

**ALASKA DEPARTMENT
OF FISH AND GAME**

*Division of
Commercial Fisheries*

Juneau, Alaska



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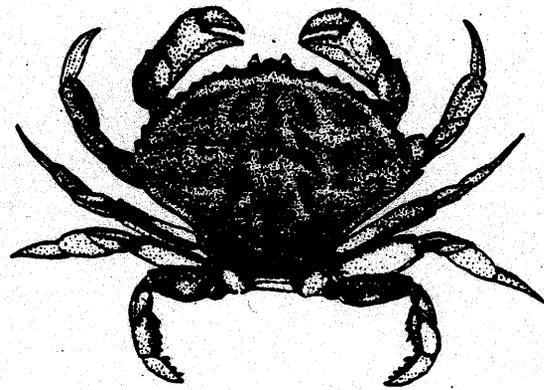
*Southeast Alaska-
Yakutat Region*

1990/1991

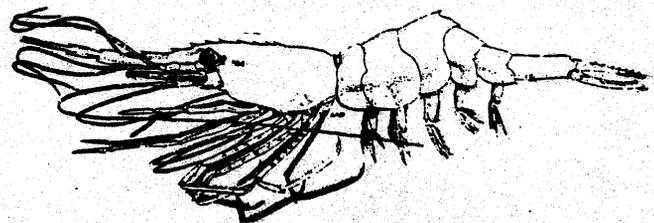
*Report to the
Board of Fisheries*

SHELLFISH FISHERIES

Dungeness Crab



Pink Shrimp



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REPORT TO THE BOARD OF FISHERIES
1990/91 REGION 1 SHELLFISH FISHERIES



Regional Information Report No.¹ 1J91-02

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

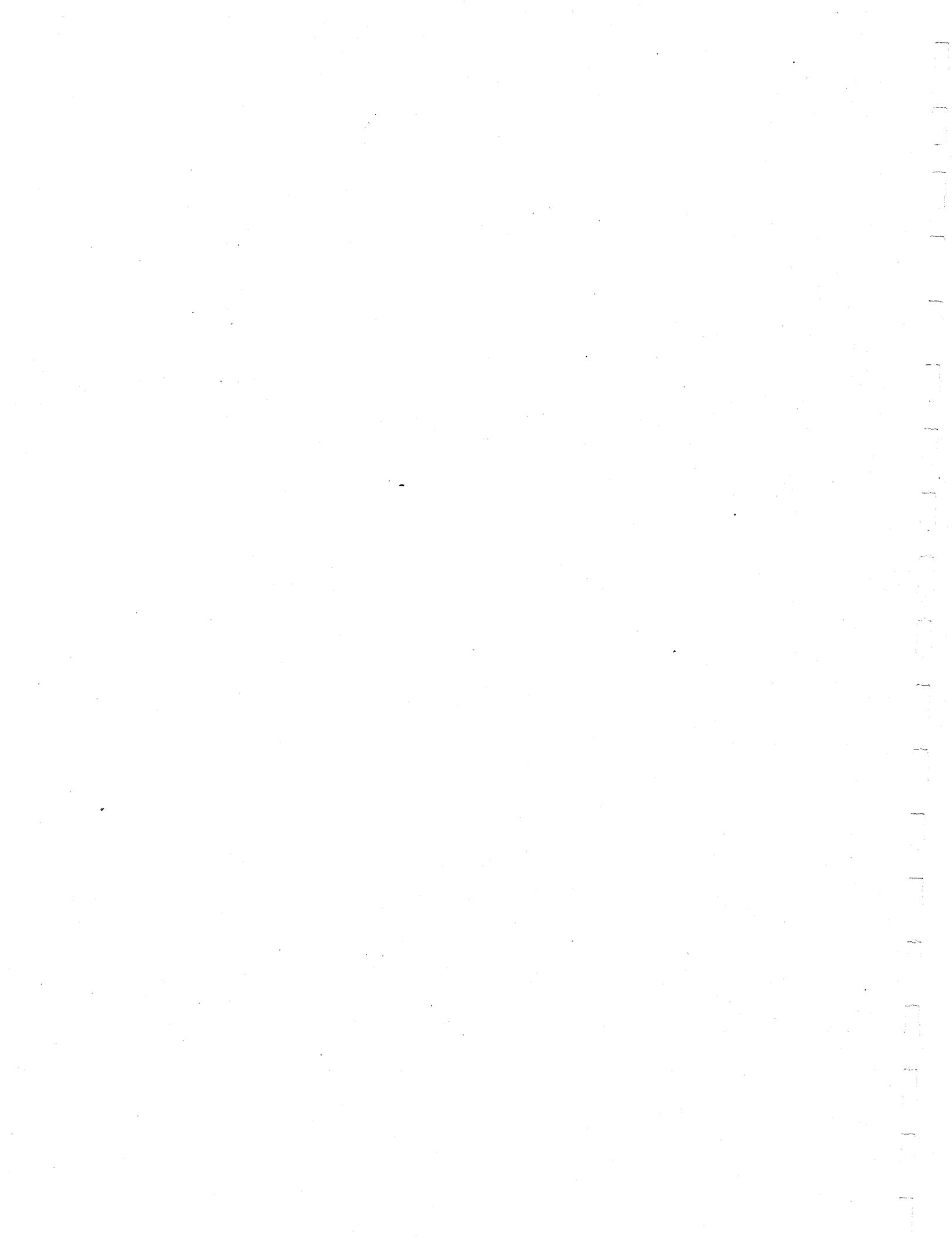
December 1991

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REPORT TO THE BOARD OF FISHERIES
INTRODUCTION TO 1990/91 SHELLFISH FISHERIES



By

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

December 1991

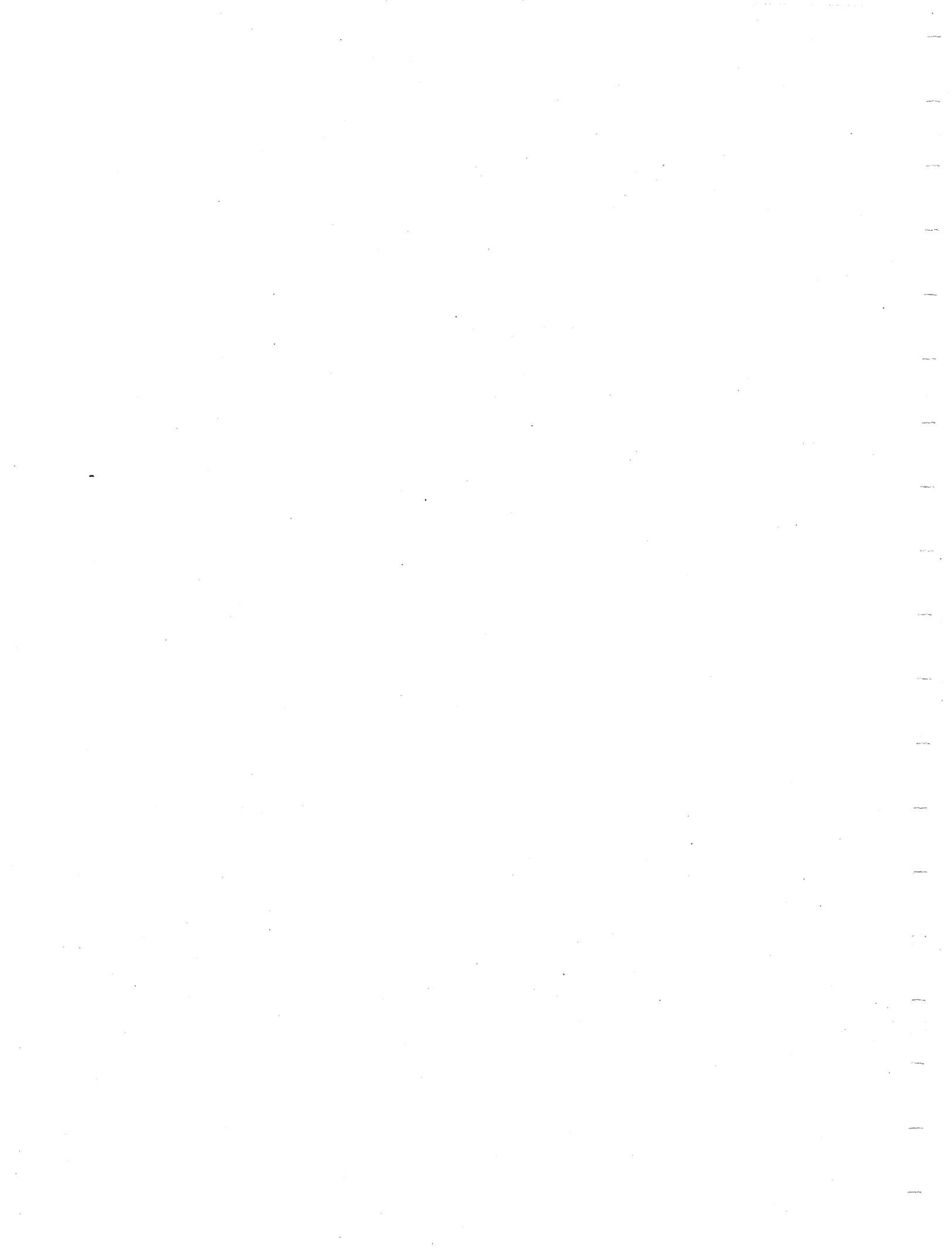


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INTRODUCTION

This report is designed to provide the Alaska Board of Fisheries (Board) with a written review of the commercial shellfish fisheries which are under the management responsibilities of Region 1, Division of Commercial Fisheries, Alaska Department of Fish and Game. This report is limited to those fisheries for which proposals are being considered by the Board and will only include sections on shrimp pot, shrimp trawl, Dungeness crab, and scallop fisheries.

Region 1 consists of two shellfish statistical areas: 1) Statistical Area A, Southeast Alaska, which includes all state waters between Dixon Entrance and Cape Fairweather and 2) Statistical Area D, Yakutat, which includes all state waters between Cape Fairweather and Cape Suckling (Figure 1). The shellfish catch reporting system is the same as that used for Region 1 salmon fisheries. Statistical Area A is subdivided into Statistical Districts 1 through 16. Statistical Area D is subdivided into Statistical Districts 181 through 191. Statistical districts in both Southeast Alaska and Yakutat are further subdivided into subdistricts. Subdistrict reporting is the most detailed level available for most fish ticket-based effort and catch information.

Most of the shellfish fisheries in Region 1 are conducted in state waters; however, some of the fisheries extend offshore into the adjoining Federal Exclusive Economic Zone (EEZ). Distinct commercial fisheries, operating under conditions specified in shellfish regulations, vie with other user groups to harvest king crab, Tanner crab, Dungeness crab, five shrimp species, abalone, scallops, sea cucumbers, and other miscellaneous species.

Management of the Southeast Alaska commercial shellfish fisheries is conducted on a region level. Management programs are conducted by the Region 1 Shellfish Biologist, a Fisheries Biologist III. Programs for miscellaneous species such as sea cucumbers, sea urchins, geoducks and other hardshell clams, abalone, octopus, snails, and other emerging fisheries are headed by another Fisheries Biologist III. Both positions are in Petersburg.

During the last completed fishery, which is summarized on a seasonal or calendar year basis, depending on the fishery, the significant shellfish fisheries resulted in a harvest of 12,216,900 lbs., worth an estimated \$18,414,600 to the fishermen (Table 1). In descending order, major fishery contributors on a weight basis were: Southeast Dungeness crab, Southeast shrimp beam trawl, Southeast Tanner crab, Yakutat Dungeness crab, Southeast sea cucumbers, and Yakutat weathervane scallops. In descending order, major fishery contributors on an exvessel value basis are: Southeast Tanner crab, Southeast Dungeness crab, Yakutat Dungeness crab, Yakutat weathervane scallops, Southeast brown king crab, and pot shrimp.

Some fisheries are in very early stages of development, such as the sea cucumber and littleneck clam fisheries. Many of the fisheries are in a fairly advanced stage of development, many have been stressed by high effort levels, and a few are in the rebuilding stages. To constrain harvests to levels that many of these fisheries can reasonably sustain, regulations have generally become more restrictive. In some fisheries, such as the currently closed Southeast Alaska red king crab commercial fishery, it appears that management actions were insufficient to prevent decline of stocks below levels which could sustain the fishery.

During the past five seasons effort levels have increased significantly in most fisheries. This trend will probably continue. Representatives of the fishing industry and representatives of the public are concerned about stock conditions supporting existing fisheries, future fisheries potential, and future subsistence and personal harvests. These concerns are evident in some of the regulatory proposals being considered by the Board.

Shellfish research projects utilized to determine stock condition or to gain necessary biological information relative to Region 1 shellfish fisheries are limited in scope and number. An annual index of abundance survey has been accomplished on red king crab stocks in 18 important bay areas of northern Southeast Alaska since 1978. However, funding constraints limited surveys to 4 to 10 bay areas between 1986 and 1989. Red king crab test fishing utilizing commercial vessels and skippers was attempted in 1988 and 1989 to validate and augment department survey cruises. Test fishing results indicated general agreement with department cruise results. King crab test fisheries were also found to be extremely costly and have since been discontinued. Seven trawl surveys, using the area-swept method to estimate pink and sidestripe shrimp populations in Yakutat Bay, were conducted between 1980 and 1984. Test fisheries and stock assessment for sea cucumbers and sea urchins were conducted in 1990 to provide the basis for fishery quotas.

Important fishery information is obtained on a regular basis for most fisheries from the dockside sampling and skipper interview program. Some Tanner crab information has been collected in conjunction with the red king crab index survey. Information on infection rates of Tanner crab by a systemic parasite (bitter crab disease) has been collected for two years from a number of important Tanner crab fishing grounds. Resulting information has provided infection rates and geographic distribution of the disease. Limited spot shrimp and pink shrimp data is being collected and analyzed through dockside sampling and onboard sampling. Dockside sampling and a limited amount of onboard sampling is important to data needs in the Dungeness crab fisheries. Port sampling for sea cucumbers was initiated in 1990.

Some information relative to miscellaneous species has been collected. The data, which includes density and size frequency information for abalone, sea cucumbers and geoducks, is helpful in estimating population levels. Additional projects have been proposed to gather management information for the

brown king crab, Tanner crab, Dungeness crab, shrimp trawl, shrimp pot and miscellaneous fisheries. A miscellaneous fishery project was funded by the legislature during 1989 and 1990.

Management, to some degree, is conducted for all fisheries within staff and funding limitations. In those fisheries with available research data and long series of harvest data, concise management plans and strategies have been developed.

For fisheries with less data, management is limited to an analysis of historic fishery information, current effort levels, current market conditions, inseason harvest data, and a review of published information related to the species. In these fisheries, management is usually limited to identification of serious problems or stock condition declines only after the condition has persisted. Management often entails reacting, within staff and funding constraints, to problems as appropriately and as quickly as possible to minimize potential resource problems. The current capabilities of industry to expand harvesting and processing in existing fisheries, or to capitalize into a new fishery, far exceeds the department's ability to gather data and manage conservatively as defined in Title 16.

Staff members whose normal fulltime assigned duties relate to shellfish fisheries include: Timothy Koeneman, Region 1 Shellfish Biologist located in Petersburg; Catherine Botelho, Assistant Region 1 Shellfish Biologist, Fishery Biologist II located in Douglas; Kenneth Imamura, Assistant Region 1 Shellfish Biologist, Fishery Biologist II, located in Douglas; and Rexanne Stafford, Fisheries Technician III port sampler, located in Petersburg. Also, Kenneth Imamura has Dungeness and Tanner crab fisheries as specific, assigned responsibilities. Robert Larson, Region 1 Herring and Miscellaneous Species Biologist is located in Petersburg.

Staff assistance is received from: Doug Mecum, Region 1 Fisheries Coordinator, Fishery Biologist IV, and Gary Gunstrom, Region 1 Research Supervisor, Fishery Biologist IV, both located in Douglas; Don House, Assistant Area Management Biologist, Fishery Biologist II, located in Ketchikan; Doug Woodby, Biometrician II, located in Douglas; and other regional and area staff members.

The introduction, shrimp pot, shrimp trawl, and scallop reports under this cover were written by Timothy Koeneman. The Dungeness crab report was written by Kenneth Imamura and Gary Gunstrom provided editorial assistance. Catherine Botelho completed the major portion of the data summaries and tables included within each report and assisted greatly in organization and editing. The sea cucumber and sea urchin reports were prepared by Robert Larson. Julie Anderson, Region 1 publication technician, compiled and finalized this document.

Table 1. Statistical Area (Southeast Alaska) and Statistical Area D (Yakutat) list of fisheries, harvest and approximate ex-vessel values from the last completed season or calendar year.

Season or Year	Fishery	Harvest in Thousands of Pounds	Approximate Ex-vessel Value in Thousands of \$\$ ^{a/}
1990/91	Red & Blue King Crab	1.2	4.7
1990/91	Brown King Crab	426.9	1,664.9
1990/91	Southeast Tanner Crab	2,241.6	4,483.2
1990/91	Yakutat Tanner Crab	41.7	75.1
1990/91	Southeast Dungeness Crab	2,677.3	4,016.0
1990/91	Yakutat Dungeness Crab	2,090.0	3,135.0
1990/91	Shrimp Beam Trawl	2,495.0	583.8
1990/91	Pot Shrimp	484.0	1,548.8
1990/91	Abalone	68.4	273.6
1990	Weatherwane Scallops	590.7	1,949.3
1990	Sea Urchins	16.3	2.5
1990	Octopus	8.8	8.8
1990	Geoduck	270.8	146.2
1990 ^{b/}	Sea Cucumbers	804.2	522.7
1990	Littleneck Clams	*	*
Total		12,216.9	18,414.6

* Where number of vessels participating is three or less, the information is considered confidential.

^{a/} This column is calculated from the average price per pound of all tickets having values indicated on them.

^{b/} Number of pounds of sea cucumbers is approximated due to different processing methods. Number of sea cucumbers = 1,641,225.

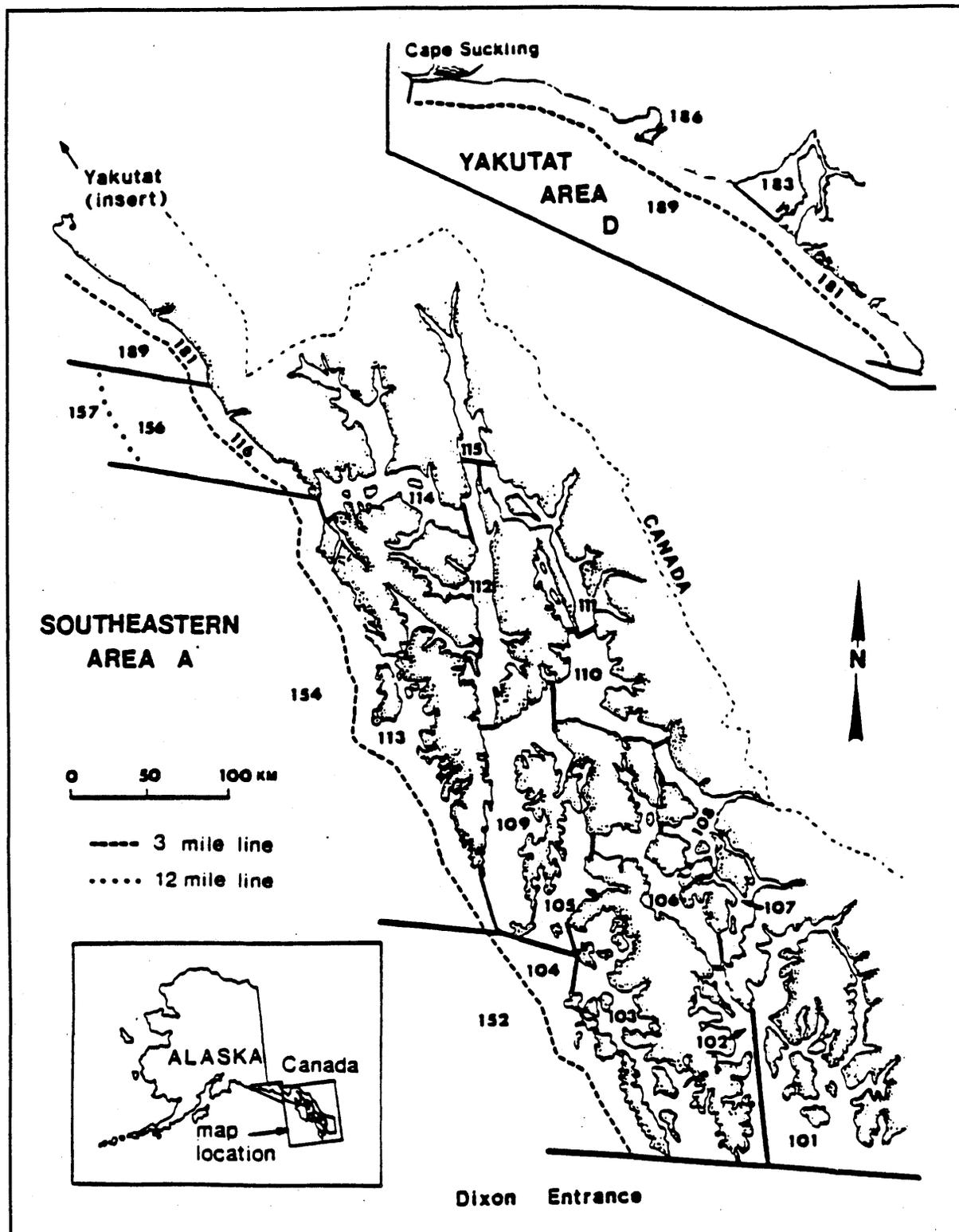
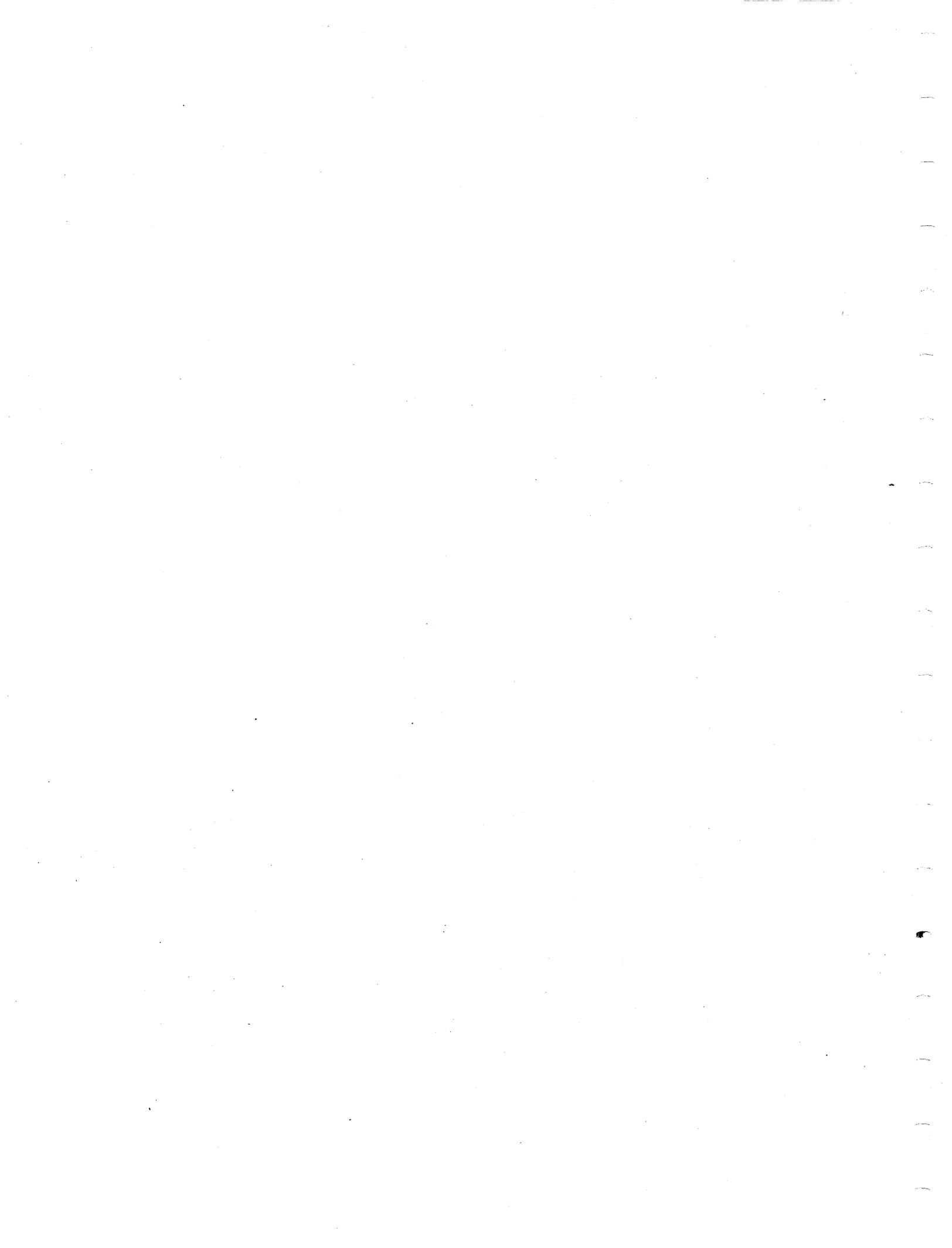


Figure 1. Statistical Area A (Dixon Entrance to Cape Fairweather) and Statistical Area D (Cape Fairweather to Cape Suckling).



REPORT TO THE BOARD OF FISHERIES
1990/91 SOUTHEAST ALASKA-YAKUTAT
RED AND BLUE KING CRAB FISHERIES



By

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Division of Commercial Fisheries
Juneau, Alaska

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INTRODUCTION

This chapter of the Region 1 shellfish report describes the commercial red and blue king crab fisheries in Southeast Alaska (Statistical Area A) and Yakutat (Statistical Area D) for the 1990/91 fishing season. A review of the red and blue king crab fisheries is presented via a discussion of harvest and effort history, regulation development, and available research information.

Red and blue king crab, *Paralithodes camtschatica*, and *P. platypus*, are harvested in the protected bays, inlets, and adjacent shorelines of straits and sounds of the northern waters of Southeast Alaska at depths of less than 150 fathoms. Important red king crab fishing grounds are located in bays which open into Frederick Sound, Stephens Passage, Seymour Canal, Icy Strait, and Peril Strait. Red king crab are the target species, with small quantities of blue king crab harvested incidentally to red or brown king and Tanner crab fisheries. Small numbers of red and blue king crab are harvested in the southern portions of Southeast Alaska and Yakutat areas.

Vessels which participate in these fisheries are primarily salmon tenders, limit seine vessels, and larger gillnet vessels. Gear has gradually evolved to include side-loading king crab pots (7' x 7' x 30"), and top-loading pyramid or conical style king crab gear.

The current red king crab management approach is based on concepts which include fishing seasons intended to avoid fishing during sensitive life history stages, the harvest of only male crab, separate minimum legal carapace widths for each species (7 inches for red king crab and 6.5 inches for blue king crab), a seasonal guideline harvest level based on survey results, gear restrictions, and a limited entry program. Regulations in the Southeast Alaska blue king crab fishery and the Yakutat red and blue king crab fishery are generally the same as those for red king crab with the exception that guideline harvest ranges are not used. Specific grounds in Southeast Alaska are open to blue king crab fishing during open red and brown king crab, and Tanner crab fisheries.

FISHERY DEVELOPMENT AND HISTORY

Southeast Alaska Red and Blue King Crab Fishery

Commercial king crab fishing in Southeast Alaska waters was initially documented in 1960 when a small harvest occurred in the Petersburg-Wrangell Management Area. During the 1961 through 1968 period, harvests (all species combined) averaged less than 900,000 lbs per year, with an average of less than nine vessels participating during each fishing season (Table 1). During this first decade of fishing the peak calendar year harvest of 2,199,772 lbs by 19 vessels occurred in 1968. In 1969 effort increased to 39 vessels, but the resulting harvest declined to 1,899,930 lbs. It is important to note that regulations in effect during this time were very liberal and included a minimum legal size smaller than that currently defined.

Harvest information was first collected on a seasonal basis in the fall of 1970, at the beginning of the 1970/71 fishing season, and extended through the spring of 1971. Species composition during the early 1970s, as reported in Table 1, have been estimated from comments included in early area management reports or informal fish ticket logs which state that red king crab made up the majority of the harvest. From the 1970/71 through the 1974/75 seasons, harvests averaged 453,436 lbs of red king crab and effort averaged 22 vessels each season. The need for the first emergency order closure occurred in January, 1971 when the harvest for the 1970/71 fishing season totaled only 221,369 lbs after 4 1/2 months of fishing by 20 vessels. This was also the first year that the minimum legal size was increased to 7.0 inches in carapace width.

Accurate species information was required on fish tickets beginning in January, 1976. From the 1975/76 through the 1984/85 fishing seasons an average of 53 vessels/permits provided average seasonal harvests of 420,900 lbs of red and blue king crab. This represented an approximate exvessel value of \$1,040,300, adjusted to the 1990 consumer price index. The peak harvest of 670,859 lbs occurred during the 1979/80 season when 43 vessels participated. A harvest of only 320,259 lbs occurred during the 1983/84 season when a peak effort of 103 vessels participated (Table 1). The last open season occurred during the 1984/85 season when 276,710 lbs were taken by 98 vessels during a seven day fishery in October. This last fishery represented an exvessel value of \$1,042,141, adjusted to the 1990 consumer price index.

Southeast Alaska Blue King Crab Fishery

During the past five fishing seasons, opportunities to harvest blue king crab have been provided by emergency order in five areas with known concentrations of blue king crab. These areas are Holkam Bay, Port Snettisham, Taku Inlet, upper Lynn Canal, and Glacier Bay. To date, these opportunities have resulted in total season harvests of less than 9,000 lbs by as many as 19 vessels and as few as one vessel. Most of this harvest occurs incidentally to directed brown king and Tanner crab harvests.

Yakutat Red and Blue King Crab Fishery

Harvests and effort in this fishery have been relatively low and intermittent. Since 1969, there have been reported harvests during six seasons, with a maximum of four participating vessels, and resulting harvests have averaged only 4,200 lbs. The highest harvests on record are less than 10,000 lbs. Both red and blue king crab have been landed, but the most consistent population in the area is the Russell Fjord blue king crab population.

REGULATION DEVELOPMENT

Fishing Seasons

From 1961 through 1968 there was no closed season. Prior to the 1969/70 king crab fishing season, a closed season from March 16 through August 14 was established. 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 recovery rates would be unacceptable to industry. Opening dates, within the September 1 through January 31 biological window, have been set by the Alaska Board of Fisheries based upon recommendations from industry and department staff comments. Since 1979 season length has been based upon population survey results. The last fishing season for red king crab opened on October 10, 1984 and closed seven days later.

Blue king crab have been taken primarily as incidental species while fishing for red king and tanner crab. In response to more restricted and subsequent closures of red king crab fishing seasons, opportunities to harvest blue king crab in certain locations have been provided beginning with the 1983/84 fishing season.

Blue king crab fisheries have occurred in conjunction with the brown king and Tanner crab fisheries, which begin on February 15.

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. From 1961 through 1968, a minimum legal size of 6 1/2 inches in carapace width existed to protect mature male red king crab from harvest during the early years of sexual maturity. Before the 1969/70 season, the minimum legal carapace width was increased to 7 inches in response to Gulf of Alaska growth and size-at-maturity information. This regulation was implemented to provide additional reproductive protection to the male portion of the stock. Regulations also provide for a season with a minimum legal carapace width of 8 inches which can be set by emergency order based on the structure of the stock. However, this has not been utilized in Southeast Alaska.

In 1978 the size limit for blue king crab was reduced to 6 1/2 inches in response to information indicating that growth and size at maturity were smaller for this species in other locations of the state. In 1990 a new regulation provided that any blue king crab infected with the parasitic barnacle, *Briarosaccus callosus*, could be retained and sold regardless of the sex or size of the crab. This regulation is intended to reduce the number of infected crab on the fishing grounds. Infected crab are incapable of reproduction and experience reduced growth. Removing infected crab should improve stock reproduction, growth, and increase maximum size.

Quotas and Guideline Harvest Ranges

In 1970 a quota of 1,500,000 lbs was provided for king crab, all species combined. In 1971 separate red and blue, and brown king crab fisheries were recognized with the adoption of distinct seasons and quotas. From 1971 through the 1978/79 season, the red and blue king crab quotas, or guideline harvest levels, were based upon historic harvest and, to a lesser degree on limited size distribution information. The first red and blue king crab quota was set in 1971 at 400,000 lbs per season. This was increased to 600,000 lbs in 1974, then reduced to 400,000 lbs in 1977.

Quotas were replaced by guideline harvest levels which provide more flexibility in management. The first guideline harvest level of 200,000 to 400,000 lbs was established in 1978. Based upon industry recommendations, this was increased to 300,000 to 600,000 lbs in 1979 and persists today. Since the

1980/81 season, seasonal harvests have been based upon results of a red king crab stock index abundance survey within the regulatory guideline harvest levels. Current regulations specify that a minimum of 300,000 lbs of crab must be available to initiate a fishery.

Fishing Gear

From 1961 through 1967 there was no limit on the amount of gear that could be fished by a vessel participating in the fishery, and no general specifications were associated with the gear fished. In 1968 a limit of 40 pots per vessel was established for Southeast Alaska. The maximum number of pots allowed per vessel increased to 60 in 1974, and to 100 pots per vessel in 1978. During the 1988 Alaska Board of Fisheries meeting a further modification of the pot limit occurred. This modification specifies that when a minimal harvest of 300,000 to 400,000 lbs of crab is appropriate, based upon survey results, the pot limit shall be 40 pots per vessel. When a harvest in excess of 400,000 lbs is appropriate the pot limit shall be 100 pots per vessel.

Prior to the 1969/70 season, pot storage in the water was allowed. Regulations do not provide for a minimum mesh size or other biological directed gear specifications, except that a pot destruct mechanism is required in case the pot is lost. Each pot must be independently buoyed and comply with marking requirements.

Limited Entry

Effective January 1, 1984 a limited entry program was established for the king and Tanner crab pot fisheries in Southeast Alaska by the Alaska Commercial Fisheries Entry Commission, with maximum effort levels of 61 permits established in the red and blue king crab fishery. The number of permanent permits granted for this fishery currently stands at 32. However, there are approximately 42 interim use permits still being fished as many are in the adjudication process. Prior to the 1990/91 fishing seasons, ring nets were eliminated as legal gear for king crab.

Yakutat Area

Regulation development in the Yakutat Area generally paralleled that in the remainder of the region. The need for specific regulations has not yet occurred in the Yakutat Area.

1990/91 SEASON SYNOPSIS

Southeast Alaska Red King Crab Fishery

The red king crab fishery in Southeast Alaska was scheduled to open by regulation on November 1, 1990. A projected harvest of at least 300,000 lbs was not available (Table 10) and the fishery did not open. This was the sixth consecutive season closure of the Southeast Alaska commercial red king crab fishery. The decision to maintain the closure was based upon information collected during the red king crab stock index of abundance survey conducted during the 1991 field season. This information indicated no appreciable improvement had occurred in general stock status.

Southeast Alaska Red King Crab Survey Results

A red king crab index of abundance survey has been conducted in Southeast Alaska since 1979. The survey is not designed to provide an estimate of the total red king crab population. Instead, it provides an index of crab abundance based on the catch of crab per pot. This population index is referred to as an index catch per unit effort (CPUE) value.

A review of the historical survey results is presented in Tables 5 through 10. For major fishing areas of Pybus Bay, Gambier Bay, Funter Bay, and Icy Strait bays, the overall abundance of legal crab was highest during the 1979 through 1982 surveys (Table 9a). Other important bays peaked around 1984 and 1985. A similar trend was true of prerecruit males (Table 9b) and adult females (Table 9c). The overall index CPUE values for all segments of the stock declined after 1985 and have been relatively low since that time.

In 1989, the survey was limited to four major areas due to budgetary constraints. The four areas were selected because of their long-term importance to regional red king crab production and/or because recent surveys indicated a potential for improvement of stock conditions in these areas. The selected areas were Gambier Bay in District 10, Seymour Canal and Barlow Cove in District 11, and Deadman Reach in District 13. The survey was conducted during October, 1989. With the exception of Barlow Cove, the survey indicated a continued low abundance of legal male red king crab. The limited 1989 data was combined with the 1988 data to obtain the best possible estimate of index CPUE values.

Based upon the method accepted by the Alaska Board of Fisheries at the 1988 meeting, an estimate of the potential available harvest was developed, on a district basis, for surveyed and unsurveyed areas (Table 10). For districts where no surveys are conducted, the average harvest for the 1971/72 through 1984/85 seasons were used. For districts where surveys were completed, the potential harvest was estimated by multiplying the average harvest in the respective district by a percentage of the recent index CPUE value compared to an average index CPUE value for that district. The percentage is obtained by dividing the most recent index CPUE value by the historical average index CPUE value for that district, and multiplying the result by 100 (Table 10). For example, if the recent index CPUE value was 10 legal crab per pot, and the average index CPUE value was 20 legal crab per pot, the resulting percentage is 50% of the average index CPUE value. If the average harvest was 100,000 lbs, then the potential harvest from that district would be 50,000 lbs.

Recent survey index CPUE values were well below the historic average index CPUE values. Therefore, the potential harvest from the major districts was projected to be well below average harvest levels (Table 10). When the current index CPUE values were considered with the average harvest levels, the potential 1990/91 seasonal harvest for Southeast Alaska was estimated to be approximately 104,000 lbs of legal crab. When the current index CPUE values were considered with the highest harvests on record for each district, the potential 1990/91 seasonal harvest for Southeast Alaska was estimated to be a maximum of 233,700 lbs of crab.

The current regulations mandate that a minimum threshold harvest level of 300,000 lbs of legal male red king crab be available before an open commercial season is allowed. With only 233,700 lbs available, under optimistic conditions, the fishery remained closed.

Southeast Alaska Blue King Crab Fishery

The harvest of blue king crab has occurred incidental to the harvest of red king crab or Tanner crab. As the red king crab fishery was closed during the 1990/91 season, blue king crab fishing was allowed during

the brown king crab and Tanner crab seasons as provided by regulation, in specified areas where blue king crab stocks are known. The open fishing areas were limited to Taku Inlet, Port Snettisham and Holkam Bay in District 11, Glacier Bay in District 14, and upper Lynn Canal in District 15. The fishery opened on February 15, 1991. Eight vessels made incidental landings of blue king crab for a total of less than 600 lbs of crab. This fishery closed on June 20, 1991, when the brown king crab fishery in the Icy Strait and Frederick Sound areas were closed. Stock assessment surveys are not conducted for blue king crab.

Yakutat Red and Blue King Crab Fishery

The Yakutat red king crab season was open from November 15, 1990 through January 24, 1991. This opening represented the entire period possible by regulations. A very small harvest of red and blue king crab occurred in the Yakutat Area this past season. However, due to the small number of vessels involved, the actual harvest remains confidential. Stock assessment surveys are not conducted in the Yakutat area.

1991/92 SEASON OUTLOOK

Southeast Alaska Red King Crab Fishery

The abundance of Southeast Alaska red king crab populations has decreased in recent years. It is not possible to determine the cause and effect relationships that have influenced these stocks; however, based upon survey results some general statements can be made.

First, the 1989 survey indicated some optimism for a future harvest as the number of legal crabs appears to be increasing (Table 9a), the number of prerecruit male crab (particularly prerecruit "threes" and "fours"), appears to be increasing (Tables 8 and 9b), and the number of adult females appears to be increasing (Table 9c). Due to budget restrictions, the survey conducted during the fall of 1989 was a limited survey and all results may not be directly comparable to earlier surveys.

Second, it is possible that either age at recruitment is considerably older than the four to six years previously thought, or larval and juvenile survival between 1979 and 1982 was very low. This is evidenced by the lack of legal crab at the present time, even though adult female abundance was relatively

high prior to 1982 (Table 9c). Information provided at the November 1989 International Symposium on King and Tanner Crab suggests that the age at recruitment for red king crab may be approximately eight years under normal growth conditions. Additionally, the maximum age of red king crab held in captivity in Japan is 21 years. This species, therefore, may have a longer maximum age than previously thought. When both of these factors are considered, annual fishing mortalities used in past fisheries may have been too exploitative.

Third, survival and growth is variable between areas. Conditions may not exist that establish high population levels in all fishing areas at the same time.

Fourth, it is becoming apparent that recruitment events are relatively rare and highly variable with respect to time, abundance and location. This is evidenced by the lack of prerecruit and recruit crab during the previous five to seven years (Table 5). A recruitment event may be the only significant recruitment event to occur in the fishery for a good number of seasons. If continued fishing over time is an objective of management, then when recruitment events are identified, they must be nurtured through conservative management, or until another significant recruitment is identified.

In summary, red king crab stock conditions are currently low, but may be on the verge of significant improvement, but the improvements may be limited to a relatively small number of bays. Continued surveys will be necessary to monitor the situation closely in order to implement correct management measures.

Southeast Alaska Blue King Crab Fishery

Blue king crab fishing opportunities during the 1991 season in portions of Districts 11, 14, and 15 will occur during the open brown king crab and Tanner crab fisheries. Fishing opportunities for blue king crab during the past five seasons have not identified stocks of sufficient size to warrant a directed fishery on this species. Since the 1976/77 season, an average of less than 7,500 lbs per season have been landed. Exploratory fishing opportunities for two years did not identify any significant populations of blue king crab. It is anticipated that future harvests will be similar to that experienced last season.

Yakutat Red and Blue King Crab Fishery

Fishing opportunities are provided by regulation, but past fishing efforts have been small, with resulting small harvests. It is anticipated that the same situation will exist next season.

Table 1. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) red and blue king crab harvest, number of landings and number of vessels by year or season, 1960 to present.

Year/ Season ^{a/}	Total Catch ^{b/}	Number of ^{c/} Landings	Number of ^{d/} Permits
1960	3,424		
1961	429,600		3
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	221,369	151	20
1971/72	391,623	213	18
1972/73	476,761	161	17
1973/74	640,369	207	27
1974/75	537,189	201	28
1975/76	346,341	170	25
1976/77	334,672	171	36
1977/78	285,057	144	35
1978/79	452,064	168	35
1979/80	670,859	251	43
1980/81	528,502	199	38
1981/82	537,712	180	48
1982/83	456,907	165	72
1983/84	320,259	139	103
1984/85	276,710	136	98
1985/86 ^{e/}	2,394	19	16
1986/87 ^{f/}	1,179	15	13
1987/88 ^{g/}	1,519	36	19
1988/89 ^{h/}	8,130	24	13
1989/90 ^{i/}	24,881	35	14
1990/91 ^{j/}	1,210	16	10

^{a/} Data for years 1960 through 1969/70 season are from management reports and informal fish ticket logs.

^{b/} 1960 through 1969 data is for all three species of king crab combined (red, brown, and blue king crab).

^{c/} Total landings are the number of unique fish tickets reporting king crab landings in any combination in a season.

^{d/} Total permits are the number of unique CFEC numbers that made landings in a season.

^{e/} Red king crab season closed in Southeast Alaska, blue king crab open February 10-24, 1986.

^{f/} Red king crab season closed in Southeast Alaska, blue king crab open January 15-29, 1987.

^{g/} Traditional red king crab season closed in Southeast Alaska; experimental red king crab opened July 1, 1988; blue king crab open January 15-February 16, 1988.

^{h/} Traditional red king crab season closed in Southeast Alaska; experimental red king crab closed January 29, 1989; blue king crab opened February 15, 1989 and closed March 8, 1989.

^{i/} Traditional red king crab season closed in Southeast Alaska; experimental red king crab closed January 31, 1990, and blue king crab in the Icy Strait/Lynn Canal area closed January 29, 1990. Blue king crab opened again February 15, 1990. The Frederick Sound areas for blues closed April 4, 1990, and Icy Strait/Lynn Canal blues closed November 9, 1990.

^{j/} Traditional red king crab season closed in Southeast Alaska. Blue king crab opened February 15, 1991 and closed June 20th. Most recent year's data is preliminary.

Table 2. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) red and blue king crab harvests in thousands of pounds by month and season, 1972/73 to present.

Season	Month												Total Landings	Total Permits	
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.			
1972/73	83.9	117.4	136.2	116.7	22.4	Closed								161	17
1973/74	171.8	228.1	184.0	50.1	6.2	0.1								207	27
1974/75	68.9	117.0	125.4	132.9	92.6	0.3								201	28
1975/76	45.4	111.7	68.6	57.0	59.5	4.1								170	25
1976/77	32.9	94.1	57.4	69.7	67.7	6.9								171	36
1977/78	38.9	43.9	45.3	50.9	57.2	5.7								144	35
1978/79	82.0	105.2	99.2	110.1	55.7	Closed								168	35
1979/80	209.4	182.5	174.3	104.7	Closed	Closed								251	43
1980/81	209.3	155.0	78.1	86.1	Closed	Closed								199	38
1981/82	Closed	327.8	176.3	33.4	Closed	Closed								180	48
1982/83	Closed	420.7	20.3	15.7	0.3	Closed								165	72
1983/84	Closed	Closed	292.9	18.8	7.9	Closed								139	103
1984/85	Closed	268.7	7.0	Closed	Closed	Closed								136	98
1985/86 ^{a/}	Closed	Closed	Closed	Closed	*	1.9								19	16
1986/87 ^{b/}	Closed	Closed	Closed	Closed	0.9	0.3								15	13
1987/88 ^{c/}	Closed	Closed	Closed	Closed	0.4	1.2								36	19
1988/89 ^{d/}	0.0	*	*	*	*	0.2	*	*	*	*	0.0	0.0		24	13
1989/90 ^{e/}	*	*	*	*	0.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0		35	14
1990/91 ^{f/}	0.0	0.0	0.0	*	*	0.5	*	0.0	0.0	0.0	0.0	0.0		16	10

^{a/} Red king crab season closed in Southeast Alaska; blue king crab open February 10-24, 1986.

^{b/} Red king crab season closed in Southeast Alaska; blue king crab open January 15-29, 1987.

^{c/} Traditional red king crab season closed in Southeast Alaska; experimental red king crab opened July 1, 1988, in Southeast Alaska; blue king crab open January 15-February 16, 1988.

^{d/} Traditional red king crab season closed in Southeast Alaska; experimental red king crab open through January 29, 1989; blue king crab opened February 15, 1989, and closed March 8, 1989, with Tanner crab in Frederick Sound.

^{e/} Traditional red king crab season closed in Southeast Alaska; experimental red king crab open through noon, January 31, 1990; blues closed in the Icy Strait area on January 29, 1990. Traditional blue king crab opened on February 15 and closed with browns in Frederick Sound on April 4, 1990.

^{f/} Traditional red king season closed in Southeast Alaska; experimental red king crab fishery repealed by the Board of Fisheries; blue king crab closed with browns on November 9, 1990, in the Icy Strait area. The traditional blue king crab fishery opened February 15, 1991; Frederick Sound and Icy Strait blue king crab closed on June 20, 1991. Most recent year's data is preliminary.

Table 3. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) red and blue king crab harvests in thousands of pounds by district and season, 1970/71 to present.

District	1970/ 1971	1971/ 1972	1972/ 1973	1973/ 1974	1974/ 1975	1975/ 1976	1976/ 1977	1977/ 1978	1978/ 1979	1979/ 1980	1980/ 1981	1981/ 1982	1982/ 1983	1983/ 1984	1984/ 1985
1	0.0	0.0	0.0	0.0	0.3	0.0	0.0	*	0.0	*	*	0.0	0.0	*	*
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	*	*
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.1	0.0	0.0	*	*	0.0	*	0.0	*	7.3	*	0.0
6	0.0	0.0	2.1	0.8	1.5	0.0	*	*	0.0	*	*	*	0.0	*	0.0
7	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.0	*	*	*	*	*	0.0
8	3.2	7.0	16.8	4.3	7.6	0.0	15.6	*	*	*	27.6	*	*	0.0	*
9	45.2	21.7	11.2	21.2	30.2	0.0	17.5	0.0	0.0	*	*	*	*	*	*
10	118.3	231.4	183.0	273.4	124.5	0.0	49.3	43.0	118.5	168.4	163.7	114.4	77.5	79.5	58.7
11	130.8	164.4	109.1	114.3	74.1	0.0	82.0	64.4	122.6	220.2	179.8	135.9	63.7	37.1	89.9
12	48.6	57.8	19.0	25.1	64.6	53.4	*	*	14.1	39.5	*	32.7	98.0	31.4	14.0
13	1.1	95.4	34.5	78.4	102.2	97.5	*	*	112.5	79.4	73.1	117.6	70.8	46.7	51.9
14	0.8	46.2	95.4	87.9	117.0	103.7	65.4	22.2	43.1	89.1	*	34.6	99.4	81.4	49.7
15	53.8	17.5	0.0	34.6	8.5	6.7	24.7	*	29.7	12.2	41.4	53.8	30.7	6.5	9.9
16	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yakutat	0.0	0.0	4.5	0.0	6.6	0.0	0.0	*	*	12.5	*	*	4.1	1.2	0.0
Total	221.4	372.9	476.8	640.4	537.2	346.4	328.7	242.0	452.1	670.9	528.5	537.7	456.9	320.3	276.7

-Continued-

Table 3.

(Page 2 of 2.)

District	1985/ 1986 ^{a/}	1986/ 1987 ^{b/}	1987/ 1988 ^{c/}	1988/ 1989 ^{d/}	1989/ 1990 ^{e/}	1990/ 1991 ^{f/}
1	0.0	0.0	0.0	0.0	*	-
2	0.0	0.0	0.0	0.0	0.0	-
3	0.0	0.0	0.0	*	*	-
4	0.0	0.0	0.0	*	0.0	-
5	0.0	0.0	*	*	*	-
6	0.0	0.0	0.0	0.0	0.0	-
7	0.0	0.0	0.0	0.0	0.0	-
8	0.0	0.0	0.0	*	0.0	-
9	0.0	0.0	0.0	0.0	*	-
10	*	0.0	*	*	*	*
11	1.4	0.4	0.6	2.3	0.8	0.2
12	0.0	*	*	0.0	0.0	-
13	0.0	0.0	0.0	0.0	0.0	-
14	*	*	0.7	*	1.7	*
15	0.3	0.3	*	0.0	3.5	*
16	0.0	0.0	0.0	0.0	0.0	-
Yakutat	0.0	0.0	0.0	0.0	0.0	*
Total	2.4	1.2	1.5	8.1	24.9 ^{g/}	1.2

^{a/} Red king crab season closed in Southeast Alaska; blue king crab open February 10-24, 1986.

^{b/} Red king crab season closed in Southeast Alaska; blue king crab open January 15-February 29, 1987.

^{c/} Red king crab season closed in Southeast Alaska; experimental red king crab opened July 1, 1988, in Southeast Alaska; blue king crab open January 15-February 16, 1988.

^{d/} Traditional red king crab season closed; experimental red king crab fishery was open through January 29, 1989; blue king crab opened February 15, 1989 and closed March 8, 1989, with Tanner crab in Frederick Sound.

^{e/} Traditional red king crab season closed in Southeast Alaska; experimental red king crab open through January 31, 1990, and blue king crab in the Icy Strait/Lynn Canal area closed January 29, 1990. Traditional blue king crab opened February 15 and closed with browns in Frederick Sound on April 4, 1990.

^{f/} Most recent year's data should be considered preliminary. Traditional red king season closed in Southeast Alaska; experimental red king crab fishery repealed by the Board of Fisheries; blue king crab closed with browns on November 9, 1990, in the Icy Strait area. The traditional blue king crab fishery opened February 15, 1991 and closed June 20, 1991 in Frederick Sound and Icy Strait areas.

^{g/} Majority of this harvest is from illegal catch and test fishing.

Table 4. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) summary of male red king crab samples of commercial landings by age/size/class, 1968/69 to present.

Season	Number of Landings Sampled	Number of Crabs Sampled	Average Carapace Length	Percent Prerecruits	Percent Recruits	-- Percent Post Recruits --				Percent Skip Molts
						+1	+2	+3	+4	
1968/69	27	2,621	152.3	20.5	49.0	14.7	13.3	2.6	0.2	
1969/70	23	4,025	160.6	3.3	64.2	14.5	14.6	3.1	0.4	
1970/71	29	2,306	160.9	2.9	45.6	28.6	17.7	4.5	0.9	27.8
1971/72	9	849	160.5	4.5	53.7	19.9	14.0	4.8	3.1	23.1
1972/73	29	2,923	158.7	6.0	58.4	19.0	11.0	3.2	1.7	17.8
1973/74	15	1,445	160.9	3.0	35.6	40.4	15.3	4.6	1.4	38.1
1974/75	24	2,283	160.5	2.0	32.8	29.6	23.6	8.1	2.5	17.8
1975/76	23	2,044	160.5	7.4	49.3	18.8	14.5	7.0	2.6	20.2
1976/77	16	1,752	159.8	4.3	54.9	10.4	13.3	5.5	3.8	17.7
1977/78	34	3,121	156.9	8.5	29.2	33.6	17.7	6.6	3.7	54.9
1978/79	16	1,467	155.1	8.1	62.9	17.7	8.9	1.8	0.5	17.9
1979/80	33	2,551	156.3	4.9	58.1	22.4	11.9	1.9	0.5	25.6
1980/81	49	3,351	156.4	6.0	55.9	24.6	11.3	1.8	0.4	25.8
1981/82	37	3,320	158.8	3.4	48.9	26.0	16.8	3.9	0.9	29.4
1982/83	30	2,821	159.4	3.7	48.4	23.6	16.8	5.9	1.6	28.6
1983/84	40	3,488	158.4	4.3	54.9	22.9	13.0	3.7	1.2	24.0
1984/85	21	3,641	159.6	3.0	43.8	30.9	17.7	3.8	0.8	31.1
1985/86	Season Closed									
1986/87	Season Closed									
1987/88	Season Closed									
1988/89	Season Closed									
1989/90	Season Closed									
1990/91	Season Closed									

Table 5. Statistical Area A (Southeast Alaska) comparison of standardized index data and commercial sampling data of male red king crab, 1979 to present. Numbers of crab are calculated as the number of pots per stratum in each bay times the standardized catch per pot in each stratum, summed across strata and bays.

Year	Sample Size	Number of Pot Lifts	Number of Sublegals	Standardized Index Data			Proportion of Recruits in Legal Pop.	Proportion of Postrecruits In Legal Pop.
				Number of Legals ^{a/}	Number of Recruits	Number of Postrecruits		
1979	4,288	320	3,154	1,134	707	426	0.6235	0.3765
1980	3,217	295	2,388	829	519	311	0.6261	0.3739
1981	4,475	371	3,477	998	670	328	0.6713	0.3287
1982	2,386	414	1,435	951	576	374	0.6057	0.3943
1983	2,439	389	1,611	828	474	354	0.5725	0.4275
1984	2,090	378	1,174	917	490	427	0.5344	0.4656
1985	1,490	385	963	528	267	261	0.5057	0.4943
1986	2,345	469	1,655	689	322	367	0.4673	0.5327
1987 ^{b/}								
Summer	1,110	197	846	264	171	93	0.6477	0.3523
Fall	847	157	686	161	83	78	0.5155	0.4845
1988 ^{c/}								
Summer	1,449	272	1,227	222	130	92	0.5856	0.4144
Fall	1,881	352	1,572	308	181	127	0.5877	0.4123
1989 ^{d/}	1,955	180	1,849	106	79	28	0.7383	0.2617
Average							0.5909	0.4091

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Table 5. (Page 2 of 2)

Season	Sample Size	Commercial Dockside Sampling Data		Number of Recruits	Number of Postrecruits	Proportion of Recruits in Legal Pop.	Proportion of Postrecruits In Legal Pop.
		Number Less than 145 mm	Number Greater than 145 mm				
1979/80	3,495	170	3,325	2,032	1,282	0.6111	0.3889
1980/81	4,235	254	3,981	2,368	1,613	0.5948	0.4052
1981/82	3,413	117	3,296	1,670	1,626	0.5067	0.4933
1982/83	2,808	104	2,704	1,358	1,346	0.5022	0.4978
1983/84	3,566	154	3,412	1,956	1,456	0.5733	0.4267
1984/85	2,238	67	2,171	980	1,191	0.4514	0.5486
1985/86	Red King Crab Season Closed						
1986/87	Red King Crab Season Closed						
1987/88	Red King Crab Season Closed						
1988/89	Red King Crab Season Closed						
1989/90	Red King Crab Season Closed						
1990/91	Red King Crab Season Closed						
Average						0.5399	0.4601

^{a/} Legal crab are defined here as all recruits and past recruits ≥ 145 mm carapace length.

^{b/} In 1987, partial surveys were conducted during summer in four bays and during fall in two bays. These statistics cannot be directly compared to the full summer surveys of 1979-1986.

^{c/} Only a partial survey of six bays occurred in summer 1988 and a full survey of ten bays occurred in fall 1988.

^{d/} Only a partial survey of four bays occurred in the fall of 1989.

Table 6. Statistical Area A (Southeast Alaska) comparison of historic red king crab index of abundance survey data, 1979 through 1985.^{a/}

	1979	1980	1981	1982	1983	1984	1985
Number of Pot Lifts	320	295	371	414	390	378	385
Red King Crab							
No. females captured	5,140	2,611	5,009	4,079	2,933	2,325	2,079
No. males captured	4,288	3,217	4,475	2,386	2,439	2,090	1,490
No. legals captured	1,134	829	998	951	828	917	528
No. sublegals captured	3,154	2,388	3,477	1,435	1,611	1,174	963
Tanner Crab							
No. females captured	902	732	977	2,026	1,322	683	1,278
No. males captured	1,628	3,309	5,771	4,819	3,695	2,464	4,834
No. legals captured	803	1,766	3,573	2,435	1,897	995	1,992
No. sublegals captured	825	1,543	2,198	2,384	1,798	1,468	2,842
Halibut^{b/}							
No. captured	204	369	574	848	623	779	802
No. legals captured	86	163	248	320	203	316	285
Avg. length (cm)	78.2	79.1	79.1	77.4	75.7	77.8	78.3
Avg. weight (kg) ^{c/}	5.8	5.8	5.8	5.2	5.2	5.2	5.8
Pacific Cod^{b/}							
No. captured	79	166	246	537	287	449	390
Avg. length (cm)	71.8	67.8	64.9	65.0	62.4	64.7	64.2
Avg. weight (kg) ^{d/}	4.5	3.7	3.3	3.3	2.9	3.2	3.2

^{a/} Crab data is standardized to 24 hour soak. The 1979 through 1985 surveys were conducted using fixed station locations with four pots per station.

^{b/} Halibut and pacific cod catches are unstandardized.

^{c/} Utilized IPHC table to convert length in cm to round weight in kg.

^{d/} Utilized $\log_{10} W = 3.1 \log_{10} L - 2.103462$ from Ketchen, 1967 FRBC Tech. Report No. 23.

Table 7. Statistical Area A (Southeast Alaska) comparison of historic red king crab index of abundance survey data, 1986 through 1989^{a/}.

	1986	1987 ^{e/}	1987 ^{e/}	1988 ^{f/}	1988 ^{f/}	1989 ^{g/}
Number of Pot Lifts	469	197	157	272	352	180
Red King Crab						
No. females captured	2,396	1,647	740	1,255	1,903	2,024
No. males captured	2,345	1,110	847	1,449	1,881	1,955
No. legal males captured	689	264	161	223	309	106
No. sublegal males captured	1,656	846	686	1,227	1,572	1,849
Tanner Crab						
No. females captured	1,967	992	468	1,234	1,336	676
No. males captured	5,128	2,862	1,330	3,741	4,548	1,458
No. legal males captured	2,000	1,365	531	1,867	2,629	746
No. sublegal males captured	3,128	1,497	799	1,874	1,919	712
Halibut^{b/}						
No. captured	785	307	158	332	305	40
No. legal captured	323	101	44	125	106	21
Avg. length (cm)	82.6	78.4	75.6	78.1	75.0	88.1
Avg. weight (kg) ^{c/}	6.8	5.5	5.1	5.7	5.0	10.1
Pacific Cod^{b/}						
No. captured	390	225	326	235	395	186
Avg. length (cm)	62.7	62.1	58.4	61.8	60.1	56.4
Avg. weight (kg) ^{d/}	2.9	2.9	2.4	2.8	2.6	2.1

^{a/} Crab data is standardized to 24 hour soak. The 1986 through 1989 surveys were conducted using a stratified random sampling design where bays are divided into strata based on areas of high, medium, and low densities.

^{b/} Halibut and pacific cod catches are unstandardized.

^{c/} Utilized IPHC table to convert length in cm to round weight in kg.

^{d/} Utilized $\log_{10} W = 3.1 \log_{10} L - 2.103462$ from Ketchen, 1967 FRBC Tech. Report No. 23.

^{e/} Partial surveys were conducted in July and October of 1987.

^{f/} Partial survey in June and July of 1988 in six bays; full survey of ten bays in September and October 1988.

^{g/} Partial survey in September and October of 1989 in four bays.

Table 8. Statistical Area A (Southeast Alaska) summary of standardized male red king crab index data in percent by size/age class, 1979 through 1989.

Year	Sample Size	Prerecruits				Recruits	Post-Recruits
		Fours	Threes	Twos	Ones		
1979	4,288	7.42	19.23	27.40	23.27	16.01	6.7
1980	3,217	7.19	12.19	20.40	30.46	19.66	10.1
1981	4,475	6.31	17.14	24.71	27.93	16.14	7.8
1982	2,386	3.41	10.53	19.63	27.60	19.49	19.4
1983	2,439	6.08	12.64	29.23	26.22	17.14	8.7
1984	2,090	3.46	9.93	16.58	32.98	22.16	14.9
1985	1,490	7.86	16.19	19.76	28.57	15.24	12.4
1986 ^{a/}	2,345	24.50	23.07	18.62	15.18	8.98	9.7
1987 ^{b/}							
Summer	1,110	8.19	20.97	24.74	20.76	15.87	9.5
Fall	847	26.17	22.00	20.05	15.48	9.24	7.1
1988 ^{c/}							
Summer	1,449	25.0	25.33	21.89	12.47	8.96	6.39
Fall	1,881	39.25	19.87	14.86	9.82	9.40	6.80
1989 ^{d/}	1,955	25.10	39.03	22.15	8.21	4.03	1.42

^{a/} The survey design was changed in 1986 and new areas added.

^{b/} These statistics are not directly comparable to 1979-1985 data because only partial surveys were conducted. Four bays were surveyed in the summer and two in the autumn.

^{c/} These statistics are not directly comparable to 1979-1985 data because only partial survey of six bays occurred in summer of 1988 and a full survey of ten bays occurred in fall of 1988.

^{d/} These statistics are not directly comparable to 1979-1985 data because only a partial survey of four bays occurred in fall of 1989.

Table 9a. Average index survey CPUE values of legal (recruit plus postrecruits) male red king crab by bay and survey for the years 1979 through fall 1989. Data standardized for a 24-hour soak.

Location	1979	1980	1981	1982	1983	1984	1985	1986 ^{a/}	Sum.	Fall	Sum.	Fall	1989	Average Index Survey CPUE Value By Bay ^{b/}	Standard Deviation
									1987	1987	1988	1988			
Farragut Bay	7.73	0.65	0.10	0.26	0.03	0.57	1.09	0.25	-	-	-	-	-	1.34	2.44
Pybus Bay	4.87	4.03	3.19	4.03	4.09	1.85	0.65	0.16	0.19	0.41	-	0.01	-	2.13	1.84
Gambier Bay	4.43	11.28	7.45	3.44	2.34	0.52	0.88	1.83	-	-	0.74	0.88	0.24	3.09	3.31
Seymour Canal	2.10	1.55	2.13	1.09	1.61	2.89	4.90	1.48	-	-	1.10	3.16	0.17	2.02	1.21
Young Bay	0.72	0.03	0.82	0.08	0.16	0.86	0.23	-	-	-	-	-	-	0.41	0.34
Barlow Cove	7.37	14.65	4.68	0.50	8.12	4.69	1.16	1.97	0.86	2.48	0.43	1.47	2.84	3.94	3.92
Eagle River	0.89	1.63	5.27	0.77	0.95	3.37	0.75	0.69	0.11	-	-	0.09	-	1.45	1.55
St. James Bay	3.62	3.90	3.60	2.17	1.00	1.01	1.13	1.05	-	-	-	0.95	-	2.05	1.23
Lynn Sisters	7.72	7.01	8.93	0.44	0.10	0.80	0.16	0.63	-	-	-	0.15	-	2.88	3.57
Funter Bay	12.12	-	-	9.15	4.40	4.15	9.49	4.82	-	-	-	-	-	7.36	3.05
Hawk Inlet	2.04	-	-	18.00	16.97	21.29	5.75	4.94	-	-	-	-	-	11.50	7.46
Excursion Inlet	3.00	1.72	1.63	0.95	0.43	1.72	0.31	0.83	0.24	-	1.04	0.04	-	1.08	0.84
Port Frederick	3.66	2.61	1.63	0.95	1.49	3.16	1.22	0.97	-	-	0.63	0.10	-	1.64	1.09
Iyoukeen Cove	20.01	0.00	0.13	3.70	9.89	4.94	3.13	1.19	-	-	-	-	-	5.37	6.29
Freshwater Bay	3.15	0.53	3.46	4.38	1.24	1.09	0.11	-	-	-	-	-	-	1.99	1.52
Sitkoh Bay	7.64	-	3.73	7.37	0.18	0.00	-	0.00	-	-	-	-	-	3.15	3.34
Rodman Bay	0.03	-	1.04	7.86	4.46	3.46	1.48	0.42	-	-	-	-	-	2.68	2.59
Deadman Reach	0.70	0.65	1.40	2.40	2.03	3.61	1.35	2.12	3.06	1.39	0.48	0.20	0.35	1.52	1.03

^{a/} The survey design was changed in 1986 from a set station pattern to stratified and random pot sets.

^{b/} Average is not a weighted average.

Table 9b. Average index survey CPUE values of prerecruit male red king crab by bay and survey for the years 1979 through fall 1989. Data standardized for a 24-hour soak.

Location	1979	1980	1981	1982	1983	1984	1985	1986 ^{a/}	Sum.	Fall	Sum.	Fall	1989	Average Index Survey CPUE Value By Bay ^{b/}	Standard Deviation
									1987	1987	1988	1988			
Farragut Bay	0.19	0.09	0.38	0.58	1.96	0.42	0.65	0.00	-	0.00	-	-	-	0.47	0.61
Pybus Bay	9.19	10.05	7.42	2.28	1.11	0.04	0.18	0.00	0.12	-	-	0.00	-	3.04	4.15
Gambier Bay	12.54	24.45	18.36	4.73	7.69	0.73	0.38	1.08	-	-	3.45	2.89	2.40	7.15	7.99
Seymour Canal	2.29	6.17	11.56	2.26	4.51	4.50	2.13	0.31	-	-	1.11	3.22	0.73	3.53	3.20
Young Bay	1.21	0.79	2.19	0.00	0.31	0.14	0.46	-	-	-	-	-	-	0.73	0.76
Barlow Cove	19.56	21.58	11.99	1.52	16.01	7.09	9.14	26.76	7.61	25.76	20.63	23.49	40.68	17.83	10.49
Eagle River	3.80	14.95	37.19	0.78	7.44	7.30	2.71	1.45	0.99	-	-	4.55	-	8.12	11.07
St. James Bay	9.25	6.65	4.28	0.55	2.51	1.67	3.20	4.67	-	-	-	7.25	-	4.45	2.83
Lynn Sisters	16.20	12.82	3.38	1.64	0.07	0.55	0.45	0.44	-	-	-	0.22	-	3.97	6.12
Funter Bay	14.39	-	-	10.93	3.31	4.13	8.20	13.01	-	-	-	-	-	9.00	4.60
Hawk Inlet	39.00	-	-	32.60	11.42	17.67	1.69	6.93	-	-	-	-	-	18.22	14.74
Excursion Inlet	15.61	7.17	12.00	2.86	1.20	0.64	0.26	0.99	0.55	-	0.79	0.40	-	3.86	5.36
Port Frederick	8.85	4.38	10.12	3.39	1.25	1.55	3.76	4.26	-	-	1.39	0.22	-	3.92	3.27
Iyoukeen Cove	10.46	0.00	0.05	5.16	4.47	0.06	0.06	0.01	-	-	-	-	-	2.53	3.87
Freshwater Bay	6.24	2.23	5.43	2.59	0.57	0.13	0.00	-	-	-	-	-	-	2.46	2.52
Sitkoh Bay	14.18	-	7.15	2.97	0.36	0.00	-	0.00	-	-	-	-	-	4.11	5.65
Rodman Bay	-	-	5.92	5.18	1.88	0.26	0.56	0.25	-	-	-	-	-	2.34	5.00
Deadman Reach	3.72	1.55	7.13	6.44	7.98	6.71	5.73	4.84	7.93	4.83	4.04	7.66	8.97	5.96	2.10

^{a/} The survey design was changed in 1986 from a set station pattern to stratified and random pot sets.

^{b/} Average is not a weighted average.

Table 9c. Average index survey CPUE values of adult female red king crab by bay and survey for the years 1979 through fall 1989. Data standardized for a 24-hour soak.

Location	1979	1980	1981	1982	1983	1984	1985	1986 ^{a/}	Sum.	Fall	Sum.	Fall	1989	Average	Standard
									1987	1987	1988	1988		Index Survey	
														CPUE Value	Deviation
														By Bay ^{b/}	
Farragut Bay	0.62	0.10	0.60	0.21	0.90	0.21	0.29	0.00	-	-	-	-	-	0.37	0.31
Pybus Bay	4.46	5.98	11.37	2.06	0.40	0.35	0.20	0.00	0.55	0.30	-	0.35	-	2.37	3.58
Gambier Bay	8.79	13.10	44.80	2.04	4.84	0.08	0.06	0.91	-	-	0.90	0.88	3.73	7.28	13.10
Seymour Canal	1.66	6.18	10.73	6.35	6.39	9.05	6.43	1.24	-	-	1.33	3.79	2.06	5.02	3.24
Young Bay	2.55	1.67	4.70	0.08	0.87	1.30	1.43	-	-	-	-	-	-	1.80	1.48
Barlow Cove	95.16	35.83	60.65	15.20	14.37	5.39	8.31	17.19	7.14	9.15	5.34	6.32	14.70	22.67	26.75
Eagle River	23.12	11.80	9.30	6.52	13.31	7.09	13.14	8.67	2.86	-	-	3.92	-	9.97	9.00
St. James Bay	24.58	23.01	10.47	24.34	8.19	1.52	1.83	9.34	-	-	-	0.28	-	11.51	10.03
Lynn Sisters	4.72	10.65	11.42	5.30	1.48	2.30	1.52	0.39	-	-	-	0.48	-	4.25	4.21
Funter Bay	3.11	-	-	26.91	46.53	4.65	9.00	6.70	-	-	-	-	-	16.15	17.21
Hawk Inlet	53.22	-	-	161.55	43.44	60.60	11.25	14.54	-	-	-	-	-	57.43	54.84
Excursion Inlet	21.77	3.05	7.19	2.92	0.56	1.73	1.65	0.17	0.53	-	0.75	0.73	-	3.73	6.31
Port Frederick	11.18	1.31	9.61	10.37	2.52	8.70	6.69	4.55	-	-	0.65	0.84	-	5.64	4.18
Iyoukeen Cove	84.87	0.00	0.00	0.00	5.28	1.15	0.00	0.00	-	-	-	-	-	11.41	29.74
Freshwater Bay	5.28	0.00	7.25	6.50	1.93	0.11	0.00	-	-	-	-	-	-	3.01	3.24
Sitkoh Bay	15.10	-	63.53	14.92	4.38	0.00	-	0.14	-	-	-	-	-	16.35	24.10
Rodman Bay	7.09	-	6.13	12.05	7.33	8.42	3.00	0.08	-	-	-	-	-	6.30	3.85
Deadman Reach	5.77	1.70	6.49	8.03	13.98	9.58	14.46	3.76	14.81	11.19	3.86	5.57	8.14	8.26	4.32

^{a/} The survey design was changed in 1986 from a set station pattern to stratified and random pot sets.

^{b/} Average is not a weighted average.

Table 9d. Average index survey CPUE values of juvenile female red king crab by bay and survey for the years 1979 through fall 1989. Data standardized for a 24-hour soak.

Location	1979	1980	1981	1982	1983	1984	1985	1986 ^{a/}	Sum.	Fall	Sum.	Fall	1989	Average Index Survey CPUE Value By Bay ^{b/}	Standard Deviation
									1987	1987	1988	1988			
Farragut Bay	0.00	0.00	0.00	0.11	0.60	0.00	0.00	0.00	-	-	-	-	-	0.09	0.21
Pybus Bay	3.92	1.90	0.54	0.03	0.07	0.00	0.00	0.00	0.00	0.07	-	0.00	-	0.59	1.24
Gambier Bay	0.85	4.87	3.62	0.95	0.36	0.00	0.00	0.15	-	-	2.63	0.67	0.45	1.32	1.64
Seymour Canal	0.12	1.90	2.13	0.06	0.13	0.46	0.06	0.03	-	-	0.00	0.93	0.83	0.60	0.77
Young Bay	0.00	0.00	0.48	0.00	0.00	0.00	0.23	-	-	-	-	-	-	0.10	0.19
Barlow Cove	3.92	1.98	0.65	0.10	3.32	0.79	2.42	18.01	0.82	8.28	13.54	3.03	14.57	5.49	6.08
Eagle River	19.94	2.83	3.11	0.00	0.00	0.09	1.50	0.09	0.46	-	-	4.19	-	3.22	6.07
St. James Bay	0.47	0.07	0.73	0.00	1.33	0.50	0.00	0.25	-	-	-	2.87	-	0.69	0.92
Lynn Sisters	0.27	3.50	0.33	0.72	0.00	0.05	0.00	0.04	-	-	-	0.00	-	0.55	1.13
Funter Bay	0.28	-	-	0.50	1.50	0.00	0.25	11.13	-	-	-	-	-	2.28	4.37
Hawk Inlet	29.38	-	-	0.53	0.37	6.56	0.13	0.55	-	-	-	-	-	6.25	11.60
Excursion Inlet	7.75	1.22	1.28	0.09	0.00	0.04	0.00	0.69	0.32	-	0.37	0.07	-	1.08	2.26
Port Frederick	4.29	0.50	1.21	0.16	0.00	0.15	1.60	1.32	-	-	0.08	0.00	-	0.93	1.33
Iyoukeen Cove	0.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	0.07	0.20
Freshwater Bay	0.70	0.00	0.45	0.00	0.00	0.00	0.00	-	-	-	-	-	-	0.16	0.29
Sitkoh Bay	0.57	-	1.98	0.70	0.00	0.00	-	0.00	-	-	-	-	-	0.54	0.77
Rodman Bay	6.34	-	0.33	0.00	0.23	0.00	0.00	0.00	-	-	-	-	-	0.99	2.36
Deadman Reach	0.74	0.10	0.42	1.04	3.14	2.23	1.38	0.69	1.03	1.74	1.10	6.34	4.35	1.87	1.78

^{a/} The survey design was changed in 1986 from a set station pattern to stratified and random pot sets.

^{b/} Average is not a weighted average.

Table 10. Statistical Area A (Southeast Alaska) summary of male red king crab harvest data since 1970/71 season and projected harvests using data from last full index of abundance survey in fall 1988 and partial index of abundance survey in fall 1989.

Dist.	High Harvest	High Year	Low Harvest	Low Year	Avg. Harvest	Index Bay Locations	Percent Relative Index Value	Potential Harvest High	Potential Harvest Low	Potential Harvest Average
1-7	32.7	81/82	0.6	75/76	8.4	None	100.00	32.7	0.6	8.4
8	27.6	80/81	0.5	79/80	9.1	None	100.00	27.6	0.5	9.1
9	45.2	70/71	0.1	81/82	17.5	None	100.00	45.2	0.1	17.5
10	273.4	73/74	30.4	75/76	122.3	Pyb/Gamb.	4.12	11.3	1.3	5.0
11	220.2	79/80	35.1	75/76	107.7	Sey/Bar/Eagle	28.90	63.6	10.1	31.1
12	98.0	82/83	7.9	80/81	35.1	Lynn Sisters	5.21	5.1	0.4	1.8
13	117.5	81/82	34.5	72/73	71.9	Deadman	23.03	27.1	7.9	16.6
14	117.0	74/75	5.2	80/81	62.7	Exc/Port Fred.	4.90	5.7	0.3	3.1
15	53.8	81/82	6.6	83/84	24.8	St.James/Eagle	26.23	14.1	1.7	6.5
16	1.3	72/73	1.3	72/73	1.3	None	100.00	1.3	1.3	1.3
Total	986.7		122.2		460.8			233.7	24.2	104.0

ASSUMPTIONS: Stock condition in bays surveyed are representative of all bays in that district; where more than one bay represents a district they contribute equally to the commercial harvest. Where data is not available we assume a percent relative index of value of 100.

RELATIVE INDEX VALUE: Determined by formula: Last Index survey CPUE Value of Legal Crab - divided by - Average Index Survey CPUE Value -times - 100.

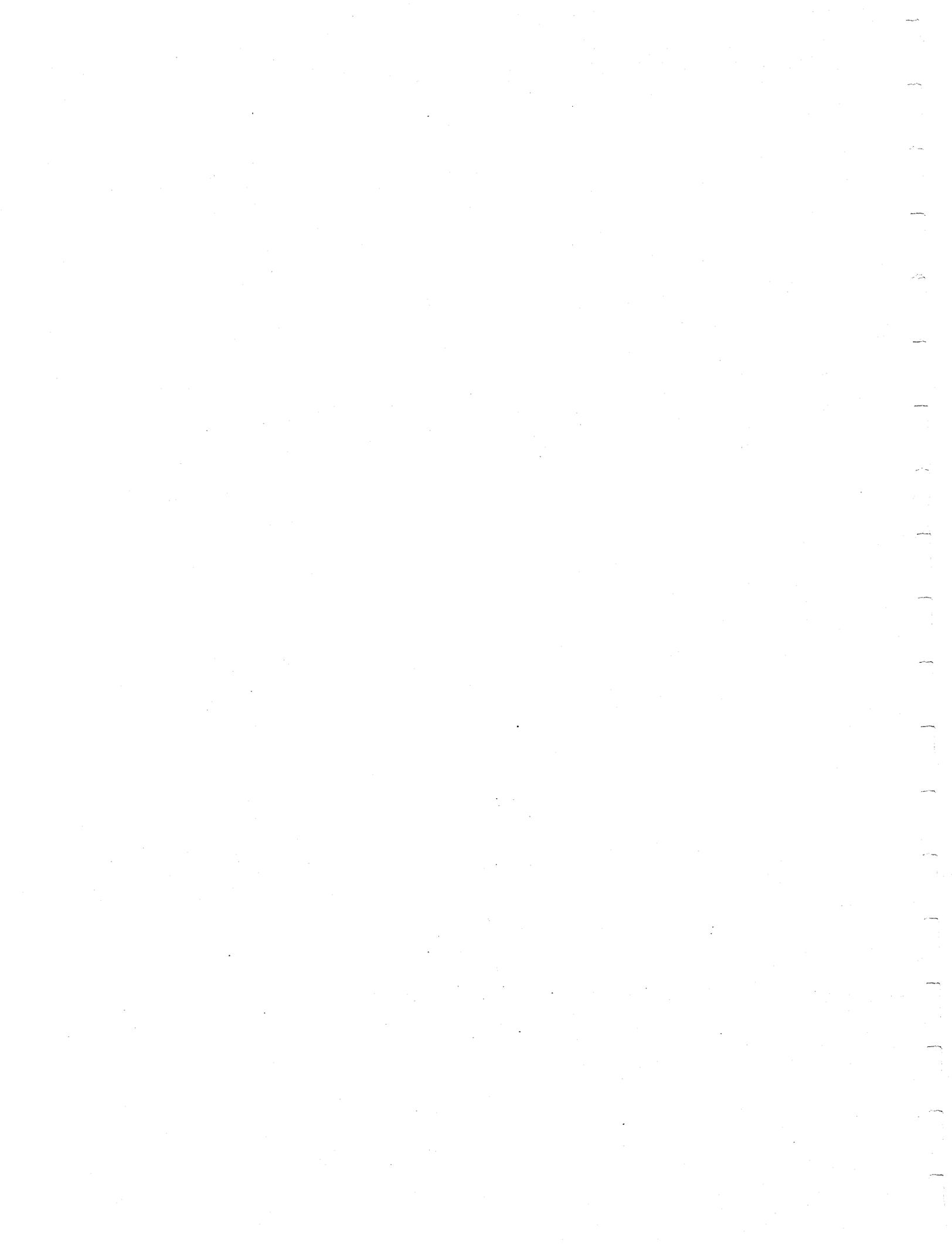
Bay Relative Index Value

Pybus Bay	= 0.01/2.13 x 100 = 0.47
Gambier Bay ^{u/}	= 0.24/3.09 x 100 = 7.77
Seymour Canal ^{u/}	= 0.17/2.02 x 100 = 8.42
Barlow Cove ^{u/}	= 2.84/3.94 x 100 = 72.08
Eagle River	= 0.09/1.45 x 100 = 6.21
St. James Bay	= 0.95/2.05 x 100 = 46.34
Lynn Sisters	= 0.15/2.88 x 100 = 5.21
Excursion Inlet	= 0.04/1.08 x 100 = 3.70
Port Frederick	= 0.10/1.64 x 100 = 6.10
Deadman Reach ^{u/}	= 0.35/1.52 x 100 = 23.03

District Percent Relative Index Values

District 10	Pybus/Gambier Average=4.12	
District 11	Seymour/Barlow/Eagle Average	= 28.90
District 14	Exc/Port Frederick Average	= 4.90
District 15	St. James/Eagle Average	= 26.23

^{u/} Last survey occurred in fall 1989; all other values from the fall 1988 survey.



REPORT TO THE BOARD OF FISHERIES

1990/91 SOUTHEAST ALASKA

BROWN KING CRAB FISHERY



By

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and
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Alaska Department of Fish and Game
Division of Commercial Fisheries
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INTRODUCTION

This chapter of the Region 1 shellfish report describes the commercial brown king crab fishery in Southeast Alaska (Statistical Area A) with emphasis on activities which occurred during the 1990/91 commercial fishing season. A review of the brown king crab fishery is presented through a discussion of harvest and effort history, regulation development, and available population structure information.

Brown king crab, *Lithodes aequispina*, are harvested from the relatively unprotected straits and sounds of the northern portion of Southeast Alaska at depths generally between 100 and 350 fathoms. Important brown king crab fishing grounds are located at the confluences of Icy Strait, Lynn Canal and Chatham Strait; where Chatham Strait and the western portion of Frederick Sound join; and where Stephens Passage and Frederick Sound meet. Small numbers of brown king crab are also landed from other waters of Southeast Alaska. The brown king crab fishery is more demanding than the red king crab, *Paralithodes camtschatica*, or Tanner crab, *Chionoecetes bairdi*, fisheries because of the difficulties associated with fishing in areas more exposed to adverse weather conditions, greater depths, strong tidal exchanges, and heavy currents. Vessels which participate in this fishery are primarily salmon tenders, limit seine vessels, and some larger gillnet vessels. Gear utilized is generally limited to the heavier side-loading king crab pots (7' x 7' x 30") and top-loading pyramid or conical style king crab gear which is stackable.

The current brown king crab management approach is based on a year around season which opens concurrently with the Tanner crab fishery, the harvest of only male crab, a minimum legal size of 7 inches in carapace width, and a seasonal guideline harvest range (GHR) based on historic harvests and fleet input, some gear restrictions, and a limited entry program.

FISHERY DEVELOPMENT AND 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. Information is not sufficient to distinguish what portion of the early harvests was brown king crab. However, documentation in available area management reports does identify that in some management areas brown king crab comprised up to 45% of the total harvest of all king crab species. Information is not adequately detailed to identify district harvests by species for these early fishing years. By 1972, adequate information on the brown king crab component of the total king crab harvest, number of vessels and number of landings was available (Table 1). This information was also detailed by month (Table 2) and district (Table 3).

By January 1976, accurate species information was required on fish tickets, and this information provides the primary source of accurate information currently used in managing the fishery. In addition, dockside

sampling of landed catches and interviews of skippers have been conducted in the fishery to obtain stock structure (Table 4) and CPUE information (Table 5). Dockside sampling was incomplete from 1970 through 1983. Data collected since 1984 have been adequate to infer stock condition. Research on life history or abundance of brown king crab are not conducted through ADF&G projects, with the exception of a small growth study that was accomplished during the early 1970's.

From calendar year 1961 through the 1971/72 fishing season, harvests of all king crab species averaged 835,200 lbs per year (or season), with an average of 14 vessels participating. Approximately 375,000 lbs of this average harvest was composed of brown king crab, with the remainder being red king crab.

Since the 1972/73 fishing season, harvests of brown king crab have averaged about 502,400 lbs of crab with an average of 41 vessels participating (Table 1). Based on current prices, this average brown king crab harvest would have an approximate exvessel value of \$1,600,000. Peak effort occurred during the 1984/85 season when 124 vessels participated for a total harvest of 848,818 lbs. Peak harvest occurred during the 1986/87 season when 1,016,011 lbs were landed by only 51 vessels. This peak harvest would have an exvessel value of \$3,200,000 using current prices.

There are four general phases that characterize the development of the brown king crab fishery in Southeast Alaska. The first phase occurred from the inception of the fishery in 1960 through the 1971/72 fishing season. This phase could be called the development phase of the fishery and could best be characterized when fishermen determined which fishing methods, gear types, depth ranges, geographic areas, and other factors yielded adequate harvests of brown king crab. Processing facilities developed product forms, marketing occurred, and prices were generally low during this time period. Effort levels were relatively low and harvests fluctuated. For most fishermen the target species may have been red king crab. Basic regulations establishing quotas, gear limits, and other major regulations were developed during this time. These regulations were primarily based on a short history of commercial fishing, little biological information, and the experiences in other Alaskan king crab fisheries. The first emergency order closure was initiated during the 1971/72 fishing season due to poor harvests after a 4.5 month fishery. The main benefit of the development stage was to identify the upper limit harvest capabilities of the stock and the need for some basic fishery regulation. Although catch and effort data are not complete for this phase, it is probably valid to state that brown king crab harvests approaching 800,000 lbs per season were not sustainable. The remaining phases can be determined by reviewing the catch and effort data in Table 1.

The second phase began with the 1972/73 fishing season and extended through the 1978/79 fishing season. This phase entailed a rather low level of effort which averaged about nine permits per season, with variable harvests which averaged 103,725 lbs per season. During this period harvests ranged between 34,451 lbs and 265,310 lbs. The average landing was comprised of 1,712 lbs during this phase. The major contribution from this phase was a further development of the gear and fishing techniques and further information on the distribution of the species.

The third phase began with the 1979/80 fishing season with only 19 permits fished, and it ranged through

the peak effort level of 124 permits fished during the 1984/85 fishing season. An average of 64 permits was fished during this period, resulting in an average seasonal harvest of 688,261 lbs. The average landing was 3,078 lbs during this period. This phase is important in that it showed a consistent harvest of almost 690,000 lbs. Many fishermen that utilized the resource during this period may have been anticipating limited entry in the fishery, and could have been participating in order to obtain points for a future fishing permit. Thus, the high effort available helped to define the limits of the stock with respect to geographic distribution (Table 3) and harvest levels.

The fourth phase began with the 1985/86 fishing season and continues today. An average of 55 permits have fished since the 1985/86 fishing season with a resulting harvest which has averaged 781,765 lbs. The peak harvest of 1,016,011 lbs by 51 permits and the peak average of 4,579 lbs also occurred during the 1986/87 fishery. The fishery was separated into four management areas after the 1986/87 fishery in an effort to prevent overexploitation of any single management area and to distribute the harvest over more geographic area. Since this peak harvest occurred, effort has declined to only 39 permits, while the average catch per landing has declined to less than 2,000 lbs per landing, and seasonal harvests have declined. It is important to note that for the past five seasons, opening dates for the brown king crab fishery have remained constant since the 1985/86 fishing season and have not been influenced by effort shifts to red king crab, since the red king crab fishery was last open during the 1984/85 fishing season.

REGULATION DEVELOPMENT

Fishing Season

Regulation development in the brown king crab fishery has generally paralleled that of the red king crab or Tanner crab fisheries in Southeast Alaska. Biological information which identifies specific molting and mating periods, or other sensitive life history stages have not been collected for brown king crab. Available information suggests that low level molting occurs throughout the year with no specific peak molting, or growth, activity. The presence of eggs in all stages of development throughout the year also support no distinct molting or mating period. Thus, seasons have been quite liberal for this commercial fishery. From 1961 through 1968 there was no closed season. Closures had been established primarily to provide fair start opportunities associated with the red king crab and Tanner crab fisheries.

Prior to the 1969/70 king crab fishing season, a closed period from March 16 through August 14 was established by the Alaska Board of Fisheries. In 1971 the separation of the brown king crab fishery from the red king crab fishery was established by the Board through regulation changes. As the season for red king crab became more restrictive, a year long season from August 1 through the following July 31

continued in the brown king crab fishery. An emergency order closed the brown king crab fishing season on April 30, 1972 in District 10 (Frederick Sound).

During the 1972/73 and 1973/74 seasons, fishing began on August 1 and closed about nine months later. From the 1974/75 season through the 1981/82 season the fishery was basically a year around endeavor, with the exception of a two and one-half month summer closure in Frederick Sound. Fishing started on dates ranging between August 1 and October 1. The change in dates coincided with the opening dates of the red king crab fishery, which was developing at a faster rate than the brown king crab fishery. Those vessels fishing certain grounds during the summer months were required to have a special written permit issued by the local ADF&G office.

From 1982/83 through 1987/88 a split season existed. Approximately one-half of the guideline harvest range (GHR) was allocated to be taken during the red king crab season which generally started in early October or November. The remainder of the GHR was taken concurrently with the Tanner crab fishery which began on early February or January. During the 1985/86 through the 1987/88 fishery there was no fall fishery because the red king crab fishery was closed. As a result, the entire GHR was available for harvest at the beginning of the Tanner crab fishery.

Beginning with the 1987/88 fishing season and extending to the present day, separate GHRs were established for each major fishing area now described in the regulation booklet (Frederick Sound, Icy Strait, Chatham Strait). Some minor changes in the boundaries of these areas have occurred to allow the harvest to be recorded in the proper statistical reporting areas. The separation into the present management areas was accomplished to prevent overexploitation of any single fishing ground. An Exploratory Area without a GHR was also established, in which fishing is allowed throughout the year, with the exception of a small closure before the Tanner crab season for enforcement reasons. The fishing season has started on either January 15 or February 15 since the 1987/88 fishing season, and occurs concurrently with the Tanner crab season. Current regulations establish a starting date of February 15, with closure to occur on January 29, unless the season is closed earlier by emergency order (EO) due to biological considerations or the attainment of the established GHRs.

Sex and Size Limits

From its inception, this fishery has been restricted to harvesting only male crab in order to protect the reproductively important females. From 1961 through 1968, a minimum legal size of 6 1/2 inches in carapace width existed. The minimum legal size was implemented to protect sexually mature male brown king crab from harvest during the early years of sexual maturity. Before the 1969/70 season, the minimum legal carapace width was increased to 7 inches in response to Gulf of Alaska growth and size at maturity information for red king crab. This regulation was implemented to provide additional reproductive protection to the male portion of the stock. Information available from red king crab suggests

that the reproductive protection afforded by minimum size regulations may not be as complete as previously thought.

Average size at maturity for male brown king crab from Southeast Alaska is not known. With the absence of this important piece of biological information, it has been assumed that the size of maturity for male brown king crab is the same as for male red king crab. This assumption was made because: (1) size at maturity for red king crab in Kodiak is known as 145 mm of carapace length; (2) growth information for Southeast Alaska red king crab are very similar to Kodiak red king crab; and (3) growth increments are very similar for both species in Southeast Alaska. Known regression formulae relating carapace length to width for brown king crab in Southeast Alaska were used to establish the correct legal width measurement.

Regulations provide that the minimum legal carapace width can be increased to 8-inches by emergency order if warranted by stock structure information. However, information concerning the structure of the prerecruit portion of the stock is not available, and this regulation has not been utilized in Southeast Alaska.

Quotas and Guideline Harvest Ranges

From 1960 through 1969, harvest limits were not established in regulation or utilized through management actions. In 1970 a quota of 1,500,000 lbs was provided for combined harvests of all species of king crab. In 1971 this quota was separated into portions for red and brown king crab, and a quota of 600,000 lbs was established for the brown king crab fishery. This quota remained in regulation through 1977. Actual harvests from the 1972/73 through the 1976/77 fishing seasons peaked at 265,310 lbs during the 1972/73 fishing season, and averaged approximately 118,000 lbs each season.

The 600,000 lb quota was replaced with a GHR of 50,000 to 200,000 lbs prior to the 1978/79 season. Guideline harvest ranges provide more flexibility to management, and they more accurately reflected recent catches. This GHR remained in effect through the 1980/81 fishing season. During these three seasons harvests averaged almost 300,000 lbs. Also, this period reflected a significant increase in effort from 14 to 54 permits fished, which resulted in a tremendous increase in harvests. The peak harvest during this period was 683,298 lbs during the 1980/81 fishing season.

The GHR was increased to 200,000 to 500,000 lbs prior to the 1981/82 fishing season, and this GHR remained in place through the 1986/87 fishing season. Effort, expressed as number of permits actually fished, continued to increase to a peak of 124 permits during this time. A significant recruitment event began to enter the fishery during the 1983/84 fishing season harvests. The combined effect of increased effort and a significant recruitment event resulted in a very significant increase in seasonal harvests. Seasonal harvests from the 1982/83 through the 1986/87 seasons averaged 868,819 lbs, with a range of

697,710 to 1,106,011 lbs.

Due to the propensity of the fleet to concentrate effort in the most productive fishing grounds rather than to distribute effort over all fishing grounds, and to prevent overexploitation on any single fishing ground, separate GHRs were established for specific fishing areas prior to the 1987/88 fishing season. The fishing areas and GHR were:

- | | |
|--------------------------|-------------------------|
| (1) Frederick Sound | 200,000 to 325,000 lbs; |
| (2) Icy Strait | 150,000 to 250,000 lbs; |
| (3) Lower Chatham Strait | 200,000 to 250,000 lbs; |
| (4) Exploratory | No GHR was established. |

These GHRs were based upon the average harvests that had occurred in each fishing area since the 1975/76 fishing season. This action was taken through a preliminary management plan.

Prior to the 1988/89 fishing season, the Alaska Board of Fisheries established regulations to describe the actual fishing grounds and set GHRs for each fishing ground. Due to industry input, the GHRs were increased for Frederick Sound and Chatham Straits areas and set as:

- | | |
|---------------------|-------------------------|
| (1) Frederick Sound | 200,000 to 500,000 lbs; |
| (2) Icy Strait | 150,000 to 250,000 lbs; |
| (3) Chatham Strait | 200,000 to 350,000 lbs; |
| (4) Exploratory | No GHR was established. |

These GHRs exist today.

Fishing Gear

From 1961 through 1967 the number of pots that could be fished by an individual permit or vessel participating in the fishery was not limited and no general specifications associated with the gear were in effect. In 1968 a limit of 40 pots per vessel was established. This limit was increased to 60 in 1974, and once again to 100 pots in 1978. This pot limit continues in effect.

Prior to the 1969/70 fishing season pot storage in the water was allowed. Regulations do not provide for a minimum mesh size or other biologically justified specifications, except that a "pot destruct" mechanism is required in case the pot is lost. Each pot must be independently buoyed and comply with marking requirements.

Limited Entry

Effective January 1, 1984 a limited entry program was established by the Alaska Commercial Fisheries Entry Commission for the king and Tanner crab pot fisheries in Southeast Alaska. The number of permanent permits granted for this fishery is presently 15. However, there are many interim permits still eligible to be fished as the adjudication process continues. At the current time, 73 total permits (permanent and interim) are eligible to fish during a brown king crab fishery. Prior to the 1990/91 fishing season, ring nets were eliminated as legal gear for king crab by the Alaska Board of Fisheries.

1990/91 SEASON SYNOPSIS

The 1990/91 commercial brown king crab fishery opened concurrently with the commercial Tanner crab fishery on February 15, 1991. The entire seasonal harvest of 426,877 lbs was made by 39 permit holders which made 220 landings (Table 1). Effort expended, in terms of number of permits fished, was the lowest recorded since the 1981/82 season. The Frederick Sound and Icy Strait areas were closed on June 20, 1991. The Chatham Strait and Exploratory areas closed on the regulatory closure date of January 29, 1992.

Landings averaged only 1,940 lbs, which was the lowest recorded since the 1978/79 fishing season and only 42% of the peak, which occurred during the 1986/87 fishing season. The average number of crabs per pot lift was 2.22, based on dockside interviews (Table 5). This was also the lowest value recorded since the 1985/86 fishing season when adequate data were first available.

Significant levels of recruitment did not enter the fishery this past season. The proportion of recruit crab in the harvest was only 24.7%, which is considerably less than the peak of 58.2% experienced in the 1984/85 season when recruitment was very good (Table 4). Average carapace length was 174.8 mm and average weight was 7.73 lbs, which are high compared to values observed during the period of good recruitment which extended from about the 1983/84 through the 1986/87 fishing seasons. Average carapace lengths during those years ranged from 165.3 mm to 169.6 mm and average weight ranged from 6.48 lbs to 7.10 lbs per crab (Tables 4 and 5).

The Frederick Sound Area produced 38% of the total harvest, followed by Chatham Strait with 25%, Icy Strait with 23%, and the Exploratory Area with 13%. Sixty-four percent of the permits were fished in Frederick Sound, with Icy Strait receiving the next greatest number of vessels. Only 6 and 7 vessels fished, respectively, in Chatham Strait and the Exploratory Area.

Frederick Sound Area

Twenty-five permit holders made 132 landings from the Frederick Sound during the past fishing season (Table 6) which lasted from February 15, 1991 through June 20, 1991. The resultant harvest of 156,758 lbs (Table 6) was the lowest since the separate fishing areas were established prior to the 1987/88 season. The resulting average landing of 1,188 lbs was also the lowest since the 1987/88 season. Although the season was closed well before the regulatory closing date, comparative monthly harvest data showed significant declines during the months of February and March relative to those experienced during previous seasons (Table 7). The greatest reduction in harvests occurred in districts 9 and 10 (Table 8).

A portion of the decline in harvest can be attributed to reduced effort as a portion of the fleet decided to participate more actively in the concurrent Tanner crab fishery. However, the majority of the harvest reduction can be explained in the "catching up" of previous recruitment during earlier commercial fishing seasons and the relative lack of new recruit crab entering the fishery prior to the fishery opening.

Dockside sampling provides an insight of recruitment events associated with this fishing area. Fairly good, although sporadic, recruitment occurred in the Frederick Sound Area during the mid-1970's, and excellent recruitment appeared to enter this fishing area from the 1983/84 through the 1986/87 seasons. This is apparent from the relatively high percent of recruit crab (from 40.2 to 68.3%) available during these seasons (Table 9), which culminated with a peak harvest during the 1988/89 fishing season (Table 6). Good recruitment was also indicated by small average carapace lengths (163.0 to 168.2 mm) and relative low numbers of skipmolted crab (12.7 to 21.6%) during these four fishing seasons (Table 9). The average weight of crab captured during this period of good recruitment was small (6.08 to 6.85 lbs/crab) compared to later seasons when crab averaged over 7 lbs (Table 10). Lastly, the catch from 1985/86 through 1987/88 was consistently above 5 crabs per pot compared to only 1.38 this past season (Table 10). Combined, the size frequency and shell condition data, the weight data, and the CPUE data indicate that a good recruitment event supported the fishery for a 4-6 year period starting with the 1983/84 fishing season. Later recruitment has not been sufficient to provide for higher harvests.

Icy Strait Area

Sixteen permit holders made 51 landings from the Icy Strait/Lynn Canal fishing area during this past fishing season (Table 11) which opened on February 15, 1991 and closed on June 20, 1991. The available effort resulted in a total harvest of 96,286 lbs (Table 11), which was the lowest harvest since separate fishing areas were established prior to the 1987/88 fishing season. The landings average of 1,888 lbs was also the lowest (Table 11). Although effort was relatively low and the season was closed before the regulatory closure date, comparative monthly harvest data also shows significant declines from March through June (Table 12). The greatest decline in harvests occurred in District 12 where harvests had

ranged from 151,829 to 205,852 lbs in previous seasons, compared to only 68,460 lbs this past season (Table 13).

As noted in the Frederick Sound fishery, a portion of the reduced harvests can be attributed to vessels deciding to concentrate fishing effort in the Tanner crab fishery. But, the greatest decline occurred due to the lack of recent recruitment into this fishery.

Samples of dockside landings from this fishing area are very limited, especially for the period of good recruitment from 1984/85 through the 1986/87 fishing seasons. Available samples do indicate that this was a period of good recruitment. Even more dramatic is the lack of recruitment during the past two seasons. Recruit crab accounted for only 5.5% of the harvest last season. The overwhelming contribution of post-recruit crab to the harvest was evidenced by the largest average carapace length on record (182.4 mm), a very large percentage of skipmolt crab of (37.0%, Table 14), and the highest average weight per crab of (8.75 lbs, Table 15). These data are indicative of an old stock with very little recent recruitment. Low stock abundance is inferred by a reduction in reported CPUE from 2.83 legal crab per pot during 1988/89 season to only 1.98 this past season (Table 15). The last significant recruitment entered this fishery prior to the 1986/87 fishery.

Chatham Strait Area

In terms of geographic area, the Chatham Strait Area is the smallest of the established areas. This area closed on January 29, 1992. During the 1990/91 fishing season six permit holders fished in this area and made 46 landings, for a total harvest of 102,160 lbs (Table 16). The average catch per landing was only 2,221 lbs (Table 16), which was only 53% of the previous season's value, and only 36% of the peak value. The number of permits fished has been consistent for the past four seasons, and the number of landings have been high for the past three seasons. Monthly harvests from March through October, 1991, were roughly one-half of the previous season (Table 17). All of the harvest comes from District 109 (Table 18).

Since the number of permits fished has been constant, and the number of landings is high, it does not appear as if effort was a significant factor in the harvest decline this season. However, dockside sampling information is not available from which to draw conclusions about stock recruitment. The 1990/91 average carapace length was over 170 mm and the proportion of recruits in the harvest were below 30% (Table 19). Average weight per crab was well over 7 lbs (Table 20). The average catch per pot lift declined somewhat from last year but the data appear relatively stable, in a statistical sense. These data are similar to data from Frederick Sound and Icy Strait areas, which indicate a lack of recent recruitment.

Exploratory Area

While the Exploratory Area encompasses the greatest geographic area of any brown king crab area, the most significant portion of the harvest occurs in waters of lower Chatham Strait. During the 1990/91 fishing season seven permit holders made 40 landings for a harvest of 52,645 lbs (Table 21). The average catch per landing was 1,316 lbs which was the lowest on record, and almost one-half the peak value of 2,539 lbs which occurred two seasons earlier (Table 21). Most of the harvest occurred from September, 1990 through January, 1991 (Table 22), and was reported from District 109 (Table 23). Effort in this fishery is increasing as evidenced by increasing permits and the number of landings, but the harvest is relatively constant (Table 21).

A very short history of dockside sampling information is available for the Exploratory Area, and it is not sufficient to assess recruitment (Tables 24 and 25). Compared to the other three fishing areas, it is evident that crab are smaller in this fishing area. During the 1990/91 fishing season, the average carapace length of 166.6 mm (Table 24) was small relative to 174.8 mm for all combined area data (Table 4). The largest crab measured in this area was 200 mm (Table 24) compared to 214 mm in other areas (Table 4). In addition, the average weight of 6.78 lbs (Table 25) was almost a full pound lighter than the overall Southeast Alaska average of 7.73 lbs (Table 5), and the largest average weight from any single landing was over 3 lbs lighter. The average catch per pot lift for this area was 1.44 legal crab higher than for Southeast Alaska combined data. However, this may be more reflective of longer soak times or other fishing techniques than to a more abundant stock.

1991/92 SEASON OUTLOOK

The only information available to assist management in determining stock strength is fish ticket information, which provides catch and effort data, and dockside sampling data which provides stock structure and limited catch per pot data. These data allow only a postseason assessment of stock condition. Some small differences in data exist between major fishing areas, but the same basic pattern develops in all areas. A review of these data indicate that stock abundance in the major fishing areas of the region is at a low level. Recruitment trends appear to be very similar in all major fishing areas, with the last significant recruitment event starting with the 1982/83 fishing season and extending through the 1986/87 fishing season. It is likely that the abundance of legal brown king crab will continue at a relatively low level, or decline further, unless a significant recruitment enters this fishery. Only continued dockside sampling of this fishery will provide information on future recruitment events and the abundance of this fishery resource.

The most significant portion of the catch decline in recent seasons can be attributed to a decline in the

abundance of legal brown king crab. It can be argued that a portion of the decline in harvest last season can be attributed to a decline in effort. Some of the decline in effort may be due to participation in the concurrent Tanner crab fishery. Some of the decline in harvest was due to management action that closed fishing areas prior to the regulatory closure date or before the GHR was reached. The data are not sufficient to determine what portion of the decline in harvest was due to the decline in effort. Both catch and effort, and the stock structure information must be viewed in combination to determine if the decline in harvest was due to a the decline in abundance of legal crab.

Catch and Effort

Catch and effort data (Table 1) indicates that effort, in terms of permits fished, peaked during the 1984/85 fishing season, while the harvest peaked during the 1986/87 season when effort was only 41% of the peak level. Also, catch per landing peaked concurrently with the peak harvest and has declined from 4,576 lbs per landing to only 1,940 lbs per landing last season. The number of landings has generally increased since the 1985/86 fishing season, indicating that fishermen made more trips in an attempt to increase their harvests while the crab population was declining.

Catch per pot information from the dockside sampling program indicated a general decline from an average of 5.14 legal crab per pot lift during the 1985/86 season to only 2.22 this past season (Table 5). The highest catch per pot reported fell from a level of 16.4 during the 1986/87 season to only 5.29 last season, the lowest on record. In addition, the lowest catch per pot reported fell from 1.58 during the 1985/86 season to 0.31 this past season. These data support the conclusion that the number of legal crab available to the fishery has declined. The condition persists today and will result in low harvests until another significant recruitment enters the fishery.

Stock Structure and Catch Per Pot

Primary data collected during dockside sampling include carapace length, shell condition, and weight. When combined, carapace length and shell condition can be utilized to determine what proportion of the stock is comprised of recruit and post-recruit crab. While not totally quantitative, this information can be utilized to determine when a significant recruitment event enters the fishery, particularly when combined with harvest data. Shell condition, itself, can be an indicator of the relative age of the stock. As king crab increase in age, the tendency to skip-molt increases. A stock with a large proportion of skip molts is an older stock, and this information can also be used to support conclusions on recruitment events. Average weight can be used as an indicator of recruitment events and relative stock age. Lighter crab indicate a significant proportion of recruit crab in the legal stock. Heavier crab indicate a significant proportion of post-recruit crab in the legal stock. Dockside sampling data is summarized in two tables.

Table 4 summarizes the size data and the various recruit and post-recruit percentages. Table 5 summarizes the weight sampling data.

Although sample sizes are small during the early seasons, it appears that recruitment was sporadic prior to the 1982/83 fishing season, and that some "catching-up" may have occurred prior to the 1982/83 fishing season. Average carapace length was primarily above 170 mm from the 1970/71 through the 1981/82 fishing seasons, and those below that level were all above 168 mm. The great majority of the harvest was comprised of post-recruit crab, and the percentage of skipmolted crab was generally above 20% of the total sample (Table 4). The average weights per crab were generally above 7.0 lbs, and were as high as 8.75 lbs during some seasons (Table 5). These data are indicative of an older stock without significant recruitment events of any magnitude.

A significant recruitment event began to enter the fishery prior to the 1982/83 fishery and lasted through the 1986/87 fishery. This was demonstrated by average carapace length consistently below 170 mm, percent of recruit crab consistently above 39.9, and percent of skipmolt crab generally below 20% for these five seasons (Table 4). In addition, the average weight per crab was between 6.48 and 7.10 lbs. It is interesting to note that this recruitment basically supported the fishery for six fishing seasons, and some post-recruits from this event may still be supporting the fishery today. This period of recruitment occurred while effort, catch per landing, and harvests all peaked.

Beginning with the 1987/88 fishing season, average carapace lengths increased, the percent of recruits declined, the percent of post-recruits increased, and the average weight per crab increased. This period coincided with declining harvests, a declining catch per landing and an increased number of landings. Thus, it is the lack of recent recruitment that is responsible for the majority of the decline in harvest. The decline in effort is due to the recognition of a declining abundance by the fleet and a choice to participate in alternative fisheries.

Table 1. Southeast Alaska (Statistical Area A) summary of commercial brown king crab harvest data from fish tickets by accounting year (October through September), 1972/73 to present.^{a/}

Accounting Year	Permits	Landings	Pounds	Lbs/Landing
1972/73	10	113	265,310	2,348
1973/74	14	92	179,520	1,951
1974/75	7	35	34,451	984
1975/76	5	21	39,439	1,878
1976/77	6	30	74,941	2,498
1977/78	14	53	82,733	1,561
1978/79	10	65	49,679	764
1979/80	19	78	163,035	2,090
1980/81	30	147	683,298	4,648
1981/82	54	255	652,865	2,560
1982/83	69	275	806,637	2,933
1983/84	90	307	974,917	3,175
1984/85	124	277	848,818	3,064
1985/86	61	211	697,710	3,306
1986/87	51	222	1,016,011	4,576
1987/88	56	235	949,205	4,039
1988/89	59	228	968,296	4,246
1989/90	63	257	627,810	2,443
1990/91	39	220	426,877	1,940

^{a/} Includes all test fishing and illegal harvest data which has been excluded from Tables 6, 11, 16, and 21.

^{b/} Most recent year's data should be considered preliminary.

Table 2. Southeast Alaska (Statistical Area A) summary of commercial brown king crab harvest data from fish tickets by month and accounting year (October through September), 1972/73 to present.

Accounting Year	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Total	Landings	Permits Fished
1972/73	18.1	43.7	18.6	22.0	26.3	19.5	35.6	11.0	6.0	11.1	9.6	43.8	265.3	113	10
1973/74	25.6	21.4	15.6	16.5	12.2	24.6	30.9	15.5	0.0	0.0	3.2	13.9	179.4	92	14
1974/75	8.9	4.9	3.2	4.5	1.4	2.8	3.8	0.0	0.0	0.0	0.0	5.0	34.5	35	7
1975/76	16.1	4.8	7.9	*	*	13.2	1.7	*	0.0	0.0	*	*	39.4	21	5
1976/77	*	9.1	*	*	*	9.1	7.5	0.0	0.0	0.0	0.0	*	74.9	30	6
1977/78	*	*	*	*	10.0	11.7	14.3	0.0	0.0	0.0	0.0	*	82.7	53	14
1978/79	*	4.4	8.7	9.7	5.9	5.9	3.7	*	0.0	0.0	*	3.3	49.7	65	10
1979/80	4.7	8.2	4.9	9.0	16.5	34.8	44.9	10.4	*	8.8	0.0	13.9	163.0	78	19
1980/81	30.2	43.2	18.2	79.3	168.7	167.7	85.3	*	*	*	*	14.0	683.3	147	30
1981/82	43.0	41.7	44.0	17.9	65.8	80.9	70.7	20.9	82.0	70.0	55.8	60.2	652.9	255	54
1982/83	173.5	77.3	65.3	0.0	115.8	166.3	15.0	46.8	27.5	35.2	59.8	24.0	806.6	275	69
1983/84	23.7	52.8	11.0	33.7	152.7	303.5	287.7	53.4	32.2	11.0	6.9	6.3	974.9	307	90
1984/85	166.9	250.8	19.9	14.9	117.8	172.5	22.3	19.6	24.9	*	19.1	11.9	848.8	277	124
1985/86	39.9	53.8	41.1	32.1	240.4	249.1	8.6	4.5	14.7	*	*	*	697.7	211	61
1986/87	147.5	80.2	46.3	326.2	136.5	70.5	67.9	39.3	39.0	*	27.8	17.3	1,016.0	222	51
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	949.2	235	56
1988/89	2.6	*	3.3	*	220.9	329.2	122.6	101.1	63.0	44.3	41.8	35.0	968.3	228	59
1989/90	78.8	31.5	6.5	5.9	66.4	145.3	68.2	60.3	55.7	42.2	23.3	43.7	627.8	257	63
1990/91 ^N	51.3	14.0	8.4	*	38.1	89.3	67.9	60.0	52.0	14.3	*	11.6	426.9	220	39

^N Most recent year's data should be considered preliminary.

Table 3. Southeast Alaska (Statistical Area A) summary of commercial brown king crab harvest data from fish tickets by fishing district and accounting year (October through September), 1972/73 to present.

District	Accounting Year																		
	1972/ 1973	1973/ 1974	1974/ 1975	1975/ 1976	1976/ 1977	1977/ 1978	1978/ 1979	1979/ 1980	1980/ 1981	1981/ 1982	1982/ 1983	1983/ 1984	1984/ 1985	1985/ 1986	1986/ 1987	1987/ 1988	1988/ 1989	1989/ 1990	1990/ 1991 ^v
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	*	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	13.9	3.2	*	17.6	10.1	*	*	*	*
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	*	14.1	*	*	*	*	0.0	0.0
8	0.4	0.1	0.1	0.0	0.0	*	0.0	1.1	1.2	6.1	*	5.4	*	4.6	0.0	*	10.3	*	*
9	10.5	0.5	14.9	0.0	*	0.0	0.0	0.0	*	48.8	109.2	135.0	192.3	234.0	609.3	298.0	413.6	231.3	213.3
10	186.5	149.2	12.3	*	*	73.7	36.7	61.3	204.6	248.0	185.7	222.7	375.9	324.4	298.8	318.6	338.8	146.1	83.2
11	36.2	24.6	0.7	0.0	*	7.3	6.7	21.8	25.9	48.8	52.6	24.6	34.5	35.6	43.8	36.9	9.1	6.9	18.5
12	5.8	0.0	5.2	*	*	*	1.3	61.8	169.7	92.9	225.8	438.2	153.3	23.3	*	195.7	140.5	206.0	82.9
13	0.0	0.6	0.0	*	0.0	*	0.0	0.0	*	6.2	12.9	*	2.5	*	0.0	0.0	0.0	0.0	0.0
14	2.6	4.1	1.4	0.0	0.0	0.0	*	*	221.7	152.6	151.1	46.5	52.8	24.8	1.5	16.4	37.5	30.2	19.4
15	23.4	0.4	0.1	*	*	*	*	16.7	53.6	49.4	37.9	93.9	13.1	24.9	16.2	67.0	12.0	8.9	8.7
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0
Total	265.4	179.5	34.7	39.4	74.9	82.7	49.7	163.0	683.3	652.9	806.6	974.9	848.8	697.7	1,016.0	949.2	968.3	627.8	426.9

^v Most recent year's data should be considered preliminary.

Table 4. Southeast Alaska (Statistical Area A) summary of commercial brown king crab length frequency and shell condition data collected during dockside sampling, 1970/71 to present.^{1/}

Accounting Year	Number of Boats Sampled	Number of Crab Sampled	Carapace Length (mm)		Recruitment					
			Average	Range	Recruits ^{2/}	% PR +1 ^{3/}	% PR +2 ^{4/}	% PR +3 ^{5/}	% PR +4 ^{6/}	% Skip Molts ^{7/}
1970/71	16	1,244	172.7	142 - 214	29.2	47.3	19.5	3.4	0.6	12.9
1971/72	15	1,594	175.2	150 - 211	18.0	47.7	28.8	5.5	0.1	26.9
1972/73	13	1,236	174.2	149 - 208	25.7	47.2	22.3	4.5	0.2	16.1
1973/74	8	604	173.0	146 - 210	26.7	39.5	28.7	4.7	0.3	28.6
1974/75	1	104	170.4	151 - 204	36.5	52.9	9.6	1.0	0.0	6.7
1975/76	10	934	171.8	145 - 208	36.1	43.1	17.6	3.1	0.1	11.3
1976/77	2	153	168.8	152 - 205	46.4	39.2	12.4	2.0	0.0	16.3
1977/78	8	727	170.0	149 - 201	23.2	39.2	29.3	8.3	0.0	53.9
1978/79	6	498	171.0	145 - 201	35.2	39.8	23.1	1.8	0.0	20.5
1979/80	5	477	169.8	145 - 203	37.1	36.5	18.9	7.3	0.2	32.7
1980/81	21	1,355	171.6	149 - 206	31.2	46.5	18.4	3.9	0.0	20.1
1981/82	7	634	177.7	148 - 214	21.3	43.7	26.7	7.6	0.8	15.1
1982/83	18	1,567	169.8	146 - 204	35.4	43.5	17.6	3.4	0.1	23.9
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	58.2	32.1	9.0	0.7	0.0	15.9
1985/86	21	2,106	166.7	149 - 198	48.4	41.2	9.1	1.4	0.0	16.4
1986/87	40	4,327	168.4	143 - 214	39.9	43.7	13.1	3.3	0.0	21.5
1987/88	64	5,733	173.3	148 - 212	20.0	49.9	23.4	6.6	0.0	26.7
1988/89	80	7,924	173.2	145 - 210	24.2	46.5	24.9	4.4	0.1	24.7
1989/90	97	9,031	176.1	146 - 211	18.9	45.8	29.5	5.7	0.1	20.8
1990/91	75	6,916	174.8	146 - 214	24.7	40.9	26.7	7.5	0.2	24.3

^{1/} Summary tables of all dockside sampling data includes data from Tables 9, 14, 19, and 24 plus data collected that could not be assigned to a fishing area.

^{2/} Recruits = all new and soft shell crab ≥ 151 mm and ≤ 167 mm carapace length.

^{3/} PR +1 = all new and soft shell crab ≥ 168 mm and ≤ 184 mm, and old & very old shell crab ≥ 151 mm and ≤ 167 mm, carapace length.

^{4/} PR +2 = all new and soft shell crab ≥ 185 mm and ≤ 201 mm, and old ≥ 168 mm & ≤ 184 mm, and very old ≥ 151 mm and ≤ 167 mm, carapace length.

^{5/} 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.

^{6/} PR +4 = all old and very old where carapace length ≥ 202 mm.

^{7/} Skip molts = all old and very old crab.

Table 5. Southeast Alaska (Statistical Area A) summary of commercial brown king crab CPUE and average weight data collected during dockside sampling and interviews, 1970/71 to present.^{1/}

Season	Number of Boats Interviewed	Number of Pots Lifted	Number of Crab Captured	Average Catch Per Pot	Range of Catch/Pot	Weight (lbs)		Estimated No. of Crab Harvested ^{2/}	Percent of Harvest Sampled ^{3/}
						Average	Range		
1970/71	0								
1971/72	0								
1972/73	0								
1973/74	1					6.91	6.91 - 6.91	25,980	2.32
1974/75	0								
1975/76	1					8.75	8.75 - 8.75	4,507	20.72
1976/77	0								
1977/78	2					7.39	7.20 - 7.58	11,195	6.49
1978/79	0								
1979/80	1					8.75	8.75 - 8.75	18,794	2.54
1980/81	9					7.78	6.55 - 8.78	87,828	1.54
1981/82	2	50	1,368	27.36	27.36 - 27.36	7.16	6.53 - 7.78	91,182	0.70
1982/83	13	1,697	3,482	2.91	1.09 - 5.32	7.04	6.48 - 7.88	114,579	1.37
1983/84	7					7.10	6.28 - 7.63	137,312	0.51
1984/85	15					6.48	5.74 - 7.28	130,990	1.04
1985/86	20	5,857	28,954	5.14	1.58 - 8.68	6.61	5.98 - 8.45	105,554	2.00
1986/87	36	8,707	33,062	4.51	1.57 - 16.40	6.90	6.16 - 8.46	137,566	3.15
1987/88	65	17,626	59,220	3.44	0.09 - 12.69	7.40	6.50 - 10.58	128,216	4.47
1988/89	86	25,765	89,212	3.50	0.43 - 8.98	7.37	5.75 - 8.71	131,439	6.03
1989/90	94	18,049	40,411	2.61	0.32 - 8.84	7.98	6.45 - 9.40	79,260	11.39
1990/91	78	13,573	27,735	2.22	0.31 - 5.29	7.73	6.31 - 10.99	55,224	12.52

3.18

^{1/} Summary tables of all dockside sampling data includes data from Tables 10, 15, 20, and 25 plus data collected that could not be assigned to a fishing area.

^{2/} Calculated by dividing fish ticket weight data by dockside sampling average weight per crab data.

^{3/} Calculated by dividing number of crab sampled for length frequency by estimated number of crab harvested.

Table 6. Frederick Sound Fishing Area summary of commercial brown king crab harvest data from fish tickets by actual fishing season, 1987/88 to present.

Season	Permits	Landings	Pounds	Lbs/Landing
1987/88	33	61	397,758	6,521
1988/89	40	96	484,127	5,043
1989/90	41	104	176,541	1,698
1990/91 ^{a/}	25	117	156,758	1,340

^{a/} Most recent year's data should be considered preliminary.

Table 7. Frederick Sound Fishing Area summary of commercial brown king crab harvest data by month and actual fishing season, 1987/88 to present.

Season	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total	Landings	Permits Fished
1987/88	218.5	179.3											397.8	61	33
1988/89		207.2	276.9										484.1	96	40
1989/90		63.2	107.1	6.3									176.5	104	41
1990/91 ^u		32.6	59.9	31.7	20.1	12.5							156.8	117	25

^u Most recent year's data should be considered preliminary.

3.20

Table 8. Frederick Sound Fishing Area summary of commercial brown king crab harvest data by fishing district and actual fishing season, 1987/88 to present.

Season	106	107	108	109	110	111	112	113	114	115	Total	Landings	Permits
1987/88	*			50,897	318,639	28,215					397,758	61	33
1988/89	*		10,301	127,705	338,123	7,987					484,127	98	40
1989/90			*	25,711	144,180	6,642					176,541	108	41
1990/91 ^u	*		*	54,498	83,164	18,138					156,758	132	25

^u Most recent year's data should be considered preliminary.

Table 9. Frederick Sound Fishing Area summary of commercial brown king crab length frequency and shell condition data collected during dockside sampling, 1970/71 to present.

Season	Number of Boats Sampled	Number of Crab Sampled	Carapace Length (mm)		Recruitment					
			Average	Range	% Recruits ^{1/}	% PR +1 ^{2/}	% PR +2 ^{3/}	% PR +3 ^{4/}	% PR +4 ^{5/}	% Skip Molts ^{6/}
1970/71	15	1,117	172.3	142 - 214	29.6	47.3	18.8	3.7	0.6	14.4
1971/72	14	1,496	174.8	150 - 211	19.1	48.9	27.6	4.3	0.1	24.9
1972/73	13	1,236	174.2	149 - 208	25.7	47.2	22.3	4.5	0.2	16.1
1973/74	8	604	173.0	146 - 210	26.7	39.5	28.7	4.7	0.3	28.6
1974/75	1	104	170.4	151 - 204	36.5	52.9	9.6	1.0	0.0	6.7
1975/76	9	847	171.1	145 - 208	37.6	43.1	16.4	2.7	0.1	11.8
1976/77	2	153	168.8	152 - 205	46.4	39.2	12.4	2.0	0.0	16.3
1977/78	0									
1978/79	6	498	171.0	145 - 201	35.2	39.8	23.1	1.8	0.0	20.5
1979/80	4	371	167.3	145 - 199	44.2	35.3	15.6	4.9	0.0	31.0
1980/81	8	643	168.1	152 - 200	38.2	49.5	10.7	1.7	0.0	20.8
1981/82	1	62	166.7	154 - 185	41.9	50.0	6.5	1.6	0.0	24.2
1982/83	3	323	166.9	151 - 191	41.7	40.8	14.1	3.4	0.0	32.2
1983/84	1	122	164.8	152 - 186	59.8	29.5	10.7	0.0	0.0	21.3
1984/85	7	804	163.0	149 - 184	68.3	26.8	4.8	0.1	0.0	14.2
1985/86	12	1,369	166.6	149 - 198	49.8	42.2	7.4	0.6	0.0	12.7
1986/87	17	1,955	168.2	143 - 210	40.2	44.2	11.6	4.0	0.1	21.6
1987/88	18	1,764	170.7	150 - 200	23.7	52.6	18.8	4.9	0.0	28.6
1988/89	41	4,271	170.9	147 - 210	30.5	46.8	20.5	2.2	0.0	23.3
1989/90	37	3,618	174.4	150 - 210	20.4	48.3	26.5	4.8	0.0	24.6
1990/91 ^{4/}	29	2,516	174.7	147 - 214	22.8	44.1	26.2	4.7	0.2	25.3

^{1/} Recruits = all new and soft shell crab ≥ 151 mm and ≤ 167 mm carapace length.

^{2/} PR +1 = all new and soft shell crab ≥ 168 mm and ≤ 184 mm, and old & very old shell crab ≥ 151 mm and ≤ 167 mm, carapace length.

^{3/} PR +2 = all new and soft shell crab ≥ 185 mm and ≤ 201 mm, and old ≥ 168 mm & ≤ 184 mm, and very old ≥ 151 mm and ≤ 167 mm, carapace length.

^{4/} 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.

^{5/} PR +4 = all old and very old where carapace length ≥ 202 mm.

^{6/} Skip molts = all old and very old crab.

Table 10. Frederick Sound Fishing Area summary of commercial brown king crab CPUE and average weight data collected during dockside sampling and interviews, 1970/71 to present.

Season	Number of Boats Interviewed	Number of Pots Lifted	Number of Crab Captured	Average Catch Per Pot	Range of Catch/Pot	Weight (lbs)		Estimated No. of Crab Harvested	Percent of Harvest Sampled
						Average	Range		
1970/71	0								
1971/72	0								
1972/73	0								
1973/74	1					6.91	6.91 - 6.91		
1974/75	0								
1975/76	1					8.75	8.75 - 8.75		
1976/77	0								
1977/78	2					7.39	7.20 - 7.58		
1978/79	0								
1979/80	0								
1980/81	3					6.96	6.55 - 7.40		
1981/82	1					6.53	6.53 - 6.53		
1982/83	3	47	250	5.32	5.32 - 5.32	6.79	6.48 - 6.97		
1983/84	1					6.28	6.28 - 6.28		
1984/85	6					6.08	5.74 - 6.46		
1985/86	12	4,392	22,394	5.21	1.58 - 7.51	6.53	5.98 - 8.45		
1986/87	17	5,166	21,775	5.10	1.90 - 16.40	6.85	6.35 - 8.46		
1987/88	20	5,856	29,884	5.59	0.22 - 12.69	7.17	6.50 - 8.02	55,475	3.18
1988/89	42	14,090	54,921	3.95	1.33 - 8.98	6.94	5.75 - 8.10	69,759	6.12
1989/90	37	7,314	14,416	2.11	0.65 - 4.86	7.62	6.45 - 9.20	23,168	15.62
1990/91	28	5,510	8,060	1.38	0.31 - 3.46	7.54	6.52 - 8.86	20,790	12.10

3.22

Table 11. Icy Strait/Lynn Canal Fishing Area summary of commercial brown king crab harvest data from fish tickets by actual fishing season, 1987/88 to present.

Season	Permits	Landings	Pounds	Lbs/Landing
1987/88	36	114	285,487	2,504
1988/89	27	110	260,781	2,371
1989/90	27	92	187,052	2,033
1990/91 ^{a/}	16	51	96,286	1,888

^{a/} Most recent year's data should be considered preliminary.

Table 12. Icy Strait/Lynn Canal Fishing Area summary of commercial brown king crab harvest data by month and actual fishing season, 1987/88 to present.

Season	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Total	Landings	Permits Fished
1987/88	43.5	71.0	46.1	28.2	27.7	49.6	*	*						285.5	114	36
1988/89		3.0	29.5	57.4	48.5	26.7	9.3	*	*	43.0	16.2	*	*	260.8	110	27
1989/90		1.2	21.0	41.6	40.6	31.7	18.5	2.9	14.9	11.7	3.0			195.5	92	27
1990/91 ^u		3.4	12.4	24.9	31.4	24.3								96.3	51	16

^u Most recent year's data should be considered preliminary.

3.24

Table 13. Icy Strait/Lynn Canal Fishing Area summary of commercial brown king crab harvest data by fishing district and actual fishing season, 1987/88 to present.

Season	106	107	108	109	110	111	112	113	114	115	Total	Landings	Permits
1987/88						8,695	193,441		16,361	66,995	285,487	114	36
1988/89						1,177	205,852		38,142	15,610	260,781	110	27
1989/90						149	151,829		29,522	5,552	187,052	92	27
1990/91 ^u						345	68,460		19,350	8,131	96,286	51	16

^u Most recent year's data should be considered preliminary.

Table 14. Icy Strait/Lynn Canal Fishing Area summary of commercial brown king crab CPUE and average weight data collected during dockside sampling and interviews, 1970/71 to present.

Season	Number of Boats Sampled	Number of Crab Sampled	Carapace Length (mm)		Recruitment					
			Average	Range	% Recruits ^{1/}	% PR +1 ^{2/}	% PR +2 ^{3/}	% PR +3 ^{4/}	% PR +4 ^{5/}	% Skip Molts ^{6/}
1970/71	1	127	175.5	145 - 204	26.0	47.2	26.0	0.8	0.0	0.0
1971/72	1	98	181.5	158 - 200	0.0	30.6	45.9	23.5	0.0	57.1
1972/73	0									
1973/74	0									
1974/75	0									
1975/76	1	87	178.2	149 - 205	20.9	43.0	29.1	7.0	0.0	6.9
1976/77	0									
1977/78	0									
1978/79	0									
1979/80	1	106	178.4	156 - 203	14.3	39.0	29.5	16.2	1.0	37.7
1980/81	13	712	174.7	149 - 206	24.8	43.8	25.5	5.9	0.0	19.5
1981/82	5	471	179.4	148 - 214	18.4	40.0	30.6	9.9	1.1	17.2
1982/83	13	1,044	170.3	146 - 204	34.8	44.2	17.3	3.6	0.1	21.2
1983/84	8	479	170.2	150 - 196	39.1	42.9	15.7	2.3	0.0	12.1
1984/85	5	564	168.5	148 - 196	43.8	39.5	15.1	1.6	0.0	18.4
1985/86	2	110	167.0	151 - 192	45.9	37.8	10.8	5.4	0.0	21.8
1986/87	1	22	168.2	156 - 181	40.9	45.5	9.1	4.5	0.0	18.2
1987/88	23	1,930	177.8	152 - 212	11.6	49.9	29.6	8.9	0.0	21.3
1988/89	23	2,085	177.4	147 - 210	13.1	45.8	33.0	8.1	0.1	26.4
1989/90	28	2,392	180.3	150 - 205	9.2	40.6	40.9	9.2	0.1	23.9
1990/91	14	1,312	182.4	150 - 213	5.5	30.6	47.5	16.0	0.4	37.0

^{1/} Recruits = all new and soft shell crab ≥ 151 mm and ≤ 167 mm carapace length.

^{2/} PR +1 = all new and soft shell crab ≥ 168 mm and ≤ 184 mm, and old & very old shell crab ≥ 151 mm and ≤ 167 mm, carapace length.

^{3/} PR +2 = all new and soft shell crab ≥ 185 mm and ≤ 201 mm, and old ≥ 168 mm & ≤ 184 mm, and very old ≥ 151 mm and ≤ 167 mm, carapace length.

^{4/} 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.

^{5/} PR +4 = all old and very old where carapace length ≥ 202 mm.

^{6/} Skip molts = all old and very old crab.

Table 15. Icy Strait/Lynn Canal Fishing Area summary of commercial brown king crab CPUE and average weight data collected during dockside sampling and interviews, 1970/71 to present.

Season	Number of Boats Interviewed	Number of Pots Lifted	Number of Crab Captured	Average Catch Per Pot	Range of Catch/Pot	Weight (lbs)		Estimated No. of Crab Harvested	Percent of Harvest Sampled
						Average	Range		
1970/71	0								
1971/72	0								
1972/73	0								
1973/74	0								
1974/75	0								
1975/76	0								
1976/77	0								
1977/78	0								
1978/79	0								
1979/80	0								
1980/81	0								
1981/82	1	50	1,368	27.36	27.36 - 27.36	7.78	7.78 - 7.78		
1982/83	10	1,650	3,232	2.31	1.09 - 3.25	7.11	6.63 - 7.88		
1983/84	5					7.18	6.70 - 7.63		
1984/85	6					6.77	6.13 - 7.28		
1985/86	2	275	546	1.99	1.99 - 1.99	7.09	7.09 - 7.09		
1986/87	5	366	200	1.72	1.72 - 1.72	6.50	6.16 - 6.77		
1987/88	22	5,660	10,896	2.33	0.09 - 4.66	7.71	6.96 - 8.64	37,028	5.21
1988/89	26	4,833	11,698	2.83	0.43 - 8.71	8.00	7.15 - 8.68	32,598	6.40
1989/90	27	4,709	10,473	2.46	0.34 - 4.10	8.53	7.62 - 9.42	21,929	10.91
1990/91	15	2,566	4,810	1.98	0.80 - 3.60	8.75	8.21 - 10.99	11,004	11.92

3.26

Table 16. Lower Chatham Fishing Area summary of commercial brown king crab harvest data from fish tickets by actual fishing season, 1987/88 to present.

Season	Permits	Landings	Pounds	Lbs/Landing
1987/88	8	28	166,131	5,933
1988/89	8	46	279,336	6,073
1989/90	5	44	185,118	4,207
1990/91 ^{a/}	6	46	102,160	2,221

^{a/} Most recent year's data should be considered preliminary.

Table 17. Lower Chatham Fishing Area summary of commercial brown king crab harvest data by month and actual fishing season, 1987/88 to present.

Season	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Total	Landings	Permits Fished
1987/88	*	44.1	33.4	33.7	49.4	*								166.1	28	8
1988/89		*	22.8	57.0	38.1	25.7	26.9	28.6	*	31.6	14.5			279.3	46	8
1989/90		*	*	*	19.8	24.0	23.6	*	25.0	31.7	*			185.1	44	5
1990/91 ^v		*	13.8	8.1	*	*	*	*	*	9.9	10.4	*	*	102.2	46	6

^v Most recent year's data should be considered preliminary.

3.28

Table 18. Lower Chatham Strait Fishing Area summary of commercial brown king crab harvest data by fishing district and actual fishing season, 1987/88 to present.

Season	106	107	108	109	110	111	112	113	114	115	Total	Landings	Permits
1987/88				166,131							166,131	28	8
1988/89				279,336							279,336	46	8
1989/90				185,118							185,118	44	5
1990/91 ^v				102,160							102,160	46	6

^v Most recent year's data should be considered preliminary.

Table 19. Lower Chatham Strait Fishing Area summary of commercial brown king crab length frequency and shell condition data collected during dockside sampling, 1970/71 to present.

Season	Number of Boats Sampled	Number of Crab Sampled	Carapace Length (mm)		Recruitment					
			Average	Range	% Recruits ^{1/}	% PR +1 ^{2/}	% PR +2 ^{3/}	% PR +3 ^{4/}	% PR +4 ^{5/}	% Skip Molts ^{6/}
1970/71	0									
1971/72	0									
1972/73	0									
1973/74	0									
1974/75	0									
1975/76	0									
1976/77	0									
1977/78	0									
1978/79	0									
1979/80	0									
1980/81	0									
1981/82	0									
1982/83	1	100	170.3	153 - 190	27.5	38.2	29.4	4.9	0.0	41.0
1983/84	0									
1984/85	0									
1985/86	0									
1986/87	1	131	167.6	150 - 185	36.2	55.4	8.5	0.0	0.0	20.6
1987/88	16	1,437	171.2	152 - 198	23.2	48.2	23.0	5.5	0.0	31.9
1988/89	11	4,115	174.0	147 - 207	23.3	47.1	24.2	5.3	0.1	22.4
1989/90	21	2,096	175.6	146 - 211	22.1	49.3	24.9	3.7	0.0	12.3
1990/91	15	1,501	173.1	147 - 211	29.5	46.7	19.5	4.1	0.2	15.7

^{1/} Recruits = all new and soft shell crab ≥ 151 mm and ≤ 167 mm carapace length.

^{2/} PR +1 = all new and soft shell crab ≥ 168 mm and ≤ 184 mm, and old & very old shell crab ≥ 151 mm and ≤ 167 mm, carapace length.

^{3/} PR +2 = all new and soft shell crab ≥ 185 mm and ≤ 201 mm, and old ≥ 168 mm & ≤ 184 mm, and very old ≥ 151 mm and ≤ 167 mm, carapace length.

^{4/} 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.

^{5/} PR +4 = all old and very old where carapace length ≥ 202 mm.

^{6/} Skip molts = all old and very old crab.

Table 20. Lower Chatham Strait Fishing Area summary of commercial brown king crab CPUE and average weight data collected during dockside sampling and interviews, 1970/71 to present.

Season	Number of Boats Interviewed	Number of Pots Lifted	Number of Crab Captured	Average Catch Per Pot	Range of Catch/Pot	Weight (lbs)		Estimated No. of Crab Harvested	Percent of Harvest Sampled
						Average	Range		
1970/71	0								
1971/72	0								
1972/73	0								
1973/74	0								
1974/75	0								
1975/76	0								
1976/77	0								
1977/78	0								
1978/79	0								
1979/80	0								
1980/81	0								
1981/82	0								
1982/83	0								
1983/84	1					7.54	7.54 - 7.54		
1984/85	0								
1985/86	6	1,190	6,014	5.53	2.92 - 8.68	6.71	6.32 - 7.21		
1986/87	11	2,894	10,182	3.33	1.57 - 4.92	7.07	6.62 - 7.52		
1987/88	15	4,190	12,194	3.13	1.28 - 5.45	7.24	6.72 - 8.05	22,946	6.26
1988/89	14	5,457	17,771	3.38	2.17 - 4.55	7.75	7.12 - 8.71	36,043	11.42
1989/90	23	5,298	13,061	2.99	0.32 - 6.39	8.02	7.00 - 8.92	23,082	9.08
1990/91	16	2,812	7,648	2.98	2.19 - 4.82	7.57	6.86 - 8.33	13,495	11.12

3.30

Table 21. Exploratory Fishing Area summary of commercial brown king crab harvest data from fish tickets by actual fishing season, 1987/88 to present.

Season	Permits	Landings	Pounds	Lbs/Landing
1987/88	6	33	69,876	2,117
1988/89	5	22	55,850	2,539
1989/90	4	20	38,482	1,924
1990/91 ^{a/}	7	40	52,645	1,316

^{a/} Most recent year's data should be considered preliminary.

Table 22. Exploratory Fishing Area summary of commercial brown king crab harvest data by month and actual fishing season, 1987/88 to present.

Season	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Total	Landings	Permits Fished
1987/88		*	*	*	*	*	17.1	13.2	12.2	*	*	*	*	68.4	32	6
1988/89				8.1	14.4	10.6	8.1	4.4	3.8	3.8	*		*	55.9	22	5
1989/90				1.1					3.8	8.0	*	*	*	38.5	20	4
1990/91 ^u			*	*		*	*	*	5.0	8.8	7.4	11.3	6.8	52.6	40	7

^u Most recent year's data should be considered preliminary.

3.32

Table 23. Exploratory Fishing Area summary of commercial brown king crab harvest data by fishing district and actual fishing season, 1987/88 to present.

Season	101	106	107	108	109	110	111	112	113	114	115	Total	Landings	Permits
1987/88		*	*		60.1							69.9	33	6
1988/89	0.0	*	*	*	46.2							55.9	22	5
1989/90					38.5							38.5	20	4
1990/91 ^u		*	*		47.4							52.6	40	7

^u Most recent year's data should be considered preliminary.

Table 24. Exploratory Fishing Area summary of commercial brown king crab length frequency and shell condition data collected during dockside sampling, 1970/71 to present.

Season	Number of Boats Sampled	Number of Crab Sampled	Carapace Length (mm)		Recruitment					
			Average	Range	% Recruits ^{1/}	% PR +1 ^{2/}	% PR +2 ^{3/}	% PR +3 ^{4/}	% PR +4 ^{5/}	% Skip Molts ^{6/}
1970/71	0									
1971/72	0									
1972/73	0									
1973/74	0									
1974/75	0									
1975/76	0									
1976/77	0									
1977/78	0									
1978/79	0									
1979/80	0									
1980/81	0									
1981/82	0									
1982/83	1	100	174.1	155 - 202	29.0	50.0	20.0	1.0	0.0	8.0
1983/84	0									
1984/85	0									
1985/86	0									
1986/87	0									
1987/88	1	124	167.7	148 - 201	49.6	41.5	8.1	0.8	0.0	8.9
1988/89	2	153	175.2	145 - 201	11.8	43.4	32.9	11.8	0.0	42.5
1989/90	3	301	169.2	150 - 201	47.7	34.9	15.8	1.7	0.0	11.3
1990/91	7	649	166.6	146 - 200	52.3	38.8	7.8	1.1	0.0	10.0

^{1/} Recruits = all new and soft shell crab ≥ 151 mm and ≤ 167 mm carapace length.

^{2/} PR +1 = all new and soft shell crab ≥ 168 mm and ≤ 184 mm, and old & very old shell crab ≥ 151 mm and ≤ 167 mm, carapace length.

^{3/} PR +2 = all new and soft shell crab ≥ 185 mm and ≤ 201 mm, and old ≥ 168 mm & ≤ 184 mm, and very old ≥ 151 mm and ≤ 167 mm, carapace length.

^{4/} 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.

^{5/} PR +4 = all old and very old where carapace length ≥ 202 mm.

^{6/} Skip molts = all old and very old crab.

Table 25. Exploratory Fishing Area summary of commercial brown king crab CPUE and average weight data collected during dockside sampling and interviews, 1970/71 to present.

Season	Number of Boats Interviewed	Number of Pots Lifted	Number of Crab Captured	Average Catch Per Pot	Range of Catch/Pot	Weight (lbs)		Estimated No. of Crab Harvested	Percent of Harvest Sampled
						Average	Range		
1970/71	0								
1971/72	0								
1972/73	0								
1973/74	0								
1974/75	0								
1975/76	0								
1976/77	0								
1977/78	0								
1978/79	0								
1979/80	0								
1980/81	0								
1981/82	0								
1982/83	0								
1983/84	0								
1984/85	0								
1985/86	0								
1986/87	3	221	905	7.98	2.73 - 10.61	6.79	6.60 - 6.99		
1987/88	2	900	1,400	1.50	1.00 - 2.00	7.19	7.11 - 7.28	9,718	1.28
1988/89	1	360	1,150	3.19	3.19 - 3.19	8.04	8.04 - 8.04	6,947	2.20
1989/90	3	142	853	6.49	3.83 - 8.84	7.01	6.68 - 7.46	5,490	5.48
1990/91	7	527	1,959	3.66	1.75 - 6.57	6.78	6.31 - 7.23	7,765	8.36

REPORT TO THE BOARD OF FISHERIES
1990/91 SOUTHEAST ALASKA TANNER CRAB FISHERIES



By

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Division of Commercial Fisheries
Juneau, Alaska

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GENERAL BACKGROUND

Of the two commercially significant species of Tanner crab (*Chionoecetes bairdi* and *C. opilio*) harvested from Alaskan waters, only *C. bairdi* is known to be present in Statistical Area A (Southeast Alaska) of Region 1 (Figure 1). Any subsequent reference to Tanner crab in this report will be referring to *C. bairdi*.

The commercial fishery for Tanner crab is based on the harvest of males over 5 1/2 inches carapace width during a season that is intended to protect sensitive life history stages such as the molting and mating periods. In addition, a guideline harvest ceiling, based on historic harvest trends, has been established. Currently, work on a comprehensive management plan for the Area A fishery is underway.

The Southeast Alaska fishery occurs in the relatively protected inshore waters south and east of Cape Fairweather and north of Dixon Entrance. The area is divided into Districts 1 to 16, generally distributed from the south to the north, and it is a super exclusive registration area. Vessels registering to fish Tanner crabs in Area A cannot fish for this species in any other area during the same registration year. The Tanner crab fishery is under limited entry, with a maximum of 83 permits, some of which will be non-transferable.

Most of the vessels used for this fishery are small, generally ranging from 35 to 50 feet keel length, though there are a few vessels with keel lengths up to about 80 feet. Most of these vessels are also used for other fisheries during the summer.

Winter crabbing for Tanner and other crabs is generally pursued as a secondary source of income during the off-season for salmon, halibut, and other groundfish. Most of the vessels have live-tanks. Currently, lighter cone or pyramid stacking pots that occupy less deck space are more commonly used than the heavier, seven-foot square pots originally designed for king crab. The effectiveness of the stacking gear is probably comparable to that of the heavier square pots for Tanner crab, although there is a perception among some members of the fleet that the square pots fish better for king crab. The choice of gear may therefore be predicated on the species to be targeted during mixed species fisheries for Tanner and brown king crab. The recent trend to shorter seasons and declining catches of brown king crab has favored the use of conical or pyramid pots by fishermen increasingly targeting Tanner crab. Soak times have also shortened to one or two days, particularly during the initial week or two of the fishery.

Historical Review

Although Tanner crab landings have been reported in Southeast Alaska since the early 1960's, it was not until the early 1970's that intensified fisheries were conducted. Tanner crab were commonly discarded by crabbers well into the mid-1970s, as they targeted the more lucrative king crab.

Since the 1972/73 season, the Southeast Alaska fishery has produced an average of 1,700,000 lbs per season. Until 1973, the season was open all year. From 1974 to 1980, the season lasted from September through either April or mid-May. Regardless of the length of the seasons, most of the harvest was taken during January through April of each year in Districts 110, 111, and 114 (Tables 5 and 6). These districts generally correspond geographically to the waters of Frederick Sound, Stephens Passage, and Icy Straits, respectively. The regulatory timing and distribution of the fishing effort reflects a combination of crab and vessel availability, market acceptability, and other factors. As the fishery slowly grew in size and intensity, the seasons were correspondingly shortened and regulations became more restrictive. Over the years, pot limits were instituted, registrations and buoy stickers were required, and small areas around Juneau were closed to commercial harvest. The whole process was one of incremental fishery development and corresponding managerial response.

However, the pace changed with the shortened 1981/82 season, when 46 vessels landed a record 3,300,000 lbs between December 1, 1981 and April 16, 1982. More than half this total was reportedly caught in Icy Straits, where the previous long-term seasonal average harvest had been about 725,000 lbs. Climbing demand for Tanner crab, an earlier season opening in Southeast Alaska than in other registration areas to the north and west, open registration, and the record landing in 1981/82 led to a doubling of the number of vessels fishing in 1982/83. Many larger crab vessels on their way to Kodiak and Bering Sea fisheries also registered for, and fished in, Southeast Alaska.

The effort expended by the fleet in 1982/83, primarily in Icy Straits, was unprecedented (Tables 1 and 6). The season, which lasted two weeks, was closed by emergency order based on extrapolation of early on-board observations of landings in the fishery in Icy Straits. The fishing effort in bays and on the better grounds in Icy Straits was extremely high. The fishery was barely manageable and several measures to prevent a recurrence were pursued by both the state and industry.

There was no fishery in calendar year 1983. During its Spring meeting in early 1983, the Board of Fisheries changed the season opening date in Southeast Alaska to February 10 to match the rest of the state. This action, in itself, discouraged larger vessels from fishing in Southeast Alaska during the 1983/84 season, when more lucrative grounds to the north and west were opening at the same time.

Southeast Alaska was designated a super exclusive registration area during the spring Board meeting in 1985. This action was an additional local reaction to the frantic 1982/83 season, and a further effort to stabilize vessel numbers likely to enter the fishery. It was assumed that operators of larger vessels, whose primary source of income was from crab fisheries in other registration areas, would not forego more lucrative opportunities by registering for Southeast Alaska.

Locally based vessel operators and processors also supported an initiative to further restrict the possibility of a recurrence of the fishery of 1982/83 by requesting limited entry status for the king and Tanner crab fisheries in Southeast Alaska. The State's response was a moratorium, initiated on January 1, 1984, on issuance of new Tanner crab permits. The Commercial Fisheries Entry Commission instituted a complex system of combined permits for the three species of king crab and Tanner crab. The full impact of the moratorium was not felt until the 1985/86 season because many prospective entrants to the 1984/85 fishery, which started on February 10, 1985, had obtained their permits prior to January 1, 1984, the cutoff date for the moratorium on new permit issuance. These measures succeeded in stabilizing the number of vessels in these fisheries. However, the number of vessels allowed was set at a level higher than that before the record-setting 1981/82 season (Table 1) that initiated the move for effort limitation. This proved to have long-term implications such as progressively shortened seasons.

In 1986, the Board adopted a regulation to restrict the boundaries of Statistical Area A to those waters of the state between Dixon Entrance and Cape Fairweather. A new statistical area, Statistical Area D, was established for those waters between Cape Fairweather and Cape Suckling. Major restructuring of the Administrative Code was necessary to accommodate this change, and implementation of the Board's action was delayed until early in 1987.

The 1987/88 season, which lasted about a month, was the shortest since that of 1982/83. Since the 1982/83 season, each opening has been restricted to less than two months. The general trend has been toward an opening lasting about two weeks, during which the catch has fluctuated between 1,000,000 and 2,200,000 lbs. Port sampling during recent seasons suggested that these levels of harvest generally resulted in harvest rates between 50 and 60% on a regional level, which was sustainable only while recruitment levels remained stable. The risk to this management option arises from the current inability of the department to detect recruitment failure until it is demonstrated by the fishery. Given the available stock condition information and sustainable harvest assumptions, the generally decreasing lengths of recent seasons are a direct indication of the increasing effectiveness of the fleet.

Short, recent seasons, lasting little longer than a month, resulted in a concentration of effort on the most productive grounds. This fishing strategy was characteristic of an efficient fleet faced with a quota that could be harvested in an abbreviated season. Many peripheral areas and grounds with harvestable

populations were foregone in favor of high production grounds, at least initially. Searching marginal areas became increasingly difficult for fishermen to economically justify during shorter and shorter seasons.

In response to requests by fishermen, the Board provided for exploratory fisheries for Tanner and red king crab to assess the status of stocks in peripheral or marginal areas that were not fished during the short, regular seasons. Starting in 1988, in areas from which little or no landings had been reported, fishing was allowed for these two species, from July 1 through March 31, under conditions of a special permit. Procedures for managing the experimental fisheries, seasons, and other criteria were established by the Board. In general, these fisheries were allowed when potential for overlaps with traditional fisheries were minimal; that is, during periods between the traditional fishing seasons for red king and Tanner crab. A major assumption was that these fisheries would be of such low intensity that mortalities associated with fishing during known molting and mating periods would be minimal. A special permit and logbook was 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 for red king crab and Tanner crab, it became obvious that interest in these fisheries was very marginal, catches were low, and no major unexploited populations of either species had been found. Also, major 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. The revocation went into effect in late summer 1990.

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. Ring net permits could be requested and issued because the permit moratorium was specific to pot gear. The number of ring net fishermen reporting landings increased from five in the 1984/85 season, peaked at 89 in the 1989/90 season, and has since declined. Total landings increased from 1,451 lbs in the 1984/85 season to 100,896 lbs or 5.11% of the total catch, during the 1989/90 season. The fishery saw a five to six-fold increase in terms of permits used, and a four to five-fold increase in pounds landed in each of the last three seasons. Since the spring meeting in 1986, ring net proposals affecting the Tanner and king crab fisheries have been a recurrent part of Board deliberations. The ring net fishery was the source of extended deliberations by the Board during the 1990 winter meeting.

In response to the growing ring net fishery and its increasing competition with the limited entry pot fishery, the Board passed a series of regulations intended to minimize conflict between the two gear groups. The number of ring nets was limited to 20 per vessel, ring net marking requirements were defined, and long-lining of ring nets was prohibited. Neither could vessels be concurrently 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 fishing. Ring nets were more carefully defined and limits set

for square footage or diameter. The intent of many of these regulations was to constrain ring net harvest below 4% of the total annual harvest of Tanner crab in Southeast Alaska.

Management Strategies for the Southeast Alaska Fishery

The process through which the seasonal harvest level is determined has been questioned. Setting the appropriate harvest level incorporates past fishery performance, largely indirectly through the catch and effort statistics extracted from the fish ticket record.

Without a department policy that provides for the survival of a portion of each year's recruitment, the Tanner crab fishery is heavily dependent on new recruits, harvesting at least half the available crab in the same season that they molt to legal size. In the absence of definitive preseason information, the department assumes that the Tanner crab stocks experience fairly stable levels of annual recruitment. If they do, then an annual harvest fluctuating around the long-term average should provide for continued viability of the resource. The annual allowable harvest level is 2,000,000 lbs, specified by regulation. The announced preseason guideline harvest range is often lower than that set by regulation. It is determined largely by more recent fleet performance and is considered to more closely reflect the current status of the stocks.

It is difficult to compare interannual variations in catch because of the rapidly evolving fleet. The actual effectiveness or efficiency of the fleet is probably higher with each season because the permit holders have found it necessary to upgrade their vessels and deck equipment, deploy and work the maximum allowed units of gear, and obtain better electronics to maintain their share of the catch. Competition has fostered the use of tenders to transport fishing gear and crabs, thereby maximizing the time on the grounds by fishing vessels.

Inseason management activities include a formal port sampling program that allows for examination of the size and shell condition of legal male crab. The tracking of fish tickets provides an estimate of catch per unit effort (catch per vessel per day), changes in this measure of relative abundance, cumulative catch rate, and the total catch to date. Onboard sampling opportunities to examine the relative abundance and sorting rates of juvenile males, females, legal though soft-shelled males, infected crab, and incidentally caught species are limited. Port sampling and fish tickets are the only available sources of information on fleet performance. As the CPUE, catch rate, and participation in the fishery declines, a flattening of the cumulative catch curve indicates the harvest of most of the immediately available legal crab, and a likely increase in the sorting of juveniles, females, and other species.

Principal management objectives for this fishery are to avoid pulse fisheries, to discourage high levels of sorting of juveniles and females, and to avoid fishing during sensitive life history stages, such as molting and mating. When a major district needs to be closed for any of these reasons, the entire registration area is closed. It is unfortunate that the variability in stock status between major fishing grounds results in some grounds reaching a harvest level that requires closing the season while others may still be fishable. As a result of conservative management there is a tendency to manage for stocks in the most heavily-fished districts, especially Districts 10, 11, and 14. Relatively strong stocks in these districts, or those that inhabit more lightly fished districts, could sustain higher harvest levels.

Until abundance estimators become available, or the Board specifies otherwise, the Tanner fishery will most likely continue to be managed at harvest levels approximating that of the last few seasons. These harvest levels are thought to allow harvest of a significant segment of the legal male population while restraining high sorting levels of sublegal male and female Tanner crab. Maintaining the catch at current levels is also thought to minimize fishing on grounds less suited for Tanner crab, and where their range often overlaps those of red king crab.

Inseason management based on fishery performance is becoming increasingly difficult because of the higher harvest rates by the progressively more efficient fleet. When preseason indicators suggest that high harvest rates and a short season are probable, management will consider relying on a predetermined season length, rather than active inseason data analysis, to constrain the harvest to a level below the 2,000,000 lbs directed by regulation.

Bitter Crab Syndrome

By the 1984/85 season, a persistent problem of astringent taste in some Tanner crab section meat had been reported. It was thought to be associated with a normal pre-molt condition in Tanner crab. A small scale blood testing project was undertaken to study this problem during the 1985/86 season. It was discovered that the bitter crab syndrome was caused by a parasitic, systemic dinoflagellate tentatively identified as *Hematodinium sp.*

Bitter crab syndrome has been reported since at least the early 1980's. It has been reported from most major fishing grounds in Southeast Alaska and sporadically from other areas as well. Its definitive identification in Bering Sea *C. opilio* stocks has accelerated research into its life history and the biochemical aspects of its association with Tanner crab because of the tremendous economic importance of Bering Sea Tanner and Snow crab stocks.

The existence of bitter crab is an important issue because it has biological and marketing implications that are somewhat interrelated. Biologically, the disease is important because it is thought to kill an infected crab within the life cycle of the infective organism, which is currently estimated to be about a year. Also, it may be spread by free-living, infective spores in the autumn, and may be infective to some degree in the vegetative stage while it is resident within the host crab during other seasons of the year. Sick crab that are transported and released in previously unaffected areas could spread the disease. Simply killing the infected crab would not necessarily render it noninfectious because even the vegetative stage of the organism remains viable for a considerable period after the death of the host crab.

Crab in the later stages of infection cannot be marketed because of the bitterly astringent taste and soft texture of the meat. These crab can usually be identified on the fishing grounds by external signs of infection such as abnormal pink or pale coloration of the crab abdomens and the ventral sides of their walking legs.

Infected crab continue to be transported out of the areas in which they are caught for two primary reasons. The first is that many vessel operators or their crews cannot differentiate between infected and healthy crab and retain all legal crab. The second is that the value of Tanner crab is currently sufficiently high now that even those fishermen who can sort infected crab retain all legal-sized male crab for the buyer to sort, rather than risk discarding a crab that would be acceptable to the buyer.

At the present time, 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. Infected crab, which can be graded visually with a high degree of accuracy at this stage, are unmarketable and they are sorted and discarded by tenders or shore-based processors, and some fishermen.

Sorting rates are reportedly as high as 80% from some areas, and recent increases in reported pounds of deadloss (mostly attributable to disposed diseased crab) indicate the magnitude of the problem. There are no industry-wide policies, regulations, or standard practices for safe disposal of these unwanted crab. Continued viability of the resource is being risked by the continued transport and often inadequate disposal of infected crab.

A possible partial solution to the transport and disposal problem would be to schedule the season during an earlier stage of the course of infection. Presumably, there is a period during October or early November during which most crab infected the previous year have died and the newly infected crab have not yet developed an unacceptable bitter taste. October or November is acceptable biologically for the

harvest of Tanner crab. Preliminary results from analysis of small samples from a limited number of bays suggests that meat recoveries are generally acceptable during this period.

However, although the externally discernible signs, internal symptoms, and mushy meat texture associated with the disease are less pronounced during the October to early November period, they are not totally absent. Meat recovery is also lower during October and November than in February. From the vessel operator's perspective, crab are not as readily caught because they are deeper and less aggregated during October and November than later in the winter. Still, from a biological standpoint, a season that minimizes waste and possibly hazardous disposal of infected crab is preferable to the current season that maximizes the risk to the continued viability of the resource.

A Tanner crab fishery to evaluate the feasibility of an earlier season to improve the marketability of Tanner crab infected with bitter crab disease was approved by the Board in 1990. Subsequently, it was determined that this fishery would not be manageable and would not provide the information for which it was intended. As a result, it was canceled by emergency order.

Season Summary

The 1990/91 season opened at 12:00 noon AST, on February 15, 1991. It closed by Emergency Order (1-C-1-91) 18 days later at 12:00 noon AST, on March 5, 1991. The harvest limit was announced in a preseason news release at 1,500,000 to 2,000,000 lbs. At the end of the opening, 2,163,663 lbs of marketable crab, plus 77,919 lbs of deadloss, for a total of 2,241,582 had been caught. Most of the reported deadloss was attributable to rejected bitter crab. At \$2.20/lb, the good product was worth about \$4,760,000 exvessel. The economic loss represented by the deadloss was conservatively set at \$170,000.

A total of 108 permits were fished during the season. They included 72 pot permits and 36 ring net permits.

Slightly more than 80% of the entire Southeast Alaska catch was reported caught in Districts 110, 111, and 114 (Table 6). This distribution of catch is somewhat typical of recent seasons. The success or failure of the fishery now hinges on these increasingly crowded, heavily fished districts. Trends in landings by district over the past few seasons suggest the interaction between the concurrent fisheries for brown king crab and Tanner crab. As brown king crab stocks declined in areas close to Petersburg, that fleet initially spread in search of alternate brown king crab fishing grounds while opportunistically fishing for Tanner crabs. In the last season, the fleet generally traded initial fishing opportunities for brown king crab to target Tanner crab in historically productive Tanner crab districts such as Districts 11 and 14.

Of the vessels registered for ring net gear, 36 reported landings. A total of 58,780 lbs, or about 2.6% of the Tanner crab catch, were reported landed with ring net gear. This percentage represented a decline from catches during the past two seasons and remains well within the 4% of the total catch allocated by the Board of Fisheries to the ring net fishery.

Table 1. Statistical Area A (Southeast Alaska) commercial Tanner crab catches in pounds, number of vessels, pounds per vessel, number of landings and pounds per landing, 1961 to present.

Season	Catch in Pounds	Number of Vessels	Pounds Per Vessel	Number of Landings	Pounds Per Landing
1961	6,800	-			
1962	7,820	-			
1963	0	-			
1964	13,940	-			
1965	0	-			
1966	-	-			
1967	2,733	-			
1968	109,220	-			
1968/69	176,572	29	6,089	78	2,263
1969/70	660,337	31	21,301	347	1,902
1970/71	167,378	12	13,948	72	2,324
1971/72	656,661	25	26,266	274	2,396
1972/73	1,600,748	31	51,637	354	4,521
1973/74	1,309,673	52	25,186	419	3,125
1974/75	863,751	52	16,611	244	3,539
1975/76	2,149,397	31	69,335	369	5,824
1976/77	2,557,429	57	44,867	380	6,730
1977/78	2,142,409	44	48,691	337	6,357
1978/79	1,559,769	38	41,047	313	4,983
1979/80	1,772,930	53	33,452	355	4,994
1980/81	2,010,370	58	34,662	417	4,821
1981/82	3,302,211	74	44,624	443	7,465
1982/83	1,222,205	97	12,600	181	6,752
1983/84	1,615,100	103	15,681	339	4,764
1984/85	1,125,213	85	13,238	272	4,137
1985/86	1,006,754	84	11,985	320	3,146
1986/87	1,123,974	74	15,189	271	4,147
1987/88	1,330,485	84	15,839	366	3,635
1988/89	1,646,332	140	11,760	388	4,243
1989/90	1,994,496	172	11,596	458	4,354
1990/91 ^{a/}	2,241,593	108	20,755	286	7,837

^{a/} Most recent year's data should be considered preliminary.

Table 2. Statistical Area A (Southeast Alaska) commercial Tanner crab harvest in thousands of pounds, by month and season, 1968/69 to present.

Season	Sept	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	205.1	338.3	393.8	695.3	458.0	109.9	Closed	Closed	Closed	2,557.4
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	607.2	282.4	37.5	Closed	Closed	Closed	1,772.9
1980/81	33.7	51.9	48.5	60.1	315.9	494.9	626.9	350.5	28.1	Closed	Closed	Closed	2,010.4
1981/82	Closed	Closed	Closed	870.8	597.7	709.1	809.4	315.2	Closed	Closed	Closed	Closed	3,302.2
1982/83	Closed	Closed	Closed	1,222.2	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed	1,222.2
1983/84 ^{a/}	0.0	*	Closed	8.2	0.0	866.0	727.5	Closed	Closed	Closed	Closed	Closed	1,615.1
1984/85	Closed	Closed	Closed	Closed	Closed	531.3	593.9	Closed	Closed	Closed	Closed	Closed	1,125.2
1985/86 ^{b/}	Closed	Closed	Closed	Closed	Closed	575.8	426.4	2.6	Closed	Closed	Closed	Closed	1,006.7
1986/87	Closed	Closed	Closed	Closed	635.4	488.6	Closed	Closed	Closed	Closed	Closed	Closed	1,124.0
1987/88	Closed	Closed	0.0	0.0	787.7	542.8	Closed	Closed	Closed	Closed	0.0	0.0	1,330.5
1988/89 ^{c/}	0.0	*	*	*	*	1,087.9	552.8	Closed	Closed	Closed	0.0	0.0	1,646.3
1989/90 ^{d/}	*	*	7.6	2.1	*	1,233.4	740.7	Closed	Closed	Closed	Closed	Closed	1,994.5
1990/91 ^{e/}	Closed	Closed	Closed	Closed	Closed	1,598.8	642.8	Closed	Closed	Closed	Closed	Closed	2,241.6

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

^{a/} Exploratory deep water Tanner (*Chioniceetes tanneri*) opened September 16 through October 31, 1983, and December 5 to January 24, 1984.

^{b/} Exploratory Tanner open in Districts 1 through 4 opened March 25, 1986, and closed May 1, 1986.

^{c/} Experimental Tanner areas opened July 1, 1988, and closed January 31, 1989. Traditional fishery opened January 15, 1989, and closed February 16, 1989.

^{d/} Experimental Tanner areas opened July 1, 1989, and closed January 31, 1990. Traditional fishery opened February 15, 1990, and closed March 8, 1990.

^{e/} Most recent year's data is considered preliminary.

Table 3. Statistical Area A (Southeast Alaska) commercial Tanner crab, harvest in thousands of pounds, by district and season, 1968/69 to present.

Season	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Total	
1968/69	0.0	0.0	0.0	0.0	0.0	0.0	*	81.3	2.1	63.1	9.2	0.0	8.0	4.8	*	0.0	176.6	
1969/70	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	78.4	0.0	179.0	227.6	4.8	28.6	96.9	44.4	0.0	660.3
1970/71	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	31.7	*	75.7	*	*	0.0	*	0.0	167.4	
1971/72	0.0	0.0	0.0	0.0	0.0	0.6	0.0	71.6	*	69.6	71.0	*	99.7	310.8	*	0.0	656.7	
1972/73	0.0	0.0	0.0	0.0	0.0	37.5	0.0	69.2	*	55.0	436.9	*	58.3	505.2	*	318.4	1,600.7	
1973/74	0.0	0.0	0.0	0.0	*	18.8	*	*	46.1	132.8	616.2	*	60.8	404.3	1.5	0.0	1,309.7	
1974/75	3.5	0.0	0.0	0.0	0.0	*	10.6	22.0	40.0	67.3	211.2	3.6	100.7	371.1	8.4	*	863.8	
1975/76	0.0	0.0	0.0	0.0	14.3	*	11.3	112.8	*	138.0	828.6	92.5	176.3	505.1	*	0.0	2,149.4	
1976/77	0.0	0.0	*	0.0	71.8	115.3	0.0	104.0	62.6	217.5	694.4	52.7	92.8	1,032.4	113.6	0.0	2,557.4	
1977/78	*	0.0	*	0.0	*	124.6	0.0	*	*	212.6	580.3	96.6	86.6	762.5	191.1	0.0	2,142.4	
1978/79	*	0.0	0.0	0.0	*	*	0.0	*	0.0	303.5	425.6	3.6	55.0	655.0	72.2	0.0	1,559.8	
1979/80	0.0	0.0	0.0	0.0	0.0	5.9	15.6	118.2	*	237.2	749.4	22.0	*	390.5	125.6	*	1,772.9	
1980/81	*	0.0	0.0	*	*	20.3	*	229.1	49.0	282.2	422.2	83.5	53.9	672.8	77.3	58.4	2,010.4	
1981/82	*	0.0	0.0	0.0	0.0	121.4	41.8	201.2	0.0	167.4	405.0	78.5	66.0	2,102.8	122.2	0.0	3,302.2	
1982/83	*	0.0	0.0	0.0	*	45.2	0.0	0.0	*	171.3	108.2	26.3	*	834.9	25.9	0.0	1,222.2	
1983/84 ^{a/}	0.0	0.0	0.0	*	*	42.0	29.1	46.4	28.9	205.4	375.6	16.5	51.2	656.5	145.8	*	1,615.1	
1984/85	*	0.0	0.0	0.0	*	7.8	14.3	40.6	36.9	136.7	368.3	66.9	44.7	225.0	182.8	0.0	1,125.2	
1985/86 ^{b/}	*	0.0	0.0	0.0	*	16.7	3.7	22.4	12.4	74.9	474.6	39.7	46.5	182.3	128.5	0.0	1,006.7	
1986/87	0.0	0.0	0.0	0.0	*	31.5	0.0	40.2	32.7	81.1	526.6	34.6	44.2	242.0	80.4	*	1,124.0	
1987/88	*	0.0	0.0	0.0	*	46.7	*	29.7	20.3	218.6	541.9	59.4	*	239.2	127.7	*	1,330.5	
1988/89 ^{c/}	0.0	0.0	0.0	0.0	*	29.1	*	54.9	29.4	326.8	622.5	91.4	*	349.1	106.0	0.0	1,646.3	
1989/90 ^{d/}	*	0.0	0.0	0.0	0.4	25.4	0.0	24.2	153.2	446.0	613.0	38.4	41.9	621.3	29.6	0.0	1,994.5	
1990/91 ^{e/}	0.0	0.0	0.0	0.0	*	36.0	0.0	41.0	237.2	302.1	695.2	63.9	*	798.5	22.4	*	2,241.6	

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

^{a/} Exploratory deep water Tanner (*Chionieetes tanneri*) opened September 16 through October 31, 1983, and December 5 to January 24, 1984.

^{b/} Exploratory Tanner in Districts 1 through 4 opened March 25, 1986, and closed May 1, 1986.

^{c/} Experimental Tanner areas opened July 1, 1988, and closed January 31, 1989. Traditional fishery opened January 15, 1989, and closed February 16, 1989.

^{d/} Experimental Tanner areas opened July 1, 1989, and closed January 31, 1990. Traditional fishery opened February 15, 1990, and closed March 8, 1990.

^{e/} Most recent year's data should be considered preliminary.

Table 4. Southeast Alaska (Statistical Area A) summary of commercial Tanner crab length frequency and shell condition data collected during dockside sampling, 1970/71 to present.^{1/}

Accounting Year	Number of Boats Sampled	Number of Crab Sampled	Carapace Width (mm)		Recruitment	
			Average	Range	% Recruits ^{2/}	% Postrecruits ^{3/}
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

1/ 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.

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

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

Table 5. Southeast Tanner Crab harvest in pounds by season by fishing area.

Season	Lynn Canal/Upper Stephens Passage ^{1/}		Icy Strait ^{2/}		Frederick Sound/Lower Stephens Passage ^{3/}		Other ^{4/}		Total Harvest
	Pounds	% of S.E. Harvest	Pounds	% of S.E. Harvest	Pounds	% of S.E. Harvest	Pounds	% of S.E. Harvest	
1971/72	13,440	2.05	310,803	47.33	200,854	30.59	131,564	20.03	656,661
1972/73	177,661	11.10	505,203	31.56	443,106	27.68	474,778	29.66	1,600,748
1973/74	377,190	28.80	404,347	30.87	396,400	30.27	131,736	10.06	1,309,673
1974/75	19,116	2.21	371,050	42.96	289,758	33.55	183,827	21.28	863,751
1975/76	782,127	36.39	505,089	23.50	406,565	18.92	455,616	21.19	2,149,397
1976/77	599,719	23.45	1,032,391	40.37	529,849	20.72	395,470	15.46	2,557,429
1977/78	394,041	18.39	762,491	35.59	648,802	30.28	337,075	15.74	2,142,409
1978/79	308,765	19.80	655,043	42.00	511,769	32.81	84,192	5.39	1,559,769
1979/80	330,221	18.63	390,460	22.02	899,658	50.74	152,591	8.61	1,772,930
1980/81	321,594	16.00	672,310	33.44	641,945	31.93	374,521	18.63	2,010,370
1981/82	380,304	11.52	2,102,755	63.68	428,259	12.97	390,893	11.83	3,302,211
1982/83	96,505	7.90	834,884	68.31	208,918	17.09	81,898	6.7	1,222,205
1983/84	298,975	18.51	656,496	40.65	450,204	27.87	209,425	12.97	1,615,100
1984/85	362,713	32.24	225,044	20.0	361,611	32.14	175,845	15.62	1,125,213
1985/86	420,258	41.74	182,316	18.11	281,531	28.0	122,649	12.15	1,006,754
1986/87	410,674	36.54	242,010	21.53	317,528	28.25	153,762	13.68	1,123,974
1987/88	458,190	34.44	239,194	17.98	459,709	34.55	173,392	13.03	1,330,485
1988/89	476,600	28.95	349,098	21.20	630,687	38.31	189,947	11.54	1,646,332
1989/90	386,754	19.39	621,277	31.15	710,551	35.63	275,914	13.83	1,994,496
1990/91	442,952	19.76	798,460	35.62	617,839	27.56	382,342	17.06	2,241,593

1/ Includes all of District 115 and District 111-30 through 111-99.

2/ Includes all of District 114.

3/ Includes all of District 110, District 111-01 through 111-29 and District 108-40 through 108-69.

4/ Includes all of Southeast Alaska outside of Lynn Canal/Upper Stephens Passage, Icy Strait, and Frederick Sound/Lower Stephens Passage.

Table 6. Southeast Alaska (Statistical Area A) summary of commercial Tanner crab CPUE and average weight data collected during dockside sampling and interviews, 1970/71 to present.^{1/}

Season	Number of Boats Interviewed	Number of Pots Lifted	Number of Crab Captured	Average Catch Per Pot	Range of Catch/Pot	Weight (lbs)		Estimated No. of Crab Harvested ^{2/}	Percent of Harvest Sampled ^{3/}
						Average	Range		
1970/71									
1971/72									
1972/73									
1973/74									
1974/75	1					3.22	3.22 - 3.22		
1975/76									
1976/77	18	58	1,400	24.14	24.14 - 24.14	2.58	2.23 - 2.98	991,252	0.38
1977/78	27	270	6,268	25.20	16.00 - 43.11	2.68	2.27 - 3.11	799,406	0.60
1978/79	12	386	5,469	19.80	17.18 - 22.42	2.60	1.59 - 2.85	599,911	0.55
1979/80	3	160	1,643	10.27	10.27 - 10.27	2.80	2.80 - 2.80	636,401	0.71
1980/81	5	300	4,560	15.20	15.20 - 15.20	2.80	2.06 - 3.20	717,989	0.59
1981/82	33	6,277	132,535	26.20	5.27 - 71.55	2.33	2.01 - 2.55	1,419,396	0.46
1982/83	39	2,043	26,152	15.00	4.91 - 29.16	2.45	2.06 - 2.97	498,859	1.16
1983/84	16	620	6,050	10.45	6.89 - 14.00	2.50	2.30 - 2.72	653,343	0.37
1984/85	22	2,070	25,455	11.61	3.89 - 17.36	2.60	2.26 - 3.04	435,685	0.74
1985/86	51	7,127	75,552	12.69	1.78 - 30.71	2.43	1.80 - 3.10	414,705	1.32
1986/87	59	14,192	135,615	12.28	2.87 - 31.96	2.49	2.13 - 2.85	451,395	1.55
1987/88	95	22,745	225,850	11.70	2.40 - 32.95	2.38	1.96 - 2.71	559,027	2.00
1988/89	99	26,387	350,878	15.17	0.40 - 32.95	2.51	2.12 - 3.11	655,909	1.53
1989/90	109	31,517	366,514	11.71	1.03 - 34.62	2.45	2.12 - 2.95	814,080	1.57
1990/91	122	39,168	568,956	15.25	1.27 - 40.34	2.57	2.11 - 3.05	872,215	1.50

^{1/} Summary tables of all dockside sampling data includes data from Tables 7, 9, and 11 plus data collected that could not be assigned to a fishing area.

^{2/} Calculated by dividing fish ticket weight data from Table 5 by dockside sampling average weight per crab data.

^{3/} Calculated by dividing number of crab sampled for length frequency by estimated number of crab harvested.

Table 7. Icy Strait summary of commercial Tanner crab CPUE and average weight data collected during dockside sampling and interviews, 1970/71 to present.

Season	Number of Boats Interviewed	Number of Pots Lifted	Number of Crab Captured	Average Catch Per Pot	Range of Catch/Pot	Weight (lbs)		Estimated No. of Crab Harvested ^{1/}	Percent of Harvest Sampled ^{2/}
						Average	Range		
1970/71									
1971/72									
1972/73									
1973/74									
1974/75									
1975/76	2					1.86	1.67 - 2.09	271,553	0.0
1976/77	2					2.10	1.97 - 2.24	491,615	0.0
1977/78	2					2.82	2.78 - 2.86	270,387	0.31
1978/79									
1979/80									
1980/81									
1981/82	21	5,074	118,704	29.51	5.27 - 71.55	2.31	2.01 - 2.55	910,284	0.30
1982/83	34	1,556	22,758	18.37	4.91 - 29.16	2.46	2.06 - 2.76	339,384	0.98
1983/84	8					2.52	2.35 - 2.67	260,514	0.31
1984/85	2					2.30	2.30 - 2.30	97,845	0.32
1985/86	1	98	811	8.28	8.28 - 8.28				
1986/87	4	1,087	11,342	12.11	6.04 - 20.77	2.37	2.28 - 2.51	102,114	0.47
1987/88	10	2,712	27,371	10.90	4.29 - 25.00	2.24	2.11 - 2.44	106,783	1.05
1988/89	17	5,812	69,339	13.30	0.40 - 26.72	2.28		153,113	1.22
1989/90	25	8,812	113,893	13.26	4.17 - 34.62	2.50	2.35 - 2.65	248,511	1.04
1990/91	34	11,683	153,781	14.08	4.24 - 40.34	2.42	2.33 - 2.57	329,942	1.05

^{1/} Calculated by dividing fish ticket weight data for Icy Strait from Table 5, by dockside sampling average weight per crab data.

^{2/} Calculated by dividing number of crab sampled for length frequency by estimated number of crab harvested.

Table 8. Icy Strait summary of commercial Tanner crab length frequency and shell condition data collected during dockside sampling, 1970-71 to present.

Accounting Year	Number of Boats Sampled	Number of Crab Sampled	Carapace Width (mm)		Recruitment	
			Average	Range	% Recruits ^{1/}	% Postrecruits ^{2/}
1970/71						
1971/72	1	87	154.0	127 - 183	75.6	24.4
1972/73						
1973/74						
1974/75						
1975/76						
1976/77 ^{3/}	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

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

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

3/ The first season that legal size was 5 1/2" (140 mm) carapace width.

Table 9. Lynn Canal/Stephens Passage summary of commercial Tanner crab CPUE and average weight data collected during dockside sampling and interviews, 1970/71 to present.

Season	Number of Boats Interviewed	Number of Pots Lifted	Number of Crab Captured	Average Catch Per Pot	Range of Catch/Pot	Weight (lbs)		Estimated No. of Crab Harvested ^{1/}	Percent of Harvest Sampled ^{2/}
						Average	Range		
1970/71									
1971/72									
1972/73									
1973/74									
1974/75									
1975/76									
1976/77	10	58	1,400	24.14	24.14 -24.14	2.62	2.45 - 2.98	228,900	1.10
1977/78	8	270	6,268	252	16.00 -43.11	2.70	2.57 - 2.86	145,941	0.95
1978/79	6	386	5,469	19.8	17.18 -22.42	2.68	2.56 - 2.80	115,211	1.05
1979/80	1	160	1,643	10.27	10.27 -10.27				
1980/81									
1981/82	4	762	8,744	12.12	12.08 -12.16	2.35	2.31 - 2.40	161,831	0.32
1982/83	8	487	3,394	10.51	5.50 -13.72	2.41	2.37 - 2.50	39,911	3.25
1983/84	2					2.60	2.49 - 2.72	114,524	0.18
1984/85	6	875	8,832	10.21	3.89 -14.00	2.59	2.49 - 2.72	140,044	0.60
1985/86	29	3,577	48,103	15.20	5.92 -30.71	2.43	1.80 - 3.10	172,946	1.83
1986/87	37	5,000	64,115	13.97	4.95 -31.96	2.53	2.13 - 2.79	161,032	2.78
1987/88	43	7,507	80,893	12.64	3.01 -32.95	2.43	1.96 - 2.71	183,247	2.89
1988/89	41	7,355	94,795	14.17	4.49 -37.36	2.63	2.21 - 3.11	178,389	2.01
1989/90	33	7,509	89,562	11.61	3.12 -32.40	2.51	2.12 - 2.84	152,984	2.58
1990/91	14	2,555	28,802	12.19	1.95 -25.26	2.60	2.45 - 2.81	168,434	0.63

^{1/} Calculated by dividing fish ticket weight data for Lynn Canal/Stephens Passage from Table 5, by dockside sampling average weight per crab data.

^{2/} Calculated by dividing number of crab sampled for length frequency by estimated number of crab harvested.

Table 10. Lynn Canal/Stephens Passage summary of commercial Tanner crab length frequency and shell condition data collected during dockside sampling, 1970/71 to present.

Accounting Year	Number of Boats Sampled	Number of Crab Sampled	Carapace Width (mm)		Recruitment	
			Average	Range	% Recruits ^{1/}	% Postrecruits ^{2/}
1970/71	1	99	157.0	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 ^{3/}	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

1/ Recruits = all new and soft shell crab ≥ 151 mm and ≤ 164 mm carapace length.

2/ Postrecruits = all new and soft shell crab ≥ 168 mm and ≤ 184 mm, and old and very old shell crab ≥ 151 mm and ≤ 167 mm, carapace length.

3/ The first season that the regulatory size was 5 1/2" (140 mm) carapace width.

Table 11. Frederick Sound summary of commercial Tanner crab CPUE and average weight data collected during dockside sampling and interviews, 1970/71 to present.

Season	Number of Boats Interviewed	Number of Pots Lifted	Number of Crab Captured	Average Catch Per Pot	Range of Catch/Pot	Weight (lbs)		Estimated No. of Crab Harvested ^{1/}	Percent of Harvest Sampled ^{2/}
						Average	Range		
1970/71									
1971/72									
1972/73									
1973/74									
1974/75	1					3.22	3.22 - 3.22		
1975/76									
1976/77	4					2.60	2.40 - 2.79		
1977/78	14					2.74	2.51 - 3.11		
1978/79	5					2.50	1.59 - 2.85		
1979/80	1					2.80	2.80 - 2.80		
1980/81									
1981/82	5					2.42	2.20 - 2.54	176,967	1.16
1982/83	4					2.66	2.35 - 2.97	78,541	0.10
1983/84	4					2.42	2.30 - 2.56	186,035	0.45
1984/85	7					2.72	2.26 - 3.04	132,945	0.80
1985/86	15	2,879	21,651	6.62	1.78 - 10.03	2.46	2.10 - 2.72	114,399	1.33
1986/87	10	3,423	36,051	11.71	2.87 - 22.22	2.48	2.13 - 2.85	128,035	0.90
1987/88	22	7,478	67,096	10.26	2.40 - 26.00	2.39	2.17 - 2.58	190,676	1.23
1988/89	30	8,957	150,506	18.78	4.48 - 42.74	2.44	2.25 - 2.75	242,605	1.42
1989/90	42	13,577	149,824	10.91	1.03 - 30.00	2.45	2.16 - 2.95	268,599	1.71
1990/91	35	13,188	209,884	16.12	5.71 - 38.64	2.63	2.12 - 2.99	230,171	1.78

^{1/} Calculated by dividing fish ticket weight data for Frederick Sound from Table 5, by dockside sampling average weight per crab data.

^{2/} Calculated by dividing number of crab sampled for length frequency by estimated number of crab harvested.

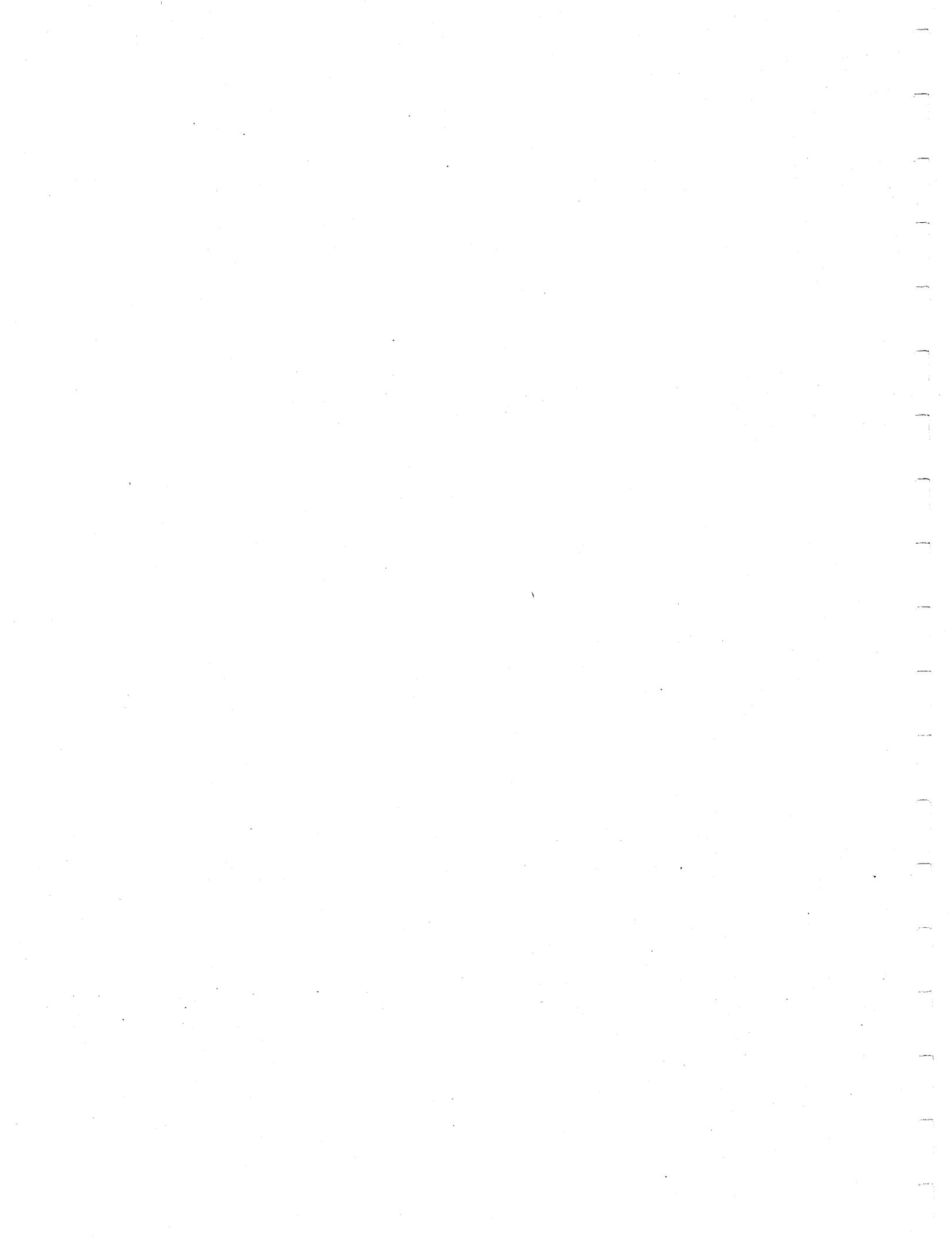
Table 12. Frederick Sound summary of commercial Tanner crab length frequency and shell condition data collected during dockside sampling, 1970/71 to present.

Accounting Year	Number of Boats Sampled	Number of Crab Sampled	Carapace Width (mm)		Recruitment	
			Average	Range	% Recruits ^{1/}	% Postrecruits ^{2/}
1970/71						
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 ^{3/}	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

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

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

3/ The first season that the regulatory legal size was 5 1/2" (140 mm) carapace width.



REPORT TO THE BOARD OF FISHERIES
1990/91 YAKUTAT TANNER CRAB FISHERIES



By

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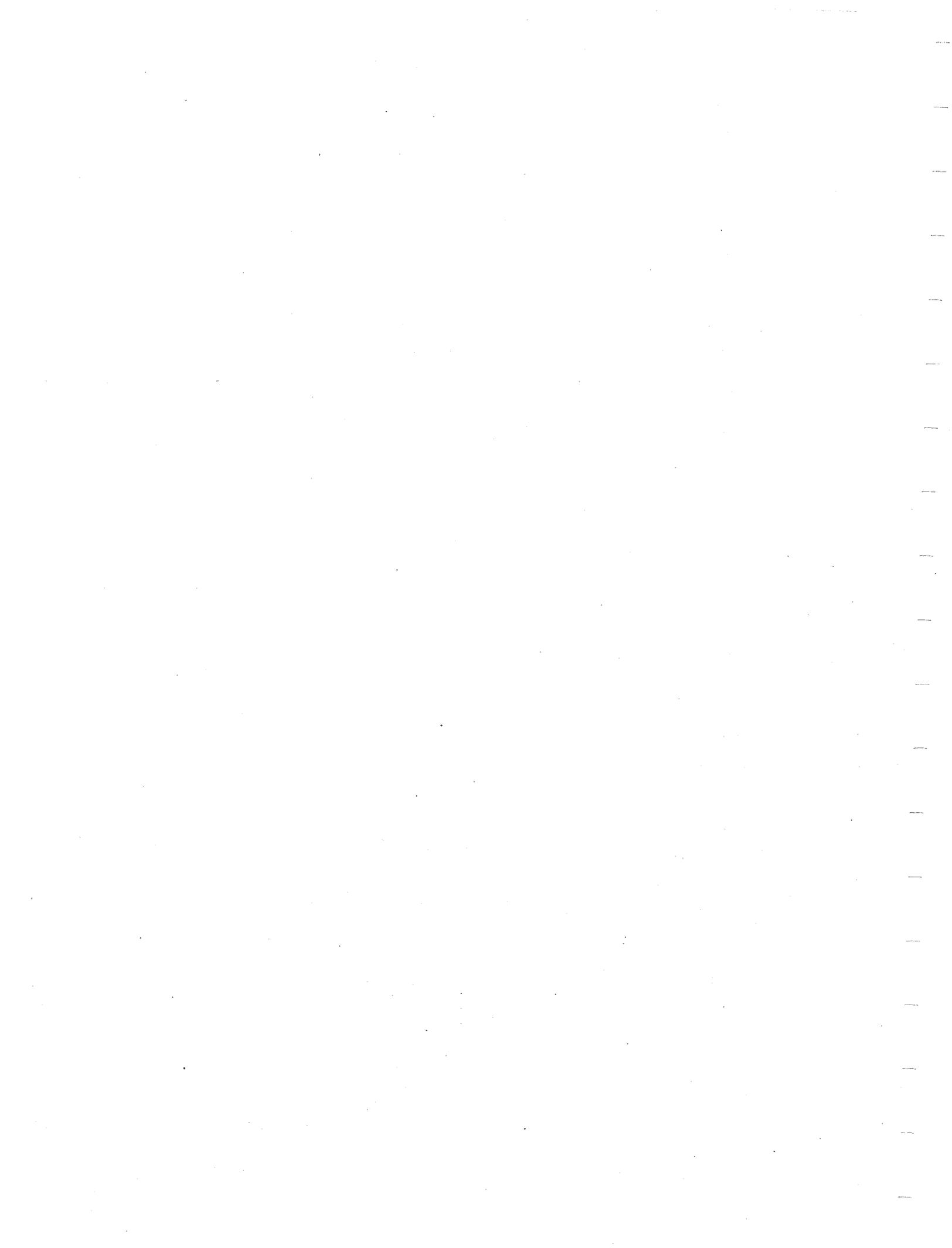


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GENERAL BACKGROUND

Of the two commercially significant species of Tanner crab (*Chionoecetes bairdi* and *C. opilio*) harvested from Alaskan waters, only *C. bairdi* is known to be present in Statistical Area D (Yakutat) of Region 1 (Figure 1). Any subsequent reference to Tanner crab in this report will be referring to *C. bairdi*.

This fishery for Tanner crab is based on the harvest of males over 5 1/2 inches carapace width during a season that is intended to protect sensitive life history stages such as the molting and mating periods. In addition, a guideline harvest ceiling of 1,000,000 lbs, based on historic harvest trends, has been established for this area.

The Yakutat (Statistical Area D) Tanner crab fishery is conducted on the open waters of the eastern Gulf of Alaska, generally along the exposed coasts, out to about the 100 fathom contour. Statistical Area D is divided into Districts 181 to 191, located generally east to west. In recent years, the season has opened on January 15 and has usually closed by regulation on May 1. Currently, the guideline harvest level is 1,000,000 lbs. Statistical Area D is a nonexclusive registration area, i.e., open to entry by new participants.

Historical Review

It was not until the early 1970's that significant Tanner crab fisheries developed in the Yakutat area (Table 1). As the demand for Tanner crab slowly grew, landings from the Yakutat area also rose, averaging about 1,500,000 lbs per season between the 1972/73 and 1979/80 seasons. Following the record 2,400,000 lb catch during the 1979/80 season the harvest steadily declined. Peak catches consistently occurred between the months of February and April (Table 2), although the season extended from September 1 to May 15 during most of the early years of the fishery.

During the 1970's, this fishery attracted large, long-ranging vessels with live tanks in which many tons of crabs could be kept alive for extended periods. Many vessels also participated in fisheries for this, and other shellfish species in other areas of Alaska. A commonly used gear was a side-loading king crab pot wrapped with small mesh to retain Tanner crabs.

With the prohibition of side-loading pots in the Yakutat area in 1983 to minimize the incidental halibut catch, the change in the starting date of the season to mid-winter, and the declining numbers of crabs, many of the larger vessels using this gear left the fishery. Between 1984 and 1985, only small, local

vessels, operated by residents of Yakutat, participated in this fishery. Reported landings were limited to the immediate vicinity of Yakutat Bay (Table 3).

In 1986, two larger crabbers entered the fishery along with the Yakutat vessels. The larger vessels experienced uniformly poor catches despite extensive exploratory fishing. In 1987, 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 1988, only one large vessel and several of the smaller vessels fishing around Yakutat Bay reported any landings.

In 1989, one large vessel and several of the smaller vessels based in Yakutat reported landings from the Yakutat area. Landings in the 1980's provided little indication of recovery of Tanner crab populations in the Yakutat area. Much of the detailed data from this fishery is considered confidential because of the few vessels that fish in this area.

Management Strategy for the Yakutat Fishery

The Yakutat Tanner fishery remains open simply to provide an indication of stock status. The persistent low catches, small average size, and poor shell condition of sampled crab suggest that at least a partial closure of this fishery may be justified as a preliminary step in rebuilding the local stocks.

Season Summary

During the 1990/91 season that lasted from January 15 through May 15, 1991, a total of six vessels harvested 41,708 lbs 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 is very limited. The landings are sporadic and occur in remote ports, or at times when department personnel are rarely able to sample them. In general, samples available from past seasons suggest that Yakutat crab are generally smaller in average size than crab from Statistical Area A (Table 4). There has also been a high incidence of "skip-molt" crab in catches from the Yakutat area in recent seasons. A high incidence of skip-molt crabs may indicate poor habitat conditions. Such conditions could also result in slower growth and a smaller size at maturity.

Table 1. Statistical Area D (Yakutat) commercial Tanner crab catches in pounds, number of vessels, pounds per vessel, number of landings and pounds per landing, 1961 to present.

Season	Catch in Pounds	Number of Vessels	Pounds Per Vessel	Number of Landings	Pounds Per Landing
1961	-	-			
1962	-	-			
1963	-	-			
1964	-	-			
1965	-	-			
1966	-	-			
1967	-	-			
1968/69	-	-			
1969/70	-	-			
1970/71	-	-			
1971/72	-	-			
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	*	*	*	*	*
1987/88	*	*	*	*	*
1988/89	155,528	5	31,106	23	6,762
1989/90	76,816	5	15,363	27	2,845
1990/91 ^{a/}	41,709	6	6,952	42	993

^{a/} Most recent year's data should be considered preliminary.

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

Table 2. Statistical Area D (Yakutat) commercial Tanner crab harvest in thousands of pounds by month and season, 1968 to present.

Season	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Total
1968	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1969	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1970	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1972	0.0	*	*	0.0	0.0	0.0	0.0	*	*	*	0.0	*	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	*	*	*	*	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	2.7	29.2	37.5	7.4	0.0	Closed	Closed	Closed	76.8
1990/91 ^{a/}	Closed	Closed	Closed	Closed	3.0	8.7	14.1	15.9	0.0	Closed	Closed	Closed	41.7

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

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

Table 3. Statistical Area D (Yakutat) commercial Tanner crab, harvest in thousands of pounds by district and season, 1968/69 to present.

Season	District						Total
	181	183	184	186	189	191	
1968/69	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1969/70	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1970/71	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1971/72	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1972/73	*	102.2	*	*	0.0	0.0	222.4
1973/74	619.4	518.6	215.6	518.3	0.0	0.0	1,872.4
1974/75	1,135.1	193.7	118.7	*	0.0	428.0	1,972.8
1975/76	*	*	*	753.1	0.0	*	1,762.6
1976/77	0.0	452.7	167.8	346.2	0.0	0.0	966.7
1977/78	0.0	1,003.1	0.0	0.0	0.0	0.0	1,003.1
1978/79	0.0	350.9	589.2	207.9	0.0	544.0	1,692.0
1979/80	720.8	216.2	198.5	461.4	0.0	838.2	2,435.1
1980/81	*	158.6	123.2	78.3	0.0	262.3	642.6
1981/82	0.0	51.2	0.0	0.0	*	*	71.3
1982/83	61.2	83.8	*	*	0.0	4.5	151.6
1983/84	0.0	11.1	0.0	0.0	0.0	0.0	11.1
1984/85	0.0	3.7	0.0	0.0	0.0	0.0	3.7
1985/86	0.0	2.4	0.0	0.0	0.0	0.0	2.4
1986/87	*	*	0.0	0.0	0.0	0.0	*
1987/88	0.0	*	0.0	0.0	0.0	*	*
1988/89	*	*	0.0	0.0	*	*	155.6
1989/90	27.9	*	0.0	0.0	0.0	*	76.8
1990/91 ^{a/}	16.2	25.6	0.0	0.0	0.0	0.0	41.7

^{a/} Most recent year's data should be considered preliminary.

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

Table 4. Yakutat summary of commercial Tanner crab length frequency and shell condition data collected during dockside sampling, 1970/71 to present.

Accounting Year	Number of Boats Sampled	Number of Crab Sampled	Carapace Width (mm)		Recruitment	
			Average	Range	% Recruits ^{1/}	% Postrecruits ^{2/}
1970/71						
1971/72						
1972/73						
1973/74						
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 ^{3/}						
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						
1985/86						
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						

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

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

3/ The first season that the regulatory legal size was 5 1/2" (140 mm) carapace width.

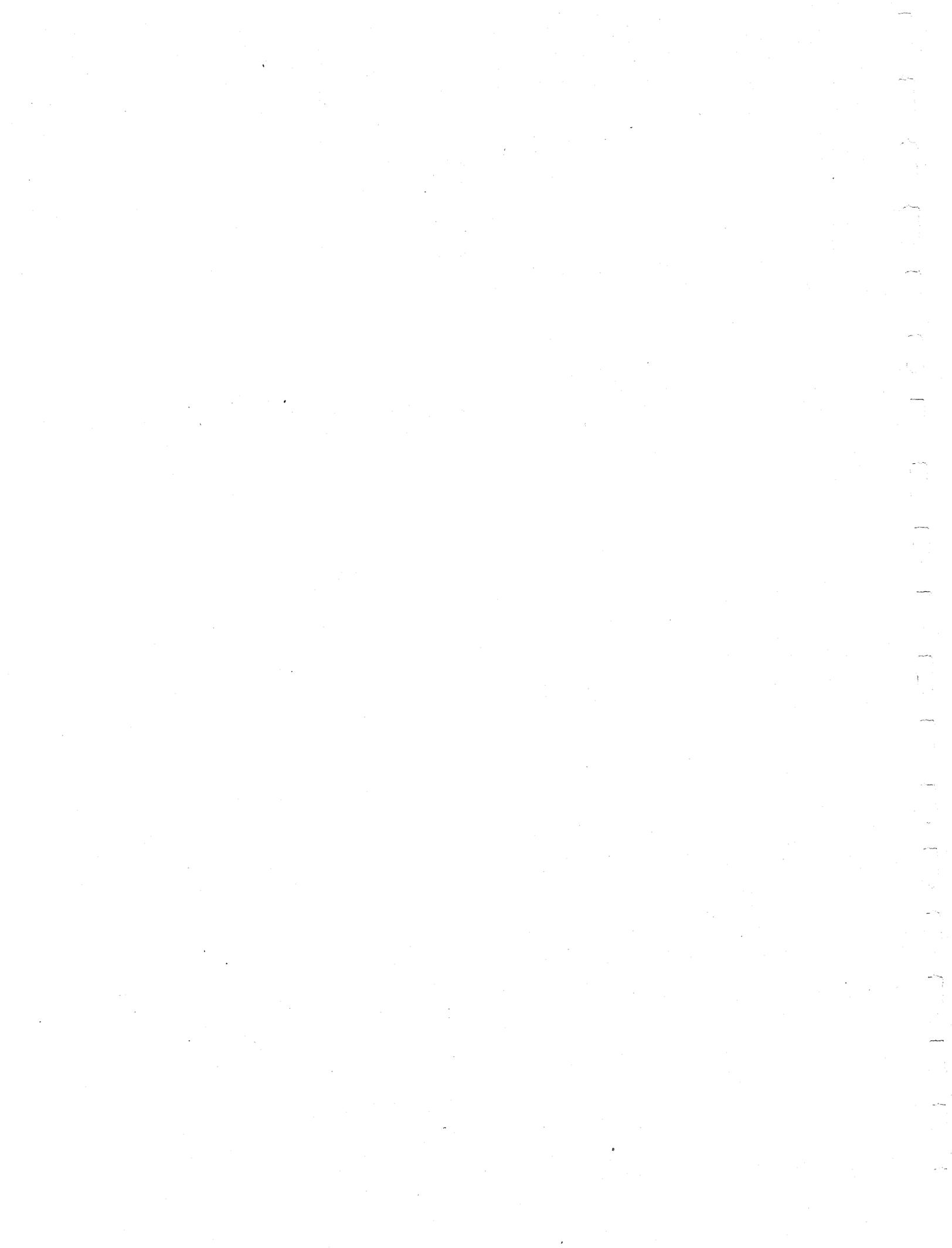
Table 5. Yakutat summary of commercial Tanner crab CPUE and average weight data collected during dockside sampling and interviews, 1970/71 to present.

Season	Number of Boats Interviewed	Number of Pots Lifted	Number of Crab Captured	Average Catch Per Pot	Range of Catch/Pot	Weight (lbs)		Estimated No. of Crab Harvested ^{1/}	Percent of Harvest Sampled ^{2/}
						Average	Range		
1970/71									
1971/72									
1972/73									
1973/74									
1974/75									
1975/76	11					1.86	1.67 - 2.09	947,628	0.11
1976/77 ^{3/}	2					2.10	1.97 - 2.24	460,310	
1977/78	4					2.22	2.01 - 2.51	451,854	0.50
1978/79	7	3,810	160,164	34.05	20.09 - 48.57	2.32	2.25 - 2.38	729,285	0.22
1979/80	21	8,802	322,624	40.85	7.69 - 79.02	2.25	2.13 - 2.38	1,082,277	0.23
1980/81	12	3,688	51,765	17.37	10.18 - 27.13	2.29	2.05 - 2.67	280,615	0.89
1981/82									
1982/83	16					2.08	1.91 - 2.21	72,895	2.60
1983/84									
1984/85	1					2.41	2.41 - 2.41	1,521	
1985/86									
1986/87	3	1,460	18,629	15.48	10.0 - 19.77				
1987/88	2	840	17,850	23.28	18.55 - 28.01	2.09	2.09 - 2.09		
1988/89	5	705	12,429	9.81	1.39 - 38.11	2.10	2.09 - 2.11	74,061	0.82
1989/90	4	142	1,621	11.32	7.87 - 16.25	2.19	2.12 - 2.30	35,076	2.22
1990/91									

^{1/} Calculated by dividing fish ticket weight data by dockside sampling average weight per crab data.

^{2/} Calculated by dividing number of crab sampled for length frequency by estimated number of crab harvested.

^{3/} The first season that the regulatory legal size was 5 1/2" (140 mm) carapace width.



REPORT TO THE BOARD OF FISHERIES
1990/91 SOUTHEAST ALASKA-YAKUTAT DUNGENESS CRAB FISHERIES



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GENERAL BACKGROUND

Dungeness crabs (*Cancer magister*) are members of the highly evolved brachyuran (true crab) subgroup of the order Crustacea. They are a highly prized, commercially significant species found in coastal waters from Baja California to the Aleutian Islands. Although Dungeness crabs are present in commercially harvestable quantities in many areas of Region 1 (Statistical Areas A and D), they are not uniformly distributed. Fairly limited areas of suitable habitat account for large portions of the total catch.

Statistical Area A (Southeast Alaska) encompasses the state waters of the Alexander Archipelago between Dixon Entrance and Cape Fairweather. It is divided into Districts 1 through 16, generally located geographically south to north. Statistical Area D (Yakutat) covers state waters between Cape Fairweather and Cape Suckling. Statistical Area D is divided into Districts 181 to 191, located generally east to west.

Although the commercial shellfish fisheries in both areas are managed by Region 1 (Southeast Alaska - Yakutat) staff, the character of the fishing fleets and the populations of Dungeness crab in these two areas are distinctly different. However, historical patterns of development of the fisheries and markets have been similar in many ways, and the environmental factors that influence the abundance of crab in both areas appear to be loosely correlated.

From the mid-1970's through the mid-1980's, demand for Dungeness crab in Southeast Alaska and Yakutat was inversely related to the availability of crab from Washington, Oregon, and California. Low catches to the south prompted greater efforts in Southeast Alaska and Yakutat to fill the demand for product. Conversely, as long as crab were available in the south, Alaskan crab was not competitive due to the higher costs of fishing, processing, and transportation. As a result, during the late sixties and seventies, when catches were high in the Pacific Northwest and northern California, Alaskan Dungeness crab stocks were apparently not fully exploited.

From the early history of the fishery through the early 1980's, participation and effort in the Dungeness crab fishery in Southeast and Yakutat were so low that informal fishing rights to specific fishing grounds were tacitly recognized within the fleet and the fishery was nearly self-regulating. Enough unfished grounds existed so an operator encountering soft-shelled crabs or experiencing low catches in one area could easily move to alternate fishing areas. The need for formal regulations and other restrictions was minimal.

This early, relaxed pattern of fishing has undergone drastic change. Starting in the early 1980's, the decline of the Dungeness fisheries of other Pacific Coast states and changing marketing preferences caused an increased demand for the Alaskan product that was no longer directly related to the supply from

Washington, Oregon, and California. The earlier practices of canning or freezing shucked meat gave way to frozen sections and whole crabs or transport of live crabs to southern markets. The physical facilities needed to prepare frozen sections or tranship live crab were much less complicated than the processing and packing plant necessary to freeze or can crab meat. Processors were more willing to purchase crab, establish markets, and provide support facilities for operators of Dungeness crab vessels.

Existence of a summer fishing season to supply the higher-priced, frozen-in-shell and live-crab tourist markets in ports in Washington, Oregon, and California, combined with ease of entry into the fishery has fostered intensely competitive fisheries. All available fishing grounds, even marginal ones, are fully utilized. In these circumstances, many fishermen encountering soft-shelled and female crabs continue to fish and subject unmarketable crabs to high sorting levels rather than move to other crowded fishing grounds.

The increasingly extensive and intensely competitive fisheries have necessitated restrictive commercial fishing regulations to control resource use and provide for continued harvests. There is continual debate about management measures considered necessary to attain these objectives. Much of the discussion hinges on the complex, poorly understood interrelationships between the role of natural and fishing mortality on the interannual variability observed in crab populations.

Prince William Sound and Cook Inlet, to the immediate north and west of Southeast Alaska and Yakutat, are the upper latitudinal limit of the range of Dungeness crab. The factors which govern its abundance can be expected to have more accentuated effects here than in more central parts of its range. Regardless of their causes, depressions in stock conditions could be more severe and extended in Alaska. The long-term management goal is to manage the commercial fishery to optimally exploit building and peaking stocks while minimizing fishery pressures on declining stocks. This may require development and adoption of management measures that differ from those used elsewhere.

SOUTHEAST ALASKA FISHERY

Background

Statistical Area A (Southeast Alaska) is a superexclusive registration area for Dungeness crab. A fishing vessel registered for a superexclusive area cannot register or fish in any other registration area in the same

calendar year. Dungeness crab are harvested in Districts 1 through 16 in bay areas with mud or sand bottoms, generally at depths less than 15 fathoms.

The vessels in this fishery vary greatly in size and condition. The protected waters, the generally inshore nature of the fishery, and the availability of numerous marketing opportunities and options allow great variability in the condition and seaworthiness of vessels engaged in the fishery. Vessels generally range from small, outboard-powered skiffs to a few large Bering Sea-class crabbing vessels. However, most are below limit seiner length (58 feet). The present pot limit (300), the discontinuous nature of crab habitat, and a convenient support infrastructure in Southeast Alaska favor vessels that are much smaller than those that typically fish crab in the Pacific Northwest and the open waters of the eastern Gulf of Alaska.

Regardless of vessel size or condition, the pots employed are similar to those used throughout the West Coast for this species. They are round, hatbox-shaped, stainless steel wire meshed pots ranging in diameter to about 40 inches and in weight to about 80 lbs. By regulation, each pot has two 4 3/8 inch escape rings to facilitate escape of sublegal male crabs (those narrower than 6 1/2 inches in carapace width) and females (which are usually less than 6 1/2 inches in width).

Considerable local variability is evident in the molting and mating periods and the stock abundance and structure of this species in Southeast Alaska. Observed areal and interseasonal availability may be caused, in part, by local variations in food availability and water temperature, as well as differences in fishing pressure.

While closed periods provide some protection during the peak molting and mating periods, the wide local variability in timing probably results in fishing on some stocks during at least portions of these sensitive life history periods. There are major concerns with fishing during these sensitive periods: 1) mortalities associated with sorting soft-shelled crab during molting periods is probably higher; 2) light weight crab which have not totally regained prime condition may be retained by less experienced fishermen and rejected by processors; and 3) disruption of mating activities could conceivably affect subsequent recruitment.

Research to specifically determine molting periods on major grounds in Southeast Alaska has yet to be conducted. However, a limited amount of tagging work conducted in the early to mid-sixties suggested that the major molting period for male crab lasted from late winter through mid-summer. The same study suggested that females molt and mate through the summer months and carry eggs from September through March.

Historical Review

Since 1960, harvests have averaged about 1,750,000 lbs. when annual (1960 to 1968) and seasonal (1969/70 to present) data are combined (Tables 1-5). Relatively high catches in the 1960's reflect a period of high market demand in response to low catches in Washington, Oregon, and California. Lower catches between the 1970/71 and 1980/81 seasons reflect high catches in the southern Pacific Coast states. Regardless of the harvest levels during these periods, the numbers of participants remained fairly stable. Since the 1981/82 season, the situation has changed. Catches have been at relatively high levels, the numbers of participants has greatly increased, and Alaskan crab have developed markets independent of markets in Washington, Oregon, and California.

The history of regulations used to manage this fishery reflect the best management practices for their respective periods and the perceived needs for conservation of the resource. From the early 1930's through 1955, regulations included a prohibition on the taking of females, a minimum size limit for males, and a closed season on the most important grounds for two to four months between May 1 and September 1. Available documentation from that period indicates that molting was thought to occur during the summer.

The summer closure was generally acceptable to the fishermen because of other fishing opportunities in the salmon and halibut fisheries. It was revoked in the late 1950's leaving until 1969 a prohibition on the taking of females, a minimum legal size for males, and liberal limits on the units of gear as the only regulations governing the fishery.

Since the late 1960's, fishing season closures have been introduced, and then modified, to reduce fishing pressure during sensitive periods in the life history of the species. An example was the closure from March through May in 1976/77 to protect male crabs during their primary molting period.

Then, in 1985, the latter half of August and the entire month of September was closed. Qualitative information suggested that it was the major mating period. This action was a further step in the gradual reduction of fishing time during periods believed to be important for the continued commercial viability of this species.

In response to increasingly high levels of participation and effort, and high harvest rates, the season was further shortened in 1989 by reducing the winter season to October and November.

Season Summary

The 1990/91 season was divided into summer (June 15 - August 15) and autumn (October 1 - November 30) segments. Two hundred and forty-eight vessels registered for the fishery this past season, compared to 245 in 1989/90. Of the registered vessels, 222 reported landings. This represented a continuing decline from the record 266 vessels that reported landings in 1988/89. The season landings totalled 2,597,195 lbs., with an exvessel value of about \$3,900,000.

Districts 6, 8, 14, and 16, with reported landings of 279,500, 270,500, 285,600, and 462,800 lbs., respectively, accounted for about 52% of the total catch (Tables 3 and 4). Within these major districts, four or five subdistricts, including 106-43 (Duncan Canal), 108-40 (Stikine River mouth), 114-70 (Glacier Bay), and 116-41 (Cape Fairweather), accounted for 688,002 lbs., or 27% of the total. Seventy-five percent of the total catch was taken during the summer season (Table 3). The winter catch of 630,000 lbs. was higher than last winter (Table 2) despite unseasonably cold weather through much of November.

Dockside sampling levels were the highest in the history of the sampling program this season, primarily due to expanded sampling in Petersburg in response to the extremely high effort on the Wrangell Narrows, Sumner Straits, and Stikine River grounds. The average shoulder width of the 13,793 crabs measured was 174.88 mm (7.0 inches). The average width of sampled crab has remained fairly constant during the past four seasons with season to season variations within 0.2 millimeters (Table 6). One of the implications is that the stocks being harvested are composed of crabs which have just molted to legal size and entered the fishery, suggesting that insignificant numbers of legal crabs are surviving beyond their first year in the fishery and that the Dungeness crab fishery in Southeast Alaska is a recruit fishery.

The major harvests will probably be confined to the summer segment in the future, much as they have been in the past, primarily because winter fisheries are forced to contend with icing of bay fishing areas, short days, and inclement weather. A recent trend toward higher effort levels through the end of the winter season has been accentuated by generally mild winters, strong markets, and the willingness of shore-based processors to purchase crab later into the winter.

YAKUTAT FISHERY

Background

Statistical Area D (Yakutat) is also a superexclusive registration area for Dungeness crab. As in Southeast Alaska, the season is split into summer (May 15 - July 15) and winter (November 1 - February 28) segments. The fishery occurs primarily between the spits and in the channels of the surf zone along the miles of productive sand and gravel beaches of the exposed outer coastline. Pots are usually set at depths between four and fifteen fathoms.

Environmental conditions along the outer coast appear to be more uniform than along the convoluted shorelines of Southeast Alaska. Based on sampling information indicating that molting generally peaks either prior to mid-May on some heavily fished grounds or after mid-July on others, the Board adopted the current May 15 to July 15 summer season. However, molting does not consistently occur during the same period each year and the relative numbers of males molting during the period varies from year to year.

It is possible that molt timing and the proportion of the stock affected by molting are related to the size and structure of the population and availability of food. Lower numbers of crabs may result in less competition for food and higher growth rates, which, in turn, result in more frequent, less predictable molting patterns.

The general class of vessels actively engaged in this fishery range in size from 40 to 60 feet. A few skiffs and larger vessels also enter the fishery each season. As a rule, the fleet is composed of sturdy vessels designed to be operated in near-shore rollers and capable of open ocean transit. The 600 pot limit, open ocean conditions, and the remote nature of the fishing grounds favor larger vessels typical of Dungeness fisheries in the Pacific Northwest. In fact, most of the vessels fishing the more remote western and eastern grounds have home ports in the Pacific Northwest.

During those seasons which are predicted by the industry as likely to be especially productive, the fleet is often accompanied on the fishing grounds by tenders that work for the more distant processors. Occasionally, floating processors have been situated in Icy Bay to expedite handling and processing of crab.

Historical Review

The average historic catch from the 1960 through the 1989/90 season was about 1,500,000 lbs. (Tables 7-10). Historically, the largest proportion of the catch has been taken during the months of June and July even during those years when the fishery opened earlier and lasted longer than it currently does (Table 9).

The earliest regulations pertaining to the Yakutat Dungeness crab fishery were issued in 1924. They specified retention of males only over 6.5 inches in total width. From 1924 to 1933, regulations remained unchanged. In 1934 trawls were prohibited, and in 1936, the size limit was increased to 7.0 inches total width.

Regulations were reworded in 1963 to allow retention of male crabs only over 6.5 inches in shoulder width, excluding the tenth anterolateral spine. This size limit persists to the present. Gear was limited to 300 pots until 1968, when it was increased to 600 pots.

In 1976, the season was shortened; it started on May 16, and was closed by emergency order on July 31. And, the Yakutat area became its own registration area, distinct from Southeast Alaska. Between the 1976/77 and 1981/82 seasons, the opening date was set for June 1 and the season often closed by emergency order in July or August in response to reports of soft-shelled crab from major fishing areas. Starting in 1982 and continuing through 1985, the opening date of the season was May 1 and the season continued to be closed by emergency order in response to occurrences of soft-shelled crab on major fishing grounds. In 1983, part of the Yakutat registration area became a superexclusive area. In 1984, the tank inspection requirement was rescinded. In 1985, the entire registration area was designated a superexclusive area. Also in 1985, the season was split into a summer (May 1 - July 14) and winter (November 1 - February 28) segments. In 1986, the summer season was shortened to a period from May 15 through July 14 to protect soft-shelled crab on the major westward grounds. This split season has since been maintained and emergency order closures to protect soft-shelled crab have been unnecessary in recent seasons. The predominant part of the total landings for the Yakutat area occur during the two-month long summer season. The winter season is usually fished only by the local Yakutat fleet and landings are a very low percentage of the total season's catch.

Season Summary

Thirty-two vessels registered for the 1990/91 season. Of these, nine were home-ported in Yakutat. While the average size of these vessels is considerably smaller than those home-ported out of state, they represent an increasing commitment by local residents to participate in this fishery. Approximately 2,000,000 lbs., with an exvessel value of about \$3,000,000, were landed through December 31.

Partly because deliveries to the shore-based plant in Yakutat were unpredictable, fewer crabs were sampled than statistically desirable. A total of 1,801 crabs were sampled for width and shell condition (Table 6). Average sizes were larger than for the previous four seasons.

Table 1. Statistical Area A (Southeast Alaska) Dungeness crab catch, number of participating vessels, number of landings, and average catch per landing, 1961 to present.

Year/ Season	Catch in Pounds	Number of Vessels	Pounds per Vessel	Number of Landings	Pounds per Landing
1961	1,449,405	-			
1961	671,455	-			
1962	2,985,939	-			
1963	3,296,362	-			
1964	3,996,100	-			
1965	2,392,395	-			
1966	1,968,117	-			
1967	2,033,156	-			
1968	1,900,690	-			
1969/70	1,149,111	20	57,456	392	2,931
1970/71	776,617	21	36,982	380	2,044
1971/72	451,281	23	19,621	315	1,433
1972/73	597,587	30	19,920	315	1,897
1973/74	748,519	41	18,257	483	1,550
1974/75	713,668	43	16,597	453	1,575
1975/76	611,621	36	16,989	346	1,768
1976/77	515,378	25	20,615	174	2,962
1977/78	127,345	12	10,612	87	1,464
1978/79	750,284	25	30,011	207	3,625
1979/80	801,753	37	21,669	313	2,562
1980/81	512,247	26	19,702	226	2,267
1981/82	2,935,110	76	38,620	748	3,924
1982/83	3,648,035	128	28,500	1,306	2,793
1983/84	2,152,738	133	16,186	1,533	1,404
1984/85	1,833,421	180	10,186	1,565	1,172
1985/86	2,314,322	215	10,764	2,071	1,117
1986/87	2,458,224	224	10,974	2,330	1,055
1987/88	3,390,845	241	14,070	2,810	1,207
1988/89	3,320,675	266	12,484	2,678	1,240
1989/90	1,922,408	249	7,721	2,116	909
1990/91 ^{a/}	2,491,572	222	11,223	2,116	1,177

^{a/} Most recent year's data should be considered preliminary.

Table 2. Statistical Area A (Southeast Alaska) 1989/90 season; Dungeness crab harvest by month and district.

Dist.	1989						1990			Total		
	May	June	July	Aug	Sept.	Oct	Nov	Dec	Jan		Feb	Mar
101	Closed	0	0	0	Closed	17,636	10,366	6,201	5,741	5,348	515	45,807
102	Closed	0	0	0	Closed	850	400	200	0	0	0	1,450
103	Closed	0	969	0	Closed	0	0	0	0	0	0	969
105	Closed	11,114	19,299	8,540	Closed	0	0	0	0	0	0	38,953
106	Closed	98,286	86,968	19,062	Closed	7,563	2,515	4,202	0	0	0	218,596
107	Closed	14,150	15,882	2,926	Closed	2,457	1,182	0	0	0	0	36,597
108	Closed	125,326	184,823	58,081	Closed	29,058	14,341	102	0	0	0	411,731
109	Closed	10,475	27,890	10,247	Closed	1,390	1,243	154	0	0	0	51,399
110	Closed	34,102	63,791	19,496	Closed	12,758	8,914	679	0	0	0	139,740
111	Closed	2,383	11,044	5,494	Closed	22,333	8,125	0	0	0	0	49,379
112	Closed	8,256	36,181	10,729	Closed	9,593	8,442	3,490	0	0	0	76,691
113	Closed	10,468	45,590	13,415	Closed	5,839	6,516	526	0	0	0	82,354
114	Closed	42,659	121,370	69,088	Closed	28,495	21,472	0	0	0	0	283,084
115	Closed	19,337	28,903	14,968	Closed	6,501	5,320	0	0	0	0	75,029
116	Closed	125,005	179,472	35,348	Closed	63,579	7,225	0	0	0	0	410,629
Total		501,561	822,182	267,394		208,052	96,061	15,554	5,741	5,348	515	1,922,408

* Where number of vessels participating is three or less, the information is considered confidential.

Table 3. Statistical Area A (Southeast Alaska) 1990/91^{a/} season; Dungeness crab harvest by month and district.

Dist.	1990						1991		Total		
	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec		Jan	Feb
101	Closed	0	0	0	Closed	31,603	16,527	---	Season In Progress	---	48,130
102	Closed	0	0	0	Closed	*	0	---	Season In Progress	---	0
103	Closed	0	0	0	Closed	3,329	3,704	---	Season In Progress	---	7,033
105	Closed	38,412	49,904	25,319	Closed	32,165	3,278	---	Season In Progress	---	149,078
106	Closed	134,514	77,791	19,956	Closed	42,887	4,348	---	Season In Progress	---	279,496
107	Closed	16,492	15,904	6,654	Closed	4,684	3,103	---	Season In Progress	---	46,837
108	Closed	65,518	84,936	40,458	Closed	65,914	13,649	---	Season In Progress	---	270,475
109	Closed	30,714	118,250	59,159	Closed	89,747	18,098	---	Season In Progress	---	315,968
110	Closed	59,423	131,598	54,065	Closed	51,589	12,194	---	Season In Progress	---	308,869
111	Closed	4,121	28,599	13,508	Closed	41,901	11,120	---	Season In Progress	---	99,249
112	Closed	6,093	53,487	21,385	Closed	15,487	5,891	---	Season In Progress	---	102,343
113	Closed	20,419	24,805	12,838	Closed	*	0	---	Season In Progress	---	58,062
114	Closed	35,136	114,596	68,102	Closed	63,259	4,536	---	Season In Progress	---	285,629
115	Closed	14,376	22,094	12,092	Closed	8,318	*	---	Season In Progress	---	56,880
116	Closed	157,099	203,667	24,261	Closed	29,240	48,506	---	Season In Progress	---	462,773
Total		582,317	925,631	357,797		480,123	144,954	---	Season In Progress	---	2,491,572

* Where number of vessels participating is three or less, the information is considered confidential.

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

Table 4. Statistical Area A (Southeast Alaska) Dungeness crab harvest in thousands of pounds by district and season, 1969/70 to present.

Season	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	Total
1969/70	12.6	0.0	0.0	0.0	27.8	44.0	9.9	230.1	154.7	103.4	9.7	100.9	28.6	404.7	22.6	0.0	1,149.0
1970/71	16.7	0.0	0.0	1.9	8.1	33.2	5.8	92.5	183.7	72.7	0.0	77.2	12.0	178.4	13.2	81.4	776.8
1971/72	15.7	0.0	0.0	0.0	0.0	60.6	5.3	45.3	54.7	46.8	0.0	35.0	14.5	118.1	16.6	37.9	451.2
1972/73	11.4	0.0	0.0	0.0	8.1	30.8	11.8	40.3	41.9	36.9	0.0	49.8	14.6	106.0	31.7	214.5	597.8
1973/74	11.0	0.0	0.0	0.0	5.5	21.1	36.2	21.4	27.8	50.1	65.6	84.0	39.4	137.1	63.9	185.4	748.5
1974/75	28.5	0.0	0.0	0.0	20.5	96.4	86.9	41.6	16.2	47.9	46.1	62.7	11.6	147.3	41.9	65.9	713.5
1975/76	43.4	0.0	1.9	0.0	47.9	21.6	100.6	17.1	8.1	53.4	2.4	17.4	72.1	165.3	11.5	49.0	611.7
1976/77	20.2	0.0	5.5	0.1	14.4	15.2	19.7	8.2	0.2	49.2	8.2	41.3	29.7	138.1	1.3	163.9	515.2
1977/78	21.1	0.0	1.1	0.0	18.4	21.3	6.9	11.2	0.0	30.2	1.1	14.7	0.1	1.2	0.0	0.0	127.3
1978/79	36.9	0.0	0.0	0.0	73.4	110.9	28.8	32.8	17.1	93.8	2.3	10.3	57.5	195.3	1.4	89.3	749.8
1979/80	23.6	0.0	0.6	0.0	52.4	101.9	63.3	54.8	2.6	50.9	0.2	63.0	27.3	279.5	0.1	81.4	801.6
1980/81	28.5	0.0	2.2	0.0	73.2	166.4	0.0	19.8	25.9	48.6	0.6	61.2	7.0	76.9	2.0	0.0	512.3
1981/82	13.9	0.0	3.8	0.0	238.2	762.2	119.3	225.3	42.8	66.8	16.9	113.2	201.7	945.6	15.4	170.1	2,935.2
1982/83	53.0	2.4	15.7	0.0	294.2	467.2	165.1	790.2	20.7	144.1	39.8	356.5	227.8	523.2	9.0	537.9	3,646.8
1983/84	71.8	1.0	13.9	3.9	85.7	142.6	70.9	591.7	79.9	137.7	6.2	77.0	116.2	251.0	8.5	492.1	2,150.1
1984/85	111.8	11.2	11.3	0.2	131.7	399.6	99.8	265.4	171.6	47.8	21.4	137.5	112.3	197.6	26.4	87.5	1,833.1
1985/86	66.3	7.1	6.5	3.9	137.9	492.2	177.8	374.9	255.5	69.1	15.7	183.2	120.0	262.6	9.0	129.6	2,311.3
1986/87	53.8	0.4	11.0	1.0	98.1	351.9	83.5	352.4	257.9	315.8	27.4	174.3	99.7	471.1	36.1	120.1	2,454.6
1987/88	57.6	5.9	14.9	1.8	161.6	507.8	79.6	534.5	297.6	376.6	118.5	148.4	76.7	562.8	32.6	406.7	3,383.5
1988/89	62.7	5.2	0.3	1.2	131.2	786.9	77.4	729.7	144.7	261.2	88.5	77.2	47.8	492.8	11.5	401.9	3,320.3
1989/90	34.0	1.7	1.0	0.0	38.9	217.9	36.0	410.8	51.4	138.3	49.4	76.4	81.4	281.3	74.0	410.0	1,902.7
1990/91 ^{a/}	48.1	.2	7.0	0.0	149.1	279.5	46.8	270.5	316.0	308.9	99.2	102.3	58.5	285.6	57.0	462.8	2,491.6

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

Table 5. Statistical Area A (Southeast Alaska) Dungeness crab catch in thousands of pounds by month and season, 1969/70 to present.

Season	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Total
1969/70	21.3	84.9	201.0	217.5	225.5	210.9	106.2	47.3	14.2	5.0	7.1	8.1	1,149.1
1970/71	11.1	37.0	168.5	150.4	157.1	122.6	68.6	35.9	9.3	5.6	4.6	5.9	776.6
1971/72	7.4	27.4	43.6	97.8	79.3	88.9	63.3	23.3	9.5	7.0	1.8	2.2	451.3
1972/73	4.2	30.5	38.6	167.2	167.7	83.6	49.5	31.5	16.7	3.5	1.4	3.2	597.6
1973/74	16.9	40.9	142.4	205.8	129.3	87.3	71.6	27.5	8.8	3.5	4.7	9.9	748.5
1974/75	24.8	21.5	135.5	167.1	135.0	85.0	53.9	27.6	26.5	6.3	13.7	16.8	713.7
1975/76	18.1	35.9	110.2	136.8	120.8	82.8	49.7	25.9	11.7	6.9	2.9	9.9	611.6
1976/77	Closed	Closed	105.9	206.1	89.9	46.1	32.0	13.2	11.7	4.1	6.1	Closed	515.4
1977/78	Closed	Closed	2.3	8.5	29.6	31.4	15.9	25.0	6.3	0.5	8.0	Closed	127.3
1978/79	Closed	Closed	126.4	206.9	152.7	104.6	70.4	43.3	18.6	18.2	9.1	Closed	750.3
1979/80	Closed	Closed	165.7	184.6	137.0	137.5	75.1	52.1	30.1	12.7	6.9	Closed	801.8
1980/81	Closed	Closed	62.7	157.1	122.2	69.9	36.3	30.2	15.1	8.6	10.1	Closed	512.2
1981/82	Closed	Closed	460.6	899.5	560.3	427.1	292.9	164.2	67.7	28.4	33.9	Closed	2,935.1
1982/83	Closed	Closed	936.7	1,048.3	735.3	450.4	219.7	145.9	68.2	16.3	22.9	Closed	3,648.0
1983/84	Closed	Closed	772.0	451.7	336.2	267.6	146.6	84.5	45.8	30.9	14.7	Closed	2,152.7
1984/85	Closed	Closed	0.0	670.8	494.4	272.4	154.6	138.2	58.6	27.0	15.1	Closed	1,833.4
1985/86	Closed	Closed	362.5	847.8	440.0	Closed	380.1	177.6	55.6	30.7	19.9	Closed	2,314.3
1986/87	Closed	Closed	273.0	796.4	446.5	Closed	460.7	274.5	100.3	58.0	48.9	Closed	2,458.2
1987/88	Closed	Closed	571.9	1,185.9	639.7	Closed	478.9	281.6	109.6	63.1	60.2	Closed	3,390.8
1988/89	Closed	Closed	774.3	1,400.9	573.1	Closed	312.0	178.2	44.8	17.4	20.0	Closed	3,320.7
1989/90	Closed	Closed	501.6	822.2	267.4	Closed	208.1	96.1	15.6	5.7	5.8	Closed	1,922.4
1990/91 ^{a/}	Closed	Closed	582.3	925.6	357.8	Closed	480.3	145.1	-- Season In Progress --			Closed	2,491.6

^{a/} Most recent year's data should be considered preliminary.

Table 6. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) summary of commercial dockside samples of Dungeness crab, 1976/77 season to present.

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Southeast Fishery	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 ^{a/}
No. of samples	3	6	11	4	5	7	9	10	3	24	29	56	76	59	171
No. of crab measured	295	624	1,124	420	445	715	840	1,103	302	2,414	2,906	5,508	6,309	5,546	13,793
Average shoulder width, mm	177.7	178.7	180.0	181.2	180.6	184.0	187.0	186.5	175.9	175.2	180.2	177.8	181.8	181.0	174.88
Average shoulder width, inches	7.0	7.0	7.1	7.1	7.1	7.2	7.4	7.3	7.0	6.9	7.1	7.0	7.1	7.1	7.0
Range shoulder width, mm	159-204	159-211	161-213	160-217	161-207	165-215	164-218	159-225	164-205	157-228	156-228	160-213	157-219	157-220	156-223

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Yakutat Fishery	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991 ^{a/}
No. of samples	3	2	27	3	2	10	16	31	41	61	30	27	40	17	17
No. of crab measured	327	188	4,491	437	494	1,077	1,700	2,473	3,593	6,729	2,224	4,080	4,869	1,800	1,801
Average shoulder width, mm	176.3	182.4	182.4	184.6	175.8	175.7	182.4	184.6	190.6	180.0	176.4	181.1	182.9	185.8	183.9
Average shoulder width, inches	6.9	7.2	7.1	7.4	7.1	6.9	7.2	7.6	7.5	7.1	7.1	7.1	7.2	7.3	7.3
Range shoulder width, mm	157-207	161-211	156-221	166-211	161-215	160-218	158-222	163-231	162-232	156-226	158-226	159-224	153-222	159-223	161-216

^{a/} Most recent year's data should be considered preliminary.

Table 7. Statistical Area D (Yakutat) Dungeness catch, number of participating vessels, number of landings, and average catch per landing, 1960 to present.

Year/ Season	Catch in Pounds	Number of Vessels	Pounds Per Vessel	Number of Landings	Pounds Per Landing
1960	543,762	-			
1961	1,023,545	-			
1962	937,051	-			
1963	1,383,298	-			
1964	637,140	-			
1965	910,278	-			
1966	528,060	-			
1967	2,031,460	-			
1968	2,096,119	-			
1969/70	1,207,397	-		107	11,284
1970/71	1,508,561	-		83	18,175
1971/72	1,212,198	-		88	13,775
1972/73	1,992,574	-		85	23,442
1973/74	2,347,752	-		236	9,948
1974/75	1,031,573	-		154	6,699
1975/76	579,908	17	34,112	113	5,132
1976/77	537,543	7	76,792	28	19,198
1977/78	131,052	3	43,684	11	11,914
1978/79	1,799,403	12	149,950	122	14,749
1979/80	1,436,923	21	68,425	87	16,516
1980/81	895,220	11	81,384	63	14,210
1981/82	3,228,301	28	115,296	169	19,102
1982/83	5,160,135	35	147,432	305	16,918
1983/84	2,666,383	67	39,797	458	5,822
1984/85	773,356	39	19,830	227	3,407
1985/86	371,237	32	11,601	168	2,210
1986/87	748,192	22	34,009	111	6,740
1987/88	2,725,040	28	97,323	191	14,267
1988/89	3,494,368	32	109,199	220	15,883
1989/90	1,701,859	29	58,685	207	8,222
1990/91 ^{a/}	2,003,806	32	62,619	263	7,619

^{a/} Most recent year's data should be considered preliminary.

Table 8. Statistical Area D (Yakutat) 1989/90 and 1990/91 seasons: Dungeness crab harvest by month and district.

Dist.	1989						1990		Total		
	May	June	July	Aug	Sept	Oct	Nov	Dec		Jan	Feb
181	519,895	648,926	116,749	Season Closed			0	*	0	0	1,285,774
183	45,346	18,944	*	Season Closed				*	*	*	66,786
191	81,983	192,987	72,912	Season Closed			0	0	0	0	347,882
Total	647,224	860,857	189,934				0	*	*	*	1,700,442

Dist.	1990						1991 ^{a/}		Total		
	May	June	July	Aug	Sept	Oct	Nov	Dec		Jan	Feb
181	664,623	869,712	241,218	Season Closed			21,117	---	Season In Progress	---	1,796,670
183	3,677	33,224	14,028	Season Closed			0	---	Season In Progress	---	50,929
186	0	3,747	0	Season Closed			0	---	Season In Progress	---	3,747
191	0	142,590	0	Season Closed			0	---	Season In Progress	---	142,590
Total	668,300	1,049,273	255,246	Season Closed			21,117	---	Season In Progress	---	1,993,936

^{a/} Most recent year's data should be considered preliminary.

* Where number of vessels participating is three or less, the information is considered confidential.

Table 9. Statistical Area D (Yakutat) Dungeness crab catch in thousands of pounds by month and season, 1969/1970 to present.

Season	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Total
1969/70	0.0	87.7	254.7	529.0	336.1	0.0	0.0	0.0	0.0	0.0	0.0	1,207.4
1970/71	0.0	40.3	386.6	426.1	511.9	143.6	0.0	0.0	0.0	0.0	0.0	1,508.6
1971/72	0.0	8.6	407.8	572.4	223.4	0.0	0.0	0.0	0.0	0.0	0.0	1,212.2
1972/73	0.0	100.7	653.7	842.1	392.7	3.4	0.0	0.0	0.0	0.0	0.0	1,992.6
1973/74	18.5	205.4	679.7	1,079.5	195.2	88.3	80.9	0.0	0.0	0.0	0.3	2,347.8
1974/75	16.3	141.0	476.0	213.3	113.3	37.4	34.3	0.0	0.0	0.0	0.0	1,031.6
1975/76	Closed	84.3	239.5	256.1	Closed	Closed	Closed	Closed	Closed	Closed	Closed	579.9
1976/77	Closed	Closed	136.0	238.5	163.0	0.0	0.0	0.0	0.0	0.0	0.0	537.5
1977/78	Closed	Closed	0.0	0.0	33.7	87.9	0.0	1.6	0.6	7.2	0.0	131.1
1978/79	Closed	Closed	738.1	816.3	245.0	Closed	Closed	Closed	Closed	Closed	Closed	1,799.4
1979/80	Closed	Closed	840.1	563.9	32.9	Closed	Closed	Closed	Closed	Closed	Closed	1,436.9
1980/81	Closed	Closed	404.4	328.3	141.2	18.7	0.5	0.0	0.0	0.5	1.5	895.2
1981/82	Closed	Closed	2,467.7	634.9	111.8	Closed	Closed	Closed	Closed	Closed	Closed	3,228.3
1982/83	Closed	0.0	3,092.1	1,857.4	210.7	0.0	0.0	0.0	0.0	0.0	0.0	5,160.1
1983/84	Closed	970.7	1,197.8	201.8	42.6	183.8	55.9	2.6	5.6	2.6	3.0	2,666.4
1984/85	Closed	402.8	316.5	54.1	Closed	Closed	Closed	0.0	0.0	0.0	0.0	773.4
1985/86	Closed	158.2	160.5	49.2	Closed	Closed	Closed	1.3	1.0	0.6	0.5	371.2
1986/87	Closed	195.2	386.1	123.0	Closed	Closed	Closed	24.9	16.6	1.3	1.0	748.2
1987/88	Closed	846.6	1,280.0	474.6	Closed	Closed	Closed	41.8	44.3	8.5	29.4	2,725.0
1988/89	Closed	1,003.7	1,856.5	590.3	Closed	Closed	Closed	29.4	14.5	0.1	0.0	3,494.4
1989/90	Closed	647.2	860.9	191.4	Closed	Closed	Closed	0.0	0.8	1.0	.6	1,701.9
1990/91 ^{a/}	Closed	668.3	1,057.9	256.4	Closed	Closed	Closed	21.1	----- Season In Progress -----			2,003.8

^{a/} Most recent year's data should be considered preliminary.

Table 10. Statistical Area D (Yakutat) Dungeness crab harvest in thousands of pounds, by district and season, 1969/70 to present.

Season	District					Total
	181	183	184	186	191	
1969/70	0.0	481.3	18.9	442.5	264.7	1,207.4
1970/71	362.4	6.0	58.0	370.9	711.2	1,508.5
1971/72	405.3	133.7	276.1	355.5	41.6	1,212.2
1972/73	879.0	52.0	273.5	727.8	60.4	1,992.6
1973/74	950.8	108.0	306.5	652.8	329.7	2,347.8
1974/75	182.8	35.0	237.7	514.6	61.5	1,031.6
1975/76	166.8	28.3	81.7	283.2	19.9	579.9
1976/77	67.3	37.7	63.3	369.4	0.0	537.5
1977/78	0.0	9.4	0.0	121.6	0.0	131.1
1978/79	426.2	209.2	289.7	797.9	76.4	1,799.4
1979/80	201.2	108.6	218.3	599.2	309.7	1,436.9
1980/81	244.0	72.8	20.5	435.0	123.0	895.2
1981/82	880.0	237.3	631.0	994.0	485.9	3,228.3
1982/83	691.5	404.3	1,715.4	784.7	1,564.2	5,160.1
1983/84	775.0	333.8	501.0	714.8	341.8	2,666.4
1984/85	249.0	135.6	53.6	306.4	28.7	773.4
1985/86	138.5	79.0	17.9	112.2	23.7	371.2
1986/87	243.6	50.0	16.1	362.9	75.7	748.2
1987/88	1,688.6	44.7	544.7	0.0	447.1	2,725.0
1988/89	1,995.5	118.6	268.9	0.0	1,111.3	3,494.4
1989/90	1,285.8	66.8	0.0	0.0	347.9	1,700.4
1990/91 ^{a/}	1,796.7	50.9	0.0	3.7	142.6	1,993.9

^{a/} Most recent year's data should be considered preliminary.

REPORT TO THE BOARD OF FISHERIES
1990/91 SOUTHEAST ALASKA-YAKUTAT SHRIMP POT FISHERIES



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Alaska Department of Fish and Game
Division of Commercial Fisheries
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INTRODUCTION

Commercial shrimp pot fisheries in Region 1 occur in both Southeast Alaska (Statistical Area A) and in Yakutat (Statistical Area D). The fisheries have been documented since 1962. Fishery development, and subsequent regulation development, have occurred independently in Southeast Alaska and Yakutat. The spot prawn (*Pandalus platycerous*) is the target species in this fishery. Lesser quantities of other species, particularly coonstripe shrimp (*P. goniurus*) are also taken. The harvest and value for the last completed year or season was 320,472 lbs, worth \$887,800.

SHRIMP POT FISHERY BACKGROUND

Harvest records indicate that this fishery was in the early stages of development from 1962 through 1968. Until 1980 effort and resulting harvests had been sporadic (Table 1). During the early years of the fishery, perhaps through 1980, participants utilized the fishery primarily as a supplemental income source. Product was sold over the dock to private individuals, restaurants, or other markets without passing through the traditional system of processors established for other fish species. In many cases, only "tails" were sold, and exvessel prices were high, dependent upon the size or count of tails per pound.

Since 1980 effort and resulting harvests have steadily increased. Harvests have averaged over 230,000 lbs, worth an annual average of \$696,000. The peak harvest occurred in 1988 when a harvest of 381,000 lbs was worth approximately \$1,100,000. The 1988 harvest was caught by a record 132 permit holders. While a major portion of the harvest continues to be sold over the dock, a significant portion of the harvest is being accepted by traditional processors with their associated transportation and marketing networks. Some fishermen have entered and utilized this fishery as a major income source. Reported harvests in the Yakutat Area are relatively small.

SHRIMP POT MANAGEMENT SYSTEM

Management is passive with little information available to scientifically manage the fishery. Management information is derived from fish tickets and identification of known fishing areas. Little research has been conducted concerning the distribution and abundance of spot prawns in Southeast Alaska and Yakutat.

Available research information was collected by various agencies during the 1960's and 1970's and was limited to pot efficiency studies and some distribution information. Pot efficiency studies concerned various pot tunnel configurations in rectangular pots, and a comparison of covered versus uncovered pots. Discussions on needed management improvements have centered on catch per unit of effort (CPUE) management. Available CPUE data from Southeast Alaska has been reviewed and has been found to be insufficient to support management on a catch per pot basis.

Research information concerning similar fisheries in Washington and British Columbia has been completed in recent years. Washington uses a very short season and bases its management on a preseason stock assessment program. It also specifies a rigid meshed pot as the only legal gear. British Columbia bases its management on CPUE information collected prior to, and during, the fishing season. The basis for management is a threshold CPUE of female spawners per pot. This management system is very costly and time consuming from a staff and enforcement perspective.

Regulations in the Southeast Alaska shrimp pot fishery include a limit of 150 pots per vessel in Districts 1 through 16, and pot specifications if left unattended for more than 14 days. In Yakutat Bay the pot limit is 75 per vessel. Pot termination devices have been defined to reduce the "ghost fishing" potential of lost pots, and guideline harvest ranges (GHR's) and open seasons have been used for some fishing locations. Guideline harvest ranges were initially established for the high harvests of Districts of 1, 2, 3, and 7. These GHR's have since been repealed based upon allocation and stock arguments provided by industry to the Alaska Board of Fisheries. A liberal GHR of 75,000 to 100,000 lbs continues for Districts 6 and 8. However, this GHR has not restricted the fishery since the largest reported harvest was less than 15,000 lbs (Table 2). This GHR is intended to maintain a ceiling on the harvest while controlling expansion of the fishery. There is no GHR for the Yakutat Area.

A fishing season is intended to prevent fishing when mature females are hatching eggs in fishing areas with consistent effort and harvests (Districts 1, 2, 3, 6, 7, and 8). The "egg hatch" closure occurs from March 1 through April 30. In addition, Districts 1, 2, 3, and 7 are closed from May 1 through September 30. The summer closure is an allocative closure that has biological significance in that fishing is prevented during the majority of the growth, recruitment, and perhaps mating period, known for other Pandalid shrimp. October is the beginning of the "egg extrusion" period for spot prawns, after which mature females carry eggs externally until they hatch the following spring. The summer closure tends to allocate the fishery for supplemental income use to those fishermen who participate in summer fisheries. An open summer fishery would tend to allocate the fishery for a primary income use. During the past five to eight years, the regulations have oscillated between using this resource for supplemental and primary incomes. In Yakutat Bay there is a summer fishery that extends from May 1 through February 28.

Effective October 1, 1986 a minimum mesh restriction of 1.75 inches, stretch measure, went into effect to assist in the escapement of smaller shrimp and reduce the potential for recruitment overfishing. However, this regulation continues to cause enforcement problems. Improvements to the regulation in 1989 increased enforcement potential, but problems continue to exist. Due to the contribution of coonstripe shrimp in Yakutat Bay, the minimum mesh utilized in that fishery is 1.50 inches.

1990 SHRIMP POT FISHERY SEASON SUMMARY

The 1990 pot fishery harvested 320,472 lbs of shrimp (primarily (97%) spot prawns) through November 1990 (Table 1). This harvest was worth approximately \$887,800. It was approximately 60,000 lbs less than the record 1988 harvest. The number of permits fished was 117, down from a record 132 in 1988, and the number of landings was below the 1988 figure (Table 1). Markets continue to be good for spot prawns.

The fishery was strong from January through March, was slow during the summer months when major fishing districts were closed, and strong during October and November (Table 3)

District 1 contributed a harvest of 112,500 lbs (Table 2), which was 35% of the total Region 1 shrimp pot harvest. This harvest was 42,000 lbs less than the previous season. Average catch per landing was 612 lbs, which was the second highest catch per landing since the 1980/81 season.

District 2, with a harvest of 52,800 lbs was the second most important district (Table 2). The average catch per landing was 406 lbs, which was the lowest value in nine years. The 1990 harvest was considerably below the peak harvest of 119,800 lbs which occurred during the 1987 season.

District 7, with a harvest of 43,300 lbs was the third most important fishing district (Table 2). This harvest was approximately 50% of the record harvest of 1984, and is 7,000 lbs below the 1989 level. Average catch per landing was 614 lbs, which was less than the peak level of 770 lbs which occurred during the 1982/83 season.

Districts 1, 2, 3, and 7, in combination, accounted for approximately 82% of the total Region 1 shrimp pot harvest. This compared to an average contribution of 79% during the past five seasons. It is important to note that harvests in these districts have all declined from peak harvests in 1984 through 1988. Districts 10 and 13 were also significant contributors during the 1990 season. The shrimp pot harvest of 6,200 lbs from Yakutat Bay was the highest since 1986, but still well below the peak harvest

of 36,300 lbs that occurred during 1983.

No dockside sampling, skipper interviews, or research was conducted by the department in 1990.

SHRIMP POT FISHERY OUTLOOK

It is difficult to provide a reasonable prediction of future stock conditions and harvest potential with the information available. Market conditions appear to be strong and available effort is very high. An initial examination of the harvest data (Table 1) appears to indicate that harvests peaked in Districts 1, 7 and 10 in 1988, District 2 in 1987, and District 3 in 1986. The decline in harvest contributions from these districts could be due to natural shrimp population fluctuations, excessive harvests, or other factors such as reduced effort.

Catch per landing in Districts 1, 2, 3, and 7 is below peak levels, though it has remained consistent between seasons since 1979. Catch per landing in Districts 6 and 8 is above average levels since 1981. Catch per landing in Districts 10 and 13 has declined over the past three or four seasons, but remains about average. Some fishermen are concerned about the harvest in District 13 but existing data are inconclusive.

A summarization of size data for spot prawns, as recorded on fish tickets, is available in Table 7. This information suggests that the percentage of jumbo and large prawns landed in the fishery has gradually increased over the last six or more seasons. At least a portion of this increase could be attributed to the implementation of mesh size restrictions on October 1, 1986. As the relative percentage of jumbo and large prawns increased, there was a decline in the relative percentage of small prawns landed. The decline in relative percentage of small prawns definitely appears to be a result of the mesh size restriction. It appears that the mesh restrictions are working as intended to reduce the harvest of small prawns and reduce the risk of overfishing. However, information is not available to determine stock abundance and year-class contributions to this fishery, and the changes observed in the size data could be a result of changes in year-class composition in spot prawn stocks.

Additional analyses need to be completed on the available size data. However, a cursory look at the data indicates that three fishing locations exhibit high proportions of small prawns. Kasaan Bay (subdistrict 102-60), Cholmondeley Sound (subdistrict 102-40), and Hetta Inlet (103-25) have small prawns that comprise from 50% to 66% of the total harvest from these grounds. This implies three possible hypotheses: 1) these grounds are very important rearing and nursery areas for spot prawns; 2) stocks from

these grounds have a reduced growth rate and smaller terminal size, and, 3) the grounds are heavily fished and most of the larger prawns of the stock has been removed by fishing. During the latest fishing season these subdistricts, in combination, provided approximately 35,000 lbs of spot prawns and coonstripe shrimp to the total harvest. In each subdistrict, the current harvests are from 17% to 68% of peak historic harvests. Effort on these grounds, expressed as number of landings, has been relative high during recent seasons.

It is possible that relative depletion of localized fishing areas has occurred, and that fishermen are maintaining good harvests by increased effort, finding new grounds, improved gear and fishing techniques, or by other means. Information is insufficient to determine why 1990 harvests were down from peak harvests. However, it may be prudent to assume that some decline in stock abundance is occurring and that stock abundance may be affected by the commercial harvest.

Table 1. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) shrimp pot fishery catch, number of landings, and CPUE, 1962 to present.

Year	Catch in Pounds	Number of Permits Fished	Number of Landings	Pounds Per Landing	Pounds Per Vessel
1962	488		6	81	
1963	686		9	76	
1964	3,669		11	334	
1965	0		0		
1966	*		*	*	
1967	38,900		113	344	
1968	38,209		65	588	
1969	40,196	5	53	758	8,039
1970	32,833	5	42	782	6,567
1971	10,122	4	24	422	2,531
1972	26,963	7	44	613	3,852
1973	*	*	*	*	*
1974	15,954	5	18	886	3,191
1975	5,841	5	11	531	1,168
1976	12,451	6	31	402	2,075
1977	19,185	7	17	1,129	2,741
1978	28,202	9	82	344	3,134
1979	23,305	10	30	777	2,331
1980	63,095	26	146	432	2,427
1981	86,803	34	227	382	2,553
1982	174,593	52	428	408	3,358
1983	289,964	87	549	528	3,333
1984	255,825	118	738	347	2,168
1985	254,858	106	749	340	2,404
1986	252,670	93	602	420	2,717
1987	320,908	99	679	473	3,241
1988	380,797	132	860	442	2,885
1989	346,304	122	799	433	2,839
1990 ^{a/}	320,472	117	817	392	2,739

^{a/} Most recent year's data should be considered preliminary.

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

Table 2. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) shrimp pot fishery catch in thousands of pounds, by year and district, 1969 to present.

Dist.	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990 ^{a/}
1	32.9	11.0	3.9	8.4	*	3.0	1.6	4.4	3.6	5.7	4.2	21.4	14.5	18.9	39.5	47.4	58.5	47.6	70.6	153.4	154.7	112.5
2	4.5	1.5	3.3	14.8	*	12.8	4.0	6.7	10.8	13.1	7.3	13.2	16.5	18.1	32.5	19.0	50.6	68.0	119.8	64.3	44.1	52.8
3		8.1			*		0.2	1.4			4.2	7.6	23.1	60.5	61.0	35.5	31.0	65.5	26.0	25.0	12.0	29.3
4					*						1.3	0.4			1.0			0.7	0.1		*	*
5					*					0.7					0.9		0.2	0.1	0.9	*	*	
6					*								4.5	4.5	13.6	4.7	4.4	5.7	1.2	0.6	11.5	1.9
7	2.8			1.7	*				4.8	3.8	5.0	15.4	19.2	28.2	73.1	82.7	57.6	26.3	45.3	48.0	50.4	43.3
8		1.1	0.9		*					4.5		0.8		2.2	4.9	15.0	5.5	3.4	1.5	2.1	7.5	11.0
9				0.2	*							2.7	2.1	4.1	6.0	1.0	1.9	0.6	6.1	15.9	*	*
10		0.2	2.0	1.9	*								2.1	0.0	5.5	13.3	26.5	15.5	23.2	31.9	23.2	37.4
11					*								0.1	0.5		0.2	1.3	0.5	1.3	2.2	*	0.9
12					*						1.3	0.0	2.0	1.1	0.5	3.7	1.6	2.3	5.6	10.0	7.6	3.4
13					*				0.4	0.1	0.5	0.5	15.8	15.2	21.1	9.0	6.5	12.0	19.8	23.5	18.7	
14					*							1.0	1.4	0.2	0.1	0.1	0.4	0.1	0.1	1.7	*	
15					*												0.2	0.3	1.0			
16					*									20.5		4.0	3.6	2.8	3.6	*	*	*
183		10.1			*	0.1						0.1	0.6	0.0	36.3	6.5	2.3	6.7	2.6	3.4	3.0	6.2
186					*													1.6				
Total	40.2	32.8	10.1	27.0	*	16.0	5.8	12.5	19.2	28.2	23.3	63.1	86.8	174.6	290.0	255.8	254.9	252.7	320.9	380.8	346.3	320.5
Landings	53	42	24	44	*	18	11	31	17	82	30	146	227	428	549	738	749	602	679	860	799	817
Vessels	5	5	4	7	*	5	5	6	7	9	10	26	34	52	87	118	106	93	99	132	122	117

^{a/} Most recent year's data should be considered preliminary.

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

NOTE: Number of vessels reported is actual number of vessels fishing, 1969 through 1974 season, and number of permits fished from 1974 to the present.

Table 3. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) shrimp pot fishery catch in thousands of pounds, by year and month, 1969 to present.

Year	Month												Total	Landings	Permits	
	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.				
1969	4,246	5,669	13,475	5,471	6,473	3,410	0	0	0	0	0	1,452	40,196	53	5	
1970	4,594	4,638	5,094	2,470	4,303	6,481	976	0	0	282	782	3,213	32,833	42	5	
1971	1,649	3,520	1,268	0	0	0	0	0	1,970	231	938	546	10,122	24	4	
1972	1,846	1,588	4,301	10,923	3,788	1,750	0	2,142	0	625	0	0	26,963	44	7	
1973	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
1974	0	1,350	4,456	7,274	0	1,665	0	0	0	362	280	567	15,954	18	5	
1975	70	567	1,265	675	0	0	956	0	0	0	362	1,946	5,841	11	5	
1976	580	1,078	1,617	1,484	1,463	1,279	1,597	1,167	0	0	540	1,646	12,451	31	6	
1977	10,400	0	1,454	6,466	0	0	310	0	100	369	86	0	19,185	17	7	
1978	9,943	1,351	1,633	5,250	3,890	255	690	90	2	560	11	4,527	28,202	82	9	
1979	0	0	0	3,239	5,109	3,168	3,946	1,644	3,589	1,790	820	0	23,305	30	10	
1980	799	1,544	3,728	2,479	12,388	8,421	7,840	1,519	1,112	9,410	3,149	706	63,095	146	26	
1981	1,679	1,373	4,041	7,443	8,275	7,171	22,552	9,964	5,717	11,413	2,863	4,312	86,803	277	34	
1982	2,625	5,113	9,907	9,955	3,288	4,982	32,589	47,300	15,039	20,566	7,042	16,187	174,593	428	52	
1983	9,214	25,817	7,468	990	4,501	3,281	50,712	42,895	58,223	38,234	34,208	14,421	289,964	549	87	
1984	12,224	20,290	22,311	24,382	30,596	29,437	8,804	8,038	4,305	32,313	36,604	26,521	255,825	738	118	
1985	29,795	35,681	9,076	8,467	29,125	19,873	15,909	17,608	18,964	15,191	26,696	28,473	254,858	749	106	
1986	28,932	30,459	27,101	10,088	2,416	3,386	8,084	7,783	3,389	45,647	45,443	39,942	252,670	602	93	
1987	45,660	61,393	24,912	9,884	5,349	2,709	6,824	4,871	5,071	64,251	48,453	41,531	320,908	679	99	
1988	45,773	54,638	15,142	17,408	9,023	6,537	5,355	5,055	3,251	72,356	82,258	64,001	380,797	860	132	
1989	47,939	52,209	19,997	10,641	2,592	5,798	6,805	8,392	5,972	76,290	61,596	48,073	346,304	799	122	
1990 ^v	47,241	42,718	37,505	9,551	11,523	7,047	7,594	9,045	4,159	105,732	38,357	0	320,472	817	117	

^v Most recent year's data should be considered preliminary; season in progress.

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

Table 4. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) shrimp pot harvests in thousands of pounds, and (landings), by district and month, 1990^{4/}.

Month	District														Total	
	1	2	3	4	6	7	8	9	10	11	12	13	16	183		
Jan.	17.7 (33)	13.4 (27)	4.8 (10)		*	3.9 (7)	*		*	*						47.2
Feb.	21.5 (33)	9.7 (23)	3.2 (9)		*	5.1 (11)	*		*						*	42.7
Mar.	12.4 (8)		*	*		*			*	11.9 (21)	*	*				37.5
Apr.										8.2 (28)	*	*				9.6
May							*	*	4.7 (18)		*	*	*	*	*	11.5
Jun.				*	*		*		3.6 (13)			*			*	7.0
Jul.					*		*		*			2.9 (19)			*	7.6
Aug.				*	*		*		*	*		2.3 (9)			*	9.6
Sep.	*				*		*		1.8 (15)	*		1.0 (7)				4.2
Oct.	47.2 (67)	19.8 (47)	8.5 (29)	*		25.5 (35)	2.0 (13)		*	*	*	*				105.7
Nov.	13.5 (36)	10.1 (27)	5.6 (14)		*	8.4 (18)	*					0.5 (4)				38.4
Dec.	-----Season in Progress-----															
Total	112.5 (178)	52.8 (124)	29.3 (66)	*	1.9 (13)	43.3 (74)	11.0 (31)	*	37.4 (146)	*	3.4 (12)	18.7 (85)	*	6.2 (69)		320.5 (817)

^{4/} Most recent year's data should be considered preliminary.

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

Table 5. Statistical Area A (Southeast Alaska) shrimp pot CPUE values in major fishing districts by fishing season. Values are in pounds of whole shrimp.

Season	-----District-----							
	<u>1,2,3,7</u>		<u>6&8</u>		<u>10</u>		<u>13</u>	
	CPP ^{a/}	CPL ^{b/}	CPP	CPL	CPP	CPL	CPP	CPL
1976/77	4,247	944						
1977/78	2,535	807						
1978/79	1,374	634						
1979/80	1,632	359						
1980/81	2,582	580						
1981/82	1,945	312	1,001	231			1,467	345
1982/83	3,668	527	793	214			1,638	139
1983/84	3,362	543	837	223	818	200	1,203	253
1984/85	2,535	460	930	274	1,188	274	1,101	367
1985/86	3,242	440	433	122	1,316	177	603	171
1986/87	4,227	711	535	89	2,337	354	1,088	212
1987/88	3,994	575	241	80	1,888	270	1,124	237
1988/89	3,388	515	788	273	1,695	317	1,208	283
1989/90	4,072	564	1,327	320	1,945	269	1,338	240
1990/91	2,912	506	899	243	1,642	185	1,449	184
Average	3,048	565	778	207	1,604	256	1,222	243
Average Last 10 Seasons	3,335	515	778	207	1,604	256	1,222	243
Average Last 15 Seasons	3,719	574	758	201	1,901	279	1,241	231

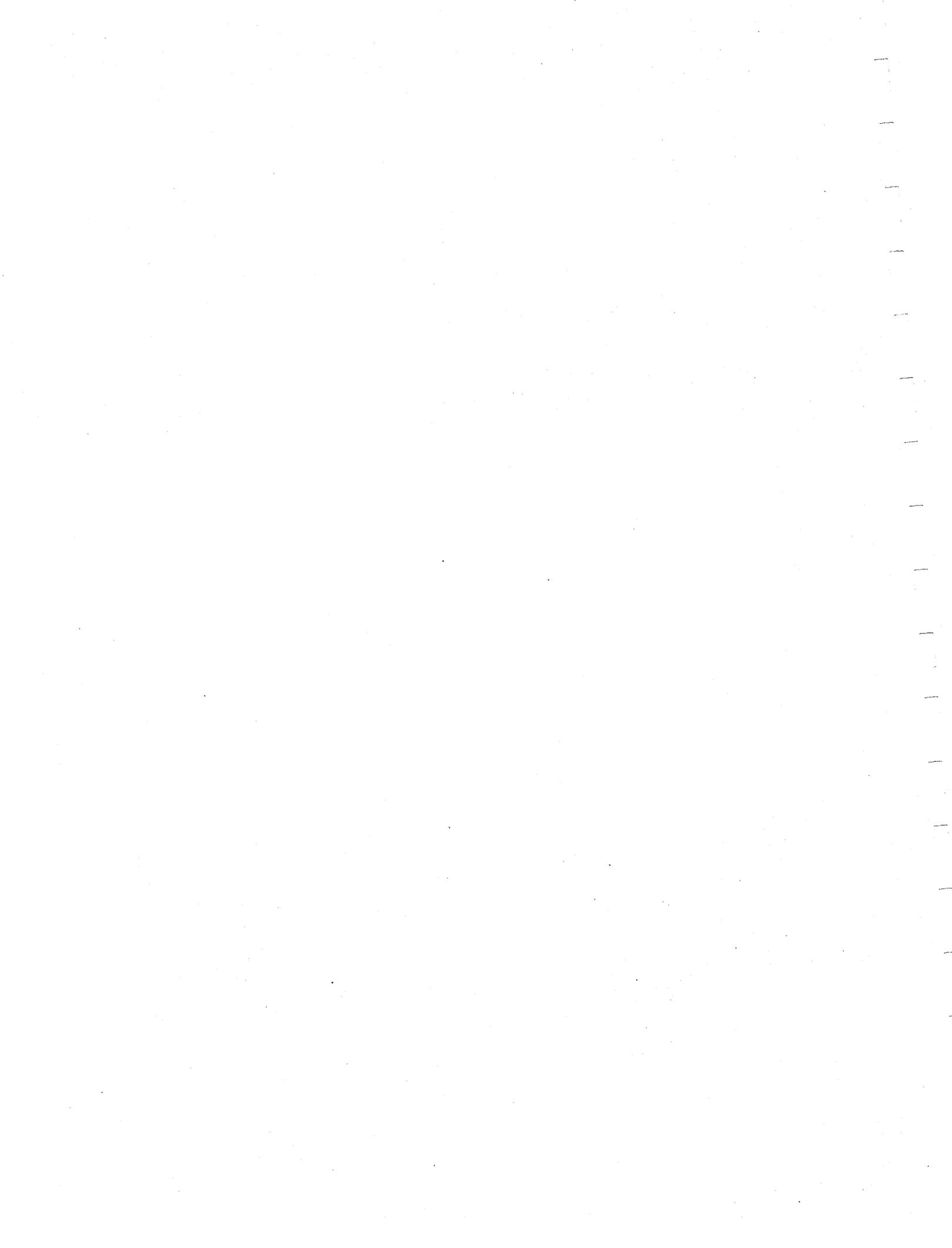
^{a/} CPP = Catch Per Permit

^{b/} CPL = Catch Per Landing

Table 6. Statistical Area A (Southeast Alaska) shrimp pot harvest by season and species.

Season	Harvest In Pounds	Spot Harvest In Pounds	Percent Spot	Coonstripe Harvest In Pounds	Percent Coonstripe	Percent Spot & Coonstripe	Percent Other Species
1970/71	6,437						
1971/72	22,343						
1972/73	10,325						
1973/74	16,088						
1974/75	5,316						
1975/76	8,023	4,759	59.32 *			59.32*	40.68
1976/77	26,012	25,446	97.82	35	0.13	97.96	2.04
1977/78	19,042	18,727	98.35			98.35	1.65
1978/79	13,264	12,880	97.10			97.10	2.90
1979/80	28,616	21,123	73.82*	186	0.65	74.47*	25.53
1980/81	68,764	60,296	87.69*	293	0.43	88.11*	11.89
1981/82	99,495	62,691	63.01*	4,170	4.19	67.20*	32.80
1982/83	190,161	145,689	76.61*	5,564	2.93	79.54*	20.46
1983/84	288,105	279,462	97.00	7,064	2.45	99.45	0.55
1984/85	251,401	241,448	96.04	9,062	3.60	99.65	0.35
1985/86	266,901	257,905	96.63	5,669	2.12	98.75	1.25
1986/87	293,096	280,465	95.69	9,722	3.32	99.01	0.99
1987/88	309,717	303,216	97.90	5,994	1.94	99.84	0.16
1988/89	374,087	367,290	98.18	6,616	1.77	99.95	0.05
1989/90	352,173	342,147	97.15	8,594	2.44	99.59	0.41
1990/91	246,209	239,772	97.39	6,212	2.52	99.91	0.09
Average	137,885	166,457	89.36	5,322	2.19	93.26	6.74
Average Last 10 Seasons	267,135	252,009	91.56	6,867	2.73	94.29	5.71
Average Last 5 Seasons	315,056	306,578	97.26	7,428	2.40	99.66	0.34

* In some years spot shrimp were identified as species code 960 which includes all species of shrimp.



REPORT TO THE BOARD OF FISHERIES
1990/91 SOUTHEAST ALASKA-YAKUTAT SHRIMP TRAWL FISHERIES



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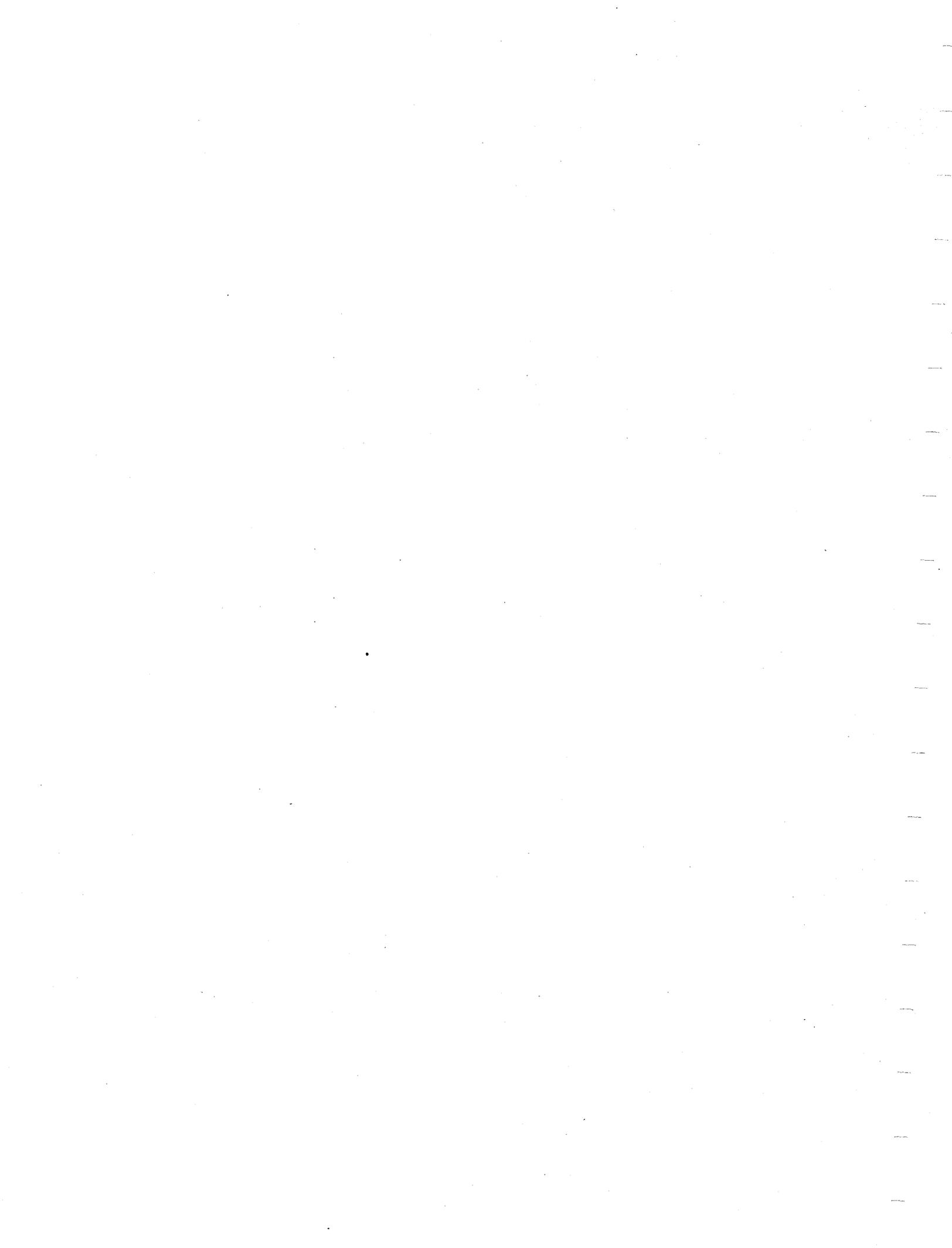


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INTRODUCTION

Commercial shrimp trawl fisheries are permitted in both Southeast Alaska (Statistical Area A) and in Yakutat (Statistical Area D), the two statistical reporting areas in Region 1. Both beam trawl and otter trawl fisheries target primarily pink shrimp (*Pandalus borealis*) and, secondarily, sidestripe shrimp (*P. dispar*). Other species harvested incidentally in much smaller quantities include coonstripe shrimp (*P. goniurus*), humpy shrimp (*P. hypsinotus*), and spot prawns (*P. playcerous*). The two gear types and fisheries differ in significant ways, and the history of their use and subsequent regulation has followed distinctly separate paths.

The beam trawl fishery, with initial harvests in 1915 and catch data summaries since 1955, has a much longer history than the otter trawl fishery which started during the 1976/77 season. Beam trawls are relatively simple gear in appearance and function. The gear uses a strong wooden beam as a "headrope", and metal "shoes" connected directly to the beam which act as the breast of the trawl. Thus, two dimensions of the net are controlled by rigid mechanisms: 1) the mouth width of the net is controlled by the beam, and the height of the net is controlled by the "shoes". Beam size is limited by the length of the vessel used to work and transport the beam. They are deployed with a single bridle and can effectively fish some gradual side slopes and irregular bottoms.

Productive beam trawling in Southeast Alaska is generally limited to four major districts by the location of the major processors, concentration of the stocks, logistics, and the size and age of the vessels in the fleet. Most of the markets are local and most of the participants are residents who fish near their home communities. The fishery tries to promote a high quality product by making daily deliveries.

In contrast to the simplicity of beam trawls, otter trawls are usually larger, more complex, double-bridled, and they fish best on smooth, level bottoms. They are dynamic trawls and rely on "otter boards" to deploy and position the net. Their design and size provides much greater fishing power than beam trawls.

Otter trawl vessels are generally larger, range over the major shrimp fishing grounds in the North Pacific, have large and advanced holding facilities, and have greater fishing power than beam trawl vessels. Otter trawling in Region 1 has concentrated on fishing grounds in the Yakutat area. Major processors and markets are as distant as Kodiak, Seward, Washington State, and Oregon.

Shrimp Beam Trawl Fishery

Shrimp harvested by the beam trawl fishery were first processed in Thomas Bay in 1915. Five processors were operating in Southeast Alaska by 1921, and fleet size, production capacity, and fishing grounds expanded into the 1950's. Until the development of the Westward (Statistical Area J) fisheries in 1959, the beam trawl fishery of Southeast Alaska was the major shrimp fishery in Alaska.

From 1955 through 1967, annual beam trawl harvests ranged from 1,800,000 to 7,600,000 lbs, with an average of 3,300,000 lbs per year. The number of participating vessels ranged from 10 to 22 (Tables 1 and 2). The catch began to decline during the 1960's. Effort and harvest stabilized at lower levels during the 1970's. Since the 1968/69 season, harvests have ranged from 400,000 to 2,200,000 lbs, with an average of 1,200,000 lbs. During the last two decades, eight to 21 vessels have participated in this fishery each season. The low harvest of 400,000 lbs during the 1985/86 season was largely attributable to a fire which temporarily closed a major processing plant in Petersburg.

Since the 1969/70 season, the seasonal catch has had an average, unadjusted, exvessel, value of \$290,000, with a seasonal low of \$120,000 and a high of \$710,000. During the more recent period since the 1982/83 season, the average, unadjusted value per season has been about \$410,000.

Prior to 1970, two geographically distinct fishing areas in Southeast Alaska produced the major portion of the beam trawl harvest. These areas included fishing grounds centered in Thomas and Farragut Bays in District 10, and Duncan Canal and Kah Sheets Bay in District 6. Catch patterns in these areas have changed significantly since 1960 as District 10 catches declined from 53% to less than 1% of the total Southeast Alaska seasonal harvest. During the same period, District 6 harvests have increased from 23% to 63% of the seasonal total (Tables 3a and 3b).

Before the late 1950's, regulations controlled the size of shrimp harvested, and a cooked and hand-peeled product was produced by more than 20 processors. Since peak production in 1958, the number of processing facilities has declined. However, total processing capacity did not necessarily decrease because plants using high capacity mechanical peelers slowly replaced those relying exclusively on hand-peeling. The first mechanized shrimp peeler was installed in Wrangell in 1957. Some hand peeling of larger shrimp still provides a quality product for specialty markets.

Regulations in the past have included conservation measures such as size controls, closures of Duncan Canal for two years, and gear mesh restrictions. Gradual development of regulations for the traditional fishing grounds in Districts 6, 7, 8, and 10 has culminated in a season closure during the egg-hatch period (February 15 through April 30), restriction of trawl gear to beam trawls only, establishment of guideline

harvest ranges (GHRs) based on historical catch data, and mesh restrictions to allow escapement of smaller shrimp.

In 1989, the Board adopted regulations which divided the season into three fishing periods and set district-specific guideline harvest ranges for Districts 6, 7, 8, and 10. The fishing periods are May 1 through June 30, July 1 through August 31, and September 1 through February 14. During each fishing period, 80,000 to 400,000 lbs may be taken from District 6, 15,000 to 50,000 lbs from District 7, 25,000 to 175,000 lbs from District 8, and 5,000 to 75,000 lbs from District 10. These regulations were intended to spread the fishing effort over the entire season and to reduce the harvest during the peak growth and recruitment period.

Current management of this fishery is limited to examining fish ticket information, limiting harvests to the established GHRs, conducting interviews with vessel skippers on an opportunistic basis, and measuring subsamples from commercial landings to estimate relative year-class strengths of the stocks.

1990/91 Shrimp Beam Trawl Season Summary

The 1990/91 shrimp beam trawl fishery harvested 2,090,000 lbs of shrimp through December, 1990. Twenty-two vessels have reported a total of 632 landings (Table 1). The total exvessel value through this period is estimated at \$450,000. The final harvest, by the end of the third and last fishing period of the season on February 14, will probably be over 2,300,000 lbs.

Fishing intensity was very high during the first fishing period that started by regulation on May 1, 1990. By the time District 8 was closed by on May 14, over 250,086 lbs had been caught. This figure exceeds the upper limit of the guideline harvest range. This high catch resulted from the efforts of 14 vessels fishing the Stikine Flats grounds. These vessels made 89 landings, averaging 2,855 lbs per landing. The northern portion of District 6 was closed on June 27, 1990, after a catch of 564,563 lbs by 11 vessels making 112 landings. Average catch per landing was 5,054 lbs. Districts 7 and 10 remained open through the end of the first fishing period on June 30. Seven vessels made 39 landings in District 7 for 33,764 lbs. District 10 landings are confidential.

During the second fishing period (July 1-August 31) fishing intensity resumed at a very high level in District 8, which closed on July 28, 1990. Twelve vessels landed 165,242 lbs in 82 landings. The average landing was 2,015 lbs. The upper limit of the guideline harvest level was approached, but not exceeded. Districts 6, 7, and 10 remained open until the end of the second fishing period on September 30, 1990. Nine vessels in District 6 reported 536,285 lbs in 126 landings. The average landing was 4,256

lbs. Districts 7 and 10 received little effort and landings are confidential.

District 8 received the brunt of the early effort during the third fishing period (September 1-February 14). District 8 was closed on September 30. By that time 222,181 lbs had been caught by 16 vessels. This harvest exceeded the upper limit of the GHR. With 102 landings, the average landing in District 8 was 2,180 lbs. When District 8 closed, the remaining effort shifted to District 6, which closed on December 28, 1990. Six vessels reported 406,921 lbs caught in District 6. With 94 landings, the average landing was 4,108 lbs. Districts 7 and 10 will probably remain open until the end of this fishing period, unless GHRs are achieved earlier.

Other Districts

The shrimp trawl fishery in other districts is not restricted by fishing seasons, fishing periods, or GHRs. Although some incidental catch is occasionally taken from the outlying districts, catches are generally insignificant, limited to landings from few vessels, and is confidential.

Ninety-seven percent of the total harvest was composed of pink shrimp. Analysis of samples collected by dock-side samplers provide data on year-class contribution to the fishery. Preliminary information indicates that two year-classes of males and two or more year-classes of females contributed to the total pink shrimp catch this season. Other dockside sampling data suggests that significant harvest is still occurring during the growth, transition, and recruitment period from May through August. More fully analyzed year-class and sex information may be available shortly in tabular or graphical format.

About 70,979 lbs of sidestripe shrimp were also reported in the catch. This represents about 3% of the total beam trawl shrimp catch. The reported catch of this species is probably a conservative estimate of their actual contribution to the total shrimp catch because only the larger sidestripes command a sufficiently high price to warrant hand separation from the predominantly pink shrimp catch. A significant portion of some sidestripe catches is composed of smaller sidestripe shrimp that are left unsorted and sold as pink shrimp. The majority of the reported sidestripe catch occurred in Districts 6 and 8, with the significant landings during May, July, and September.

Shrimp Beam Trawl Outlook

It is probable that strong year-classes apparent in major stocks and the relatively strong harvests

experienced during the past few fishing seasons will support high harvest levels in the coming 1991/92 season. The current regulatory structure has allowed a satisfactory management strategy that spreads the catch over a longer season, promotes higher quality, and supports stock conservation. Without additional information it is assumed that the 1991/92 harvest will be similar to the 2,100,000 lbs taken this past season. Increased fishing intensity in the beam trawl fishery is resulting in changes as fishermen utilize multiple day trips to optimize fishing time and economics. Skippers are contemplating various methods to hold shrimp for longer periods of time and still maintain product quality. Present data is insufficient to accurately project future harvests beyond the upcoming 1991/92 season.

Shrimp Otter Trawl Fishery

The first significant otter trawl landings from Region 1 were reported during 1975. As in the beam trawl fishery, the primary species taken by otter trawl gear is pink shrimp, although catches of predominantly sidestripe shrimp have been reported from Yakutat Bay.

The otter trawl fishery gradually expanded until the peak harvest of 2,100,000 lbs occurred during the 1980/81 season, during which 19 vessels made 38 landings (Table 5). Seasonal harvests since then have averaged 163,000 lbs with an average exvessel value of about \$50,000. The catch was landed in ports as far distant as Washington and Oregon States, Kodiak, and Seward. No significant harvest has been reported in this fishery since the 1987/88 season.

Locations from which significant landings have been reported include Yakutat Bay, Glacier Bay, and Icy Bay. The most consistent production has occurred in Yakutat Bay (Table 6). The most recent catches have been reported from Icy Bay, where there is no quota or guideline harvest level.

The otter trawl is prohibited in many potentially productive areas of Southeast Alaska and Yakutat. The productive portions of Districts 6, 8, and 10 have been closed to otter trawls since the 1959/60 fishing season. All shrimp trawling is prohibited in Lituya Bay to provide for a subsistence priority harvest from this location, and all shrimp fisheries are prohibited by the National Park Service in Glacier Bay in order to enhance the availability of whale food. National Marine Fisheries Service surveys indicate that portions of Glacier Bay have high concentrations of pink and sidestripe shrimp that could support a commercial fishery. Portions of Yakutat Bay used by Yakutat residents for subsistence fishing and shellfish fishing are closed to commercial trawl gear. The open portions of Yakutat Bay have a monthly guideline harvest limit of 30,000 lbs per month during the open season between June 21 and February 14. This monthly quota is considered very conservative. Stock abundance estimates obtained by Department of Fish and Game and National Marine Fisheries Service research cruises conducted in Yakutat Bay five times since

1980 ranged between 1,800,000 and 6,500,000 lbs. Stock composition ranged from 43% to 91% pink shrimp, a major percentage of the remainder was sidestripe shrimp.

1990/91 Shrimp Otter Trawl Season Summary

There was a small harvest of shrimp by otter trawl gear during the 1990/91 season. The data is confidential.

Shrimp Otter Trawl Outlook

Since no research cruises have been conducted in Region 1 since September 1984, it is difficult to assess the current condition of shrimp stocks. Previous estimates of stock abundance in Yakutat Bay, and the management controls available in the existing regulations, suggest that increases in the harvest to levels approximating 270,000 lbs per season may be allowed without damaging the resource. However, sustained harvests of at this level would require additional surveys to assure continued conservative management.

Information is unavailable for other shrimp stocks which have been previously fished by the otter trawl fleet. If unrestricted fishing occurs in the future in remote and unregulated areas like Icy Bay, overexploitation could easily precede implementation of appropriate management measures. However, the processing capabilities and markets for otter trawl shrimp caught in Alaska are limited and no significant effort or harvest is anticipated.

Table 1. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) shrimp beam trawl catch, number of vessels, number of landings, pounds per vessel, and pounds per landing, 1955 to present.

Year/ Season	Catch in Pounds	Number of Vessels	Landings	Pounds per Vessel	Pounds per Landing
1955	1,777,122	15		118,475	
1956	3,301,598	15		220,107	
1957	2,350,499	10		235,045	
1958	7,605,871	14		543,277	
1959	5,518,843	22		250,857	
1960	3,343,373	21	1,007	159,208	3,320
1961	4,212,300	20	1,394	210,615	3,022
1962	3,884,050	22	1,400	176,548	2,774
1963	3,110,340	20	1,080	155,517	2,880
1964	2,793,101	13	1,092	214,854	2,558
1965	2,941,429	13	1,338	226,264	2,198
1966	3,784,597	14	1,663	270,328	2,276
1967	2,203,753	13	1,105	169,519	1,994
1968/69	2,003,753	12	925	166,979	2,166
1969/70	1,840,727	10	952	184,073	1,934
1970/71	742,404	8	477	92,801	1,556
1971/72	1,050,978	8	592	131,372	1,775
1972/73	797,387	9	421	88,599	1,894
1973/74	674,386	8	460	84,298	1,466
1974/75	1,205,617	9	434	133,957	2,778
1975/76	983,609	12	450	81,967	2,186
1976/77	768,930	14	476	54,924	1,615
1977/78	949,043	10	404	94,904	2,349
1978/79	1,033,325	9	519	114,814	1,991
1979/80	956,927	17	982	56,290	974
1980/81	843,737	21	920	40,178	917
1981/82	918,975	15	523	61,265	1,757
1982/83	1,397,026	15	455	93,135	3,070
1983/84	1,768,148	18	668	98,230	2,647
1984/85	1,289,970	23	809	56,086	1,595
1985/86	428,184	16	249	26,762	1,720
1986/87	2,220,423	16	423	138,776	5,202
1987/88	1,761,636	25	387	70,465	4,546
1988/89	1,679,547	19	528	88,397	3,181
1989/90	1,826,928	21	651	86,997	2,806
1990/91 ^{a/}	2,081,142	22	632	94,597	3,293

^{a/} Most recent year's data should be considered preliminary.

Table 2. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) shrimp beam trawl harvests in thousands of pounds by month and season, 1969/70 to present.

Season	May	June	July	Aug.	Sept.	Month Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	Total
1969/70	326.7	280.2	78.8	129.1	184.7	241.2	119.6	165.2	160.0	100.6	32.4	22.4	1,840.7
1970/71	131.3	105.1	65.5	79.8	49.7	64.3	54.8	59.2	59.9	56.8	2.8	13.2	742.4
1971/72	139.0	106.3	144.5	106.5	69.7	78.3	101.6	71.1	66.0	121.1	38.7	8.2	1,051.0
1972/73	168.5	126.4	77.2	66.1	65.8	44.7	64.0	46.3	81.6	42.2	6.1	8.5	797.4
1973/74	96.3	124.1	72.6	73.7	45.0	32.0	59.1	64.8	60.3	29.2	8.8	8.5	674.4
1974/75	160.9	199.2	202.4	168.0	120.1	61.4	73.9	90.8	104.2	21.6	0.7	2.4	1,205.6
1975/76	180.7	130.3	67.2	92.6	112.3	154.5	73.0	77.8	38.9	46.1	3.6	6.7	983.6
1976/77	78.8	171.7	120.0	118.8	61.8	37.4	55.2	33.3	65.0	25.7	0.5	0.8	768.9
1977/78	73.7	235.3	147.9	166.6	126.2	48.3	29.5	18.7	81.2	21.7	0.0	0.0	949.0
1978/79	107.0	130.9	140.6	240.2	112.0	93.1	67.8	36.0	72.3	22.5	8.3	2.5	1,033.3
1979/80	98.2	154.9	146.6	177.4	104.2	55.1	58.4	39.6	66.3	48.2	3.4	4.5	956.9
1980/81	153.8	168.6	164.9	153.7	54.2	30.2	35.5	12.2	33.6	31.6	1.8	3.7	843.7
1981/82	165.1	183.4	124.0	168.8	81.1	52.7	36.2	48.3	33.0	22.3	0.9	3.1	919.0
1982/83	181.1	171.7	168.8	159.4	134.0	50.1	60.7	82.0	152.6	119.8	64.4	52.5	1,397.0
1983/84	436.3	249.0	287.0	218.2	138.5	132.0	83.3	86.9	100.3	16.2	9.0	9.6	1,768.1
1984/85	156.3	252.5	269.9	232.8	130.9	59.5	61.8	49.7	51.9	22.5	1.1	1.0	1,290.0
1985/86	125.4	105.3	46.1	23.2	39.1	13.8	31.3	27.0	8.6	7.7	0.8	0.0	428.2
1986/87	292.3	507.2	576.0	446.8	372.0	0.7	0.0	1.8	1.4	0.4	0.8	1.2	2,200.4
1987/88	634.0	721.0	291.2	90.8	0.1	0.1	1.3	7.6	5.9	6.0	2.6	1.1	1,761.6
1988/89	650.5	369.0	258.4	137.9	2.6	2.5	82.8	127.9	37.8	2.7	3.2	4.2	1,679.5
1989/90	473.6	236.2	260.8	180.3	224.3	115.8	65.6	43.6	167.8	53.4	1.9	3.8	1,826.9
1990/91 ^{a/}	546.7	336.5	386.5	357.5	293.3	143.3	17.3	-----Season in Progress-----					2,081.1

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

Table 3a. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) shrimp beam trawl fishery catch in thousands of pounds by season and district, 1969/70 through 1978/79.

Dist.	Year									
	69/70	70/71	71/72	72/73	73/74	74/75	75/76	76/77	77/78	78/79
1	0.0	0.3	3.2	0.0	0.8	0.7	1.7	1.6	0.0	1.7
2	0.0	0.0	0.0	0.0	0.0	1.3	0.1	0.0	0.0	0.0
3	0.0	0.0	0.0	0.7	0.0	0.0	4.8	1.1	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	1.2	0.0	0.0	0.0	0.0	0.0	39.3	0.0	0.0	0.0
6	865.5	344.4	442.4	451.5	260.0	973.2	812.3	620.9	717.7	625.0
7	0.0	38.1	67.0	35.7	48.7	10.4	14.2	29.2	40.3	140.1
8	609.7	158.5	285.7	219.6	323.4	212.4	84.5	85.5	176.0	261.9
9	13.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	350.1	201.1	252.3	89.9	41.6	6.7	26.3	27.9	14.1	3.4
11	0.9	0.0	0.0	0.0	0.0	0.7	0.5	2.7	1.0	1.2
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
181	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
183	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
184	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
186	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
191	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	1,840.7	742.4	1,051.0	797.4	674.4	1,205.6	983.6	768.9	949.1	1,033.3
Landings	952	477	592	421	460	434	450	476	404	519
Vessels	10	8	8	9	8	9	12	14	10	9

Table 3b. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) shrimp beam trawl fishery catch in thousands of pounds, by season and district, 1979/80 to present.

Dist.	Year											
	79/80	80/81	81/82	82/83	83/84	84/85	85/86	86/87	87/88	88/89	89/90	90/91 ^{a/}
1	6.4	3.2	6.7	2.5	7.2	0.1	*	*	0.0	*	*	*
2	1.5	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
3	2.4	1.1	1.3	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.7	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0
6	427.4	416.9	790.4	1,199.6	1,015.4	544.7	235.7	1,667.1	1,234.5	1,049.1	1,020.8	1,302.8
7	109.8	77.9	31.5	11.8	138.6	101.2	29.7	100.1	75.8	17.5	88.0	48.7
8	405.7	342.5	88.3	51.0	545.6	607.9	160.7	429.4	434.1	593.9	676.7	649.9
9	0.0	1.8	0.0	97.1	21.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	2.8	0.0	0.0	34.3	26.3	34.7	*	*	*	*	*	0.0
11	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0
12	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
14	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0
15	0.1	0.2	0.2	0.1	2.0	0.9	*	0.0	0.0	0.0	*	*
16	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
181	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
183	0.0	0.0	0.0	0.0	11.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
184	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
186	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0
191	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	956.9	843.7	919.0	1,397.1	1,768.1	1,289.9	428.2	2,200.4	1,761.6	1,679.5	1,826.9	2,081.1
Landings	982	920	523	455	668	809	249	423	389	528	651	632
Vessels	17	21	15	15	18	23	16	16	25	19	21	22

^{a/} Most recent year's data should be considered preliminary.

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

Table 4. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) shrimp beam trawl harvest and (landings) by district and month, 1990/91^{a/}.

Month	District					Total Vessels	Total Catch
	1	6	7	8	10		
May	0	244.3 (49)	31.8 (29)	254.1 (89)	*	15	546.7
June	0	320.3 (63)	*	Closed	*	9	336.5
July	0	205.3 (41)	*	165.2 (82)	*	12	386.5
August	*	330.9 (85)	*	*	*	12	357.5
September	0	*	*	222.2(102)	*	16	293.3
October	0	127.3 (6)	*	Closed	0	9	143.3
November	0	*	0.0	Closed	*	*	17.3
December	-----Season in Progress -----						
Total Harvest	*	1,302.8	48.7	649.9	*		2,081.1
Landings	*	286	57	276	*		632
No. of Vessels in fishery	*	17	10	21	*		22

^{a/} Most recent year's data should be considered preliminary.

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

Table 5. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) shrimp otter trawl fishery catch, number of landings, and CPUE (pounds-per-landing), 1975/76 to present.

Year/ Season	Catch in Pounds	Number of Landings	Pounds Per Landing	Number of Vessels	Pounds Per Vessel
1975/76	*	*	*	*	*
1976/77	*	*	*	*	*
1977/78	0	0	0	0	0
1978/79	0	0	0	0	0
1979/80	*	*	*	*	*
1980/81 ^{a/}	2,051,966	38	53,999	19	107,998
1981/82	*	*	*	*	*
1982/83	*	*	*	*	*
1983/84	417,362	11	37,942	6	69,560
1984/85	202,259	6	33,710	4	50,565
1985/86	*	*	*	*	*
1986/87	480,374	11	43,670	4	120,094
1987/88	*	*	*	*	*
1988/89	0	0	0	0	0
1989/90	0	0	0	0	0
1990/91 ^{b/}	*	*	*	*	*

a/ 1980/81 season includes 450,000 pounds reported out of Yakutat Bay in August and September, but not reported on fish tickets.

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

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

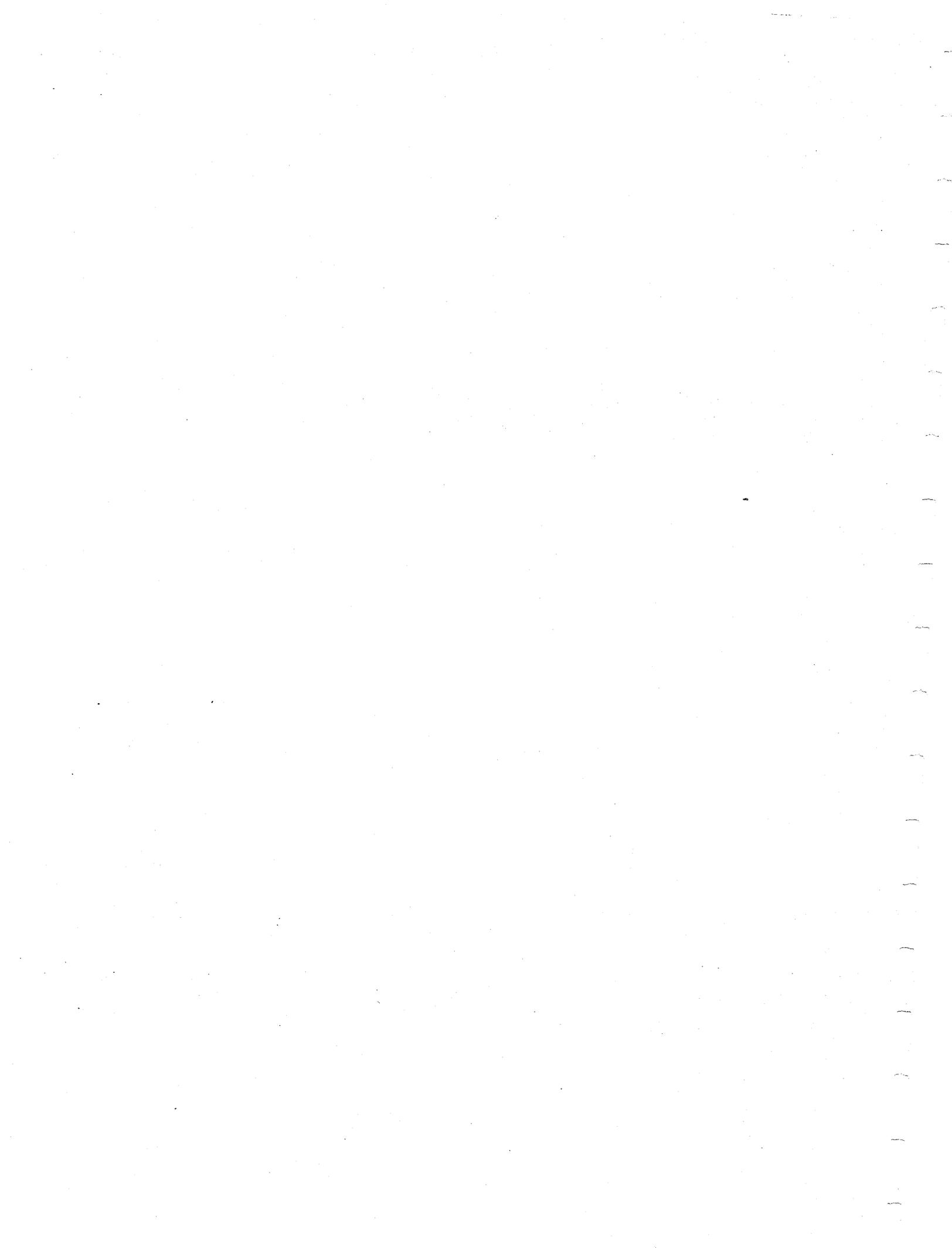
Table 6. Historic shrimp otter trawl harvests from District 183, which includes Yakutat Bay.

Year/ Season	Harvest in Pounds	Number of Landings	Pounds Per Landing
1979/80	*	*	*
1980/81 ^{a/}	1,799,899	21	85,709
1981/82	*	*	*
1982/83	*	*	*
1983/84	*	*	*
1984/85	*	*	*
1985/86	0		
1986/87	0		
1987/88	0		
1988/89	0		
1989/90	0		
1990/91 ^{b/}	*	*	*

a/ 1980/81 season includes 450,000 pounds reported checking out of Yakutat Bay during the fishery (August 1980), but not reported on fish tickets.

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

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



REPORT TO THE BOARD OF FISHERIES
1990/91 SOUTHEAST ALASKA-YAKUTAT SCALLOP FISHERIES



By

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

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INTRODUCTION

This report reviews the 1990 season commercial scallop dredge fisheries of Region I. The weathervane scallop, *Pactinopectin caurinus*, is the target species of these fisheries. During the 1990 calendar year offshore beds in Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) yielded a harvest of 586,726 lbs that resulted from 10 vessels that made 52 landings. The exvessel value of this harvest was conservatively estimated at \$1,930,200.

SCALLOP FISHERY BACKGROUND

The commercial scallop dredge fishery began in Region 1 in 1968. Harvests in this fishery are reported in lbs of shucked scallop meat, which is about 11 percent of their live, whole weight. Vessels that participate in this fishery normally use two dredges, one fished off each side, that are each approximately 12 feet in width. Whole scallops are brought aboard, small scallops and bycatch are discarded, large scallops are shucked by the processing crew, and the meats are iced or frozen for later sale. Shells and viscera are normally discarded overboard.

The early years of the fishery, 1968 and 1969, were very productive. About one 1,000,000 lbs were harvested by 14 vessels (Table 1). These years were followed by a few years of relatively low effort and moderate harvests. Additional participants entered the fishery in 1975, but harvests did not correspondingly increase, and from 1977 through 1979 both effort and harvests declined. Effort and harvest increased from 1980 through 1982, decreased in 1983, remained low through 1989, and increased in 1990. Some of these fluctuations in effort and harvest may have been a result of market conditions and the presence of more lucrative alternative fishing opportunities. However, a trend of high effort and high harvests, followed by low effort and low harvests, is evident in the data and may be an indication of the need for a recovery period after periods of high harvest. In most years the harvest is taken by relatively few vessels during the late spring and early fall months.

The major portion of the harvests occur in the Gulf of Alaska in Statistical Area D. During the most recent five seasons, the average harvest from this area was approximately 60,000 lbs, from an average of two vessels.

The fishing effort has targeted weathervane scallops in waters of the outside portions of Statistical Area A in only five of the past 22 years. Harvests from 1980 through 1983 averaged 11,000 lbs. No harvest

occurred in this area from 1984 through 1989.

SCALLOP FISHERY MANAGEMENT SYSTEM

Management is passive in this fishery. The primary conservation strategy employed is a four inch minimum ring diameter for scallop dredges. In theory, this provides for some escapement of smaller, sexually mature scallops, since studies conducted during the developmental stages of this fishery indicated an average size of maturity of approximately three inches in shell length for this species.

Information on size, sex, and age is collected as opportunities exist. Basic life history and harvest rate information was collected, analyzed, and reported by department biologists from 1968 through 1972. This information was instrumental in establishing the regulation on minimum inside ring diameter. Research assessment programs have not yet been conducted to obtain more detailed information concerning distribution, abundance, and life history of the weathervane scallop.

A permit-registration system, using the Miscellaneous Species Registration and Permit form, provides information on effort levels and controls movement of vessels between Statistical Areas. Permits can stipulate location and duration of the harvest, limit gear and other harvest procedures, and require periodic reporting. For each vessel, it is normal practice to issue a valid permit for only one registration area at a time. Permits have not been issued for known weathervane scallop grounds on inside waters of Statistical Area A, as the Department of Fish and Game considers these stocks too limited to sustain a commercial fishery. Inside weathervane scallop stocks have been utilized by subsistence, personal use, and sport users. Recently, collections have been requested for mariculture purposes.

There is no closed season restricting the commercial fishery. Harvest data is collected through state's fish ticket system. This system provides information on harvest (in shucked meat weight), date, participant, location of harvest, and other information as requested and reported by fishermen.

1990 SCALLOP FISHERY SUMMARY

The 1990 season landings of 586,726 lbs of shucked scallop meats was the largest Region 1 harvest since 1969. Ten vessels reported making 52 deliveries in 1990. The catch per landing of 11,283 lbs was the highest since 1981. Seventy-five percent of this harvest and nearly 90 percent of this effort was reported from the general Yakutat grounds between Cape Fairweather and Cape Suckling.

Six vessels fishing within the confines of Yakutat Bay harvested 66,375 lbs, a record for the bay. This unprecedented effort and harvest resulted in gear conflicts and perceptions of habitat damage by local residents of Yakutat. The department arranged for a biologist to observe the scallop fishing operations and to document the prevalence of incidental species in the catch. The information which was collected by the observer suggested that there is often significant bycatch of species important to subsistence and commercial fishermen. In response to reports of gear conflicts and indications of the potential for adverse affects on shellfish stocks, a portion of Yakutat Bay (all waters of Yakutat Bay east of a line from Point Carrew to Point Latouche) was closed to the commercial scallop dredge fishery from June through October, 1990.

The 148,624 lbs reported harvested from offshore grounds of Southeast Alaska, and the catch per landing of 18,578 lbs were both records for this area.

SCALLOP FISHERY OUTLOOK

The status of scallop stocks in Region 1 is unknown. The available information has not been sufficiently analyzed to determine if it can forecast future harvest trends or can be used as the basis for a more active management system. Markets continue to be good for scallop meats so it is anticipated that effort and catch will closely correspond to availability of scallops.

Table 1. Statistical Area A (Southeast Alaska) and statistical Area D (Yakutat) historic commercial catch and effort for weathervane scallops.

Year	Number of Permits	Catch in Pounds	Number of Landings	Average Pounds Per Landing	Average Pounds Per Permit
1968	8	927,795	31	29,929	
1969	14	837,087	59	14,188	59,792
1970	*	*			
1971	*	*			
1972	4	128,241	6	21,373	32,060
1973 ^{a/}	4	173,700	4	43,425	43,425
1974	*	*			
1975	6	122,853	11	11,168	20,476
1976	6	189,543	15	12,636	31,591
1977	*	*			
1978	No Fishing Occurred				
1979	*	*			
1980	8	261,517	23	11,370	32,690
1981	13	463,551	37	12,528	35,658
1982	8	196,968	28	7,035	24,621
1983	*	*			
1984	*	*			
1985	*	*			
1986	*	*			
1987	*	*			
1988	*	*			
1989	*	*			
1990 ^{b/}	10	586,726	52	11,283	58,673

^{a/} Catch and effort information prior to 1973 is from Kaiser, Rodney J. 1986, Characteristics of the Pacific Weathervane Scallop (*Pecten [Pactinopectin] caurinus*, Gould 1850) Fishery in Alaska, 1967-1981.

^{b/} Most recent year's data should be considered preliminary.

*

Table 2. Statistical Area D (Yakutat) historic commercial catch and effort for weathervane scallops.

Season	Catch in Pounds	Number of Permits	Number of Landings	Average Pounds per Landing
1973	*	*	*	*
1974	*	*	*	*
1975	122,853	6	11	11,168
1976	189,543	6	15	12,636
1977	*	*	*	*
1980	255,667	8	22	11,621
1981	455,858	12	36	12,663
1982	168,353	7	24	7,015
1984	*	*	*	*
1985	*	*	*	*
1986	*	*	*	*
1987	*	*	*	*
1988	*	*	*	*
1989	*	*	*	*
1990 ^{a/}	438,102	9	42	9,384
Average ^{b/}	170,115	4	16	

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

^{a/} Most recent year's data should be considered preliminary.

^{b/} Averages are calculated only from years where landings were reported.

Table 3. Statistical Area A (Southeast Alaska) historic commercial catch and effort for weathervane scallops.

Season	Catch in Pounds	Number of Permits	Number of Landings	Average Pounds per Landing
1980	*	*	*	*
1981	*	*	*	*
1982	*	*	*	*
1983	*	*	*	*
1990 ^{a/}	148,624	5	8	18,578
Average ^{b/}	38,316	2	3	

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

^{a/} Most recent year's data should be considered preliminary.

^{b/} Averages are calculated only from years where landings were reported.

REPORT TO THE BOARD OF FISHERIES
1990/91 SOUTHEAST ALASKA-YAKUTAT
MISCELLANEOUS SPECIES FISHERIES



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ABALONE

Background

The Alaskan abalone fishery targets the pinto, or northern abalone (*Haliotis kamschatkana*), which inhabits the rocky lower intertidal and subtidal surge zones of the outer coasts of Southeast Alaska. Commercially harvestable quantities of abalone occur in parts of Districts 103, 104, 105 and 113. Life history information for this species in Alaska is very limited. Information from other North Pacific locations is useful in understanding the basic biology of this species. Tagging studies indicate it is a slow growing, long-lived species. Spawning probably occurs during the summer and through early autumn in the most productive areas. Size frequency information indicates that, in at least some areas, a climax population may have existed prior to recent commercial exploitation. Recruitment levels appear to be low and sporadic. Fecundity increases greatly with increasing shell length. Known predators include rockfish, starfish, octopus, sea otter, and man. Throughout the range of this and various other abalone species, exploitation has usually resulted in stock depletion and restrictive management.

Abalone can be picked by hand from the shoreline during extreme low tides. However, the commercial fishery utilizes SCUBA or hookah (umbilical diving) gear and most of the harvest occurs subtidally. Fishing success is variable depending upon weather, substrate, vegetative growth, visibility, diver experience, abalone abundance, and other factors.

Management strategy for the commercial fisheries include closures during spawning and settling periods, a 3 1/2 inch minimum size to insure some reproduction before full recruitment into the fishery, and guideline harvest ranges intended to protect the two major fisheries from overexploitation. In general, the major fisheries are divided into the District 113 (northern outer coast) and Districts 103, 104, and 105 (southern and southern outer coast) fisheries. This division was established historically by early fishing and landings patterns that generally persist to the present day. Closed waters around Ketchikan and Sitka, around Coronation Island in lower Chatham Straits, and the southern half of the west coast of Prince of Wales Island protect stocks from commercial exploitation.

The fishing season starts on October 1 of each year. In recent seasons, characterized by increasing brevity, closure dates have been set prior to the opening of the season.

Historical Summary

Harvests of Alaskan abalone were highly variable from 1964 through 1976 (Tables 1, 2, 3, and 4). During these years, effort and landings were sporadic, generally in response to fluctuations in local markets. Seasons were open all year, minimum legal size was set at three inches in greatest diameter, and the fishery was managed through harvest permits that reflected area-specific stock conditions. In 1968, the minimum legal size was raised to four inches in Districts 101 through 106. Minimum sizes were raised for Districts 109 through 114 to 3 1/2 inches in 1976, followed by a general change for all districts to 3 1/2 inches in 1977.

In 1977, a reduced supply of abalone products on the world market, the acceptance of pinto abalone in the Japanese market, favorable monetary exchange rates for the yen, and relaxed Alaskan harvest regulations combined to improve the commercial feasibility of this fishery. Landings jumped from a long-term average catch of about 4,000 pounds to 163,178 pounds in the 1977/78 season. This was followed by a 268,667 pound harvest in 1978/79.

During their spring meeting in 1979, the Board adopted a proposal to increase the minimum size from 3 1/2 inches to 3 3/4 inches. In response to requests by subsistence users, major commercial fishing closures were approved around Ketchikan and the small communities on the outside coast of Prince of Wales Island. Despite these substantial setbacks, 273,770 pounds were harvested in 1979/80, the first of the seasonal accounting years which started on September 1, 1979. The 1979/80 season ended on June 14, 1980, when the season was closed by emergency order for the first time. This closure was a result of the Board adopting a 250,000 pound seasonal quota in the spring of 1980.

The intensified fishing effort and remote locations of harvest in 1980/81 resulted in 279,113 pounds being harvested before the department could respond. The season closed by regulation on May 31, 1981. Earlier in 1981, more changes to harvest quotas and seasons were adopted by the Board. The harvest range was reduced to 100,000 pounds to 125,000 pounds and the season shortened to September 15 through May 15.

The 1981/82 season lasted about two months, ending on November 12, 1981. The Sitka area was reopened on December 1 through December 15 so catches from this area would more closely approximate the historical relative proportion of the total catch harvested from the outside districts and those around Ketchikan. The differences in the lengths of the seasons for these two generally separate fishing areas continue to the present. For much the same reasons as in prior seasons, the total catch of 172,029 pounds was considerably above the upper guideline harvest range of 125,000 pounds.

In 1982 the Board split the existing guideline harvest range, allocating 86,000 pounds to 107,500 pounds to the area around Ketchikan and 14,000 pounds to 17,500 pounds to the area around Sitka. The season lasted about 1 1/2 months in the Ketchikan area and 4 months in the Sitka area.

In 1983 the Board split the season into autumn and spring segments, in each of which 50% of the allowable harvest was to be taken. The first segment was closed after about 1 1/2 months. The second was open from March 1, 1984 to May 15, 1984. The split allowed much more complete accounting of fish tickets and provided a total harvest of 126,942 pounds, very close to the upper end of the guideline harvest range. No major regulatory changes occurred in 1984 and the 1984/85 season was managed for autumn and spring segments. However, it was apparent at this time that the resource was in trouble. Only 68,276 pounds were harvested in both segments.

The Board restricted the 1985/86 harvest to a range of 25,000 pounds to 50,000 pounds in the Ketchikan area and 8,000 pounds in the Sitka area and delayed the Sitka area opening to November 1. The Ketchikan area season was over in a month and that in Sitka lasted little more than 1 1/2 months.

Starting in the 1986/87 season, harvest has been held to levels between 54,804 pounds in 1986/87 to 76,100 pounds in 1988/89. Regulations have not changed during this period, but the fleet has continued to improve its capabilities (Table 4). A significant portion of the catch is processed by floating processors and the fleet is becoming increasingly mobile.

Season Summary

The 1990/91 season opened on October 1, 1990. Ninety-seven permitted divers made 194 landings for a total of 68,386 pounds (Tables 1 and 2). Landed value is difficult to assess for this fishery because of the various forms of sale (fresh or frozen, in-shell and shucked, local specialty market or distant market, floating processor or shore plant).

Except for District 113, which is managed separately, the length of the season for the rest of Southeast Alaska was set prior to the opening. Closure was by emergency order in District 113. A total of 62,779 pounds was reported landed, mainly from Districts 103, 104, and 105 (Tables 2 and 3). This harvest was considerably above the upper guideline harvest range of 50,000 pounds. Tracking the fleet and compiling harvest information has continually become more difficult with the improvements incorporated into the operations of increasingly competitive commercial fishermen.

Unlike the 1988/89 and 1989/90 seasons, the relative harvest in District 105, which is more protected and

inland than Districts 103 or 104, was low. District 103 landings were above the 5 year average, as were those in District 104.

District 113 was closed by emergency order on November 9, 1990. Twenty-six landings were reported from District 113. This was the second lowest catch reported from District 113 since the start of the high level fisheries in 1977/78.

Any perceived trends in the fisheries data for this species could easily be an artifact of the nature of current fisheries, which are very short and intense. Short-term influences such as inclement weather greatly affect the distribution of the fleet and possibly skews the district catches in any given season. A few participants also account for a disproportionate amount of the catch, and their fishing patterns also affect the reported fishing and landings patterns. Present management strategies are considered to be quite conservative, with the intent to provide for a small fishery while allowing some rebuilding of those stocks which were heavily harvested during the early 1980's.

Issues

Much of the emotion and heated discussions that characterized interactions between the department, the Board of Fisheries, and industry during the late 1970's and early 1980's has subsided, along with the resource. There is general agreement that most of the stocks were harvested at an inappropriate rate during that early period.

Commercial harvest and competition with subsistence users has been addressed by large area closures to commercial harvest. In general terms, the commercial abalone fishery, its pattern of development, and initial overharvest will remain a sore point for many in the subsistence versus commercial use debate.

Outlook

Unless major changes in the abalone populations occur naturally or management strategy for this species severely curtails harvest, the fishery in the near future will approximate that of the last 2 to 3 seasons. Seasons will be as short as, if not shorter, than recent seasons because of continued high interest and participation in the fishery. There are also very few indications of a general increase in abundance on historically productive grounds to justify a larger harvest or longer season.

Port sampling will continue to be done as the rare opportunity presents itself and as other duties of higher priority allow (Table 5). There is also no expectation for funding and staffing of field programs to more closely study the population dynamics and biology of abalone (Table 6).

A major developing problem which is not readily acknowledged is the threat of the rapidly expanding sea otter populations to shellfish species in Southeast Alaska. The current rate of increase of sea otters will see their current population, conservatively estimated at 5,000 animals in Southeast Alaska in 1989, double its size every four years. The preferred habitat for sea otters overlaps that of many economically valuable shellfish species, most notably abalone, sea urchins, Dungeness, Tanner, and king crabs, and hardshell clams. Experience in other recently colonized waters of the state suggests that these shellfish species may be driven to economic extinction by sea otters.

GEODUCK

Background

Known geoduck clam, *Panopea abrupta*, beds occur sporadically in the central and southern portion of Southeast Alaska, primarily in protected waters near the outside coast. Studies done in other locations, specifically Puget Sound in Washington State, and more generally in British Columbia, indicate that this clam may live to be over 100 years old. It appears that Southeast Alaska is the extreme northern edge of the geographic range of this species and that recruitment may be sporadic or very low seasonally.

Problems specific to fisheries for this species include susceptibility to overharvest because of their sporadic recruitment, low growth rates, and extremely high maximum age. These problems can be minimized through appropriate management. Some of the research and management measures are detailed under the management strategies section below.

However, there are other problems not as amenable to solution. One of the most troubling is the tendency for the clams to bioaccumulate undesirable micro-organisms or compounds. Fairly high levels of paralytic shellfish poisoning (PSP) have been found in geoducks in Southeast Alaska, most strongly associated with the viscera. However, as the mantle and necks are the usual body parts consumed, and PSP concentrations are lower in these, this is not considered to be an insurmountable obstacle to commercial harvest.

In order to protect consumers, the state requires that each individual delivered lot of commercially harvested clams be tested by the ADEC laboratory in Palmer and certified free of PSP prior to release for marketing. In addition, water quality for commercial beds is tested for human pathogenic micro-organisms and certified safe by the Alaska Department of Environmental Conservation (ADEC). Waste portions of the clam must be disposed of safely. The need to securely quarantine lots subject to approval for sale, the time required for transport and testing of samples, and the relatively short shelf life of the fresh product requires a closer working relationship between government and industry to successfully market the product than is necessary for most other seafood products.

Historical Summary

Starting in 1978 with the Noyes Island survey, state grants were used to find and qualitatively assess commercial beds in the Ketchikan, Petersburg-Wrangell, and Sitka management areas. A number of potential commercial beds were located. Procedures for testing and certifying the product for human consumption were established. Harvestable biomass was estimated for a few promising beds. As a result, three beds in the vicinity of Noyes Island were certified for harvesting. Finally, two processors conducted the required modifications to their facilities and procedures to handle batch processing, lot testing, and product quarantine and were certified to process geoducks. Prior to 1985 a few geoducks were test marketed or sold for bait.

In late 1985, the first permit was issued for the commercial harvest of geoduck clams. This harvest was conducted under a management plan based on population estimates and designed to control the development of the fishery as well as prevent the depletion of the beds which were open, and was based upon population estimates. During the 1985/86 season, 154,582 pounds were harvested of the 300,000 pound five year quota in the Noyes Island area. During the 1986/87 season, only 28,191 pounds were harvested; the decline mainly due to poor marketing conditions and high operational costs. Increased interest in this fishery began after department personnel completed a survey and population estimate project on the west side of Gravina Island. During the 1987/88 season all catches occurred in the spring of 1988 and totaled 124,568 pounds from the Vallenar Bay area of Gravina Island and 60,577 pounds from Noyes Island. The Vallenar Bay beds were closed on May 16, 1988. In the 1988/89 season, the total landings were 143,200 pounds. For the 1989 calendar year 139,000 pounds were taken in the January to June spring fishery and 65,400 pounds in the fall for a total annual catch in 1989 of 204,400 pounds.

Season Summary

In the 1989/90 season, a total of 196,000 pounds were available as a harvest quota from the four open fishing areas. Total reported landings were 207,100 pounds for the October 1989 to May 1990 season. An additional 126,000 pounds were taken during the first three months of the 1990/90 season (October, November and December) for a total annual catch in the 1990 calendar year of 267,708 pounds (Table 7). The average price being paid during this season is \$.54 per pound, exvessel.

The only departure from the established management strategy was to combine the two southern subareas in the Kah Shakes fishing area into a single subarea, thereby opening them both to harvest in the same rotation.

Management Strategy for the Southeast Alaska Geoduck Fishery

Management goals in the geoduck fishery are to provide for low exploitation rates for this long-lived species with low and sporadic recruitment. In order to do this, harvests are permitted only during an October 1 through May 30 season, which avoids the summer spawning and recovery season when meat condition is poor. Harvests are also restricted to beds which have been surveyed, and for which biomass estimates are available.

At the present time, only four areas have been surveyed; 1) Symonds Bay on Biorka Island in the Sitka Management Area, and 2) West Gravina Island, 3) Kah Shakes Bay, and 4) the Ulitka/Little Steamboat/Big Steamboat complex of bays on the north shore of Noyes Island in the Ketchikan Management Area. After an area has been surveyed, the harvestable population is estimated, and a guideline harvest level is determined based upon a calculated 2% annual fishing mortality.

The annual guideline harvest level (GHL) for Symonds Bay, which is open each season, is 10,000 pounds. The Kah Shakes fishing area is divided into three subareas, each of which is fished once in three years for 20,000 pounds per season. West Gravina Island beds are divided into four subareas, each of which is fished once in four years for 100,000 pounds to 125,000 pounds. In the Noyes Island fishery, the fishery alternates each year between Big Steamboat and Little Steamboat/Ulitka Bays. The GHL for Big Steamboat is 64,000 pounds. The GHLs for Little Steamboat (15,000 pounds) and Ulitka Bays (26,000 pounds) provide for a combined harvest of 41,000 pounds during alternate years when these two bays are open and Big Steamboat Bay is closed.

The fisheries are monitored through the miscellaneous vessel registration and harvest permit system and fish ticket information. In most cases, a diving logbook is a condition of the harvest permit. Other biological data is sporadically collected from the fishery as time and opportunities permit.

SEA URCHIN

Background

The two commercial species of sea urchins, the red sea urchin (*Strongylocentrotus franciscanus*), and the green sea urchin (*S. drobachiensis*) are found throughout Southeast Alaska. The red sea urchin occurs primarily in the southern regions of Southeast Alaska in rocky areas and is predominant in the outside waters. The green sea urchin is commonly found in the central and northern regions of southeast Alaska, in a wider variety of habitats. The red sea urchin population is kept at low levels on the outside coast of Chichagof Island, the Maurelle Islands and the Barrier Islands due to predation by sea otters.

Historical Summary

Harvesting of red and green sea urchins, in Southeast Alaska, began in 1981. Interest was limited during 1981, 1982, and 1983 with only one to two boats fishing with limited catches, although the roe was test marketed in Japan and was well received. Both red and green sea urchins were harvested with the majority of the catch made up of red urchins. Most of the sea urchins were harvested in District 101 around Gravina Island.

The first significant harvest of red sea urchins occurred in Southeast Alaska in 1984 when 11 divers, making 45 deliveries, harvested 107,380 pounds of red sea urchins. The majority of the harvest occurred in District 101 for red urchins, Gravina and the Percy Islands. There was also a limited harvest of green sea urchins in District 106 and 112, and a small number of red urchins were harvested in District 102 and 104. The red sea urchin fishery had a size limit of three to five inches in tests diameter to protect small urchins for recruitment, to provide large urchins as a protective spine canopy for young urchins, and to give processors the desired three to five inch red sea urchins. There was no size limit on the smaller green sea urchins. The season was open from October 1, 1984 to January 31, 1985. The miscellaneous species shellfish permit, which was required of all divers, was the main tool used to manage the fishery. There was also concern that purple sea urchins were harvested as red sea urchins.

During 1985 there was a limited harvest of green sea urchins in District 106, east Sumner Strait and District 111, north of Juneau. Red sea urchins were never targeted during that fall season but accounted for a total spring catch of 85,946 pounds for a total annual catch of 125,973 pounds for all of 1985.

The sea urchin harvest in 1986 occurred during the fall only and amounted to 282,400 pounds of red urchins from Districts 101, 102, 103 and 104. During the September through December time period 13 divers made 153 deliveries. Areas that were heavily fished in District 101 included: Vallenar Bay, Nichols Pass, the Percy Islands, Mountain Point and several areas around Gravina Island. Other open districts included west Behm Canal, the east side of Prince of Wales Island, south of Kasaan Bay and north of Cholmondeley Sound, and the west side of Prince of Wales, north east of Craig (Sea Otter Sound area).

The large harvest continued during the early spring of 1987 and throughout the summer until September when a total of 652,965 pounds of primarily red urchins were harvested by 19 divers making 332 deliveries. The season was extended throughout the summer to determine roe content in the summer months. A management plan was implemented creating a size limit of 3 to 4 1/2 inches on red sea urchins to reflect the needs of the processors. A miscellaneous species shellfish permit was required along with a logbook program which was implemented to record the daily harvest, locations of harvest, and maturity of the roe. Divers were also required to fill out a registration permit with the local fishery biologists. Initially, the permits were issued for two weeks to closely manage the fishery. A three year rotational management plan was implemented in the Ketchikan area which included: the Percy Islands area, Nichols Passage area and Vallenar Bay area with only one area open a season. Percy Islands would be opened up first, then Nichols Pass, with Vallenar Bay area last. This was to ensure optimum recruitment and continuation of the local fishery. Vallenar Bay and Nichols Passage were closed down for the season. Roe content of the harvested urchins was higher on the west coast of Prince of Wales Island than on the eastern shore and other inside waters. Roe percentages seemed to increase until May after which percentages were seen to decrease. Weighted roe percentages on the inside waters varied from 3.8% to 8.5%, while weighted roe percentages on the outside waters varied from 5.4% to 13.4%. Prices for the sea urchins ranged from \$.10 to \$.20 cents per pound, depending on the roe quality. A limited amount of green sea urchins were harvested in 1987 from District 101 and 112. The processors in Ketchikan were unable to maintain a stable market (for a number of reasons), which stopped the regular fall fishery.

The harvest in 1988 totaled 54,409 pounds of red and green sea urchins by 4 divers making 31 deliveries. Red urchins were harvested in District 101 along the northern portion of Gravina Island with primarily green urchin harvests occurring in District 112, south of Peril Strait and District 114, north of Hoonah. The management plan was revised and the season was changed to October 1 through April 30. Due to the lack of staff time and budget support future harvest would be restricted to two districts, District 101, Gravina Island and District 103, west coast of Prince of Wales Island.

The harvest in 1989 totaled 142,068 pounds of primarily red urchins from the Ketchikan area and a small amount of green urchins from Peril Strait. All, except for 7,300 pounds, were taken during the January through March time period by 12 divers making 83 deliveries.

Season Summary

Harvest during 1990 was limited 16,270 pounds of red urchins taken by 5 divers making 28 deliveries during the January through March time period (Table 7). No green urchins were harvested in 1990. Open areas included portions of District 101, Gravina Island and District 103, west coast of Prince of Wales Island.

Management Strategy

During the 1990 calendar year the urchin fishery management plan called for red urchin size limit of 3 to 4 1/2 inches and the rotation of fishing areas near Ketchikan. The primary tool to document participants and list fishery methods, means, areas etc. remained the miscellaneous shellfish permit. Catches were recorded on fish tickets. Prior to the fall season in 1990, the adequacy of that plan was questioned because of the great increase in interest from industry and lack of assessment information. It was the decision by the Department that the fishery had passed beyond the experimental stage and information necessary to adequately conduct the fishery was lacking. No additional permits were issued and no catch occurred in the fall of 1990.

The presence of sea otters determines the occurrence of red urchins. If recent estimates of a 20% annual increase in sea otter abundance for Southeast Alaska are correct the long range possibilities for a large urchin fishery are doubtful.

SEA CUCUMBERS

Background

Sea cucumbers are echinoderms, related to sea urchins and starfish. As a group, they are widely distributed in many of the oceans of the world. Some species have been harvested for human consumption for thousands of years, notably in the Orient. As demand has increased, exploitation of other species, including some native to the West Coast of North America, has begun.

The principal commercial species of sea cucumber harvested in Southeast Alaska is the giant red sea cucumber *Parastichopus californicus*. It is a common species distributed from Mexico to Southeast Alaska and has been observed at least as far west and north as Cook Inlet and Kodiak Island. It occupies rocky and shelly subtidal habitats from nearshore shallows to over 100 fathoms, where its primary food seems to be detritus which it ingests along with significant amounts of fine substrate. Its ecological function seems to include recycling of larger detrital material into nutrients for the primary producers in the marine food chain. It appears to favor locations with moderate current and oceanic salinities, avoiding mud bottoms and areas subject to inundation by freshwater or glacial runoff. Major centers of abundance in Southeast Alaska seem to be located more on the outer coasts and immediately contiguous waters rather than the inner waterways and fjords.

Most of the harvest in Alaska has been confined to Southeast Alaska to date, primarily around the communities of Ketchikan and Sitka and secondarily around Craig. The fishery for this species has grown rapidly in the last four years, with continuing interest by divers and processors. There are four or five processors located in Ketchikan, with two processing sea cucumbers exclusively, one is in Craig, and one is in Sitka, processing sea cucumbers as the primary product.

Most of the vessels pioneering this fishery were small skiffs of limited range and capability. The fishery was pursued in the vicinity of either Ketchikan or Sitka, mostly as a day fishery with up to several thousand sea cucumbers delivered per vessel per diver day. Most harvest was by SCUBA or hookah diving gear, with an average of two divers operating off a single skiff or vessel. Most of the harvest was taken from depths between 10 feet to 60 feet. Each diver could work for between two and six hours per day, depending on the maximum working depths. Harvest of sea cucumbers consists of collecting sea cucumbers, which lie passively on the sea floor, filling large mesh bags with them, and transporting the filled bags to tendering skiffs or vessels.

During the later portion of 1989 and the spring of 1990, larger vessels, including at least one floaton

processor became more common. The immediate obstacle to development of multiple day fisheries in remote areas has been industry's inability to keep sea cucumbers alive, even in circulating holding tanks, for more than a few days. As the operational constraints to using floating processors are overcome, their use will probably allow more intensive harvest of more remote areas.

Processing of sea cucumbers is conducted in a two step process. The freshly caught sea cucumber is eviscerated on the fishing grounds by either the diver or a tender operator. A small slit is cut into the ventral, anterior end of the animal and the viscera, gonads, respiratory trees, water, and body fluids are expressed through this opening. The slit, drained sea cucumbers are placed in buckets or totes and transported to the processing facility, where they may be immediately processed or held for up to two days in a refrigerator or on ice. Sea cucumbers are bought by the bucket or drained weight, depending on the processor. Holding times for eviscerated, densely packed sea cucumbers are limited by their rapid decomposition, which occurs even when they are refrigerated.

Processing at the plant consists primarily of continuing the incision made by the diver so the sea cucumber is slit from anterior to posterior, opened, and the muscle bundles separated from the skin with a scraper or knife. The major product from this fishery to date has been the longitudinal and transverse muscle bundles or meat.

Some processors also freeze the skins for shipment. Others, with no market for skins, discard them. A few processors are experimenting with added value processing of skins for the oriental dried sea cucumber market.

Skin processing involves cooking or boiling the skins to a specific texture and drying the product. The dried skins are ostensibly used, mostly in the Orient, in upscale cuisine. While the processed skins are of higher value, the production of an acceptable dried product, known in the industry as *tre pang* or *beche de mer*, has not been achieved yet by Alaskan processors.

Historical Review of the Fishery

Management for this fishery developed on an area specific basis in response to the onset of processing in communities. The first registrations for sea cucumber were requested in 1981. One or two registrations were issued each year between 1981 and 1986, but only one vessel reported any landings during this period. The first fisheries were based in Ketchikan and over the years, evolution of the management strategy resulted in a partition of most of the statistical subdistricts into one of three seasonal rotations. Five percent of the estimated abundance in an area was harvested, after which the area was to be closed

for two years. Abundance was estimated by using results from a small number of test diving transects conducted by department divers in the Ketchikan area.

Rapid expansion in 1987 saw five registered vessels and 13 permits harvest 133,000 sea cucumbers (73,567 pounds), with 155 reported landings. This represented the beginning of the development of processing and marketing of this species from Alaska.

In 1988, seven vessels were registered and five permits issued for this fishery. About 91,000 sea cucumbers (50,403 pounds), with 75 landings, were harvested in 1988.

With the exception of the west coast of Prince of Wales and the outer open ocean coasts, most of the statistical districts in the Ketchikan management were assigned to a rotation by the fall of 1989. A processor started purchasing sea cucumbers in Sitka in 1989. Sitka Sound was divided into three rotational areas with the first rotational area closed in January 1990.

Other management areas were less involved with this fishery because the resource was apparently concentrated on the southern and western portions of Southeast Alaska rather than those in the Petersburg, Juneau, and Haines management areas. Fishing was permitted in those management areas on a special permit basis, with restrictive conditions and limited quotas.

Effort increased in 1989 to 60 vessels and 95 hand-pick permits. The harvest increased to 2,594,000 cucumbers (1,296,931 pounds), with 1351 landings.

Monthly prices per pound averaged \$.55 at the beginning of the year through July, at which time prices began rising, ending the year at an average of about \$.70 in December. The total exvessel value of the product was about \$531,400.00.

1990 Season Update

Harvest was initiated in the Ketchikan and Sitka Sound rotational areas with additional subdistricts opened by permit in the spring of 1990. The trend of more divers and greater catches continued into 1990 and spread to include requests to harvest in the majority of Southeast Alaska. The fishery was closed throughout Southeast Alaska on May 5, 1990, by which time over 1.7 million pounds had been landed by about 190 divers.

The closure was necessitated by the lack of available staff to cope with the management needs of the

rapidly expanding fishery and by the lack of regulatory or statutory authority to control effort. Immediately subsequent to the state's decision to close the fishery, but prior to the closure date, the Central Council of the Tlingit and Haida Tribes of Alaska filed a lawsuit against the state to protect subsistence uses of sea cucumbers and other traditional resources.

Interim Management Measures for the red sea cucumber fishery were published in September of 1990 as ADF&G Regional Information Report 1J90-30 and the fishery reopened October 14, 1990 in the Sitka area, October 21, 1990 in the Ketchikan area and December 2, 1990 in the Petersburg/Wrangell area.

A total of 13 different rotational areas were opened for the 1990/1991 season, defined as the period between October 1, 1990 and September 30, 1991. Quotas were described in number of cucumbers and totaled 706,000 cucumbers in the Ketchikan area, 35,000 cucumbers in the Petersburg area and 949,000 cucumbers in the Sitka area. The 1990/91 season closed on March 10, 1991 in the Ketchikan area with 719,151 cucumbers (323,618 pounds at \$.45 per pound); January 24, 1991 in the Petersburg area with 34,600 cucumbers (19,389 pounds at \$.56 per pound and February 28, 1991 in the Sitka area with 902,700 cucumbers (433,290 pounds at \$.48 per pound). In the calendar year 1990, 242 divers harvested 4,736,246 cucumbers (2,178,673 pounds) with 2,261 deliveries (Tables 8 and 9). Prices ranged from \$.60 to \$.84 per pound and averaged about \$.75 per pound for a total exvessel value of about \$1,600,000.

Additional information on the history of sea cucumber fisheries on the Pacific coast and in Alaska, a summary of sea cucumber biology, as well as details of the methods used to calculate harvest rates in pursuant to this plan are available as ADF&G Regional Information Report 1J90-31 (Imamura and Kruse 1990). The formal adoption of a final sea cucumber fishery management plan was anticipated to occur during the January 1991 session of the Board of Fisheries.

OCTOPUS

Background

Octopus, mostly *Octopus dofleini*, has been harvested in Southeast Alaska at minimal levels. Most are caught incidentally in the shellfish pot fisheries.

Historical Summary

Since 1976, octopus landings have ranged between 324 pounds and 17,262 pounds. Octopus has been sold predominately as bait in the longline fisheries. The last reported average exvessel prices in 1990 were around \$1.28 per pound. The only data source for management of this fishery are total weight per landing in the fish ticket system. Miscellaneous permit forms are used to manage this fishery. Historically, higher landings in the mid-1980's were a result of efforts to establish a commercial pot fishery, with specialized octopus pots, in Southeast Alaska, (Table 7).

Season Summary

Eight processors reported purchases of octopus in 1990. Thirty permit holders reported landings of 8,810 pounds during 1990. Most landings were apparently associated with the commercial shrimp pot fishery. Most of the landings were reported from the southern Southeast Alaska fishing districts (Districts 101, 102, and 103) between October and December, which coincides with the height of the pot shrimp fishery in these districts.

Management Strategy

There are currently no defined management measures established for the octopus fishery. Current harvest patterns indicate that octopus remain predominantly an incidental species taken opportunistically in the commercial pot fisheries for other shellfish. Insufficient fisheries and biological data are available to draft a comprehensive management plan for octopus. However, the existing low market demand (the Asian market prefers other species), inconsistent catches in directed fisheries (the experimental octopot fishery has declined), and gear limitations are likely to discourage development of this fishery for the foreseeable future and obviate any compelling need to immediately formulate a management plan.

SQUID

Background

The commercial fishery for squid, most likely *Loligo opalescens*, has been minimal and sporadic. There has been some interest in the use of purse seine gear for harvesting squid off the west coast of Prince of Wales Island where it has been observed locally concentrated in shallow water in the spring. Only small harvests have occurred in this fishery. No permits for mechanical jigging machines or hydraulic pumps, commonly used in squid fisheries in other areas of the world, have been requested or issued.

This fishery uses the fish ticket system and the stipulations on the miscellaneous permit form as management tools. A management plan has not yet been developed for this species.

Historical summary

There have been no registrations or permits requested for this species since 1984. No significant landings were reported for those years for which permits were issued (Table 7).

Season summary

No squid registrations were requested in 1990 and none were reported landed during the year.

SNAILS

Background

Marine snails are a part of the ethnic cuisine for a number of European and Asian cultures. As such, there has been sporadic interest in commercial fisheries for a few of the species that are readily available in

Southeast Alaska. Among these are the neptunid species; including *Neptunia lyrata* and *N. pribiloffensis*, and the buccinid species; including *Buccinium glaciale* and *B. scalariforme*. These are not the only snail species commonly caught incidentally in traps set for shrimp and crab and in trawls for groundfish and shrimp in Southeast Alaska, but they are the species best known to have some market value, because of their pleasing appearance and taste when properly processed. These and other species of snails are often caught in very high densities and are commonly considered a pest by those pot fishing for crab and shrimp.

Directed fisheries for snails in Alaskan waters have largely been limited to longline pot fisheries conducted in the eastern Bering Sea by the Japanese distant water fleet. Domestic efforts and markets have been insufficient to consistently support a domestic fishery in Southeast Alaska, although snails are landed occasionally as an incidental catch and for test marketing and some processors have invested in specialized equipment for their plants.

Paralytic shellfish toxin has been documented in these species. It is assumed that the snails sequester toxin concentrated initially by their favored prey species, which are commonly bivalves and other filter feeders of plankton. The necessity for testing each lot of the catch for paralytic shellfish toxin has constrained development of this fishery in Southeast Alaska, as has the necessity for processors to obtain certification for handling the product. If the problems associated with paralytic shellfish toxin in snails can be solved, either through demonstration of consistent safety of the product or modification of the product, it is likely that a small scale fishery, conducted during the winter and spring, could develop in Southeast Alaska.

Historical Summary

The first commercial harvests for marine snails in Southeast Alaska were recorded in 1978. Since that time, landings have been reported during five seasons (Table 7), most recently in 1989. Landings have never exceeded 1,000 pounds in any of these seasons, and the participation levels have been so low that the exact catch, participation, and landings are confidential. Most landings have been reported from the winter months. It is assumed that snails are landed as incidental catch by commercial pot shrimp and crab fishermen.

Season Summary

A few permits were issued for snails but no landings have been reported in calendar year 1990, which is considered the season for this species.

Management Strategy

The miscellaneous species harvest permit and registration forms are used to manage this fishery. Landings are reported on fish tickets. No management plan has been drafted for this species. Demand for snails is directly linked in the world market to demand for abalone, for which it is often substituted. As such, tracking abalone trends worldwide should provide some indication of the future direction of fisheries for marine snails.

Table 1. Statistical Area A (Southeast Alaska) historic abalone, harvests in pounds by management area, 1964 to present.

Year Total	Ketchikan Districts (1-4)	Sitka Districts (13, 9A)	Petersburg Districts (5-8, 9B 10)	Juneau Districts (11, 12, 14-16)
1964		3,000		3,000
1965		1,000		1,000
1966	3,000			3,000
1967	6,511			6,511
1968				
1969				
1970		1,100		1,100
1971		923		923
1972		2,610		2,610
1973	144	2,669		2,813
1974		16,339		16,339
1975		8,497		8,497
1976	55	546		601
1977/78	805	10,861		11,666
1978/79	130,438	49,320		*
1979/80	313,520	61,733	3,134	298
1980/81	228,891	18,382	3,362	*
1981/82	337,481	32,589	824	0
1982/83	96,968	12,826	3,490	0
1983/84	37,499	8,735	570	0
1984/85	73,592	8,459	13,461	0
1985/86	59,280	8,827	6,946	0
1986/87	37,909	13,262	9,495	0
1987/88	53,440	10,964	3,769	0
1988/89	39,290	10,172	26,638	0
1989/90	33,572	4,020	24,212	0
1990/91 ^{a/}	48,303	5,607	14,476	0

^{a/} Most recent year's data should be considered preliminary.

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

Table 2. Statistical Area A (Southeast Alaska) abalone, seasonal commercial harvests in round pounds (landings) by district, 1977/78 to present.

Season	-----Districts-----									Total
	1	2	3	4	5	9	13	14	16	
1977/78	0	0	*	0	0	0	11,666 (79)	0	0	11,666 (79)
1978/79	*	*	26,911 (34)	103,234 (37)	0	0	49,320 (157)	*	0	179,927 (232)
1979/80	*	0	104,679 (62)	208,806 (182)	*	0	61,733 (188)	*	*	378,685 (434)
1980/81	0	3,807 (7)	138,025 (84)	87,059 (45)	0	*	18,382 (70)	0	0	251,971 (205)
1981/82	*	*	105,796 (107)	230,218 (178)	*	0	32,589 (70)	0	0	370,894 (361)
1982/83	*	0	29,693 (33)	67,177 (82)	3,490 (4)	0	12,826 (14)	0	0	113,284 (134)
1983/84	*	0	19,607 (8)	17,302 (21)	*	0	8,735 (5)	0	0	46,804 (37)
1984/85	4,696 (16)	0	40,769 (50)	28,127 (25)	13,461 (8)	0	8,459 (7)	0	0	95,512 (101)
1985/86	*	*	26,739 (42)	32,462 (39)	5,498 (5)	1,448 (4)	*	0	0	70,053 (99)
1986/87	*	0	19,417 (19)	18,432 (22)	9,495 (13)	0	13,262 (11)	0	0	60,666 (66)
1987/88	0	449 (5)	26,000 (30)	26,991 (46)	3,769 (8)	0	10,964 (18)	0	0	68,173 (107)
1988/89	0	0	18,227 (40)	21,063 (35)	26,638 (14)	0	10,172 (25)	0	0	76,100 (114)
1989/90	*	0	17,004 (39)	15,394 (33)	23,388 (19)	*	4,020 (14)	0	0	61,804 (117)
1990/91 ^{a/}	*	0	22,741 (73)	25,475 (70)	14,476 (25)	0	5,607 (23)	0	0	68,386 (194)

^{a/} Most recent year's data should be considered preliminary.

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

Table 3. Statistical Area A (Southeast Alaska) 1990/91^{a/} and 1989/90 season harvests statistics of pinto abalone, in pounds and landings by district and month.

1990/91 ^{a/}					
District	October	November	December	February	Total
1	*				*
3	22,741 (73)				22,741 (73)
4	25,475 (70)				25,475 (70)
5	14,476 (25)				14,476 (25)
13	5,607 (23)				5,607 (23)
Total Pounds	68,386				68,386
Total Landings	(194)				(194)
1989/1990 ^{a/}					
District	October	November	December	February	Total
1	974 (13)	*			974 (13)
3	17,004 (39)				17,004 (39)
4	15,394 (33)				15,394 (33)
5	23,388 (19)				23,388 (19)
9	*				*
13	4,020 (14)				4,020 (14)
Total Pounds	61,804	*			61,804
Total Landings	(117)				(117)

^{a/} Most recent year's data should be considered preliminary.

* Where number of vessels participating is three or less, the information is considered confidential.

Table 4. Statistical Area A (Southeast Alaska) historic abalone fishery statistics.

Season	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91 ^{a/}
Harvest In Pounds	11,666	179,927	378,685	251,971	370,894	113,284	46,804	95,512	75,053	60,666	68,173	76,100	61,804	68,386
Number Landings	79	232	434	205	361	134	37	101	99	66	104	107	117	194
Months Fishing	12	12	9.5	9	2.5	1.3	4.5	5.1	2.6	4.8	1.2	1.1	1.3	0.3
Weeks Fishing	52	52	38	36	10	5	17.8	21.0	8.6	19.3	5.0	4.0	5.7	1.3
Pounds/ Landings	147.7	775.5	872.5	1,229.1	1,027.4	845.4	1,265.0	945.7	758.1	919.2	655.5	711.2	528.2	352.5
Pounds/ Month	972.2	14,993.9	39,861.6	27,996.8	148,357.6	87,141.5	10,400.9	18,727.8	28,866.5	12,638.8	56,810.8	69,181.8	47,541.5	68,386
Pounds/ Week	224.3	3,460.1	9,965.4	6,999.2	37,089.4	22,656.8	2,629.4	4,548.2	8,727.1	3,143.3	13,634.6	19,025.0	10,842.8	52,604
Landings/ Monthly	6.6	19.3	45.7	22.8	144.4	103.1	8.2	19.8	38.1	13.8	86.7	97.3	90.0	194
Landings/ Weekly	1.5	4.5	11.4	5.7	36.1	26.8	2.1	4.8	11.5	3.4	20.8	26.8	20.5	149.2

^{a/} Most recent year's data should be considered preliminary.

Table 5. Statistical Area A (Southeast Alaska) abalone, summary of commercial dockside sampling data.

Season	Number of Landings Sampled	Sample Size	Average Length (mm)	Length Range	Number Abalone Per Pound
1977/78	4	493	98.02	81-126	2.86
1978/79	7	965	100.22	80-136	Not Sampled
1979/80	18	2,026	106.06	84-143	2.51
1980/81	10	1,311	103.91	90-130	2.78
1981/82	7	785	106.91	83-136	2.60
1982/83	6	689	103.01	89-132	2.74
1983/84	13	971	106.46	92-138	2.90
1984/85	5	608	106.35	92-136	2.79
1985/86	5	433	100.97	92-137	3.08
1986/87	4	502	103.61	89-137	3.04
1987/88	4	730	104.52	90-137	3.12
1988/89	3	458	103.81	92-128	2.80
1989/90	2	423	107.60	93-134	2.60
1990/91	5	1,310	105.60	87-130	Not Sampled

Table 6. Comparative abalone length frequencies from research sites in Districts 3 and 4 (outside Prince of Wales Island) in areas open to commercial exploitation. Data developed by Robert Larson.

Year of Sample	1979	1980	1981
No. of sites	7	18	54
Sample size	1,304	1,230	2,848
Ab.'s collected per diving minute	Unknown	Approx. 4.0	6.0
Percent \leq 3 inches	17	28	57
Percent $>$ 3 inches by $<$ 3.75 inches	31	39	29
Percent \geq 3.75 inches	52	32	14
Average Length	3.7	3.4	2.9

NOTE: No studies done from 1982 through 1990.

Table 7. Statistical Area A (Southeast Alaska) and Statistical Area D (Yakutat) commercial catch (landings) of miscellaneous species.

Year	----- Species and Species Code -----						
	Octopus 870	Sea Urchins 896	Snails 890	Geoducks 815	Razor Clams 830	Squid 875	Coral 899
1976	1,384 (19)						
1977	390 (8)						
1978	1,135 (15)		*		*		*
1979	1,346 (17)					*	*
1980	3,581 (36)			*			
1981	6,538 (66)	*					
1982	2,274 (42)	*					
1983	5,750 (10)	*	*	*			
1984	3,796 (14)	107,380 (45)	471 (6)	*	*		
1985	*	125,973 (59)		*			
1986	*	282,384 (153)		130,961 (37)			
1987	17,262 (96)	652,965 (332)					
1988	20,485 (236)	54,409 (31)	873 (8)	128,750 (109)			
1989	6,414 (87)	142,068 (83)	*	204,441 (186)			
1990 ^{a/}	8,810 (178)	16,270 (28)		267,708 (182)			

^{a/} Most recent year's data should be considered preliminary.

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

Table 8. Statistical Area A (Southeast Alaska) sea cucumber harvests in numbers, pounds, registered vessels, permits fished, and landings, 1981 to present.

Year	Number of Cucumbers	Pounds of Cucumbers	Number of Registered Vessels	Number of Permits Fished	Number of Landings
1981			1		
1982			1		
1983			0		
1984	*	*	2		*
1985			1		
1986			0		
1987	132,484	73,567	5	13	155
1988	90,652	50,018	7	5	75
1989	2,137,678	1,326,970	75	97	1,389
1990 ^{a/}	3,745,959	2,177,166	109	242	2,260

^{a/} Most recent year's data is considered preliminary.

* Where number of vessels participating is three or less, the information is considered confidential.

Table 9. Statistical Area A (Southeast Alaska) sea cucumber harvests in numbers (landings) by district 1987 to present.

Season	1	2	3	5	6	7	9	10	11	12	13	Total
1987	105,807 (113)	26,677 (42)										132,484 (155)
1988	90,652 (75)											90,652 (75)
1989	1,033,730 (726)	235,330 (94)		*	*				*		866,679 (559)	2,137,678 (1,389)
1990 ^{u/}	594,858 (397)	534,661 (197)	800,884 (368)	207,077 (79)	106,374 (21)	*	154,761 (74)	4,054 (8)		106,270 (58)	1,209,411 (1,058)	3,745,959 (2,260)

^{u/} Most recent year's data is preliminary.

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