Fisheries Management Report No.: 06-03

Report to the Alaska Board of Fisheries, 2006 Shrimp, Dungeness Crab and Scallop Fisheries of Southeast Alaska

by

Gretchen H. Bishop,

and

Joe Stratman

January 2006

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

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Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

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

FISHERIES MANAGEMENT REPORT NO. 06-03

REPORT TO THE ALASKA BOARD OF FISHERIES, 2006 SHRIMP, DUNGENESS CRAB AND SCALLOP FISHERIES OF SOUTHEAST ALASKA

by

Gretchen H. Bishop,

and

Joe Stratman

Alaska Department of Fish and Game, Division of Commercial Fisheries, Douglas

Alaska Department of Fish and Game
Division of Sport Fish, Research and Technical Services
333 Raspberry Road, Anchorage, Alaska, 99518-1599

January 2006

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Gretchen H. Bishop,
and
Joe Stratman
Alaska Department of Fish and Game, Division of Commercial Fisheries
Douglas Island Center Building, 8023rd Street
Douglas, Alaska 99824-0020 USA

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ABSTRACT

This report reviews the commercial fisheries for Dungeness crabs, shrimp and scallops in Region I, which consists of 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 16 Districts.

Shellfish harvests in Region I totaled over 8 million pounds valued at over $15 million during the last completed season or year. In the top five fisheries, Southeast Dungeness crab was the most valuable, followed by Southeast shrimp pot. In landed poundage, Southeast Dungeness crab was also first followed again by, the Southeast shrimp pot, and Southeast shrimp beam trawl fisheries.

Most of the shellfish fisheries in Region I are fully developed. The shrimp pot fishery, limited to entry, has seen large increases in harvest and effort in the past decade. The Yakutat Dungeness crab fishery was designated as collapsed and in recovery status by the BOF in 2000 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.

The ability of Alaska Department of Fish and Game to provide for sustained yields varies among the fisheries due to different levels of development of stock assessment programs and management plans. Many Southeast Alaska and Yakutat shellfish fisheries lack either developed management plans or stock assessment programs or both, and have higher risks of over-exploitation. Southeast shrimp pot fisheries and Yakutat scallops, have developing stock assessment programs but no abundance-based management plans. Southeast and Yakutat Dungeness crab, Yakutat shrimp pot, and Southeast beam trawl shrimp have neither stock assessment programs nor management plans, making them the highest risk fisheries.

Keywords: Dungeness crab, *Cancer magister*, spot prawn, *Pandalus platyceros*, 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 Dungeness crabs, shrimp and scallops in Region I, which consists of 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 101 through 16 (Figure 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, a few fisheries with state management authority, such as weathervane scallops, extend into the Exclusive Economic Zone (EEZ). Data for king and Tanner crab fisheries are summarized in this introduction for comparative purposes, but are not described in later chapters. Fisheries for king and Tanner crab were considered by the Board of Fisheries during the previous year (2005).

Shellfish harvests in Region I totaled over 8 million pounds valued at over $15 million during the last completed season or year (Table 1). In the top five fisheries, Southeast Dungeness crab was the most valuable, followed by Southeast shrimp pot, Southeast golden king crab, Southeast Tanner crab, and Southeast red and blue king crab. In landed poundage, Southeast Dungeness crab was also first followed by, Southeast shrimp pot, Southeast beam trawl shrimp, Southeast Tanner crab, and Southeast golden king crab.

Most of the shellfish fisheries in Region I are fully developed. Some stocks have been unable to sustain consistent and significant harvests. The red king crab fishery was reopened in 1993 after eight years of closure and provided five years of harvests above the regulatory threshold of 300,000 pounds. The fishery was closed in 1998 and 2000 due to low stock strength in a few harvest areas. The threshold was lowered to 200,000 pounds in 2002 and the fishery provided two seasons of harvest at the new lower threshold before a closure was necessary in 2004. The fishery was opened again for the 2005 season.

Other fisheries are in various stages of development. The shrimp pot fishery, limited to entry, has seen large increases in harvest and effort in the past decade. Yakutat Dungeness and Yakutat Tanner crab fisheries were designated as collapsed and in recovery status by the BOF in 2000 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 RESEARCH AND MANAGEMENT

The ability of ADF&G to provide 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. As a result it is the most sustainably managed shellfish fishery in the region. 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 include an annual red king crab pot survey in northern Southeast Alaska, an annual Tanner crab pot survey, an annual shrimp pot survey, and a triennial scallop dredge and video transect survey. Surveys for Tanner crab, shrimp pot, and scallops are recent additions and have been conducted for nine years or less. Short-term surveys that have been conducted in the past include several 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.

Dockside sampling and skipper interviews are routinely conducted in Southeast Alaska for all crab and shrimp fisheries. The objectives of port 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, even basic port sampling has not been systematically conducted for Yakutat shellfish fisheries. Harvest and effort data is also collected through the fish ticket system for both Yakutat and Southeast Alaska Shellfish fisheries.

Onboard observers have been placed sporadically on vessels in the golden king crab fishery beginning with the 2000/2001 season and the beam trawl fishery beginning with the 2001/2002 season. Through this voluntary program, ADF&G 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.

STAFF

All Region I shellfish (crab, shrimp and scallops) research and stock assessment programs fall under the responsibility of the regional shellfish staff. This group is also responsible for crab and shrimp fishery management, with the exception of shrimp pot management. The shrimp pot, fisheries are managed by area management biologists under the supervision of Bill Davidson, regional management coordinator, in Sitka. All other marine fisheries research (non-salmon) and management is under the supervision of Kyle Hebert, regional marine fisheries supervisor, in Douglas.

SHELLFISH STAFF			
Name	Title	Job Class	Location
Gretchen Bishop	Regional Shellfish Project Leader	Fisheries Biologist III	Douglas
Chris Siddon	Shellfish/Dive Biometrician	Biometrician II	Douglas
Janet Rumble	Asst. Shellfish Biologist, Research	Fisheries Biologist II	Douglas
Vacant	Asst. Shellfish Biologist, Management	Fisheries Biologist II	Douglas
Joe Stratman	Asst. Shellfish Biologist, Management	Fisheries Biologist II	Petersburg
Teresa Stolpe	Shellfish Management Technician	Fisheries Technician IV	Petersburg

CHAPTER 2: SOUTHEAST DUNGENESS CRAB FISHERY INTRODUCTION

LIFE HISTORY

Dungeness crabs *Cancer magister* are members of the highly evolved brachyuran (true crab) subgroup of the order Crustacea. They are commercially significant and widely distributed in coastal waters of the eastern Pacific Ocean from Baja California to the Aleutian Islands. Southeast Alaska (Registration Area A) (Figure 1) is near the northern limit of the range of Dungeness crab. In Southeast Alaska, Dungeness crabs are found throughout the reporting districts between Dixon Entrance and Cape Fairweather. Their habitat is areas with mud and sand substrate at depths between two and 50 fathoms.

The size limit for Dungeness crabs in Southeast Alaska is 6.5-inches or 165 mm in carapace width (CW). This is one molt of approximately 25 mm above the size (140 mm CW) that males become sexually mature. The rationale for this is to allow a year class of males to participate in mating prior to recruiting to the commercial fishery. Recruitment is thought to be at 4 or 5 years of age in Southeast Alaska.

Dungeness crabs in Southeast Alaska have a fairly extended and somewhat variable molting period. Males molt from February through July while females molt from August through September. Males grasp and guard premolt females and copulation takes place immediately after the female molts. Females can store sperm for periods up to several years. Thus, eggs are extruded either soon after mating or a year later, depending upon the energetic condition of the female at the time of mating. Egg extrusion occurs from October through December. Fecundity of female Dungeness crabs increases with size and a large female may produce up to 2.5 million eggs. Ovigerous females cease feeding and bury in well-aerated sandy areas to incubate their eggs. Egg hatching occurs from April through June.

FISHERY

Southeast Alaska has produced a long-term average harvest of about 2.4 million pounds of Dungeness crab per season. Average harvests for the 1970s, 1980s, and 1990s and 2000s have been respectively 0.6, 2.5, 3.4, and 4.6 million pounds.

Southeast Alaska is a super exclusive 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 registration year. The fishery is also under limited entry. Although there are 281 current Dungeness crab limited entry pot permit holders, actual participation is variable. In the past five seasons, an average of 207 permit holders have registered and fished in Southeast Alaska. 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.

There are three different seasons for Dungeness crabs in Southeast Alaska. Most of northern Southeast Alaska has a four month summer and a fall season from June 15 through August 15 and October 1 through November 30. Southern Southeast Alaska is open for a five month fall and winter season from October 1 – February 28. A small area near Sitka is open only for a two month fall season from October 1 – November 30.

Most of the product is marketed as 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.

FISHERY DEVELOPMENT AND HISTORY

The Dungeness crab fishery dates back to the 1930s. Prior to the 1960s, harvest statistics from much of the Gulf of Alaska coast were combined into a single total. Since 1960, commercial Dungeness crab harvests from Southeast Alaska have averaged 2.4 million pounds per season (Table 2).

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 1981/1982 and 1990/1991 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 45 nontransferable permits have been issued, 21 additional permit holders are vying for the remaining 12 permits to be issued to achieve the maximum of 308 total permits to be issued (B6410P-C State of Alaska 2005-12-07 Commercial Fisheries Entry Commission Limited Fisheries Status Report). The tiered permit system will be 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 1976/1977 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. 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 101, 102, 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 is the current standard measuring point in all 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 2001/2002 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 2001/2002 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 2001/2002. 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

Following is a description of major management concerns for this fishery.

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, and Hollis. 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 103, 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 105 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

ADF&G has conducted sporadic stock assessment surveys for Dungeness crab from 1987 through 2004. 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, ADF&G 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 1999/2000 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

The most recent stock assessment survey program was conducted from April 2000 – June 2004. During survey work, 40 pots, half with open and half with closed escape rings, were set daily in four depth strata ranging from 2 – 40 fathoms. Objectives of the survey program were five-fold:

1) Estimate pre-season index of abundance for legal male Dungeness crab;
2) Estimate harvest rate by comparing pre- and post-season surveys;
3) More clearly define timing of female and male molt periods and mating;
4) Determine growth by tagging crab; and
5) Determine relation between catch and soak time.

Surveys were conducted initially in Stikine Flats, Duncan Canal, and Kah Sheets Bay and expanded to Peril Strait, Tenakee Inlet, Port Camden, and finally to Berners Bay, and St. James Bay. A report on the results of the survey program is in progress (Rumble and Bishop *In press*).

Tagging Program

Tagging was conducted as part of the Kittiwake Dungeness crab survey from 2000 – 2003. Goals of the tagging program were to estimate molt increment and molt frequency for male Dungeness crabs and to compare these growth rates between areas and with those conducted in the early 1970s (Lehman 1970). Initially, both male and female crabs were tagged during pre- and post-season surveys. However the tagging protocol was refined to include tagging on pre-season surveys of sublegal male crab only, to assure that recovered crabs would have grown. This, paired with the extensive port sampling and reward program, has provided ADF&G with valuable growth and molt frequency information (Bishop et al. *In press*).

Port 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 ADF&G can determine the recruit or year-class composition of the harvest.

SEASON SUMMARY

2002/2003 Season Summary

As the harvest estimate from the first weeks catch was above threshold, the 2002/2003 season was not curtailed by the Dungeness management plan. The overall harvest was 7,332,665 pounds (Table 2), with an average price of $1.00/pound, yielding an exvessel value of $7.3 million. The summer season's landings totaled 5,936,856 pounds, which was 80% of the total harvest (Table 3). The fall/winter season's landings totaled 1,395,809 pounds, which was 20% of the total harvest (Table 3). Two hundred twenty permit holders reported landings for the season. Harvest in Districts 106, 108 and 109 comprised 59% of the total harvest (Table 3). The harvest in these districts consisted respectively of 90.6, 94.0, and 92.7% recruit crabs (Table 6). For the entire 2002/2003 season, 0.6% of the commercial harvest was sampled (Table 6).

After nine years of testing, following an incident in 1992 when PSP was found in Dungeness crab in Hoonah, the Alaska Department of Environmental Conservation stopped testing for PSP in Dungeness crab in Southeast Alaska. The Alaska Department of Environmental Conservation (ADEC) stated that for four years there had been no toxins detected in their samples. This decision by ADEC had management implications by lifting the prohibition on surface shipping of Dungeness crab during the summer season.

The 2002/2003 commercial harvest of 7,332,665 pounds was the highest ever recorded in Registration Area A (Table 2). The 2002/2003 harvest exceeded the second highest harvest on record, that of the 1996/1997 season's harvest of 5,005,840 pounds, by well over two million pounds (Table 2). The prevalence of soft shell crabs in the catch and in the harvest was high at the beginning of the 2002/2003 season.

2003/2004 SEASON SUMMARY

The predicted harvest for the 2003/2004 season was above threshold relative to the Dungeness management plan so the season length was not curtailed. The overall harvest was 4,537,049 pounds (Table 2) with an average price of $1.38/pound, yielding an exvessel value of $6.3 million. The summer season's landings totaled 3,346,776 pounds, which was 74% of the total harvest (Table 4). The fall/winter season's landings totaled 1,190,273 pounds, which was 26% of the total harvest (Table 4). Two hundred nine permit holders reported landings (Table 2). Harvest in Districts 106, 108, 109 and 111 comprised 63% of the total harvest (Table 4). Carryover from the previous strong season decreased the percent recruit slightly to respectively of 90.2, 86.9, and 85.9, and 88.6% recruit crabs (Table 7). For the entire 2003/2004 season, 1.0% of the commercial harvest was sampled, an increase from the previous season (Table 7). Crabs were in hard shell condition at the beginning of the 2003/2004 season.

2004/2005 SEASON SUMMARY

The predicted harvest for the 2004/2005 season was above threshold relative to the Dungeness management plan so the season length was not curtailed. The overall harvest was 4,578,578 pounds (Table 2) with an average price of $1.36/pound, yielding an exvessel value of $6.2 million. The summer season's landings totaled 3,690,534 pounds, which was 81% of the total harvest (Table 5). The fall/winter season's landings totaled 888,044 pounds, which was 19% of the total harvest (Table 5). One hundred ninety-nine permit holders recorded landings (Table 2). Harvest in Districts 106, 108, 109 and 111 comprised 55% of the total harvest (Table 5). Harvest in these districts consisted respectively of 90.5, 90.7, and 93.3, and 91.8% recruit crabs (Table 7). During the 2004/2005 season, 0.9% of the harvest was sampled (Table 8) which was very similar to 2003/2004. Crabs were in a hard shell condition at the beginning of the 2004/2005 season.

The 2004/2005 season was noteworthy for how much it resembled the 2003/2004 season in terms of overall harvest, price/pound, permits fished, landings recorded and percentage of the catch sampled by ADF&G technicians. Also, just as in 2003/2004, Districts 106, 108, 109 and 111 produced a majority of the total harvest.

2005/2006 SEASON OUTLOOK

Preliminary harvest figures indicate that approximately 3.2 million pounds of Dungeness crab were harvested during the 2005/2006 summer season, right at the 10-year average for summer seasons of 3.3 million pounds. The number of permits reporting harvest for the summer season

was 181, down slightly from the 10-year average for summer seasons of 197 permits. Summer harvest in Districts 106, 108, 109 and 111 was 55% of the total harvest. The average price per pound for the summer season was $1.21/pound, which is down slightly from the last two full seasons.

Catch rates in the summer fishery were somewhat spotty, strong in some areas but weak in others. The crab condition in the summer fishery was very good. Even early in the summer season there was very little problem with soft shell crab arriving on the docks. Airline fleet reconfiguration posed challenges to marketing fresh crab at the beginning of the summer season.

CHAPTER 3: SOUTHEAST SHRIMP BEAM TRAWL

INTRODUCTION

LIFE HISTORY

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

The target species *P. borealis*, and *Pandalopsis dispar* are associated with soft muddy bottoms and thus are a very appropriate target for a bottom trawl fishery. As they are diurnally migrating planktivores they do not effectively recruit to pot gear. Bycatch consists of generally less than 10% by weight of juvenile fishes and Dungeness crabs.

COMMERCIAL FISHERY

Productive beam trawling has historically been limited to four major fishing areas in Southeast Alaska. These areas are District 108, portions of Districts 106 (Duncan Canal and Kah Sheets Bay), District 107 (Eastern Channel), and District 110 (Thomas and Farragut Bays), all located in the Petersburg-Wrangell Management Area (Figure 2). The concentration of the fishery in these areas is due to the abundance of the resource, the presence of the major processors, and limited vessel capabilities. Most vessels are less than 60 feet 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 1999/2000 season had been participating since the inception of the fishery in 1915. Vessels strive 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 February 15 through April 30, guideline harvest levels determined by historic harvests, and three fishing periods in three of the major fishing areas. A fourth fishing period occurs in the Stikine Flats area. The fishing periods were based upon industry input 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 110) 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

(Statistical 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 1982/1983 season and the Southeast Alaska beam trawl shrimp fishery is once again the major shrimp trawl 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 (**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**). 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 1998/1999 fishery when only 24 permit holders participated. Fisheries conducted during the 2000/2001 through 2002/2003 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 continues to decline, mostly due to low exvessel value as a result of large harvests from the north Atlantic.

During the 1970s, harvest opportunities occurred in all major fishing areas throughout the year (Table 10.). 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 10.). Seasonal harvests for the region approached 1,000,000 pounds prior to 1980 and averaged about 2,700,000 pounds during the 1990s. Harvests have declined to an average of 1,028,000 pounds during the first few years of the 21st century.

Prior to 1970 Districts 106 and 110 produced the majority of the beam trawl harvest and District 108 produced relatively low harvests. Harvests from District 110 occur in Farragut and Thomas Bays, and harvests from District 106 included Duncan Canal and Kah Sheets Bay. With the decline in abundance in District 110, the fishery became almost totally dependent upon District 106 and harvests from District 108 began to increase. From the 1969/1970 through the 1978/1979 fishing seasons, District 106 harvests averaged almost 600,000 pounds per season while District 108 harvests averaged less than 250,000 pounds per season (Table 11). During this 10-season period, harvests from District 108 exceeded harvests from District 106 only once. Regulatory guideline harvest levels were increased in 1978. In the following decade through the 1988/1989 season, average shrimp harvests from Duncan Canal were nearly 900,000 pounds, more than double that of the Stikine Flats area (Table 12). Three fishing periods were established in regulations in 1989 for the four major fishing areas. During the 1990s, the pattern

of high harvests in District 106 relative to District 108 continued, District 106 averaging 1,200 pounds per year and District 108 averaging 800 pounds (Table 13). As price per pound and processing capacity have declined in recent years, fewer permit holders have found this fishery to be worth the effort, thus harvest and participation from all areas has declined. Recent harvests from District 110, mostly of larger shrimp species, have continued and non-traditional fisheries in Districts 103, 105, 107, 109, 110, and 111, have also produced sporadic harvest (Table 14.). There are a few catcher-processor vessels beginning to develop their markets and processing methods, but none of these vessels has begun producing frozen-at-sea product. If this occurs, the exvessel value and pace of the fishery could increase.

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 since then with some modifications to beginning and ending dates. The current season is 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 in 1997 for Stikine Flats of District 108 only. At the 2003 meeting of the Board of Fisheries the end of the final fishing periods was changed from February 14 to February 28 for consistency with the shrimp pot fishery. 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 108.

Non-Traditional Northern Shrimp Fisheries

Prior to 1994 all fishing districts in Southeast Alaska, except District 108 and a portion of District 106 (Duncan Canal and Kah Sheets Bay), District 107 (Eastern Channel), and District 110 (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 Board of Fisheries and resulted in the closure for Districts 101, 102, 104, and 112 through 116, which had low and sporadic historical effort and harvests.

At the request of industry in 1997, regulations were developed by the Board of Fisheries to provide additional fishing time during the egg-hatch period in most of the non-traditional areas if their respective guideline harvest levels had not been achieved during the normal fishing time of May through mid-February. 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 Board of Fisheries for consistency with the shrimp pot fishery and because there was very 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% and fishers must notify ADF&G two hours before landing to allow for biological sampling of the harvest. If necessary, the commissioner may require an onboard observer during fishing operations. The department evaluates opening a directed sidestripe shrimp fishery on a case-by-case basis. Since the sidestripe shrimp component of the Gulf of Alaska and South-central 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 108 since the 1997/1998 season, during one fishing period in District 106 during the 1997/1998 season, once in District 10 in the 1999/2000 season, and once in Section 11-B during the 2000/2001 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 been harvested during the traditional beam trawl season as the fishery. This is because fishing periods have remained open as GHLs have not been achieved; also there is no maximum mesh size or bycatch limit for sidestripe shrimp during the traditional beam trawl fishery.

SIZE RESTRICTIONS

As early as 1941, regulations specified that not more that 50% of the shrimp harvested could be less than three inches total length. These regulations were altered to no more than 25% 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 (#79-46-FB) to discourage the harvest of shrimp less than two years of age. This policy instructs ADF&G 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.

Traditional Northern Shrimp Fisheries

In 1977, harvest quotas for each of the four major fishing areas (District 108 and portions of Districts 106, 107, and 110) 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 108 and a portion of District 106, 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 106 from 80,000 to 400,000 pounds; a portion of District 107 from 15,000 to 50,000 pounds; a portion of District 110 from 5,000 to 75,000 pounds; and all of District 108 from 25,000 to 175,000 pounds. In 1997, with the addition of a fourth fishing period in District 108 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 103, 105, 109, and 111 and remaining portions of Districts 106, 107, and 110. In 1997, at the request of industry, the total District 111 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.

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 1 7/8 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%. Trawl web used during the directed sidestripe shrimp fishery was initially required, after the 1997 Board of Fisheries 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% of the total pandalid shrimp harvest may be comprised of other species of shrimp. However, during the 2000 Board of Fisheries 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 1963/1964 fishing season this regulation was altered to the present district boundaries.

In 1980 beam trawling was prohibited in waters of Lituya Bay (District 116) 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 112). During the 1997 Board of Fisheries meeting, otter trawls were eliminated as a legal gear type in Southeast Alaska, effective May 8, 1998.

LIMITED ENTRY

The Commercial Fisheries Entry Commission, in response to petitions received from beam trawl fishers 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, 28 permits have been issued with 22 additional applicants either undergoing hearings or administrative review for additional points or vying for the remaining 13 permits that will be available. Of the 28 permits that were granted, 3 are non-transferable and 25 are transferable (CFEC website, B6410P-C State of Alaska 2005-12-07 Commercial Fisheries Entry Commission Limited Fisheries Status Report).

STOCK ASSESSMENT

There is no fishery-independent stock assessment survey program for the beam trawl fishery. However, dockside sampling and collection and sexing of shrimp samples have been conducted since 1986. In addition, limited onboard sampling by observers was conducted in spring of 2002. 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. ADF&G plans to continue the dockside sampling during the upcoming 2005/2006 season.

Present information does not allow the department to project future abundance. Stock assessment data is not available, and shrimp samples obtained through dockside sampling are not analyzed in sufficient time to effect management decisions. But, it is possible to make a general qualitative statement concerning stock strength. Relatively strong year-classes have been evident in major stocks and have supported relatively strong harvests during the late 1990s. Reduced harvests during the early 2000s do not appear to be a function of reduced shrimp biomass. Major stocks are expected to remain strong for the near term.

SUMMARY OF RECENT SEASONS HARVESTS

TRADITIONAL NORTHERN SHRIMP FISHERIES

Harvest and Effort by Area and Season

Reported harvest from fish tickets and port sampling data provide the information summarized for the traditional beam trawl fishing areas (Figure 2) in Duncan Canal (District 106), Eastern Channel (District 107), Stikine Flats (District 108), and Thomas and Farragut Bays (District 110). The majority of the commercial harvest reported from District 106 comes from Statistical Areas 106-42 and 106-43, in District 107 from Statistical Area 107-45, and in District 108 from Statistical Areas 108-40 and 108-50. Thomas Bay, 110-12, and Farragut Bay, 110-14, support the majority of harvest in District 110.

Since the 1997/1998 season, total harvest and number of permits fished have steadily declined (**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**). Declines in total harvest and effort are likely due to low prices for northern shrimp, a lack of processing priority for northern shrimp, and fewer active participants in the fishery. Harvest is composed primarily of northern shrimp, *Pandalus borealis*, though smaller numbers of small *Pandalopsis dispar* (sidestripe shrimp) and *Pandalus goniurus* (humpy shrimp) are also harvested and sold as northern shrimp. The northern shrimp harvested in Southeast Alaska competes 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.

Average harvest per landing for the last five years in Southeast Alaska for northern shrimp has remained fairly consistent in all areas fished, with a slight increase in harvest per landing in the 2003/2004 and 2004/2005 seasons. This increase is attributed to the declining number of permits fished that are targeting northern shrimp, leaving a larger biomass available to harvest. In the 2004/2005 season, only eight permit holders participated in the fishery, the smallest number of permit holders since the 1973/1974 season (**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**). Another factor attributed to higher harvest per landing is the trend towards two-day fishing trips, rather than one-day trips. A higher percentage of permit holders fishing in Districts 107, 108 and 110 are fishing larger meshed nets. These nets catch fewer of the smaller northern shrimp and an increasing proportion of the larger, more valuable species such as sidestripe, coonstripe and spot shrimp. Harvest from these permit holders is often direct marketed or sold dockside. For this reason, few if any of these sorted landings are port sampled by ADF&G technicians.

Most of the effort over the last three seasons has occurred in Duncan Canal, District 106, and the Stikine Flats, District 108 (Table 15, Table 16, and Table 17). Though harvest in Duncan Canal declined during the 2002/2003 and 2003/2004 seasons, harvest and landings from Duncan Canal saw a large increase in the 2004/2005 season (Table 17). Harvest in the Stikine Flats area has shown a gradual decrease in the last three seasons (Table 15, Table 16, and Table 17). The Eastern Channel, District 107, and Thomas and Farragut Bays, District 110, have also had declining effort and harvest over the last three seasons (Table 15, Table 16 and Table 17).

Species Composition by Area and Season

The species composition of the harvest in traditional areas of Southeast Alaska can vary widely by district. Duncan Canal has supported and continues to support primarily a northern shrimp fishery. In the last three seasons (2002/2003, 2003/2004 and 2004/2005 seasons) northern shrimp have made up more than 99% of the total harvest in Duncan Canal. This mirrors harvests throughout the 1990s, when 99% of the harvest was comprised of northern shrimp. In the 1990s, harvests in Eastern Channel were 94% northern shrimp. Over the last three seasons, more of an effort to target sidestripe shrimp has been made in Eastern Passage, yielding an average catch of 85% northern shrimp and 15% sidestripe shrimp. Harvest by species for the Stikine Flats averaged 93% for northern shrimp, less than 7% for sidestripe shrimp, and less than 1% for coonstripe and spot shrimp for the 1991/1992 through 1996/1997 seasons. Proportional harvest by species in the Stikine Flats for the 1997/1998 through 2001/2002 seasons averaged 85% northern shrimp, 14% sidestripe shrimp, and less than 1% coonstripe and spot shrimp. This trend towards targeting larger shrimp has continued in the Stikine Flats area over the last three seasons, when the harvest was comprised of 75% northern shrimp, 23% sidestripe shrimp, and less than 2% coonstripe and spot shrimp combined. Though effort in Thomas and Farragut Bays is down considerably since the 1990s, the harvest from these bays also shows a trend towards an increased interest in targeting larger shrimp. Over the last three seasons, northern shrimp have comprised 90% of the harvest. Larger shrimp like sidestripe shrimp comprised 8% of the harvest, and coonstripe shrimp and spot shrimp, combined, made up 2% of the harvest.

Harvest and Effort by Fishing Period

Throughout the mid to late 1990s in Duncan Canal and Thomas and Farragut Bays, harvest was fairly well distributed throughout the fishing periods. Over the last three seasons, harvest in these areas has been largely limited to the first and to a lesser extent the third fishing periods. These two seasonal harvest aggregations are attributed to a processor priority towards more lucrative finfish and shellfish markets, and away from less lucrative northern shrimp markets. These processors concentrate their buying at the start of the season, before summer salmon and crab fisheries begin, and buy again in the fall, once salmon, halibut, sablefish and crab fisheries have ceased. With the closing of the northern shrimp peeling line in Petersburg in 2005/2006 season, this trend is likely to be exacerbated in the near future.

Throughout the mid to late 1990s, the Stikine Flats harvest was also fairly well distributed throughout the fishing periods. Lately, the seasonal harvest by fishing period in the Stikine Flats has been affected by the same processing reasons given above for Duncan Canal and Thomas and Farragut Bays. Over the last three seasons, the percentage of seasonal harvest being taken during the first fishing period has increased each season, culminating in 54% of the 2004/2005 harvest being taken in period 1. Over the last three seasons, the percentage of seasonal harvest taken in the second fishing period has decreased in each season, culminating in 4% of the

2004/2005 harvest being taken in period 2. During the last three seasons in the Stikine Flats, all of the harvest in the second fishing period has come from permit holders targeting larger shrimp for their own markets and dockside sales. Over the last three seasons, seasonal harvest percentages in the third and fourth fishing periods have remained steady, averaging 22% and 28% respectively.

Eastern Channel saw more variability in harvest percentage by fishing period throughout the mid to late 1990s. Effort peaked in this area in the 1996/1997 season as permit holders positioned themselves for limited entry. Since that season, the number of permits fished and landings made has gradually decreased. What harvest that has occurred in the last three seasons has come largely from the first fishing period, culminating in 100% of the 2003/2004 seasonal harvest being taken in period 1. Effort in the 2004/2005 season was so limited that the data remains confidential, with less than three permits reporting landings in Eastern Channel.

NON-TRADITIONAL NORTHERN SHRIMP FISHERIES

Beam trawl fishing has occurred at low and sporadic levels outside of the traditional areas surrounding Petersburg and Wrangell since the 1969/1970 season. These non-traditional beam trawl areas include: all of the statistical areas in District 103, all of the statistical areas in District 105, the southern statistical areas in District 106 (Sumner Strait and South Zarembo areas), the southern statistical areas in District 107 (Blake Passage area), all of the statistical areas in District 109, the western statistical areas in District 110 (Upper Frederick Sound area), and all of the statistical areas in District 111. Over the last three seasons (2002/2003, 2003/2004 and 2004/2005), harvest in non-traditional areas has been very limited. The last recorded harvest from non-traditional areas took place in the 2002/2003 season, when harvests were made in District 103, District 109 and District 110 (Upper Frederick Sound). This harvest data remains confidential, since fewer than three permit holders made harvests in these areas.

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 shrimp, like 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 2003/2004 and 2004/2005 seasons. The last directed sidestripe shrimp fishery occurred in District 108 in June, in the 2002/2003 season.

OUTLOOK

FISHERY TRENDS

The increased use of larger mesh web in trawl construction could increase the quality of the northern shrimp available, and possibly increase the exvessel value of the harvest. Even larger web is being used to target sidestripe shrimp, with some significant bycatches of coonstripe shrimp. However, the use of larger mesh web does have potential negative biological consequences. Larger web will tend to target more strongly on the female portion of the stock. The removal of female shrimp at an increasing rate could reduce the reproductive potential of the stock and result in smaller populations during future seasons. Without pre-season stock assessment methods, inseason monitoring tools, and with management based on historic

harvests, which included a broader segment of all year-classes, it is possible to over-exploit some stocks prior to taking appropriate management action.

The continued development of beam trawl fisheries in districts outside the boundaries of the four major fishing areas could provide more product to the fishery, particularly with the high proportion of larger and more valuable sidestripe shrimp found in some locations. 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.

Effort has decreased from 23 permits in the 1999/2000 season to 8 permits fished during the 2004/2005 season. This decrease is 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. With the implementation of the limited entry program, permits have been and will continue to be purchased by fishers desiring diversification. This may result in 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.

MANAGEMENT PROGRAM AND CONCERNS

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. Summary of fish ticket totals document the actual, reported harvest levels. Developing programs, such as the logbook program required for the non-traditional areas and the beam trawl observer trips will allow ADF&G to assess the harvest levels and collect biological information from area fisheries.

Not unlike the management of the shrimp pot 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 establishment of directed beam-trawl fisheries and use of larger mesh sizes appears to be focusing more effort on the larger species and larger individual shrimp. Additional regulations to separate traditional northern shrimp and sidestripe fisheries will be necessary to assure adequately conservative management for sidestripe populations.

Additionally, there has been interest in harvesting shrimp earlier in the spring when more of the female shrimp are bearing eggs and when a larger proportion of the population appears to be undergoing the spring molt. The trend towards harvest by vessels processing at sea could eventually make the timely tracking of cumulative harvest more difficult, requiring additional reporting to ADF&G by the fleet.

The bycatch limits for spot and coonstripe shrimp established at the 2003 meeting of the BOF has reduced the incentive to target these species in the beam trawl fishery.

CHAPTER 4: SOUTHEAST SHRIMP POT FISHERY INTRODUCTION

LIFE HISTORY

The spot shrimp *Pandalus platyceros* is the target species for the shrimp pot fishery in most areas of Southeast Alaska, with smaller quantities of coonstripe shrimp *P. hypsinotus* also harvested. Although life history information concerning these species is limited, much is known about congeneric species *Pandalus borealis* and *P. jordani*. Shrimp must shed their exoskeleton to grow; as a result there are no permanent structures to use for age determination, such as the otoliths in fish. Modal analysis of length frequency data as well as laboratory ageing techniques using intracellular pigments may provide some indication of relative age; however, there are considerable differences in age and growth between areas. Canadian reports suggest the maximum age of the spot shrimp is three to five years, while Alaskan tagging data from Prince William Sound suggests eight to 10 years (Butler 1964; Kimker et al. 1996). All pandalid shrimp are protandric hermaphrodites, which means they first mature and spawn as males, transition to females, and spawn as females for the remainder of their lives. For the pandalid species *Pandalus jordani*, the age, and thus size, at which transition to female and egg-bearing occurs is variable, and appears to be effected by environmental as well as fishery-related selection pressures (Hannah and Jones 1991; Hannah and Richmond 1993). Spot shrimp are thought to be functional males for one to three seasons in British Columbia, then change sex and spawn as females for their last year of life (Butler 1980). Spot shrimp in the colder waters of coastal Alaska may be much older, possibly living 7 or more years (Kimker et al. 1996). While relatively little is known about age or size at sex change for spot shrimp, growth rate appears to be directly related to temperature while size at maturity appears to be indirectly related in another Pandalid shrimp, the northern shrimp, *Pandalus borealis*, from Icelandic waters (Skuladottir et al. 1991). The age of transition from male to female in *P. borealis*, appears to be influenced by near-bottom temperatures in the Gulf of Maine, with a general increase in age at first spawning as temperature decreased (Appollonio et al. 1986). Thus slower growing, late maturing shrimp in cold areas have higher longevity and maximum length than faster growing shrimp in warmer waters (Savard and Parsons 1990). This means that smaller egg-bearing female shrimp may be growing faster in warmer waters and may grow slower but attain a larger maximum size in colder waters. Again using *P. borealis* as example, some researchers report that changes in age and size at maturity could be density dependent (Charnov and Anderson 1989).

The transition from male to female probably occurs during the summer months of the second or third year of life. Shrimp living in colder waters may not become females until later. Females undergo another molt into “breeding dress” in the late summer or fall, after which they extrude their mature eggs from the internal ovaries. Near Petersburg, (Hynes 1929) found an average count of 3,900 eggs per female. Eggs are fertilized externally as they are extruded onto the pleopods under the abdomen. Developing embryos are carried on the external pleopods until they are fully developed. In Alaska, eggs may be held until the onset of the spring phytoplankton and zooplankton blooms during late March to mid-May. There appear to be multiple size classes of female shrimp in several of the fishing districts surveyed by ADF&G. Two sizes of female spot shrimp have been reported during some years in Hood Canal (Chew et al. 1974). Following release of the larvae, females appear to undergo a growth and molting period during the summer

before extruding the eggs again in the late summer and fall. Females are not thought to survive long after the release of the eggs in British Columbia spot shrimp stocks.

The free-swimming larvae spend up to three months in the plankton at the mercy of the tides and currents. Larvae appear to hatch at night, assisted by the female moving her pleopods, thus expelling the larvae while swimming or clinging to something. 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). Although larvae may be widely transported by currents, settled juveniles and adults appear to be relatively sedentary. Tagged adults may remain within a mile or two of their release location (Kimker et al. 1996). Spot and coonstripe shrimp appear to utilize shallow water eelgrass and *Laminarium* or *Agarum* spp. kelp habitats as juveniles, before migrating to rocky habitats including reefs, glass sponge reefs and corals (Chew et al. 1974; Marliave and Roth 1995). They occur from the intertidal to depths of greater than 1,500 feet, from the Korea Strait to the Sea of Japan along the Siberian east coast Unalaska to San Diego, California (Butler 1964). Adults may have a daily (diurnal) migration as well, shallower at night and deeper during the day (Butler 1980). The concept of meta-populations may apply to spot shrimp, with larvae being transported by ocean currents from relatively distant adult populations, thus potentially repopulating depleted waters. Advection into bays and fjords in Southeast Alaska may depend on prevalent wind patterns and resultant currents. Larvae in some inshore waters may experience very small-scale entrainment patterns, with potential effects on adult recruitment to localized fisheries.

COMMERCIAL FISHERY

Two species of shrimp, *P. platyceros* and *P. hypsinotus*, are harvested in the shrimp pot fishery of Southeast Alaska. The long-term average harvest for this fishery is 0.49 million pounds, however, there has been a progressive increase from 0.02 million pounds in the 1970s, 0.29 in the 1980s, 0.87 in the 1990s, to 1.06 in the 2000s. The greatest portion of the harvest is taken in Districts 101, 103, and 107. Smaller but significant historical harvests have also occurred in Districts 102, 106, and 110. More recently, harvests from Districts 108, 109, 111, 112, and 113 have also become important. Districts are managed to achieve guideline harvest levels (GHLs) in pounds of spot shrimp except in Districts 115, and 116, where GHLs are based on coonstripe shrimp, and in District 111 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 and 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 is 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 operations and to empty 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.

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 minimal and not overly successful experimentation with the live shrimp market.

Current management is based upon 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, thus reducing mortality of smaller shrimp, a standardization of two sizes of pots with a maximum number of pots per vessel, hauling hour restrictions, and a guideline harvest level (GHL) for each fishing district.

Regulations have also been adopted for permitting of shrimp floating processors, and reporting requirements for shrimp catcher processor vessels. Harvest is recorded and summarized through the ADF&G fish ticket system.

Pre-season surveys, and on-board and dockside sampling are conducted annually; major areas are surveyed annually and sampled, lesser areas may have sampling only while minor areas may have no coverage. 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 (Davidson et al. *In prep*).

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, primarily salmon and halibut. Harvests and effort increased through the 1980s, and culminated in the mid-1990s with harvest of almost 1.14 million pounds caught during the 1994/1995 season and a maximum number of 352 permits fished during the 1995/1996 season (Table 18 and Table 20).

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, picked “tails” were sold, and exvessel 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.

From 1990/1991 through the 1994/1995 fishing seasons the character of the fishery underwent radical changes with the number of permits fished as high as 248 and harvests exceeding 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 and the first emergency order was issued to close Districts 106 and 108 when the guideline harvest level was reached. The rapid escalation of effort and harvest evoked petitions for limited entry, which was put in place 1995.

Harvests initially decreased following implementation of limited entry, then increased again as shrimp fishers switched to catcher-processing in order to capitalize on high prices for boxed, whole shrimp frozen-at-sea that are sold overseas, primarily to 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 1999/2000 season, although harvests subsequently regained previous, high levels. Recently the market has recovered and strong exvessel prices are the norm. Average harvest for 1996/1997 through 2004/2005 seasons was just under 1 million pounds, caught by an average of 170 permit holders (Table 18). During the 2004/2005 and 2005/2006 seasons the market demand for smaller 'Large' or 40.5 – 54.0 gram and 'Medium' size or 24.0 – 29.5 gram shrimp increased. This has resulted in a decline in the size of shrimp that may be economically targeted.

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. Seasons have been set to prevent harvesting during the egg hatch period in major districts and mesh restrictions were set to allow the escapement of all shrimp below approximately 30 mm in carapace length. 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. The guideline harvest ranges currently in regulation for each district were established based on harvest history data, and not 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.

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 1981/1982 fishing season. During the 1982/1983 season, fishing was not allowed during May and June in Districts 101 through 108. 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.

Prior to the 1983/1984 season the District 101 fishery was restricted by Board of Fisheries actions to a September 1 through April 30 season. This was an allocation for fishers who traditionally used District 101 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 1986/1987 season, major areas (Districts 101, 102, 103, and 107) 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 106 and 108) were open from May 1 through February 28 with only an egg-hatch closure in place. All other areas (Districts 104, 105, and 109 through 116) remained open throughout the year without an egg-hatch closure.

In 1997, the Board of Fisheries 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 GHR is not achieved for a summer season from May 15 – July 31. This continues the egg hatch closure and allows a regulatory closure of 2 months prior to the October opening to allow for a fair start the following season but does provide for fishing during the summer growth period.

SIZE RESTRICTIONS

The Alaska Board of Fisheries 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 116. Fleet testimony at the 1997 Board of Fisheries 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.

QUOTAS AND GUIDELINE HARVEST LEVELS

Prior to the 1983/1984 season, a GHL of 125,000 pounds was established for each of Districts 101, 102, 103, and 107, and a GHL of 55,000 pounds for each of Districts 106 and 108. By the 1986/1987 season the GHR for Districts 106 and 108 was altered 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 to maintain the fishery at a stable level and provide for some protection against over-harvesting. For districts with a fairly consistent harvest history, guideline harvest levels were set based on the average harvest for the five fishing seasons, 1990/1991 through 1994/1995. For districts with low and intermittent harvests, guideline harvest levels were arbitrarily set at 20,000 pounds. In January of 1997, the Board of Fisheries adopted regulatory GHRs for each district. Those GHRs were the same as those imposed by emergency order beginning with the 1995/1996 season.

At the 2000 meeting of the Board of Fisheries the Pot Shrimp Management Plan was developed and put into regulation. This plan addressed guideline harvest levels on several different levels. 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 2000/2001 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 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 112, 113, and 114 GHRs would be for spot shrimp, while for Districts 115 and 116 GHRs would refer to coonstripe shrimp, and District 111 GHRs would be for 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 107 it amounts to a 20,000 – 30,000 pound increase. Finally, the Pot Shrimp Management Plan specified that District 103 be split into Sections 3-A and 3-B and 3-C and that the GHR for Section 3-A be 0 – 275,000 pounds minus the average harvest from Section 3-B and 3-C from 1990/1991 through 1994/1995 seasons while Sections 3-B and 3-C have a GHR of 0 – 50,000 pounds. This was based upon the perception that shrimp populations in District 103 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 1995/1996 through 1999/2000 seasons.

GEAR RESTRICTIONS

With the exception of the minimum mesh size, no gear restrictions were implemented until the 1976/1977 season when a pot limit of 150 pots per vessel was established for Districts 101 through 115. Until October of 1997, the 150 pot limit applied to all portions of Registration Area A. Minor 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 some CPUE 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, the Board of Fisheries in January of 1997, adopted gear regulations allowing for standardization during a number of years. 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.

In October 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 reduce interpretation distortions. Further, all pots on board a vessel or operated from a vessel had to be of the same type and of the same size. Limits of 140 small pots or 100 large pots being operated from a registered shrimp fishing vessel continued.

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 include time limitations for deployment and retrieval of gear from 8:00 AM until 4:00 PM each day, restrictions on carrying pot gear owned only by the vessel operator, and unique identification tags for each pot.

No additional gear restrictions were put into regulation at the 2000 or 2003 meetings of the Board of Fisheries.

FLOATING PROCESSORS

Beginning in 1994 floating processors were increasingly available on the fishing grounds not only for transporting gear for a "mosquito fleet" that moves from one district as it closes to another, but also to purchase live shrimp. As a result, GHRs were achieved more quickly. In order to remain competitive, those fishers that wished to explore other grounds within a district were forced to remain in localized areas and sell to the floating processors. This had implications for localized depletion of shrimp stocks. In an effort to slow the pace of the fishery, the 1997 Board of Fisheries eliminated the ability of floating processors to transport pots for fishing vessels and implemented requirements that includes 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 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 meeting and revised at the 2003 meeting Board of Fisheries in order to allow ADF&G to track harvest from catcher–processors inseason. A catcher processor is defined as a vessel that catches and processes their own product on board [5 AAC 31.143 (d)]. Catcher processors cannot buy or process shrimp from another fishing vessel or act as a tender so observers are not required. However, call in’s are required of catcher processor owners or operators within 72 hours of the closure of a district or section and during the fishery for some districts, as established by preseason news release and emergency order. Fish tickets must be submitted to an ADF&G office within 7 days of delivering shrimp in a district.

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 towards 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 and 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 website, B6410P-C State of Alaska 2005-12-07 Commercial Fisheries Entry Commission Limited Fisheries Status Report).

STOCK ASSESSMENT

POT SURVEYS

Little research had been conducted concerning the distribution and abundance of spot shrimp in Southeast Alaska prior to 1996. Information concerning pot efficiency and limited stock distribution data was collected by various agencies during the 1960s and early 1970s. Pot efficiency studies concerned various pot tunnel configurations in rectangular pots and a comparison of covered versus uncovered pots.

During the mid 1990s, ADF&G reviewed available CPUE data recorded on fish tickets and found it to be insufficient to provide a basis for management. More information on the status of the shrimp populations was needed in order to establish biologically based, sustainable harvest levels. To this end, ADF&G initiated a shrimp pot stock assessment research program and during September 1996 the department conducted the first pilot survey in Ernest Sound. The initial purpose of this program was to collect and evaluate data required for rational management, to understand the variability of various parameters associated with stock assessment, to investigate factors essential to establishing an appropriate stock assessment program, and to provide information necessary to develop a well-founded management plan.

The preseason survey program was subsequently expanded, first to the Cordova Bay area (Section 3-A) in 1997, followed by Hoonah Sound (Section 13-C) beginning in 1999 and Tenakee Inlet (District 112) in 2000. The objectives of these surveys are:

i) To develop a survey-based index of abundance;

ii) To describe the size composition of stocks from a variety of areas;

iii) To determine sex ratios, and size at first spawning, for spot and coonstripe shrimp; and

iv) To describe trap selectivity, pot saturation curves and the behavior of shrimp attracted to pot gear.

Post-season surveys were conducted in Districts 103, in 1998, 1999, 2000, and 2001 and in District 107 in 2000 and 2001 in an effort to estimate the population size by comparing the ratio of pre to post-season size specific shrimp abundance. While removals by the fishery between pre- and post-season surveys are quite evident, this method has proved to be somewhat complicated by pot selectivity and shrimp behavior. Specifically, it appears that size-specific catchability of shrimp may be a function of the size composition of shrimp available. When large shrimp are abundant, they appear to inhibit the catch of small shrimp and conversely when they are removed, a disproportionate increase in the catch rate of small shrimp is observed. The catch rate of small shrimp often increases during post-season surveys (Love and Bishop 2005). Thus, before pre- and post-season survey information can be used to obtain an accurate harvest rate estimate for shrimp, the results of soak time experiments conducted in 2002 and 2003 must be analyzed. To date the most useful information collected appears to be trends in size composition.

SAMPLING PROGRAM

ADF&G began coordinated dockside sampling of the landed catch in 1997. The dockside sampling program has subsequently been expanded to sample landed catch in all ports throughout the region. In addition, in major districts, managers now monitor the fishery on the grounds, and sample the landed catch directly from fishers. Limited onboard observing has been conducted opportunistically to obtain information in Districts without either survey, dockside, or on the grounds sampling programs.

VOLUNTARY LOGBOOK PROGRAM

A voluntary logbook program was implemented beginning with the 2004/2005 season to collect information on the size composition of the commercial catch, particularly from districts for which no other information source is available.

Results of the expanding research and management programs are beginning to yield a better understanding of the effects of commercial fishing on the relative abundance and size of shrimp removed by the commercial fleet, commercial catch rates, as well as the portion of the population of shrimp present that are harvested by commercial gear. ADF&G began using sampling, fishery, and survey data to adjust preseason GHLs in the 2003/2004 season.

SEASON SUMMARIES

2002/2003 SEASON SUMMARY

A detailed 'Pot Shrimp Fishery Management Plan' describing management for the season was released in September, 2002 (ADF&G 2002). This was followed by a news release to the fleet announcing fishing seasons, fishing periods, lawful gear, GHLs, catcher processor reporting requirements, and other restrictions. The fishery opened on October 1, 2002, targeting a GHL of 1.01 million pounds (Table 24). A total of 158 permits were registered 151 of which were fished (Table 18). There were no floating processors and 6 registered tenders. A total of 1,058,348 pounds of shrimp were harvested by seasons's end (Table 18). Approximately 60,650 pounds of coonstripes were included in the total harvest. Average price of spot prawns is estimated at $4.0 per whole pound. The estimated exvessel value for the 2002/2003 season was about $4.4 million.

For the fall/winter season, the earliest closure was of Section 13-C on October 5, 2002 the latest of Districts 104, and 116 on February 28, 2003. District 105 re-opened for a summer season on May 15, 2003, closing on July 31, 2003

2003/2004 SEASON SUMMARY

A detailed 'Pot Shrimp Fishery Management Plan' describing management for the season was released in September, 2003 (ADF&G 2003). This was followed by a news release to the fleet announcing fishing seasons, fishing periods, lawful gear, GHLs, catcher processor reporting requirements, and other restrictions. The fishery opened on October 1, 2003 targeting a GHL of 1.01 million pounds (Table 24). A total of 168 permits were registered and 156 permits were fished (Table 18). There were no floating processors and 8 registered tenders. A total of 1,132,721 pounds of shrimp were harvested by seasons's end (Table 18). Approximately 57,402 pounds of coonstripes were included in the total harvest. Average price of spot prawns is estimated at $4.0 per whole pound. The estimated exvessel value for the 2002/2003 season was $4.5 million.

For the fall/winter season, the earliest closure was of Section 13-C on October 5, 2003 and the latest of Districts 13-A/B and 116 on February 28, 2004. Districts 104, 105, and 115 re-opened for a summer season on May 15, 2004; the summer season ended on July 31, 2004 with the closure of Districts 105, and 115 (Table 24).

2004/2005 SEASON SUMMARY

A detailed 'Pot Shrimp Fishery Management Plan' describing management for the season was released in September, 2004 (ADF&G 2004). This was followed by a news release to the fleet announcing fishing seasons, fishing periods, lawful gear, GHLs, catcher processor reporting requirements, and other restrictions. The fishery opened on October 1, 2004 targeting a GHL of 937,000 pounds (Table 24). A total of 183 permits registered of which 149 permits were fished (Table 18). There were 9 registered tenders but no floating processors. A total of 1,000,677 pounds of shrimp were harvested by seasons's end (Table 18). Approximately 36,495 pounds of coonstripes were included in the total harvest. Average exvessel price of pot-captured shrimp species is estimated at $5.20 per whole pound. The estimated exvessel value for the 2002/2003 season was about $5.2 million.

For the fall/winter season the earliest closure was on October 3 of District 12, Tenakee the latest on February 28 of Districts 104, and 116. Districts 105 and 115 re-opened on May 15 for a summer season, the summer season ended on July 30 with the closure of District 115 (Table 24).

2005/2006 OUTLOOK

A detailed 'Pot Shrimp Fishery Management Plan' describing management for the season was released in September, 2005 (Davidson et al. *In prep*). This was followed by a news release to the fleet announcing fishing seasons, fishing periods, lawful gear, GHLs, catcher processor reporting requirements, and other restrictions. The fishery opened on October 1, 2005 targeting a GHL of 939,000 pounds (Table 24). A total of 159 permits are registered to date. There are no floating processors and 4 registered tenders. A total of 895,000 pounds of shrimp have been harvested as of December 11, 2005.

As of December 11, 2005 Districts 101, 102, Sections 3-A, and 3-B/C, Districts 107, 108, 109, 110, 111, 112, Tenakee, Rest of 112, Sections 13-C, and 13-A/B have closed while Districts 4, 5, 6, 14, and 15 remain open. The earliest closure was on December 14. District 16 remained closed for the 2005/2006 season because of conservation concerns (Davidson et al. *In prep*).

CHAPTER 5: YAKUTAT DUNGENESS CRAB FISHERY

INTRODUCTION

Dungeness crabs *Cancer magister* are members of the highly evolved brachyuran (true crab) subgroup of the order Crustacea. They are commercially significant and widely distributed in coastal waters of the eastern Pacific Ocean from Baja California to the Aleutian Islands.

Fishing grounds in Yakutat (Registration Area D) are close to the northern limit of Dungeness crab distribution. They 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. Through the past forty open seasons, Yakutat produced a long-term average harvest of about 1,370,000 pounds per season (Table 26) but with a downward trend occurring since 1992/1993. 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 1989/1990 and 1999/2000 fishing seasons were closed early because of indications of low stock abundance shown in fish ticket and port sampling information. Since the 2000/2001 season, ADF&G 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 can register a vessel to crab in this area. 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.

Management of this fishery is problematic because collection of biological data is limited to port 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.

The summer fishery overlaps important parts of the male molting period, which extends into mid-summer, and the female molting period that extends through the summer. The major mating period is also during mid to late summer. The relative success of the summer fishery depends on sporadic major recruitment events that support the fishery for up to three years thereafter. Once a large recruit year-class passes through the fishery, the fishery is dependent on annual recruitment

and is vulnerable to local depletion until another large year class enters the fishery. Alaska is the only management jurisdiction on the West Coast of North America that allows major summer fisheries for Dungeness crabs, justifying the risks because of overriding economic considerations. The Yakutat summer fishery is considered a necessary concession to the extreme winter weather conditions on the open ocean fishing grounds.

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 1981/1982 season, the landings and participants fluctuated widely (Table 26). 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 1981/1982 and 1995/1996 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 1975/1976, 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 1976/1977 season started on June 1, with a scheduled closure on February 28, 1977. The season opening and closing dates remained the same through the 1981/1982 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 1982/1983 through 1984/1985 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 Board of Fisheries at their January 1997 meeting to deal specifically with Yakutat stock status, they directed ADF&G to take action. In the first three weeks of the 1997/1998 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 1998/1999 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 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).

OUTLOOK

The Yakutat Dungeness crab fishery was designated as collapsed at the 2000 meeting of the Board of Fisheries. 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. A survey was conducted from May 19 – 25, 2004 during to determine whether any significant recovery of stocks had been accomplished. During this survey and a commercial vessel with experience fishing the historical Yakutat Dungeness grounds was chartered to use commercial methods and gear to capture as many crabs as possible. An ADF&G biologist was placed aboard to sample and measure crabs captured using standard ADF&G sampling protocols. Over these 7 days a total of 605 pots were set in 5 statistical areas, respectively: 181-10, 181-60, 183-10, 181-50, and 181-40. Of the 605 pots, 425 were sampled for crabs. In these 425 pots there were 32 sublegal, 57 legal, 38 unmeasured males, and 33 female Dungeness crabs (Table 27). Only 1 of the 33 females captured was ovigerous. The soak times ranged from 15 - 48 hours. Most pots were set in 3 - 10 fathoms water depth. There were a couple of pots that were set in 10 - 20 fathoms. For comparison purposes, fish ticket data from Registration Area D shows that for fish tickets on which pot lifts were recorded the catch rate ranged from 3.4 to 4.5 pounds/pot or 1.7 to 2.3 crabs/pot from 1995 – 1999, assuming a 2-pound average, prior to the closure of the fishery.

When 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.

CHAPTER 6: YAKUTAT SHRIMP TRAWL FISHERY

INTRODUCTION

This chapter describes the commercial trawl fishery for shrimp in the Yakutat Area (Registration Area D) and reviews the history of the fishery and development of management regulations. The chapter 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 of the 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. There has been very little effort in this fishery in recent seasons because of the poor market for northern shrimp and the relative inaccessibility of the Yakutat area to a processing facility.

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 28). During the past 29 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 10 seasons when there were a limited number of boats and landings and there have been 0 pound harvests in 14 seasons (Table 28).

The highest harvest on record was in the 1980/1981 season when a harvest exceeding 1,900,000 pounds was reported by 16 vessels making 23 landings (Table 28). Most of this volume was harvested in Yakutat Bay during the fall (Table 29) 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 northern shrimp, but undoubtedly some sidestripe shrimp were also harvested. Northern shrimp were the predominate species harvested through the 1987/1988 season. No harvest was reported from the 1988/1989 and 1989/1990 seasons.

There was a small resurgence in the fishery from the 1990/1991 through the 1993/1994 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. No harvest was reported for the 1994/1995 through 2003/2004 seasons.

ADF&G conducted stock assessment surveys in Yakutat Bay from 1980 through 1984 (Table 31). 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 1980/1981 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 1982/1983 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 shrimp trawl 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 shrimp trawl 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 1981/1982 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, shrimp trawling was eliminated from Yakutat Bay.

In 1997 a shrimp trawl 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 ADF&G, 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% 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 commercial shrimp pot fisheries in these areas.

SEASON SUMMARIES

2004/2005 SEASON SUMMARY

The shrimp trawl harvest in the Yakutat Registration Area during the past season is confidential (Table 29).

2005/2006 SEASON OUTLOOK

There has been little interest in this fishery during the past 10 seasons, and the market for northern shrimp remains week. However, the market for larger sidestripe shrimp is strong, and this situation could change. If the market supports the operation of a catcher-processor or a floating processor, or if land based processing interest develops in the city of Yakutat, it may be difficult to effectively manage the fishery with existing regulations and programs. If the resurgence of the fishery targets sidestripe shrimp while discarding northern shrimp, accurate accounting for bycatch will be necessary. Trawlable grounds in Yakutat Bay are utilized by other commercially important species that include Dungeness, Tanner, and king crab and halibut and scallops.

Stock assessment surveys have not been conducted since September 1984 (Table 32), and the current condition of the shrimp stocks is unknown. Previous survey estimates would support a seasonal harvest of up to 270,000 pounds from Yakutat Bay however it is closed by regulation. A total of 350,000 pounds could be harvested from Icy Bay. Sustained harvests at these levels 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. It may be necessary to incorporate bycatch criteria into the management strategy for this fishery.

CHAPTER 7: YAKUTAT SHRIMP POT FISHERY INTRODUCTION

LIFE HISTORY

The Yakutat shrimp pot fishery targets both spot prawns *Pandalus platyceros*, and coonstripe shrimp *P. hypsinotus*. The reader is referred to Chapter 4 above for a review of their life history.

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 feet. In a longline system each pot is attached to the groundline with a snap, similar to that used on longline 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 types are "cone style" pots. These pots are constructed using two 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. 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.

FISHERY DEVELOPMENT AND HISTORY

The first reported landings occurred in the Yakutat Area during the 1969/70 fishing season (Table 33). For the next 10 seasons, landings occurred during only two seasons. Participation and landings have been fairly consistent since the 1982/1983 fishing season, with a peak harvest of 29,872 pounds occurring during that season. The peak effort level of 16 permits occurred during the 1995/1996 season when 15,411 pounds were landed. Harvest has averaged 10,500 pounds by an average of 8 vessels per season since the 1982/1983 season. 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 $5.00 per pound during recent seasons.

Peak effort and harvests normally occur during May and June (Table 34). However, activity in this fishery can be highly variable.

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 pounds 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 pounds.

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 (79-46-FB) 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 minimizing the retention of the smaller male, transitional, and female prawns and coonstripe shrimp.

GEAR RESTRICTION

A mesh restriction specifying 1 1/2-inch 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 net webbing or rigid mesh with at least two opposing sides of the pot having a webbed panel of minimum stretch mesh of the 1 1/2 inch stretch mesh if a permit holder is fishing inside Yakutat Bay. The 1-1/2 inch 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 more samples for size and sex data are collected and analyzed. The use of a smaller minimum mesh size risks unintended harvest of smaller spot prawns, increasing handling mortality. This may constitute a conservation concern.

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 1995/1996 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 inches), buoy markings, and escape mechanisms.

QUOTAS AND GUIDELINE HARVEST LEVELS

In the mid-1990s, several larger southeast shrimp pot 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 resulting in implementation of a GHL for the commercial harvest, for the first time.

During the 1996/1997 season, a GHL of 10,000 pounds was set for Yakutat Bay, north and east of a line from Ocean Cape to Point Manby, for the period from May through September. The 10-year average harvest for the 1987/1988 to 1996/1997 seasons equaled 9,427 pounds, and the 15-year average harvest was 10,204 pounds (Table 33). 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 years historically reported for this fishery and provided some protection against possible localized depletion. The summer GHL represented a higher harvest than the prior seasonal average but was lower than the maximum historical harvests in the early 1980s. The 5-year average harvest for the Yakutat registration area for the 1997/1998 through 2001/2002 seasons was 12,711 pounds, while the 10-year average for the period 1992/1993 to 2001/2002 was 12,079 pounds. These averages appear somewhat high because they represent all of Registration Area D including harvests from Yakutat Bay as well as Icy Bay. The GHL for Icy Bay was established by emergency order at 10,000 pounds for the 2000/2001 season to allow for a limited fishery on an unknown biomass of spot and coonstripe shrimp.

While there had not been a consistent shrimp trawl fishery in Yakutat Bay, surveys in the early 1980s demonstrated harvestable stocks capable of supporting a fishery with a monthly quota of 30,000 pounds. In 1997, the BOF prohibited continuation of shrimp trawling inside Yakutat Bay. This prohibition to trawl gear may maximize availability of coonstripe shrimp to pot gear, but does eliminate harvest of northern 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 pounds for each month the fishery is open. This provides a potential season total of about 10,000 pounds. 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 pounds for a potential seasonal total of an additional 10,000 pounds.

2002/2003 SEASON SUMMARY

A harvest of 10,596 pounds was reported in 2002/2003 by 7 permit holders making 118 landings (Table 33). The Doggie Island area is fished from October through February while Yakutat Bay was fished primarily from May to September (Table 34). 83% of the harvest reported was taken in Statistical Area 183-11, the Doggie Island area and November had the highest harvest (Table 34). The harvest level, number of participants, and the number of landings were lower than the 1997/1998 through 2001/2002 average (Table 33).

2003/2004 SEASON SUMMARY

A harvest of 4,446 pounds was reported for all of Registration Area D in 2003/2004 by 6 permit holders making 47 landings (Table 33). Only 55% of the harvest came from Statistical Area 183-11, Doggie Island area of Yakutat Bay, seasonally, November saw the highest harvest (Table 34). The harvest level, number of participants, and the number of landings were lower than the 1997/1998 through 2002/2003 average (Table 33).

2004/2005 SEASON SUMMARY

The harvest during the 2004/2005 season was confidential as less than 3 permit holders participated (Table 33).

CHAPTER 8: 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 inches 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-inches across the shell (Hennick 1970). Although there is no minimum legal size, harvest is limited to scallops of four-inches 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 Registration Area D (Yakutat area) and District 16 of Southeast Alaska. Commercial dredging for the weathervane scallop in the Yakutat area 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.

Scallop dredging in Registration Area A (Southeast Alaska) is limited by regulation to District 16, with the exception of Lituya Bay in District 16, which is closed. The known offshore beds in District 16 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 inches depending on the scallop species targeted, prohibition on chafing gear and shucking machines, maximum opening of 15 feet 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 feet, 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 feet 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 pounds in Registration Area D and 0 to 35,000 pounds 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 35). 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 pounds in 1968 (Yakutat Annual Report, 1968) and 800,000 pounds in 1969, by up to 14 vessels (Table 35). 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 pounds in Area D in 1992. In response, ADF&G 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 Yakutat have been constrained to a maximum of 250,000 pounds under the ASFMP.

DISTRICT 16

The fishery in Southeast Alaska started in the early 1980s as stocks in the Yakutat Area 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, and one to nine vessels in each of the other 16 years of record. The peak harvest of 148,624 pounds occurred in 1990, with an overall historical average of about 46,000 pounds (Table 36). 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.

In recent seasons the harvest has usually been after the Yakutat fishery closed. The general pattern has been for vessels displaced by competition or closure from the more productive grounds in Alaska to prospect for product in Southeast Alaska.

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 pounds for Registration Area D and 0 to 35,000 pounds 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 inches (Hennick 1970) a four-inch 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 feet 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, 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 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 pounds. 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 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 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-inch 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

Mandatory observers are required on each vessel fishing for scallops. The observer program has two main goals: to monitor bycatch and to collect biological and commercial fishing information about the weathervane scallop. There has been concern about the bycatch of crab and other important commercial species. The results from observer sampling from 1993 through 2001 (**Error! Reference source not found.**) show that there is minimal bycatch of crab in Yakutat Registration Area D and District 16, especially when compared with other registration areas.

Observer sampling of the scallop catch and discarded scallops allows determination of the stock size composition. In addition, shells are collected for ageing in order to determine the age structure and population dynamics of Yakutat weathervane scallop populations.

CRAB BYCATCH LIMITS

Dungeness and Tanner crab are captured incidentally in scallop dredges in the Yakutat fishery. The estimated bycatch for District 16 and Yakutat 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 1980/1981 through the 1990/1991 seasons the Yakutat Dungeness crab fishery averaged an annual harvest of 2.2

million pounds or approximately 1.1 million crabs. During it's peak from 1972/1973 – 1981/1982 seasons the Yakutat Tanner crab fishery averaged an annual harvest of 1.3 million pounds 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 the Bering Sea and Scallop Registration Area D. These bycatch caps are based on the most recent Tanner crab trawl survey population estimate in each area. They are calculated as 1% of the surveyed population in areas where a commercial crab fishery has opened in the most recent season and .5% 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 Scallop Registration Area D. This is both because there is no annual survey to use to estimate populations of Tanner and Dungeness crab in Scallop Registration Area D 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) and relative to the historic commercial harvest of Dungeness and Tanner crab in the area (Hebert et al. 2002; Hebert et al. 2005).

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.

SEASON SUMMARIES

2003/2004 SEASON SUMMARY

Registration Area D

The 2003/2004 commercial scallop season in Registration Area D started on July 1, 2003 and did not achieve its GHL of 200,000 pounds by the regulatory closing date of February 15, 2004. Harvest and effort are confidential as less than 3 vessels participated.

District 16

The 2003/2004 District 16 fishery opened on July 1, 2003 and did not achieve its GHL of 35,000 pounds by the regulatory closing date of February 15, 2004. Harvest and effort are confidential as less than 3 vessels participated.

2004/2005 SEASON SUMMARY

Registration Area D

The 2004/2005 commercial scallop season in Registration Area D opened on July 1, 2004 and did not achieve its GHL of 200,000 pounds by the regulatory closing date of February 15, 2005. Harvest and effort are confidential as less than 3 vessels participated.

District 16

The 2004/2005 District 16 fishery opened on July 1, 2004 and did not achieve its GHL of 35,000 pounds by the regulatory closing date of February 15, 2005. Harvest and effort are confidential as less than 3 vessels participated.

2005/2006 Season Outlook

Registration Area D

The 2004/2005 commercial scallop season in Registration Area D opened on July 1, 2005 and has not achieved its GHL of 200,000 pounds as of December 11, 2005. Harvest and effort are confidential as less than 3 vessels participating.

District 16

The 2005/2006 fishery in District 16 fishery opened on July 1, 2005 and has not achieved its GHL of 35,000 pounds as of December 11, 2005. Harvest and effort are confidential as less than 3 vessels are participating.

REFERENCES CITED

ADF&G (Alaska Department of Fish and Game). 2002. Pot shrimp fishery management plan, 2002. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report #1J02-35, Douglas.

ADF&G (Alaska Department of Fish and Game). 2003. Pot shrimp management plan, 2003. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report #1J03-31, Douglas.

ADF&G (Alaska Department of Fish and Game). 2004. Pot shrimp management plan, 2004. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report #1J04-34, Douglas.

Appollonio, S., D., K. Stevenson, and E. E. Dunton. 1986. Effects of temperature on the biology of the northern shrimp, Pandalus borealis in the Gulf of Maine. NOAA Technical Report NMFS 42:22pp.

Barnhart, J. P., and G. E. Rosenkranz. 2000. Summary and analysis of onboard observer collected data from the 1998/99 statewide commercial weathervane scallop fishery. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 4K00-8, Kodiak.

Berkeley, A. A. 1930. The post-embryonic development of the common pandalids of British Columbia. Contributions to Canadian Biology 6:79-163.

Bishop, G. H., M. S. M. Siddeek, and J. M. Rumble. *In press*. Growth of male Dungeness crabs in Southeastern Alaska. in: Fourth World Fisheries Congress, Vancouver, British Columbia, eds.

Boutillier, J. A. 1984. Prawn - Minimum Size Limit. [*in*]. 1982 Shellfish Management Advice, Pacific Region. G. S. Jamieson (ed). Can. Man. Rep. Fisheries and Aquatic Science 1774:11-24.

Butler, T. H. 1964. Growth, reproduction, and distribution of pandalid shrimps in British Columbia. Journal of the Fisheries Research Board of Canada 21:1403-1452.

Butler, T. H. 1980. Shrimps of the Pacific coast of Canada. Canadian Bulletin of Fisheries and Aquatic Sciences. 202:143-145.

Charnov, E. L., and P. J. Anderson. 1989. Sex change and population fluctuations in pandalid shrimp. The American Naturalist 134:824-827.

Chew, K. K., D. Holland, J. W. Wells, D. H. McKenzie, and C. K. Harris. 1974. Depth distribution and size of spot shrimp, *Pandalus platyceros* trawled in Dabob Bay of Hood Canal, Washington, from 1966 to 1972. Proceedings of the National Shellfish Association 64:28-32.

Davidson, B., R. Bachman, G. Bishop, W. Bergmann, P. Doherty, D. Gordon, K. Hebert, J. Breese, K. Monagle, E. Coonradt, S. Forbes, D. Harris, B. Meredith, and T. Thynes. *In prep*. Pot shrimp management plan for Southeast Alaska. Alaska Department of Fish and Game, Fishery Management Report, Anchorage.

Hannah, R. W., and S. A. Jones. 1991. Fishery-induced changes in the population structure of pink shrimp *Pandalus jordani*. Fishery Bulletin 89:41-51.

Hannah, R. W., and N. T. Richmond. 1993. Weight change of pink shrimp *Pandalus jordani*, after commercial harvest and handling. Fishery Bulletin 91:804-807.

Haynes, E. B. 1985. Morphological development, identification, and biology of larvae of *Pandalidae*, *Hippolytidae*, and *Crangonidae* (*Crustacea, Decapoda*) of the northern North Pacific Ocean. Fishery Bulletin 83:253-288.

Hebert, K., G. H. Bishop, J. M. Rumble, D. C. Love, and M. Pritchett. 2002. Report to the Board of Fisheries, Shellfish Fisheries, Region I: Southeast Alaska - Yakutat. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report #1J02-45, Douglas.

REFERENCES CITED (Continued)

Hebert, K., G. H. Bishop, J. M. Rumble, and A. Tingley. 2005. Report to the Board of Fisheries, 2005 Shellfish Fisheries; Region I: Southeast Alaska - Yakutat. Alaska Department of Fish and Game, Division of Commercial Fisheries, Regional Information Report 1J05-02, Douglas.

Hennick, D. P. 1970. Reproductive cycle, size at maturity, and sexual composition of commercially harvested weathervane scallops, *Patinopecten caurinus* in Alaska. Journal of the Fisheries Research Board of Canada 28:608-609.

Hynes, F. W. 1930. Shrimp fishery of southeast Alaska. Appendix to the Report of the U.S. Commissioner of Fisheries for 1929. B.F. Doc. No. 1052, Appendix 1, 18 p.

Kimker, A. T., W. E. Donaldson, and W. R. Bechtol. 1996. Spot shrimp growth in Unakwik Inlet, Prince William Sound, Alaska. Alaska Fishery Research Bulletin 3:8 pp.

Lehman, C. 1970. Dungeness crab research. Completion Report, Commercial Fisheries Research and Development Act 5-10-R and 5-21-R. Alaska Department of Fish and Game, Juneau.

Love, D. C., and G. H. Bishop. 2005. Pot shrimp stock assessment survey results from 1996 - 2003 in Districts 3, 7, 12, and 13 of Southeastern Alaska. Alaska Department of Fish and Game, Fishery Data Series No. 05-32, Anchorage.

Marliave, J. B., and M. Roth. 1995. Agarum kelp beds as nursery habitat of spot prawns *Pandalus platyceros* Brandt, 1851 (Decapoda, Caridea). Crustaceana 68:27-37.

Pitcher, K. W., and K. K. Imamura. 1990. Impacts of sea otter predation on Dungeness crab abundance in Cross Sound-Icy Strait, Southeastern Alaska. United States Fish and Wildlife Service Cooperative Agreement No. 14-16-009-954. Alaska Department of Fish and Game. Final Report 1-18 .

Price, V. A., and K. K. Chew. 1972. Laboratory rearing of spot shrimp larvae (*P. platyceros*) and description of stages. Journal of the Fisheries Research Board of Canada 29:413-422.

Rumble, J. M., and G. H. Bishop. *In prep*. Southeast Alaska Dungeness crab stock assessment survey from 2000–2004. Alaska Department of Fish and Game, Fishery Data Series, Anchorage.

Savard, L., and D. G. Parsons. 1990. Geographic variations in the life history of *Pandalus borealis* from the Northwest Atlantic. ICES Symposium on Shellfish Life Histories and Shellfishery Models, Paper, No. 27.

Skuladottir, U., J. Palsson, G. S. Bragason, and S. Brynjolfsson. 1991. The variation in size and age at change of sex, maximum length and length of ovigerous periods of the shrimp, *Pandalus borealis*, at different temperatures in Icelandic waters. ICES CM 1991/K:5:15.

TABLES AND FIGURES

Table 1.–Harvest and approximate exvessel values from the last completed season or calendar year for shrimp, crab and scallop fisheries in Registration Area A (Southeast Alaska) and Registration Area D (Yakutat).

Season or Year	*Fishery*	*Harvest, thousands of pounds*	*Approximate Exvessel Value in Thousands of $$*[a]
Southeast			
2004/2005	Dungeness Crab	4,578.6	$6,273
2004/2005	Pot Shrimp	1,000.3	$4,000
2004/2005	Beam Trawl Shrimp	986.5	$270
2005/2006	Red and Blue King Crab	202.3	$1,061
2004/2005	Tanner Crab (*bairdi*)	805.4	$1,577
2004/2005	Golden King Crab	555.2	$2,220
	SUBTOTAL	8,128.0	15,401
Yakutat			
2004/2005	Dungeness Crab	0.0	$0
2004/2005	Pot Shrimp	2.5	$10
2004/2005	Otter Trawl Shrimp	0.0	$0
2004/2005	Weathervane Scallops [b]	111.4	$446
2004/2005	Red and Blue King Crab	0.0	$0
2004/2005	Tanner Crab	0.0	$0
	SUBTOTAL	114.0	456
	GRAND TOTAL	8,242.1	$15,857

[a] This column is calculated from the average price per pound of all tickets having values indicated on them.
[b] District 16 is included in Registration Area D for this fishery only.

Table 2.–Registration Area A (Southeast Alaska) Dungeness crab harvest, number of permits fished, number of landings, and average harvest per landing, 1960 to present.

Year or Season	*Harvest, pounds*	*Permits*	*Landings*	*Pounds per Permit*	*Pounds per Landing*
1960	1,449,405				
1961	671,455				
1962	2,985,939				
1963	3,296,362				
1964	3,996,100				
1965	2,392,395				
1966	1,968,117				
1967	2,033,156				
1968	1,900,690				
1969/1970	1,149,111	24	392	47,880	2,931
1970/1971	776,617	21	380	36,982	2,043
1971/1972	452,681	23	315	20,576	1,437
1972/1973	597,587	31	315	19,277	1,897
1973/1974	748,519	41	483	18,257	1,549
1974/1975	713,995	55	453	12,982	1,576
1975/1976	611,621	36	344	16,989	1,177
1976/1977	515,378	25	174	20,615	2,961
1977/1978	127,345	12	87	10,612	1,463
1978/1979	754,759	25	208	30,190	3,628
1979/1980	801,753	37	313	21,669	2,561
1980/1981	521,247	26	227	20,048	2,296
1981/1982	2,932,427	75	749	39,099	3,915
1982/1983	3,668,062	129	1,303	28,435	2,815
1983/1984	2,150,692	131	1,530	16,417	1,405
1984/1985	1,843,502	180	1,583	10,242	1,164
1985/1986	2,314,618	216	2,073	10,716	1,116
1986/1987	2,453,055	224	2,330	10,974	1,052
1987/1988	3,391,699	241	2,746	14,070	1,235
1988/1989	3,321,734	264	2,683	12,535	1,238
1989/1990	1,918,880	245	2,096	7,831	915
1990/1991	2,662,840	243	2,342	10,787	1,136
1991/1992	4,705,314	316	3,379	14,890	1,392
1992/1993	3,089,398	247	2,492	12,508	1,239
1993/1994	2,536,701	198	1,956	12,812	1,296
1994/1995	1,921,689	182	1,786	10,559	1,075
1995/1996	4,404,519	201	2,737	21,913	1,609
1996/1997	5,005,840	203	2,896	24,659	1,728
1997/1998	4,062,423	232	4,042	17,510	1.005
1998/1999	2,320,030	244	3,127	9,508	743
1999/2000	3,276,647	196	2,911	16,718	1,126
2000/2001	2,565,230	198	2,380	12,956	1,078
2001/2002	4,105,697	209	3,061	19,644	1,341
2002/2003	7,332,665	220	3,561	33,330	2,059
2003/2004	4,537,049	209	2,931	21,708	1,548
2004/2005[a]	4,578,578	199	2,403	23,008	1,905

[a] Most recent seasons data should be considered preliminary.

Table 3.–Registration Area A (Southeast Alaska) 2002/2003 season; Dungeness crab harvest in exvessel pounds by month and district.

District	2002						2003			Total
	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	
101	Closed	Closed	Closed	Closed	61,404	24656	26164	17,477	3,150	132,851
102	Closed	Closed	Closed	Closed	78,838	28,469	*	3,974	*	116,051
103	6,764	4,871	1,823	Closed	*	*	Closed	Closed	Closed	14,791
104	0	0	0	Closed	0	0	Closed	Closed	Closed	0
105	101,720	182,777	69,050	Closed	115656	46,678	Closed	Closed	Closed	515,881
106	581,949	636,769	182,635	Closed	109772	47,778	Closed	Closed	Closed	1,558,903
107	311,811	83,579	6,243	Closed	16,671	4,378	Closed	Closed	Closed	422,682
108	563,513	678,826	120,407	Closed	159,186	63,918	Closed	Closed	Closed	1,585,850
109	245,965	548,789	262,130	Closed	108,278	42,726	Closed	Closed	Closed	1,207,888
110	57,463	153,519	46,010	Closed	13470	10,119	Closed	Closed	Closed	280,581
111	161,451	383,666	117,261	Closed	211433	44,204	Closed	Closed	Closed	918,015
112	58,988	83,260	34,131	Closed	39,536	7,647	Closed	Closed	Closed	223,562
113	39,881	53,059	16,152	Closed	16,970	19,295	0	0	0	145,357
114	21,941	47,132	12,222	Closed	28,330	10,679	Closed	Closed	Closed	120,304
115	18,505	29,644	12,950	Closed	17,406	11,444	Closed	Closed	Closed	89,949
116	Closed	0	Closed	Closed	Closed	Closed	Closed	Closed	Closed	0
Total	2,169,951	2,885,891	881,014	0	977,240	363,034	29,284	21,451	4,800	7,332,665

Note: * denotes that where number of vessels participating is less than three, the information is considered confidential.

Table 4.–Registration Area A (Southeast Alaska) 2003/2004 season; Dungeness crab harvest in exvessel pounds by month and district.

District	2003							2004		Total
	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	
101	Closed	Closed	Closed	Closed	61,563	29,157	19,604	11,455	10,450	132,229
102	Closed	Closed	Closed	Closed	59,723	17,144	8,346	*	*	91,807
103	6,909	15,075	11,962	Closed	*	*	Closed	Closed	Closed	34,989
104	0	0	0	Closed	0	0	Closed	Closed	Closed	0
105	110,999	72,297	15,071	Closed	13,712	15,441	Closed	Closed	Closed	227,520
106	365,891	191,522	51,540	Closed	113,524	50,224	Closed	Closed	Closed	772,701
107	88,447	46,078	11,596	Closed	7,864	18,653	Closed	Closed	Closed	172,638
108	460,850	218,362	45,341	Closed	78,896	25,749	Closed	Closed	Closed	829,198
109	251,973	177,520	48,291	Closed	66,530	24,828	Closed	Closed	Closed	569,142
110	60,157	79,904	23,461	Closed	15,206	9,928	Closed	Closed	Closed	188,656
111	140,622	185,222	37,333	Closed	263,579	49,849	Closed	Closed	Closed	676,605
112	60,476	192,308	53,928	Closed	89,840	35,843	Closed	Closed	Closed	432,395
113	23,289	54,494	25,204	Closed	*	*	*	0	0	118,584
114	26,010	73,759	35,409	Closed	33,242	8,590	Closed	Closed	Closed	177,010
115	32,973	32,955	19,548	Closed	25,050	*	Closed	Closed	Closed	113,575
116	Closed	0	Closed	Closed	Closed	Closed	Closed	Closed	Closed	0
Total	1,628,596	1,339,496	378,684	0	836,212	293,657	31,905	15,949	12,550	4,537,049

Note: * denotes that where number of vessels participating is less than three, the information is considered confidential.

Table 5.–Registration Area A (Southeast Alaska) 2004/2005 season; Dungeness crab harvest in exvessel pounds by month and district.

District	2004							2005		Total
	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	
101	Closed	Closed	Closed	Closed	119,822	36,766	23,334	2,146	8,900	190,968
102	Closed	Closed	Closed	Closed	54,482	*	10,862	*	*	81,704
103	*	5,860	*	Closed	1,905	7,945	Closed	Closed	Closed	25,472
104	0	0	0	Closed	0	0	Closed	Closed	Closed	0
105	35,942	28,217	9,939	Closed	8,488	2,585	Closed	Closed	Closed	85,171
106	470,442	206,784	46,072	Closed	73,413	29,400	Closed	Closed	Closed	826,111
107	148,474	62,973	10,813	Closed	14,984	11,300	Closed	Closed	Closed	248,544
108	368,834	135,785	38,381	Closed	82,848	26,740	Closed	Closed	Closed	652,588
109	189,199	166,465	33,866	Closed	57,762	26,322	Closed	Closed	Closed	473,614
110	92,523	151,920	64,330	Closed	23,664	25,195	Closed	Closed	Closed	357,632
111	234,102	187,579	51,640	Closed	78,872	18,371	Closed	Closed	Closed	570,564
112	149,046	189,100	63,988	Closed	29,298	16,901	Closed	Closed	Closed	448,333
113	22,588	112,465	30,373	Closed	10,259	5,353	Closed	Closed	Closed	181,038
114	75,171	168,610	44,459	Closed	43,008	*	Closed	Closed	Closed	336,717
115	40,652	39,222	4,958	Closed	9,047	6,243	Closed	Closed	Closed	100,122
116	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	0
Total	1,829,607	1,454,980	405,947	0	607,852	228,049	34,196	6,595	11,352	4,578,578

Note: * denotes that where number of vessels participating is less than three, the information is considered confidential.

Table 6.–Summary of Dungeness crab port sampling by fishery area during the 2002/2003 commercial season.

Fishery Area	Number Crab Harvested	Percent Harvest Sampled	Number Crab Sampled	Average Carapace Width, mm	Average Weight, pounds	Percent Recruits
Behm Canal, Portland Canal	68,129	2.3	1,568	174.2	2.0	77.2
East Coast, Prince of Wales	55,527	0.3	151	179.9	2.1	91.3
West Prince of Wales	6,789	3.0	201	181.1	2.2	71.1
Port Camden, West Kuiu	807,148	0.5	4,246	179.2	2.1	92.7
Duncan Canal	692,554	0.8	5,280	180.1	2.1	90.6
Ernest Sound, Clarence Strait	251,207	0.2	501	179.5	2.1	89.9
Stikine Flats	737,459	0.4	2,843	178.1	2.2	94.0
East Admiralty, Mainland Bays	530,550	0.6	3,159	180.4	2.2	88.3
Tenakee Inlet	49,262	0.7	348	180.8	2.4	83.3
Peril Strait	97,992	0.4	351	176.1	2.1	93.8
Icy Straits, Glacier Bay	83,942	1.1	900	177.6	2.0	86.5
Lynn Canal	44,182	1.0	435	178.1	2.1	90.7
Thomas Bay, Farragut Bay	34,347	0.3	99	176.7	2.0	94.9

Table 7.–Summary of Dungeness crab port sampling by fishery area during the 2003/2004 commercial season.

Fishery Area	Number Crab Harvested	Percent Harvest Sampled	Number Crab Sampled	Average Carapace Width, mm	Average Weight, pounds	Percent Recruits
Behm Canal, Portland Canal	67,464	2.4	1,650	173.3	2.0	65.5
East Coast, Prince of Wales	46,367	1.5	713	175.6	2.0	73.0
West Prince of Wales	14,597	0.3	50	182.5	2.2	88.0
Port Camden, West Kuiu	352,245	0.4	1,552	181.1	2.2	85.9
Duncan Canal	355,307	1.6	5,781	178.1	2.1	90.2
Ernest Sound, Clarence Strait	110,495	0.5	601	175.6	2.0	97.1
Stikine Flats	378,115	1.1	4,034	180.7	2.2	86.9
East Admiralty, Mainland Bays	385,183	1.0	3,684	178.9	2.1	88.6
Tenakee Inlet	142,374	0.5	650	179.2	2.3	86.5
Peril Strait	70,070	0.1	104	177.3	2.1	82.2
Icy Straits, Glacier Bay	114,426	0.9	1,005	179.2	2.2	89.1
Lynn Canal	*		360	180.4	*	85.3
Thomas Bay, Farragut Bay	33,583	0.6	201	180.2	2.2	94.5

Note: * denotes that where number of vessels participating is less than three, the information is considered confidential.

Table 8.–Summary of Dungeness crab port sampling by fishery area during the 2004/2005 commercial season.

Fishery Area	Number Crab Harvested	Percent Harvest Sampled	Number Crab Sampled	Average Carapace Width, mm	Average Weight, pounds	Percent Recruits
Behm Canal, Portland Canal	95,964	1.6	1,504	175.7	2.0	80.3
East Coast, Prince of Wales	42,554	0.6	262	174.0	1.9	66.3
West Prince of Wales	10,351	1.5	154	177.0	2.1	88.2
Port Camden, West Kuiu	232,669	0.9	2,011	178.0	2.1	93.3
Duncan Canal	364,540	1.5	5,463	178.5	2.1	90.5
Ernest Sound, Clarence Strait	161,184	0.4	701	178.0	2.1	94.4
Stikine Flats	310,863	0.9	2,701	176.4	2.0	90.7
East Admiralty, Mainland Bays	423,758	0.9	3,610	178.7	2.1	91.8
Tenakee Inlet	96,726	0.3	301	183.5	2.3	82.0
Peril Strait	124,587	0.5	644	182.4	2.3	83.5
Icy Straits, Glacier Bay	215,580	0.3	698	177.8	2.1	90.6
Lynn Canal	50,978	0.4	225	181.3	2.3	82.6
Thomas Bay, Farragut Bay	51,055	0.5	278	177.3	2.1	92.6

Table 9.–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 or Season[a]	Harvest, pounds	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
1968/1969	2,003,753	12	925	166,979	2,166
1969/1970	1,840,727	11	952	167,339	1,933
1970/1971	742,404	11	477	67,491	1,556
1971/1972	1,050,978	9	592	116,775	1,775
1972/1973	797,387	9	421	88,599	1,894
1973/1974	674,386	8	460	84,298	1,466
1974/1975	1,205,617	20	434	60,281	2,777
1975/1976	983,609	12	450	81,967	2,185
1976/1977	768,930	14	476	54,924	1,615
1977/1978	949,043	10	404	94,904	2,349
1978/1979	1,033,325	9	519	114,814	1,990
1979/1980	956,927	17	982	56,290	974
1980/1981	843,737	21	920	40,178	917
1981/1982	919,275	15	524	61,285	1,754
1982/1983	1,397,026	15	455	93,135	3,070
1983/1984	1,756,533	18	667	97,585	2,633
1984/1985	1,294,545	23	811	56,285	1,596
1985/1986	429,224	16	252	26,827	1,703
1986/1987	2,203,935	16	435	137,746	5,066
1987/1988	1,761,636	25	388	70,465	4,540
1988/1989	1,675,643	18	527	93,091	3,179
1989/1990	1,813,032	21	645	86,335	2,810
1990/1991	2,494,957	23	793	108,476	3,146
1991/1992	2,934,341	28	1,036	104,798	2,832
1992/1993	2,375,742	41	922	57,945	2,576
1993/1994	2,135,500	25	705	85,420	3,029
1994/1995	3,223,791	25	814	128,952	3,960
1995/1996	3,053,316	48	793	63,611	3,850
1996/1997	2,536,985	51	884	49,745	2,869
1997/1998	3,051,197	42	983	72,648	3,103
1998/1999	2,264,641	24	834	94,360	2,715
1999/2000	1,893,815	23	566	82,340	3,346
2000/2001	1,413,264	16	543	88,329	2,603
2001/2002	903,897	19	358	47,574	2,525
2002/2003	1,096,235	13	423	84,326	2,592
2003/2004	740,387	10	216	74,039	3,428
2004/2005[a]	986,451	8	232	123,306	4,252

Note: Most recent year's data should be considered preliminary.

[a] Data from 1955 through the 1968/1969 seasons is from annual reports. Harvest and effort data from 1969/1970 to the present is from the ADF&G Integrated Fisheries Data Base (IFDB).

Table 10. Registration Area A (Southeast Alaska) shrimp beam trawl harvest in thousands of pounds by month and season, 1969/1970 to present.

Season	Month												Total
	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	
1969/1970	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
1970/1971	131.3	105.1	65.4	79.8	49.7	64.3	54.8	59.2	59.9	56.8	*	13.2	742.4
1971/1972	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
1972/1973	168.5	126.4	77.2	*	*	44.7	64.0	46.3	81.6	42.2	6.1	8.5	797.4
1973/1974	96.3	124.1	*	*	*	*	59.1	64.8	60.3	29.2	*	8.4	674.4
1974/1975	160.9	199.2	202.4	168.0	120.1	61.4	73.9	90.8	104.2	21.6	*	*	1,205.6
1975/1976	180.7	130.3	67.2	*	112.3	154.5	73.0	77.8	38.9	46.1	*	6.7	983.6
1976/1977	78.8	171.7	120.0	118.8	61.8	37.4	55.2	33.3	65.0	25.7	*	*	768.9
1977/1978	73.7	235.3	147.9	166.6	126.2	48.3	29.5	18.7	81.2	21.7	0.0	0.0	949.0
1978/1979	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
1979/1980	98.2	154.9	146.6	177.4	104.2	55.1	58.4	39.6	66.3	48.1	*	*	956.9
1980/1981	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
1981/1982	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
1982/1983	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
1983/1984	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
1984/1985	156.3	252.5	272.5	232.8	132.9	59.5	61.8	49.7	51.9	22.5	*	*	1,294.5
1985/1986	125.6	105.3	46.1	23.2	39.1	13.8	31.3	29.8	*	8.4	*	*	429.2
1986/1987	294.4	508.2	576.0	446.8	372.0	*	*	*	*	*	*	*	2,203.9
1987/1988	634.0	721.0	291.2	90.8	*	*	*	*	*	6.0	*	*	1,761.6
1988/1989	647.2	369.0	258.4	137.9	*	2.5	82.8	127.3	37.8	*	*	*	1,675.6
1989/1990	473.6	236.2	259.0	173.4	224.3	115.8	*	38.4	167.8	53.4	*	*	1,813.0
1990/1991	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
1991/1992	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
1992/1993	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
1993/1994	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
1994/1995	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
1995/1996	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
1996/1997	782.8	262.2	609.0	162.8	510.3	100.3	73.3	7.6	*	1.4	*	*	2,537.0
1997/1998	727.8	237.8	637.6	183.9	677.6	142.2	129.0	261.0	*	41.6	*	0.0	3,051.2
1998/1999	524.8	260.8	501.3	317.7	348.7	138.8	102.6	3.4	22.3	15.5	*	*	2,264.6
1999/2000	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
2000/2001	486.3	172.6	219.6	185.8	92.0	78.5	118.7	*	25.4	25.9	*	*	1,413.3
2001/2002	363.0	149.3	11.3	41.0	97.9	*	93.1	17.9	42.6	9.0	*	0.0	903.9
2002/2003	350.8	138.7	*	90.7	147.5	*	129.3	18.4	38.9	110.9	*	0.0	1,096.1
2003/2004	336.0	53.1	19.9	15.8	*	136.1	104.1	19.1	24.5	27.4	0.0	0.0	740.3
2004/2005[a]	480.0	195.5	*	*	*	76.8	126.0	5.7	12.1	10.8	0.0	0.0	986.5

Note: Most recent year's data should be considered preliminary.

Note: * Denotes that where number of permits participating is less than three boats, information is considered confidential.

Table 11.–Registration Area A (Southeast Alaska) shrimp beam trawl fishery harvest in thousands of pounds by season and district, 1969/1970 through 1978/1979 seasons.

District	Season									
	1969/1970	1970/1971	1971/1972	1972/1973	1973/1974	1974/1975	1975/1976	1976/1977	1977/1978	1978/1979
101	0.0	*	*	0.0	*	*	*	1.6	0.0	*
102	0.0	0.0	0.0	0.0	0.0	1.3	0.1	0.0	0.0	0.0
103	0.0	*	*	*	0.0	0.0	*	*	0.0	0.0
104	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
105	*	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0
106: Duncan	865.5	344.4	442.4	450.3	260.0	973.2	554.2	610.2	669.7	625.0
106: Sumner	0.0	0.0	0.0	*	0.0	0.0	257.6	10.7	*	*
107: Eastern	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
107: Blake	0.0	38.1	67.0	35.7	48.7	10.4	14.6	29.2	40.3	140.1
108: Stikine	609.7	158.5	285.7	219.6	323.4	212.4	84.5	85.5	176.0	261.9
109	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110: Thomas	350.1	198.6	252.3	89.9	*	*	*	27.9	*	3.4
110: Upper Fred	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111	*	0.0	0.0	0.0	0.0	*	*	*	*	*
112	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
113	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
114	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
115	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0
116	0.0	0.0	0.0	0.0	0.0	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

* Where number of permits participating is less than three boats, information is considered confidential.

Table 12.–Registration Area A (Southeast Alaska) shrimp beam trawl fishery harvest in thousands of pounds, by season and district, 1979/1980 through 1988/1989 season.

District	Season									
	1979/1980	1980/1981	1981/1982	1982/1983	1983/1984	1984/1985	1985/1986	1986/1987	1987/1988	1988/1989
101	*	*	*	*	*	*	*	*	0.0	*
2	1.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
103	*	*	*	*	0.0	0.0	0.0	0.0	0.0	0.0
104	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0
105	*	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0
106:	427.4	415.0	693.8	1,199.6	1,015.4	523.9	235.7	1,645.3	1,225.7	1,043
106:	0.0	*	*	0.0	0.0	17.7	*	*	*	*
107:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*
107:	109.8	77.9	31.5	11.8	138.6	101.3	30.6	100.6	75.8	15.9
108:	405.7	342.5	88.6	51.0	545.0	610.8	160.9	432.4	436.3	590.0
109	0.0	*	0.0	*	*	0.0	0.0	0.0	0.0	0.0
110:	2.8	0.0	0.0	*	26.3	33.8	*	*	*	*
110:	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
111	0.0	*	*	0.0	0.0	0.0	0.0	0.0	*	0.0
112	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
113	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
114	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0
115	*	*	*	*	2.0	*	*	0.0	0.0	0.0
116	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1,840.7	742.4	1,051.0	797.4	674.4	1,205.6	983.6	768.9	949.0	1,033
Landings	952	477	592	421	460	434	450	476	404	519
Permits	11	11	9	9	8	20	12	14	10	9

Note: * Denotes that where number of permits participating is less than 3 boats, information is considered confidential.

Table 13.–Registration Area A (Southeast Alaska) shrimp beam trawl fishery harvest in thousands of pounds, by season and district, 1989/1990 to 1998/1999.

District	Season									
	1989/1990	1990/1991	1991/1992	1992/1993	1993/1994	1994/1995	1995/1996	1996/1997	1997/1998	1998/1999
101	*	*	0.0	0.0	*	*	*	----------Closed ----------		
102	0.0	0.0	0.0	*		---------- Closed ----------				
103	0.0	80.1	20.4	125.3	18.9	31.6	19.2	69.9	24.2	47.3
104	0.0	0.0	0.0	0.0		---------- Closed ----------				
105	0.0	0.0	0.0	*	0.0	*	182.0	74.1	11.7	0.0
106:	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
106:	0.0	*	0.0	13.8	*	*	0.0	*	0.0	0.0
107:	17.5	55.5	74.1	42.4	*	232.2	168.1	115.2	174.7	62.7
107:	70.8	40.5	101.5	60.1	50.6	0.0	3.6	8.4	*	0.8
108:	676.7	652.0	697.9	683.6	834.3	848.5	905.7	611.9	1,347.8	818.8
109	0.0	*	*	19.6	*	0.0	*	*	*	*
110:	*	*	321.3	148.7	219.7	241.7	239.7	280.8	240.1	*
110:	0.0	0.0	*	0.0	0.0	*	*	28.4	16.9	*
111	0.0	*	9.6	98.0	112.4	295.0	170.3	57.4	13.9	36.2
112	0.0	0.0	*	0.0		---------- Closed ----------				
113	0.0	0.0	*	0.0		---------- Closed ----------				
114	0.0	0.0	0.0	0.0		---------- Closed ----------				
115	*	*	0.0	*		---------- Closed ----------				
116	0.0	0.0	0.0	0.0		---------- Closed ----------				
	*	*	0.0	0.0	*	*	*	----------Closed ----------		
Total	1,813.0	2,495.0	2,934.3	2,375.7	2,135.5	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

Note: * Denotes that where number of permits participating is less than 3 boats, information is considered confidential.

Table 14.–Registration Area A (Southeast Alaska) shrimp beam trawl fishery harvest in thousands of pounds, by season and district, 1999/2000 - present.

District	Season					
	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005[a]
101				---------- Closed ----------		
102				---------- Closed ----------		
103	*	*	*	*	0.0	0.0
104				---------- Closed ----------		
105	*	0.0	0.0	0.0	0.0	0.0
106: Duncan	838.9	585.8	222.5	99.9	62.5	484.1
106: Sumner	0.0	0.0	0.0	0.0	0.0	0.0
107: Eastern	45.8	89.2	57.7	62.4	35.6	*
107: Blake	*	*	*	0.0	0.0	0.0
108: Stikine	704.7	562.3	583.1	790.8	571.2	467.7
109	*	*	5.9	*	0.0	0.0
110: Thomas	247.1	64.1	23.2	*	*	*
110: Upper Fred	*	*	*	*	0.0	0.0
111	26.0	81.9	*	0.0	0.0	0.0
112				---------- Closed ----------		
113				---------- Closed ----------		
114				---------- Closed ----------		
115				---------- Closed ----------		
116				---------- Closed ----------		
Total	1,893.8	1,413.3	903.9	1,096.2	740.4	986.5
Landings	566	543	358	423	216	232
Permits	23	16	19	13	10	8

Note: * Denotes that where number of permits participating is less than 3 boats, information is considered confidential.

[a] most recent year's data should be considered preliminary.

Table 15.–Registration Area A (Southeast Alaska) shrimp beam trawl harvest and landings by district and month, 2002/2003.

Month	Duncan Canal	Sumner Strait	Eastern Channel	Fishery Blake Passage	Stikine Flats	Thomas Bay	All Others Southeast	Total Permits	Total Harvest
May	19,241(8)		*		284,365(68)	*	*	7	350,832
June	*		*		*	*		5	138,746
July					*			*	*
August	*				48,759(37)	*	*	5	90,731
September	*				127,790(43)		*	5	147,479
October					*			*	*
November	*		*		113,525(48)	*		4	129,337
December					15,005(12)	*	*	6	18,395
January					33,709(31)		*	7	**
February			*		85,601(52)		*	8	110,869
March	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
April	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED

Note: * Denotes that where number of permits participating is less than 3 boats, information is considered confidential.

Table 16.–Registration Area A (Southeast Alaska) shrimp beam trawl harvest and landings by district and month, 2003/2004.

Month	Duncan Canal	Sumner Strait	Eastern Channel	Fishery Blake Passage	Stikine Flats	Thomas Bay	all Others Southeast	Total Permits	Total Harvest
May	*		*		227,749(45)	*		5	336,026
June			*			*		4	53,124
July					19,939(12)			3	19,939
August					15,825(10)			3	15,825
September					*			*	*
October	*				130,498(29)			3	**
November	*				101,904(28)			3	**
December					19,080(14)			5	19,080
January					24,492(8)			3	24,492
February					27,440(16)			4	27,440
March	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
April	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED

Note: * Denotes that where number of permits participating is less than 3 boats, information is considered confidential.
Note: ** Denotes that numbers are confidential, where totals can be used to calculate confidential catch.

Table 17.–Registration Area A (Southeast Alaska) shrimp beam trawl harvest and landings by district and month, 2004/2005.

Month	Duncan Canal	Sumner Strait	Eastern Channel	Fishery Blake Passage	Stikine Flats	Thomas Bay	All Others Southeast	Total Permits	Total Harvest
May	212,955(34)				252,776(64)	*		6	**
June	179,769(25)		*			*		6	193,653
July					*			*	*
August					*			*	*
September					*			*	*
October	*				27,702(9)	*		3	76,752
November	*				77,151((26)			3	*
December					5,678(5)			4	5,678
January					12,129(7)			5	12,129
February					10,767(9)			3	10,767
March	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
April	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED

Note: Recent season's data should be considered preliminary.
Note: * Denotes that where number of permits participating is less than 3 boats, information is considered confidential.
Note: ** Denotes numbers that are confidential, where totals can be used to calculate confidential catch.

Table 18.–Registration Area A (Southeast Alaska) shrimp pot fishery harvest, number of landings, and CPUE, 1968/1969 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 Permit	Pounds per Landing
1968/1969	32,373	4	47	689	8,093
1969/1970	19,928	3	25	797	6,643
1970/1971	12,684	5	27	470	2,537
1971/1972	26,727	6	49	545	4,455
1972/1973	*	*	*	*	*
1973/1974	*	*	*	*	*
1974/1975	7,640	7	16	478	1,091
1975/1976	19,242	5	29	664	3,848
1976/1977	15,716	6	16	982	2,619
1977/1978	24,631	10	76	324	2,463
1978/1979	21,318	9	35	609	2,369
1979/1980	57,878	19	124	467	3,046
1980/1981	80,862	31	191	423	2,608
1981/1982	157,770	49	381	414	3,220
1982/1983	268,680	58	374	718	4,632
1983/1984	257,317	93	653	394	2,767
1984/1985	299,015	117	781	383	2,556
1985/1986	209,211	81	498	420	2,583
1986/1987	354,145	83	608	582	4,267
1987/1988	369,164	96	688	537	3,845
1988/1989	440,615	121	812	543	3,641
1989/1990	415,828	110	816	510	3,780
1990/1991	562,596	138	1,100	511	4,077
1991/1992	823,511	177	1,561	528	4,653
1992/1993	676,928	150	1,266	535	4,513
1993/1994	918,021	183	1,625	565	5,017
1994/1995	1,142,717	248	2,718	420	4,608
1995/1996	988,805	352	2,854	346	2,809
1996/1997	1,035,344	203	1,996	519	5,100
1997/1998	891,119	200	1,766	505	4,456
1998/1999	856,284	185	1,839	466	4,629
1999/2000	868,520	154	1,378	630	5,640
2000/2001	1,063,047	160	1,311	811	6,644
2001/2002	1,052,015	169	2,450	429	6,225
2002/2003	1,058,348	151	2,695	393	7,009
2003/2004	1,132,721	156	2,801	404	7,261
2004/2005 [a]	1,000,677	149	2,499	400	6,716

Note: Harvest based on 2.0 conversion tail to whole weight and corrected fish tickets.
[a] Most recent year's data should be considered preliminary.
* Where number of vessels participating is less than three, information is confidential.

Table 19.–Registration Area A (Southeast Alaska) shrimp pot fishery harvest in thousands of pounds by month, 1968/1969 season to present.

Year	Month												Total Harvest	Landings	Permits
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.			
1968/1969				2.9	4.8	9.4	5.5	*	*				32	47	4
1969/1970			*	*	4.6	5.1	*	*	6.5	1.0			20	25	3
1970/1971	*	*	3.2	*	3.5	*						*	13	27	5
1971/1972	*	*	*	*	*	4.5	11.3	3.8	1.8		*		27	49	6
1972/1973	*					*	*		*				*	*	*
1973/1974			*		*	*	*		*				*	*	*
1974/1975	*	*	*	*	*	*	*			*			8	16	7
1975/1976		*	*	*	*	*	*	*	*	*	*		19	29	5
1976/1977		*	*	*		*	*			*		*	16	16	6
1977/1978	*	*		*	*	*	*	*	*	*	*	*	25	76	10
1978/1979	*	*	*				*	5.1	*	*	*	*	21	35	9
1979/1980		*		*	1.5	3.0	2.7	16.5	8.3	7.9	*	9.1	58	123	19
1980/1981	10.0	3.1	*	*	*	4.2	8.1	6.5	7.2	22.0	9.9	5.9	81	192	32
1981/1982	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
1982/1983	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
1983/1984	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
1984/1985	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
1985/1986	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
1986/1987	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
1987/1988	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

-continued-

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Year	Month												Total Harvest	Landings	Permits
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.			
1988/1989	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
1989/1990	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
1990/1991	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
1991/1992	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
1992/1993	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
1993/1994	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
1994/1995	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
1995/1996	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
1996/1997	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
1997/1998	757.0	57.9	30.9	3.7	6.8	5.6	7.5	9.4	10.1	*	*		868	1,759	198
1998/1999	618.9	128.6	47.8	19.9	25.6	*		16.3	4.1	2.1	3.8	2.9	861	1,833	185
1999/2000	639.8	96.9	39.0	33.3	24.5	CLOSED	CLOSED	18.0	8.2	12.2		*	870	1,373	157
2000/2001	816.3	153.3	39.4	18.1	13.6	CLOSED	CLOSED	11.7	6.2	4.1		*	1,057	1,302	161
2001/2002	841.2	120.9	26.3	17.9	17.3	CLOSED	CLOSED	11.8	9.4	5.3		*	1,047	2,440	172
2002/2003	814.4	163.2	34.4	8.6	24.6	CLOSED	CLOSED	6.4	7.5	*		6.9	1,066	2,709	155
2003/2004	918.1	154.5	12.4	16.7	8.4	CLOSED	CLOSED	8.4	5.7	8.5		*	1,140	2,810	157
2004/2005[a]	840.5	112.3	17.4	8.7	10.8	CLOSED	CLOSED	3.4	*	3.8			999	2,491	149

Note: Harvest based on 2.0 conversion tail to whole weight and corrected fish tickets.
[a] Most recent year's data should be considered preliminary; season in progress.
* Where number of vessels participating is less than three, information is confidential.

Table 20.–Registration Area A (Southeast Alaska) shrimp pot fishery harvest in thousands of pounds by district, 1968/1969 season to present.

Season	District															
	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116
1968/1969	25.1	*					*									
1969/1970	11.9		*													
1970/1971	3.7	*						*		*						
1971/1972	10.6	14.8					*		*	*						
1972/1973		*					*									
1973/1974	*	*														
1974/1975	4.1	*	*													
1975/1976	7.2	11.5	*													
1976/1977	*	9.6	*				3.3									
1977/1978	5.6	14.1			*		*						*			
1978/1979	4.2	6.7	*	*			3.6					*	*			
1979/1980	19.0	12.8	*				18.3	*					*	*		
1980/1981	15.4	14.8	25.0	*		*	16.6	*	*	*		*	*			
1981/1982	26.3	17.5	57.1			9.4	15.6	2.0	4.9	*	*	*	14.6	*		4.7
1982/1983	31.0	36.5	84.8	*		7.8	73.9	2.7	9.6	3.9		*	14.9	*		*
1983/1984	41.1	22.5	36.6	*	*	7.7	87.2	16.5	*	14.2	*	3.3	21.1			*
1984/1985	69.1	50.6	18.5	*	*	6.2	85.4	8.7	*	33.5	*	*	17.1	0.5		*
1985/1986	36.7	37.5	71.1	*	*	6.0	23.1	2.8	1.7	13.4	*	0.4	11.1	*	*	*
1986/1987	60.9	137.3	48.9		*	2.2	40.6	2.0	5.2	33.1	2.3	3.9	11.0	*	*	*
1987/1988	118.5	80.0	27.5	*	*	0.6	50.2	2.8	18.8	29.0	2.3	13.9	21.5	2.0	*	*

-continued-

Table 20.–Page 2 of 2

Season	District															
	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116
1988/1989	200.8	62.8	19.8	*	*	8.0	61.5	0.9	6.6	36.4	0.6	10.7	26.8	*		*
1989/1990	155.3	68.6	27.0	2.7		8.4	44.2	18.7	*	47.9	*	6.6	30.5			*
1990/1991	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
1991/1992	168.6	83.5	274.4	*	*	21.2	123.4	15.3	2.9	49.7	*	12.3	61.2		3.3	4.5
1992/1993	160.1	70.0	221.9	4.7	*	24.4	64.5	20.1	9.6	30.5	*	26.8	40.4		1.2	*
1993/1994	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	*
1994/1995	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
1995/1996	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
1996/1997	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	*
1997/1998	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	*
1998/1999	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
1999/2000	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	*
2000/2001	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	*
2001/2002	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	*
2002/2003	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
2003/2004	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
2004/2005[a]	169.5	88.5	302.9	19.3	21.6	66.5	91.0	19.8	17.9	51.6	21.8	41.4	52.8	21.3	4.8	*

Note: Harvest based on 2.0 conversion tail to whole weight and corrected fish tickets.
a Most recent year's data should be considered preliminary.
* Where number of vessels participating is less than three, information is confidential.

Table 21.–Registration Area A (Southeast Alaska) shrimp pot harvest in thousands of pounds, number of permits, and number of landings by district by month, 2002/2003 season.

District	Oct	Nov	Dec	Jan	Feb	May	Jun	Jul	Closure date	Total Harvest	Permits	Landings
101	87,438	69,995							21-Nov	157,393	44	472
102	89,581								30-Oct	89,581	12	144
3-A	224,008	41,648							9-Nov	266,617	33	510
3-B/C	54,174								21-Oct	54,174	12	121
104[b]				*	21,689				28-Feb	22,153	4	28
105[b]	*	*	*	*	*	6,358	7,535	*	31-Jul	19,563	9	96
106	68,331								26-Oct	68,331	11	174
107	95,274	18,412							8-Nov	114,036	24	430
108	24,328								31-Oct	24,328	8	114
109	15,935								1-Nov	15,935	8	34
110	54,710								16-Oct	54,710	17	109
111	8,637	6,658	4,165						12-Dec	19,460	12	76
Tenakee	21,558								6-Oct	24,714	8	39
Remainder of Dist. 12	16,684	*							31-Oct	17,048	10	55
13-A/B	8,312	1,664	4,738	*					5-Jan	14,868	9	69
13-C	38,340	*							5-Oct	40,778	22	57
114[b]	*	4,539	7,549	7,074					18-Jan	19,903	9	99
115[b]	3,824	5,426	9,903	*					6-Feb	19,561	7	71
116	*	14,034	*						28-Feb	23,267	3	51
Harvest	814,435	163,229	34,357	8,552	24,601	6,358	7,535	*				
Permits	149	87	19	8	6	5	5	*				
Landings	1,865	542	144	39	37	26	44	*				

* Where number of vessels participating is less than three, information is confidential.

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

Table 22.–Registration Area A (Southeast Alaska) shrimp pot harvest in thousands of pounds, number of permits, and number of landings by district by month, 2003/2004 season.[a]

District	Oct	Nov	Dec	Jan	Feb	May	Jun	Jul	Closure date	Total Harvest	Permits	Landings
101	129,425	52,948							19-Nov	182,373	52	557
102	96,711								22-Oct	96,711	16	187
3-A	246,383	38,485							17-Nov	284,868	36	493
3-B/C	65,209								15-Oct	65,209	11	86
104[b]				*	*	*	*	*	16-Jul	20,361	4	53
105[b]	*	2,380	*	*	*	5,725	*	4,666	31-Jul	17,737	11	84
106	70,026								24-Oct	70,026	14	173
107	91,528	22,156	2,785	*					21-Jan	122,064	25	471
108	22,734								18-Oct	22,734	10	92
109	18,208								24-Oct	18,208	7	53
110	61,653								12-Oct	61,653	18	104
111	11,148	10,866							17-Nov	22,014	10	62
Tenakee	30,494								6-Oct	34,812	8	44
Remainder of Dist. 12	16,713	2,892							6-Nov	19,605	9	68
13-A/B	1,646	4,486	4,345	3,397	*				28-Feb	14,008	11	65
13-C	42,308								5-Oct	44,506	19	58
114[b]	4,587	7,588	4,614	2,801					15-Jan	19,590	12	108
115[b]	*	1,464	*	*	*	*	*		31-Jul	6,916	8	38
116	*	11,234							28-Feb	16,239	3	41
Harvest	918,078	154,499	12,350	16,749	8,435	8,421	5,723	*				
Permits	153	82	16	10	6	6	4	*				
Landings	2,007	559	61	63	26	31	20	*				

* Where number of vessels participating is less than three, information is confidential.

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

Table 23.–Registration Area A (Southeast Alaska) shrimp pot harvests in thousands of pounds, number of permits, and number of landings by district by month, 2004/2005 season.[a]

District	Oct	Nov	Dec	Jan	Feb	May	Jun	Jul	Closure date	Total Harvest	Permits	Landings
101	94,884	65,886	8,076	*					20-Dec	169,476	46	606
102	88,524								14-Oct	88,524	19	163
3-A	256,392								21-Oct	258,087	33	425
3-B/C	46,497								15-Oct	46,497	11	88
104b		*	1,587	*	*				29-Feb	19,296	3	57
105b		5,508	4,754	*	*	3,434	*	3,780	22-Jul	21,584	10	117
106	65,524								21-Oct	65,524	11	141
107	82,450	8,521							6-Nov	90,971	19	322
108	19,736	*							6-Nov	19,848	6	105
109	17,911								30-Oct	17,911	5	45
11	51,592								11-Oct	51,592	14	78
111	13,127	8,636							12-Nov	21,763	7	52
Tenakee	23,729								3-Oct	26,106	12	27
Remainder of Dist. 12	17,663								23-Oct	17,663	7	51
13-A/B	11,174	6,790	*						4-Dec	18,502	8	54
13-C	34,270								5-Oct	36,115	16	42
11b	6,116	13,534	1,632						7-Dec	21,282	15	114
11b	2,074	1,970	*						31-Jul	4,838	6	28
11	*	*							31-Jul	*	*	*
Harvest	840,538	112,262	17,381	8,722	10,815	3,434	*	3,780				
Permits	146	62	26	5	3	3	*	3				
Landings	1,805	481	90	34	31	23	*	15				

Note * Where number of vessels participating is less than three, information is confidential.

[a] Most recent year's data should be considered preliminary.

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

Table 24.–Guideline harvest levels for 2002/2003 through 2005/2006 Southeast Alaska commercial pot shrimp fishery by District or Section.

Management District /Section	Guideline Harvest Level (GHL) in Whole Pounds by Season			
	2005/2006	2004/2005	2003/2004	2002/2003
101	164,000	164,000	164,000	164,000
102	86,000	86,000	86,000	86,000
3-A	198,000	198,000	264,000	264,000
3-B/C	50,000	50,000	50,000	50,000
104	20,000	20,000	20,000	20,000
105	20,000	20,000	20,000	20,000
106	82,000	68,000	68,000	68,000
107	78,000	78,000	104,000	104,000
108	20,000	20,000	20,000	20,000
109	18,000	18,000	18,000	18,000
11	48,000	48,000	36,000	36,000
111	20,000	20,000	20,000	20,000
12, Tenakee Inlet	28,000	20,000	20,000	20,000
12, other than Tenakee Inlet	15,000	15,000	15,000	15,000
13-A/B	15,000	15,000	15,000	15,000
13-C	42,000	42,000	30,000	30,000
114	20,000	20,000	20,000	20,000
115	15,000	20,000	20,000	20,000
116	CLOSED	15,000	20,000	20,000
Total	939,000	937,000	1,010,000	1,010,000

Table 25.–Historical closure dates and days fished by district and section for the Southeast Alaska commercial pot shrimp fishery, 1995/1996 through 2004/2005 seasons.

Management District /Section	Closure Date by Season										
	2005/2006	2004/2005	2003/2004	2002/2003	2001/2002	2000/2001	1999/2000	1998/1999	1997/1998	1996/1997	1995/1996
101	14 Dec 05	20 Dec 04	19 Nov 03	21 Nov 02	19 Nov 01	10-Nov-00	7-Feb-00	5-Jan-99	7-Nov-97	6-Nov-96	2-Jan-96
102	14 Oct 05	14 Oct 04	22 Oct 03	30 Oct 02	28 Oct 01	29-Oct-00	3-Nov-99	5-Jan-99	22-Oct-97	30-Oct-96	10-Jan-96
3-A	15 Oct 05	21 Oct 04	17 Nov 03	9 Nov 02	28 Oct 01	10-Oct; 4-Nov-00	12-Oct-99	Oct 9, Oct 26-30	9-Oct-97	14-Oct-96	13-Nov-95
3-B/C	25 Nov 05	15 Oct 04	15 Oct 03	21 Oct 02	15 Nov 01	15-Oct-00	-	-	-	-	-
104		28 Feb 05	16 Jul 04	28 Feb 03	31 Jul 02	16-Jul-01	31-Jul-00	31-Aug-99	31-Aug-98	29-Aug-97	8-May-96
105		22 Jul 05	31 Jul 04	31 Jul 03	31 Jul 02	31-Jul-01	31-Jul-00	31-Aug-99	31-Aug-98	27-Dec-96	13-Mar-96
106		21 Oct 04	24 Oct 03	26 Oct 02	27 Oct 01	11-Nov; 17-Dec	14-Feb-00	14-Feb-99	3-Nov-97	1-Nov-96	5-Nov-95
107	30 Oct 05	6 Nov 04	21 Jan 04	8 Nov 03	8 Nov 01; 10 Dec 01	3-Nov-00	24-Nov-99	31-Dec-98	24-Oct-97	20-Oct-96	5-Nov-95
108	06 Nov 04	6 Nov 04	18 Oct 03	31 Oct 02	4 Nov 01	23-Oct-00	22-Oct-99	19-Oct; 2-Nov; 13-Nov[f]	23-Oct; 26-Oct 29-97[h]	1-Nov-96	5-Nov-95
109	19 Oct 05	30 Oct 04	24 Oct 03	1 Nov 02	25 Oct 01	1-Nov-00	26-Nov-99	2-Dec-98	9-Dec-97	27-Dec-96	11-Mar-96
110	8 Oct 05	11 Oct 04	12 Oct 03	16 Oct 02	14 Oct 01	26-Oct-00	30-Oct-99	20-Nov-98	3-Nov-97	29-Nov-96	6-Jan-96
111	12 Nov 05	12 Nov 04	17 Nov 03	12 Dec 02	24 Jan 02	10-Feb-01	31-Jul-00	31-Aug-99	31-Aug-98	18-May-97	23-Jun-96
112, Tenakee	5 Oct 05	3 Oct 04	6 Oct 03	6 Oct 02	6 Oct 01	7-Oct-00	9-Oct-99	15-Oct-98	31-Oct-97	18-Nov-96	4-Feb-96
Rest of 112	16 Oct 05	23 Oct 04	6 Nov 03	31 Oct 02	29 Dec 01	-	-	-	10-Oct-97	18-Oct-96	16-Jan-96
13-C	6 Oct 05	5 Oct 04	5 Oct 03	5 Oct 02	4 Oct 01	5-Oct-00	5-Oct-99	7-Oct-98	8-Dec-97	25-Nov-96	16-Jan-96
13-A/B	30 Oct 05	28 Feb 04	28 Feb 04	5 Jan 03	28 Feb 02	28-Feb-01	29-Feb-00	28-Feb-99	31-Aug-98	30-Sep-97	30-Sep-96
114		7 Dec 04	15 Jan 04	18 Jan 03	27 Jun 02	31-Jul-01	31-Jul-00	31-Aug-99	26-Jun-98	30-Sep-97	30-Sep-96
115		30 Jul 05	31 Jul 04	6 Feb 03	28 May 02	12-Dec-01	10-Jun-00	21-May-99	8-Dec-97	26-Feb-97	30-Sep-96
116	Closed	28 Feb 05	28 Feb 04	28 Feb 02	5 Dec 01	20-Nov-01	15-Dec-99	1-Dec-98	7-Nov-97	6-Nov-96	2-Jan-96

Source: (Davidson et al. *In prep*)

Table 26.–Registration Area D (Yakutat) Dungeness crab harvest, number of participating vessels, number of landings, and average harvest per landing, 1960 to 2004/2005.

Year or Season	Harvest, Pounds	Permits	Landings	Pounds per Permit	Pounds per Landing
1960	543,762	-			
1961	1,023,545	-			
1962	937,051	-			
1963	1,383,298	-			
1964	637,140	-			
1965	910,278	-			
1966	528,060	-			
1967	2,031,460	-			
1968	2,096,119	-			
1969/1970	1,223,240	11	107	111,204	11,432
1970/1971	1,508,561	10	83	150,856	18,175
1971/1972	1,212,198	7	88	173,171	13,774
1972/1973	1,992,574	9	85	221,397	23,442
1973/1974	2,347,752	27	236	86,954	9,948
1974/1975	1,031,573	22	154	46,890	6,698
1975/1976	579,908	17	113	34,112	5,131
1976/1977	537,543	7	28	76,792	19,197
1977/1978	131,052	3	11	43,684	11,913
1978/1979	1,799,403	12	122	149,950	14,749
1979/1980	1,436,923	21	87	68,425	16,516
1980/1981	895,220	10	63	89,522	14,209
1981/1982	3,228,301	28	169	115,296	19,102
1982/1983	5,160,135	35	305	147,432	16,918
1983/1984	2,666,383	67	458	39,797	5,821
1984/1985	774,828	39	228	19,830	3,398
1985/1986	371,237	32	168	11,601	2,209
1986/1987	755,912	22	111	34,360	6,810
1987/1988	2,725,040	28	191	97,323	14,267
1988/1989	3,494,368	32	220	109,199	15,883
1989/1990	1,701,859	29	207	58,685	8,221
1990/1991	2,101,676	36	320	58,380	6,567
1991/1992	2,852,074	67	482	42,568	5,917
1992/1993	1,392,700	49	257	28,416	5,419
1993/1994	815,969	44	250	18,545	3,263
1994/1995	915,523	47	240	19,479	3,814
1995/1996	557,528	46	269	12,120	2,072
1996/1997	244,425	26	152	9,401	1,608
1997/1998	156,072	30	84	5,202	1,858
1998/1999	121,478	29	84	4,189	1,446
1999/2000	65,386	10	51	6,539	1,282
2000/2001 -		---------- Closed ----------			

Table 27.–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.

Statistical area name	Statistical area	Dates surveyed	Number of pots		Number of crabs in sampled pots			
			Set	Sampled	Sublegal males	Legal males	Females	Legal males per pot
N. of Cape Fairweather	181-10	5/19-5/21	191	48	5	1	1	0.02
N. of Alsek River to N. of Yakutat Bay	181-60	5/19-5/22	252	215	10	16	31	0.07
Yakutat Bay	183-10	5/24-5/25	31	31	0	0	0	0
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

Table 28.–Registration Area D (Yakutat) shrimp trawl harvest, number of vessels, number of landings, pounds per vessel, and pounds per landing, 1976/1977 to present.

Year or Season	Harvest, Pounds	Permits	Landings	Pounds per Permit	Pounds per Landing
1976/1977	*				
1977/1978	0	0	0	0	0
1978/1979	0	0	0	0	0
1979/1980	*				
1980/1981[a]	1,906,680	16	23	119,168	82,899
1981/1982	*				
1982/1983	141,714	3	7	47,238	20,245
1983/1984	426,649	5	10	85,330	42,665
1984/1985	*				
1985/1986	*				
1986/1987	*				
1987/1988	40,448	3	6	13,483	6,741
1988/1989	0	0	0	0	0
1989/1990	0	0	0	0	0
1990/1991	*				
1991/1992	*				
1992/1993	34,875	3	3	11,625	11,625
1993/1994	*				
1994/1995	0	0	0	0	0
1995/1996	0	0	0	0	0
1996/1997	0	0	0	0	0
1997/1998	0	0	0	0	0
1998/1999	0	0	0	0	0
1999/2000	0	0	0	0	0
2000/2001	0	0	0	0	0
2001/2002	0	0	0	0	0
2002/2003	0	0	0	0	0
2003/2004	0	0	0	0	0
2004/2005[b]	*	*	*	*	*

Note * Where number of vessels participating is less than three, information is confidential.

[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 fishtickets.

[b] Most recent year's data should be considered preliminary.

[*] Where number of permits less than three, data is considered confidential.

Table 29.–Registration Area D (Yakutat) shrimp trawl harvests in thousands of pounds by month and season, 1976/1977 to present.

Season	Month												Total
	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	
1976/1977	0.0	*	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*
1977/1978	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
1978/1979	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
1979/1980	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	*	*
1980/1981[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
1981/1982	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	*
1982/1983	*	*	*	*	*	0.0	0.0	0.0	*	0.0	0.0	0.0	141.7
1983/1984	0.0	0.0	0.0	0.0	*	*	0.0	0.0	0.0	0.0	*	128.0	426.6
1984/1985	0.0	*	0.0	*	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*
1985/1986	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	*
1986/1987	0.0	0.0	0.0	0.0	0.0	0.0	*	*	0.0	*	154.7	0.0	*
1987/1988	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	*	0.0	*	0.0	40.5
1988/1989	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
1989/1990	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
1990/1991	0.0	*	0.0	*	*	0.0	0.0	0.0	0.0	0.0	0.0	*	*
1991/1992	0.0	0.0	*	*	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	*
1992/1993	0.0	0.0	*	*	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.9
1993/1994	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	*
1994/1995	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
1995/1996	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
1996/1997	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
1997/1998	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
1998/1999	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
1999/2000	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
2000/2001	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
2001/2002	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
2002/2003	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
2003/2004	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
2004/2005[b]	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	*

Note *Denotes that where number of vessels participating is less than three, information is confidential.

[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.

[b] Most recent year's data should be considered preliminary.

Table 30.–Registration Area D (Yakutat) shrimp trawl fishery harvest in thousands of pounds, by season and district, 1976/1977 through 1985/1986.

District	Season									
	1976/1977	1977/1978	1978/1979	1979/1980	1980/1981[a]	1981/1982	1982/1983	1983/1984	1984/1985	1985/1986
181	*	0.0	0.0	0.0	556.8	0.0	*	310.4	*	*
183	0.0	0.0	0.0	*	1,349.9	*	*	*	*	0.0
189	*	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0
191	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	*	0	0	*	1,906.7	*	141.7	426.6	*	*
Landings		0	0		23		7	10		
Permits		0	0		16		3	5		

Note *Denotes that where number of vessels participating is less than three, information is confidential.

[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.

Table 31.–Registration Area D (Yakutat) shrimp trawl fishery harvest in thousands of pounds, by season and district, 1986/1987 through 1995/1996.

District	Season									
	1986/1987	1987/1988	1988/1989	1989/1990	1990/1991	1991/1992	1992/1993	1993/1994	1994/1995	1995/1996
181	*	40.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
183	0.0	0.0	0.0	0.0	*	*	*	*	0.0	0.0
189	0.0	0.0	0.0	0.0	*	0.0	*	0.0	0.0	0.0
191	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	*	40.5	0.0	0.0	*	*	34.9	*	0.0	0.0
Landings		6.0	0.0	0.0			3.0		0.0	0.0
Permits		3.0	0.0	0.0			3.0		0.0	0.0

Note *Denotes that where number of vessels participating is less than three, information is confidential.

Table 32.–Summary of shrimp research cruises in Yakutat Bay, Alaska.

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

[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.

Table 33.–Registration Area D (Yakutat) shrimp pot fishery harvest, number of permits and landings, and CPUE, 1968/69 to present.

Season[a]	Harvest, pounds	Permits	Landings	Pounds Per Permit	Pounds Per Landing
1968/1969	0	0	0		
1969/1970	*				
1970/1971	0	0	0		
1971/1972	0	0	0		
1972/1973	0	0	0		
1973/1974	0	0	0		
1974/1975	*				
1975/1976	0	0	0		
1976/1977	0	0	0		
1977/1978	0	0	0		
1978/1979	0	0	0		
1979/1980	*				
1980/1981	*				
1981/1982	*				
1982/1983	29,872	4	63	7,468	474
1983/1984	14,249	8	33	1,781	432
1984/1985	2,796	6	35	466	80
1985/1986	7,441	5	33	1,488	225
1986/1987	2,643	5	10	529	264
1987/1988	4,403	8	45	550	98
1988/1989	2,714	6	15	452	181
1989/1990	8,352	5	72	1,670	116
1990/1991	12,791	7	70	1,827	183
1991/1992	8,773	12	79	731	111
1992/1993	3,844	4	41	961	94
1993/1994	7,093	6	55	1,182	129
1994/1995	6,358	6	64	1,060	99
1995/1996	15,411	16	106	963	145
1996/1997	24,532	14	218	1,752	113
1997/1998	11,999	10	135	1,200	89
1998/1999	6,324	10	113	632	56
1999/2000	7,007	4	86	1,752	81
2000/2001	28,487	11	140	2,590	203
2001/2002	9,740	7	81	1,391	120
2002/2003	10,596	7	118	1,514	90
2003/2004	4,446	6	47	741	95
2004/2005[a]	*				

Note * Denotes that where number of vessels participating is less than three, information is confidential.

[c] Most recent year's data should be considered preliminary.

Table 34.–Registration Area D (Yakutat) shrimp pot harvest in pounds by district and month, 2000/2001 to present.

Season	Month										Total Harvest
	October	November	December	January	February	May	June	July	August	September	
District 181, outside/Icy Bay											
2000/2001	*										*
2001/2002											
2002/2003											
2003/2004					*				*		*
2004/2005 [a]	*										*
District 183, Yakutat Bay											
2000/2001				602	2,445	1,392	656	*	288	*	6,415
2001/2002	280	*			*		*	*			766
2002/2003	*				*	*	*	*	*	*	1,796
2003/2004				*	*	*	*	*	*	*	1,280
2004/2005 [a]											
District 183, Statistical area 183-11 Doggie Island											
2000/2001	*	1,599	1,201	3,108	3,483	572	*			*	11,797
2001/2002	2,424	2,340	2,550	*	*						8,974
2002/2003	1,838	2,840	2,288	1,340	*						8,800
2003/2004	357	*	*	*	*						2,454
2004/2005[a]	*	*	*								*
Average											
2000/2001	3,710	16,203	0	1,964	686	966	288	190	1,680	1,599	1,201
2001/2002	2,766	2,242	0	1,338	338	346	412	535	2,704	2,390	2,550
2002/2003	1,340	500	0	274	324	356	572	96	2,006	2,840	2,288
2003/2004	771	808	340	280	218	304	588	164	357	250	366
2004/2005[a]	60	346	0	672	524	176	0	382	90	2,897	150

c Most recent year's data should be considered preliminary.
* Where number of permits is three or less, data is considered confidential.

Table 35.–Registration Area D (Yakutat) 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	0	0	0	0	0
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	243,810	4	8	60,953	30,476
1998/1999	241,337	7	51	34,477	4,732
1999/2000	249,681	3	22	83,227	11,349
2000/2001	195,699	3	34	65,233	5,756
2001/2002	*	*	*	*	*
2002/2003	*	*	*	*	*
2003/2004	*	*	*	*	*
2004/2005 [a]	*	*	*	*	*
Average	208,739	5	20	43,166	10,671

* Asterisks indicate confidential information where fewer than three permits were fished.

[a] Most recent year's data should be considered preliminary.

Table 36.–Southeast Alaska (District 16 only), historic commercial catch and effort for weathervane scallops.

Year or Season	Harvest, pounds 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	22,020	4	4	5,505	5,505
1998/1999	*	*	*	*	*
1999/2000	*	*	*	*	*
2000/2001	30,904	3	11	10,301	2,809
2001/2002	*	*	*	*	*
2002/2003	*	*	*	*	*
2003/2004	*	*	*	*	*
2004/2005[a]	*	*	*	*	*
Average	21,554	2	4	8,065	3,705

Note: * Denotes confidential information where fewer than three permits were fished.

[a] Most recent year's data should be considered preliminary.

Table 37.–Scallop Registration Area D (Yakutat) annual bycatch of Tanner, Dungeness, and king crab (updated from Barnhart and Rosenkranz 2000).

	District 16			*Yakutat*		
Year or Season	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
1998/1999	129	0	0	5,884	0	277
1999/2000	273	0	0	8,891	0	177
2000/2001	48	0	0	4,993	0	584
2001/2002	627	0	22	17,395	0	313
2002/2003	833	0	32	6,770	0	1,150
2003/2004	185	0	0	8,423	0	779
2004/2005[a]	0	0	21	1,650	0	905
Average	274	0	41	5,550	3	884

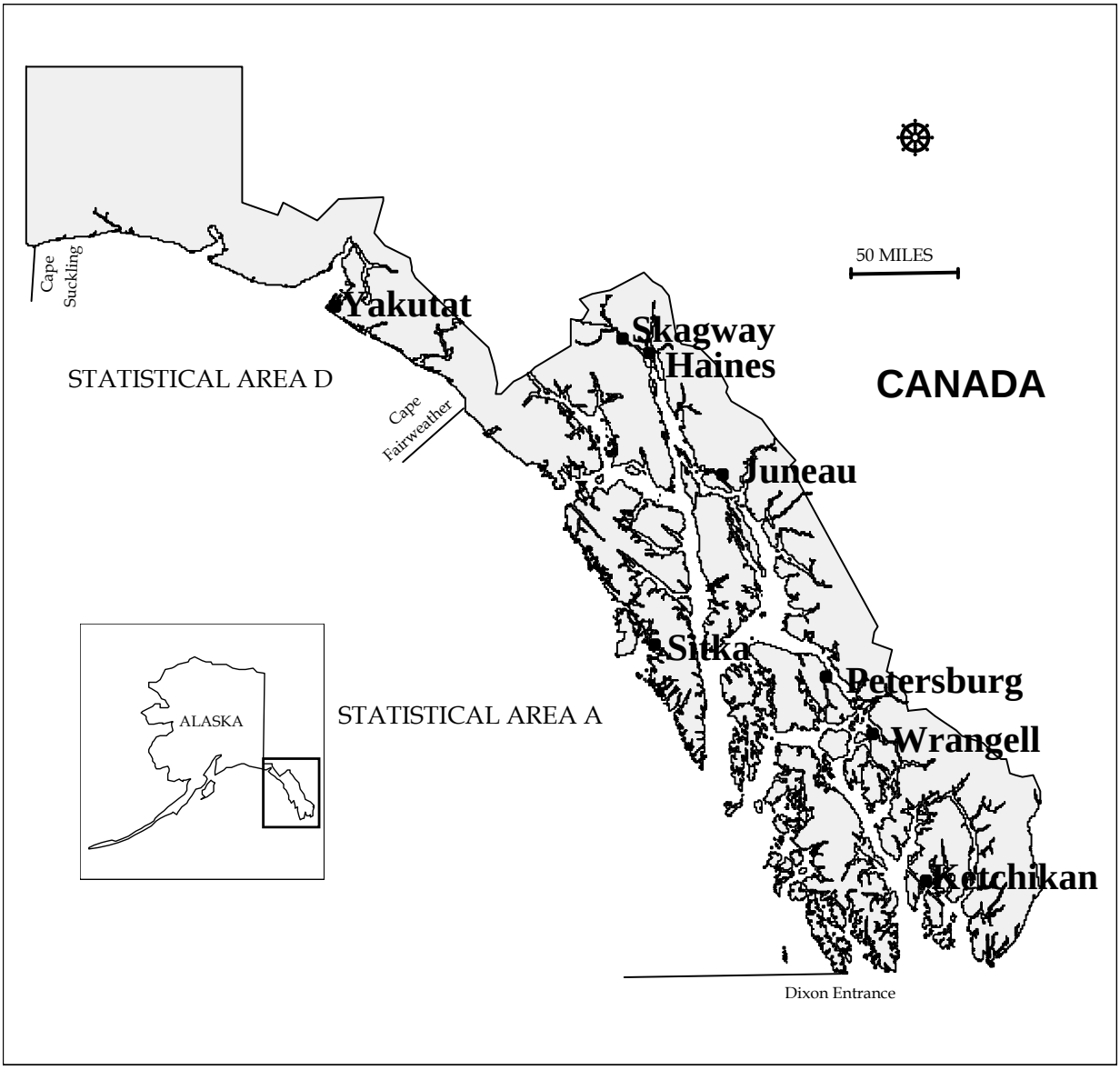

Figure 1.–Registration Area A (Dixon Entrance to Cape Fairweather) and Registration Area D. (Cape Fairweather to Cape Suckling).

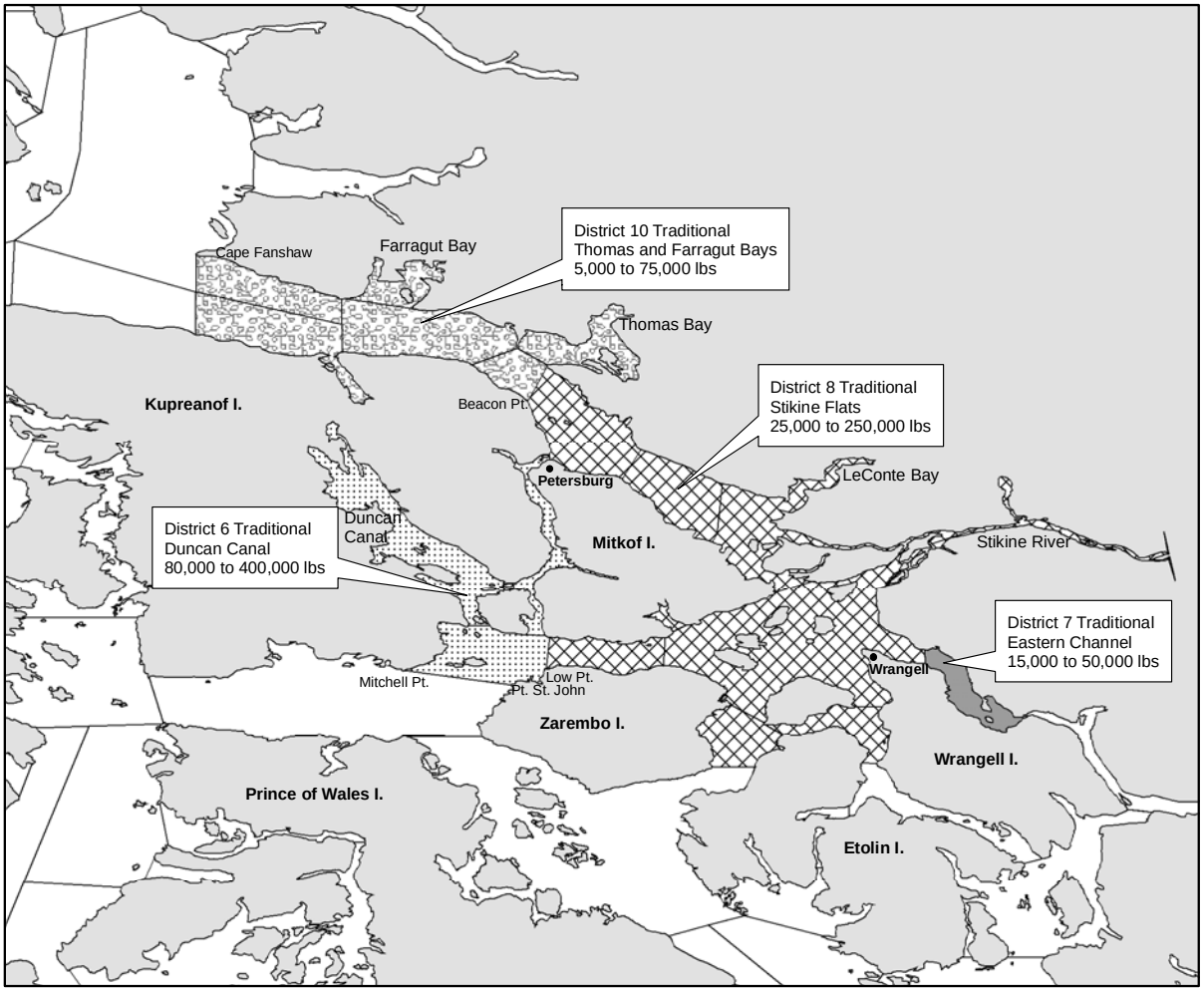

Figure 2.–Traditional beam trawl shrimp fishery areas and fishing period guideline harvest ranges for Southeast Alaska.

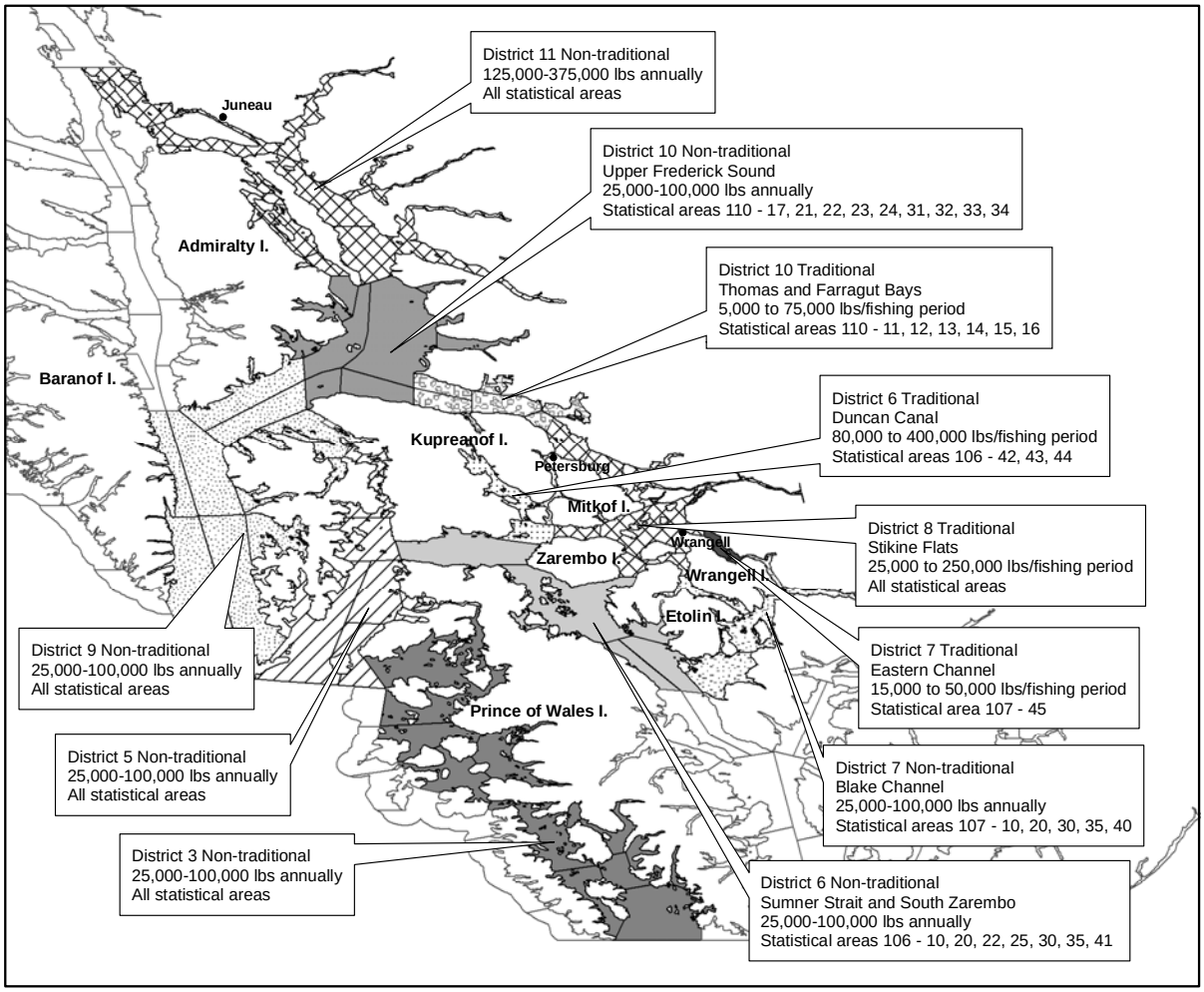

Figure 3.–Beam trawl shrimp fishery areas and fishing period guideline harvest ranges for Southeast Alaska.

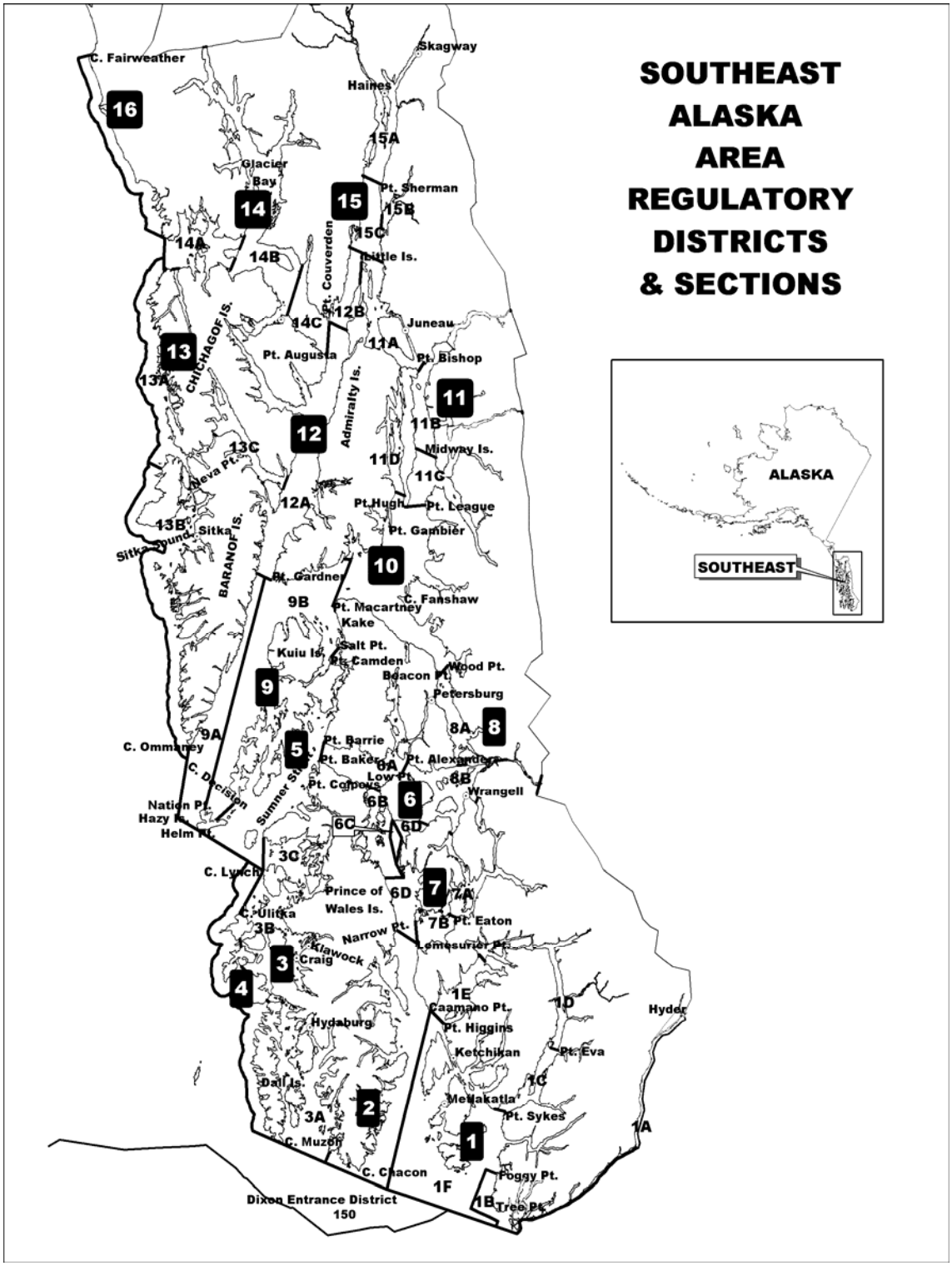

Figure 4.–Management boundaries for the shrimp pot fishery in Registration Area A (Southeast Alaska).