Fishery Management Report No. 11-56

2012 Report to the Board of Fisheries on Region 1 Shrimp Fisheries

by

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and

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November 2011

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

Symbols and Abbreviations

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

Weights and measures (metric)

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

Weights and measures (English)

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

Time and temperature

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

Physics and chemistry

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

General

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

Mathematics, statistics

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

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2012 REPORT TO THE BOARD OF FISHERIES ON REGION 1 SHRIMP FISHERIES

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

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ABSTRACT

This report reviews the commercial fisheries for Shrimp in Region I, which includes Southeast Alaska (Registration Area A) and Yakutat (Registration Area D).

Shrimp harvests for the 2010/11 season in Region I totaled over 0.68 million pounds valued at over $1.6 million during the last completed season. Ninety-five percent of the value of the fisheries is from the Southeast pot shrimp fishery, the Southeast beam trawl fishery made up the majority of the remaining 5%. Yakutat trawl fisheries have had no recent effort, while little effort has occurred in the pot shrimp fishery.

An average of 138 permits perticiapte in the Southeast pot shrimp fishery, landing 919,629 lbs/yr over the last 10 years. Over this time stocks have been declining, and guideline harvest levels have been adjusted to combat this decline. The Southeast beam trawl fishery has not sustained consistent and significant harvests due to poor market conditions. Yakutat fisheries are harvested at very low levels, with the last harvest in the trawl fishery occurring in the 2004/05 season, and the last non-confidential harvest occurring in the 1992/93 season. The Yakutat pot shrimp fishery has been harvested annually at a small level, 3 out of the last 5 season's harvest are confidential.

The ability of the department to manage for sustained yields varies among the fisheries due to different levels of development of stock assessment programs and management plans. The Southeast pot shrimp fishery has a developing stock assessment program, but no abundance-based management plan. Beginning in 2010, survey, and on the grounds sampling plans were revised to maximize available data, and in 2011 two new districts were added to the annual pot shrimp survey, and dockside sampling was increased.. The Southeast beam trawl fishery is currently monitored by logbooks, and dockside sampling. No sampling programs exist for the Yakutat fisheries.

Key words: spot shrimp, *Pandalus platyceros*, coonstripe shrimp, *Pandalus hypsinotus*, northern shrimp, *Pandalus borealis*, sidestripe shrimp, *Pandalopsis dispar*, Southeast Alaska, Yakutat, Fisheries management, Invertebrate fisheries, Shrimp, Harvest statistics.

CHAPTER 1: INTRODUCTION TO SOUTHEAST ALASKA/YAKUTAT SHRIMP FISHERIES

INTRODUCTION

This report reviews the commercial fisheries for Shrimp in Region I, which includes Southeast Alaska (Registration Area A) and Yakutat (Registration Area D). Area A encompasses all waters within the Alexander Archipelago and offshore waters from Dixon Entrance to Cape Fairweather, divided into Districts 1 through 16 (Figure1.1). Area D encompasses state waters from Cape Fairweather to Cape Suckling, divided into Districts 81 through 91. Shrimp fisheries in these areas are entirely in state waters.

The Southeast pot shrimp fishery is fully developed, with an average of 138 permits landing 919,629 lbs/yr over the last 10 years. Over this time stocks have been declining, and guideline harvest levels (GHLs) have been adjusted accordingly. The Southeast beam trawl fishery has been unable to sustain consistent and significant harvests due to poor market conditions. Yakutat fisheries are harvested at very low levels, with the last harvest in the otter trawl fishery occurring in the 2004/05 season, and the last non-confidential harvest occurring in the 1992/93 season. The Yakutat pot shrimp fishery has been prosecuted annually at a small level, 3 out of the last 5 season's harvest are confidential.

Limited entry has played a significant role in harvest and effort trends. All Southeast Alaska shrimp fisheries are currently under limited entry. In contrast, all Yakutat shrimp fisheries remain open access.

Shrimp harvests in Region I totaled 688,000 pounds valued at over $1.6 million during the last completed season (Table 1.1). Ninety-five percent of the value of the fisheries is from the Southeast pot shrimp fishery, the Southeast beam trawl fishery made up the majority of the remaining 5%. Yakutat trawl fisheries have had no recent effort, while little effort has occurred in the pot shrimp fishery, with less than three permits fishing in the most recent season.

SHRIMP RESEARCH AND MANAGEMENT

The ability of the department to manage for sustained yields varies among the fisheries due to different levels of development of stock assessment programs and management plans. Shrimp fisheries lack developed management plans and stock assessment programs, and thus have a high risk of over-exploitation. The southeast shrimp pot fishery has a developing stock assessment program, but no abundance-based management plan. Southeast beam trawl shrimp, and the Yakutat shrimp fisheries have neither stock assessment programs nor management plans, making them the highest risk fisheries.

Stock assessment surveys currently conducted in Southeast Alaska include an annual shrimp pot survey in six districts. These surveys are all relatively recent, with the District 3 survey started in 1997, Districts 7 and 13 in 1999, District 12 in 2000, and Districts 1 and 2 in 2011. Short-term surveys that have been conducted in the past include 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.

On the grounds sampling is conducted for the southeast pot shrimp fishery annually in 5 to 6 districts. The objectives of on the grounds sampling is to get detailed fishing location and effort information, as well as data on size frequency, and sex. The major target of on the grounds sampling is catcher processors which cannot be sampled dockside.

Dockside sampling and skipper interviews are routinely conducted in Southeast Alaska for all shrimp fisheries. The objectives of dockside sampling are to gather data and information on size frequency, sex, fishing location, effort levels, and estimates of average catch per unit of effort (CPUE). This data provides the only biological information for shrimp beam trawl fisheries which lack stock assessment surveys. However, for Yakutat shellfish fisheries even basic port sampling has not been systematically conducted. Harvest and effort data is also collected through the fish ticket system for both Yakutat and Southeast Alaska shellfish fisheries.

Onboard observers were placed sporadically on vessels in the beam trawl shrimp fishery beginning with the 2001/2002 season, but the program is no longer conducted.

Logbook information is collected voluntarily in the southeast pot fishery, and is mandatory 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 fisheries, because it provides detailed catch and pot lift information.

TASK FORCE STATUS

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

STAFF

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

SHRIMP PROJECT STAFF

Name	Title	Job Class	Location
Forrest Bowers	Region I Marine Fisheries Supervisor	Fishery Biologist IV	Douglas
Bill Davidson	Region I Fisheries Management Coordinator	Fishery Biologist IV	Sitka
Joe Stratman	Region I Shellfish Management Project Leader	Fishery Biologist III	Petersburg
Quinn Smith	Region I Shrimp Research Biologist	Fishery Biologist II	Douglas
Chris Siddon	Shellfish and Dive Fisheries Biometrician	Biometrician III	Douglas

CHAPTER 1—TABLES AND FIGURES

Table 1. 1– Registration Area A (Southeast Alaska) and Registration Area D (Yakutat) list of shellfish fisheries, harvest, and approximate exvessel values from the last completed season or calendar year.

Area Season	Fishery	Harvest (lbs)	Approximate exvessel Value
Southeast			
2005/2006	Red and blue king crab	209,799	$1,099,000
2010/2011	Tanner crab (*C. bairdi*)	891,344	$2,425,059
2010/2011	Golden king crab	687,505	$4,656,267
2010/2011	Dungeness crab	3,245,265	$5,525,404
2010/2011	Pot shrimp	556,574	$1,519,447[a]
2010/2011	Beam trawl shrimp	132,383	$107,813
Subtotal		**5,722,870**	**$15,332,990**
Yakutat			
2000/2001	Red and blue king crab	391	$2,960
1999/2000	Tanner crab	[b]	[b]
1999/2000	Dungeness crab	65,386	$133,145
2010/2011	Pot shrimp	[b]	[b]
2004/2005	Otter trawl shrimp	[b]	[b]
2010/2011	Weathervane scallop	160,340	$1,282,720[c]
Subtotal		**230,499**	**$1,427,272**
Grand Total		**5,953,369**	**$16,760,262**

[a] Value estimate based on 2010 exvessel price data from Commercial Fisheries Entry Commission.

[b] Confidential data, fewer than three permits fished.

[c] Value estimate based on 2009 exvessel price data.

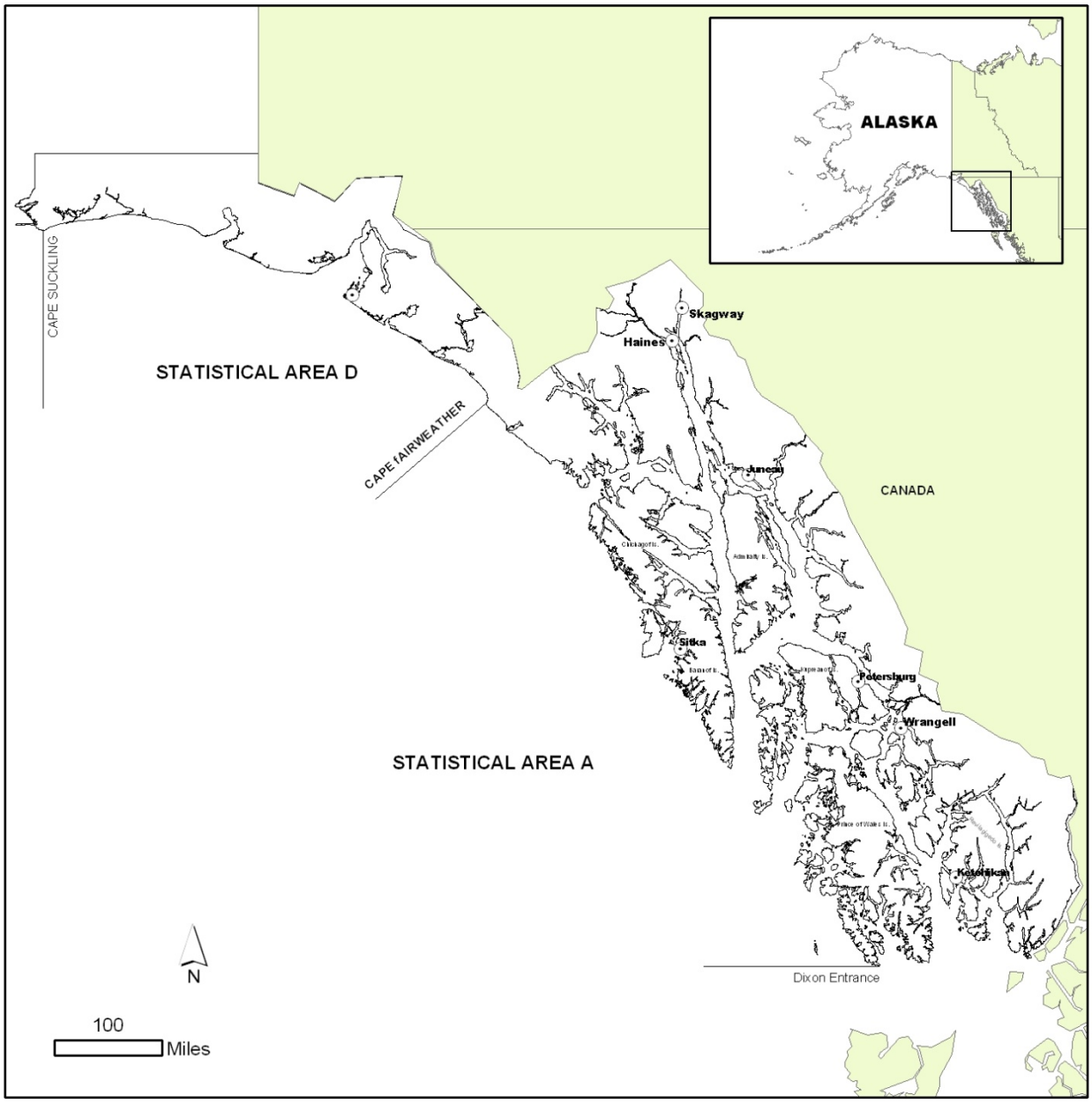

Figure 1.1–Registration Area A (Dixon Entrance to Cape Fairweather) and Registration Area D (Cape Fairweather to Cape Suckling).

CHAPTER 2: SOUTHEAST BEAM TRAWL SHRIMP FISHERY

INTRODUCTION

LIFE HISTORY

The northern shrimp, *Pandalus borealis*, has a circumboreal distribution—from Maine to Southeast Alaska, although its Atlantic cousin is thought to differ at the species or subspecies level (Squires 1992). It is a pelagic species, associated with soft bottoms, and exhibits diurnal vertical migrations to feed on plankton (Barr 1970, Rice et al. 1980) as well as seasonal migrations to shallow water for reproduction. Like most of its genera, this species is a protandric hermaphrodite, and most individuals begin life as males, transitioning to females after reproducing for one or two years (Berkeley 1930, Butler 1964). However, primary females occur at varying prevalence in all populations and there is significant plasticity in the time of transition, which is related to growth rate. At higher growth rate, the species matures as a female at a smaller size; growth rate increases with increasing water temperature, and food availability, this latter factor is affected by both food supply and population density (Koeller et al. 2003, Wieland 2004). Besides changes in the size at transition, water temperatures outside their narrow preference (3–6 ºC for *P. borealis*) can cause both delays in oviposition timing and reductions in the number of breeding females (Nunes 1984). Thus, increased water temperature can cause declines in recruitment.

COMMERCIAL FISHERY

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

Productive beam trawl fishing has historically been limited to four major fishing areas in Southeast Alaska. These areas are District 8, portions of Districts 6 (Duncan Canal and Kah Sheets Bay), District 7 (Eastern Channel), and District 10 (Thomas and Farragut Bays), all located in the Petersburg-Wrangell Management Area (Figure 2.1). The concentration of the fishery in these areas has been due to the abundance of the resource, the presence of the major processors, and limited vessel capabilities. Most vessels are less than 60 ft in length, utilize small horsepower engines, do not have refrigerated holds, and have a crew of two or three. One vessel that had fished up until the 1999/2000 season had been participating since the inception of the fishery in 1915. Vessels have strived to provide a high quality product through daily deliveries. Most of the participants are residents of Petersburg or Wrangell.

When compared to the more common otter trawl, the beam trawl is a relatively simple gear type in appearance and function. A strong wooden or metal beam acts as a head rope, and metal "shoes" connected directly to each end of the beam act as the breast of the trawl. Thus, rigid members control two important net dimensions: 1) the width of the mouth is determined by the length of the beam; and 2) the opening height of the net is determined by the height of the metal "shoes." Vessel length limits beam length. Most beam trawls are deployed with a single bridle and fish best on flat substrates. However, they can effectively fish some gradual side slopes and irregular bottoms. When not deployed, the beam trawl is stored on the vessel bulwarks, somewhat compromising the sea-keeping capabilities of the vessel.

Management is based on a closed season designed to prevent fishing on major stocks during the egg-hatch period from March 1 through April 30, guideline harvest levels determined by historic

harvests, and three fishing periods in the three major fishing areas plus a fourth fishing period in the Stikine Flats area only. The fishing periods were based upon industry input and are designed to spread out the harvest and processing requirements. Multiple fishing periods also take advantage of growth and recruitment.

FISHERY DEVELOPMENT AND HISTORY

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

From 1955 through 1967 annual beam trawl harvests ranged from 1,800,000 to 7,600,000 pounds, with an average of 3,600,000 pounds per year (Table 2.1). The number of vessels participating ranged from 10 to 22. The peak production year was 1958 when 14 vessels caught over 7,600,000 pounds. During the late 1960s and early 1970s harvest and effort declined. Seasonal harvests averaged 916,300 pounds and effort averaged 12 vessels during the 1970s. Through the 1980s the harvest and effort increased to an average of 1,409,500 pounds by an average of 19 vessels. During the 1990s the harvest has averaged 2,674,500 pounds by an average of 34 permit holders. Some of the participants that were involved in the fishery between 1992 and 1997 were speculating on qualification into the limited entry program. Relatively few of the maximum of 51 vessels contributed substantially to the harvest or were dependent upon the fishery for a major portion of their fishing income. The effects of the limited entry program are evident in the 1998/1999 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 continued to decline after the 2002/03 season, mostly due to low prices per pound as a result of large harvests of slightly larger northern shrimp from the Eastern seaboard and the western coast of North America. Regionwide harvest dropped off precipitously in the 2006/2007 season after the main buyer of northern shrimp in Petersburg stopped buying after an eighty-year history in the fishery (Table 2.1). Since the 2006/2007 season, harvests have largely been marketed to small buyers and through dockside sales.

During the 1970s, harvest opportunities occurred in all major fishing areas throughout the year (Table 2.2). As substantial and consistent increases in effort began in 1980, guideline harvest levels were achieved quickly and it became necessary to close major fishing areas by emergency order. Fishing opportunities were no longer available in major fishing areas throughout the year, especially during the winter months. Typically, the months of May, July, and September received high effort, with each month providing harvests exceeding 500,000 pounds (Table 2.2). Seasonal harvests for the region approached 1,000,000 pounds prior to 1980. In the 1980s harvests increased and averaged 1,400,000 pounds. Harvest and effort in the fishery increased

again and averaged about 2,700,000 pounds during the 1990s. Harvests have declined to an average of 560,000 pounds during the first decade of the 21st century.

Prior to 1970 Districts 6 and 10 produced the majority of the beam trawl harvest and District 8 produced relatively low harvests. Harvests from District 10 occurred in Farragut and Thomas Bays, and harvests from District 6 included Duncan Canal and Kah Sheets Bay. With the decline in abundance in District 10, the fishery became almost totally dependent upon District 6 and harvests from District 8 began to increase. From the 1969/1970 through the 1978/1979 fishing seasons, District 6 harvests averaged almost 600,000 pounds per season while District 8 harvests averaged less than 250,000 pounds per season (Table 2.3). During this ten-season period, harvests from District 8 exceeded harvests from District 6 only once. Regulatory GHLs 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 2.4). Three fishing periods were established in regulation in 1989 for the four major fishing areas. During the 1990s, the pattern of high harvests in District 6 relative to District 8 continued, District 6 averaging 1,200,000 pounds per year and District 8 averaging 800,000 pounds (Table 2.5). As price per pound and processing capacity declined in the 21st century, fewer permit holders have found this fishery to be worth the effort, thus harvest and participation from all areas has declined. Since the 1999/2000 season, harvest has largely been dominated by effort in Districts 6 and 8, with very little harvest coming from the non-traditional areas (Table 2.6). The main buyer of northern shrimp in Petersburg stopped buying in June of 2005 after an eighty-year history in the fishery. Since then the few permit holders left participating in the fishery have largely targeted sidestripe shrimp in District 8 for smaller markets and dockside sales.

REGULATION DEVELOPMENT

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

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

FISHING SEASONS AND PERIODS

Traditional Northern Shrimp Fisheries

A fishing season from May 1 through March 15 was established by 1924. A similar season has since been in place with some modifications to beginning and ending dates. The season is now May 1 to February 28. The purpose of the closed period is to protect female shrimp during the egg hatch period when fishing would reduce the reproductive potential of the stock.

As the fishery intensified during the 1980s, the GHR was taken in successively fewer days. In response, three fishing periods were established beginning in 1989. These periods were May 1 through June 30, July 1 through August 31, and September 1 through February 14. A fourth fishing period, December 1 through February 14, was added for Stikine Flats of District 8 only,

in 1997. These regulatory periods were established for several reasons: to protect shrimp during the critical egg hatch period, to lengthen the total fishing season in these districts by spreading harvest over a longer period of time, to reduce effort during recruitment and growth periods in the spring and summer months and to increase overall harvest in District 8.

Non-Traditional Northern Shrimp Fisheries

Prior to 1994 all fishing districts in Southeast Alaska, except District 8 and a portion of District 6 (Duncan Canal and Kah Sheets Bay), District 7 (Eastern Channel), and District 10 (Thomas and Farragut Bays), were open throughout the year. During the early 1990s large catcher-processor vessels using otter trawl gear requested permits to fish for shrimp in the region, leading to requests to the commissioner to close shrimp fisheries in outside waters. The department initiated began to close some of the areas where these vessels were fishing to prevent bycatch of other commercial important species, primarily rockfish. Initial closures were made by either emergency regulation or emergency order (EO). The issue was brought before the Alaska Board of Fisheries (board) and resulted in the closure for Districts 1, 2, 4, and 12 through 16, which had low and sporadic historical effort and harvests.

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

Directed Sidestripe Shrimp Fisheries

In 1997, regulations were adopted to provide for directed sidestripe shrimp fisheries by beam trawl only during fishing seasons and periods and in areas established by the commissioner by emergency order. Additional conditions include limiting the vessel from participating at the same time in a directed northern shrimp fishery, a larger minimum mesh size, and mandatory logbook completion. Incidental shrimp species harvest cannot be greater than 10 percent and fishermen must notify the department 2 hrs before landing to allow for biological sampling of the harvest. If necessary, the commissioner may require an onboard observer during fishing operations. The department will evaluate opening a directed sidestripe shrimp fishery on a case-by-case basis. Since the sidestripe shrimp component of the Gulf of Alaska and Southcentral Alaska stocks seemed to be the most susceptible to overharvest and stock collapse, these measures were required in Southeast to collect the necessary information needed to manage sidestripe shrimp harvest conservatively. To date, fishing opportunities have been provided during eight fishing periods in District 8 since the 1997/98 season, during one fishing period in District 6 during the 1997/1998 season and once in Section 11-B during the 2001/2002 season. Only once during these openings has the upper end of the GHR (50,000 pounds) been reached, requiring an emergency closure prior to the regulatory closure date. Since 2002 sidestripe shrimp have only

been harvested during the traditional beam trawl season, and there have been no directed sidestripe fisheries as described in regulation.

Size Restrictions

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

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

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

QUOTAS AND GUIDELINE HARVEST RANGES

Traditional Northern Shrimp Fisheries

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

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

Non-Traditional Northern Shrimp Fisheries

In 1994, seasonal GHRs of 0 to 100,000 pounds were established for Districts 3, 5, 9, and 11 and remaining portions of Districts 6, 7, and 10. In 1997, at the request of industry, the total District 11 GHR was increased and is now more than triple the 1994 GHR. Seasonal GHRs were

established by section: 11-A, 11-B, and 11-C from 25,000 to 75,000 pounds in each, and 11-D from 50,000 to 150,000 pounds.

Directed Sidestripe Shrimp Fisheries

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

Spot and Coonstripe Shrimp Bycatch Limits

In 2003 the board addressed a series of proposals regarding spot and coonstripe bycatch in the beam trawl fishery. The board adopted the current spot and coonstripe shrimp beam trawl trip and seasonal bycatch limits at this meeting. Those limits were based on historic harvest of these species in the beam trawl fishery.

GEAR RESTRICTIONS

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

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

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

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

LIMITED ENTRY

The Commercial Fisheries Entry Commission (CFEC), in response to petitions received from beam trawl permit holders during 1995 and 1996, established January 1, 1997 as the qualification date for limited entry with the four years immediately preceding being the qualification period. Therefore, to be eligible to apply for an entry permit, an individual would have had to be a permit holder during at least one of the years during the qualification period of January 1, 1993 through December 31, 1996. To date currently, 32 permanent permits have been issued. Of the permanent permits issued, 6 of these have been cancelled leaving 26 permits active in the fishery (CFEC 2011a).

OTHER REGULATORY CHANGES

At the 2006 board meeting a new regulation was carried preventing simultaneous registration for the beam trawl and pot shrimp fisheries. New reporting requirements were issued for catcher processors at the 2009 board meeting.

MANAGEMENT CONCERNS

Effort has decreased from 23 permits in the 1999/2000 season to 5 permits fished during the 2007/2008 season. This decrease has been due in part to low prices at the cannery and a reduction in processing capabilities, or the need to use existing facilities to process product from other fisheries. A portion of this decrease is undoubtedly because the limited entry permit qualification period is over. Also, the main buyer of northern shrimp in Petersburg stopped their shrimp operation in June of 2005. Currently participation in the fishery is very low, with a handful of permit holders targeting sidestripe shrimp for smaller markets and dockside sales. With the implementation of the limited entry program, permits have been and will continue to be purchased by permit holders desiring diversification. If markets improve this fishery may in the future see higher effort levels, more efficient and species-specific gear, and eventual development of non-traditional product forms such as value-added frozen-at-sea shrimp to garner a higher price from a currently undervalued resource. In turn, these changes identify the need to establish a research program for necessary biological information, a more active management program, and the development of a management plan to ensure future conservation goals are achievable.

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

Not unlike the management of the pot shrimp fisheries, beam trawl harvest levels are set based on average historical harvest levels, not population estimates. While this fishery has sustained itself for almost 80 years, the size composition of the harvest appears to be changing. The move

towards use of larger mesh sizes appears to be focusing more effort on the larger species and larger individual shrimp. Regulation changes may be needed to adequately control the expansion of the fishery and to prevent high-grading of some species of shrimp while dumping the less desirable species or smaller shrimp. Additional regulations to separate traditional northern shrimp and sidestripe fisheries may be necessary to assure adequately conservative management for sidestripe populations.

STOCK ASSESSMENT

The beam trawl fishery stock assessment program in Southeast Alaska is still in its infancy. Although dockside sampling and collection and sexing of shrimp samples has been conducted since 1986, and sporadic sampling by onboard observers was conducted in 2002, to date no fishery-independent survey program has been developed. Furthermore, the decline in market and resulting loss of peeling capacity in Petersburg beginning in 2005 all but shut down commercial beam trawl production of northern pink shrimp and eliminated dockside sampling, with the increase in harvest for the 2010/2011 season, a small dockside sampling program was resumed. 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.

RECENT SEASONS

TRADITIONAL NORTHERN SHRIMP FISHERIES

Harvest and Effort by Area

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

Since the 1997/1998 season, total harvest and number of permits fished have steadily declined (Table 2.1). Declines in total harvest and effort were due to low prices for northern shrimp, a lack of processing priority for northern shrimp, and fewer active participants in the fishery. Harvest was composed primarily of northern shrimp, *Pandalus borealis*, though smaller numbers of small *Pandalopsis dispar* (sidestripe shrimp) and *Pandalus goniurus* (humpy shrimp) were also harvested and sold as northern shrimp. The northern shrimp harvested in Southeast Alaska competed in the marketplace with large harvests of north Atlantic *P. borealis* (thought by some to be a different species), and *P. jordani* (smooth pink shrimp) from British Columbia and Oregon. Over the last few seasons, smaller average size of northern shrimp harvested in Southeast Alaska has further undermined the position of northern shrimp from Southeast Alaska in global markets. This competition from other northern shrimp fisheries in the Pacific Northwest and north Atlantic led to the collapse of the Southeast northern shrimp fishery in 2005 (the 2005/2006 season) when the main buyer in Petersburg shut down its peelers after an eighty year history in the fishery. The last commercial quantities of northern shrimp were purchased in

Wrangell in the spring of 2006 (the 2006/2007 season). The 2008/2009 and 2009/2010 seasons had continued low effort (Table 2.1) with a handful of registrants targeting the larger sidestripe shrimp for smaller markets and dockside sales. A slight increase in harvest occurred during the 2010/2011 season when permit holders explored new market opportunities. Most of the effort over the past three seasons has occurred in District 8 (Table 2.6) where sidestripe shrimp are more prevalent.

Species Composition

The composition of harvest for Districts 6, 7, 8 and 10 has varied over the past 11 seasons. Duncan Canal has supported primarily a northern shrimp fishery, which made up over 99% of the species harvested since the 1991/1992 season. Eastern Channel is also primarily a northern shrimp fishery, with an average of 94% of the harvest made up of northern shrimp, 5% sidestripe shrimp and the other species making up the remaining 1%. Sidestripe and to a lesser extent coonstripe and spot shrimp have generally occurred in an increasing proportion of the harvest since 1991 from the Stikine Flats. Harvest by species for Stikine Flats averaged 93% for northern shrimp, slightly 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 for the period from 1997 to 2002 has averaged 85% northern shrimp, 14% sidestripe shrimp, and less than 1% for coonstripe and spot shrimp. In 2003/2004 season, coonstripe and spot shrimp bycatch limits went into effect in the beam trawl fishery. From the 2003/2004 through the 2007/2008 seasons combined, pink shrimp have comprised 82% of the harvest, sidestripe shrimp 15%, coonstripe shrimp 2% and spot shrimp 1% in the traditional beam trawl areas. From the 2008/2009 through the 2010/2011 seasons combined, sidestripe shrimp have comprised 56% of the harvest, pink shrimp 40%, and spot shrimp 4% in the traditional beam trawl areas.

NON-TRADITIONAL NORTHERN SHRIMP FISHERIES

Beam trawl fishing has occurred at low and sporadic levels outside the Petersburg-Wrangell area since at least the 1969/1970 season, with the exception of Blake Channel which had significant harvests in the 1970s, 1980s and early 1990s (Tables 2.3, 2.4 and 2.5). These non-traditional beam trawl fishing areas include District 3, District 5, South Zarembo and Sumner Straits (a portion of District 6), Blake Channel (a portion of District 7), District 9, Upper Frederick Sound (a portion of western District 10) and District 11. These districts and portions of districts are managed with a single fishing season and generic guideline harvest levels not to exceed 150,000 pounds. During the past three seasons the only non-traditional area fished was District 11 (Table 2.6). Harvest and effort data are confidential since fewer than three permits were fished District 11 in the 2008/2009, 2009/2010, and 2010/2011 seasons.

DIRECTED SIDESTRIPE SHRIMP FISHERIES

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

CHAPTER 2–TABLES AND FIGURES

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

Year/ Season	Harvest in pounds	Number of permits	Landings	Pounds/ permit	Pounds/landing
1955	1,777,122	15	[a]	118,475	[a]
1956	3,301,598	15	[a]	220,107	[a]
1957	2,350,499	10	[a]	235,045	[a]
1958	7,605,871	14	[a]	543,277	[a]
1959	5,518,843	22	[a]	250,857	[a]
1960	3,343,373	21	1,007	159,208	3,320
1961	4,212,300	20	1,394	210,615	3,022
1962	3,884,050	22	1,400	176,548	2,774
1963	3,110,340	20	1,080	155,517	2,880
1964	2,793,101	13	1,092	214,854	2,558
1965	2,941,429	13	1,338	226,264	2,198
1966	3,784,597	14	1,663	270,328	2,276
1967	2,203,753	13	1,105	169,519	1,994
1968/69	2,003,753	12	925	166,979	2,166
1969/70	1,840,727	11	952	167,339	1,933
1970/71	742,404	11	477	67,491	1,556
1971/72	1,050,978	9	592	116,775	1,775
1972/73	797,387	9	421	88,599	1,894
1973/74	674,386	8	460	84,298	1,466
1974/75	1,205,617	20	434	60,281	2,777
1975/76	983,609	12	450	81,967	2,185
1976/77	768,930	14	476	54,924	1,615
1977/78	949,043	10	404	94,904	2,349
1978/79	1,033,325	9	519	114,814	1,990
1979/80	956,927	17	982	56,290	974
1980/81	843,737	21	920	40,178	917
1981/82	919,275	15	524	61,285	1,754
1982/83	1,397,026	15	455	93,135	3,070
1983/84	1,756,533	18	667	97,585	2,633
1984/85	1,294,545	23	811	56,285	1,596
1985/86	429,224	16	252	26,827	1,703
1986/87	2,203,935	16	435	137,746	5,066
1987/88	1,761,636	25	388	70,465	4,540
1988/89	1,675,643	18	527	93,091	3,179
1989/90	1,813,032	21	645	86,335	2,810
1990/91	2,494,957	23	793	108,476	3,146
1991/92	2,934,341	28	1,036	104,798	2,832
1992/93	2,375,742	41	922	57,945	2,576
1993/94	2,135,500	25	705	85,420	3,029
1994/95	3,223,791	25	814	128,952	3,960
1995/96	3,053,316	48	793	63,611	3,850
1996/97	2,536,985	51	884	49,745	2,869
1997/98	3,051,197	42	983	72,648	3,103
1998/99	2,264,641	24	834	94,360	2,715
1999/00	1,893,815	23	566	82,340	3,346
2000/01	1,413,264	16	543	88,329	2,603
2001/02	903,897	19	358	47,574	2,525
2002/03	1,096,235	13	423	84,326	2,592
2003/04	740,387	10	216	74,039	3,428
2004/05	986,451	8	232	123,306	4,252
2005/06	621,047	8	173	77,631	3,590
2006/07	133,869	7	50	19,124	2,677
2007/08	43,290	5	24	8,658	1,803
2008/09	88,641	6	64	14.774	1,385
2009/10	60,549	4	72	15,137	841
2010/11	132,385	5	114	26,477	1,161

[a] No landings data available.

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

	Month												
Season	**May**	**June**	**July**	**Aug**	**Sept.**	**Oct.**	**Nov.**	**Dec.**	**Jan.**	**Feb.**	**Mar.**	**Apr.**	**Total**
1969/70	326.7	280.2	78.8	129.1	184.7	241.2	119.6	165.2	160.0	100.6	32.4	22.4	1,840.7
1970/71	131.3	105.1	65.4	79.8	49.7	64.3	54.8	59.2	59.9	56.8	[a]	13.2	742.4
1971/72	139.0	106.3	144.5	106.5	69.7	78.3	101.6	71.1	66.0	121.1	38.7	[a]	1,051.0
1972/73	168.5	126.4	77.2	[a]	[a]	44.7	64.0	46.3	81.6	42.2	6.1	8.5	797.4
1973/74	96.3	124.1	[a]	[a]	[a]	[a]	59.1	64.8	60.3	29.2	[a]	8.4	674.4
1974/75	160.9	199.2	202.4	168.0	120.1	61.4	73.9	90.8	104.2	21.6	[a]	[a]	1,205.6
1975/76	180.7	130.3	67.2	[a]	112.3	154.5	73.0	77.8	38.9	46.1	[a]	6.7	983.6
1976/77	78.8	171.7	120.0	118.8	61.8	37.4	55.2	33.3	65.0	25.7	[a]	[a]	768.9
1977/78	73.7	235.3	147.9	166.6	126.2	48.3	29.5	18.7	81.2	21.7	0	0	949.0
1978/79	107.0	130.9	140.6	240.2	112.0	93.1	67.8	36.0	72.3	22.5	8.3	[a]	1,033.3
1979/80	98.2	154.9	146.6	177.4	104.2	55.1	58.4	39.6	66.3	48.1	[a]	[a]	956.9
1980/81	153.8	168.6	164.9	153.7	54.2	30.2	35.5	12.2	33.6	31.6	5.5	0.0	843.7
1981/82	165.1	183.4	124.0	168.8	81.1	52.7	36.5	48.3	33.0	22.3	0.9	3.1	919.3
1982/83	181.1	171.7	168.8	159.4	134.0	50.1	60.7	82.0	152.6	119.8	64.4	52.5	1,397.0
1983/84	436.3	249.0	287.0	218.2	127.5	132.0	83.3	86.9	101.7	16.2	9.0	9.6	1,756.5
1984/85	156.3	252.5	272.5	232.8	132.9	59.5	61.8	49.7	51.9	22.5	[a]	[a]	1,294.5
1985/86	125.6	105.3	46.1	23.2	39.1	13.8	31.3	29.8	[a]	8.4	[a]	[a]	429.2
1986/87	294.4	508.2	576.0	446.8	372.0	[a]	[a]	[a]	[a]	[a]	[a]	[a]	2,203.9
1987/88	634.0	721.0	291.2	90.8	[a]	[a]	[a]	[a]	[a]	6.0	[a]	[a]	1,761.6
1988/89	647.2	369.0	258.4	137.9	[a]	2.5	82.8	127.3	37.8	[a]	[a]	[a]	1,675.6
1989/90	473.6	236.2	259.0	173.4	224.3	115.8	[a]	38.4	167.8	53.4	[a]	[a]	1,813.0
1990/91	546.7	336.5	386.5	357.8	293.3	147.4	161.2	148.7	16.8	9.4	17.1	73.4	2,495.0
1991/92	611.6	325.5	887.2	79.1	336.4	219.0	167.2	165.6	114.8	17.1	6.4	15.6	2,934.3
1992/93	469.3	253.7	404.4	295.7	194.5	186.4	136.8	112.4	131.8	65.5	58.3	67.0	2,375.7
1993/94	548.0	215.4	372.0	239.2	121.3	86.9	104.5	100.3	147.4	85.7	112.1	[a]	2,135.5
1994/95	560.0	266.2	574.6	468.2	196.3	96.9	149.3	188.5	387.0	41.9	231.6	63.5	3,223.8
1995/96	686.6	338.2	522.3	344.7	515.0	66.7	137.8	55.8	62.7	157.9	104.1	61.3	3,053.3
1996/97	782.8	262.2	609.0	162.8	510.3	100.3	73.3	7.6	[a]	1.4	[a]	[a]	2,537.0
1997/98	727.8	237.8	637.6	183.9	677.6	142.2	129.0	261.0	[a]	41.6	[a]	0.0	3,051.2
1998/99	524.8	260.8	501.3	317.7	348.7	138.8	102.6	3.4	22.3	15.5	[a]	[a]	2,264.6
1999/00	581.9	231.4	385.4	313.2	224.9	64.4	29.3	6.9	3.5	47.1	1.6	4.2	1,893.8
2000/01	486.3	172.6	219.6	185.8	92.0	78.5	118.7	[a]	25.4	25.9	[a]	[a]	1,413.3
2001/02	363.0	149.3	11.3	41.0	97.9	[a]	93.1	17.9	42.6	9.0	[a]	0.0	903.9
2002/03	314.4	138.7	[a]	90.7	147.5	[a]	129.3	18.4	38.9	110.9	[a]	0.0	1,096.2
2003/04	336.0	53.1	19.9	15.8	[a]	136.1	104.1	19.1	24.5	27.4	0.0	0.0	740.4
2004/05	480.0	195.5	[a]	[a]	[a]	76.8	126.0	5.7	12.1	10.8	0.0	0.0	986.5
2005/06	461.8	114.8	11.3	[a]	5.8	0.0	0.0	4.1	7.5	13.7	0.0	0.0	621.1
2006/07	84.4	23.0	0.0	0.0	[a]	0.0	0.0	1.6	3.0	21.2	0.0	0.0	133.9
2007/08	[a]	[a]	[a]	0.0	[a]	[a]	[a]	[a]	[a]	[a]	0.0	0.0	43.3
2008/09	[a]	[a]	[a]	[a]	[a]	[a]	5.0	3.9	5.7	25.3	0.0	0.0	88.6
2009/10	11.9	[a]	[a]	[a]	1.8	[a]	[a]	[a]	[a]	20.3	0.0	0.0	60.5
2010/11	20.3	[a]	11.2	[a]	0.0	[a]	[a]	[a]	31.8	47.8	0.0	0.0	132.4

[a] Fewer than 3 permits were fished; information is confidential.

Table 2.3–Registration Area A shrimp beam trawl fishery harvest in thousands of pounds by season and district, 1969/70 through 1978/79.

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

[a] Denotes confidential data, fewer than three permits fished.

Table 2.4–Registration Area A shrimp beam trawl fishery harvest in thousands of pounds by season and district, 1979/80 through 1988/89 seasons.

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

[a] Fewer than 3 permits were fished; information is confidential.

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

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

[a] Fewer than 3 permits were fished; information is confidential.

Table 2.6–Registration Area A shrimp beam trawl fishery harvest in thousands of pounds by season and district, 1999/90 through 2010/11 seasons.

	Season											
District	**1999/00**	**2000/01**	**2001/02**	**2002/03**	**2003/04**	**2004/05**	**2005/06**	**2006/07**	**2007/08**	**2008/09**	**2009/10**	**2010/11**
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
3	[a]	[a]	[a]	[a]	0.0	0.0	[a]	0.0	0.0	0.0	0.0	0.0
4	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
5	[a]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6: Duncan	838.9	585.8	222.5	99.9	62.5	484.1	302.7	[a]	0.0	0.0	0.0	0.0
6: Sumner	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7: Eastern	45.8	89.2	57.7	62.4	35.6	[a]	[a]	[a]	0.0	0.0	0.0	0.0
7: Blake	[a]	[a]	[a]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8: Stikine	704.7	562.3	583.1	790.8	571.2	467.7	300.0	120.6	37.8	85.7	55.7	130.6
9	[a]	[a]	5.9	[a]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10: Thomas	247.1	64.1	23.2	[a]	[a]	[a]	[a]	[a]	[a]	0.0	0.0	[a]
10: Up. Fred	[a]	[a]	[a]	[a]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	26.0	81.9	[a]	0.0	0.0	0.0	0.0	0.0	0.0	[a]	[a]	[a]
12	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
13	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
14	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
15	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
16	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Total	1,893.8	1,413.3	903.9	1,096.2	740.4	986.5	621.1	133.9	38.4	85.2	58.4	126.7
Landings	566	543	358	423	216	232	173	50	24	63	73	105
Permits	23	16	19	13	10	8	8	7	5	6	4	5

[a] Fewer than 3 permits were fished; information is confidential.

Table 2.7–Registration Area A (Southeast Alaska) shrimp beam trawl harvest in thousands of pounds and landings by district and month, 2008/09.

	Fishery								
Month	Duncan Canal	Sumner Strait	Eastern Channel	Blake Passage	Stikine Flats	Thomas Bay	all Others Southeast	Total Permits	Total Harvest
May	0	0	0	0	[a]	0	0	[a]	[b]
June	0	0	0	0	[a]	0	0	[a]	[b]
July	0	0	0	0	[a]	0	[a]	[a]	[b]
August	0	0	0	0	0.0	0	[a]	[a]	[b]
September	0	0	0	0	[a]	0	[a]	[a]	[b]
October	0	0	0	0	[a]	0	0	[a]	[b]
November	0	0	0	0	4.8	0	[a]	4	[b]
December	0	0	0	0	3.9	0	0	3	3.9
January	0	0	0	0	[a]	0	[a]	3	5.7
February	0	0	0	0	25.2	0	[a]	4	[b]
March	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
April	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed

[a] Fewer than 3 permits were fished; information is confidential.

[b] Total harvest is confidential, to prevent back calculation of confidential catch information.

Table 2.8–Registration Area A (Southeast Alaska) shrimp beam trawl harvest in thousands of pounds and landings by district and month, 2009/10.

	Fishery								
Month	**Duncan Canal**	**Sumner Strait**	**Eastern Channel**	**Blake Passage**	**Stikine Flats**	**Thomas Bay**	**all Others Southeast**	**Total Permits**	**Total Harvest**
May	0	0	0	0	[a]	0	[a]	3	11.9
June	0	0	0	0	[a]	0	[a]	[a]	[b]
July	0	0	0	0	[a]	0	[a]	[a]	[b]
August	0	0	0	0	[a]	0	[a]	[a]	[b]
September	0	0	0	0	[a]	0	[a]	3	1.8
October	0	0	0	0	[a]	0	0	[a]	[b]
November	0	0	0	0	[a]	0	0	[a]	[b]
December	0	0	0	0	[a]	0	0	[a]	[b]
January	0	0	0	0	[a]	0	0	[a]	[b]
February	0	0	0	0	20.3	0	0	3	20.3
March	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
April	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed

[a] Fewer than 3 permits were fished; information is confidential.

[b] Total harvest is confidential, to prevent back calculation of confidential catch information.

Table 2.9–Registration Area A (Southeast Alaska) shrimp beam trawl harvest in thousands of pounds and landings by district and month, 2010/11.

	Fishery								
Month	Duncan Canal	Sumner Strait	Eastern Channel	Blake Passage	Stikine Flats	Thomas Bay	All Others Southeast	Total Permits	Total Harvest
May	0	0	0	0	[a]	0	[a]	3	20.3
June	0	0	0	0	[a]	0	[a]	[a]	[b]
July	0	0	0	0	[a]	[a]	[a]	3	11.2
August	0	0	0	0	[a]	0	0	[a]	[b]
September	0	0	0	0	0	0	0	[a]	[b]
October	0	0	0	0	[a]	0	0	[a]	[b]
November	0	0	0	0	[a]	0	0	[a]	[b]
December	0	0	0	0	[a]	0	0	[a]	[b]
January	0	0	0	0	31.8	0	0	4	31.8
February	0	0	0	0	47.8	0	0	4	47.8
March	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
April	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed

[a] Fewer than 3 permits were fished; information is confidential.

[b] Total harvest is confidential, to prevent back calculation of confidential catch information.

Table 2.10–Beam trawl fishing areas and associated statistical areas (districts and all associated statistical areas) for the harvest information from fish tickets for the 1991/92 to 2010/11 seasons.

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

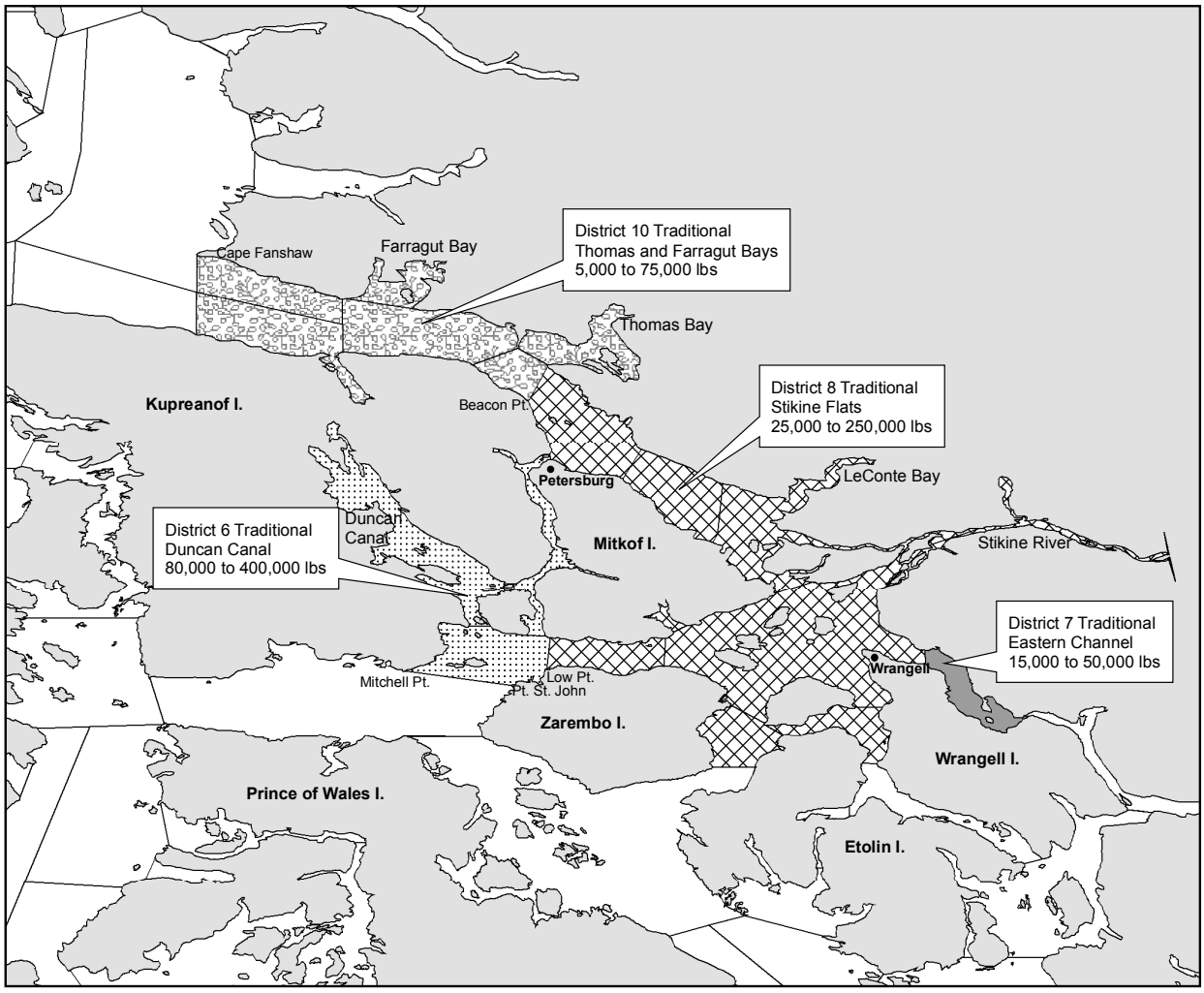

Figure 2.1–Traditional beam trawl shrimp fishery areas and fishing period guideline harvest ranges for Southeast Alaska.

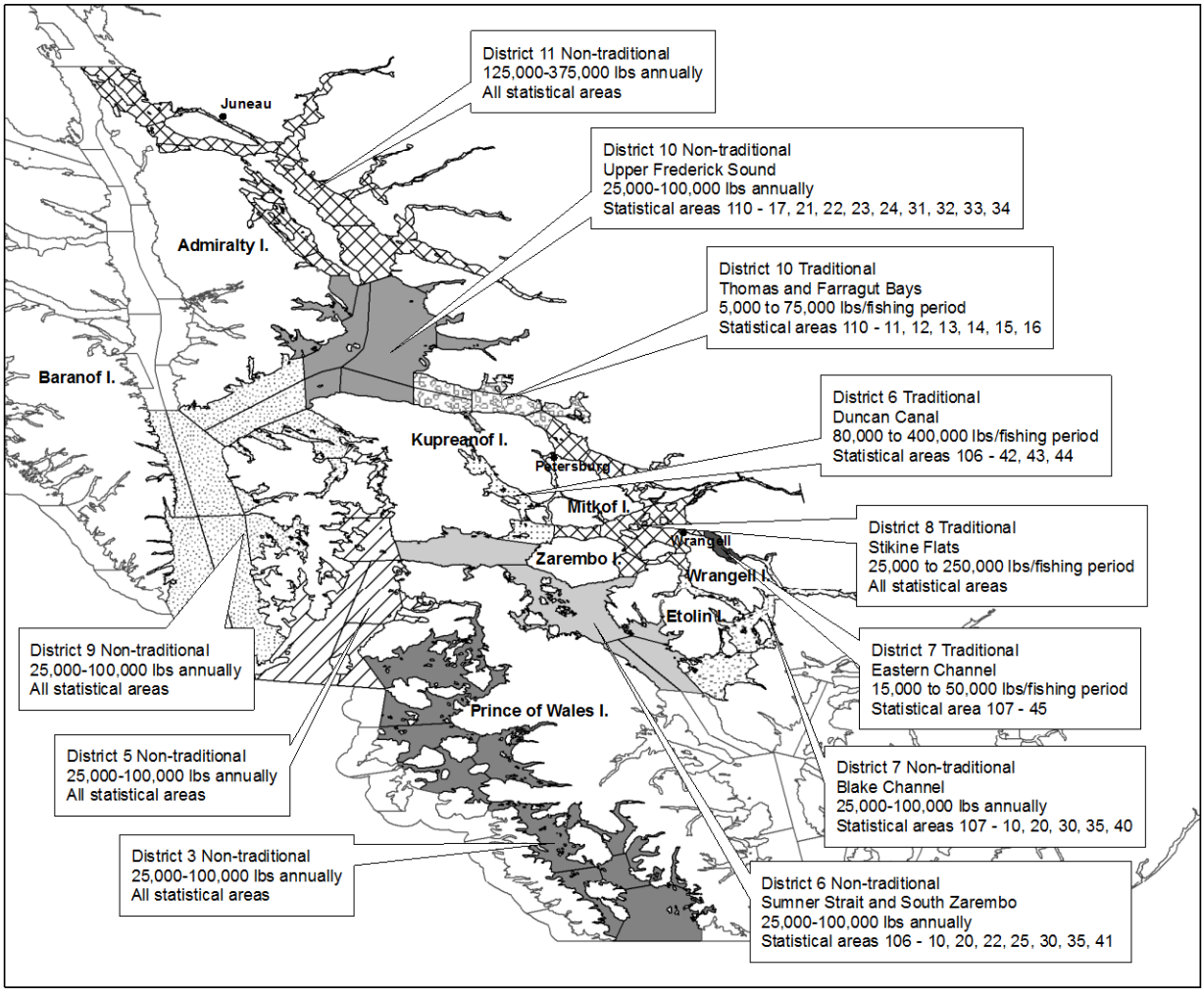

Figure 2. 2–Beam trawl shrimp fishery areas and fishing period guideline harvest ranges for Southeast Alaska.

CHAPTER 3: SOUTHEAST SHRIMP POT FISHERY

INTRODUCTION

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

LIFE HISTORY

Spot shrimp (*Pandalus platyceros*), the target species for the shrimp pot fishery in Southeast Alaska, are widely distributed within the North Pacific Ocean. They occur from the intertidal to depths of greater than 1,500 ft, from the Korea Strait to the Sea of Japan, along the Siberian east coast, and from Unalaska to San Diego, California (Butler 1964).

Southeast Alaska specific life history information on Spot shrimp is limited. Thus, much must be inferred from studies in Prince William Sound and British Columbia.

Spot shrimp have a complex life cycle; hatching from eggs carried on the female's abdomen, progressing through planktonic five larval stages (Price and Chew 1972), before settling to the benthos as juveniles. Five juvenile stages occur prior to maturation to a functional, adult male (Berkeley 1930; Haynes 1985).

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

Adult Spot shrimp are benthic scavengers as well as predators and undergo diurnal feeding migrations, moving shoreward along the bottom into shallower waters at night and back to deeper waters during the day (Butler 1970).

All pandalid shrimp are protandric hermaphrodites; they mature and spawn first as males, and subsequently transition to females and spawn as females for the remainder of their lives. Spot shrimp are thought to mature sexually after 1.5 years and reproduce as males for an additional one to three seasons in British Columbia (Butler 1964). The transition from male to female occurs during second or third year of life. The size at which shrimp make this transition is quantitatively expressed as the length at which 50% are female (L50), and varies with environmental and populations stresses, thus making a useful metric to gauge population health.

Females are not thought to survive long after the release of eggs in British Columbia while in Alaska, multiple size classes of female shrimp have been documented during department surveys (Love and Bishop 2005). This suggests either multiple spawnings of individual females or a protracted and highly variable age at transition, which the L50 values in department surveys do not corroborate.

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

The concept of meta-populations may apply to spot shrimp. Larvae are planktonic and may be widely transported by currents, while juveniles and adults are relatively sedentary. Tagged adults remain within a mile or two of their release location (Kimker et al. 1996). Larval transport into bays and fjords in Southeast Alaska may depend on oceanographic conditions such as: prevailing wind patterns; tidal currents; fresh water influence; and differential flow dynamics. Larvae in some inshore waters may experience very small-scale entrainment patterns. Thus, depleted waters could be repopulated by a distant larval source, or areas of good habitat may not get adequate larval supply to support a viable population.

COMMERCIAL FISHERY

Two species of shrimp, *P. platyceros* and *P. hypsinotus*, are harvested in the shrimp pot fishery of Southeast Alaska. Shrimp harvests in recent years from 2000/2001 through the 2010/2011 seasons have averaged 886,500 pounds. Generally, there has been a progressive increase in harvest from the 1970's when harvests averaged only 21,500 pounds, to 285,000 pounds in the 1980s, 876,000 in the 1990, 919,000 in the 2000s, and 557,000 in the 2010/11 season (Table 3.1). The greatest portion of the harvest is taken in Districts 1, 2, 3 and 7 which represent 62% of the most recent 10 year average harvests (Table 3.2). Smaller but significant historical harvests have also occurred in Districts 6, 10 and 13 which represent 18% of the most recent 10-year average harvests. Nineteen distinct areas including districts or portions of districts are managed to achieve GHLs. Most districts are managed to target spot shrimp, however GHLs in Districts 15 and 16 are based on coonstripe shrimp, and the GHL in District 11 is based on spot and coonstripe shrimp combined.

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

The fishing season is October 1–February 28, with a provision for re-opening of districts where the GHL is not taken during the regular season for a summer season of May 15–July 31. However, in productive districts most of the harvest occurs in the first month or week of the fishery. Over the most recent 10-year period 79% of seasonal harvests have taken place by the end of October (Table 3.3).

The product type has changes over recent seasons from a primarily hand packed frozen at sea whole shrimp for the Japanese sushi market, to a domestic tailed product. There has been some experimentation with the live shrimp market.

The basis of current management includes the following key features: a closed season to prevent fishing on major stocks during the egg-hatch or growth and recruitment periods, maintenance of

a number of age classes of shrimp, maintenance of adequate brood stock for rebuilding of shrimp stocks, minimum mesh size restrictions intended to only capture and retain the larger size segment of the stock, pot standardization of two sizes, a maximum number of pots per vessel, hauling hour restrictions, a GHL for each fishing district, and reporting requirements to ensure timely harvest monitoring and closures.

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

FISHERY DEVELOPMENT AND HISTORY

Harvest records dating from 1962 indicate that the shrimp pot fishery began with sporadic effort and low harvests through the late-1970s when the shrimp pot fishery served as a supplemental source of income to other fisheries. Harvests and effort increased through the 1980s, and culminated in the mid-1990s with harvest of almost 1.14 million pounds caught during the 1994/1995 season. The maximum number of permits fished was 352 during the 1995/1996 season (Table 3.1). During the past several years harvest as well as effort has declined somewhat from a peak period during the early 2000s.

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

From 1990/1991 through the 1994/1995 fishing seasons the character of the fishery changed. Through these years the number of permits fished increased to 248 and harvests reached in excess of 1.1 million pounds. In October 1994, the first floating processor entered the fishery, and the market product began to change towards unsorted, whole shrimp with a moderate increase in value. This change in market product meant that fishermen 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 fishermen began to rely on this fishery as a significant source of their fishing income. Pot efficiency during this period and the pace of the fishery increased. The first inseason EO was issued in the 1994/1995 season to close District 13 in mid-March of 1995. GHLs were first assigned to all districts for fisheries beginning October 1, 1995. Following this the first succession of inseason EOs were issued to close Districts 6, 7, and 8 on November 5, District 3

on November 13, and District 1 on January 2 for the 1995/1996 season when the guideline harvests levels were reached. Effort in the 1995/1996 season peaked for the history of the fishery at 352 permits. The rapid escalation of effort and harvest evoked petitions for limited entry, which was adopted by the CFEC in November, 1995. CFEC established the maximum number of permits in the fishery as 332, based on participation during the 1995 calendar year.

Harvests and efforts decreased moderately following implementation of limited entry in 1998, then increased again as many shrimp fishermen switched to on-board processing in order to capitalize on high prices for sorted, boxed, whole shrimp frozen-at-sea for the Japanese markets. With so many inexperienced catcher-processors delivering inconsistent quality product, the Alaskan frozen-at sea markets declined in value for a few years following the 1999/1900 season, although harvests subsequently regained previous, high levels. The percentage of shrimp landed by catcher-processors peaked at 72% for the 2006/2007 season. The Japanese market for whole frozen shrimp declined sharply during the 2007/2008 season, leading to increased harvest of shrimp as tailed product for the domestic market.

REGULATION DEVELOPMENT

Throughout most of the development of the shrimp pot fishery, management has been passive with only fish ticket data available to assist managers. As the intensity of the fishery has increased over the years, regulation has been increased in efforts to provide a manageable and sustainable fishery. Seasons have been set to prevent harvesting during the egg hatch period and mesh restrictions were set to allow the escapement of shrimp below approximately 30 mm in carapace length. Standardization of pots sizes and numbers, as well as adoption of limited entry by CFEC have helped to provide a more orderly fishery, and to derive information on area specific harvest rates. The GHRs currently in regulation for each area were initially established as guideline harvest levels based on historical harvests, to prevent uncontrolled expansion of the fishery, but they were not based on information describing stock abundance or stock condition. Current research aims to develop a biologically based index of abundance, which the department reviews each year as a basis to adjust GHLs to provide for sustainable harvest. Some history on the development of regulations for the pot shrimp fishery is provided in the following sections.

FISHING SEASONS

Prior to 1970, shrimp pot fishing was allowed only during periods when the shrimp trawl fishery was open, (roughly May 1 through February 14). In 1970, pot fishing was allowed throughout the year; this liberal season existed through the 1981/1982 fishing season. During the 1982/1983 season, fishing was not allowed during May and June in Districts 1 through 8. This closure was intended to protect fecund, female shrimp from exploitation during the egg-hatch period in an attempt to maximize stock reproduction potential. The actual range of egg-hatch probably varies by location throughout the region but can be safely defined as from late February through the middle of May.

For the 1983/1984 season the District 1 fishery was restricted by the board to a September 1 through April 30 season. This was an allocation for fishermen who traditionally used District 1 as a supplemental income source during the fall and winter months. The closure during the late spring and summer provided the important biological benefits of allowing stock recruitment to occur through molting and growth processes.

By the 1986/1987 season, major areas (Districts 1, 2, 3, and 7) were open only from October 1 through February 28 which was established for a combination of egg-hatch closure, growth, and allocation for a fall/winter fishing season. The minor areas (Districts 6 and 8) were open from May 1 through February 28 with only an egg-hatch closure in place. All other areas (Districts 4, 5, and 9 through 16) remained open throughout the year without an egg-hatch closure.

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

SIZE RESTRICTIONS

The board policy on small shrimp (79-46-FB), primarily developed for the trawl fisheries, also applies to the shrimp pot fishery, however, specific regulations concerning a minimum legal shrimp size have not been developed. A mesh restriction specifying 1.75-inch stretch mesh was established in 1986 to assist in the escapement of shrimp less than 30 mm in carapace length and to reduce the potential for growth over-fishing. This minimum size is similar to that recommended for the Canadian west coast shrimp trap fisheries (Boutillier 1984), and should provide for some protection for at least two year-classes of small shrimp. Shrimp pots must be entirely covered with net webbing or rigid mesh. However, there is no mesh restriction for waters of Lituya Bay in District 16. Fleet testimony at the 1997 board 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.

Fishing hours of 8:00 a.m. to 4:00 p.m. are currently in regulation to slow the pace of the shrimp fishery and to allow mesh restrictions time to allow small shrimp to escape the pot. Mesh restrictions have not been totally effective at protecting small shrimp because current regulations do not restrict fishermen from picking sets twice during the daily 8:00 a.m. to 4:00 p.m. fishing period. Longer soak periods would allow the regulatory mesh size more time to passively sort small shrimp but could lead to other impacts on the dynamics or on the economics of the fishery.

QUOTAS AND GUIDELINE HARVEST LEVELS

Prior to the 1983/1984 season, a GHL of 125,000 pounds was established for each of Districts 1, 2, 3, and 7, and a GHL of 55,000 pounds for each of Districts 6 and 8. By the 1986/1987 season a GHR for Districts 6 and 8 was set to a range of 75,000 to 100,000 pounds and dropped entirely for all other districts. This situation existed until October 1, 1995 when the department implemented GHLs for each district by EO. This action was taken in response to the ongoing trend of increasing harvests in an attempt to maintain the fishery at a sustainable harvest level. For districts with a fairly consistent harvest history, guideline harvest levels were set based on the average harvest for the previous five fishing seasons, 1990/1991 through 1994/1995. The District 13 GHL was set based on harvests from only four years since harvests in 1994/1995 were nearly double any previous year. For districts with low and intermittent harvests, guideline harvest levels were arbitrarily set at 20,000 pounds. In January of 1997, the board adopted regulatory GHRs for each district. Those GHRs were the same as the levels imposed by

emergency order beginning with the 1995/1996 season, with the lower end of each range set to zero.

In 2000 the board adopted the Pot Shrimp Management Plan. This plan addressed guideline harvest levels in several ways. First, it specified that the upper range of the existing GHRs be modified to use a more accurate tail to whole weight conversion factor of 2.0 based on data from shrimp 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 the department to verify, correct, and apply the new conversion to the historic fish ticket databases.

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

Finally, the Pot Shrimp Management Plan specified that District 3 be split into two management areas–Section 3-A, and Sections 3-B and 3-C combined. The GHR for Section 3-A was set at a range of 0–264,000 pounds. Sections 3-B and 3-C were provided a GHR of 0–50,000 pounds. These ranges were based upon the perception that shrimp populations in District 3 could support a higher harvest than the historical average. For the spot shrimp districts, no specific GHRs for coonstripe shrimp were set but it was stated that the 'allowable harvest' would be based on the average catch during 1995/1996 through 1999/2000 seasons.

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

GEAR RESTRICTIONS

With the exception of the minimum mesh size, no gear restrictions were implemented until the 1976/1977 season when a pot limit of 150 pots per vessel was established for Districts 1 through 15. Until October of 1997, the 150 pot limit applied to all portions of Registration Area A. Regulations concerning a maximum tunnel perimeter (15-inch), pot marking requirements, prohibitions against simultaneously fishing shrimp pots and any other type of commercial, sport, or personal use pot, escape mechanisms, and some clarification of mesh requirements had also been developed.

Enforcement problems repeatedly demonstrated the need for clearer definitions of shrimp pot gear. It was also thought that a reduction in pot sizes would slow the fishery and could provide more useful CPUE data to the department if gear was standardized, and if a tiered pot system

under consideration by CFEC was implemented. Coupled with the implementation of limited entry, in January, 1997 the board adopted gear regulations providing for phased implementation of standardized pots. Through September 30, 1998, the number of shrimp pots that could be operated from a registered shrimp fishing vessel was 140 small pots or 100 pots larger than a small pot. If any pot operated from a vessel was larger than a small pot, the total number of pots that could be operated from that vessel was 100 pots.

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

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

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

At the 2006 board meeting in Ketchikan, regulations were clarified so that fishermen could only fish all small pots or all large pots in order to improve the quality of harvest rate information reported on fish tickets. Pot marking requirements were modified to provide marked buoys on each end of a longline with more than five pots. This regulation is intended to prevent gear entanglement and loss in congested fishing areas. In 2006 a new regulation prevented simultaneous registration for the pot shrimp and beam trawl shrimp fisheries.

FLOATING PROCESSORS

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

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

CATCHER-PROCESSOR REPORTING

Reporting requirements for shrimp catcher-processors were first established at the 2000 board meeting and revised in 2003, 2006, and 2009. With such a large proportion of the fleet acting in the dual role both as fishermen and as processors (and therefore issuing their own fish tickets) it became necessary to regulate harvest reporting to support inseason management and prevent overharvesting in any of the 19 areas being managed. Under statewide general provisions fish tickets are not required to be delivered to the deaprtment until seven days after each landing of product making the tracking of harvests with fish tickets impractical for management purposes. Reporting requirements now allow the department to regularly track harvest from shore-based processors, catcher-processors and catcher-sellers inseason. A catcher-processor is defined as a vessel that catches and processes their own product on board. Catcher processors cannot buy or process shrimp from another fishing vessel or act as a tender so observers are not required. Regulations in 2003 allowed the department to specify information to be reported during weekly call-in periods by emergency order. Regulations were modified in 2006 so that the department would not need to specify what information would be required by EO each year. Catcher-processors were also required to report harvests to department managers within 72 hours of the closure of a fishing area, and to contact the department before fishing in a new fishing area. Regulations require catcher-processors to report harvest on fish tickets for each day fished and for each area fished. Fish tickets are due to the department within sevendays of the closure of an area where the catcher-processor has fished.

In 2009 reporting requirements were changed and clarified to further improve and more accurately track harvests inseason. The requirement to report fishing activity was shortened to within 2 business days of deploying gear or within two business days of ceasing fishing in a district and was extended to apply to all shrimp fishermen (not just to catcher-processors). Weekly reporting by noon Wednesday each week was also extended to include catcher-sellers (in addition to catcher-processors). For catcher-processors it was further clarified that the department must be contacted before fishing in a new district.

CATCHER-SELLERS

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

LIMITED ENTRY

In April 1995 CFEC 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 CFEC 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. CFEC 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 fishermen. And finally, by law, the commission was required to revise upward to the maximum number of

permits to 332 that legally participated in calendar year 1995. In October, 1996 the commissioners adopted a point system for the fishery. By February 1998 CFEC began the process of issuing and denying permits for this fishery. To date, 329 permits have been issued including 311 permanent and 18 interim entry permits (CFEC 2011b). . Of the 329 permits that were granted 273 remain active and eligible to participate in the fishery, but only 106 permits fished during the 2010 calendar year (CFEC 2011c). The average permit market price was $15,400 in 2010.

STOCK ASSESSMENT

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

STOCK ASSESSMENT SURVEY

A preseason pot shrimp pilot survey was conducted in September 1996 in Ernest Sound. Additional areas were added; Cordova Bay (1997), Hoonah Sound (1999), Tenakee Inlet (2000), Kasaan Bay (2011), Cholmondeley Sound (2011), Back and West Behm Canals (2011), George and Carroll Inlets (2011) (Figure 3.2). In order to minimize variability in catch rates and provide more accuracy when conducting analyses, index set locations and standardized methods were established. The objectives of these surveys are to obtain information on shrimp abundance, define trap selectivity and associated behavior of shrimp attracted to pot gear, develop a survey-based index of abundance, define the size composition of stocks from a variety of areas, and to determine sex ratios, size at first spawning, and female fecundity for both spot and coonstripe shrimp (Love & Bishop 2005, Bishop et al. 2009).

ON-THE-GROUNDS SAMPLING

On-the-grounds sampling began in 1998, with dual objectives of obtaining catch rate information to accurately target GHLs inseason and of collecting sampling data from unsorted shrimp. Districts 1, 2, Sections 3-A, and 3-B/C, Districts 6, 7, 8, 9, 10, Tenakee, Section 13-C, and District 15 have been sampled in this way; recent trips have focused on District 2, Section 3-A, Districts 6, 7, 10, and 15.

LOGBOOK PROGRAM

A voluntary logbook program was initiated in 2005 with the objective of collecting size-specific spot shrimp CPUE data from catcher-processors. Participating fishermen provide the Department with definitions of their size categories at the beginning of the season and inseason record their harvest information by shrimp size category on their daily fish tickets. This information is used for analysis of interannual trends in CPUE and for Leslie depletion estimator modeling to determine harvest rate. Logbook data has been collected from 2005–2010 in all except districts which have seen limited effort (District 4) or been closed during this time period (Districts 15 and 16); however, for many districts there is insufficient data for either analysis, either because of limited effort or limited participation. In recent years the switch from whole to tailed product has caused the logbook program to drop off considerably, with only District 6 still having useable information.

DOCKSIDE SAMPLING

Dockside sampling began in 1997 first in Districts 1, 6, 7, 14, and 16 and gradually expanding into Districts 3, 4, 8, 10, 11 and 15. However, dockside deliveries dwindled as the proportion of the harvest which was processed onboard increased until by 2002 only Districts 6, 7, 8, 11, 14 and 15 were regularly being sampled dockside. By 2007, this had dwindled further to Districts 6, 7, and 8 only, due to shifting or declining harvests in Districts 11, 14, and 15 (Bishop et al. 2009). By 2010 only catches from part of District 6 were sampled. The dockside program was revitalized for the 2011/2012 season in an attempt to maximize the availability of this important data.

STOCK ASSESSMENT REGIONWIDE OVERVIEW

In general, data availability for spot shrimp stocks in Southeast Alaska is inadequate to estimate shrimp population size, and appropriate harvest rates for sustainable yield. This allows much less reliability in predicting stock changes over time and increases the potential risk for over-harvesting, thus conservative management must be used. The recommendations for changes in GHLs made are based on stock status, standardized score, and confidence levels (Table 3.9). A "Poor" designation is associated with a 40% reduction in the GHL or district closure; a "Below Average" designation can range from a 20–40% reduction; a "Moderate" designation a 0–20% reduction an "Above Average" designation a 0–20% increase; and a "Healthy" designation a 0–40% increase. Decreases in GHLs need to be large enough to be effective, and increases not so large as to produce future declines.

RECENT SEASONS

2008/2009 SEASON SUMMARY

A detailed 'Pot Shrimp Fishery Management Plan' providing district-specific information and describing management for the season was released in September 2008 (Davidson et al. 2008). In addition a news release issued on September 4, 2008 announced fishing seasons, fishing periods, lawful gear, vessel registration, GHLs, catcher-processor reporting requirements, fish ticket requirements, logbooks, and other information. The fishery opened on October 1, 2008 targeting a GHL of 752,100 pounds. In comparison with the 2007/2008 season, the regional GHL was decreased by 10%. GHLs were decreased in 7 areas including District 1 by 20%, Section 3-A by 20%, District 6 by 20%, District 12-Tenakee Inlet by 40%, District 12-Remainder by 33%, Section 13-C by 12%, and District 14 by 33%. District 16 was re-opened for a 15,000 pound GHL following a 3-year closure to allow re-building of the stock (Table 3.4).

A total of 277 CFEC permits were issued for the 2008 calendar year. A total of 102 fishing vessels and 3 tenders registered for the 2008/2009 season. 41 permit holders, 40% of the fishing vessels, were registered as catcher-processors, and there were no floating processors. A total of 93 CFEC permit holders fished and made 1,440 landings, the lowest number that fished since the 1986/1987 season (Table 3.1).

Total landings for the season were 585,301 pounds, 78% of the season's GHL (Table 3.1). The average pounds per landing was 406 and the average pounds per permit was 6,294. Total landings of spot shrimp were 564,685 pounds; total landings of coonstripe shrimp were 19,577 pounds, 3.3% of the total. CFEC reports total gross earnings of $1,797,769 for the 2008 calendar year (which largely overlaps with the major harvest period in October, November, and December

of the 2008/2009 season (CFEC 2011b). Landings and value reported on annual operator reports equates to an average ex-vessel price of $3.06/pound. The average annual earnings per permit holder is reported by CFEC as $18,727. Of total pounds landed for the 2008/2009 season: 69% was by catcher-processors, 19% by shore-based processors, and 12% by catcher-sellers.

The 2008/2009 season progressed somewhat slower than average with 378,000 pounds and 65% of the season's GHL harvested in October (Tables 3.5, 3.3). Another 87,500 pounds was harvested in November bringing cumulative annual pot gear shrimp harvests to 80% of seasonal landings by the close of November. Landings during the fall-winter season (October 1–February 28) were 99% of total landings, and landings during the summer season (May 15–July 31) were around 1% of the total with landings from three districts that were re-opened. A historic summary of shrimp harvests by season and district is presented in Table 3.2. Table 3.5 shows harvests by area and month for the 2008/2009 season, including closure dates for each district, effort levels by district, effort levels by month, and overall effort for the season. The first area to close was Tenakee Inlet after 4 days. This area was followed in turn by Section 13-C after 5 days, District 12-Remainder after 9 days, District 9 after 12 days, District 10 after 16 days, District 11 after 19 days, (Table 3.8). Districts 6 and 7 closed in mid-December, District 2 closed at the end of January, District 16 closed in early February, and the remaining open areas closed by regulation after 151 days on February 28. Additional fishing time was provided in Districts 4 and 5 in the summer fishing period from May 15 through July 31. By-month participation declined from initial effort by 90 permit holders in October to 43 in November, 21 in December, 16 in January and 14 in February. Peak effort in the summer season was by 3 permit holders in June.

2009/2010 SEASON SUMMARY

For the first time in eight years, a detailed 'Pot Shrimp Fishery Management Plan' was not published as a Regional Information Report (RIR) for the 2009/2010 season. This measure was taken to reduce the workload upon fishery management staff. In place of the RIR was a detailed season-opening news release issued on September 15, 2009. The news release announced pertinent details about the fishery including fishing seasons, fishing periods, lawful gear, vessel registration, new catcher-processor reporting requirements, fish ticket requirements, GHLs, voluntary logbook procedures and other information. The fishery opened on October 1, 2009 targeting a region wide GHL of 692,400 pounds. In comparison with the prior season, GHLs were decreased by 40% in District 1 and 25% in District 2, District 14 was closed, Districts 15 was re-opened following a 3-year closure, and 16 was closed for the season as a continuation of a new alternate-year harvesting strategy. The regional GHL was decreased by 8% compared with the previous season. (Table 3.4).

A total of 278 permits were issued by CFEC for the 2009 calendar year. A total of 117 fishing vessels and five tenders registered for the 2009/2010 season. Forty-four permit holders, or 39% of the fishing vessels were registered as catcher-processors, and there were no floating processors. A total of 109 CFEC permit holders fished and made 1,601 landings over the course of the season (Table 3.1).

The total pounds landed for the season was 656,418, 95% of the season's GHL (Table 3.1). The average pounds per landing was 410 and the average pounds per permit was 6,022. Total landings of spot shrimp were 637,265 pounds; total landings of coonstripe shrimp were 19,235 pounds, 2.9% of the total. CFEC reports total gross earnings of $1,862,466 for the 2009 calendar

year, which equates to a reported average ex-vessel price of $2.80/pound (CFEC 2011b). The average annual earnings per permit holder for 2009 is reported by CFEC as $17,245, 97% of the previous 5-year average. Of total pounds landed for the 2009/10 season: 65% was by catcher-processors, 21% by shore-based processors, 14% by catcher-sellers.

The 2009/2010 season progressed rapidly, with 544,000 pounds and 83% of the season's GHL harvested in October. Another 58,000 pounds was harvested in November bringing cumulative annual pot gear shrimp harvests to 92% of the final season's landings by the close of November (Tables 3.2, 3.6). Landings during the fall-winter season (October 1–February 28) were 99% of total landings, and landings during the summer season (May 15–July 31) were around 1% of the total, similar to the previous season. A historic summary of shrimp harvests by season and district is presented in Table 3.3. Table 3.6 shows harvests by district and month for the 2009/2010 season, including closure dates for each district, effort levels by district, regional harvest and effort levels by month, and harvest and effort level for the season. The first area to close was Tenakee Inlet after three days. This area was followed in turn by Section 13-C after four days, District 10 after nine days, District 11 and the Remainder of District 12 after 10 days, District 9 after 24 days, Section 3-A after 32 days, District 2 after 34 days, and District 1 after 38 days. (Table 3.8). Sections 3-B/C, District 8, District 6, and District 7 all closed in December. Districts 4, 5, 13-A/B and 15 all closed by regulation at the end of the season and only District 4 was re-opened for a summer season from May 26 through July 31. By-month participation declined from 104 permit-holders in October, to 43 permits in November, 14 permits in December, five in January and seven in February (Table 3.6). Summer season effort and harvest was low and is confidential.

2010/2011 SEASON SUMMARY

For the second consecutive year a 'Pot Shrimp Fishery Management Plan' was not issued as an RIR. Instead a detailed season-opening news release announcement was issued on September 3, 2010 announcing fishing seasons, fishing periods, lawful gear, vessel registration, GHLs, rationales for GHL setting, anticipated management actions, catcher-processor reporting requirements, fish ticket requirements, logbooks, and other information. The fishery opened on October 1, 2010 targeting a regionwide GHL of 598,600 pounds. In comparison with the prior season, GHLs were decreased by 40% in Sections 3-A and District 12-Tenakee, by 30% in District 7, and by 25% in Sections 3-B/C and District 8. District 14 remained closed for a second consecutive season and District 16 re-opened on an alternate year fishing regime. The regional GHL was decreased by 14% compared with the prior year and cumulative GHL reductions since the 2004/2005 season have been around 40%. Due to the prolonged trend of declining stock status in many shrimp populations the department indicated intentions for conservative management and the potential for early area closures where inseason CPUE evaluations indicated declining trends.

A total of 275 CFEC permits were issued by CFEC for the 2010 calendar year. A total of 113 fishing vessels and three tenders registered for the 2010/2011 season. Permit renewals were consistent over the prior three years and vessel registrations were similar to the previous season. Forty-eight fishermen were registered as catcher-processors, 42% of the fleet. A total of 108 CFEC permit holders fished and made 1,175 landings over the course of the season (Table 3.1).

Total landings for the season were 556,574 pounds, 93% of the season's GHL and 85% of the prior season's harvest (Table 3.1). The average pounds per landing was 474 and the average

pounds per permit was 5,153. Total pounds of spot shrimp landed were 530,720; total landings of coonstripe shrimp were 26,093 pounds, 4.7% of the total. CFEC reports preliminary total gross earnings of $1,533,186 for the 2010 calendar year, which equates to a reported average ex-vessel price of $2.75/pound, comparable with recent years (CFEC 2011b). The average annual earnings per permit holder is reported by CFEC as $14,464 (80% of the previous 5-year average). Of total pounds landed for the 2010/11 season: 64% was by catcher-processors, 20% by shore-based processors, 15% by catcher-sellers and 1% by catcher-exporters.

The 2010/2011 season progressed at a normal pace with 84% of the harvest taken in October, 91% of the harvest taken by the end of November, 95% by the end of December, 98% by the end of January and over 99% taken by the fall-winter season closure at the end of February (Table 3.3). Pounds harvested per month were 466,000 in October, 44,000 in November, and fell below 20,000 from December through February. A historic summary of shrimp harvests by season and district is presented in Table 3.2. Harvests by district and month for the 2010/2011 season, including closure dates for each district, seasonal effort levels by district, effort and harvests by month and regional effort levels for the season is shown in Table 3.7. The first area to close by emergency order was Tenakee Inlet after two days. Other areas closed in the following sequence: Section 13-C after six days, District 10 after eight days, District 11 after 10 days, District 12-Remainder after 19 days, District 2 after 33 days, District 7 after 34 days, District 1 after 38 days, District 9 after 49 days, the eastern portion of District 15 after 50 days, Sections 3-B/C after 53 days, District 16 after 54 days, and Districts 6 & 8 after 92 days (Table 3.8). The three remaining areas, District 5, Section 13-B/C and District 15, closed on February 28 by regulation, and District 5 and a portion of Sections 13-A/B reopened until the end of the summer season on July 31. Fishery participation began with 106 permit-holders in October, and then declined to 23 permits in November, to 10 permits in December, with four or fewer through the end of the season (Table 3.7). A total of 108 permit holders made landings for the season with the great majority (106) fishing during October.

2011/2012 SEASON OUTLOOK

The 2011/2012 Southeast pot shrimp fishery is in progress at the time of this report. A season-opening news release was issued on September 8, 2011 announcing fishing seasons, fishing periods, lawful gear, vessel registration, GHLs, catcher-processor reporting requirements, fish ticket requirements, voluntary logbook program plans, and other information. Vessel registrations for the fishery have increased 20% compared with the prior season to 135 fishing vessels and six tenders. The fishery opened on October 1, 2008 targeting a reduced GHL of 535,600 pounds (Table 3.4). In comparison with the prior season, GHLs were decreased by 10% overall. GHLs were reduced by 65% District 6 and by 20% in District 9. District 16 was closed in continuation of an alternate-year harvest strategy. The department announced pre-scheduled partial area closures for Eliza Harbor in District 9, Crawfish and West Crawfish Inlets in Sections 13-A/B, and in West Behm Canal in District 1, and the pre-scheduled closure of District 1 after 38 days on November 7. District 15 would continue to be sub-divided into two areas, each with one-half of the district GHL. The GHL reductions and management measures were implemented following a detailed review of shrimp population stock status and a consultation with shellfish research and management biologists on May 10, 2011.

By the close of October emergency orders have been issued closing 10 of the 17 areas opened for the 2011/2012 season. Cumulative harvests through October are 454,000 pounds, 85% of the

535,000-pound GHL. Ninety-nine permit holders have made 771 landings. Based on the pre-season stock assessment survey, a decision was made not to open District 12-Tenakee Inlet this season. Initial indications are that although some areas have demonstrated remarkable improvements in fishery performance, overall fishery performance is showing mixed results. As with salmon fisheries, ex-vessel prices have shown improvement.

MANAGEMENT CONCERNS

The Southeastern Alaska pot shrimp fishery has a long history and is unique within the state. The fishery is well-regulated, yet, there continue to be problems of concern to management. Based on an annual review of the available harvest and stock assessment information there is evidence that the majority of shrimp management areas are moderately and steadily declining. The department has responded by reducing historically determined guideline harvest levels or implementing fishery closures for many of 19 areas managed over the past eight-year period (Table 3.4). GHLs have been reduced from 1,010,000 pounds in 2003/2004 to 535,600 pounds in 2011/2012. In response harvests over this period have declined from 1,132,721 pounds in 2003/2004 to 557,817 pounds in 2010/2011. The department intends to manage this resource conservatively in order to ensure an ongoing and sustainable fishery and has identified the following management concerns:

1. Declining harvests, decreased GHLs, and biological evaluations of specific populations all reflect the conclusion that many shrimp populations in the region have begun to decline from recently more robust populations. The ability to react to changing resource levels will be important to provide a sustainable fishery.
2. The fishery is affected by changing markets. Markets for shrimp rapidly developed in the early 1990s leading to increased and accelerated harvests, emergency closures, GHL's based on historical harvests (1990/1991 to 1994/1995) and the adoption of a limited entry program beginning in 1998. This was followed by a collapse of the whole frozen Japanese market in 2008 leading to lower prices, new markets and decreased effort. Markets appear to have increased in 2010/2011.
3. A program to monitor specific area harvests by shrimp size categories over the course of the season using voluntary logbooks has been effective to estimate harvest rates of individual areas. The loss of market for sorted, whole-frozen product has greatly diminished the ability to collect this type of information for stock assessment purposes.
4. The department has maintained four, fishery-independent detailed stock assessment surveys in District 7, Section 3-A, Section 13-C, and District 12-Tenakee. Other major districts have been lacking in adequate stock assessment data. In 2011 two new surveys were initiated. Funding was reprogrammed from existing surveys to complete a new survey in District 2. Funding was secured from the state legislature which is being applied to initiate a new survey in District 1. Additional surveys or stock assessment data sources may be needed in the future.
5. Subsistence fisheries harvests in Districts 7, 8, 13, and Section 15-A, Personal Use fisheries in all other districts, and sport harvests throughout the region are not monitored. Current harvests and future trends in harvests may represent a significant component of overall harvests–especially in areas near major communities.

6. Outside of the personnel cost for biologists already funded to provide for other commercial fisheries, the commercial shrimp fisheries are allocated about $70,000 per year to manage and research a fishery worth $1.5–4.0 million (or more) in ex-vessel value annually. Implementation of new management approaches that would improve management, stock assessment, or to maximize harvests would require increased funding and/or additional personnel.
7. The board established a Southeast Alaska Pot Shrimp Fishery Task Force in 2003 to help develop the fishery with industry representation from various communities. The task force meets infrequently, and has not held regular elections so only some communities are represented by this process.
8. There were 275 limited entry and interim permits issued in 2010, yet only 108 permits made landings in that year. Many of the 167 latent permits are transferable and effort in the fishery may be expected to increase when shrimp stocks or prices increase, or other economic factors change.
9. Southeast Alaska specific biological data for pot shrimp is limited. Basic life history parameters such as lifespan, multiple spawning potential, and spawn success are unknown in the region. If basic life history were better understood it would lead to enhanced understanding of the resource and improved fishery management.

CHAPTER 3—TABLES AND FIGURES

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

Season	Harvest (pounds)	Permits	Landings	Pounds/landing	Pounds/permit
1970/71	12,684	5	27	470	2,537
1971/72	26,727	6	49	545	4,455
1972/73	[a]	[a]	[a]	[a]	[a]
1973/74	[a]	[a]	[a]	[a]	[a]
1974/75	7,640	7	16	478	1,091
1975/76	19,242	5	29	664	3,848
1976/77	15,716	6	16	982	2,619
1977/78	24,631	10	76	324	2,463
1978/79	21,318	9	35	609	2,369
1979/80	57,878	19	124	467	3,046
1980/81	80,862	31	191	423	2,608
1981/82	157,770	49	381	414	3,220
1982/83	268,680	58	374	718	4,632
1983/84	257,317	93	653	394	2,767
1984/85	299,015	117	781	383	2,556
1985/86	209,211	81	498	420	2,583
1986/87	354,145	83	608	582	4,267
1987/88	369,164	96	688	537	3,845
1988/89	440,615	121	812	543	3,641
1989/90	415,828	110	816	510	3,780
1990/91	562,596	138	1,100	511	4,077
1991/92	823,511	177	1,561	528	4,653
1992/93	676,928	150	1,266	535	4,513
1993/94	918,021	183	1,625	565	5,017
1994/95	1,142,717	248	2,718	420	4,608
1995/96	988,805	352	2,854	346	2,809
1996/97	1,035,344	203	1,996	519	5,100
1997/98	891,119	200	1,766	505	4,456
1998/99	856,284	185	1,839	466	4,629
1999/00	868,520	154	1,378	630	5,640
2000/01	1,063,047	160	1,311	811	6,644
2001/02	1,052,015	169	2,450	429	6,225
2002/03	1,058,348	151	2,695	393	7,009
2003/04	1,132,721	156	2,801	404	7,261
2004/05	1,000,677	149	2,499	400	6,716
2005/06	975,777	143	2,320	421	6,824
2006/07	937,066	136	2,029	462	6,890
2007/08	722,028	110	1,609	449	6,564
2008/09	590,107	95	1,451	407	6,212
2009/10	661,940	109	1,609	411	6,073
2010/11 [b]	556,574	108	1,175	474	5,153
Avg. 70–79	**21,545**	**7**	**38**		
Avg. 80–89	**285,261**	**84**	**580**		
Avg. 90–99	**876,378**	**199**	**1,810**		
Avg. 00–09	**919,629**	**138**	**2,078**		

[a] Fewer than 3 permits were fished; information is confidential.

[b] The 2010/11 data should be considered preliminary.

Table 3.2–Registration Area A (Southeast Alaska) shrimp pot fishery harvest in thousands of pounds by district, 1970/71 season to present. Note: Harvest based on 2.0 conversion tail to whole weight and corrected fish tickets.

	District															
Season	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
1970/71	3.7	[a]						[a]		[a]						
1971/72	10.6	14.8					[a]		[a]	[a]						
1972/73		[a]					[a]									
1973/74	[a]	[a]														
1974/75	4.1	[a]	[a]													
1975/76	7.2	11.5	[a]													
1976/77	[a]	9.6	[a]				3.3									
1977/78	5.6	14.1			[a]		[a]						[a]			
1978/79	4.2	6.7	[a]	[a]			3.6					[a]	[a]			
1979/80	19.0	12.8	[a]				18.3	[a]					[a]	[a]		
1980/81	15.4	14.8	25.0	[a]		[a]	16.6	[a]	[a]	[a]		[a]	[a]			
1981/82	26.3	17.5	57.1			9.4	15.6	2.0	4.9	[a]	[a]	[a]	14.6	[a]		4.7
1982/83	31.0	36.5	84.8	[a]		7.8	73.9	2.7	9.6	3.9		[a]	14.9	[a]		[a]
1983/84	41.1	22.5	36.6	[a]	[a]	7.7	87.2	16.5	[a]	14.2	[a]	3.3	21.1			[a]
1984/85	69.1	50.6	18.5	[a]	[a]	6.2	85.4	8.7	[a]	33.5	[a]	[a]	17.1	0.5		[a]
1985/86	36.7	37.5	71.1	[a]	[a]	6.0	23.1	2.8	1.7	13.4	[a]	0.4	11.1	[a]	[a]	[a]
1986/87	60.9	137.3	48.9		[a]	2.2	40.6	2.0	5.2	33.1	2.3	3.9	11.0	[a]	[a]	[a]
1988/89	200.8	62.8	19.8	[a]	[a]	8.0	61.5	0.9	6.6	36.4	0.6	10.7	26.8	[a]		[a]
1989/90	155.3	68.6	27.0	2.7		8.4	44.2	18.7	[a]	47.9	[a]	6.6	30.5			[a]

–continued–

Table 3.2.–Page 2 of 2.

Season	District															
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
1990/91	181.3	78.9	61.8	11.4		10.2	97.6	13.6	5.2	42.8	1.5	16.8	39.8		[a]	0.8
1991/92	168.6	83.5	274.4	[a]	[a]	21.2	123.4	15.3	2.9	49.7	[a]	12.3	61.2		3.3	4.5
1992/93	160.1	70.0	221.9	4.7	[a]	24.4	64.5	20.1	9.6	30.5	[a]	26.8	40.4		1.2	[a]
1993/94	147.0	120.5	288.6	5.4	[a]	41.2	120.5	25.3	27.0	36.0	2.1	33.5	61.7	[a]	1.8	[a]
1994/95	159.9	76.9	232.0	1.0	21.6	130.2	199.6	30.4	12.1	88.5	3.1	58.9	110.8	2.4	8.9	5.9
1995/96	179.4	90.5	245.1	23.3	34.9	76.0	120.2	9.2	25.9	48.8	23.4	28.3	49.2	17.7	10.1	7.7
1996/97	171.9	82.5	280.9	20.8	24.2	79.0	128.2	29.8	19.5	53.0	20.5	28.6	48.8	4.3	22.2	[a]
1997/98	142.7	83.0	228.0	10.2	5.9	72.6	127.2	20.0	21.0	39.6	18.3	25.5	41.1	12.2	21.9	[a]
1998/99	163.2	76.5	225.7	6.1	5.5	68.3	101.9	20.5	18.1	31.8	8.9	30.1	66.8	6.6	22.8	17.6
1999/00	158.6	76.1	237.8	16.6	11.8	70.0	100.9	23.5	18.3	37.9	8.6	26.0	48.0	[a]	24.7	[a]
2000/01	161.3	122.0	305.6	20.3	14.3	79.4	116.2	23.5	20.8	46.2	19.8	25.6	47.8	16.5	24.2	[a]
2001/02	174.2	103.7	320.7	10.4	7.9	71.0	128.8	19.6	18.5	38.4	24.1	36.7	42.3	21.9	18.9	[a]
2002/03	157.4	89.6	320.8	22.2	19.6	68.3	114.0	24.3	15.9	54.7	19.5	41.8	55.6	19.9	19.6	23.3
2003/04	182.4	96.7	350.1	20.4	17.7	70.0	122.1	22.7	18.2	61.7	22.0	54.4	58.5	19.6	6.9	16.2
2004/05	169.5	88.5	302.9	19.3	21.6	66.5	91.0	19.8	17.9	51.6	21.9	41.4	52.9	21.3	6.3	[a]
2005/06	176.3	83.1	258.5	18.6	19.3	82.4	87.9	24.9	20.3	53.3	23.6	50.0	57.7	15.8	4.2	closed
2006/07	154.0	99.1	252.7	15.1	10.2	80.7	87.3	23.5	24.1	51.4	23.5	48.6	53.6	13.3	closed	closed
2007/08	97.7	91.0	226.8	[a]		37.8	84.8	17.0	17.4	44.2	20.7	35.5	44.5	13.1	closed	closed
2008/09	56.1	88.4	149.6		8.0	33.9	58.1	8.7	18.1	55.7	20.2	26.3	45.0	7.7	closed	[a]
2009/10	50.8	65.2	184.1	20.9	16.7	54.9	87.1	20.7	19.0	53.5	27.4	22.6	37.6	closed	10.4	closed
2010/11[b]	39.5	69.2	118.3	[a]	10.7	36.4	49.9	14.0	21.9	56.8	24.2	23.1	46.9	closed	9.3	[a]
10-yr Average 2001/02–2010/11	**125.8**	**87.5**	**248.5**	**18.1**	**14.6**	**60.2**	**91.1**	**19.5**	**19.1**	**52.1**	**22.7**	**38.0**	**49.5**	**16.6**	**10.8**	**19.8**
Avg. Percent	**14%**	**10%**	**28%**	**2%**	**2%**	**7%**	**10%**	**2%**	**2%**	**5%**	**3%**	**4%**	**6%**	**2%**	**1%**	**2%**

[a] Fewer than 3 permits were fished; information is confidential.

[b] The 2010/11 data should be considered preliminary.

Table 3.3–Registration Area A (Southeast Alaska) shrimp pot fishery harvest in thousands of pounds by month, 1970/71 season to present. Note: Harvest based on 2.0 conversion tail to whole weight and corrected fish tickets.

Season	Month												Total Harvest	Landings	Permits
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.			
1970/71	[a]	[a]	3.2	[a]	3.5	[a]						[a]	13	27	5
1971/72	[a]	[a]	[a]	[a]	[a]	4.5	11.3	3.8	1.8		[a]		27	49	6
1972/73	[a]					[a]	[a]		[a]				[a]	[a]	[a]
1973/74			[a]		[a]	[a]	[a]		[a]				[a]	[a]	[a]
1974/75	[a]	[a]	[a]	[a]	[a]	[a]	[a]			[a]			8	16	7
1975/76		[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]		19	29	5
1976/77		[a]	[a]	[a]		[a]	[a]			[a]		[a]	16	16	6
1977/78	[a]	[a]		[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	25	76	10
1978/79	[a]	[a]	[a]				[a]	5.1	[a]	[a]	[a]	[a]	21	35	9
1979/80		[a]		[a]	1.5	3.0	2.7	16.5	8.3	7.9	[a]	9.1	58	123	19
1980/81	10.0	3.1	[a]	[a]	[a]	4.2	8.1	6.5	7.2	22.0	9.9	5.9	81	192	32
1981/82	11.4	3.8	5.5	2.7	6.3	14.6	11.7	3.4	6.3	34.4	36.2	20.3	158	381	49
1982/83	25.3	11.7	22.3	13.9	26.5	11.4	[a]	7.9	3.4	51.5	51.6	39.6	269	373	58
1983/84	44.2	32.4	15.0	13.3	21.3	22.9	24.3	32.5	31.7	8.7	5.9	4.1	257	653	93
1984/85	35.3	34.6	26.5	30.3	40.5	9.9	9.7	31.7	21.1	17.0	20.0	22.2	299	780	117
1985/86	20.3	30.3	25.2	34.7	33.1	31.1	11.1	2.3	4.3	7.3	6.3	2.6	209	498	81
1986/87	54.6	55.6	45.7	55.3	70.1	30.4	12.3	7.0	3.6	7.6	5.0	6.0	354	608	83
1988/89	86.6	97.3	68.9	56.1	62.3	23.4	12.3	2.5	5.8	8.1	9.9	7.1	441	836	121
1989/90	87.9	70.7	51.9	53.8	48.6	41.8	11.6	11.1	7.7	10.8	8.8	8.9	416	816	110

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Table 3.3.–Page 2 of 2.

Season	Month												Total Harvest	Landings	Permits
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.			
1990/91	129.4	76.0	65.1	81.3	105.6	28.5	20.9	3.9	12.6	16.6	12.1	10.4	563	1,100	138
1991/92	226.2	166.0	110.3	104.9	79.4	54.2	18.4	14.3	12.7	10.8	16.8	8.8	823	1,560	177
1992/93	140.5	105.7	91.5	101.8	124.7	34.9	15.4	22.8	8.5	11.3	10.6	8.3	677	1,291	150
1993/94	174.3	194.6	99.2	131.1	130.5	44.5	22.4	25.0	23.2	20.4	26.3	24.4	916	1,650	182
1994/95	184.8	140.4	104.6	179.1	182.4	61.0	30.6	118.2	63.6	19.3	25.1	29.9	1,140	2,687	246
1995/96	463.0	205.3	119.1	73.3	41.4	38.8	8.3	11.3	9.4	6.9	8.4	1.4	987	2,843	351
1996/97	795.3	129.7	23.7	18.3	20.7	7.8	4.7	6.0	3.5	3.7	4.5	4.6	1,023	1,988	202
1997/98	757.0	57.9	30.9	3.7	6.8	5.6	7.5	9.4	10.1	[a]	[a]		868	1,759	198
1998/99	618.9	128.6	47.8	19.9	25.6	[a]		16.3	4.1	2.1	3.8	2.9	861	1,833	185
1999/00	639.8	96.9	39.0	33.3	24.5	CLOSED	CLOSED	18.0	8.2	12.2	CLOSED	[a]	870	1,373	157
2000/01	816.3	153.3	39.4	18.1	13.6	CLOSED	CLOSED	11.7	6.2	4.1	CLOSED	[a]	1,057	1,302	161
2001/02	841.2	120.9	26.3	17.9	17.3	CLOSED	CLOSED	11.8	9.4	5.3	CLOSED	[a]	1,047	2,440	172
2002/03	814.4	163.2	34.4	8.6	24.6	CLOSED	CLOSED	6.4	7.5	[a]	CLOSED	6.9	1,066	2,709	155
2003/04	918.1	154.5	12.4	16.7	8.4	CLOSED	CLOSED	8.4	5.7	8.5	CLOSED	CLOSED	1,133	2,801	156
2004/05	840.9	112.3	17.4	8.7	11.0	CLOSED	CLOSED	4.3	[a]	3.8	CLOSED	CLOSED	1,001	2,499	149
2005/06	800.2	114.0	21.9	13.1	16.8	CLOSED	CLOSED	2.7	[a]	[a]	CLOSED	CLOSED	976	2,320	143
2006/07	830.9	78.8	4.1	5.3	8.4	CLOSED	CLOSED	[a]	[a]	[a]	CLOSED	CLOSED	943	2,029	136
2007/08	518.4	91.8	16.1	34.4	30.7	CLOSED	CLOSED	16.9	11.6	5.1	CLOSED	CLOSED	728	1,614	108
2008/09	378.0	87.5	27.6	46.6	40.2	CLOSED	CLOSED	[a]	4.1	[a]	CLOSED	CLOSED	585	1,440	99
2009/10	543.8	58.2	18.0	16.1	12.1	CLOSED	CLOSED	[a]	[a]	[a]	CLOSED	CLOSED	656	1,609	109
2010/11[b]	466.1	43.7	19.3	15.2	8.5	CLOSED	CLOSED	[a]	[a]	[a]	CLOSED	CLOSED	557	1,175	108
Avg. Percent 2001/02 to 2010/11	**80%**	**12%**	**2%**	**2%**	**2%**			**1%**	**1%**	**<1%**			**-**	**-**	**-**

[a] Fewer than 3 permits were fished; information is confidential.

[b] The 2010/11 data should be considered preliminary.

Table 3.4–Guideline harvest levels for the Southeast Alaska commercial pot shrimp fishery by Area, in pounds whole shrimp from the 2002/03 through 2011/12 season, noting years when GHL changes were implemented. Note: The year when the GHL was changed is highlighted in bold type.

	GHL									
Area	**2011/12**	**2010/11**	**2009/10**	**2008/09**	**2007/08**	**2006/07**	**2005/06**	**2004/05**	**2003/04**	**2002/03**
1	50,000	50,000	**50,000**	**78,700**	98,400	**98,400**	164,000	164,000	164,000	164,000
2	65,000	65,000	**65,000**	86,000	86,000	86,000	86,000	86,000	86,000	86,000
3-A	95,000	**95,000**	158,400	**158,400**	198,000	198,000	198,000	**198,000**	264,000	264,000
3-B/C	30,000	**30,000**	40,000	40,000	**40,000**	50,000	50,000	50,000	50,000	50,000
4	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
5	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
6	**24,000**	68,000	68,000	**68,000**	82,000	82,000	**82,000**	68,000	68,000	68,000
7	54,600	**54,600**	78,000	78,000	78,000	78,000	78,000	**78,000**	104,000	104,000
8	15,000	**15,000**	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
9	**14,000**	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000
10	48,000	48,000	48,000	48,000	48,000	48,000	48,000	**48,000**	36,000	36,000
11	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
12-Ten.	10,000	**10,000**	17,000	**17,000**	28,000	28,000	**28,000**	20,000	20,000	20,000
12-Rem.	10,000	10,000	10,000	**10,000**	15,000	15,000	15,000	15,000	15,000	15,000
13-A/B	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
13-C	30,000	30,000	30,000	**30,000**	**34,000**	42,000	42,000	**42,000**	30,000	30,000
14	Closed	Closed	**Closed**	**10,000**	15,000	**15,000**	20,000	20,000	20,000	20,000
15	15,000	15,000	**15,000**	Closed	Closed	**Closed**	**15,000**	20,000	20,000	20,000
16	**Closed**	**15,000**	**Closed**	**15,000**	Closed	Closed	**Closed**	**15,000**	20,000	20,000
TOTAL	**535,600**	**598,600**	**692,400**	**752,100**	**835,400**	**853,400**	**939,000**	**937,000**	**1,010,000**	**1,010,000**

Table 3.5–Registration Area A (Southeast Alaska) shrimp pot harvest in thousands of pounds, number of permits, and number of landings by district, by month, and for the 2008/09 season.

Area	Oct	Nov	Dec	Jan	Feb	May	Jun	Jul	Closure Date	Harvest Pounds	Permits	Landings
1	24.9	20.9	4.3	3.5	[a]	-	-	-	Feb-28	56,067	18	218
2	50.3	18.7	4.0	15.4	-	-	-	-	Jan-30	88,409	14	219
3-A	62.6	26.3	8.8	1.8	19.3	-	-	-	Feb-28	118,838	16	270
3-B/C	[a]	[a]	[a]	7.4	12.5	-	-	-	Feb-28	30,276	6	62
4	0	0	0	0	0	0	0	0	Feb–28/Jul-31 [b]	0	0	0
5	0	0	0	[a]	[a]	[a]	[a]	[a]	Feb–28/Jul–31 [b]	8,029	3	50
6	20.4	9.7	3.5	-	-	-	-	-	Dec-17	33,873	6	98
7	55.0	2.8	0	-	-	-	-	-	Dec-17	57,792	11	185
8	0.6	3.3	[a]	[a]	[a]	-	-	-	Feb-28	8,686	7	47
9	18.1	-	-	-	-	-	-	-	Oct-12	18,099	6	36
10	55.7	-	-	-	-	-	-	-	Oct-16	55,673	10	83
11	20.0	-	-	-	-	-	-	-	Oct-19	20,034	4	32
Tenakee	12.3	-	-	-	-	-	-	-	Oct-4	12,296	4	11
R-12	12.4	-	-	-	-	-	-	-	Oct-9	12,406	8	24
13-A/B	9.7	[a]	0	[a]	[a]	-	-	-	Feb-28	12,330	6	21
13-C	30.4	-	-	-	-	-	-	-	Oct-5	30,376	15	30
14	1.8	[a]	[a]	[a]	[a]	-	-	-	Feb-28	7,736	4	44
15	-	-	-	-	-	-	-	-	Closed			
16	0	0	[a]	[a]	[a]	-	-	-	Feb-4	[a]	[a]	[a]
Harvest	378,006	87,531	27,604	46,030	40,161	[a]	4,093	[a]	**Ann. harvest**	**585,301**	**-**	**-**
Permits	90	43	21	16	14	[a]	3	[a]	**Ann. permits**	**-**	**93**	**-**
Landings	793	288	99	98	128	[a]	19	[a]	**Ann. landings**	**-**	**-**	**1440**

[a] Fewer than 3 permits were fished; information is confidential.

[b] Reopened by emergency order May 15 to July 31.

Table 3.6– Registration Area A (Southeast Alaska) shrimp pot harvest in thousands of pounds, number of permits, and number of landings by district by month, 2009/10 season.

Area	Oct	Nov	Dec	Jan	Feb	May	Jun	Jul	Closure Date	Harvest Pounds	Permits	Landings
1	44.1	6.7	-	-	-	-	-	-	7-Nov	50,804	16	153
2	62.2	3.0	-	-	-	-	-	-	3-Nov	65,207	11	141
3-A	137.0	-	-	-	-	-	-	-	1-Nov	137,015	18	293
3-B/C	20.7	22.2	4.2	-	-	-	-	-	7-Dec	47,054	9	121
4	0	0	[a]	[a]	[a]	[a]	[a]	[a]	28-Feb/31-Jul[b]	20,932	3	66
5	[a]	0	[a]	8.4	4.7	-	-	-	28-Feb	16,683	5	47
6	42.5	8.2	4.1	-	-	-	-	-	23-Dec	54,884	12	170
7	66.4	9.7	[a]	-	-	-	-	-	23-Dec	78,077	15	242
8	11.7	6.6	2.3	-	-	-	-	-	12-Dec	20,659	12	99
9	19.0	-	-	-	-	-	-	-	24-Oct	18,960	4	37
10	53.5	-	-	-	-	-	-	-	9-Oct	53,548	13	73
11	27.4	-	-	-	-	-	-	-	10-Oct	27,437	5	32
Tenakee	11.0	-	-	-	-	-	-	-	3-Oct	10,982	7	15
R-12	8.1	-	-	-	-	-	-	-	10-Oct	8,066	7	25
13-A/B	6.7	[a]	[a]	-	-	-	-	-	28-Feb	10,020	7	23
13-C	25.8	-	-	-	-	-	-	-	4-Oct	25,776	15	27
14	Closed									Closed		
15	7.6	1.4	0	[a]	[a]	-	-	-	28-Feb[c]	10,446	5	39
16	Closed									Closed		
Harvest	543,839	58,165	18,024	16,138	12,068	[a]	[a]	[a]	**Ann. harvest**	**656,418**	**-**	**-**
Permits	104	43	14	5	7	[a]	[a]	[a]	**Ann. permits**	**-**	**109**	**-**
Landings	1,196	219	76	32	24	[a]	[a]	[a]	**Ann. landings**	**-**	**-**	**1,601**

[a] Fewer than 3 permits were fished; information is confidential.

[b] Reopened by emergency order for summer season May 26 to July 31.

[c] Eastern portion of district closed December 4.

Table 3.7–Registration Area A (Southeast Alaska) shrimp pot harvest in thousands of pounds, number of permits, and number of landings by district by month, 2010/11 season.

Area	Oct	Nov	Dec	Jan	Feb	May	Jun	Jul	Closure date	Total pounds harvested	Area permits	Landings
1	33.9	5.6	-	-	-	-	-	-	7-Nov	39,467	16	131
2	67.2	1.9	-	-	-	-	-	-	2-Nov	69,182	15	149
3-A	85.2	-	-	-	-	-	-	-	30-Oct	85,228	11	164
3-B/C	33.1	-	-	-	-	-	-	-	22-Oct	33,108	7	44
4	0	0	[a]	[a]	[a]	-	-	-	12-Feb	[a]	[a]	[a]
5	0	[a]	3.9	[a]	2.3	-	-	-	28-Feb/31-Jul[b]	10,713	5	22
6	20.0	9.2	7.2	-	-	-	-	-	31-Dec	36,350	7	103
7	50.0	-	-	-	-	-	-	-	3-Nov	50,320	8	136
8	8.5	4.1	1.5	-	-	-	-	-	31-Dec	13,994	11	88
9	12.7	9.2	-	-	-	-	-	-	18-Nov	21,925	7	45
10	56.8	-	-	-	-	-	-	-	8-Oct	56,752	15	62
11	24.2	-	-	-	-	-	-	-	10-Oct	24,203	5	30
Tenakee	14.2	-	-	-	-	-	-	-	2-Oct	14,152	7	15
R-12	9.0	-	-	-	-	-	-	-	19-Oct	8,953	9	26
13-A/B	5.1	[a]	[a]	[a]	[a]	[a]	[a]	[a]	28-Feb/31-Jul[b]	14,619	6	28
13-C	32.2	-	-	-	-	-	-	-	6-Oct	32,242	17	36
14	Closed									Closed		
15	8.2	[a]	-	-	-	-	-	-	28-Feb[c]	9,304	6	39
16	[a]	[a]	-	-	-	-	-	-	23-Nov	[a]	[a]	[a]
Harvest	466,130	43,744	19,340	15,574	8,544	[a]	[a]	[a]	**Ann. harvest**	**556,574**	**-**	**-**
Permits	106	23	10	4	4	[a]	[a]	[a]	**Ann. permits**	**-**	**108**	**-**
Landings	948	128	51	26	15	[a]	[a]	[a]	**Ann. landings**	**-**	**-**	**1,175**

[a] Fewer than 3 permits were fished; information is confidential.

[b] Reopened by emergency order for summer season May 15 to July 31.

[c] Eastern portion of District 15 closed November 14.

Table 3.8– Historical number of days open by area for the Southeast Alaska commercial pot shrimp fishery, 1998/99 through 2010/11 seasons.

Area	2010/11	2009/10	2008/09	2007/08	2006/07	2005/06	2004/05	2003/04	2002/03	2001/02	2000/01	1999/00	1998/99
1	38	38	151	229	47	75	80	49	52	50	41	130	97
2	33	34	122	107	38	14	13	21	30	28	29	34	97
3-A	30	32	151	229	18	15	20	47	41	28	14	12	14
3-B/C	22	68	151	132	47	6	14	14	21	46	15	-	-
4	125	218	229	229	229	213	150	213	151	229	213	230	335
5	229	151	229	229	229	151	222	229	228	229	229	230	335
6	92	84	78	151	39	77	21	24	26	27	51	137	137
7	34	84	78	59	22	30	37	113	39	71	34	55	92
8	92	73	151	151	30	37	37	18	31	35	23	22	29
9	49	24	12	14	16	19	30	24	32	25	32	57	63
10	8	9	16	9	8	8	11	12	16	14	26	30	51
11	10	10	19	15	19	43	43	48	73	116	133	230	335
12-Ten	2	3	4	3	4	5	3	6	6	6	7	9	15
12-R	19	10	9	10	12	16	23	37	31	90	-	-	-
13-A/B	229	151	151	14	17	30	152	152	97	151	151	152	151
13-C	6	4	5	7	5	6	5	5	5	4	5	5	7
14	closed	closed	151	151	151	151	68	107	110	194	229	230	151
15	151	151	closed	closed	closed	151	226	230	129	163	73	178	335
16	54	closed	127	closed	closed	closed	151	152	151	66	51	76	264

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

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

Table 3.9–Stock status, confidence information, and standardized scores for the 2011/12 season. Standardized scores are used to compare among districts and range from +1 to -1. The standardized score is calculated as the score divided by the total possible score for a given management unit.

Management Unit	Stock Status	Confidence	Std. Score
District 1	Below Average	0.19	-0.33
District 2	Below Average	0.32	-0.52
Section 3-A	Below Average	0.28	-0.59
Sections 3-B/C	Moderate	0.18	-0.18
District 4	Above Average	0.12	0.44
District 5	Above Average	0.10	0.46
District 6	Poor	0.40	-0.95
District 7	Below Average	0.54	-0.36
District 8	Below Average	0.18	-0.22
District 9	Below Average	0.17	-0.58
District 10	Moderate	0.36	0.03
District 11	Moderate	0.15	0.00
Tenakee	Above Average	0.52	0.25
Remainder of District 12	Poor	0.18	-0.67
Sections 13-A/B	Moderate	0.18	-0.19
Section 13-C	Below Average	0.44	-0.53
District 14	Closed	NA	NA
District 15	Above Average	0.12	0.50
District 16	Healthy	0.10	1.00

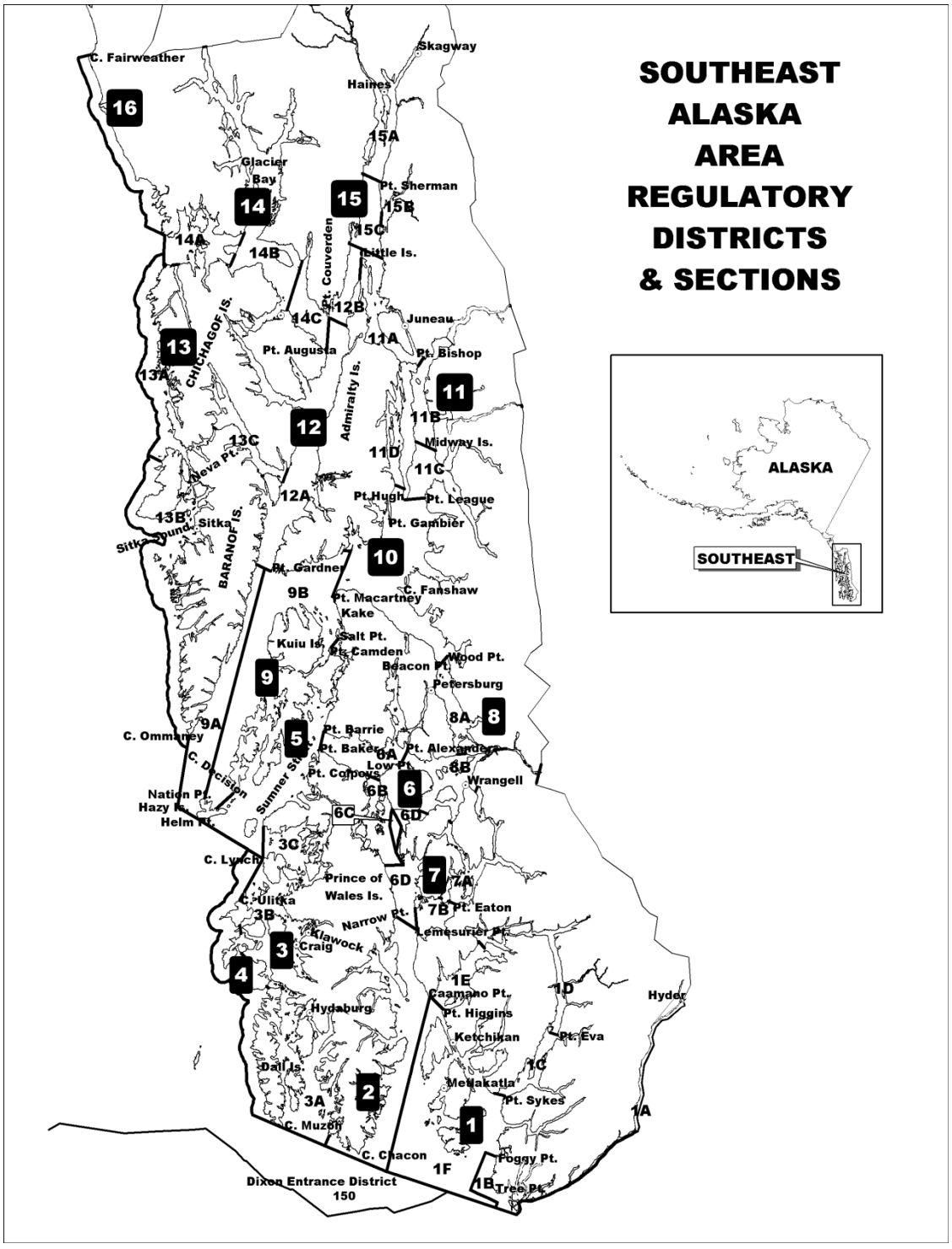

Figure 3.1–Shrimp pot fishery management units in Registration Area A, Southeast Alaska.

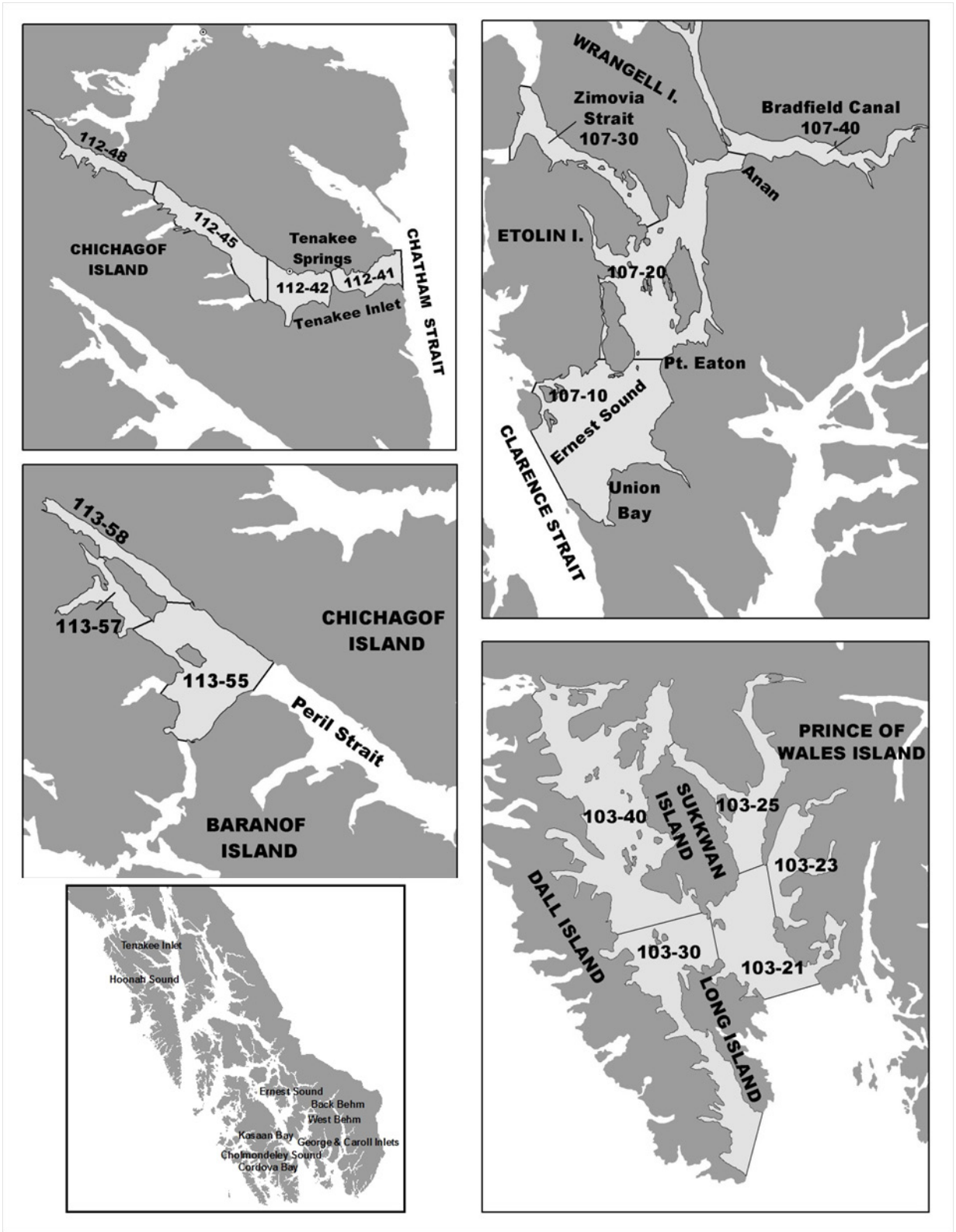

Figure 3.2–Areas currently surveyed for stock assessment of the shrimp pot fishery in Registration Area A, Southeast Alaska.

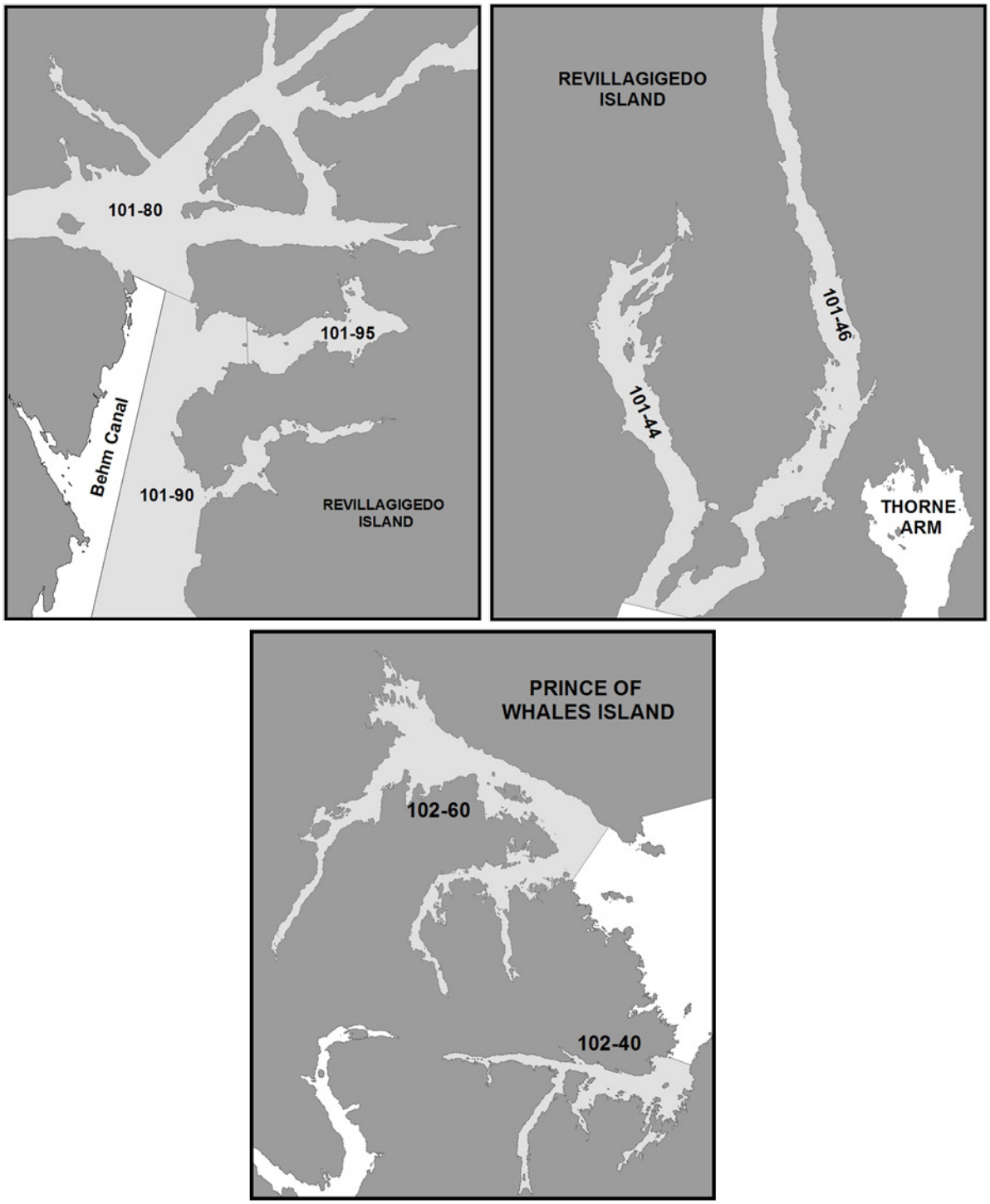

Figure 3.3–Page 2 of 2.

CHAPTER 4: YAKUTAT SHRIMP OTTER TRAWL FISHERY

INTRODUCTION

COMMERCIAL FISHERY

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

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

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

FISHERY DEVELOPMENT AND HISTORY

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

The highest harvest on record was in the 1980/1981 season when a harvest exceeding 1,900,000 pounds was reported by 16 vessels making 23 landings (Table 4.1). Most of this volume was harvested in Yakutat Bay during the fall (Table 4.2) by larger vessels that also participated in various shrimp fisheries around Kodiak Island and further westward. Fish ticket data indicate the harvest was comprised of only pink shrimp, but undoubtedly some sidestripe shrimp were also harvested. These northern shrimp (pink shrimp and small sidestripe shrimp) were the predominate species harvested through the 1987/1988 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 (Table 4.3). There were no harvests reported for the 1994/1995 through 1998/1999 seasons.

The department conducted stock assessment surveys in Yakutat Bay from 1980 through 1984 (Table 4.4). The fall 1980 and spring 1981 surveys were conducted in cooperation with the National Marine Fisheries Service. All subsequent surveys occurred with department vessels, equipment, and personnel. During some years, both spring and fall surveys were completed. Survey results indicated population estimates ranging from 1,840,000 to 6,460,000 pounds of all species of shrimp combined, and an average composition of 70% northern shrimp and 30% sidestripe shrimp. No surveys have been conducted since 1984. The abundance of northern and sidestripe shrimp in Icy and Yakutat Bays 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 pound monthly GHL, 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 board eliminated trawl shrimp fishing in the contiguous waters of Yakutat Bay east of a line from the westernmost tip of Ocean Cape to the westernmost tip of Point Manby, including the waters of Russell and Nunatak Fjords.

FISHING SEASONS

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

GUIDELINE HARVEST LEVELS

Initial GHLs 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 rate 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 board amended the harvest level to 30,000

pounds/month to prevent taking the entire GHL early in the season. This monthly harvest level was also established to provide opportunities for local Yakutat residents to enter the commercial fishery. In 1997, fishing for shrimp with trawl gear was eliminated from Yakutat Bay.

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

GEAR RESTRICTIONS

Legal trawl gear is still broadly defined as trawls, including beam and otter trawls, with no restriction to the maximum opening dimensions of the trawl mouths. In 1997 the board discussed limiting gear to beam trawl only, but did not take action to do so. 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 growing commercial pot shrimp fisheries in these areas.

MANAGEMENT CONCERNS

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

STOCK ASSESSMENT

Trawl surveys have not been conducted in Registration Area D since September 1984 (Table 4.4), and the current condition of the shrimp stocks is unknown. Future sustained harvests would require stock assessment surveys to verify seasonal abundance and new regulations to assure adequate monitoring and reporting of both the harvest of target species and incidental bycatch. If landings increased it could become necessary to incorporate bycatch criteria into the management strategy for this fishery.

RECENT SEASONS

No shrimp were reported taken with trawl gear in the Yakutat Registration Area during the past three seasons. The last harvest of shrimp taken with trawl gear occurred in November of the 2004/2005 season (Table 4.2).

CHAPTER 4–TABLES AND FIGURES

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

Year/ Season	Harvest in pounds	Number of permits	Landings	Pounds per permit	Pounds per landing
1976/77	[a]	[a]	[a]	[a]	[a]
1977/78	0	0	0	0	0
1978/79	0	0	0	0	0
1979/80	[a]	[a]	[a]	[a]	[a]
1980/81[b]	1,906,68	16	23	119,168	82,899
1981/82	[a]	[a]	[a]	[a]	[a]
1982/83	141,714	3	7	47,238	20,245
1983/84	426,649	5	10	85,330	42,665
1984/85	[a]	[a]	[a]	[a]	[a]
1985/86	[a]	[a]	[a]	[a]	[a]
1986/87	[a]	[a]	[a]	[a]	[a]
1987/88	40,448	3	6	13,483	6,741
1988/89	0	0	0	0	0
1989/90	0	0	0	0	0
1990/91	[a]	[a]	[a]	[a]	[a]
1991/92	[a]	[a]	[a]	[a]	[a]
1992/93	34,875	3	3	11,625	11,625
1993/94	[a]	[a]	[a]	[a]	[a]
	No harvest in seasons 1994/95 through 2003/04				
2004/05	[a]	[a]	[a]	[a]	[a]
	No harvest in seasons 2005/06 through 2010/11				

[a] Fewer than 3 permits were fished; information is confidential.

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

Season	Month												
	May	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**March**	**April**	**Total**
1976/77	0.0	[a]	0.0	[a]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[a]
1977/78	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978/79	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979/80	0.0	0.0	0.0	0.0	[a]	0.0	0.0	0.0	0.0	0.0	0.0	[a]	[a]
1980/81[b]	0.0	0.0	[a]	1,350.0	481.9	0.0	0.0	0.0	0.0	0.0	24.3	0.0	1,906.7
1981/82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[a]	0.0	0.0	0.0	[a]
1982/83	[a]	[a]	[a]	[a]	[a]	0.0	0.0	0.0	[a]	0.0	0.0	0.0	141.7
1983/84	0.0	0.0	0.0	0.0	[a]	[a]	0.0	0.0	0.0	0.0	[a]	128.0	426.6
1984/85	0.0	[a]	0.0	[a]	[a]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[a]
1985/86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[a]	0.0	0.0	0.0	0.0	[a]
1986/87	0.0	0.0	0.0	0.0	0.0	0.0	[a]	[a]	0.0	[a]	154.7	0.0	[a]
1987/88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[a]	[a]	0.0	[a]	0.0	40.5
1988/89	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989/90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990/91	0.0	[a]	0.0	[a]	[a]	0.0	0.0	0.0	0.0	0.0	0.0	[a]	[a]
1991/92	0.0	0.0	[a]	[a]	0.0	[a]	0.0	0.0	0.0	0.0	0.0	0.0	[a]
1992/93	0.0	0.0	[a]	[a]	[a]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.9
1993/94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	[a]	0.0	0.0	0.0	[a]
No harvest in seasons 1994/95 through 2003/04													
2004/05	0.0	0.0	0.0	0.0	0.0	0.0	[a]	0.0	0.0	0.0	0.0	0.0	0.0
No harvest in seasons 2005/06 through 2010/11													

[a] Fewer than 3 permits were fished; information is confidential.

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

	District						
Season	**181**	**183**	**189**	**191**	**Total**	**Landings**	**Permits**
1976/77	[a]	0	[a]	0	[a]	[a]	[a]
1977/78	0	0	0	0	0	0	0
1978/79	0	0	0	0	0	0	0
1979/80	0	[a]	[a]	0	[a]	[a]	[a]
1980/81	556.8	1349.9	0	0	1906.7	23	16
1981/82	0	[a]	0	0	[a]	[a]	[a]
1982/83	[a]	[a]	0	0	141.7	7	3
1983/84	310.4	[a]	0	0	426.6	10	5
1984/85	[a]	[a]	0	0	[a]	[a]	[a]
1985/86	[a]	0	0	0	[a]	[a]	[a]
1986/87	[a]	0	0	0	[a]	[a]	[a]
1987/88	40.5	0	0	0	40.5	6	3
1988/89	0	0	0	0	0	0	0
1989/90	0	0	0	0	0	0	0
1990/91	0	[a]	[a]	0	[a]	[a]	[a]
1991/92	0	[a]	0	0	[a]	[a]	[a]
1992/93	0	[a]	[a]	0	34.9	3	3
1993/94	0	[a]	0	0	[a]	[a]	[a]
	No harvest in seasons 1994/95 through 2003/04						
2004/05	[a]	0	0	0	[a]	[a]	[a]
	No harvest in seasons 2005/06 through 2010/11						

[a] Fewer than 3 permits were fished; information is confidential.

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

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

Source: Schaefers and Smith 1954.

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

[b] NMFS gear is an otter trawl.

CHAPTER 5: YAKUTAT SHRIMP POT FISHERY

INTRODUCTION

COMMERCIAL FISHERY

Both spot and coonstripe shrimp are harvested, primarily from rocky habitat located in Yakutat Bay by fishermen using baited pot gear, which is either longlined or fished singly from vessels ranging in length from small skiffs up to about 40 ft. In a longline system each pot is attached to the groundline with a snap, similar to that used on longlined snap-on groundfish gear. Pot construction is extremely varied in size, shape, weight and configuration, so it is difficult to describe a "standard" pot

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

FISHERY DEVELOPMENT AND HISTORY

The first reported landings occurred in the Yakutat Area during the 1969/1970 fishing season. For the next ten seasons, landings occurred during only two seasons. Participation and landings have been fairly consistent since the 1982/1983 fishing season, with a peak landing of 29,830 lbs occurring during that season. The peak effort level of 15 permits occurred during the 1995/1996 season when 13,418 lbs were landed. Average landings have totaled 7,705 pounds by six vessels per season (Table 5.1). Usually, only the tails are sold by the shrimper to private individuals, restaurants, or other specialty markets without passing through traditional processors. This is a low volume fishery with a relatively high exvessel value. The average price paid for tails has been about $4.14 per pound during recent seasons.

Peak effort and harvests normally occur during May and June. However, activity in this fishery can be highly variable. For example, the peak harvest during the 1982/1983 season occurred during the month of September.

REGULATION DEVELOPMENT

Management of the commercial shrimp pot fishery in the Yakutat Area is largely passive, focusing on Yakutat Bay. Regulations specific to Yakutat Bay are limited to a closed season to prevent fishing during the egg-hatch period, a minimum mesh size to retain the larger female segment of the stock, a maximum number of pots per participant to limit effort, and prohibition of trawling in productive areas heavily utilized by the pot fishery. Fish ticket data assists tracking major trends or changes in stock status. The Yakutat Area has had a separate section in the regulatory code since 1985.

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

FISHING SEASONS

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

SIZE RESTRICTION

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

GEAR RESTRICTION

A mesh restriction specifying 1.5-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 webbing or rigid mesh. At least two opposing sides of the pot must have a webbed panel of 1.5-inch stretch mesh if a permit holder is fishing inside Yakutat Bay. The 1.5-inch minimum mesh size allows the retention of smaller shrimp, compared to the Southeast Alaska fishery.

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-in), buoy markings, and escape mechanisms.

GUIDELINE HARVEST LEVELS

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

During the 1996/1997 season, a GHL of 10,000 lbs was set for Yakutat Bay, north and east of a line from Ocean Cape to Point Manby, for the period between May through September. The harvest level for the winter fishery from October 1 through February 28 was unrestricted because potential effort was less in winter than in summer. The GHL capped the harvest at a level commensurate with those historically reported for this fishery and provided some protection against possible local depletion. The summer GHL represented a higher harvest than the prior ten-year seasonal average but was lower than the maximum historical harvests in the early 1980s.

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

RECENT SEASONS

Fewer than three permits fished the 2008/2009 and 2010/2011 seasons, and catch records are confidential. In 2009/2010 three permits harvested 3,026 pounds making 30 landings (Table 5.1). Effort and landings were less than half of average. No dockside sampling or skipper interviews were conducted and no fish ticket size data are available.

CHAPTER 5—TABLES AND FIGURES

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

Season	Harvest (lbs)	Number of Permits Fished	Number of Landings	Lbs per Landing	Lbs per permit
1968/69	0	0	0	0	0
1969/70	[a]	[a]	[a]	[a]	[a]
1970/71	0	0	0	0	0
1971/72	0	0	0	0	0
1972/73	0	0	0	0	0
1973/74	0	0	0	0	0
1974/75	[a]	[a]	[a]	[a]	[a]
1975/76	0	0	0	0	0
1976/77	0	0	0	0	0
1977/78	0	0	0	0	0
1978/79	0	0	0	0	0
1979/80	[a]	[a]	[a]	[a]	[a]
1980/81	[a]	[a]	[a]	[a]	[a]
1981/82	[a]	[a]	[a]	[a]	[a]
1982/83	29,830	4	63	473	7,458
1983/84	13,938	8	33	422	1,742
1984/85	2,475	6	35	70	413
1985/86	6,910	5	33	209	1,382
1986/87	2,421	5	10	242	484
1987/88	2,945	8	45	65	368
1988/89	2,995	6	16	187	499
1989/90	7,148	5	72	99	1,430
1990/91	10,711	7	70	153	1,530
1991/92	7,316	12	78	93	610
1992/93	2,999	4	40	74	750
1993/94	5,916	6	55	107	986
1994/95	5,738	6	64	89	956
1995/96	13,418	15	103	123	848
1996/97	20,862	14	218	96	1,490
1997/98	9,546	10	135	71	955
1998/99	11,833	14	127	93	845
1999/00	4,107	8	76	54	513
2000/01	28,674	13	167	172	2,206
2001/02	16,746	13	152	110	1,288
2002/03	11,943	12	143	84	995
2003/04	4,514	8	57	79	564
2004/05	2,280	5	28	81	456
2005/06	7,397	6	74	100	1,233
2006/07	752	4	17	44	188
2007/08	[a]	[a]	[a]	[a]	[a]
2008/09	[a]	[a]	[a]	[a]	[a]
2009/10	3,026	3	30	101	1,008
2010/11[b]	[a]	[a]	[a]	[a]	[a]
Average	7,705	6	7	165	1,443

[a] Fewer than 3 permits were fished; information is confidential.

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

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