorted and discarded on the fishing grounds. At $1.69/pound, marketable product had an exvessel value of $0.96 million.

The harvest in the first 5 days, the core-period, totaled 573,877 or 94.8% of the total. In the last five days of the fishery, the non-core period, 31,185 pounds of Tanner crab were harvested. Approximately 91.7% or 545,467 pounds of the pot fishers' harvest came from the core areas while 8.3% or 49,268 pounds came from non-core areas.

A total of 67 pot and ring net permits reported landings during the season. The 49 pot permit crab fishers landed 594,735 pounds of crab, of which 558,246 pounds were marketable. A total of 10,327 pounds, or about 1.7% of the total Tanner crab harvest was reported landed by 18 ring net permit holders. Marketable crab comprised 9,887 pounds of the total ring net harvest and 440 pounds were dead loss, all of which was due to bitter crab.

A summary of the harvest by fishing area indicated that about 542,440 pounds, 90%, of the total season's harvest was taken from the three major fishing areas; Icy Strait, Lynn Canal/Stephens Passage, and Frederick Sound (Table 12.6).

Port Sampling Data

The overall crab size during the 2008 season, at 150.7 mm CW or 2.4 pounds, was the lowest in the past three seasons, likewise the percent of recruits was also down and at it lowest point since the late 1970s (Tables 12.7 and 12.8). Catch rate was estimated at 10.6 crabs per pot, the lowest since the 2002/03 season (Table 12.8).

Icy Strait crabs were smaller than the previous two seasons with an average carapace width of 150.1 mm CW and 2.4 pounds, a corresponding decrease was seen in the percent recruit which at 65.6% was the lowest since the 1992 season (Tables 12.9 and 12.10). The catch rates were lower than the previous 5 years at an average of 12 crabs per pot. The size of Lynn Canal area crabs remained the same at 151.8 mm CW or 2.4 pounds while the percent recruit continued to decline at 59.6%. Catch rates in Lynn Canal were almost double from the previous season at 15.3 crabs per pot (Tables 12.11 and 12.12). Frederick Sound crab size and percent recruit were down slightly at 152.2 mm CW and 2.6 pounds, and 55.5% recruit (Tables 12.13 and 12.14). The Frederick Sound area catch rate also down from the previous season at 11.1 crabs per pot.

CHAPTER 12—TABLES AND FIGURES

Table 12.1–Traditional commercial Tanner crab pot and ring net harvest information for Registration Area A, 1968/69 to present.

Year/ Season	Pot Fishery					Ring Net Fishery			Combined Gears				
	Permits Fished	Number of Crabs	Total Pounds	Pots Lifted	CPUE	Permits Fished	Number of Crabs	Total Pounds	Permits Fished	Number of Crabs	Total Pounds	Average Weight	Price/ Pound
1968/69	29	70,892	177,825						29	70,892	177,825	2.5	
1969/70	31	251,295	660,337						31	251,295	660,337	2.6	
1970/71	12	62,704	167,378						12	62,704	167,378	2.7	
1971/72	25	258,080	656,661						25	258,080	656,661	2.5	
1972/73	31	614,443	1,597,838						31	614,443	1,597,838	2.6	
1973/74	52	531,114	1,309,673						52	531,114	1,309,673	2.5	
1974/75	51	340,361	863,751						51	340,361	863,751	2.5	
1975/76	32	868,815	2,149,397						32	868,815	2,149,397	2.5	
1976/77	55	1,078,454	2,563,710						55	1,078,454	2,563,710	2.4	
1977/78	44	835,928	2,142,409						44	835,928	2,142,409	2.6	
1978/79	38	589,781	1,559,769						38	589,781	1,559,769	2.6	
1979/80	51	729,812	1,781,175						51	729,812	1,781,175	2.4	
1980/81	59	851,281	2,013,276						59	851,281	2,013,276	2.4	
1981/82	73	1,406,267	3,305,857						73	1,406,267	3,305,857	2.4	
1982/83	95	446,283	1,101,630			2	*	*	97	446,449	1,101,630	2.5	
1983/84	100	644,002	1,593,468						100	644,002	1,593,468	2.5	$1.20
1984/85	78	472,669	1,129,473			5	660	1,451	83	473,329	1,130,924	2.4	$1.20
1985/86	72	422,678	1,006,396			11	1,153	2,609	83	423,831	1,009,005	2.4	$1.87
1986/87	67	462,702	1,120,373			7	1,605	3,601	74	464,307	1,123,974	2.4	$2.01
1987/88	71	548,854	1,317,887			13	5,484	12,598	84	554,338	1,330,485	2.4	$2.20
1988/89	77	631,705	1,583,711			63	25,501	62,621	140	657,206	1,646,332	2.5	$2.32
1989/90	81	769,601	1,908,624			92	42,421	101,045	173	812,022	2,009,669	2.5	$1.91
1990/91	72	850,706	2,182,813			36	23,728	58,780	108	874,434	2,241,593	2.6	$1.45
1991/92	83	783,499	2,073,353			41	20,649	49,568	124	804,148	2,122,921	2.6	$1.72
1992/93	83	614,958	1,536,143			51	13,771	33,544	134	628,729	1,569,687	2.5	$1.51
1993/94	81	760,273	1,964,380	48,794	16	44	15,607	37,146	125	775,880	2,001,526	2.6	$1.97
1994/95	91	940,233	2,433,571	55,771	17	82	29,685	73,576	173	969,918	2,507,147	2.6	$3.21
1995/96	94	733,210	1,969,394	45,711	16	74	21,539	50,642	168	754,749	2,020,036	2.7	$1.89
1996/97	94	688,431	1,818,884	41,898	16	70	33,974	81,935	164	722,405	1,900,819	2.6	$1.73
1997/98	92	981,437	2,614,166	41,332	24	93	35,154	87,156	185	1,016,591	2,701,322	2.7	$1.60

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Table 12.1–Page 2 of 2.

Year/ Season	Pot Fishery					Ring Net Fishery			Combined Gears				
	Permits Fished	Number of Crabs	Total Pounds	Pots Lifted	CPUE	Permits Fished	Number of Crabs	Total Pounds	Permits Fished	Number of Crabs	Total Pounds	Average Weight	Price/ Pound
1998/99	93	757,545	2,086,672	36,872	21	87	31,161	77,459	180	788,706	2,164,131	2.7	$2.06
1999/00	92	588,428	1,616,945	34,432	17	110	34,276	89,211	202	622,704	1,706,156	2.7	$2.13
2000/01	81	447,043	1,221,668	32,187	14	80	30,784	74,012	161	477,827	1,295,680	2.7	$1.93
2001/02	83	356,704	935,026	29,035	12	57	12,312	29,810	140	369,016	964,836	2.6	$1.71
2002/03	67	300,453	776,687	22,937	13	44	12,008	27,547	111	312,461	804,234	2.6	$2.05
2003/04	68	328,814	811,647	23,463	14	30	8,049	20,511	98	336,863	832,158	2.5	$2.13
2004/05	60	313,281	787,625	18,248	17	21	6,886	16,410	81	320,167	804,035	2.5	$1.96
2005/06	53	341,115	866,037	18,839	18	19	8,376	20,484	72	349,491	886,521	2.5	$1.42
2006/07	57	360,820	911,515	22,332	16	19	6,741	16,385	76	367,561	927,900	2.5	$1.67
2007/08	49	235,789	594,735	16,295	14	18	3,948	10,327	67	239,737	605,062	2.5	$1.69
5-year avg.	57	315,964	794,312	19,835	16	21	6,800	16,823	79	322,764	811,135	2.5	$1.77

***** Fewer than 3 permits were fished; information is confidential.

Number of crabs and pot lifts for pot fishery from 1993/94 to present are from logbooks, all other information from fishtickets.

Table 12.2–Traditional commercial Tanner crab harvest in thousands of pounds, by month and season in Registration Area A, 1968/69 to present.

Season	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
1968/69	0	0	0	0	10,008	8,277	13,137	60,424	34,999	34,195	*	8,595	177,825
1969/70	24,421	30,619	17,488	18,695	19,691	97,188	214,401	149,620	21,002	*	*	*	660,337
1970/71	913	*	6,694	7,079	21,265	41,440	56,239	*	0	0	0	0	167,378
1971/72		29,914	30,951	39,046	29,367	17,946	91,576	203,460	148,496	58,539	*	1,034	656,661
1972/73	5,359	39,096	83,806	86,733	50,707	140,770	376,634	554,558	228,712	26,617	*	*	1,597,838
1973/74	29,402	91,781	94,821	87,290	69,476	126,267	314,656	416,168	89,811				1,309,673
1974/75	*	77,220	70,645	56,565	71,647	74,368	180,565	225,790	102,605				863,751
1975/76	13,256	110,312	125,429	107,128	159,655	367,402	634,649	460,031	171,535				2,149,397
1976/77	3,861	76,151	277,031	209,229	338,272	393,722	695,293	458,008	112,143				2,563,710
1977/78	29,434	162,649	139,499	176,005	149,876	303,768	592,475	504,744	83,959				2,142,409
1978/79	6,590	47,585	76,675	91,665	200,058	189,220	465,356	422,280	60,340				1,559,769
1979/80	60,702	55,748	74,471	61,002	153,949	440,029	615,468	282,356	37,450				1,781,175
1980/81	26,144	52,621	48,540	60,071	315,911	504,091	627,344	350,454	28,110				2,013,276
1981/82				870,816	597,721	712,698	809,360	315,187					3,305,857
1982/83				1,102,009									1,102,009
1983/84						866,004	727,464						1,593,468
1984/85						531,064	599,860						1,130,924
1985/86						577,662	426,397						1,009,005
1986/87					635,358	488,616							1,123,974
1987/88					787,725	524,760							1,330,485
1988/89						1,087,935	552,783						1,646,332
1989/90						1,233,415	740,708						2,009,669
1990/91						1,598,811	642,782						2,241,593
1991/92						1,730,820	392,101						2,122,921
1992/93						1,268,195	301,492						1,569,687
1993/94						1,559,853	441,673						2,001,526
1994/95						2,507,147							2,507,147
1995/96						2,020,036							2,020,036
1996/97						1,900,819							1,900,819
1997/98						2,701,322							2,701,322
1998/99						2,164,131							2,164,131

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Table 12.2–Page 2 of 2.

Season	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
1999/00						1,704,408							1,704,408
2000/01						1,295,680							1,295,680
2001/02						964,836							964,836
2002/03						804,234							804,234
2003/04						832,158							832,143
2004/05						804,035							804,035
2005/06						886,521							886,521
2006/07						927,900							927,900
2007/08						605,062							605,062

* Fewer than 3 permits were fished; information is confidential.

Table 12.3–Summary of commercial catch GHL calculations for the 14 surveyed areas and other areas with health criteria for the 2007/08 season. See matrix of stock health determination for 2007 Tanner crab from the Tanner crab and red king crab surveys for a more detailed look at assessment for stock status. The expansion factor of 71% (29% for non-surveyed areas) for the total crab biomass was based on the percent of commercial catch harvested from 1980–2000 in surveyed areas. The 1993–2002 average catch represents a mean historical baseline of harvest.

Survey	Survey Area	Legal Crab Biomass	Mature Crab Biomass	Stock Status	Legal Harvest Rate	Mature Harvest Rate	Total GHL	1993–2002 Average Catch
Tanner crab survey	Icy Strait	165,829	238,772	Poor	0%	0%	0	185,166
	Glacier Bay	841,433	1,497,452	moderate	18%	10%	149,745	255,482
	Stephens Passage	197,843	290,703	moderate	15%	10%	29,070	144,241
	Thomas Bay	96,126	173,242	moderate	18%	10%	17,324	59,356
	Holkham Bay	66,496	100,557	Poor	0%	0%	0	245,541
	Port Camden	3,557	7,980	Poor	0%	0%	0	39,239
Red king crab survey	Seymour Canal	295,928	471,374	Healthy	32%	20%	94,275	115,719
	North Juneau	96,526	127,602	poor	0%	0%	0	83,188
	Excursion Inlet	159,358	255,020	poor	0%	0%	0	79,705
	Pybus Bay	100,075	161,155	healthy	32%	20%	32,231	23,783
	Gambier Bay	33,278	46,636	poor	0%	0%	0	53,615
	Peril Strait	39,287	113,795	healthy	58%	20%	22,759	16,184
	Lynn Sisters	24,264	36,872	moderate	15%	10%	3,687	9,400
	Port Frederick	19,406	44,154	moderate	23%	10%	4,415	13,920
	Other Areas	873,841	1,456,255				144,390	541,009
	Total	3,013,246	5,021,568				497,897	1,865,548

Table 12.4–Matrix of stock health determination for Tanner crab from the 2007 Tanner crab survey. Bold and bold-underlined entries represent positive and negative indicators (scores) of stock health, respectively. The long-term average is defined from available data 1997–2007. Short-term trends are based on individual regression analyses over the past 4 years (including the current year). Total score is the sum of scores (+1, 0, -1 for long-term; +.25, 0, -.25 for short-term) for each response variable. Stock health is defined by the total score: < -1.1 = poor, -1.1 to 1.1 = moderate, and > 1.1 = healthy.

Recruit Class	Data type	Parameter	Icy Strait		Glacier Bay		Stephens Passage		Thomas Bay		Holkham Bay		Port Camden	
			% of baseline	Score	% of baseline	Score	% of baseline	Score	% of baseline	Score	% of baseline	Score	% of baseline	Score
Large/ Mature Females	Percent Clutch Fullness < 25%	long-term average	623%	**-1**	74%	0	147%	0	-84%	**1**	23%	0	NA	NA
		short term trend	No Trend	0	No Trend	0	No Trend	0	No Trend	0	No Trend	0	NA	NA
	CPUE	long-term average	-1%	0	110%	0	-29%	0	10%	0	-5%	0	-100%	**-1**
		short-term trend	No Trend	0	No Trend	0	No Trend	0	No Trend	0	No Trend	0	**Sig. Dec.**	**-0.25**
Prerecruit Males	CPUE	long-term average	-44%	**-1**	-6%	0	21%	0	24%	0	-52%	**-1**	-69%	**-1**
		short-term trend	**Sig. Dec.**	**-0.25**	No Trend	0	No Trend	0	No Trend	0	No Trend	0	No Trend	0
Recruit Males	CPUE	long-term average	-60%	**-1**	-40%	0	-39%	**-1**	-28%	**-1**	-77%	**-1**	-70%	**-1**
		short-term trend	**Sig. Dec.**	**-0.25**	No Trend	0	No Trend	0	No Trend	0	**Sig. Dec.**	**-0.25**	No Trend	0
Postrecruit Males	CPUE	long-term average	-60%	**-1**	103%	0	13%	0	-38%	**-1**	-13%	0	-97%	**-1**
		short-term trend	No Trend	0	**Sig. Inc**	**0.25**	No Trend	0	No Trend	0	No Trend	0	No Trend	0
2006 Stock status			healthy		healthy		moderate		healthy		poor		poor	
2006 Legal Harvest rate			50%		50%		25%		50%		0%		0%	
2007 Total Score			-4.5	0.25	-1	-1	-2.25	-4.25						
2007 Stock status			poor		moderate		moderate		moderate		poor		poor	
2007 Mature Harvest rate			0%		10%		10%		10%		0%		0%	

Table 12.5–Matrix of stock health determination for Tanner crab from the 2007 red king crab survey. Bold and bold-underlined entries represent positive and negative indicators (scores) of stock health, respectively. The long-term average is defined from 1993–2002. Short-term trends are based on individual regression analyses over the past 4 years (including the current year). Total score is the sum of scores (+1, 0, -1 for long-term; +.25, 0, -.25 for short-term) for each response variable. Stock health is defined by the total score: < -1.1 = poor, -1.1 to 1.1 = moderate, and > 1.1 = healthy.

			Seymour Canal		**North Juneau**		**Excursion Inlet**		**Pybus Bay**		**Gambier Bay**	
Recruit Class	**Data type**	**Parameter**	**% of baseline**	**Score**	**% of baseline**	**Score**	**% of baseline**	**Score**	**% of baseline**	**Score**	**% of baseline**	**Score**
Large/ Mature Females	Percent Clutch Fullness < 25%	long-term average	-36%	0	-23%	0	83%	0	35%	0	21%	0
		short term trend	No Trend	0	No Trend	0	Sig. Inc.	-0.25	No Trend	0	No Trend	0
	CPUE	long-term average	104%	0	-57%	**-1**	63%	0	209%	**1**	-58%	**-1**
		short-term trend	**Sig. Inc.**	**0.25**	No Trend	0	No Trend	0	No Trend	0	No Trend	0
Prerecruit Males	CPUE	long-term average	121%	**1**	-34%	**-1**	21%	0	370%	**1**	-57%	-1
		short-term trend	**Sig. Inc.**	**0.25**	**Sig. Dec.**	**-0.25**	No Trend	0	No Trend	0	No Trend	0
Recruit Males	CPUE	long-term average	-15%	0	-69%	**-1**	-35%	**-1**	-16%	0	-63%	-1
		short-term trend	**Sig. Inc.**	**0.25**	No Trend	0	No Trend	0	No Trend	0	No Trend	0
Postrecruit Males	CPUE	long-term average	14%	0	-48%	**-1**	-33%	0	157%	**1**	-19%	0
		short-term trend	**Sig. Inc.**	**0.25**	No Trend	**0**	No Trend	0	**Sig. Inc.**	**0.25**	No Trend	0
2006 Stock status			healthy		NA		moderate		healthy		poor	
2006 Legal Harvest rate			50%				25%		50%		0%	
2007 Total Score			2		-4.25		-1.25		3.25		-3	
2007 Stock status			healthy		poor		poor		healthy		poor	
2007 Mature Harvest rate			20%		0%		0%		20%		0%	

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Table 12.5–Page 2 of 2.

Recruit Class	Data type	Parameter	Peril Strait % of baseline	Peril Strait Score	Lynn Sisters % of baseline	Lynn Sisters Score	Port Frederick % of baseline	Port Frederick Score
Large/ Mature Females	Percent Clutch Fullness < 25%	long-term average	-4%	0	0%	0	-51%	0
		short term trend	No Trend	0	No Trend	0	No Trend	0
	CPUE	long-term average	151%	**1**	-31%	0	-41%	**-1**
		short-term trend	No Trend	0	No Trend	0	No Trend	0
Prerecruit Males	CPUE	long-term average	62%	**1**	-19%	0	96%	**1**
		short-term trend	**Sig. Inc.**	**0.25**	**Sig. Inc.**	**0.25**	**Sig. Inc.**	**0.25**
Recruit Males	CPUE	long-term average	35%	0	-80%	**-1**	-37%	**-1**
		short-term trend	**Sig. Inc.**	**0.25**	No Trend	0	No Trend	0
Postrecruit Males	CPUE	long-term average	27%	0	10%	0	-30%	0
		short-term trend	No Trend	0	No Trend	0	No Trend	0
2006 Stock status			moderate		moderate		poor	
2006 Legal Harvest rate			25%		25%		0%	
2007 Total Score			2.5		-0.75		-0.75	
2007 Stock status			healthy		moderate		moderate	
2007 Mature Harvest rate			20%		10%		10%	

Table 12.6–Traditional commercial Tanner crab harvest in pounds by season, by fishing area in Registration Area A, 1971/72 to present.

Season	Lynn Canal/Upper Stephens Passage[a]		Icy Strait[b]		Frederick Sound/ LowerStephens Passage[c]		Other[d]		Total
	Pounds	% of S.E. Harvest	Pounds	% of S.E. Harvest	Pounds	% of S.E. Harvest	Pounds	% of S.E. Harvest	
1971/72	13,440	2.0	310,803	47.3	200,854	30.6	131,564	20.0	656,661
1972/73	177,661	11.1	505,203	31.6	443,106	27.7	471,868	29.5	1,597,838
1973/74	377,190	28.8	404,347	30.9	396,400	30.3	131,736	10.1	1,309,673
1974/75	19,116	2.2	371,115	43.0	289,758	33.5	183,762	21.3	863,751
1975/76	782,127	36.4	505,089	23.5	406,565	18.9	455,616	21.2	2,149,397
1976/77	599,719	23.4	1,034,577	40.4	529,849	20.7	399,565	15.6	2,563,710
1977/78	394,041	18.4	762,491	35.6	648,802	30.3	337,075	15.7	2,142,409
1978/79	308,765	19.8	655,043	42.0	511,769	32.8	84,192	5.4	1,559,769
1979/80	330,221	18.5	391,185	22.0	907,178	50.9	152,591	8.6	1,781,175
1980/81	321,594	16.0	682,736	33.9	634,425	31.5	374,521	18.6	2,013,276
1981/82	384,252	11.6	2,102,755	63.6	428,259	13.0	390,591	11.8	3,305,857
1982/83	92,055	8.4	816,016	74.0	108,918	9.9	85,020	7.7	1,102,009
1983/84	298,975	18.8	656,496	41.2	468,461	29.4	169,536	10.6	1,593,468
1984/85	366,496	32.4	225,044	19.9	365,395	32.3	173,989	15.4	1,130,924
1985/86	421,236	41.7	182,316	18.1	282,490	28.0	122,963	12.2	1,009,005
1986/87	410,674	36.5	242,010	21.5	317,528	28.3	153,762	13.7	1,123,974
1987/88	458,190	34.4	239,194	18.0	459,709	34.6	173,392	13.0	1,330,485
1988/89	476,600	28.9	349,098	21.2	628,454	38.2	192,180	11.7	1,646,332
1989/90	386,754	19.2	621,277	30.9	709,733	35.3	291,905	14.5	2,009,669
1990/91	442,952	19.8	798,460	35.6	617,839	27.6	382,342	17.1	2,241,593
1991/92	617,885	29.1	800,184	37.7	442,200	20.8	262,652	12.4	2,122,921
1992/93	452,466	28.8	490,117	31.2	433,002	27.6	194,102	12.4	1,569,687
1993/94	253,543	12.7	517,397	25.9	888,117	44.4	342,469	17.1	2,001,526

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Table 12.6–Page 2 of 2.

Season	Lynn Canal/Upper Stephens Passage[a]		Icy Strait[b]		Frederick Sound/ LowerStephens Passage[c]		Other[d]		Total
	Pounds	% of S.E. Harvest	Pounds	% of S.E. Harvest	Pounds	% of S.E. Harvest	Pounds	% of S.E. Harvest	
1994/95	409,187	16.3	735,200	29.3	1,051,899	42.0	310,861	12.4	2,507,147
1995/96	314,961	15.6	725,970	35.9	704,529	34.9	274,576	13.6	2,020,036
1996/97	293,328	15.4	673,305	35.4	490,752	25.8	443,434	23.3	1,900,819
1997/98	418,743	15.5	692,620	25.6	517,500	19.2	1,072,459	39.7	2,701,322
1999/00	468,373	27.5	440,239	25.8	536,957	31.5	258,839	15.2	1,704,408
2000/01	412,435	31.8	298,607	23.0	391,751	30.2	192,887	14.9	1,295,680
2001/02	346,676	35.9	265,940	27.6	228,773	23.7	123,447	12.8	964,836
2002/03	311,273	38.7	226,527	28.2	192,255	23.9	74,179	9.2	804,234
2003/04	237,442	28.5	263,533	31.7	249,000	29.9	82,183	9.9	832,158
2004/05	189,323	23.5	319,875	39.8	224,851	28.0	69,986	8.7	804,035
2005/06	162,500	18.3	386,736	43.6	280,586	31.7	56,699	6.4	886,521
2006/07	152,729	16.5	363,656	39.2	294,745	31.8	116,770	12.6	927,900
2007/08	135,312	22.4	230,612	38.1	176,516	29.2	62,622	10.3	605,062

[a] Includes all of District 15 and Subdistricts 111-30 through 111-99.

[b] Includes all of District 14.

[c] Includes all of District 10, Subdistricts 111-01 through 111-29, and Subdistricts 108-40 through 108-60.

[d] Includes all other areas of Southeast Alaska.

Table 12.7–Summary of traditional commercial Tanner crab size frequency and shell condition data collected during dockside sampling in Registration Area A, 1970/71 to present.

Season	Number of Sampled		Carapace Width (mm)		Recruitment	
	Boats	Crab	Average	Range	% Recruits[a]	% Postrecruits[b]
1970/71	1	99	157	137–177	68.4	31.6
1971/72	3	235	149.8	121–183	67.1	32.9
1972/73	3	429	156.9	128–183	73.4	26.6
1973/74	9	1,658	153	111–190	68.7	31.3
1974/75	6	616	157.4	127–190	64.2	35.8
1975/76	15	1,663	154.1	116–190	62.4	37.6
1976/77	28	3,753	154.5	124–192	53.3	46.7
1977/78	36	4,786	155.3	124–192	25.4	74.6
1978/79	28	3,273	154.9	129–198	44.4	55.6
1979/80	43	4,509	154.6	128–193	63	37
1980/81	43	4,223	152.3	125–192	70	30
1981/82	59	6,556	149.7	129–193	67.6	32.4
1982/83	55	5,808	151.3	123–185	74.6	25.4
1983/84	24	2,444	152	135–187	76.2	23.8
1984/85	24	3,211	152.2	135–197	77.1	22.9
1985/86	50	5,453	151	128–191	75.6	24.4
1986/87	62	6,984	152.2	133–188	72.8	27.2
1987/88	106	10,933	150.8	134–186	67.7	32.3
1988/89	45	10,030	152.8	133–194	58.4	41.6
1989/90	122	12,806	150.8	129–185	63.7	36.3
1990/91	124	13,050	152.2	131–193	74.2	25.8
1991/92	112	11,568	155	129–190	58.3	41.7
1992/93	104	11,175	151.9	130–192	66	34
1993/94	125	14,731	150.1	130–190	77.1	22.9
1994/95	156	18,235	151.6	99–191	74.1	25.9
1995/96	120	15,085	153.7	132–189	75.5	23.7
1996/97	124	13,123	152.4	132–196	77.5	21.7
1997/98	151	11,345	153.8	127–190	74.0	25.5
1998/99	121	9,306	154.2	125–193	67.2	32.4
1999/00	135	9,345	154.9	129–193	68.5	30.9
2000/01	116	9,096	154.7	134–197	65.6	34.2
2001/02	126	9,194	152.9	118–197	73.9	24.2
2002/03	111	7,864	152.7	133–190	77.4	22.1
2003/04	96	6,849	152.1	131–189	75.5	23.9
2004/05	92	6,767	150.9	127–192	65.4	33.8
2005/06	85	6,268	151.6	126–185	73.7	26.0
2006/07	84	6,200	152.4	129–190	69.2	30.5
2007/08	40	2,891	150.7	136–183	56.9	42.7

[a] Recruits = all new and soft shell crab ≥140 mm and ≤164 mm carapace width.

[b] Postrecruits = all new and soft shell crab ≥165 mm and old and very old shell crab ≥140 mm carapace width.

Table 12.8–Tanner crab catch rate and weights in Registration Area A, 1974/75 to present. Data were collected during dockside sampling and interviews.[a]

Season	Number of			Avg. catch per pot	Range of catch/pot	Weight (lb)		Estimated no. crab harvested [b]	Percent of harvest sampled [c]
	Boats interviewed	Pots lifted	Crab captured			Average	Range		
1974/75	1					3.2	3.2–3.2		
1975/76									
1976/77	18	58	1,400	24.1	24.1–24.1	2.6	2.2–3.0	992,862	0.4
1977/78	27	270	6,268	25.2	16.0–43.1	2.7	2.3–3.1	799,406	0.6
1978/79	12	386	5,469	19.8	17.2–22.4	2.6	1.6–2.9	599,911	0.6
1979/80	3	160	1,643	10.3	10.3–10.3	2.8	2.8–2.8	636,401	0.7
1980/81	5	300	4,560	15.2	15.2–15.2	2.8	2.1–3.2	721,454	0.6
1981/82	33	6,277	132,535	26.2	5.3–71.6	2.3	2.0–2.6	1,417,128	0.5
1982/83	39	2,043	26,152	15	4.9–29.2	2.5	2.1–3.0	450,342	1.3
1983/84	16	620	6,050	10.5	6.9–14.0	2.5	2.3–2.7	643,194	0.4
1984/85	22	2,070	25,455	11.6	3.9–17.4	2.6	2.3–3.0	435,351	0.7
1985/86	51	7,127	75,552	12.7	1.8–30.7	2.4	1.8–3.1	414,705	1.3
1986/87	59	14,192	135,615	12.3	2.9–32.0	2.5	2.1–2.9	451,395	1.6
1987/88	95	22,745	225,850	11.7	2.4–33.0	2.4	2.0–2.7	559,027	2
1988/89	99	26,387	350,878	15.2	0.4–33.0	2.5	2.1–3.1	655,909	1.5
1989/90	109	31,517	366,514	11.7	1.0–34.6	2.5	2.1–3.0	820,253	1.6
1990/91	135	41,706	579,928	13.9	0.9–40.3	2.6	2.1–3.0	862,772	1.6
1991/92	110	33,381	361,572	10.8	0.8–99.2	2.7	2.1–3.1	776,537	1.4
1992/93	95	28,569	297,428	10.4	0.5–31.7	2.5	2.1–3.0	604,781	1.7
1993/94	125	28,188	379,078	13.5	0.3–47.5	2.4	1.9–2.9	805,074	1.8
1994/95	144	27,846	355,628	12.8	0.3–59.5	2.5	2.0–3.0	973,428	1.7
1995/96	115	22,426	387,880	17.3	0.5–56.8	2.6	2.1–3.2	743,168	2
1996/97	128	20,799	306,781	14.8	0.4–65.8	2.5	2.1–3.1	721,779	1.8
1997/98	151	28,592	547,766	19.2	0.4–91.6	2.7	2.0–3.1	979,088	1.2
1998/99	121	25,736	420,029	16.3	0.3–60.6	2.6	2.1–3.3	775,714	1.2
1999/00	134	25,467	321,886	12.6	0.3–62.5	2.7	2.1–6.2	594,465	1.6
2000/01	116	26,821	324,890	12.1	0.2–32.6	2.7	2.2–3.4	454,152	2
2001/02	126	28,194	282,369	10	0.3–64.9	2.6	2.1–3.1	359,625	2.6
2002/03	111	20,469	213,415	10.4	0.2–44.6	2.5	1.8–3.0	310,675	2.5
2003/04[a]	96	19,223	242,538	12.6	0.5–41.3	2.5	2.1–3.1	325,963	2.1
2004/05	92	18,783	274,289	14.6	0.6–41.5	2.4	2.0–2.9	324,126	2.1
2005/06	85	20,311	335,523	16.5	0.5–63.0	2.5	2.2–3.0	349,208	1.8
2006/07	84	25,262	314,433	12.5	0.6–57.3	2.5	1.9–3.0	366,070	1.7
2007/08	40	7,843	82,827	10.6	0.4–34.6	2.4	2.1–3.0	243,744	1.2

[a] Summary tables of all dockside sampling data includes data from Tables 4.6, 4.8, and 4.10 plus data collected that could not be assigned to a fishing area.

[b] Calculated by dividing fish ticket weight data from Table 4.5 by dockside sampling average weight per crab data.

[c] Calculated by dividing number of crab sampled for size frequency by estimated number of crab caught.

Table 12.9–Tanner crab catch rate and average weight in Icy Strait, 1975/76 to present. Data were collected during dockside sampling and interviews.

Season	Number Sampled			Avg. catch per pot	Range of catch/pot	Weight (lb)		Estimated no. crab harvested [b]	Percent of harvest sampled [c]
	Boats interviewed	Pots lifted	Crab captured			Average	Range		
1975/76	2					1.9	1.7–2.1	271,553	0
1976/77	2					2.1	2.0–2.2	492,687	0
1977/78	2					2.8	2.8–2.9	270,387	0.3
1978/79									
1979/80									
1980/81									
1981/82	21	5,074	118,704	29.5	5.3–71.6	2.3	2.0–2.6	910,284	0.3
1982/83	34	1,556	22,758	18.4	4.9–29.2	2.5	2.1–2.8	339,384	1
1983/84	8					2.5	2.4–2.7	260,514	0.3
1984/85	2					2.3	2.3–2.3	97,845	0.3
1985/86	1	98	811	8.3	8.3–8.3				
1986/87	4	1,087	11,342	12.1	6.0–20.8	2.4	2.3–2.5	102,114	0.5
1987/88	10	2,712	27,371	10.9	5.0–25.0	2.2	2.1–2.4	106,783	1.1
1988/89	17	5,812	69,339	13.3	0.4–26.7	2.3		153,113	1.2
1989/90	25	8,812	113,893	13.3	4.3–34.6	2.5	2.4–2.7	248,511	1
1990/91	34	11,683	153,781	14.1	4.2–40.3	2.4	2.3–2.6	329,942	1.1
1991/92	26	8,901	106,340	11.8	1.0–21.5	2.7	2.6–2.9	301,305	1
1992/93	30	9,676	102,557	10.9	2.5–26.7	2.6	2.3–3.0	188,507	2.2
1993/94	24					2.5	2.1–2.9	208,764	1.5
1994/95	39					2.5	2.2–3.1	290,917	1.6
1995/96	29	6,379	100,386	15.7	1.7–56.8	2.7	2.3–3.2	272,311	1.2
1996/97	40	9,526	167,253	17.6	0.4–65.8	2.5	2.3–2.8	265,024	1.5
1997/98	29	8,848	136,226	15.4	0.4–56.8	2.6	2.4–3.0	258,280	0.8
1998/99	27	5,619	114,969	20.5	1.1–60.1	2.7	2.4–3.1	259,305	0.8
1999/00	26	5,208	82,812	15.9	0.2–62.5	2.7	2.1–3.0	163,041	1.1
2000/01	20	7,307	92,424	12.7	2.3–33.7	2.5	2.2–2.7	120,188	1
2001/02	24	7,057	79,708	11.3	2.0–27.3	2.7	2.3–2.9	99,725	1.6
2002/03	15	3,317	44,675	13.5	1.9–37.5	2.6	2.2–2.8	85,527	1
2003/04	18	3,587	58,624	16.3	3.3–48.8	2.5	2.3–3.0	106,421	1.1
2004/05	18	4,943	113,504	23.0	2.5–48.8	2.4	2.2–2.5	132,845	1
2005/06	30	7,172	156,833	21.9	2.4–63.0	2.5	2.2–2.7	153,794	1
2006/07	22	5,447	103,307	19.0	2.6–57.3	2.6	2.3–2.9	139,089	0.8
2007/08	5	613	7,336	12.0	1.0–34.6	2.4	2.3–2.5	94,374	0.4

[a] Calculated by dividing fish ticket weight data for Icy Strait from Table 4.3, by dockside sampling average weight per crab data.

[b] Calculated by dividing number of crab sampled for size frequency by estimated number of crab caught.

Table 12.10–Icy Strait summary of traditional commercial Tanner crab size frequency and shell condition, 1971/72 to present. Data was collected during dockside sampling.

Season	Number sampled		Carapace width (mm)		Recruitment	
	Boats	Crab	Average	Range	% Recruits[a]	% Postrecruits[b]
1971/72	1	87	154	127–183	75.6	24.4
1972/73						
1973/74						
1974/75						
1975/76						
1976/77[c]	1	101	155.2	140–179	76.2	23.8
1977/78	4	828	157.6	126–190	22.3	77.7
1978/79						
1979/80	2	207	152.6	138–179	67.5	32.5
1980/81	23	2,863	148.8	130–181	67.4	32.6
1981/82	22	2,759	148.8	130–181	66.5	33.5
1982/83	32	3,317	151	123–178	74.7	25.3
1983/84	8	803	152.4	137–181	68.2	31.8
1984/85	2	309	146.6	136–165	55.8	44.2
1985/86	1	118	148.3	138–180	82.7	17.3
1986/87	4	485	148.4	136–176	42.8	57.2
1987/88	11	1,118	149.4	137–184	66.8	33.2
1988/89	18	1,875	151.8	135–184	64.9	35.1
1989/90	25	2,576	151.1	135–183	69.8	30.2
1990/91	33	3,472	150	132–180	83.9	16.1
1991/92	27	2,943	155.1	132–189	67.3	32.7
1992/93	36	4,079	152.4	135–189	71.4	28.6
1993/94	27	3,061	150.8	131–185	80.3	19.7
1994/95	40	4,666	150.5	135–190	85.6	14.4
1995/96	29	3,162	152.8	137–185	80.3	19.7
1996/97	37	3,954	151.2	133–186	87.8	11.7
1997/98	29	2,154	154.1	130–190	87.2	12.6
1998/99	26	2,158	154.8	133–187	84	15.8
1999/00	22	1,746	154.2	135–189	81.8	17.4
2000/01	16	1,197	151.4	138–183	90.1	9.9
2001/02	21	1,563	153.8	137–182	88.5	11.5
2002/03	12	843	153.3	136–178	85	14.6
2003/04	16	1,134	150.9	135–182	90.9	8.6
2004/05	16	1,348	149.6	128–177	67.1	31
2005/06	21	1,575	151.0	134–174	83.6	16.1
2006/07	15	1,122	153.7	138–184	76.6	23.4
2007/08	2	375	151.0	137–181	65.6	34.1

a Recruits = all new and soft shell crab ≥140 mm and ≤164 mm carapace width.

b Postrecruits = all new and soft shell crab ≥165 mm and old and very old crab ≥140 mm carapace width.

c The first season that legal size was 5 1/2-inch (140 mm) carapace width.

Table 12.11–Tanner crab catch rate and average weight in Lynn Canal/Stephens Passage, 1976/77 to present. Data was collected during dockside sampling and interviews.

Season	Number Sampled			Avg. catch per pot	Range of catch/pot	Weight (lb)		Estimated no. crab harvested [b]	Percent of harvest sampled [c]
	Boats interviewed	Pots lifted	Crab captured			Average	Range		
1976/77	10	58	1,400	24.1	24.1	2.6	2.5–3.0	228,652	1.1
1977/78	8	270	6,268	25.2	16.0–43.1	2.7	2.6–2.9	145,941	1
1978/79	6	386	5,469	19.8	17.2–22.4	2.7	2.6–2.8	115,211	1.1
1979/80	1	160	1,643	10.3	10.3–10.3				
1980/81									
1981/82	4	762	8,744	12.1	12.1–12.2	2.4	2.3–2.4	161,831	0.3
1982/83	8	487	3,394	10.5	5.5–13.7	2.4	2.4–2.5	39,911	3.3
1983/84	2					2.6	2.5–2.7	114,524	0.2
1984/85	6	875	8,832	10.2	3.9–14.0	2.6	2.5–2.7	141,504	0.6
1985/86	29	3,577	48,103	15.2	5.9–30.7	2.4	1.8–3.1	173,348	1.8
1986/87	37	5,000	64,115	14	5.0–32.0	2.5	2.1–2.8	161,032	2.8
1987/88	43	7,507	80,893	12.6	3.0–33.0	2.4	2.0–2.7	183,247	2.9
1988/89	41	7,355	94,795	14.2	4.5–37.4	2.6	2.2–3.1	178,389	2
1989/90	33	7,509	89,562	11.6	3.1–32.4	2.5	2.1–2.8	157,619	2.5
1990/91	14	2,555	28,802	12.2	2.0–25.3	2.6	2.5–2.8	168,434	0.6
1991/92	35	6,481	89,249	15.3	0.3–30.0	2.7	2.2–3.1	224,686	1.7
1992/93	22	6,163	68,767	11.4	4.3–19.4	2.7	2.2–3.0	170,742	1.6
1993/94	5					2.4	2.2–2.6	106,085	1.2
1994/95	30					2.5	2.2–3.0	161,734	2.6
1995/96	23	784	7,881	10.1	3.2–17.3	2.7	2.1–3.1	114,762	3.3
1996/97	27	1,836	33,536	18.3	7.3–42.7	2.7	2.3–3.1	107,923	2.2
1997/98	36	3,913	86,103	22.0	11.7–46.3	2.8	2.3–3.0	151,596	1.8
1998/99	19	2,385	63,005	26.4	11.7–60.6	3	2.9–3.3	112,339	1.1
1999/00	24	3,458	91,701	26.5	2.3–52.3	2.9	2.5–3.2	161,223	1.3
2000/01	35	6,347	89,096	14.0	0.8–36.7	2.8	2.4–3.2	144,459	1.5
2001/02	44	6,557	95,146	14.5	1.0–64.9	2.6	2.3–3.1	133,400	2.2
2002/03	36	4,787	83,123	17.4	1.6–43.6	2.5	2.2–2.9	123,133	2.1
2003/04	32	6,043	77,552	12.8	2.9–44.0	2.4	2.2–2.8	96,428	2.3
2004/05	18	3,695	53,834	14.6	0.8–23.3	2.5	2.3–2.6	75,762	1.7
2005/06	18	3,349	56,820	17.0	3.8–31.2	2.5	2.2–2.9	64,166	1.8
2006/07	19	7,611	63,477	8.3	2.7–24.5	2.4	1.9–2.7	62,707	2
2007/08	7	1,048	16,081	15.3	6.0–37.2	2.4	2.1–2.5	55,312	1

a Calculated by dividing fish ticket weight data for Lynn Canal/Stephens Passage from Table 4.3, by dockside sampling average weight per crab data.

b Calculated by dividing number of crab sampled for size frequency by estimated number of crab caught.

Table 12.12–Lynn Canal/Stephens Passage summary of traditional commercial Tanner crab size frequency and shell condition, 1970/71 to present. Data was collected during dockside sampling.

	Number of sampled		Carapace width (mm)		Recruitment	
Season	Boats	Crab	Average	Range	% Recruits[a]	% Postrecruits[b]
1970/71	1	99	157	137–177	68.4	31.6
1971/72						
1972/73						
1973/74						
1974/75						
1975/76	5	655	155.5	126–182	47.6	52.4
1976/77[c]	15	2,521	154.7	124–191	45.5	54.5
1977/78	10	1,382	155.7	131–187	20.2	79.8
1978/79	9	1,213	154.7	129–191	53.4	46.6
1979/80	5	555	153.3	128–186	74.8	25.2
1980/81	4	155	149.9	136–182	36.4	63.6
1981/82	5	518	151.4	131–193	71.1	28.9
1982/83	12	1,296	151.2	135–177	79	21
1983/84	2	204	153.8	139–177	67	33
1984/85	8	845	153.5	136–183	75.5	24.5
1985/86	29	3,166	151.6	135–191	72.4	27.6
1986/87	40	4,473	152.9	133–188	72.1	27.9
1987/88	52	5,300	151.9	135–185	71.5	28.5
1988/89	33	3,592	154.7	133–194	75.2	24.8
1989/90	35	3,945	151.9	129–185	69.1	30.9
1990/91	10	1,053	155.2	138–188	69.1	30.9
1991/92	37	3,796	156.7	129–190	51.2	48.8
1992/93	26	2,713	155.1	135–192	54.7	45.3
1993/94	12	1,292	151.7	130–190	68.3	31.7
1994/95	30	4,194	152.9	131–191	64.7	35.3
1995/96	23	3,317	155.9	136–186	54.1	45.9
1996/97	25	2,372	156.2	134–196	61.1	38.5
1997/98	35	2,680	157.9	136–189	62.3	37.6
1998/99	18	1,275	159.7	125–193	58.7	41.1
1999/00	23	2,157	157.9	129–188	55.7	44.1
2000/01	30	2,128	158.1	136–197	46.0	53.9
2001/02	40	2,993	152.8	118–197	64.3	31.8
2002/03	34	2,545	155.4	133–190	74.5	25.2
2003/04	30	2,219	152.7	131–189	71.9	27.4
2004/05	17	1,275	153.4	136–190	67.0	32.3
2005/06	15	1,125	153.1	130–180	69.4	30.1
2006/07	17	1,250	152.9	137–188	69.1	30.8
2007/08	7	525	151.8	136–181	59.6	39.8

a Recruits = all new and soft shell crab ≥140 mm and ≤164 mm carapace width.

b Postrecruits = all new and soft shell crab ≥ 165 mm and old and very old shell crab ≤140 mm carapace width.

c The first season that the regulatory size was 5 1/2-inch (140 mm) carapace width.

Table 12.13–Frederick Sound summary of traditional commercial Tanner crabs CPUE and average weight, 1974/75 to present. Data was collected during dockside sampling and interviews.

Season	Number Sampled			Avg. catch per pot	Range of catch/pot	Weight (lb)		Estimated no. crab harvested [b]	Percent of harvest sampled [c]
	Boats interviewed	Pots lifted	Crab captured			Average	Range		
1974/75	1					3.2	3.2		
1975/76									
1976/77	4					2.6	2.4–2.8		
1977/78	14					2.7	2.5–3.1		
1978/79	5					2.5	1.6–2.9		
1979/80	1					2.8	2.8		
1980/81									
1981/82	5					2.4	2.2–2.5	176,967	1.2
1982/83	4					2.7	2.4–3.0	40,947	2
1983/84	4					2.4	2.3–2.6	193,579	0.4
1984/85	7					2.7	2.3–3.0	134,336	0.8
1985/86	15	2,879	21,651	6.6	1.8–10.0	2.5	2.1–2.7	115,115	1.3
1986/87	10	3,423	36,051	11.7	2.9–22.2	2.5	2.1–2.9	128,035	0.9
1987/88	22	7,478	67,096	10.3	2.4–26.0	2.4	2.2–2.6	190,676	1.2
1988/89	30	8,957	150,506	18.8	4.5–42.7	2.4	2.3–2.8	242,605	1.4
1989/90	42	13,577	149,824	10.9	1.0–30.0	2.5	2.2–3.0	268,599	1.7
1990/91	35	13,188	209,884	16.1	5.7–38.6	2.6	2.1–3.0	230,171	1.8
1991/92	26	10,387	93,663	8.7	2.0–20.0	2.7	2.3–3.0	158,191	1.6
1992/93	19	6,449	75,307	12	3.3–31.7	2.5	2.1–2.8	176,736	1.4
1993/94	44					2.4	1.9–2.9	363,335	1.7
1994/95	45					2.5	2.0–3.0	414,133	1.4
1995/96	40	6,404	109,007	13.2	0.5–31.7	2.7	2.1–2.9	265,764	2.1
1996/97	39	4,286	57,385	13.4	3.8–32.0	2.6	2.1–2.9	186,461	1.8
1997/98	35	4,366	86,792	19.9	0.5–54.6	2.6	2.2–3.1	196,591	1.3
1998/99	25	7,378	112,153	15.2	1.1–54.9	2.5	2.1–2.9	211,257	0.9
1999/00	51	11,948	148,149	12.4	0.5–69.2	2.7	2.2–3.3	190,398	1.8
2000/01	44	9,448	106,877	11.3	0.2–32.9	2.7	2.3–3.3	137,832	2.5
2001/02	39	8,371	76,916	9.2	0.6–38.0	2.7	2.1–3.1	80,771	3
2002/03	37	8,371	71,339	8.5	0.5–44.6	2.6	1.8–3.0	69,523	3.5
2003/04	36	7,009	88,212	12.6	0.7–34.0	2.6	2.2–3.1	92,872	2.8
2004/05	34	6,699	88,029	13.1	0.5–34.0	2.5	2.1–3.0	88,410	2.6
2005/06	28	7,001	102,133	14.6	1.1–49.6	2.5	2.2–3.0	107,979	1.8
2006/07	25	7,227	103,586	14.3	0.6–31.1	2.6	2.2–3.0	113,916	1.4
2007/08	15	3,971	43,987	11.1	1.3–18.5	2.6	2.1–3.0	68,935	1.5

[a] Calculated by dividing fish ticket weight data for Frederick Sound from Table 4.5, by dockside sampling average weight per crab data.

[b] Calculated by dividing number of crab sampled for size frequency by estimated number of crab caught.

Table 12.14–Frederick Sound summary of traditional commercial Tanner crab size frequency and shell condition, 1971/72 to present. Data was collected during dockside sampling.

Season	Number of sampled		Carapace width (mm)		Recruitment	
	Boats	Crab	Average	Range	% Recruits[a]	% Postrecruits[b]
1971/72	2	148	147.4	121–180	60	40
1972/73	3	429	156.9	128–183	73.4	26.6
1973/74	9	1,658	153	111–190	68.7	31.3
1974/75	4	412	158.8	127–190	58.7	41.3
1975/76	3	304	154.3	135–183	75.3	24.7
1976/77[c]	8	820	155.3	129–192	67.7	32.3
1977/78	16	1,862	156.2	124–192	33.3	66.7
1978/79	17	1,851	155.5	131–198	42.3	57.7
1979/80	36	3,747	154.9	134–193	61	39
1980/81	30	3,081	153	125–192	68.9	31.1
1981/82	20	2,046	150.9	130–188	63.8	36.2
1982/83	8	785	153.4	135–185	70.2	29.8
1983/84	8	839	152.4	135–187	80.6	19.4
1984/85	8	1,068	155.2	135–197	67.7	32.3
1985/86	14	1,524	151.5	131–188	80	20
1986/87	10	1,150	151.8	136–187	81.3	18.7
1987/88	23	2,338	150.3	135–186	65.6	34.4
1988/89	33	3,434	151.9	133–182	44.3	55.7
1989/90	45	4,586	150.9	132–185	60	40
1990/91	40	4,086	153.6	131–193	70.4	29.6
1991/92	26	2,593	154.6	134–189	60.1	39.9
1992/93	24	2,413	149.4	133–185	73.1	26.9
1993/94	48	6,297	150	130–186	80.2	19.8
1994/95	47	5,593	152.8	115–188	73.4	26.6
1995/96	40	5,549	154.1	135–188	66.9	33.1
1996/97	37	3,331	153.7	132–195	74.8	24.4
1997/98	31	2,448	152.3	127–186	74.9	23.8
1998/99	21	1,800	153.9	135–188	74.2	25.5
1999/00	49	3,445	154.4	131–193	72.9	26.6
2000/01	39	3,448	155.1	134–188	68.1	31.5
2001/02	33	2,422	153.9	132–192	72.8	25.8
2002/03	33	2,443	153.7	134–185	78.1	21.3
2003/04	35	2,608	153.5	134–187	75.4	24.1
2004/05	32	2,318	151.6	135–192	74.2	25.2
2005/06	26	1,947	152.7	126–183	71.8	27.9
2006/07	22	1,637	153.2	136–190	67.3	32.3
2007/08	14	1,047	152.2	137–183	55.5	44.2

[a] Recruits = all new and soft shell crab ≥140 mm and ≤164 mm carapace width.

[b] Postrecruits = all new and soft shell crab ≥ 165 mm and old and very old crab ≤ 140 mm carapace width.

[c] The first season that the regulatory legal size was 5 1/2-inch (140 mm) carapace width.

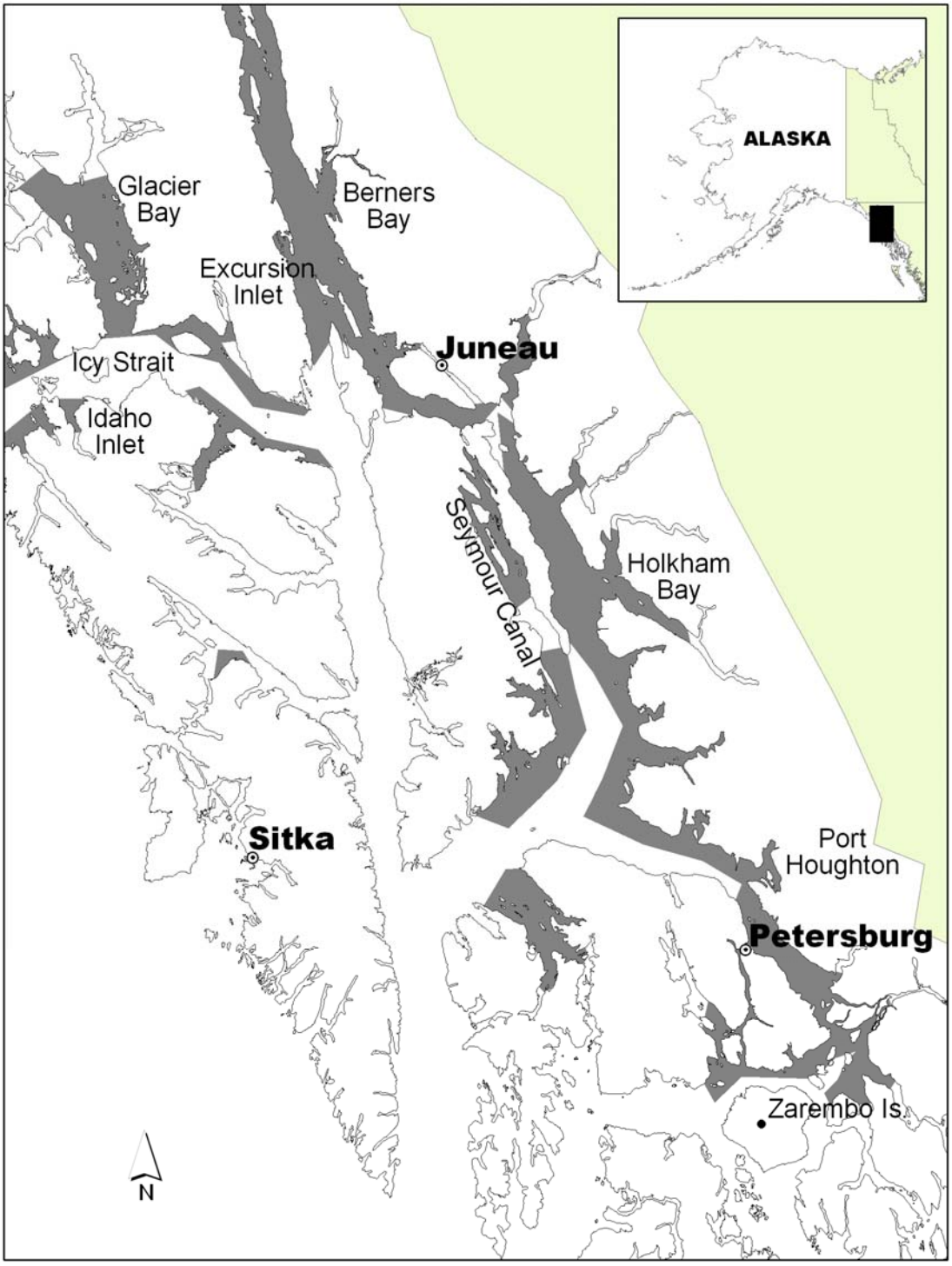

Figure 12.1–Map showing major Tanner fishing grounds in Southeast Alaska.

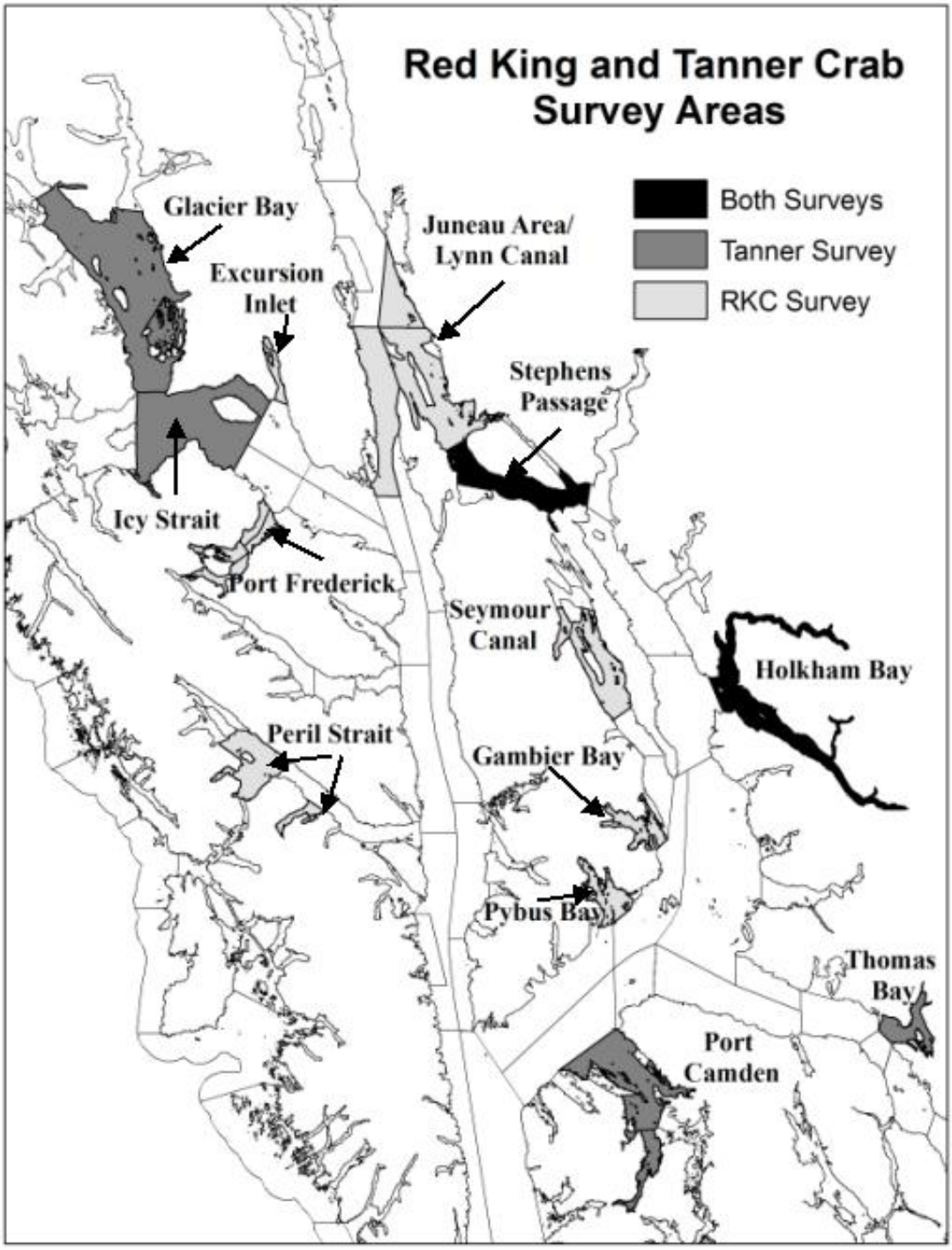

Figure 12.2–Map showing red king and Tanner crab survey areas in Southeast Alaska, ADF&G Registration Area A.

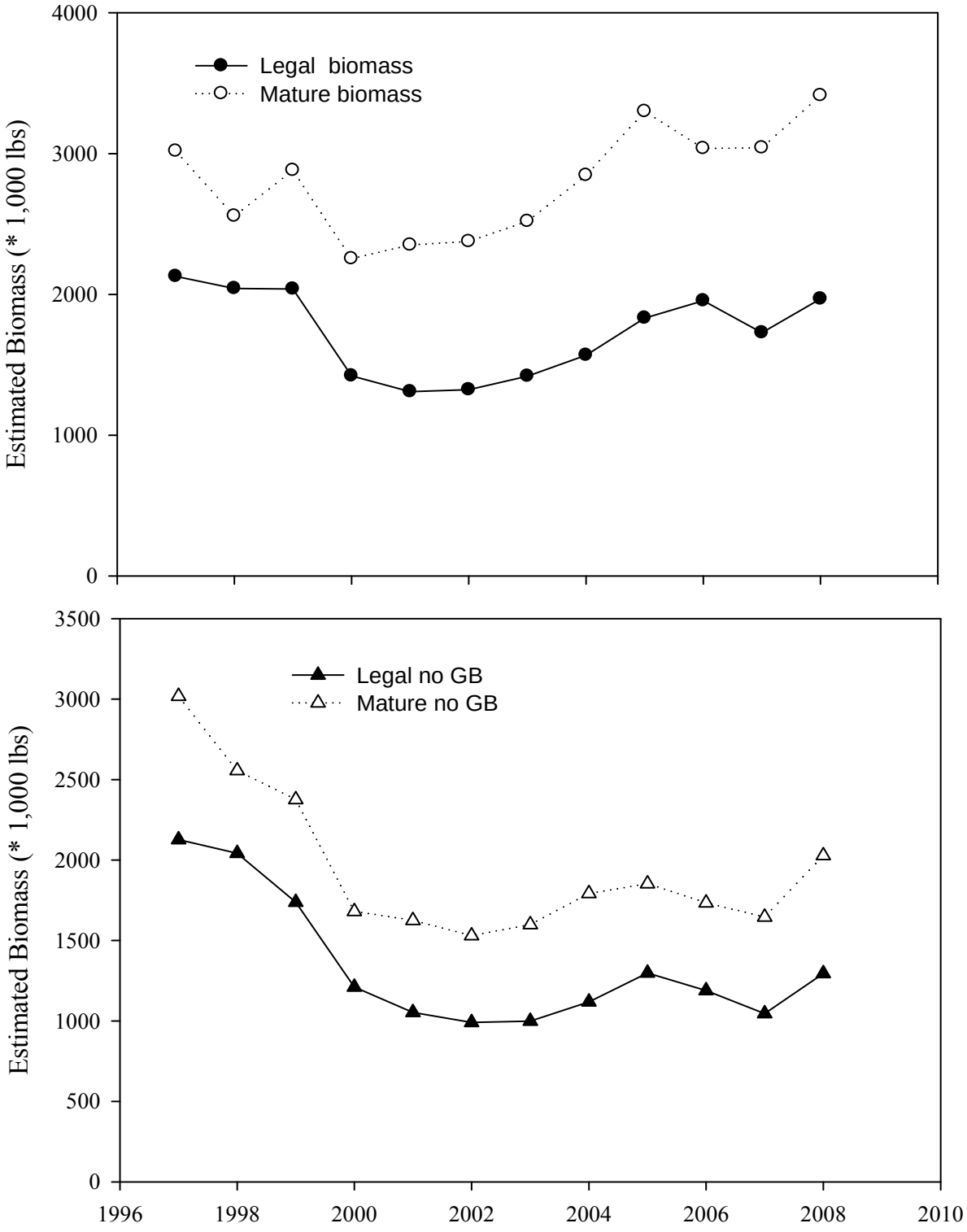

Figure 12.3–Sum of survey area biomass estimates (excluding expansion factor) for legal and mature Tanner crab with and without Glacier Bay (GB) from catch-survey modeling of red king crab and Tanner crab survey data combined, 1997–2008 survey years, Southeast Alaska.

CHAPTER 13: YAKUTAT TANNER CRAB FISHERY

INTRODUCTION

Tanner crabs are a widely distributed brachyuran (true) crab that inhabits temperate and subarctic waters of the eastern Pacific Ocean from northern California to the Bering Sea.

COMMERCIAL FISHERY

The Yakutat fishery occurs in both the relatively protected major bays in the area, Icy Bay and Yakutat Bay, as well as in portions of the more exposed outside coast between Cape Fairweather and Cape Suckling. Most of the fishing occurs out to the 100-fathom contour. For reporting purposes, this area is divided into four major districts, 181, 183, 189, and 191. Districts 181, 183, and 191 encompass state waters within three miles, and District 189 includes waters under state management jurisdiction between three and 200 miles.

Yakutat is a nonexclusive registration area for Tanner crab, which means that a vessel fishing there may also fish in other nonexclusive registration areas in the same registration year (August 1 through July 31). The Yakutat fishery is also open to entry to any properly licensed, permitted, and registered participant.

Despite many indications of poor recruitment and low abundance, continued fishing was permitted throughout the late 1990s so that harvest data with which to assess stock condition was available. It was thought that a low level of fishing activity was tolerable as long as it did not significantly exceed that of recent seasons. However, a period of low harvest level persisted since the early 1980s to 2000. Since continued fishing on reduced brood stock could increase the recovery period, a decision was made to close the fishery until stock recovery could be demonstrated. The Yakutat Tanner crab stock was designated as a "Collapsed and Recovering Fishery" (ADF&G 1999) in preparation for the January 2000 Alaska Board of Fisheries (BOF) meeting.

FISHERY DEVELOPMENT AND HISTORY

During the open seasons from 1995/96 through 1999/00, the fishery had been conducted either by smaller vessels based in Yakutat, fishing mainly in Yakutat Bay, or by larger vessels based in other ports that range widely throughout the Registration Area. Most of the vessels had live tanks, although some of those on the smaller vessels are simple drop-in tanks intended for day fishing. Most of the smaller vessels are used primarily for other fisheries during the rest of the year and winter crabbing for Tanner and other crabs is generally pursued as a secondary source of income. No more than six vessels of various sizes normally fished in any given season.

Lightweight cone or pyramid-shaped pots had been more commonly used than the heavier, 7-foot square pots originally designed for king crab. An additional factor favoring the lighter gear in Yakutat is the area-wide prohibition on the use of side-loading pots.

Regulations in Yakutat include harvest of only male Tanner crab larger than 5 1/2 inches (140 mm) carapace width during a January 15–May season. Also, a guideline harvest ceiling of

1,000,000 pounds, based on historic harvest trends, has been established for this area. Actual stock composition can only be inferred because no preseason stock assessments are conducted.

Port sampling of Tanner crab from Yakutat has been limited by the widespread, low-level nature of the fishery and limited staffing and funding. Available information demonstrates that Yakutat crabs are smaller, more often skip-molts, and generally less robust than those harvested in more productive areas to the east (Southeast Alaska) and west (Kodiak). These characteristics have been assumed to indicate more marginal habitat or environmental conditions for Tanner crabs in Yakutat than other areas. Seasonal effort and total catch in the last decade have been order of magnitude less than the 1970s harvests.

It was not until the early 1970s that significant Tanner crab fisheries developed in the Yakutat area (Table 13.1). As the overall market for Tanner crabs slowly grew, landings from the Yakutat area also rose, averaging about 1,500,000 pounds per season between the 1972/73 and 1979/80 seasons. Following the record 2,435,000-pound catch during the 1979/80 season the harvest steadily declined through most of the 1980s. Peak catches consistently occurred between the months of February and April (Table 13.2), although the season had extended from September 1 to May 15 during most of the early years of the fishery.

During the 1970s, this fishery attracted large, long-ranging vessels with live tanks in which many tons of crabs could be kept alive for extended periods. Landings from this period suggest that much of the area was heavily fished (Table 13.3). Many of these vessels also participated in shellfish fisheries in other areas of Alaska.

The stocks could not sustain the levels of harvest of the 1970s and crashed between the 1979/80 and 1980/81 seasons. The early 1980s saw the use of side-loading pots prohibited, the starting date of the season changed to mid-winter, and a continued decline in the number of vessels, the catch per vessel, and the total catch. Catch during the 1980s averaged about 130,000 pounds per season. Many of the larger vessels left the fishery. Those remaining were forced by regulation to switch to top-loading conical or pyramidal pots. By the 1983/84 and 1984/85 seasons, only small, local vessels, operated by residents of Yakutat, were participating in this fishery. Reported landings were limited to the immediate vicinity of Yakutat Bay (Table 13.3).

In the 1985/86 season, two larger crabbers entered the fishery. The larger vessels experienced uniformly poor catches despite extensive exploratory fishing. In the 1986/87 season, five large vessels based in Kodiak, Valdez, and Pelican registered for the fishery, along with the local fleet in Yakutat. Only two of the larger vessels actively participated in the fishery, and their disappointing landings discouraged the remaining three from entering the fishery. In the 1987/88 season, only one large vessel and several of the smaller vessels fishing around Yakutat Bay reported any landings. In the 1988/89 season, one large vessel and several of the smaller vessels based in Yakutat reported landings from the Yakutat area. Much of the detailed data from this fishery is considered confidential because of the few vessels that fished in this area.

During the 1989/90 season, only a few local vessels, limited to the waters of Yakutat Bay, participated in the fishery. From the 1989/90 season to the closure in 1999/00 season, the consistent fishing pattern was for one or two larger vessels a season to prospect throughout much of the area and land most of the catch while smaller vessels based in Yakutat fished Yakutat Bay. Catch averaged 80,000 pounds annually.

Because the Tanner crab stocks in the Yakutat area have not recovered since the crash in the early 1980s, the fishery was designated as 'collapsed and recovering' at the January 2000 board meeting.

REGULATION DEVELOPMENT

FISHING SEASONS AND PERIODS

Fishing seasons in Yakutat started in the 1973/74 season. By regulation, the season started on September 1 and ended on May 20, 1974. For most of the 1970s, the seasons started on September 1 and extended through May 15 of the following year.

The 1979/80 and 1980/81 seasons were shorter, closing by emergency order on April 20 in the 1979/80 season and by regulation on May 1, 1981, respectively. Stocks began crashing in the 1980/81 season, and subsequent changes to the season resulted in reduced fishing time. In 1981/82 and 1982/83, the season started on February 1 and closed on May 15. The season was further shortened in early 1982, starting on February 10 for the 1983/84 season and ending on May 1, 1984. Increasing catch resulted in adoption of a 1984/85 season that extended from January 15 to May 1, 1985. This season has remained in effect through the present.

SEX AND SIZE RESTRICTIONS

Size restrictions permitting harvest of only male crabs over 5.5 inches in carapace width were first implemented in the 1976/77 season and have remained the same since then.

QUOTAS AND GUIDELINE HARVEST RANGES

A 3,000,000-pound Guideline Harvest Ceiling (GHC) was instituted in 1976/77 in response to the rapidly escalating fishery. It was amended to a Guideline Harvest Range (GHR) in 1978/79, of between 500,000 and 3,000,000 pounds. This range remained unchanged through the 1983/84 season. The range was revised for the 1984/85 season to 200,000 to 1,000,000 pounds. This was further revised for the 1986/87 season to ceiling of 1,000,000 pounds and has remained unchanged since. The last revision essentially reduced the lower end of the GHR to zero pounds and provided for closures if stock conditions did not support any harvest.

GEAR RESTRICTIONS

There were no gear restrictions during the 1973/74 season. Between the 1974/75 and 1976/77 seasons, pots, ring nets, and shrimp trawls were legal. In 1976/77, a pot limit was imposed for waters within Yakutat Bay. Only 60 pots could be used for king and Tanner crabs within the bay when both seasons overlapped. During the closed season for Tanner crab, only 100 pots could be used for king crabs. Starting in 1977/78, gear was limited to either pots or ring nets and the pot limit in Yakutat Bay was changed to allow 100 pots for both Tanner and king crab fisheries. Tanner pots had to have a tunnel eye opening with a maximum height of 5 inches and a tunnel eye perimeter of greater than 30 inches. This distinguished Tanner pots from Dungeness pots. Buoy stickers for fishing in Yakutat Bay were required. In 1980/81, the 100-pot restriction area was expanded to an area in Yakutat Bay east of a line from Cape Sitkagi to Ocean Cape, essentially including all productive waters within Yakutat Bay. Side-loading pots were prohibited from the entire registration area for the 1982/83 season to reduce halibut by-catch. Consequently, some vessels that had been using side-loading king crab pots with Tanner boards were discouraged from entering the fishery. Two, 4¾-inch diameter escape rings were required

for each pot during the 1984/85 season. Starting in 1985/86, gear storage was restricted to a period of seven days after the season closure. Escape rings were repealed for the 1988/89 fishery. Ring nets were prohibited starting with the 1991/92 fishery, as a consequence of board action restricting their use in the state to Southeast Alaska.

OTHER RESTRICTIONS

Starting in 1979/80, formal hold inspections and certifications were repealed. Starting in 1985/86, preseason prospecting during a period 14 days before the season opening was prohibited and vessels were required to be at a processing plant within 24 hours after the closure of the season.

STOCK ASSESSMENT

There have never been stock assessment surveys for the Yakutat Tanner crab stock and dockside sampling effort has been extremely limited. Minimal dockside sampling was conducted through the 1999/2000 season (Table 13.4 and 13.5). The fishery was re-opened for a 14-day fishing period within the waters of Yakutat Bay and 30-day period elsewhere during the 2003/04 season. Although participation was very limited, there was no evidence of stock recovery.

RECENT SEASONS

The Yakutat Tanner fishery has been closed since the 1999/00 season and was designated as 'collapsed and recovering' at the January 2000 board meeting. The only sources of information at present are the ADF&G Sport Fish division Statewide personal use and sport harvest survey, the bycatch of juvenile Tanner crab from the Yakutat scallop observer program, and anecdotal information from crabbers passing by Yakutat who set personal use pots. None of these sources suggest a recovery.

While it is probable that the collapse of the Yakutat Tanner crab fishery is due at least partially to over harvest, and excessive handling of the non-legal portion of the stock (ADF&G 1999), the changing oceanography of the Gulf of Alaska has also been implicated. Variations in recruitment of other Gulf of Alaska shellfish stocks have been related to oceanographic conditions (Zheng and Kruse 2000). Nonetheless, there is also an underlying relationship between brood stock abundance and recruitment (Zheng and Kruse 1998), especially when populations are low. Our best management practice until stock recovery is apparent will be careful maintenance of existing brood stock populations.

CHAPTER 13—TABLES

Table 13.1–Commercial Tanner crab catches in pounds, number of vessels, pounds per permit, number of landings and pounds per landing in Registration Area D, 1972/73 season to present.

Year/Season	Number			Pounds per Permit	Average Weight
	Permits	Crabs	Pounds		
1972/73	7	74,636	222,441	31,777	3.0
1973/74	11	934,100	1,872,357	170,214	2.0
1974/75	13	876,889	1,972,752	151,750	2.2
1975/76	5	861,569	1,762,589	352,518	2.0
1976/77	7	433,994	966,650	138,093	2.2
1977/78	8	437,542	1,003,116	125,390	2.3
1978/79	15	753,248	1,691,941	112,796	2.2
1979/80	23	1,089,820	2,435,123	105,875	2.2
1980/81	14	289,880	642,608	45,901	2.2
1981/82	7	32,521	71,302	10,186	2.2
1982/83	10	72,784	151,621	15,162	2.1
1983/84	4	4,958	11,142	2,786	2.2
1984/85	5	1,728	3,665	733	2.1
1985/86	5	1,185	2,379	476	2.0
1986/87	3	23,575	48,877	16,292	2.1
1987/88	2	*	*	*	
1988/89	5	73,179	155,528	31,106	2.1
1989/90	5	35,135	76,816	15,363	2.2
1990/91	7	19,260	41,749	5,964	2.2
1991/92	4	18,493	39,495	9,874	2.1
1992/93	5	53,167	116,718	23,344	2.2
1993/94	11	154,921	364,365	33,124	2.4
1994/95	14	45,749	107,010	7,644	2.3
1995/96	7	12,352	27,828	3,975	2.3
1996/97	8	7,686	16,733	2,092	2.2
1997/98	4	4,330	9,559	2,390	2.2
1998/99	5	3,742	8,528	1,706	2.3
1999/00	1	*	*	*	
2000-2003			Season Closed		
2003/04			* *	*	
2004-2008			Season Closed		

* Fewer than 3 permits were fished; information is confidential.

Table 13.2–Commercial Tanner crab catch in pounds by month and season in Registration Area D, 1972/73 to present.

Season	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
1972/73		*	*					*	122,912	*		17,224	222,441
1973/74					*	*	313,787	990,247	558,047				1,872,357
1974/75					*	*	592,145	839,397	481,855				1,972,752
1975/76				*	*	*	661,843	456,738	*				1,762,589
1976/77					*	*	486,130	*					966,650
1977/78		*	14,537	31,555	161,674	206,022	254,174	279,030	53,124				1,003,116
1978/79	*	*		*	63,661	185,056	412,844	766,267	238,068				1,691,941
1979/80		10,242	16,442	27,877	56,929	524,077	1,220,869	572,219	*				2,435,123
1980/81				*	6,157	181,891	392,739	60,836					642,608
1981/82							16,390	47,076	7,836				71,302
1982/83						50,187	73,934	27,500					151,621
1983/84						*	5,848	3,580					11,142
1984/85								3,665					3,665
1985/86					*	*	1,117	*					2,379
1986/87						*	48,151	*					48,877
1987/88						*	*	*	*				*
1988/89					*	*	70,291	36,772	47,102				155,528
1989/90					*	29,204	37,493	7,369					76,816
1990/91					*	8,663	14,109	15,887			*		41,749
1991/92				*	18,882	14,237	5,803						39,495
1992/93						*	81,964	31,574	*				116,718
1993/94					7,604	207,315	109,399	30,966	9,081				364,365
1994/95					54,039	35,653	7,336	7,405	2,577				107,010
1995/96					12,958	6,693	4,283	3,894					27,828
1996/97					2,325	4,735	1,877	4,503	*				16,733
1997/98					*	4,481	2,153	*	*				9,559
1998/99					1,080	*	*	2,708					8,528
1999/00					*								*
2000-2008	Season Closed / No Harvest												

* Fewer than 3 permits were fished; information is confidential.

Table 13.3–Commercial Tanner crab, catch in thousands of pounds by district and season in Registration Area D, 1972/73 season to present.

	District						
Season	**181**	**182**	**183**	**185**	**189**	**191**	**Total**
1972/73	120,230		102,211				222,441
1973/74	963,274	*	292,603		615,959		1,872,357
1974/75	1,329,936		*		*	428,043	1,972,752
1975/76	1,448,504		*		*	*	1,762,589
1976/77	513,935		452,715				966,650
1977/78			1,003,116				1,003,116
1978/79	718,047		404,571	*		544,013	1,691,941
1979/80	1,330,149		153,995		112,794	838,185	2,435,123
1980/81	163,965		150,992		65,372	262,279	642,608
1981/82			51,201			*	71,302
1982/83	8,399		83,821		*	*	151,621
1983/84			11,142				11,142
1984/85			3,665				3,665
1985/86			2,379				2,379
1986/87	*		*				48,877
1987/88			*			*	*
1988/89	*		7,878		*	*	155,528
1989/90	27,915		*			*	76,816
1990/91	16,193		25,556				41,749
1991/92	*		13,972				39,495
1992/93	*		53,318				116,718
1993/94	320,574		28,573		15,218		364,365
1994/95	77,436		29,574				107,010
1995/96	10,181		17,647				27,828
1996/97	*		11,866				16,733
1997/98			9,559				9,559
1998/99			8,528				8,528
1999/00			*				*
2000-2008	Season Closed / No Harvest						

* Fewer than 3 permits were fished; information is confidential.

Table 13.4–Tanner crab size frequency and shell condition in Yakutat Area D, 1974/75 to present. Data collected during dockside sampling.

	Number of sampled		Carapace width (mm)		Recruitment	
Season	**Boats**	**Crab**	**Average**	**Range**	**% Recruits[a]**	**%Postrecruits[b]**
1974/75	3	516	141.4	110 - 174	87.3	12.7
1975/76	11	1,079	140.7	96 - 179	39.3	60.7
1976/77[c]	0	0				
1977/78	9		145.1	122 - 171	65.0	35.0
1978/79	15	1,616	147.8	128 - 172	57.3	42.7
1979/80	22	2,509	147.3	131 - 174	22.5	77.5
1980/81	22	2,505	147.3	107 - 172	2.7	97.3
1981/82	1	99	146.6	137 - 165	75.0	25.0
1982/83	17	1,894	145.9	131 - 173	81.9	18.1
1983/84	1	100	149.9	139 - 170	44.9	55.1
1984/85	0	0				
1985/86	0	0				
1986/87	4	520	144.0	130 - 166	14.3	85.7
1987/88	2	548	145.4	136 - 169	59.2	40.8
1988/89	6	611	148.4	135 - 177	35.8	64.2
1989/90	5	779	147.0	137 - 174	4.1	95.9
1990/91	0	0				
1991/92	4	0	148.5	137 - 178	8.7	91.3
1992/93	0					
1993/94	4	654	147.0	436-171	71.1	28.9
1994/95	0	0				
1995/96	0	0				
1996/97	0	0				
1997/98	0	0				
1998/99	0	0				
1999/00	2	206	147.7	139 - 175	88.3	11.7
2000-2008	Season Closed / No Harvest					

[a] Recruits = all new and soft shell crab >140 mm and <164 mm carapace width.

[b] Postrecruits = all new and soft shell crab >165 mm and old and very old crab >140 mm carapace width.

[c] The first season that the regulatory legal size was 5 1/2-inches (140 mm) carapace width.

Table 13.5–Summary of commercial Tanner crab CPUE and average weight in Yakutat Area D, 1975/76 to present. Data collected during dockside sampling and interviews.

Season	Number of			Average Catch/Pot	Range of Catch/Pt	Weight (lb)		Estimated No. of Crab Caught[a]	Percent of Catch Sampled[b]
	Boats Interviewed	Pots lifted	Crab captured			Average	Range		
1975/76	11					1.9	1.7 - 2.1	947,628	0.1
1976/77[c]	2					2.1	2.0 - 2.2	460,310	
1977/78	4					2.2	2.0 - 2.5	451,854	0.5
1978/79	7	3,810	160,164	34.1	20.1 - 48.6	2.3	2.3 - 2.4	729,285	0.2
1979/80	21	8,802	322,624	40.9	7.7 - 79.0	2.3	2.1 - 2.4	1,082,277	0.2
1980/81	12	3,688	51,765	17.8	10.2 - 27.1	2.3	2.1 - 2.7	280,615	0.9
1981/82	0								
1982/83	16					2.1	1.9 - 2.2	72,895	2.6
1983/84	0								
1984/85	1					2.4		1,521	
1985/86	0								
1986/87	3	1,460	18.629	15.5	10.0 - 19.8				
1987/88	2	840	17,850	23.3	18.6 - 28.0	2.1			
1988/89	5	705	12,429	9.8	1.4 - 38.1	2.1		74,061	0.8
1989/90	4	142	1,621	11.3	7.9 - 16.3	2.2	2.1 - 2.3	35,076	2.2
1990/91	0								
1991/92	5	597	8,335	7.6	1.2 - 16.6	2.3		16,168	3.5
1992-1999	No information								
1999/00	2	*	*	*	*	*	*	*	*
2000-2008	Season Closed / No Harvest								

[a] Calculated by dividing fish ticket weight data by dockside sampling average weight per crab data.

[b] Calculated by dividing number of crab sampled for size frequency by estimated number of crab catch.

[c] The first season that the regulatory legal size was 5 1/2-inches (140 mm) carapace width.

* Fewer than 3 permits were fished; information is confidential.

CHAPTER 14: YAKUTAT SCALLOP FISHERY

INTRODUCTION

LIFE HISTORY

The weathervane scallop *Patinopecten caurinus* is widely distributed over sandy substrates at depths of 15–110 fathoms (Barnhart and Rosenkranz 2000), primarily in areas with relatively high bottom currents. A filter feeder on near bottom plankton, this species becomes sexually mature in Alaska at a diameter of three in at which time they are approximately three-years of age (Hennick 1970). However, the oldest scallop aged in Alaska was estimated to be 28-years of age; it measured 10-in across the shell (Hennick 1970). Although there is no minimum legal size, harvest is limited to scallops of four-in in shell width or greater by the minimum inside diameter of the dredge ring. This allows the escapement of mature scallops. Weathervanes are dioecious and in Alaska release gametes into the water column for fertilization from mid May to early July. Fertilized eggs settle to the bottom where they hatch into larvae within several days and settle after two to three weeks. Other commercially exploited species that are captured during scallop dredging include juvenile Dungeness crab *Cancer magister* and Tanner crab *Chionoecetes bairdi* that are found over similar substrates.

FISHERY

Commercial scallop harvest in Region I occurs in Scallop Registration Area D (Yakutat area; Figure 14.1), defined as Registration Area D and all waters of District 16 (5 AAC 38.076(b)(2)). Commercial dredging for the weathervane scallop in Registration Area D occurs in open coastal waters between Cape Fairweather and Cape Suckling. Known offshore beds are extensive and overlap state and federal Exclusive Economic Zone (EEZ) waters. Harvestable populations also occur in Yakutat Bay, but scallop dredging in the bay is prohibited by regulation. The known offshore beds in District 16 (between Cape Spencer and Cape Fairweather) are small in comparison to those historically fished elsewhere in Alaska and overlap state and EEZ waters. Many of the productive beds are discontinuous or dispersed between foul grounds.

The fishery is managed by the State of Alaska according to guidelines in the Alaska Scallop Fishery Management Plan (ASFMP), adopted in 1993. The major features of the plan are required registration, minimum ring sizes of 3 or 4 in depending on the scallop species targeted, prohibition on chafing gear and shucking machines, maximum opening of 15 ft for a scallop dredge, maximum of 12 crew members, guideline harvests ranges by registration area, and a requirement for complete observer coverage on all participating vessels.

The determination of the number of vessels allowed to participate in the statewide fishery is under the jurisdiction of the North Pacific Fishery Management Council, which set the maximum number of vessels at nine in 1999, and identified the permitted vessels at that time. Most vessels working in this fishery are very seaworthy, in excess of 70 ft, and based in Kodiak, Seward, and in other states. The fleet is highly mobile. Most vessels fish New Bedford-type dredges, approximately 12 to 15 ft in

width, with one set off each side of the vessel. These dredges have heavy, rectangular steel frames supporting a mesh bag made from heavy steel rings. Ideally, the dredge skims the bottom just deeply enough to flip scallops into the mesh bag without plowing into the substrate.

Scallop fishing, processing, and marketing operations are more vertically integrated than most other fisheries in Alaska. The same company that owns or operates the vessel also warehouses, transships, brokers, and sells the product to consumers. The primary product is the major adductor muscle, with most processing, and freezing or icing, conducted aboard the harvester vessel on the fishing grounds. The current guideline harvest range (GHR) is 0 to 250,000 lbs in Registration Area D and 0 to 35,000 lbs in District 16. Landed product weight is reported in pounds of frozen or iced meat, which comprises 6 to 11 percent of the live whole weight.

FISHERY DEVELOPMENT AND HISTORY

REGISTRATION AREA D

The first reports of scallop harvests in the Yakutat area were in 1968. Since then, harvests have varied widely (Table 14.1). The roller coaster highs and lows in the harvest reflect a largely unregulated fishery, driven by economics and market forces before adoption of the ASFMP in 1993. Since scallops live for many years after reaching harvestable size and worldwide demand has generally outstripped supply, the recurring crashes in the historical harvest record were strong circumstantial evidence that exploitation rates during some years had been too high. There was little consideration for long-term reproductive viability. Combined with sporadic recruitment, heavy harvests did not leave enough scallops on the grounds to carry the fishery over poor years.

The earliest years of the fishery were very productive. Virgin biomass supported harvests of over 900,000 lbs in 1968 (Yakutat Annual Report, 1968) and 800,000 lbs in 1969, by up to 14 vessels (Table 14.1). These years were followed by two decades of reduced effort and harvests. A statewide trend of increasing interest and participation in scallop fisheries in the early 1990s culminated in a peak harvest of over one million lbs in Registration Area D in 1992 (Table 14.1). In response, the department developed an interim management plan in 1993 under the High Impact Emerging Fishery regulation (5 AAC 39.210). The Alaska Board of Fisheries subsequently adopted a management plan, the ASFMP, into regulation. Annual harvests in Registration Area D have been constrained to a maximum of 250,000 lbs under the ASFMP.

DISTRICT 16

The fishery in Southeast Alaska started in the early 1980s as stocks in Registration Area D to the north and west were fished down. Interest and harvests have been generally low and intermittent. District 16 stocks have been spared much of the roller coaster highs and lows prior to implementation of the Alaska Scallop Fishery Management Plan in 1993. Only a few vessels fished in most seasons, with a maximum of nine vessels in 1994 (Table 14.2), and one to nine vessels in each of the other 16 years of record. The peak harvest of 148,624 lbs occurred in 1990, with an overall historical average of about 46,000 lbs (Table 14.2). Annual harvests in District 16 have been constrained to a maximum of 35,000 lbs under the ASFMP.

Most of the effort in Southeast Alaska has occurred in District 16, although a few landings were reported during the 1982 season from three other districts around the outer coasts of Southeast Alaska before limitation of the fishery to District 16 in 1993. Due to the low numbers of participants and landings, historical data for much of this fishery is confidential.

REGULATION DEVELOPMENT

The weathervane scallop fishery evolved from a wide-open, almost unregulated fishery through the 1992 season into one of the most stringently controlled and managed fisheries in the state in little more than a single season. The speed of emergency order implementation of the statewide ASFMP, and the scope of the regulations were unprecedented.

GUIDELINE HARVEST RANGES

A guideline harvest range (GHR) of 0 to 250,000 lbs for Registration Area D and 0 to 35,000 lbs for District 16 was established by the ASFMP in 1993. The ceilings are the approximate long-term average annual harvests for each area up to 1992.

GEAR RESTRICTIONS

As weathervane scallops become sexually mature at approximately three in (Hennick 1970) a four-in minimum ring inside diameter for scallop dredges was established in order to permit the escape of juvenile and smaller sexually mature scallops. This was the primary passive management tool from 1969 through 1992, and continues to be used as a conservation measure to the present time. Since 1993, the width or horizontal front opening of scallop dredge gear has been limited to 15 ft and the use of any chafing gear or device that would tend to restrict the size of the rings has been prohibited.

To further discourage the entry of ever-larger vessels into the fishery, regulations adopted as part of the ASFMP in 1993 restricted the number of dredges that may be deployed at any time from a scallop vessel to two. Prohibiting mechanical or automated shuckers and restricting the crew size to 12, excluding the observer, has limited daily production per vessel. With the exception of experimental dredges operating under stringent permit conditions, only dredges as defined and restricted by regulation may be used.

FISHING SEASONS AND PERIODS

Registration Area D

For much of its history, this fishery has been open all year, with no closures during sensitive spawning periods. In late spring of 1991, Yakutat Bay was closed to commercial scallop dredging by the Alaska Board of Fisheries. Closure of the bay alleviated conflicts with commercial and subsistence salmon fishers, Dungeness crab and shrimp pot fishers, and other miscellaneous interests. Season closures went into effect in 1993, with the winter fishery managed for a harvest of about 125,000 lbs. The fishery lasted from January 1 through February 28. The ASFMP, with its observer requirement and new regulations, went into effect before the summer fishery, which opened on July 1 and closed on July 11, 1993. The next season opened on January 10, 1994. The delay was due to problems in scheduling training and certification for observers. The season lasted eight days, closing on January 18, 1994. The summer season opened on July 1 and closed on July 12, 1994. The Board of Fisheries formally changed the opening date for the winter fishery in late 1994 from January 1 to January 10 and from a split season to a single winter season. The single winter season lasted through 1997.

In 1995, the season opened January 10 and closed on February 2. The season was shorter in 1996, opening on January 10 and closing on January 25. The last year for the winter fishery was in 1997 when the season opened on January 10 and closed on February 24. At the Alaska Board

of Fisheries meeting in 1997 regulations changed so that the season was opened on July 1 and extended to February 15. In 1998, the season opened on July 1 and closed on July 29. In 1999 the season was July 1 to September 1.

DISTRICT 16

Prior to 1993, this fishery was open all year, with an accounting period of January 1 through December 31. Starting in 1993, the statewide management plan was implemented. For Southeast Alaska, it specified a split season, with a winter fishery starting on January 1 and a summer fishery starting on July 1. In 1994, because of high anticipated effort and catch levels, the winter season opened and closed after a one-day fishery on January 20. The following summer season, which opened by regulation on July 1 and closed by emergency order on October 31, was not as intense because productive areas in other parts of the state were open concurrently.

In 1995, there was only a winter fishery, which opened January 10 and closed on February 13. There were two seasons in 1996. The first one opened in state waters only on January 10 and closed on January 20. The summer fishery opened in federal waters on August 1 and continued through the fall to close on November 29. In 1997, there was a winter fishery lasting from January 10 to February 24. At the Alaska Board of Fisheries meeting in 1997 regulations changed so that the season was opened on July 1 and extended to February 15. There was not a summer fishery in 1997, as the annual allocation had been taken in the winter. The next season began in 1998, opening July 1 and closing on October 6. In 1999, the season was shorter, opening July 1 and extending to September 1.

SIZE RESTRICTIONS

There are no size restrictions on scallops. Any scallop that is retained by 4-in minimum-diameter, legal gear may be possessed and processed. In the past, a high percentage of the smaller scallops retained by this gear could not be economically hand-processed and were returned to the sea. These smaller scallops can now be processed and profitably marketed. Management assumes that adherence to the current GHR will be sufficient to insure overall stock viability despite retention of a larger percentage of smaller scallops.

OBSERVER PROGRAM

The ASFMP allows ADF&G to require vessels participating in the Yakutat area scallop fishery to carry an onboard observer. The purposes of the onboard observer program are to collect a variety of biological and fishery dependent data, monitor bycatch, and provide for regulatory enforcement (Barnhart 2008). Data are collected on bycatch species, discarded and retained scallop harvest, harvest size composition, CPUE, meat recovery, and location, area and depth (Barnhart 2008). During the season, onboard observers e-mail tri-weekly reports detailing scallop harvest, number of tows, area fished and crab bycatch. These harvest data are used to manage the fishery inseason and to track GHLs in Registration Area D and District 16. These data are also used to set GHLs for the following season, and are provided to local advisory committees (ACs), the Alaska Board of Fisheries (BOF), the North Pacific Fisheries Management Council (NPFMC), the National Marine Fisheries Service (NMFS), and the public to help answer questions pertaining to the weathervane scallop fishery in the Yakutat area (Barnhart 2008).

CRAB BYCATCH LIMITS

Dungeness and Tanner crab are captured incidentally in scallop dredges in the Yakutat fishery. The estimated bycatch for District 16 and Registration Area D combined from 1993 through 1998 averaged 4,561 Tanner crab with a modal carapace width of approximately 28 mm and 966 juvenile Dungeness crab annually (Barnhart and Rosenkranz 2000) At its peak from 1980/81 through the 1990/91 seasons the Yakutat Dungeness crab fishery averaged an annual harvest of 2.2 million lbs or approximately 1.1 million crabs. During it's peak from 1972/73–1981/82 seasons the Yakutat Tanner crab fishery averaged an annual harvest of 1.3 million lbs or approximately 0.6 million crabs (Hebert et al. 2002; Hebert et al. 2005)

Tanner crab bycatch caps are established for each management area or district except in the Yakutat area. These bycatch caps are based on the most recent Tanner crab trawl survey population estimate in each area. They are calculated as 1 percent of the surveyed population in areas where a commercial crab fishery has opened in the most recent season and .5 percent if it has not opened. Although the SFMP states that bycatch limits may be required for scallop fisheries opened by permit, no bycatch limits have been established to date for the regular fishery in the Yakutat area. This is both because there is no annual survey to use to estimate populations of Tanner and Dungeness crab in the Yakutat area and because the observed bycatch of crab in the scallop fishery in this area is low in comparison to that of other areas (Barnhart and Rosenkranz 2000).

PERMITS AND REGISTRATION

Regulations specific to the Yakutat area date back to 1960. Between 1960 and 1969, the definition of legal gear was very broad; any device capable of being dragged on the ocean floor and taking scallops was legal, including longlines, trawls, and dredges. Declining harvest during the mid-1970s led to the deletion of longlines as legal gear in 1976, and of trawls in 1981. Permits were required of scallop dredgers from 1979 to 1985. The first closure of Yakutat Bay by regulation occurred in 1992.

In 1995, all of Registration Area D and District 16 in Registration Area A were combined into Scallop Registration Area D to expedite scallop management. Before the areas were combined, vessel operators had to return to Yakutat, deliver scallops caught in an area, void their registration, and register for the new area before they could fish in it. Under the current definition, vessels can fish in either area after reporting their intentions by radio to the management office in Yakutat.

MANAGEMENT CONCERNS

The Yakutat registration area is the only scallop registration area in Alaska that currently does not have crab bycatch caps in place. While red king crab bycatch is virtually nonexistent, and Dungeness crab bycatch is currently at very low levels, Region I shellfish management is concerned about the increasing amount of Tanner crab bycatch in the Yakutat registration area scallop fishery. In the last full season, 2007/08, Tanner crab bycatch reached a level of just under 14,000 crabs (Table 14.3). This was the second highest amount of Tanner crab bycatch in the last seventeen full seasons, eclipsed only by the 2000/01 season when roughly 18,000 crabs were caught. Region I shellfish management will begin to explore means by which to set an equitable Tanner crab bycatch cap prior to the 2009/10 season. Since Tanner crab bycatch caps will be a

significant change to the Yakutat scallop fishery, industry will be made aware of any Tanner crab bycatch cap before it is implemented.

In addition to the lack of Tanner crab bycatch caps, the Yakutat registration area also differs from other areas in the amount of area closed to dredging. While scallop registration areas in Prince William Sound, Cook Inlet, Alaska Peninsula, Bering Sea, and Dutch Harbor have significant portions closed to dredging, the only waters closed to dredging in the Yakutat area is Yakutat Bay. There is currently a vessel-based limited entry system in effect for the statewide scallop fishery in all state waters. Should the sunset date expire on the vessel based limited entry system now in effect for state waters - as it nearly did in 2008 before the sunset date was changed to December 31, 2013 - the fishery in state waters would revert to an open-entry fishery. With the large amount of open state waters in the Yakutat area it is likely that the inception of an open-entry fishery would attract effort to the Yakutat area. This would lead to more complicated management with differing amounts of effort on either side of the state and federal boundary. It would also very likely lead to higher amounts of Tanner crab bycatch than currently occurs, especially if no Tanner crab bycatch caps are instituted prior to the expiration of the sunset date.

STOCK ASSESSMENT

The weathervane scallop population in the Yakutat area is not annually surveyed and no estimate of abundance has been made. Statewide scallop research staff has been in the process of transitioning from dredge surveys to surveys using a camera in a towed sled. Initial tests of the camera survey have been conducted in the Yakutat area in 2002 and 2006 (Rosenkranz 2008, personal communication). As scallop survey technology is advanced, this population will likely be more regularly surveyed in the future

RECENT SEASONS

2006/07 SEASON SUMMARY

Registration Area D

Prior to the start of the 2006/07 season, Region I Shellfish reduced the GHL for Registration Area D twenty-five percent from 200,000 lbs to 150,000 lbs. Region I Shellfish was concerned about GHLs not being met in Registration Area D from the 2001/02 through 2004/05 seasons, declining catch rates, poor recruitment, and smaller scallops making up a larger proportion of the harvest. The 2006/07 commercial scallop season in Registration Area D started on July 1, 2006 and achieved its GHL of 150,000 lbs on October 24, 2006. The harvest was 150,041 lbs of shucked meats (Table 14.1). Less than 3 vessels participated, but one vessel landed on two distinct permits (Table 14.1).

District 16

Prior to the start of the 2006/07 season, Region I Shellfish reduced the GHL for District 16 twenty-five percent from 35,000 lbs to 21,000 lbs. Region I Shellfish was concerned about GHLs not being met in District 16 from the 2001/02 through 2005/06 seasons, declining catch rates, poor recruitment, and smaller scallops making up a larger proportion of the harvest. The 2006/07 District 16 fishery opened on July 1, 2006 and did not achieve its GHL of 21,000 lbs by the regulatory closing date of February 15, 2007. Harvest and effort are confidential as less than 3 vessels participated.

Though only two permits landed in the Yakutat area (Registration Area D and District 16 combined) during the 2006/07 season making harvest and effort data confidential, indications from the observer data noted the highest CPUE since the 1999/00 season. Industry indicated that Yakutat area scallop meats were of much better quality in the 2006/07 fishery than in recent seasons when poor recovery and 'weak meats' were a problem in some scallop beds. Histograms of shell height (SH) distributions for the Yakutat area showed subtle changes in 2006/07 compared to recent seasons. The 2006/07 catch contained higher proportions of scallops 135–150 mm SH than were harvested during recent seasons in the Yakutat area. Registration Area D saw a slightly wider range of scallop sizes in the 2006/07 catch. In Registration Area D, industry targeted scallops larger than 120 mm SH. In District 16 there was some evidence of a recruitment event with a good pulse of scallops caught in the 70-95 mm SH range (Rosenkranz 2008 memo).

2007/08 SEASON SUMMARY

Registration Area D

The 2007/08 commercial scallop season in Registration Area D opened on July 1, 2007 and did not achieve its GHL of 150,000 lbs by the regulatory closing date of February 15, 2008. Harvest and effort are confidential as only two permits made landings.

District 16

The 2007/08 District 16 fishery opened on July 1, 2007 and did not achieve its GHL of 21,000 lbs by the regulatory closing date of February 15, 2008. Harvest and effort are confidential since only one permit made landings.

For the scallop beds that produced nearly all of the 2007/08 harvest in the Yakutat area, CPUE was down slightly from the previous season. High variability and a late season drop in CPUE by one of the vessels were attributed to poor weather conditions encountered late in the season. Histograms of SH distributions for Area D show a high proportion of the catch in the 95-110 mm SH range. Scallops of this size were not marketable. Mean SH for the retained catch in Area D was similar to the previous season. No histograms were generated from the District 16 catch since effort there was very low (Rosenkranz, 2008 memo).

2008/09 SEASON OUTLOOK

Registration Area D

The 2008/09 commercial scallop season in Registration Area D opened on July 1, 2008 and achieved its GHL of 150,000 lbs on August 29, 2008. A preliminary estimate has the harvest at 150,289 lbs of shucked meats (Table 14.1).

District 16

The 2008/09 fishery in District 16 fishery opened on July 1, 2008 and achieved its GHL of 21,000 lbs on August 24, 2008. Harvest and effort data are confidential since only one permit made landings in District 16.

CHAPTER 14–TABLES AND FIGURES

Table 14.1–Registration Area D historic commercial harvest and effort for weathervane scallops.

Year or Season	Harvest (pounds shucked meat)	Permits	Landings	Pounds per Permit	Pounds per Landing
1969	836,807	14	59	59,772	14,183
1970	*	*	*	*	*
1971	84,948	3	10	28,316	8,495
1972	128,241	4	6	32,060	21,374
1973	173,700	4	4	43,425	43,425
1974	*	*	*	*	*
1975	139,022	6	11	23,170	12,638
1976	189,543	6	15	31,591	12,636
1977	*	*	*	*	*
1978	0	0	0	0	0
1979	30	1	1	30	30
1980	255,667	8	22	31,958	11,621
1981	455,858	12	36	37,988	12,663
1982	168,353	7	24	24,050	7,015
1983	0	0	0	0	0
1984	74,010	3	15	24,670	4,934
1985	*	*	*	*	*
1986	98,513	3	19	32,838	5,185
1987	*	*	*	*	*
1988	*	*	*	*	*
1989	*	*	*	*	*
1990	442,310	9	49	49,146	9,027
1991	402,571	5	55	80,514	7,319
1992	1,063,838	9	70	118,204	15,198
1993	264,193	10	16	26,419	16,512
1994	253,060	12	18	21,088	14,059
1995	242,491	10	18	24,249	13,472
1996	238,736	5	15	47,747	15,916
1997	242,940	4	8	60,735	30,368
1998/99	240,086	7	49	34,298	4,900
1999/00	249,681	3	22	83,227	11,349
2000/01	195,699	3	34	65,233	5,756
2001/02	*	*	*	*	*
2002/03	*	*	*	*	*
2003/04	*	*	*	*	*
2004/05	*	*	*	*	*
2005/06	199,351	3	38	66,450	5,246
2006/07	150,041	3	16	50,014	9,378
2007/08	*	*	*	*	*
2008/09[a]	150,289	3	21	50,096	7,157
Averages	203,454	5	20	44,164	10,326

* Fewer than 3 permits were fished; information is confidential.

[a] Most recent year's data should be considered preliminary.

Table 14.2–District 16 historic commercial harvest and effort for weathervane scallops.

Year or Season	Harvest, lbs shucked meat	Permits	Landings	Pounds per permit	Pounds per landing
1980	*	*	*	*	*
1981	*	*	*	*	*
1982	*	*	*	*	*
1983	*	*	*	*	*
1984	0	0	0	0	0
1985	0	0	0	0	0
1986	0	0	0	0	0
1987	0	0	0	0	0
1988	0	0	0	0	0
1989	0	0	0	0	0
1990	148,624	5	8	29,725	18,578
1991	39,817	3	9	13,272	4,424
1992	*	*	*	*	*
1993	*	*	*	*	*
1994	27,613	9	10	3,068	2,761
1995	33,302	7	8	4,757	4,163
1996	*	*	*	*	*
1997	22,890	4	5	5,723	4,578
1998/99	*	*	*	*	*
1999/00	*	*	*	*	*
2000/01	30,904	3	11	10,301	2,809
2001/02	*	*	*	*	*
2002/03	*	*	*	*	*
2003/04	*	*	*	*	*
2004/05	*	*	*	*	*
2005/06	*	*	*	*	*
2006/07	*	*	*	*	*
2007/08	*	*	*	*	*
2008/09[a]	*	*	*	*	*
Average	19,805	2	4		

* Fewer than 3 permits were fished; information is confidential.

[a] Most recent year's data should be considered preliminary.

Table 14.3–Scallop Registration Area D (Yakutat) annual bycatch of Tanner, Dungeness, and king crab (updated from Barnhart and Rosenkranz 2000).

Year or Season	District 16			Registration Area D		
	Tanner	King	Dungeness	Tanner	King	Dungeness
1993				1,700	40	351
1994	10	0	15	2,370	0	179
1995	469	0	93	3,751	0	2,379
1996	39	0	140	2,591	0	2,320
1997	669	0	1	6,872	0	38
1998/99	129	0	0	5,884	0	277
1999/00	273	0	0	8,891	0	177
2000/01	48	0	0	4,993	0	584
2001/02	627	0	22	17,395	0	313
2002/03	833	0	32	6,770	0	1,150
2003/04	185	0	0	8,423	0	779
2004/05	0	0	21	1,650	0	905
2005/06	175	0	0	5189	0	394
2006/07	174	0	21	7961	0	159
2007/08	12	0	170	13,429	0	145
2008/09[a]	282	0	0	2188	0	10
Average	262	0	34	6254	3	635

[a] Most recent year's data should be considered preliminary.

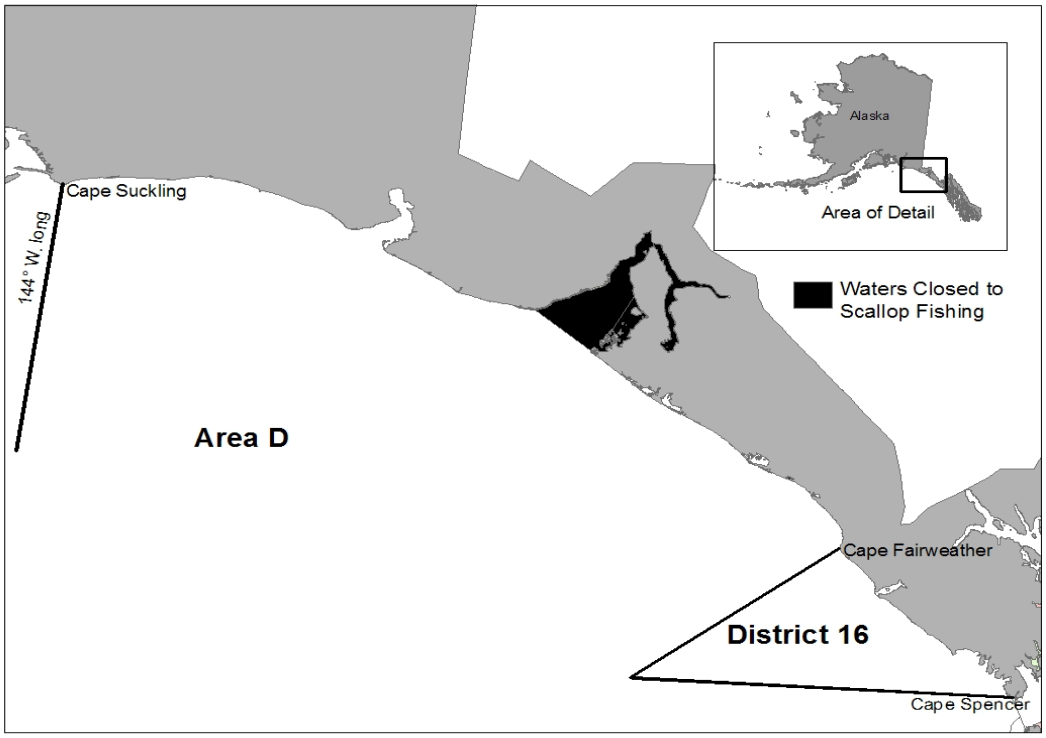

Figure 14.1–Yakutat weathervane scallop fishing registration area and closed waters.

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