Report to the Board of Fisheries, 2002

SHELLFISH FISHERIES

Region I: Southeast Alaska-Yakutat

Alaska Department Fish and Game
Commercial Fisheries Division
Juneau, Alaska

Regional Information Report No. 1J02-14

February 2002

TABLE OF CONTENTS

Section 1
Introduction to Shellfish Fisheries

REPORT TO THE BOARD OF FISHERIES, 2002

INTRODUCTION TO SHELLFISH FISHERIES

By

Susan E. Merkouris
and
Gretchen H. Bishop

Regional Information Report[1] No. 1J02-14

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

February 2002

[1] The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data, this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

ACKNOWLEDGEMENTS

Although the current authors have updated this report and those in the following sections, much of the verbiage regarding fishery histories and management have been retained from previous Southeast Alaska reports to the Board of Fisheries. We would like to acknowledge the contributions of these authors, Tim Koeneman, Catherine Botelho, and Ken Imamura.

AUTHORS

Susan E. Merkouris was the Shellfish Project Leader for Region I of the Commercial Fisheries Division (July 2001 – January 2002).

Gretchen H. Bishop is the assistant shellfish biologist charged with management and stock assessment for Tanner and Dungeness crabs in Southeast Alaska, Registration Area A and Yakutat, Registration Area D.

Peter van Tamelen is the assistant shellfish biologist in charge of management and stock assessment for red king crab in Southeast, Registration Area A and Yakutat, Registration Area D, golden king crab in Southeast, and management of the scallop fishery in Yakutat.

Jan Rumble is a project biologist with the shellfish section.

John Clark is the Region I, shellfish and dive fisheries biometrician.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

This report reviews the major commercial fisheries for shellfish in Region I. Region I consists of Southeast Alaska (Registration Area A) and Yakutat (Registration Area D). Area A encompasses all waters within the Alexander Archipelago and offshore waters from Dixon Entrance to Cape Fairweather, divided into Districts 1 through 16 (Figure 1.1). Area D encompasses state waters from Cape Fairweather to Cape Suckling, divided into Districts 81 through 91. Shellfish fisheries in these areas are primarily in state waters; however, a few fisheries with state management authority, such as weathervane scallops, extend into the Exclusive Economic Zone (EEZ). Data for shrimp and scallop fisheries are summarized in this introduction for comparative purposes, but are not described in later chapters.

Regional shellfish harvests in the 2000/2001 season totaled over 7 million pounds valued at nearly $16 million during the last completed season or year (Table 1.1). The highest value fisheries as well as poundages currently come from the Southeast Alaska portion of Region 1. The top three fisheries in terms of exvessel value were (ranked in order) Southeast pot shrimp, Southeast Dungeness crab, and Southeast Tanner crab. The Southeast golden king crab and the Yakutat scallop fisheries were the fourth and fifth most valuable. In terms of poundage, the Southeast Dungeness crab fishery ranked first, followed by the Southeast shrimp beam trawl, Southeast Tanner crab, Southeast pot shrimp, and Southeast golden king crab fisheries.

Most of the shellfish fisheries are fully developed. Some stocks have been able to sustain consistent and significant harvests, including the Southeast fisheries for Dungeness crab, Tanner crab, and trawl shrimp. The Southeast red king crab fishery reopened in 1993 after eight years of closure and has provided commercial harvests in seven of the past nine seasons when the threshold has been reached.

Limited entry has played a significant role in harvest and effort trends. Recently limited fisheries include Southeast Dungeness crab, pot shrimp, and trawl shrimp.

Shellfish Research and Management

The ability of the department to provide for sustained yields varies among the fisheries. Those fisheries with stock assessment programs and management plans are most adequately managed. The Southeast red king crab fishery is the only fishery for which there is a long time series of stock abundance information and has a formal management plan with guideline harvest levels (GHLs) determined preseason each year. Other fisheries lack historic abundance-based management plans and are cause for concern. These include fisheries for Dungeness crab, Tanner crab, pot shrimp, and beam trawl shrimp. However, the department has initiated pilot stock assessment surveys and research for several Southeast shellfish fisheries in recent years, including Tanner crab, Dungeness crab, and pot shrimp. In addition, an interim management plan for Dungeness crab was recently adopted by the Board of Fisheries and implemented beginning with the 2000/2001 season.

Significant progress has been made in the development of our Tanner crab stock assessment program. We now have a 5-year time series of preseason stock assessment survey data and are beginning to model these data with the near future goal of generating abundance estimates and GHLs for major Tanner crab stocks in Southeast. These surveys allow the department to sample the female and sublegal components of the stock as well as the legal male crab. We have initiated new stock assessment and basic life history research projects for our Dungeness crab and pot shrimp fisheries. Both of these survey programs are in the pilot phase of examining stocks with pre- and postseason surveys of major fisheries. We are conducting basic life history investigations during these surveys as well. For example, we have begun a tagging study for Dungeness crab to obtain molt timing, molt increment, and molt probability information for Dungeness crab in Southeast.

The management plan for scallops in Area D has been developed by the statewide scallop program in Kodiak, and in 2002 the department will begin developing survey methods for estimating stock abundance in this fishery. As yet, abundance-based management plans have not been developed for pot shrimp in Southeast and Yakutat. These fisheries are managed based on historic harvest levels and regulatory guideline harvest ranges. The Tanner and Dungeness crab fisheries in the Yakutat area remain closed to allow rebuilding of these stocks. The department has not yet initiated stock assessment programs for these fisheries.

Dockside sampling and skipper interviews are conducted for the crab, trawl shrimp, and pot shrimp fisheries to gather a time series of data for size frequency, shell condition, average weight, sex (shrimp), fishing location, effort levels, and estimates of average harvest per unit of effort (CPUE). Many of the major pot shrimp fishing areas are sampled on the fishing grounds by department staff. Biological data is collected from the Yakutat scallop fishery by the onboard observer program. These data provide the biological information for all fisheries including those lacking stock assessment surveys. These data also allow an assessment of relative strength of various portions of the commercially exploited populations and a qualitative estimate of stock condition. Commercial harvest and effort data is also collected through the fish-ticket system.

Logbook information is collected from Southeast red king crab, golden king crab, and Tanner crab (pot) fishery, and from shrimp trawl fisheries in non-traditional areas. This information is particularly valuable for inseason and postseason management and evaluation of the crab fisheries, and provides accurate records of pot lifts and catch by location for each vessel.

In 2000, the department began working with three industry task forces: 1) Southeast Dungeness Crab Task Force, 2) Southeast King & Tanner Crab Task Force, and 3) Southeast Pot Shrimp Task Force. These efforts have opened up a new avenue for better communications and involvement by the fleet in our management and research programs for the major crab and shrimp fisheries in Southeast. For example, at the request of the King and Tanner Crab Task Force, the department initiated a pilot onboard sampling program for golden king crab during the 2000/2001 season. The department is beginning to index the stock components through sampling of commercial pots both with and without escape rings. The department plans to continue this cooperative project to enhance our knowledge of golden king crab stocks.

Staff

The management and research programs for red and golden king crab, Tanner crab, Dungeness crab, trawl shrimp, the research program for pot shrimp, and the management program for the scallop fishery are the responsibility of the Region 1 shellfish staff with occasional participation by area management staff. Management of pot shrimp fisheries is the responsibility of the area management staff. The shellfish program is supervised by the regional marine fisheries supervisor located in Douglas (this position is currently vacant). The regional stock biology staff conducts the dockside sampling and skipper interviews with assistance from the shellfish and area management staffs.

SHELLFISH STAFF

Name	Title	Job Class	Location
Susan E. Merkouris (through Jan 2002)	Region I Shellfish Project Leader	Fisheries Biologist III	Douglas
Gretchen Bishop	Asst. Regional Tanner and Dungeness Crab Biologist	Fisheries Biologist II	Douglas
David Love	Asst. Regional Shrimp Biologist	Fisheries Biologist II	Petersburg
Peter G. van Tamelen	Asst. Regional King Crab and Scallop Biologist	Fisheries Biologist II	Douglas
Janet Rumble	Asst. Crab Project Biologist	Fishery Biologist I	Douglas
John Clark	Shellfish Biometrician	Biometrician II	Douglas
Teresa Stolpe	Shellfish Technician	Fish & Wildlife Technician III	Petersburg
Christie Hendrich	Shellfish Technician	Fish & Wildlife Technician III	Douglas
Andy Piston	Shellfish Technician	Fish & Wildlife Technician III	Ketchikan
Joe Stratman	Port Sampling Supervisor	Fishery Biologist II	Petersburg
Hilary Wood	Shellfish Port Sampler	Fish and Wildlife Tech. IV	Petersburg
Anne Reynolds	Shellfish Port Sampler	Fishery Biologist I	Douglas

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

Season or Year	Fishery	Harvest in Thousands of lb	Approximate Exvessel Value in Thousands of $$[a]
Southeast			
2000/01	Dungeness Crab	2,565.2	4,386.5
2000/01	Pot Shrimp	1,040.8	4,941.0
2000/01	Beam Trawl Shrimp	1,413.3	623.2
2000/01	Red and Blue King Crab	No Fishery	N/A
2000/01	Tanner Crab (*C. bairdi*)	1,283.9	2,730.0
2000/01	Golden King Crab	530.8	1,930.0
	SUBTOTAL	6,834.0	14,610.7
Yakutat			
2000/01	Dungeness Crab	No Fishery	N/A
2000/01	Pot Shrimp	24.0	106.6
2000/01	Red and Blue King Crab	0.4	3.0
2000/01	Tanner Crab	No Fishery	N/A
2000/01	Scallops[b]	226.6	1,246.3
	SUBTOTAL	251.0	1,355.9
GRAND TOTAL		7,085.0	15,966.6

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

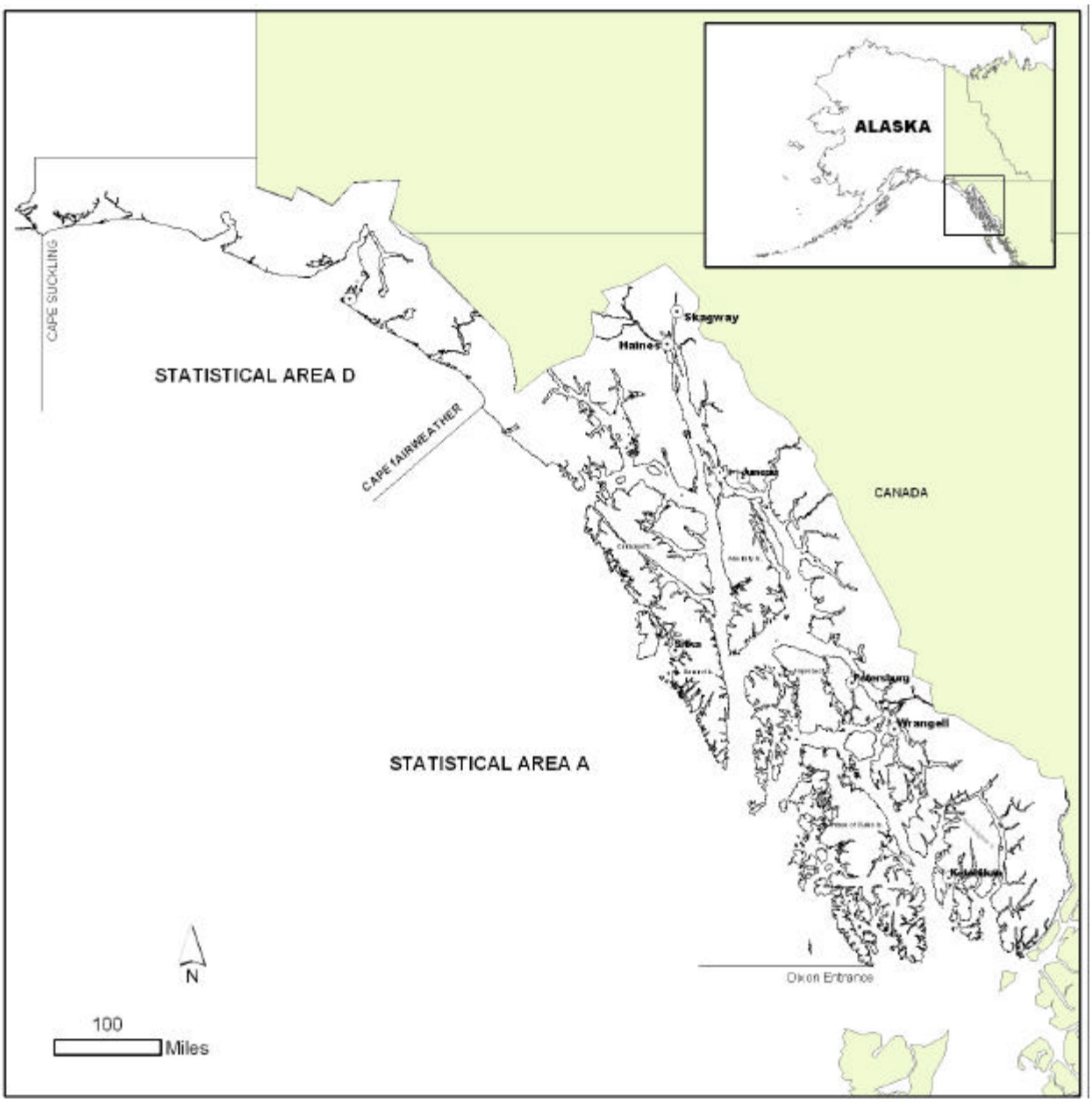

Figure 1.1. Registration Area A (Dixon Entrance to Cape Fairweather) and Registration Area D. (Cape Fairweather to Cape Suckling).

Section 2
Southeast Alaska Red and Blue King Crab Fisheries

REPORT TO THE BOARD OF FISHERIES, 2002

SOUTHEAST ALASKA

RED AND BLUE KING CRAB FISHERIES

By

Peter G. van Tamelen,
Susan E. Merkouris,
and
John E. Clark

Regional Information Report[1] No. 1J02-14

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

February 2002

[1] The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data, this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

This report presents an overview of the commercial red and blue king crab fishery in Southeast Alaska (Registration Area A) with emphasis on the last 3 fishing seasons, 1999/2000, 2000/2001, and 2001/2002. Information is presented on historical catch and effort, regulation development, research results, and stock assessment.

Red king crab, *Paralithodes camtschaticus*, are taken primarily in the protected bays, inlets, and adjacent shorelines of straits and sounds in Southeast Alaska north of Petersburg. Few red king crab are caught from the southern portion of Southeast Alaska. Red king crab generally inhabit depths of less than 150 fathoms. Important red king crab fishing grounds include Gambier Bay, Pybus Bay, Seymour Canal, the Juneau Area, Lynn Canal, Holkham Bay, Excursion Inlet, Port Frederick, and Peril Strait (Figure 2.1). Small quantities of blue king crab, *P. platypus*, are harvested incidentally during the red king crab fishery and the concurrent golden king crab, *Lithodes aequispinus*, and Tanner crab, *Chionoecetes bairdi*, fisheries.

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

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

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

FISHERY DEVELOPMENT AND HISTORY

Commercial Fishery History

Commercial king crab fishing in Southeast Alaska waters was initially documented in 1960 when a small harvest occurred in the Petersburg/Wrangell Management Area. From 1962 through 1968, catches ranged widely from about 100,000 pounds to more than 2 million pounds in 1968, with 7-9 permit holders participating until 1968 when effort increased to 19 permit holders (Table 2.1). In 1969, effort increased to 39 permit holders but the resulting catch declined to 1,899,930 pounds. These high catches were due to liberal gear and season regulations, a smaller minimum legal size (6.5 inches), catches that included a combination of red, golden, and blue king crab, and the lack of reasonable guideline harvest levels (GHLs) or quotas.

In 1970 the department began collecting information on the species composition of the commercial king crab catch in Southeast Alaska through the dockside sampling and skipper interview programs. From 1970/1971 through the 1975/1976 seasons, catches averaged 539,742 pounds of red king crab and effort averaged 24 permit holders (Table 2.1). The first emergency order closure occurred in January 1971 when the catch for the 1970/1971 fishing season totaled only 389,373 pounds after 4.5 months of fishing by 20 permit holders. The minimum legal size was subsequently increased to 7 inches in carapace width during the 1971 board meeting.

Accurate species composition information was required on fish tickets beginning in January 1976. From the 1976/1977 through the 1984/1985 fishing seasons, the number of permit holders increased from about 34 to more than 90 and catches averaged 407,384 pounds of red king crab. The average exvessel value of the red king crab catch during this period was approximately $1.0 million (adjusted to the 1990 consumer price index). The peak catch of 658,087 pounds was taken by 39 permit holders during the 1979/1980 season. Fishing effort peaked during the 1983/1984 season when 97 permit holders caught only 280,681 pounds of red king crab (Table 2.1). During the 1984/1985 season, 95 permit holders caught 270,495 pounds during a 7-day fishery in October. The commercial fishery was then closed for eight consecutive fishing seasons (1985/1986 through 1992/1993) when department survey results indicated low stock abundance. The fishery was reopened for the 1993/1994 season after department survey data indicated red king crab stocks had rebuilt to levels sufficient to support a commercial harvest above the minimum threshold of 300,000 pounds. The fishery continued during the next four seasons, with an average catch of about 300,000 pounds by about 79 permit holders. Exvessel value of recent seasonal catches averaged approximately $1.40 million.

Stock Assessment Surveys

The department has conducted a survey of red king crab abundance in Southeast Alaska since 1979. The survey provides an index of crab abundance in terms of crabs per pot per day. The survey is conducted in Districts 10 through 15 in areas where the majority of the red king crab catch occurs (Table 2.2). Crab

abundance is estimated with a population model, which uses a time series of survey catch rate and catch data (commercial and personal use). This model, in use since 1993, provides estimates of abundance of legal crab since 1979 for each major production area.

The trend in all districts has been a decline in abundance of legal males from peaks in the late 1970s and early 1980s to a low extending from 1985 to 1990. Abundance then increased in the early 1990s to levels that were considered adequate to support a sustainable fishery from 1993/1994 through 1997/1998. Declines in the abundance of legal crab in Pybus Bay, Gambier Bay, and Peril Strait resulted in an allowable harvest below the minimum threshold level for the 1998/1999 and 2000/2001 fishing seasons; hence the fishery was closed.

Experimental Fishing

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

During the winter 1988 meeting, the Board of Fisheries provided regulations allowing for experimental fishing in non-traditional areas by commercial king crab permit holders. These regulations required mandatory logbook completion. This experimental fishing effort was an attempt to find new and significant stocks to reach the minimum GHL and reopen the commercial fishery. During the 1988/1989 and 1989/1990 seasons, the department issued experimental permits to 19 permit holders who fished at various times from July through January. Of the 19 permits issued, 7 resulted in landings. The total number of pounds landed was 2,061. Thirty-six subdistricts were fished, with catches reported from ten subdistricts. After two seasons of exploratory fishing, it was obvious that interest in these fisheries was low, catches were poor, and no major unexploited populations of either species had been found. Also, flagrant abuses of permit conditions and violations of regulations had occurred. As a result, the board decided during its winter meeting in 1990 to revoke the regulations that provided for these fisheries.

Dockside Sampling and Logbook Program

Department personnel have collected carapace length and shell condition data from landings at ports throughout the region since the late 1960s. Resulting data, collected from 1970/1971 to present, are used to estimate recruitment trends and relative contribution from various size-classes of crab to the total stock (Table 2.3). Staff members began collecting average weight data from landings in 1975. Average weight data provides additional insight into stock dynamics. Beginning in 1980, skipper interviews provided an estimate of catch per unit of effort (CPUE) that could be used to estimate stock abundance. Beginning with

the 1993/1994 fishing season, a mandatory logbook program was established to obtain detailed CPUE information from the entire fleet. This information is used to gauge fleet efficiency and to estimate the appropriate length of subsequent fishing seasons and, recently, has been used to monitor catch rates and effort inseason. These data can also be used to improve catch projections for upcoming seasons.

REGULATION DEVELOPMENT

Fishing Seasons

From 1961 through 1968 there was no closed season for the commercial king crab fishery. Prior to the 1969/1970 fishing season, a closed season was established from March 16 through August 14. A fishing season of September 1 through January 31 was established in 1971 to provide a closure during the molting and mating season, during a portion of the aggregation period prior to the molting and mating season, and during the major growth period when meat recovery rates are low. The current regulatory season extends from November 1 through January 24. Since 1979, actual open fishing periods have been set based on estimates of population size and predicted fishing effort necessary to achieve the GHL. During the past two open seasons, fishing periods have been limited to fewer than 14 days.

Sex and Size Limits

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

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

Quotas and Guideline Harvest Ranges

A quota of 1.5 million pounds was provided for king crab (all species combined) in 1970. Separate red and golden king crab fisheries were recognized with the adoption of distinct seasons and quotas in 1971. From 1971 through the 1978/1979 season, the red king crab quotas, guideline harvest ranges (GHR), or guideline harvest levels (GHLs) were based upon historic catch and limited size distribution information obtained from the dockside sampling program. The first red king crab quota was set in 1971 at 400,000 pounds per season. This was increased to 600,000 pounds in 1974, and then reduced to 400,000 pounds in 1977.

Quotas were replaced by GHRs after 1977. The first GHR of 200,000 to 400,000 pounds was established in 1978. The GHR was increased to 300,000 to 600,000 pounds in 1979 based on industry recommendations. Since the 1980/1981 season, allowable catches, expressed as either GHLs or GHRs, have been based on results from the red king crab index of abundance survey. The available harvest surplus is currently computed using a harvest rate approach. Current regulations specify that a minimum of 300,000 pounds of surplus legal sized crab must be available before the commercial fishery will be opened.

Fishing Gear

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

To reduce the capture of sublegal crab, all pots must have either 9.5-inch stretch mesh along one panel or have 6.25-inch escape rings. In order to reduce “ghost fishing” by lost pots, regulations require degradable twine or a timed galvanic release device that will allow caught crab to escape after a short period of time. Tunnel height on standard side loading pots must be a minimum of 8 inches in the vertical dimension. Currently, about 80 percent of the vessels are using cones or pyramids. There are restrictions on pot storage before and after fishing seasons and each pot, or stack of pots, must be buoyed and marked. Ring nets were eliminated as legal gear for king crab in 1990. Marking requirements for pot buoys include sequentially numbered stickers, which are purchased from the department.

Management Plan

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

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

Additional elements used to manage the fishery are included in regulations concerning allocation between commercial and personal use fishers in Section 11-A, lawful gear, and closed waters.

Limited Entry

A limited entry program was established for the king and Tanner crab pot fisheries in Southeast Alaska by the Commercial Fisheries Entry Commission (CFEC) in January 1984. The CFEC adopted a maximum effort level of 61 permits for the red king crab fishery. Currently there are 81 permits eligible to participate in the red king crab fishery. Some of these permits may not be eligible to fish after the adjudication process is completed.

1999/2000 SEASON SYNOPSIS

Red King Crab Survey Results

A stock assessment survey in June and July 1999 indicated the overall abundance and relative health of red king crab stocks were adequate to allow a commercial fishery. The allowable surplus harvest, or GHL, was estimated at 342,000 pounds and represented a harvest rate of 0.27 of legal crab. Generally, crab stocks in bay areas bordering Icy Strait, Lynn Canal, and upper Stephens Passage were in relatively good condition (Figures 2.2 and 2.3). There were high abundances of various recruit classes in these areas suggesting overall abundance will remain relatively high in the near future. Peril Strait and Rodman Bay remained closed due to poor catches of legal and prerecruit male crab. Pybus Bay and Gambier Bay stocks responded

to the fishery closure in the previous year with some increase in abundance of legal crab but abundances in these areas remained low compared to other bays and past surveys. Seymour Canal continued to have a high abundance of legal crab, but these crab were almost all postrecruit.

Commercial Fishery Summary

Prior to the opening date of November 1, 1999, all permit holders and processors were mailed information on registration, reporting, and gear marking requirements. All permit holders were required to pre-register prior to fishing, and to complete mandatory logbooks during the fishery. A 20-pot limit per vessel restriction was in effect for the fifth consecutive season because the GHL (342,000 pounds) was less than 400,000 pounds.

Because of the stock decreases noted above, fishing time was restricted in Pybus and Gambier Bays to four days prior to the season opening. The open portion of Section 11-A was fished for nine days, closing three days prior to the end of the Registration Area A fishing season. This reduction in fishing days was made to stay within the guidelines for allocation to personal use and commercial fishers.

The commercial fishery was closed by emergency order on November 13, 1999 after 77 permit holders made 215 landings totaling 289,548 pounds (Table 2.1). Based on a sample of 135 landings, the average size was 161.1 mm in carapace length (Table 2.3) and the average weight was 7.60 pounds per crab (Table 2.4). Approximately 44 percent of the landed crab recruited to the fishery in 1999, and 30 percent recruited the prior year. More than half of the total catch came from District 11 (Table 2.2).

2000/2001 SEASON SYNOPSIS

Red King Crab Survey Results

The 2000 stock assessment survey was conducted during June and July. Survey results indicated that the overall abundance of red king crab stocks was very low, and stocks were not adequate to allow a commercial harvest (Figures 2.2 and 2.3). The abundance and overall condition of Pybus Bay, Seymour Canal, and Peril Strait stocks was low enough to warrant closure of those waters to personal use harvest. Declines in abundance of legal and mature male red king crab appear to have happened over a 2- to 4-year period in those areas (Figure 2.2). The legal male red king crab segment was comprised primarily of postrecruits in Pybus Bay and Seymour Canal. However, the more northern areas in Icy Strait, Lynn Canal, and upper Stephens Passage continued to demonstrate strong stock abundances. Increases in abundance of

legal and mature male red king crab occurred over a three- to seven-year period in these waters. King crab populations in these bays appeared very healthy. The Juneau area (Section 11-A) and Lynn Canal bays had significant and healthy numbers of both recruit and postrecruits. In Excursion Inlet, Lynn Canal, and the Juneau area, large numbers of prerecruits were also present.

Commercial Fishery Summary

Survey results indicated that the overall abundance and relative health of red king crab stocks were not adequate to allow a commercial fishery during the 2000/2001 season. The allowable harvest surplus, or GHL, was estimated at 183,000 pounds of legal crab and was below the regulatory threshold of 300,000 pounds; hence, the fishery was closed by emergency order, and the closure was announced to the public through the news release system. Personal use fishing in Pybus Bay, Gambier Bay, Peril Strait, and Rodman Bay was also closed by emergency order.

2001/2002 SEASON SYNOPSIS

Red King Crab Survey Results

A stock assessment survey in June and July 2001 indicated the overall abundance and relative health of red king crab stocks were adequate to allow a commercial fishery (Figures 2.2 and 2.3). The allowable surplus harvest, or GHL, was estimated at 302,000 pounds and represented a harvest rate of about 20 percent of legal crab. Generally, crab stocks in bay areas bordering Icy Strait, Lynn Canal, and upper Stephens Passage were in better condition than Peril Strait and Seymour Canal. The northern areas had a wide span of recruit classes in the survey catches and will probably continue to have good overall abundance and condition. Pybus Bay and Gambier Bay rebounded from the survey results in 2000 probably due to the closure of the commercial fishery and personal use fishery in Pybus Bay. However, the abundances in all these areas is still below historic high abundances seen in the 1979–1981 and 1994–1996 surveys.

Commercial Fishery Summary

All permit holders were required to pre-register prior to fishing, and to complete mandatory logbooks during the fishery. A 20-pot limit per vessel restriction was in effect for the sixth consecutive season because the GHL (302,000 pounds) was less than 400,000 pounds.

The preseason news release for the fishery specified a 14-day season, except for Seymour Canal and Peril Strait where fishing time was limited to six days because of the stock concerns noted above and for Section 11-A that was managed inseason to stay within the guidelines for allocation to personal use and commercial fishers. The open portion of Section 11-A was fished for almost five days. Most of the Juneau area personal use harvest of 79,000 pounds of crab had already occurred by the time the commercial fishery opened.

The commercial fishery was closed by emergency order on November 12, 2001 two days prior to the scheduled closing. High reported catch rates in all areas indicated that the GHL would be reached on or before November 12. During the season, 77 permit holders made 177 landings totaling 296,967 pounds of red king crab (Table 2.1). An additional 880 pounds of blue king crab were landed incidental to the fishery (Table 2.5). Based on a sample of 78 landings, the average size was 160.7 mm in carapace length (Table 2.3) and the average weight was 7.65 pounds per crab (Table 2.4). About 36 percent of the landed crab recruited into the fishery this year, and 45 percent had been in the fishery for one year. Thus, the majority of the catch was comprised of crab that recruited into the fishery during the past two seasons. As in most previous seasons, the majority of the catch came from Districts 10 and 11 (Table 2.2).

2002/2003 OUTLOOK

The department will conduct the 2002 red king crab survey during June and July, using the department's *R/V Medeia* and a chartered vessel. Results of that survey will determine whether or not a commercial fishery occurs in November 2002. Holkham Bay, a major area of harvest in 2001, will be added to the survey in 2002. Some areas received particularly high effort in 2001, and these areas will be carefully assessed during the 2002 survey. Most of the stocks in Southeast Alaska appear healthy and we anticipate that there will be a commercial fishing season in 2002. If stocks decline, the department will reevaluate the harvest rate and also examine the effect of current personal use harvests and regulations on stock health.

Table 2.1. Registration Area A (Southeast Alaska) red king crab catch, number of landings, and number of permits by year or season, 1960 to present. The data from 1960–1969 include all three species of king crab (red, blue, and golden) from all of Southeast Alaska including Yakutat. Yakutat king crab are also included in the 1969/1970 season.

Year/ Season[a]	Total Catch	Number of[b] Landings	Number of[c] Permits
1960	3,424		
1961	*	*	*
1962	1,289,550		8
1963	1,112,200		8
1964	820,530		9
1965	579,300		7
1966	105,899		8
1967	599,078		7
1968	2,199,722		19
1969	1,899,930	122	39
1969/70	1,438,226	401	33
1970/71	389,373	150	20
1971/72	670,645	183	19
1972/73	528,025	198	19
1973/74	758,103	234	29
1974/75	535,534	201	27
1975/76	356,771	170	32
1976/77	328,145	174	35
1977/78	234,494	138	34
1978/79	443,639	165	34
1979/80	658,087	229	39
1980/81	532,647	193	35
1981/82	524,109	171	46
1982/83	394,157	111	57
1983/84	280,681	119	97
1984/85	270,495	121	95
1985 Thru 1992	**----------Fishery Closed----------**		
1993/94	202,384	180	83
1994/95	256,267	246	84
1995/96	357,639	201	73
1996/97	428,549	218	79
1997/98	307,832	184	76
1998/99	**----------Fishery Closed----------**		
1999/00	289,548	215	77
2000/01	**----------Fishery Closed----------**		
2001/02[d]	296,967	177	77

* Where number of permits is 3 or less, the information is considered confidential.

[a] Data for years 1960 through the 1969/1970 season are from management reports and informal fish ticket logs.

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

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

[d] Most recent season data is considered preliminary.

Table 2.2. Registration Area A (Southeast Alaska) traditional red king crab catch in thousands of pounds by district and season, 1970/1971 to present.

	District															
Season	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1970/71						*		*	45.8	116.4	119.6	*	*	*	53.8	389.4
1971/72								*	*	197.6	259.4	*	95.8	*	*	670.6
1972/73	*					*		16.8	*	223.8	103.6	*	40.0	*	*	528.0
1973/74					*	*	*	*	21.1	365.1	120.7	*	98.7	87.1	*	758.1
1974/75	*					*	*	8.3	27.9	124.5	74.1	60.2	101.2	128.8	8.5	535.5
1975/76					*	*		15.5	3.2	30.3	35.1	53.4	95.8	116.1	*	356.8
1976/77			*		*	*		16.7	17.5	49.3	82.0	*	*	63.8	24.7	328.1
1977/78	*				*	*		*		43.0	64.5	*	*	18.5	*	234.5
1978/79								*		118.5	122.9	14.1	112.5	40.2	28.9	443.6
1979/80	*				*	*	*	*	*	168.4	220.2	39.5	79.4	89.1	11.8	658.1
1980/81	*					*	*	27.4	*	163.7	179.2	*	73.4	*	39.9	532.7
1981/82					*	*	*	*	*	114.4	135.4	32.7	116.7	32.8	52.8	524.1
1982/83					7.3		*	*	*	77.4	53.8	79.6	70.8	79.5	20.5	394.2
1983/84	*		*		*	*	*		*	79.5	35.2	30.2	46.7	50.8	1.9	280.7
1984/85	*		*						*	58.7	89.0	14.2	51.9	48.9	6.2	270.5
1985-1992	----------Fishery Closed----------															
1993/94						*		*	2.4	29.6	76.9	38.9	22.7	10.3	20.9	202.4
1994/95					*			*	*	69.5	113.5	24.8	21.8	13.4	6.6	256.3
1995/96								*	*	169.7	142.0	*	13.1	18.5	6.3	357.6
1996/97								*	1.5	176.7	206.2	2.2	18.3	18.0	*	428.5
1997/98									1.4	76.7	184.2	*	*	25.3	7.5	307.8
1998/99	----------Fishery Closed----------															
1999/00								*	*	43.5	191.9	11.7	*	32.9	9.3	289.5
2000/01	----------Fishery Closed----------															
2001/02									*	83.0	147.9	5.9	*	41.6	15.5	297.0

* Where number of permits is 3 or less, the information is considered confidential.

Table 2.3. Registration Area A (Southeast Alaska) summary of commercial red king crab length frequency and shell condition data collected during dockside sampling, 1970/1971 to present.

Season	Number of Boats Sampled	Number of Crab Sampled	Carapace Length (mm)		Recruits[a]	Recruitment				Skip Molts[f]
			Average	Range		% PR +1[b]	%PR +2[c]	% PR +3[d]	%PR +4[e]	
1970/71	29	2,264	161.0	138-201	40.24	39.6	18.3	1.9	0.0	28.5
1971/72	10	742	160.2	134-203	47.7	33.0	14.9	4.1	0.3	24.4
1972/73	30	3,032	158.7	133-205	53.5	32.5	11.5	2.4	0.1	20.5
1973/74	15	1,438	161.6	140-208	27.6	52.5	17.6	2.1	0.2	39.7
1974/75	20	2,181	166.3	137-200	27.6	47.4	21.3	3.8	0.0	18.6
1975/76	21	1,969	160.3	135-207	49.0	29.6	16.6	4.7	0.2	22.2
1976/77	18	1,460	160.6	115-204	50.1	33.0	11.9	4.5	0.6	21.4
1977/78	32	3,161	156.7	136-203	29.7	40.2	20.4	9.5	0.2	67.9
1978/79	18	1,712	155.4	137-202	61.5	28.7	8.5	1.1	0.1	22.9
1979/80	30	3,082	156.1	137-193	55.5	31.0	11.6	1.9	0.0	29.1
1980/81	49	4,103	156.3	134-196	53.0	34.7	10.8	1.4	0.0	29.5
1981/82	37	3,425	158.8	123-199	47.1	35.0	15.4	2.5	0.0	30.6
1982/83	30	2,821	159.4	137-200	46.0	33.6	15.5	4.9	0.0	30.5
1983/84	42	3,521	158.4	137-196	51.9	33.9	11.7	2.6	0.0	24.9
1984/85	36	3,641	159.6	139-196	48.3	37.9	12.3	1.5	0.0	22.6
1985 thru 1992		**----------Fishery Closed----------**								
1993/94	116	8,601	162.9	103-209	30.5	46.5	19.4	3.6	0.0	30.3
1994/95	124	7,974	162.8	90-209	34.5	33.1	23.4	9.0	0.1	36.9
1995/96	73	5,882	159.4	96-204	56.2	30.1	9.5	4.2	0.1	17.8
1996/97	132	7,744	161.5	113-212	38.6	44.0	12.9	4.4	0.2	28.8
1997/98	111	5,919	164.4	122-207	28.2	44.0	23.4	4.5	0.0	33.6
1998/99		**----------Fishery Closed----------**								
1999/00	135	6,320	161.1	135-199	44.5	29.7	17.9	7.9	0.1	34.0
2000/01		**----------Fishery Closed----------**								
2001/02	78	3,873	160.7	135-195	36.4	45.3	16.7	1.64	0.0	34.6

[a] Recruits = all new and soft shell crab ≥145 mm and ≤161 mm carapace length.

[b] PR + 1 = all new and soft shell crab ≥162 mm and ≤178 mm, and old shell crab ≥145 mm and ≤161 mm, carapace length.

[c] PR + 2 = all new and soft shell crab ≥179 mm and ≤195 mm, and old crab ≥162 mm and ≤178 mm, and very old ≥145 mm and ≤161 mm, carapace length.

[d] PR + 3 = all new and soft shell crab ≥196 mm and all old ≥179 mm and ≤195 mm, and very old ≥162 mm and ≤178 mm, carapace length.

[e] PR + 4 = all old and very old where carapace length ≥196 mm.

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

Table 2.4. Registration Area A (Southeast Alaska) summary of commercial red king crab CPUE and average weight data collected during dockside sampling and interviews, 1970/1971 to present.

Season Sampled	Number of Boats Interviewed	Number of Pots Lifted	Number of Crab Captured	Average Catch Per Pot	Range of Catch/Pot	Weight (pounds) Average	Weight (pounds) Range	Estimated No. of Crab Caught	Percent of Catch Sampled
1970/71	1					8.60	8.60-8.60		
1971/72									
1972/73									
1973/74									
1974/75									
1975/76	2					8.36	7.49-9.22	10,129	19.4
1976/77	5					8.03	7.34-10.10	40,847	3.6
1977/78	15					7.47	6.85-9.88	31,397	10.1
1978/79	8					7.18	6.29-8.67	61,775	2.8
1979/80	4					7.40	6.62-7.94	88,918	3.5
1980/81	41	5,345	29,897	5.60	1.0-14.47	7.17	6.38-8.16	74,331	5.5
1981/82	19	600	900	1.50	1.50-1.50	7.21	6.45-8.73	72,684	4.7
1982/83	23	1,542	6,449	4.18	1.30-7.63	7.65	6.61-8.51	52,410	5.4
1983/84	29	3,693	4,165	1.13	0.16-4.33	6.98	5.51-8.54	40,031	8.8
1984/85	27	1,334	3,893	2.92	1.60-6.30	7.43	6.66-8.53	35,813	10.2
1985 thru 1992		----------				**Fishery Closed**	----------		
1993/94	114	10,158	17,749	1.75	0.03-6.21	8.06	5.84-9.60	25,110	34.3
1994/95	120	9,087	15,063	1.66	0.05-7.77	8.03	6.15-10.33	31,905	25.0
1995/96	73	5,350	16,676	3.12	0.48-9.60	7.47	5.54-8.72	47,877	12.3
1996/97	129	11,958	36,449	3.05	0.35-11.45	7.84	6.26-9.59	54,667	14.2
1997/98	111	8,236	24,079	2.92	0.32-12.00	8.31	5.68-9.82	37,030	16.0
1998/99		----------				**Fishery Closed**	----------		
1999/00	135	11,958	25,907	2.17	0.15-15.38	7.60	5.52-9.97	38,107	16.6
2000/01		----------				**Fishery Closed**	----------		
2001/02	78	6,561	21,313	3.25	0.39-8.10	7.65	6.60-8.63	38,830	10.0

Table 2.5. Registration Area A (Southeast Alaska) blue king crab catch, number of landings, and number of permits by season, 1976/1977 to present for all fisheries.

Year/Season	Total Catch	Number of Landings	Number of Permits
1976/77	*	*	*
1977/78	3,709	8	5
1978/79	*	*	*
1979/80	*	*	*
1980/81	2,017	7	6
1981/82	4,159	11	9
1982/83	46,639	52	28
1983/84	38,330	40	30
1984/85	5,436	25	17
1985/86	1,886	18	16
1986/87	1,179	15	13
1987/88	1,506	35	18
1988/89	3,186	15	9
1989/90	501	14	8
1990/91	597	11	8
1991/92	1,037	14	9
1992/93	929	11	9
1993/94	2,124	30	15
1994/95	5,334	62	25
1995/96	3,397	43	20
1996/97	1,248	30	16
1997/98	2,287	21	11
1998/99	*	*	*
1999/00	9,070	40	19
2000/01	2,776	14	6
2001/02[a]	880	19	10

* Where number of permits is 3 or less, the information is considered confidential.

[a] Most recent season data is considered preliminary.

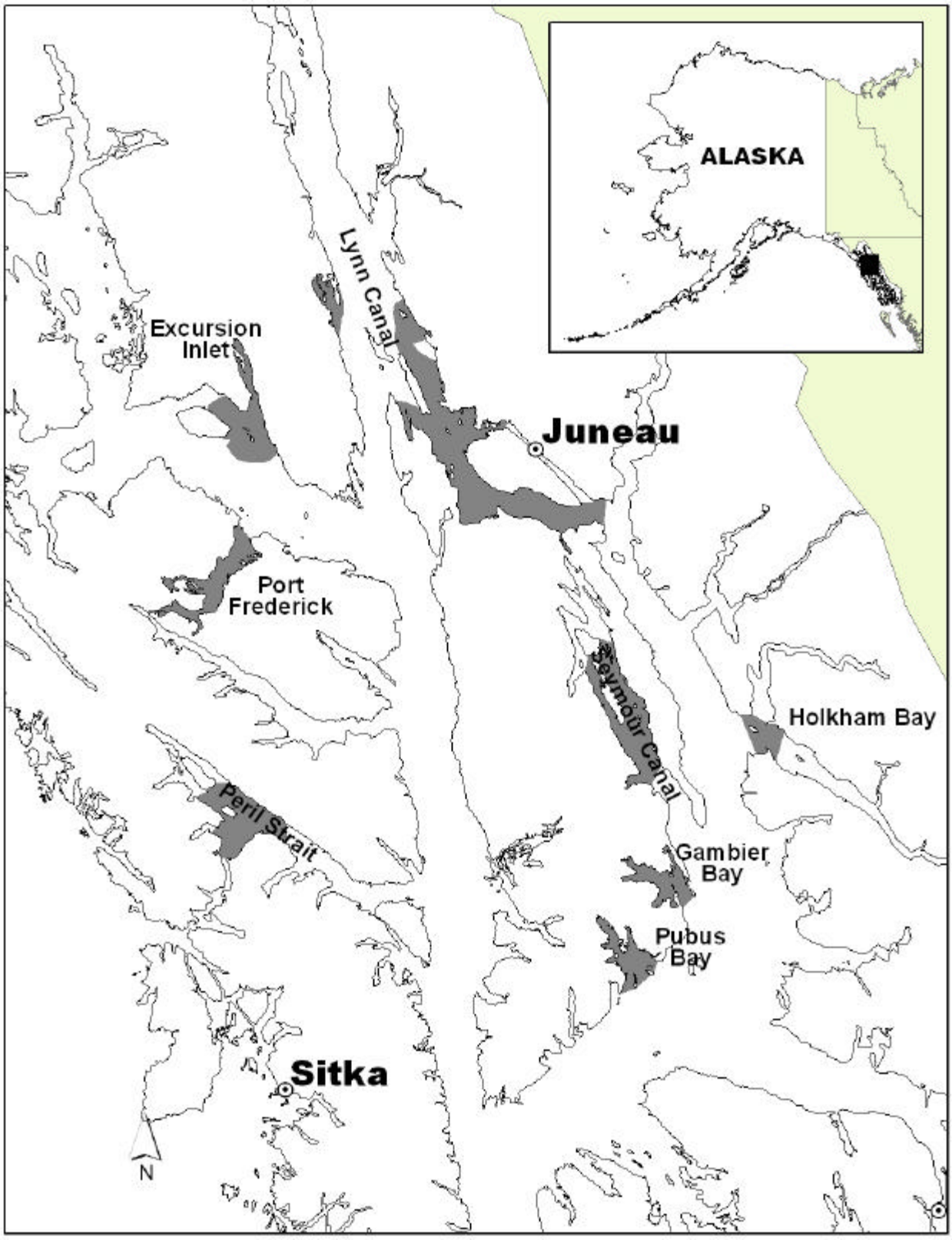

Figure 2.1. Map showing red king crab fishing areas in Southeast Alaska.

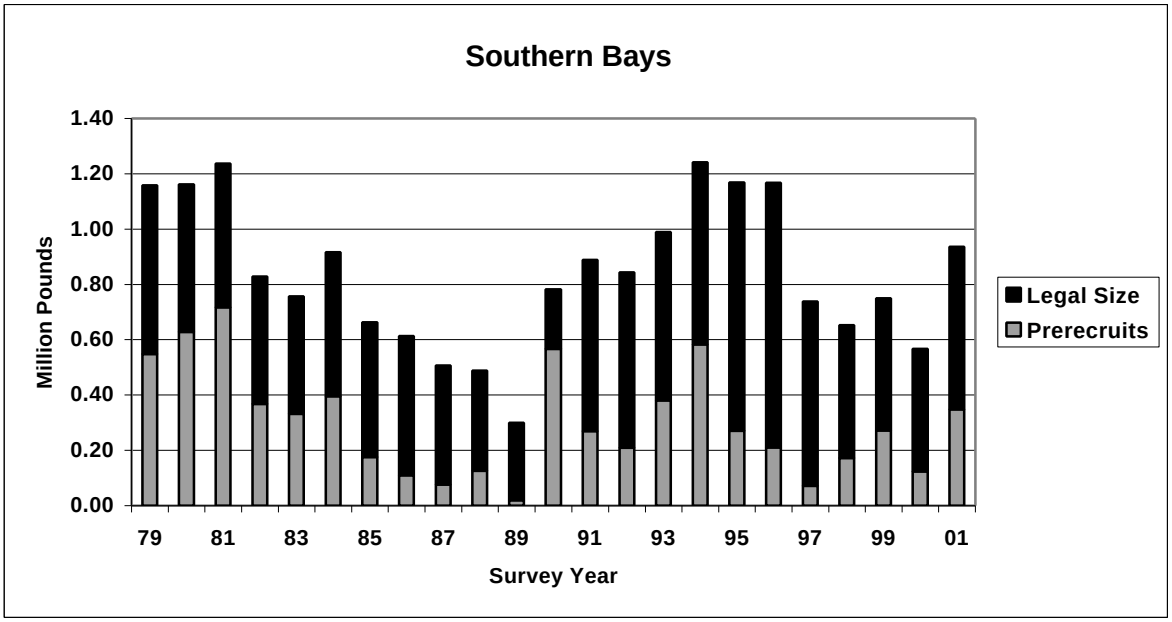

Figure 2.2. Estimated biomass of mature male red king crab in bays opening into Frederick Sound, lower Stephens Passage, and Peril Strait.

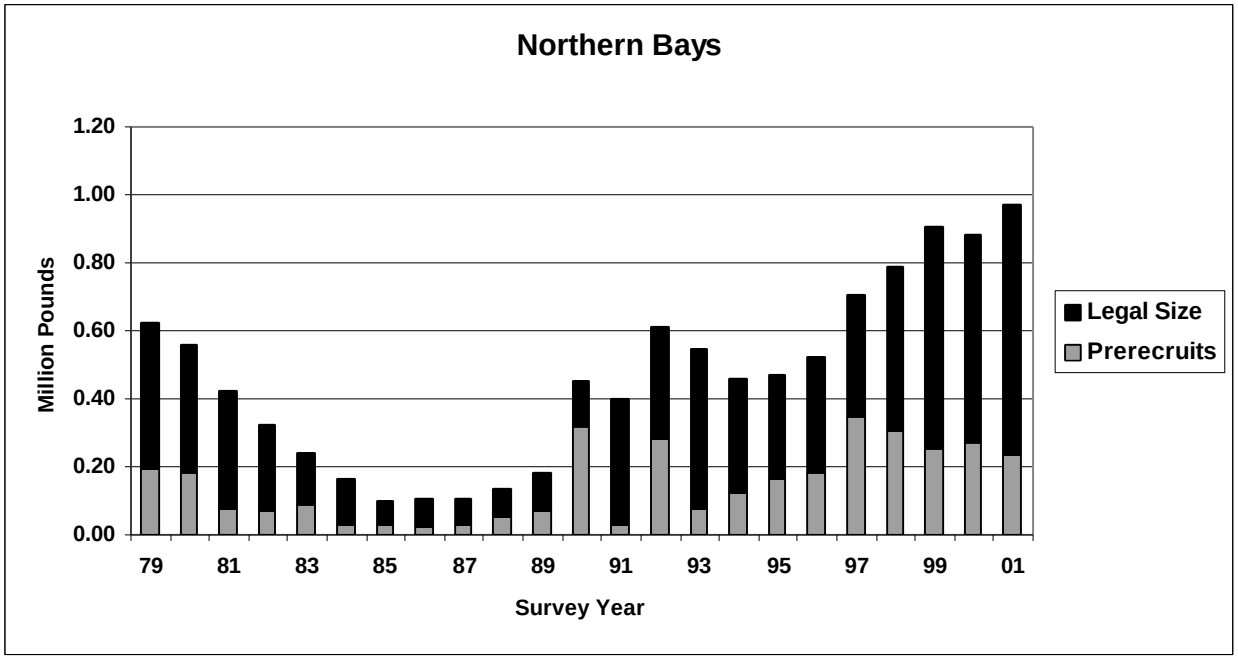

Figure 2.3. Estimated biomass of mature male red king crab in bays opening into Icy Strait, Lynn Canal, and upper Stephens Passage.

Section 3
Southeast Alaska Golden King Crab Fisheries

REPORT TO THE BOARD OF FISHERIES, 2002

SOUTHEAST ALASKA

GOLDEN KING CRAB FISHERIES

By

Peter G. van Tamelen
and
Susan E. Merkouris

Regional Information Report[1] No. 1J02-14

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

February 2002

[1] The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data, this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

This report presents an overview of the commercial golden king crab fishery in Southeast Alaska (Registration Area A) with emphasis on the 2000/2001 fishing season and an outlook for the 2001/2002 season. Information is presented on historical catch and effort, regulation development, and available dockside sampling data. Stock assessment surveys are not conducted for this fishery, but stock status can be roughly inferred using fishery trend and dockside survey data.

Golden king crab, *Lithodes aequispinus,* are taken from the deeper waters, between 100 and 350 fathoms, of northern Southeast Alaska. Few golden king crab are harvested from the southern portion of Southeast Alaska. Important golden king crab fishing grounds are located at the confluence of Icy Strait, Lynn Canal, and Chatham Strait; where Chatham Strait and the western portion of Frederick Sound meet; and where Stephens Passage and Frederick Sound meet. From the fishers' perspective, the golden king crab fishing conditions are more demanding than the red king crab, *Paralithodes camtschaticus,* or the Tanner crab, *Chionoecetes bairdi,* fisheries because of the difficulties associated with grounds more exposed to adverse weather conditions, greater depths, strong tidal exchanges, and heavy currents.

Commercial vessels participating in the golden king crab fishery are primarily salmon tenders, salmon purse seine vessels, and a few large drift gillnet boats. Fishing gear has gradually evolved to include side-loading king crab pots (7-foot x 7-foot x 30-inch) and top-loading pyramid or conical-style pots. Because of challenging fishing conditions fishers prefer heavier gear, and use different line and buoy train set-ups. Soak times are generally longer compared to red king or Tanner crab fishing.

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

- seasons that open concurrently with the Tanner crab fishery
- the harvest of only male crab with a minimum legal carapace width
- gear limits of 100 pots per vessel
- separate stock management (5 fishing areas)
- guideline harvest ranges based on historic harvest levels by fishing areas that consider stock dynamics (level of recruitment)

FISHERY DEVELOPMENT AND HISTORY

Commercial Fishery History

The department began collecting species composition information from the commercial king crab catches in Southeast Alaska in 1970. For information on the harvest levels before this time, see the report about red and blue king crab in Southeast Alaska. Reliable golden king crab catch data has been available since the 1972/1973 fishing season. From the 1972/1973 through the 1979/1980 seasons, catches ranged from about 32,000 pounds to almost 178,000 pounds by 20 or fewer permit holders (Table 3.1). Adjusted to the 1990 consumer price index (CPI), the average exvessel value of the golden king harvest during this period was approximately $220,000. Effort and catches increased significantly after the 1979/1980 fishing season.

During the seasons 1980/1981 through 1989/1990, the average number of permits fished was 65 with a high of 124. This effort level resulted in an average catch of 824,383 pounds worth approximately $1.9 million, adjusted to 1990 CPI. At current prices, this average catch would be worth about $3.1 million. These relatively high catches coincided with 4 years of good recruitment starting in 1983 and ending by 1988 (Table 3.4). Fishing effort peaked during the 1984/1985 season when 124 permits fished for a catch of 848,818 pounds. The catch peaked 2 seasons later during the 1986/1987 season when only 51 permits fished for a catch of 1,016,011 pounds. Although effort and catches declined through the 1995/1996 season, they have increased since then in response to increasing recruitment.

The development of the golden king crab fishery in Southeast Alaska occurred in 5 phases. Initial development (first phase) occurred from in 1960 through the 1971/1972 fishing season. This development phase was characterized by fishers determining which fishing methods, gear types, depth ranges, geographic areas, and other factors yielded adequate harvests of golden king crab. Also during this phase, processing facilities developed product forms and studied marketing potential. Prices and effort were generally low. Catches fluctuated, probably because red king crab was the primary target species during this phase. The entire fishery was managed as a single stock. Basic regulations included establishing a quota, gear limits, size limits, and other regulatory needs. These initial regulations were based on a short history of commercial exploitation, little scientific information, and experiences in other Alaska king crab fisheries. Many of these initial regulations changed dramatically as better information became available.

The second phase occurred during the 1972/1973 through 1979/1980 seasons and was characterized by relatively low effort levels but generally increasing catches. Additional knowledge on gear requirements, fishing techniques, and geographic distribution of the species became available. Exvessel prices continued to be low. Due to concentrated effort and resulting catches, it was necessary to reduce fishing time in District 10, and eventually to eliminate the year-round season.

The third phase began with the 1980/1981 fishing season and ended with the 1984/1985 fishing season. Effort gradually increased from 30 to 124 permits fished. A significant portion of the effort increase can be attributed to the evolving limited entry program for king and Tanner crab in Southeast Alaska. Knowledge on gear design and fishing techniques developed to a point where it was sufficient to harvest the available stock throughout the range in Southeast Alaska. Fishing occurred throughout the year in some areas. This phase is important because it showed consistently increasing catches that led to a liberalization of some regulations. Specifically, quotas used to manage the fishery were increased due to industry interactions with

the Alaska Board of Fisheries and the gear limit was increased to 100 pots per vessel. Although fishing effort and resulting catches were increasing, scientific information sufficient to properly manage stocks was not available.

The fourth phase began with the 1985/1986 fishing season and extended through the 1995/1996 fishing season. The peak catch of slightly more than one million pounds occurred during the 1986/1987 season and has declined since due to lack of recruitment and overexploitation. The fishery was separated into 5 management areas with guideline harvest ranges established in each area in an attempt to prevent further overexploitation in any single area or serial depletion of a number of fishing areas. The department has used emergency order authority to close the fishery early each season, when data indicated that substantial recruitment had not entered the fishery and stocks were not strong enough to support significant catches. The effort and catch declined for 7 seasons, to a low of 15,718 pounds in 1995/1996.

The fifth, and current phase, began with the 1996/1997 fishing season. Effort and catches increased in response to the development of a live market with improved prices and as a result of increases in the availability of recruit size crab. Anecdotal information from pot shrimp fishers in Frederick Sound and Clarence Strait during previous years indicated a very significant increase in the number of small golden king crab. By the 1996/1997 season the small crab had grown to legal size and surviving at relatively high levels. Recruitment has remained fairly high since 1996/1997 leading a slow but consistent increase in seasonal catches.

Dockside Sampling and Skipper Interviews

Department personnel have collected shell condition and carapace length data from landings at various ports throughout the region since 1970 (Table 3.4). Resulting data are used to estimate recruitment trends and relative contribution from various size-classes of crab. Department personnel began collecting average weight data from landings in 1975 (Table 3.5). Average weight data provides additional insight into stock dynamics. In 1985, skipper interviews were initiated to provide an estimate of catch per unit of effort (CPUE) that may be useful for determination of fishing mortality.

REGULATION DEVELOPMENT

Fishing Seasons

Regulation development in the golden king crab fishery has generally paralleled that of the red king and Tanner crab fisheries. Biological information which identifies specific molting and mating periods, or other sensitive life history periods when fishing should be curtailed have not been collected for golden king crab. Available information from other registration areas and Southeast Alaska suggests that molting may occur

throughout the year, with a slight peak in late spring and early summer. Softshell crab, however, are frequently caught during the fishery starting in February. The presence of eggs in all stages of development throughout the year supports the conclusion of no distinct molting or mating period. As a result, fishing seasons have been liberal. From 1961 through 1968 there was no closed season. Closures have been primarily established to provide fair start opportunities during red king crab and Tanner crab fisheries. Fishing has started on dates ranging from August 1 through mid-February. The fishery currently starts on February 15, concurrently with the start of the commercial Tanner crab fishery, and continues until the season is closed by emergency order due to resource conservation concerns or the attainment of established guideline harvest ranges. In recent seasons, the fishery has closed between March and June, depending upon effort, harvests, harvest rates, and recruitment levels.

Sex and Size Limits

From its inception, the golden king crab fishery has been restricted to harvesting only male crab in order to protect the reproductively important female crab. From 1961 through 1968, a minimum legal size of 6 ½ inches in carapace width was in place. The minimum legal size was established to protect sexually mature male king crab from harvest during the early years of sexual maturity. The minimum legal carapace width was increased to 7 inches in 1969. This size limit was based on growth and size at maturity information collected from Gulf of Alaska red king crab stocks. The larger minimum size limit was implemented to increase reproductive potential by providing additional protection to mature male crab. The minimum legal carapace width has been reduced to 6 ½ inches in the Cape Ommaney and Clarence Strait areas due to evidence that mature crab are smaller in these southern regions.

Average size at maturity for male golden king crab in Southeast Alaska is unknown. With the absence of this important piece of biological information, it has been assumed that size of maturity for male golden king crab is about the same as for male red king crab, based on red king crab data from Kodiak. This assumption was made because growth information for Southeast Alaska and Kodiak red king crab is very similar, and because growth increments for both species in Southeast Alaska are almost identical. Known regression formulae relating carapace length to carapace width for golden king crab in Southeast Alaska were used to establish the legal width measurement.

In 1990, a regulation was adopted allowing the harvest of any king crab infected with the parasitic barnacle, *Briarosaccus callosus*, regardless of the sex or size of the crab. Crab infected with this parasite are incapable of reproduction and may experience reduced growth. Removal of infected crab may improve stock reproduction and growth.

Quotas and Guideline Harvest Ranges

In 1970, a quota of 1.5 million pounds was provided for king crab (all species combined). In 1971, separate red and golden king crab fisheries were recognized with the adoption of distinct seasons, and a quota of 600,000 pounds was established for the golden king crab fishery. This quota remained in regulation through 1977. After 1977, guideline harvest ranges (GHRs) replaced quotas. The first GHR of 50,000 to 200,000 pounds was established in 1978. The GHR was increased to 200,000 to 500,000 pounds in 1981 based on industry recommendations. This GHR remained in regulation through the 1986/1987 fishing season. When stocks were strong and prices good, the GHRs were often exceeded from 1980 through 1998 because most fishery monitoring was done by fish tickets received by the department. Seasons were closed when the fish ticket data neared the GHR set preseason. Relying solely on fish ticket data, however, may not include crab caught and delivered in the prior week or crab caught and still held on the vessels. Also, any crab caught in unpulled and fished crab pots are excluded. This combination of factors led to reduced ability to manage for a GHR inseason.

Due to the propensity of the fleet to concentrate fishing effort only in the most productive fishing grounds, and in order to prevent overexploitation on any single fishing ground, separate GHRs were established in 1987. Initially only 3 areas (Frederick Sound, Icy Strait, and Lower Chatham Strait) were assigned GHRs. Five defined fishing areas and GHRs exist in regulation today: Cape Ommaney, Chatham Strait, Clarence Strait, Frederick Sound, and Icy Strait Areas (Figure 3.1).

Fishing Gear

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

There is no minimum mesh size requirement for king crab pots although 6 ¼ inch escape rings or 9 inch stretch mesh must be installed on every king crab pot. Regulations also require degradable twine or a timed galvanic release device in case the pot is lost. Tunnel height on standard side loading pots must be a minimum of eight inches in the vertical dimension. There are restrictions on pot storage before and after fishing seasons and each pot must be independently buoyed and marked. Ring nets were eliminated as legal gear for king crab in 1990.

Limited Entry

The Commercial Fisheries Entry Commission (CFEC) in January 1984 established a limited entry program for the king and Tanner crab pot fisheries in Southeast Alaska. The CFEC adopted a maximum effort level of 57 permits for the golden king crab fishery. Currently there are 59 permits eligible to participate in the golden king crab fishery. Some of these permits may not be eligible to fish once the adjudication process is completed.

1998/1999 SEASON SYNOPSIS

For the 1998/1999 season, the department announced guideline harvest levels by fishing area through a news release. Fishing was monitored through fish tickets and dockside interviews during landings. Fishing seasons were closed by area using emergency orders. The earliest closure was Frederick Sound, which closed on March 7 after a previously announced closure date of March 1. The fleet protested the March 1 closure date because high amplitude tides would not allow them to retrieve their gear. The last fishery to close was Cape Ommaney on June 27. During the season, 30 permit holders fished and a total of 367,782 pounds of golden king crab were caught from all fishing areas (Table 3.1). Most of the catch occurred during February, March, and April (Table 3.2). Frederick Sound, Chatham Strait, and Icy Strait produced the majority of the catch (Tables 3.6–3.10.).

Dockside sampling data from commercial landings indicated that 46 percent of the crab were recruit crab and the average size was 166.7 mm in carapace length. These data are quite similar to good recruitment events, which supported the fishery in the early to mid-1980s (Table 3.4). The average CPUE of 4.8 crab per pot lift was greater than overall average for all years. (Table 3.5). The average weight of 6.5 pounds per crab was smaller than most years. About 44 percent of the crab landed were postrecruit 1s (Table 3.4), indicating increased recruitment during the preceding seasons. In combination, these data suggested that significant recruitment had entered the fishery over the past 2 seasons and stock abundance was increasing**.**

1999/2000 SEASON SYNOPSIS

Guideline harvest levels by fishing area were announced through a news release. Fishing was monitored through fish tickets and dockside interviews during landings. Fishing seasons were closed by area using emergency orders. The earliest closure was Frederick Sound which closed on March 12, and the last fishery to close was Clarence Strait on June 27. During the season, 46 permit holders fished and a total of 560,729 pounds of golden king crab were caught from all fishing areas (Table 3.1). Most of the catch occurred during February, March, and April (Table 3.2). Frederick Sound, Chatham Strait, and Icy Strait produced the majority of the catch (Tables 3.6–3.10.).

Dockside sampling data from commercial landings indicated that 45 percent of the crab were recruit crab and the average size was 166.9 mm in carapace length. These data are quite similar to good recruitment events, which supported the fishery in the early to mid-1980s (Table 3.4). The average weight of 6.7 pounds per crab and the average CPUE of 3.9 crab per pot lift were close to the overall average for all years. (Table 3.5). About 45 percent of the crab landed were postrecruit 1s (Table 3.4), indicating increased recruitment during the preceding seasons. In combination, these data suggested that significant recruitment had entered the fishery over the past few seasons and stock abundance was increasing**.**

2000/2001 SEASON SYNOPSIS

The 2000/2001 golden king crab fishery opened concurrent with the commercial Tanner crab fishery on February 15, 2001. At the request of the King and Tanner Crab Task Force, two of the main fishing areas, Frederick Sound and Icy Strait, were each divided into two smaller fishing areas. Frederick Sound was divided into North and South Frederick Sound, and Icy Strait was divided into East and West Icy Strait. The department announced guideline harvest levels by fishing area through a news release. Fishing was again monitored through fish tickets and dockside interviews during landings but also included soliciting inseason logbook data by cell or satellite phone. This inseason data dramatically improved the capability to target GHLs. Fishing seasons were closed by area using emergency orders. The earliest closure was Frederick Sound, which closed on March 5, and the last fishery to close was Cape Ommaney on July 18. During the season, 45 permit holders fished and a total of 530,765 pounds of golden king crab were caught from all fishing areas (Table 3.1). Most of the catch occurred during February, March, and April (Table 3.2). Frederick Sound, Chatham Strait, and Icy Strait produced the majority of the catch (Tables 3.6–3.10.). Eight permit holders that had the option of fishing for both golden king and Tanner crab bypassed the Tanner and targeted only golden king crab, and three additional permit holders switched to golden king crab before the end of the Tanner crab season.

Dockside sampling data from commercial landings indicated that 35 percent of the crab were recruit crab and the average size was 168.9 mm in carapace length. These data are quite similar to good recruitment events, which supported the fishery in the early to mid-1980s (Table 3.4). The average weight of 7.2 pounds per crab and the average CPUE of 3.0 crab per pot lift were close to the overall average for all years. (Table 3.5). Almost 46 percent of the crab landed were postrecruit 1s (Table 3.4), indicating increased recruitment during the preceding seasons. In combination, these data suggested that significant recruitment had entered the fishery over the past few seasons and stock abundance was increasing**.**

This year, the department and the fleet worked together to increase observer coverage for this fishery. Some vessels volunteered to have ADF&G observers onboard to document the catch of sublegal and female crab. To further this objective, vessels with observers were allowed to close the escape rings or 9-inch stretch mesh panel on 10 of their pots. This program provided the first objective data on the relative abundance of sublegal and female crab in this fishery. One observer trip each was made in 4 of the 5 fishing areas with Clarence Strait being unobserved.

2001/2002 OUTLOOK

Fish ticket and dockside sampling data provide a postseason analysis of stock condition, and a limited estimate of future stock conditions. Some differences in data quantity exist between fishing areas, but there is good data for four of the five fishing areas. The Frederick Sound and Cape Ommaney stocks both appear healthy with above average catch rates, good recruitment, and good abundances of sublegal crab. The Icy Strait areas had low to average catch rates relative to the long term average, and the amount of recruitment has declined over the past two years. In addition, the observer trip found few sublegal crab, indicating that this stock may decline in the future. Although catch rates were high in the Chatham Strait area, the abundances of new recruits to the fishery and sublegal crab were low. It appears the good fishing in recent years is due to 2- or 3-year classes of crab in this area. We have very few data regarding the Clarence Strait fishing area. The catch rates for 2000/2001 were slightly below average.

The department has announced a GHL of 540,000 pounds for the 2001/2002 season, apportioned to the five fishing areas. The GHLs for the Icy Strait and Frederick Sound areas were further apportioned into two subareas each. This is a decrease from the 2000/2001 GHL of 630,000 but is similar to the actual catch for the 2000/2001 season. The decrease is due to low recruitment or catch rates or both in some areas. The fleet anticipates that golden king crab stock abundance will remain the same or increase, and this expectation will result in similar or increased effort compared to the 2000/2001 season. As long as CPUE remains relatively high, and favorable market conditions prevail, sufficient effort should be available to achieve the announced GHLs. The department's intention is to continue to collect size frequency and shell condition information from each area and use fish ticket and logbook data to monitor and manage the fisheries. Each of the five fishing areas will be managed as separate stocks of crab. In the long term, we would like to develop a population model using all of the available data to provide the department with an estimate of stock abundance so that future harvests can be guided by sound management practices.

Table 3.1. Registration Area A (Southeast Alaska) commercial golden king crab catches, number of landings, permits and pounds per landing by accounting season (October through September), 1972/1973 to present.

Season	Total Catch (Pounds)	Number of Landings	Number of Permits	Pounds per Landing
1972/73	177,544	85	12	2,089
1973/74	71,783	38	11	1,889
1974/75	32,332	28	6	1,155
1975/76	68,842	33	7	2,086
1976/77	75,046	30	6	2,501
1977/78	83,407	54	14	1,544
1978/79	52,476	66	10	795
1979/80	167,823	82	20	2,046
1980/81	704,622	158	30	4,459
1981/82	652,870	254	53	2,570
1982/83	804,437	283	70	2,843
1983/84	973,100	307	89	3,169
1984/85	848,818	277	124	3,064
1985/86	698,249	211	61	3,309
1986/87	1,016,011	222	51	4,576
1987/88	949,205	235	56	4,039
1988/89	967,611	226	58	4,281
1989/90	628,903	256	61	2,456
1990/91	426,877	220	39	1,940
1991/92	227,949	153	33	1,490
1992/93	103,781	80	18	1,297
1993/94	30,318	51	13	594
1994/95	39,344	65	19	605
1995/96	15,718	38	11	413
1996/97	67,164	62	16	1,083
1997/98	244,484	87	18	2,810
1998/99	367,782	105	30	3,503
1999/00	560,729	144	46	3,894
2000/01[a]	530,765	189	45	2,808

[a] Most recent season data is considered preliminary.

Table 3.2. Registration Area A (Southeast Alaska) commercial golden king crab catches (in thousands of pounds) by season (October through September), by month, 1972/1973 to present.

Season	Oct	Nov	Dec	Jan	Feb	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.
1972/73	27.6	36.5	18.6	18.1	22.1	0.0	7.6	6.4	6.0	11.1	9.6	13.9
1973/74	4.4	0.1	0.0	16.5	12.2	8.7	24.8	0.0	0.0	0.0	0.0	5.0
1974/75	3.7	8.1	3.2	5.4	0.0	2.8	1.9	0.0	0.0	0.0	0.0	7.2
1975/76	16.1	5.4	7.9	*	*	13.2	1.7	*	0.0	0.0	*	*
1976/77	*	9.1	*	*	*	9.1	7.5	*	0.0	0.0	0.0	*
1977/78	*	*	*	14.2	10.0	11.7	14.3	0.0	0.0	0.0	0.0	*
1978/79	*	4.4	8.7	9.7	5.9	5.9	3.7	*	0.0	0.0	*	3.3
1979/80	4.7	8.2	4.9	9.0	16.5	34.8	44.9	10.4	*	8.8	0.0	18.7
1980/81	36.2	43.2	18.2	79.3	178.3	171.0	87.7	*	*	*	*	14.0
1981/82	43.0	41.7	44.0	17.9	65.8	80.9	70.5	20.9	82.0	70.0	55.8	60.4
1982/83	174.1	77.5	58.7	0.0	115.8	168.3	15.0	46.8	27.5	36.6	59.8	24.1
1983/84	23.7	50.6	11.0	33.7	152.7	303.5	287.8	53.4	32.2	11.0	6.9	6.6
1984/85	166.9	250.8	19.9	14.9	117.8	172.5	22.3	19.6	24.9	*	19.1	11.9
1985/86	39.9	53.8	41.1	32.1	240.9	249.1	8.6	4.5	14.7	*	*	*
1986/87	147.5	80.2	46.3	326.2	136.5	70.5	67.9	39.3	39.0	*	27.8	17.3
1987/88	13.2	15.2	10.3	264.6	297.4	80.2	64.0	79.0	63.8	29.3	20.1	12.2
1988/89	*	*	*	*	220.9	329.2	122.6	101.1	63.0	44.3	41.8	35.0
1989/90	78.3	28.3	6.5	5.9	71.1	145.3	68.2	60.3	55.7	42.2	23.3	43.7
1990/91	51.3	14.0	8.4	*	38.1	89.3	67.9	60.0	52.0	14.3	*	11.6
1991/92	18.7	17.7	16.0	10.8	8.7	48.0	54.9	29.6	*	*	*	*
1992/93	*	*	*	*	2.9	28.2	22.3	13.9	8.6	*	*	0.0
1993/94	0.0	0.0	0.0	0.0	2.6	9.0	13.1	5.6	0.0	0.0	0.0	0.0
1994/95	0.0	0.0	0.0	0.0	6.3	14.5	15.2	3.4	0.0	0.0	0.0	0.0
1995/96	0.0	0.0	0.0	0.0	2.2	*	5.0	*	*	0.0	0.0	0.0
1996/97	0.0	0.0	0.0	0.0	6.4	26.0	12.6	13.3	8.8	0.0	0.0	0.0
1997/98	0.0	0.0	0.0	0.0	14.5	81.0	95.2	40.3	*	0.0	0.0	0.0
1998/99	0.0	0.0	0.0	0.0	67.4	226.0	57.5	*	*	0.0	0.0	0.0
1999/00	0.0	0.0	0.0	0.0	256.0	237.1	51.3	14.1	*	0.0	0.0	0.0
2000/01[a]	0.0	0.0	0.0	0.0	201.2	156.3	120.7	36.1	*	*	0.0	0.0

[a] Most recent season data is considered preliminary.

* Where number of permits participating is 3 or less, information is confidential.

Table 3.3. Registration Area A (Southeast Alaska) commercial golden king crab catches (in thousands of pounds) by district and season through 1972/1973 to present.

	District															
Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Total
1972/73								*	*	128.6	19.0	*		*	*	177.5
1973/74										50.4	17.1			*	*	71.8
1974/75								*	17.2	14.4	*				*	32.3
1975/76								*		*		*	*	*	*	68.8
1976/77									*	*	*	*			*	75.0
1977/78								*	*	74.4	7.3	*	*		*	83.4
1978/79										39.5	6.7	*		*	*	52.5
1979/80								*		*	21.8	61.8		*	21.5	167.8
1980/81								*	*	204.6	29.8	169.7	*	236.9	55.9	704.6
1981/82								*	*	248.2	48.8	92.9	6.2	152.4	49.4	652.9
1982/83						13.9	*	*	109.3	186.5	44.6	228.7	*	151.7	39.3	804.4
1983/84						*	*	*	135.4	222.7	24.6	438.2	*	46.5	91.7	973.1
1984/85		*				*	*	*	192.3	375.9	34.4	153.3	2.5	52.8	13.7	848.8
1985/86	*	*				18.2	*	4.6	234.0	324.4	35.6	23.3	*	24.8	25.4	698.2
1986/87	*					*	*	*	609.3	298.8	43.8	*		1.5	16.2	1016.0
1987/88						*	*	*	298.0	318.6	36.9	195.7		16.4	67.0	949.2
1988/89						*	*	10.3	413.6	338.1	9.1	14.1		37.5	12.0	967.6
1989/90	*					*		*	229.8	145.6	6.8	204.5		30.2	8.8	628.9
1990/91						*		*	213.3	83.2	18.5	82.9		19.3	8.7	426.9
1991/92						*	*	*	137.8	11.8	21.0	38.1		*	4.0	227.9
1992/93						*		*	*	*	11.2	*		*		103.8
1993/94									*	*	5.6	*		*		30.3
1994/95						*			*	*	9.0	2.8		*	*	39.3
1995/96									*		3.0	*		*		15.7
1996/97						*		*	*	3.9	15.7					67.2
1997/98						*	*	*	150.9	18.6	21.0	13.0		*	*	244.5
1998/99		*				*	*	*	190.8	57.8	13.1	37.4		52.1	*	367.8
1999/00						*	*	*	236.3	168.1	11.8	34.6		101.1		560.7
2000/01						*	*		246.4	114.6	11.6	104.5	*	41.2	*	530.8

* Where number of permits is 3 or less, the information is considered confidential.

Table 3.4. Registration Area A (Southeast Alaska) commercial golden king crab size frequency and shell condition data collected during dockside sampling, 1969/1970 to present.

Season	Number of Boats Sampled	Number of Crab Sampled	Carapace Length (mm)		Recruitment					
			Average	Range	Recruits[a]	% PR +1[b]	% PR +2[c]	% PR +3[d]	% PR +4[e]	% Skip Molts[f]
1969/70	4	72	173.5	154-202	30.56	44.4	22.2	2.8	0.0	12.5
1970/71	19	1,151	174.6	142-214	25.7	48.9	20.7	3.2	1.5	12.2
1971/72	21	1,705	175.1	150-211	19.9	47.6	27.4	4.5	0.7	23.5
1972/73	11	1,040	174.7	149-208	24.2	50.2	21.6	3.3	0.8	13.0
1973/74	8	604	173.0	146-210	26.8	39.4	28.8	4.2	0.8	28.8
1974/75	2	201	169.5	151-204	40.3	47.8	10.0	2.0	0.0	11.9
1975/76	9	837	172.1	145-208	35.1	43.2	18.5	3.0	0.2	10.8
1976/77	2	153	168.8	152-205	46.4	39.2	12.4	1.3	0.7	16.3
1977/78	8	727	170.0	149-201	23.7	37.6	30.0	8.1	0.7	55.4
1978/79	6	498	171.0	145-201	35.4	39.6	23.2	1.6	0.2	20.6
1979/80	6	478	169.8	145-203	37.7	35.6	19.0	7.4	0.4	32.8
1980/81	20	1,354	171.6	140-206	31.6	45.8	18.6	3.7	0.3	20.2
1981/82	6	533	176.4	148-214	24.0	43.7	23.8	6.6	1.9	18.2
1982/83	18	1,567	169.8	146-204	35.7	43.1	17.7	3.5	0.1	24.0
1983/84	10	703	169.6	150-196	40.9	41.3	15.2	2.6	0.0	15.8
1984/85	12	1,368	165.3	148-196	58.3	31.9	9.0	0.7	0.0	16.0
1985/86	17	1,765	166.6	148-198	51.1	40.4	7.8	0.8	0.0	12.4
1986/87	43	4,609	168.0	143-210	42.1	41.4	13.1	3.2	0.2	22.5
1987/88	66	5,726	173.2	148-214	21.1	48.0	24.1	6.9	0.2	26.6
1988/89	78	7,320	172.8	142-210	25.6	46.5	24.0	3.8	0.2	24.1
1989/90	91	8,378	176.6	146-211	16.3	46.2	31.3	5.9	0.4	22.8
1990/91	80	7,108	175.4	147-214	23.0	40.5	28.3	7.2	1.1	24.7
1991/92	61	5,157	172.8	146-213	31.1	38.1	22.0	7.4	1.5	26.9
1992/93	18	1,454	171.8	148-211	34.9	40.8	18.6	4.6	1.0	20.5
1993/94	13	1,080	171.1	133-206	30.7	52.7	14.2	2.3	0.1	16.2
1994/95	13	1,037	171.1	137-208	34.0	43.6	16.9	5.1	0.5	22.1
1995/96	15	351	172.2	146-208	36.1	40.5	19.7	2.9	0.9	12.7
1996/97	19	1,585	165.9	143-206	54.6	33.8	10.2	1.3	0.1	16.0
1997/98	32	2,490	166.0	147-212	38.2	45.0	15.0	1.7	0.0	33.9
1998/99	35	2,401	166.7	145-210	46.3	44.0	8.8	1.0	0.0	20.4
1999/00	59	4,154	166.9	138-203	45.5	45.0	9.2	0.3	0.0	18.4
2000/01	85	5,717	168.9	143-206	34.9	45.9	18.1	1.2	0.0	25.8

[a] Recruits = all new and soft shell crab ≥ 151 mm and ≤ 167 mm carapace length.
[b] PR +1 = all new and soft shell crab ≥ 168 mm and ≤ 184 mm, and old shell crab ≥ 151 mm and ≤ 167 mm, carapace length.
[c] PR +2 = all new and soft shell crab ≥ 185 mm and ≤ 201 mm, and old crab ≥ 168 mm and ≤ 184 mm, and very old ≥ 151 mm and ≤ 167 mm, carapace length.
[d] PR +3 = all new and soft shell crab ≥ 202 mm and all old ≥ 185 mm and ≤ 201 mm, and very old ≥ 168 mm and ≤ 184 mm, carapace length.
[e] PR +4 = all old and very old where carapace length ≥ 202 mm.
[f] Skip molts = all old and very old crab.

Table 3.5. Registration Area A (Southeast Alaska) commercial golden king crab CPUE and average weight data collected during dockside sampling and interviews, 1973/1974 to present.

Season	Number of Boats Sampled	Number of Pots Lifted	Number of Crab Captured	Average Catch Per Pot	Range of Catch/Pot	Weight (lb) Average	Range	Estimated No. of Crab Caught[a]	Percent of Catch Sampled[b]
1973/74	1					6.91	6.91-6.91		
1974/75	0								
1975/76	1					8.75	8.75-8.75	4,507	18.57
1976/77	0								
1977/78	2					7.47	7.20-7.58	11,161	6.51
1978/79	0								
1979/80	1					8.75	8.75-8.75	19,179	2.49
1980/81	9					7.75	6.55-8.78	90,887	1.49
1981/82	2	50	1,368	27.36	27.36-27.36	7.36	6.53-7.78	88,762	0.60
1982/83	15	1,697	3,482	2.05	1.09-5.32	7.05	6.48-7.94	114,172	1.37
1983/84	8	300	900	3.00	3.00-3.00	7.06	6.28-7.63	137,809	0.51
1984/85	12					6.44	5.74-7.28	131,757	1.04
1985/86	17	2,471	11,743	4.75	1.58-7.51	6.58	5.98-8.47	106,072	1.66
1986/87	40	9,023	35,064	3.89	1.57-16.4	6.86	6.16-8.46	148,123	3.11
1987/88	62	14,365	52,275	3.64	0.09-12.69	7.31	6.50-10.58	129,676	4.42
1988/89	78	23,811	83,295	3.50	0.43-8.98	7.23	5.75-8.68	133,144	5.50
1989/90	90	18,068	40,560	2.24	0.32-8.71	8.03	6.45-9.40	78,566	10.66
1990/91	80	14,544	29,877	2.05	0.31-8.84	7.79	6.50-10.99	54,790	12.97
1991/92	61	9,850	19,072	1.94	0.18-6.58	7.44	6.30-9.78	30,347	16.99
1992/93	18	2,507	6,627	2.64	0.52-4.88	7.36	6.38-8.19	14,107	10.31
1993/94	13	1,425	2,771	1.94	0.65-3.42	7.16	6.51-8.27	4,232	25.52
1994/95	13	1,389	2,164	1.56	0.51-2.67	7.25	6.55-9.15	5,428	19.10
1995/96	15	835	208	0.25	0.01-1.06	7.19	6.03-8.50	2,202	15.94
1996/97	19	2,782	5,284	1.90	0.30-3.28	6.61	5.90-8.00	10,164	15.59
1997/98	31	4,665	17,503	3.75	0.08-6.67	6.57	5.81-7.67	36,095	6.90
1998/99	37	7,143	33,901	4.75	1.02-10.00	6.54	5.86-7.36	56,236	4.27
1999/00	59	14,999	57,871	3.86	0.62-10.00	6.68	4.80-7.86	83,880	4.95
2000/01	87	16,586	49,593	2.99	0.36-7.47	7.19	6.11-8.52	73,802	7.75

[a] Calculated by dividing fish ticket weight data by dockside sampling average weight per crab data.
[b] Calculated by dividing number of crab sampled for length frequency by estimated number of crab harvested.

Table 3.6. Frederick Sound management area golden king crab catches by pounds, landings, permits, and pounds per landing, 1974/1975 to present.

Season	Total Catch (Pounds)	Number of Landings	Number of Permits	Pounds per Landing
1974/75	29,002	24	6	1,208
1975/76	*	*	*	*
1976/77	*	*	*	*
1977/78	81,814	50	11	1,636
1978/79	45,116	47	6	959
1979/80	82,005	53	12	1,547
1980/81	219,792	59	11	3,725
1981/82	293,924	113	16	2,601
1982/83	244,918	79	24	3,100
1983/84	271,081	92	30	2,946
1984/85	427,454	113	54	3,782
1985/86	418,755	99	32	4,229
1986/87	486,810	81	32	6,010
1987/88	409,744	66	33	6,208
1988/89	499,751	100	40	4,997
1989/90	189,561	108	42	1,755
1990/91	159,956	118	25	1,355
1991/92	57,571	61	20	944
1992/93	26,998	44	13	613
1993/94	15,825	43	10	368
1994/95	18,588	46	14	404
1995/96	6,525	29	10	225
1996/97	28,550	50	15	571
1997/98	96,691	42	14	2,302
1998/99	172,492	40	20	4,312
1999/00	311,263	65	28	4,789
2000/01[a]	208,373	86	32	2,423

[a] Most recent season data is considered preliminary.

* When the number of permits participating is 3 or less, information is confidential.

Table 3.7. Lower Chatham management area golden king crab catches by pounds, landings, permits, and pounds per landing, 1981/1982 to present.

Season	Total Catch (Pounds)	Number of Landings	Number of Permits	Pounds per Landing
1981/82	*	*	*	*
1982/83	89,870	22	9	4,085
1983/84	78,271	12	4	6,522
1984/85	112,704	24	11	4,696
1985/86	163,694	37	13	4,424
1986/87	412,789	86	16	4,799
1987/88	181,492	38	8	4,776
1988/89	224,211	42	7	5,338
1989/90	184,327	44	6	4,189
1990/91	111,348	42	5	2,651
1991/92	52,419	29	5	1,807
1992/93	*	*	*	*
1993/94	*	*	*	*
1994/95	*	*	*	*
1995/96	*	*	*	*
1996/97	*	*	*	*
1997/98	70,709	19	4	3,721
1998/99	73,934	17	5	4,349
1999/00	79,208	28	6	2,829
2000/01[a]	126,579	34	10	3,723

[a] Most recent season data is considered preliminary.

* When the number of permits participating is 3 or less, information is confidential.

Table 3.8. Icy Strait/Lynn Canal management area golden king crab catches by pounds, landings, permits, and pounds per landing, 1975/1976 to present.

Season	Total Catch (Pounds)	Number of Landings	Number of Permits	Pounds per Landing
1975/76	9,036	15	5	602
1976/77	*	*	*	*
1977/78	*	*	*	*
1978/79	7,360	19	6	387
1979/80	85,818	29	11	2,959
1980/81	484,830	99	23	4,897
1981/82	306,459	128	40	2,394
1982/83	423,573	165	54	2,567
1983/84	584,421	187	64	3,125
1984/85	223,269	104	67	2,146
1985/86	82,557	49	23	1,684
1986/87	45,228	36	18	1,256
1987/88	285,487	114	36	2,504
1988/89	191,084	85	26	2,248
1989/90	243,611	108	29	2,255
1990/91	111,313	61	20	1,824
1991/92	51,730	39	11	1,326
1992/93	8,189	10	4	818
1993/94	5,092	8	4	636
1994/95	4,307	12	8	358
1995/96	*	*	*	*
1996/97	0	0	0	0
1997/98	39,378	18	6	2,187
1998/99	92,335	36	7	2,565
1999/00	135,817	30	18	4,527
2000/01[a]	149,279	72	23	2,073

[a] Most recent season data is considered preliminary.

* When the number of permits participating is 3 or less, information is confidential.

Table 3.9. Cape Ommaney management area golden king crab catches by pounds, landings, permits, and pounds per landing, 1981/1982 to present.

Season	Total Catch (Pounds)	Number of Landings	Number of Permits	Pounds per Landing
1981/82	*	*	*	*
1982/83	19,124	7	4	2,732
1983/84	30,756	9	4	3,417
1984/85	61,644	13	10	4,741
1985/86	*	*	*	*
1986/87	47,136	17	7	2,772
1987/88	54,264	21	7	2.584
1988/89	46,076	14	4	3.291
1989/90	*	*	*	*
1990/91	44,260	24	4	1,844
1991/92	61,007	31	5	1,967
1992/93	*	*	*	*
1993/94	*	*	*	*
1994/95	0	0	0	0
1995/96	0	0	0	0
1996/97	0	0	0	0
1997/98	*	*	*	*
1998/99	*	*	*	*
1999/00	25,709	20	5	1,285
2000/01[a]	37,560	14	4	2,683

[a] Most recent season data is considered preliminary.

* When the number of permits participating is 3 or less, information is confidential.

Table 3.10. Clarence Strait management area golden king crab catches by pounds, landings, permits, and pounds per landing, 1981/1982 to present.

Season	Total Catch (Pounds)	Number of Landings	Number of Permits	Pounds per Landing
1981/82	*	*	*	*
1982/83	17,375	13	4	1,336
1983/84	*	*	*	*
1984/85	23,747	23	5	1,032
1985/86	26,466	25	4	1,058
1986/87	*	*	*	*
1987/88	*	*	*	*
1988/89	*	*	*	*
1989/90	*	*	*	*
1990/91	0	0	0	0
1991/92	*	*	*	*
1992/93	*	*	*	*
1993/94	0	0	0	0
1994/95	*	*	*	*
1995/96	0	0	0	0
1996/97	*	*	*	*
1997/98	*	*	*	*
1998/99	*	*	*	*
1999/00	*	*	*	*
2000/01[a]	*	*	*	*

[a] Most recent season data is considered preliminary.

* When the number of permits participating is 3 or less, information is confidential.

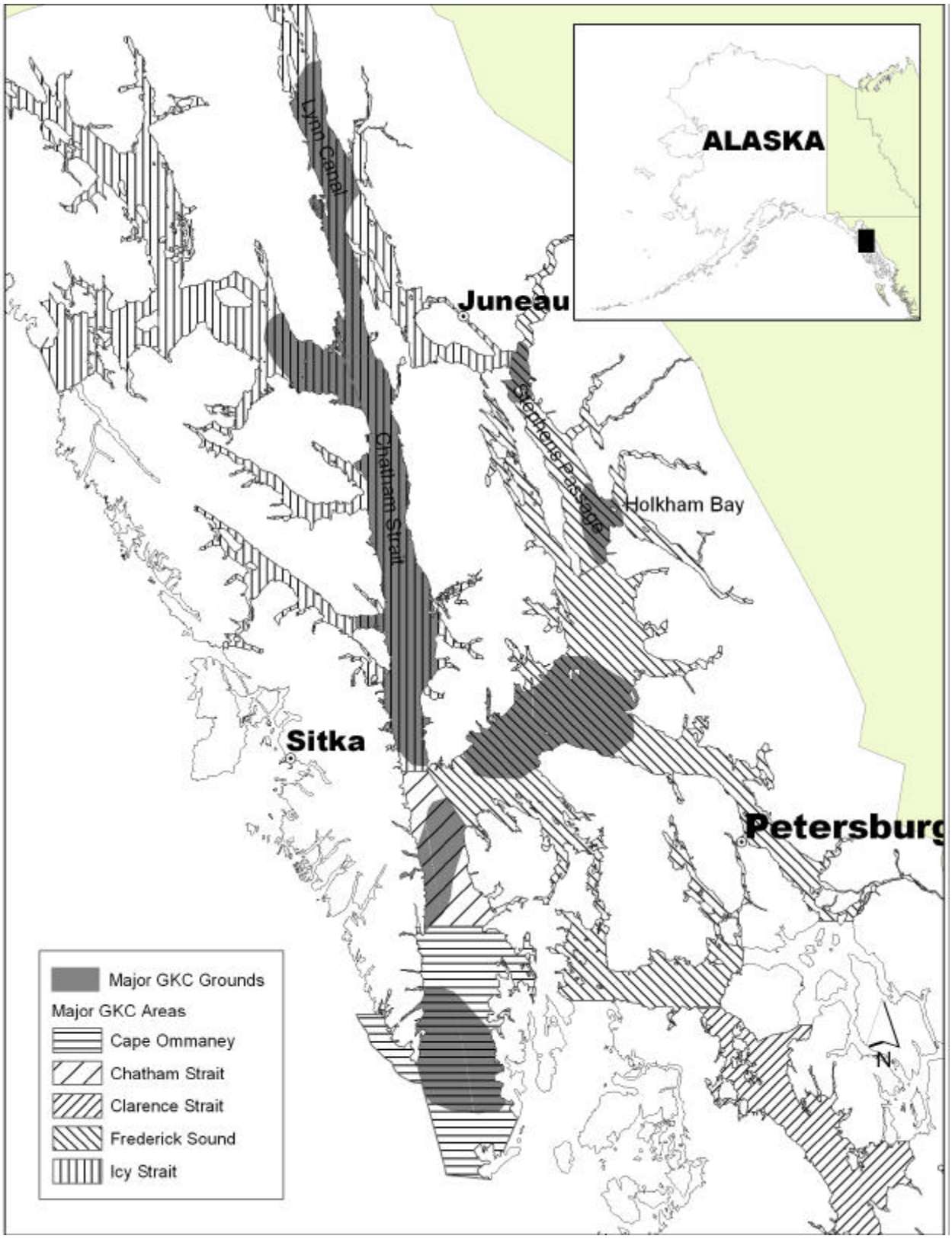

Figure 3.1. Map showing major golden king crab (GKC) areas and fishing grounds in Southeast Alaska.

Section 4
Southeast Alaska Tanner Crab Fisheries

REPORT TO THE BOARD OF FISHERIES, 2002

SOUTHEAST ALASKA

TANNER CRAB FISHERIES

By

Gretchen H. Bishop,
Jan Rumble,
and
Susan E. Merkouris

Regional Information Report[1] No. 1J02-14

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

February 2002

[1] The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data, this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

TABLE OF CONTENTS

Page

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

The Tanner crab, *Chionoecetes bairdi*, is a brachyuran (true) crab that inhabits temperate and subarctic waters of the eastern Pacific Ocean from northern California to the Bering Sea. *C. bairdi* and the closely-related snow crab, *C. opilio*, support significant Alaska commercial fisheries, but only *C. bairdi* is known to be present in Registration Area A (Southeast Alaska) of Region I. The Southeast Alaska fishery occurs primarily in the more northern waters of the region.

Southeast Alaska has been a superexclusive registration area for Tanner crab since 1985. Vessels registered to fish for Tanner crab in Southeast Alaska cannot fish in any other registration area in Alaska for Tanner crab during the same registration year (August 1–July 31).

The Tanner crab pot fishery in Southeast Alaska was the first Tanner fishery in the state to be placed under limited entry. As of November 2001, 36 permanent permits have been assigned with 62 interim-use permits still being evaluated for inclusion under the permanent 83-permit limit. Ring net gear (CFEC permit category T10) is also legal in Southeast Alaska and is not under limitation.

Until the late 1980s, most of the participants in this fishery used pot gear and smaller vessels between 35 to 50 feet in length, although there were also a few vessels up to about 80 feet. Since then, the intensifying fishery has promoted use of larger vessels by pot fishers and the entry of more small-boat participants using ring nets. Almost all the pot vessels have live-tanking capability. Winter crabbing for Tanner and other crabs is generally pursued as a secondary, though seasonally important, source of income.

Currently, lighter cone or pyramid nesting pots that occupy less deck space are more often used than the heavier, seven by seven foot stacking pots originally designed for king crab in the Bering Sea fisheries. The choice of gear may be predicated on the species to be targeted during mixed-species fisheries for Tanner and golden king crab, with the use of conical or pyramid pots favored for Tanner crab.

Current regulations in Southeast Alaska allow harvest of only male Tanner crab larger than 5 1/2 inches (140 mm) in carapace width (CW) during a winter season (starting on February 15) late in the seasonal biological harvest window for this species. At industry request during the March 1999 BOF meeting, the regulatory ‘maximum harvest level’ of 2 million pounds was changed to a ‘guideline harvest level’ (GHL) of 2 million pounds. Although the average harvest for this species in Southeast Alaska for the last 10 years (1991/1992 to 2000/2001 seasons) has been close to 2 million pounds, recent trends in abundance suggest that it probably is not a sustainable annual harvest level. The underlying management strategy is abundance based to allow harvest of males considered surplus to the reproductive needs of this species.

We began limited preseason stock assessment surveys in two areas, Icy Straits, and the backside of Douglas Island in October 1997; in 1998 we added Holkham Bay, in 1999 Glacier Bay, and in 2001 Thomas Bay, Port Camden, and an additional strata in Holkham Bay were added. All six areas are major fishing grounds. The survey currently provides a preseason index of abundance for major fishing grounds. Bycatch of Tanner crab during the red king crab survey provides additional information on Tanner crab abundance in other fishing grounds. Our goal is to use preseason abundance information from these two surveys to estimate the size of the Tanner crab population and set preseason GHLs by applying a harvest rate to the population size. However, the department is still several years away from

being able to do this. In recent years, we have been working with the recently established King and Tanner Crab Task Force to fine tune survey protocols.

The Tanner crab fishery depends heavily on recruits (all new and soft shell crab ≥140 mm and ≤164 mm CW) and typically harvests over half the available crab in the same season in which they molt to legal size. The exploitation rate, which is the percentage of all legal crab caught in a season, was modeled for 1983/1984 through 1991/1992 seasons and averaged 60 percent. This is on the higher end of the generally acceptable range for this species in this state and other species with similar life histories in general. Port sampling data shows a high percentage of recruit crab in the fishery in the 1990s, suggesting that the harvest rate continues to average at least 60 percent.

As a result of management's inability to assess the strength of annual recruitment and the potential risks of simply allowing the maximum harvest level to be taken, the target harvest level for many seasons since the early 1980s was set lower than the 2 million pound ceiling established by regulation. It was thought that the fishery could probably sustain higher harvest levels during some seasons, but the risk of allowing consistently higher harvest each season was considered unacceptably high. However, beginning with the 1995/1996 season, the department began setting the season length based upon the estimated length of time to harvest 2 million pounds if stock abundance was average, and announcing the closure preseason.

Principal management objectives for this fishery are to attain the allowable harvest level, to minimize sorting of juveniles and females, and to avoid fishing during molting and mating periods. If a major district needs to be closed for any of these reasons then the entire registration area is closed. This prevents pulse fishing, wherein a fleet moves from areas being closed into fewer and fewer remaining open areas. Pulse fishing tends to concentrate increasing effort onto stocks that have already been heavily fished. Avoidance of pulse fishing is a secondary management objective.

Inseason Management Activities

Inseason management activities include an extensive port-sampling program. Size and shell condition data are taken for legal male crab as they are delivered to processors. Skippers are interviewed to collect fishing location and effort information. By the end of the first week of a season, port sampling provides good indications of size composition of the legal segment of the population and the percent of the fishery comprised of the recruit class. Port sampling is the main management activity undertaken during the season.

At least one aerial over flight is conducted during the first few days of the fishery to map the distribution of the fleet and to document the effort on the most heavily fished grounds. By the end of the second fishing day effort is generally concentrated on the most productive grounds. The distribution of vessels and gear indirectly indicates the relative importance of an area to the overall harvest and provides checks on fish ticket and logbook data reported by crab fishers.

When seasons were longer than about three weeks, fish ticket data could be used to estimate catch rate (daily catch per vessel) and exploitation rate (the percent of legal crab taken by the fleet) inseason. The 1990/1991 season, which opened for 18 days, was barely long enough to allow this kind of management. This method of estimating overall exploitation rate relies on multiple landings by the same vessel during

the course of the season. Since vessels land crab about once per week this management strategy is best applied to fisheries of at least 21 days. There was also a limitation in the speed at which catch data could be obtained from the fleet that complicated inseason management of seasons shorter than about 21 days. The last season in which a fishery lasted 21 or more days was in 1989/1990.

Mandatory logbooks detailing daily fishing activities and catch per pot were initiated in 1993/1994 to try to obtain better exploitation rate estimates. Starting in the 1995/1996 season daily reporting was attempted to expedite transfer of catch data from the fishing fleet to the resource managers. Reporting was conducted by VHF radio marine operator calls, cellular phones, satellite phones, single side-band radio, and via relay from catcher boats through tenders to processors. Although the program was continued for two seasons, it was dropped beginning in the 1997/1998 season. The primary reason for discontinuing daily reporting was that compliance was low and seasons had shortened to the point where inseason management was no longer being conducted. The low compliance was at least partially because the communication technology available could not assure confidentiality, but also because there was no enforcement as there was no regulation requiring daily reporting.

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

As the fishery has intensified and shortened to less than 10 days, and without daily reporting, inseason management is no longer possible. For the last six seasons, since the 1995/1996 season, management has been forced to set the season length by preseason news release. This season length has been based upon averaging previous seasons' cumulative catch curves to estimate the length of time to harvest a GHL of 2 million pounds if stock abundance was average. Inseason management activities are currently limited to port sampling for size and shell condition of crabs delivered to processors and limited aerial over flights of major fishing grounds.

Management by Major Fishing Ground

In the past, harvest and sampling data were summarized by district. However, major fishing grounds often do not coincide with district boundaries. To better reflect observed and reported fishing patterns, three major, geographically distinct fishing grounds and one general category for all other areas in Southeast Alaska were defined. These were designated Icy Strait, Lynn Canal/Upper Stephens Passage, Frederick Sound/Lower Stephens Passage, and other areas. These 'ground' designations correspond approximately to District 14, combined Districts 11 and 15, and combined Districts 8, 9, and 10, respectively. As resources to conduct surveys by fishing grounds become available, it may be possible to establish harvest rates and GHLs by fishing ground. This would permit harvests at, or near, the most appropriate rate for each fishing ground. Conceivably, this could allow a higher total harvest and more management flexibility.

FISHERY DEVELOPMENT AND HISTORY

General Traditional Pot Fishery

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

Since the 1968/1969 season, the Southeast Alaska fishery has produced an average of 1,637,724 pounds per season (Table 4.1). Regardless of the length of the seasons (the fishery was open all year prior to 1973), most of the harvest was historically taken between January through April of each year from the major fishing grounds (Table 4.2). The 1970s were characterized by gradual fishery development and corresponding managerial response.

Fishing pace increased with the shortened 1981/1982 season, when 74 vessels landed a record 3,302,211 pounds between December 1, 1981 and April 16, 1982. About two-thirds of this total was reportedly caught in Icy Strait, where the previous long-term, average harvest had been about 725,000 pounds. Increasing demand for Tanner crab product, an earlier season opening in Southeast Alaska than in other registration areas to the north and west, open registration, and the record landing in 1981/1982 attracted 97 vessels to the fishery in the 1982/1983 season. Many larger crab vessels on their way to Kodiak and Bering Sea fisheries fished in Southeast Alaska first.

The 1982/1983 season was closed after two weeks by an emergency order based on onboard observer catch rate information collected during the first few weeks of the fishery from the Icy Strait fishing grounds. Both the fishing effort and exploitation rates were extremely high. Management could not respond effectively to the huge influx of effort into the Icy Strait fishery. Although the fishery was closed by emergency order after the shortest season on record up to that time, the stocks were depressed in District 14 for many subsequent years.

There was no fishery in calendar year 1983. During the BOF shellfish meeting early in the year the board changed the season opening date in Southeast Alaska to February 10 in order to match the rest of the state. This action, in itself, discouraged larger vessels from fishing in Southeast Alaska during the 1983/1984 season because more lucrative grounds to the north and west would be opening at the same time.

Locally based vessel operators and processors also requested limited entry status for the king and Tanner crab fisheries in Southeast Alaska. In response, the Commercial Fisheries Entry Commission (CFEC) initiated a permit moratorium on January 1, 1984.

The CFEC instituted a complex system of combined permits for the three species of king crab and Tanner crab. The full impact of the moratorium was not felt until the 1985/1986 season because many prospective entrants to the 1984/1985 fishery had exercised the two-year option on permit renewals and obtained their permits prior to January 1, 1984, which was the cutoff date for the moratorium on new permit issuance. Moreover, the CFEC was forced by their regulatory guidelines to set the maximum

number of permits to be allowed at 83, which was a relatively high level. This has proved to have long-term implications, such as progressively shortened seasons as the efficiency of the fleet improved.

Southeast Alaska was designated a superexclusive registration area during the spring board meeting in 1985. This action was in continued reaction to the frantic 1982/1983 season. It was intended to discourage operators of larger vessels, whose primary sources of income were from crab fisheries in other registration areas, from fishing in Southeast Alaska.

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

The harvest has declined over the past four seasons from 2,701,322 pounds in 1997/1998 to 1,295,680 in 2000/2001 (Table 4.1) although season lengths have remained the same or increased. Preseason survey data corroborates that low harvests are due to reduced population size.

Recent seasons have resulted in a concentration of effort on the most productive grounds. Many marginal grounds are ignored as searching for productive areas becomes increasingly difficult to justify economically during the first few productive days of the season. Limiting preseason prospecting to more than 30 days in advance of the fishery has exacerbated this concentration of effort. Nonetheless, the fleet has adapted to short seasons in many ways. The use of tenders, the frequencies of vessel leasing, crew size, pot pulling frequency, and bait volumes have all increased. Thus the fishery has continued to intensify despite the extremely short seasons. The only factor that has seemed to mitigate the intensity of this fishery in recent years has been the strong market and recruitment of the golden king crab fishery.

Management is responding by developing a fishery-independent stock assessment program. In time, perhaps within three years, preseason survey data may support more flexible management based on stock composition and abundance.

Experimental Pot Fishery

Exploratory Tanner Crab Fisheries

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

In general, these fisheries were scheduled during periods of the year to minimize overlapping with traditional fisheries for red king and Tanner crab. A major assumption was that these fisheries would be

of such low intensity that mortality associated with fishing during known molting and mating periods would be minimal. Special permits and logbooks were required because the primary purpose of this fishery was to provide assessments from areas that were not surveyed by the department.

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

Deepwater Chionoecetes Species Fisheries

Upon request by crab fishers interested in exploratory fishing for deepwater species related to *Chionoecetes bairdi*, the department issued permits for *C. tanneri* and managed a fishery by emergency order from September 16, 1983 through October 31, 1983, and December 5, 1983 through January 24, 1984. Harvest levels did not support development of an economically viable fishery at that time. Requests for permits for *C. tanneri* and *C. angulatus* recurred in 1995, permits were issued for the period from March 5, 1995 through April 30, 1995, and the fishery was managed by emergency order. The fleet expended more effort and more areas were fished, but results were discouraging. The number of crab per pot, pots pulled per hour, and crab meat-fullness were low, precluding the development of a viable fishery.

Ring Net Fishery

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

The number of ring net crab fishers reporting landings increased from five in the 1984/1985 season to peak at 92 in the 1989/1990 season, and gradually declining to 44 by the 1993/1994 season. The total climbed again to 109 for the 1999/2000 season in expectation of higher prices. In the 2000/2001 season, only 81 ring net permit holders reported landings.

Total ring net harvest increased from 1,451 pounds in the 1984/1985 season to 101,045 pounds, or 5.0 percent of the total harvest, during the 1989/1990 season. During the 1990 winter meeting, the board passed a number of restrictive regulations intended to cap the ring net portion of the total Tanner harvest at a maximum of four percent. Since adoption of these restrictions, ring net harvests were consistently below this level until recent years. Ring net harvest has since fluctuated between 33,544 and 88,921 pounds, exceeding the four percent cap in the 1996/1997, 1999/2000, and 2000/2001 seasons respectively at 4.3 percent, 5.3 percent, and 5.8 percent of the total harvest.

Bitter Crab Syndrome

By the 1984/1985 season processors handling crab from the extreme north end of Southeast Alaska, notably Lynn Canal, were receiving complaints from consumers of bitter tasting meat from some section-packed crab. Most management staff thought it was associated with a normal pre-molt condition in Tanner crab since the fishery during that historical period partially extended into the initial phases of the annual molt in some areas. However, a few samples of crab blood collected during the 1985/1986 season revealed that the bitterness was closely correlated with presence and concentration of a systemic parasite. This systemic parasite is a highly specialized dinoflagellate of the genus *Hematodinium*.

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

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

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

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

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

A partial solution to the transport and disposal problem might be to schedule the season during an earlier stage of the course of infection. Presumably, there should be a period during October or early November when most crab infected during the previous year have died and the majority of the newly infected crab have not yet developed an unpleasant taste. A harvest period between October and November is acceptable from a biological standpoint for the harvest of Tanner crab. Preliminary analyses of crab

samples from some bays indicate meat recoveries high enough for crabs to be marketable during this period. Small-scale openings or test fisheries may be an appropriate means of harvesting and utilizing crab from areas with high infection rates.

Although symptoms of the disease are less pronounced from October to early November, they are not absent. Meat recovery is lower during October and November than in February. Crabs are not as readily caught because they are deeper and less aggregated during October and November than later in the winter. Despite the disadvantages, a season that minimizes waste and possibly hazardous disposal of infected crab may be preferable to the current season.

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

In the 1992/1993 season, product transfer restrictions were imposed on vessels fishing in District 15. Any Tanner crabs caught in District 15 could only be shipped live out of district if they were transferred onto tenders within the district and water from holding tanks on the tenders were not discharged while the crabs were being transported to on-shore processors located in other districts. This requirement was intended to reduce handling of bitter crab and minimize the risk of spreading the infection to stocks between high incidence districts and processors. Enforcement of the restriction was difficult. There have been no similar restrictions to fishing in District 15 since that season.

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

The bitter crab problem does not appear to be diminishing. High percentages of bitter crab, in excess of 40 percent from some districts, are beginning to encourage processors to explore alternate processing or product options for bitter crab. A cooperative study in the early 1990s by a processor and various state agencies on seasonality of bitter crab rates and intensity suggested that it might be possible to process less-infected bitter crab for alternate product or value-added marketing.

REGULATION DEVELOPMENT

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

Fishing Seasons and Periods

Prior to 1963 there were no seasons designated for Southeast Alaska. Tanner crab could be caught at any time during the year. In 1963 the season was set at January 1 through December 31. The season was first shortened in some areas in 1969, largely to facilitate management of the red king crab fishery. In 1974 the season was closed by emergency order on May 15.

In 1974, the season starting date was changed to September 1. During much of the 1970s the season started on September 1 and closed by emergency order in April or early May. In 1981 the season started on December 1, 1981 and was closed on April 16, 1982 by emergency order after a record harvest of over 3.0 million pounds. In 1982 the season was closed by emergency order in mid-December after two weeks of fishing, because of unprecedented effort and heavy concentration in District 14. In early 1983 the season starting date was changed to February 10.

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

Size Restrictions

A minimum size of 5½ inches carapace width was implemented in 1976 for males and persists to the present. This size permits nearly all males at least one season, and possibly two, of reproductive activity prior to attainment of legal size.

Quotas and GHRs

A Guideline Harvest Level (GHL) of 1,750,000 pounds was first set in 1976. It was revised downward to a GHR of 750,000 to 1,500,000 pounds in 1978. In 1979 the GHR was revised to 750,000 to 2,500,000 pounds. In response to locally high harvest rates and the subsequent effects on the stocks in Icy Strait in the early 1980s, the GHR was then revised downward to between 0 and 2 million pounds in 1985. This range was sufficient to provide a relatively stable harvest until the 1997/1998 season when an unanticipated shift in effort to non-traditional fishing grounds south of Petersburg and west of Wrangell pushed the total season harvest to over 2.7 million pounds. If the increased harvest from non-traditional grounds were discounted from the total harvest, the harvest from traditional districts would have totaled a little more than 2.0 million pounds. Following the Board of Fisheries meeting in 1990, the GHL was changed to a maximum allowable harvest of 2.0 million pounds. After the 1999 Board of Fisheries meeting, the maximum allowable harvest was changed to a guideline harvest level of 2.0 million pounds.

Gear Restrictions

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

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

In 1984 fishing with pots or storing pots in the water 10 days before the start of the season was prohibited. In 1985, the preseason fishing prohibition was lengthened to 14 days. Starting in 1986 a 10-day preseason, in-water storage period was allowed with some restrictions. Since 1987 preseason gear storage for a period of 10 days before the start of the season was permitted under some conditions. Beginning with the 1999/2000 season, vessels and persons registered for the commercial Tanner crab fishery could not fish with any commercial, sport, subsistence, or personal use gear except for commercial Dungeness and shrimp pot gear for 30 days prior to the start of the season.

Since 1981 in-water pot storage was permitted for 72 hours after the season closure. Also in 1985 post-season pot storage was allowed for seven days after closure of the entire registration area or 72 hours after closure of a portion of the area.

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

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

for both ring nets and pots. Wording was incorporated to prevent use of ring net gear to conduct preseason test fishing under the guise of subsistence or personal use fishing.

Other Regulations

Retention of soft-shelled crab was expressly prohibited from 1954 through 1968. Hold inspections were initiated in 1974. Also in 1974 Southeast Alaska and Yakutat were combined into a single nonexclusive registration area. In 1975 preseason hold inspections and vessel registrations were required. A preseason registration deadline was in effect in 1978. The first allocative area closure of the commercial fleet in favor of the personal use fishery was in Gastineau Channel. Chemical baits or lures were permitted to attract shellfish. A registration deadline of 30 days prior to the season start was implemented in 1979. Also in 1979 the hold inspection requirement was dropped because it was considered unnecessary in Southeast Alaska and Yakutat. It is unclear when the 30-day registration deadline was repealed but it was put back into regulation beginning in 2000.

In 1981 Fritz Cove and Auke Bay were closed to commercial fishing. In 1982 the commercial closures were repealed, along with the closure of Gastineau Channel. In 1983, the board passed proposals establishing Southeast Alaska and Yakutat as a superexclusive registration area, and permit holders in the Southeast Alaska fishing districts requested a moratorium on new permits. Vessels could have only one legal limit aboard, in storage, or fishing during the season. Gastineau Channel was closed again to commercial fishing. A moratorium on new pot permits was implemented in 1985.

Beginning with the 1987/1988 season, Southeast Alaska and Yakutat were designated separate registration areas, A and D, respectively. By the mid-1990s effort in the fishery had effectively increased because processors started sending tenders to distant fishing grounds to support their fishing fleets, crab fishers were using larger vessels, and more were using full limits of gear. Efficiency and intensity increased, as seasons grew progressively shorter. Daily harvest logbooks have been mandatory since the start of the 1993/1994 season. Logbooks were one of the last remaining options left to managers trying to conduct inseason management. When the season length shortened to less than two weeks in 1994/1995, inseason management became increasingly untenable and a lower pot limit proposal was prepared for presentation to the BOF in 1995.

The board adopted a reduction in pot limit to 80 pots, although the department had requested a limit of 50 pots. The board directed the department to assess the feasibility of using daily radio reports of catch and effort from all pot crab fishers in the 1995/1996 and 1996/1997 seasons to support continuing inseason management based on real-time catch data. The reporting requirement was dropped after two seasons due to technological challenges and low compliance.

1998/1999 SEASON SYNOPSIS

The 1998/1999 season opened at 12:00 noon AST, on February 15, 1999. In a preseason news release, the department set the season length at six days with the closure scheduled for noon on February 21. The department estimated that an opening of six days would result in a harvest of 1,500,000 to 2,000,000 pounds depending on the actual stock abundance, which was unknown. This conclusion was based on historical harvest rates, assuming overall stock conditions were similar to those of the past few seasons.

At the end of the opening 2,095,173 pounds of marketable crab plus 68,787 pounds of deadloss, for a total of 2,164,131 pounds, had been caught. As in the past, the major discard class was bitter crab, which accounted for 60,197 pounds of the total deadloss. It was probable that the reported bitter crab loss was actually much higher, since an unknown amount of bitters were sorted and discarded on the fishing grounds. At almost $2.13/pound, marketable product was worth at least $4,463,000 exvessel. The economic loss represented by the deadloss was conservatively set at $128,000.

A total of 180 pot and ring net permits were fished during the season. The 94 pot permit crab fishers landed 2,086,802 pounds of crab, of which 2,021,822 pounds were marketable. A total of 77,329 pounds, or about 3.6 percent of the total Tanner crab harvest, was reported landed by 86 ring net permit holders. Marketable crab comprised 73,351 pounds of the total ring net harvest and 3,923 pounds were deadloss, of which 2,288 pounds were due to bitter crab.

A summary of the harvest by fishing area indicated that about 1,589,934 pounds (73.5 percent) of the total season's harvest was taken from the three major fishing areas; Icy Strait, Lynn Canal/Stephens Passage, and Frederick Sound (Table 4.3).

The top six of the 13 onshore processors accounted for 90 percent of the total regional production this season. The major portion of the harvest was processed by processors based in Petersburg, with purchases also reported by plants in Juneau, Sitka, Hoonah, and Wrangell. Two ring-net catcher sellers reported sales.

Aerial surveys were not flown during the 1998/1999 Tanner crab season. Preseason stock assessment surveys were conducted in Holkham Bay, Stephens Passage, and Icy Strait in October 1998.

Port Sampling Data

Port sampling information summarized for the registration area indicated that, at 154.2 mm, the overall average size of crabs was above the ten-year average and the percent of recruits, representing crabs entering the fishery for the first time, was below the ten-year average (Table 4.4). Catch per unit effort was estimated at 17.2 crabs per pot, the second highest since the start of the “modern” period in this fishery. The average weight of 2.6 pounds/crab, however, was unremarkable (Table 4.5).

Data from Icy Strait suggest that the average size and weight were higher than recent seasons and the percent of recruit crabs declined from the 80 percent or higher levels of the previous five seasons (Tables

4.6 and 4.7). As evidenced by a higher percent of recruit, this stock was fished at a higher exploitation rate than stocks in other areas and may be at greater risk. The size and weight of crabs sampled from Lynn Canal (Tables 4.8 and 4.9) were high and the estimated percent of recruit crab continued a 5-year declining trend. Percent recruit was the lowest of the three major grounds. This is because of the high percentage of bitter crab in the harvests from Lynn Canal, which results in a lack of interest in fishing here during increasingly short seasons. This means that Lynn Canal has been fished at a lower exploitation rate than the other traditional fishing grounds, and that more large crab are being left on the grounds. Size and weight data from Frederick Sound (Tables 4.10 and 4.11) were within the usual range of recent seasons, as was the percent of recruits in the harvest.

1999/2000 SEASON SYNOPSIS

The 1999/2000 season opened at 12:00 noon AST, on February 15, 2000. In a preseason news release the department set the season length at six days with the closure scheduled for noon on February 21. The department estimated that an opening of six days would result in a harvest of 2 million pounds or less depending on the actual stock abundance, which was unknown. This conclusion was based on historical catch rates, assuming overall stock conditions were similar to those of the past few seasons.

At the end of the opening, 1,612,215 pounds of marketable crab, plus 92,123 pounds of deadloss, for a total of 1,704,408 pounds, had been caught. As in the past, the major discard class was bitter crab, which accounted for 82,193 pounds of the total deadloss. It was probable that the reported bitter crab loss was actually much higher, since an unknown amount were sorted and discarded on the fishing grounds. At almost $2.24/pound, marketable product was worth at least $3,611,000 exvessel. The economic loss represented by the deadloss was conservatively set at $184,000.

A total of 183 pot and ring net permits was fished during the season. The 91 pot permit crab fishers landed 2,615,043 pounds of crab, of which 2,479,297 pounds were marketable. A total of 86,119 pounds, or about 3.2 percent of the total Tanner crab harvest, was reported landed by 92 ring net permit holders. Marketable crab comprised 84,978 pounds of the total ring net harvest and 1,141 pounds were deadloss, of which 452 pounds were due to bitter crab.

A summary of the harvest by fishing area indicated that about 1,445,569 pounds (85 percent) of the total season's harvest was taken from the three major fishing areas; Icy Strait, Lynn Canal/Stephens Passage, and Frederick Sound (Table 4.3).

Five of ten shore-based processors processed 92 percent of the crab harvested this season. A record seven ring net catcher-sellers reported sales. The major portion of the harvest was processed by processors based in Petersburg, with purchases also reported by plants in Juneau, Sitka, Hoonah, and Wrangell.

Aerial surveys were flown over most of the fishing grounds in northern Southeast Alaska on February 17, 2000 to document effort and location of fishing vessels. Most of the vessels were observed on fishing grounds near Pleasant Island and on the backside of Douglas Island.

Preseason stock assessment surveys were conducted in Holkham Bay, Stephens Passage, Icy Strait, and for the first time in Glacier Bay in October 1999. Cost recovery was conducted on a trial basis during this survey and a total of 1,748 pounds of Tanner crab was harvested and sold to a processor.

Port Sampling Data

Port sampling information summarized for the registration area indicated that, at 154.9 mm, the overall average size of crabs was above the ten-year average and the percent of recruits, representing crabs entering the fishery for the first time, was below the ten-year average (Table 4.4). Catch per unit effort was estimated at 12.9 crabs per pot, down considerably from the previous two seasons. The average weight of 2.7 pounds/crab was also slightly above the ten-year average (Table 4.5).

Data from Icy Strait suggest that the average size and weight were higher than average and the percent of recruit crabs continued to decline (Tables 4.6 and 4.7). The consistently high percentage of recruitment in the Icy Strait fishery indicates that it is fished at a higher exploitation rate than stocks in other areas and may be at greater risk of recruitment failure. In stark contrast, while the size and weight of crabs sampled from Lynn Canal (Tables 4.8 and 4.9) was also high, the estimated percent of recruit crab was the lowest of the three major grounds. This is a result of the high percentage of bitter crab in the harvest from Lynn Canal. As a result, it is likely that Lynn Canal has been fished at a lower exploitation rate than the other traditional fishing grounds, resulting in more large crab being left on the grounds. Size and weight data from Frederick Sound (Tables 4.10 and 4.11) were within the usual range of recent seasons, as was the percent of recruits in the harvest.

2000/2001 SEASON SYNOPSIS

The 2000/2001 season opened at 12:00 noon AST, on February 15, 2001. In a preseason news release, the department set the season length at seven days, with the closure scheduled for noon on February 22. The department estimated that an opening of seven days would result in a harvest of 2 million pounds or less, depending on the actual stock abundance, which was unknown. This conclusion was based on historical catch rates, assuming overall stock conditions were similar to those of the past few seasons.

At the end of the opening, 1,225,010 pounds of marketable crab, plus 70,149 pounds of deadloss, and 521 pounds of personal use, for a total of 1,295,680 pounds, had been caught. As in the past, the major discard class was bitter crab, which accounted for 67,187 pounds of the total deadloss. It was probable that the reported bitter crab loss was actually much higher, since an unknown amount of bitters were sorted and discarded on the fishing grounds. At almost $2.05/pound, marketable product was worth at least $2,511,000 exvessel. The economic loss represented by the deadloss was conservatively set at $138,000.

A total of 164 pot and ring net permits were fished during the season. The 83 pot permit crab fishers landed 1,220,383 pounds of crab, of which 1,152,617 pounds were marketable. A total of 75,297 pounds, or about 5.8 percent of the total Tanner crab harvest was reported landed by 81 ring net permit holders. Marketable crab comprised 72,393 pounds of the total ring net harvest and 2,904 pounds were deadloss, of which 2,593 pounds were due to bitter crab.

A summary of the harvest by fishing area indicated that about 1,102,793 pounds (85 percent) of the total season's harvest was taken from the three major fishing areas; Icy Strait, Lynn Canal/Stephens Passage, and Frederick Sound (Table 4.3).

Six of nine on-shore processors handled 91 percent of the regional production this season. The major portion of the harvest was processed by processors based in Petersburg, with purchases also reported by plants in Juneau, Hoonah, Sitka, and Wrangell. Two ring-net and one pot gear catcher-seller also reported sales.

Two aerial surveys were flown over most of the Tanner crab fishing grounds in northern and central Southeast Alaska on February 17 and 20, 2001, to document effort and location of fishing vessels. In the north, very little effort was observed in the Pleasant Island area and most effort was concentrated on the backside of Douglas Island. In the central area, major concentrations of vessels were observed in Thomas Bay and Holkham Bay with moderate effort in Port Camden and Seymour Canal as well.

Preseason stock assessment surveys were conducted in Holkham Bay, Stephens Passage, Icy Strait, and Glacier Bay in October 2000. No cost recovery was conducted this season because of the low production the previous season and general disenchantment of the fleet.

Port Sampling Data

Port sampling information summarized for the registration area indicated that, at 154.7 mm, the overall average size of crabs was above the ten-year average and the percent of recruits, representing crabs entering the fishery for the first time, was below the ten-year average (Table 4.4). Catch per unit effort was estimated at 11.9 crabs per pot and was the lowest in eight seasons. The average weight of 2.7 pounds/crab was slightly above the ten-year average (Table 4.5).

In contrast, Icy Strait crab were smaller in carapace width and average weight with a higher percentage of recruit crabs than in recent years (Tables 4.6 and 4.7), suggesting that although catch rates for the current season were lower than average (13.0 crab/pot) some recruitment might be expected soon. Lynn Canal Tanner crab remained large, with a lowest catch rate and percentage of recruit crab in five seasons (Tables 4.8 and 4.9). Like Lynn Canal, Frederick Sound crab size and weight (Tables 4.10 and 4.11) were well above average, while catch rates and percentage of recruits in the harvest were below average.

SUMMARY OF STOCK STATUS: OUTLOOK for 2001/2002 SEASON

The current Tanner crab season will open by regulation for six days for pot fishers and five days for ring net fishers on February 15, 2002. It will still be another three to five years before the department can develop population estimates, determine an appropriate harvest rate, and set abundance-based preseason GHLs.

Current stock status is poor. Fishery logbook data indicates that catch per unit effort (CPUE) has declined over the past four seasons, survey data also indicates a trend of declining CPUE over this period, and port sampling data indicates below average recruitment to the fishery since 1997. Survey data also suggests good pre-recruit abundance so it may simply be that we are currently in a recruitment trough. However, it also appears that current harvest rates are leading to increased reliance upon less stable single-year class fisheries. Unpublished modeling by our biometrician indicates that harvest rates in the late 1980s averaged around 60 percent of legal males. Tanner crab harvests for this period, averaged 1.6 million pounds. Managers of the *C. bairdi* fishery in the eastern Bering Sea currently target a harvest rate of 40 percent of legal males (Zheng and Kruse 1999). Thus, it appears that a 2-million pound GHL may not be a sustainable average harvest level. This may be because bitter crab syndrome has increased in prevalence, sea otters have reduced Tanner crab populations in some areas, and we have lost some fishing grounds in Glacier Bay. Also, we have probably lost crab to handling mortality. Escape rings were not required effective July 1998 and the average pot hauls per day from logbook data has increased, decreasing the ability of female and sublegal males to escape even in the case that escape rings are present.

A reasonable long-term approach to ensuring the health of the Southeast Alaska Tanner crab fishery includes continued development of the stock assessment program to better allow managers to determine appropriate harvest rates and to set pre-season GHLs, effort restrictions to slow the pace of this fishery, and an inseason management program.

LITERATURE CITED

Zheng, J., and G. Kruse. 1999. Evaluation of harvest strategies for Tanner crab stocks that exhibit periodic recruitment. Journal of Shellfish Research 18:667-679.

Table 4.1. Traditional commercial Tanner crab pot and ring net harvest by permit, number of landings, pounds, and pounds per permit in Registration Area A, 1968/1969 to present.

	Pot Fishery				Ring Net Fishery					Combined Gear Total
Season	Permits	Landings	Pounds	Total Harvest	Permits	Landings	Pounds	Pounds per Permit	Percent Total Harvest	Pounds
1968/69	29	78	176,572	6,089						176,572
1969/70	31	347	660,337	21,301						660,337
1970/71	12	72	167,378	13,948						167,378
1971/72	25	274	656,661	26,266						656,661
1972/73	31	354	1,600,748	51,637						1,600,748
1973/74	52	419	1,309,673	25,186						1,309,673
1974/75	51	244	863,751	16,936						863,751
1975/76	32	369	2,149,397	67,169						2,149,397
1976/77	55	381	2,563,775	46,614						2,563,775
1977/78	44	337	2,142,409	48,691						2,142,409
1978/79	38	313	1,559,769	41,047						1,559,769
1979/80	51	354	1,773,655	34,778						1,773,655
1980/81	58	418	2,020,071	34,829						2,020,071
1981/82	72	438	3,301,909	45,860						3,301,909
1982/83	95	173	1,106,080	11,643	*	*	*	*	< 0.1	1,106,459
1983/84	100	333	1,604,864	16,049						1,604,864
1984/85	77	261	1,127,833	14,647	5	6	1,451	290	0.1	1,129,284
1985/86	71	296	1,003,826	13,952	11	22	2,609	237	0.3	1,006,435
1986/87	67	260	1,120,373	16,722	7	11	3,601	514	0.3	1,123,974
1987/88	71	315	1,317,887	18,562	13	51	12,598	969	0.9	1,330,485
1988/89	76	241	1,582,648	20,568	63	142	62,621	994	3.8	1,645,269
1989/90	77	257	1,884,781	23,857	92	180	101,045	1,098	5.0	1,985,826
1990/91	75	198	2,184,844	29,131	36	88	56,749	1,576	2.5	2,241,593
1991/92	82	256	2,059,069	25,111	41	111	49,568	1,209	2.4	2,108,637
1992/93	83	219	1,529,152	18,424	51	100	33,544	658	2.1	1,562,696
1993/94	81	248	1,957,932	24,172	44	92	37,146	844	1.9	1,995,078
1994/95	91	241	2,414,037	26,528	82	185	73,576	897	3.0	2,487,613
1995/96	95	222	1,953,790	20,731	73	131	50,303	693	2.5	2,004,391
1996/97	94	226	1,818,884	19,350	70	184	81,764	1,171	4.3	1,900,648
1997/98	93	232	2,615,043	28,119	93	214	86,279	928	3.2	2,701,322
1998/99	94	193	2,086,802	22,200	86	173	77,329	899	3.6	2,164,131
1999/00	92	176	1,615,487	17,560	109	180	88,921	816	5.3	1,704,408
2000/01[a]	83	159	1,220,383	14,703	81	129	75,297	930	5.8	1,295,680

* Where number of permits participating is 3 or less, information is confidential.

[a] Most recent season data is considered preliminary.

Table 4.2. Traditional commercial Tanner crab harvest in thousands of pounds, by month and season in Registration Area A, 1968/1969 to present.

Season	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
1968/69	0.0	0.0	0.0	0.0	10.0	8.3	13.1	60.4	35.0	32.9	*	8.6	176.6
1969/70	24.4	30.6	17.5	18.7	19.7	97.2	214.4	149.6	21.1	*	*	*	660.3
1970/71	0.9	*	6.7	7.1	21.3	41.4	56.2	*	0.0	0.0	0.0	0.0	167.4
1971/72	0.0	29.9	31.0	39.0	29.4	17.9	91.6	203.5	148.5	58.5	*	1.0	656.7
1972/73	5.4	42.0	83.8	86.7	50.7	140.8	376.6	554.6	228.7	26.6	*	*	1,600.7
1973/74	29.4	91.8	94.8	87.3	69.5	126.3	314.7	406.2	89.8	0.0	0.0	0.0	1,309.7
1974/75	*	77.2	70.6	56.6	71.6	74.4	180.6	225.8	102.6	Closed	Closed	Closed	863.8
1975/76	13.3	110.3	125.4	107.1	159.7	367.4	634.6	460.0	171.5	Closed	Closed	Closed	2,149.4
1976/77	3.9	76.2	277.0	209.2	338.3	393.8	695.3	458.0	112.1	Closed	Closed	Closed	2,563.8
1977/78	29.4	162.6	139.5	176.0	149.9	303.8	592.5	504.7	84.0	Closed	Closed	Closed	2,142.4
1978/79	6.6	47.6	76.7	91.7	200.1	189.2	465.4	422.3	60.3	Closed	Closed	Closed	1,559.8
1979/80	60.7	55.7	74.5	61.0	153.9	440.0	607.9	282.4	37.5	Closed	Closed	Closed	1,773.7
1980/81	33.7	51.9	48.5	60.1	315.9	504.1	627.3	350.5	28.1	Closed	Closed	Closed	2,020.1
1981/82	Closed	Closed	Closed	870.8	597.7	708.7	809.4	315.2	Closed	Closed	Closed	Closed	3,301.8
1982/83	Closed	Closed	Closed	1,106.5	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	1,106.5
1983/84	Closed	Closed	Closed	Closed	Closed	866.0	727.5	Closed	Closed	Closed	Closed	Closed	1,604.9
1984/85	Closed	Closed	Closed	Closed	Closed	529.4	599.9	Closed	Closed	Closed	Closed	Closed	1,129.3
1985/86	Closed	Closed	Closed	Closed	Closed	575.8	425.7	Closed	Closed	Closed	Closed	Closed	1,006.4
1986/87	Closed	Closed	Closed	Closed	635.4	488.6	Closed	Closed	Closed	Closed	Closed	Closed	1,124.0
1987/88	Closed	Closed	Closed	Closed	787.7	542.8	Closed	Closed	Closed	Closed	Closed	Closed	1,330.5
1988/89	Closed	Closed	Closed	Closed	Closed	1,087.9	552.8	Closed	Closed	Closed	Closed	Closed	1,645.3
1989/90	Closed	Closed	Closed	Closed	Closed	1,233.4	740.7	Closed	Closed	Closed	Closed	Closed	1,985.8
1990/91	Closed	Closed	Closed	Closed	Closed	1,598.8	642.8	Closed	Closed	Closed	Closed	Closed	2,241.6
1991/92	Closed	Closed	Closed	Closed	Closed	1,727.2	381.5	Closed	Closed	Closed	Closed	Closed	2,108.6
1992/93	Closed	Closed	Closed	Closed	Closed	1,261.2	301.5	Closed	Closed	Closed	Closed	Closed	1,562.7
1993/94	Closed	Closed	Closed	Closed	Closed	1,555.4	441.7	Closed	Closed	Closed	Closed	Closed	1,995.1
1994/95	Closed	Closed	Closed	Closed	Closed	2,487.1	Closed	Closed	Closed	Closed	Closed	Closed	2,487.1
1995/96	Closed	Closed	Closed	Closed	Closed	2,020.4	Closed	Closed	Closed	Closed	Closed	Closed	2,004.4
1996/97	Closed	Closed	Closed	Closed	Closed	1,900.6	Closed	Closed	Closed	Closed	Closed	Closed	1,900.6
1997/98	Closed	Closed	Closed	Closed	Closed	2,701.3	Closed	Closed	Closed	Closed	Closed	Closed	2,701.2
1998/99	Closed	Closed	Closed	Closed	Closed	2,164.1	Closed	Closed	Closed	Closed	Closed	Closed	2,164.1
1999/00	Closed	Closed	Closed	Closed	Closed	1,704.4	Closed	Closed	Closed	Closed	Closed	Closed	1,704.4
2000/01[a]	Closed	Closed	Closed	Closed	Closed	1,295.7	Closed	Closed	Closed	Closed	Closed	Closed	1,295.7

* Where number of permits participating is 3 or less, information is confidential.

[a] Most recent season data is considered preliminary.

Table 4.3. Traditional commercial Tanner crab harvest in pounds by season, by fishing area in Registration Area A, 1971/1972 to present.

Season	Lynn Canal/ Upper Stephens Passage[a]		Icy Strait[b]		Frederick Sound/ LowerStephens Passage[c]		Other[d]		Total
	Pounds	% of S.E. Harvest	Pounds	% of S.E. Harvest	Pounds	% of S.E. Harvest	Pounds	% of S.E. Harvest	
1971/72	13,440	2.1	310,803	47.3	200,854	30.6	131,564	20.0	656,661
1972/73	177,661	11.1	505,203	31.6	443,106	27.7	474,778	29.7	1,600,748
1973/74	377,190	28.8	404,347	30.9	396,400	30.3	131,736	10.1	1,309,673
1974/75	19,116	2.2	371,115	43.0	289,758	33.6	183,762	21.3	863,751
1975/76	782,127	36.4	505,089	23.5	406,565	18.9	455,616	21.2	2,149,397
1976/77	599,719	23.4	1,034,642	40.4	529,849	20.7	399,565	15.6	2,563,775
1977/78	394,041	18.4	762,491	35.6	648,802	30.3	337,075	15.7	2,142,409
1978/79	308,765	19.8	655,043	42.0	511,769	32.8	84,192	5.4	1,559,769
1979/80	330,221	18.6	391,185	22.1	899,658	50.7	152,591	8.6	1,773,655
1980/81	321,594	15.9	682,011	33.8	641,945	31.8	374,521	18.5	2,020,071
1981/82	380,304	11.5	2,102,755	63.7	428,259	13.0	390,591	11.8	3,301,909
1982/83	96,505	8.7	816,016	73.8	108,918	9.8	85,020	7.7	1,106,459
1983/84	298,975	18.6	656,496	41.0	468,461	29.2	180,932	11.3	1,604,864
1984/85	366,496	32.5	223,404	19.8	365,395	32.4	173,989	15.4	1,129,284
1985/86	421,236	41.9	182,316	18.1	282,490	28.1	120,393	12.0	1,006,435
1986/87	410,674	36.5	242,010	21.5	317,528	28.3	153,762	13.7	1,123,974
1987/88	458,190	34.4	239,194	18.0	459,709	34.6	173,392	13.0	1,330,485
1988/89	476,600	29.0	349,098	21.2	629,771	38.3	189,800	11.5	1,645,269
1989/90	386,754	19.7	621,277	31.3	709,685	35.7	268,110	13.6	1,985,826
1990/91	442,952	19.8	798,460	35.6	617,839	27.6	382,342	17.1	2,241,593
1991/92	617,235	29.3	822,562	39.0	442,200	21.0	226,640	10.8	2,108,637
1992/93	452,466	29.0	490,117	31.4	433,002	27.7	187,111	12.0	1,562,696
1993/94	253,543	12.7	517,397	26.0	881,669	44.2	342,469	17.2	1,995,078
1994/95	409,187	16.5	715,656	28.8	1,051,899	42.3	310,871	12.5	2,487,613
1995/96	314,961	15.7	725,970	36.2	704,231	35.1	258,931	12.9	2,004,391
1996/97	293,328	15.4	673,305	35.4	490,581	25.8	443,434	23.3	1,900,648
1997/98	418,743	15.5	692,620	25.6	517,500	19.2	1,072,459	39.7	2,701,322
1998/99	339,264	15.7	691,595	32.0	559,075	25.8	574,197	26.5	2,164,131
1999/00	468,373	27.5	440,239	25.8	536,957	31.5	258,839	15.2	1,704,408
2000/01[a]	412,435	31.8	298,607	23.0	391,751	30.2	192,887	14.9	1,295,680

[a] Includes all of District 115 and District 111-30 through 111-99.
[b] Includes all of District 114.
[c] Includes all of District 110, District 111-01 through 111-29, and District 108-40 through 108-69.
[d] Includes all of Southeast Alaska outside of Lynn Canal Upper/Stephens Passage, Icy Strait, and Frederick Sound/Lower Stephens Passage.

Table 4.4. Summary of traditional commercial Tanner crab size frequency and shell condition data collected during dockside sampling in Registration Area A, 1970/1971 to present.

	Number of Sampled		Carapace Width (mm)		Recruitment	
Season	Boats	Crab	Average	Range	% Recruits[b]	% Postrecruits[c]
1970/71	1	99	157.0	137 - 177	68.4	31.6
1971/72	3	235	149.8	121 - 183	67.1	32.9
1972/73	3	429	156.9	128 - 183	73.4	26.6
1973/74	9	1,658	153.0	111 - 190	68.7	31.3
1974/75	6	616	157.4	127 - 190	64.2	35.8
1975/76	15	1,663	154.1	116 - 190	62.4	37.6
1976/77	28	3,753	154.5	124 - 192	53.3	46.7
1977/78	36	4,786	155.3	124 - 192	25.4	74.6
1978/79	28	3,273	154.9	129 - 198	44.4	55.6
1979/80	43	4,509	154.6	128 - 193	63.0	37.0
1980/81	43	4,223	152.3	125 - 192	70.0	30.0
1981/82	59	6,556	149.7	129 - 193	67.6	32.4
1982/83	55	5,808	151.3	123 - 185	74.6	25.4
1983/84	24	2,444	152.0	135 - 187	76.2	23.8
1984/85	24	3,211	152.2	135 - 197	77.1	22.9
1985/86	50	5,453	151.0	128 - 191	75.6	24.4
1986/87	62	6,984	152.2	133 - 188	72.8	27.2
1987/88	106	10,933	150.8	134 - 186	67.7	32.3
1988/89	45	10,030	152.8	133 - 194	58.4	41.6
1989/90	122	12,806	150.8	129 - 185	63.7	36.3
1990/91	124	13,050	152.2	131 - 193	74.2	25.8
1991/92	112	11,568	155.0	129 - 190	58.3	41.7
1992/93	104	11,175	151.9	130 - 192	66.0	34.0
1993/94	125	14,731	150.1	130 - 190	77.1	22.9
1994/95	156	18,235	151.6	99 - 191	74.1	25.9
1995/96	120	15,085	153.7	132 - 189	67.0	33.0
1996/97	124	13,123	152.4	132 - 196	71.2	28.8
1997/98	151	11,345	153.8	127 - 190	67.3	32.7
1998/99	121	9,306	154.2	125 - 193	60.1	39.9
1999/00	135	9,345	154.9	129 - 193	60.9	39.1
2000/01[a]	116	9,094	154.7	134 - 197	59.0	41.0

[a] Summary tables of all dockside sampling data includes data from Tables 8, 10, and 12 plus data collected that could not be assigned to a fishing area.

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

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

Table 4.5. Tanner crab catch rate and weights in Registration Area A, 1974/1975 to present. Data were collected during dockside sampling and interviews.[a]

Season	Number of			Avg. Catch	Range of	Weight (lb)		Estimated	Percent of
	Boats Interviewed	Pots Lifted	Crab Captured	Per Pot	Catch/Pot	Average	Range	No. Crab Harvested [b]	Harvest Sampled [c]
1974/75	1					3.2	3.2 - 3.2		
1975/76									
1976/77	18	58	1,400	24.1	24.1 - 24.1	2.6	2.2 - 3.0	992,862	0.4
1977/78	27	270	6,268	25.2	16.0 - 43.1	2.7	2.3 - 3.1	799,406	0.6
1978/79	12	386	5,469	19.8	17.2 - 22.4	2.6	1.6 - 2.9	599,911	0.6
1979/80	3	160	1,643	10.3	10.3 - 10.3	2.8	2.8 - 2.8	636,401	0.7
1980/81	5	300	4,560	15.2	15.2 - 15.2	2.8	2.1 - 3.2	721,454	0.6
1981/82	33	6,277	132,535	26.2	5.3 - 71.6	2.3	2.0 - 2.6	1,417,128	0.5
1982/83	39	2,043	26,152	15.0	4.9 - 29.2	2.5	2.1 - 3.0	450,342	1.3
1983/84	16	620	6,050	10.5	6.9 - 14.0	2.5	2.3 - 2.7	643,194	0.4
1984/85	22	2,070	25,455	11.6	3.9 - 17.4	2.6	2.3 - 3.0	435,351	0.7
1985/86	51	7,127	75,552	12.7	1.8 - 30.7	2.4	1.8 - 3.1	414,705	1.3
1986/87	59	14,192	135,615	12.3	2.9 - 32.0	2.5	2.1 - 2.9	451,395	1.6
1987/88	95	22,745	225,850	11.7	2.4 - 33.0	2.4	2.0 - 2.7	559,027	2.0
1988/89	99	26,387	350,878	15.2	0.4 - 33.0	2.5	2.1 - 3.1	655,909	1.5
1989/90	109	31,517	366,514	11.7	1.0 - 34.6	2.5	2.1 - 3.0	820,253	1.6
1990/91	122	39,168	568,956	15.3	1.3 - 40.3	2.6	2.1 - 3.0	872,215	1.5
1991/92	105	32,421	354,003	11.7	0.3 - 30.0	2.7	2.1 - 3.1	789,752	1.5
1992/93	89	27,471	299,288	11.1	2.5 - 31.7	2.5	2.1 - 3.0	617,666	1.8
1993/94	101	48,905	772,609			2.4	1.9 - 2.9	821,822	2.0
1994/95	152	56,061	938,582			2.5	2.0 - 3.0	995,041	1.8
1995/96	120	17,874	262,601	14.7	0.5 - 56.8	2.6	2.1 - 3.2	758,603	1.9
1996/97	124	21,130	370,121	14.8	0.4 - 65.8	2.5	2.1 - 3.1	760,259	1.7
1997/98	148	28,592	547,527	19.2	0.4 - 91.6	2.7	2.0 - 3.1	1,029,162	1.8
1998/99	121	25,736	420,029	17.2	0.3 - 60.6	2.6	2.1 - 3.3	823,499	1.1
1999/00	137	25,467	321,886	12.9	0.3 - 62.5	2.7	2.1 - 6.2	634,243	1.6
2000/01[a]	117	27,120	329,419	11.9	0.2 - 32.6	2.7	2.2 - 3.4	484,269	1.8

[a] Summary tables of all dockside sampling data includes data from Tables 4.6, 4.8, and 4.10 plus data collected that could not be assigned to a fishing area.
[b] Calculated by dividing fish ticket weight data from Table 4.5 by dockside sampling average weight per crab data.
[c] Calculated by dividing number of crab sampled for size frequency by estimated number of crab caught.

Table 4.6. Tanner crab catch rate and average weight in Icy Strait, 1975/1976 to present. Data were collected during dockside sampling and interviews.

Season	Number of			Avg.	Range of	Weight (lb)		Estimated No.	Percent of
	Boats Interviewed	Pots Lifted	Crab Captured	Catch/Pot	Catch/Pot	Average	Range	Crab Harvested [a]	Harvest Sampled [b]
1975/76	2					1.9	1.7 - 2.1	271,553	0.0
1976/77	2					2.1	2.0 - 2.2	492,687	0.0
1977/78	2					2.8	2.8 - 2.9	270,387	0.3
1978/79									
1979/80									
1980/81									
1981/82	21	5,074	118,704	29.5	5.3 - 71.6	2.3	2.0 - 2.6	910,284	0.3
1982/83	34	1,556	22,758	18.4	4.9 - 29.2	2.5	2.1 - 2.8	339,384	1.0
1983/84	8					2.5	2.4 - 2.7	260,514	0.3
1984/85	2					2.3	2.3 - 2.3	97,845	0.3
1985/86	1	98	811	8.3	8.3 - 8.3				
1986/87	4	1,087	11,342	12.1	6.0 - 20.8	2.4	2.3 - 2.5	102,114	0.5
1987/88	10	2,712	27,371	10.9	5.0 - 25.0	2.2	2.1 - 2.4	106,783	1.1
1988/89	17	5,812	69,339	13.3	0.4 - 26.7	2.3		153,113	1.2
1989/90	25	8,812	113,893	13.3	4.3 - 34.6	2.5	2.4 - 2.7	248,511	1.0
1990/91	34	11,683	153,781	14.1	4.2 - 40.3	2.4	2.3 - 2.6	329,942	1.1
1991/92	26	8,901	106,340	11.8	1.0 - 21.5	2.7	2.6 - 2.9	301,305	1.0
1992/93	30	9,676	102,557	10.9	2.5 - 26.7	2.6	2.3 - 3.0	188,507	2.2
1993/94	24					2.5	2.1 - 2.9	208,764	1.5
1994/95	39					2.5	2.2 - 3.1	290,917	1.6
1995/96	29	6,379	100,386	15.7	1.7 - 56.8	2.7	2.3 - 3.2	272,311	1.2
1996/97	32	9,662	142,227	15.3	0.9 - 65.8	2.5	2.3 - 2.8	269,415	1.4
1997/98	27	9,025	142,542	15.8	0.4 - 56.8	2.6	2.4 - 3.0	262,592	0.9
1998/99	25	5,359	104,753	22.2	1.1 - 45.9	2.7	2.4 - 3.1	256,146	0.7
1999/00	22	4,193	67,231	17.8	1.0 - 62.5	2.7	2.1 - 3.0	163,051	1.0
2000/01	16	4,554	55,540	13.0	3.6 - 25	2.5	2.2 - 2.7	119,443	1.0

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

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

Table 4.7. Icy Strait summary of traditional commercial Tanner crab size frequency and shell condition, 1971/1972 to present. Data was collected during dockside sampling.

	Number of Sampled		Carapace Width (mm)		Recruitment	
Season	Boats	Crab	Average	Range	% Recruits[a]	% Postrecruits[b]
1971/72	1	87	154	127 - 183	75.6	24.4
1972/73						
1973/74						
1974/75						
1975/76						
1976/77[c]	1	101	155.2	140 - 179	76.2	23.8
1977/78	4	828	157.6	126 - 190	22.3	77.7
1978/79						
1979/80	2	207	152.6	138 - 179	67.5	32.5
1980/81	23	2,863	148.8	130 - 181	67.4	32.6
1981/82	22	2,759	148.8	130 - 181	66.5	33.5
1982/83	32	3,317	151.0	123 - 178	74.7	25.3
1983/84	8	803	152.4	137 - 181	68.2	31.8
1984/85	2	309	146.6	136 - 165	55.8	44.2
1985/86	1	118	148.3	138 - 180	82.7	17.3
1986/87	4	485	148.4	136 - 176	42.8	57.2
1987/88	11	1,118	149.4	137 - 184	66.8	33.2
1988/89	18	1,875	151.8	135 - 184	64.9	35.1
1989/90	25	2,576	151.1	135 - 183	69.8	30.2
1990/91	33	3,472	150.0	132 - 180	83.9	16.1
1991/92	27	2,943	155.1	132 - 189	67.3	32.7
1992/93	36	4,079	152.4	135 - 189	71.4	28.6
1993/94	27	3,061	150.8	131 - 185	80.3	19.7
1994/95	40	4,666	150.5	135 - 190	85.6	14.4
1995/96	29	3,162	152.8	137 - 185	80.3	19.7
1996/97	32	3,859	151.6	133 - 186	80.5	19.5
1997/98	29	2,153	154.1	130 - 190	79.6	20.4
1998/99	26	2,158	155.2	133 - 187	76.8	23.2
1999/00	22	1,743	154.7	135 - 189	75.7	24.3
2000/01	16	1,197	151.8	138 - 183	84.1	15.9

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

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

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

Table 4.8. Tanner crab catch rate and average weight in Lynn Canal/Stephens Passage, 1976/1977 to present. Data was collected during dockside sampling and interviews.

Season	Number of			Avg.	Range of	Weight (lb)		Estimated	Percent of
	Boats Interviewed	Pots Lifted	Crab Captured	Catch Per Pot	Catch/Pot	Average	Range	No. Crab Harvested [a]	Harvest Sampled [b]
1976/77	10	58	1,400	24.1	24.1	2.6	2.5 - 3.0	228,652	1.1
1977/78	8	270	6,268	25.2	16.0 - 43.1	2.7	2.6 - 2.9	145,941	1.0
1978/79	6	386	5,469	19.8	17.2 - 22.4	2.7	2.6 - 2.8	115,211	1.1
1979/80	1	160	1,643	10.3	10.3 - 10.3				
1980/81									
1981/82	4	762	8,744	12.1	12.1 - 12.2	2.4	2.3 - 2.4	161,831	0.3
1982/83	8	487	3,394	10.5	5.5 - 13.7	2.4	2.4 - 2.5	39,911	3.3
1983/84	2					2.6	2.5 - 2.7	114,524	0.2
1984/85	6	875	8,832	10.2	3.9 - 14.0	2.6	2.5 - 2.7	141,504	0.6
1985/86	29	3,577	48,103	15.2	5.9 - 30.7	2.4	1.8 - 3.1	173,348	1.8
1986/87	37	5,000	64,115	14.0	5.0 - 32.0	2.5	2.1 - 2.8	161,032	2.8
1987/88	43	7,507	80,893	12.6	3.0 - 33.0	2.4	2.0 - 2.7	183,247	2.9
1988/89	41	7,355	94,795	14.2	4.5 - 37.4	2.6	2.2 - 3.1	178,389	2.0
1989/90	33	7,509	89,562	11.6	3.1 - 32.4	2.5	2.1 - 2.8	157,619	2.5
1990/91	14	2,555	28,802	12.2	2.0 - 25.3	2.6	2.5 - 2.8	168,434	0.6
1991/92	35	6,481	89,249	15.3	0.3 - 30.0	2.7	2.2 - 3.1	224,686	1.7
1992/93	22	6,163	68,767	11.4	4.3 - 19.4	2.7	2.2 - 3.0	170,742	1.6
1993/94	5					2.4	2.2 - 2.6	106,085	1.2
1994/95	30					2.5	2.2 - 3.0	161,734	2.6
1995/96	23	784	7,881	10.1	3.2 - 17.3	2.7	2.1 - 3.1	114,762	3.3
1996/97	26	1,820	51,099	28.1	13.2 - 48.3	2.7	2.3 - 3.1	109,335	2.2
1997/98	34	3,952	83,997	21.3	11.4 - 49.3	2.8	2.3 - 3.0	151,680	4.8
1998/99	18	2,187	56,616	28.8	13.6 - 60.6	3.0	2.9 - 3.3	113,088	1.2
1999/00	22	1,676	58,193	25.1	2.0 - 52.3	2.8	2.5 - 3.2	167,276	1.0
2000/01	30	5,235	76,503	12.6	0.8 - 29.7	2.8	2.4 - 3.2	147,298	1.5

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

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

Table 4.9. Lynn Canal/Stephens Passage summary of traditional commercial Tanner crab size frequency and shell condition, 1970/1971 to present. Data was collected during dockside sampling.

	Number of Sampled		Carapace Width (mm)		Recruitment	
Season	Boats	Crab	Average	Range	% Recruits[a]	% Postrecruits[b]
1970/71	1	99	157	137 - 177	68.4	31.6
1971/72						
1972/73						
1973/74						
1974/75						
1975/76	5	655	155.5	126 - 182	47.6	52.4
1976/77[c]	15	2,521	154.7	124 - 191	45.5	54.5
1977/78	10	1,382	155.7	131 - 187	20.2	79.8
1978/79	9	1,213	154.7	129 - 191	53.4	46.6
1979/80	5	555	153.3	128 - 186	74.8	25.2
1980/81	4	155	149.9	136 - 182	36.4	63.6
1981/82	5	518	151.4	131 - 193	71.1	28.9
1982/83	12	1,296	151.2	135 - 177	79.0	21.0
1983/84	2	204	153.8	139 - 177	67.0	33.0
1984/85	8	845	153.5	136 - 183	75.5	24.5
1985/86	29	3,166	151.6	135 - 191	72.4	27.6
1986/87	40	4,473	152.9	133 - 188	72.1	27.9
1987/88	52	5,300	151.9	135 - 185	71.5	28.5
1988/89	33	3,592	154.7	133 - 194	75.2	24.8
1989/90	35	3,945	151.9	129 - 185	69.1	30.9
1990/91	10	1,053	155.2	138 - 188	69.1	30.9
1991/92	37	3,796	156.7	129 - 190	51.2	48.8
1992/93	26	2,713	155.1	135 - 192	54.7	45.3
1993/94	12	1,292	151.7	130 - 190	68.3	31.7
1994/95	30	4,194	152.9	131 - 191	64.7	35.3
1995/96	23	3,317	155.9	136 - 186	54.1	45.9
1996/97	26	2,364	155.6	134 - 196	55.0	45.0
1997/98	35	2,679	158.3	136 - 189	50.7	49.3
1998/99	18	1,275	159.9	125 - 193	46.4	53.6
1999/00	23	2,157	158.4	129 - 188	47.0	53.0
2000/01	30	2,128	158.6	136 - 197	39.3	60.7

[a] Recruits = all new and soft shell crab =140 mm and =164 mm carapace width.
[b] Postrecruits = all new and soft shell crab = 165 mm and old and very old shell crab =140 mm carapace width.
[c] The first season that the regulatory size was 5 1/2-inch (140 mm) carapace width.

Table 4.10. Frederick Sound summary of traditional commercial Tanner crabs CPUE and average weight, 1974/1975 to present. Data was collected during dockside sampling and interviews.

Season	Number of			Avg.	Range of	Weight (lb)		Estimated	Percent of
	Boats Interviewed	Pots Lifted	Crab Captured	Catch Per Pot	Catch/Pot	Average	Range	No. of Crab Harvested [a]	Harvest Sampled [b]
1974/75	1					3.2	3.2		
1975/76									
1976/77	4					2.6	2.4 - 2.8		
1977/78	14					2.7	2.5 - 3.1		
1978/79	5					2.5	1.6 - 2.9		
1979/80	1					2.8	2.8		
1980/81									
1981/82	5					2.4	2.2 - 2.5	176,967	1.2
1982/83	4					2.7	2.4 - 3.0	40,947	2.0
1983/84	4					2.4	2.3 - 2.6	193,579	0.4
1984/85	7					2.7	2.3 - 3.0	134,336	0.8
1985/86	15	2,879	21,651	6.6	1.8 - 10.0	2.5	2.1 - 2.7	115,115	1.3
1986/87	10	3,423	36,051	11.7	2.9 - 22.2	2.5	2.1 - 2.9	128,035	0.9
1987/88	22	7,478	67,096	10.3	2.4 - 26.0	2.4	2.2 - 2.6	190,676	1.2
1988/89	30	8,957	150,506	18.8	4.5 - 42.7	2.4	2.3 - 2.8	242,605	1.4
1989/90	42	13,577	149,824	10.9	1.0 - 30.0	2.5	2.2 - 3.0	268,599	1.7
1990/91	35	13,188	209,884	16.1	5.7 - 38.6	2.6	2.1 - 3.0	230,171	1.8
1991/92	26	10,387	93,663	8.7	2.0 - 20.0	2.7	2.3 - 3.0	158,191	1.6
1992/93	19	6,449	75,307	12.0	3.3 - 31.7	2.5	2.1 - 2.8	176,736	1.4
1993/94	44					2.4	1.9 - 2.9	363,335	1.7
1994/95	45					2.5	2.0 - 3.0	414,133	1.4
1995/96	40	6,404	109,007	13.2	0.5 - 31.7	2.7	2.1 - 2.9	265,764	2.1
1996/97	35	6,704	79,087	11.3	6.4 - 34.7	2.6	2.1 - 2.9	192,117	1.8
1997/98	27	3,760	87,759	23.3	0.5 - 52.2	2.5	2.2 - 3.1	203,979	1.4
1998/99	21	6,812	107,573	19.2	1.1 - 53.1	2.5	2.1 - 2.9	223,630	0.7
1999/00	49	11,251	146,822	14.9	0.5 - 50.0	2.6	2.2 - 3.3	206,522	1.8
2000/01	39	8,859	99,509	13.0	0.2 - 32.6	2.8	2.3 - 3.3	139,911	2.1

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

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

Table 4.11. Frederick Sound summary of traditional commercial Tanner crab size frequency and shell condition, 1971/1972 to present. Data was collected during dockside sampling.

Season	Number of Sampled		Carapace Width (mm)		Recruitment	
	Boats	Crab	Average	Range	% Recruits[a]	% Postrecruits[b]
1971/72	2	148	147.4	121 - 180	60.0	40.0
1972/73	3	429	156.9	128 - 183	73.4	26.6
1973/74	9	1,658	153.0	111 - 190	68.7	31.3
1974/75	4	412	158.8	127 - 190	58.7	41.3
1975/76	3	304	154.3	135 - 183	75.3	24.7
1976/77[c]	8	820	155.3	129 - 192	67.7	32.3
1977/78	16	1,862	156.2	124 - 192	33.3	66.7
1978/79	17	1,851	155.5	131 - 198	42.3	57.7
1979/80	36	3,747	154.9	134 - 193	61.0	39.0
1980/81	30	3,081	153.0	125 - 192	68.9	31.1
1981/82	20	2,046	150.9	130 - 188	63.8	36.2
1982/83	8	785	153.4	135 - 185	70.2	29.8
1983/84	8	839	152.4	135 - 187	80.6	19.4
1984/85	8	1,068	155.2	135 - 197	67.7	32.3
1985/86	14	1,524	151.5	131 - 188	80.0	20.0
1986/87	10	1,150	151.8	136 - 187	81.3	18.7
1987/88	23	2,338	150.3	135 - 186	65.6	34.4
1988/89	33	3,434	151.9	133 - 182	44.3	55.7
1989/90	45	4,586	150.9	132 - 185	60.0	40.0
1990/91	40	4,086	153.6	131 - 193	70.4	29.6
1991/92	26	2,593	154.6	134 - 189	60.1	39.9
1992/93	24	2,413	149.4	133 - 185	73.1	26.9
1993/94	48	6,297	150.0	130 - 186	80.2	19.8
1994/95	47	5,593	152.8	115 - 188	73.4	26.6
1995/96	40	5,549	154.1	135 - 188	66.9	33.1
1996/97	35	3,394	153.4	132 - 195	67.3	32.7
1997/98	31	2,444	153.1	127 - 186	71.6	28.4
1998/99	21	1,798	154.1	135 - 188	67.8	32.2
1999/00	49	3,572	154.8	131 - 193	66.4	33.6
2000/01	39	3,448	155.6	134 - 188	58.3	41.7

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

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

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

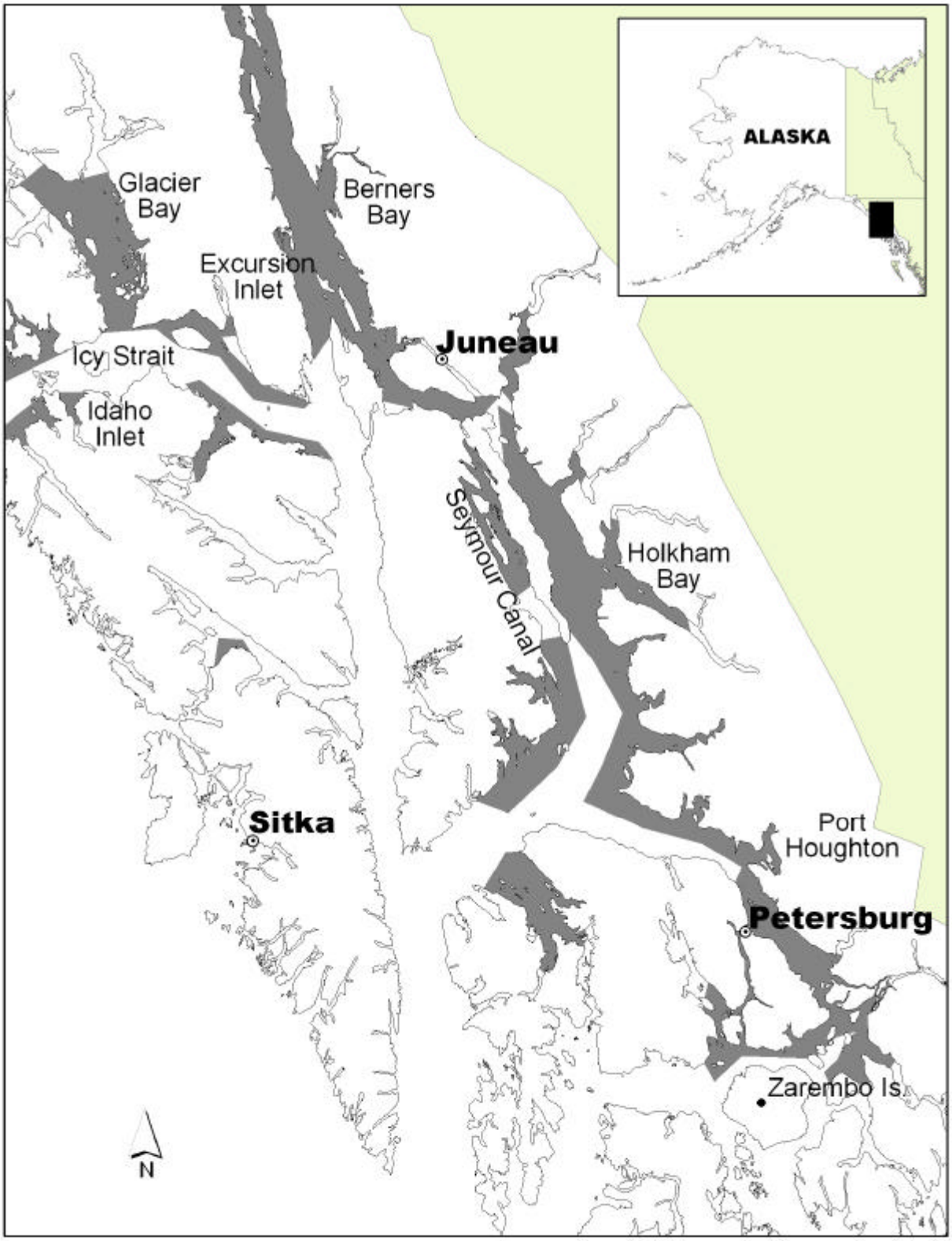

Figure 4.1. Map showing major Tanner fishing grounds in Southeast Alaska.

Section 5
Yakutat Red and Blue King Crab Fisheries

REPORT TO THE BOARD OF FISHERIES, 2002

YAKUTAT RED AND BLUE KING CRAB FISHERIES

By
Peter G. van Tamelen
and
Susan E. Merkouris

Regional Information Report[1] No. 1J02-14

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

February 2002

1 The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data, this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

This section describes the commercial red and blue king crab fisheries in the Yakutat area (Registration Area D). Red king crab, *Paralithodes camtschaticus,* and blue king crab, *P. platypus,* are harvested in small numbers during a season from November 15 through January 24. Harvest is limited by low abundance of both species in the Yakutat area.

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

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

FISHERY DEVELOPMENT AND HISTORY

Harvests and effort in this fishery have been relatively low and intermittent. Since 1972, there have been reported harvests during 21 seasons, with a maximum of 4 participating vessels, and resulting harvests have averaged only 4,533 pounds. The highest seasonal harvest on record totals less than 20,000 pounds. Both red and blue king crabs have been landed, but the most consistent harvests are from the Russell Fjord blue king crab population.

REGULATION DEVELOPMENT

Fishing Seasons

Starting in 1962, a legal season throughout the entire calendar year was established by regulation. This season was established as January 1 through December 31. In 1969 the season was shortened to August 15 to March 15. In 1970 the season length was tied into a maximum harvest of 1.5 million pounds combined from Registration Areas A and D. In 1971 the season was from September 1 through January 31 or until 400,000 pounds of red king crab were taken in areas A and D combined. The season remained the same but the harvest ceiling was raised to 600,000 pounds in 1974. The season was shortened in 1981

to October 1 to January 31 and in 1983 to November 15 to January 24. In 1984 the season was changed to October 10 to January 24 and once more in 1985 to November 15 to January 24, which is the existing fishing season.

Sex and Size Limits

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

Quotas and Guideline Harvest Ranges

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

Fishing Gear

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

In-water gear storage was not allowed from May 1 to August 31 in 1981 and 1982. Side-loading pots were prohibited in Yakutat waters beginning in January 1, 1983. Pot storage requirements were changed so that all gear needed to be removed from the water within 7 days of the closure of the 1983/1984 season. Starting in 1985, pot gear could not be used for 14 days prior to the season opening date by

crabbers intending to fish for red and blue king crabs. Pots could be stored all year in waters of Russell Fjord. In 1988 escape panels needed to be fastened with no greater than 30-count thread.

RECENT SEASON SYNOPSES

Yakutat Red and Blue King Crab Fishery

The Yakutat red and blue king crab season was open from November 15 through January 24 during each of the past three seasons. The GHL was not achieved and it was not necessary to use emergency order authority to close the fishery during the past three fishing seasons. The long-term average harvest since the 1977/1978 season is 4,428 pounds. There were some seasons when no harvests were reported (Table 5.1). The harvest since the 1997/1998 season has ranged from 114 to 2,053 pounds, seasonally, which is below the long-term average. Between one and four permit holders participated during each of the last three seasons. Stock assessment surveys are not conducted in the Yakutat area.

2001/2002 SEASON OUTLOOK

Yakutat Red and Blue King Crab Fishery

Fishing opportunities are provided by regulation. Past fishing efforts and harvests have been limited, and resulted in harvests far below the GHL. It is anticipated that the same situation will exist next season.

Table 5.1. Red and blue king crab harvest, number of landings and number of permits by season in Registration Area D, 1972/1973 to present.

Season	Total Harvest[a]	Number of[b] Landings	Number of[c] Permits
1972/73	*	*	*
1974/75	*	*	*
1977/78	*	*	*
1978/79	*	*	*
1979/80	13,915	17	4
1980/81	*	*	*
1981/82	*	*	*
1982/83	4,118	14	4
1983/84	1,248	4	4
1984/85	0		
1985/86	*	*	*
1986/87	0		
1987/88	0		
1988/89	0		
1989/90	0		
1990/91	*	*	*
1991/92	*	*	*
1992/93	*	*	*
1993/94	*	*	*
1994/95	*	*	*
1995/96	*	*	*
1996/97	*	*	*
1997/98	*	*	*
1998/99	2,053	10	4
1999/00	*	*	*
2000/01[d]	*	*	*

[a] Harvest data is for red and blue king crab, combined. In some years, the blue harvest was a large part of the total.
[b] Total landings are the number of unique fish tickets reporting king crab landings in any combination in a season.
[c] Total permits are the number of unique CFEC permits that made landings in a season.
[d] Most recent year's data should be considered preliminary.
* Where number of permits is 3 or less, the information is considered confidential.

Section 6
Yakutat Tanner Crab Fisheries

REPORT TO THE BOARD OF FISHERIES, 2002

YAKUTAT TANNER CRAB FISHERIES

By

Gretchen H. Bishop
and
Jan Rumble

Regional Information Report[1] No. 1J02-14

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

February 2002

1 The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data, this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

The Tanner crab, *Chionoecetes bairdi*, is a brachyuran (true) crab that inhabits temperate and subarctic waters of the eastern Pacific Ocean from northern California to the Bering Sea. *Chionoecetes bairdi* and the closely-related snow crab, *C. opilio*, support significant Alaska fisheries, but of the two, only *C. bairdi* is known to be present in Registration Area D (Yakutat) of Region I.

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

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

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

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

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

Regulations in Yakutat include harvest of only male Tanner crab larger than 5 1/2 inches (140 mm) carapace width during an extended winter season (January 15 – May 1). Also, a guideline harvest ceiling of 1,000,000 pounds, based on historic harvest trends, has been established for this area. Actual stock composition can only be inferred because no preseason stock assessments are conducted. The season typically opened by regulation on January 15 and usually closed by regulation on May 1.

Port sampling of Tanner crab from Yakutat has been limited by the widespread, low-level nature of the fishery and limited staffing and funding. Available information demonstrates that Yakutat crab are

smaller, more often skip-molts, and generally less robust than those harvested in more productive areas to the east (Southeast Alaska) and west (Kodiak). These characteristics have been assumed to indicate more marginal habitat or environmental conditions for Tanner crab in Yakutat than other areas. Seasonal effort and total catch in the last decade have been order of magnitude less than the 1970s harvests.

FISHERY DEVELOPMENT AND HISTORY

It was not until the early 1970s that significant Tanner crab fisheries developed in the Yakutat area (Table 6.1). As the overall market for Tanner crab slowly grew, landings from the Yakutat area also rose, averaging about 1,500,000 pounds per season between the 1972/1973 and 1979/1980 seasons. Following the record 2,435,000-pound catch during the 1979/1980 season the harvest steadily declined through most of the 1980s. Peak catches consistently occurred between the months of February and April (Table 6.2), although the season had extended from September 1 to May 15 during most of the early years of the fishery.

During the 1970s, this fishery attracted large, long-ranging vessels with live tanks in which many tons of crabs could be kept alive for extended periods. Landings from this period suggest that much of area was heavily fished (Table 6.3). Many vessels also participated in shellfish fisheries in other areas of Alaska.

The stocks could not sustain the levels of harvest of the 1970s and crashed between the 1979/1980 and 1980/1981 seasons. The early 1980s saw the use of side-loading pots prohibited, the starting date of the season changed to mid-winter, and a continued decline in the number of vessels, the catch per vessel, and the total catch. Catch during the 1980s averaged about 130,000 pounds per season. Many of the larger vessels left the fishery. Those remaining were forced by regulation to switch to top-loading conical or pyramidal pots. By the 1983/1984 and 1984/1985 seasons, only small, local vessels, operated by residents of Yakutat, were participating in this fishery. Reported landings were limited to the immediate vicinity of Yakutat Bay (Table 6.3).

In the 1985/1986 season, two larger crabbers entered the fishery. The larger vessels experienced uniformly poor catches despite extensive exploratory fishing. In the 1986/1987 season, five large vessels based in Kodiak, Valdez, and Pelican registered for the fishery, along with the local fleet in Yakutat. Only two of the larger vessels actively participated in the fishery, and their disappointing landings discouraged the remaining three from entering the fishery. In the 1987/1988 season, only one large vessel and several of the smaller vessels fishing around Yakutat Bay reported any landings. In the 1988/1989 season, one large vessel and several of the smaller vessels based in Yakutat reported landings from the Yakutat area. Much of the detailed data from this fishery is considered confidential because of the few vessels that fished in this area.

During the 1989/1990 season, only a few local vessels, limited to the waters of Yakutat Bay, participated in the fishery. From the 1989/1990 season to the closure in 1999/2000 season, the consistent fishing pattern was for one or two larger vessels a season to prospect throughout much of the area and land most of the catch while smaller vessels based in Yakutat fished Yakutat Bay. Catch averaged 80,000 pounds annually.

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

REGULATION DEVELOPMENT

Fishing Seasons and Periods

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

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

Size Restrictions

Size restrictions permitting harvest of only male crabs over 5.5 inches in carapace width were first implemented in the 1976/1977 season and have remained the same since then.

Quotas and GHRs

A 3,000,000-pound Guideline Harvest Ceiling (GHC) was instituted in 1976/1977 in response to the rapidly escalating fishery. It was amended to a Guideline Harvest Range (GHR) in 1978/1979, of between 500,000 and 3,000,000 pounds. This range remained unchanged through the 1983/1984 season. The range was revised for the 1984/1985 season to 200,000 to 1,000,000 pounds. This was further revised for the 1986/1987 season to ceiling of 1,000,000 pounds and has remained unchanged since. The last revision essentially reduced the lower end of the GHR to zero pounds and provided for closures if stock conditions did not support any harvest.

Gear Restrictions

There were no gear restrictions during the 1973/1974 season. Between the 1974/1975 and 1976/1977 seasons, pots, ring nets, and shrimp trawls were legal. In 1976/1977, a pot limit was imposed for waters within Yakutat Bay. Only 60 pots could be used for king and Tanner crabs within the bay when both seasons overlapped. During the closed season for Tanner crab, only 100 pots could be used for king crabs. Starting in 1977/1978, gear was limited to either pots or ring nets and the pot limit in Yakutat Bay was changed to allow 100 pots for both Tanner and king crab fisheries. Tanner pots had to have a tunnel eye opening with a maximum height of 5 inches and a tunnel eye perimeter of greater than 30 inches. This distinguished Tanner pots from Dungeness pots. Buoy stickers for fishing in Yakutat Bay were required. In 1980/1981, the 100-pot restriction area was expanded to an area in Yakutat Bay east of a line from Cape Sitkagi to Ocean Cape, essentially including all productive waters within Yakutat Bay. Side-loading pots were prohibited from the entire registration area for the 1982/1983 season to reduce halibut by-catch. Consequently, some vessels that had been using side-loading king crab pots with Tanner boards were discouraged from entering the fishery. Two, 4¾-inch diameter escape rings were required for each pot during the 1984/1985 season. Starting in 1985/1986, gear storage was restricted to a period of seven days after the season closure. Escape rings were repealed for the 1988/1989 fishery but will be proposed for reinstatement prior to any re-opening of this fishery. Ring nets were prohibited starting with the 1991/1992 fishery, as a consequence of board action restricting their use in the state to Southeast Alaska.

Other Restrictions

Starting in 1979/1980, formal hold inspections and certifications were repealed. Starting in 1985/1986, preseason prospecting during a period 14 days before the season opening was prohibited and vessels were required to be at a processing plant within 24 hours after the closure of the season.

1998/1999 SEASON SYNOPSIS

During the 1998/1999 season, a total of five vessels harvested 8,528 pounds of Tanner crab in the Yakutat area. As in the past, the major portion of the catch was reported from waters between the Yakutat forelands and Icy Bay.

Port sampling for Tanner crab from the Yakutat area was not conducted for the 1998/1999 season. The landings were sporadic or at times when department personnel were unable to sample them.

1999/2000 SEASON SYNOPSIS

A news release and an emergency order were issued closing the Yakutat Tanner crab fishery prior to the start of the 1999/2000 season, however the news release was not distributed in Yakutat. Thus, crabs were landed although the fishery was closed. Less than four vessels harvested Tanner crabs in the Yakutat area so harvest information remains confidential.

The 1999/2000 Yakutat Tanner crab fishery was sampled, however this information is also confidential.

2000/2001 and 2001/2002 SEASON SYNOPSES

The Yakutat Tanner crab fishery remained closed for the 2000/2001 and 2001/2002 seasons.

GENERAL OUTLOOK

In the absence of any stock assessment and monitoring program for the Yakutat Tanner crab fishery, it is difficult to assess whether there have been improvements in stock condition since its closure in the 1999/2000 season. Our only sources of information at present are the ADF&G Sport Fish division Statewide personal use and sport harvest survey, the bycatch of juvenile Tanner crab from the Yakutat scallop observer program, and anecdotal information from crabbers passing by Yakutat who set personal use pots. None of these sources suggest a recovery.

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

In the absence of sufficient funds to conduct stock assessment research, we are planning a very short fishery for the 2003/2004 season, beginning January 15, 2004, to provide information on population trends. If significant improvement is evident and a stock assessment and monitoring program are in place then we will petition the BOF to re-open the commercial fishery at the March 2005 BOF meeting.

LITERATURE CITED

ADF&G. 1999. Preliminary report to the Alaska Board of Fisheries. Collapsed or recovering shellfish fisheries in the State of Alaska. Regional Information Report No. 1J02-06. Alaska Department of Fish and Game, Douglas, 44 pp.

Zheng, J., and G. Kruse. 1998. Stock-recruitment relationships for Bristol Bay Tanner crab. Alaska Fisheries Research Bulletin 5:116-130.

Zheng, J., and G. Kruse. 2000. Recruitment patterns of Alaskan crabs in relation to decadal shifts in climate and physical oceanography. ICES Journal of Marine Science 57:438-451.

Table 6.1. Commercial Tanner crab catches in pounds, number of vessels, pounds per permit, number of landings and pounds per landing in Registration Area D, 1972/1973 season to present.

Season	Catch in Pounds	Number of Permits	Pounds Per Permit	Number of Landings	Pounds Per Landing
1972/73	222,441	7	31,777	22	10,110
1973/74	1,872,357	11	170,214	110	17,021
1974/75	1,972,752	13	151,750	60	32,879
1975/76	1,762,589	5	352,518	35	50,359
1976/77	966,650	7	138,093	15	64,443
1977/78	1,003,116	8	125,390	103	9,738
1978/79	1,691,941	15	112,796	107	15,812
1979/80	2,435,123	23	105,875	114	21,360
1980/81	642,608	14	45,901	84	7,650
1981/82	71,302	7	10,186	32	2,228
1982/83	151,621	10	15,162	55	2,756
1983/84	11,142	4	2,786	13	857
1984/85	3,665	5	733	15	244
1985/86	2,379	5	476	9	264
1986/87	48,877	*	*	*	*
1987/88	*	*	*	*	*
1988/89	155,528	5	31,106	23	6,762
1989/90	76,816	5	15,363	27	2,845
1990/91	41,709	6	6,952	42	993
1991/92	38,615	4	9,654	29	1,331
1992/93	116,718	5	23,344	37	3,154
1993/94	364,365	11	33,124	75	4,858
1994/95	107,010	14	7,644	76	1,408
1995/96	27,828	7	3,975	40	695
1996/97	16,302	7	2,329	33	494
1997/98	9,559	4	2,390	26	368
1998/99	8,528	5	1,706	23	371
1999/00	*	*	*	*	*
2000/01[a]	Closed	Closed	Closed	Closed	Closed

[a] The fishery closed early this season.

* Where numbers of vessels participating is 3 or less, information is confidential.

Table 6.2. Commercial Tanner crab catch in thousands of pounds by month and season in Registration Area D, 1972/1973 to present.

Season	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
1972/73	0.0	*	*	0.0	0.0	0.0	0.0	*	122.9	*	0.0	17.9	222.4
1973/74	0.0	0.0	0.0	0.0	*	*	313.8	990.2	558.0	Closed	Closed	Closed	1,872.4
1974/75	0.0	0.0	0.0	0.0	*	*	592.1	839.4	481.9	Closed	Closed	Closed	1,972.8
1975/76	0.0	0.0	0.0	*	*	*	661.8	456.7	*	Closed	Closed	Closed	1,762.6
1976/77	0.0	0.0	0.0	0.0	*	*	486.1	*	0.0	Closed	Closed	Closed	966.7
1977/78	0.0	*	14.5	31.6	161.7	206.0	254.2	279.0	53.1	Closed	Closed	Closed	1,003.1
1978/79	*	*	0.0	*	63.7	185.1	412.8	766.3	238.1	Closed	Closed	Closed	1,691.9
1979/80	0.0	10.2	16.4	27.9	56.9	524.1	1,220.9	578.7	Closed	Closed	Closed	Closed	2,435.1
1980/81	0.0	0.0	0.0	*	6.2	181.9	392.7	60.8	0.0	Closed	Closed	Closed	642.6
1981/82	Closed	Closed	Closed	Closed	0.0	0.0	16.4	47.1	7.8	Closed	Closed	Closed	71.3
1982/83	Closed	Closed	Closed	Closed	Closed	50.2	73.9	27.5	0.0	Closed	Closed	Closed	151.6
1983/84	Closed	Closed	Closed	Closed	Closed	*	5.8	3.6	0.0	Closed	Closed	Closed	11.1
1984/85	Closed	Closed	Closed	Closed	0.0	0.0	0.0	3.7	0.0	Closed	Closed	Closed	3.7
1985/86	Closed	Closed	Closed	Closed	*	*	1.1	*	0.0	Closed	Closed	Closed	2.4
1986/87	Closed	Closed	Closed	Closed	0.0	*	48.2	*	*	Closed	Closed	Closed	*
1987/88	Closed	Closed	Closed	Closed	0.0	*	*	*	*	Closed	Closed	Closed	*
1988/89	Closed	Closed	Closed	Closed	*	*	70.3	36.8	47.1	Closed	Closed	Closed	155.5
1989/90	Closed	Closed	Closed	Closed	*	29.2	37.5	7.4	0.0	Closed	Closed	Closed	76.8
1990/91	Closed	Closed	Closed	Closed	*	8.7	14.1	15.9	0.0	Closed	Closed	Closed	41.7
1991/92	Closed	Closed	Closed	Closed	0.0	18.9	13.4	5.8	0.0	Closed	Closed	Closed	38.6
1992/93	Closed	Closed	Closed	Closed	0.0	*	66.2	31.6	15.7	Closed	Closed	Closed	116.7
1993/94	Closed	Closed	Closed	Closed	7.6	207.3	109.4	31.0	9.1	Closed	Closed	Closed	364.4
1994/95	Closed	Closed	Closed	Closed	54.0	35.7	7.3	2.6	0.0	Closed	Closed	Closed	107.0
1995/96	Closed	Closed	Closed	Closed	13.0	6.7	4.3	3.9	0.0	Closed	Closed	Closed	27.8
1996/97	Closed	Closed	Closed	Closed	*	4.7	1.9	4.4	*	Closed	Closed	Closed	16.3
1997/98	Closed	Closed	Closed	Closed	*	4.5	*	*	*	Closed	Closed	Closed	9.6
1998/99	Closed	Closed	Closed	Closed	*	*	*	2.7	Closed	Closed	Closed	Closed	8.5
1999/00[a]	Closed	Closed	Closed	Closed	*	Closed	Closed	Closed	Closed	Closed	Closed	Closed	*
2000/01	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	0.0

[a] The fishery closed early this season.

* Where numbers of permits participating is 3 or less, information is confidential.

Table 6.3. Commercial Tanner crab, catch in thousands of pounds by district and season in Registration Area D, 1972/1973 season to present.

Season	District				
	181	183	189	191	Total
1972/73	120.2	102.2	0.0	0.0	222.4
1973/74	963.3	292.6	616.0	0.0	1,872.4
1974/75	1,330.0	*	*	428.0	1,972.8
1975/76	1,448.5	*	*	*	1,762.6
1976/77	513.9	452.7	0.0	0.0	966.7
1977/78	0.0	1,003.1	0.0	0.0	1,003.1
1978/79	718.0	404.6	0.0	544.0	1,692.0
1979/80	1,330.1	154.0	112.8	838.2	2,435.1
1980/81	164.0	151.0	65.4	262.3	642.6
1981/82	0.0	51.2	0.0	*	71.3
1982/83	8.4	83.8	*	*	151.6
1983/84	0.0	11.1	0.0	0.0	11.1
1984/85	0.0	3.7	0.0	0.0	3.7
1985/86	0.0	2.4	0.0	0.0	2.4
1986/87	*	*	0.0	0.0	*
1987/88	0.0	*	0.0	*	*
1988/89	*	7.9	*	*	155.6
1989/90	27.9	*	0.0	*	76.8
1990/91	16.2	25.6	0.0	0.0	41.7
1991/92	*	*	0.0	0.0	38.6
1992/93	*	*	0.0	0.0	116.7
1993/94	320.6	28.6	15.2	0.0	364.4
1994/95	77.4	29.6	0.0	0.0	107.0
1995/96	10.2	17.6	0.0	0.0	27.8
1996/97	*	*	0.0	0.0	16.3
1997/98	0.0	9.6	0.0	0.0	9.6
1998/99	0.0	8.5	0.0	0.0	8.5
1999/00[a]	0.0	*	0.0	0.0	*
2000/01	Closed	Closed	Closed	Closed	0.0

[a] The fishery closed early this season.

* Where numbers of permits participating is 3 or less, information is confidential.

Table 6.4. Tanner crab size frequency and shell condition in Yakutat Area D, 1974/1975 to present. Data collected during dockside sampling.

Accounting Year	Number of Boats Sampled	Number of Crab Sampled	Carapace Width (mm)		Recruitment	
			Average	Range	% Recruits[a]	% Postrecruits[b]
1974/75	3	516	141.4	110 - 174	87.3	12.7
1975/76	11	1,079	140.7	96 - 179	39.3	60.7
1976/77[c]	0					
1977/78	9	2,256	145.1	122 - 171	65.0	35.0
1978/79	15	1,616	147.8	128 - 172	57.3	42.7
1979/80	22	2,509	147.3	131 - 174	22.5	77.5
1980/81	22	2,505	147.3	107 - 172	2.7	97.3
1981/82	1	99	146.6	137 - 165	75.0	25.0
1982/83	17	1,894	145.9	131 - 173	81.9	18.1
1983/84	1	100	149.9	139 - 170	44.9	55.1
1984/85	0					
1985/86	0					
1986/87	4	520	144.0	130 - 166	14.3	85.7
1987/88	2	548	145.4	136 - 169	59.2	40.8
1988/89	6	611	148.4	135 - 177	35.8	64.2
1989/90	5	779	147.0	137 - 174	4.1	95.9
1990/91	0					
1991/92	4	565	148.5	137 - 178	8.7	91.3
1992/93	0					
1993/94	4	654	147.0	436-171	71.1	28.9
1994/95	0					
1995/96	0					
1996/97	0					
1997/98	0	0				
1998/99	0	0				
1999/00	2	206	147.7	139 - 175	88.3	11.7
2000/01[a]	Closed	Closed	Closed	Closed	Closed	Closed

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

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

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

Table 6.5. Summary of commercial Tanner crab CPUE and average weight in Yakutat Area D, 1975/1976 to present. Data collected during dockside sampling and interviews.

Season	Boats Interviewed	Number of Pots Lifted	Number of Crab Captured	Average Catch Per Pot	Range of Catch/Pot	Weight (lb) Average	Weight (lb) Range	Estimated No. of Crab Caught[a]	Percent of Catch Sampled[b]
1975/76	11					1.86	1.67-2.09	947,628	0.1
1976/77[c]	2					2.10	1.97-2.24	460,310	
1977/78	4					2.22	2.01-2.51	451,854	0.5
1978/79	7	3,810	160,164	34.1	20.1-48.6	2.32	2.25-2.38	729,285	0.2
1979/80	21	8,802	322,624	40.9	7.7-79.0	2.25	2.13-2.38	1,082,277	0.2
1980/81	12	3,688	51,765	17.8	10.2-27.1	2.29	2.05-2.67	280,615	0.9
1981/82	0								
1982/83	16					2.08	1.91-2.21	72,895	2.6
1983/84	0								
1984/85	1					2.41	2.41-2.41	1,521	
1985/86	0								
1986/87	3	1,460	18.629	15.5	10.0-19.8				
1987/88	2	840	17,850	23.3	18.6-28.0	2.09	2.09-2.09		
1988/89	5	705	12,429	9.8	1.4-38.1	2.10	2.09-2.11	74,061	0.8
1989/90	4	142	1,621	11.3	7.9-16.3	2.19	2.12-2.30	35,076	2.2
1990/91	0								
1991/92	5	597	8,335	7.6	1.2-16.6	2.31	2.23	16,168	3.5
1992/93	0								
1993/94	0								
1994/95	0								
1995/96	0								
1996/97	0								
1997/98	0								
1998/99	0								
1999/00	2	*	*	*	*	*	*	*	*
2000/01[a]	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed

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

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

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

* Where numbers of permits participating is 3 or less, information is confidential.

Section 7
Section 11-A Personal Use and Commercial King Crab Fisheries

REPORT TO THE BOARD OF FISHERIES, 2002

SECTION 11-A PERSONAL USE AND COMMERCIAL KING CRAB FISHERIES

By

John E. Clark,

Susan E. Merkouris,

Peter G. van Tamelen,

and

Gary Timothy

Regional Information Report[1] No. 1J02-14

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

February 2002

[1] The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data, this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

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

The personal use king crab fishery developed from the subsistence fishery. Current management of the Southeast Alaska stocks is accomplished by a mixture of commercial and personal use regulations. The Section 11-A fishery is conducted according to a management and allocation plan adopted by the Board of Fisheries during the 1995/1996 meeting cycle and modified in subsequent Board of Fisheries sessions. Commercial fish ticket data are available to determine commercial harvests. Personal use permits in Section 11-A, creel census data, sport fishery mail-out survey data, and phone survey results provide estimates of the non-commercial use of the king crab resource.

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

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

In Section 11-A, present management provides for a split in the available harvest among more than 2,000 personal use households and an average of 16 commercial permit holders. Personal use harvests in Section 11-A peaked at 10,800 crab in 1993/1994 and have ranged between 5,500 and 9,500 crab since then. Continued controversy between personal and commercial uses centers on the harvest allocation and fishing area.

REGULATORY HISTORY

The regulatory structure and allocation guidelines used in the management of the commercial and personal use fisheries in Southeast Alaska have significantly increased in complexity in recent years. This has occurred concurrently with increasingly detailed management of these fisheries by time and area

(Table 1). Prior to 1970, there were no time or area closures and regulations were limited to size, sex, and gear restrictions. From 1970 through the 1984/1985 seasons, the number of days opened to commercial harvests was successively reduced and some of the waters near Juneau were closed to the commercial fishery. Personal use harvests were limited to 6 crab per person per day in 1971 and personal use gear was to be clearly marked.

The commercial fishery was closed from the 1985/1986 through 1992/1993 seasons due to low regionwide stock abundance. A moratorium was imposed on new permits beginning in 1985/1986 and commercial regulations were altered to reflect a more conservative approach to management of the commercial fishery. Restrictive conservation measures were discussed, but not implemented in the subsistence or personal use fisheries. However, personal use gear was limited to 5 pots per person or 10 pots per vessel in 1985/1986. When survey data indicated that stocks were once again strong enough to support commercial fishing, the allocation controversy intensified. In 1993 additional portions of Section 11-A were closed to commercial fishing by emergency order by direction of Commissioner Rosier. In 1995, the portions of Section 11-A initially closed by emergency order were added into the commercial fishing regulations. However, the controversy over stock strength and allocation of Juneau area king crab stocks persisted, even as stocks increased to high levels.

The Alaska Board of Fisheries initiated a management and allocation plan for red king crab in Section 11-A, beginning with the 1996/1997 season. Commercial Fishing Regulation 5 AAC 34.111 allocated 45 percent of the available harvest to the commercial fishery with a season from November 1 until closed by emergency order, 46 percent to the summer personal use fishery from July 1 to September 30, and 9 percent to the winter personal use fishery from October 1 to March 31. One of the reasons the board separated personal use allocation into summer and winter seasons was to provide crab for dive fishers who traditionally harvest during the winter when crab migrate into shallow waters. This allocation plan was revised in March 1999 to an allotment of 40 percent, 50 percent, and 10 percent of the available harvest to the commercial, summer personal use, and winter personal use fisheries respectively. The entire commercial fishery share was to be reallocated to the personal use fishery if the regionwide commercial fishery was not opened (5 AAC 34.111 Section 11-A Red and Blue King Crab Management and Allocation Plan (b)(4)).

Specific areas of Southeast Alaska have been closed by the department to both commercial and personal use harvests in recent seasons due to low abundance of both legal and non-legal segments of the red king crab stocks. The red king crab stock assessment survey provides information on the abundance and overall condition of all segments of the red king crab populations in 8 principal areas of harvests. Recently populations in Pybus Bay, Peril Strait area, and Seymour Canal have been identified as stocks in need of more restrictive conservation actions and these areas have been closed to commercial and personal use fisheries for one or more years.

MANAGEMENT AND HARVEST TRENDS IN SECTION 11-A

There is no reliable data on personal use harvests prior to the 1988/1989 season. Since that time, personal use harvests have been estimated by returns from the statewide mail out sport fish survey and creel survey programs. In Section 11-A, harvests are also monitored by the personal use permit program and periodic phone surveys. These data indicate that the personal use harvests in the Section 11-A area increased

significantly from the late 1980s to a peak harvest of 10,799 crab in the 1993/1994 season (Table 2). Restrictions in the number of crab per person and pots per boat and resumption of commercial fishing in the area resulted in a decrease in personal use harvest to 5,500 crab in 1995/1996. An allocation plan was implemented in 1996/1997. Recent increases in personal use harvests to almost 9,500 crab is due to an increase in the abundance of legal red king crab in the Juneau Area and commercial fishery closures and reallocation to personal use fishers. Documented personal use harvests in other areas of the region peaked in 1998/1999 season, but recent closures in the Peril Strait area have resulted in these harvests declining to about 12 percent of the peak harvest.

The regionwide commercial fishery reopened in the 1993/1994 season and has been opened each season since then except for the 1998/1999 and 2000/2001 seasons. From 1993/1994 through 1999/2000, an average of 16 permits participated in the commercial fishery in Section 11-A and 79 total permits in Southeast Region as a whole. There was a dramatic increase in effort and catch rates in the 2001/2002 Section 11-A fishery, with 29 permits fishing in the Juneau area. The commercial fishery has accounted for about one-third of the total harvest in Section 11-A in years when the commercial fishery was opened, or about one-fourth of the total harvest over all years since 1993/1994. Regionwide, the commercial fishery has accounted for about 80 percent of the total harvest in years when the commercial fishery was opened, or about 60 percent of the total harvest over all years since 1993/1994.

PERSONAL USE PERMITS AND DAILY BAG LIMITS

Permit procedures and daily possession limits have been revised each season in an effort to more precisely achieve allocation objectives (Table 3). In the 1996/1997 season, separate summer and winter individual permits were issued for the personal use king crab fishery. A daily bag and possession limit of three crab per individual was implemented with no seasonal limit. In the 1997/1998 season, household permits replaced individual permits to simplify the permitting and reporting process. The daily bag and possession limit was decreased to two crab per person in order to keep the fishery open for the entire season. A combined summer/winter limit of 20 crab per household permit, or 10 crab per household when the household was a single person, was put in effect for the 1998/1999 fishery. The purpose of the seasonal bag limit was to ensure that anyone wanting to fish in the winter season could do so without fear that the season would close early. This same type of permit was continued for the 1999/2000 season.

The 2000/2001 season saw a number of inseason adjustments to daily and seasonal limits to both target changing allocation goals and keep the personal use fishery open for the entire season. When the fishery opened on July 1, permits limited catch to 5/10 crab per individual/household and possession limit was 1 crab/person/day. On July 20, the catch limits were increased to 10/20 crab per individual/household and 2 crab/per/day when a larger than expected abundance was estimated for the Juneau area from the red king crab survey, and catch rates and number of permits were lower than expected. On August 4, the catch limits were increased again to 20/40 crab per individual/household and 3 crab/person/day when it was determined that the available harvest for the commercial fishery did not meet the 300,000 lb regionwide threshold level, and the fishery would not open [5 AAC 34.113]. The allowable commercial harvest for Section 11-A was then reallocated to the personal use fishery. The catch limits were subsequently reduced to 10/20 crab per individual/household and 2 crab/person/day on October 1 for the entire winter fishery.

The total number of permits issued has continued to increase since 1997/1998 season (Table 4). The increase from 1,452 to 2,061 permit equates to a 42 percent increase in permit numbers. The number of

permits returned ranges from 65 percent of the issued permits in the 1997/1998 season to 90 percent in the 2000/01 season and averaged 85 percent over the last 3 years. Reported personal use harvests have ranged from 5,471 crab to 9,011 crab. Total personal use harvest is estimated by expanding the reported catch rates on returned permits across half of the non-returned permits (assuming that the other half were permits with no harvest). The total estimated personal use harvests range from 6,612 crab to 9,471 crab (Table 4). The majority of crab are harvested by pot gear, with 10 to 20 percent of the winter harvest being harvested by divers.

GUIDELINE HARVEST LEVEL, HARVEST, AND GEAR

The Guideline Harvest Level (GHL) for Section 11-A has been set each year based on red king crab stock assessment survey estimates of crab abundance and allocation guideline specified by the Board of Fisheries. A total of over 1,600 survey pots have been set in the Juneau area (including Barlow Cove and Eagle River areas) since 1979. Currently, approximately 100 pots are set each year to measure the relative abundance of both legal and non-legal red king crab. An estimate of the total abundance of legal and mature male crab is obtained from the survey catch data. The target harvest from the Juneau area is set as 20 percent of the mature abundance (which is approximately 30 percent of the legal abundance). This quantity of crab is then allocated to the commercial, summer personal use, and winter personal use fisheries based on regulatory allocation guidelines.

For the Juneau area, the total allowable harvest has ranged from 8,300 crab in 1997/1998 season to nearly 18,000 crab in 2001/2002 (Table 5). The ability to accurately attain the allocated harvest varies and generally requires intensive management oversight. Personal use harvests have ranged from 78 percent to 169 percent of the specified allocation. The total harvest in the summer fishery has been within 1 percent of the total 1996/1997 through 2000/2001 allocation. The total winter personal use harvest has exceeded the same winter total allocation by 47 percent.

The commercial fishery harvests total 90 percent of the total allocated harvest during this time period (including an allocation of 0 crab for the 2000/2001 season). However, achieving the GHL in individual years has varied greatly. In the 1998/1999 fishery, 6,533 crab were allocated to the commercial fishery, but the fishery was not opened to harvest these crab. In 1999/2000, the quota was exceeded by a factor of more than double, resulting in a harvest of 11,353 crab with a GHL of 4,964 crab. This past November, despite intensive monitoring efforts, the commercial harvest was approximately 20 percent above the GHL.

MANAGEMENT CONSIDERATIONS

Management of both the personal use and commercial fisheries in Section 11-A is requiring an ever-increasing amount of staff effort and resources to achieve target harvest levels. This is due to a number of factors, including increasing interest in personal use fishing, increases in commercial effort and intensity in Section 11-A, and allocation guidelines that are very difficult to realistically achieve. For example, management of the 2001/2002 fisheries required an additional phone survey in the summer to monitor harvests in the personal use fishery, additional staff time to contact commercial boats in Section 11-A on a daily basis to obtain catch per pot estimates, additional aerial surveys to monitor the distribution of effort (a total of 4 surveys), more intensive oversight of fish ticket data and tender reports, and very active support of enforcement.

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

The reallocation of commercial harvest to the personal use fisheries when the regionwide commercial fishery is not opened significantly increases the complexity of attaining allocation goals. The red king crab survey is conducted from mid-June through July. These data are entered into a database, reviewed and checked for errors, and then input into a catch-survey analysis to estimate the abundance of different segments of the population in 8 separate areas. Overall stock condition, catch history, and a number of other factors may lead to adjustments to target harvests from these areas. The determination of the allowable harvest for the commercial fishery is often made in late August or early September. Because over 50 percent of the summer personal use harvest occurs in July and over 90 percent by the end of August, meaningful adjustments in either possession or gear limits to harvest additional crab are not possible. However, management of the winter personal use fishery to harvest the relatively small number of additional crab is relatively straightforward.

The high abundance of red king crab in Section 11-A in recent years has resulted in dramatic increases in commercial effort and intensity. In 1994/1995, 31 boats harvested almost 6,100 crab in 17 days. Effort decreased to only 6 boats harvesting 673 crab in 4 days the following year. This increased to 16 boats harvesting 11,353 crab in 9 days in 1999/2000. This season was characterized by a number of boats retaining their crab onboard until a closure was announced and unobserved increases in effort and harvest rates in the last days of the fishery. This resulted in harvests totaling over two times the target GHL for Section 11-A. In the 2001/2002 commercial fishery, a total of 29 boats aggressively fished for the GHL of 7,300 crab. Management actions including multiple aerial surveys, requesting daily logbook data from each boat in Section 11-A, boarding and logbook documentation by Fish and Wildlife Protection, and daily projection of target date of closure resulted in a commercial harvest that was approximately 1,500 crab over the GHL.

Personal use harvests in waters outside of Section 11-A are poorly documented and almost certainly underestimated. In some areas, such as Deadman Reach, personal use harvests may exceed commercial harvests and are partially responsible for declines in abundance. Understanding the impacts of personal

use fisheries on areas outside of the Juneau area is pivotal for more responsive management of these stocks.

Table 7.1. Abbreviated history of regulatory changes and management actions concerning time and area closures in the commercial and personal use red and blue king crab fisheries in Section 11-A and other Southeast Alaska areas.

Season	Personal Use in 11-A	Personal Use in Other Southeast Areas	Commercial fishery in 11-A	Commercial fishery in other Southeast Areas
Before 1970	No closed times and areas		No closed times and areas	
1970 - 1979/80	Seasonal closure first established in 1974/75. Seasons ranged from July 1 - January 31 to July 1 to March 31 (1979/80). Possession limit of 6 crab per person (1979/80) for all Southeast Alaska.		Seasons ranged from August 1 to June 30 (1969 season) to September 1 to December 18 (1979/80 season). Some areas were closed early.	
			Gastineau Channel closed in 1978/79.	
1980/81 - 1984/85	Season established as July 1 - March 31. Possession limit of 6 crab per person.		Seasons gradually reduced from 114 days (September 1 to December 24 1980) to 7 days (October 10 to October 17 1984).	
			Auke Bay and Gastineau Channel remain closed.	
1985/86 - 1992/93	Season remained July 1 - March 31. Possession limit remained 6 crab per person. Gear limited to 5 pots per person and 10 pots per vessel (1985/86).		No traditional commercial fishery.	
1993/94	Waters deeper than 100 feet closed from Oct. 4 - March 31.	No change from 1992/93	Opened Nov. 1 - Nov. 9. Juneau area[a] closed to all commercial fishing.	Opened Nov. 1 - Nov. 9 and Nov. 27 - Dec. 3. Pybus Bay and Port Frederick closed
1994/95	Personal use closure in Juneau Area[a] from Oct. 25 to end of season.	No change from 1993/94	Opened Nov. 1 - Nov. 18. Juneau Area[a] closed.	Opened Nov. 1 - Nov. 18. No area closures
1995/96	Possession limited to 3 crab per person and 4 pots per person and vessel.	Possession limited to 3 crab per person and 4 pots per person and vessel in areas 12-B and 15-C.	Opened Nov. 1 - Nov. 5. Juneau Area[a] closed.	Opened Nov. 1 - Nov. 17. No area closures.
1996/97	Allocation guidelines established. Personal use permit required. Winter fishery closed March 7, 1997.	No change from 1995/96	Allocation guidelines established. Commercial fishery opened Nov. 1 - Nov. 11. Juneau Area[a] closed.	Opened Nov. 1 - Nov. 20. No area closures.

-continued-

Table 7.1. (page 2 of 2)

Season	Personal Use in 11-A	Personal Use in Other Southeast Areas	Commercial fishery in 11-A	Commercial fishery in other Southeast Areas
1997/98	Possession limited to 2 crab per person. Summer fishery closed August 16 and winter fishery closed December 29. Household permit required.	No change from 1996/97	Opened Nov. 1 - Nov. 12. Juneau Area[a] closed.	Opened Nov. 1 - Nov. 15. Fishing in Pybus Bay and Gambier Bay limited to 4 days and 8 days respectively.
1998/99	2 crab per person limit. Seasonal limit of 10/20 crab per individual/household.	Pybus Bay and Peril Strait areas closed October 1 1998.	No commercial fishery.	
1999/00	2 crab per person limit. Seasonal limit of 10/20 crab per individual/household. Winter fishery closed February 29, 2000.	Pybus Bay reopened October 19, 1999. Peril Strait area remained closed.	Opened Nov. 1 - Nov. 10. Juneau Area[a] closed.	Opened Nov. 1 - Nov. 13. Fishing in Pybus Bay and Gambier Bay limited to 4 days. Peril Strait Area closed
2000/01	See Table 5 for details. Harvest reallocation from commercial to personal use resulted in final summer limits of 3 crab per person and 20/40 crab per individual/household on August 4. Limits decreased to 2 crab per person and 10/20 Crab per individual/household for winter Fishery.	Pybus Bay and Seymour Canal closed September 22, 2000. Peril Strait area remained closed.	No commercial fishery.	

[a] Juneau Area defined as Gastineau Channel, Barlow Cove, and waters enclosed by a line from Outer Point on Douglas Island across Stephens Passage to the mouth of Bear Creek on Admiralty Island extending north to Symonds Point and across Saginaw Channel to the Southeast tip of Shelter Island and extending north to south tip of Halibut Cove, across Favorite Channel to south entrance of Amalga Harbor (See Figure 1).

Table 7.2. Estimated number of red and blue king crab caught in the personal use and commercial fisheries and number of commercial permits fished.

Season	Personal Use Harvest in 11-A	Personal Use Harvest in Other Southeast Areas	Commercial Fishery Harvest in 11-A	Number of Commercial Permits fished in 11-A	Commercial Fishery Harvest in Other Southeast Areas	Total Number of Commercial Permits Fished in Southeast Alaska
1988/89	665	1,130	0	0	0	0
1989/90	2,228	1,130	0	0	0	0
1990/91	2,361	1,130	0	0	0	0
1991/92	2,972	1,130	0	0	0	0
1992/93	6,835	1,625	0	0	0	0
1993/94	10,799	2,806	4,153	19	23,314	83
1994/95	7,139	2,718	6,089	31	29,558	84
1995/96	5,540	3,253	673	6	50,988	73
1996/97	6,975	2,176	2,996	11	55,302	79
1997/98	6,612	3,208	3,016	12	36,764	76
1998/99	7,016	5,295	0	0	0	0
1999/00	9,044	862	11,353	16	27,312	77
2000/01	9,471	641	0	0	0	0
2001/02[a]	na	na	8,794	29	33,162	77
Average[b]	5,973	2,085	2,175	16	17,172	79

[a] Data from the commercial fishery is very preliminary. The personal use fishery is still open and permits are not due to be returned till April 15, 2002.

[b] Average for harvests includes all seasons from 1988/89 through 2000/2001. Average for permits includes only the seasons when the commercial fishery was opened (1993/1994 through 1997/1998 and 1999/2000).

Table 7.3. Openings, closures, and fishery regulations by season for the red and blue king crab personal use fishery from 1996–2001.

Season	Type of Permit	Daily Limit	Season Limit	Closure Date
1996/97 Summer	Individual	3 Crab/Person	No Limit	August 30, 1996
1996/97 Winter	Individual	3 Crab/Person	No Limit	March 7, 1997
1997/98 Summer	Seasonal Household	2 Crab/Person	No Limit	August 16, 1997
1997/98 Winter	Seasonal Household	2 Crab/Person	No Limit	December 29, 1997
1998/99 Summer	Seasonal Household	2 Crab/Person	10/20 Crab per Individual/Household for Summer and Winter Season	September 30, 1998[a]
1998/99 Winter	Seasonal Household	2 Crab/Person		March 31, 1999[b]
1999/00 Summer	Seasonal Household	2 Crab/Person	10/20 Crab per Individual/Household for Summer and Winter Season	September 30, 1999[a]
1999/00 Winter	Seasonal Household	2 Crab/Person		February 29, 2000
2000/01 Summer (July 1 - July 19)	Summer Household	1 Crab/Person	5/10 Crab per Individual/Household in Summer	
2000/01 Summer (July 20 - August 3)	Summer Household	2 Crab/Person	10/20 Crab per Individual/Household in Summer	
2000/01 Summer (August 4 - Sept. 30)	Summer Household	3 Crab/Person	20/40 Crab per Individual/Household in Summer	September 30, 2000[a]
2000/01 Winter	Winter Household	2 Crab/Person	10/20 Crab per Individual/Household in Winter	March 31, 2001[b]
2001/02 Summer	Summer Household	2 Crab/Person	10/20 Crab per Individual/Household in Summer	September 30, 2001[a]
2001/02 Winter	Winter Household	2 Crab/Person	10/20 Crab per Individual/Household in Winter	Ongoing

[a] September 30 is the regulatory closing date for the Summer Red King Crab Personal Use Fishery.
[b] March 31 is the regulatory closing date for the Winter Red King Crab Personal Use Fishery.

Table 7.4. Number of permits issued and returned, total reported harvest of returned permits, and percent of harvest by type of gear in the Section 11-A red and blue king crab personal use fishery by season.

Year/Season	Permits Issued	Permits Returned	Percent Returned	Reported Harvest	Estimated Harvest	Percent by Gear		
						Pot	Dive	Ring Net
1996/97 Summer	1,474	1,216	82.5%	5,222	5,723	99%	<1%	<1%
1996/97 Winter	645	382	59.2%	997	1,252	78%	20%	2%
1996/97 Total	2,119	1,598	75.4%	6,219	6,975			
1997/98 Summer	1,452	951	65.5%	3,949	4,772	99%	<1%	<1%
1997/98 Winter				670	810	91%	7%	2%
Unknown				852	1,030	99%	0%	<1%
1997/98 Total	1,452	951	65.5%	5,471	6,612			
1998/99 Summer	1,675	1,412	84.3%	4,963	5,386	99%	<1%	<1%
1998/99 Winter				1,489	1,616	76%	14%	10%
Unknown				13	14	85%	15%	0%
1998/99 Total	1,675	1,412	84.3%	6,465	7,016			
1999/00 Summer	1,946	1,589	81.7%	6,304	6,941	99%	<1%	<1%
1999/00 Winter				1,910	2,103	80%	10%	10%
Unknown				0	0			
1999/00 Total	1,946	1,589	81.7%	8,214	9,044			
2000/01 Summer	2,061	1,861	90.3%	6,410	6,737	99%	<1%	<1%
2000/01 Winter				2,570	2,701	72%	11%	17%
Unknown				31	33	100%	0%	0%
2000/01 Total	2,061	1,861	90.3%	9,011	9,471			

Table 7.5. Total allowable harvest, allocations, and estimated harvest of red and blue king crab in the personal use and commercial fisheries.

Season	Commercial Fishery		Summer Personal Use Fishery		Winter Personal Use Fishery		Total Allowable Harvest	
		Estimated Harvest		Estimated Harvest		Estimated Harvest		Estimated Harvest
	Allocation		Allocation		Allocation		Goal	
1996/97[a]	3,825	2,996	3,900	5,723	765	1,252	8,490	9,971
1997/98[a]	3,750	3,016	3,800	5,653	750	959	8,300	9,628
1998/99[a]	6,533	0	6,678	5,397	1,307	1,619	14,518	7,016
1999/00[b]	4,964	11,353	6,200	6,941	1,241	2,103	12,405	20,396
2000/01[b]	4,140	0	5,176		1,035		10,351	
2000/01 Reallocation	0	0	8,626	6,760	1,725	2,710	10,351	9,471
2001/02[b, c]	7,189	8,794	8,986	na	1,797	na	17,972	na
1996/97–2000/01 Average	3,814	3,473	5,841	6,095	1,158	1,729	10,813	11,296

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

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

[c] Data from the commercial fishery is preliminary. The personal use fishery is still open and permits are not due to be returned till April 15 2002.

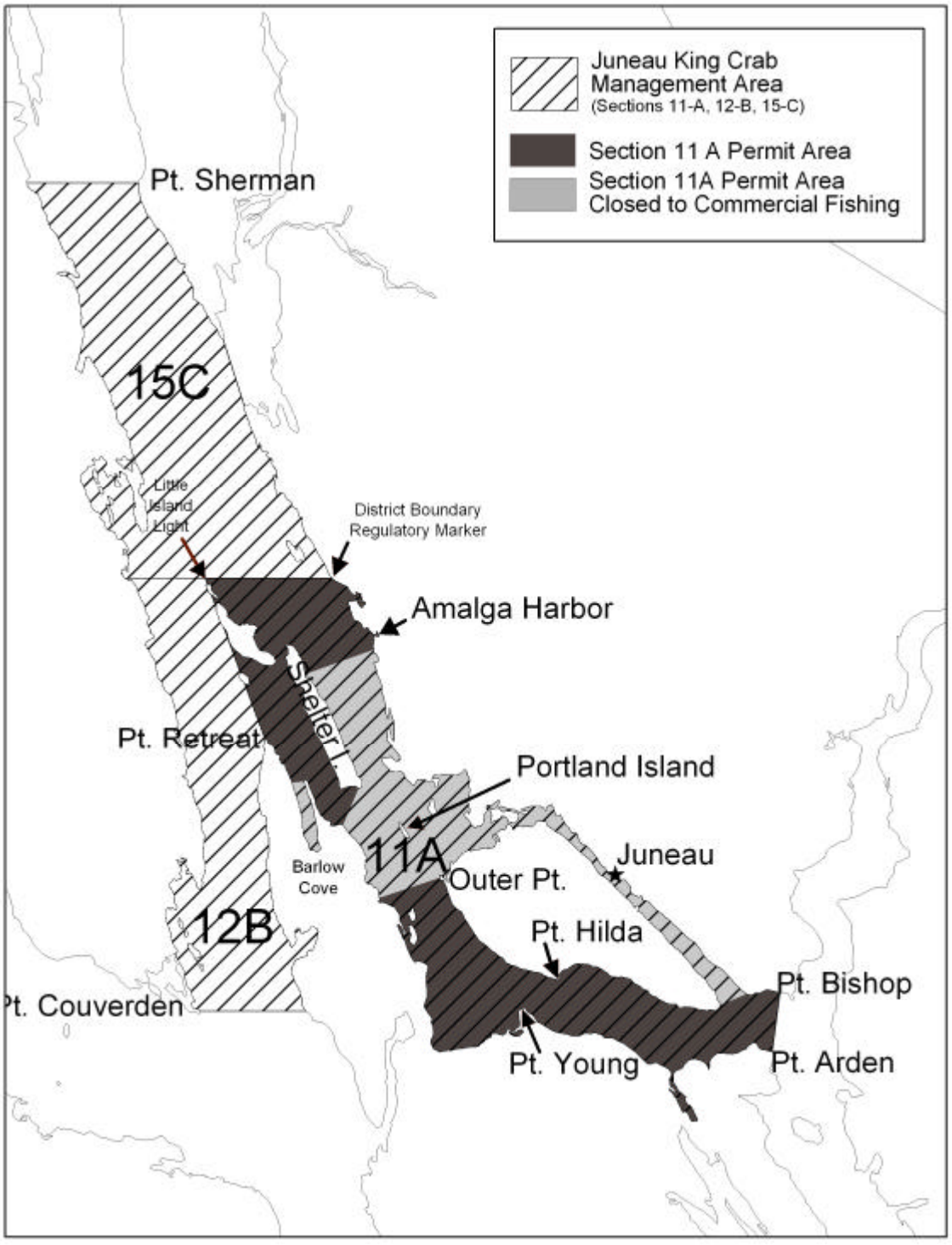

Figure 7.1. The Juneau king crab management area including the Section 11-A permit area and waters closed to commercial fishing.