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**PRINCE WILLIAM SOUND MANAGEMENT AREA
1996 SHELLFISH REPORT
TO THE ALASKA BOARD OF FISHERIES**



by

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INTRODUCTION

The Prince William Sound (PWS) Management Area (Area E) is comprised of all waters of Prince William Sound and the Gulf of Alaska from Cape Suckling to the east and Cape Fairfield to the west (Figure 1) This report documents the most recently completed shellfish fisheries in the area. The fisheries are the 1996 sidestripe shrimp *Pandalopsis dispar* trawl fishery and the 1996 weathervane scallop *Patinopecten caurinus* dredge fishery. Finally, razor clams *Siliqua patula* harvested under subsistence regulations are reported.

The following fisheries are also reviewed in this report although the 1996 - 1997 commercial seasons were not opened. The 1996 Dungeness crab *Cancer magister*, and the 1996 spot shrimp *Pandalus platyceros* fisheries were closed due to low stock abundance and poor recruitment.

Shellfish landings from the sidestripe shrimp trawl fishery in Area E during 1996 included 111,255 lb of trawl shrimp. Harvest data from the 1996 weathervane scallop fishery are confidential. A department policy on confidentiality states that any time a fishery or statistical area has fewer than three participants, catch information may not be made public. Table 1 lists emergency orders affecting area fisheries during 1996.

DUNGENESS CRAB FISHERY

Introduction

The Prince William Sound Management Area is divided into 3 Dungeness crab fishing districts. The 3 districts are Orca Inlet, Copper River, and Northern district (Figure 1). Historically, the major Dungeness crab harvests have come from the Orca Inlet and Copper River Districts. Dungeness crabs were also harvested from the Orca Bay portion of the Northern District and in western Prince William Sound. These harvests, however, have been proportionately small (Appendix A).

Northern District

The Northern District season is open year-round. The harvest has been taken either incidental to the Tanner crab fishery or by one or two vessels targeting Dungeness crab. The district has limited Dungeness crab habitat and a history of low production. For example in the last 10 years, total harvest was 5,461 lb by 2 vessels in 1987. The eastern portion of Orca Bay, which adjoins Orca Inlet, provides Dungeness crab to both the Orca Inlet and Northern Districts. Movement generally occurs from Orca Bay into Orca Inlet during the summer with a return to the deeper waters of Orca Bay in the winter.

Orca Inlet District

Orca Inlet, which is immediately adjacent to the community of Cordova, once provided a fishery that allowed participation by small vessels in an area protected from adverse sea conditions. The largest vessels fishing this area were in the 40 foot seiner class. Most vessels made 1 day trips and delivered each fishing day. Harvests have ranged from over 1.0 million lb in the early 1960's to 35,000 lb in 1976. The limited data available on effort in this district indicate that for the period 1976 to 1979 the number of vessels ranged from 3 to 34 and averaged 23. This district has a 100 pot limit. The Orca Inlet district has been closed via regulation from 1980 to 1995.

The department conducted an annual survey in the Orca Inlet district from 1977 to 1994. In 1995, due to low abundance, the survey was changed to a biennial schedule. The district opens on or after September 1 by emergency order only and closes on May 31. The September opening occurs only if the department survey indicates both an adequate abundance of Dungeness crabs and completion of the annual molt.

The major reason for the continued suppression of the Dungeness crab population in Orca Inlet is predation by the sea otter. The otters arrived in large numbers during 1980 and immediately impacted the Dungeness crab stock. A sea otter predator/prey relationship study conducted in the late 1970's showed that when Dungeness crabs are available, a sea otter is capable of eating 10 crabs per day.

Copper River District

The Copper River District fishery occurs along the eastern portion of the Copper River delta and in the Controller Bay area. The 10 year (1983-1992) average annual catch and effort during years when harvest occurred were approximately 590,000 lb and 12 vessels. The Copper River District is exposed to the Gulf of Alaska and the longer running distance to market generally requires larger vessels. Beginning in 1987, split regulatory seasons were implemented in the Copper River District with open season dates of March 20 to May 20 and July 25 to December 31. The regulatory closure extends from May 20 to July 25 and is designed to protect the stock from handling mortality during the soft shell period following the annual adult male molt. Additionally, the Controller Bay area closes on October 15. The early fall closure is designed to reduce gear loss and consequent mortality from storms in this area of shallow water.

The department conducts an annual Dungeness softshell survey prior to the July 25 opening date. If 10 percent or greater of the crabs are in a softshell condition the fishery is delayed and another survey is conducted in mid-August. The July 25 opening was delayed via emergency order in 1987, 1988, 1990,

and 1991. The corresponding opening dates for the aforementioned years were: August 20, September 15, August 19, and August 28.

The fishery has remained closed since the spring of 1992 when the fishery reached an historical low harvest of 2,458 lb by 2 vessels. Catch per unit of effort (CPUE) of legal crab averaged 1.0 for both of the department's 1992 summer soft shell surveys (1.2 in July and 1.1 in August) indicating that the stock was depressed. This condition coupled with relatively poor recruitment resulted in the closure of the 1992 fall season fishery by emergency order.

Statewide Dungeness regulations provide for a male only harvest with a minimum legal size of 6.5 inches. Gear requirements include a biodegradable escape mechanism and two 4 ³/₈ inch escape rings. Regulations which are specific to the PWS management area include superexclusive registration, a 250 pot limit for the Northern and Copper River Districts, and a 100 pot limit for the Orca Inlet District.

1996 Season Summary

Northern District

No effort occurred in the Northern District in 1996. The district was open for the entire year.

Orca Inlet District

There was no open season in the Orca Inlet District in 1996. The 1996 survey yielded a total of 2 Dungeness crabs in 30 pot lifts.

Copper River District

The Copper River District season remained closed during 1996. The department's August survey CPUE of all males and legal males averaged 4.5 per pot and 1.0 per pot (Table 2). These figures are comparable to the department's 1992 survey (1.1), a year when only 2,458 lb were commercially harvested during the spring season.

1997 Management Outlook

Northern District

The Northern district will remain open year-round.

Orca Inlet District

Orca Inlet will continue to be surveyed on a biennial basis, however, a near term recovery is not anticipated as the sea otter population does not appear to be declining. Due to extremely small survey catches there is a low likelihood of the stock increasing to a fishable level. The next Orca Inlet survey will occur in 1998.

Copper River District

The department plans to continue monitoring the summer molt in the Copper River District via the annual survey prior to the July 25 regulatory opening date. If the molting period is prolonged or has not occurred, an emergency order will be issued to delay the fishery opening and the department will conduct an additional survey in mid-August. Between 1995 and 1996, the August survey CPUE of prerecruit crabs declined from 9.9 to 3.5 crabs per pot. Survey CPUE of newshell prerecruit crabs also

declined from 3.0 in 1995 to 1.3 in 1996. The high incidence of skip molting in the prerecruit classes indicates continued poor recruitment in 1997. The 1997 fishery will remain closed if weak recruitment persists.

POT SHRIMP FISHERY

Introduction

The Prince William Sound Management Area is divided into two shrimp pot fishing areas (Figure 2). They are the Eastern Area and the Traditional Harvest Area (THA). The shrimp pot fishery targets on spot shrimp and to a limited extent coonstripe shrimp *Pandalus hypsinotus*.

Eastern Area

The Eastern Area includes all waters east of a line from Montague Point to Bidarka Point as well as territorial waters along the outer portion of the management area. This area has a very low production history. Harvests have averaged less than 1,000 lb. The last reported commercial harvest of spot shrimp from the Eastern area occurred in 1991 when 325 lb were harvested. Reports from subsistence and sport fishermen indicate that shrimp catches are very low. The area is open year around. A commissioner's permit is required to fish in this area to allow the monitoring of effort and catch via mandatory logbooks and department contact.

Traditional Harvest Area

The Traditional Harvest Area is characterized by numerous steeply cut glacial fjords and passages. This area encompasses the northern shore of PWS from Port Valdez to Whittier and all of western and southwestern PWS including Montague Strait. Historically, a majority of the shrimp catch has come from the THA. Market access is 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, because the product can be utilized shortly after capture. The Prince William Sound shrimp pot fishery was unique in that participants varied from full-time to seasonal and weekend fishermen. This heterogeneous mix has split the industry as to the desired season of harvest.

Commercial shrimp landings were first documented in 1960 when 4,100 lb were harvested. Early seasons lasted the entire year. From 1960 through 1977, catch varied from no reported harvest in 1962 and 1966 to a high of 20,000 lb in 1974 (Appendix B). The shrimp pot fishery expanded rapidly after 1978 with increases in both catch and effort. Growth of the fishery was greatest from 1978 through 1982. During this period local markets were established and the major harvest areas located. Landings increased from 12,000 lb in 1978 to 178,000 lb in 1982. Similarly, effort increased from 9 to 57 vessels during this period.

During the period 1982-1984 the open season was reduced to April 1 through November 30 with a guideline harvest range of 75,000 to 145,000 lb. Despite the shortened fishing season catch and effort increased to 214,000 lb and 79 vessels.

In 1984 the BOF adopted a spot shrimp management plan which recognized the need for a conservative management policy for the THA. Among other things the plan called for seasons avoiding peak egg bearing periods and guideline harvest ranges. This resulted in two open seasons per

year (March 15-June 30 and August 15-December 15) and a GHR of 75,000 to 100,000 lb per season.

In subsequent seasons, catch and effort reached historical highs of 290,653 lb in 1986 and 86 vessels in 1987. During the years 1985-1987 the harvest peaked at 290,653 lb and vessels at 86 in 1987. By 1989 catch and effort had declined to a low of 29,315 lb from 33 vessels. A limited spot shrimp fishery was held in 1991 with a conservative guideline harvest range of 10,000 to 40,000 lb. The 1991 fishery closed after 46 days of fishing and the harvest totaled 17,255 lb taken by 14 vessels making 44 landings. Fishery performance data from the 1991 fishery indicated that the stock was at a very low level. The commercial spot shrimp season remained closed in the THA through 1994 due to low abundance.

In 1989 the department began a survey of spot shrimp in the THA to assess the spot shrimp stocks. Six stations in the northern, western, and southwestern portions of PWS have been surveyed annually since 1989. Two experimental stations in southwestern PWS were added in 1991. Data from the survey, specifically CPUE and sex ratios, were used in making management decisions regarding the 1991 fishery and in subsequent years when no fishery occurred.

Statewide shrimp regulations specify buoy marking, maximum tunnel size, and a biodegradable escape mechanism. During the spring 1994 meeting the BOF adopted a new GHR for PWS shrimp, reducing it from 150,000-200,000 lb to 0-100,000 lb. In summary, additional regulations specific to shrimp fishing with pot gear in the PWS Management Area include the following:

1. Two regulatory fishing seasons occur per calendar year in the Traditional Harvest Area. The spring season opens on May 1 and closes on June 30 and the fall season begins on August 15 and continues until December 15.
2. The annual GHR harvest range is 0 - 100,000 lb. The guideline is split evenly between the two seasons. Either season may be closed earlier by emergency order if the harvest level is achieved. When excessive harvest occurs during the spring season, the poundage is deducted from the fall season.

3. A limit of 150 pots per vessel.
4. Pots with a definable side must have at least two adjacent sides completely composed of rigid mesh that allows the unaided passage of a 7/8" dowel. Round pots must have the rigid mesh covering a minimum of 50% of the vertical surface area of the pot.

1996 Season Summary

The Eastern area remained open to harvest through 1996, however, there was no effort.

Commercial fishing in the THA was closed in 1996 due to continued low abundance. The October spot shrimp survey CPUE declined from 1.3 lb per pot in 1991 to 0.5 lb per pot in 1995 (Table 3). Survey CPUE of spot shrimp at experimental stations in southwestern PWS increased from 0.5 lb per pot in 1994 to 0.8 lb per pot in 1995 (Table 4). Another potential indicator of stock health is the number of egg bearing females. Among the traditional stations the number of egg bearing females declined from a high of 463 (1.8 per pot) in 1992 to a low of 118 (0.4 per pot) in 1994. The 1995 survey catch of egg bearing (ovigerous) females was 127. While there is no direct correlation between number of spawners and recruitment, the decline in the survey catch of egg bearing females would be a factor in consideration of future openings.

1997 Management Outlook

Eastern Prince William Sound

A proposal to eliminate the eastern area and combine it with the THA will be considered by the Alaska Board of Fisheries during its March meeting. This would result in a single season for the entire area.

Currently the department plans to allow year-round fishing in this area during 1997 and use the commissioner's permit as the primary management tool. Since production was historically low and zero in recent years, it appears that no significant quantities of spot shrimp exist in this district. All shrimp harvests in the district have occurred inside PWS. The Gulf of Alaska portion of the area does not apparently provide the habitat required for spot shrimp.

Traditional Harvest Area

The November, 1996 annual spot shrimp survey within the THA indicated that overall the stock remained depressed. Catch per pot averaged 0.5 lb for both traditional and experimental sites, a figure that is comparable to the 1995 level of 0.6 lb and well below the historical fishery CPUE of 1.5 to 2.0 lb per pot. The number of females captured at both traditional and experimental sites declined from 219 in 1995 to 169 in 1996. Based upon the 1996 survey catch data, the department intends to close the fishery through 1997.

It is apparent that a conservative management approach is warranted for the following reasons:

1. The numbers of female and large male shrimp remains low. If a fishery is permitted, these shrimp will be targeted as salable and the abundance of this size range will decline further thereby reducing the brood stock and increasing the risk of future recruitment failure.
2. Spot shrimp are long lived and slow growing further emphasizing the need to keep fishing mortalities low.

The 1997 spot shrimp survey will occur in October, after the period of summer growth. This survey will provide the basis for a management decision regarding the 1998 fishery.

TRAWL SHRIMP FISHERY

Introduction

The PWS Management Area is divided into two shrimp trawl fishing areas, the Northwest Shrimp Trawl Fishing District (NSTFD) and the central/southwest areas of PWS (Figure 3). Emphasis in the shrimp trawl fishery has shifted from the harvest of pink shrimp *Pandalus borealis* in southwestern PWS to sidestripe shrimp in northwestern PWS. Large Kodiak based vessels harvested pink shrimp in southwestern PWS and constituted the main effort during the early 1980's. The fishery for pink shrimp declined due to the low ex-vessel value, limited processing capabilities, and declining stocks. After the trawl fishery for pink shrimp was fully developed, catches ranged from 171,000 lb to 1.3 million lb and effort ranged from 3 to 14 vessels (Appendix C).

The first documented harvest of sidestripe shrimp occurred in 1983 from the Icy Bay area in southwestern PWS, however, subsequent activity focused on Port Wells and Wells Passage in northwestern PWS. Increased harvests of sidestripe shrimp began in 1985. The reason for the sudden expansion was the development of markets and gear by fishermen with small, efficient vessels, targeting on stocks which were previously unfished.

The sidestripe shrimp fishery has operated chiefly out of the ports of Whittier and Valdez. Sidestripe tails were sold fresh in PWS communities and Anchorage while markets for whole, fresh, and frozen sidestripes existed in both Anchorage and Japan. Harvests during the developing years (1987-1991) came almost exclusively from the Port Wells and Wells Passage areas. From 1987 to 1993, catch and effort increased from 96,000 lb landed by 2 vessels to 246,000 lb landed by 7 vessels. The increased harvests in these years reflects increases in both effort and areas fished. During the years 1992 and 1993, effort in the central and southwest areas increased sharply and included two larger catcher-processors.

Concern for the conservation of the sidestripe shrimp resource in Port Wells heightened as catch and effort increased. In April 1990 the department initiated a program utilizing onboard observer data to calculate an area-swept estimate of shrimp abundance in the Port Wells area. A 20% harvest rate was applied to the estimate. Although this management strategy seemed conservative, harvest levels declined from 80,000 lb in 1991 to 35,000 lb in 1994. For the period 1991 through 1994, fishery closures were effected by emergency order in the Port Wells area on June 23, June 3, May 20, and May 24 due to attainment of the respective harvest levels.

The trawl fishery in the central and southwest areas of PWS has been managed based upon historical catches and CPUE. Catch and CPUE have declined in these areas, particularly the central sound, resulting in reduced harvest levels. In response to industry claims that reduced CPUE reflected a shift in shrimp distribution rather than declining abundance, the department reopened the shrimp fishery in the central and southwest portions of PWS in October of 1994 with a conservative GHL of 10,000 lb. Catch and CPUE remained low indicating that no seasonal shift in distribution occurs. The GHL was not raised and the fishery closed on October 20, 1994. Actual catch data are confidential due to the low number of participants.

During 1992 and 1993 effort primarily focused in the central portion of PWS, however, during 1995 the majority of the fishing occurred in the southwest portion of PWS. Although the guideline was attained prior to the August 15 regulatory closure date, the department allowed the fishery to continue to the regulatory closure date because it offered the opportunity to gather additional data from the new harvest areas while posing little risk to the sidestripe shrimp stock. The central and southwest portions of PWS closed by regulation on August 15. Harvest from these areas in 1995 totaled 51,967 lb from 15 landings by 3 vessels.

Since the development of the sidestripe shrimp fishery, a variety of regulatory measures have been developed by both industry and the department and adopted by the BOF. These regulatory measures were most recently restructured in 1994.

At the spring 1994 shellfish meeting the BOF created the Northwest Shrimp Trawl Fishing District (NSTFD) and set open season dates of April 15 to August 15, and October 1 to December 31 for the entire management area. The spring open season date change was based upon data which indicated that egg release was not complete until April 15. The fall open season date was changed based upon the recommendation of fishermen stating that soft shell shrimp were present until October 1. Additionally, the BOF changed the cod end requirement and stipulated that the entire cod end will consist of square hung $1\frac{7}{8}$ in mesh. Other changes made in the regulatory framework of the shrimp trawl fishery included the deletion of the Icy Bay Shrimp District and its guideline harvest range (GHR).

In summary the current regulatory measures for trawl shrimp are:

- 1) April 15- August 15 and October 1-December 31 season dates.
- 2) Cod end mesh must be completely composed of $1\frac{7}{8}$ inch stretched mesh hung horizontal and perpendicular to the mouth of the trawl.
- 3) A year-round closure in eastern Prince William Sound (Port Fidalgo, Orca Bay, Hinchinbrook Entrance, and north Montague) to minimize indirect fishing mortality on depressed stocks of king and Tanner crabs in these key production areas.

1996 Season Summary

The PWS sidestripe shrimp fishery opened by regulation on April 15, 1996 with preseason ghl's set (by general area) equal to the 1995 spring season harvest levels. The harvest level in the NSTFD was subsequently adjusted based upon inseason biomass estimates with a 20% harvest rate applied. The biomass estimates were generated using area-swept data collected from a commercial vessel.

The department continued to collect onboard observer data in 1996 during the commercial fishery in Port Wells. The inseason ghl was set at 49,000 lb based upon these data. This was the first year since 1991 that the Port Wells quota has increased. The Port Wells and Wells Passage portion of the NSTFD closed by emergency order on June 15, 1996 due to the projected attainment of the guideline. The harvest from the Port Wells area totaled 45,103 lb from 18 landings by 3 vessels.

After the closure of the Port Wells area, the trawl fishery for sidestripe shrimp shifted into the remainder of the PWS management area, primarily the Perry Passage portion of the NSTFD and the central and southwest areas of PWS. The department utilized inseason fishing information and catch rates from the 1995 Perry Pass observer data to set a guideline of 19,000 lb for Perry Passage and the balance of the NSTFD in 1996. Based upon based upon a harvest of 18,500 lb and projected catch, the NSTFD closed on July 12. Harvest from the Perry Pass area was 30,674 lb from 13 landing by 3 vessels. Total harvest from the NSTFD was 75,777 lb.

The preseason guideline harvest level of 33,000 lb for the central and southwest portions of PWS was equal to the 1994 harvest from these areas. Although the department considered the aforementioned shift in effort from the central area to the southwest area, catch rates in the southwest did not indicate a strong stock of sidestripes. Total harvest from the central and southwest areas was 33,692 lb. The entire management area closed by regulation on August 15 and remained closed by emergency order for the remainder of 1996.

Total harvest in 1996 was 111,255 lb, which included 21,704 lb of deadloss, from 42 landings by 3 vessels. Deadloss was composed of unmarketable or small sidestripe and pink shrimp. Deadloss typically accounts for 5% to 45% of the shrimp catch depending upon the vessel and its markets. The reporting of deadloss remains incomplete with some vessels reporting only a small proportion of the actual amount.

Two of the 3 vessels participating in the fishery operated otter trawls; the other was a beam trawl. Vessel length ranged from 36' to 46'. The average ex-vessel value for trawl caught shrimp was \$2.69 per lb whole shrimp weight resulting in a fishery value of approximately \$300,000.

1997 Management Outlook

The department will continue to manage the sidestripe trawl fishery in the Port Wells area via a 20% harvest rate applied to an area-swept population estimate generated from commercial trawl vessel data. Fishery performance data collected since 1991 indicates the sidestripe stock in the Port Wells portion of the NSTFD declined from earlier years. Catch per hour towed declined by approximately 50% from 1991 to 1992 and continued to decline annually through 1995. However, the increase in both catch rates and the biomass estimate in 1996 indicated a slight increase in abundance. The department plans to maintain a conservative approach in increasing harvest from this area. Effort in the fishery is expected to remain stable due to the relatively low overall harvest. Any increase in effort, however, will likely result in the early attainment of the harvest level thereby prompting a closure prior to the regulatory date.

The central and southwest areas of PWS have received sporadic effort since 1993. Currently, catch rates in these areas of PWS indicate that the stock is small. Catch and catch rates in the central portion of PWS decreased further in 1996. This area, which accounted for approximately 60% of the 1993 harvest, contributed significantly less to harvests during 1994-96. The 1997 preseason guideline harvest level for this area will be set equal to the 1996 harvest. The department will continue to monitor logbook data for significant changes in CPUE. Additionally, the department plans to extend its sampling program to the southwest portion of PWS during the 1997 season. A harvest level may eventually be established by applying the area swept assessment methodology used in the Port Wells area.

Due to very limited processing capability and suspected limited abundance, no fishery targeting pink shrimp is expected in southwestern PWS in 1997.

RAZOR CLAM FISHERY

Introduction

Beginning in 1916 and continuing into 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 razor clams were harvested from Orca Inlet and the western Copper River Delta (Figure 4). The eastern Copper River Delta, which includes Kanak Island, was not a substantial contributor to the early harvests. Catches during this time ranged from 3.6 million lb in 1917 to a frequent harvest of over 1.0 million lb. Most of the product was canned and used for human consumption.

Beginning in the 1950's and continuing into the early 1980's, commercial demand for razor clams shifted to Dungeness crab bait. Coincident with the market shift, the PWS razor clam industry experienced a period of decline. The decline was attributable to a variety of factors including a market shift from the West coast to the East coast clam fishery and substrate change caused by alteration in the Copper River outflow which severely affected juvenile survival. Additionally, the "Good Friday Earthquake" in 1964 caused significant uplift in prime razor clam habitat in Orca Inlet. This loss of habitat resulted in record low harvests in the 70's and early 80's (Appendix D) and caused a shift in clam digging effort to the east side of the Copper River delta and Controller Bay area.

The demand for razor clams for human consumption increased again in 1983 when a decline in clam abundance in Washington state led to an expanded fishery in Prince William Sound. Since 1983 the majority of the clam harvest has been taken at Kanak Island beach with minor amounts coming from

Softuk and Katalla beaches on the eastern Delta. Yearly harvests during the 1980's attained a maximum of 170,000 lb in 1984 with a recent ten year (1981 - 1990) average annual harvest of 45,000 lb and an average of 16 diggers.

The department currently monitors commercial razor clam harvests via fish ticket information. The non-commercial harvest from the Copper River Delta is monitored through a permit system which requires a harvest report.

A guideline harvest range of 100,000 to 150,000 lb is in effect for the combined commercial and sport/subsistence harvests from Kanak Island. By regulation, clams harvested from Kanak Island must be used for human consumption as food. There is a 4 1/2 in (114 mm) minimum legal size for all commercially harvested razor clams. Additionally, razor clams may only be commercially harvested from beaches certified by the Alaska Department of Environmental Conservation (ADEC). Certification allows bivalves to be sold for human consumption.

On the Copper River Delta, noncommercially harvested razor clams also have a minimum legal size of 4 1/2 in (114 mm), however, there is no minimum size for noncommercial clams harvested on a elsewhere in the management area.

1996 Season Summary

There was no commercial harvest of razor clams from the PWS management area in 1996. The reported non-commercial harvest (subsistence, sport, and personal use) during 1996 was 381 lb. The department issued 47 non-commercial permits for the Copper River Delta. Among those permitted, 19 dug clams, 20 did not dig, and 8 did not report. Harvest was greatest from Kanak Island with 259 lb reported. Softuk beach account for the majority of the balance with 74 lb reported. Other beaches with harvest reported included Katalla with 40 lb, Quinesault with 5 lb, and Grass Island with 3 lb.

1997 Management Outlook

Although the department does not conduct population estimates, reports from non-commercial diggers indicate that razor clam abundance has declined over the previous 7 years in the eastern delta, Katalla, and Controller Bay areas. This information is supported by the lack of interest from commercial diggers and the relatively low number of permits issued in recent years. Additionally, ex-vessel value of razor clams has not substantially increased for several years. Bait and food clams command a similar price, approximately ranging from \$0.50 to \$1.00 per pound. The local bait clam market has been poor since 1991 due to the depressed Dungeness stocks on the Copper River Delta. Unless an increased demand for food clams occurs and clam abundance increases over current levels, the harvest will remain well below the guideline harvest range of 100,000 to 150,000 lb set for the beach at Kanak Island. If effort increases at Kanak Island, the department will monitor the stock via catch per unit of effort data.

WEATHERVANE SCALLOP FISHERY

Introduction

A fishery for weathervane scallops developed in the PWS management area in 1992. Although landings have occurred from the Yakutat area to the east since the late 1960's, the 1992 harvest constitutes the first documented commercial scallop landings from Area E.

The 1992 harvest of weathervane scallops in the PWS management area totaled 208,836 lb of meats taken by 4 boats. This poundage equates to approximately 2.1 million lb whole scallop weight. The commissioner's permit was a management tool used to require fishermen to submit logbooks and weekly catch reports. Logbooks were largely incomplete. Harvest occurred from two statistical areas

(202-09 and 202-10) in the Kayak Island vicinity (Figure 5). Waters of PWS and the nearshore Gulf remained closed to scallop dredging due to bycatch concerns for depressed Tanner and Dungeness crab stocks. Fishing began in late February 1992 and closed by emergency order on April 23. The closure was based upon an allowable harvest of 64,000 lb meat weight which was established by developing an area-swept scallop biomass estimate using fishery performance data and applying a 10% harvest rate. This harvest rate was identical to that specified by the Board of Fisheries for the Cook Inlet scallop fishery.

The discrepancy between allowable (64,000 lbs) and actual harvest (208,836 lbs) was directly attributable to a lack of timely and accurate catch reporting. As the fishery progressed, both effort and the geographic area fished increased. Information gathering was difficult because the majority of landings occurred at a port with no department staffing. Collection of data in season was accomplished by weekly radio reports of estimated catch, however, actual catch by each vessel was not ascertained until the time of landing. Errors from radio reports of estimated catch were not evident in some cases for up to 2 weeks. The time delay was attributable to fishing trip length and the time necessary for a fish ticket to arrive via mail. By the time that a picture scallop stock distribution and density had emerged, the harvest had progressed to an estimated 150,000 lb. When the fishery closed 3 days later the harvest was approximately 209,000 lb meat weight.

After the eastern Gulf portion of the management area closed, participants expressed an interest in exploratory fishing in the western Gulf portion of the area. Effort in the western Gulf portion of the management area was low with only 2 participants and no reported harvest.

During 1992, in response to the increases in scallop harvests statewide, the department began development of an interim fisheries management plan under 5 AAC 39.210. Management Plan for High Impact and Emerging Fisheries. This interim management plan was formulated and implemented in July 1993, prior to the opening in PWS.

Key features of the PWS portion of the plan included:

1. Area registration.
2. Gear requirements including 4" ring size and maximum of two 15' dredges.
3. Guideline harvest level of 50,000 lb meat weight.
4. Bycatch caps of 500 and 130 Tanner crabs east and west of 147°00' W. longitude, respectively.
5. Season dates set by emergency order.
6. Industry funded observer program.
7. Crew size limit of 12.

Two scallop fishing areas were established for the PWS Management Area. The Eastern area comprised the location of the primary harvest and had a quota of 50,000 lb meat weight. The Western area opened to provide an opportunity for exploratory fishing with an initial quota of 5,000 lb.

The 1993 scallop fishery in the PWS management area opened on July 15 at 12:00 noon. Seven vessels ranging in length from 81' to 145' participated in the fishery. The scallop harvest from the Eastern area totaled 63,068 lb meat weight. Catch per tow and tow length averaged 231 lb meat weight and 51 minutes. Prior to fishing each vessel was required to register and each observer was briefed. Radio contacts were made twice daily with each observer reporting fishing area, number of tows, sampling intensity, crab bycatch, and scallop catch. The fishery closed by emergency order in the eastern area on July 18, 1993 at 7:00 a.m. resulting in a fishery duration of 67 hours (2.8 days). Four vessels made tows in the western Gulf area after the Eastern area closed. No catch was reported from this area.

The Statewide Scallop Management Plan was adopted with changes during the spring 1994 BOF meeting. The season opening date was set at January 10 with the closure set by emergency order. Additionally, the 1994 Plan established closure areas in the eastern portion of PWS and along the Copper River Delta (Figure 6). These closures were intended to address concerns for depressed Tanner crab stocks within PWS and the depressed Dungeness crab stocks in the Copper River Delta area.

There was no commercial scallop season during 1994 due to the change of season dates from July to January. Any harvest in 1994 would have effectively doubled the removals from the stock during the same spawning cycle.

The 1995 weathervane scallop fishery opened at 12:00 noon on January 10 with a preseason guideline harvest level of 50,000 lb meat weight. Two vessels participated; therefore, the catch data are confidential. Permit stipulations were identical to the 1993 fishery, with the exception that the line dividing the eastern and western area was moved to 146°00 W. long. Although observer data were not fully analyzed, the relatively narrow range of sizes in the catch indicated that the fishery is supported by a single or possibly 2 year classes. Observers expressed difficulty in obtaining examples of younger age classes due to the low numbers. Harvest again occurred over a small area and was confined to 2 statistical subareas. The fishery closed by emergency order at 6:00 pm on January 26 due to attainment of the quota. Waters west of 146°00' west longitude remained open to exploratory fishing, however, no fishing occurred.

Subsequent to the January 26 closure, a vessel fished the Kayak scallop bed but remained outside the 3 mile territorial waters limit. This was due to a loophole in the Magnusson Act which allowed for harvest in the EEZ provided that a vessel was not licensed or registered by the State of Alaska. The estimated harvest by this vessel was 60,000 lb meat weight. This amount effectively doubled the allowable harvest for 1995.

1996 Season Summary

The illegal fishing that occurred near Kayak Island in 1995 resulted in the closure of commercial scallop fisheries in federal waters. State waters of the eastern area also closed due to the high 1995 harvest and to avoid overharvest of the scallop resource in the Kayak Island vicinity. No effort

occurred in the western area. Experimental fishing in both 1992 and 1993 in the western Gulf of Alaska portion of the management area yielded no indication of a commercial scallop resource.

1997 Management Outlook

Commercial scallop fishing will open in the eastern area on January 10. Due to the relatively small PWS harvest guideline, effort will likely remain low. The department plans to conduct a scallop assessment in the Kayak Island area in 1996. If it is successful, the data may be used to adjust the harvest level. The department remains concerned for the health of the scallop stock in the eastern area due to the relatively narrow range of ages evident in the fishery. If the age structure of the stock remains the same, the harvest level will likely be reduced. The western portion of the management area will remain open for exploratory harvest in 1997.

MISCELLANEOUS SHELLFISH

Squid and Octopus

Squid are taken as bycatch during the commercial shrimp trawl fishery. The 1996 harvest totaled 1,070 lb by 2 vessels. Octopus harvested incidentally to the longline and pot groundfish fisheries will be reported in the groundfish annual management report.

Sea Cucumbers and Urchins

There have never been any reported landings of sea cucumbers or urchins from the PWS Management Area. The department conducts no surveys of either sea cucumbers or urchins. The most recent effort

for sea cucumbers occurred in 1992 when 5 permits were issued, however, no catch was reported. This is consistent with anecdotal reports on abundance from both department and sport divers. No permits have been issued for sea urchin harvest. Anecdotal information indicates few urchins of a marketable size in PWS.

Table 1. Shellfish Emergency Orders affecting Dungeness crab, shrimp, and miscellaneous shellfish in Prince William Sound, 1996 - 97.

Fishery	Emergency order #	Effective date	Explanation
Dungeness	2-S-E-03-96	01/01/96	Personal use - closed Orca Inlet to fishing due to low abundance.
	2-S-E-04-96	01/01/96	Subsistence - closed Orca Inlet to fishing due to low abundance.
Scallops	2-S-E-07-96	01/10/96	Commercial - closed the eastern Gulf of Alaska portion of the PWS management area to scallop dredging.
Pot Shrimp	2-S-E-08-96	05/01/96	Commercial - closed the western side of PWS (formerly the Traditional Harvest Area) to fishing for the 1996 season.
Trawl Shrimp	2-S-E-09-96	06/15/96	Commercial - closed the Port Wells area due to attainment of guideline harvest level.
	2-S-E-10-96	07/12/96	Commercial - closed the Northwest Shrimp Trawl Fishing District due to attainment of guideline harvest level.
Dungeness	2-S-E-11-96	07/25/96	Commercial - closed Copper River District fishery until May 20, 1997 due to low abundance.
Trawl Shrimp	2-S-E-12-96	10/01/96	Commercial - closed the waters of PWS management area to trawling for shrimp.
Dungeness	2-S-E-04-97	01/01/97	Personal Use - closed Orca Inlet to fishing due to low abundance.
	2-S-E-05-97	01/01/97	Subsistence - closed Orca Inlet to fishing due to low abundance.
Scallops	2-S-E-06-97	01/19/97	Commercial - closed the eastern Gulf of Alaska portion of the PWS management area to scallop dredging.

**Table 2. Copper River District Dungeness crab survey average catch per pot
August 1985 - 1996.**

Year	Number of pots	Legal crabs	True recruits	Sublegal crabs	Newshell sublegal	Female crabs
1985	N/A					
1986	65	16.0	12.1 (76%)	10.8	3.8 (35%)	3.1
1987	80	9.9	4.3 (43%)	13.1	5.9 (45%)	10.5
1988	80	8.0	4.8 (60%)	11.8	4.1 (35%)	9.2
1989	N/A					
1990	80	8.3	3.0 (36%)	8.6	1.9 (22%)	8.0
1991	80	3.5	2.2 (63%)	12.6	3.2 (25%)	6.8
1992	80	1.1	0.3 (27%)	10.0	3.4 (34%)	2.0
1993	37	3.5	1.6 (46%)	15.8	4.5 (28%)	3.7
1994	78	1.4	0.3 (21%)	9.2	3.1 (34%)	1.4
1995	80	1.5	0.3 (20%)	9.9	3.0 (20%)	0.7
1996	80	1.1	0.3 (24%)	3.5	1.3 (37%)	0.1

Table 3. Traditional station catch statistics from the PWS spot shrimp surveys, 1989 - 1996.

Year	1989	1990	1991	1992	1993	1994	1995	1996
Number of pots	132	197	194	261	250	264	262	263
Number of pounds	170	176.8	259.8	202.1	104.7	89	131.4	140.1
Mean weight per pot (lb)	1.3	0.9	1.3	0.8	0.4	0.3	0.5	0.5
Number of shrimp	5,192	4,283	5,964	3,962	2,075	2,541	3,418	N/A
Mean # shrimp per pot	39	22	31	15	8	10	13	N/A
Number of males	4,958 (96%)	3,910 (91%)	5,535 (93%)	3,480 (88%)	1,654 (80%)	2,418 (95%)	3,280 (96%)	N/A
Number of females	234 (4%)	373 (9%)	429 (7%)	482 (12%)	421 (20%)	123 (5%)	138 (4%)	169
Number of ovigerous females	213	343	324	463	413	118	127	N/A
Mean size males (mm)	27.7	29.3	30.5	31.7	28.1	27.5	28.7	N/A
Mean size females (mm)	41.3	41.9	41.3	41.9	42.5	43.5	43.1	N/A

Table 4. Experimental station catch statistics from the PWS spot shrimp surveys, 1991 - 1996.

Year	1991	1992	1993	1994	1995	1996
Number of pots	11	110	86	87	88	88
Number of pounds	0.8	70.4	19	43.5	74.8	42
Mean weight per pot (lb)	<0.1	0.6	0.2	0.5	0.8	0.5
Number of shrimp	25	1,233	432	1,274	1,635	N/A
Mean # shrimp per pot	2	11	5	15	19	N/A
Number of males	24 (96%)	1,085 (88%)	371 (86%)	1,233 (97%)	1,554 (95%)	N/A
Number of females	1 (4%)	148 (12%)	61 (14%)	41 (3%)	81 (5%)	68
Number of ovigerous females	1	147	58	41	69	N/A
Mean size males (mm)	31.4	33.0	27.5	27.6	30.3	N/A
Mean size females (mm)	40.4	43.0	43.3	43.8	43.9	N/A

Prince William Sound pot shrimp management areas.

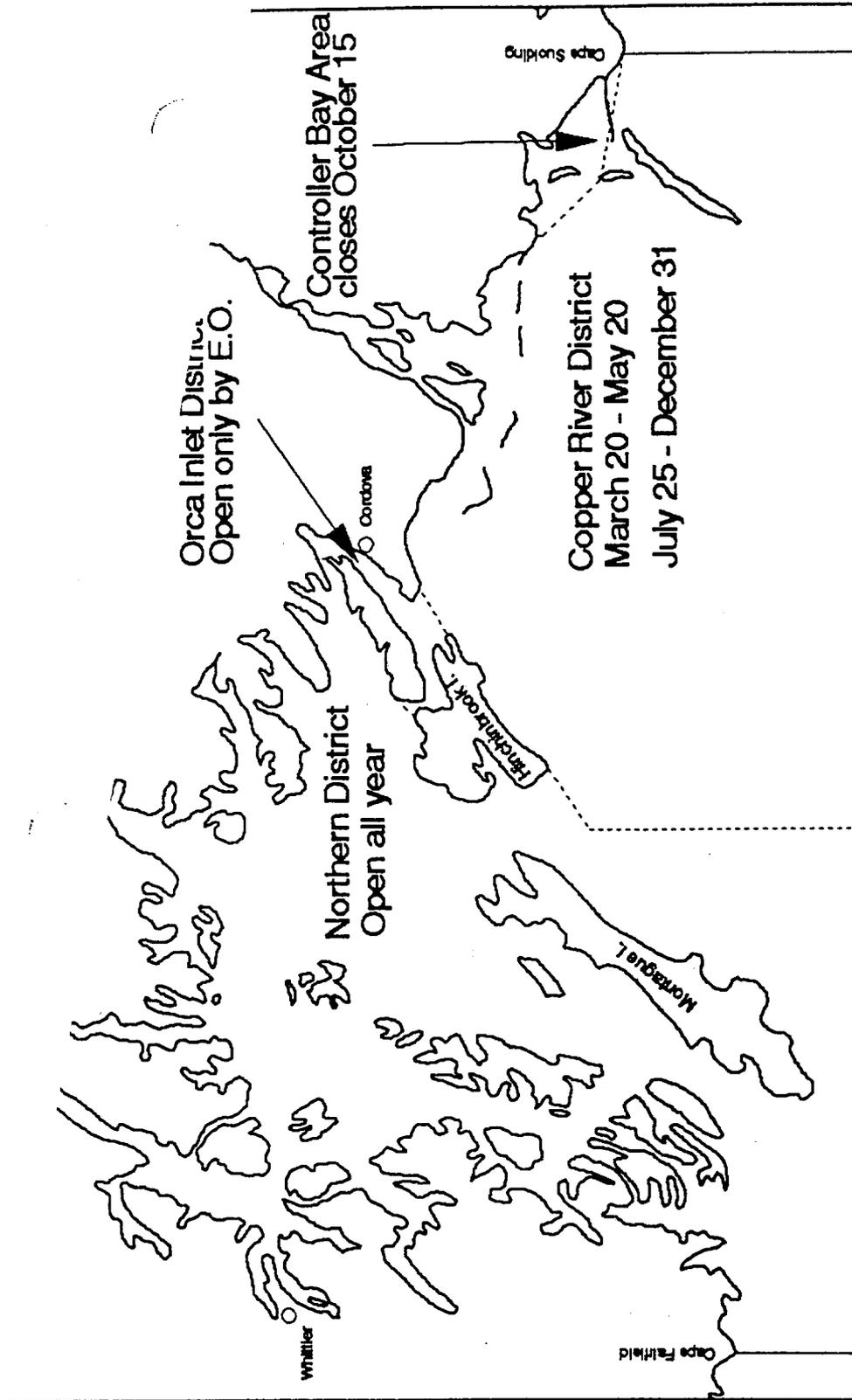


Figure 1. Prince William Sound Dungeness fishing seasons and districts.

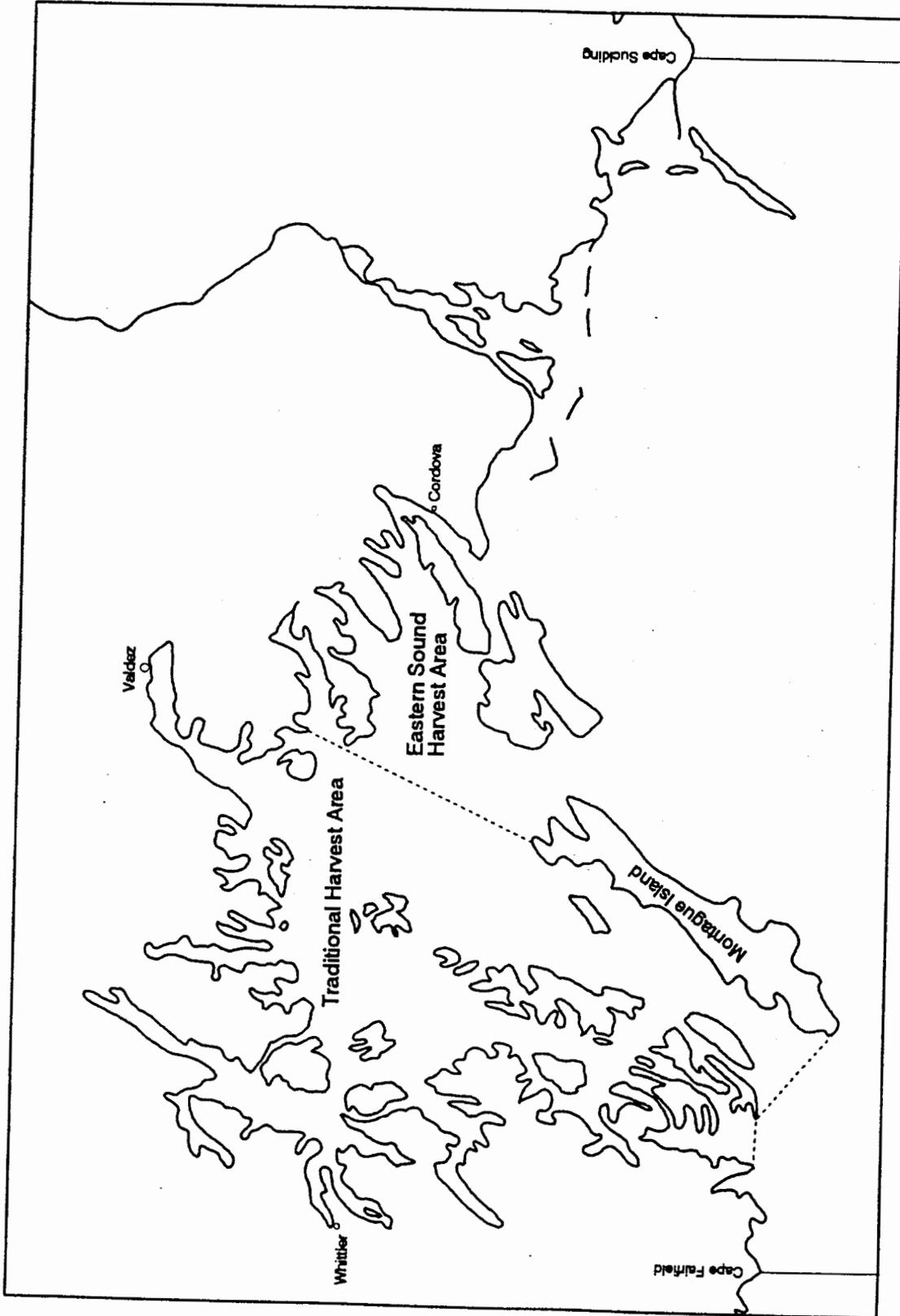


Figure 2. Prince William Sound pot shrimp management areas.

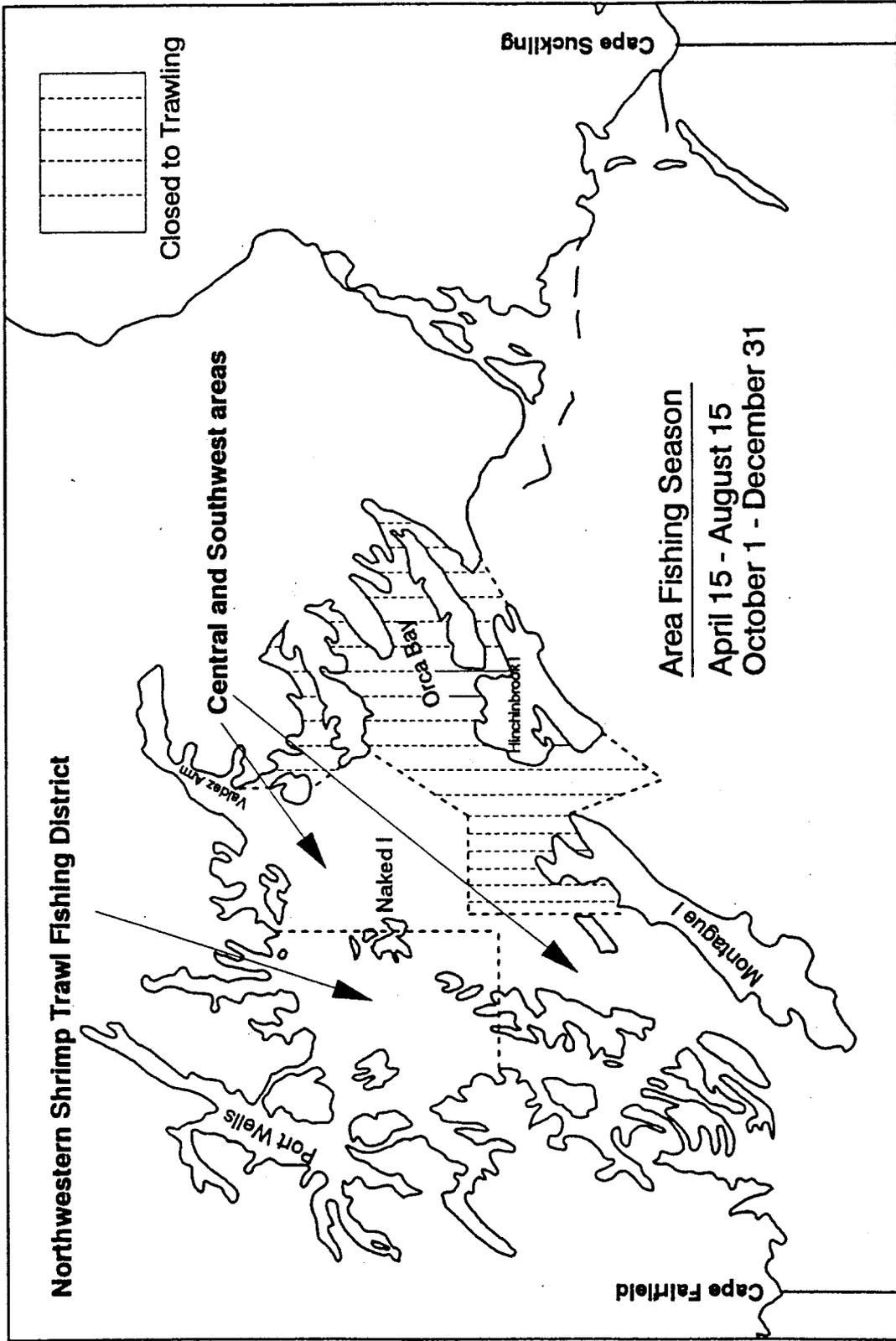


Figure 3. Prince William Sound 1996 trawl shrimp fishing areas and regulatory seasons.

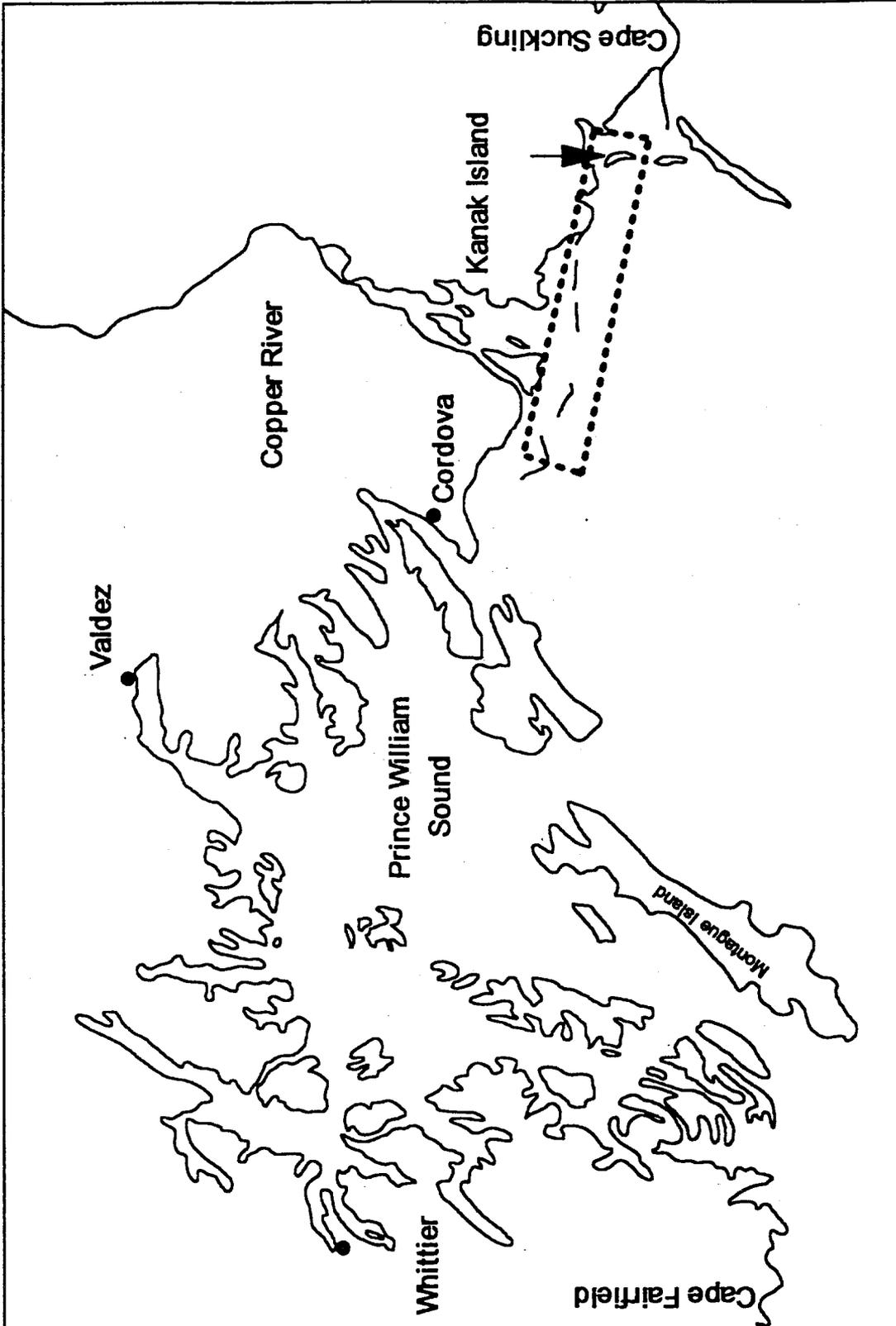


Figure 4. Copper River Delta razor clam harvest area.

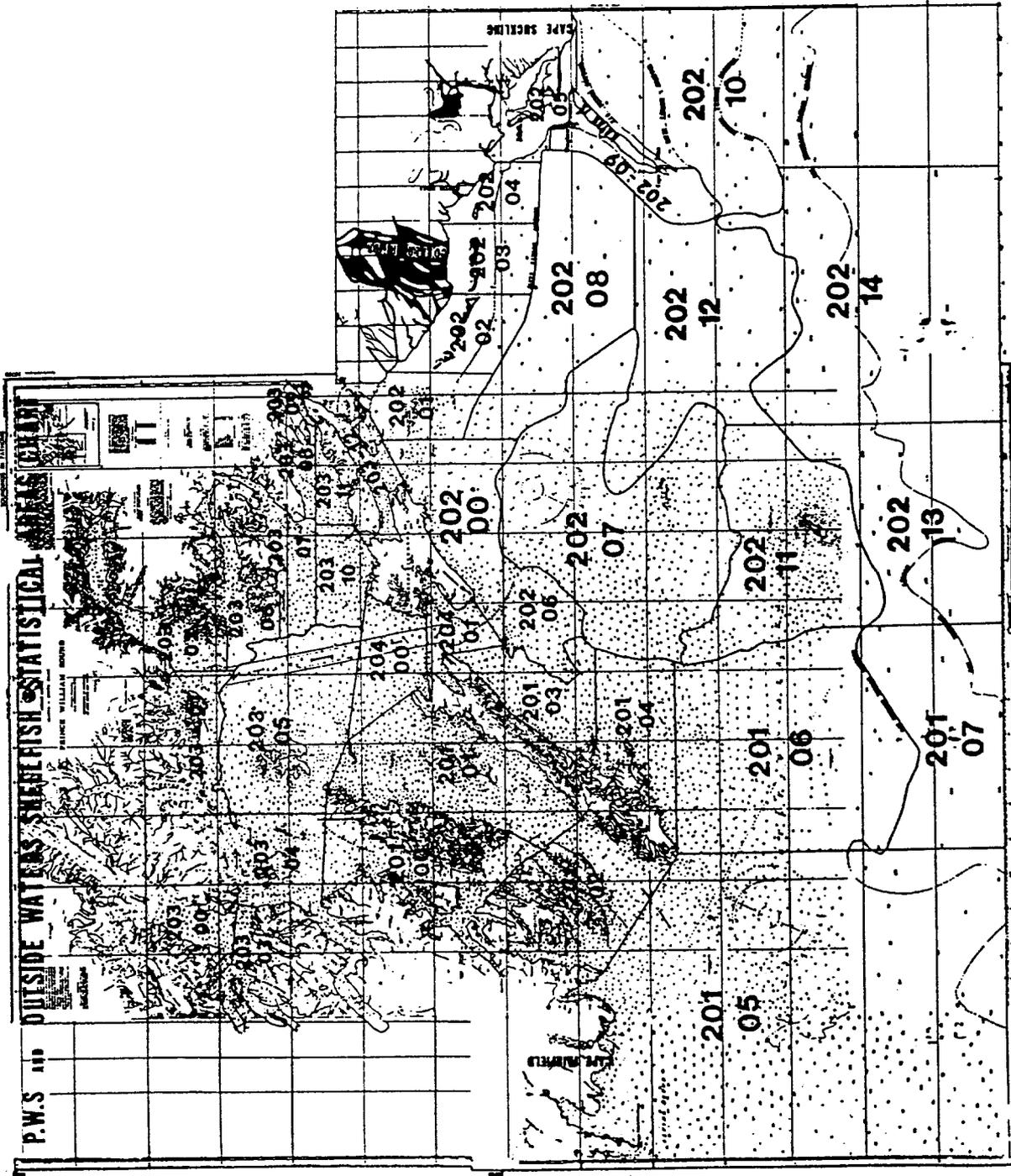


Figure 5. Prince William Sound and outside waters shellfish statistical areas chart.

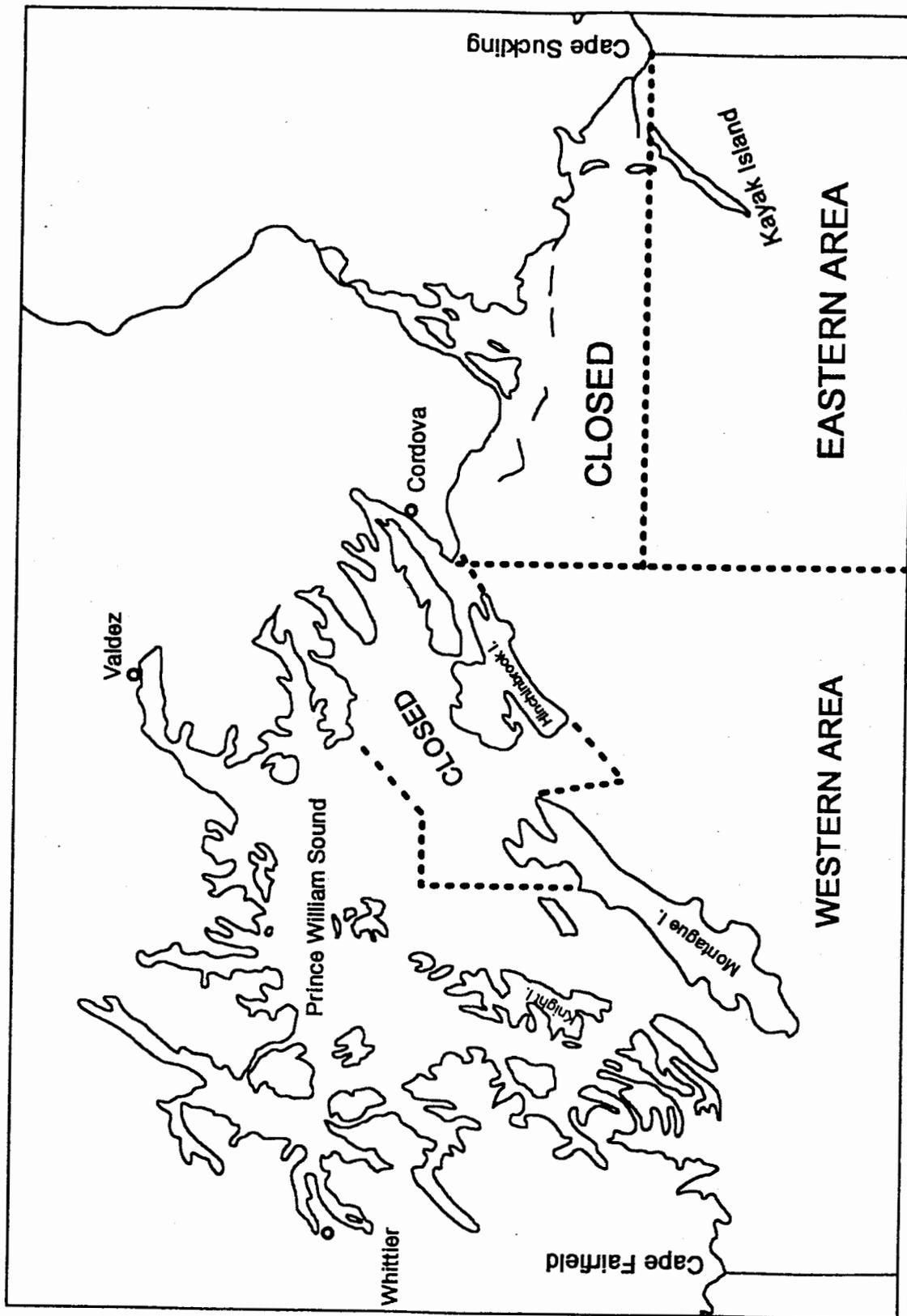


Figure 6. Prince William Sound scallop fishing areas and season date in 1996.

Appendix A. Prince William Sound Area Dungeness crab catch, 1960 - 1996.

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 AVAIL
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	---	---	---	CLOSED	---	31,152	---	5	690,819
1981	1,503,574	202	18	---	---	25	CLOSED	---	5,683	11	5	1,509,257
1982	757,911	139	16	332,417	2.2	26	CLOSED	---	4,221	4	2	762,182
1983	379,094	86	9	184,026	2.1	49	CLOSED	---	511	14	2	379,605
1984	826,778	88	10	413,394	2.0	92	CLOSED	---	150	2	2	826,938
1985	1,006,196	124	17	483,748	2.1	63	CLOSED	---	1,233	5	1	1,007,429
1986	1,090,477	105	16	531,940	2.1	58	CLOSED	---	0	---	---	1,090,477
1987	887,713	92	13	438,974	2.0	34	CLOSED	---	5,461	2	2	893,174
1988	602,969	48	8	298,569	2.0	52	CLOSED	---	0	---	---	602,969
1989	635,976	43	9	326,226	2.0	25	CLOSED	---	0	---	---	635,976
1990	397,913	63	17	196,266	2.0	36	CLOSED	---	0	---	---	397,913
1991	70,259	32	14	39,033	1.8	62	CLOSED	---	0	---	---	70,259
1992 (1)	2,458	5	2	1,229	2.0	n/a	CLOSED	---	0	---	---	2,458
1993	S E A S O N	C L O S E D	---	---	---	---	CLOSED	---	NO EFFORT	---	---	---
1994	S E A S O N	C L O S E D	---	---	---	---	CLOSED	---	NO EFFORT	---	---	---
1995	S E A S O N	C L O S E D	---	---	---	---	CLOSED	---	NO EFFORT	---	---	---
1996	S E A S O N	C L O S E D	---	---	---	---	CLOSED	---	NO EFFORT	---	---	---

(1) Spring season only.

Appendix B. Pot shrimp harvest, Prince William Sound Management Area,
1960 - 1996.

Year	Vessels	Landing	W E I G H T (lb)			Total ¹ whole wt.
			spot	coonstripe	other	
1960						4,988
1961						—
1962						3,576
1963						1,101
1964						4,248
1965						4,356
1966						—
1967						749
1968						6,866
1969						5,146
1970						19,776
1971						13,073
1972						6,949
1973						6,370
1974						24,978
1975						4,150
1976						2,410
1977						7,516
1978	9	17	N/A	N/A	N/A	15,466
1979	17	98	N/A	N/A	N/A	52,208
1980	23	155	84,787	5,174	67	90,028
1981	51	509	153,017	20,055	465	173,537
1982	57	397	205,746	7,250	784	213,781
1983	71	646	198,719	14,119	583	213,420
1984	79	513	198,729	7,911	640	207,280
1985	78	528	271,928	3,919	860	276,707
1986	80	540	286,105	3,715	812	290,632
1987	86	498	265,707	3,795	151	269,653
1988	76	433	191,630	764	48	192,442
1989	33	69	28,884	431	0	29,315
1990	23	59	36,378	358	0	36,737
1991	15	45	17,302	278	0	17,580
1992	C L O S E D					
1993	C L O S E D					
1994	C L O S E D					
1995	C L O S E D					
1996	C L O S E D					

¹ Catches converted from tail weight to whole weight using a conversion factor of 2.

Appendix C. Trawl shrimp harvest, Prince William Sound Management Area 1972 - 1996.

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	W E I G H T (lb)			Deadloss	Total
			Pink	Sidestripes	Other		
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	3	61	132	63,708	0	—	63,840
1990	4	89	3,348	105,795	15	18,303	127,461
1991	5	67	3,453	84,483	193	51,429	139,558
1992	5	70	651	196,467	28	49,097	246,243
1993	7	72	23	190,976	51	55,140	246,190
1994	6	47	749	85,980	0	24,134	110,863
1995	4	39	0	73,706	0	24,189	97,895
1996	3	42	0	89,551	0	21,704	111,255

Appendix D. Razor clam harvest in pounds, Prince William Sound Area, 1960 - 1996.

Year	COMMERCIAL		NON - COMMERCIAL	
	Diggers	Pounds	Diggers	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	No Effort	0	50	2,903
1990	"	0	50	2,641
1991	"	0	77	1,484
1992	"	0	92	2,403
1993	Confidential	Confidential	37	1,131
1994	0	0	28	459
1995	0	0	14	92
1996	0	0	19	381

1. A permit is required to harvest razor clams from the Copper River Delta for personal use, sport, or subsistence.

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