Prince William Sound Management Area Shellfish Report to the Alaska Board of Fisheries

By: Wayne Donaldson

Regional Informational Report[1] No. 2C90-01

Alaska Department of Fish and Game
Division of Commercial Fisheries, Central Region
333 Raspberry Road
Anchorage, Alaska 99581

March 1990

[1] Contribution 90-01 from the Cordova area office. The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate timely reporting of recently collected information, reports in this series undergo only limited internal review and may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author or the Division of Commercial Fisheries.

TABLE OF CONTENTS

LIST OF TABLES

APPENDIX TABLES

LIST OF FIGURES

INTRODUCTION

This report documents the most recently completed shellfish fisheries in the Prince William Sound Management Area (Area E). Area E is comprised of all waters of Prince William Sound and the Gulf of Alaska from Cape Fairfield on the west to Cape Suckling on the east.

These fisheries are: 1989 Dungeness crab (Cancer magister) fishery, 1989 pot shrimp fishery, and the 1989-90 trawl shrimp fishery. The pot and trawl shrimp fisheries were interrupted during the aftermath of the Exxon Valdez oil spill. The brown king crab fishery (Lithodes aequispina) was closed for the entire 1989-90 season due to oil.

The Tanner crab fishery remained closed during the 1990 season due to low stock abundance. No commercial effort occurred during 1989 for razor clams (Siliqua patula) although the season was open.

Shellfish landings from Area E during the past year included, 635,796 pounds of Dungeness crab and 24,478 pounds of pot shrimp. Data on landings from the trawl shrimp and miscellaneous shellfish fisheries are confidential because of the small number of participants.

The ex-vessel value by fishery was $642,154 for Dungeness crab and $89,100 for pot shrimp. The ex-vessel value of trawl shrimp and miscellaneous shellfish fisheries is also confidential.

TANNER CRAB FISHERY

Introduction

The area's Tanner crab (Chionoecetes bairdi) resource has historically been the number one shellfish resource in terms of landed weight. The fishery started in 1968 and has produced over 74 million pounds during 22 fishing seasons. Historically, the harvest was roughly split between the Gulf of Alaska and Prince William Sound.

The area is divided into four Tanner crab management districts (Figure 1). The Northern and Hinchinbrook Districts include most inside waters while the Eastern and Western Districts encompass the Gulf of Alaska portion of the management area and the southwestern Sound.

Tanner crab fishing began in 1968 when 1.2 million pounds were landed. The fishery peaked during the 1972-73 season when 13.9 million pounds were taken. The entire area experienced decreasing harvests during the late 70's and early 80's. These decreasing harvests preceded large area closures during the 1984 and 1985 seasons (Appendix Table 1).

The recent ten year average annual harvest is 1.5 million pounds. This average includes three years when there was no fishery. More than 65% of the harvest during this 10 year period was from the Gulf of Alaska portion of the management area.

During the most recent Tanner crab fisheries, 1986 to 1988, the waters inside of Prince William Sound have been the most productive. More than 90% of the harvest was taken within the

Sound during this time.

The decline of Prince William Sound Tanner crab stocks is generally attributed to both the over harvest of immature and mature males and harvest of females prior to the adoption of the minimum size limit of 5.3 inches in 1976. For example in 1974, 3.8 million pounds were harvested of which 2.7 million pounds were below the current minimum size limit.

Lengthy seasons also had significant adverse effects on the stocks due to excessive trapping, handling and lost gear. Seasons from 1974 through 1981 lasted seven months.

Unfavorable environmental conditions may also be responsible for the sharp decline of Tanner crabs in the Gulf of Alaska portion of the management area.

The Tanner crab fishery reopened in 1986 after a two year absence of fishing. The intent of this fishery was to allow for the harvest of crabs which had been on the grounds for several years and were considered excess to the reproductive needs of the stock. It is likely that some of these crabs would have succumbed to natural mortality if not harvested. The harvest was 0.54 million pounds. The majority of crabs taken during the 1986 season were postrecruits (74%).

The Department's 1986 summer survey of the Tanner stock indicated that the stock size was stable. Increased catches of recruit and prerecruit crabs prompted the Department to set the guideline for the 1987 season at 0.5 million pounds.

The 1987 season harvest of 0.57 million pounds was similar to the 1986 harvest, however, recruit crabs comprised one half of the harvest. The increase in the percent of recruits is attributed to

the removal of old-shell crabs during the 1986 season along with moderate recruitment during 1987.

The Department's 1987 summer survey indicated that the abundance of recruit and prerecruit crabs was not increasing therefore a conservative approach to the 1988 fishing season was taken. In-season harvest statistics confirmed that recruitment was declining therefore the harvest was limited to 0.47 million pounds.

During 1988, the annual stock survey revealed a decline in the legal segment of the stock. The average catch of legal crabs declined from 11.1 crabs/pot in 1987 to 4.1 crabs/pot in 1988. Both recruit and prerecruit abundance also declined to historic survey lows. In conjunction with the decline in survey catch was a coincidental decrease in the geographic area which the stock was occupying. Two areas within Prince William Sound which had moderate catches of Tanner crab during 1986 and 1987 were nearly devoid of crab during the 1988 survey. This information prompted the Department to close the 1989 Tanner crab fishery.

The annual stock survey in 1989 indicated a small improvement in the stock size over 1988. The index of legal males increased from 4.1 to 6.7 crabs/pot. Similarly the index of prerecruit-1 males increased from 1.2 crabs/pot in 1988 to 3.1 crabs/pot in 1989. Although stock abundance improved over 1988 the stock size remains small. The last commercial fishery occurred in 1988 when the index of legal males was 11.1 crabs/pot.

During the past year the Department saw evidence that the Bitter Crab Disease exists in Prince William Sound. During November a sample of juvenile crab from upper Montague Strait was found to have an infection rate of three percent. This disease is characterized by poor meat quality, a pink carapace and milky hemolymph. According to biologists in Southeast Alaska, the

disease results in 100% mortality of infected crabs.

1991 Management Outlook

Based on results of the 1989 stock assessment survey, recruitment is not expected to markedly increase in 1989, therefore a fishery in 1991 is improbable. The small resurgence of recruit crabs seen on the 1986 and 1987 surveys was not sustained. The Department will continue to monitor the stock on an annual basis.

The propagation of weak year classes are a direct function of diminished reproductive capacity. This reduction was caused by the over harvest of legal, sublegal and even female crabs during the lengthy seasons of the 1970's.

The Department's near term goal is to provide maximum reproductive potential, reduce handling and trapping losses and when possible allow small fisheries, similar to the 1986 thru 1988 seasons.

Favorable environmental conditions for shellfish coupled with decreased predation by bottomfish will increase year class strength. The Department plans to maintain reproductive potential to set the stage for recovery when ocean conditions favor shellfish production.

KING CRAB FISHERY

Introduction

Three species of king crab are found in the Prince William Sound Management Area. Red (Paralithodes camtschatica), blue (Paralithodes platypus) and brown (Lithodes aequispina). Red king crabs have the most extensive distribution, occurring in most inside waters of the Sound. The blue king occurs in the Port Wells - Harriman Fjord area with other small isolated pockets associated with glacial fjords in the western Sound. The brown king is found in the central and western Sound at depths of 150 - 400 fathoms. Waters in the Gulf of Alaska portion of the management area have no known concentrations except for a very sparse distribution of brown king crab.

The abundance of red king crab is ascertained during Tanner crab surveys. An annual index (since 1977) is established to track the red king crab population. Brown and blue king crab populations are assessed by commercial fishery dockside interviews and size frequency analysis.

Catch reporting by species did not begin until the 1979-80 season (Appendix Table 2), however, the harvest of nearly 300,000 pounds in 1972 is believed to be primarily blue king crab.

During the previous 11 years, when catch was recorded by species, the stocks of both blue and red king crab have declined. Fishery closures for blue and red king crab resulted in a shift in effort to brown king crab. The recent five year average annual harvest (1984 - 1988) of brown king crab is 55,000 pounds.

The Alaska Board of Fisheries, at the spring 1988 meeting, adopted a guideline harvest range of 40,000 - 60,000 pounds for brown king crab in Area E. This range was adopted to help stabilize the legal segment of the brown king crab stock from recent declines in average size, weight and distribution.

The regulatory season opens throughout Prince William Sound on October 1 and closes on December 20. A second season opens on January 5 and closes by regulation March 15. This split season allows a two week period when gear must be removed from the fishing grounds. This closure was designed to eliminate preemption of grounds prior to the Tanner crab fishery which until 1988 began on January 5. The Alaska Board of Fisheries established a season opening for Tanner crab on January 15 at the 1988 meeting thus a proposal is submitted to align the opening of these two seasons.

1989-90 Season Summary

Fishing for brown king crab was not opened during the 1989-90 fishing season due to concerns of oil contamination. Due to the continued low abundance of the red and blue king crab stocks, fishing for these species remained closed.

1990-91 Management Outlook

The Department plans to open the brown king crab season on October 1, 1990. The Department will once again target the midpoint of the guideline harvest range as a preseason harvest estimate. Dockside samples and interviews will be used to adjust the harvest level. The Department will analyze recruitment, average size, total weight

and catch distribution in deciding the actual harvest. The catch is expected to be comprised of crabs similar in size to the 1988-89 season as prerecruit abundance was reported to not be increasing. Effort is expected to be similar to the past few seasons.

Some fishermen report decreased amounts of sublegal crabs on the grounds. If the 1990 season indicates that prerecruit abundance is low then a conservative approach should be taken and the harvest limited to the lower end of the guideline harvest range. When assessing the short history of exploitation of brown king crab, it is apparent that this stock is small. Since 1982, the geographic range of commercial quantities of crab has declined, the average size and weight have also declined.

Blue king crab is scheduled to remain closed for the 1990-91 season based on the 1986-87 season fishery performance. Increased recruitment due to immigration is highly unlikely. There is a low probability that the stock is related to other blue king crab populations in Alaska because of geographic isolation. While fishing during the last regulatory season in 1986-87, fishermen reported few undersize male and female blue king crabs, thus a recovery of the stock is not expected in the near term.

Red king crab will be assessed during the annual Tanner crab survey. Interviews with both commercial brown king crab and subsistence crab fishermen will be used to gain an impression of the strength of the red king crab population. Red king crab survey catches remain low. No fishery is anticipated until a healthy increase in the red stock occurs on an area wide basis.

DUNGENESS CRAB FISHERY

Introduction

Historically, the major Dungeness crab harvests have come from two areas of Prince William Sound: (1) Orca Inlet District and (2) Copper River District (Figure 2). Dungeness are also harvested from the Orca Bay portion of the Northern District as well as from small populations in western Prince William Sound, however, these harvests have been proportionately small. The Northern District harvest is either taken incidental to the Tanner crab fishery or by one or two vessels targeting on Dungeness crab.

Orca Inlet, which is immediately adjacent to the community of Cordova, had once provided a fishery that allowed participation by small vessels in an area protected from adverse sea conditions. The very largest vessels fishing this area were in the 40 foot seiner class. Most vessels made 1-day trips and delivered each fishing day. This district has a 100 pot limit.

The Copper River District fishery, which has a 250 pot limit, is a spring and fall fishery due to a regulatory closure for soft crabs during the summer months. This area is not sheltered from the Gulf of Alaska and the longer running distance to market generally requires larger vessels. Beginning in 1987, fishing in the Copper River District was allowed by regulation from March 20 to May 20. A regulatory closure extends from May 20 to July 25. The season reopens from July 25 to December 31, except for the Controller Bay area which closes on October 15. This early closure is designed to reduce gear loss from storms in this area of shallow water and quicksand.

The July 25th reopening was delayed via emergency order in 1987 and 1988 until the crabs had attained an acceptable shell hardness. The opening date in 1987 was August 20, and the opening date in 1988 was September 15.

Prior to 1987, fishing during the molting period was regulated entirely by emergency order. The current season was established to prevent fishing during the major molting period (Figure 3).

The Northern District is open year-round.

1989 Season Summary

The 1989 catch of Dungeness crab in the Prince William Sound Management Area was 635,976 pounds harvested by 9 vessels (Appendix Table 3). Catch by statistical area is listed in Table 3. The average ex-vessel price was $1.01 per pound resulting in a fishery value of approximately $642,000. Production and effort was similar to the 1988 season.

Copper River District

The 1989 catch from the Copper River District was 635,976 pounds harvested by 9 vessels. The spring season opened by regulation on March 20 and continued through May 20 with little effort.

The fall season opened by regulation on July 25. A survey by the Department during mid-July indicated that less than 5% of the male crab captured by pots were soft, therefore, the season was allowed to open on July 25. Effort on the grounds did not begin until mid-

August and continued through mid-November.

Dockside sampling for both the spring and fall fisheries estimate recruitment at 25% of all crabs landed for the year (Figure 4). The average weight of crabs sampled was 2.0 pounds and the average size was 6.9 inches, carapace width.

Orca Inlet District

Orca Inlet District opens September 1, by emergency order only, and closes on May 31. The September opening occurs only if an adequate abundance of Dungeness crabs exists and if the annual molt has been completed.

The season was not opened in 1989, as it hasn't been since 1980. There are few males of any size remaining on the grounds. The abundance of male crabs is not expected to increase in the near future.

The reason for the continued suppression of the Dungeness crab population in Orca Inlet is predation by the sea otter. The otter arrived in large numbers during 1980 and immediately impacted the Dungeness crab stock. According to a recent study, when Dungeness crabs are available, otters are capable of eating 10 crabs per day.

Emergency order closures have been in effect for the subsistence fishery since September 1981, and the personal use fishery since 1988.

Northern District

No harvest occurred from the Northern District in 1989. This district was open from January 1 until April 30 when an emergency order was issued closing the district due to oil. The district has limited Dungeness habitat and a low production history.

The eastern portion of Orca Bay, which adjoins Orca Inlet, provides Dungeness crabs for both the Orca Inlet and Northern Districts. Crabs generally move from Orca Bay into Orca Inlet during the summer and return to the deeper waters of Orca Bay in the winter.

1990 Management Outlook

Vessel effort during the spring fishery is expected to increase over the 1989 level. Reduced harvests during the December and January Dungeness fisheries of Oregon, California and Washington will most likely result in more vessels travelling north to participate in Alaskan fisheries. The spring harvest will be mainly harvesting postrecruit crabs.

The Department plans to monitor the summer molt. If the molting period is prolonged, an emergency order will be issued to delay the regulatory opening of July 25.

Figure 4, indicates that the majority of crabs harvested in 1989 were postrecruits. This infers that the harvest of crabs from previous fisheries was low enough to allow escapement. This escapement provided a substantial quantity of crabs which fishermen were able to harvest in 1989.

Orca Inlet will continue to be surveyed, however, a recovery is not anticipated as the sea otter population does not appear to be declining. The Department's annual survey in the Inlet also indicates that a fishery in the near term is not imminent.

The Northern district will remain open year-round.

POT SHRIMP FISHERY

Introduction

The Prince William Sound pot shrimp fishery was first documented in 1960 when 4,100 pounds were harvested. From 1960 until 1977 catches varied from no reported harvest in 1962 and 1966 to a high of 20,000 pounds in 1974 (Appendix Table 4).

The pot shrimp fishery expanded rapidly after 1978 with increases in both catch and participants. Growth of the fishery was most rapid from 1978 through 1982. During this time local markets were being established and the major harvesting areas were being located. Catch increased from 12,000 pounds in 1978 to 178,000 pounds in 1982. Similarly, effort increased from 9 to 57 vessels during this period. Harvests were stable from 1982 through 1984 due to a management strategy which employed the following:

1) Elimination of year-round fishing, and seasons set to avoid fishing during peak egg bearing periods.

2) Establishment of a guideline harvest range, based on historical harvests.

In September of 1984 the Alaska Board of Fisheries established three fishing areas with a management plan for each (Figure 5). These areas were: Traditional Harvest Area, Montague Strait Experimental Harvest Area and the Eastern Harvest Area.

The Traditional Harvest Area includes most of the known pot shrimp stock and has been the most productive of the three areas. This area encompasses the north shore from Port Valdez to Whittier and all of the western and southwestern Sound. Two regulatory fishing seasons were established: a spring season beginning on March 15 and continuing until June 30 and a fall season from August 15 to December 15. The annual guideline harvest range is 150,000 - 200,000 pounds split evenly between the two seasons. Either season may be closed earlier by emergency order if the harvest level is achieved. If excessive harvests occur during the spring season the poundage is deducted from the fall season. Additionally, any harvest in the Montague Strait Experimental Harvest Area taken during the open Traditional Area season is included into the Traditional Area harvest guideline.

The Montague Strait Experimental Harvest Area was established to gain year around fishery performance data. Some fishermen claimed that catch would increase with year-round fishing and that restrictive management was blocking the harvest of large quantities of spot shrimp in the Montague Strait area. Harvest was unregulated and depended only upon effort and success. Mandatory logbooks allow fishery performance to be tracked. Fishermen were not allowed to concurrently fish both the Traditional and Experimental Areas.

The eastern Sound, which has a very low production history, was also designated as a year-round fishery. Permits required for this area allow the monitoring of effort and catch.

The western and northern portions of Prince William Sound, which are characterized by numerous steeply cut glacial fjords, comprise the majority of pot shrimp harvests (Traditional Harvest Area). This area is accessed through the ports of Whittier, Valdez and Seward, which have direct transportation ties with the Anchorage metropolitan area. This accessibility has been the key to development of fresh markets for unprocessed spot shrimp. Shrimp fishermen have been able to develop markets where their product can be utilized shortly after capture.

The Prince William Sound pot shrimp fishery is unique in that it draws upon fishermen who fish with varying degrees of intensity, from full time participants to seasonal and weekend fishermen. This heterogeneous mix has often times split the industry as to the desired season of harvest.

1989 Season Summary

The 1989 commercial harvest of pot shrimp in the Prince William Sound Management Area was 24,478 pounds (whole shrimp weight). The harvest by species was: spot 24,118, and coonstripe 360 pounds. The harvest was taken by 33 vessels which made 69 landings. Catch by statistical area is listed in Table 4.

Ex-vessel value of pot shrimp varies with the count of shrimp tails per pound and the marketing strategy. A greater value is placed on the larger shrimp. Ex-vessel values range from $2.23/lb. - $5.45/pound for tails. The average price/pound was $3.64 and the fishery was worth approximately $89,100 to the fishermen.

Traditional Harvest Area

The 1989 spring season for the Traditional Harvest Area opened by regulation on March 15 and was closed by emergency order due to oil on April 3, 1989. The emergency order to close the fishery was issued on March 28. At the time of the closure the Department planned to allow a fall fishery beginning on August 15, in the Traditional Harvest Area.

The preseason guideline harvest range for the spring 1989 season was 50,000 to 70,000 pounds. The harvest range was reduced from the 75,000 to 100,000 pound range established by the Board in 1985.

In addition to the reduced harvest range, waters of the entire southwestern section of the Traditional Harvest Area and the entire Montague Strait Experimental Harvest Area were closed during the spring season (Figure 6).

The reduction in harvest range for the spring season was due to:

1) The decrease of 16,000 pounds, which was the average spring harvest in the southwestern section of the Traditional Harvest Area from 1985 - 1988.

2) The subtraction of 5,000 pounds, which was the average harvest taken in the Montague Strait Experimental Harvest Area from 1986 and 1987 and applied toward the Traditional Harvest Area guideline from 1986 and 1987.

3) A recent decline in expected harvests in other open waters which have shown signs of weakening.

Harvest statistics from the shortened 1989 spring season indicate that catch/landing was 358 pounds. The same portion of the spring 1988 fishery had a catch/landing of 471 pounds. The 1989 harvest represents a 26% decline in catch/landing when comparing the early portion of both the 1988 and 1989 seasons.

Reviewing these harvest statistics, the Department set the fall season guideline at 56,000 to 76,000 pounds. The fall guideline consisted of a core guideline of 30,000 to 50,000 pounds and an additional 26,000 pounds remaining from the lower end of the spring guideline which was not harvested due to the shortened season.

The core guideline of 30,000 to 50,000 pounds was based on a reduced abundance of shrimp (from landing data) and a small area open to fishing.

The fall season did not open as was expected, due to oil. Although some bays were free of oil the Department could not conduct an orderly fishery in a small area. During past fall seasons between 43 to 54 vessels have participated. A similar level of effort and a greatly reduced area open to fishing would cause an unorderly harvest. The concentrated effort would also result in an excessive harvest and handling of unsalable shrimp from a small area. Since the stock of shrimp is declining, a season of this type would be detrimental to the long term health of this fishery.

Conversations with fishermen over the past two years and fish ticket data indicate that the stock of pot shrimp is declining in selected locations of the Traditional Harvest Area. The area of most immediate concern is the southwestern Sound, statistical areas 201-00 and 201-02. In area 201-02 the catch/landing decreased from 989 pounds in 1987, to 310 pounds in 1988. Statistical area 201-00 declined from 589 pounds/landing in 1987 to 386 in 1988 (Appendix Table 5). Fishermen who regularly fish this portion of

the Sound have confirmed this decline.

Other locations in the Traditional Harvest Area do not appear to have taken such a drastic decline, however, fish ticket data shows a decline in the shrimp stock is affecting most of the Traditional Harvest Area (Appendix Table 6).

The record of catch/landing (1985 - 1988) for the Traditional Harvest Area is as follows: For 1985 the overall catch/landing was 400 pounds. During 1986 and 1987 the average was 422 and 448 pounds. The 1988 average was 373 and the shortened 1989 season was 358 pounds/landing.

Montague Strait Experimental Harvest Area

The Montague Strait Experimental Harvest Area, although designated as a year-round fishery, was closed on October 3, 1988. This area was open continuously since January 1, 1985.

The justification for the closure was twofold. First, the annual harvest had been declining since 1986. The diminishing harvests indicated that the stock of pot shrimp was declining from the effects of unregulated year-round fishing. As a conservation measure, the Department closed the area until the Board has reviewed fishery performance of the area. Secondly, fish ticket data indicated that the catch per landing of 491 pounds was below the average of the prior three years which was 698 pounds/landing.

During 1988, landings were made during January, February, March and June. The Experimental Area was created to provide harvest data on a continuing basis, however, no landings were recorded during July, August or September (Appendix Table 7). The Experimental

Area has ceased providing continuous fishing data as specified in the management plan. Three of the four vessels fishing the area in 1988 did not provide log books with their fish tickets as required in the management plan.

The highest annual harvest was in 1985 when 18 vessels harvested 46,984 pounds. Harvest in 1986 was similar at 46,347 pounds. Catch declined in 1987 to 22,411 pounds and in 1988 the harvest through September was 1,964 pounds. Since 1985 the number of vessels fishing this area has declined from 18 to 4.

Eastern Prince William Sound

Harvest and effort were minimal during 1989. Due to the small number of participants the catch information is confidential. This area was open from January 1 to April 3 and also from August 15 to December 31. The closure from April through August was due to oil.

1990 Management Outlook

The total harvest for all of Prince William Sound is expected to increase from the oil shortened season in 1989. The Department will once again request accurate and complete fish tickets. Obtaining accurate and complete fish tickets has been a management problem over the course of this fishery. As a recent example, several fishermen during 1989 submitted fish tickets to the Department over one year after landing. One vessel operator submitted late tickets for over 12,000 pounds. It was later discovered that his vessel was in dry dock. Other vessel operators simply forget to mail their fish tickets on time.

Delinquent gear is another problem which plagues this fishery as well as other shellfish fisheries. In late May of 1989 a Department vessel retrieved over 600 shrimp pots, which were not retrieved when the pot shrimp season was closed due to the oil spill. A number of these pots contained spot shrimp.

The Department believes that effort data, when provided on fish tickets, can indicate stock trends for pot shrimp by area. The fishing effort of 40 to 50 vessels with information from various areas of Prince William Sound is extremely valuable.

Figure 7 is a size frequency of the spot shrimp resource in Prince William Sound. This data was collected in November of 1989 and represents 264 pot lifts from six sites (Unakwik Inlet, Port Wells, Culross Passage, Herring Bay, Chenega Island and Green Island). The pots were covered with solid black fabric and the tunnel entrances were covered with 1/2 in webbing. The pots were set to cover a variety of depths at each location. No attempt was made to optimize the catch or target a specific size range.

This figure illustrates the effect of removing commercially valuable shrimp by the commercial fishery. A pronounced decline occurs above 30 mm (30 mm corresponds to about 57 tails/pound). The average catch of females was one/pot whereas the average male catch was 18/pot. Approximately 95% of the females were bearing eggs.

The November survey was the first pot shrimp stock assessment survey ever conducted in Prince William Sound. Additional surveys are necessary to track growth and abundance. The Department will continue a stock assessment survey for the immediate future.

Spot shrimp growth data from a tagging study in Prince William Sound indicates that growth is about 10% of the carapace

length/year. This information means that the large spike of males from Figure 7 will slowly move into the salable size range. At the present time these shrimp are unsalable due to their size, however, they are captured and retained by shrimp pots during the commercial fishery. As a means of protecting this stock component the Department is proposing a mesh restriction to help protect these young males.

Another way to protect the stock is to limit the annual harvest. Limiting the harvest will reduce the handling mortality of small unsalable males, conserve females for egg production, and protect the larger males which will be transforming to females shortly and contribute to egg production. The females and larger males appear to be low in number from previous fishing effort.

Traditional Harvest Area

The preseason harvest estimate for the 1990 Traditional Harvest Area spring season is 30,000 pounds with a range of 20,000 to 40,000 pounds. The Department will monitor the catch. If catch rates continue to decline the harvest will be held to the lower end of the guideline, likewise an increase will allow the harvest to achieve the higher end of the range. Waters of the southwestern Sound as well as those of the Montague Strait Experimental Harvest Area will be closed for the spring 1990 season. Other waters may be closed if oil persists.

A conservative approach to the 1990 spring season is warranted for the following reasons:

1) Harvest statistics indicate that the stock is declining in most areas of Prince William Sound.

2) Size information from the Department's survey in November 1989 indicates that there is a moderately strong spike of unsalable male shrimp which need protection from fishing induced handling mortalities.

3) The average number of egg bearing females appears low, therefore the remaining females, which are targeted in the fishery, need protection to continue egg production.

4) Spot shrimp are long lived and relatively slow growing. Since they are long lived and slow growing, fishing mortalities must be maintained at or below the level of replacement. If harvests exceed the level of replacement the stock declines. If the resource is over harvested the slow growing spot shrimp will require many years to recover, providing that small shrimp are available to grow to a harvestable size.

5) The pot shrimp fishery has accelerated rapidly over the past ten years. The indication from test fishing and recent declines in the commercial fishery suggest that the harvest has been too high.

The stock of spot shrimp in the southwestern Sound and the Montague Strait Experimental Harvest Area is depressed. These waters have recently experienced a large decline in shrimp abundance.

Results from the shortened 1989 spring fishery also indicate that the pot shrimp stock is declining in waters that are projected to open in 1990. Harvest statistics from the shortened 1989 spring season indicate that catch/landing was 358 pounds. During the spring 1988 season the early portion of that fishery had a catch/landing of 471 pounds. The 1989 harvest represents a 26%

decline in catch/landing when comparing the early portion of both the 1988 and 1989 seasons.

Several fishermen have expressed concern with the harvest of egg bearing females during the early portion of the spring season. The current best estimate, based on logbook information, indicates that egg bearing females harvested during the early portion of the spring fishery can comprise 30% of the catch. The Department shares this concern of harvesting females shortly before egg release.

Figure 8 shows the percent of large females bearing eggs in the Montague Experimental Area by month from 1985 - 1988. Egg release begins in March continuing through April. During May, June and July almost all large shrimp were non egg bearing.

Eastern Prince William Sound

The Department plans to allow year-round fishing in this area during 1990. Total production from the eastern Sound has been limited and no significant quantities of pot shrimp exist. All shrimp landings to date have occurred within Prince William Sound. The Gulf of Alaska portion of this area does not provide the habitat required for pot shrimp. Continued fishing will not jeopardize the major stock in the central and western Sound.

TRAWL SHRIMP FISHERY

Introduction

Recent emphasis in the trawl shrimp fishery has shifted from the harvest of pink shrimp in southwestern Prince William Sound to sidestripe shrimp in the northwestern Sound. Large Kodiak based vessels harvesting pink shrimp were the primary user group during the early 1980's. The increased harvests of sidestripe shrimp began in 1985. Development of markets and gear by small vessels, on stocks which were previously unfished, is the reason for the sudden expansion. The pink shrimp fishery has declined due to low ex-vessel value of pink shrimp, limited processing capabilities and poor pink shrimp stock conditions (Appendix Table 8).

The trawl fishery targeting on sidestripe shrimp initially developed around the Icy Bay area in southwestern Prince William Sound. The first documented harvests occurred in 1983, however, recent activity has focused on the northwestern Sound (Figure 9). The sidestripe fishery is characterized by smaller vessels than those targeting on pink shrimp. Sidestripes are generally marketed whole and fresh in the Anchorage area. One processor is marketing these shrimp in Japan.

The Board of Fisheries at their spring 1986 shellfish meeting established new season dates of March 1 through November 30 for sidestripe shrimp fishing in northwestern Prince William Sound. The season dates and gear requirements were adopted as a result of a public proposal. The season was based on a difference in the egg bearing period for sidestripe shrimp in the northwestern Sound from other areas in Prince William Sound. Gear requirements for March and April require a minimum mesh size of 1 5/8 inch stretched,

throughout the cod end, hung horizontal and perpendicular to the mouth of the trawl. The large mesh was instituted to allow the escape of small sidestripe and pink shrimp.

Regulatory measures for trawl shrimp:

1) A March-April closure during the peak egg release period in southwestern and central Prince William Sound for pink shrimp.

2) A 250,000 - 600,000 pound guideline harvest range for the Icy Bay District, which is in the southwestern Sound.

3) A December - February closure during peak egg release period in the northwestern sound for sidestripe shrimp.

4) Cod end mesh restriction during March and April along with a 10% maximum limit on pink shrimp per landing during this time in the northwestern Sound.

5) A year-round closure in the eastern Prince William Sound (Port Fidalgo, Orca Bay and Hinchinbrook Entrance) to minimize mortality of king and Tanner stocks in this key production area.

6) A June through August season in the Northern Herring Fishing District to avoid conflict with herring season closures.

1989 Season Summary

Landings of sidestripe shrimp were interrupted by oil in 1989. The harvest was less than the 1988 level, however, is confidential due to the small number of participants. Sidestripes were harvested from late March through November in the northwestern Sound.

The average ex-vessel value for sidestripe shrimp was $1.46 per pound, whole shrimp weight.

The customary pink shrimp fishery in Icy Bay and Port Bainbridge located in southwestern Prince William Sound had no landings. The season was open from May 1 through February 28.

The trawl fishery in Simpson Bay, which is in eastern Prince William Sound, was not opened during the past registration year. Normally this area is opened concurrently with the Tanner crab season to provide trawlers an opportunity to harvest bottomfish, which is sold as hanging bait to the crab fleet, and shrimp. The Tanner crab fishery was closed in 1990, therefore this area was not opened. Trawl caught shrimp have not been taken from this area since 1984.

1990 Management Outlook

The outlook for 1990 is a continuation of the sidestripe fishery with effort and landings above the 1989 level. Several vessels have recently shown interest and are expected to participate during 1990.

As a method of obtaining information on effort and life history events, the Department is supportive of extending the Commissioners permit for the entire fishing season in the northwestern Sound as suggested in a public proposal. Information on pounds/hour towed, species composition, soft-shell periods, egg bearing and releasing times are important stock parameters which can be gained through the efforts of the participants.

The Department will collect information on the egg bearing period for sidestripe shrimp to allow a future assessment of the fishing season. Effort has steadily increased over the past several years. As effort increases the Department is concerned that the season length may not be an adequate measure to protect trawl shrimp stocks. The season is currently open for nine months/year in the northwestern Sound. Catch rates are indicative of a small stock. The Department is concerned that the amount of fishing time may result in future stock declines. The Department is considering placing a guideline harvest range on areas that receive the most fishing pressure.

The Department does not conduct stock surveys for pink shrimp or sidestripe shrimp. Due to the low ex-vessel value for pink shrimp, there is not expected to be any effort in the southwestern Sound for pink shrimp.

RAZOR CLAM FISHERY

Introduction

Beginning in 1916 and continuing until the mid 1950's Cordova was known as the "razor clam capital of the world". Although historical fishery statistics are imprecise, it appears that the majority of clams were harvested from Orca Inlet and the western Copper River Delta (Figure 10). The eastern Copper River Delta, which includes Kanak Island, was not a substantial contributor to the early harvests. Catches in this era ranged from 3.6 million pounds in 1917 to a frequent harvest of over one million pounds. Most of the product was canned and ultimately used for human consumption.

The razor clam industry began to decline in the 1950's for a number of reasons: economic - the east coast clam fishery gained economic dominance; biological - substrate change caused largely by alteration in the Copper River outflow, which severely affected juvenile survival; and perhaps over utilization by the commercial fishery. In the late 50's and early 60's commercial demand for razor clams shifted from human consumption to Dungeness crab bait. The "Good Friday Earthquake" in 1964 caused significant uplift in prime razor clam habitat in Orca Inlet. This additional loss of habitat resulted in record low harvests in the 70's and early 80's (Appendix Table 9). The bulk of the production since the mid 70's has come from the eastern Copper River Delta which includes Kanak Island.

The demand for razor clams for human consumption increased again in 1983. A decline in clam abundance in Washington led to an expanded fishery in Prince William Sound. During the past five

seasons almost all clams have been taken at Kanak Island Beach with minor amounts harvested from Softuk and Katalla beaches on the eastern Delta.

Harvests during the 1980's have not exceeded 170,000 pounds with a recent ten year (1979 - 1988) average annual harvest of 48,000 pounds. The average number of diggers during this time was 20.

A guideline harvest range of 100,000 to 150,000 pounds is in effect for both commercial and subsistence harvests from Kanak Island. The minimum legal size of clams is 4.5 inches in length. Commercial diggers may only harvest razor clams from Kanak Island for human consumption. Although Kanak Island is designated for food clams, the Department has difficulty enforcing this regulation. Sand bars near Kanak, which are exposed at low or minus tides have been the recent source of bait clams. The Department believes that harvest of some bait clams are actually being taken from Kanak. For enforcement purposes the Department has defined Kanak Island as all tidelands which have a physical land connection with Kanak Island during any tide stage.

The Department tracks the subsistence harvest through a permit system. There are two major subsistence uses: home use, and commercial crab fishermen digging their own bait for Dungeness crab fisheries in Icy Bay and the Copper River Delta.

1989 Season Summary

There was no commercial harvest in 1989.

Kanak Island usually receives annual certification by the Alaska Department of Environmental Conservation. The certification by

D.E.C. allows bivalves to be sold for human consumption. Because there was no effort the beach was not inspected in 1989.

The reported subsistence harvest was 2,903 pounds. The Department issued 90 subsistence permits for the Delta. Fifty permits were returned. Harvest from Kanak Island was 2,561 pounds, Softuk Bar 182 pounds, Katalla beach 120 pounds, and Pete Dahl Bar 40 pounds.

Historically crab fishermen have dug subsistence clams for use as bait during their commercial operations. During 1989 there was no reported harvest by crab fishermen which may be due to either non reporting of subsistence use, or availability of bait clams through commercial facilities.

1990 Management Outlook

Effort should resume during 1990 unless other more lucrative forms of employment develop on oil spill cleanup. Ex-vessel value has not substantially increased for several years. Bait and food clams command a similar price per pound. The local bait clam market appears stable and unless an increased demand for food clams occur, the harvest should remain well below the guideline harvest range of 100,000 to 150,000 pounds set for the beach at Kanak Island. If effort increases at Kanak Island the Department will monitor the beach via catch per unit of effort data.

Some subsistence diggers, who have dug clams for many years on the Delta, have reported a lack of razor clams on Katalla Beach. Some diggers are speculating that since Kanak Island was designated as a food only beach in 1985, that effort increased for bait clams at Katalla Beach where clams are not as numerous. Due to the concentration of bait diggers at Katalla beach during the past few

seasons a decrease in the availability of subsistence clams is being reported.

MISCELLANEOUS SHELLFISH

A small quantity of squid was captured during commercial shrimp fishing. Due to the small number of participants the exact harvest information is confidential.

Table 1. 1990 Commercial Tanner Crab Catch by Statistical Area.

Statistical Area	Number Of Vessels	Total Pounds
	-Fishery Closed-	
Total	0	0

Table 2. 1989-90 Commercial Brown King Crab Catch by Statistical Area.

Statistical Area	Number Of Vessels	Total Pounds
	-Fishery Closed-	
Total	0	0

Table 3. 1989 Commercial Dungeness Crab Catch by Statistical Area.

Statistical Area	Number Of Vessels	Total Pounds
202-03	4	68,787
202-04	9	384,574
202-05	9	182,435
Total	9	635,796

Table 4. 1989 Commercial Pot Shrimp Catch by Statistical Area.

Statistical Area	Number Of Vessels	Total Pounds
201-00	-Data is Confidential-	--
201-01	-Data is Confidential-	--
203-00	6	1,991
203-01	8	5,459
203-02	-Data is Confidential-	--
203-03	8	10,471
203-04	8	4,753
203-06	-Data is Confidential-	--
203-07	-Data is Confidential-	--
Total	33	24,478

Table 5. 1989 Commercial Trawl Shrimp Catch by Statistical Area.

Statistical Area	Number Of Vessels	Total Pounds
	-Data is Confidential-	

Table 6. 1989 Commercial Razor Clam Harvest by Statistical Area.

Statistical Area	Number Of Vessels	Total Pounds
	-No Effort-	
Total	0	0

Table 7. Shellfish Emergency Orders issued, Prince William Sound Management Area, 1989-90.

Fishery	Emergency Order #	Effective Date	Explanation
Tanner	2-S-E-12-89	01/15/90	Commercial - Closed the entire management area to Tanner crab fishing due to low stock abundance.
	2-S-E-13-89	10/01/89	Personal Use - Closed Orca Bay to subsistenc fishing due to low stock abundance.
	2-S-E-14-89	10/01/89	Subsistence - Closed Orca Bay to personal use fishing due to low stock abundance.
King	2-S-E-15-89	10/01/89	Commercial - Closed entire management area t red and blue king crab fishing due to low stock abundance. Closed brown king crab fishing due to oil.
	2-S-E-16-89	10/01/89	Subsistence - Closed Hinchinbrook Entrance and Orca Bay to subsistence king crab fishing due to low stock abundance.
	2-S-E-17-89	10/01/89	Personal Use - Closed Hinchinbrook Entrance and Orca Bay to personal use king crab fishing due to low stock abundance.
Dungeness	2-S-E-07-89	04/30/89	Commercial - Closed the Northern District to fishing due to oil.
	2-S-E-01-90	02/01/90	Subsistence - Closed Orca Inlet to the subsistence harvest of Dungeness crab.
	2-S-E-03-90	02/01/90	Personal Use - Closed Orca Inlet to the personal use harvest of Dungeness crab.

-Continued-

Table 7. (page 2 of 2)

Fishery	Emergency Order #	Effective Date	Explanation
Pot Shrimp	2-S-E-04-89	03/15/89	Commercial - Closed the southwestern portion of the Traditional Harvest Area and the entire Montague Strait Experimental Harvest Area to fishing for the spring 1989 season due to a decline in shrimp abundance.
	2-S-E-05-89	04/03/89	Commercial - Closed the entire Prince William Sound Management Area due to oil spill.
	2-S-E-08-89	08/15/89	Commercial - Closed the southwestern portion of the Traditional Harvest Area and the Montague Strait Experimental Harvest Area, due to reduced shrimp stock and the presence of oil.
	2-S-E-09-89	08/15/89	Commercial - Closed the entire Traditional Harvest Area and the Montague Strait Experimental Harvest Area due to additional information which indicated oil was located in areas which were scheduled to open.
Trawl Shrimp	2-S-E-06-89	04/09/89	Commercial - Closed the entire Prince William Sound Management Area due to oil spill.
	2-S-E-10-89	08/15/89	Commercial - Extended the trawl shrimp closur in the Prince William Sound Management Area due to oil.
	2-S-E-11-89	08/25/89	Commercial - Opened the trawl shrimp fishery in Port Wells.
	2-S-E-18-89	12/06/89	Commercial - Extended the closure for trawl shrimp in southwestern Prince William Sound due to oil.
Razor Clams	2-S-E-02-90	02/01/90	Commercial - Closed Orca Inlet to the commercial harvest of razor clams due to low stock abundance.

Table 8. Prince William Sound shellfish ex-vessel value during the 1989-90 fishing seasons.

Fishery	Pounds	Price/lb.	Total Value
1990 Tanner Crab	- Season Closed -		---
1989-90 King Crab	- Season Closed -		---
1989 Dungeness	635,796	$1.01	642,154
1989 Pot Shrimp	24,478	$3.64	89,100
1989-90 Trawl Shrimp	- Data is Confidential -		---
1989 Razor Clams	0	---	---
1989 Miscellaneous Shellfish	- Data is Confidential -		---
Total			$731,254

All shrimp prices are based on whole shrimp weight.

Appendix Table 1. Prince William Sound Area historical Tanner crab catch in pounds, by season.

Season	Inside	Outside	Total	Vssls.	Lndgs.	% Re-cruit	Avg. Wt.	# Crab
1968-69			1,235,613					
1969-70			1,284,597					
1970-71			4,159					
1971-72			7,788,498					
1972-73			13,927,868					
1973-74	1,658,000	8,500,000	10,158,000					
1974-75	1,187,000	2,667,000	3,854,000					
1975-76	3,322,482	3,810,262	7,132,744					
	Northern	Hinchinbrook	Western	Eastern				
1976-77(1)	782,048	766,650	701,725	70,925	2,321,348	23	316			
1977-78	994,721	1,161,831	2,079,549	570,573	4,806,674	38	591		2.2	2,184,852
1978-79	649,977	708,562	2,248,545	3,443,471	7,050,555	51	783		2.1	3,357,408
1979-80	140,228	332,583	1,462,059	4,057,847	5,992,717	49	561		2.0	2,996,359
1980-81	152,196	812,352	1,561,207	250,076	2,775,831	30	304		2.1	1,321,824
1981-82	351,139	722,834	1,503,253	288,425	2,865,651	29	216		---	------
1982-83	471,422	31,447	921,663	45,308	1,469,840	40	304		2.1	699,924
1984 (2)	Closed	Closed	Closed	No Effort	0	0	0	--	---	------
1985	Closed	Closed	No Effort	No Effort	0	0	0	--	---	------
1986	137,720	236,241	160,829	587	535,377	14	35	26	2.1	254,941
1987	152,834	222,052	196,246	0	571,132	23	65	51	2.1	271,968
1988	55,929	226,509	191,654	0	474,092	21	46	34	2.1	225,758
1989	Closed	Closed	Closed	Closed	0	0	0	--	---	------
1990	Closed	Closed	Closed	Closed	0	0	0	--	---	------

(1) New districts established and first season of the minimum legal size.

(2) Calendar year season established.

Appendix Table 2. King crab catch, Prince William Sound Management Area, 1960 - 1990.

Year/Season	Pounds all species
1960	246,965
1961	236,081
1962	31,478
1963	43,569
1964	14,028
1965	5,500
1966	11,000
1967	41,800
1968	200,000
1969	48,100
1970	94,300
1971	144,200
1972	296,200
1973	207,916
1974	85,379
1975	53,423
1976-77	17,087
1977-78	86,595
1978-79	114,000

Seasons	Red	Blue	Brown	Avg. Wt. Brown	Total	Vessels	Landings
1979-80	52,026	13,662	0		65,688	18	109
1980-81	32,433	7,282	20		39,735	14	65
1981-82	25,358	5,634	0		30,992	11	43
1982-83	30,809	10,433	147,016	9.7	188,258	31	187
1983-84	16,467	5,324	50,535	8.8	73,226	18	69
1984-85	235	closed	40,232	--	40,467	4	14
1985-86	closed	closed	51,800	5.8	51,800	4	11
1986-87	closed	163	65,674	6.1	65,837	4	11
1987-88	closed	closed	68,270	6.6	68,270	4	15
1988-89	closed	closed	48,442	6.6	48,442	5	14
1989-90	closed	closed	closed	--	0	0	0

Appendix Table 3. Prince William Sound Area Dungeness crab catch, 1960 - 1989.

Year	Copper River Pounds	Lndgs.	Vessels	# Crab	Avg. Wt.	Percent Recruits	Orca Inlet Pounds	Vessels	Northern District Pounds	Lndgs.	Vessels	Total Pounds
1960	—	—	—	—	—	—	1,524,326	—	—	—	—	1,524,326
1961	—	—	—	—	—	—	990,242	—	—	—	—	990,242
1962	—	—	—	—	—	—	1,353,190	—	—	—	—	1,353,190
1963	—	—	—	—	—	—	1,216,846	—	—	—	—	1,216,846
1964	—	—	—	—	—	—	1,290,929	—	—	—	—	1,290,929
1965	—	—	—	—	—	—	1,240,372	—	—	—	—	1,240,372
1966	—	—	—	—	—	—	999,341	—	—	—	—	999,341
1967	—	—	—	—	—	—	NO DATA AVAILABLE		—	—	—	NO DATA AVAILABLE
1968	—	—	—	—	—	—	579,279	—	—	—	—	579,279
1969	336,696	—	—	—	—	—	541,822	—	—	—	—	878,518
1970	78,223	—	—	—	—	—	660,411	—	—	—	—	738,634
1971	78,848	—	—	—	—	—	430,976	—	—	—	—	509,824
1972	437,865	—	—	—	—	—	286,808	—	—	—	—	724,673
1973	458,613	—	—	—	—	—	347,764	—	—	—	—	806,377
1974	290,149	—	—	—	—	—	269,015	—	—	—	—	559,164
1975	654,410	—	—	—	—	—	163,631	—	—	—	—	818,041
1976	254,933	—	4	—	—	—	35,399	3	—	—	—	290,332
1977	506,751	—	4	—	—	—	228,858	23	—	—	—	735,609
1978	1,319,451	—	12	—	—	—	648,439	34	49,571	—	17	2,053,461
1979	504,770	—	19	—	—	—	123,245	32	20,924	—	16	652,924
1980	659,667	—	10	—	—	—	NO FISHING	—	31,152	—	5	690,819
1981	1,503,574	202	18	—	—	25	NO FISHING	—	5,683	11	5	1,509,257
1982	757,911	139	16	332,417	2.2	26	NO FISHING	—	4,221	4	2	762,182
1983	379,094	86	9	184,026	2.1	49	NO FISHING	—	511	14	2	379,605
1984	826,778	88	10	413,394	2.0	92	NO FISHING	—	150	2	2	826,938
1985	1,006,196	124	17	483,748	2.1	63	NO FISHING	—	1,233	5	1	1,007,429
1986	1,090,477	105	16	531,940	2.1	58	NO FISHING	—	0	—	—	1,090,477
1987	887,713	92	13	438,974	2.0	34	NO FISHING	—	5,461	2	2	893,174
1988	602,969	48	8	298,569	2.0	52	NO FISHING	—	0	—	—	602,969
1989	635,976	43	9	326,226	2.0	25	NO FISHING	—	0	—	—	635,976

Appendix Table 4. Pot shrimp harvest, Prince William Sound Management Area, 1960 - 1989.

Year	Vessels	Landings	Spot	Coonstripe	Other	Total Whole Wt.
1960						4,165
1961						---
1962						2,986
1963						919
1964						3,547
1965						3,637
1966						---
1967						625
1968						5,733
1969						4,297
1970						16,513
1971						10,916
1972						5,802
1973						5,319
1974						20,857
1975						3,465
1976						2,012
1977						6,276
1978	9	17	N/A	N/A	N/A	12,914
1979	17	98	N/A	N/A	N/A	43,594
1980	23	155	70,797	4,320	56	75,173
1981	51	509	127,769	16,746	388	144,903
1982	57	397	171,798	6,054	655	178,507
1983	71	646	165,930	11,789	487	178,206
1984	79	513	165,939	6,606	534	173,079
1985	78	528	227,060	3,272	718	231,050
1986	80	540	238,898	3,102	678	242,678
1987	86	498	221,865	3,169	126	225,160
1988	76	433	160,011	638	40	160,689
1989	33	69	24,118	360	0	24,478

Appendix Table 5. Traditional Harvest Area catch/landing by statistical area, 1987 - 1989

Stat Area	1989 # Landings	1989 # Pounds	1989 Pounds/ Landing	1988 # Landings	1988 # Pounds	1988 Pounds/ Landing	1987 # Landings	1987 # Pounds	1987 Pounds/ Landing
201-00	Confidential		--	35	13,513	386	64	38,314	589
201-01	Confidential		--	4	3,230	808	6	5,387	898
201-02	Closed		--	4	1,240	310	13	12,855	989
203-00	12	1,991	166	97	22,376	224	127	30,573	241
203-01	15	5,459	364	64	27,826	435	57	33,412	586
203-02	Confidential		--	20	3,805	190	19	3,883	204
203-03	18	10,471	582	108	33,025	306	80	32,046	401
203-04	14	4,753	340	90	52,544	584	75	41,474	553
203-05	No landings		--	1	202	202	0	0	--
Total	68	24,366	358	423	157,761	373	441	197,944	448

Appendix Table 6. Synopsis of the Prince William Sound pot shrimp fishery, Traditional Harvest Area seasons, 1985 - 1989 (whole shrimp weight).

Year	# Vessels	# Landings	# Pounds	Pounds/ Landing	# Fishing Days
			SPRING SEASON		
1985	59	248	104,109	420	69
1986	51	252	90,941	361	73
1987	54	218	106,396	488	48
1988	56	213	87,130	409	38
1989	33	68	24,366	358	19
			FALL SEASON		
1985	43	202	75,666	375	67
1986	48	214	105,796	494	51
1987	54	223	91,548	410	38
1988	47	210	70,631	336	49
1989	--	--	--	--	--

Appendix Table 7. Catch and effort in the Montague Strait Experimental Harvest Area by month, 1985 - 1988.

	1985			1986		
	Vessels	Landings	Pounds	Vessels	Landings	Pounds
Jan.	8	10	5,681	2	2	1,441
Feb.	10	13	7,784	5	9	6,979
March	10	12	6,824	6	7	7,314
April	2	2	2,179	3	3	3,956
May	1	1	1,470	0	0	0
June	3	5	2,116	4	5	1,553
July	4	10	3,302	5	14	5,911
Aug.	3	5	2,226	2	3	1,166
Sept.	1	1	810	0	0	0
Oct.	1	1	1,453	6	10	6,131
Nov.	1	1	1,561	7	8	11,216
Dec.	5	9	11,578	2	2	680
Total	18	69	46,984	15	63	46,347

	1987			1988		
	Vessels	Landings	Pounds	Vessels	Landings	Pounds
Jan.	2	2	3,435	1	1	381
Feb.	4	6	8,911	1	1	242
March	2	3	3,285	1	1	476
April	1	1	1,132	0	0	0
May	3	4	1,924	0	0	0
June	3	4	1,246	1	1	865
July	4	7	1,179	0	0	0
Aug.	3	4	799	0	0	0
Sept.	0	0	0	0	0	0
Oct.	0	0	0	--	--	closed
Nov.	1	1	324	--	--	closed
Dec.	1	1	176	--	--	closed
Total	12	33	22,411	4	4	1,964

Appendix Table 8. Trawl shrimp harvest, Prince William Sound Management Area 1972 - 1989.

Year	Vessels	Pounds
1972		5,153
1973		4,243
1974		1,345
1975		26,961
1976		134,115
1977		170,757
1978	8	440,684
1979	4	634,518
1980	6	557,328
1981	4	70,560
1982	9	346,517

Year	Vessels	Landings	Pink	Sidestripes	Other	Total
1983	13	46	420,275	1,058	2,345	423,678
1984	14	55	1,292,643	8,842	1,155	1,302,640
1985	6	44	432,514	15,696	440	448,650
1986	3	44	218,156	27,701	13	245,870
1987	2	109	275	95,043	440	95,758
1988	4	99	497	111,898	52	112,447
1989	*	*	*	*	*	*

(*) Catch data is confidential due to the small number of participants.

Appendix Table 9. Razor clam harvest in pounds, Prince William Sound Area, 1960 - 1989.

Year	Commercial Diggers	Commercial Pounds	Subsistence Users	Subsistence Pounds
1960		433,930		
1961		261,628		
1962		208,698		
1963		86,340		
1964		39,275		
1965		86,477		
1966		27,063		
1967		98,446		
1968		72,806		
1969		26,887		
1970		27,909		
1971		37,972		
1972		30,326		
1973		30,318		
1974		29,747		
1975		15,443		
1976		1,516		
1977	11	2,160		
1978	54	29,865		
1979	26	12,904		
1980	21	5,881		
1981	7	28,970		
1982	12	15,275		
1983	41	124,835		
1984	41	168,426		
1985	25	60,274	37	4,930
1986	17	13,122	38	4,831
1987	12	40,954	83	6,225
1988	4	6,766	52	2,768
1989	0	0	50	2,903

1. A subsistence permit is required to harvest razor clams from the Copper River Delta.

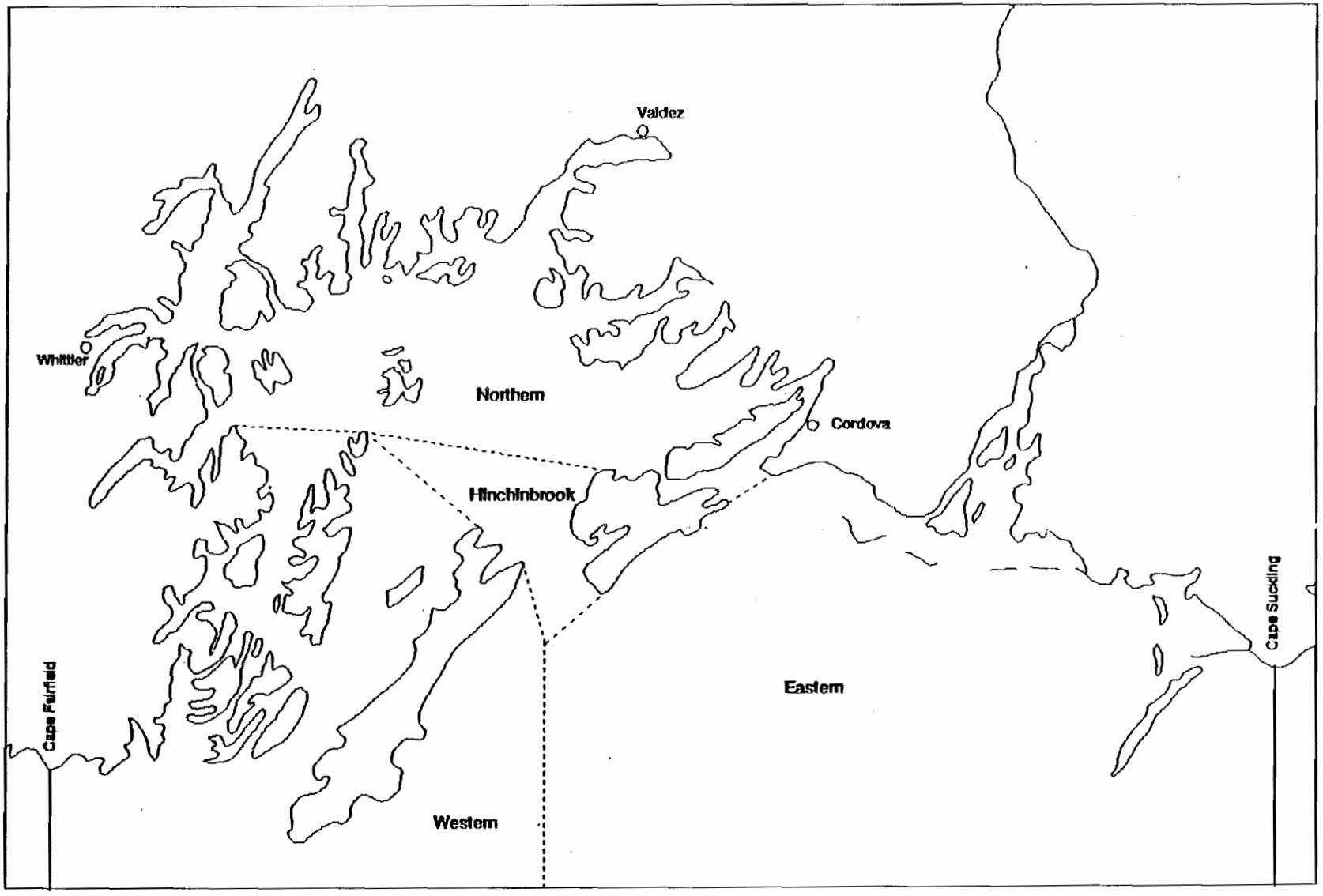

Figure 1. Prince William Sound Tanner Crab Fishing Districts

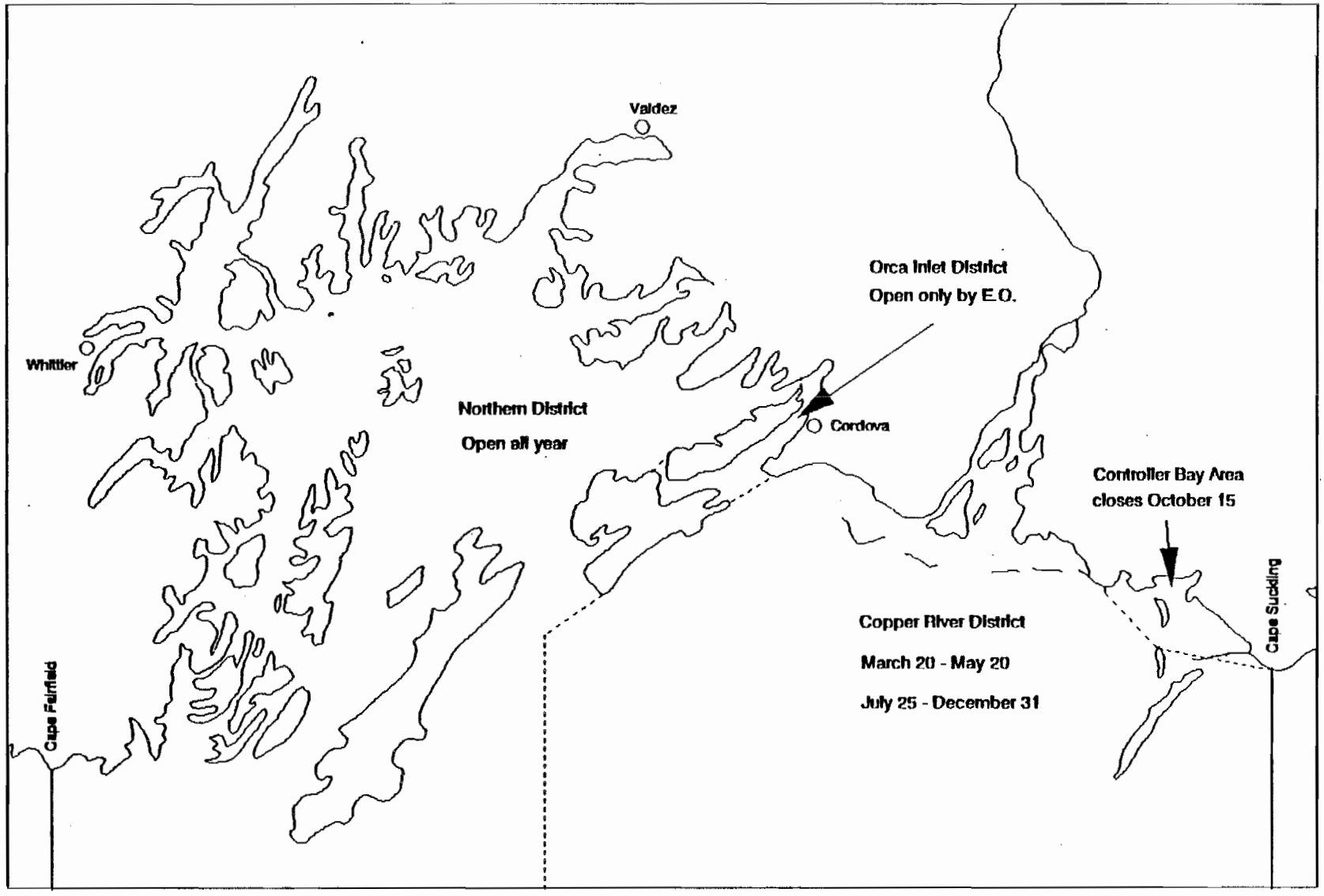

Figure 2. Prince William Sound Dungeness Fishing Seasons and Districts

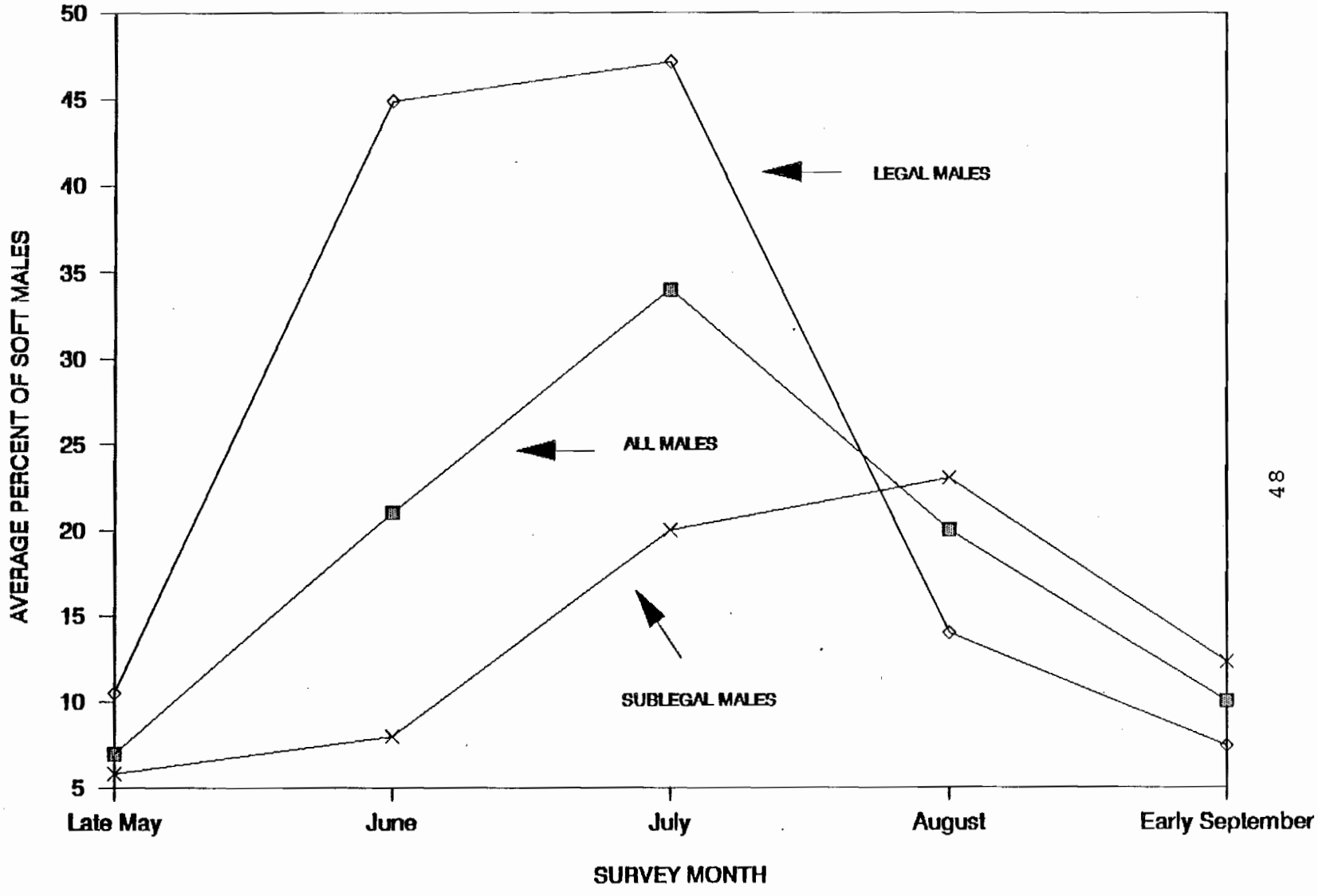

Figure 3. Average Male Softshell Percent from the Copper River District, captured with pots, 1985 - 1988.

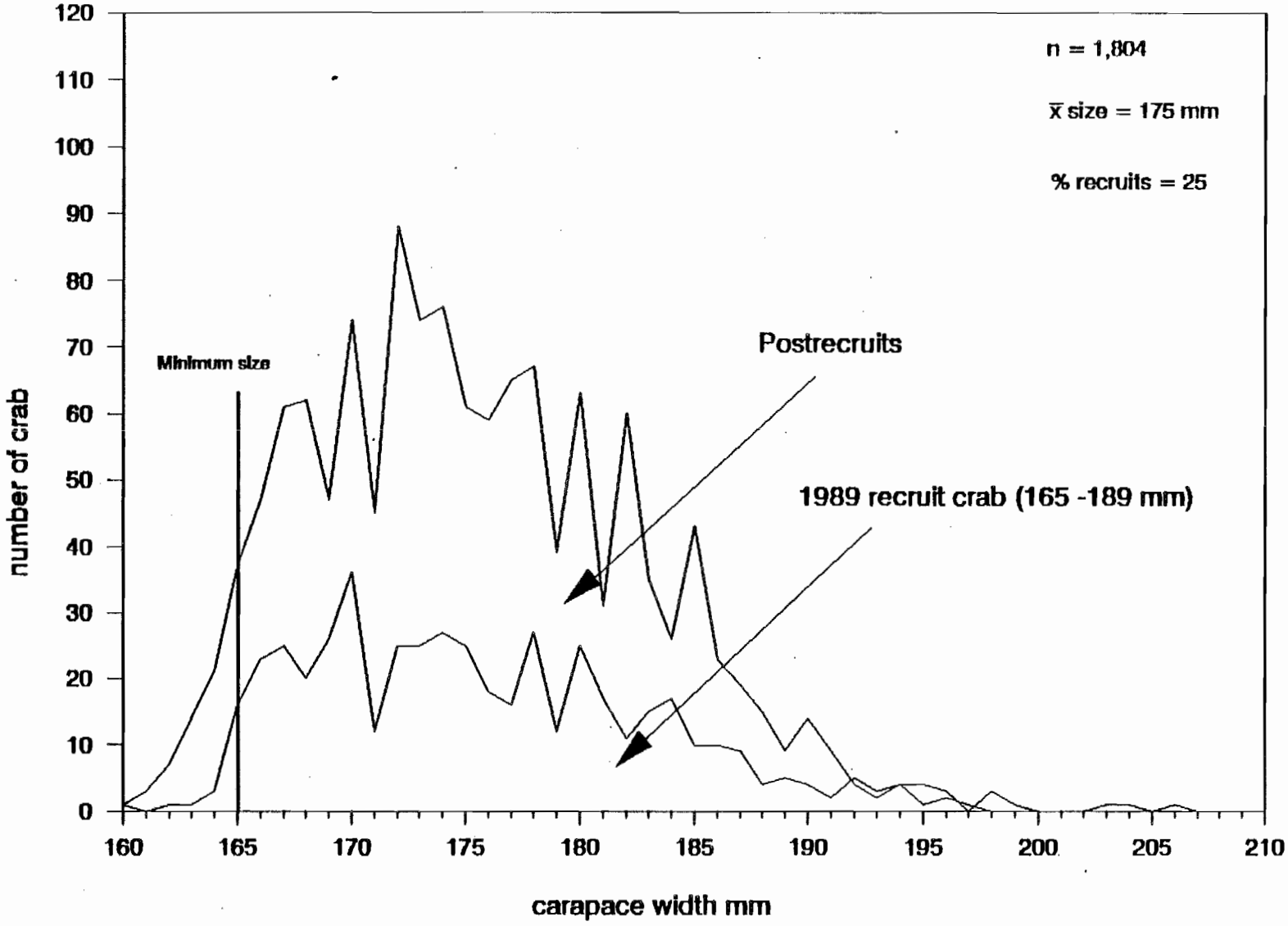

Figure 4. Copper River District Dungeness Size Frequency, 1989.

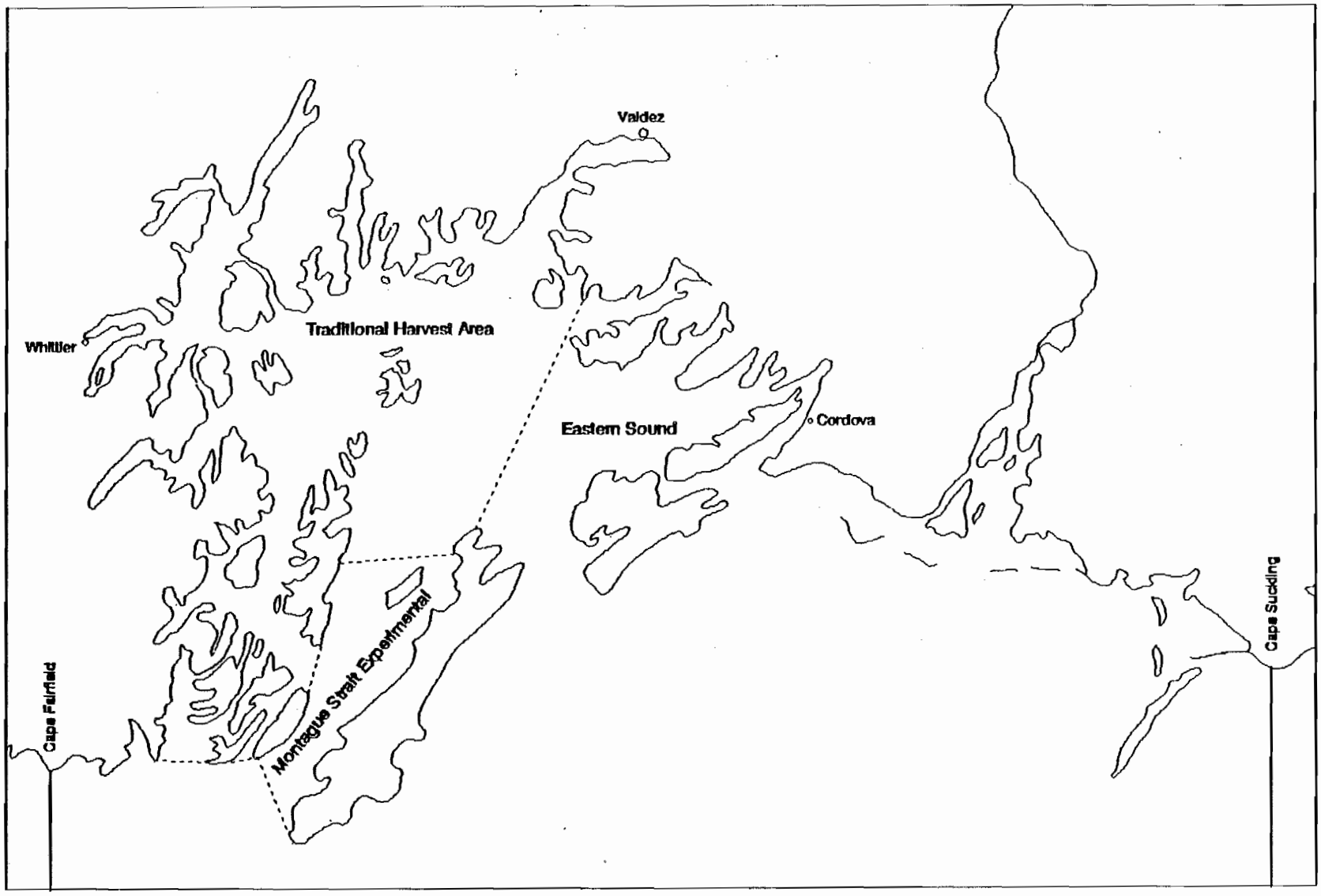

Figure 5. Prince William Sound Pot Shrimp Management Areas.

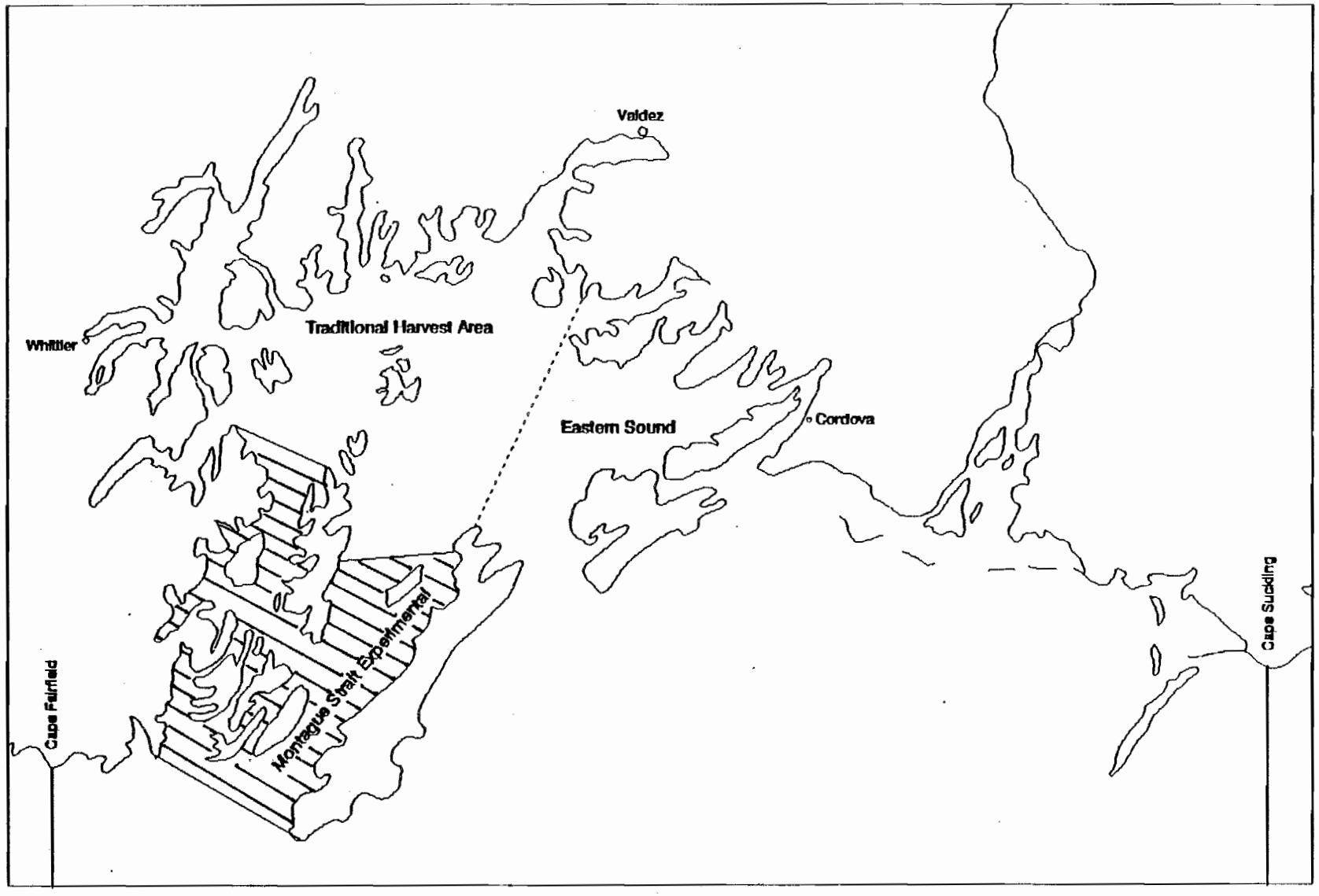

Figure 6. Closed Waters for the 1989 Spring Pot Shrimp Fishery.

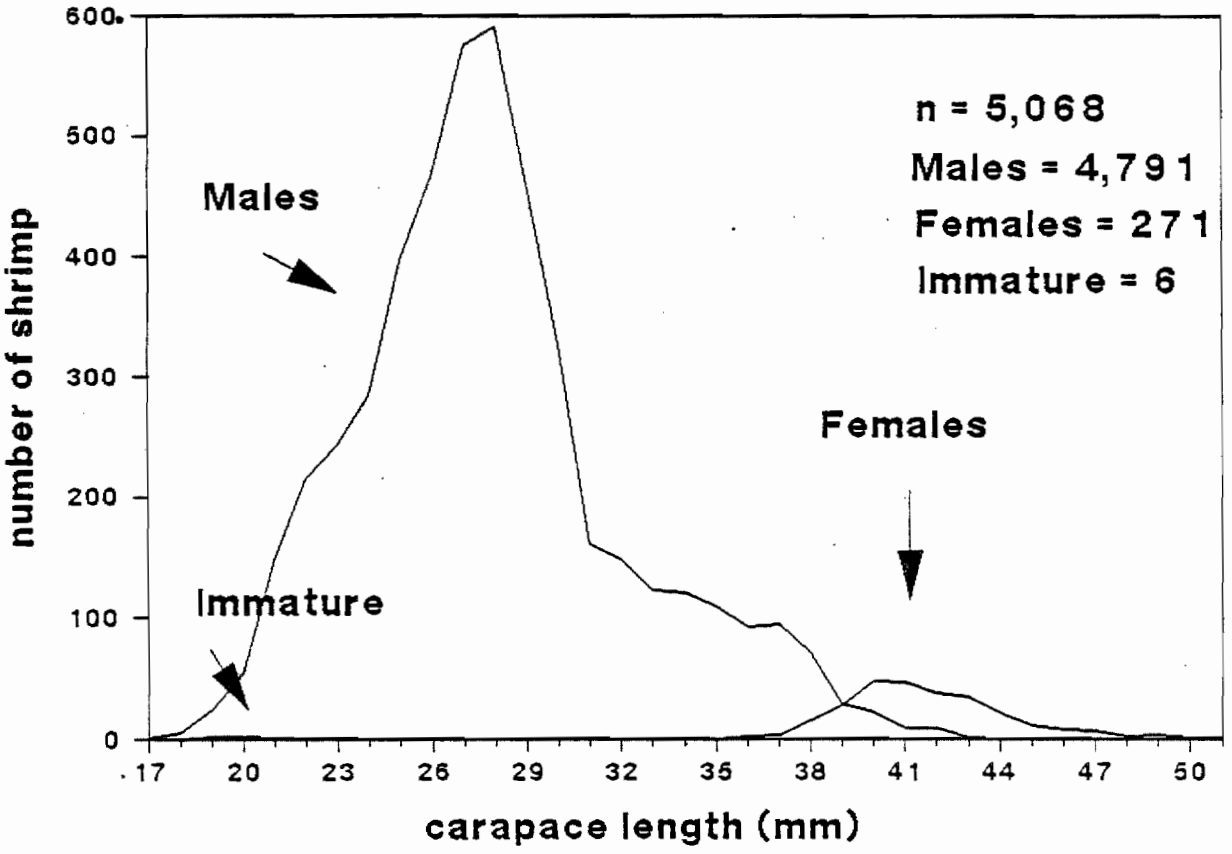

Figure 7. Size frequency of spot shrimp captured from six survey locations in Prince William Sound. Shrimp pots were fished November 7 - 14, 1989.

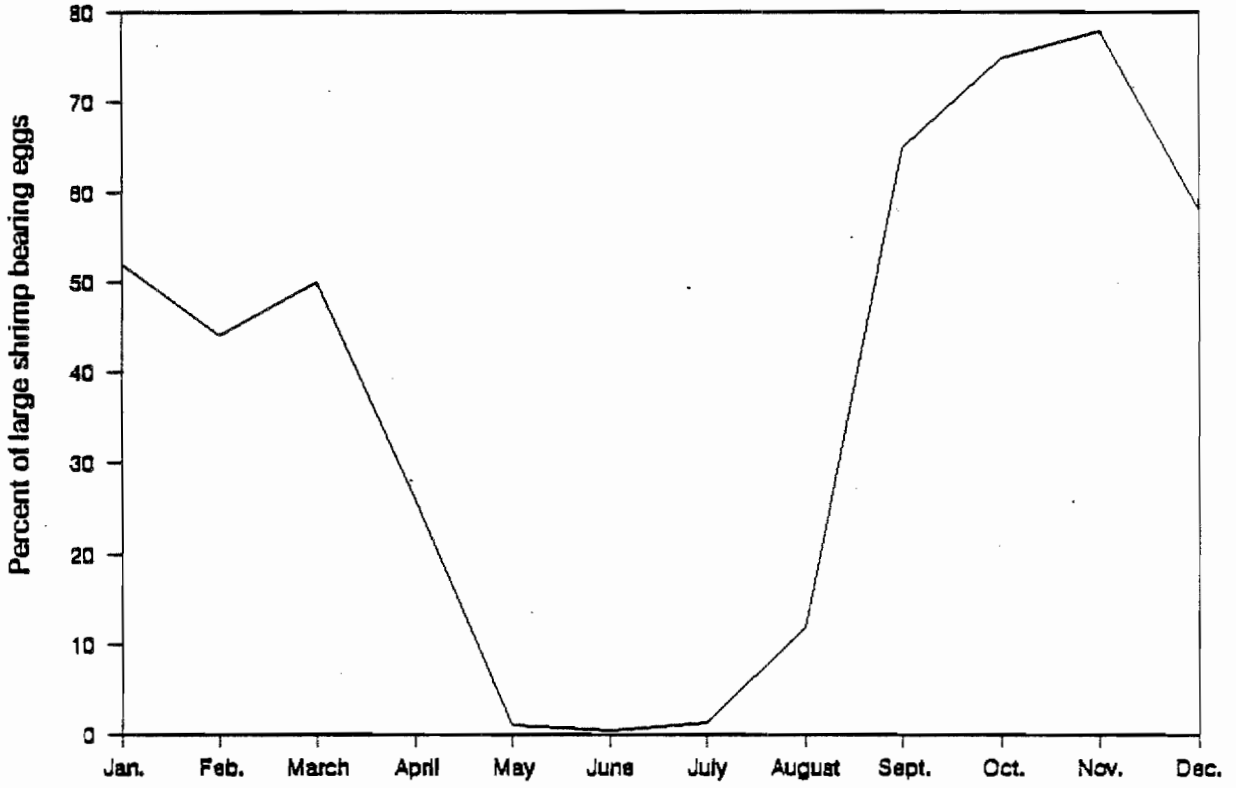

Figure 8. Average egg bearing percent of spot shrimp by month from the Montague Strait Experimental Harvest Area, 1985 - 1988.

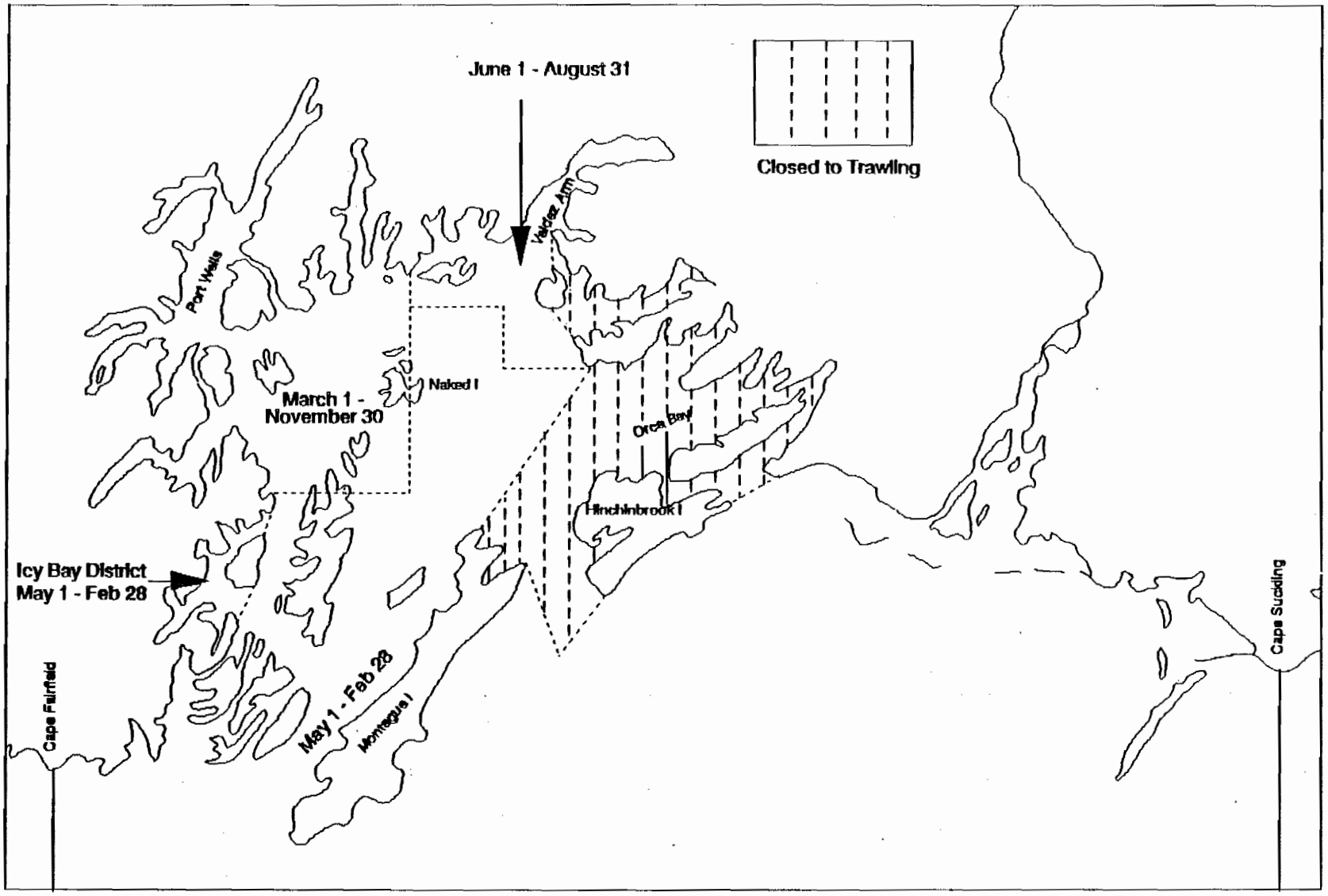

Figure 9. Prince William Sound Trawl Shrimp Fishing Seasons.

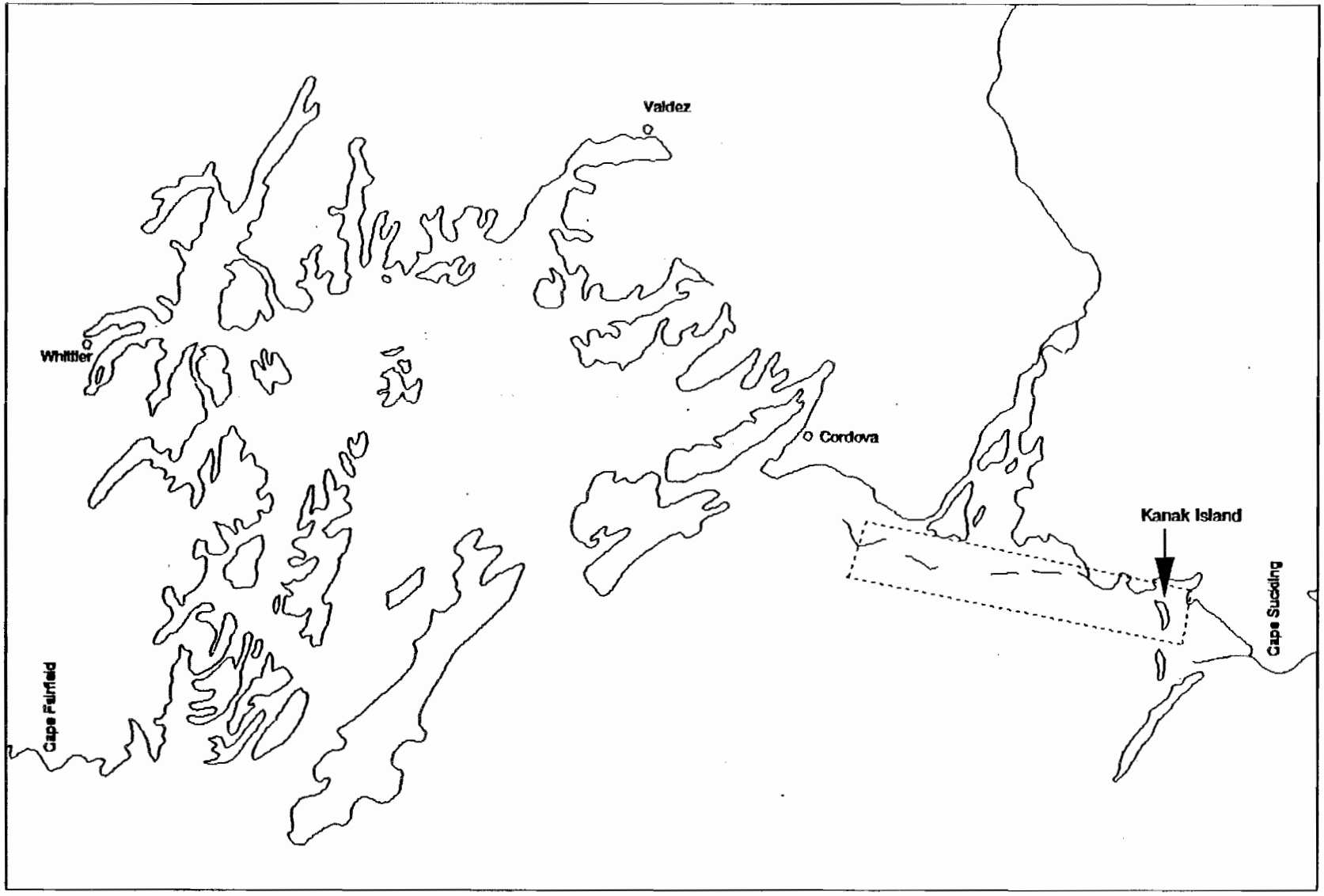

Figure 10. Copper River Delta, Razor Clam Harvest Area.

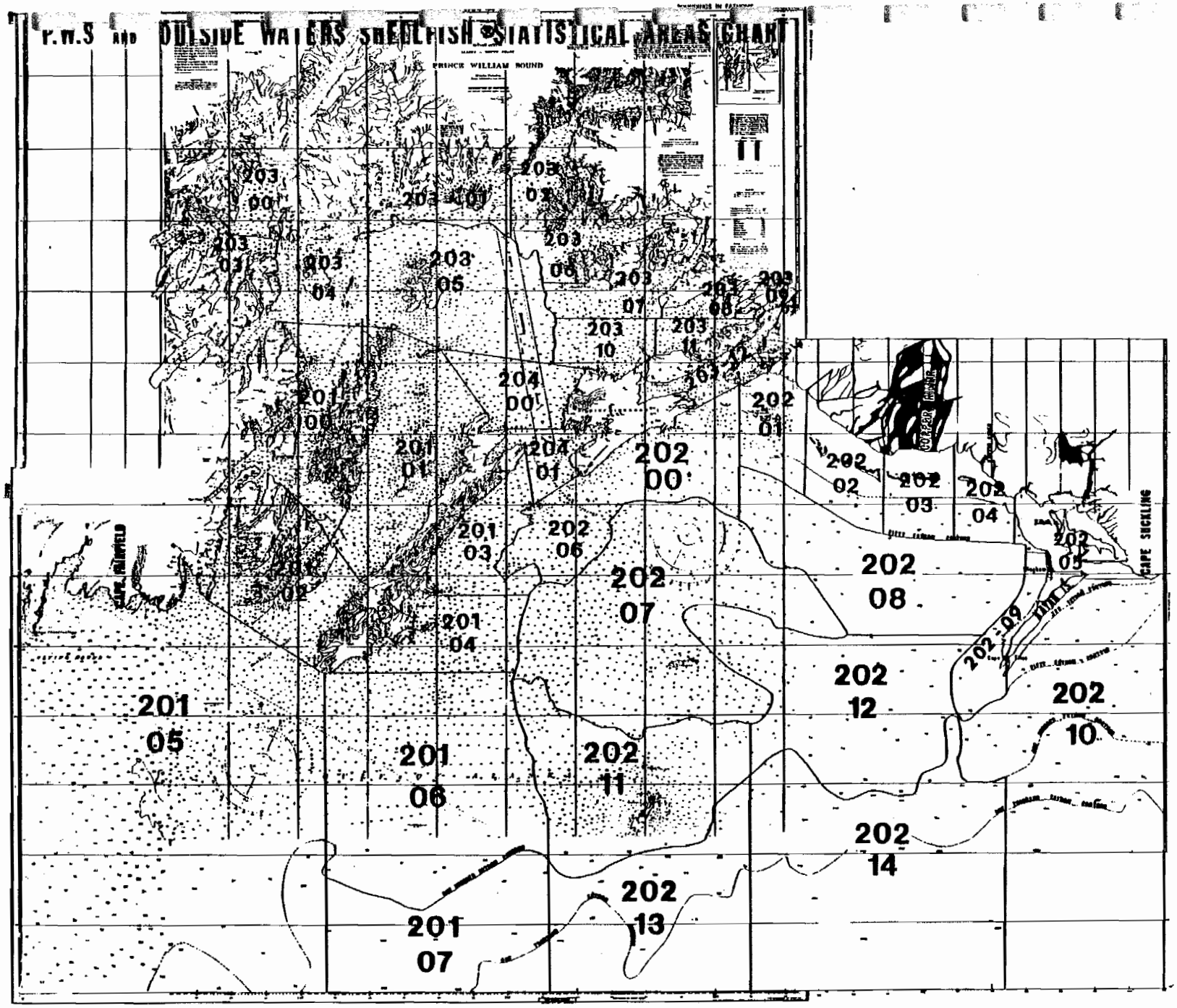

Figure 11. Prince William Sound Shellfish Statistical Areas Chart.

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, 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.C., U.S. Department of Interior, Washington, D.C. 20204.