Fishery Management Report No. 17-61

2018 Report to the Board of Fisheries on Region 1 Shrimp Fisheries

By

Quinn Smith

And

Dan Gray

December 2017

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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2018 REPORT TO THE BOARD OF FISHERIES ON REGION 1 SHRIMP FISHERIES

by

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

and

Dan Gray
Alaska Department of Fish and Game, Division of Commercial Fisheries, Sitka

Alaska Department of Fish and Game
Division of Sport Fish, Research and Technical Services
333 Raspberry Road, Anchorage, Alaska, 99518-1565

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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.

Quinn Smith,
Alaska Department of Fish and Game, Division of Commercial Fisheries,
802 3rd St, Douglas, AK 99824, USA

and

Dan Gray,
Alaska Department of Fish and Game, Division of Commercial Fisheries
304 Lake St, Rm.103, Sitka, AK 99835, USA

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TABLE OF CONTENTS

Page

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF FIGURES

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 in Region I totaled over 1.56 million lb and were valued at over $2.7million during the 2016/17 season. Seventy-eight 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 22%. Yakutat trawl fisheries have had no recent effort while little effort has occurred in the pot shrimp fishery; less than three permits fishing in the most recent season.

The Southeast pot shrimp fishery is fully developed, with an average of 108 permits landing 594,140 lb per year over the last 10 years. Over this time stocks have been declining and guideline harvest levels have been adjusted to combat this decline. Participation and harvest in the Southeast beam trawl fishery has increased over the past few seasons due to improving 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 harvested annually at a small level, with an average of two permits participating per year.

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 developed 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. These improvements to the fishery assessment have allowed managers to more sustainably manage the fishery. The Southeast beam trawl fishery is currently monitored by voluntary logbooks and dockside sampling, while 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 (Figure 1.1). Area D encompasses state waters from Cape Fairweather to Cape Suckling, divided into Districts 81–91. Shrimp fisheries in these areas are entirely in state waters.

The Southeast pot shrimp fishery is fully developed, with an average of 108 permits landing 594,140 lb per year over the last 10 years. Over this time stocks have been declining and guideline harvest levels (GHLs) have been adjusted to combat this decline. Participation and harvest in the Southeast beam trawl fishery has increased over the past few seasons due to improving 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 harvested annually at a small level, with an average of two permits participating per year.

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 over 1.56 million lb and were valued at over $2.7 million during the 2016/17 season (Table 1.1). Seventy-eight percent of the value of the fisheries is from the Southeast pot shrimp fishery, and the Southeast beam trawl fishery made up the majority of the remaining 22%. Yakutat trawl fisheries have had no recent effort and 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 Region I shrimp pot fishery is the only shellfish fishery managed individually by area offices within the region. 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 shrimp pot fishery has a developed 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.

The regional stock biology staff conducts dockside sampling and skipper interviews with assistance from the shellfish and area management staffs. Stock assessment surveys currently conducted in Southeast Alaska include an annual shrimp pot survey in five districts. These surveys are all relatively recent; the District 3 survey started in 1997, districts 7 and 13 in 1999, District 12 in 2000, and districts 1 and 2 in 2011. The District 13 survey was abandoned in 2015 due to program budget reductions. Past surveys include a trawl survey to estimate stock abundance and size class composition of northern and sidestripe shrimp in Yakutat Bay. This survey ended in 1984 and was conducted on seven occasions. A 2012 survey investigated the use of the Canadian spawner index management system and was cancelled after the 2013 survey due to budget reductions.

Annual on the grounds sampling is conducted for the southeast pot shrimp fishery 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 composition. 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 2001/02 season, but the program is no longer conducted.

Logbooks were made mandatory for catcher-processor vessels in the southeast pot shrimp fisheries beginning in the 2015/16 season, and are also mandatory for the shrimp trawl fisheries in nontraditional 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 by the Board of Fisheries (board) in 2003 and was charged with conducting an annual joint meeting with the Alaska Department of Fish and Game (department). Goals of this task force were to review pot shrimp stock status and exchange information and ideas to further improve fishery management. The board chose to dissolve the formal Task Force in 2012 in favor of an ad hoc organization. Goals of this organization include advising on long-term management goals and plans, research plans, stock assessment and data collection, and management issues such as fleet capacity.

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 (lb)	Approximate exvessel Value
Southeast			
2011/2012	Red and blue king crab	176,545	$1,878,898
2016/2017	Tanner crab (*C. bairdi*)	993,614	$2,683,963
2016/2017	Golden king crab	61,586	$668,798
2016/2017	Dungeness crab	2,358,645	$7,168,785
2016/2017	Pot shrimp	561,184	$2,095,815*
2016/2017	Beam trawl shrimp	864,10	$553,649*
	Subtotal	4,151,574	$15,049,908
Yakutat			
2000/2001	Red and blue king crab	391	$2,960
1999/2000	Tanner crab	**	**
1999/2000	Dungeness crab	65,386	$133,145
2016/2017	Pot shrimp	**	**
2004/2005	Otter trawl shrimp	**	**
2016/2017	Weathervane scallop	120,384	$1,471,092***
	Subtotal	186,161	$1,607,197

* Value estimate based on 2016 exvessel price data from Commercial Fisheries Entry Commission.

** Confidential data, fewer than three permits fished.

*** Value estimate based on 2012 NMFS exvessel price data.

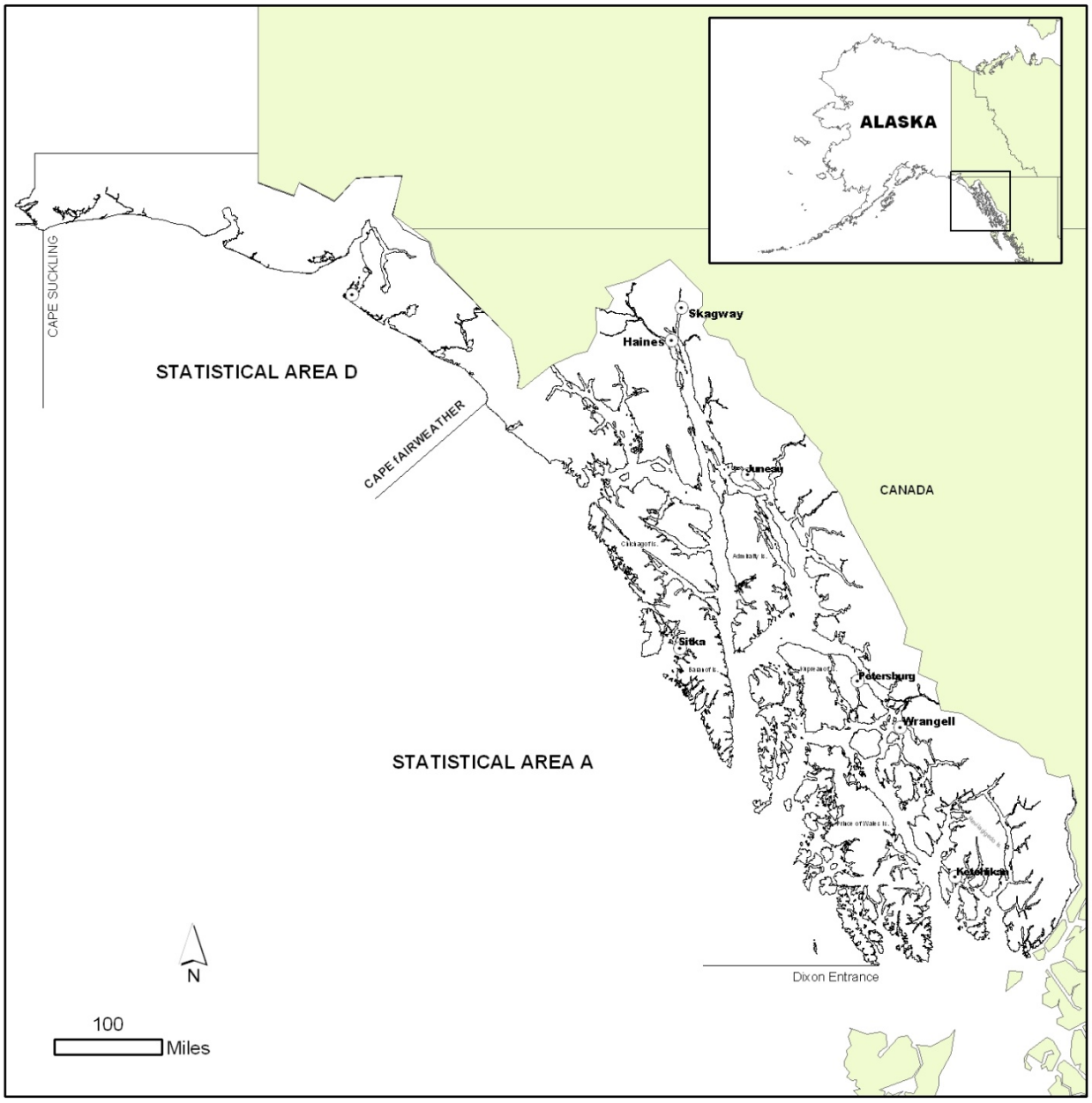

Figure 1.1–Registration Area A (Dixon Entrance to Cape Fairweather) and Registration Area D (Cape Fairweather to Cape Suckling).

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 the Atlantic population is thought to differ at the subspecies level (Squires 1992). It is a pelagiobenthic 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 rates, 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*. In recent seasons the preference has been for sidestripe shrimp due to low demand for northern shrimp. Starting in the 2015/16 season, a local processor began buying northern shrimp again. Other species incidentally captured and landed in smaller quantities are the coonstripe shrimp (*Pandalus hypsinotus*), humpy shrimp (*P. goniurus*), and spot shrimp (*P. platyceros*).

Productive beam trawl fishing has historically been limited to four major fishing areas in Southeast Alaska. These areas are District 8, portions of Districts 6 (Duncan Canal and Kah Sheets Bay), District 7 (Eastern Channel), and District 10 (Thomas and Farragut Bays), all located in the Petersburg-Wrangell Management Area (Figure 2.1). The concentration of the fishery in these areas has been due to the abundance of the resource, the presence of the major processors, and limited vessel capabilities. Most vessels are less than 60 ft in length, utilize small horsepower engines, do not have refrigerated holds, and have a crew of two or three. One vessel that had fished up until the 1999/00 season had participated 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 components 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. Beam length varies by vessel size. 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–April 30, GHLs 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 lb 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 to 1967 annual beam trawl harvests ranged from 1,800,000 to 7,600,000 lb, with an average of 3,600,000 lb per year (Table 2.1). The number of vessels participating ranged from 10–22. The peak production year was 1958 when 14 vessels caught over 7,600,000 lb. During the late 1960s and early 1970s harvest and effort declined. Seasonal harvests averaged 916,300 lb and effort averaged 12 vessels during the 1970s. Through the 1980s the harvest and effort increased to an average of 1,409,500 lb by 19 vessels. During the 1990s the harvest has averaged 2,674,500 lb by 34 permit holders. Some of the participants that were involved in the fishery between 1992–1997 were speculating on qualification into the limited entry program. Relatively few of the maximum of 51 vessels contributed substantially to the harvest or were dependent upon the fishery for a major portion of their fishing income. The effects of the limited entry program are evident in the 1998/99 fishery when only 24 permit holders participated. Fisheries conducted during the 2000/01 through 2002/03 seasons averaged 990,000 lb delivered by an average of 14 active participants worth about $280,000 annually. Effort and participation in the fishery continued to decline after the 2002/03 season, mostly due to low prices as a result of large harvests of slightly larger northern shrimp from the Eastern seaboard and the western coast of North America. Regionwide harvest dropped off precipitously in the 2006/07 season after the main buyer of northern shrimp in Petersburg stopped buying after an 80-year history in the fishery (Table 2.1). From the 2006/07 to the 2015/16 seasons, harvests were largely marketed to small buyers and through dockside sales. A new processor in Petersburg began buying northern shrimp in the 2015/16 season, which has increased participation and harvest.

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, GHLs 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 lb (Table 2.2). Seasonal harvests for the region approached 1,000,000 lb prior to 1980. During the 1980s harvests increased and

averaged 1,400,000 lb. Harvest and effort in the fishery increased again and averaged about 2,700,000 lb during the 1990s. Harvests have declined to an average of 560,000 lb 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 primarily dependent upon District 6 and harvests from District 8 began to increase. From the 1969/70 through the 1978/79 fishing seasons, District 6 harvests averaged almost 600,000 lb per season while District 8 harvests averaged less than 250,000 lb 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 1988/89 season, average shrimp harvests from Duncan Canal were nearly 900,000 lb, 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 lb per year and District 8 averaging 800,000 lb (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 1999/00 season, harvest has largely been dominated by effort in districts 6 and 8, with very little harvest coming from the nontraditional areas (Table 2.6).

REGULATION DEVELOPMENT

Documentation describing shrimp fishing regulations is available since 1924. Regulations prior to that date are unknown. Regulations from 1924–1932 primarily concern fishing seasons. Size restriction regulations were first implemented in 1941. During the next decade closed areas were added and from 1947 to 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 fishing seasons, fishing periods, or guideline harvest ranges (GHRs).

FISHING SEASONS AND PERIODS

Traditional Northern Shrimp Fisheries

A fishing season from May 1 to March 15 was established by 1924. Since then, a similar season has been in place with slight modifications to beginning and ending dates. The season is now May 1–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–June 30, July 1–August 31, and September 1–February 14. A fourth fishing period, December 1–February 14, was added in 1997 for the Stikine Flats area of District 8. These regulatory periods were established for several reasons: to protect shrimp during the critical egg hatch period, to lengthen the total fishing season 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.

Nontraditional 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 closures in 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 board and resulted in the closure of districts 1, 2, 4, and 12–16, 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 nontraditional areas if their respective GHLs have not been achieved during the normal fishing time of May through mid-February (Table 2.2). Justification for the change included the need for more exploration time due to greater fishing expense than in 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 to 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 beam trawl fisheries during fishing seasons and periods 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 two hours before landing to allow for biological sampling of the harvest. If necessary, the commissioner may require an onboard observer during fishing operations. The department evaluates opening a directed sidestripe shrimp fishery on a case-by-case basis. Since the sidestripe shrimp component of the Gulf of Alaska and 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 1997/98 season, and once in Section 11-B during the 2001/02 season. Only once during these openings has the upper end of the GHR (50,000 lb) 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 in total length. By 1952 there were no size regulations and size of shrimp landed was controlled by industry through price.

By 1979, the board 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 is taken from each 500 to 1,000 pound 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 and were 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 as follows: a portion of District 6 from 80,000 to 400,000 lb; a portion of District 7 from 15,000 to 50,000 lb; a portion of District 10 from 5,000 to 75,000 lb; and all of District 8 from 25,000 to 175,000 lb. 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 lb, the seasonal harvest potential increased by half a million pounds, increasing the total allowed season harvest to 1.2 million lb, more than double the previous GHR.

Nontraditional Northern Shrimp Fisheries

In 1994, seasonal GHRs of 0 to 100,000 lb 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 lb in each, and 11-D from 50,000 to 150,000 lb.

Directed Sidestripe Shrimp Fisheries

With the implementation of the directed sidestripe shrimp fishery in 1997, a limit of 50,000 lb 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. Spot shrimp bycatch limits are 1,000 lb in all districts except districts 8, 9, and the nontraditional portion of District 10 where they are 6,000, 2,000, and 2,000 lb respectively. Coonstripe bycatch limits vary from 1,000 to 4,000 lb per District with the exception of Districts 6, 8, and the nontraditional portion of District 10 where they are 9,000, 10,000, and 7,000 lb respectively.

GEAR RESTRICTIONS

In 1962, a regulation defining a minimum mesh size used in beam trawls was 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 to the current regulatory mesh size of approximately 1.35-inch stretched measure (13.5 in across 10 meshes). Due to the relatively low market value of small northern shrimp, many fishermen are currently using web between 1.38-in and 1.50-in stretched mesh, to reduce their harvest of small northern shrimp.

A directed sidestripe fishery was established in 1997 by emergency order. In that fishery trawl webbing must be a least one and seven-eighths in stretched measure, or no more than 13 meshes per ft 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), with the intent 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.

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 U.S. National Park Service prohibited trawling in waters of Glacier Bay. Beginning in mid-1986, trawling was prohibited in the waters of Tenakee Inlet (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.

There is no regulation restricting the length of the beam of the trawl. At the 2015 meeting the board passed regulation allowing for the use of multiple beam trawls as a mechanism to increase both safety and efficiency. If multiple trawls are used the combined lengths of the beams can be no more than 60 ft.

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, 32 permanent permits have been issued. Of the permanent permits issued, 7 of these have been cancelled leaving 25 permits active in the fishery (CFEC 2017a).

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 allowing for the department to require weekly reporting of any other information determined necessary for the conservation and management of the fishery.

MANAGEMENT CONCERNS

Effort decreased from 23 permits in the 1999/00 season to an average of 6 permits fished during the 2006/07 to 2014/15 seasons, and participation has increased slightly in the last 2 seasons to a high of 9 permits in the 2016/17 season. This decrease was due in part to low exvessel prices and a reduction in processing capacity, 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. Additionally, the main buyer of northern shrimp in Petersburg stopped their shrimp operation in June of 2005. The uptick in permits in recent years is due to a new processor buying trawl shrimp in Petersburg. Currently, participation in the fishery is still low compared to historic levels with a total of 38% of available GHL taken during the 2016/17 season. With the implementation of the limited entry program, permits have been and will continue to be purchased by permit holders desiring diversification. If markets continue to improve, this fishery may see higher effort levels, more efficient and species-specific gear, and eventual development of nontraditional 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.

The main management tool used for the beam trawl fishery is fish tickets which allows for description of harvest trends. However, in the absence of reliable effort data it is not possible to track basic fishery metrics like catch per unit effort (CPUE). 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 GHLs established for the different areas. In addition, managers track 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. Developing programs, such as the logbook program required for the nontraditional areas and the beam trawl observer trips, will allow the department to assess harvest levels and collect biological information from area fisheries.

Beam trawl harvest levels are set based on average historical harvest levels, not population estimates. Although 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 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 northern shrimp and eliminated dockside sampling. With the increase in harvest beginning in the 2010/11 season, a small dockside sampling program was resumed, and continues. 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 estimates of bycatch and discards.

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). In recent seasons, effort has been concentrated in Duncan Canal and the Stikine delta. Harvest in Duncan Canal averaged 343,400 lb per season from the 2014/15 through 2016/17 seasons, while harvest in the Stikine delta has averaged 347,400 lb per season over the same time period. An average of 11,000 lb per season has come from all other areas combined (Table 2.1).

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 98% of the species harvested during the last 10 seasons. 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, less than 7% for sidestripe shrimp, and less than 1% for coonstripe and spot shrimp for the 1991/92

through 1996/97 seasons. Proportional harvest by species for the period from 1997 to 2002 has averaged 85% northern shrimp, 14% sidestripe shrimp, and less than 1% for coonstripe and spot shrimp. In 2003/04 season, coonstripe and spot shrimp bycatch limits went into effect in the beam trawl fishery. From the 2003/04 through the 2007/08 seasons, northern shrimp have accounted for 82% of the harvest, sidestripe shrimp 15%, coonstripe shrimp 2%, and spot shrimp 1% in the traditional beam trawl areas. From the 2008/09 through the 2016/17 seasons, sidestripe shrimp have made up 55% of the harvest, northern shrimp 47%, and spot shrimp 3% in the traditional beam trawl areas.

NONTRADITIONAL NORTHERN SHRIMP FISHERIES

Beam trawl fishing has occurred at low and sporadic levels outside the Petersburg-Wrangell area since at least the 1969/70 season, with the exception of Blake Channel which had significant harvests in the 1970s, 1980s, and early 1990s (Tables 2.3, 2.4, and 2.5). These nontraditional beam trawl fishing areas include District 3, District 5, South Zarembo and Sumner Strait (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 areas are managed with a single fishing season and generic GHLs not to exceed 150,000 lb. During the past three seasons the only nontraditional areas fished were districts 3 and 11 (Table 2.6).

DIRECTED SIDESTRIPE SHRIMP FISHERIES

Over the past few 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 during the 2002/03 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 lb northern shrimp	Harvest in lb sidestripe shrimp	Number of permits	Landings	Lb per permit	Lb per landing
1955	1,777,122	-	15	-	118,475	-
1956	3,301,598	-	15	-	220,107	-
1957	2,350,499	-	10	-	235,050	-
1958	7,605,871	-	14	-	543,277	-
1959	5,518,843	-	22	-	250,857	-
1960	3,343,373	-	21	1,007	159,208	3,320
1961	4,212,300	-	20	1,394	210,615	3,022
1962	3,884,050	-	22	1,400	176,548	2,774
1963	3,110,340	-	20	1,080	155,517	2,880
1964	2,793,101	-	13	1,092	214,854	2,558
1965	2,941,429	-	13	1,338	226,264	2,198
1966	3,784,597	-	14	1,663	270,328	2,276
1967	2,203,753	-	13	1,105	169,519	1,994
1968/69	2,003,753	-	12	925	166,979	2,166
1969/70	1,840,727	-	11	952	167,339	1,934
1970/71	742,404	-	11	477	67,491	1,556
1971/72	1,050,978	-	9	592	116,775	1,775
1972/73	787,839	11,113	9	421	88,772	1,898
1973/74	514,740	4,032	8	460	64,847	1,128
1974/75	473,023	3,157	20	434	23,809	1,097
1975/76	1,010,814	16,512	12	450	85,611	2,283
1976/77	734,385	61,806	14	476	56,871	1,673
1977/78	927,414	18,887	10	404	94,630	2,342
1978/79	989,757	42,792	9	519	114,728	1,989
1979/80	821,983	141,193	17	982	56,657	981
1980/81	879,748	107,959	21	920	47,034	1,074
1981/82	884,656	35,297	15	524	61,330	1,756
1982/83	1,370,060	36,026	15	455	93,739	3,090
1983/84	1,699,964	55,444	18	667	97,523	2,632
1984/85	1,199,897	97,742	23	811	56,419	1,600
1985/86	366,741	68,326	16	252	27,192	1,726
1986/87	2,176,173	23,395	16	435	137,473	5,056
1987/88	1,719,001	39,927	25	388	70,357	4,533
1988/89	1,611,298	64,577	18	527	93,104	3,180

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Table 2.1–Page 2 of 2.

Year/ Season	Harvest in lb northern shrimp	Harvest in lb sidestripe shrimp	Number of permits	Landings	Lb per permit	Lb per landing
1989/90	1,717,758	97,374	21	645	86,435	2,814
1990/91	2,401,717	89,595	23	793	108,318	3,142
1991/92	2,818,316	119,948	28	1,036	104,938	2,836
1992/93	2,227,141	160,996	41	922	58,247	2,590
1993/94	2,006,747	140,611	25	705	85,894	3,046
1994/95	3,178,603	76,116	25	814	130,189	3,998
1995/96	3,010,132	40,733	48	793	63,560	3,847
1996/97	2,444,308	66,995	51	884	49,241	2,841
1997/98	2,959,266	139,044	42	983	73,769	3,152
1998/99	2,090,512	141,977	24	834	93,020	2,677
1999/00	1,756,258	114,977	23	566	81,358	3,306
2000/01	1,229,420	158,328	16	543	86,734	2,556
2001/02	758,734	129,284	19	358	46,738	2,480
2002/03	887,477	192,365	13	423	83,065	2,553
2003/04	568,096	164,371	10	216	73,247	3,391
2004/05	866,565	113,625	8	232	122,524	4,225
2005/06	559,194	63,068	8	173	77,783	3,597
2006/07	98,702	33,237	7	50	18,848	2,639
2007/08	12,015	31,275	5	24	8,658	1,804
2008/09	26,457	58,770	6	64	14,205	1,332
2009/10	16,360	42,421	4	72	14,695	816
2010/11	69,390	57,351	5	114	25,348	1,112
2011/12	308,010	75,200	8	204	47,901	1,878
2012/13	176,384	55,640	7	110	33,146	2,109
2013/14	73,240	60,784	5	111	26,805	1,207
2014/15	261,847	58,941	5	170	64,158	1,887
2015/16	651,522	126,619	7	376	111,163	2,070
2016/17**	821,494	144,182	9	472	107,297	2,046
Avg.60–69	3,011,742	-	16	1,196	191,717	2,512
Avg.70–79	805,334	37,437	12	522	77,019	1,672
Avg.80–89	1,362,530	62,607	19	562	77,061	2,746
Avg.90–99	2,489,300	109,099	33	833	84,853	3,144
Avg.00–09	502,302	98,674	10	216	54,650	2,539

** The 2016/17 data should be considered preliminary.

No data.

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	*	13.2	742.4
1971/72	139.0	106.3	144.5	106.5	69.7	78.3	101.6	71.1	66.0	121.1	38.7	*	1,051.0
1972/73	168.5	126.4	77.2	*	*	44.7	64.0	46.3	81.6	42.2	6.1	8.5	797.4
1973/74	96.3	124.1	*	*	*	*	59.1	64.8	60.3	29.2	*	8.4	674.4
1974/75	160.9	199.2	202.4	168.0	120.1	61.4	73.9	90.8	104.2	21.6	*	*	1,205.6
1975/76	180.7	130.3	67.2	*	112.3	154.5	73.0	77.8	38.9	46.1	*	6.7	983.6
1976/77	78.8	171.7	120.0	118.8	61.8	37.4	55.2	33.3	65.0	25.7	*	*	768.9
1977/78	73.7	235.3	147.9	166.6	126.2	48.3	29.5	18.7	81.2	21.7	0	0	949.0
1978/79	107.0	130.9	140.6	240.2	112.0	93.1	67.8	36.0	72.3	22.5	8.3	*	1,033.3
1979/80	98.2	154.9	146.6	177.4	104.2	55.1	58.4	39.6	66.3	48.1	*	*	956.9
1980/81	153.8	168.6	164.9	153.7	54.2	30.2	35.5	12.2	33.6	31.6	5.5	0.0	843.7
1981/82	165.1	183.4	124.0	168.8	81.1	52.7	36.5	48.3	33.0	22.3	0.9	3.1	919.3
1982/83	181.1	171.7	168.8	159.4	134.0	50.1	60.7	82.0	152.6	119.8	64.4	52.5	1,397.0
1983/84	436.3	249.0	287.0	218.2	127.5	132.0	83.3	86.9	101.7	16.2	9.0	9.6	1,756.5
1984/85	156.3	252.5	272.5	232.8	132.9	59.5	61.8	49.7	51.9	22.5	*	*	1,294.5
1985/86	125.6	105.3	46.1	23.2	39.1	13.8	31.3	29.8	*	8.4	*	*	429.2
1986/87	294.4	508.2	576.0	446.8	372.0	*	*	*	*	*	*	*	2,203.9
1987/88	634.0	721.0	291.2	90.8	*	*	*	*	*	6.0	*	*	1,761.6
1988/89	647.2	369.0	258.4	137.9	*	2.5	82.8	127.3	37.8	*	*	*	1,675.6
1989/90	473.6	236.2	259.0	173.4	224.3	115.8	*	38.4	167.8	53.4	*	*	1,813.0
1990/91	546.7	336.5	386.5	357.8	293.3	147.4	161.2	148.7	16.8	9.4	17.1	73.4	2,495.0
1991/92	611.6	325.5	887.2	79.1	336.4	219.0	167.2	165.6	114.8	17.1	6.4	15.6	2,934.3

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Table 2.2–Page 2 of 2.

Season	Month												Total
	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	
1992/93	469.3	253.7	404.4	295.7	194.5	186.4	136.8	112.4	131.8	65.5	58.3	67.0	2,375.7
1993/94	548.0	215.4	372.0	239.2	121.3	86.9	104.5	100.3	147.4	85.7	112.1	*	2,135.5
1994/95	560.0	266.2	574.6	468.2	196.3	96.9	149.3	188.5	387.0	41.9	231.6	63.5	3,223.8
1995/96	686.6	338.2	522.3	344.7	515.0	66.7	137.8	55.8	62.7	157.9	104.1	61.3	3,053.3
1996/97	782.8	262.2	609.0	162.8	510.3	100.3	73.3	7.6	*	1.4	*	*	2,537.0
1997/98	727.8	237.8	637.6	183.9	677.6	142.2	129.0	261.0	*	41.6	*	0.0	3,051.2
1998/99	524.8	260.8	501.3	317.7	348.7	138.8	102.6	3.4	22.3	15.5	*	*	2,264.6
1999/00	581.9	231.4	385.4	313.2	224.9	64.4	29.3	6.9	3.5	47.1	1.6	4.2	1,893.8
2000/01	486.3	172.6	219.6	185.8	92.0	78.5	118.7	*	25.4	25.9	*	*	1,413.3
2001/02	363.0	149.3	11.3	41.0	97.9	*	93.1	17.9	42.6	9.0	*	0.0	903.9
2002/03	314.4	138.7	*	90.7	147.5	*	129.3	18.4	38.9	110.9	*	0.0	1,096.2
2003/04	336.0	53.1	19.9	15.8	*	136.1	104.1	19.1	24.5	27.4	0.0	0.0	740.4
2004/05	480.0	195.5	*	*	*	76.8	126.0	5.7	12.1	10.8	Closed	Closed	986.5
2005/06	461.8	114.8	11.3	*	5.8	0.0	0.0	4.1	7.5	13.7	Closed	Closed	621.1
2006/07	84.4	23.0	0.0	0.0	*	0.0	0.0	1.6	3.0	21.2	Closed	Closed	133.9
2007/08	*	*	*	0.0	*	*	*	*	*	*	Closed	Closed	43.3
2008/09	*	*	*	*	*	*	5.0	3.9	5.7	25.3	Closed	Closed	88.6
2009/10	11.9	*	*	*	1.8	*	*	*	*	20.3	Closed	Closed	60.5
2010/11	20.3	*	11.2	*	0.0	*	*	*	31.8	47.8	Closed	Closed	132.4
2011/12	249.9	66.8	*	*	*	*	*	*	5.1	28.0	Closed	Closed	388.2
2012/13	177.5	*	*	*	*	*	*	*	*	15.8	Closed	Closed	234.5
2013/14	10.8	*	*	0.0	*	*	*	*	6.8	77.0	Closed	Closed	136.0
2014/15	*	*	0	*	*	*	*	52.5	75.5	132.3	Closed	Closed	331.7
2015/16	194.3	89.6	*	55.3	92.6	*	40.9	105.9	145.7	21.9	Closed	Closed	796.9
2016/17	188.0	101.1	*	133.7	87.3	*	28.3	59.5	147.8	123.8	Closed	Closed	981.5

* 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 1980/81 seasons.

	Season											
District	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	1979/80	1980/81
1	0	*	*	0	*	*	*	1.6	0	*	*	*
2	0	0	0	0	0	1.3	0.1	0	0	0	1.5	0.0
3	0	*	*	*	0	0	*	*	0	0	*	*
4	0	0	0	0	0	0	0	0	0	0	0.0	0.0
5	*	0	0	0	0	0	*	0	0	0	*	0.0
6: Duncan	865.5	344.4	442.4	450.3	260	973.2	554.2	610.2	669.7	625	427.4	415.0
6: Sumner	0	0	0	*	0	0	257.6	10.7	*	*	0.0	*
7: Eastern	0	0	0	0	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	109.8	77.9
8: Stikine	609.7	158.5	285.7	219.6	323.4	212.4	84.5	85.5	176.0	261.9	405.7	342.5
9	*	0	0	0	0	0	0	0	0	0	0.0	*
10: Thomas	350.1	198.6	252.3	89.9	*	*	*	27.9	*	3.4	2.8	0.0
10: Up. Fred	0	*	0	0	0	0	0	0	0	0	*	0.0
11	*	0	0	0	0	*	*	*	*	*	0.0	*
12	0	0	0	0	0	0	0	0	0	0	0.0	0.0
13	0	0	0	0	0	0	0	0	0	0	*	0.0
14	0	0	0	0	0	0	0	0	0	0	0.0	0.0
15	0	0	0	0	0	*	0	0	0	0	*	*
16	0	0	0	0	0	0	0	0	0	0	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	957.2	843.8
Landings	952	477	592	421	460	434	450	476	404	519	982	920
Permits	11	11	9	9	8	20	12	14	10	9	17	21

Note: * Denotes confidential data because fewer than three permits fished.

Table 2.4–Registration Area A shrimp beam trawl fishery harvest in thousands of pounds by season and district, 1981/82 through 1992/93 seasons.

	Season											
District	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93
1	*	*	*	*	*	*	0.0	*	*	*	0.0	0.0
2	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*
3	*	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	80.1	20.4	125.3
4	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*
6: Duncan	693.8	1199.6	1,015.4	523.9	235.7	1,645.3	1,225.7	1,043.0	1,006.9	1,565.5	1,680.5	1,184.8
6: Sumner	*	0.0	0.0	17.7	*	*	*	*	0.0	*	0.0	13.8
7: Eastern	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	17.5	55.5	74.1	42.4
7: Blake	31.5	11.8	138.6	101.3	30.6	100.6	75.8	15.9	70.8	40.5	101.5	60.1
8: Stikine	88.6	51.0	545.0	610.8	160.9	432.4	436.3	590.0	676.7	652.0	697.9	683.6
9	0.0	*	*	0.0	0.0	0.0	0.0	0.0	0.0	*	*	19.6
10: Thomas	0.0	*	26.3	33.8	*	*	*	*	*	*	321.3	148.7
10: Up. Fred	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0
11	*	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	*	9.6	98.0
12	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0
14	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0
15	*	*	2.0	*	*	0.0	0.0	0.0	*	*	0.0	*
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	919.6	1,397.5	1,756.8	1,298.3	435.2	2,205.6	1,764.1	1,678.5	1,813.0	2,495.0	2934.3	2,375.7
Landings	524	455	667	812	252	435	388	528	645	793	1,036	922
Permits	15	15	18	23	16	16	25	18	21	23	28	41

* 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, 1993/94 through 2004/05 seasons.

	Season											
District	1993/94	1994/95	1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05
1	*	*	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	*	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
3	18.8	31.6	19.2	69.9	24.2	47.3	*	*	*	*	0.0	0.0
4	0.0	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
5	0.0	*	182.0	74.1	11.7	0.0	*	0.0	0.0	0.0	0.0	0.0
6: Duncan	829.0	1,406.7	1,355.6	1,285.2	1,250.6	989.1	838.9	585.8	222.5	99.9	62.5	484.1
6: Sumner	*	*	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7: Eastern	*	232.2	168.1	115.2	174.7	62.7	45.8	89.2	57.7	62.4	35.6	*
7: Blake	50.7	0.0	3.6	8.4	*	0.8	*	*	*	0.0	0.0	0.0
8: Stikine	834.4	848.5	905.7	611.9	1,347.8	818.8	704.7	562.3	583.1	790.8	571.2	467.7
9	*	0.0	*	*	*	*	*	*	5.9	*	0.0	0.0
10: Thomas	220.2	241.7	239.7	280.8	240.1	*	247.1	64.1	23.2	*	*	*
10: Up. Fred	0.0	*	*	28.4	16.9	*	*	*	*	*	0.0	0.0
11	112.4	295.0	170.3	57.4	13.9	36.2	26.0	81.9	*	0.0	0.0	0.0
12	0.0	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
13	0.0	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
14	0.0	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
15	*	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
16	0.0	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
Total	2,139.0	3,223.8	3,053.3	2,537.0	3,051.2	2,269.1	1,893.8	1,413.3	903.9	1,096.2	740.4	986.5
Landings	705	814	793	884	983	834	566	543	358	423	216	232
Permits	25	25	48	51	42	24	23	16	19	13	10	8

* 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, 2005/06 through 2016/17 seasons.

	Season											
District	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
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	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0
4	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6: Duncan	302.7	*	0.0	0.0	0.0	0.0	*	*	0.0	*	303.1	562.0
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	*	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	*
7: Blake	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0
8: Stikine	300.0	120.6	37.8	85.7	55.7	130.6	192.8	77.9	135.9	165.4	481.9	395.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10: Thomas	*	*	*	0.0	0.0	*	0.0	0.0	0.0	*	*	*
10: Up. Fred	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	*	*	*	*	0.0	0.0	0.0	*	*
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	621.1	133.9	38.4	85.2	58.4	126.7	338.3	234.5	135.9	331.7	796.8	981.5
Landings	173	50	24	63	73	105	204	110	111	170	376	472
Permits	8	7	5	6	4	5	8	7	5	5	7	9

* Fewer than 3 permits were fished; information is confidential

Table 2.7—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 2015/16 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
Nontraditional	District 6	South Zarembo	106-10, 20, 21, 22, 25, 30
		Sumner Strait	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

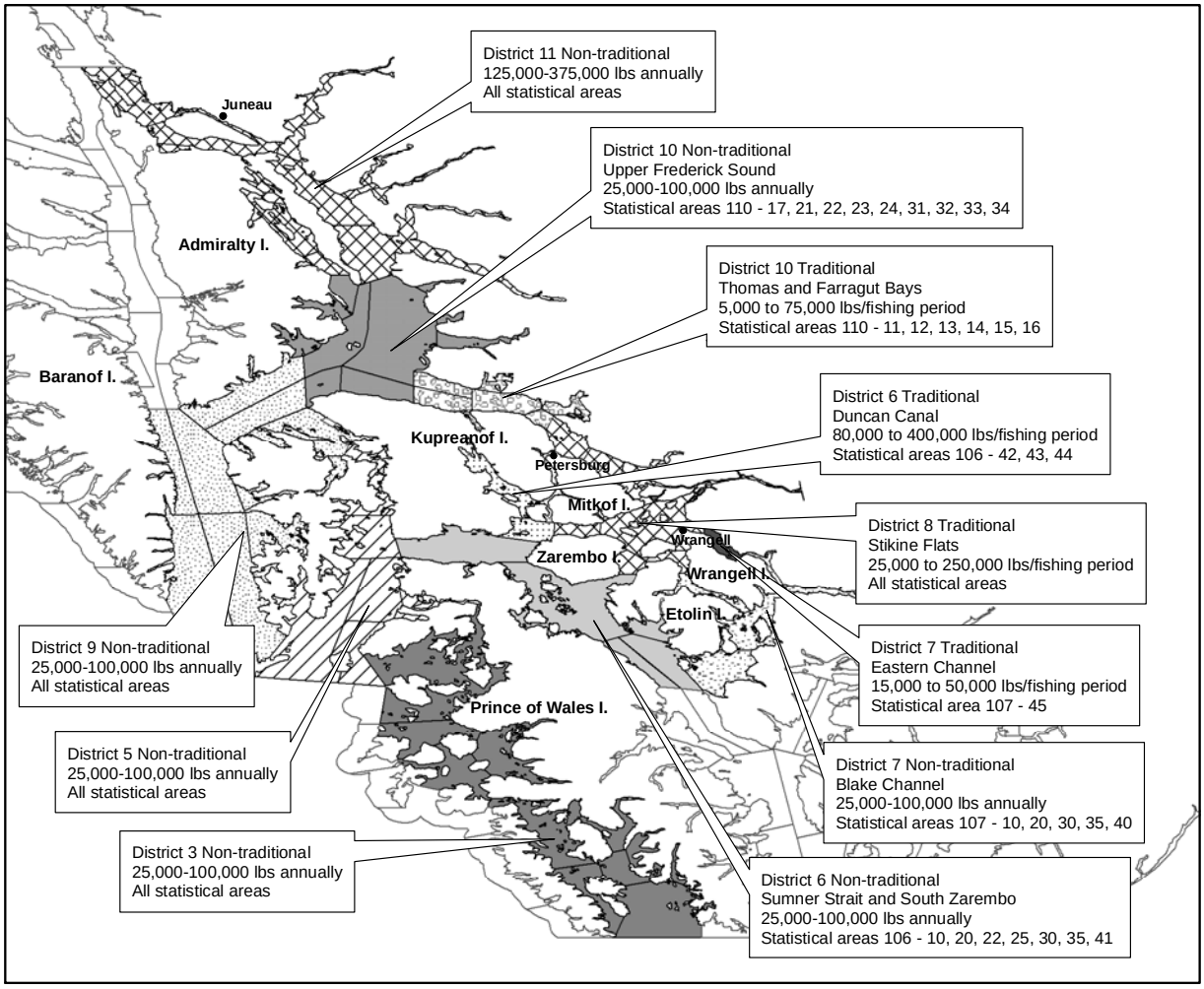

Figure 2.1–Beam trawl shrimp fishery areas and fishing period guideline harvest ranges for Southeast Alaska.

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, substantial 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 the 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.

Disagreement exists on both spot shrimp longevity and multiple spawning potential. Fishery managers in British Columbia manage based on the assumption that shrimp live to a maximum of 5 years and spawn once as females (Butler 1964). Studies done in Prince William Sound found a maximum age of 8–10 years or greater (Armstrong et al 1995, Kimker et al. 1996). Multiple size classes of female shrimp have been documented during department surveys (Love and Bishop 2005), which suggests either multiple spawnings of individual females or a protracted and highly variable age at transition. The L50 values from department surveys do not corroborate the notion of a protracted and highly variable age at transition. Preliminary data from laboratory studies done by the University of Alaska in collaboration with the department show that females are capable of multiple spawnings and do start producing new eggs soon after their clutch hatches.

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, spot shrimp (*Pandalus platyceros*) and coonstripe shrimp (*P. hypsinotus*, are harvested in the shrimp pot fishery of Southeast Alaska. Shrimp harvests in recent years from 2006/07 through the 2015/16 seasons have averaged 626,500 lb. Generally, there has been a progressive increase in harvest from the 1970s when harvests averaged only 21,500 lb, to 285,000 lb in the 1980s, 876,000 in the 1990s, 919,000 in the 2000s, and 510,500 during the 2015/16 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 ft 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 reopening of districts where the GHL is not taken during the regular season for a summer season of May 15–July 31. 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 occurred by the end of October (Table 3.3).

Product type has changed over recent seasons from 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

multiple age classes of shrimp, maintenance of adequate brood stock for rebuilding, 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, including 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. Preseason surveys, onboard sampling, 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. Details of the pot shrimp stock assessment survey program are described in Love and 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 peaked in the mid-1990s with harvest of almost 1.14 million lb caught during the 1994/95 season. The maximum number of permits fished was 352 during the 1995/96 season (Table 3.1). During the past several years harvest as well as effort has declined 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." Shrimp tails were primarily sold, and exvessel prices were dependent upon the size of the tails or count of tails per pound with larger shrimp commanding the highest price. Because the fishery was supported by relatively low volumes with moderate prices, the fishery remained slow paced. Harvests in the 1980s averaged 285,000 lb per year from 84 permits (Table 3.1).

From 1990/91 through the 1994/95 fishing seasons, the character of the fishery changed. Through these years the number of permits increased to 248 and harvests reached in excess of 1.1 million lb. 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 removing heads 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 1994/95 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 1995/96 season when the guideline harvests levels were reached. Historic effort in the fishery peaked in the 1995/96 season 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.

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

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 increased over the years, additional regulations have been implemented 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 32 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 GHLs 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–February 14). In 1970, pot fishing was allowed throughout the year; this liberal season existed through the 1981/82 fishing season. During the 1982/83 season, fishing was not allowed during May and June in districts 1–8. 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 the egg-hatch period probably varies by location throughout the region but likely occurs sometime between late February through the mid-May.

For the 1983/84 season the District 1 fishery was restricted by the board to a September 1–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 1986/87 season, major areas (districts 1, 2, 3, and 7) were open only from October 1–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–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 to 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 and modified to the current requirement of allowing a seven-eighths inch dowel to pass through the mesh on its own weight in 1989. These restrictions assist in the escapement of shrimp less than 30 mm in carapace length and reduce the potential for growth over-fishing. This minimum mesh 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.

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 more than once 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 economics of the fishery.

QUOTAS AND GUIDELINE HARVEST LEVELS

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

In 2000, the board adopted the Pot Shrimp Management Plan. This plan addressed GHLs 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 2000/01 season following a major effort by the department to verify, correct, and apply the new conversion to the historic fish ticket database.

The management plan further 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 GHRs for District 11 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, but in District 7 it amounted to a 20,000–30,000 lb increase.

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

GHRs were again addressed at the 2006 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 1976/77 season when a pot limit of 150 pots per vessel was established for districts 1–15. Until October of 1997, the 150 pot limit applied to all portions of Registration Area A. Regulations had also been developed concerning a maximum tunnel perimeter (15 in); 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.

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 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 the following: time limitations were established 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, 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.

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.

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 production 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

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. 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 department 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 track inseason harvest from shore-based processors, catcher-processors, and catcher-sellers.

Regulations adopted 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 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 seven days 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). In 2015 the board accepted a proposal to require all catcher processors to complete daily logbooks. This has provided the department with detailed size data on the catch

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 2017b). Of the 329 permits that were granted, 273 remain active and eligible to participate in the fishery, but only 109 permits fished during the 2016/17 season. . The average permit market price was $18,500 in 2016.

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), and Back and West Behm Canals (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 determine sex ratios, size at first spawning, and female fecundity for both spot and coonstripe shrimp (Love and 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 to collect 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 districts 1, 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. These logbooks were made mandatory prior to the 2015/16 season. Logbooks provide the department with definitions of operation specific size categories at the beginning of the season and inseason records of harvest information by shrimp size category on daily fish tickets. This information is used for analysis of interannual trends in CPUE by size and for Leslie depletion estimator modeling to determine harvest rates.

DOCKSIDE SAMPLING

Dockside sampling began in 1997 first in districts 1, 6, 7, 14, and 16 and gradually expanded 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, dockside deliveries had decreased 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 2011/12 season in an attempt to maximize the availability of this important data, however it quickly dropped off again, primarily due to the lack of unsorted product available for sampling.

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 GHL changes are based on stock status, standardized stock health score, and confidence levels (percentage of possible data sources available for the GHL area) (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 to 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

2014/15 SEASON SUMMARY

A season-opening news release announcement was issued on September 10, 2014, detailing fishing seasons, fishing periods, lawful gear, vessel registration, GHLs, anticipated management actions, catcher-processor reporting requirements, fish ticket requirements, logbooks, and other information. The fishery opened on October 1, 2014, targeting a regional GHL of 513,700 lb, a 1% reduction from the 2013/14 season GHL. GHLs were decreased in 3 areas including District 2 by 20%, District 8 by 30%, and District 11-Seymour by 20%. District 16 was opened according to the two-year rotational cycle (Table 3.4).

For inseason management of districts 6 and 7, the commercial fishery data includes daily harvest rates from catcher-processors, harvest rates of size XL or larger shrimp from catcher-processor log book data, and carapace length data derived from sampling on the grounds. The department analyzes the harvest information from the first 7 to 10 days of the fishery and compares it to prior seasons. Adjustments to the GHL are made according to the degree above or below the current year harvest data compared to past years. Inseason adjustments will not exceed 40% of the initial GHL and the department may close the fishery before the inseason revised GHL is reached if it becomes evident that fishery performance is below historical levels for healthy stocks. Using the inseason management criteria for District 6, the net decrease was 35%, decreasing the GHL from 32,000 to 20,800 lb of spot shrimp, and for District 7 the net increase was 10%, increasing the GHL from 63,700 to 70,000 lb of spot shrimp. The adjusted total GHL was 508,800 lb.

A total of 262 CFEC permits were issued for the 2014 calendar year. A total of 109 fishing vessels and 3 tenders registered for the 2014/15 season. Sixty-two permit holders, 57% of the fishing vessels, were registered as catcher-processors, and there were no floating processors. A total of 103 CFEC permit holders fished and made 1,091 landings (Table 3.1).

Total landings for the season were 543,441 lb, 107% of the total GHL (Table 3.1). The average pounds per landing was 498 and the average pounds per permit was 5,276. CFEC reports total gross earnings of $2,408,574 for the 2014 calendar year (which largely overlaps with the major harvest period in October, November, and December of the 2014/15 season (CFEC 2017b). Landings and value reported on annual operator reports equates to an average exvessel price of $4.60 per lb. The average annual earnings per permit holder is reported by CFEC as $24,329.

The 2014/15 season progressed rapidly with 522,300 lb, 103% of the season's GHL and 96% of total season landings, harvested in October (Tables 3.5, 3.3). Another 5,700 lb was harvested in November bringing cumulative annual pot gear shrimp harvests to 97% 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 two districts that were reopened. A historical 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 2014/15 season, including closure dates for each district, effort levels by district, effort levels by month, and overall effort for the season. By-month/district participation declined from 99 permit holders in October, to 6 in November, and 5 or less through February. Peak effort in the summer season was by 4 permit holders in May.

2015/16 SEASON SUMMARY

A season-opening news release announcement was issued on September 4, 2015, detailing fishing seasons, fishing periods, lawful gear, vessel registration, GHLs, anticipated management actions, catcher-processor reporting requirements, fish ticket requirements, logbooks, and other information. The fishery opened on October 1, 2015 targeting a regionwide GHL of 528,800 lb, an increase of 3% compared with the previous season. In comparison with the prior season, GHLs were increased in District 1 by 28%, in Section 3-A by 20%, and in District 7 by 17%, and were decreased in District 2 by 19%, in District 5 by 40%, and in District 9 by 21%. The remainder of District 12 was opened for the first time in three seasons, and District 16 was closed for the season as a continuation of the alternate-year harvesting strategy.

Using the same experimental inseason management criteria as in the 2014/15 season, there were no in season changes to the GHLs for Districts 6 and 7.

A total of 257 permits were issued by CFEC for the 2015 calendar year. A total of 122 fishing vessels and 5 tenders registered for the 2015/16 season. Fifty-seven permit holders, or 47% of the fishing vessels, were registered as catcher-processors, and there were no floating processors. A total of 95 CFEC permit holders fished and made 1,129 landings over the course of the season (Table 3.1).

The total pounds landed for the season was 510,499, 97% of the GHL. The average landing was 452 lb and the average pounds per permit was 5,374. CFEC reports total gross earnings of $1,703,059 for the 2015 calendar year, which equates to a reported average exvessel price of $3.38 per lb (CFEC 2017b). The average annual earnings per permit holder for 2015 is reported by CFEC as $17,557.

The 2015/16 season progressed rapidly with 485,800 lb and 95% of the season's GHL harvested in October. Another 9,100 lb was harvested in November and December bringing cumulative annual pot gear shrimp harvests to 97% of the final season landings by the close of December (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. A historical 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 2015/16 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 Section 13-C after five days, and districts 1, 2, 3, 6, 7, 8, 9, 10, 11-Seymour Canal, and the remainder of District 12 closed by the end of October (Table 3.6). The remainder of District 11 closed on November 4 and Districts 4, 5, and 15 closed by regulation at the end of the season on February 28. Districts 4, 5, and 15 reopened for a summer season beginning May 15. By-month/district participation declined from 93 permit-holders in October to 7 permits in November, and 3 or fewer permits for the remainder of the season (Table 3.6). Summer season peak effort was 6 permits.

2016/17 SEASON SUMMARY

A season-opening news release announcement was issued on September 1, 2016, detailing fishing seasons, fishing periods, lawful gear, vessel registration, GHLs, anticipated management actions, catcher-processor reporting requirements, fish ticket requirements, logbooks, and other information. The fishery opened on October 1, 2016, targeting a regionwide GHL of 524,200 lb, a 1% decrease compared with the prior year. The GHL was decreased by 30% in District 2 and 20% in District 10. The remainder of District 12 was closed and District 14 was reopened after a three-year closure. District 16 was reopened for the season as a continuation of the alternate-year harvesting strategy.

Using the inseason management criteria for District 6, the net increase was 40%, increasing the GHL from 32,000 to 44,800 lb of spot shrimp, and for District 7, the net increase was 10%, increasing the GHL from 74,300 to 81,730 lb of spot shrimp. The adjusted total GHL was 545,300 lb.

A total of 256 permits were issued by CFEC for the 2016 calendar year. A total of 110 fishing vessels and two tenders registered for the 2016/17 season. Forty-six fishermen, or 42% of the fleet, were registered as catcher-processors. A total of 108 CFEC permit holders fished and made 976 landings over the course of the season (Table 3.7).

The total pounds landed for the season was 581,674, 107% of the adjusted GHL. The average pounds per landing was 596 and the average pounds per permit was 5,386. CFEC reports preliminary total gross earnings of $2,095,815 for the 2016 calendar year, which equates to a reported average exvessel price of $3.60 per lb (CFEC 2017b). The average annual earnings per permit holder is reported by CFEC as $19,960 and represents a gradual increase over the previous three years.

The 2016/17 season progressed rapidly with 97% of the harvest taken in October and 98% of the harvest taken by the end of February (Table 3.3). Pounds harvested by month were 562,000 in October, 1,700 in November, and 4,700 in February. A historical summary of shrimp harvests by season and district is presented in Table 3.2. Harvests by district and month for the 2016/17 season, including closure dates for each district, seasonal effort levels by district, and 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 Section 13-C after five days. Districts 1, 2, 3, 6, 7, 8, 9, 10, 11-Seymour, 13-A/B, and 14 closed by the end of October (Table 3.7). The remaining areas, districts 4, 5, the remainder of 11, 15, and 16 closed on February 28 by regulation. Districts 4, 5, and 15 reopened on May 15. By-month/district fishery participation was 105 permit-holders in

October, five permits in November, eight in May, and four or fewer during the remainder of the season (Table 3.7). A total of 108 permit holders made landings for the season with 97% fishing during October.

2017/18 SEASON OUTLOOK

The 2017/18 Southeast pot shrimp fishery began October 1, 2017. A season-opening news release was issued on September 1, 2017 announcing fishing seasons, fishing periods, lawful gear, vessel registration, GHLs, catcher-processor reporting requirements, fish ticket requirements, voluntary logbook program plans, and other information. The fishery is targeting a GHL of 504,700 lb. In comparison with the prior season, GHLs were decreased by 4% overall. GHLs were increased by 34% in District 6 and decreased by 47% in District 11-B/C and by 19% in District 13-C. Districts 14 and 16 will be closed. 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.

Inseason management of districts 6 and 7 will continue in the 2017/18 season and those GHLs may be adjusted.

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 management concerns. 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 GHLs 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 lb in 2003/04 to 504,700 lb in 2017/18. In response, harvests over this period have declined from 1,132,721 lb in 2003/04 to 581,674 lb in 2016/17. 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 are declining from the peak levels seen in the 1990s and 2000s. The ability to react to changing resource levels is often challenged in this fishery by the presence of remote fishing locations, poor weather, and the fast pace of the 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 (1990/91 to 1994/95) 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. The department has maintained five fishery-independent detailed stock assessment surveys in districts 1, 2, 7, and 12-Tenakee, and Section 3-A. A survey in Section 13-C ceased in 2015 after 15 years due to budgetary constraints; it was resurveyed in 2017, but the future of the survey in Section 13-C is unknown . Additional surveys or stock assessment data sources may be needed in the future.

3. Regionwide there is little information available on the magnitude of non-commercial shrimp harvest. This represents a significant source of uncertainty in shrimp stock assessment.
4. There were 256 limited entry and interim permits issued in 2016, yet only 105 permits made landings in that year. Many of the 151 latent permits are transferable and effort in the fishery may be expected to increase when shrimp stocks or economic factors change.
5. 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 increase understanding of the resource and improve fishery management.

CHAPTER 3—TABLES AND FIGURES

Table 3.8–Registration Area A (Southeast Alaska) shrimp pot fishery harvest, number of landings, and CPUE, 1977/78 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 spot shrimp	Harvest coonstripe shrimp	Permits	Landings	Lb per landing	Lb per permit
1977/78	24,631	-	10	76	324	2,619
1978/79	21,318	-	9	35	609	2,463
1979/80	57,878	-	19	124	467	2,369
1980/81	79,206	1,492	31	191	423	3,046
1981/82	149,047	7,415	49	381	411	2,603
1982/83	259,145	6,676	58	374	711	3,193
1983/84	245,531	10,672	93	653	392	4,583
1984/85	292,492	6,180	117	781	382	2,755
1985/86	199,820	8,847	81	498	419	2,553
1986/87	345,404	7,901	83	608	581	2,576
1987/88	362,677	6,351	96	688	536	4,257
1988/89	431,973	8,470	121	812	542	3,844
1989/90	402,801	10,781	110	816	507	3,640
1990/91	548,221	14,101	138	1,100	511	3,760
1991/92	794,727	28,487	177	1,561	527	4,075
1992/93	659,601	17,970	150	1,266	535	4,651
1993/94	877,369	41,970	183	1,625	566	4,517
1994/95	1,076,467	67,315	248	2,718	421	5,024
1995/96	924,154	65,245	352	2,854	347	4,612
1996/97	944,695	94,261	203	1,996	521	2,811
1997/98	802,673	92,361	200	1,766	507	5,118
1998/99	761,485	95,659	185	1,839	466	4,475
1999/00	790,783	83,100	154	1,378	634	4,633
2000/01	1,002,467	67,538	160	1,311	816	5,675
2001/02	977,846	79,413	169	2,450	432	6,688
2002/03	1,004,004	60,989	151	2,695	395	6,256
2003/04	1,079,319	57,989	156	2,801	406	7,053
2004/05	966,339	36,788	149	2,499	401	7,290
2005/06	946,891	31,148	143	2,320	422	6,732
2006/07	920,791	21,865	136	2,029	465	6,839
2007/08	706,629	21,269	110	1,609	452	6,931
2008/09	564,357	19,567	95	1,451	402	6,617
2009/10	637,265	19,235	109	1,609	408	6,147
2010/11	530,721	26,093	109	1,176	473	6,023
2011/12	546,096	18,397	110	1,005	562	5,108
2012/13	586,626	28,651	106	1,152	534	5,132
2013/14	537,627	24,819	109	1,144	492	5,805
2014/15	521,740	23,382	103	1,091	500	5,160
2015/16	498,396	12,103	95	1,129	452	5,292
2016/17*	566,523	16,177	108	976	597	5,374
Avg. 70–79	21,545	-	7	38	567	3,078
Avg. 80–89	276,810	7,479	84	580	490	3,376
Avg. 90–99	818,018	60,047	199	1,810	503	4,559
Avg. 00–09	880.591	41,580	138	2,078	460	6,658

** The 2016/17 data should be considered preliminary.

– No data.

Table 3.9–Registration Area A (Southeast Alaska) shrimp pot fishery harvest in thousands of pounds by district, 1970/71 season to present. Note: Harvest is 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	*	-	-	-	-	-	*	-	*	-	-	-	-	-	-
1971/72	10.6	14.8	-	-	-	-	*	-	*	*	-	-	-	-	-	-
1972/73	-	*	-	-	-	-	*	-	-	-	-	-	-	-	-	-
1973/74	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1974/75	4.1	*	*	-	-	-	-	-	-	-	-	-	-	-	-	-
1975/76	7.2	11.5	*	-	-	-	-	-	-	-	-	-	-	-	-	-
1976/77	*	9.6	*	-	-	-	3.3	-	-	-	-	-	-	-	-	-
1977/78	5.6	14.1	-	-	*	-	*	-	-	-	-	-	*	-	-	-
1978/79	4.2	6.7	*	*	-	-	3.6	-	-	-	-	*	*	-	-	-
1979/80	19.0	12.8	*	-	-	-	18.3	*	-	-	-	-	*	*	-	-
1980/81	15.4	14.8	25.0	*	-	*	16.6	*	*	*	-	*	*	-	-	-
1981/82	26.3	17.5	57.1	-	-	9.4	15.6	2.0	4.9	*	*	*	14.6	*	-	4.7
1982/83	31.0	36.5	84.8	*	-	7.8	73.9	2.7	9.6	3.9	-	*	14.9	*	-	*
1983/84	41.1	22.5	36.6	*	*	7.7	87.2	16.5	*	14.2	*	3.3	21.1	-	-	*
1984/85	69.1	50.6	18.5	*	*	6.2	85.4	8.7	*	33.5	*	*	17.1	0.5	-	*
1985/86	36.7	37.5	71.1	*	*	6.0	23.1	2.8	1.7	13.4	*	0.4	11.1	*	*	*
1986/87	60.9	137.3	48.9	-	*	2.2	40.6	2.0	5.2	33.1	2.3	3.9	11.0	*	*	*
1988/89	200.8	62.8	19.8	*	*	8.0	61.5	0.9	6.6	36.4	0.6	10.7	26.8	*	-	*
1989/90	155.3	68.6	27.0	2.7	-	8.4	44.2	18.7	*	47.9	*	6.6	30.5	-	-	*
1990/91	181.3	78.9	61.8	11.4	-	10.2	97.6	13.6	5.2	42.8	1.5	16.8	39.8	-	*	0.8
1991/92	168.6	83.5	274.4	*	*	21.2	123.4	15.3	2.9	49.7	*	12.3	61.2	-	3.3	4.5
1992/93	160.1	70.0	221.9	4.7	*	24.4	64.5	20.1	9.6	30.5	*	26.8	40.4	-	1.2	*

-continued-

Table 3. 2.–Page 2 of 2.

	District															
Season	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1993/94	147.0	120.5	288.6	5.4	*	41.2	120.5	25.3	27.0	36.0	2.1	33.5	61.7	*	1.8	*
1994/95	159.9	76.9	232.0	1.0	21.6	130.2	199.6	30.4	12.1	88.5	3.1	58.9	110.8	2.4	8.9	5.9
1995/96	179.4	90.5	245.1	23.3	34.9	76.0	120.2	9.2	25.9	48.8	23.4	28.3	49.2	17.7	10.1	7.7
1996/97	171.9	82.5	280.9	20.8	24.2	79.0	128.2	29.8	19.5	53.0	20.5	28.6	48.8	4.3	22.2	*
1997/98	142.7	83.0	228.0	10.2	5.9	72.6	127.2	20.0	21.0	39.6	18.3	25.5	41.1	12.2	21.9	*
1998/99	163.2	76.5	225.7	6.1	5.5	68.3	101.9	20.5	18.1	31.8	8.9	30.1	66.8	6.6	22.8	17.6
1999/00	158.6	76.1	237.8	16.6	11.8	70.0	100.9	23.5	18.3	37.9	8.6	26.0	48.0	*	24.7	*
2000/01	161.3	122.0	305.6	20.3	14.3	79.4	116.2	23.5	20.8	46.2	19.8	25.6	47.8	16.5	24.2	*
2001/02	174.2	103.7	320.7	10.4	7.9	71.0	128.8	19.6	18.5	38.4	24.1	36.7	42.3	21.9	18.9	*
2002/03	157.4	89.6	320.8	22.2	19.6	68.3	114.0	24.3	15.9	54.7	19.5	41.8	55.6	19.9	19.6	23.3
2003/04	182.4	96.7	350.1	20.4	17.7	70.0	122.1	22.7	18.2	61.7	22.0	54.4	58.5	19.6	6.9	16.2
2004/05	169.5	88.5	302.9	19.3	21.6	66.5	91.0	19.8	17.9	51.6	21.9	41.4	52.9	21.3	6.3	*
2005/06	176.3	83.1	258.5	18.6	19.3	82.4	87.9	24.9	20.3	53.3	23.6	50.0	57.7	15.8	4.2	closed
2006/07	154.0	99.1	252.7	15.1	10.2	80.7	87.3	23.5	24.1	51.4	23.5	48.6	53.6	13.3	closed	closed
2007/08	97.7	91.0	226.8	*	0.0	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	0.0	8.0	33.9	58.1	8.7	18.1	55.7	20.2	26.3	45.0	7.7	closed	*
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	39.5	69.2	118.3	*	10.7	36.4	49.9	14.0	21.9	56.8	24.2	23.1	46.9	closed	9.3	*
2011/12	55.9	76.2	138.7	*	8.6	31.8	62.4	12.9	10.8	52.7	21.3	8.3	53.6	closed	14.8	closed
2012/13	71.7	74.8	140.8	*	*	37.7	82.9	12.9	16.5	40.3	30.3	closed	43.4	8.8	15.8	*
2013/14	56.8	62.3	150.0	12.6	3.0	35.1	97.0	12.4	15.3	35.6	21.6	closed	46.4	closed	14.6	closed
2014/15	68.6	50.9	144.5	18.1	3.7	22.0	77.5	8.8	18.5	35.7	18.5	closed	44.1	closed	14.8	14.7
2015/16	63.3	39.2	146.7	19.6	4.9	28.0	81.7	10.2	12.2	33.7	18.1	5.1	40.3	closed	7.7	closed
2016/17	74.9	30.6	174.2	18.3	1.3	41.1	87.8	11.6	12.8	41.9	18.1	closed	47.6	6.8	5.6	*
10-year Average 2007/08–2016/17	63.5	64.9	157.8	*	*	35.9	76.9	12.9	16.3	45.0	20.0	12.1	44.9	3.6	9.1	*
Avg. Percent	11%	11%	26%	*	*	6%	13%	2%	3%	7%	4%	2%	7%	1%	2%	*

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

** The 2016/17 data should be considered preliminary.

Table 3.10—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.

	Month												Total		
Season	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Harvest	Landings	Permits
1970/71	*	*	3.2	*	3.5	*	-	-	-	-	-	*	13	27	5
1971/72	*	*	*	*	*	4.5	11.3	3.8	1.8	-	*	-	27	49	6
1972/73	*	-	-	-	-	*	*	-	*	-	-	-	*	*	*
1973/74	-	-	*	-	*	*	*	-	*	-	-	-	*	*	*
1974/75	*	*	*	*	*	*	*	-	-	*	-	-	8	16	7
1975/76	-	*	*	*	*	*	*	*	*	*	*	-	19	29	5
1976/77	-	*	*	*	-	*	*	-	-	*	-	*	16	16	6
1977/78	*	*	-	*	*	*	*	*	*	*	*	*	25	76	10
1978/79	*	*	*	-	-	-	*	5.1	*	*	*	*	21	35	9
1979/80	-	*	-	*	1.5	3.0	2.7	16.5	8.3	7.9	*	9.1	58	123	19
1980/81	10.0	3.1	*	*	*	4.2	8.1	6.5	7.2	22.0	9.9	5.9	81	192	32
1981/82	11.4	3.8	5.5	2.7	6.3	14.6	11.7	3.4	6.3	34.4	36.2	20.3	158	381	49
1982/83	25.3	11.7	22.3	13.9	26.5	11.4	*	7.9	3.4	51.5	51.6	39.6	269	373	58
1983/84	44.2	32.4	15.0	13.3	21.3	22.9	24.3	32.5	31.7	8.7	5.9	4.1	257	653	93
1984/85	35.3	34.6	26.5	30.3	40.5	9.9	9.7	31.7	21.1	17.0	20.0	22.2	299	780	117
1985/86	20.3	30.3	25.2	34.7	33.1	31.1	11.1	2.3	4.3	7.3	6.3	2.6	209	498	81
1986/87	54.6	55.6	45.7	55.3	70.1	30.4	12.3	7.0	3.6	7.6	5.0	6.0	354	608	83
1988/89	86.6	97.3	68.9	56.1	62.3	23.4	12.3	2.5	5.8	8.1	9.9	7.1	441	836	121
1989/90	87.9	70.7	51.9	53.8	48.6	41.8	11.6	11.1	7.7	10.8	8.8	8.9	416	816	110
1990/91	129.4	76.0	65.1	81.3	105.6	28.5	20.9	3.9	12.6	16.6	12.1	10.4	563	1,100	138
1991/92	226.2	166.0	110.3	104.9	79.4	54.2	18.4	14.3	12.7	10.8	16.8	8.8	823	1,560	177
1992/93	140.5	105.7	91.5	101.8	124.7	34.9	15.4	22.8	8.5	11.3	10.6	8.3	677	1,291	150

-continued-

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.			
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	*	*	0	868	1,759	198
1998/99	618.9	128.6	47.8	19.9	25.6	*	0	16.3	4.1	2.1	3.8	2.9	861	1,833	185
1999/00	639.8	96.9	39.0	33.3	24.5	CLOSED	CLOSED	18.0	8.2	12.2	CLOSED	*	870	1,373	157
2000/01	816.3	153.3	39.4	18.1	13.6	CLOSED	CLOSED	11.7	6.2	4.1	CLOSED	*	1,057	1,302	161
2001/02	841.2	120.9	26.3	17.9	17.3	CLOSED	CLOSED	11.8	9.4	5.3	CLOSED	*	1,047	2,440	172
2002/03	814.4	163.2	34.4	8.6	24.6	CLOSED	CLOSED	6.4	7.5	*	CLOSED	6.9	1,066	2,709	155
2003/04	918.1	154.5	12.4	16.7	8.4	CLOSED	CLOSED	8.4	5.7	8.5	CLOSED	CLOSED	1,133	2,801	156
2004/05	840.9	112.3	17.4	8.7	11.0	CLOSED	CLOSED	4.3	*	3.8	CLOSED	CLOSED	1,001	2,499	149
2005/06	800.2	114.0	21.9	13.1	16.8	CLOSED	CLOSED	2.7	*	*	CLOSED	CLOSED	976	2,320	143
2006/07	830.9	78.8	4.1	5.3	8.4	CLOSED	CLOSED	*	*	*	CLOSED	CLOSED	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	*	4.1	*	CLOSED	CLOSED	585	1,440	99
2009/10	543.8	58.2	18.0	16.1	12.1	CLOSED	CLOSED	*	*	*	CLOSED	CLOSED	656	1,609	109
2010/11	466.1	43.7	19.3	15.2	8.5	CLOSED	CLOSED	*	*	*	CLOSED	CLOSED	557	1,175	108
2011/12	533.4	14.5	*	*	3.7	CLOSED	CLOSED	*	*	0	CLOSED	CLOSED	565	1,005	110
2012/13	564.7	25.1	6.1	5.7	6.8	CLOSED	CLOSED	3.7	3.1	0	CLOSED	CLOSED	615	1,152	106
2013/14	542.1	12.1	*	*	*	CLOSED	CLOSED	1.9	*	0	CLOSED	CLOSED	563	1,144	109
2014/15	522.3	5.7	*	*	5.8	CLOSED	CLOSED	3.7	*	*	CLOSED	CLOSED	546	1,093	104
2015/16	485.8	4.4	4.6	*	*	CLOSED	CLOSED	9.0	4.8	*	CLOSED	CLOSED	510	1,129	95
2016/17**	562.0	1.7	0	*	4.7	CLOSED	CLOSED	5.7	2.3	*	CLOSED	CLOSED	582	796	108
Avg. Pct. for 2004/05 to 2013/14	83%	9%	2%	2%	2%	-	-	1%	1%	<1%	-	-	-	-	-

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

**The 2016/17 data should be considered preliminary.

- No data.

Table 3.11–Guideline harvest levels for the Southeast Alaska commercial pot shrimp fishery by Area, in pounds whole shrimp from the 2003/04 through 2016/17 season, noting years when GHL changes were implemented. Note: The year when the GHL was changed is highlighted in bold type.

Area	GHL													
	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
1	164,000	164,000	164,000	**98,400**	98,400	**78,700**	**50,000**	50,000	50,000	50,000	50,000	50,000	**64,000**	64,000
2	86,000	86,000	86,000	86,000	86,000	86,000	**65,000**	65,000	65,000	65,000	65,000	**52,000**	**42,000**	**30,000**
3-A	264,000	**198,000**	198,000	198,000	198,000	**158,400**	158,400	**95,000**	95,000	95,000	95,000	95,000	**114,000**	114,000
3-B/C	50,000	50,000	50,000	50,000	**40,000**	40,000	40,000	**30,000**	30,000	30,000	30,000	30,000	30,000	30,000
4	20,000	20,000	20,000	20,000	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	20,000	20,000	**12,000**	12,000
6	68,000	68,000	**82,000**	82,000	82,000	**68,000**	68,000	68,000	**24,000**	**38,400**	**36,800**	**20,800**	**32,000**	**44,800**
7	104,000	**78,000**	78,000	78,000	78,000	78,000	78,000	**54,600**	54,600	80,900	**77,500**	**70,000**	**74,300**	**81,730**
8	20,000	20,000	20,000	20,000	20,000	20,000	20,000	**15,000**	15,000	15,000	15,000	10,500	10,500	10,500
9	18,000	18,000	18,000	18,000	18,000	18,000	18,000	18,000	**14,000**	14,000	14,000	14,000	**11,000**	11,000
10	36,000	**48,000**	48,000	48,000	48,000	48,000	48,000	48,000	48,000	48,000	36,000	36,000	36,000	**29,000**
11-Sey*	-	-	-	-	-	-	-	-	-	**Exp****	15,000	**12,000**	12,000	12,000
11-Rem	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	**7,500**	7,500	7,500	7,500	7,500
12-Ten	20,000	20,000	**28,000**	28,000	28,000	**17,000**	17,000	**10,000**	**Closed**	Closed	Closed	Closed	Closed	Closed
12-Rem	15,000	15,000	15,000	15,000	15,000	**10,000**	10,000	10,000	10,000	**Closed**	Closed	Closed	7,500	Closed
13-A/B	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000
13-C	30,000	**42,000**	42,000	42,000	**34,000**	**30,000**	30,000	30,000	30,000	**26,000**	26,000	26,000	26,000	26,000
14	20,000	20,000	20,000	**15,000**	15,000	**10,000**	**Closed**	Closed	Closed	10,000	Closed	Closed	Closed	**7,500**
15	20,000	20,000	**15,000**	**Closed**	Closed	Closed	**15,000**	15,000	15,000	15,000	15,000	15,000	15,000	15,000
16	20,000	**15,000**	**Closed**	Closed	Closed	**15,000**	**Closed**	15,000	Closed	15,000	Closed	15,000	Closed	15,000
TOTAL	1,010,000	937,000	939,000	853,400	835,400	752,100	692,400	598,600	535,600	564,800	537,800	508,800	528,800	545,030

* After the 2012 board meeting, Seymour Canal GHL was split from the remainder of District 11.

** The 2012/13 season in Seymour Canal was experimentally managed based on the Canadian Spawner Index system; this experiment was terminated when it became apparent it was going to overharvest the stock.

- No data.

Table 3.12–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 2014/15 season.

Area	Oct	Nov	Dec	Jan	Feb	May	Jun	Jul	Closure Date	Harvest Lb	Permits	Landings
1	68.6	-	-	-	-	-	-	-	Oct 19	68,567	23	134
2	50.9	-	-	-	-	-	-	-	Oct 26	50,851	13	110
3-A	111.1	-	-	-	-	-	-	-	Oct 14	111,098	18	135
3-B/C	36.4	-	-	-	-	-	-	-	Oct 18	36,364	14	67
4	6.6	3.6	-	*	*	-	-	-	Feb 28	18,129	8	53
5	2.6	0	0	*	*	*	*	*	July 31[a]	3,737	5	32
6	22.0	-	-	-	-	-	-	-	Oct 23	22,039	5	50
7	77.5	-	-	-	-	-	-	-	Oct 12	77,465	14	134
8	8.8	-	-	-	-	-	-	-	Oct 22	8,817	8	48
9	18.5	-	-	-	-	-	-	-	Oct 8	18,495	5	40
10	35.7	-	-	-	-	-	-	-	Oct 15	35,734	10	65
Seymour	*	-	-	-	-	-	-	-	Oct 11	*	2	21
R-11	6.4	-	-	-	-	-	-	-	Nov 4	6,438	3	24
Tenakee	closed	-	-	-	-	-	-	-	-	closed	-	-
R-12	closed	-	-	-	-	-	-	-	-	closed	-	-
13-A/B	17.6	*	-	-	-	-	-	-	Oct 30	17,572	10	49
13-C	26.5	-	-	-	-	-	-	-	Oct 5	26,532	11	22
14	closed	-	-	-	-	-	-	-	-	closed	-	
15	9.8	*	*	0	*	3.2	-	-	Jun 12[ab]	14,805	9	83
16	14.7	-	-	-	-	-	-	-	Oct 24	14,730	3	28
Harvest	522.3	5.7	*	*	5.8	*	*	*	Ann. harvest	543,441	-	-
Permits	99	6	1	2	5	4	1	1	Ann. permits	-	104	-
Landings	990	24	3	11	15	37	14	1	Ann. landings	-	-	1,093

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

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

[b] Eastern portion of district closed Nov 3.

\- No data.

Table 3.13–Registration Area A (Southeast Alaska) shrimp pot harvest in thousands of pounds, number of permits, and number of landings by district by month, 2015/16 season.

Area	Oct	Nov	Dec	Jan	Feb	May	Jun	Jul	Closure Date	Harvest Lb	Permits	Landings
1	63.3	-	-	-	-	-	-	-	Oct 19	63,279	19	154
2	39.2	-	-	-	-	-	-	-	Oct 26	39,203	10	93
3-A	116.2	-	-	-	-	-	-	-	Oct 14	116,235	18	145
3-B/C	30.5	-	-	-	-	-	-	-	Oct 18	30,492	8	47
4	*	*	0	*	*	6.9	4.6	*	July 31[a]	19,566	5	58
5	*	1.5	*	0	0	2.1	0.3	-	July 31[a]	4,886	8	23
6	28.0	-	-	-	-	-	-	-	Oct 23	27.979	8	65
7	81.7	-	-	-	-	-	-	-	Oct 12	81,653	16	153
8	10.2	-	-	-	-	-	-	-	Oct 22	10,166	7	44
9	12.2	-	-	-	-	-	-	-	Oct 8	12,213	4	28
10	33.7	-	-	-	-	-	-	-	Oct 15	33,705	7	67
Seymour	*	0	0	0	*	-	-	-	Oct 11	*	2	20
R-11	6.4	-	-	-	-	-	-	-	Nov 4	6,359	4	28
Tenakee	closed	-	-	-	-	-	-	-	-	closed	-	-
R-12	5.1	-	-	-	-	-	-	-	Oct 9	5,108	4	21
13-A/B	13.7	-	-	-	-	-	-	-	Oct 30	13,708	7	32
13-C	26.6	-	-	-	-	-	-	-	Oct 5	26,584	9	26
14	closed	-	-	-	-	-	-	-	-	closed	-	-
15	*	*	*	*	*	*	-	-	July 31[a,b]	7,660	4	42
16	closed	-	-	-	-	-	-	-	-	closed	-	-
Harvest	485.8	4.4	4.6	*	*	*	4.8	*	Ann. harvest	510,499	-	-
Permits	93	7	3	2	2	6	5	1	Ann. permits	-	95	-
Landings	938	190	6	7	8	30	17	7	Ann. landings	-	-	1,129

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

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

[b] Eastern portion of district closed Feb 28.

\- No data.

Table 3.14–Registration Area A (Southeast Alaska) shrimp pot harvest in thousands of pounds, number of permits, and number of landings by district by month, 2016/17 season.

Area	Oct	Nov	Dec	Jan	Feb	May	Jun	Jul	Closure date	Total lb harvested	Area permits	Landings
1	74.9	-	-	-	-	-	-	-	Oct 13	74,923	23	168
2	30.6	-	-	-	-	-	-	-	Oct 23	30,630	9	44
3-A	136.2	-	-	-	-	-	-	-	Oct 13	136,240	19	150
3-B/C	38.0	-	-	-	-	-	-	-	Oct 14	37,968	7	52
4	*	*	0	*	*	3.6	*	-	July 31[a]	18,297	6	41
5	0	*	0	0	0	*	*	*	July 31[a]	1,266	4	9
6	41.2	-	-	-	-	-	-	-	Oct 18	41,156	7	68
7	87.8	-	-	-	-	-	-	-	Oct 12	87,752	16	146
8	11.6	-	-	-	-	-	-	-	Oct 18	11,590	7	33
9	12.8	-	-	-	-	-	-	-	Oct 8	12,757	3	19
10	41.9	-	-	-	-	-	-	-	Oct 14	41,943	11	68
Seymour	*	-	-	-	-	-	-	-	Oct 9	*	2	16
R-11	5.6	0	0	0	*	-	-	-	Feb 28	*	4	35
Tenakee	closed	-	-	-	-	-	-	-	-	closed	-	-
R-12	closed	-	-	-	-	-	-	-	-	closed	-	-
13-A/B	19.7	-	-	-	-	-	-	-	Oct 16	19,692	7	21
13-C	27.9	-	-	-	-	-	-	-	Oct 5	27,946	12	32
14	6.8	-	-	-	-	-	-	-	Oct 11	6,806	5	22
15	2.6	*	0	0	*	1.9	-	-	July 31[a]	5,641	7	28
16	*	-	-	-	-	-	-	-	Feb 28	*	2	21
Harvest	562.0	1.7	0	*	4.7	*	2.3	*	Ann. harvest	581,677	-	-
Permits	105	5	0	1	3	8	4	1	Ann. permits	-	108	-
Landings	910	10	0	6	10	25	12	2	Ann. landings	-	-	976

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

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

\- No data.

Table 3.15–Historical number of days open by area for the Southeast Alaska commercial pot shrimp fishery, 2003/04 through 2016/17 seasons.

Area	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
1	49	80	75	47	229	151	38	38	26	21	14	14	19	13
2	21	13	14	38	107	122	34	33	20	15	19	17	26	13
3-A	47	20	15	18	229	151	32	30	19	16	13	10	14	13
3-B/C	14	14	6	47	132	151	68	22	23	29	19	16	18	14
4	213	150	213	229	229	229	218	125	229	229	151	151	151	229
5	229	222	151	229	229	229	151	229	229	229	229	229	229	229
6	24	21	77	39	151	78	84	92	10	11	21	18	23	18
7	113	37	30	22	59	78	84	34	12	17	17	14	12	12
8	18	37	37	30	151	151	73	92	22	21	28	28	22	18
9	24	30	19	16	14	12	24	49	10	11	11	10	8	8
10	12	11	8	8	9	16	9	8	7	9	10	14	16	14
11-Sey*	-	-	-	-	-	-	-	-	-	8	8	12	11	9
11-Rem	48	43	43	19	15	19	10	10	6	143	19	21	35	151
12-Ten	6	3	5	4	3	4	3	2	Closed	Closed	Closed	Closed	Closed	Closed
12-R	37	23	16	12	10	9	10	19	42	Closed	Closed	Closed	9	Closed
13-A/B	152	152	30	17	14	151	151	229	64	229	56	32	30	15
13-C	5	5	6	5	7	5	4	6	4	4	4	4	5	5
14	107	68	151	151	151	151	Closed	Closed	Closed	54	Closed	Closed	Closed	11
15-E	230	226	151	Closed	Closed	Closed	151	151	28	99	39	34	151	229
15-Rem	230	226	151	Closed	Closed	Closed	151	151	256	192	151	180	151	229
16	152	151	Closed	Closed	Closed	127	Closed	54	Closed	72	Closed	72	Closed	151

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.

* After the 2012 board meeting Seymour Canal GHL was split from the remainder of District 11.

Table 3.16–Stock status, confidence information, and standardized scores for the 2016/17 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	Above Average	0.32	0.21
District 2	Above Average	0.36	0.22
Section 3-A	Moderate	0.33	-0.15
Sections 3-B/C	Moderate	0.18	0.00
District 4	Below Average	0.24	-0.46
District 5	Moderate	0.13	0.00
District 6	Above Average	0.42	0.44
District 7	Moderate	0.65	0.16
District 8	Moderate	0.22	0.11
District 9	Poor	0.17	-0.60
District 10	Moderate	0.33	-0.13
Seymour	Below Average	0.18	-0.29
Remainder of District 11	Poor	0.06	-1.00
Tenakee	Above Average	0.32	0.59
Remainder of District 12	CLOSED	0.00	NA
Sections 13-A/B	Moderate	0.18	-0.18
Section 13-C	Poor	0.20	-0.62
District 14	Moderate	0.09	0.00
District 15 East	Moderate	0.15	-0.05
Remainder of District 15	Moderate	0.18	0.00
District 16	Moderate	0.18	0.15

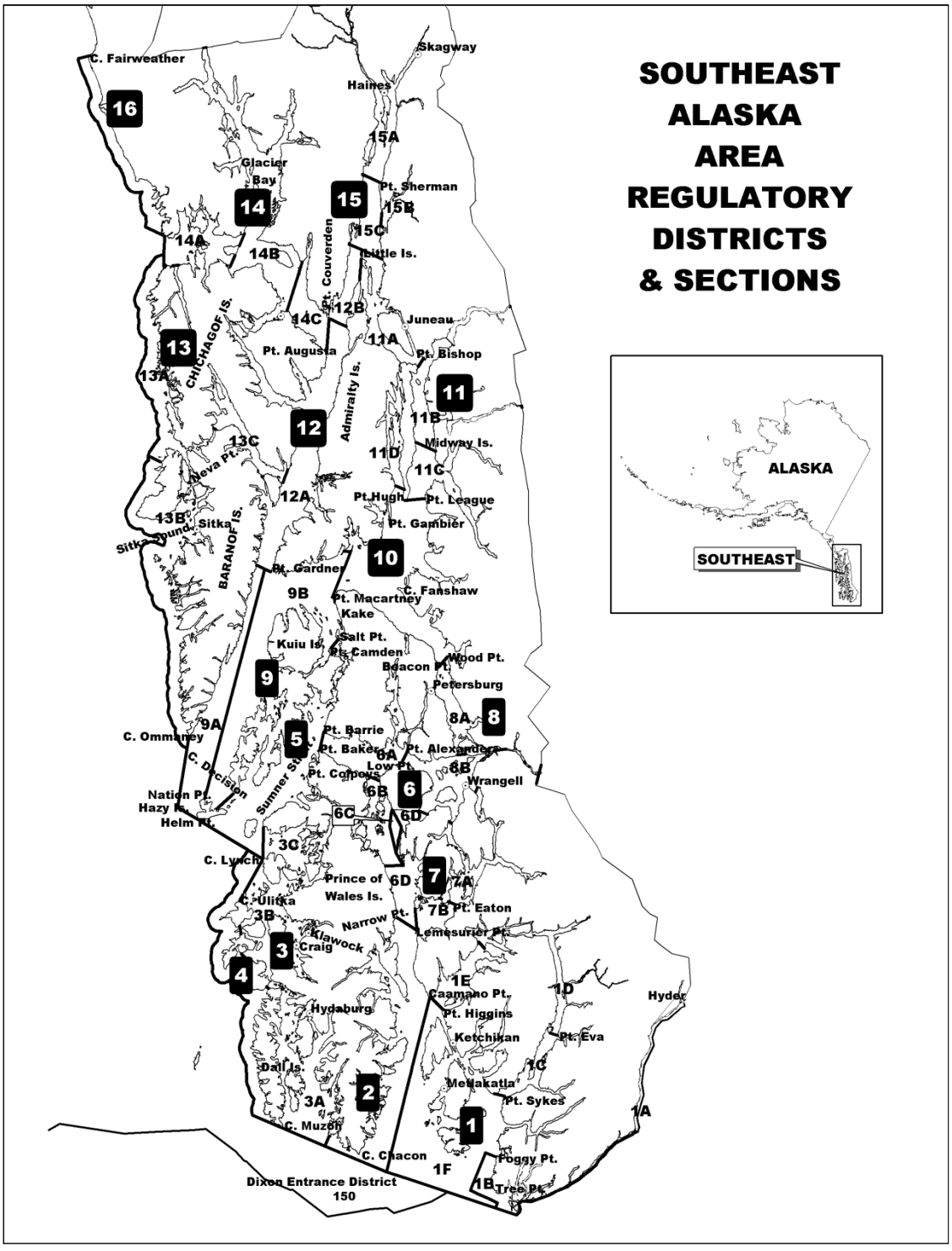

Figure 3.1–Shrimp pot fishery management units in Registration Area A, Southeast Alaska.

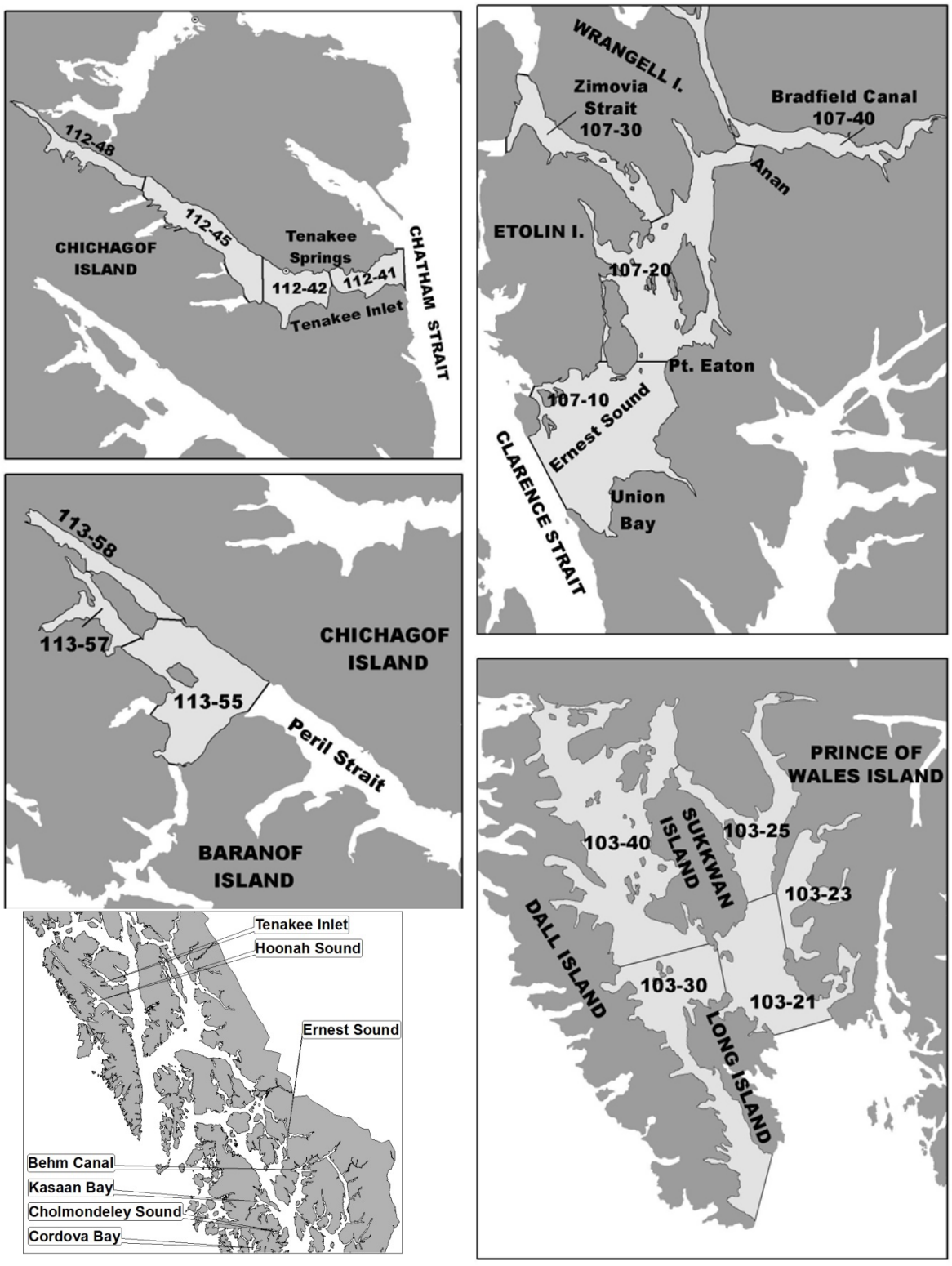

Figure 3.2–Areas currently surveyed for stock assessment of the shrimp pot fishery in Registration Area A, Southeast Alaska.

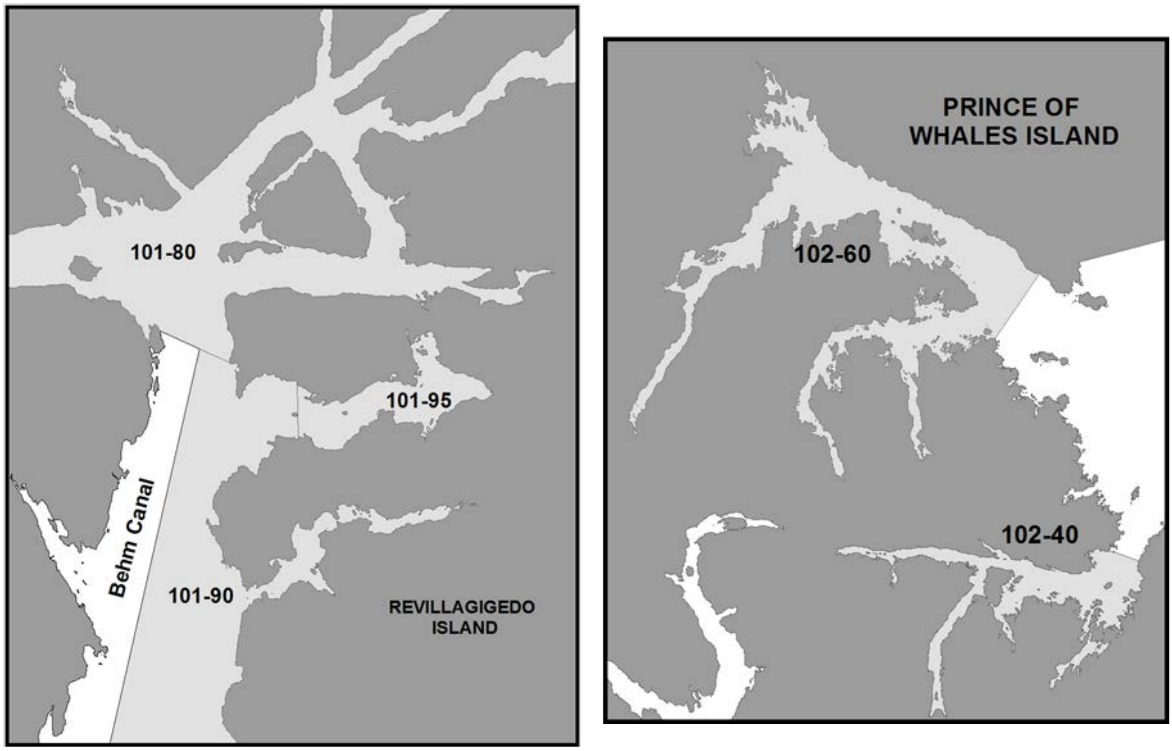

Figure 3.2–Page 2 of 2.

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 used to exist in Kodiak, Seward, Valdez, and Astoria, Oregon.

The largest 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 include 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 were often retained because of their relatively high economic value.

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 40 seasons, there have only been six seasons when harvests exceeded 100,000 lb and these all occurred between 1977 and 1987. Harvests are confidential for ten seasons when there were a limited number of boats and landings.

The highest harvest on record was in the 1980/81 season when a harvest exceeding 1,900,000 lb 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 northern shrimp, but undoubtedly some sidestripe shrimp were also harvested. These northern shrimp (northern shrimp and small sidestripe shrimp) were the predominate species harvested through the 1987/88 season. No harvest was reported from the 1988/89 and 1989/90 seasons.

There was a small resurgence in the fishery from the 1990/91 through the 1993/94 seasons (Table 4.3). 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.

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 lb 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 1980/81 season was closed by emergency order, regulations were developed in cooperation with the Yakutat Advisory Committee and brought before the board. The resulting regulations were a mixture of biological needs expressed by the department and desires by the community of Yakutat to continue to utilize the local resources through commercial, personal use, and subsistence fisheries. By the 1982/83 season, a 30,000 lb 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 GHL of 1.28 to 2.0 million lb for Yakutat Bay for the 1981/82 season. In 1982, the board amended the harvest level to 30,000 lb/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 lb 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 nonexistent in the Yakutat area. It is likely that future effort in the fishery will target the larger sidestripe shrimp. If the fishery is once again prosecuted, regulation changes may be needed to adequately control the expansion of the fishery and to prevent high-grading of some species of shrimp while discarding 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 2004/05 season (Table 4.2).

CHAPTER 4–TABLES

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

Year/ Season	Harvest in lb	Number of permits	Landings	Lb per permit	Lb per landing
1976/77	*	*	*	*	*
1977/78	0	0	0	0	0
1978/79	0	0	0	0	0
1979/80	*	*	*	*	*
1980/81[b]	1,906,680	16	23	119,168	82,899
1981/82	*	*	*	*	*
1982/83	141,714	3	7	47,238	20,245
1983/84	426,649	5	10	85,330	42,665
1984/85	*	*	*	*	*
1985/86	*	*	*	*	*
1986/87	*	*	*	*	*
1987/88	40,448	3	6	13,483	6,741
1988/89	0	0	0	0	0
1989/90	0	0	0	0	0
1990/91	*	*	*	*	*
1991/92	*	*	*	*	*
1992/93	34,875	3	3	11,625	11,625
1993/94	*	*	*	*	*
No Harvest in seasons 1994/95 through 2003/04					
2004/05	*	*	*	*	*
No Harvest in seasons 2005/06 through 2016/17					

* 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.

	Month												
Season	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	Total
1976/77	0.0	*	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*
1977/78	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1978/79	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1979/80	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	*	*
1980/81[a]	0.0	0.0	*	1,350.0	481.9	0.0	0.0	0.0	0.0	0.0	24.3	0.0	1,906.7
1981/82	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	*
1982/83	*	*	*	*	*	0.0	0.0	0.0	*	0.0	0.0	0.0	141.7
1983/84	0.0	0.0	0.0	0.0	*	*	0.0	0.0	0.0	0.0	*	128.0	426.6
1984/85	0.0	*	0.0	*	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*
1985/86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	*
1986/87	0.0	0.0	0.0	0.0	0.0	0.0	*	*	0.0	*	154.7	0.0	*
1987/88	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	*	0.0	*	0.0	40.5
1988/89	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1989/90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1990/91	0.0	*	0.0	*	*	0.0	0.0	0.0	0.0	0.0	0.0	*	*
1991/92	0.0	0.0	*	*	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	*
1992/93	0.0	0.0	*	*	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0	34.9
1993/94	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	*
No Harvest in seasons 1994/95 through 2003/04													
2004/05	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0
No Harvest in seasons 2005/06 through 2016/17													

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

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

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

	District						
Season	181	183	189	191	Total	Landings	Permits
1976/77	*	0	*	0	*	*	*
1977/78	0	0	0	0	0	0	0
1978/79	0	0	0	0	0	0	0
1979/80	0	*	*	0	*	*	*
1980/81	556.8	1349.9	0	0	1906.7	23	16
1981/82	0	*	0	0	*	*	*
1982/83	*	*	0	0	141.7	7	3
1983/84	310.4	*	0	0	426.6	10	5
1984/85	*	*	0	0	*	*	*
1985/86	*	0	0	0	*	*	*
1986/87	*	0	0	0	*	*	*
1987/88	40.5	0	0	0	40.5	6	3
1988/89	0	0	0	0	0	0	0
1989/90	0	0	0	0	0	0	0
1990/91	0	*	*	0	*	*	*
1991/92	0	*	0	0	*	*	*
1992/93	0	*	*	0	34.9	3	3
1993/94	0	*	0	0	*	*	*
No Harvest in seasons 1994/95 through 2003/04							
2004/05	*	0	0	0	*	*	*
No Harvest in seasons 2005/06 through 2016/17							

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

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

Begin Date	Vessel	Gear	Tows	Shrimp per nm (lb)	Percent Northern Shrimp	Percent Sidestripe Shrimp	Area Surveyed (nm^2)	Estimated biomass (lb x 10^6)	Confidence limits of biomass estimate (lb x 10^6)
March, 1953	*R/V John N. Cobb*	20′ Beam	26	297.42[a]	Unknown	Unknown	Unknown	Unknown	Unknown
September, 1980	*R/V Resolution*	32′ NMFS[b]	9	680.56	91	8	50.01	6.46	4.73 to 8.19
March, 1981	*R/V John N. Cobb*	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	14	141.53	47	53	50.01	1.43	1.05 to 1.64
September, 1982	*Resolution*	32′ NMFS	5	206.00	65	35	12.89	0.50	0.30 to 2.13
September, 1984	*R/V Pandulus*	32′ NMFS	22	181.06	61	38	50.01	1.72	1.31 to 2.13
September, 1984	*R/V Pandulus*	32′ NMFS	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 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 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-inch 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.

FISHERY DEVELOPMENT AND HISTORY

The first reported landings occurred in the Yakutat Area during the 1969/70 fishing season. For the next ten seasons, landings occurred during only two seasons. Participation and landings have been fairly consistent since the 1982/83 fishing season, with a peak landing of 29,830 lb occurring during that season. The peak effort level of 15 permits occurred during the 1995/96 season when 13,418 lb were landed. Average landings over the past ten seasons are 1,800 lb by two vessels per season (Table 5.1). Generally tailed product is sold 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 between $10 and $13 per lb during recent seasons.

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

REGULATION DEVELOPMENT

In response to increasing effort and higher harvest rates a GHL of 10,000 lb for the May through September period was established for Yakutat Bay in 1996. 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 lb.

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 spot shrimp. 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-in stretch measure was established in 1986 for all pots used in Yakutat Bay to reduce the potential for recruitment overfishing 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 1995/96 season, fleet members considered the number of allowable pots to be more than the fishery could withstand. Current regulations allow for a limit of 30 pots per vessel inside Yakutat Bay. Along with the pot reduction adopted in 1997, trawling is prohibited within all waters of Yakutat Bay.

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

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 inseason starting and ending dates, and implementation of a GHL for the commercial harvest.

During the 1996/97 season, a GHL of 10,000 lb 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.

In 1997, 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 lb for each month the fishery is open. This provides a potential season total of about 10,000 lb. 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 lb for a potential seasonal total of 10,000 lb.

RECENT SEASONS

Fewer than three permits fished the 2013/14 through 2016/17 seasons, and catch records are confidential. In 2012/13 four permits harvested 3,638 lb making 78 landings (Table 5.1). No dockside sampling or skipper interviews were conducted and no fish ticket size data are available for recent seasons.

CHAPTER 5—TABLE

Table 5.1–Registration Area D (Yakutat) shrimp pot fishery harvest, number of landings, and CPUE, 1974/75 to present.

Season	Harvest (lb)	Number of Permits Fished	Number of Landings	Lb per Landing	Lb per permit
1974/75	*	*	*	*	*
1975/76	0	0	0	0	0
1976/77	0	0	0	0	0
1977/78	0	0	0	0	0
1978/79	0	0	0	0	0
1979/80	*	*	*	*	*
1980/81	*	*	*	*	*
1981/82	*	*	*	*	*
1982/83	29,830	4	63	473	7,458
1983/84	13,938	8	33	422	1,742
1984/85	2,475	6	35	70	413
1985/86	6,910	5	33	209	1,382
1986/87	2,421	5	10	242	484
1987/88	2,945	8	45	65	368
1988/89	2,995	6	16	187	499
1989/90	7,148	5	72	99	1,430
1990/91	10,711	7	70	153	1,530
1991/92	7,316	12	78	93	610
1992/93	2,999	4	40	74	750
1993/94	5,916	6	55	107	986
1994/95	5,738	6	64	89	956
1995/96	13,418	15	103	123	848
1996/97	20,862	14	218	96	1,490
1997/98	9,546	10	135	71	955
1998/99	11,833	14	127	93	845
1999/00	4,107	8	76	54	513
2000/01	28,674	13	167	172	2,206
2001/02	16,746	13	152	110	1,288
2002/03	11,943	12	143	84	995
2003/04	4,514	8	57	79	564
2004/05	2,280	5	28	81	456
2005/06	7,397	6	74	100	1,233
2006/07	752	4	17	44	188
2007/08	*	*	*	*	*
2008/09	*	*	*	*	*
2009/10	3,026	3	30	101	1,008
2010/11	*	*	*	*	*
2011/12	*	*	*	*	*
2012/13	3,638	4	78	47	909
2013/14	*	*	*	*	*
2014/15	*	*	*	*	*
2015/16	*	*	*	*	*
2016/17	*	*	*	*	*
10 year average	1,800	2	46	39	857

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

REFERENCES CITED

Armstrong, D. A., P. A. Dinnel, J. M. Orensanz, J. L. Armstrong, T. L. McDonald, R. F. Cudimano, R. S. Nemeth, M. L. Landolt, J. R. Skalski, R. F. Lee, and R. J. Huggett. 1995. Status of selected bottomfish and crustacean species in Prince William Sound following the Exxon Valdez oil spill. Pages 485–547 [*In*] P. G. Wells, J. N. Butler, J. S. Hughes, editors. Exxon Valdez oil spill: fate and effects in Alaskan waters. Am Soc Testing Materials, Philadelphia.

Barr, L. 1970. Diel vertical migration of Pandalus borealis in Kachemak Bay, Alaska. Journal of the Fisheries Research Board of Canada 27: 669–676.

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

Bishop, G. H., C. Siddon, and J, Bednarski. 2009. Stock status of spot shrimp in Southeast Alaska prior to the 2008–09 season. Alaska Department of Fish and Game, Fishery Data Series No. 09-46, Douglas.

Boutillier, J. A. 1984. Prawn-minimum size limit. [*In*] G. S. Jameison, editor. 1982 shellfish management advice, Pacific Region. Canadian Manuscript Report of Fisheries and Aquatic Sciences 1774:11–24

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

Butler, T. H. 1970. Synopsis of biological data on the prawn, Pandalus platyceros Brandt, 1851. FAO Fisheries Reports 57(4):1289–1315.

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

CFEC (Commercial Fisheries Entry Commission). 2017a. Fishery Statistics, Permits & Permit Holders, 2011 Permit Status, All Fisheries (P17A). http://www.cfec.state.ak.us/pstatus/14052013.htm (Accessed August 15, 2017).

CFEC (Commercial Fisheries Entry Commission). 2017b. Fishery Statistics, Permits and Permit Holders, Permit Status, All Fisheries (P91A). http://www.cfec.state.ak.us/bit/X_P91A.htm (Accessed August 12, 2017).

Haynes, E. B. 1985. Morphological development, identification, and biology of larvae of Pandalidae, Hippolytidae, and Crangonidae (Crustacea, Decapoda) of the northern North Pacific Ocean. Fishery Bulletin 83(3): 253–288.

Kimker, A. T., W. E. Donaldson, and W. R. Bechtol. 1996. Spot shrimp growth in Unakwik Inlet, Prince William Sound, Alaska. Alaska Department of Fish and Game, Division of Commercial Fisheries, Fishery Research Bulletin 3(1):1–8

Koeller, P. A., M. Covey, and M. King. 2003. Is size at sex transition an indicator of growth or abundance in pandalid shrimp? Fisheries Research 65(1): 217–230.

Love, D. C., and G. H. Bishop. 2005. Pot Shrimp Stock Assessment Survey Results from 1996–2003 in Districts3, 7, 12, and 13 of Southeastern Alaska. Alaska Department of Fish and Game, Division of Commercial Fisheries, Fishery Data Series No. 05-32, Juneau.

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

Nunes, P. 1984. Reproductive and larval biology of northern shrimp, *Pandalus borealis Kroyer*, in relation to temperature. Doctoral dissertation, University of Alaska, Fairbanks.

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

Rice, R. L., K. I. McCumby, and H. M. Feder. 1980. Food of Pandalus borealis, Pandalus hypsinotus, and Pandalus goniurus (Pandalidae, Decapoda) from lower Cook Inlet, Alaska. Proceedings of the National Shellfisheries Association 70:47–54.

REFERENCES CITED (Continued)

Squires, H. J. 1992. Recognition of Pandalus eous Makarov, 1935, as a Pacific species not a variety of the Atlantic Pandalus borealis Kroyer, 1838 (Decapoda, Caridea). Crustaceana 63: 257–262.

Wieland, K. 2004. Length at sex transition in northern shrimp (Pandalus borealis) off West Greenland in relation to changes in temperature and stock size. Fisheries Research 29(1):49–56.