

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF COMMERCIAL FISHERIES

LOWER COOK INLET AREA
ANNUAL SHELLFISH MANAGEMENT REPORT

1990-91



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

The Cook Inlet Management Area, Statistical Area H, has as its eastern boundary the longitude of Cape Fairfield ($148^{\circ} 50'$ W. long.) and its southern boundary the latitude of Cape Douglas ($58^{\circ} 52'$ N. lat.). The management area is divided into six shellfish districts: Southern, Kamishak, Barren Islands, Outer, Eastern and Central (Figure 1).

A discrete management area (G) has been established specifically for the trawl and pot shrimp fisheries in the Outer and Eastern Districts (Figure 2). Area G has as its boundaries the longitude of Cape Fairfield on the east and a line drawn from the westernmost tip of Point Adam to the westernmost tip of Cape Elizabeth and south along $151^{\circ} 53'$ W. longitude on the west.

This report covers the most recent shellfish fisheries in Cook Inlet: 1990 Dungeness (*Cancer magister*), razor clam (*Siliqua patula*), hardshell clams, blue mussels (*Mytilus edulis*), octopus (*Octopus dofleini*), sea cucumbers (*Parasitichopus californicus*), 1990-91 Tanner crab (*Chionoecetes bairdi*) and Area G pot shrimp. The 1990 seasons for scallops (*Pecten caurinus*) and green sea urchins (*Stronglyocentrotus droebachiensis*) were open but no one fished. This was also the case for the 1990-91 Area G trawl shrimp fishery. The 1990 seasons for red king crab (*Paralithodes camtschaticus*), and the 1990-91 Area H trawl and pot shrimp fisheries were closed due to low stock conditions. A summary of the king crab, scallop and shrimp stocks as well as historic fisheries are given in this report. Emergency orders affecting these fisheries are listed on Table 1.

Shellfish landings from the Cook Inlet Management Area (H) included 537,485 pounds of Tanner crab, 29,502 pounds of Dungeness crab, 323,205 pounds of razor clams, 36,844 pounds of hardshell clams, 22,525 pounds of sea cucumbers, 1,343 pounds of octopus and 10,600

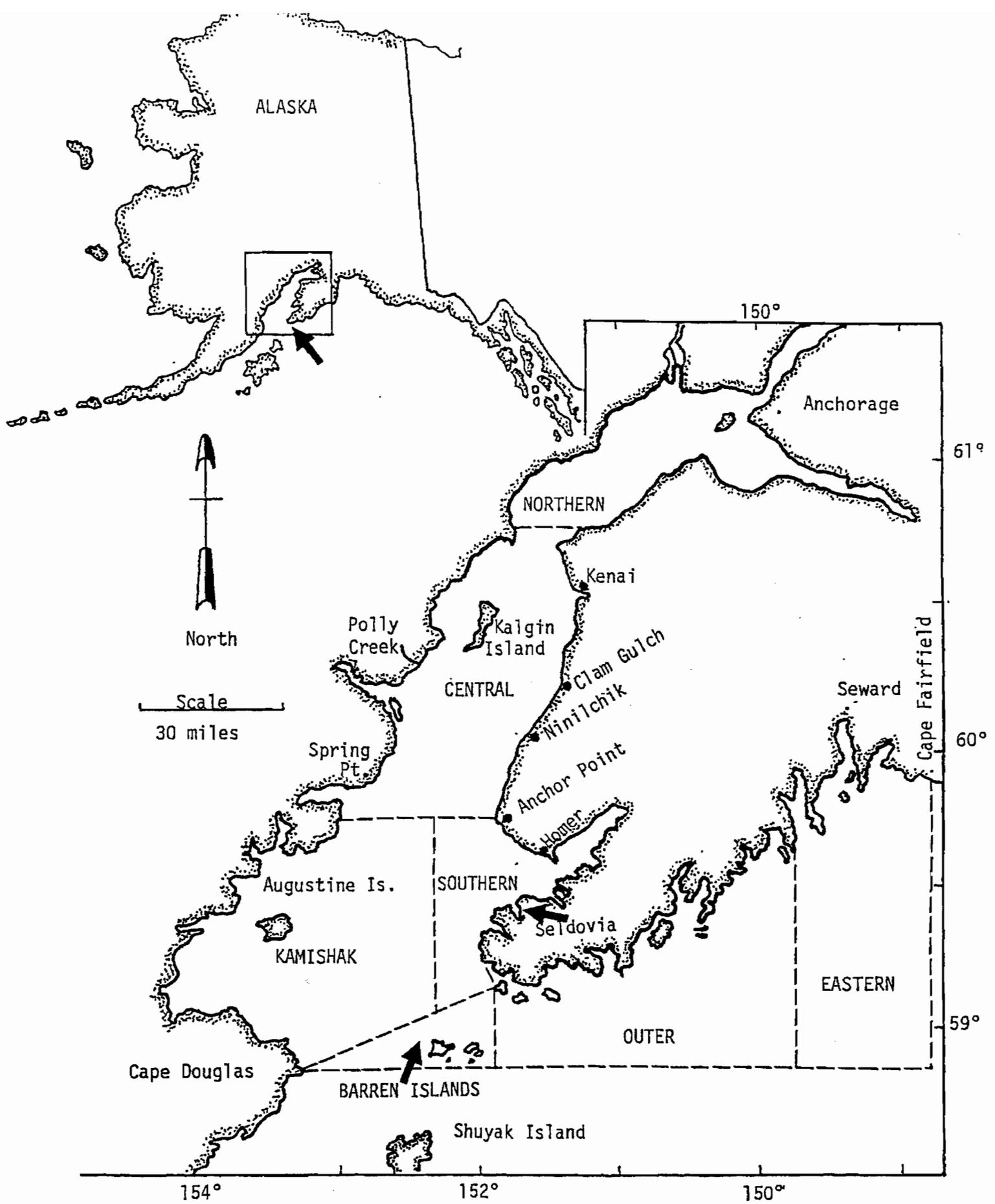


Figure 1. Cook Inlet district location chart.

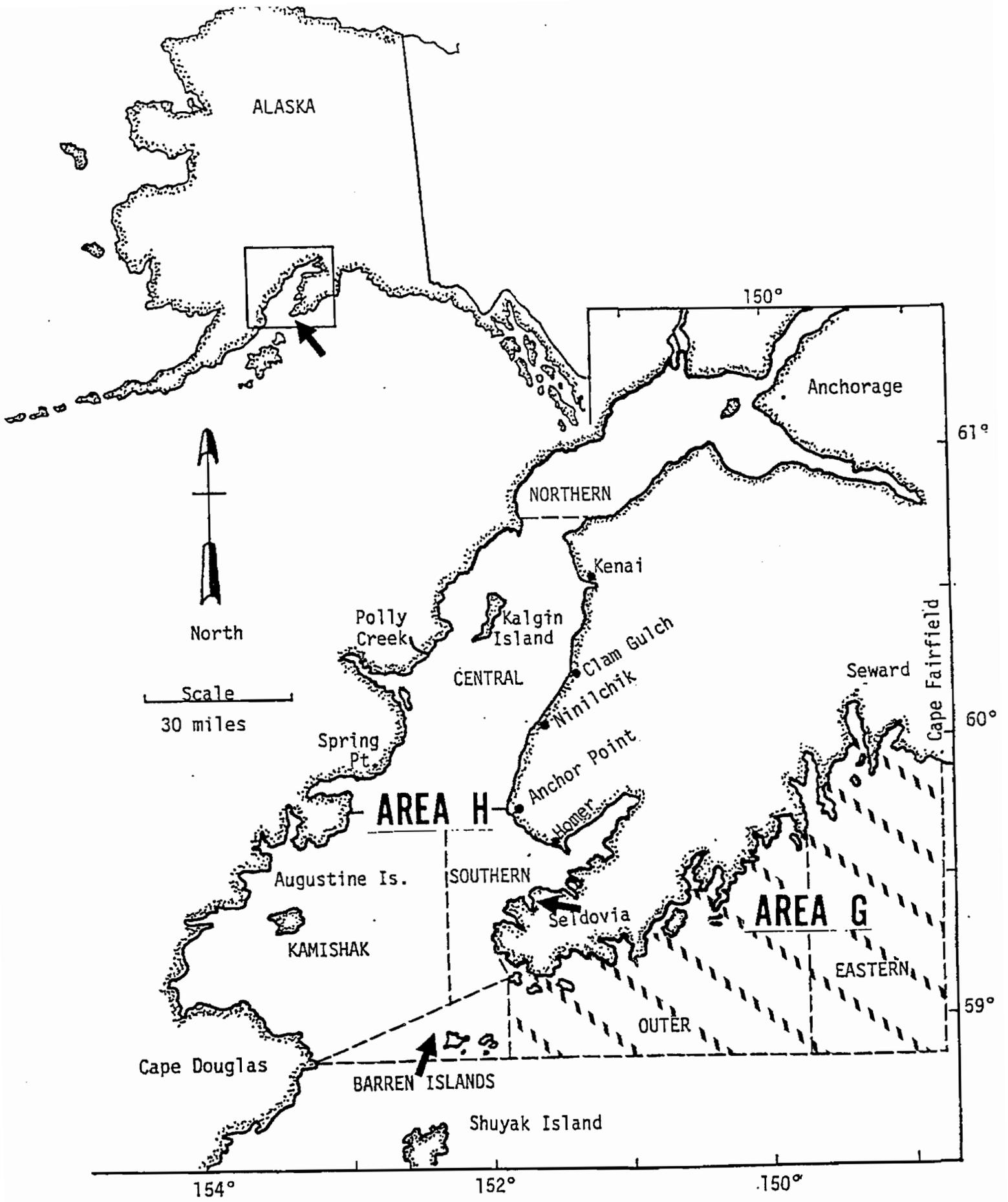


Figure 2. Cook Inlet Area (H) and Outer Cook Inlet Area (G) districts location chart for shrimp management.

pounds of mussels. Shrimp landings for Area G included 8,853 pounds of pot caught shrimp.

The approximate ex-vessel value by species was \$800,000 for Tanner crabs, \$50,000 for Dungeness, \$172,000 for razor clams, an estimated \$16,000 for sea cucumbers, \$1,800 for octopus, \$43,000 for hardshell clams and \$2,700 for blue mussels. Ex-vessel value for Area G pot shrimp was \$25,000. Total estimated ex-vessel value of all shellfish species for the Cook Inlet Management Area was approximately \$1.11 million.

TANNER CRAB FISHERY

Introduction

Historically Tanner crab fishing has occurred in six of the districts of the Cook Inlet Management Area (H): Southern, Kamishak, Barren Islands, Central, Outer and Eastern (Figure 1). Historical catch, since inception of the minimum legal size in 1976, has ranged from 510,034 pounds in 1990 to 5.7 million pounds in 1978-79 (Figure 3, Appendix A). The number of participating vessels has ranged from 7 in 1990 to 137 in the 1988 season. The entire management area was closed for the 1989 season due to depressed stock conditions.

The Southern District is fished by both small and large vessels. The fishery occurs in the relatively protected waters of Kachemak Bay. A significant number of the vessels have dry holds. The Homer and Seldovia boat harbors, home ports to most of the fleet, are no more than a three hour run from the geographic extremes of the district. Fishing depths ranged from 5 to 95 fathoms, but generally are between 30 and 55. Historical annual harvest has ranged from 0.5 to 2.9 million pounds. The fishery was closed in

both 1989 and 1990 due to depressed stock conditions. Recent vessel effort has been high with 127 boats fishing during the 1988 season (Appendix A).

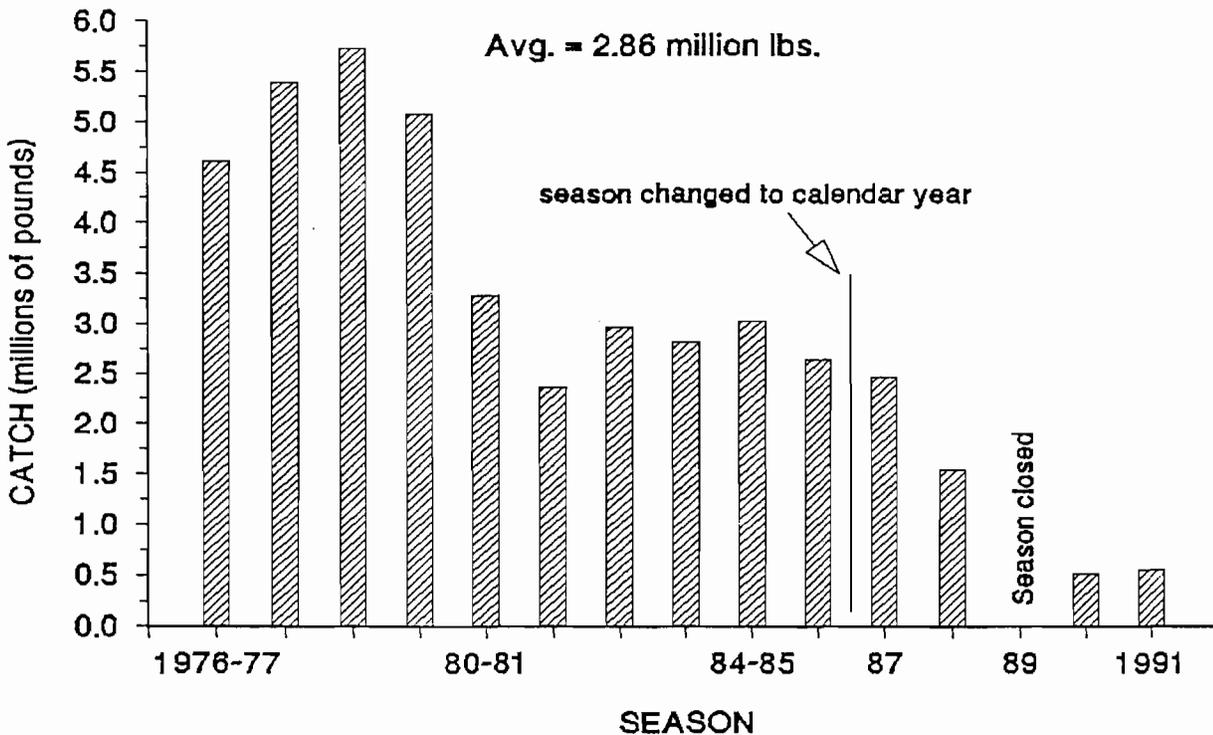


Figure 3. Tanner crab catch by season, Cook Inlet Management Area, 1976-1991.

The Kamishak Bay and Barren Islands Districts are often considered one management unit because survey, fishery and tag recovery information show that these two districts contain a single stock of Tanner crabs. The fishery in the Kamishak and Barren Islands Districts occurs in open waters subject to severe weather and icing conditions, as well as extreme tides and seasonal ice flows from upper Cook Inlet and Kamishak Bay itself. All participating vessels have circulating sea water systems. The smallest vessels are generally 50 feet in keel length. These smaller vessels are often extremely limited in fishing time due to the weather conditions. Many fishermen generally fish around the clock; the boats jog while the gear soaks. Safe anchorage from storms is located behind Augustine Island or in Iniskin Bay. Fishing occurs

in a 15 to 90 fathom depth range. Historical catch since full development of the fishery and implementation of the legal minimum size has ranged from 0.4 to 3.3 million pounds. The fishery was closed in 1989 due to depressed stock conditions. Vessel effort has ranged from 17 to 28 boats (Appendix A).

The Outer and Eastern Districts are located in the Gulf of Alaska bordering the Prince William Sound Management Area (E) on the east at Cape Fairfield. Recently this fishery has occurred in or near the mouths of the many fjord like bays along the outer coast of the Kenai Peninsula; however, the exposed open waters in the Gulf of Alaska portion of these districts once provided significant portions of the catch. The fleet in these districts is characterized by both small and large vessels, the smaller boats fishing the bays and the larger ones fishing the bays and the ocean. Poor weather conditions impact all of the boats since the smaller vessels must negotiate open ocean waters to reach gear placed in the bays both east and west of Seward, which is the delivery point for most of the crabs. Some crabs, however, are delivered to Homer resulting in an equally rough trip from the bays of the outer Kenai Peninsula to Homer.

This crab stock has suffered the same severe decline in abundance as the stocks as far east as Yakutat. Historical catch since implementation of the minimum legal size in 1976 has ranged from 0.2 to 0.8 million pounds. The fishery was closed from 1989 through 1991 due to depressed stock conditions. Vessel effort, only available since 1981, has ranged from 7 to 25 boats (Appendix A).

The regulatory season for the entire management area is from January 15 through March 31. The season may be terminated earlier by emergency order. The opening date of January 15 was first implemented in 1987. From the periods 1983 to 1986 and 1972 to 1974 the season opening was November 1. From 1974 to 1983 it was

December 1. In the Southern and Kamishak/Barren Islands Districts the emergency order is utilized to close the fishery once the guideline harvest level is achieved. The Outer and Eastern Districts close either based on decline in catch per unit of effort (CPUE) or by regulation on March 31.

The Department has been tagging Tanner crabs for the past four years in the Southern, Kamishak Bay and Barren Islands Districts. Thus far there has been no interchange of legal males between the Southern District and the Kamishak/Barren Islands; however, tag recovery has indicated the Kamishak Bay and Barren Islands Districts Tanner crabs are one stock. Furthermore the legal males tagged in these two districts have been captured in Kodiak's North Mainland Section, but only on a regular basis as far south as Douglas Reef, which is approximately 5 miles south of Cape Douglas (Figure 1).

Regulations distinctive to the Cook Inlet commercial Tanner crab fishery are:

- 1) Superexclusive registration.
- 2) Registration prior to the season opening.
- 3) Gear storage in the Kamishak and Southern Districts in 15 fathoms or less, except in the eastern portion of the Southern District where it is 10 fathoms or less.
- 4) A 75 pot limit in the Southern District if the guideline harvest level is greater than 800,000 pounds. A 40 pot limit if it is less.
- 5) Buoy identification tags are required in the Southern District to assist with the pot limit enforcement.

- 6) A requirement for two 4 3/4 inch escape rings on all gear.

1991 Season Summary

The Southern, Kamishak Bay and Barren Islands Districts were opened to commercial fishing in 1991. The Central, Outer and Eastern Districts remain closed. The total catch was 537,485 pounds, including 2,540 pounds of deadloss, taken by 71 vessels.

Southern District

The 1991 season harvest for the Southern District was 271,379 pounds including 125 pounds of deadloss. The crabs were taken by 68 vessels which made 128 landings. The average size of participating vessels was 41 feet with a range of 20 to 76 feet. Thirty vessels were tanked and 38 were dry. The fishery was executed in two 12 hour periods, 0900 to 2100 January 19 and 23.

Overall catch per unit of effort was 21.7 legal males per pot. Mean soak time was 5.5 hours. The average weight of the crabs was 2.56 pounds and the average width was 156.3 mm (6.15 in.) (Table 2). True recruits comprised 37 percent of the catch.

The 1991 commercial season in the Southern District was unique from previous fisheries in three ways:

- 1) There was a 40 pot limit with an accompanying buoy tag requirement.
- 2) Ambient air temperature was a determining factor for the opening of the fishery.
- 3) The length of the season was set prior to the opening.

Although a pot limit for the Southern District had previously been in place, the 1991 season was the first time that buoy tags were required. A series of 40 tags unique to each vessel were issued at the time of registration. A fee sufficient to recover the cost of the tags was charged to each registrant. Although there were a few reported problems with adhering the tags to the buoys, Fish and Wildlife Protection officers, who patrolled the fishing grounds aboard the State Vessel Pandalus, felt compliance with the pot limit was excellent due primarily to the buoy tags.

Justification for opening of the fishery based on air temperature was a result of research completed by National Marine Fisheries Service (NMFS) (Carls and O'Clair, 1989). This work showed that as temperature declined, related damage to Tanner crabs increased. Utilizing wind chill charts and weather forecasts provided by the National Weather Service, a harvest of Tanner crab can occur within a temperature regime that would minimize the damage to sublegal and female Tanners that are sorted from the legal male catch. The NMFS data were extrapolated to fit the real weather and fishing conditions in the Southern District. This resulted in a determination of minimum temperature and wind conditions under which the season would be opened, which was 15 degrees Fahrenheit with a wind speed of 0 to 10 knots.

The length of the season was set prior to the opening in order to avoid overharvest. Previously the department had used inseason fishery performance data, such as catch per unit of effort, to determine the closure. Due to the increase in effort and the reduction in harvestable crabs, the resource had often been overfished by the time the staff collected the cpue data and implemented the closure. With an enforceable pot limit and a registration deadline, effort can be anticipated and the rate of harvest estimated, therefore allowing for the determination of season length prior to the actual fishery.

Cold temperature conditions resulted in a delay of the season opening until January 19, 1991. The season opened by emergency order for a twelve hour period. Buoy tags had been issued to 75 vessels. There was one additional registrant for ring nets. Of the 75 registered vessels, 41 had dry holds while 34 were tanked. Based on the potential for a 75 vessel, 40 pot per vessel fishery, the department estimated that the preseason guideline of 250,000 pounds would be harvested in an 18 to 24 hour period.

The season length was reduced to 12 hours due to a lack of processing capacity. The department was notified of this problem on January 11, 1991. The only processor intending to buy Southern District crabs concluded that they could not take the entire guideline within a time period that would preclude deadloss on the untanked boats waiting to deliver. The season was therefore shortened to avoid a waste of crabs resulting from deadloss.

The fishery opened by emergency order at 0900 January 19 and closed via the same emergency order at 2100 January 19. This particular time period was chosen to take advantage of both available daylight and tides. The department estimated that 50 to 60 percent of the harvest would be taken in the 12 hour period. Subsequently an unforeseen change in the weather, which resulted in wind gusts exceeding 60 mph, curtailed the effective fishing time of the majority of the fleet. Although some of the larger tanked vessels fished for the entire period, most of the boats quit fishing prior to the closure. Air temperatures remained between 30 and 40 degrees F, thus there was no temperature induced damage to female and sublegal crabs.

The catch for the January 19 fishery was 100,991 pounds taken by 50 vessels. An additional 12 vessels set gear, but did not deliver any crabs due to either breakdown or weather. Catch per unit of effort averaged 24.7 legal males per pot with an mean soak time of 5.4 hours.

The second opening took place January 23 from 0900 to 2100 hours. The guideline harvest level was 150,000 pounds, which was the remainder of the original 250,000 pound quota. The fishery was postponed until January 23 due both to temperature considerations and the delay in gear removal from the first opening.

Weather conditions were perfect for both the crabs and fishermen during the second season. The catch was 170,388 pounds harvested by 66 boats and one ring netter who fished from a pot vessel. Catch per unit of effort averaged 21.2 legal males per pot with a mean soak time of 5.6 hours.

Kamishak Bay and Barren Islands Districts

The season opened in the Kamishak Bay and Barren Islands Districts by regulation on January 15, 1991 and closed by emergency order on March 4, 1991. The pre-season guideline harvest level was 250,000 pounds. The final catch was 266,106 pounds harvested by eight vessels. Overall catch per unit of effort was 21.6 legal males per pot (Table 2). Registered lengths of the eight participating vessels ranged from 50 to 78 feet with an average of 63 feet.

Prior to the end of the season, as the guideline harvest level was approaching, fishermen voluntarily radioed their daily catch to the department using individual code sheets. This method allowed the staff to obtain real time catch and catch per unit of effort data thereby reducing the guesswork in estimating the time it would take the fleet to achieve the guideline harvest. Fishermen further agreed to a 2 day notification of the closure, which was a significant reduction from the normal 7 day warning.

Monthly catch per unit of effort for January, February and March were 22.5, 23.9 and 19.0, respectively. The 19.0 cpue for March reflects the last week of the fishery since the season closed on

March 4. The average weight of delivered crabs was 2.10 pounds with an average width of 145.8 mm (5.74 in.). True recruits comprised 16 percent of the catch. Skipmolts in the recruit size class (140 - 165 mm) accounted for 83 percent of the crabs.

All the crabs were captured from the waters east and southeast of Augustine Island extending northward toward Chinitna Point. There was no effort around Cape Douglas as this area is characterized by deeper waters, poorer weather and more severe tidal action therefore making it difficult to fish for the size class of vessels that were participating in the fishery.

During the month of February, a reduction in fishing time resulted from unusually early ice floe movement originating from upper Cook Inlet and the shallower inshore waters of western and northern Kamishak Bay itself. Due to the ice movement through and near the pots, fishermen were forced to move their gear out of the ice for extended periods of time. Coincidental to moving their pots out of the ice, they moved them out of the crabs. The 1991 season was extended for at least two weeks by pot logistic problems resulting from ice movement. Gear loss was minimal as the fleet numbered five vessels at the time, all of whom responsibly worked with one another to eliminate gear loss as well as find pots drug off by the ice.

Outer, Eastern and Central Districts

The Central, Outer and Eastern Districts were closed to commercial fishing in 1991. The department does not survey the Outer, Eastern and Central Districts; however, adjacent districts were assessed. These districts, Western in the Prince William Sound Management Area and the northeastern portion of the Kodiak Management Area, both exhibited depressed Tanner crab stocks. The aforementioned,

coupled with the historical decline in commercial harvest from the Outer and Eastern Districts, indicate continued low stock abundance.

1992 SEASON MANAGEMENT OUTLOOK

Southern District

The department will conduct both pot and trawl surveys for Tanner crabs in 1991. Review of the 1990 trawl survey data indicates a potential for increased recruitment in 1991 (Figure 4). The true

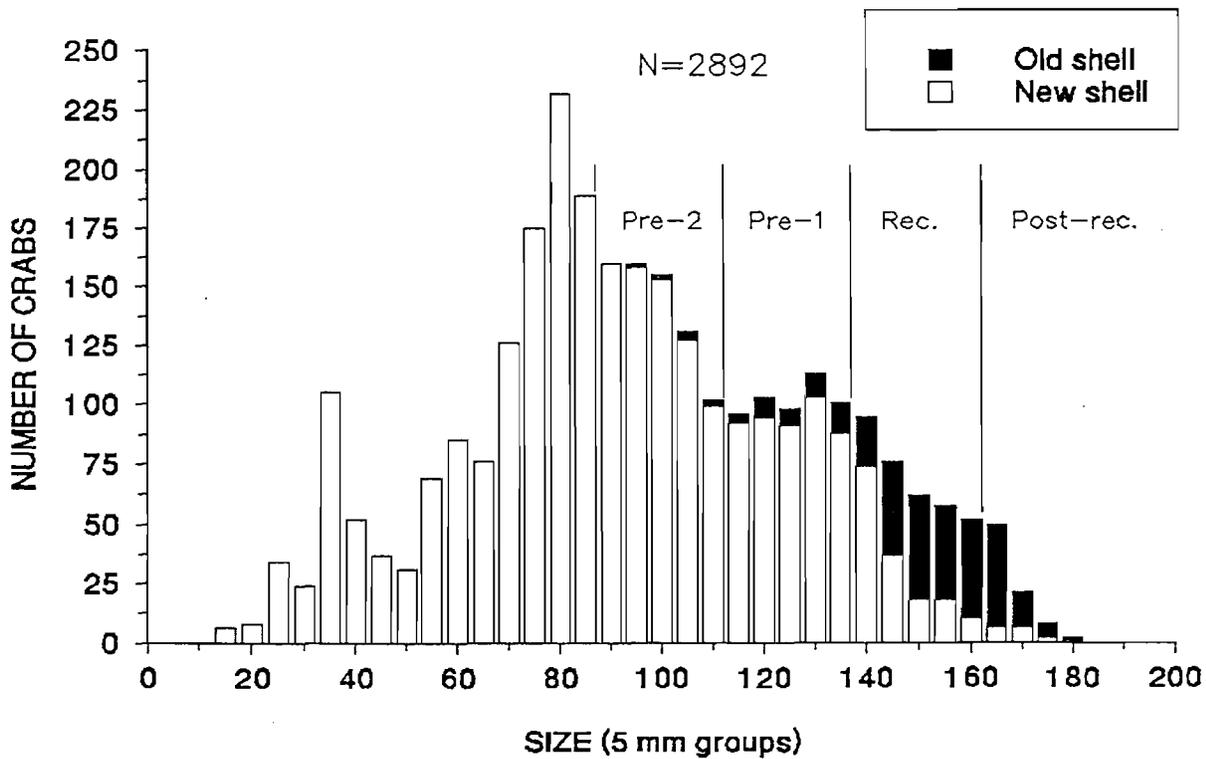


Figure 4. Male Tanner crab size frequency, Southern District, 1990 Cook Inlet trawl survey.

prerecruit one population estimate in 1990 was 400,000 crabs. Survival between the prerecruit one and recruit age classes, however, cannot be calculated at this time. Furthermore, although

survival of legal crabs from the 1991 fishery was estimated to be 70 percent, or approximately 250,000 males, a significant portion of these crabs may not live until the 1992 season since they are very old shells and therefore more prone to natural mortality resulting from old age. Consequently the inability to estimate both the survival at recruitment and old age precludes a statistical estimate of the crabs available for the 1992 season. Experience, however, suggests a sufficient abundance to at least allow limited sport, personal use and commercial fisheries in 1991 and 1992.

Kamishak and Barren Islands Districts

These two districts will also be surveyed in 1991 with both pots and trawls. The number of true (new shell) prerecruit ones identified by the 1990 trawl survey will likely result in poor recruitment in 1991 (Figure 5). The Department, however, reduced

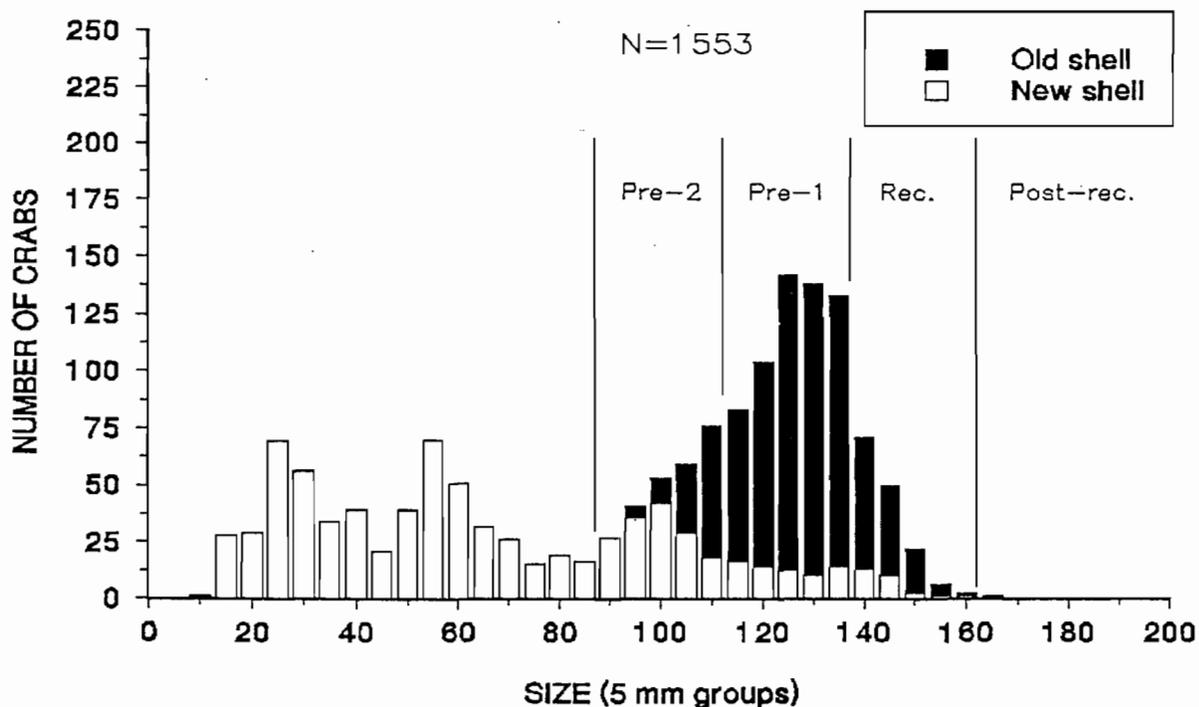


Figure 5. Male Tanner crab size frequency, Kamishak District, 1990 Cook Inlet trawl survey.

fishing mortality in the 1991 fishery, allowing for a greater percentage of potential post recruits for the 1992 harvest. The 1992 season, therefore, will be determined by two events that cannot yet be precisely quantified: 1) the apparent potential for poor recruitment in 1991, and 2) survival of those legal males which were not caught during the 1991 season (post recruits). The problem is further exacerbated since 84 percent of the legal males that survived the 1991 fishery were skipmolts; therefore, there is likelihood that natural mortality due to old age may take a significant number of these post recruits prior to the 1992 season.

The skipmolting phenomenon at smaller sizes also accounts for the smaller average weights and sizes of the legal crabs harvested in the 1991 fishery. For example the average size and weight of the crabs taken in the 1991 fishery were 146 mm (5.74 in.) and 2.10 pounds per crab. For comparative purposes, the average size and weight of the commercially harvested crabs from the 1991 Southern District fishery were 156 mm (6.15 in.) and 2.56 pounds (Appendix B).

Outer, Eastern and Central Districts

The Department does not conduct stock assessment surveys in the Outer, Eastern and Central Districts. As this stock has been on a long, steady decline, there is no reason to expect a miraculous recovery. There has not been a fishery in these districts since 1988. It may be prudent to execute a time limited commercial harvest in 1992 in order to gain much needed stock composition information via the commercial fleet. For example, a season of 30 days duration would allow the fishermen to fish the various bays on the outer Kenai coast that once had commercial quantities of Tanner crabs. Dockside sampling of these catches coupled with thorough fishermen interviews appears to be the only likely method by which the department can collect stock status information.

Summary

In summation, there is a reasonable prospect for a limited fishery in each of the districts in the Cook Inlet Management Area. Recruitment will improve only in the Southern District. The bulk of the harvest in the management area will therefore come from post recruits that have either survived previous fisheries, or recruited during closed seasons.

KING CRAB FISHERY

Introduction

There are two species of king crab found in the Cook Inlet Management Area (H), red and brown. Red is the dominant species with brown found only in a scattered distribution in the outer Gulf of Alaska. Most of the red king crab fishery has occurred either in the Southern District or the Kamishak/Barren Islands Districts. Very little catch has come from the Outer District and none has been documented from the Eastern District (Figure 1).

Earliest recorded commercial landings of king crab occurred in 1937 when crabs were canned at a Halibut Cove packing facility. Commercial fishing for this species remained at a relatively low level through the 1940's. By the mid-1950's harvest levels rose to approximately 2 million pounds per year. During the 1960's fishing expanded to the Kamishak Bay District and boats were harvesting up to 8 million pounds per year. During 1964-65 a significant drop in catch occurred in the Kamishak District primarily due to lack of processing facilities in the Seldovia area which was a result of earthquake damage in 1964. From the late 1960's through 1976 the seasonal catches ranged from 2.5 to 4.8 million pounds. Since that time catches have generally declined (Figure 6 and Appendix C).

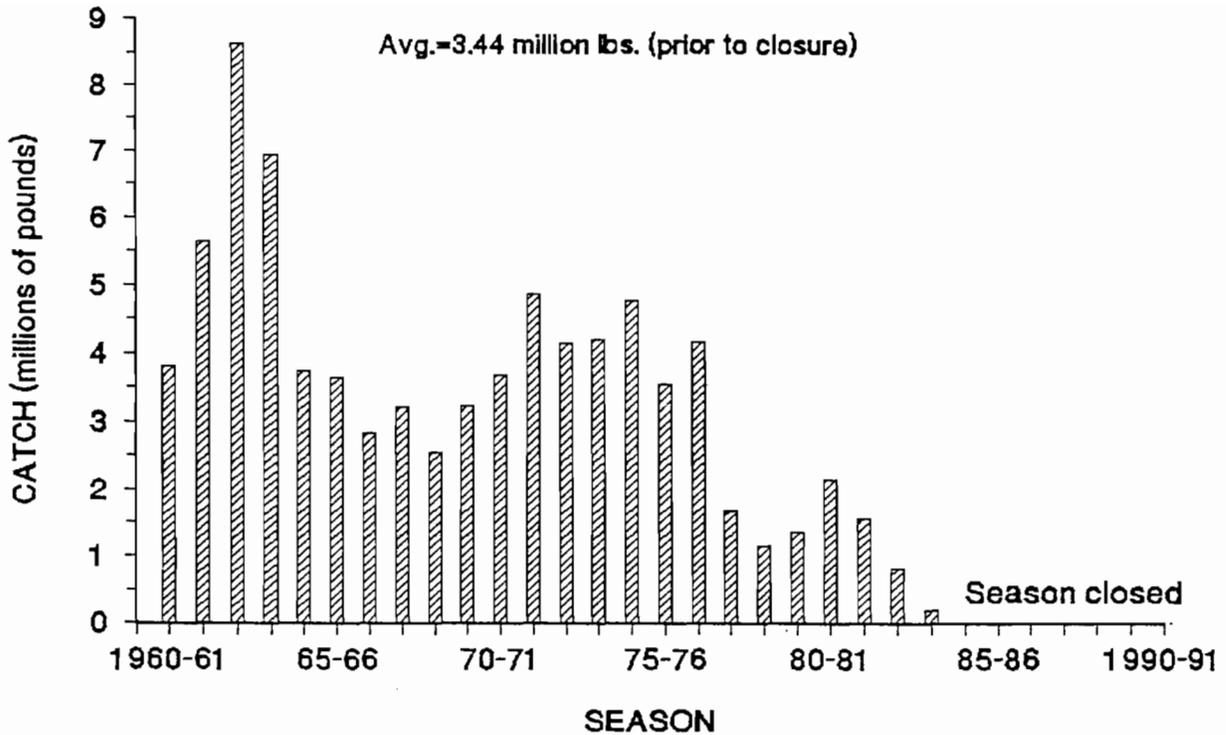


Figure 6. King crab catch by season, Cook Inlet Management Area, 1960-90.

The commercial fishery has been closed due to low abundance since the 1981-82 season in the Southern District and the 1983-84 season in the Kamishak/Barren Islands Districts.

The current season opens by regulation on August 1. From 1983 to 1987 the season opening date was July 15. Prior to 1983 the season opened on August 1.

The minimum legal size for all species of king crab is seven inches in carapace width with a provision for an eight inch season. The eight inch season, which may be opened and closed by emergency order, has been in effect since 1976. It was used during the 1976-77 season in all districts and during the 1977-78 season in the Kamishak/Barren Islands Districts only. The seven inch minimum legal size has been in effect since 1963.

Cook Inlet is a superexclusive registration area for king crab. The current pot limit is 75 if the management area guideline harvest level is greater than 1.5 million pounds. If the guideline is less than 1.5 million, then the pot limit is 40. Similar to the Tanner crab fishery, there is a buoy tag requirement accompanying the pot limit.

1990 Season Summary

Southern District

No king crab harvest has been allowed in the Southern District since the 1981-82 season. Extreme low abundance as well as heavy infestation of egg predators in the female clutches necessitated maximum protection of the stock. Although the incidence of egg parasitism seems to have abated, the overall measurable abundance of king crabs remains very low.

The 1990 survey indicated that the aggregation of large males off Barabara Point still exists. Excluding the Barabara Point catch, however, the department pot index averaged 0.5 legal males per pot for the remaining 19 stations. Further evidence of the depressed condition of the Southern District king crab stock was illustrated by the historical low catches of 10 females and 19 sublegal males.

The king crab catch from the trawl survey totalled six animals, four males and two females. This compares to 4,400 Tanner crabs captured. Given that the trawl survey is a new stock assessment tool, and that the aggregating nature of king crab may not lend itself to measurement by trawl surveys when the stocks are small, the trawl catch nevertheless indicated that the stock is not large.

None of the aforementioned data justify commercial harvest of the king crabs, even with an 8 inch minimum size designed to harvest

older post recruits. If an 8 inch season was biologically justifiable, that is, a portion of the 8 inch crabs were excess to the reproductive stock, the damage and mortality inflicted by handling the sublegal males and females by a directed king crab fishery could not be tolerated by this depressed stock.

Kamishak Bay and Barren Islands Districts

The Kamishak/Barren Islands Districts were first closed to commercial fishing due to low abundance prior to the 1984-85 season. The commercial fishery has remained closed through 1990.

Department pot index data continue to indicate an increase in large old post recruit males. Recruitment, however, is not improving. Although the overall numbers of males and females remain low, the distribution of the crabs, as identified by the pot survey is improving. This is a result of the increased catch of post recruits.

The 1990 trawl survey catch of king crabs appears to indicate a stock as depressed as that of the Southern District. The disparity between the numbers documented by the pot index versus the trawl survey seems large. The trawl survey, however, occurs in late July, at a time after the major portion of the king crab stock has emmigrated from the the Kamishak and Barren Islands Districts. The pot surveys occur in mid June just prior to the migration. The king crab movement has been documented by commercial fishermen, early department pot surveys and a department tag and recapture study conducted in the 1960's. The crabs return sometime in the fall or early winter. They are caught as a by-catch to the commercial Tanner crab fishery.

Poor recruitment, coupled with continuing low numbers of sublegals and females, did not justify a directed commercial fishery after the regulatory opening of August 1, 1990. The fishery remained closed via emergency order.

Outer and Eastern Districts

Regulatory fishing for brown king crab was permitted coincidentally to the Tanner crab season in the Outer and Eastern Districts in 1988. No fishing occurred due to lack of abundance of this species. Brown king crab have never been found in high concentrations. In 1990 the Tanner season was not opened; therefore, by regulation, a brown king crab season could not be permitted.

1991 SEASON MANAGEMENT OUTLOOK

Southern District

The department will conduct its annual Southern District king and Tanner crab survey in June and July of 1991. The pot index will occur in June and the trawl survey in July. It is doubtful that the results from this assessment will indicate any significant increase in the legal segment of the stock, thereby justifying opening of the commercial, sport and personal use fisheries.

Kamishak Bay and Barren Islands Districts

The number of prerecruit ones caught in recent surveys does not indicate that this size class will provide the recruitment necessary to justify opening the commercial fishery on August 1, 1991. The Department will conduct the 1991 survey in June with

pots and again in July with a trawl. The June pot survey is the traditional survey with respect to gear and timing. All king and Tanner crab surveys in the Cook Inlet Management Area are in a transitional period from pots to trawls. This will necessitate dual pot and trawl surveys until the staff is satisfied that the trawl survey is capable of sampling both king and Tanner crabs in the management area.

In order to fully utilize the trawl survey to assess king crabs in the Kamishak and Barren Islands Districts, the survey will have to be conducted while the crabs are catchable, i.e., they are somewhere in the survey area, or they are in a sufficiently hardshell condition to minimize damage to individual crabs caused by the trawl. Thus far it appears that the crabs are too soft to capture with a trawl in mid June, and they have migrated out of the survey area by late July. A few more years of comparative data should allow the department the information necessary to solve this apparent dilemma. In the interim, dual pot and trawl surveys will continue.

The increase in post recruits has not escaped the attention of the commercial fishermen who participate in the Tanner crab fishery during the months of January and February. King crabs are caught incidentally to the directed harvest of Tanner crabs. These fishermen have requested that the department consider an 8 inch (post recruit) season for king crabs coincidental to the commercial Tanner crab fishery. They justify the harvest as follows:

- 1) Their observed incidental catch of large old king crabs has increased annually.
- 2) The king crabs are caught while fishing for Tanners, therefore effort will not be directed solely at king crabs.

- 3) King crabs are in the best condition for handling during the winter months.
- 4) A conservative guideline harvest can be set based on a percentage of the 1992 Tanner crab guideline, perhaps in the magnitude of 10 to 20 percent. Individual vessels may not exceed this percentage of king crab bycatch for each delivery.

An 8 inch king crab season opened by emergency order is already permissible via the regulations. It is not clear if the harvest guideline may be set as a bycatch of the directed commercial Tanner crab fishery. Although department pot surveys indicate an increase of larger older post recruit males, these same surveys cannot demonstrate that these males are excess to the reproductive needs of the stock. In fact, preliminary data from the Institute of Marine Science, Seward, indicate that large males are equally important to the reproductive stock as the smaller mature males. There is some evidence that old males near senescence are no longer capable of producing viable sperm. Positive external identification of these animals would be impossible for anyone, including commercial fishermen. It therefore seems apparent that harvest of eight inch males would not be prudent, considering the overall existing stock condition.

Outer and Eastern Districts

These districts will remain closed to the harvest of red king crabs until the overall stock in the remainder of the Cook Inlet Management Area recovers. Permits for brown king crab will be issued only if the Tanner crab season is opened.

Summary

The condition of the red king crab stock in the Southern District is severely depressed. Although the fecundity of the females is improving, the overall number of catchable crabs is at a historical low. It does not appear that a commercial, sport or personal use fishery is likely to occur at least for another three or four years, or more.

The buildup of post recruits in the Kamishak District does not by itself justify a commercial harvest of these animals whether it is limited or not. Available data indicate that these older, large males are essential in maintaining the highest possible reproductive capacity. This is essential to rebuilding the stock.

DUNGENESS CRAB FISHERY

Introduction

The majority of the commercial, sport and personal use Dungeness crab fishing in Cook Inlet has occurred in the Southern District (Figure 1), which includes Kachemak Bay. During the 1960's and early 70's commercial catch and effort were usually not a result of resource abundance. The harvest instead was a function of market conditions created by fluctuation in the catches from the west coast Dungeness crab fisheries. Catch and effort increased significantly in 1978 to 1.2 million pounds taken by 49 vessels. Subsequently, favorable market conditions and the need of fishermen to find alternative fisheries have kept effort high. Since 1978 annual harvests have ranged from a low of 29,502 pounds in 1990 to a high of 2.1 million pounds in 1979. The average annual harvest since 1978 was 1.01 million pounds (Figure 7). Effort has ranged from 23 vessels in 1990 to 108 vessels in 1982 (Appendix Table 4).

Since 1979, 92 percent of the crabs have been harvested between the months of June and October (Figure 8).

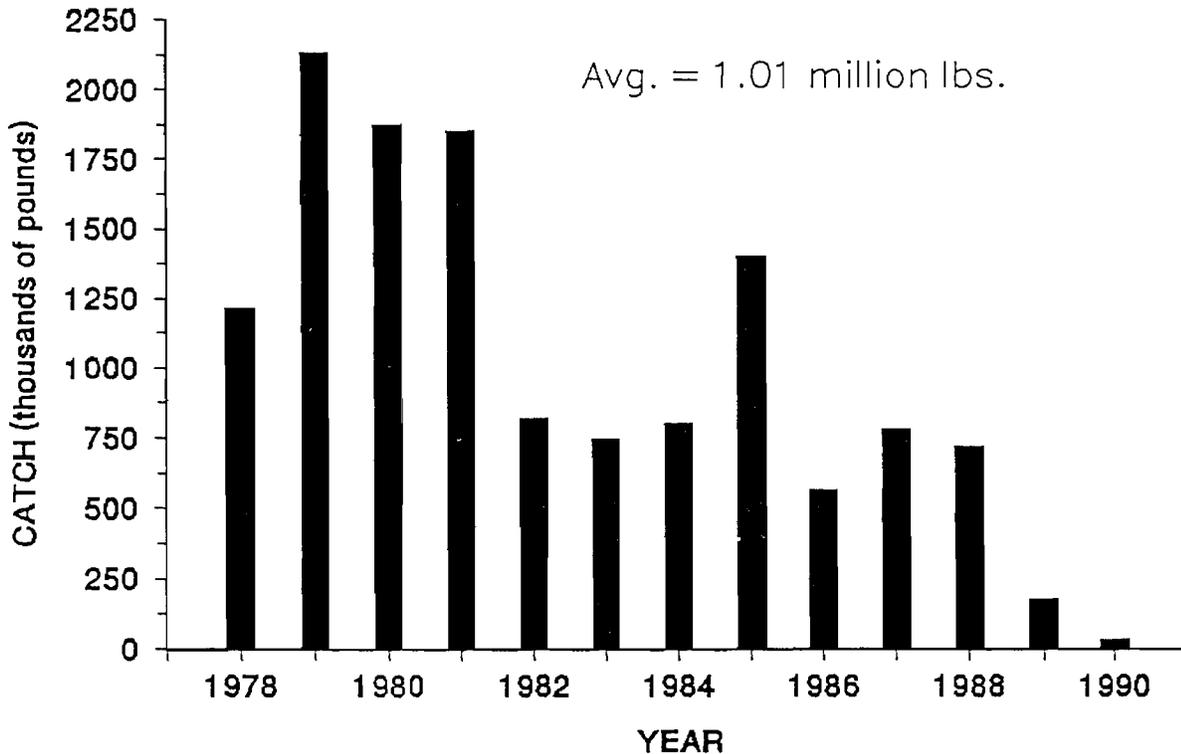


Figure 7. Dungeness crab catch by year, Cook Inlet Management Area, 1978-90.

Biological regulations for the commercial Dungeness fishery consist of a males only harvest and a minimum carapace width of 6.5 inches (165 mm). Regulations that are specific to the Cook Inlet management area are as follows:

- 1) A two part regulatory season for the Southern District which opens the water east of Homer Spit by emergency order on or after June 1 and closes no later than November 1, and opens the water west of Homer Spit on June 1 and closes no late than November 1. The opening east of Homer Spit is contingent on department test fishing data indicating that the molt of adult crabs is over. This regulation was adopted by the Board of Fisheries in 1990.

- 2) Closure of Southern District waters in depths of 10 fathoms or less from January 15 through April 30. This regulation is irrelevant due to the adoption of the previous regulation.
- 3) A regulation adopted by the Board of Fisheries in 1986 that closed entire Area H to Dungeness fishing during the 15 day period prior to the opening of the Tanner season, allowing for the removal of delinquent gear and a fair start for the Tanner crab fishery.
- 4) A 150 pot limit in the Southern District.
- 5) A gear regulation that requires consecutive numbering of all buoys.

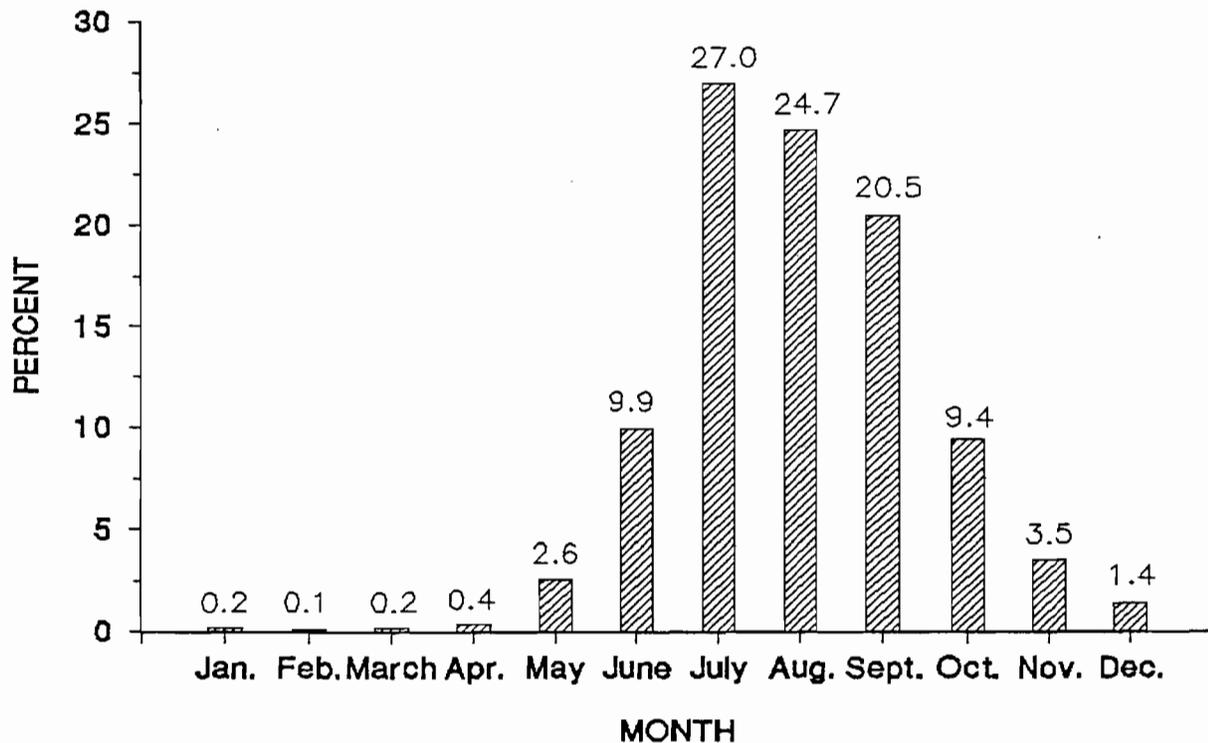


Figure 8. Dungeness crab harvest (percent) by month, Cook Inlet Management Area, 1979-1989.

Historically some level of fishing occurred throughout the year. Effort, however, increased significantly after the major molt, which provided new recruit crabs. The peak molting time for adult males in Kachemak Bay can occur from late April through mid-September in any given year. In some years the molt may occur in May and June, in others in June and July, and in still others from July to September. The molt is stimulated by water temperature and physiological condition of the crab. The inconsistency in molt timing between years is partially explained by the significant annual spring-summer temperature variation in the shallower north temperate and sub-arctic waters of Alaska.

Within Kachemak Bay itself, molting generally occurs somewhat earlier in the waters east of Homer Spit than in the waters west of the Spit, where the influence of Cook Inlet proper is much greater. Newly molted legal crabs are often caught east of Homer Spit one month or more before appearing in the gear west of the Spit. Crabs east of Homer Spit are most likely resident from the first post-larval instar up to legal size. Those legal crabs captured west of the Spit, however, may actually be reared as juveniles in the waters of Cook Inlet north of Anchor Point. Catches of small crabs by upper Cook Inlet salmon set netters and casual observations of molted exoskeletons from the general public indicate significant numbers of Dungeness reside in upper Cook Inlet.

Ninety percent or more of the Dungeness fleet are residents of Kachemak Bay communities of Homer and Seldovia. The fishing vessels are in the 40 foot size class and smaller. Smaller vessels without circulating tanks generally fish the waters east of Homer Spit while larger vessels with circulating tanks fish the deeper somewhat rougher waters west of the Spit.

Two major problems have had significant negative impact on this fishery:

- 1) Depression of the stock due to handling and trapping mortality which was the result of fishing during and immediately after the molting period.
- 2) Violation of the 150 pot limit by a portion of the fleet.

Fishing during and immediately after the major molting period for adult males has played a significant part in the recent sharp decline in the Dungeness crab harvest (Figure 8). Mortalities associated with handling and trapping may not have been significant during the 1960's and early 70's when effort levels were low and stock abundance was high; however, since then the level of fishing has accelerated not only in amount of vessels and pots, but also in the amount of time each year that the gear is deployed.

In addition to the recruitment event, the Cook Inlet Dungeness fishery has evolved into a summer fishery for the following reasons:

- 1) Salmon fishermen are occupied with salmon fishing, thus creating a niche for fishermen who do not hold permits for limited entry fisheries.
- 2) The weather is better.
- 3) The catcher/seller sales to the tourist industry are at their peak.

1990 Season Summary

The 1990 fishery was managed via the relatively conservative season regulation adopted by the Board of Fisheries in March 1990. The new season dates were based on an attempt to avoid fishing during the major molting period of the catchable crabs.

The total 1990 Dungeness crab harvest for the entire Cook Inlet Management Area was 29,502 pounds taken by 23 vessels (Table 3). Catch in the Southern District was 28,938 pounds by 23 vessels, while the remaining 564 pounds were harvested in the Central District by one boat. The total catch was taken between June and September (Table 4).

After two softshell test fishing periods, one in late May and the other in late June, the waters east of Homer Spit were opened by emergency order on June 29, 1990. The season in these waters subsequently closed by emergency order on August 8. West of Homer Spit the fishery opened by regulation on June 1. The fishery closed by emergency order in the entire Cook Inlet Management Area on September 7, 1990.

The catch east of Homer Spit was 10,495 pounds taken by 18 vessels. Catch per unit of effort averaged 0.69 crabs per pot. The average weight of the crabs was 1.89 pounds.

The harvest west of Homer Spit was 18,433 pounds caught by 10 boats. Catch per unit of effort averaged 1.56 crabs per pot. The average weight of the crabs was 2.17 pounds.

Two processors and 15 catcher/sellers purchased or sold crabs in 1990. Ex-vessel prices varied considerably due to the catcher/sellers. In general the price per pound was approximately \$1.70.

No dockside sample data were collected; therefore, average size and age structure information are not available.

1991 Management Outlook

Based on the decline of the Dungeness crab stock in the Southern District (Kachemak Bay), there is a very limited probability of a commercial Dungeness crab fishery in 1991. The goal of the closure will be to re-establish an abundance of adult crabs which will not only enhance the reproductive capabilities of the stock but also once again provide for quantity and quality in the commercial, sport and personal use fisheries.

The department will charter a commercial fishing vessel to conduct test fishing in both the waters east and west of Homer Spit to determine molt timing, female reproductive condition and a relative index of abundance. The test fishing will begin in early June and extend on a monthly basis through early September.

Emergency orders will be issued in late May canceling the openings for all types of Dungeness fisheries in the Southern District that normally open by regulation in June. The department/industry test fishing in part is designed to identify recruitment into both the adult and legal segments of the stock. If an unexpectedly significant number of crabs appear throughout the gear, a limited opening of all fisheries will be evaluated.

The department is aware of an identifiable year class of adult Dungeness crabs which were observed by fishermen during the fall 1990 sport/personal use Tanner crab fishery. This is a single cohort of Dungeness which has molted in August for the past two years, 1989 and 1990. This group of animals is prominent because it is the sole catchable year class of any significant abundance available. These crabs are the only known functionally mature

Dungeness crabs in the Southern District, if not the entire management area. Inflicting any level of fishing mortality on these animals would diminish the recuperative potential of the stock.

The commercial season in the remaining districts of the management area will be open in 1991. The only district likely to see any effort is the Central District which is north of the Southern District in central Cook Inlet. Although there are crabs resident at least part of the year in this area, fishing effort has been light as it is a difficult place to retrieve gear due to the tidal action and nature of the general outflow of Cook Inlet. Extreme siltation tends to cause gear to become imbedded in the bottom therefore making it impossible to recover pots. Only those few areas out of the extreme water flow are fishable.

AREA H TRAWL SHRIMP FISHERY

Introduction

Cook Inlet is separated into two shrimp registration areas: Area H, which includes the Southern, Kamishak, and Barren Islands Districts; and Area G, which includes the Outer and Eastern Districts (Figure 2). Historically the primary trawl shrimp fishery has occurred in the Southern District of Area H.

The Area H trawl shrimp fishery has occurred within Kachemak Bay and is characterized by superexclusive registration and definitive management under the Kachemak Bay Trawl Shrimp Management Plan. This plan has three basic features:

- 1) An annual guideline harvest level determined from stock assessment surveys.

- 2) Annual harvest spread out over the entire fishing season utilizing three separate regulatory sub-seasons.
- 3) Sub-season harvest spread out by having equal weekly guideline harvests.

Such characteristics allow practical use of fishery performance as an in-season management tool and maximize monitoring of the shrimp stock status throughout the year in an attempt to avoid overfishing. Also, two areas closed to trawl shrimp fishing are maintained throughout the year (Figure 9): the first includes the majority of upper Kachemak Bay east of Homer Spit, originally established because this area consistently contained small, juvenile pink shrimp; the second includes Tutka Bay and Sadie Cove, established because the staff felt the small area encompassed by these bays lent itself to the potential of overharvest.

Commercial trawl shrimp harvests in Kachemak Bay reached the five million pound level in the late 1960's and remained near that level through the early 1980's (Figure 10, Appendix E). Low stock abundance resulted in partial closures of the fishery during the mid-1980's and total closure beginning in the fall of 1986. Effort has varied from a low of one vessel during 1968 to a high of 23 in 1981. Prior to 1983, most commercial harvest and effort occurred west of Homer Spit, but between 1983 and 1986 virtually all effort shifted to the area east of the Homer Spit.

Pink shrimp (Pandalus borealis) historically made up the bulk of the commercial catch, with sidestripes (Pandalopsis dispar) seasonally making up a lower but often significant portion of the catch. Humpy shrimp (Pandalus goniurus) have at times comprised up to half of the harvest, but this species appears to undergo erratic population fluctuations and their contributions to the most recent fisheries have been negligible. Coonstripe shrimp (P. hypsinotus) consistently made up less than five percent of the catch.

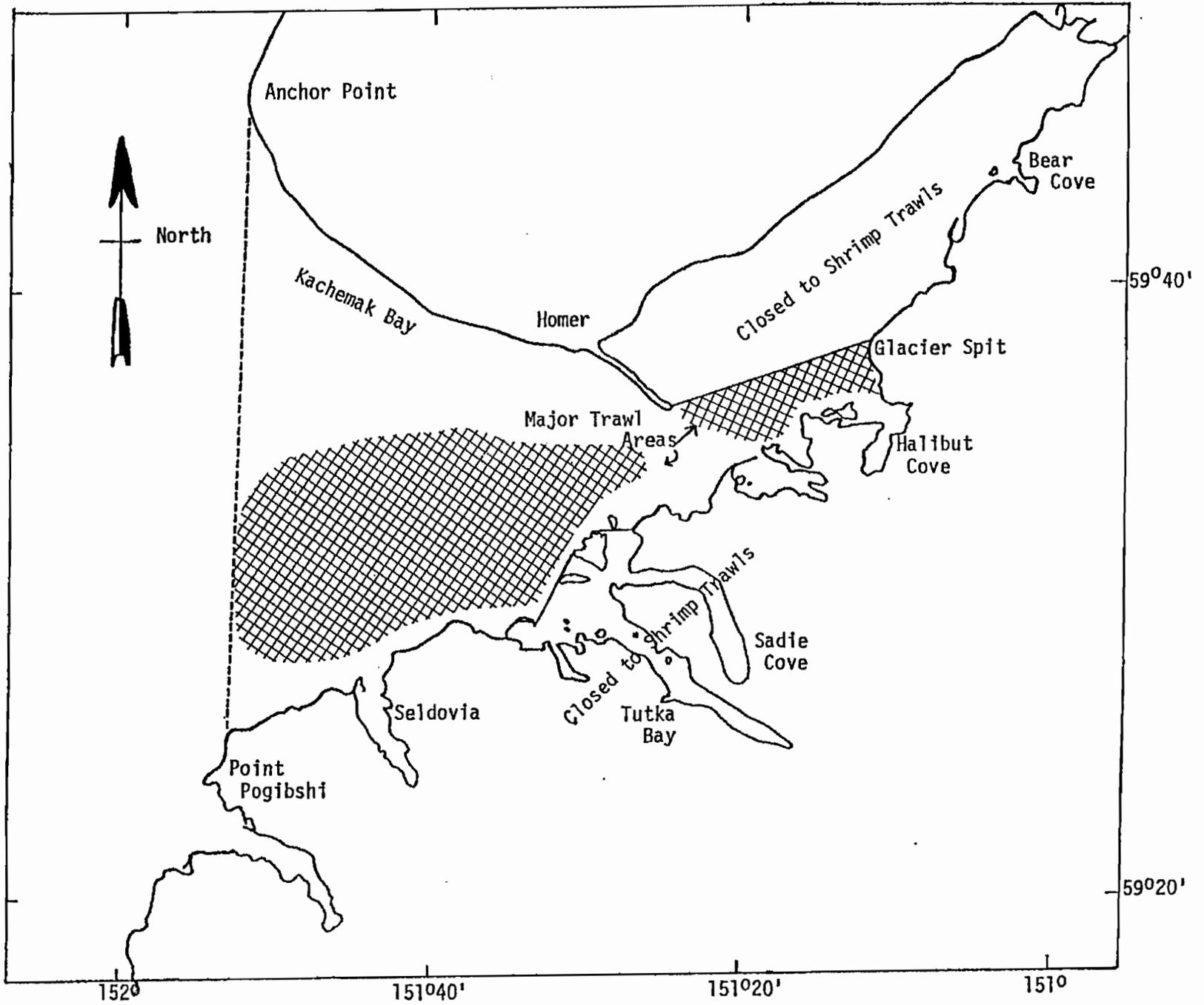


Figure 9. Location of commercial shrimp trawling in Kachemak Bay.

Kachemak Bay Commercial Trawl Shrimp

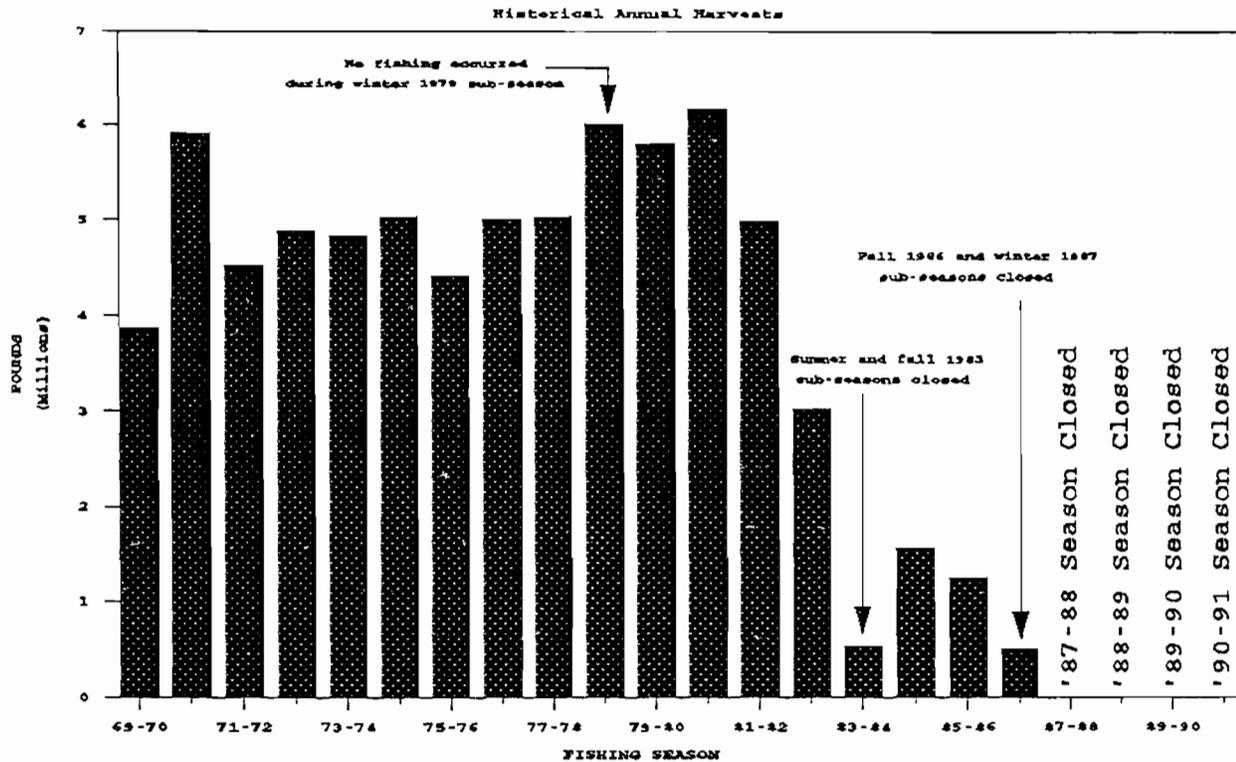


Figure 10. Commercial harvests from the trawl shrimp fishery, Area H of the Cook Inlet Management Area, 1969-90.

Trawl index of abundance surveys have been conducted in Kachemak Bay since 1971, with two yearly surveys (spring and fall) occurring since 1976. These surveys, which determine each season's guideline harvest level, have indicated significant declines in abundance and distribution of all Pandalid shrimp stocks in Kachemak Bay since the late 1970's (Figure 11, Appendix F). These declines led to the aforementioned commercial closures of the 1980's.

In an effort to obtain better and more accurate information on the shrimp stocks in Kachemak Bay, the index of abundance surveys were expanded in 1988 to include more sampling stations east of the Homer Spit. The Department felt the better coverage of that area, where the majority of shrimp are caught, could only enhance the Department's ability to make decisions regarding openings and closures. Because the new stations have only been in place for a relatively short time, these stations are not utilized in any of

the published calculations for estimates of abundance, but rather are used for comparative purposes at this time.

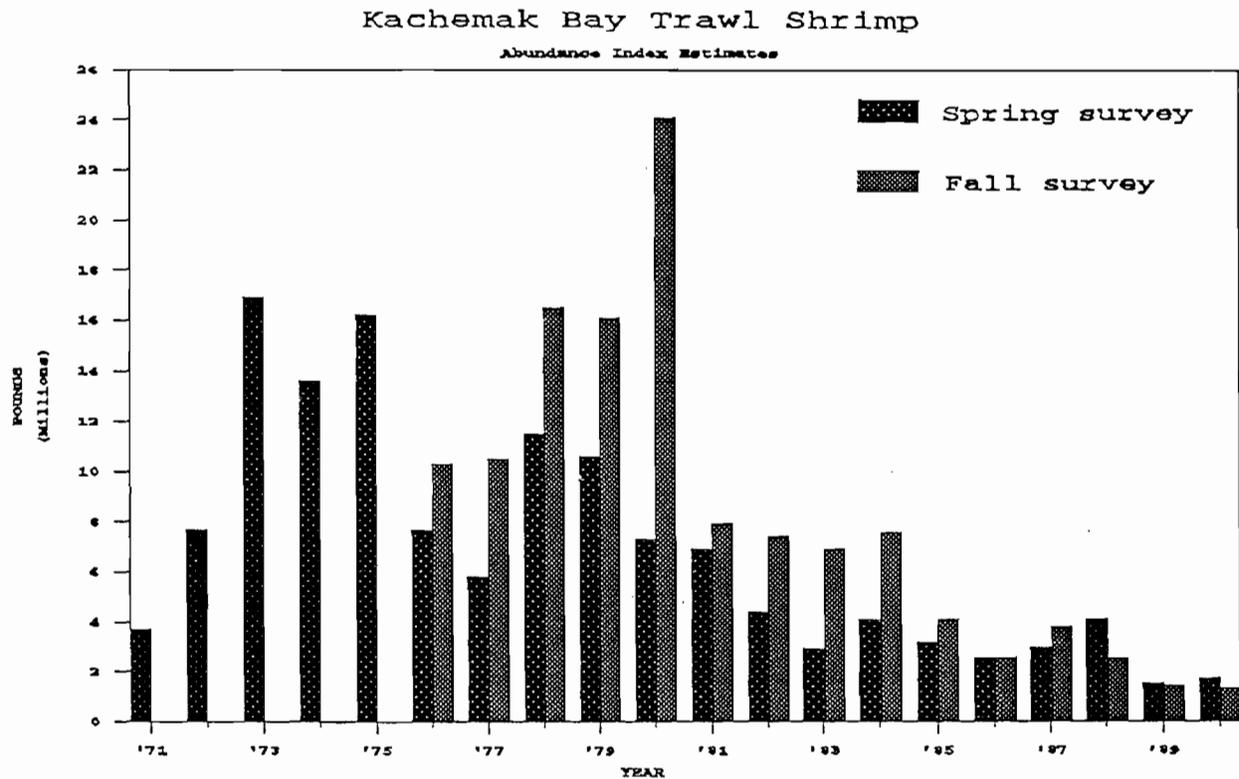


Figure 11. Trawl shrimp index of abundance estimates for commercial species of Pandalid shrimp in the Southern District (Kachemak Bay) of the Cook Inlet Management Area, 1972-90.

1990-91 Season Summary

The first Department survey of 1990 occurred during the month of May. Results of that survey indicated a slight increase in estimated abundance of shrimp in Kachemak Bay over both previous surveys, from 1.5 and 1.4 million pounds (spring and fall 1989, respectively) to 1.7 million pounds (Figure 11, Appendix F). As has been the case during recent years, the majority of shrimp caught during this survey came from the area north and east of Glacier Spit (commercially closed area). Count per pound (Appendix G) and length frequency data suggested that the pink shrimp from

this area were a mixture of females, males, and juveniles, contrary to recent surveys which indicated shrimp from this area were predominantly males and juveniles. West and south of Glacier Spit, catches of shrimp were minor improvements over recent surveys, with the majority of pink shrimp consisting of females and transitionals. West of Homer Spit, the overall geographic distribution of shrimp was similar to recent surveys, limited to a few stations north and northwest of Yukon Island, but total catches were once again very small. Abundance of fish was considered high in all areas sampled.

All information collected during this survey indicated that, despite some shift in size composition and distribution, the stocks remained depressed by historical standards. Therefore, the Department issued Emergency Order No. 2-S-H-06-90, closing the Kachemak Bay trawl shrimp fishery for the entire 1990-91 fishing season.

The fall survey of 1990 was conducted during late September and early October. Results of the survey yielded the lowest midpoint of the abundance estimate for traditional stations, 1.3 million pounds, ever recorded in the index program (Figure 11, Appendix F). Once again the bulk of the survey shrimp catch came from the area north and east of Glacier Spit. Fish catches from all areas were at or near record highs. The Department still felt that allowing any fishing mortality on the shrimp stocks would be detrimental to reproductive success because many females would be taken, further justifying the closure announced after the spring 1990 survey.

Current environmental factors, such as (but not limited to) water temperature and food availability, as well as large populations of predator species such as Pacific cod (Gadus macrocephalus), walleye pollock (Theragra chalcogramma), and Pacific halibut (Hippoglossus stenolepis), may be the most important elements influencing stocks of shrimp in Kachemak Bay. Regardless of cause, the shrimp stocks

remained at extremely depressed levels during 1990. Fish abundance levels remained extremely high. In an effort to enhance growth and reproduction in the shrimp stocks, the Department had little alternative than to curtail commercial fishing for the entire fishing year.

1991-92 Management Outlook

The spring survey of 1991 will indicate any changes in the stocks that may have occurred since the fall 1990 survey. A decision to reopen commercial fishing for the upcoming regulatory year beginning July 1 will rest primarily on the results of that spring survey. Based on the known life history information regarding growth and age of shrimp, the Department has seen no definitive or convincing evidence to allow any commercial trawl shrimp fishing in Kachemak Bay during 1991-92.

An analysis of historical pink shrimp length frequencies collected during Kachemak Bay trawl shrimp surveys is occurring at this time. In addition to providing a compilation of historical information, this study could help to determine annual growth and survival of pink shrimp in Kachemak Bay, thus expanding the existing knowledge of this species and facilitating management decisions.

AREA G TRAWL SHRIMP FISHERY

Introduction

Area G is a non-exclusive shrimp registration area, encompassing the Outer and Eastern Districts of Cook Inlet (Figure 2), established by the Board of Fisheries in the spring of 1977. The first year of significant harvest occurred in the 1982-83 season when four vessels harvested 239,584 pounds (Figure 12, Appendix H).

The catch increased steadily for the next two seasons to a peak harvest of just under 2.0 million pounds taken by 11 vessels during the 1984-85 season. Prior to 1985, the season for shrimp trawling in Area G was open year round. A regulatory season was adopted by the Board for Area G in the spring of 1985, beginning June 1 and ending February 28.

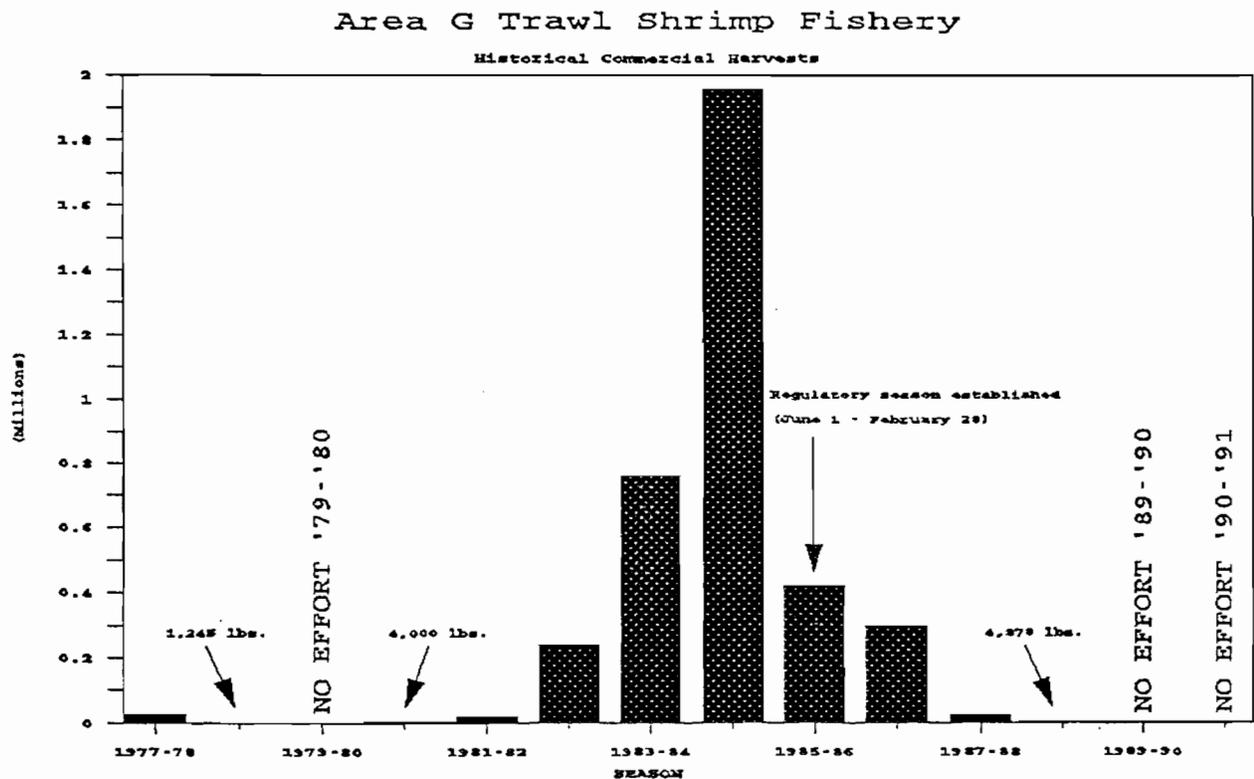


Figure 12. Commercial trawl shrimp harvests by regulatory season in Area G (Outer Cook Inlet), Cook Inlet Management Area, 1977-90.

Although surveys are not conducted in Area G, the stocks there have never been considered dense. In the very early years of this fishery, with virgin stocks, trawl CPUE was never high, rarely approaching 1,000 pounds per hour. Logbook information collected over time indicates that fishermen in Area G must make long tows, often with extremely low catch results.

1990-91 Season Summary

The Area G season opened on June 1, 1990, but for the second consecutive year no effort occurred during the entire open season, which ended on February 28, 1991. The most likely reason for the lack of effort in Area G was that the market for pink shrimp has been depressed in recent years and there were probably no active buyers in Kodiak, where the majority of Area G pink shrimp are sold. Although some trawl effort has been directed specifically at sidestripe shrimp in the past, it is unclear why no effort was directed at this species during 1990/91.

1991-92 Management Outlook

No population abundance index surveys are planned by the Department for any portion of Area G. Therefore, the commercial fishery is the sole source of information concerning stock status. The low historical fishery performance in terms of catch per unit of effort would suggest low abundance levels of pink shrimp. Fishermen can sometimes overcome the low catch rates if they can locate and harvest a higher percentage of larger, more marketable shrimp, such as sidestripes, and subsequently receive a higher price for the product, an event which occurred on a small scale in 1988-89. However, both the abundance and the location of these more valuable species seems to be inconsistent from year to year, therefore making it difficult to target on these individuals.

Although no specific management strategy exists for Area G beyond the implementation of a biological season, the Department will continue to collect logbooks from vessels fishing the area and will monitor catches through fish ticket information and log book analysis. Harvest and effort in Area G could increase in future years if the market for sidestripe shrimp continues to grow and if more vessels become efficient at targeting on this species.

AREA H POT SHRIMP FISHERY

Introduction

Similar to trawl shrimp, the Cook Inlet Management Area is separated into two distinct registration areas for pot shrimp: Area H, consisting of the Southern, Kamishak, and Barren Islands Districts; and Area G, consisting of the Outer and Eastern Districts (Figure 2). Traditionally the major pot shrimp fishery has occurred in the Southern District.

Pot shrimp fishing in Kachemak Bay of the Southern District is primarily undertaken by small vessel fishermen that develop their own markets. The target species is the coonstripe shrimp, the most abundant pot shrimp species in Kachemak Bay. Spot shrimp (Pandalus platyceros) also occur in the bay but their contribution to the fishery is generally negligible. Each regulatory fishing season, which begins June 1 and ends March 31, is managed via three separate sub-seasons with appropriate guideline harvest levels set for each sub-season.

Prior to 1986, guideline harvest levels were determined by the Department's two annual pot shrimp surveys as well as by voluntary commercial fishery performance information. All pot shrimp surveys were subsequently eliminated in the Cook Inlet Area. Fishery performance data in the form of voluntary logbooks was collected consistently during 1986 and 1987 and was the sole criteria used to judge stock status during those years. This information, along with that from the most recent Department trawl surveys and from local Personal Use fishermen, suggested that stocks of pot shrimp in Kachemak Bay continue to be depressed. Commercial catch figures show that the most recent harvests are well below those of the 1970's and early 1980's (Figure 13, Appendix I).

Area H Pot Shrimp

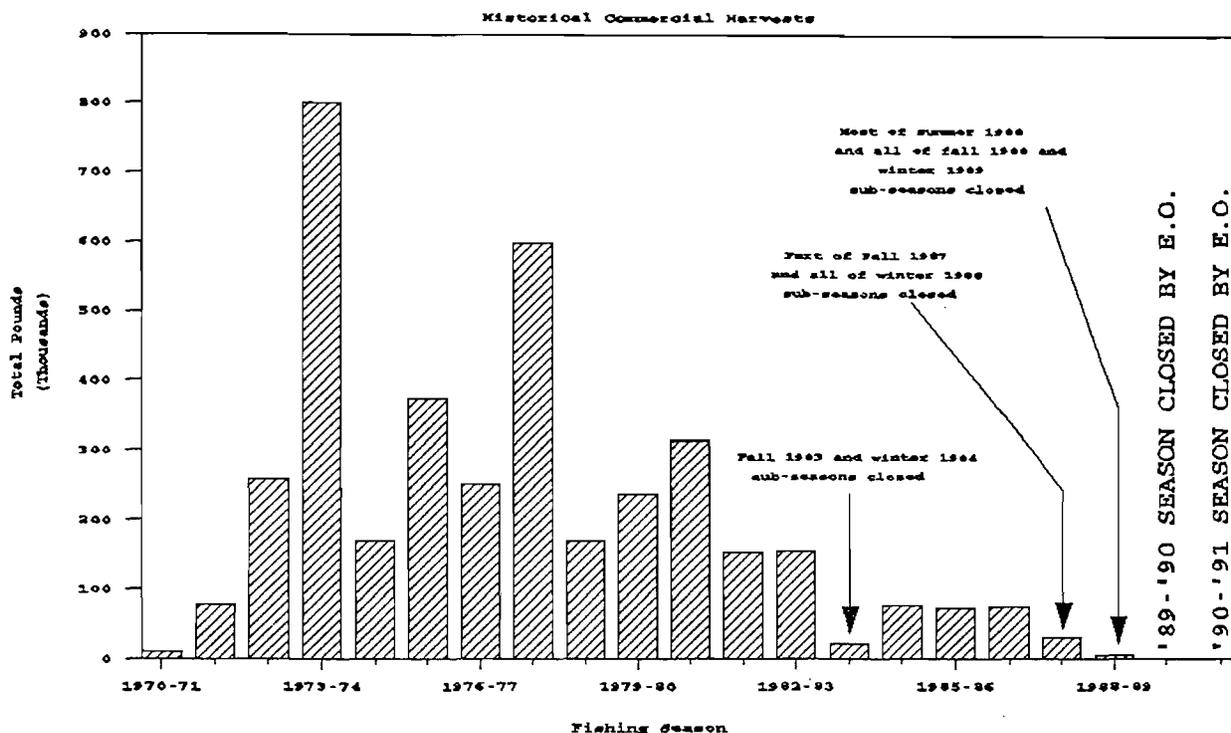


Figure 13. Commercial pot shrimp harvests by regulatory season in Area H, Cook Inlet Management Area, 1970-90.

1990-91 Season Summary

With no assessment surveys specifically directed at coonstripe shrimp in Kachemak Bay, and with no commercial pot shrimp fishery during 1989-90, the Department relied on data obtained in the spring 1990 trawl survey and voluntary information from personal use fishermen. Results from the spring survey indicated an average catch of 24.7 pounds of coonstripe shrimp caught per one nautical mile towed east of the Homer Spit, and an average of 3.5 pounds of coonstripes per nautical mile in the Tutka Bay/Sadie Cove area. The former figure, an average from all stations east of the spit, is considered high by recent standards. However, this average was supported by a single station's estimated catch of over 200 pounds of coonstripes. The average survey catch of coonstripes from the Tutka/Sadie area is considered dismally low considering that this was one of the primary production areas in the commercial pot

fishery. Voluntary information offered by personal use fishermen since 1988 has indicated very poor catches when compared to historical averages. In addition, nearly every individual Personal Use fisherman commented on the small size of the coonstripes caught.

Based on this information, the Department felt the coonstripe shrimp stocks in Kachemak Bay to be depressed, therefore no commercial fishing pressure was warranted. Emergency Order No. 2-S-H-04-90 closed the pot shrimp fishery for the entire 1990-91 season.

1991-92 Management Outlook

All information collected during 1990 indicated that stocks of Pandalid shrimp continue to be depressed in Kachemak Bay. Prior to the scheduled 1991 regulatory opening, information from the May 1991 trawl shrimp survey and from any Personal Use shrimp fishermen will be reviewed. Should stock status be evaluated as still depressed, the commercial fishery will not be opened. In that instance, the fishery would be closed for the entire fishing year in order to facilitate growth, recruitment, and reproduction in the pot shrimp stocks.

The life cycle for coonstripe shrimp in the more temperate Pacific waters of Canada has been documented at about four years (Butler, 1980). Although no information exists specifically for the coonstripe shrimp in Kachemak Bay, the life cycle in these more northerly waters is probably a minimum of six years. This phenomenon of slower growth and longer life cycles for shrimp in more northerly latitudes has also been demonstrated in pink shrimp. Olson (1975) found the minimum life cycle of these smaller Pandalids to be five years in Kachemak Bay, whereas Butler (1980) documented a maximum life cycle of four years in British Columbia.

It is therefore unlikely that the stocks of coonstripes could recover to a level of significant abundance in just one year. Based on this information, data gathered from both the trawl index surveys and the Personal Use fishery must clearly indicate a resurgence of the coonstripe shrimp stocks in Kachemak Bay before the Department would allow a commercial fishery to occur.

AREA G POT SHRIMP FISHERY

Introduction

Area G, also known as Outer Cook Inlet, includes the Outer and Eastern Districts (Figure 2). Currently there are no closed season or biological regulations governing the pot shrimp fishery. The target species is the spot shrimp. Since 1977, catch and effort have remained low, never exceeding a reported annual harvest of 20,500 pounds whole weight caught by 8 participating vessels in 1989 (Figure 14, Appendix J). Despite the extensive coastal area, historical information collected from this fishery suggests that the stocks of shrimp here occur within some (but not all) bays and are of limited abundance.

1990 Season Summary

The commercial season began by regulation on January 1, but actual effort began when one vessel started fishing in March. Harvest remained low during March and April but began to increase in May. The greatest effort in any single month occurred during both the months of June and July, when a total of three vessels actively participated during each month. Effort declined after July, and although the season remained open through the end of the calendar year, the final delivery was made near the end of September.

Area G Pot Shrimp

Historical Commercial Harvests

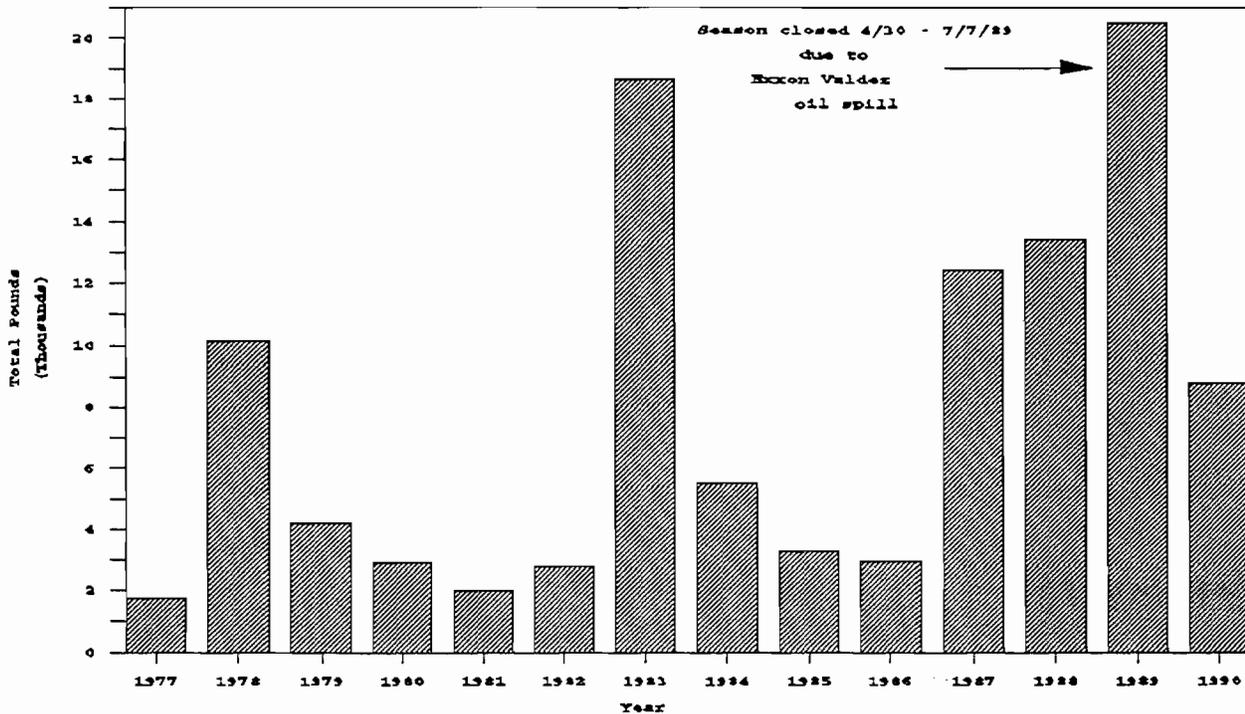


Figure 14. Commercial pot shrimp harvests by year in Area G (Outer Cook Inlet), Cook Inlet Management Area, 1977-90.

For the season, a total of five different vessels harvested 8,853 pounds of shrimp whole weight, consisting of 8,183 pounds (92%) of spot shrimp, 707 pounds (8%) of coonstripes, and 8 pounds (<0.1%) of pinks. Catch per unit of effort, obtained from fish tickets, showed an overall season average of approximately 0.56 pounds per pot, unadjusted for soak time. At an average price of nearly \$3.00 per pound for all shrimp, the estimated ex-vessel value of this fishery was approximately \$25,000.

1990 Management Outlook

Collection and review of fish ticket information is the primary form of management strategy employed for Area G pot shrimp. In addition, voluntary logbook information is provided by a few fishermen throughout the season and compared to that of past years.

The information collected during 1990 gave no indications to expect either harvest or effort to increase in the near future.

Catch reporting accuracy is unknown for Area G pot shrimp due to a lack of any historical enforcement effort. Since there is no longer a Department office in Seward, and since there is little chance of ever being cited for violations, some fishermen may not bother to report their catches at all. Therefore published catch figures are only those reported to the Department on fish tickets and may not truly represent the actual harvest from Area G.

SCALLOP FISHERY

Introduction

The commercial scallop fishery in the Cook Inlet Management Area (H) began in 1983 although sporadic interest had occurred prior to that time. The Alaska Board of Fisheries responded to a public proposal in 1983 by directing the Department to allow restricted "exploratory" fisheries in 1983 and 1984. These initial fisheries were characterized by low effort due to severe permit restrictions when compared with traditional scallop fisheries both inside and outside Alaska. The most important restrictions were:

- 1) Legal gear limited to a six-foot wide dredge with minimum ring size of four inches inside diameter.
- 2) Only one unit of gear allowed on board at any one time.
- 3) Mandatory log book completion.
- 4) Contact with the Homer office prior to and at the completion of each trip.

- 5) An agreement to carry Department observers on board if requested.

The target species of the fishery is the Pacific weathervane scallop. Except for some brief exploratory fishing in the Kamishak District in 1984 and in the Outer District in 1987, a single bed of scallops near Augustine Island in the Kamishak District has sustained virtually the entire harvest since the fishery began. The Department conducted an assessment survey in August, 1984, using the state research vessel PANDALUS, to better define the extent of this particular bed and to aid in establishing appropriate harvest levels.

Based on information from the 1984 survey as well as data from the initial fisheries, the Board of Fisheries adopted regulations for scallops in Cook Inlet in 1985. These regulations included a season in the Kamishak District from August 15 through October 31, a guideline harvest level of 10,000 to 20,000 pounds of shucked meats, and the restrictions mentioned previously. The Southern District was not opened to scallop fishing in order to protect crab stocks, while the Outer and Eastern Districts were opened year round to encourage exploratory fishing. Commercial fishery performance has been used in-season to adjust guideline levels. Harvest and effort peaked in this fishery during 1986 when 3 vessels took slightly more than 15,000 pounds of shucked meats (Figure 15, Appendix K).

At the start of the 1987 fishery, several experienced participants demonstrated extremely poor fishery performance during their first trips to the traditional Kamishak bed. Realizing that this bed is limited in size, and that the recovery rate for heavily exploited scallop stocks in Alaska is slow, the Department was compelled to close the Kamishak District scallop fishery less than one week after it opened. The significant reduction in CPUE demonstrated in the 1987 fishery compared to previous fisheries occurred over only

Historical Cook Inlet Scallop Harvests

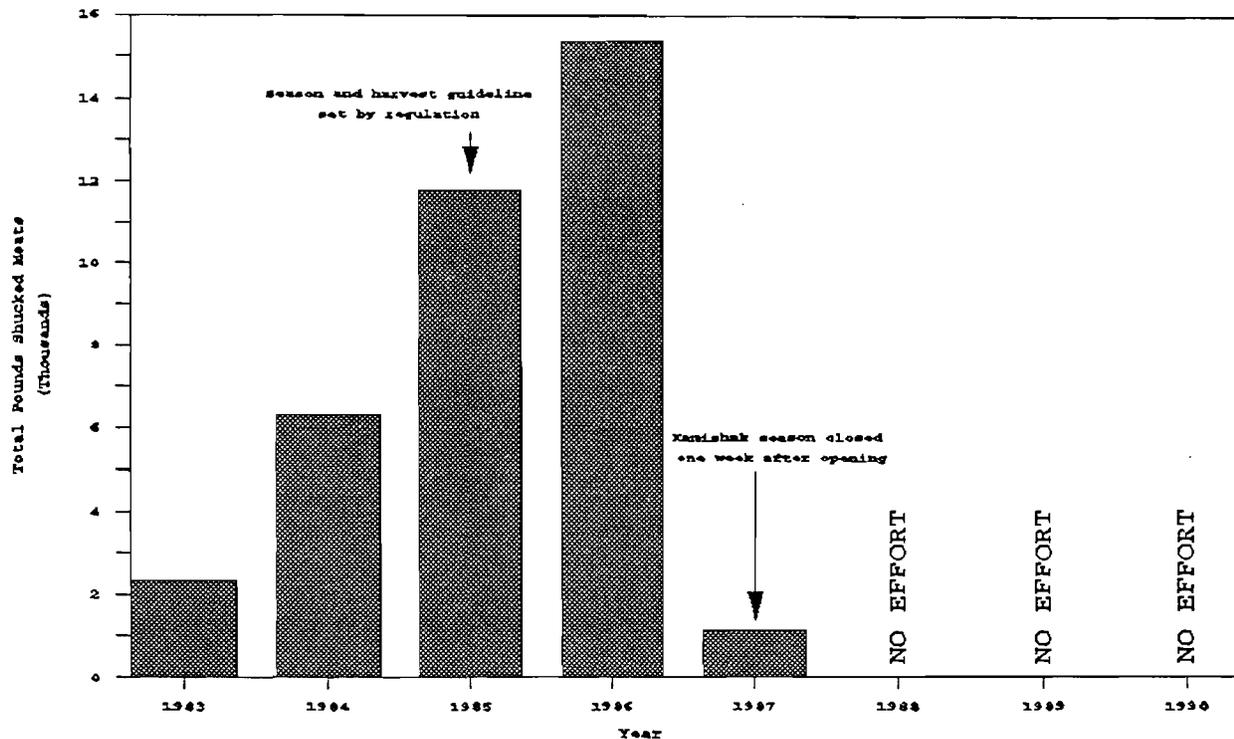


Figure 15. Commercial scallop harvest by year, Cook Inlet Management Area, 1983-90.

one year's time and appears to have been the result of illegal fishing activity which probably occurred during the fall months of 1986 and winter months of 1987. In an attempt to address the potential problem of illegal fishing, the Department required scallop vessels transitting the Cook Inlet area to be inspected prior to and immediately after entering and leaving the area. This requirement may have been implemented too late, however, since the majority of illegal activity may have already occurred. No commercial effort occurred in Cook Inlet during 1988 and 1989.

1990 Season Summary

Scallop regulations and harvest guidelines adopted in 1985 remained in effect through 1990, with the exception that the harvest guideline range in the Kamishak District was zero to 20,000 pounds. As has been the case during recent years, the department intended

to closely monitor fishery performance within this district in order to justify continued fishing or closure of the fishery. No permits were issued for any district in the Cook Inlet area in 1990, subsequently no effort or harvest occurred.

1991 Management Outlook

Without a commercial fishery and CPUE data, the Department has no means by which to judge the health of the scallop resource in the Kamishak District. Therefore, the department will allow the 1991 scallop season there to open by regulation on August 15 with a zero to 20,000 pound guideline harvest level. Vessel logbooks and skipper interviews will be closely scrutinized early in the season to see if the fishery performance justifies continued fishing. Samples of scallops from the fishery will also be analyzed and compared for size and age to those from earlier fisheries. A season closure will occur should the Department feel that the stock is jeopardized. In addition, the Department will continue to require scallop vessels fishing other areas to receive hold inspections prior to and immediately after entering and exiting the Cook Inlet Area. Scallop vessel effort is once again expected to be low in all districts of the Cook Inlet area during the 1991 season.

Based on available growth and recruitment information, the recovery of the Kamishak scallop bed under ideal conditions would probably begin to occur in a minimum of two years. However, at least four to six years time would probably be required to re-establish a multiple age structure and sufficient abundance to support any significant commercial effort.

HARDSHELL CLAMS AND MUSSELS

Introduction

Commercial hardshell clam and mussel harvest in the Cook Inlet Management Area was not well documented prior to 1986. Before harvesting clams or mussels for human consumption, an area must be certified by the Alaska Department of Environmental Conservation (ADEC) in accordance with the National Shellfish Sanitation Program (NSSP) for water quality due to concerns of human health. A limited amount of hardshell clams were harvested in Chinitna Bay in 1985 after the area was certified for lot sampling by ADEC, and in 1986 ADEC permitted the use of lot sampling plan for Chugachik Island (near Bear Cove) in Kachemak Bay. Through 1989, Chugachik Island, Halibut Cove Lagoon, Kasitsna Bay, and Jakalof Bay, all in the Southern District, were certified for lot sampling.

From 1986 through 1989, the total annual harvest of hardshell clams has ranged from 14,500 pounds to 20,000 pounds (Figure 16, Appendix L), all hand-dug by 2 to 9 permit holders. The latter poundage was harvested in 1989 and consisted of 15,300 pounds, or 77 percent, sold as otter food to rehabilitation centers as a result of the *Exxon Valdez* oil spill. The majority of the hardshell clam harvest from 1986-88 came from the Bear Cove area, but the Jakalof/Kasitsna area has subsequently become equally important for commercial harvest. Only 102 pounds of blue mussels (*Mytilus edulis*) were harvested commercially prior to 1989 (Figure 17, Appendix M), but in that year the catch rose to over 167,000 pounds due to utilization of the product for otter food, once again as a result of the oil spill.

Cook Inlet Hardshell Clams

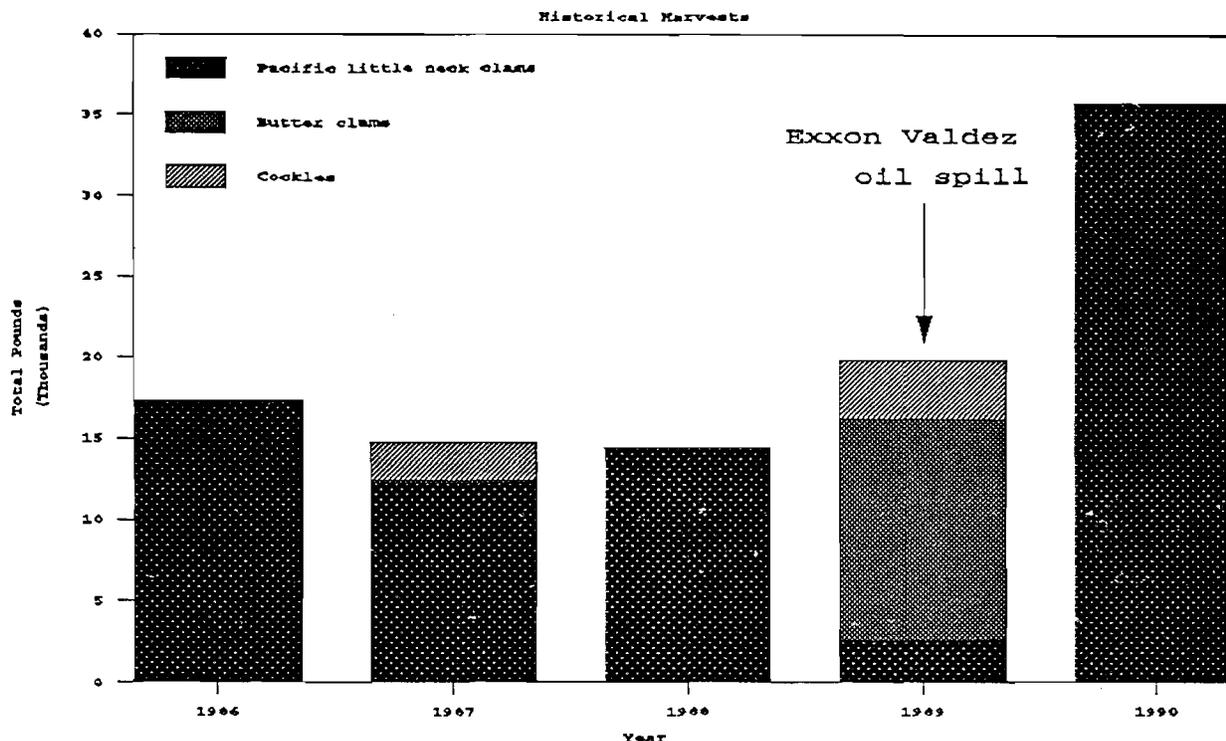


Figure 16. Commercial hardshell clam harvest by year, Cook Inlet Management Area, 1986-90.

Currently there are no closed season or closed area regulations for harvesting with forks and shovels, but minimum sizes were established by the Alaska Board of Fisheries in the spring of 1990 for Pacific little neck clams (Protothaca staminea) at 1.5 inches (38.1 mm) and butter clams (Saxidomus giganteus) at 2.5 inches (63.5 mm). A Commissioner's permit is required to use hydraulic diggers. Market conditions seem to be the dominant factor affecting the harvest of clams and mussels in Cook Inlet.

The department began a hardshell clam assessment program on two beaches within Jakalof Bay in 1989. The program was intended to evaluate the populations of clams on these beaches and monitor them over time in an attempt to determine the effects of harvesting, both commercial and personal use. Additionally, some growth information may be obtained, but results are incomplete at this time. As long as the program can continue, the staff expects to

better understand the effects of digging effort on the clam resources of Jakalof Bay. It is hoped that the information obtained from this assessment program can be applied to other beaches in order to provide an overall estimate of the hardshell clam resources in Kachemak Bay.

Cook Inlet Blue Mussels

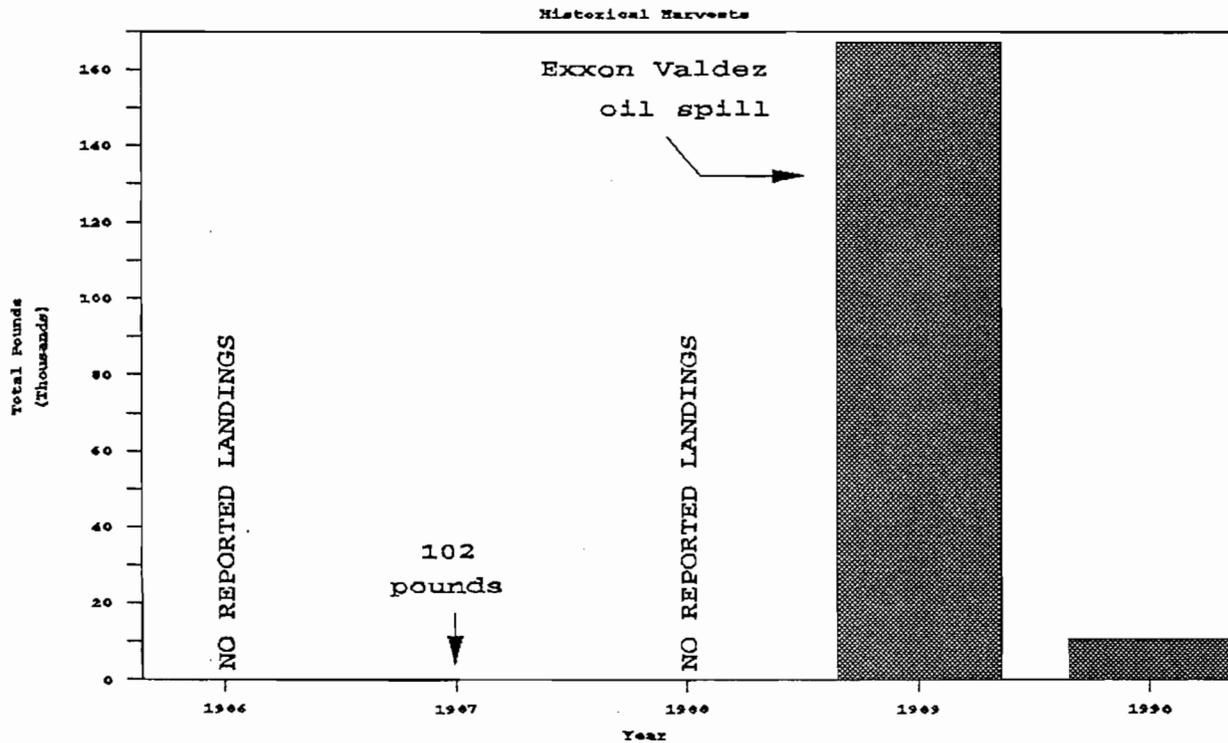


Figure 17. Historical commercial harvest of blue mussels by year in the Cook Inlet Management Area (H).

1990 Season Summary

Active harvesting of Cook Inlet clams and mussels in 1990 began in April and continued through the end of the year, with no effort occurring during the month of November. Total hardshell clam harvest for the year was 35,744 pounds, all Pacific little necks hand-dug by 19 permit holders (Table 6). The most effort and harvest occurred during the months of June through August (Table 7). Through October, the hardshell clam harvest came exclusively from Chugachik Island and Jakalof Bay. During the month of

December, the entire harvest of hardshells shifted to Tutka Bay after that area was certified by ADEC. Blue mussel totals for the year were 10,600 pounds taken by 2 permit holders (Table 8), with all the harvest occurring in the Jakalof/Kasitsna areas. At approximate average prices paid for hardshell clams of \$1.20 per pound and \$.25 per pound for blue mussels, the estimated ex-vessel value of this fishery was \$45,700

1991 Management Outlook

A controversy arose in early 1991 over the commercial clamming effort which occurred in Tutka Bay during late 1990 because this area lies within the boundaries of Kachemak Bay State Park (KBSP). Supporters of the park, citing statutes governing permissible activities within state parks, urged the Department of Natural Resources, Division of Parks and Outdoor Recreation (DPOR), to ban commercial clamming in KBSP. DPOR intends to restrict this activity via Special Use Permits beginning in 1991. The issue may ultimately be one of user-group allocation, which would then be the responsibility of the Board of Fisheries to decide.

Market demand and economics will probably play the biggest role in determining the 1991 Cook Inlet clam and mussel harvests. The majority, if not all, of the wildstock clam and mussel harvests from Cook Inlet have traditionally been sold within Alaska, primarily in the Anchorage area. Some Anchorage area retailers are reputed to have purchased clams from outside Alaska, selling them at prices competitive with in-state products. High labor and transportation costs in this fishery and in the state prevent Alaskan products from competing effectively with similar products out of the state. The in-state market may in fact be at or near the saturation point at current price levels, thus precluding further expansion unless a significant change in market conditions occurs.

Fishing effort in the Cook Inlet clam fishery could increase should operators of several new mariculture farms also engage in commercial harvest of wildstock, but total actual harvest may not necessarily increase significantly because of the aforementioned market limitations. Barring any unforeseen circumstances, the hardshell clam and mussel harvests for 1991 will probably be similar to the 1990 harvest totals. The Bear Cove, Tutka Bay, and Kasitsna/Jakalof Bay areas are expected to produce the majority of the hand-dug hardshell clam harvests in Cook Inlet. Hydraulic dredge effort is unknown for 1991 at this time.

RAZOR CLAMS^a

Introduction

Razor clams are present in many areas of Cook Inlet with particularly dense concentrations occurring near Polly Creek on the western shore of the Central District and from Clam Gulch to Ninilchik on the eastern shore of this district (Figure 1). The eastern shoreline has been set aside exclusively for sport harvest since 1959. All commercial harvests since that time have come from the west shore, principally from the Polly Creek/Crescent River beach, the only such area in Cook Inlet certified by the Alaska Department of Environmental Conservation for human consumption harvest. The harvest of razor clams from this certified beach for any purpose other than human consumption is specifically prohibited by regulation. Permits issued for this area allow a maximum of ten percent incidental bait harvest, to account for those clams which are broken and cannot be sold for human consumption.

^aInformation for the 1990 razor clam fishery in Cook Inlet was provided by Paul Ruesch, Area Management Biologist, Div. of Commercial Fisheries, Soldotna.

No razor clam harvest limits are in place for any area, but in the spring of 1990 the Alaska Board of Fisheries adopted a regulation requiring a four and one-half inch (114 mm) minimum size for razor clams. At this same meeting, the Board also prohibited the use of hydraulic diggers (dredges) in the Cook Inlet area. Historically the majority of razor clams harvested in Cook Inlet have been hand-dug. Numerous attempts have been made in Cook Inlet to develop a dredge to efficiently and economically harvest this species with minimal incidental damage to non-target animals, but none have been considered successful.

Since 1919, commercial razor clam harvest levels in Cook Inlet have fluctuated from no fishery for as many as eight consecutive years to production in excess of half a million pounds (live weight) in 1922 (Figure 18, Appendix N). The sporadic nature of the fishery has been a function of effort and market opportunities rather than limited availability of the resource.

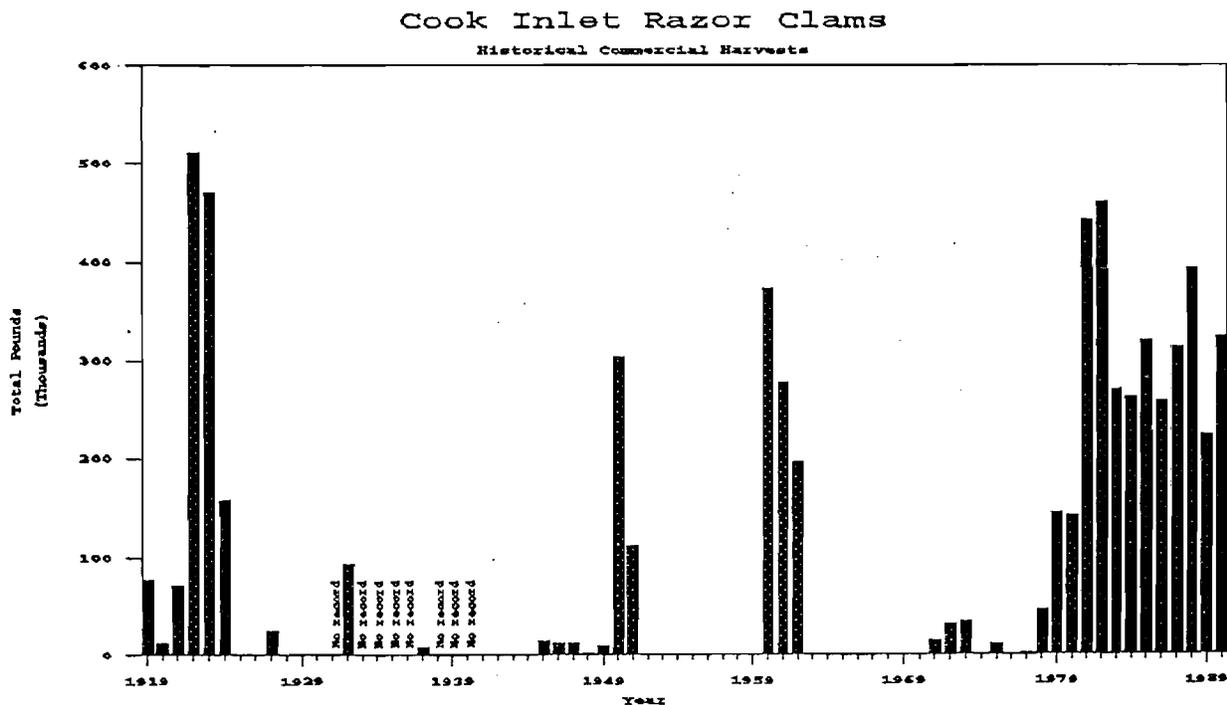


Figure 18. Commercial razor clam harvests by year, Cook Inlet Management Area, 1919-90.

1990 Season Summary

The 1990 razor clam fishery occurred between the months of May and August. The total harvest of 323,533 pounds of razor clams was taken by 42 permit holders. Human consumption harvest comprised 95.6 percent, or 309,025 pounds, of this total, while 4.4 percent (14,508 pounds) was sold as bait. The entire harvest came from ten miles of the Polly Creek/Crescent River certified beach. Total ex-vessel value of the 1990 fishery was approximately \$172,000. Both the number of diggers and the total poundage harvested were increases over 1989.

1991 Management Outlook

The 1991 Cook Inlet razor clam harvest is expected to be similar to recent seasons with an anticipated total of 200,000 to 350,000 pounds taken. Hand-digging effort is expected to range from 30 to 60 individuals, depending on the number of companies buying the product. The department intends to continue to issue permits and monitor the catch through fish tickets as in the past.

OCTOPUS

Introduction

The harvest of octopus in the Cook Inlet area has historically occurred incidentally in other directed fisheries such as the commercial Tanner crab fishery. Historical Cook Inlet octopus harvest records have been kept only since 1986 (Figure 19, Appendix O). An increased amount of interest in directing effort

specifically towards octopus has occurred in recent years, but actual effort has been minimal and resultant harvest negligible.

Historical Cook Inlet Octopus Harvests

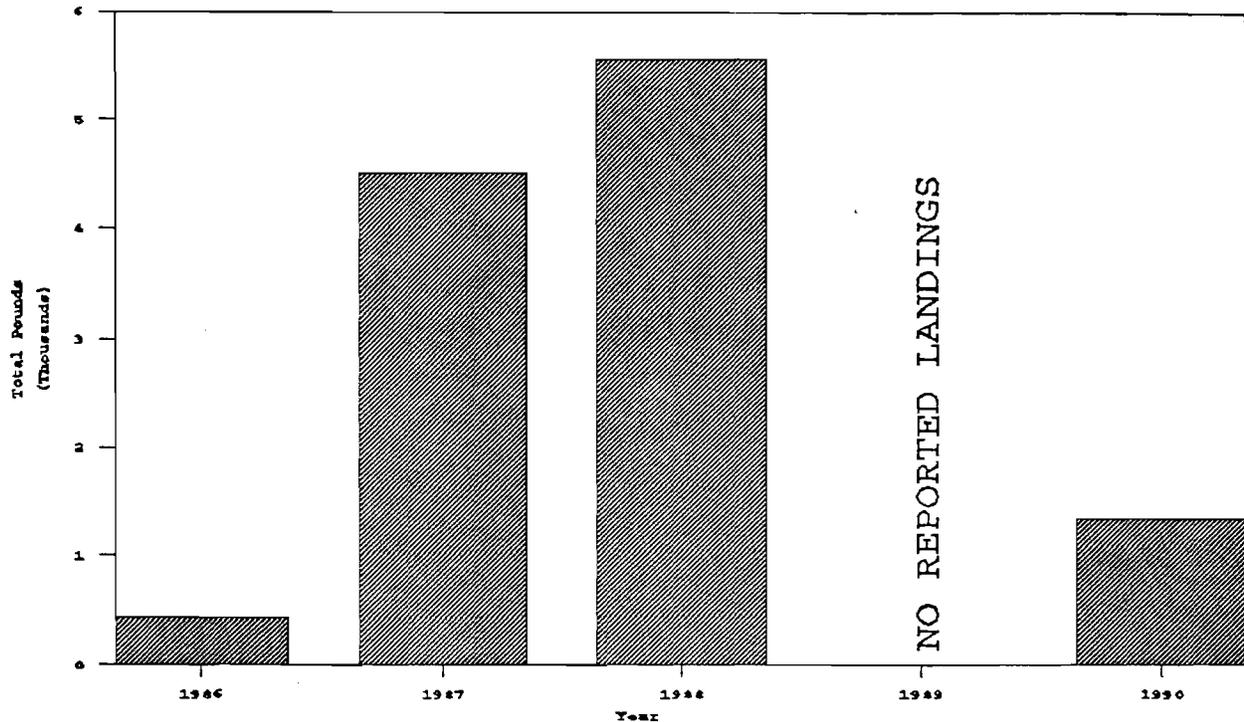


Figure 19. Commercial octopus harvests in the Cook Inlet Management Area, 1986-90.

There are no closed seasons or size limits on octopus at the present time, but a permit is required prior to fishing a given registration area. Cook Inlet permit restrictions include short permit duration (typically one to four months), strict reporting requirements, and a detailed description of gear to be utilized. This last requirement is necessary to prevent gear legally defined as king, Tanner, Dungeness, or shrimp pots from being used to capture octopus, in order to prevent fishing for those species during closed periods under the guise of octopus fishing. Additionally, this requirement will help to eliminate the incidental by-catch of king, Tanner, and Dungeness crabs, stocks of which are currently depressed in the Southern District.

1990 Season Summary

During 1990, seven registration permits were issued to individuals specifically targeting on octopus in Cook Inlet. Four of these permit holders reported actually setting gear, but only two reported commercial deliveries totalling 149 pounds whole weight. The fishery performance in terms of catch per unit of effort for those fishermen actively fishing was considered poor, with long soaks usually resulting in small or zero catches. Incidental harvest of octopus amounted to 1,194 pounds taken by one vessel fishing for miscellaneous saltwater finfish with pots. Total harvest for the 1990 season was 1,343 pounds from three vessels. Estimated ex-vessel value of this fishery was \$1,800.

1990 Management Outlook

The high prices paid for octopus in recent years, publications promoting the potential octopus fishery in Alaska, and the attraction of an alternative fishery are all expected to produce a continued interest in octopus as a target species during 1991. The extent of this resource in Cook Inlet outside the Southern District is questionable and could ultimately affect any directed fishery. In the absence of a demonstrably effective method of harvest, the Cook Inlet octopus catch is not expected to increase significantly in 1991.

SEA URCHINS

Introduction

Sea urchins, and commercial fisheries for them, occur along the U.S. and Canadian Pacific coast from California to Alaska, but the green sea urchin, the smallest of the commercial urchin species, is

the only urchin species in Cook Inlet which occurs in quantities sufficient to support commercial effort. Although red urchins (Strongylocentrotus franciscanus) do occur in small, isolated beds within the management area, their numbers and scattered distributions are considered incapable of supporting any form of commercial effort. Green urchins are harvested solely for their gonads, considered a delicacy in the Orient. No commercial harvest for this species had ever occurred in Cook Inlet prior to 1987. In that year, one permit holder harvested a total of 224 pounds (whole weight) of urchins (Figure 20, Appendix P), using diving gear.

Historical Green Sea Urchin Harvests

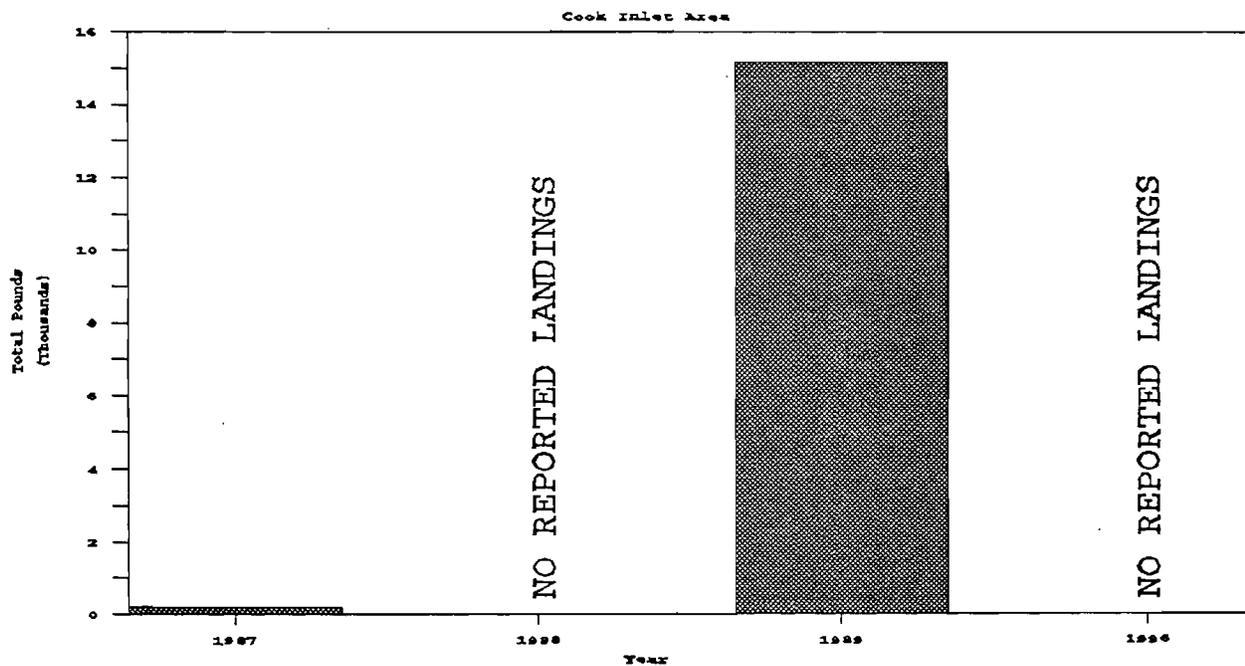


Figure 20. Commercial sea urchin harvests by year, Cook Inlet Management Area, 1987-90.

By regulation in the Cook Inlet management area, each fisherman must obtain a Commissioner's permit prior to harvesting urchins commercially. An additional regulatory requirement limits allowable methods of harvest to hand picking or the use of an abalone iron, both intended to minimize disruption of the substrate. Utilizing available published information on this species as well as the framework of current management practices

for the red urchin in southeast Alaska, the department established the following permit restrictions:

- 1) A minimum legal size of 1.75 inches (44.5 mm) and a maximum legal size of 2.50 inches (63.5 mm), measured across the test and not including spines. The minimum size is intended to protect the broodstock, while the maximum size is intended to protect sufficient numbers of large urchins, which in turn provide a canopy that helps protect the smaller urchins.
- 2) Permit duration from mid-September through mid-December, the time period when the gonads are fullest and therefore of highest market quality. The permit period may be extended past mid-December if recovery data is made available to the department.
- 3) Area of harvest in the Southern District alternated each year between that portion of Kachemak Bay east of Homer Spit and that portion west of the Spit, in order to reduce the potential of over-harvest in any one given area.

The market demand for urchin gonads appears to be substantial as evidenced by the amount of interest generated towards the harvest of this species. Most of these fishermen, however, assume that the urchins which occur in Cook Inlet are similar to those species which occur further south. The green urchin, being smaller in size, must be harvested in larger quantities to be economically profitable. Potential harvesters in the Cook Inlet area have found, through personal use investigations (i.e. collecting with a sport fishing license), that thus far the numbers of marketable urchins, regardless of the size limits, have not justified the investment in time and money necessary to establish an economical commercial venture.

1990 Season Summary

Because the area east of Homer Spit was open for urchin harvest during 1989, the area west of the Spit was the only area open during 1990 under the previously mentioned management scheme. Prior to the commercial season, one individual with extensive experience harvesting urchins in other areas undertook a thorough personal use investigation of the waters west of the Spit. He voluntarily shared his results with the staff and felt that concentrations and distributions of urchins in this area were insufficient to support his commercial operation. Nonetheless, ten individuals received permit registrations for the season, but no commercial deliveries were reported, indicating that either sufficient numbers of urchins were indeed absent in this area or that the market had softened considerably since the previous year's fishery.

1991 Management Outlook

As long as a strong market exists for urchin gonads, the harvest of these invertebrates is expected to generate a considerable amount of interest. Oriental markets apparently demand strict adherence to guidelines in terms of urchin size and gonad quality, and although the urchins of Kachemak Bay do meet these guidelines, it is questionable whether there are sufficient commercial quantities available to satisfy the economic minimums needed by the fishing and processing industries. Estimates of sea urchin abundance or occurrence elsewhere in the management area are unknown at this time.

Because the area west of the Homer Spit was open commercially during 1990, the Department intends to open only the area east of the Homer Spit during 1991. This rotational harvest scheme between areas is not a new management approach directed solely at Cook

Inlet harvesters, but rather is a common practice employed in southeast Alaska as well as other Pacific Coast urchin fisheries to help protect against over-exploitation of any one given area. In fact, the Cook Inlet strategy is probably more liberal than most rotational schemes, which are often on a three or four year basis. All other permit restrictions in Cook Inlet will remain in effect for 1991. Size limit modifications and/or season extensions will be determined, as in the past, on a case by case basis using the best available information.

It must be noted that sea urchin growth rates are highly variable on an annual basis. Should the stocks experience good growth rates during several successive years, an expansion of the commercial fishery remains a distinct possibility. However, present stock conditions suggest that effort will probably remain low in the near term.

SEA CUCUMBERS

Introduction

Prior to 1990, the Cook Inlet Management Area had no documented history of sea cucumber (Parastichopus californicus) harvest. No information is available regarding the extent, distribution, or life history of this species in the management area. No regulations or harvest guidelines specific to the commercial harvest of cucumbers are in effect for Cook Inlet. In the absence of biological information, any commercial fishery under consideration would be on an experimental basis only in order to collect fundamental information and establish a preliminary data base on this species in Cook Inlet. As such, total effort would be severely restricted by permit. Although sea cucumbers had been reported observed in Cook Inlet, especially within the Southern

District (Kachemak Bay), the staff felt that populations were probably not considered dense.

1990 Season

Due to the experimental nature of the fishery, the maximum number of active number sea cucumber permit registrations allowed at any one time during 1990 for the Southern District was five, and each permit was to be of relatively short duration (three months or less). During the months of March and April, two permit holders made seven landings totalling 22,525 pounds (whole weight) of sea cucumbers. A total of three additional permits were issued during the year, but no further commercial harvest resulted. At an estimated price of approximately \$0.70 per pound, the ex-vessel value of the fishery was \$16,000.

Much of the interest in the 1990 Cook Inlet sea cucumber fishery was generated by the same fishery in Southeast Alaska which had exploded in late 1989 and early 1990. When closures began to occur in that management area, divers began to investigate alternative harvest areas to supply this oriental delicacy. The information gathered during this inaugural fishery in Cook Inlet indicated that sea cucumbers do occur here, as expected, but that numbers appear relatively limited with regards to commercial quantities. Several permit holders during 1990 made numerous investigative dives, not only in various areas of Kachemak Bay but also on the outer Gulf of Alaska coast of the Kenai Peninsula and into Prince William Sound. These investigations resulted in the discovery of only negligible quantities of sea cucumbers, leaving the divers very discouraged.

1991 Management Outlook

The 1990 commercial sea cucumber fishery in the Cook Inlet area led the staff to believe that concentrations of this species may not be sufficient to support commercial effort. One possible explanation is that this area represents the northern fringe of the sea cucumber's range, therefore resulting in only scattered distributions of these animals. Spawning, settlement, growth, and recruitment could all be more variable in Cook Inlet than in more temperate waters. Whatever the reasons, the staff intends to continue its conservative approach to the management of this species until such time as the available information justifies a change in this strategy. Department policy on new or developing fisheries dictates strict measures to ensure conservation of the target species and reproductive viability of the stocks while gathering basic information on which to base management decisions. Such measures include, but are not limited to, strict permit requirements, limited numbers of permits issued, closures based on quickly escalating harvest or effort, and management decisions based on the best available information. Where little or no information exists, decisions will be made with a primary concern for conservation. Sharing of all information gathered during diving operations will be encouraged and could dictate in-season management decisions. Marketing economics and the status of other sea cucumber fisheries, such as that in Southeast, could determine the amount of interest expressed in Cook Inlet during 1991. The staff does not expect harvest to increase over 1990 levels and may in fact be much less or even zero.

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EEO STATEMENT

The Alaska Department of Fish and Game operates all of its public programs and activities free from discrimination on the basis of race, religion, color, national origin, age, sex, or handicap. Because the department receives federal funding, any person who believes he or she has been discriminated against should write to:

O.E.O.

U.S. Department of Interior

Washington, DC 20240

Table 1. Numeric listing of shellfish emergency orders, including personal use, issued for the Cook Inlet Management Area for the fisheries listed in the 1990-91 Cook Inlet Area Shellfish Annual Management Report.

Emergency Order Number	Effective Date	Explanation
2-S-H-01 and 02-90		Listed in 1989-90 Annual Management Report.
2-S-H-03-90	03/27/90	Closed the commercial Dungeness crab fishery in the Southern District. Reopened the waters west of Homer Spit on June 1 and the waters east of Homer Spit on a date to be specified by E.O.
2-S-H-04-90	06/01/90	Extended the closure of the Kachemak Bay pot shrimp fishery for the entire 1990-91 regulatory season.
2-S-H-05-90	06/29/90	Opened the commercial Dungeness crab fishery in the waters east of Homer Spit.
2-S-H-06-90	07/01/90	Extended the closure of the Kachemak Bay trawl shrimp fishery for the entire 1990-91 regulatory season.
2-S-H-07-90	08/01/90	Closed Cook Inlet Management Area to commercial harvest of red and blue king crabs.
2-S-H-08-90	08/08/90	Closed the commercial Dungeness crab fishery in the waters east of Homer Spit.
2-S-H-09-90	09/07/90	Closed the commercial Dungeness crab fishery in the entire Cook Inlet Management Area.
2-S-H-01-91	01/15/91	Closed the commercial Tanner crab fishery in the Outer, Eastern and Central Districts.
2-S-H-02-91	01/15/91	Delayed the opening of the commercial Tanner crab fishery in the Southern District until further notice.

Table 1. Continued.

Emergency Order Number	Effective Date	Explanation
2-S-H-03-91	01/19/91	Opened the commercial Tanner crab fishery in the Southern District for a 12 hour period.
2-S-H-04-91	01/23/91	Opened the commercial Tanner crab fishery in the Southern District for a 12 hour period.
2-S-H-05-91	03/04/91	Closed the commercial Tanner crab fishery in the Kamishak Bay and Barren Islands Districts.
2-PU-H-01-90	04/03/90	Closed the personal use Dungeness crab fishery in the Southern District. Reopened the fishery effective June 15.
2-PU-H-02-90	08/01/90	Closed the personal use king crab fishery in the Cook Inlet Management Area until 08/01/91.
2-PU-H-03-90	08/08/90	Closed the personal use Dungeness crab fishery in waters east of Homer Spit.
2-PU-H-04-90	09/07/90	Closed the personal use Dungeness crab fishery in the entire Cook Inlet Management Area.
2-PU-H-05-90	09/21/90	Opened the personal use Tanner crab fishery in the waters of the Southern District east of a line from Anchor Point to Point Bede. Closed those waters on 10/31/91.
2-PU-H-06-90	09/21/90	Amends emergency order No. 2-PU-H-05-90 which erroneously closed the personal use Tanner crab fishery in the described waters on 10/31/91. The closure date was amended to 10/31/90.

Table 2. Tanner crab (*Chionecetes bairdi*) catch by district and statistical sub-area, Cook Inlet Management Area, 1990/91 season.

District	Statistical Sub-area	No. of Boats	No. of Landings	No. of Crab	No. of Pounds	No. of Pots Pulled	Average Weight per crab	Average Pounds per pot	No. of Crab per pot
Eastern	C L O S E D			B Y	E M E R G E N C Y			O R D E R	
Outer	C L O S E D			B Y	E M E R G E N C Y			O R D E R	
Southern	241-11	21	32	50,323	128,670	1,437	2.56	89.54	35.02
	241-12	23	32	21,820	56,026	1,014	2.57	55.25	21.52
	241-13	12	14	7,417	18,949	629	2.55	30.13	11.79
	241-15	<u>30</u>	<u>50</u>	<u>26,514</u>	<u>67,734</u>	<u>1,801</u>	<u>2.55</u>	<u>37.61</u>	<u>14.72</u>
S. District Totals		68	128	106,074	271,379	4,881	2.56	55.60	21.73
Central	C L O S E D			B Y	E M E R G E N C Y			O R D E R	
Kamishak	249-10	3	4	14,032	29,563	557	2.11	53.08	25.19
	249-20	3	4	21,972	45,615	699	2.08	65.26	31.43
	249-25	1	1	2,640	5,544	138	2.10	40.17	19.13
	249-30	1	1	170	357	30	2.10	11.90	5.67
	249-35	<u>6</u>	<u>14</u>	<u>88,017</u>	<u>185,027</u>	<u>4,440</u>	<u>2.10</u>	<u>41.67</u>	<u>19.82</u>
Kamishak Dist. Totals		8	20	126,831	266,106	5,864	2.10	45.38	21.63
Area H Totals		71	144	232,905	537,485	10,745	2.31	50.02	21.68

Table 3. Dungeness crab (Cancer magister) catch by district and statistical sub-area, Cook Inlet Management Area, 1990 season.

District	Statistical Sub-area	No. of Boats	No. of Landings	No. of Crab	No. of Pounds	No. of Pots Pulled	Average Weight per crab	Average Pounds per pot	No. of Crab per pot
Southern	241-11	7	6	7,848	17,064	4,586	2.17	3.72	1.71
	241-12	1	1	327	589	296	1.80	1.99	1.10
	241-13	12	32	1,959	3,686	2,996	1.88	1.24	0.66
	241-14	13	36	3,339	6,337	4,808	1.89	1.32	0.69
	241-15	2	6	254	472	285	1.85	1.66	0.89
	241-16	3	7	153	310	300	2.02	1.03	0.51
	241-60	1	1	160	480	250	3.00	1.92	0.64
S. District Totals		23	110	14,040	28,938	13,491	2.06	2.14	1.04
Central	244-70	C O N F I D E N T I A L			564	C O N F I D E N T I A L			
Area H Totals		23	110	14,040	29,502	13,491	2.06	2.15	1.04

Table 4. Dungeness crab catch and effort by month, Cook Inlet Management Area, 1990.

Month	Southern District				Central District				Cook Inlet Total			
	Boats	Lndgs.	Pounds	Accum.	Boats	Lndgs.	Pounds	Accum.	Boats	Lndgs.	Pounds	Accum.
Jan	1	4	99	99	NO EFFORT				1	4	99	99
Feb	NO EFFORT				NO EFFORT				NO EFFORT			
Mar	NO EFFORT				NO EFFORT				NO EFFORT			
Apr	CLOSED BY E.O.				NO EFFORT				NO EFFORT			
May	CLOSED BY E.O.				NO EFFORT				NO EFFORT			
Jun	3	7	303 ^a	402	NO EFFORT				3	7	303	402
Jul	18	54	10,890	11,292	Confidential		564	564	18	56	11,454	11,856
Aug	16	40	15,992 ^b	27,284	NO EFFORT				16	40	15,992	27,848
Sep	4	5	1,654 ^c	28,938	CLOSED BY E.O.				4	5	1,654	29,502
Oct	CLOSED BY E.O.				CLOSED BY E.O.				CLOSED BY E.O.			
Nov	CLOSED BY REGULATION				CLOSED BY E.O.				C L O S E D			
Dec	CLOSED BY REGULATION				CLOSED BY E.O.				C L O S E D			
Cum. Vess.	23				Confidential				23			

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^aSouthern District waters west of Homer Spit opened June 1, 1990, by regulation; remaining waters (east of Homer Spit) opened by emergency order effective 6:00 A.M. June 29, 1990, after completion of softshell survey.

^bSouthern District waters east of Homer Spit closed by emergency order effective 12:00 noon August 8, 1990, due to low stock abundance.

^cSouthern District waters west of Homer Spit, as well as those in the Central, Kamishak, and Barren Islands Districts, closed by emergency order effective 12:00 noon September 7, 1990, due to low stock abundance.

Table 5. Pot shrimp catch by district, statistical sub-area, and registration area, Area H and Area G, Cook Inlet Management Area, 1990-91 season.

District	Statistical Sub-area	No. of Boats	No. of Landings	Coon-stripes	Spots	Pinks	Total Pounds	No. of Pots	Pounds per Pot
Southern/ Area H									
	CLOSED	BY	EMERGENCY	ORDER	FOR	ENTIRE	1990/91	SEASON	
Area G:									
Eastern	231-05	3	11	329	525	8	862	1,946	0.4
	231-30	<u>1</u>	<u>3</u>	<u>329</u>	<u>51</u>	<u>8</u>	<u>51</u>	<u>50</u>	<u>1.0</u>
Eastern Dist. Totals		3	14	329	576	8	913	1,996	0.5
Outer	232-23	2	11	378	7,562	0	7,940	13,135	0.6
Area G/ Cook Inlet Totals		5	25	707	8,138	8	8,853	15,131	0.6

Table 6. Hardshell clam catch by district and statistical sub-area, Cook Inlet Management Area, 1990.

District	Statistical Sub-area	No. of Permits	No. of Landings	Little-neck Clams	Eastern Soft Shells	Total Pounds
Southern	241-14	7	24	18,956	0	18,956
	241-16	12	38	16,738	50	16,788
Southern District/ Area H Totals		19	62	35,694	50	35,744

Table 7. Hardshell clam and mussel catch by month, Cook Inlet Management Area, 1990.

Month	PACIFIC LITTLE NECK CLAMS			BLUE MUSSELS		
	No. of Permits	No. of Landings	Total Pounds	No. of Permits	No. of Landings	Total Pounds
Jan	N O	E F F O R T		N O	E F F O R T	
Feb	N O	E F F O R T		N O	E F F O R T	
Mar	N O	E F F O R T		N O	E F F O R T	
Apr	2	2	962 ^a	1	1	500
May	3	5	2,776	1	1	300
Jun	4	8	5,666	1	2	1,400
Jul	9	13	8,001	1	1	1,200
Aug	13	20	10,885	1	1	2,000
Sep	5	5	2,634	1	1	500
Oct	6	6	1,920	1	1	1,000
Nov	N O	E F F O R T		N O	E F F O R T	
Dec	3	3	2,900	2	2	3,700
Totals	19	62	35,744	2	10	10,600

^aIncludes 50 pounds of Eastern soft shell clams (Mya arenaria).

Table 8. Blue mussel (Mytilus edulis) catch by district and statistical sub-area, Cook Inlet Management Area, 1990.

District	Statistical Sub-area	No. of Permits	No. of Landings	Blue Mussel Total Pounds
Southern/ Area H Totals	241-16	2	10	10,600

Table 9. Octopus (Octopus dofleini) catch by district and statistical sub-area, Cook Inlet Management Area, 1990.

District	Statistical Sub-area	No. of Vessels	No. of Landings	Octopus Total Pounds
Eastern	231-05	1	1	15
Southern	241-12	1	3	134
Barren Isl.	248-20	1	1	825
Kamishak	249-20	1	1	369
Cook Inlet/ Area H Totals		3	6	1,343

Table 10. Sea cucumber (Parastichopus californicus) catch by district and statistical sub-area, Cook Inlet Management Area, 1990.

District	Statistical Sub-area	No. of Permits	No. of Landings	Sea Cucumber Total Pounds
Southern/ Area H Totals	241-16	2	14	22,525

Appendix A. Tanner crab catch (pounds) by season, Cook Inlet Management Area, 1968-91.

Season	Southern District	No. of Vessels	Kamishak/ Barren Is. District	No. of Vessels	Outer/ Eastern District	No. of Vessels	Central District	No. of Vessels	Total Catch	Total Vessels
1968-69	1,388,282		12,398		816				1,401,496	
1969-70	1,147,154		71,196		104,191				1,322,541	
1970-71	1,046,803		541,212		3,000				1,591,015	
1971-72	2,462,956		974,962		804,765				4,242,683	
1972-73	2,935,662		3,361,023		1,266,023				7,562,708	
1973-74	1,387,535		4,689,251		1,891,021				7,967,807	
1974-75	967,762		2,150,462		656,660				3,774,884	
1975-76	1,339,245		3,281,084	17	850,964				5,471,293	57
1976-77	2,009,633	35	1,765,926	24	824,520				4,600,079	67
1977-78	2,806,568	55	2,077,092	28	502,049				5,385,709	92
1978-79	2,323,420	75	2,713,339	27	694,728				5,731,487	77
1979-80	1,134,940	68	3,338,623	24	595,645				5,069,208	68
1980-81	1,047,630	46	1,757,331	20	463,201				3,268,162	52
1981-82	548,529	41	1,286,332	18	524,897	9			2,359,758	51
1982-83	584,908	48	1,693,794	20	682,919	20			2,961,621	65
1983-84	996,763	45	1,373,674	17	443,384	14			2,813,821	71
1984-85	1,229,298	83	1,535,547	19	259,083	7			3,023,928	86
1985-86	1,164,261	103	1,288,711	24	177,041	5			2,630,013	109
1987	1,077,379	87	1,111,339	21	251,174	13	7,771	2	2,447,663	95
1988	944,763	127	417,182	24	168,969	23	8,396	3	1,539,310	137
1989	CLOSED	--	CLOSED	--	CLOSED	--	CLOSED	--	0	--
1990	CLOSED	--	510,034	7	CLOSED	--	CLOSED	--	510,034	7
1991	271,379	68	266,106	8	CLOSED	--	CLOSED	--	537,485	71
Average ^a	1,075,965	59	1,409,002	19	372,507	9	3,233	1	2,858,552	70

^a Since inception of minimum legal size between the 1976-77 season.

Appendix B. Average weight of Tanner crabs, by district, from the commercial fishery, Cook Inlet Management Area, 1974-1991.

Season	Southern District	Kamishak/Barren Is. Districts	Outer/Eastern Districts	Central District
Prior to 1974	No data	data	available	
1974-75	2.85		N/A	
1975-76	2.65		"	
1976-77	2.79		"	
1977-78	2.65		2.35	
1978-79	2.64		2.25	
1979-80	2.60		2.23	
1980-81	2.75		2.20	
1981-82	2.50		2.29	
1982-83	2.47		2.29	
1983-84	2.51		2.23	
1984-85	2.49		2.29	
1985-86	2.30		2.17	
1987 ^a	2.31		2.26	
1988	2.46		2.29	2.33
1989	CLOSED		CLOSED	2.14
1990	CLOSED		CLOSED	CLOSED
1991	2.56		2.13	CLOSED
			2.09	CLOSED
Average	2.57	2.24	2.19	2.24

^a Season opened by regulation 1/15/87. Prior to 1987, the season overlapped two calendar years.

Appendix C. King crab catch in pounds by season, Cook Inlet Management Area, 1960-90.

Season	District			Total Catch	Number of Vessels
	Southern	Kamishak/ Barren Is.	Outer/ Eastern		
1960-61	2,699,680	986,551	118,067	3,804,298	
1961-62	1,619,642	3,642,500	368,909	5,631,051	
1962-63	2,763,343	5,509,708	343,505	8,616,556	
1963-64	1,960,426	4,915,303	59,352	6,935,081	
1964-65	1,892,479	1,850,572	963	3,744,014	
1965-66	1,948,012	1,684,346	14,491	3,646,849	
1966-67	1,347,904	1,386,008	89,510	2,823,422	
1967-68	1,117,397	1,883,605	239,518	3,240,520	
1968-69	750,906	1,711,296	87,302	2,549,504	
1969-70	1,464,721	1,688,803	73,644	3,227,168	
1970-71	1,540,018	2,115,991	9,468	3,665,477	
1971-72	1,992,224	2,868,315	12,657	4,873,197	
1972-73	1,391,024	2,756,023	1,966	4,149,013	
1973-74	1,971,841	2,236,131	5,613	4,213,585	
1974-75	1,816,512	2,965,310	2,035	4,783,857	
1975-76	1,674,872	1,832,484	45,293	3,552,649	
1976-77	1,035,316	3,103,895	16,384	4,155,595	
1977-78	584,090	1,099,279	1,350	1,684,719	74
1978-79	664,388	480,261	1,753	1,146,402	89
1979-80	853,584	489,365	4,871	1,347,820	82
1980-81	508,670	1,635,922	8,022	2,152,614	50
1981-82	183,899	1,371,821	4,143	1,559,863	53
1982-83	CLOSED	807,079	15,280	822,359	27
1983-84	CLOSED	188,027	4,504	192,531	17
1984-85	CLOSED	CLOSED	CLOSED	0	--
1985-86	CLOSED	CLOSED	CLOSED	0	--
1986-87	CLOSED	CLOSED	CLOSED	0	--
1987-88	CLOSED	CLOSED	CLOSED	0	--
1988-89	CLOSED	CLOSED	CLOSED	0	--
1989-90	CLOSED	CLOSED	CLOSED	0	--
1990-91	CLOSED	CLOSED	CLOSED	0	--

Note: Average pre 1984-85 closure catch = 3.44 million pounds per year.

Appendix D. Dungeness crab catch by year, Cook Inlet Management Area, 1961 - 1990.

Year	Southern district catch (lbs.)	Other districts catch (lbs.)	Total catch (lbs.)	No. of Vessels	No. of Landings
1961	193,683	0	193,683		
1962	530,770	0	530,770		
1963	1,665,599	11,605	1,677,204		
1964	417,005	6,036	423,041		
1965	74,211	0	74,211		
1966	12,523	117,037	129,560		
1967	7,168	0	7,168		
1968	484,452	3,407	487,859		
1969	49,894	0	49,894		
1970	209,819	0	209,819		
1971	97,161	0	97,161		
1972	38,930	0	38,930		
1973	308,777	1,271	310,048		
1974	718,729	2,514	721,243	38	619
1975	361,893	922	362,815	34	402
1976	118,903	395	119,298	19	123
1977	74,195	510	74,705	18	94
1978	1,212,571	3,208	1,215,779	49	668
1979	2,130,963	0	2,130,963	72	1,485
1980	1,875,281	0	1,875,281	54	1,183
1981	1,850,977	0	1,850,977	88	2,047
1982	818,380	505	818,885	108	2,310
1983	746,585	834	747,419	71	1,194
1984	799,638	570	800,208	102	1,687
1985	1,389,891	12,511	1,402,402	106	1,768
1986	550,968	12,894	563,862	83	1,069
1987	761,423	21,753	783,176	100	1,377
1988	677,334	41,941	719,275	84	1,305
1989	170,266	7,798	178,064	43	455
1990	28,938	564	29,502	23	112

Note: Average catch 1978-1990 = 1.01 million pounds per year.

Appendix E. Trawl shrimp catches in the Kachemak Bay trawl shrimp fishery in the Cook Inlet Management Area, 1969-1991.

SEASON	NUMBER OF VESSELS	CATCH (lbs)			
		JUN 1-OCT 31	NOV 1-MAR 31	APR 1-MAY 31	TOTAL
1969-70 ^a	7	1,289,656	1,692,854	889,330	3,871,840
1970-71 ^a	3	3,211,924	2,076,228	617,836	5,905,988
1971-72 ^a	7	2,618,630	1,761,569	140,707	4,520,906
1972-73 ^a	10	2,772,422	2,109,660		4,882,082
1973-74 ^b	13	2,502,154	2,323,780		4,825,934
1974-75	4	2,512,764	2,519,148		5,031,912
1975-76	4	1,997,563	2,421,456		4,419,019
1976-77	5	2,545,885	2,453,101		4,998,986
1977-78	7	2,490,969	2,546,977		5,037,946
1978-79	6	2,952,733	3,060,066		6,012,799
		JUL 1-SEP 30	OCT 1-DEC 31	JAN 1-MAR 31	
1979-80	7	2,013,298	2,052,646	1,731,483	5,797,427
1980-81	15	1,780,298	2,691,746	1,704,706	6,177,129
1981-82	23	1,614,868	1,686,781	1,693,850	4,995,499
1982-83	15	998,522	1,012,388	1,009,857	3,020,767
1983-84	10	CLOSED	CLOSED	525,508	525,508
1984-85	10	519,651	528,506	518,529	1,566,686
1985-86	5	488,606	257,782	503,340	1,249,728
1986-87	3	504,206	CLOSED	CLOSED	504,206
1987-88	0	CLOSED	CLOSED	CLOSED	0
1988-89	0	CLOSED	CLOSED	CLOSED	0
1989-90	0	CLOSED	CLOSED	CLOSED	0
1990-91	0	CLOSED	CLOSED	CLOSED	0

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^aCatches listed for comparative purposes by seasons established in 1973.

^bJune 1 - October 31 and November 1 - March 31 seasons with respective guidelines established.

Appendix F. Abundance index estimates of commercial species of Pandalid shrimp (millions of pounds) in the Southern District (Kachemak Bay), by sampling period and year, based on pounds of shrimp caught per one nautical mile tow (traditional stations only).

MONTH	YEAR	MEAN CATCH (lbs/tow)	NUMBER OF STATIONS	% ERROR	ABUNDANCE INDEX (Mill. of lbs.)	RANGE (Mill. of lbs.)
<u>SPRING</u>						
May	1971	130.2 ^a	56	20.0	3.7	3.0 to 4.5
May	1972	271.1 ^a	66	35.5	7.7	5.0 to 10.5
May	1973	592.8 ^a	59	27.8	16.9	12.2 to 21.6
Jun	1974	476.6 ^a	30	22.8	13.6	10.5 to 15.7
May	1975	1,136.9 ^b	37	27.9	16.2	11.7 to 20.7
May	1976	541.3	36	28.3	7.7	5.5 to 9.9
Jun	1977	407.9	40	17.1	5.8	4.8 to 6.8
May	1978	810.9	36	25.2	11.5	8.6 to 14.5
May	1979	743.7	41	20.9	10.6	8.4 to 12.8
May	1980	513.7	39	19.5	7.3	5.9 to 8.7
May	1981	486.1	37	18.4	6.9	5.6 to 8.2
May	1982	306.8	38	21.8	4.4	3.4 to 5.3
May	1983	204.0	37	24.8	2.9	2.2 to 3.6
May	1984	282.3	34	34.2	4.1	3.0 to 5.2
May	1985	197.5	34	39.7	3.2	1.9 to 4.5
May	1986	157.2	34	50.9	2.6	1.3 to 4.0
May	1987	178.8	34	45.2	3.0	1.6 to 4.3
May	1988	247.5	33	45.0	4.1	2.3 to 6.0
May	1989	90.5	31	65.9	1.5	0.5 to 2.5
May	1990	106.5	33	87.1	1.7	0.2 to 3.2
<u>FALL</u>						
Oct	1976	719.8	33	21.6	10.3	8.0 to 12.5
Nov	1977	738.1	36	28.9	10.5	7.5 to 13.5
Oct	1978	1,160.3	32	25.5	16.5	12.3 to 20.7
Oct	1979	1,133.3	32	23.3	16.1	12.4 to 19.9
Oct	1980	1,689.4	37	19.3	24.1	19.4 to 28.7
Oct	1981	604.8	35	26.9	7.9	5.8 to 10.0
Oct	1982	519.2	36	26.3	7.4	5.4 to 9.3
Oct	1983	481.3	36	36.6	6.9	4.9 to 8.8
Oct	1984	531.9	35	26.3	7.6	6.1 to 9.1
Oct	1985	284.9	34	32.0	4.1	2.8 to 5.4
Sep	1986	154.0	34	37.9	2.6	1.6 to 3.6
Sep/Oct	1987	227.0	34	66.1	3.8	1.3 to 6.3
Nov	1988	152.3	28	64.8	2.5	0.9 to 4.2
Sep	1989	84.8	32	49.0	1.4	0.7 to 2.1
Sep/Oct	1990	80.3	34	54.5	1.3	0.6 to 2.1

^a66' Nordby net, 50% assumed net efficiency.

^bFrom this survey to present, a 61' NMFS net with 100% assumed net efficiency has been used.

Appendix G. Historical average numbers of pink shrimp (Pandalus borealis) per pound, by area, from laboratory measurements of samples taken during ADF&G trawl shrimp surveys in the Southern District (Kachemak Bay) of the Cook Inlet Management Area.

Year	East of Homer Spit				West of Spit	
	Closed area		Open Area		# shrimp per lb.	No. of Samples
	# shrimp per lb.	No. of Samples	# shrimp per lb.	No. of Samples		
SPRING SURVEY						
1971	213.4	23	230.3	13	159.6	54
1972	203.0	20	185.3	8	137.3	72
1973	167.2	15	230.4	4	152.0	55
1974	125.6	3	133.8	3	126.0	23
1975	143.5	2	154.6	5	135.9	25
1976	157.8	4	169.6	10	107.5	32
1977	142.7	11	144.7	8	109.0	33
1978	163.6	4	155.0	5	123.7	33
1979	203.3	5	170.7	6	126.6	21
1980	190.1	4	173.6	5	112.0	23
1981	190.9	4	193.1	5	111.7	20
1982	177.2	5	180.8	4	106.8	17
1983	176.2	4	151.3	5	102.6	10
1984	224.2	5	177.5	4	98.5	11
1985	244.3	5	193.8	4	199.0	1
1986	229.4	5	155.5	3	NO DATA	0
1987	275.9	5	134.2	4	111.8	2
1988	237.8	6	125.8	9	104.1	7
1989	201.8	6	131.4	8	98.9	7
1990	185.7	6	136.3	9	102.2	12

-continued-

Year	East of Homer Spit				West of Spit	
	Closed area		Open Area		# shrimp per lb.	No. of Samples
	# shrimp per lb.	No. of Samples	# shrimp per lb.	No. of Samples		
FALL SURVEY						
1976	144.1	1	NO DATA	0	112.5	2
1977	164.0	2	NO DATA	0	144.1	3
1978	159.6	1	148.1	1	133.4	4
1979	NO DATA	0	149.8	2	135.0	5
1980	183.0	1	150.8	2	135.4	3
1981	182.0	5	112.9	4	127.7	13
1982	181.9	5	202.0	3	106.8	9
1983	232.7	5	198.9	4	146.2	2
1984	205.8	5	183.8	4	142.6	10
1985	246.7	4	190.0	1	247.5	4
1986	230.7	5	215.3	4	131.4	2
1987	184.4	5	114.3	4	NO DATA	0
1988	167.0	6	126.8	10	83.9	1
1989	193.0	6	167.4	9	109.0	6
1990	158.5	6	134.9	7	79.5	7

Appendix H. Trawl shrimp catches in Outer Cook Inlet (Area G),
Cook Inlet Management Area, 1977-91.

Season	Number of Vessels	Catch (lbs.)
1977-78	2	26,556
1978-79	1	1,245
1979-80	0	0
1980-81	1	4,000
1981-82	2	19,454
1982-83	4	239,584
1983-84	7	760,430
1984-85	11	1,957,959
1985-86 ^a	4	421,063
1986-87	2	297,762
1987-88	1	22,231
1988-89	1	4,878
1989-90	0	0
1990-91	0	0

^aRegulatory season of 1 June through 28 February adopted by
the Alaska Board of Fisheries in spring, 1985.

Appendix I. Pot shrimp harvest in Area H, Cook Inlet Management Area, 1969-91.

Season	Catch (lbs.)			Total	Vessels
	JUN 1 - SEP 30	OCT 1 - MAY 31			
1969-70					
1970-71	3,606	7,602		11,208	
1971-72	8,836	70,601		79,437	
1972-73	75,247	184,230		259,477	
1973-74	63,181	738,165		801,346	
1974-75	43,650	126,472		170,122	
1975-76	100,765	273,758		374,523	
1976-77	52,115	199,559		251,674	26
1977-78	85,511	511,938		597,449	51
1978-79	49,080	121,234		170,314	41
1979-80	59,963	177,927		237,890	49
	<u>JUN 1 - SEP 15 Vessels</u>	<u>NOV 1 - DEC 31 Vessels</u>	<u>FEB 1 - MAR 31 Vessels</u>		
1980-81	74,368	134,275	104,716	313,359	30
1981-82	56,092	47,859	49,885	153,836	45
1982-83	54,153	49,130	52,339	155,622	40
1983-84	21,438	CLOSED	CLOSED	21,438	15
1984-85	25,874	28,151 ^a	22,080	76,105	22
	<u>JUN 1 - SEP 15 Vessels</u>	<u>OCT 1 - DEC 31 Vessels</u>	<u>FEB 1 - MAR 31 Vessels</u>		
1985-86	27,312	20,737	24,048 ^b	72,097	25
1986-87	24,844	20,188	30,257	75,289	37
1987-88	26,216	5,416 ^c	CLOSED	31,632	30
1988-89	5,323 ^d	CLOSED	CLOSED	5,323	9
1989-90	CLOSED	CLOSED	CLOSED	0	
1990-91	CLOSED	CLOSED	CLOSED	0	

^aSeason extended through 1/31/85.

^bSeason extended through 4/5/86 due to eruptions of Augustine volcano and subsequent ash fallout.

^cSeason closed by E.O. on 11/13/87 due to low CPUE and high incidence of small shrimp.

^dSeason closed by E.O. on 6/22/88 due to limited amount of CPUE information and depressed stocks.

Appendix J. Pot shrimp catch and effort in Outer Cook Inlet
(Area G), Cook Inlet Management Area, 1977-90.

Season	Number of Vessels	Catch (lbs.)
1977	6	1,776
1978	11	10,157
1979	5	4,211
1980	3	2,911
1981	5	2,031
1982	7	2,805
1983	13	18,679
1984	5	5,504
1985	6	3,305
1986	4	2,967
1987	9	12,458
1988	7	13,445
1989 ^a	8	20,500 ^b
1990	5	8,853

^aSeason closed from April 30 through July 7 due to *Exxon Valdez* oil spill.

^bIncludes 600 lbs. deadloss, oiled spot shrimp.

Appendix K. Pacific weathervane scallop (Pecten caurinus) catches, Cook Inlet Management Area, 1983-90.

Year	District	Number of Vessels			Catch (lbs) of Shucked meats
1983	Kamishak			1	2,346
1984	Kamishak			3	6,305
1985 ^a	Kamishak			1	11,810
1986	Kamishak			3	15,364
1987	Outer			1	1,128
	<u>Kamishak^b</u>			<u>2</u>	<u>360</u>
	'87 Total			2	1,488
1988	NO	EFFORT	IN	COOK	INLET
1989	NO	EFFORT	IN	COOK	INLET
1990	NO	EFFORT	IN	COOK	INLET

^aSeason and harvest guideline set by regulation.

^bSeason closed by E.O. on August 21, 1987, one week after opening, due to low C.P.U.E.

Appendix L. Harvest of hardshell clams, Cook Inlet Management Area, 1986-90.

Year	No. of Permits	No. of Landings	Pacific Little necks	Butter Clams	Cockles	Total Pounds
1986	5	18	17,303	0	0	17,303
1987	8	69	12,214	206	2,347	14,767
1988	2	32	14,449	0	0	14,449
1989	9	41	2,584	13,675 ^a	3,581 ^b	19,840
1990	19	62	35,744 ^c	0	0	35,744

^aIncludes 13,348 pounds sold as otter food as a result of Exxon Valdez oil spill.

^bIncludes 1,981 pounds sold as otter food as a result of Exxon Valdez oil spill.

^cIncludes 50 pounds of Eastern soft shell clams (Mya arenaria).

Appendix M. Harvest of blue mussels (Mytilus edulis), Cook Inlet Management Area, 1986-90.

Year	No. of Permits	No. of Landings	Blue Mussel Total Pounds
1986	0	0	0
1987	1	2	102
1988	0	0	0
1989	9	98	167,243 ^a
1990	2	10	10,600

^aIncludes 165,268 pounds sold as otter food as a result of Exxon Valdez oil spill.

Appendix N. Harvest of razor clams (Siliqua patula), Cook Inlet Management Area, 1919-1990.

Year	Pounds	Year	Pounds
1919	76,963	1955	0
1920	11,952	1956	0
1921	72,000	1957	0
1922	510,432	1958	0
1923	470,280	1959	0
1924	156,768	1960	372,872
1925	0	1961	277,830
1926	0	1962	195,650
1927	25,248	1963	0
1928	0	1964	0
1929	0	1965	0
1930	0	1966	0
1931	No record	1967	0
1932	93,840	1968	0
1933	No record	1969	0
1934	No record	1970	0
1935	No record	1971	14,755
1936	No record	1972	31,360
1937	8,328	1973	34,415
1938	No record	1974	0
1939	No record	1975	10,020
1940	No record	1976	0
1941	0	1977	1,762
1942	0	1978	45,931
1943	0	1979	144,358
1944	0	1980	140,240
1945	15,000	1981	441,949
1946	11,424	1982	460,639
1947	11,976	1983	269,618
1948	2,160	1984	261,742
1949	9,672	1985	319,034
1950	304,073	1986	258,632
1951	112,320	1987	312,349
1952	0	1988	392,610
1953	0	1989	222,747
1954	0	1990	323,533

Appendix O. Octopus (Octopus dofleini) harvests in the Cook Inlet Management Area (H).

Year	No. of Vessels	No. of Landings	Total Pounds
1986	8	16	435
1987	21	57	4,512
1988	17	43	5,569
1989	N O	R E P O R T E D	L A N D I N G S
1990	3	6	1,343

Appendix P. Green sea urchin (Strongylocentrotus droebachiensis) harvest, Cook Inlet Management Area, 1987-90.

Year	No. of Permits	Total Pounds
1987	1	224
1988	N O	E F F O R T
1989 ^a	1	15,181
1990	N O	E F F O R T

^aSeason extended, from June 1989 through February 1990 (normal season September 15 through December 15).

Appendix Q. Sea cucumber (Parastichopus californicus) harvest,
Cook Inlet Management Area, 1990.

Year	No. of Permits	Total Pounds
1990	2	22,525