PRINCE WILLIAM SOUND MANAGEMENT AREA
1990 SHELLFISH ANNUAL MANAGEMENT REPORT

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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: 1990 Dungeness crab (Cancer magister) fishery, 1990 pot shrimp fishery, 1990-91 trawl shrimp fishery and the 1990-91 brown king crab (Lithodes aequispina) fishery.

The Tanner crab fishery remained closed during the 1991 season due to low stock abundance. No commercial effort occurred during 1990 for razor clams (Siliqua patula) although the season was open.

Shellfish landings from Area E during the past year included 397,913 pounds of Dungeness crab, 30,675 pounds of pot shrimp and 127,461 pounds of trawl shrimp. Harvest data from the brown king crab fishery is confidential because of the small number of participants.

The estimated ex-vessel value by fishery was $664,515 for Dungeness crab, $136,504 for pot shrimp and $158,279 for trawl shrimp. The ex-vessel value of the brown king crab fishery is confidential.

TANNER CRAB FISHERY

Introduction

The area's Tanner crab (Chionoecetes bairdi) 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 the prior 23 years. 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 of the area 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 desire to harvest crabs which had been on the grounds for several years and were considered excess to the reproductive needs of the stock prompted a reopening of the Tanner crab fishery in 1986. It is likely that some of the older crabs would have succumbed to natural mortality if not harvested. The harvest for 1986 was 0.53 million pounds and 75% of the crabs taken during that fishery were postrecruits.

The Alaska Department of Fish & Game's (ADF&G) 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 in the Northern and Hinchinbrook Districts 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 fishery has remained closed through the 1991 season due to continued low stock abundance.

The waters inside of Prince William Sound were the most productive during the 1986 - 1988 fisheries. More than 90% of the harvest was taken within the Sound during this time.

The recent ten-year average annual harvest is 0.5 million pounds. This average includes five years when there was no fishery. The harvest over the prior ten-year period is roughly split between the Sound and the Gulf of Alaska portion of the management area.

The precipitous decline in abundance of Prince William Sound Tanner crab 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.

Sampling for occurrence of Bitter Crab dinoflagellate disease syndrome was accomplished in 1990. Hemolymph samples from 87 crabs were submitted to the Alaska Department of Fish & Game Fish Pathology Laboratory in Juneau. Results revealed that six adult crab tested positive. Of the six positive crab, four were oldshell. Additional information suggests that the disease is also widespread among small crabs. During trawl sampling a visual inspection of the hemolymph indicated a possible infection rate of up to 13% for crabs in the 20 to 70 millimeter size range.

The Bitter Crab 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.

1992 Management Outlook

Based on results of the 1990 stock assessment pot survey, recruitment is not expected to markedly increase in 1991, therefore a fishery in 1992 is improbable. The small resurgence of recruit crabs captured during pot surveys in 1986 and 1987 was not sustained.

Additional information from limited trawling that the Department conducted also indicates that recruitment is not expected to increase in the next year. Figure two represents the size frequency of Tanner crabs from waters inside of Prince

William Sound during August 1990. A substantial portion of this sample is comprised of crabs less than 75 millimeters in carapace width. Male crabs less than 75 millimeters in carapace width, will require several more years of growth to attain legal size. 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 and a subsidence of the bitter crab disease 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). The harvest of nearly 300,000 pounds in 1972 is believed to be primarily blue king crab.

During the previous 12 years, when catch was recorded by species, the stocks of both blue and red king crab declined. Both the red and blue king crab fisheries have remained closed since the 1987-88 season. Fishery closures for blue and red king crab have coincided with the development of the brown king crab fishery. Recent indications from the brown king crab fishery signify that the stock of brown crab is small.

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 declines in average size, weight, and distribution experienced since the fishery began in 1982.

The regulatory season opens throughout Prince William Sound on October 1 and closes on December 20. A second season opens on January 15 and closes by regulation March 15. This split season allows a three-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 opens January 15.

1990-91 Season Summary

Fishing for brown king crab opened on October 1, 1990 and remained open until December 20, 1990. Due to the continued low abundance of the red and blue king crab stocks, fishing for these species remained closed.

The preseason guideline harvest level for the 1990-91 season was 40,000 pounds. This is the low end of the guideline harvest range established by the Board of Fisheries. Effort on the grounds did not begin until early November. Harvest information from the brown king crab season is confidential due to the limited number of participants, however catches were poor and the participants did not achieve the low end of the guideline. As a result of the poor fishery performance the second season that was scheduled to open on January 15, was closed by emergency order for the remainder of the regulatory season.

1991-92 Management Outlook

The Department plans to open the brown king crab season on October 1, 1991. The preseason expectation by the Department is for a continuation of the low harvest experienced in 1990. The fishery will show, if in fact, that the stock has declined to a level as experienced during the 1990 season. If fishery performance does not substantially improve over 1990 levels, then the fishery will be restricted.

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 1991-92 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. Incidental 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 3). 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 shell 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. The 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 1988, and 1990 until the crabs had attained an acceptable shell hardness. The opening date in 1987 was August 20, in 1988 September 15, and in 1990 the district opened on August 19.

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.

The Northern District is open year-round.

1990 Season Summary

The 1990 catch of Dungeness crab in the Prince William Sound Management Area was 397,913 pounds which was taken by 17 vessels (Appendix Table 3). Catch by statistical area is listed in Table 3. The average ex-vessel price was $1.67 per pound resulting in a fishery value of approximately $665,000. Production in 1990 was approximately 60% of the 1989 harvest and effort was nearly double the 1989 level.

Copper River District

The 1990 catch from the Copper River District was 397,913 pounds harvested by 17 vessels. The spring season opened by regulation on March 20 and continued through May 20. During the spring season eight vessels participated and the harvest was 142,000 pounds. Prior to the 1990 season, the largest number of participants in the spring season was five vessels.

The fall season regulatory opening was delayed by emergency order. A softshell survey conducted by the Department during mid-July indicated that 16% of legal size male crabs captured by pots were soft. A second soft shell survey in mid-August revealed that the percentage of soft shell males had declined in most of the district to the level that would permit a fishery. The district opening was split to allow fishermen access to those crabs which were acceptable to handle and still provide protection to crabs in an area which maintained a high percentage of soft shells. A partial opening occurred on August 19, except for deep waters of the district east of Martin Islands. The deep waters east of Martin Islands opened on September 1, to allow additional time for shell hardening. Fishing effort in the Copper River District continued through mid-October.

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 1990, 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, an otter is 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 1990. This district was open for the entire year. 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.

1991 Management Outlook

Vessel effort during the spring 1991 fishery is expected to decrease over the 1990 level. Although the ex-vessel value of Dungeness was high in 1990 the crab harvest was the lowest since 1983. Since the spring season targets on crabs which escaped the fall 1990 fishery, the harvest is expected to be low. Annual recruitment of crabs into legal size generally occurs after the spring season. The spring harvest will be mainly harvesting postrecruit crabs.

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

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 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 one. These areas were: Traditional Harvest Area, Montague Strait Experimental Harvest Area, and the Eastern Harvest Area.

The Department has managed the pot shrimp fishery in the Sound under the plan established by the Board of Fisheries from 1985 through mid-1990. During the spring 1990 shellfish Board of Fisheries meeting, the Board adopted a proposal submitted by the Department to eliminate and combine the Montague Strait Experimental Harvest area into the Traditional Harvest Area. The Montague Strait Experimental Harvest Area was established to gain year-round fishery performance

data. However, due to continuous fishing from 1985 - 1988 a stock conservation problem developed and the Department closed this area in October 1988.

The Board of Fisheries also adopted two gear related proposals during the March 1990 Board meeting. The first new regulation places a limit of 150 pots per vessel. This is viewed as an allocation among fishermen. The second new regulation is intended to provide protection to nonsalable size shrimp by allowing small shrimp egress through rigid mesh while retaining larger salable size shrimp. Pots with a definable side must have at least two adjacent sides completely composed of uncovered rigid mesh. The mesh size must be large enough to allow the unaided passage of a 7/8 inch round dowel. Round pots must have rigid mesh covering a minimum of 50% of the vertical surface area of the pot.

The western and northern portions of Prince William Sound, which are characterized by numerous steeply cut glacial fjords and passages, comprise the majority of pot shrimp harvests (Traditional Harvest Area). This area is accessed through the ports of Whittier, Valdez and Seward, that have direct transportation ties with the Anchorage metropolitan area. This accessibility has been the key to development of fresh markets for unprocessed spot shrimp (Pandalus platyceros). Shrimp fishermen have been able to develop markets where their product can be utilized shortly after capture. This area encompasses the north shore from Port Valdez to Whittier and all of the western and southwestern Sound including Montague Strait (Figure 4).

Two regulatory fishing seasons occur per calendar year in the Traditional Area. The spring season opening date was changed by the Board of Fisheries during the 1990 Board meeting. The spring season opens on May 1 rather than March 15. The justification for delaying the season opening was a desire to avoid harvest during the egg release period. The spring season closes on June 30. The fall season begins on August 15 and continues until 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.

The eastern Sound, which has a very low production history, was also designated as a year-round fishery. A Commissioner's permit is required for this area to allow the monitoring of effort and catch.

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 oftentimes split the industry as to the desired season of harvest.

1990 Season Summary

The 1990 commercial harvest of pot shrimp in the Prince William Sound Management Area was 30,675 pounds (whole shrimp weight). The harvest by species was spot 30,376, and coonstripe (Pandalus hypsinotus) 299 pounds. The harvest was taken by 23 vessels which made 59 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 for 1990 range from $3.50/pound - $9.00/pound for tails. The average price/pound whole weight was $4.45 and the fishery was worth approximately $137,000 to the fishermen.

Traditional Harvest Area

The 1990 spring season for the Traditional Harvest Area opened by regulation on March 15 and closed by emergency order on April 8, due to attainment of the midpoint of the guideline harvest range.

The emergency order to close the fishery was issued on April 3. The preseason guideline harvest range issued by the Department was 20,000 to 40,000 pounds whole weight. This guideline was reduced from the regulatory guideline of 75,000 - 100,000 pounds established in the Prince William Sound Management Plan in 1985.

The guideline was reduced due to the closure of the southwestern portion of the Traditional Harvest Area. In addition, the Montague Strait Experimental Harvest Area remained closed. The majority of the closed waters were due to low stock abundance, however a small portion of the closed waters at the north end of Knight Island were not opened due to oil sheens in that area (Figure 5).

The ADF&G's intent for allowing a fishery during the spring of 1990 was to evaluate the condition of the stock. The total annual harvest from Prince William Sound declined rapidly from 242,000 pounds in 1988 to 24,000 pounds in 1989. A small fishery would allow both the fishing fleet and the ADF&G to evaluate commercial catches of shrimp after a short period of reduced harvests.

Tagging of spot shrimp by ADF&G in Prince William Sound indicates that growth of adults is slow (approximately 3 millimeters/year) and that movement is negligible. Longevity is estimated to be at least 8 to 10 years. Based on this information the ADF&G concluded that the shrimp decline and subsequent recovery would not occur in one or two years. However, to dispel previous assertions that growth was much quicker than the Department's estimates, a small fishery was permitted during the spring of 1990.

Information that the ADF&G considered in setting the preseason harvest guideline was:

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 for other open waters which have shown signs of weakening.

The ADF&G placed an observer aboard commercial vessels during the season. Five vessels were monitored. Estimates of catch-per-unit -effort (CPUE) of salable

size shrimp was 1/4 to 1/3 pound of shrimp tails/pot. Conversations with the vessel operators indicated that their catches had declined substantially during the past several seasons. Based on catch rates observed during the fishery, ADF&G did not extend the season beyond the preseason harvest forecast of 20,000 to 40,000 pounds.

Reviewing the spring season fishery performance, the Department closed the fall 1990 season. The fall closure was intended to:

1) Allow the remaining females the opportunity to produce and release eggs.

2) Conserve males for future rebuilding of the female stock component.

3) Reduce the overall harvest rate during a period of low stock abundance.

Conversations with fishermen over the past several years and the onboard observations indicate that the stock of pot shrimp is weak and has recently declined in most locations of the Traditional Harvest Area. The southwestern portion of the Traditional Harvest Area was the first location to have fishery closures implemented due to the declining stock. It is now apparent that the stock in the northern portion of the Traditional Harvest Area is also weak.

Montague Strait Experimental Harvest Area

The Montague Strait Experimental Harvest Area, although designated as a year-round fishery, was closed to fishing on October 3, 1988 and has not reopened since the closure. This area was continuously open since January 1, 1985.

The justification for the October 1988 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. 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.

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 in this area declined from 18 to 4.

Eastern Prince William Sound

Harvest and effort were minimal during 1990. Due to the small number of participants the catch information is confidential. This area was open for the entire regulatory year.

1991 Management Outlook

Traditional Harvest Area

The ADF&G is closing the Traditional Harvest Area for both the spring and fall seasons during 1991. Figure six is a comparison of the size frequency of spot shrimp from Prince William Sound during November 1989 and November 1990. This data represents approximately 264 pot lifts from six sites (Unakwik Inlet, Port Wells, Culross Passage, Herring Bay, Chenega Island and Green Island) during each survey. The pots were covered with solid black fabric and the tunnel entrances were covered with 1/2 inch webbing. A stratified sampling plan is employed to cover a variety of depths at each location. No attempt was made to optimize the catch or target a specific size or depth range.

Figure six illustrates the effect of removing commercially valuable shrimp by the fishery. A pronounced decline occurs from the male to female portions of the size frequency during both years. The average catch of female spot shrimp was one/pot in 1989 and two/pot in 1990. Approximately 70% of the stock captured in 1990 is considered unsalable.

Spot shrimp growth data from a tagging study in Prince William Sound indicates that growth is approximately 10% of the carapace length/year. This slow growth is confirmed by the shift in size frequencies from 1989 to 1990. The large spike

of males indicated during the fall of 1989 shifts slightly to the right in the 1990 size frequency.

While it is apparent that the stock of shrimp is currently at a low level, a conservative management approach for the immediate future is warranted for the following reasons:

1) The number of female and large male shrimp is low. If a fishery was permitted, these shrimp will be targeted as salable and the abundance of this size range will decline further and the risk of recruitment failure will increase.

2) Spot shrimp are long lived and 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 overharvested the slow growing spot shrimp will require many years to recover, providing that small shrimp are available to grow to a harvestable size.

3) 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 exceeded the replacement rate.

Eastern Prince William Sound

The Department plans to allow year-round fishing in this area during 1991. 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 (Pandalus borealis)in southwestern Prince William Sound to sidestripe shrimp (Pandalopsis dispar) in the Northwestern Sound (Figure 7). 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 6).

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. The sidestripe fishery is characterized by smaller vessels than those targeting on pink shrimp. Sidestripes are generally marketed whole and fresh in Japan and Anchorage. Occasionally, fishermen sell sidestripe tails in Anchorage.

The Board of Fisheries at their spring 1986 shellfish meeting established a fishing season of March 1 through November 30 for sidestripe shrimp fishing in Northwestern Prince William Sound. During the 1990 spring Shellfish Board meeting, a season of April 1 through August 15 and September 15 through December 31 was implemented. The opening date was changed to accommodate ADF&G's request to delay fishing in the spring due to a concern that the egg release period was not complete. The egg release season does not appear to be complete on April 1,. however, the Department does not have sufficient data to support a later opening date. The closure from August 16 through September 14 was proposed by a fishermen who indicated to the Board that soft-shell shrimp were prevalent in the catch during that time. The season was extended to December 31 to enable fishermen to provide shrimp to market during the holidays.

From 1986 to 1990 gear requirements in the Northwestern Sound for March and April required 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 Board adopted a public proposal in 1990 to increase the cod end mesh size to 1 7/8 inch stretched and to require this large mesh for the entire fishing season. The intent of large mesh is to allow for the escape of small sidestripe and pink shrimp from the trawl.

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 January - March closure during peak egg release period in the Northwestern Sound for sidestripe shrimp.

4) Cod end mesh restriction during the entire season in the Northwestern Sound. Cod ends must be at least 15 feet in length with at least 12 feet composed of 1 7/8 inch stretched mesh hung horizontal and perpendicular to the mouth of the trawl.

5) No more than 10% by weight of the shrimp in possession may be pink shrimp in the Northwestern Sound.

6) 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.

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

1990 Season Summary

The sidestripe shrimp season in the Northwestern Sound opened by regulation on March 1, 1990 and remained open through December 31 except for the Port Wells area, which closed by emergency order on August 15, 1990 for the remainder of the

season. As effort and landings for the Port Wells area increased, the Department has become concerned for the conservation of the sidestripe shrimp resource in Port Wells. This concern prompted the Department to collect onboard observer data in April 1990, to calculate an area swept estimate of abundance for the Port Wells area. The Department presented the population estimate to commercial fishermen and processors during June 1990 in Anchorage. The Department applied a 20% harvest rate to the calculated salable biomass of sidestripe shrimp to arrive at a harvest level of 44,000 pounds. The Department closed the Port Wells area to commercial fishing from September 15 to December 31. At the time of the closure the 20% harvest rate was exceeded. This was the first closure of the trawl shrimp sidestripe fishery.

Figure 8 is a sample of the size structure of the sidestripe shrimp stock. The data was collected in April 1990 on a commercial vessel. The largest component of the sample is males (57%), followed by juveniles (16%), transitionals (14%), and females (13%). Because the sample was taken during the egg release period, the percentage of females on the grounds may be slightly higher if sampled during the fall. This size frequency suggests that all segments of the stock are vulnerable to capture.

Fishery removals of juvenile shrimp has a cumulative effect. The year class or classes that comprise the juvenile segment of the stock are subjected to fishing mortalities over time as juveniles, males, transitionals and females. Unless exceptionally strong recruitment frequently occurs, the juvenile segment of the stock will greatly decrease in number by the time they transform to females. This situation is not desirable as future egg production declines.

The trawl shrimp harvest in Prince William Sound for 1990 was 109,158 pounds of whole shrimp. Sidestripe shrimp dominated the landings with 105,795 pounds. Incidental landings of pink shrimp amounted to 3,348 pounds with 15 pounds of miscellaneous shrimp species. Approximately 18,000 pounds of deadloss (pink shrimp, small sidestripes or large crushed sidestripes) were reported on fish tickets. This was the first season when deadloss was reported. The Department notified processors that reporting of shrimp catches which were not purchased, for whatever reason, were required to be reported by regulation. The reported

deadloss of shrimp for 1990 is considered to be only a partial accounting of the actual amount of shrimp landed but not purchased in 1990.

The trawl shrimp catch by statistical area is confidential due to the limited number of participants. Trawl shrimp landings occurred from late March through August and during the months of October and December.

The average ex-vessel value for trawl caught shrimp was $1.49 per pound, whole shrimp weight. The ex-vessel fishery value was approximately $158,000.

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. This area has opened concurrently with the Tanner crab season to provide trawlers an opportunity to harvest bottomfish, that is sold as hanging bait to the crab fleet, and shrimp. The Tanner crab fishery was closed in 1991, therefore this area was not opened. Trawl caught shrimp have not been taken from this area since 1984.

1991 Management Outlook

The outlook for 1991 indicates a reduction in harvests of sidestripe shrimp from the Port Wells Area and a potential early closure due to the attainment of the guideline harvest. Other waters of the area will remain open to exploratory fishing if Port Wells closes. During the past several seasons the majority of shrimp harvest was produced in Port Wells.

The regulatory season permits fishing for eight months per year in the Northwestern Sound. The ADF&G believes that continuous fishing pressure for eight months will result in a greatly reduced stock. The potential for future fishery closures, such as the pot shrimp fishery, is real. Several additional

vessels have recently shown interest and are expected to increase their effort during 1991.

The Department plans to continue interactions with the fishermen during the season. Information on pounds/hour towed, species composition, soft-shell periods, egg bearing and releasing times are important stock parameters that can be gained through the efforts of the participants. The Department will also attempt to gain compliance with the reporting of deadloss to document the full extent of biomass harvested.

Catch rates are indicative of a small stock and few regulations exist to maximize the long-term benefit of the trawl shrimp resource. Due to the low ex-vessel value for pink shrimp, there is not expected to be effort in the southwestern Sound for pink shrimp in 1991.

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 9). 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: 1) economic - the east coast clam fishery gained economic dominance 2) biological - substrate change caused largely by alteration in the Copper River

outflow that severely affected juvenile survival and 3) 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 7). 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. Since 1983, 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 (1981 - 1990) average annual harvest of 45,000 pounds. The average number of diggers during this time was 16.

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, that 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 that have a physical land connection with Kanak Island during any tide stage.

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

1990 Season Summary

There was no commercial harvest in 1990.

Kanak Island usually receives annual certification by the Alaska Department of Environmental Conservation (D.E.C.). 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 1990.

The reported non-commercial harvest (subsistence, sport and personal use) was 2,641 pounds. The Department issued 91 non-commercial permits for the Delta. Fifty permits were returned. Harvest from Kanak Island was 2,076 pounds, Softuk Bar 249 pounds, Katalla beach 315 pounds, and Strawberry Bar 1 pound.

Historically crab fishermen have dug clams for use as bait during their commercial operations. During 1990 there was no reported harvest by crab fishermen which may be due to either non reporting of non-commercial use, or availability of bait clams through commercial facilities.

1991 Management Outlook

Effort should resume during 1991 for bait clams. Although the Department does not monitor on-site stock levels, it appears that razor clam abundance declined over the previous five years on the eastern delta. One possible explanation may be the reported change in shape of tidal areas near Kanak Island due to longshore transport and beach erosion.

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 non-commercial 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 non-commercial 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. 1991 Commercial Tanner Crab Catch by Statistical Area.

Statistical Area	Number Of Vessels	Total Pounds
FISHERY CLOSED		
Total	0	0

Table 2. 1990-91 Commercial Brown King Crab Catch by Statistical Area.

Statistical Area	Number Of Vessels	Total Pounds
DATA IS CONFIDENTIAL		
Total	0	0

Table 3. 1990 Commercial Dungeness Crab Catch by Statistical Area.

Statistical Area	Number Of Vessels	Total Pounds
202-03	1	4,526
202-03	7	79,088
202-04	17	269,797
202-05	6	44,502
Total	17	397,913

Table 4. 1990 Commercial Pot Shrimp Catch by Statistical Area.

Statistical Area	Number Of Vessels	Total Pounds
203-00	-Data is Confidential-	--
203-01	5	3,744
203-02	-Data is Confidential-	--
203-03	8	5,374
203-04	11	13,412
Total	23	30,675

Table 5. 1990 Commercial Trawl Shrimp Catch by Statistical Area.

Statistical Area	Number Of Vessels	Total Pounds
201-00	-Data is Confidential-	--
201-02	-Data is Confidential-	--
203-00	-Data is Confidential-	--
203-04	-Data is Confidential-	--
	4	127,461

Table 6. 1990 Commercial Razor Clam Harvest by Statistical Area.

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