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NORTON SOUND - PORT CLARENCE - KOTZEBUE

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PRESENTATION

This report summarizes the 1997 season and historical information concerning management of the commercial and subsistence fisheries of the Norton Sound, Port Clarence and Kotzebue Sound districts. Data from special management and research projects are included in this report. A more complete documentation of project results will be presented in separate reports.

Data presented in this report supersedes information found in previous management reports. An attempt has been made to correct errors presented in earlier reports. Previously unreported data has been included and is indicated by appropriate footnotes. Current year catch data presented has been derived from seasonal field data.

This report is organized into the following major sections:

- (1) Salmon
- (2) Herring
- (3) King Crab
- (4) Miscellaneous species

In order to facilitate use of this report, tabular data has been separated into two categories: 1) tables presenting annual data; 2) appendix tables which present historic comparisons. The text for each major section is followed by tables, figures, and appendices.

SECTION 1: SALMON
(Includes Norton Sound, Port Clarence
and Kotzebue Districts)

SECTION I - SALMON

INTRODUCTION

Boundaries

The Norton Sound, Port Clarence and Kotzebue Sound salmon management districts include all waters from Point Romanof in southern Norton Sound to Point Hope and includes St. Lawrence Island. These management districts comprise over 65,000 square miles, with a coastline exceeding that of California, Oregon, and Washington combined.

Salmon Resources

Five species of Pacific salmon are indigenous to the area with chum (*Oncorhynchus keta*) and pink salmon (*O. gorbuscha*) historically being the most abundant. Chum, pink, and chinook (king) salmon (*O. tshawytscha*) have been found as far north as Barrow; however, these species are uncommon north of the Kotzebue Sound drainages. The northernmost large concentrations of chum salmon are found within the Kotzebue Sound drainages, while large numbers of pink, chinook and coho (*O. kisutch*) salmon are not found north of Norton Sound. Small sockeye (red) salmon (*O. nerka*) populations exist within a few Seward Peninsula drainages.

Commercial Fishery

In 1959 and 1960, Department biologists conducted resource inventories which indicated harvestable surpluses of salmon available in several rivers systems of the Norton Sound Arctic area. The Department liberalized various regulations and encouraged processors to explore and develop new fishing grounds. As a result, commercial salmon fishing activity has grown significantly since statehood, enabling some local residents to obtain cash income.

The majority of commercial fishermen and many buying station workers are resident Native Alaskans (Yupik, Inupiat, Siberian Yupik from St. Lawrence Island). Commercial fishermen operate set gillnets from outboard powered skiffs to capture salmon. All commercial salmon fishing is done in coastal marine waters.

Salmon effort and catch per unit effort data (CPUE) presented throughout this section have been derived as follows. Boat (or fisherman) hours have been computed after assuming that if a fishing boat delivers during a fishing period, it fished the entire period. The total number of individual boats delivering in any period is multiplied by the number of hours open to commercial fishing. Catch per fisherman (or boat) hour is obtained by dividing the total fishermen hours into the catch

for the corresponding period of time. Total fishermen (or boats) is the total number of fishermen making deliveries, regardless of how many deliveries were made or days fished during a particular period or season. There are a number of fishermen who deliver only once or twice during the entire season. Total days fished is the total number of hours open to commercial fishing during the season divided by 24 hours.

Subsistence Fishery

There are approximately 16,000 people in the area, the majority of whom are Native Alaskans, residing in more than 26 small villages scattered along the coast and the major river systems. Nearly all of the local residents are dependent to varying degrees on the fish and game resources for their livelihood.

Subsistence fishermen operate gillnets or seines in the main rivers and, to a lesser extent, in the coastal marine waters capturing primarily salmon, whitefish, arctic char and inconnu (sheefish). Beach seines are used near the spawning grounds to catch schooling or spawning salmon and other species of fish. The major portion of fish taken during the summer months is air dried or smoked for later consumption by villagers or occasionally their dogs.

Prior to 1960, subsistence harvest information is incomplete or entirely lacking. From the early 1960s until 1982, the Department conducted annual household surveys in communities with major salmon fisheries. Beginning in 1983, budgetary restrictions made it impossible to conduct surveys in each village. For the last 5 years that these surveys were conducted for Norton Sound (1978-1982) the average subsistence catch was 73,000 salmon including all species (Appendix Table A8). The majority of salmon taken are pinks and chums.

Subsistence surveys for the Kotzebue area were less complete. An expansion of documented surveys from several years for different villages estimates total subsistence salmon harvest for the Kotzebue Sound area to approach 75,000 (Appendix Table C6). Since 1974, subsistence salmon catches in the Nome Subdistrict (Subdistrict 1) have been determined from the return of catch calendars as required under a permit system. Not all fishermen were contacted, and the data were not expanded therefore these harvests should be considered minimum figures.

In 1994, the Department initiated a new annual subsistence salmon harvest assessment effort in northwest Alaska which provided more extensive, complete, and reliable salmon harvest estimates than existed previously. In 1997, the department continued its subsistence salmon harvest assessment program. Household surveys were conducted in ten of the 11 communities in the Norton Sound District, both communities in the Port Clarence District, and six of the 15 Kotzebue District communities. In Kotzebue, subsistence salmon harvests were determined through a postcard survey and in the Nome area, harvests were determined through fishing permits and catch calendars.

In the 18 surveyed communities, surveyors attempted to contact 100 percent of the households, with an actual contact rate of 90 percent in 1997. The harvest data were expanded to account for those households not contacted. Since 1994, the average subsistence catch for Norton Sound was 113,944 salmon including all species. In Port Clarence the average catch was 43,051 salmon since 1994, and in the Kotzebue District the average catch was 80,483 salmon.

The goals of the post-season household survey were to: 1) collect harvest data that would result in a total harvest estimate for subsistence salmon by species and community, 2) compile information on gear types, participation rates, sharing, use of salmon for dog food, and household size, and, 3) update household lists and identify subsistence fishing households. Researchers interviewed households with the use of a two-page survey instrument (Appendices G5-G8).

Management

The Division of Commercial Fisheries of the Alaska Department of Fish and Game is responsible for the management of commercial and subsistence fisheries in this vast area. The permanent full-time staff assigned to this area during 1997 consisted of the Area management Biologist stationed in Nome, the Assistant Area Biologist stationed in Nome, an Area Fish Culturist, an Assistant Management Biologist in Kotzebue, an Administrative Clerk assigned to the Nome office and a seasonal Fish Culturist in the Nome office. In addition, summer seasonal assistance in conducting various management and research activities was provided by approximately 20 seasonal biologists and technicians in Norton Sound and Kotzebue Sound. Additional assistance was provided by biologists from the regional staff. In 1997, college interns funded by Norton Sound Economic Development Corporation was utilized as fisheries technicians in some projects. Four Cooperative projects staffed by Kawarak Inc. in Norton Sound supplement the salmon escapement monitoring activities of the area staff.

The main objective of the Department's program is to manage the commercial and subsistence salmon fisheries on a sustained yield basis. Various field projects are conducted to provide information on salmon abundance, migration and stock composition. Summaries of these projects are presented in Appendix G2.

Management of the salmon fishery is complicated by the difficulty in obtaining valid escapement data in this large area and by insufficient comparative catch and return information. Management problems are compounded by the need to provide not only for adequate escapements, but for the needs of several different user groups. Alaska state law requires that subsistence uses receive a priority over other uses of fish and wildlife resources. If the subsistence harvest or demands increase, commercial fishing may be restricted. It should be pointed out that increases in commercial fishing efficiency are expected and may balance any immediate decline in subsistence utilization or increase in run size with the result that present regulations have been maintained or made even more restrictive.

The basic regulation that governs the commercial salmon harvest in all districts is the scheduled weekly fishing period. Commercial fishing regulations provide for a total of two to four days of fishing per week during the open season depending on area and season. The Department attempts to distribute fishing effort throughout the entire return to avoid harvesting only particular segments of the return. Occasionally, fishing time is increased or decreased by Emergency Order, depending upon fishing conditions and the strength of the returns or spawning escapements, as determined by special studies conducted by the Department. Emergency Orders issued during the 1997 seasons are presented in Appendix G3.

Weekly fishery reports, which give information on fishery status and fishing schedules, are broadcast during the fishing season over radio KICY and KNOM in Nome, and KOTZ in Kotzebue. In addition, fishery news articles are published in the Nome Nugget, Bering Strait Record, and the Arctic Sounder.

NORTON SOUND DISTRICT

District Boundaries

The Norton Sound Salmon District consists of all waters between Cape Douglas in the north and Point Romanof Light in the south. The District is divided into six subdistricts: Subdistrict 1, Nome; Subdistrict 2, Golovin; Subdistrict 3, Moses Point; Subdistrict 4, Norton Bay; Subdistrict 5, Shaktoolik; and Subdistrict 6, Unalakleet Subdistrict (Figure 1). Each of these subdistricts contains at least one major salmon-producing stream. Subdistrict boundaries were established to facilitate management of individual salmon stocks.

All commercial salmon fishing in the district is by set gillnets in marine waters; fishing effort is usually concentrated near river mouths. Commercial fishing typically begins in June and targets chinook salmon. Emphasis switches to chum salmon around June 25 and the coho salmon fishery begins the third week of July. The season closes September 7. Pink salmon may be very abundant on even year returns and a pink directed fishery may replace or may be scheduled to alternate periods with the historical chum directed fishery.

Salmon management has changed significantly during recent years due to limited market conditions and marginal returns of many salmon stocks within the district. The Eastern subdistricts, Norton Bay, Shaktoolik, and Unalakleet all have fairly healthy salmon stocks. Commercial fishing in these subdistricts is managed using commercial fishing statistics and the Unalakleet River test fishing escapement index. Both the Golovin and Moses Point Subdistricts have recently suffered from poor chum salmon returns. In these two subdistricts, management first insures an adequate escapement, then a subsistence harvest within historical levels and finally an attempt is made to provide for a commercial and sport harvest. The Nome Subdistrict is managed intensively for subsistence use. Registration permits, closed waters, setting fishing period length, limiting gear and

harvest limits are all tools that can be employed throughout the season to provide for escapement needs and to maximize subsistence opportunity.

Historical Fishery Use

Fishing has been a part of life for Norton Sound residents for many centuries as indicated by archeological evidence dating back 2,000 years (Bockstoe, 1979). The largest pre-contact settlements on the Bering Strait Islands and the Western Seward Peninsula were located where marine mammals were the primary subsistence resource. The rest of the regions population lived in small groups scattered along the coast, often moving on a seasonal basis to access fish and wildlife resources (Thomas 1982). During summer months residents would disperse, usually in groups comprised of one or two families, and set up camps near the mouths of streams. Harvest levels of fish on any one stream were relatively small because of the low concentrations of people who caught only what their families and one or two dogs needed through the winter (Thomas 1982).

A large scale fur trade was developed by the Russians in the late 1800's and continued after the American purchase (Magdaniz 1981). The activities and support for hundreds of commercial whalers and trading ships caused trading to increase in the region around 1848 (Ray 1975). The increased competition for walrus, caribou, and other species from outsiders may have increased the importance of salmon to area residents (Magdaniz 1981). In the late 1890's gold was discovered on the Seward Peninsula and boom-towns sprang up with thousands of new immigrants flocking to the region. Commerce developed which drew people to central locations that evolved into year-round communities. Other reasons for communities to become established stemmed from the operation of missions.

The impacts of mining was significant on fish populations. Nearly every stream on the Seward Peninsula had some sort of mining operation working on it which ranged from simple gold panning to sluice boxes to hydraulic giants to bucket line dredges. One example of extensive impact was on the Solomon River which is only 30 miles long but had 13 dredges working at one time. Another obvious impact was simply the large number of people who came to live in the region between 1900 and 1930. Communities like Nome, with a population of 30,000 and Council with 10,000 people at one time, did not exist before gold was discovered.

It was in the late 19th century when the size of the dog teams increased from two or three to as many as ten to twenty. At about the same time wooden boats began to replace kayaks (Thomas 1982). Consequently, the demand for dry fish to feed the dog teams increased along with the development of better means to harvest fish. Winter transportation throughout the region was done with hired dog teams and drivers who carried mail or freight along the coast and across the state to the ice-free port at Seward. Dry fish became a major barter item in response to the great demand for dog food which consisted of primarily chum and pink salmon (Thomas 1982).

Local residents would spend most of their summers catching and drying large amounts of salmon, some of which they kept for themselves and the rest would be bartered or sold to mining camps, roadhouses, and trading posts or stores. For example, the Haycock mining camp on the Koyuk River would buy about two tons of dry fish each year. There were roadhouses at Golovin, Walla, Moses Point, Isaac's Point, Ungalik, Robertvale, foothills (south of Shaktoolik), Egavik, and many other locations. Dry fish was bought in units of bundles (50 dry fish tied together) at a typical price of 10 cents per pound from the fishermen. One elder in the area felt that more fish were retained for their own use as compared to the amount sold which may have averaged five to ten bundles per household (Thomas 1982).

After the gold rush the number of people gradually decreased over the next twenty years as the gold deposits were worked out. The number of dog teams diminished by the mid 1930's with the introduction of the mail plane and mechanical tractors. The last mail team contract ended in 1962 at Savoonga. Local stores continued to trade in dry fish at Shaktoolik, Saint Michael, Unalakleet, and Golovin. An example of quantity was the Shaktoolik store that had a cache 8x20x40 feet which would be filled to the top with dry fish. One elder said the stores would buy the fish for 6 cents a pound and sell them for 10 cents a pound or their equivalent in groceries and supplies (Thomas 1982). By the early 1960's, commercial salmon fishing developed into a source of summer cash and snowmachines were replacing the need for dog teams (Thomas 1982). Dry fish was no longer needed to feed dogs and cash was becoming more available for trading at stores.

Commercial Fishery Overview

Commercial salmon fishing in this district first began in the Unalakleet and Shaktoolik Subdistricts in 1961. Most of the early interest involved chinook and coho salmon which were flown in dressed condition to Anchorage for further processing. A single U.S. freezer ship also purchased and processed chum and pink salmon during 1961. In 1962, two floating cannery ships operated in the district and the commercial fishery was extended into the Norton Bay, Moses Point and Golovin Bay Subdistricts. The peak in salmon canning operations occurred during 1963.

Since then, markets have been sporadic and some subdistricts have often been unable to attract buyers for entire seasons. A joint venture between KEG (Koyuk-Elim-Golovin) Fisheries and NPL Alaska, Inc., operated from 1984 until mid-season in 1988. A permit issued by the Governor allowed two Japanese freezer ships to buy directly from domestic fishermen and was limited to salmon caught in the internal waters of Golovin and Norton Bays. Currently, the most consistent markets are at Unalakleet and Shaktoolik where fish are purchased, iced, and flown directly to Anchorage for processing and resale.

The commercial salmon fishing season opens by emergency order between June 8 and July 1, depending on run timing within each subdistrict. The season closes by regulation on August 31 in Subdistricts 1, 2, and 3, and on September 7 in Subdistricts 4, 5, and 6, but processors often terminate their operations prior to the regulatory closure dates. Two 48 hour fishing periods

normally occur each week unless changed by emergency order with the exception of the Nome and Moses Point Subdistricts, where two 24 hour fishing periods are scheduled each week.

Commercial fishing gear is restricted to set gillnets, with a maximum aggregate length of 100 fathoms allowed for each fisherman. There are no mesh size or depth restrictions during the normally scheduled periods. However, mesh size is often restricted in an attempt to harvest a specific species of salmon. The majority of the gillnets fished are approximately 5 3/4 inch stretched measure. In the Unalakleet and Shaktoolik Subdistricts, 8 1/4 inch stretched mesh gillnets are commonly used during the chinook salmon run in June through early July. During years when large pink salmon runs occur, the Department provides fishing periods when only 4 1/2 inch mesh nets or less may be set or drifted. These special small mesh periods are an attempt to target pink salmon without over harvesting the larger sized salmon species.

Most fishermen do not tend their nets continuously once they are set, leaving them unattended overnight. Fish quality suffers due to the length of time fish may be left in the nets and is especially poor when storms prevent fishermen from checking their gear for extended periods of time.

Commercial Fishery Management

The Norton Sound District is managed on the basis of comparative commercial catch data, escapements and weather conditions. A single factor or combination of factors may result in issuance of emergency orders affecting seasons, fishing periods, allowable mesh size, and areas.

Aerial surveys are used to monitor escapements in the majority of the Norton Sound streams. Weather conditions, time of day, type of aircraft, water conditions, bottom conditions, date of survey, and efficiency of the surveyor and pilot must be taken into account when making inter-annual aerial survey comparisons. Counting towers are a much more consistent and accurate method of obtaining escapement information and have been utilized on many river systems in Norton Sound. Seven counting towers were operated in 1997.

The Commercial fishing season begins with chinook salmon in mid June. Emphasis switches to chum salmon around June 25, then gradually shifts to coho during the third week in July. Pink salmon are abundant during even years, but there is often no market for this species. The southern Subdistricts 5 and 6 (Shaktoolik and Unalakleet) have maintained commercial fisheries. They target chinook, chum, and coho salmon, with chinook and coho salmon catches remaining fairly stable while chum salmon catches have been declining since the early 1980's. Management has consisted of a series of Emergency Orders that open and close fishing, adjust fishing time, and restrict mesh size, a fishing period.

Commercial fisheries in Subdistricts 2 and 3 (Golovin and Moses Point) target chum salmon. The commercial chum salmon harvest has dropped dramatically since the mid 1980's. Poor returns have

resulted in restrictive management actions during recent years when the seasons have been closed by E.O. to allow for escapement and subsistence needs.

There has been little or no commercial salmon harvests in Subdistricts 1 and 4 (Nome and Koyuk) since the early 1980's. In the Nome Subdistrict this is due to very depressed stocks which in some years require closure or severe restrictions on the fishery. Conversely, the Norton Bay Subdistrict has healthy stocks, but can't attract markets willing to operate in this remote area.

Salmon management has changed significantly during recent years due to limited market conditions and marginal returns of many salmon stocks within the district. The Eastern subdistricts, Norton Bay, Shaktoolik, and Unalakleet all have relatively healthy salmon stocks. Commercial fishing in these subdistricts is managed using commercial fishing statistics and the Unalakleet River test fishing escapement index. Both the Golovin and Moses Point Subdistricts have recently suffered from poor chum salmon returns. In these two subdistricts, management first insures an adequate escapement, then a subsistence harvest within historical levels and finally an attempt is made to provide for a commercial and sport harvest. The Nome Subdistrict is managed intensively for subsistence use. Registration permits, closed waters, setting fishing period length, limiting gear and harvest limits are all tools that can be employed throughout the season to provide for escapement needs and to maximize subsistence opportunity.

Subsistence Fishery Overview

Due to budgetary restrictions, household subsistence harvest surveys were not conducted district wide in Norton Sound from 1985 to 1993. Since 1994, the department has conducted an annual subsistence salmon harvest assessment effort in northwest Alaska which provided more extensive, complete, and reliable salmon harvest estimates than previously existed. These household subsistence harvest surveys are primarily funded by the Commercial Fisheries Management and Development Division and were conducted by the Division of Subsistence during the fall 1997 and winter 1998 in 10 Norton Sound villages. For the first time, the St. Lawrence Island communities of Gambell and Savoonga were included in the Norton Sound District surveys because information from these communities was needed by the Board of Fisheries to make subsistence needs determinations for the region. Subsistence harvest estimates for the district are generated from the data gathered by the survey project.

Daily surveys of Unalakleet River and ocean subsistence fishermen have been conducted annually since 1985 during the chinook salmon run. Although total harvests by subsistence fishers were not documented, effort and catch information were used to judge timing and magnitude of the chinook salmon return. The commercial fishery is delayed until it becomes apparent subsistence needs are being met and chinook salmon are beginning their upstream migration as indicated by the Department of Fish and Game test net in the lower Unalakleet River. There is a growing trend to move subsistence nets from the river mouth out to the ocean in order to avoid large debris loads

from spring runoff. It is presently unclear what changes this fishing technique will have on chinook salmon escapement.

Low salmon stock levels in the Nome Subdistrict combined with a large concentration of users has required issuing subsistence harvest permits for the area since 1974. These are issued by regulation to each household and designated fishing location. Each location may have its own catch limit per permit and the fisherman is allowed to change locations after notifying the local Fish and Game office. After the fishing season, households must return the completed calendar to the department, whether or not they actually fished.

Regulatory Actions in Nome Subdistrict

Although pink salmon are usually the most abundant species of salmon in Subdistrict 1 streams, the commercial fishery has primarily targeted chum salmon. The relatively large chum salmon catches in this subdistrict in conjunction with weak local abundance implied that the fishery intercepts non-local stocks. A 1978-79 Norton Sound stock separation study confirmed this view. Salmon tagged near Nome were re-captured in fisheries from Golovin (Subdistrict 2) to Kotzebue. In an attempt to provide for spawning requirements in addition to an important subsistence fishery that targets local stocks, a commercial harvest guideline of 5,000-15,000 chum salmon was adopted as a regulation.

Due to poor chum salmon escapement during the 1982 and 1983 seasons, the Board of Fisheries, in response to an advisory committee petition, directed the Department to manage the commercial fishery so that chum salmon escapement could be optimized. During the 1984 fall Board of Fisheries meetings, these directives which had been in practice that season became regulation. In response to public and advisory board proposals, the following commercial fishery restrictions were adopted as regulations:

- 1) Salmon may be taken commercially only from July 1 through August 31.
- 2) Fishing periods were restricted to two 24-hour periods per week.
- 3) Waters west of Cape Nome were closed to commercial salmon fishing.

The Department was also directed to allow a harvest at the lower end of the guideline harvest range of 5,000 to 15,000 chum salmon, as stipulated in 5AAC 04.360.

In addition to these commercial fishing restrictions, a proposal to restrict the sport fishery in the Nome and Snake Rivers was adopted in 1984:

With a bag and possession limit of 15 salmon, other than chinook salmon, only 5 could be chum and coho salmon, in combination.

Subsistence permit limits in the Nome and Snake Rivers were restricted to 20 chum and 20 coho salmon. The remainder of the permit limit could be filled with salmon other than chum or coho salmon.

However, even with these restrictive regulations in place, chum salmon escapement goals were difficult to attain. The 1987 fishing season experienced poor returns of both chum and pink salmon to Nome Subdistrict streams. Numerous management actions were made which curtailed commercial fishing activities, and later, sport, personal use, and subsistence were also restricted. Even with such drastic fishery restrictions, escapement goals for chum salmon were not attained during 1987 in the Nome, Eldorado, Flambeau, Bonanza, Snake, and Solomon Rivers. In response to this continuing trend of decreasing chum and pink salmon returns to the Nome Subdistrict, several new regulations were adopted during the 1987 Alaska Board of Fisheries meetings.

With the commercial fishery all but eliminated in recent years, proposals affecting the sport, personal use, and subsistence fisheries were considered. The following new sport fish regulations were adopted for all Nome area road system streams (Seward Peninsula drainages from Cape Prince of Wales to Cape Darby):

- 1) For salmon other than chinook, 10 per day, 10 in possession, only 3 which may be chum salmon and coho salmon, in combination.
- 2) For chinook salmon, 1 per day, 1 in possession.

These new regulations superseded those adopted during 1984. Additional new regulations affecting personal use and subsistence fishermen which were adopted in 1987 included:

- 1) In the Nome River, no person may operate more than 50 feet of gillnet in the aggregate.
- 2) The Nome River was added to the regulation 5AAC 01.170 (e) which states that small mesh gillnets (less than 4 ½ inch mesh) and beach seines may not be used in specific Nome Subdistrict streams.

Regulation changes in 1992 restricted the use of beach seines in the Nome subdistrict. The managers now have the authority to allow the subsistence harvest of chum or pink salmon by beach seine if escapement needs are likely to be met. Beginning in 1991, no chum salmon harvests have been allowed until escapement goals were likely to be met or conservative management actions were judged to be no longer effective. In the past beach seines were viewed as an overly effective means to harvest fish, but during the last two years, beach seines were used as a means to harvest abundant species, while allowing the live release of other species experiencing depressed runs.

1997 Norton Sound Salmon Fishery

Commercial Fishery Overview

The 1997 Norton Sound District commercial salmon fishing season first opened in the Unalakleet and Shaktoolik Subdistricts on June 12 and ended on August 23. Commercial fishing dates and times were set throughout the season by Emergency Order. The commercial salmon harvest totaled 79,141 fish that was comprised of 12,573 chinook, 161 sockeye, 32,284 coho, 20 pink, and 34,103 chum salmon (Table 1). One hundred two permit holders participated in the fishery and received \$363,907 for their catch (Appendix Table A11). This report should be considered preliminary and will be updated with additions and corrections in subsequent reports.

Appendix Table A2 through A8 lists the Norton Sound salmon historical and current year commercial harvests relative to the previous 5-year (1992-1996) and the previous 10-year (1987-1996) averages. The chinook salmon total harvest for 1997 was the highest since 1985. The harvest was 93% above the previous 5-year average and 95% above the previous 10-year average. The coho salmon harvest was the lowest since 1987 at 56% below the previous 5-year average and 46% below the previous 10-year average. Historically Norton Sound has had very limited, but sporadic markets for pink salmon. A market opened in 1994, which focused on the abundant even year return. The fishery went well so it was attempted on the weaker return in 1995 with such poor results that no directed pink fishery was prosecuted in 1997. The commercial harvest of pink salmon in 1997 totaled only 20 fish. The Norton Sound chum salmon commercial harvest was 18% below the 5-year average and 44% below the 10-year average. This low chum salmon harvest can be attributed primarily to the combination of a low harvestable surplus in the northern subdistricts and poor markets in the southern subdistricts.

The Norton Sound Salmon District has 201 CFEC salmon permits, of which 102 actually fished during the 1997 season (Table 1). The number of participating fishermen this season was 11% below the previous 5-year average and 19% below the previous 10 year average. There has been a significant drop in effort in recent years due primarily to poor market conditions. The 1997 season ended with the second lowest number of commercial fishermen participating on record.

Two primary salmon buyers operated in Norton Sound during the 1997 season. Salmon were delivered to Unalakleet from other subdistricts using tenders and aircraft. Some fish were headed and gutted while others were iced in the round, then shipped airfreight to markets. In addition, a few individual fishermen sold their catch of fresh salmon locally and to wholesale distributors, as permitted under catcher-seller status. The average price paid for chinook salmon was \$1.00 per pound, \$.72/lb for sockeye, \$.47/lb for coho, \$.06/lb for pink, and \$.11/lb for chum salmon

(Appendix Table A10). The total value of the raw fish was \$363,908 and 22% below the previous 5-year (1992-1996) average of \$466,531.

Subsistence Fishery Summary

The department documented the 1997 subsistence salmon harvests in Norton Sound using two methods: 1) post-season household surveys were conducted in Golovin, White Mountain, Elim, Koyuk, Shaktoolik, Unalakleet, St. Michael, Stebbins, Savoonga and Gambell, and 2) subsistence fishing permits in the Nome Subdistrict and the Salmon Lake-Pilgrim River drainage. Council, a seasonal community on the Niukluk River, had no year-round residents in 1997 and was not surveyed. However, an unknown amount of subsistence salmon fishing occurs at Council by Nome residents that is not documented by household surveys or permits. An unknown amount of subsistence salmon fishing by Nome residents also occurs at Woolley Lagoon.

The subsistence harvest in the Norton Sound District in 1997 was 81,370 fish (Table 9). Of the total salmon harvest, 11.1 percent were chinook, 32.9 percent were chum, 33.4 percent were pink salmon, 2.3 percent were sockeye, and 20.2 percent were coho. Excluding the St. Lawrence Island harvests for which only one year of data is available, this was 35 to 45 percent lower than the annual subsistence salmon harvests in the district in 1994-96. A combination of poor coho and chum salmon returns, an off year for pink salmon abundance, and poor weather during the fishing season contributed to the low harvest in 1997. Nome area permit information and subsistence harvests by community can be found in Table 2 and Table 9.

The estimated mean salmon harvest was 73.1 salmon per household in the Norton Sound District. This includes 8.1 chinook, 24.1 chum, 24.4 pink, 1.7 sockeye, and 14.8 coho. Subdistrict 5 (Shaktoolik) accounted for the largest mean household harvest of salmon, an estimated 210 fish. The mean household harvests in the other subdistricts were 56 salmon in Subdistrict 1 (Nome), 92 salmon in Subdistrict 2 (Golovin and White Mountain), 68 salmon in Subdistrict 3 (Elim), 98 salmon in Subdistrict 4 (Koyuk), 106 salmon in Subdistrict 6 (Unalakleet), 55 salmon in southern Norton Sound (St. Michael and Stebbins), and 26 salmon at St. Lawrence Island.

In the Norton Sound District, 61 percent of the households subsistence fished for salmon and an additional seven percent assisted other households in processing subsistence-caught salmon. About four percent of the subsistence salmon harvest was used for dog food. Rod and reel was used by about 64 percent of households to harvest salmon, while 49 percent of households used gill nets, 14 percent used seines, and 2 percent used drift nets. Although rod and reel was the most widely used gear type, it accounted for only 12 percent of the total salmon harvest. Coho salmon was the primary target of rod and reel fishing.

In the Norton Sound District, 46 percent of the fishing households responded that their subsistence chum salmon fishing was "poor", 39 percent responded "average", and 15 percent responded "very

good". A combination of poor coho and chum salmon returns, an off year for pink salmon, regulatory restrictions and bad weather contributed to a poor subsistence salmon season.

Season Summary by Subdistrict

Nome - Subdistrict 1. The commercial salmon season in the Nome Subdistrict is scheduled to take place by regulation between July 1 and August 31. However, due to low chum, pink, and coho salmon returns, no commercial salmon harvest occurred (Table 1). Commercial fishing in the subdistrict is typically very limited due to the limited abundance of small local salmon stocks and the high subsistence demand. Sport fishing for chum salmon is closed by regulation in the subdistrict. The previous ten year average commercial harvest is 1 chinook, 1 sockeye, 260 coho, 50 pink, and 897 chum salmon. The ten-year average subsistence salmon harvest in the subdistrict is 71 chinook, 165 sockeye, 1,218 coho, 2,783 pink, and 4,051 chum salmon. One hundred eight subsistence fishing permits were issued in 1997 for the Nome Subdistrict. Harvest results will be available in a latter report.

Subsistence fishing was closed prior to the beginning of the chum salmon return for nearly the entire area except in marine waters East of Cape Nome. On July 21, only the Flambeau River, Eldorado River, Safety Sound and marine waters east of Cape Nome were opened to subsistence fishing because the chum salmon escapements had built to adequate levels. The rest of the subdistrict remained closed until August 7. It was felt that continued restrictions would have little benefit in boosting chum salmon escapement and opening the subdistrict would allow for a coho salmon subsistence harvest.

The entire area from Cape Prince of Wales to Cape Darby, which includes the Nome Subdistrict, was closed August 15 to the sport harvest of coho salmon due to poor returns. On August 16, this same area was closed to all subsistence fishing for the same reason, extremely poor coho salmon returns. Subsistence fishing reopened throughout the area on September 1 when the bulk of the coho salmon return had passed beyond the harvest zone on most rivers. However, the upper Fish River and Niukluk Rivers remained closed through September 10 because coho salmon in those streams were still vulnerable and required continued protection.

Golovin Bay-Subdistrict 2. Over the past eight years, chum salmon stocks in the Golovin Bay Subdistrict have received little or no commercial exploitation and still have not made spawning escapements in some years. The 1997 Salmon Management Plan informed fishermen that the Golovin Bay Subdistrict commercial harvest would be limited to a maximum of 15,000 chum salmon before mid-July in an attempt to protect the chum salmon stocks and allow for a harvest while flesh quality is at its best. By that date, the chum salmon run would be assessed and fishing time would be adjusted accordingly.

Commercial fishing began on June 18 for a single 24 hour period with a mesh restriction to target chinook salmon (Table 4). Both the chinook and chum salmon returns appeared strong so additional commercial periods were allowed with unrestricted mesh gear to target either species. The subdistrict was closed on August 5 when the coho salmon return was assessed to be well below average. However, a single fishing period in a special harvest area was allowed later that same day which directed a harvest for chum salmon to be used as crab bait. Only one coho was reported harvested that period. The total season commercial harvest landed by 11 permits included 19 chinook, 2 sockeye, 102 coho, 8,003 chum, and 20 pink salmon.

As stated earlier, on August 16, the Golovin Bay Subdistrict was included in the subsistence salmon closure of the area from Cape Prince of Wales to Cape Darby. The coho salmon return was very low as indicated by the Department's counting tower, aerial surveys, and public comments. The lower portion of the Fish River and marine waters reopened September 1 since the fish had moved past that area. However, the upper portion of the river remained closed through September 10 because the coho salmon in that area were still susceptible to subsistence harvest.

Moses Point-Subdistrict 3. The Moses Point Subdistrict chum salmon return has also experienced a decrease in size in recent years despite conservative management actions. The salmon management plan stated that there was to be no chum salmon directed fishery with the possibility of a subsistence closure during the run if the chum salmon escapement levels were likely to fall short of the Kwiniuk River counting tower goal of 19,500 chum salmon. Commercial fishing was to remain closed through June and early July to protect the chum salmon stocks. If the chum salmon return were weak, attempts would be made to minimize the impact on the subsistence harvest by allowing directed fishing on other salmon species. The Department's Kwiniuk River counting tower closely monitored the escapement throughout the run.

In the past there had been a small annual harvest of chinook salmon that has not occurred recently out of concern for chum salmon. Since the chinook salmon return appeared strong and there was new regulation that allowed mesh restrictions to target chinook salmon, on June 21 a single commercial fishing period was planned to take a chinook salmon harvest of similar magnitude to previous years (Table 5). After that period, the subdistrict remained closed until August 4 when it reopened. The chum salmon goal had been attained and there was a limited market for coho and chum salmon. The subdistrict closed for the season on August 14 due to poor coho salmon returns.

The Moses Point Subdistrict total commercial season harvest taken by 21 permits included 844 chinook, 1,409 coho, and 2,683 chum salmon (Table 5). The chinook salmon harvest was the highest since 1987, the coho salmon harvest was 62% below the previous 5-year average, and even though the chum salmon harvest was above the previous 5-year average, it was still 37% below the previous 10-year average.

Norton Bay - Subdistrict 4. The Norton Bay Subdistrict typically has difficulty attracting a buyer due to its remoteness and its reputation for watermarked fish. Consequently, in 1995, a regulatory change was implemented that moved the western boundary from Six Mile Point to Isaac's Point in an attempt to improve fish quality. Due to lack of timely salmon escapement information the Norton Bay Subdistrict is managed similar to the Shaktoolik and Unalakleet Subdistricts because it is believed they reflect similar trends in salmon return strength and timing. In 1997 a salmon buyer expressed an interest in buying fish in the subdistrict so a period was scheduled for June 25 to test the quantity and quality of both chinook and chum salmon. Product quality was judged to be poor so no further openings were announced due to lack of market (Table 6). Nine fishermen made landings that totaled 194 chinook and 531 chum salmon for the season. These catches are near averages that include seasons not fished, yet well below average when those years not fished were omitted from the averages.

Shaktoolik and Unalakleet - Subdistricts 5 and 6. Both the Shaktoolik and Unalakleet Subdistricts, which share a common boundary, consistently attract commercial markets due to larger volumes of fish and better transportation services. Management actions typically encompass both subdistricts because salmon tend to intermingle and the harvest in one subdistrict affects the movement of fish in the adjacent subdistrict. As stated earlier the, department's test net in the Unalakleet River and early season interviews with fishermen at Unalakleet are used to set early fishing periods in both subdistricts. As the season progresses, the test net, commercial catch indices, and the North River counting tower operated through cooperation with Kawarak Incorporated are used to assess return strengths of each salmon species. Aerial surveys are frequently not obtained in either subdistrict due to poor survey conditions. When conditions allow, aerial surveys can be used as a late assessment check, once salmon have migrated the long distance between the fishery and the spawning grounds.

Commercial fishing is typically only allowed after chinook salmon have been observed entering the Unalakleet River in increasing numbers for a week's time to assure the harvest is directed on actively migrating stocks and not on milling fish. The chinook salmon return began early and appeared strong. The first fishing period in both subdistricts opened on June 12 for 24 hours (Table 7 and 8). It was directed at chinook salmon using a minimum mesh size restriction of 7.5 inches. A second 24-hour period opened on June 16 in both subdistricts. The chinook salmon return continued to be strong with escapements increasing well ahead of schedule while the chum salmon run showed signs of a good return. On June 19, both subdistricts went to a standard schedule of two 48-hour periods per week with unrestricted mesh size. For the next three periods the chinook salmon catches decreased until June 30 when most fishermen had shifted their focus to target chum salmon.

The Shaktoolik Subdistrict closed on July 3 when the only buyer ceased operations. That same buyer also ceased operations in the Unalakleet Subdistrict July 9, but fishing time was increased to 5 days per week because there was still interest by catcher/sellers who found their own markets. In addition, the chum return continued to look strong. On July 14, fishing gear was restricted to a maximum mesh size of 6 inches to conform with regulation. In addition, fishing

time was reduced in preparation for the approaching coho salmon directed fishery. The Shaktoolik Subdistrict reopened August 4 on the same fishing schedule as Unalakleet to target coho salmon.

The 1997 season began with expectations of an average coho salmon return. By the end of the first week in August the coho salmon return was behind schedule based on harvest and escapement indices. The southern subdistricts showed signs of improvement and the Department theorized that the coho salmon run was simply slow in arriving due to the unusually warm season. Commercial fishing periods continued in both subdistricts with only a few minor adjustments in schedule to accommodate tenders. By the third week in August, the coho return was considered below average based on both escapement and catch indices so both the Unalakleet and Shaktoolik Subdistricts closed for the season on August 23.

Commercial catches in the Shaktoolik Subdistrict included 2,449 chinook, 4,694 coho, and 5,747 chum salmon harvested by 19 permit holders (Table 1 and 7). The chinook salmon harvest was 67% above the previous 5 year average and 59% above the previous 10 year average. The coho salmon harvest was 67% below the previous 5 year average and 57% below the previous 10 year average. There was a very limited chum salmon market with most fish being purchased as an incidental product of the chinook and coho salmon directed fisheries in both subdistricts. The total chum salmon harvest in the Shaktoolik Subdistrict was 60% below the 5 year average and 68% below the 10 year average harvest.

The Unalakleet Subdistrict had similar catches and trends. The harvest by 57 permit holders included 9,067 chinook, 159 sockeye, 26,079 coho, and 17,139 chum salmon (Table 1 and 8). The chinook salmon catch was 81% above the previous 5 year average and 100% above the previous 10 year average. The coho salmon harvest in the subdistrict was 51% below the previous 5 year average and 41% below the previous 10 year average. The total chum salmon harvest was 32% below both the 5 and 10 year averages. There were no pink salmon sales reported from either the Unalakleet or Shaktoolik Subdistricts in 1997 due to lack of market.

Escapement

Table 3 lists aerial survey escapement indices for the major index streams of Norton Sound. Survey conditions were fair to good for most of the district in 1997 for chinook, chum, and pink salmon, but poor to unacceptable for coho salmon throughout the district. As usual, the Nome Subdistrict streams received the most intensive survey efforts because salmon stocks local to the Nome area are limited, easily accessed by road system, and are exposed to intensive subsistence and sport fishing pressure.

Department escapement projects in the Norton Sound District include counting towers on the Kwiniuk, Niukluk, and Shaktoolik Rivers, a test net operated on the Unalakleet River, and a weir on the Nome River. Both the Unalakleet test net and the Kwiniuk tower projects have been in operation for many years. They provide comparable and timely information that is used as a

basis for inseason salmon management decisions. The Nome River weir first began as a tower late in 1993 and was operational as a tower in 1994 and 1995 before switching to a weir in 1996. The Niukluk tower became functional in 1995. Both the Nome and Niukluk River projects have limited years of data that can be used when making comparisons, but have proven to be reliable and will become more valuable the longer they operate. This was the second season the Shaktoolik tower was operated. Project modifications were made that provided better data early in the season, but the tower flooded out again in 1997 when the river overflowed its banks for the second year in a row.

Four additional counting tower projects were also operated in the Norton Sound District this season. The Snake, Eldorado, Pilgrim, and North River projects were setup and operated by Kawarak Incorporated. The projects ran as cooperative ventures with the Department of Fish and Game who supplied technical advice and purchased some equipment. The projects supplied daily information to the Department that was very useful to management of the local salmon resource.

Chinook Salmon

The Unalakelet and Shaktoolik Subdistricts are the primary chinook salmon producers in Norton Sound. On a smaller scale, the Norton Bay, Moses Point and Golovin Bay Subdistricts have also experienced a gradual increasing trend of chinook salmon returns in recent years. The 1997 season noted an above average chinook salmon return for nearly every drainage surveyed. Daily subsistence fishermen interviews conducted at Unalakelet, the Department's test fish project in the Unalakelet River, aerial survey data, and comparative commercial catch data all indicated that chinook salmon escapements were above average in the Unalakelet and Shaktoolik Subdistricts while the Kwiniuk River counting tower nearly doubled the average chinook salmon passage. Comments from local fishers regarding other subdistricts indicated chinook salmon returns were among the highest in many people's memory.

Chum Salmon

Chum salmon escapements were typically below average throughout most of Norton Sound in 1997. Streams in the Nome Subdistrict were surveyed with mixed results. The Sinuk, Nome, Flambeau, Bonanza, and Solomon Rivers had chum salmon escapement at approximately one half their escapement goals. The Eldorado River attained its goal and the Snake River was not surveyed, but the counting tower project which does not have a formal escapement goal, indicated a strong chum salmon passage that suggests the Snake River also attained its goals.

Chum salmon production in the Golovin Bay Subdistrict is primarily supported by one river system with escapement goals set for select individual tributaries called index areas. Aerial surveys estimated chum salmon escapements to have attained escapement goals for all the index areas in the subdistrict. Therefore, chum salmon escapement to the subdistrict was assumed to be adequate in 1997. The Kwiniuk River tower project attained its chum salmon escapement

goal with a preliminary expanded count of 20,118 fish. However, the Tubutulik River, a close neighbor to the Kwiniuk River, had an aerial survey count of chum salmon only one quarter of its escapement goal.

Aerial surveys in the Norton Bay, Shaktoolik, and Unalakleet Subdistricts are not consistently obtained each year, but exceptionally low water and few pink salmon provided ideal viewing conditions in 1997. The Ungalik River was the only stream surveyed in the Norton Bay Subdistrict and was assessed at more than twice its goal. A survey of the Shaktoolik River observed less than half its chum salmon escapement goal while the Unalakleet River had mixed indicators. The test net caught slightly less than average numbers, but the aerial survey counts were well above average for the Unalakleet River. Therefore, it is believed that the Unalakleet drainage had adequate chum salmon escapements for 1997.

Coho Salmon

Coho salmon are found in nearly all of the chum salmon producing streams throughout Norton Sound with the primary commercial contributors being the Unalakleet and Shaktoolik Rivers. Because inclement weather is normally experienced in this area during August and September, escapement data for all subdistricts can be somewhat sketchy. Streams in the northern subdistricts of Norton Sound are typically surveyed and the Unalakleet River test net has the best data set to compare coho salmon escapement in eastern Norton Sound. The newer assessment projects are intended to monitor coho as well as chum salmon, but still lack a historic data base. Nearly all escapement monitoring projects had gaps in operations of varying degrees due to high water in 1997.

Overall, coho salmon escapements were average to well below average in all subdistricts. The coho salmon returns were the weakest in the northern subdistricts which required very restrictive measures to assure adequate escapements. Yet in some cases escapements were still very poor. The southern subdistricts were difficult to assess due to high water conditions. Coho salmon run assessment relied upon the Unalakleet test net and comparative commercial catch statistics which both indicated below average returns in 1997 and therefore, below average escapements were assumed.

Pink Salmon

During recent years, pink salmon returns to Norton Sound have followed an odd/even year cycle with the even years building in size and typically much larger than the odd years. The 1997 return came in late as is typical on odd years and was very small as expected in the northern subdistricts. However, in the southern subdistricts, the run timing was late, but much larger than expected.

Management Concerns

Management Concerns

Chum salmon stocks have been depressed throughout Norton Sound over the past eight to nine years with escapements in the northern subdistricts continuing to be a major concern. Chum salmon escapement goals are generally being met, but the cost has been a drastic reduction of all forms of harvest in many instances. The Nome Subdistrict was closed in 1997 during the entire chum salmon run to sport and commercial fishing. Subsistence fishery management actions included intense management on a stream-by-stream basis. The Golovin, Norton Bay, and Unalakleet Subdistricts attained their escapement goals with limited commercial harvests levels. Both the Moses Point and Shaktoolik Subdistricts had chum salmon escapements at or below their goals with each having small commercial salmon harvests. Even though escapement goals were obtained for most index streams, chum salmon harvests will continue to be managed conservatively to assure future returns.

The streams of the Nome Subdistrict and those of the Moses Point Subdistrict have been managed to assure an adequate chum salmon escapement since 1989. The Kwiniuk and Eldorado Rivers have now attained adequate chum salmon escapement levels during the past four years. The "rivers of concern" classification and the strict requirement that escapement goals be met before any harvest can be allowed is no longer appropriate. The management staff is planning to allow limited subsistence harvests on the Eldorado River shortly after July 4. On the Kwiniuk River, commercial fishing will be directed at king salmon and assumes there will be an incidental chum salmon harvest early in the season. Chum salmon management will continue to be quite conservative to allow other streams in those subdistricts to recover, but some response to the recent gains in the recovery of these stocks is warranted.

The renewed interest in Norton Sound pink salmon commercial fishing has proven feasible and manageable on strong year classes, but is questionable during weak year return. Management Plans will have to be developed that set exploitation levels and escapement needs, gear and harvest requirements, and consider incidental weak stock impacts.

Salmon marketing conditions have become significant factors for consideration when scheduling fishing periods. Market conditions have caused more restrictive limitations than biological factors in recent years for many species. Fish buyers frequently notify the Department of Fish and Game that they can only handle a limited quantity with a high quality standard and at a specific rate to optimize their operations. The fishery manager must not only monitor the salmon returns and harvest rates, but must coordinate schedules with the salmon buyers to protect the limited markets available for Norton Sound salmon.

1998 Norton Sound Salmon Outlook

Salmon forecasts and harvest projections for the 1998 commercial salmon season are based on qualitative assessments of brood year returns, subjective determinations of freshwater overwintering and ocean survival, and projections of local market conditions. Salmon buyers will

probably operate in only some of the Norton Sound subdistricts during 1998. The chinook return is expected to be above average with a commercial harvest ranging from 5,000 to 8,000 fish. The pink salmon market is uncertain in 1998. However, the pink salmon escapements during 1996 were strong in most index streams indicating a potential surplus of several million salmon in the coming 1998 season. The 1998 chum salmon return is expected to be about average while the market for Norton Sound chum will likely be weak. The commercial harvest of chum salmon will be managed conservatively to provide a potential harvest between 40,000 and 80,000. The 1994 coho salmon commercial harvest and escapements indicate that the 1997 coho return will be well above average and the commercial harvest is expected to range from 60,000 to 80,000 fish.

Table 1. Norton Sound commercial salmon harvest summary by subdistrict, 1997.

| | | Subdistricts | | | | | | Total |
|--------------------------|--------------|--------------|--------|--------|-------|---------|---------|------------------|
| | | 1 | 2 | 3 | 4 | 5 | 6 | Number |
| Number of Fishermen | | 0 | 11 | 21 | 9 | 19 | 57 | 102 ^a |
| Chinook | Number | 0 | 19 | 844 | 194 | 2,449 | 9,067 | 12,573 |
| | Weight(lbs.) | | 288 | 17,004 | 3,469 | 46,454 | 157,921 | 225,136 |
| Sockeye | Number | 0 | 2 | 0 | 0 | 0 | 159 | 161 |
| | Weight(lbs.) | | 15 | | | | 1,080 | 1,095 |
| Coho | Number | 0 | 102 | 1,409 | 0 | 4,694 | 26,079 | 32,284 |
| | Weight(lbs.) | | 787 | 9,617 | | 32,452 | 192,661 | 235,517 |
| Pink | Number | 0 | 20 | 0 | 0 | 0 | 0 | 20 |
| | Weight(lbs.) | | 50 | | | | | 50 |
| Chum | Number | 0 | 8,003 | 2,683 | 531 | 5,747 | 17,139 | 34,103 |
| | Weight(lbs.) | | 58,516 | 22,537 | 4,520 | 42,084 | 125,349 | 253,006 |
| Coho Salmon Roe | | | | | | 531 lbs | | |
| Chinook Salmon Roe | | | | | | 294 lbs | | |
| Salmon Roe (unspecified) | | | | | | 55 lbs | | |
| Totals ^b | Number | | 8,146 | 4,936 | 725 | 12,890 | 52,444 | 79,141 |
| | Weight(lbs.) | | 59,656 | 49,158 | 7,989 | 120,990 | 477,011 | 714,804 |

^a Some fishermen fished more than one subdistrict.

^b Totals do not include Salmon Roe sold.

Table 2. Nome area subsistence salmon catches, Norton Sound, 1997.

| | Number of Permits | | | Number of Salmon Harvested | | | | | |
|----------------------------|-------------------|----------|--------|----------------------------|---------|------|------|-------|-------|
| | Issued | Returned | Fished | Chinook | Sockeye | Coho | Pink | Chum | Total |
| Marine Waters | 72 | 36 | 19 | 8 | 45 | 98 | 65 | 1,938 | 2,154 |
| Nome River | 6 | 3 | 2 | 1 | 4 | 38 | 5 | 126 | 174 |
| Snake River | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Eldorado River | 18 | 13 | 7 | 1 | 1 | 176 | 102 | 574 | 854 |
| Flambeau River | 5 | 4 | 2 | 0 | 0 | 10 | 0 | 57 | 67 |
| Bonanza River | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Safety Sound | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Solomon River | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ⊗ Penny River | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Cripple Creek | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Sinuk River | 2 | 1 | 1 | 0 | 0 | 3 | 3 | 1 | 7 |
| Feather River | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Fish River ^a | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Niukluk River ^a | 4 | 1 | 1 | 1 | 98 | 0 | 3 | 18 | 120 |
| Port Clarence ^a | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Kuzitrin River | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pilgrim River | 13 | 8 | 2 | 0 | 18 | 0 | 2 | 8 | 28 |
| Total | 128 | 67 | 34 | 11 | 166 | 325 | 180 | 2,722 | 3,404 |

^a Permits were not required, therefore data does not represent total subsistence harvest.

See Table 9 for estimates of total subsistence salmon harvest by community and subdistrict.

Table 3. Salmon escapement indices of Norton Sound Streams, 1997.

| Stream Name | Chinook | Coho | Sockeye | Pink ^a | Chum ^b |
|--|-------------|-----------------|-----------------|-------------------|-------------------|
| <u>Pilgrim Drainage</u> (including Salmon Lake) | Above Avg. | Below Avg. | Record High | | Average |
| <u>Sinuk Drainage</u> (including Glacial Lake) | | Well Below Avg. | Well Below Avg. | Below Avg. | Below Avg. |
| <u>Nome Subdistrict</u> | | | | | |
| Cripple River | | | | Below Avg. | Below Avg. |
| Penny River | | | | Below Avg. | |
| Snake River | | Average | | | At Goal |
| Nome River | | Average | | Below Avg. | Below Goal |
| Flambeau River | | Average | | Below Avg. | Below Goal |
| Eldorado River | | Well Below Avg. | | Below Avg. | At Goal |
| Bonanza River | | Below Avg. | | Below Avg. | Below Goal |
| Solomon River | | Average | | Below Avg. | Below Goal |
| <u>Fish River Drainage</u> | Above Avg. | Well Below Avg. | | Below Avg. | Above Goal |
| <u>Kwiniuk River</u> | Above Avg. | Below Avg. | | Below Avg. | At Goal |
| <u>Tubutulik River</u> | Above Avg. | | | Average | Below Avg. |
| <u>Ungalik River</u> | Record High | | | Average | Above Goal |
| <u>Shaktoolik River</u> | Above Avg. | Below Avg. | | Above Avg. | Below Goal |
| <u>Unalakleet River</u> | Above Avg. | Below Avg. | | Above Avg. | Above Goal |

a Pink salmon have an odd/even year return cycle. Odd year returns are much smaller and are evaluated relative to other odd year returns.

b Chum salmon are evaluated relative to average except when there is an established escapement goal.

Table 4. Commercial salmon set gillnet catches from Golovin, Subdistrict 2, Norton Sound, 1997.

| Period Number | Period Dates | Hours Fished | No. of Fishermen | Period Catch and Catch Per Unit Effort | | | | | Cumulative Catch and Catch Per Unit Effort | | | | | | | | | | | | | | |
|---------------|--------------|--------------|------------------|--|--------------|----------------|--------------|-------------|--|-------------|-----------|-------------|-----------|----|------|---|------|-----|------|------|------|----|------|
| | | | | Chinook Number | Chinook CPUE | Sockeye Number | Sockeye CPUE | Coho Number | Coho CPUE | Chum Number | Chum CPUE | Pink Number | Pink CPUE | | | | | | | | | | |
| | 2 6/21-6/22 | 24 | 2 | 10 | 0.21 | 0 | 0.00 | 0 | 0.00 | 218 | 4.54 | 0 | 0.00 | 10 | 0.21 | 0 | 0.00 | 0 | 0.00 | 218 | 4.54 | 0 | 0.00 |
| | 3 6/25-6/28 | 48 | 4 | 3 | 0.02 | 0 | 0.00 | 0 | 0.00 | 1204 | 6.27 | 0 | 0.00 | 13 | 0.05 | 0 | 0.00 | 0 | 0.00 | 1422 | 5.93 | 0 | 0.00 |
| | 4 6/29-7/01 | 42 | 4 | 1 | 0.01 | 0 | 0.00 | 0 | 0.00 | 1705 | 10.15 | 0 | 0.00 | 14 | 0.03 | 0 | 0.00 | 0 | 0.00 | 3127 | 7.66 | 0 | 0.00 |
| | 5 7/21-7/23 | 48 | 6 | 5 | 0.02 | 2 | 0.01 | 10 | 0.03 | 1146 | 3.98 | 0 | 0.00 | 19 | 0.03 | 2 | 0.01 | 10 | 0.03 | 4273 | 6.14 | 0 | 0.00 |
| | 6 7/24-7/26 | 48 | 2 | 0 | 0.00 | 0 | 0.00 | 18 | 0.19 | 1247 | 12.99 | 0 | 0.00 | 19 | | 2 | | 28 | 0.07 | 5520 | 6.97 | 0 | 0.00 |
| | 7 7/29-7/31 | 48 | 4 | 0 | 0.00 | 0 | 0.00 | 49 | 0.26 | 1802 | 9.39 | 0 | 0.00 | 19 | | 2 | | 77 | 0.13 | 7322 | 7.44 | 0 | 0.00 |
| | 8 8/01-8/03 | 48 | 3 | 0 | 0.00 | 0 | 0.00 | 24 | 0.17 | 659 | 4.58 | 0 | 0.00 | 19 | | 2 | | 101 | 0.14 | 7981 | 7.08 | 0 | 0.00 |
| | 9 8/05-8/06 | 24 | 1 | 0 | 0.00 | 0 | 0.00 | 1 | 0.04 | 22 | 0.92 | 20 | 0.83 | 19 | | 2 | | 102 | 0.14 | 8003 | 6.95 | 20 | 0.83 |

Total Hours fished 330

Total number of permits used = 11

Table 5. Commercial salmon set gillnet catches from Moses Point, Subdistrict 3, Norton Sound, 1997.

| Period Number | Period Dates | Hours Fished | No. of Fishermen | Period Catch and Catch Per Unit Effort | | | | | Cumulative Catch and Catch Per Unit Effort | | | | | | | | | | | | | | |
|---------------|--------------|--------------|------------------|--|------|---------|------|--------|--|--------|------|--------|------|---------|------|---------|------|--------|------|--------|------|------|---|
| | | | | Chinook | | Sockeye | | Coho | | Chum | | Pink | | Chinook | | Sockeye | | Coho | | Chum | | Pink | |
| | | | | Number | CPUE | Number | CPUE | Number | CPUE | Number | CPUE | Number | CPUE | Number | CPUE | Number | CPUE | Number | CPUE | Number | CPUE | | |
| 1 | 6/18-6/19 | 24 | 16 | 844 | 2.20 | 0 | 0.00 | 0 | 0.00 | 166 | 0.43 | 0 | 0.00 | 844 | 2.20 | 0 | 0 | 0 | 0 | 166 | 0.43 | 0 | 0 |
| 3 | 8/04-8/06 | 48 | 9 | 0 | 0.00 | 0 | 0.00 | 431 | 1.00 | 1042 | 2.41 | 0 | 0.00 | 0.00 | 0 | 0 | 431 | 1.00 | 1208 | 1.48 | 0 | 0 | |
| 4 | 8/07-8/08 | 30 | 9 | 0 | 0.00 | 0 | 0.00 | 361 | 1.34 | 948 | 3.51 | 0 | 0.00 | 0.00 | 0 | 0 | 792 | 1.13 | 2156 | 1.99 | 0 | 0 | |
| 5 | 8/11-8/13 | 48 | 10 | 0 | 0.00 | 0 | 0.00 | 617 | 1.29 | 527 | 1.10 | 0 | 0.00 | 0.00 | 0 | 0 | 1409 | 1.19 | 2683 | 1.71 | 0 | 0 | |

Total Hours fished = 150

Total number of permits used = 21

Table 6. Commercial salmon set gillnet catches from Norton Bay, Subdistrict4, Norton Sound, 1997.

| Period Number | Period Dates | Hours Fished | No. of Fishermen | Period Catch and Catch Per Unit Effort | | | | | | | | | | Cumulative Catch and Catch Per Unit Effort | | | | | | | | | |
|---------------|--------------|--------------|------------------|--|------|---------|------|--------|------|--------|------|--------|------|--|------|---------|------|--------|------|--------|------|------|------|
| | | | | Chinook | | Sockeye | | Coho | | Chum | | Pink | | Chinook | | Sockeye | | Coho | | Chum | | Pink | |
| | | | | Number | CPUE | Number | CPUE | Number | CPUE | Number | CPUE | Number | CPUE | Number | CPUE | Number | CPUE | Number | CPUE | Number | CPUE | | |
| 1 | 6/25-6/26 | 24 | 9 | 194 | 0.90 | 0 | 0.00 | 0 | 0.00 | 531 | 2.46 | 0 | 0.00 | 194 | 0.90 | 0 | 0.00 | 0 | 0.00 | 531 | 2.46 | 0 | 0.00 |

Total Hours fished = 24

Total number of permits used = 9

Table 7. Commercial salmon set gillnet catches from Shaktoolik, Subdistrict 5, Norton Sound, 1997.

| Period Number | Period Dates | Hours Fished | No. of Fishermen | Period Catch and Catch Per Unit Effort | | | | | Cumulative Catch and Catch Per Unit Effort | | | | | | | | | | | | | | |
|---------------|--------------|--------------|------------------|--|--------------|----------------|--------------|-------------|--|-------------|-----------|-------------|-----------|----------------|--------------|----------------|--------------|-------------|-----------|-------------|-----------|-------------|-----------|
| | | | | Chinook Number | Chinook CPUE | Sockeye Number | Sockeye CPUE | Coho Number | Coho CPUE | Chum Number | Chum CPUE | Pink Number | Pink CPUE | Chinook Number | Chinook CPUE | Sockeye Number | Sockeye CPUE | Coho Number | Coho CPUE | Chum Number | Chum CPUE | Pink Number | Pink CPUE |
| 1 | 6/12-6/13 | 24 | 12 | 510 | 1.77 | 0 | 0.00 | 0 | 0.00 | 3 | 0.01 | 0 | 0.00 | 510 | 1.77 | 0 | 0.00 | 0 | 0.00 | 3 | 0.01 | 0 | 0.00 |
| 2 | 6/16-6/17 | 24 | 13 | 370 | 1.19 | 0 | 0.00 | 0 | 0.00 | 13 | 0.04 | 0 | 0.00 | 880 | 1.47 | 0 | 0.00 | 0 | 0.00 | 16 | 0.03 | 0 | 0.00 |
| 3 | 6/19-6/21 | 48 | 18 | 755 | 0.87 | 0 | 0.00 | 0 | 0.00 | 141 | 0.16 | 0 | 0.00 | 1635 | 1.12 | 0 | 0.00 | 0 | 0.00 | 157 | 0.11 | 0 | 0.00 |
| 4 | 6/23-6/25 | 48 | 18 | 594 | 0.69 | 0 | 0.00 | 0 | 0.00 | 102 | 0.12 | 0 | 0.00 | 2229 | 0.96 | 0 | 0.00 | 0 | 0.00 | 259 | 0.11 | 0 | 0.00 |
| 5 | 6/26-6/28 | 48 | 6 | 91 | 0.32 | 0 | 0.00 | 0 | 0.00 | 56 | 0.19 | 0 | 0.00 | 2320 | 0.89 | 0 | 0.00 | 0 | 0.00 | 315 | 0.12 | 0 | 0.00 |
| 6 | 6/30-7/02 | 48 | 11 | 129 | 0.24 | 0 | 0.00 | 0 | 0.00 | 4145 | 7.85 | 0 | 0.00 | 2449 | 0.78 | 0 | 0.00 | 0 | 0.00 | 4460 | 1.42 | 0 | 0.00 |
| 7 | 8/04-8/06 | 48 | 12 | 0 | 0.00 | 0 | 0.00 | 1773 | 3.08 | 1086 | 1.89 | 0 | 0.00 | 2449 | 0.78 | 0 | 0.00 | 1773 | 3.08 | 5546 | 1.49 | 0 | 0.00 |
| 8 | 8/07-8/09 | 36 | 14 | 0 | 0.00 | 0 | 0.00 | 737 | 1.46 | 0 | 0.00 | 0 | 0.00 | 2449 | 0.78 | 0 | 0.00 | 2510 | 2.32 | 5546 | 1.49 | 0 | 0.00 |
| 9 | 8/11-8/13 | 48 | 13 | 0 | 0.00 | 0 | 0.00 | 502 | 0.80 | 133 | 0.21 | 0 | 0.00 | 2449 | 0.78 | 0 | 0.00 | 3012 | 1.77 | 5679 | 1.31 | 0 | 0.00 |
| 10 | 8/14-8/16 | 36 | 2 | 0 | 0.00 | 0 | 0.00 | 201 | 2.79 | 19 | 0.26 | 0 | 0.00 | 2449 | 0.78 | 0 | 0.00 | 3213 | 1.81 | 5698 | 1.29 | 0 | 0.00 |
| 11 | 8/18-8/20 | 48 | 10 | 0 | 0.00 | 0 | 0.00 | 911 | 1.90 | 20 | 0.04 | 0 | 0.00 | 2449 | 0.78 | 0 | 0.00 | 4124 | 1.83 | 5718 | 1.17 | 0 | 0.00 |
| 12 | 8/21-8/23 | 36 | 7 | 0 | 0.00 | 0 | 0.00 | 570 | 2.26 | 29 | 0.12 | 0 | 0.00 | 2449 | 0.78 | 0 | 0.00 | 4694 | 1.87 | 5747 | 1.12 | 0 | 0.00 |

Total Hours fisher 492

Total number of permits used = 19

Table 8. Commercial salmon set gillnet catches from Unalakleet, Subdistrict 6, Norton Sound, 1997.

| Period Number | Period Dates | Hours Fished | No. of Fishermen | Period Catch and Catch Per Unit Effort | | | | | Cumulative Catch and Catch Per Unit Effort | | | | | | | | | | | | | | |
|---------------|--------------|--------------|------------------|--|--------------|----------------|--------------|-------------|--|-------------|-----------|-------------|-----------|----------------|--------------|----------------|--------------|-------------|-----------|-------------|-----------|-------------|-----------|
| | | | | Chinook Number | Chinook CPUE | Sockeye Number | Sockeye CPUE | Coho Number | Coho CPUE | Chum Number | Chum CPUE | Pink Number | Pink CPUE | Chinook Number | Chinook CPUE | Sockeye Number | Sockeye CPUE | Coho Number | Coho CPUE | Chum Number | Chum CPUE | Pink Number | Pink CPUE |
| 1 | 6/12-6/13 | 24 | 35 | 1283 | 1.53 | 0 | 0.00 | 0 | 0.00 | 22 | 0.03 | 0 | 0.00 | 1283 | 1.53 | 0 | 0.00 | 0 | 0.00 | 22 | 0.03 | 0 | 0.00 |
| 2 | 6/16-6/17 | 24 | 33 | 1022 | 1.29 | 0 | 0.00 | 0 | 0.00 | 38 | 0.05 | 0 | 0.00 | 2305 | 1.41 | 0 | 0.00 | 0 | 0.00 | 60 | 0.04 | 0 | 0.00 |
| 3 | 6/19-6/21 | 48 | 34 | 3052 | 1.87 | 0 | 0.00 | 0 | 0.00 | 221 | 0.14 | 0 | 0.00 | 5357 | 1.64 | 0 | 0.00 | 0 | 0.00 | 281 | 0.09 | 0 | 0.00 |
| 4 | 6/23-6/25 | 48 | 38 | 2064 | 1.13 | 0 | 0.00 | 0 | 0.00 | 206 | 0.11 | 0 | 0.00 | 7421 | 1.46 | 0 | 0.00 | 0 | 0.00 | 487 | 0.10 | 0 | 0.00 |
| 5 | 6/26-6/28 | 48 | 28 | 973 | 0.72 | 0 | 0.00 | 0 | 0.00 | 724 | 0.54 | 0 | 0.00 | 8394 | 1.31 | 0 | 0.00 | 0 | 0.00 | 1211 | 0.19 | 0 | 0.00 |
| 6 | 6/30-7/02 | 48 | 24 | 421 | 0.37 | 0 | 0.00 | 0 | 0.00 | 1756 | 1.52 | 0 | 0.00 | 8815 | 1.16 | 0 | 0.00 | 0 | 0.00 | 2967 | 0.39 | 0 | 0.00 |
| 7 | 7/03-7/05 | 48 | 7 | 147 | 0.44 | 0 | 0.00 | 0 | 0.00 | 2188 | 6.51 | 0 | 0.00 | 8962 | 1.13 | 0 | 0.00 | 0 | 0.00 | 5155 | 0.65 | 0 | 0.00 |
| 8 | 7/07-7/12 | 120 | 4 | 31 | 0.06 | 0 | 0.00 | 0 | 0.00 | 737 | 1.54 | 0 | 0.00 | 8993 | 1.07 | 0 | 0.00 | 0 | 0.00 | 5892 | 0.70 | 0 | 0.00 |
| 9 | 7/14-7/16 | 48 | 1 | 9 | 0.19 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 | 9002 | 1.07 | 0 | 0.00 | 0 | 0.00 | 5892 | 0.70 | 0 | 0.00 |
| 10 | 7/17-7/19 | 48 | 2 | 7 | 0.07 | 6 | 0.06 | 11 | 0.11 | 674 | 7.02 | 0 | 0.00 | 9009 | 1.05 | 6 | 0.06 | 11 | 0.11 | 6566 | 0.77 | 0 | 0.00 |
| 11 | 7/21-7/23 | 48 | 11 | 4 | 0.01 | 4 | 0.01 | 194 | 0.37 | 1330 | 2.52 | 0 | 0.00 | 9013 | 0.99 | 10 | 0.02 | 205 | 0.33 | 7896 | 0.88 | 0 | 0.00 |
| 13 | 7/28-7/30 | 48 | 26 | 10 | 0.01 | 17 | 0.01 | 1330 | 1.07 | 1467 | 1.18 | 0 | 0.00 | 9023 | 0.87 | 27 | 0.01 | 1535 | 0.82 | 9363 | 0.91 | 0 | 0.00 |
| 14 | 7/31-8/02 | 48 | 32 | 18 | 0.01 | 35 | 0.02 | 2760 | 1.80 | 1898 | 1.24 | 0 | 0.00 | 9041 | 0.76 | 62 | 0.02 | 4295 | 1.26 | 11261 | 0.95 | 0 | 0.00 |
| 15 | 8/04-8/06 | 48 | 38 | 6 | 0.00 | 45 | 0.02 | 6957 | 3.81 | 2624 | 1.44 | 0 | 0.00 | 9047 | 0.66 | 107 | 0.02 | 11252 | 2.15 | 13885 | 1.02 | 0 | 0.00 |
| 16 | 8/07-8/09 | 48 | 36 | 8 | 0.00 | 5 | 0.00 | 4429 | 2.56 | 1255 | 0.73 | 0 | 0.00 | 9055 | 0.59 | 112 | 0.02 | 15681 | 2.25 | 15140 | 0.99 | 0 | 0.00 |
| 17 | 8/11-8/13 | 48 | 15 | 1 | 0.00 | 2 | 0.00 | 1031 | 1.43 | 238 | 0.33 | 0 | 0.00 | 9056 | 0.56 | 114 | 0.01 | 16712 | 2.18 | 15378 | 0.96 | 0 | 0.00 |
| 18 | 8/14-8/16 | 48 | 26 | 3 | 0.00 | 7 | 0.01 | 2879 | 2.31 | 543 | 0.44 | 0 | 0.00 | 9059 | 0.52 | 121 | 0.01 | 19591 | 2.19 | 15921 | 0.92 | 0 | 0.00 |
| 19 | 8/18-8/20 | 48 | 32 | 3 | 0.00 | 30 | 0.02 | 3050 | 1.99 | 688 | 0.45 | 0 | 0.00 | 9062 | 0.48 | 151 | 0.01 | 22641 | 2.16 | 16609 | 0.88 | 0 | 0.00 |
| 20 | 8/21-8/23 | 48 | 28 | 5 | 0.00 | 8 | 0.01 | 3438 | 2.56 | 530 | 0.39 | 0 | 0.00 | 9067 | 0.45 | 159 | 0.01 | 26079 | 2.21 | 17139 | 0.85 | 0 | 0.00 |

Total Hours fished 936

Total number of permits used = 57

Table 9. 1997 Norton Sound area subsistence salmon harvests.

| | | | Chinook | | Chum | | Pink | | Sockeye | | Coho | | Total | |
|---------------------------------|----------------------|------------|------------------|--------------|------------------|---------------|------------------|---------------|------------------|--------------|------------------|---------------|------------------|---------------|
| | Total HH's Contacted | HH's | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total |
| Nome Permits ¹ | 106 | 57 | 10 | 19 | 2,696 | 4,996 | 175 | 287 | 50 | 99 | 325 | 534 | 3,256 | 5,936 |
| Subdistrict 1 | 106 | 57 | 10 | 19 | 2,696 | 4,996 | 175 | 287 | 50 | 99 | 325 | 534 | 3,256 | 5,936 |
| Golovin | 46 | 38 | 65 | 81 | 1,450 | 1,788 | 1,337 | 1,648 | 28 | 35 | 251 | 311 | 3,131 | 3,863 |
| Niukluk R. Permits ¹ | 5 | 1 | 1 | 4 | 18 | 72 | 3 | 12 | 98 | 392 | 0 | 0 | 120 | 480 |
| White Mountain | 64 | 61 | 51 | 54 | 2,879 | 3,031 | 2,753 | 2,910 | 0 | 0 | 231 | 244 | 5,914 | 6,239 |
| Subdistrict 2 | 115 | 100 | 117 | 138 | 4,347 | 4,891 | 4,093 | 4,570 | 126 | 427 | 482 | 555 | 9,165 | 10,581 |
| Elim | 77 | 72 | 584 | 619 | 1,946 | 2,064 | 1,239 | 1,314 | 47 | 50 | 1,144 | 1,213 | 4,960 | 5,261 |
| Subdistrict 3 | 77 | 72 | 584 | 619 | 1,946 | 2,064 | 1,239 | 1,314 | 47 | 50 | 1,144 | 1,213 | 4,960 | 5,261 |
| Koyuk | 69 | 68 | 555 | 565 | 3,975 | 4,040 | 1,765 | 1,795 | 53 | 54 | 317 | 322 | 6,665 | 6,777 |
| Subdistrict 4 | 69 | 68 | 555 | 565 | 3,975 | 4,040 | 1,765 | 1,795 | 53 | 54 | 317 | 322 | 6,665 | 6,777 |
| Shaktookik | 54 | 45 | 943 | 1,146 | 1,326 | 1,612 | 4,752 | 5,779 | 51 | 62 | 2,271 | 2,761 | 9,343 | 11,360 |
| Subdistrict 5 | 54 | 45 | 943 | 1,146 | 1,326 | 1,612 | 4,752 | 5,779 | 51 | 62 | 2,271 | 2,761 | 9,343 | 11,360 |
| Unalakleet ² | 219 | 208 | 3,847 | 4,191 | 1,166 | 1,603 | 9,610 | 10,477 | 181 | 196 | 6,264 | 6,746 | 21,068 | 23,213 |
| Subdistrict 6 | 219 | 208 | 3,847 | 4,191 | 1,166 | 1,603 | 9,610 | 10,477 | 181 | 196 | 6,264 | 6,746 | 21,068 | 23,213 |
| Stebbins | 116 | 108 | 1,081 | 1,164 | 3,000 | 3,230 | 226 | 243 | 108 | 116 | 1,696 | 1,826 | 6,111 | 6,580 |
| St. Michael | 84 | 82 | 949 | 970 | 2,755 | 2,816 | 82 | 84 | 40 | 41 | 536 | 547 | 4,362 | 4,458 |
| South Norton Sound | 200 | 190 | 2,030 | 2,134 | 5,755 | 6,046 | 308 | 327 | 148 | 157 | 2,232 | 2,374 | 10,473 | 11,038 |
| Gambell | 146 | 126 | 144 | 161 | 1,320 | 1,446 | 2,042 | 2,235 | 701 | 766 | 1,446 | 1,594 | 5,653 | 6,204 |
| Savoonga | 127 | 123 | 24 | 24 | 105 | 105 | 414 | 414 | 81 | 81 | 375 | 376 | 999 | 1,001 |
| St. Lawrence Island | 273 | 249 | 168 | 186 | 1,425 | 1,551 | 2,456 | 2,649 | 782 | 847 | 1,821 | 1,971 | 6,652 | 7,204 |
| NORTON SOUND | 1,113 | 989 | 8,254 | 8,998 | 22,636 | 26,803 | 24,398 | 27,200 | 1,438 | 1,892 | 14,856 | 16,476 | 71,582 | 81,370 |

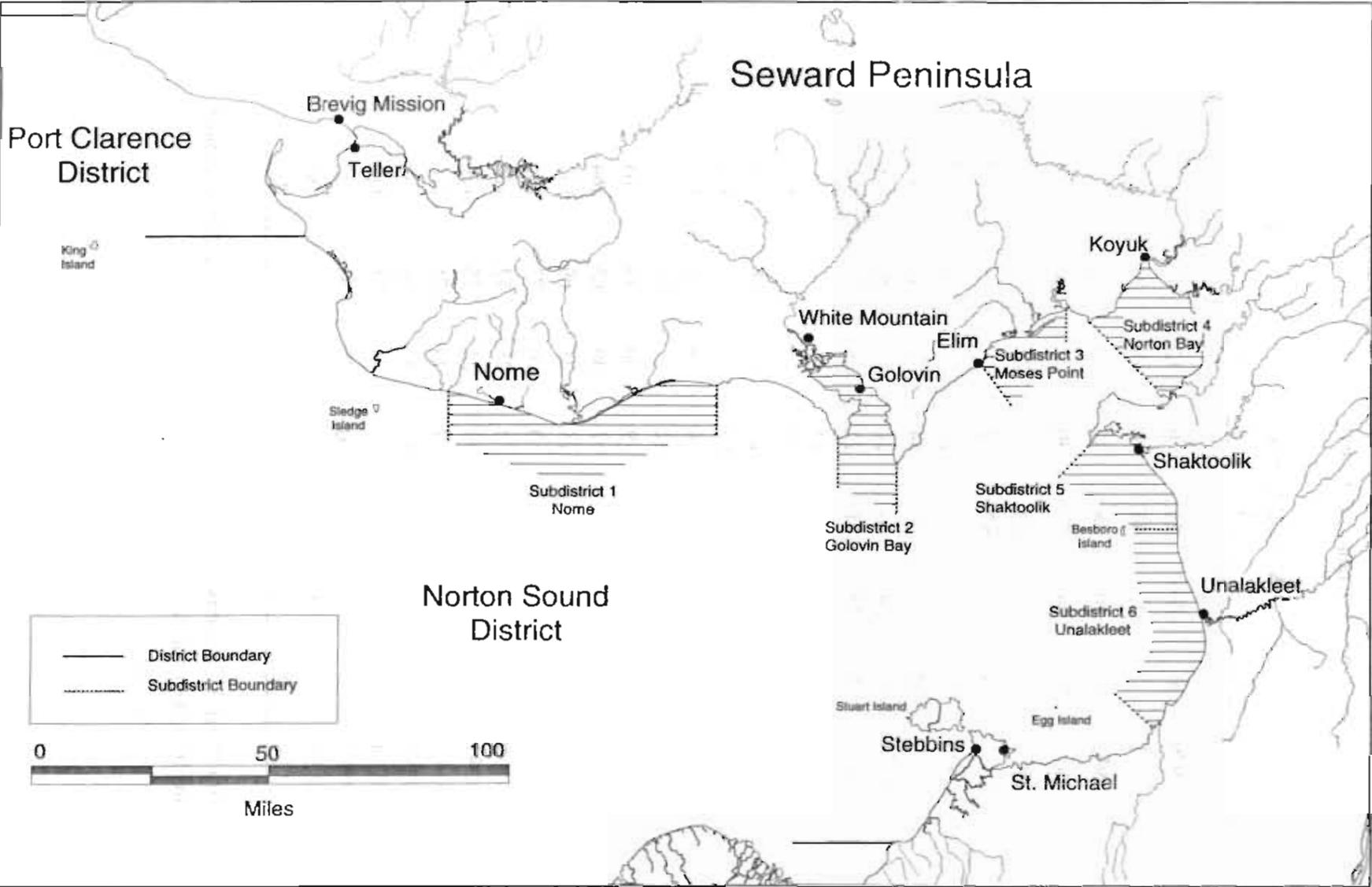
* Data from households were expanded to households not contacted. If less than 30 and less than 50% of households in a community were contacted, then reported harvest is used for estimated harvest.

¹ Alaska Department of Fish and Game, Division of Commercial Fisheries Management and Development, permit returns, 1997. Expansion is by drainage.

² Estimated salmon harvest in Unalakleet includes 130 chinook, 372 chum, 330 pink, 5 sockeye, and 133 coho from the ADF&G test net fishery in addition to survey results.

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, household surveys, 1997.

Figure 1. Norton Sound commercial salmon fishing subdistricts.



Appendix Table A1. Number of commercial salmon fishermen fishing in Norton Sound 1970-1997.

| Year | SUBDISTRICT | | | | | | District ^a |
|------|-------------|----|----|----|----|----|-----------------------|
| | 1 | 2 | 3 | 4 | 5 | 6 | Totals |
| 1970 | 6 | 33 | 21 | 0 | 12 | 45 | b |
| 1971 | 7 | 27 | 45 | 6 | 19 | 72 | b |
| 1972 | 20 | 20 | 48 | 32 | 20 | 71 | b |
| 1973 | 21 | 34 | 57 | 30 | 27 | 94 | b |
| 1974 | 25 | 25 | 60 | 8 | 23 | 53 | b |
| 1975 | 24 | 42 | 67 | 42 | 39 | 61 | b |
| 1976 | 21 | 22 | 54 | 27 | 37 | 60 | b |
| 1977 | 14 | 25 | 52 | 24 | 30 | 45 | 164 |
| 1978 | 16 | 24 | 44 | 26 | 26 | 51 | 176 |
| 1979 | 15 | 21 | 41 | 22 | 29 | 63 | 175 |
| 1980 | 14 | 17 | 26 | 13 | 26 | 66 | 159 |
| 1981 | 15 | 19 | 33 | 10 | 26 | 73 | 167 |
| 1982 | 18 | 17 | 28 | 10 | 32 | 68 | 164 |
| 1983 | 19 | 21 | 39 | 15 | 34 | 72 | 170 |
| 1984 | 8 | 22 | 25 | 8 | 24 | 74 | 141 |
| 1985 | 9 | 21 | 34 | 12 | 21 | 64 | 155 |
| 1986 | 13 | 24 | 34 | 9 | 30 | 73 | 163 |
| 1987 | 10 | 21 | 34 | 12 | 39 | 65 | 164 |
| 1988 | 5 | 21 | 36 | 13 | 21 | 69 | 152 |
| 1989 | 2 | 0 | 13 | 0 | 26 | 73 | 110 |
| 1990 | 0 | 15 | 23 | 0 | 28 | 73 | 128 |
| 1991 | 0 | 16 | 24 | 0 | 25 | 75 | 126 |
| 1992 | 2 | 1 | 21 | 9 | 25 | 71 | 110 |
| 1993 | 1 | 8 | 26 | 15 | 37 | 66 | 153 |
| 1994 | 1 | 5 | 21 | 0 | 39 | 71 | 119 |
| 1995 | 2 | 7 | 12 | 0 | 26 | 58 | 105 |
| 1996 | 1 | 4 | 12 | 0 | 20 | 54 | 86 |
| 1997 | 0 | 11 | 21 | 9 | 19 | 57 | 102 |

^a District total is the number of fishermen that actually fished in Norton Sound; Some fishermen may have fished more than one subdistrict.

^b Data not available

Appendix Table A2. Commercial and subsistence salmon catches by species, by year in Nome Subdistrict, Norton Sound District, 1964-1997.

| NOME (SUBDISTRICT 1) | | | | | | | | | | | | | | | | | | | |
|------------------------------|------------|---------|-------|--------|--------|--------|-------------|---------|---------|----------|----------|----------|----------|---------|-------|--------|--------|--------|--|
| Year | Commercial | | | | | | Subsistence | | | | | | Combined | | | | | | |
| | Chinook | Sockeye | Coho | Pink | Chum | Total | Chinook | Sockeye | Coho | Pink | Chum | Total | Chinook | Sockeye | Coho | Pink | Chum | Total | |
| 1964 | 5 | - | - | 1 | 1,194 | 1,200 | - | - | - | - | - | - | 5 | - | - | 1 | 1,194 | 1,200 | |
| 1965 | 1 | - | - | 193 | 1,941 | 2,135 | - | - | 780.0 | 1,825.0 | 2,605.0 | 1 | - | - | 973 | 3,766 | 4,740 | | |
| 1966 | 1 | - | 32 | 1 | 581 | 615 | 12.0 | - | 1,794.0 | 1,762.0 | 3,760.0 | 13 | - | 224 | 1,795 | 2,343 | 4,375 | | |
| 1967 | - | - | - | 72 | 406 | 478 | 11.0 | - | 36.0 | 349.0 | 627.0 | 1,023.0 | 11 | - | 36 | 421 | 1,033 | 1,501 | |
| 1968 | - | - | - | 50 | 102 | 152 | 7.0 | - | 108.0 | 6,507.0 | 621.0 | 7,243.0 | 7 | - | 108 | 6,557 | 723 | 7,395 | |
| 1969 | - | - | 63 | 330 | 601 | 994 | 2.0 | - | 27.0 | 3,649.0 | 508.0 | 4,186.0 | 2 | - | 90 | 3,979 | 1,109 | 5,180 | |
| 1970 | - | - | 6 | 55 | 980 | 1,021 | - | - | 35.0 | 5,001.0 | 458.0 | 5,494.0 | 0 | - | 41 | 5,056 | 1,418 | 6,515 | |
| 1971 | 11 | - | - | 14 | 2,315 | 2,340 | - | - | 122.0 | 5,457.0 | 2,900.0 | 8,479.0 | 11 | - | 122 | 5,471 | 5,215 | 10,819 | |
| 1972 | 15 | - | - | 12 | 2,643 | 2,670 | 19.0 | - | 52.0 | 4,684.0 | 315.0 | 5,070.0 | 34 | - | 52 | 4,696 | 2,958 | 7,740 | |
| 1973 | - | - | - | 321 | 1,132 | 1,453 | 14.0 | - | 120.0 | 5,108.0 | 1,863.0 | 7,105.0 | 14 | - | 120 | 5,429 | 2,995 | 8,558 | |
| 1974 | 19 | - | 123 | 7,722 | 10,431 | 18,295 | 8.0 | - | 5.0 | 3,818.0 | 183.0 | 4,014.0 | 27 | - | 128 | 11,540 | 10,614 | 22,309 | |
| 1975 | 2 | - | 319 | 2,163 | 8,364 | 10,848 | 2.0 | - | 97.0 | 6,267.0 | 2,858.0 | 9,224.0 | 4 | - | 416 | 8,430 | 11,222 | 20,072 | |
| 1976 | 2 | 10 | 26 | 1,331 | 7,620 | 8,989 | 13.0 | - | 189.0 | 5,492.0 | 1,705.0 | 7,399.0 | 15 | 10 | 215 | 6,623 | 9,325 | 16,388 | |
| 1977 | 8 | - | 58 | 65 | 15,998 | 16,129 | 35.0 | - | 498.0 | 2,773.0 | 12,192.0 | 15,498.0 | 43 | - | 556 | 2,838 | 28,190 | 31,627 | |
| 1978 | 19 | - | - | 22,869 | 8,782 | 31,670 | 35.0 | - | 225.0 | 13,063.0 | 4,295.0 | 17,618.0 | 54 | - | 225 | 35,932 | 13,077 | 49,288 | |
| 1979 | 9 | - | 29 | 5,860 | 5,391 | 11,289 | 11.0 | - | 1,120.0 | 6,353.0 | 3,273.0 | 10,757.0 | 20 | - | 1,149 | 12,213 | 8,664 | 22,046 | |
| 1980 | 8 | - | - | 10,007 | 13,922 | 23,937 | 129 | - | 2,157 | 22,246 | 5,983 | 30,515 | 137 | - | 2,157 | 32,253 | 19,905 | 54,452 | |
| 1981 | 4 | - | 508 | 3,202 | 18,666 | 22,380 | 25 | 14 | 1,726 | 5,584 | 9,579 | 15,938 | 39 | 14 | 2,234 | 8,786 | 27,245 | 38,318 | |
| 1982 | 20 | - | 1,163 | 18,512 | 13,447 | 33,162 | 21 | 6 | 1,829 | 19,202 | 4,831 | 25,889 | 41 | 6 | 3,012 | 37,714 | 18,278 | 59,051 | |
| 1983 | 23 | - | 261 | 308 | 11,691 | 12,283 | 74 | 53 | 1,911 | 8,086 | 7,091 | 17,215 | 97 | 53 | 2,172 | 8,394 | 18,782 | 29,498 | |
| 1984 | 7 | - | 820 | - | 3,744 | 4,571 | 83 | 16 | 1,795 | 17,182 | 4,883 | 23,959 | 90 | 16 | 2,615 | 17,182 | 8,627 | 28,530 | |
| 1985 | 21 | - | 356 | - | 8,219 | 8,596 | 56 | 114 | 1,054 | 2,117 | 5,667 | 9,008 | 77 | 114 | 1,410 | 2,117 | 11,886 | 15,604 | |
| 1986 | 6 | - | 50 | - | 8,160 | 8,216 | 150 | 107 | 688 | 8,720 | 8,085 | 17,750 | 156 | 107 | 738 | 8,720 | 16,245 | 25,966 | |
| 1987 | 3 | - | 577 | - | 5,646 | 6,226 | 200 | 107 | 1,100 | 1,251 | 8,394 | 11,052 | 203 | 107 | 1,677 | 1,251 | 14,040 | 17,278 | |
| 1988 | 2 | - | 54 | 182 | 1,628 | 1,866 | 83 | 133 | 1,076 | 2,159 | 5,952 | 9,383 | 65 | 133 | 1,130 | 2,341 | 7,580 | 11,249 | |
| 1989 | 2 | - | - | 123 | 492 | 617 | 24 | 131 | 469 | 924 | 3,399 | 4,947 | 26 | 131 | 469 | 1,047 | 3,891 | 5,564 | |
| 1990 | 0 | 0 | 0 | 0 | 0 | 0 | 58 | 234 | 510 | 2,233 | 4,246 | 7,281 | 58 | 234 | 510 | 2,233 | 4,246 | 7,281 | |
| 1991 | 0 | 0 | 0 | 0 | 0 | 0 | 83 | 166 | 1,279 | 194 | 3,715 | 5,437 | 83 | 166 | 1,279 | 194 | 3,715 | 5,437 | |
| 1992 | 1 | 2 | 693 | 185 | 881 | 1,762 | 152 | 163 | 1,481 | 7,351 | 1,684 | 10,831 | 153 | 165 | 2,174 | 7,536 | 2,565 | 12,593 | |
| 1993 | 0 | 2 | 611 | 0 | 132 | 745 | 52 | 80 | 2,070 | 873 | 1,766 | 4,941 | 52 | 82 | 2,681 | 873 | 1,898 | 5,586 | |
| 1994 | 0 | 1 | 287 | 0 | 66 | 354 | 23 | 69 | 983 | 6,556 | 1,673 | 9,304 | 23 | 70 | 1,270 | 6,556 | 1,739 | 9,658 | |
| 1995 | 0 | 1 | 369 | 0 | 122 | 492 | 36 | 211 | 1,897 | 486 | 5,344 | 7,974 | 36 | 212 | 2,266 | 486 | 5,466 | 8,466 | |
| 1996 | 0 | 0 | 9 | 13 | 3 | 25 | 19 | 353 | 1,317 | 5,802 | 4,333 | 11,824 | 19 | 353 | 1,326 | 5,815 | 4,336 | 11,849 | |
| 1997 | 0 | 0 | 0 | 0 | 0 | 0 | 19 | 99 | 534 | 287 | 4,996 | 5,936 | 19 | 99 | 534 | 287 | 4,996 | 5,936 | |
| 5-year avg. ^a | 0 | 1 | 255 | 3 | 65 | 323 | 30 | 162 | 1,360 | 2,801 | 3,622 | 7,976 | 30 | 163 | 1,615 | 2,803 | 3,687 | 8,299 | |
| 10-year avg. ^b | 1 | 1 | 202 | 50 | 332 | 586 | 53 | 164 | 1,162 | 2,687 | 3,711 | 7,776 | 53 | 165 | 1,364 | 2,737 | 4,043 | 8,362 | |

^a 1993-1997

^b 1988-1997

Appendix Table A3. Commercial and subsistence salmon catches by species, by year in Golovin Subdistrict, Norton Sound District, 1962-1997.

| GOLOVIN BAY (SUBDISTRICT 2) | | | | | | | | | | | | | | | | | | |
|-----------------------------|------------|---------|-------|--------|--------|---------|-------------|---------|-------|--------|--------|--------|----------|---------|-------|--------|--------|---------|
| Year | Commercial | | | | | | Subsistence | | | | | | Combined | | | | | |
| | Chinook | Sockeye | Coho | Pink | Chum | Total | Chinook | Sockeye | Coho | Pink | Chum | Total | Chinook | Sockeye | Coho | Pink | Chum | Total |
| 1962 | 45 | 11 | 264 | 10,276 | 68,720 | 79,316 | - | - | - | - | - | - | 45 | 11 | 264 | 10,276 | 68,720 | 79,316 |
| 1963 | 40 | 40 | - | 19,677 | 49,850 | 69,607 | - | - | 118 | 5,702 | 9,319 | 15,139 | 40 | 40 | 118 | 25,379 | 59,169 | 84,746 |
| 1964 | 27 | 40 | 3 | 7,236 | 58,301 | 65,607 | - | - | - | - | - | - | 27 | 40 | 3 | 7,236 | 58,301 | 65,607 |
| 1965 | - | - | - | - | - | - | 2 | - | 49 | 1,523 | 3,847 | 5,421 | 2 | - | 49 | 1,523 | 3,847 | 5,421 |
| 1966 | 17 | 14 | 584 | 4,665 | 29,791 | 35,071 | 4 | - | 176 | 1,573 | 3,520 | 5,273 | 21 | 14 | 760 | 8,238 | 33,311 | 40,344 |
| 1967 | 10 | - | 747 | 5,790 | 31,193 | 37,740 | 3 | - | 185 | 2,774 | 4,803 | 7,765 | 13 | - | 932 | 8,564 | 35,996 | 45,505 |
| 1968 | 12 | - | 205 | 18,428 | 10,011 | 28,656 | 4 | - | 181 | 4,955 | 1,744 | 6,884 | 16 | - | 386 | 23,383 | 11,755 | 35,540 |
| 1969 | 28 | - | 1,224 | 23,208 | 20,949 | 45,409 | 2 | - | 190 | 2,760 | 2,514 | 5,466 | 30 | - | 1,414 | 25,968 | 23,463 | 50,875 |
| 1970 | 13 | - | 3 | 18,721 | 20,566 | 39,303 | 4 | - | 353 | 2,046 | 2,614 | 5,017 | 17 | - | 366 | 20,767 | 23,180 | 44,320 |
| 1971 | 37 | - | 197 | 2,735 | 33,824 | 36,793 | 7 | - | 191 | 1,544 | 1,936 | 3,678 | 44 | - | 388 | 4,279 | 35,760 | 40,471 |
| 1972 | 36 | - | 20 | 6,562 | 27,097 | 33,715 | 4 | - | 62 | 1,735 | 2,022 | 3,829 | 40 | - | 82 | 8,297 | 29,125 | 37,544 |
| 1973 | 70 | - | 183 | 14,145 | 41,889 | 56,087 | 1 | - | 48 | 9 | 74 | 132 | 71 | - | 231 | 14,154 | 41,763 | 56,219 |
| 1974 | 30 | - | 3 | 28,340 | 30,173 | 58,546 | 3 | - | - | 967 | 205 | 1,175 | 33 | - | 3 | 29,307 | 30,378 | 59,721 |
| 1975 | 17 | - | 206 | 10,770 | 41,761 | 52,754 | - | - | 1 | 2,011 | 2,025 | 4,037 | 17 | - | 207 | 12,781 | 43,786 | 56,791 |
| 1976 | 12 | - | 1,311 | 24,051 | 30,219 | 55,593 | - | - | - | 1,995 | 1,128 | 3,123 | 12 | - | 1,311 | 26,046 | 31,347 | 58,716 |
| 1977 | 26 | - | 425 | 7,928 | 53,912 | 62,292 | 3 | - | 80 | 703 | 2,915 | 3,701 | 29 | - | 506 | 8,631 | 56,827 | 65,993 |
| 1978 | 22 | - | 94 | 72,033 | 41,462 | 113,611 | 1 | - | - | 2,470 | 1,061 | 3,532 | 23 | - | 94 | 74,503 | 42,523 | 117,143 |
| 1979 | 75 | 49 | 1,606 | 45,948 | 30,201 | 77,879 | - | - | 845 | 2,546 | 2,840 | 6,231 | 75 | 49 | 2,451 | 48,494 | 33,041 | 84,110 |
| 1980 | 36 | 36 | 328 | 10,774 | 52,809 | 63,783 | 12 | - | 892 | 10,727 | 4,057 | 15,488 | 48 | 36 | 1,020 | 21,501 | 58,666 | 79,271 |
| 1981 | 23 | 5 | 13 | 49,755 | 58,323 | 108,119 | 8 | - | 1,520 | 5,158 | 5,543 | 12,229 | 31 | 5 | 1,533 | 54,913 | 63,866 | 120,348 |
| 1982 | 78 | 5 | 4,281 | 39,510 | 51,970 | 95,844 | 7 | - | 1,289 | 4,752 | 1,868 | 7,918 | 85 | 5 | 8,570 | 44,262 | 53,838 | 103,760 |
| 1983 | 52 | 10 | 295 | 17,414 | 48,283 | 66,054 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1984 | 31 | - | 2,462 | 88,588 | 54,153 | 145,234 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1985 | 193 | 113 | 1,196 | 3,019 | 55,781 | 60,302 | 12 | 2 | 430 | 1,904 | 9,577 | 11,925 | 205 | 115 | 1,626 | 4,923 | 65,358 | 72,227 |
| 1986 | 81 | 8 | 958 | 25,425 | 69,725 | 96,197 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1987 | 166 | 51 | 2,203 | 1,579 | 44,334 | 48,333 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1988 | 108 | 921 | 2,149 | 31,559 | 33,348 | 68,085 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1989 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1990 | 52 | 21 | 0 | 0 | 15,993 | 16,066 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1991 | 49 | 1 | 0 | 0 | 14,839 | 14,889 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1992 | 6 | 9 | 2,085 | 0 | 1,002 | 3,102 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1993 | 1 | 4 | 2 | 8,480 | 2,803 | 11,290 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1994 | 0 | 0 | 3,424 | 0 | 111 | 3,535 | 253 | 168 | 733 | 8,410 | 1,337 | 10,901 | 253 | 168 | 4,157 | 8,410 | 1,448 | 14,436 |
| 1995 | 0 | 0 | 1,616 | 4,296 | 1,987 | 7,899 | 165 | 34 | 1,649 | 7,818 | 10,373 | 20,039 | 165 | 34 | 3,265 | 12,114 | 12,360 | 27,938 |
| 1996 | 0 | 0 | 638 | 0 | 0 | 638 | 86 | 134 | 3,014 | 17,399 | 2,867 | 23,506 | 86 | 134 | 3,652 | 17,399 | 2,867 | 24,138 |
| 1997 | 19 | 2 | 102 | 20 | 8,003 | 8,148 | 138 | 427 | 555 | 4,570 | 4,891 | 10,581 | 157 | 429 | 657 | 4,590 | 12,894 | 18,729 |
| 5-year avg. ^a | 4 | 1 | 1,156 | 2,559 | 2,581 | 6,302 | - | - | - | - | - | - | - | - | - | - | - | - |
| 10-year avg. ^b | 24 | 96 | 1,002 | 4,436 | 7,809 | 13,365 | - | - | - | - | - | - | - | - | - | - | - | - |

^a 1993-1997

^b 1988-1997

^c Subsistence survey not conducted.

^d Harvest estimate from Div. of Subsistence survey.

Appendix Table A4. Commercial and subsistence salmon catches by species, by year in Moses Point Subdistrict, Norton Sound District, 1962-1997.

| MOSES POINT (SUBDISTRICT 3) | | | | | | | | | | | | | | | | | | |
|-----------------------------|------------|---------|-------|--------|--------|--------|-------------|---------|-------|-------|-------|---------------------|----------|---------|-------|--------|--------|--------|
| Year | Commercial | | | | | | Subsistence | | | | | | Combined | | | | | |
| | Chinook | Sockeye | Coho | Pink | Chum | Total | Chinook | Sockeye | Coho | Pink | Chum | Total | Chinook | Sockeye | Coho | Pink | Chum | Total |
| 1962 | 27 | - | - | 11,100 | 50,683 | 61,810 | - | - | - | - | - | - | 27 | 0 | 0 | 11,100 | 50,683 | 61,810 |
| 1963 | 15 | - | - | 2,549 | 46,274 | 48,838 | 5 | - | - | 5,808 | 8,316 | 14,123 | 20 | 0 | 0 | 8,357 | 54,590 | 62,967 |
| 1964 | 32 | 3 | - | 3,372 | 28,568 | 31,975 | - | - | - | 63 | 348 | 411 | 32 | 3 | 0 | 3,435 | 28,916 | 32,386 |
| 1965 | - | - | - | - | - | - | 16 | - | 72 | 1,325 | 9,857 | 11,270 | 16 | - | 72 | 1,325 | 9,857 | 11,270 |
| 1966 | 17 | - | - | 2,745 | 24,741 | 27,503 | 14 | - | 250 | 2,511 | 5,409 | 8,184 | 31 | 0 | 250 | 5,256 | 30,150 | 35,687 |
| 1967 | - | - | - | - | - | - | 39 | - | 116 | 1,322 | 9,913 | 11,390 | 39 | - | 116 | 1,322 | 9,913 | 11,390 |
| 1968 | 12 | - | 1 | 9,012 | 17,908 | 26,933 | 2 | - | 80 | 6,135 | 2,527 | 8,744 | 14 | - | 81 | 15,147 | 20,435 | 35,677 |
| 1969 | 29 | - | - | 11,807 | 26,594 | 38,430 | 9 | - | 109 | 1,790 | 1,303 | 3,211 | 38 | - | 109 | 13,597 | 27,897 | 41,641 |
| 1970 | 39 | - | - | 13,052 | 29,726 | 42,817 | 16 | - | 160 | 4,661 | 6,960 | 11,797 | 55 | - | 160 | 17,713 | 36,686 | 54,614 |
| 1971 | 95 | - | 4 | 922 | 43,831 | 44,852 | 16 | - | 271 | 1,046 | 2,227 | 3,560 | 111 | - | 275 | 1,968 | 46,058 | 48,412 |
| 1972 | 190 | - | 11 | 5,866 | 30,919 | 36,986 | 44 | - | 108 | 1,579 | 2,070 | 3,801 | 234 | - | 119 | 7,445 | 32,989 | 40,787 |
| 1973 | 134 | - | - | 10,603 | 31,389 | 42,126 | 2 | - | - | - | 298 | 300 | 136 | - | 0 | 10,603 | 31,687 | 42,426 |
| 1974 | 198 | - | 9 | 12,821 | 55,276 | 68,304 | 3 | - | - | 2,382 | 1,723 | 4,108 | 201 | - | 9 | 15,203 | 56,999 | 72,412 |
| 1975 | 16 | - | - | 4,407 | 46,699 | 51,122 | 2 | - | 6 | 1,280 | 508 | 1,796 | 18 | - | 6 | 5,687 | 47,207 | 52,918 |
| 1976 | 24 | - | 232 | 5,072 | 10,890 | 16,218 | 22 | - | - | 5,016 | 1,548 | 6,586 | 46 | - | 232 | 10,088 | 12,438 | 22,804 |
| 1977 | 96 | - | 6 | 9,443 | 47,455 | 57,000 | 22 | - | 225 | 1,145 | 1,170 | 2,562 | 118 | - | 231 | 10,588 | 48,625 | 59,562 |
| 1978 | 444 | - | 244 | 39,694 | 44,595 | 84,977 | 38 | - | 407 | 1,995 | 1,229 | 3,669 | 482 | - | 651 | 41,689 | 45,824 | 88,646 |
| 1979 | 1,035 | - | 177 | 40,811 | 37,123 | 79,146 | 18 | - | 890 | 6,078 | 1,195 | 8,179 | 1,051 | 0 | 1,067 | 46,889 | 38,318 | 87,325 |
| 1980 | 502 | - | - | 1,435 | 14,755 | 16,692 | 131 | - | 229 | 4,232 | 1,393 | 5,985 | 633 | 0 | 229 | 5,667 | 16,148 | 22,677 |
| 1981 | 198 | - | 5 | 26,417 | 29,325 | 55,945 | 32 | - | 2,345 | 6,530 | 2,819 | 11,726 | 230 | 0 | 2,350 | 32,947 | 32,144 | 67,671 |
| 1982 | 253 | - | 318 | 9,849 | 40,030 | 50,450 | 1 | - | 1,835 | 3,785 | 3,537 | 9,158 | 254 | 0 | 2,153 | 13,634 | 43,567 | 59,606 |
| 1983 | 254 | - | - | 17,027 | 65,776 | 83,057 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1984 | - | - | 5,959 | 28,035 | 9,477 | 43,471 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1985 | 816 | 32 | 1,803 | 559 | 24,468 | 27,676 | 67 | - | 1,389 | 1,212 | 947 | 3,615 | 883 | 32 | 3,192 | 1,771 | 25,413 | 31,291 |
| 1986 | 600 | 41 | 5,874 | 15,795 | 20,668 | 42,978 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1987 | 907 | 15 | 64 | 568 | 17,278 | 18,832 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1988 | 663 | 93 | 3,974 | 13,703 | 18,585 | 37,018 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1989 | 62 | - | - | - | 167 | 229 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1990 | 202 | 0 | 0 | 501 | 3,723 | 4,426 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1991 | 161 | 0 | 0 | 0 | 804 | 965 | 312 | - | 2,153 | 3,555 | 2,660 | 8,680 ^a | 473 | 0 | 2,153 | 3,555 | 3,464 | 9,645 |
| 1992 | 0 | 0 | 3,531 | 0 | 6 | 3,537 | 100 | - | 1,281 | 6,152 | 1,260 | 8,793 ^a | 100 | 0 | 4,812 | 6,152 | 1,266 | 12,330 |
| 1993 | 3 | 0 | 4,065 | 0 | 167 | 4,235 | 368 | - | 1,217 | 1,726 | 1,635 | 4,948 ^a | 371 | 0 | 5,282 | 1,726 | 1,602 | 9,181 |
| 1994 | 0 | 0 | 5,345 | 0 | 414 | 5,759 | 322 | 104 | 1,180 | 9,345 | 3,476 | 14,427 ^a | 322 | 104 | 6,525 | 9,345 | 3,890 | 20,186 |
| 1995 | 4 | 44 | 3,742 | 2,962 | 1,171 | 7,923 | 284 | 17 | 1,353 | 2,046 | 3,774 | 7,474 ^a | 288 | 61 | 5,095 | 5,008 | 4,945 | 15,397 |
| 1996 | 0 | 0 | 1,915 | 68,609 | 0 | 70,524 | 417 | 52 | 1,720 | 9,442 | 2,319 | 13,951 ^a | 417 | 52 | 3,635 | 78,051 | 2,319 | 84,475 |
| 1997 | 844 | 0 | 1,409 | 0 | 2,683 | 4,936 | 619 | 50 | 1,213 | 1,314 | 2,064 | 5,261 ^a | 1,463 | 50 | 2,622 | 1,314 | 4,747 | 10,197 |
| 5-year avg. ^b | 170 | 9 | 3,295 | 14,314 | 887 | 18,675 | 402 | 45 | 1,337 | 4,775 | 2,654 | 9,212 | 572 | 53 | 4,632 | 19,089 | 3,541 | 27,887 |
| 10-year avg. ^b | 194 | 14 | 2,398 | 8,578 | 2,772 | 13,955 | - | - | - | - | - | - | - | - | - | - | - | - |

^a 1993-1997

^b 1968-1997

^c Subsistence survey not conducted.

^d Harvest estimated from Div. of Subsistence survey.

Appendix Table A5. Commercial and subsistence salmon catches by species, by year in Norton Bay Sub-district, Norton Sound District, 1962-1997.

| NORTON BAY (SUBDISTRICT 4) | | | | | | | | | | | | | | | | | | | |
|----------------------------|------------|---------|-------|--------|--------|--------|-------------|---------|------|-------|-------|---------------------|----------|---------|-------|--------|--------|--------|--|
| Year | Commercial | | | | | | Subsistence | | | | | | Combined | | | | | | |
| | Chinook | Sockeye | Coho | Pink | Chum | Total | Chinook | Sockeye | Coho | Pink | Chum | Total | Chinook | Sockeye | Coho | Pink | Chum | Total | |
| 1962 | 387 | 7 | 40 | 4,402 | 24,380 | 29,216 | - | - | - | - | - | - | 387 | 7 | 40 | 4,402 | 24,380 | 29,216 | |
| 1963 | 137 | 2 | - | 17,676 | 12,469 | 30,284 | - | - | - | 5,097 | - | 5,097 | 137 | 2 | - | 22,773 | 12,469 | 35,361 | |
| 1964 | 50 | 3 | - | 988 | 5,916 | 6,957 | - | - | - | - | - | - | 50 | 3 | - | 988 | 5,916 | 6,957 | |
| 1965 | - | - | - | - | - | - | 4 | - | 22 | 252 | 3,032 | 3,310 | 4 | - | 22 | 252 | 3,032 | 3,310 | |
| 1966 | - | - | - | - | - | - | 7 | - | 41 | 929 | 3,612 | 4,580 | 7 | - | 41 | 929 | 3,612 | 4,580 | |
| 1967 | - | - | - | - | - | - | 12 | - | 14 | 1,097 | 2,945 | 4,068 | 12 | - | 14 | 1,097 | 2,945 | 4,068 | |
| 1968 | - | - | - | - | - | - | 28 | - | 71 | 1,916 | 1,872 | 3,867 | 28 | - | 71 | 1,916 | 1,872 | 3,867 | |
| 1969 | 26 | - | - | 4,849 | 3,974 | 8,840 | 59 | - | 189 | 2,115 | 3,855 | 6,218 | 85 | - | 189 | 6,964 | 7,820 | 15,067 | |
| 1970 | - | - | - | - | - | - | 3 | - | 10 | 840 | 3,500 | 4,353 | 3 | - | 10 | 840 | 3,500 | 4,353 | |
| 1971 | - | - | - | - | - | - | 5 | - | 47 | 92 | 2,619 | 2,763 | 5 | - | 47 | 92 | 2,619 | 2,763 | |
| 1972 | 43 | - | - | 1,713 | 7,799 | 9,555 | 30 | - | 44 | 2,089 | 2,022 | 4,185 | 73 | - | 44 | 3,802 | 9,821 | 13,740 | |
| 1973 | 28 | - | - | 1,845 | 4,672 | 6,345 | 1 | - | - | 10 | 130 | 141 | 29 | - | - | 1,855 | 4,802 | 6,486 | |
| 1974 | 21 | - | - | 654 | 3,826 | 4,501 | - | - | - | 17 | 900 | 917 | 21 | - | - | 671 | 4,726 | 5,418 | |
| 1975 | 68 | - | 89 | 1,137 | 17,385 | 18,670 | 1 | - | - | 93 | 361 | 455 | 69 | - | 89 | 1,230 | 17,746 | 19,134 | |
| 1976 | 102 | - | 95 | 4,456 | 7,161 | 11,814 | 2 | - | - | 41 | 236 | 279 | 104 | - | 95 | 4,497 | 7,397 | 12,093 | |
| 1977 | 158 | - | 1 | 2,495 | 13,563 | 16,217 | 14 | - | - | 420 | 2,055 | 2,489 | 172 | - | 1 | 2,915 | 15,618 | 18,706 | |
| 1978 | 470 | - | 144 | 8,471 | 21,973 | 31,058 | 12 | - | 21 | 1,210 | 1,060 | 2,303 | 482 | - | 165 | 9,681 | 23,033 | 33,361 | |
| 1979 | 856 | - | 2,547 | 6,291 | 15,599 | 25,293 | 12 | - | 697 | 735 | 1,400 | 2,844 | 868 | - | 3,244 | 6,936 | 16,999 | 28,047 | |
| 1980 | 340 | - | - | 47 | 7,855 | 8,242 | 22 | - | 33 | 4,275 | 1,132 | 5,462 | 362 | - | 33 | 4,322 | 8,987 | 13,704 | |
| 1981 | 63 | - | - | 177 | 3,111 | 3,351 | 7 | - | 82 | 2,314 | 3,515 | 5,918 | 70 | - | 82 | 2,491 | 6,626 | 9,269 | |
| 1982 | 96 | - | 2,332 | 2,535 | 7,128 | 12,091 | 1 | - | 484 | 2,600 | 2,485 | 5,570 | 97 | - | 2,616 | 5,135 | 9,613 | 17,661 | |
| 1983 | 215 | - | 204 | 3,935 | 17,157 | 21,511 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1984 | - | - | - | 1,162 | 3,442 | 4,604 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1985 | 528 | - | 384 | 88 | 9,946 | 10,928 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1986 | 139 | 2 | 1,512 | 40 | 1,994 | 3,687 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1987 | 544 | - | 145 | 16 | 3,586 | 4,291 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1988 | 434 | 2 | 709 | 1,749 | 7,521 | 10,415 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1989 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1990 ^a | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1991 ^a | 0 | 0 | 0 | 0 | 0 | 0 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1992 | 27 | 0 | 0 | 0 | 1,787 | 1,814 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1993 | 267 | 0 | 0 | 290 | 1,378 | 1,935 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 1994 | 0 | 0 | 0 | 0 | 0 | 0 | 308 | 1 | 370 | 6,049 | 4,581 | 11,309 [*] | 308 | 1 | 370 | 6,049 | 4,581 | 11,309 | |
| 1995 | 0 | 0 | 0 | 0 | 0 | 0 | 475 | 46 | 985 | 3,514 | 5,828 | 10,848 [*] | 475 | 46 | 985 | 3,514 | 5,828 | 10,848 | |
| 1996 | 0 | 0 | 0 | 0 | 0 | 0 | 295 | 3 | 676 | 3,929 | 4,161 | 9,064 [*] | 295 | 3 | 676 | 3,929 | 4,161 | 9,064 | |
| 1997 | 194 | 0 | 0 | 0 | 331 | 725 | 498 | 34 | 322 | 1,795 | 4,040 | 6,777 [*] | 850 | 34 | 322 | 1,795 | 4,571 | 7,502 | |
| 5-year avg. ^a | 92 | 0 | 0 | 58 | 382 | 532 | - | - | - | - | - | - | - | - | - | - | - | - | |
| 10-year avg. ^b | 92 | 0 | 71 | 204 | 1,122 | 1,489 | - | - | - | - | - | - | - | - | - | - | - | - | |

^a 1993-1997

^b 1988-1997

^c Subsistence survey not conducted.

^d No commercial harvest reported.

^e Harvest estimated from Div. of Subsistence survey.

Appendix Table A6. Commercial and subsistence salmon catches by species, by year in Shaktoolik Subdistrict, Norton Sound District, 1961-1997.

| Year | Commercial | | | | | | Subsistence | | | | | | Combined | | | | | |
|---------------------------|------------|---------|--------|---------|--------|---------|-------------|---------|-------|-------|-------|---------------------|----------|---------|--------|---------|--------|---------|
| | Chinook | Sockeye | Coho | Pink | Chum | Total | Chinook | Sockeye | Coho | Pink | Chum | Total | Chinook | Sockeye | Coho | Pink | Chum | Total |
| 1961 | 140 | - | - | 29,075 | 24,746 | 53,961 | - | - | - | - | - | - | 140 | - | - | 29,075 | 24,746 | 53,961 |
| 1962 | 1,738 | - | 2,113 | 840 | 8,718 | 13,209 | - | - | - | - | - | - | 1,738 | - | 2,113 | 840 | 8,718 | 13,209 |
| 1963 | 490 | 11 | 563 | 5,139 | 19,153 | 25,345 | - | - | - | - | - | - | 480 | 11 | 563 | 5,139 | 19,153 | 25,345 |
| 1964 | 631 | 79 | 16 | 1,969 | 35,272 | 37,967 | 77 | - | 340 | 2,132 | 5,412 | 7,961 | 708 | 79 | 356 | 4,101 | 40,884 | 48,928 |
| 1965 | 127 | 30 | - | 3 | 8,956 | 8,516 | 31 | - | 107 | 3,763 | 3,420 | 7,321 | 158 | 30 | 107 | 3,766 | 11,776 | 15,837 |
| 1966 | 310 | - | 956 | 344 | 8,292 | 9,902 | 142 | - | 762 | 1,445 | 4,183 | 6,532 | 452 | - | 1,718 | 1,789 | 12,475 | 16,434 |
| 1967 | 43 | - | 88 | 1,050 | 1,655 | 2,836 | 262 | - | 387 | 2,010 | 4,436 | 7,095 | 305 | - | 475 | 3,060 | 6,091 | 9,931 |
| 1968 | 61 | - | 130 | 2,205 | 2,504 | 4,900 | 10 | - | 458 | 6,355 | 1,915 | 8,738 | 71 | - | 588 | 8,560 | 4,419 | 13,638 |
| 1969 | 33 | - | 276 | 6,197 | 8,645 | 15,151 | 40 | - | 193 | 4,018 | 3,429 | 7,690 | 79 | - | 469 | 10,215 | 12,084 | 22,841 |
| 1970 | 197 | - | 155 | 2,301 | 15,753 | 18,406 | 43 | - | 210 | 2,474 | 2,016 | 4,743 | 240 | - | 365 | 4,775 | 17,769 | 23,149 |
| 1971 | 284 | - | 238 | 28 | 13,399 | 13,949 | 87 | - | 329 | 494 | 5,060 | 5,970 | 371 | - | 567 | 522 | 18,459 | 19,919 |
| 1972 | 419 | - | 11 | 2,798 | 12,022 | 15,250 | 64 | - | 235 | 939 | 3,399 | 4,637 | 483 | - | 246 | 3,737 | 16,421 | 19,867 |
| 1973 | 289 | - | 177 | 6,450 | 14,500 | 21,416 | 51 | - | 130 | 3,410 | 1,397 | 4,988 | 340 | - | 307 | 9,860 | 15,897 | 26,404 |
| 1974 | 583 | - | 179 | 5,650 | 28,391 | 32,803 | 93 | - | 353 | 1,901 | 358 | 2,705 | 676 | - | 532 | 7,551 | 26,749 | 35,506 |
| 1975 | 651 | 2 | 812 | 1,774 | 49,536 | 52,775 | 18 | - | 14 | 1,394 | 334 | 1,760 | 889 | 2 | 826 | 3,168 | 49,870 | 54,535 |
| 1976 | 892 | - | 129 | 15,803 | 15,798 | 32,622 | 24 | - | 121 | 1,188 | 269 | 1,602 | 916 | - | 250 | 16,991 | 16,067 | 34,224 |
| 1977 | 1,521 | 4 | 418 | 7,743 | 38,591 | 46,277 | 49 | - | 170 | 585 | 2,190 | 2,994 | 1,570 | 4 | 588 | 8,326 | 38,781 | 49,271 |
| 1978 | 1,339 | 7 | 1,116 | 46,236 | 35,388 | 84,086 | 81 | - | 15 | 3,275 | 1,170 | 4,541 | 1,420 | 7 | 1,131 | 49,511 | 36,558 | 88,627 |
| 1979 | 2,377 | - | 3,383 | 18,944 | 22,030 | 46,734 | 62 | - | 1,605 | 2,575 | 1,670 | 5,912 | 2,439 | - | 4,988 | 21,519 | 23,700 | 52,646 |
| 1980 | 1,086 | - | 8,001 | 1,947 | 27,453 | 38,487 | 57 | - | 756 | 3,227 | 1,827 | 5,867 | 1,143 | - | 8,757 | 5,174 | 29,280 | 44,354 |
| 1981 | 1,484 | 4 | 1,191 | 29,695 | 21,097 | 53,471 | 8 | - | 525 | 2,225 | 3,490 | 6,248 | 1,492 | 4 | 1,716 | 31,920 | 24,587 | 59,719 |
| 1982 | 1,677 | 3 | 22,232 | 17,019 | 26,240 | 67,172 | 68 | - | 2,138 | 3,865 | 1,165 | 7,236 | 1,745 | 3 | 24,371 | 20,884 | 27,405 | 74,408 |
| 1983 | 2,742 | 4 | 12,877 | 12,031 | 67,310 | 94,964 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1984 | 1,613 | - | 10,730 | 1,596 | 32,309 | 46,248 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1985 | 5,312 | - | 2,806 | - | 13,403 | 21,523 | 298 | - | 1,379 | 24 | 298 | 1,999 | 5,610 | - | 4,187 | 24 | 13,701 | 23,522 |
| 1986 | 1,075 | 29 | 6,626 | - | 16,126 | 23,856 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1987 | 2,214 | - | 6,193 | - | 14,088 | 22,495 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1988 | 671 | 79 | 6,096 | 3,681 | 21,521 | 32,048 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1989 | 1,241 | 43 | 8,066 | - | 19,641 | 28,991 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1990 | 2,644 | 49 | 4,895 | 0 | 21,748 | 29,136 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1991 | 1,324 | 55 | 11,614 | 0 | 31,619 | 44,612 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1992 | 1,098 | 56 | 14,860 | 0 | 27,867 | 43,681 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1993 | 2,756 | 20 | 11,130 | 106,743 | 20,864 | 141,513 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1994 | 885 | 8 | 22,065 | 502,231 | 5,411 | 530,600 | 1,175 | 1 | 2,777 | 8,133 | 1,221 | 14,307 ^a | 2,060 | 9 | 24,842 | 511,364 | 6,632 | 544,907 |
| 1995 | 1,239 | 5 | 10,856 | 37,377 | 14,775 | 64,252 | 1,275 | 2,480 | 2,620 | 7,024 | 2,480 | 15,885 ^a | 2,514 | 2,485 | 13,482 | 44,401 | 17,255 | 80,137 |
| 1996 | 1,340 | 1 | 13,444 | 304,982 | 3,237 | 323,004 | 1,114 | 31 | 3,615 | 8,370 | 4,425 | 17,555 ^a | 2,454 | 32 | 17,059 | 313,352 | 7,662 | 340,559 |
| 1997 | 2,448 | 0 | 4,694 | 0 | 5,747 | 12,890 | 1,146 | 62 | 2,761 | 5,778 | 1,612 | 11,360 ^a | 3,595 | 62 | 7,455 | 5,779 | 7,359 | 24,250 |
| 5-year avg. ^b | 1,794 | 7 | 12,438 | 190,267 | 10,007 | 214,452 | - | - | - | - | - | - | - | - | - | - | - | - |
| 10-year avg. ^c | 1,595 | 32 | 10,732 | 106,113 | 17,243 | 125,073 | - | - | - | - | - | - | - | - | - | - | - | - |

^a 1993-1997

^b 1988-1997

^c Subsistence survey not conducted.

^d Harvest estimated from Div. of Subsistence survey.

Appendix Table A7 Commercial and subsistence salmon catches by species, by year in Unalakleet Subdistrict, Norton Sound District, 1961-1997.

| UNALAKLEET (SUBDISTRICT 6) | | | | | | | | | | | | | | | | | | |
|----------------------------|------------|---------|--------|---------|---------|---------|-------------|---------|--------|--------|--------|--------|----------|---------|--------|---------|---------|---------|
| Year | Commercial | | | | | | Subsistence | | | | | | Combined | | | | | |
| | Chinook | Sockeye | Coho | Pink | Chum | Total | Chinook | Sockeye | Coho | Pink | Chum | Total | Chinook | Sockeye | Coho | Pink | Chum | Total |
| 1961 | 5,160 | 35 | 13,807 | 5,162 | 23,586 | 47,750 | - | - | - | - | - | - | 5,160 | 35 | 13,807 | 5,162 | 23,586 | 47,750 |
| 1962 | 5,089 | - | 6,739 | 6,769 | 30,283 | 48,880 | - | - | - | - | - | - | 5,089 | - | 6,739 | 6,769 | 30,283 | 48,880 |
| 1963 | 5,941 | 18 | 16,202 | 1,140 | 27,003 | 50,304 | - | - | - | - | - | - | 5,941 | 18 | 16,202 | 1,140 | 27,003 | 50,304 |
| 1964 | 1,273 | 1 | 79 | 1 | 19,611 | 20,965 | 488 | - | 2,227 | 7,030 | 6,726 | 16,471 | 1,761 | 1 | 2,306 | 7,031 | 26,337 | 37,430 |
| 1965 | 1,321 | - | 2,030 | 24 | 26,498 | 29,873 | 521 | - | 4,562 | 11,488 | 8,791 | 25,362 | 1,842 | - | 4,592 | 11,512 | 35,289 | 55,235 |
| 1966 | 1,208 | - | 4,183 | 5,023 | 18,840 | 27,254 | 90 | - | 789 | 6,083 | 3,987 | 10,340 | 1,298 | - | 4,972 | 11,106 | 29,227 | 37,603 |
| 1967 | 1,751 | - | 1,544 | 21,961 | 8,502 | 33,758 | 490 | - | 484 | 9,964 | - | 10,938 | 2,241 | - | 2,028 | 31,925 | 8,502 | 44,696 |
| 1968 | 960 | - | 6,540 | 41,474 | 14,865 | 63,848 | 186 | - | 1,493 | 11,044 | 2,982 | 15,705 | 1,146 | - | 6,042 | 52,518 | 17,847 | 79,853 |
| 1969 | 2,276 | - | 5,273 | 46,558 | 22,032 | 70,139 | 324 | - | 1,493 | 4,230 | 4,196 | 10,233 | 2,600 | - | 6,756 | 44,788 | 26,228 | 80,372 |
| 1970 | 1,604 | - | 4,261 | 30,779 | 40,029 | 76,673 | 495 | - | 3,907 | 10,104 | 7,214 | 21,720 | 2,099 | - | 8,168 | 40,883 | 47,243 | 98,393 |
| 1971 | 2,168 | - | 2,688 | 1,196 | 17,543 | 43,593 | 911 | - | 3,137 | 2,230 | 7,073 | 13,351 | 3,077 | - | 5,825 | 3,426 | 44,616 | 56,944 |
| 1972 | 2,235 | - | 412 | 28,231 | 20,440 | 51,318 | 643 | - | 1,818 | 3,132 | 4,132 | 9,725 | 2,878 | - | 2,230 | 31,363 | 24,572 | 61,043 |
| 1973 | 1,397 | - | 8,922 | 13,335 | 25,716 | 49,370 | 323 | - | 213 | 6,233 | 3,426 | 10,195 | 1,720 | - | 9,135 | 19,568 | 29,142 | 59,365 |
| 1974 | 2,100 | - | 1,778 | 93,332 | 36,170 | 133,380 | 313 | - | 706 | 7,341 | 588 | 8,948 | 2,413 | - | 2,484 | 100,673 | 36,758 | 142,328 |
| 1975 | 1,638 | - | 3,167 | 12,137 | 48,740 | 65,682 | 163 | - | 74 | 4,758 | 2,038 | 7,033 | 1,801 | - | 3,241 | 16,895 | 50,778 | 72,715 |
| 1976 | 1,211 | 1 | 5,141 | 37,203 | 24,268 | 67,824 | 142 | - | 694 | 4,316 | 2,832 | 7,984 | 1,353 | 1 | 5,835 | 41,519 | 27,100 | 78,808 |
| 1977 | 2,691 | 1 | 2,781 | 21,001 | 32,936 | 59,410 | 723 | - | 1,557 | 8,870 | 6,085 | 17,235 | 3,414 | 1 | 4,338 | 28,871 | 39,021 | 76,645 |
| 1978 | 7,525 | 5 | 5,737 | 136,200 | 37,079 | 186,546 | 1,044 | - | 2,538 | 13,268 | 3,442 | 20,292 | 8,569 | 5 | 8,275 | 149,468 | 40,521 | 206,838 |
| 1979 | 6,354 | 8 | 23,696 | 49,647 | 30,445 | 110,150 | 640 | - | 3,330 | 6,960 | 1,597 | 12,527 | 6,994 | 8 | 27,026 | 56,607 | 32,042 | 122,677 |
| 1980 | 4,339 | 3 | 21,512 | 203,142 | 64,198 | 293,194 | 1,048 | - | 4,758 | 19,071 | 5,230 | 30,105 | 5,385 | 3 | 26,270 | 222,213 | 69,428 | 323,299 |
| 1981 | 6,157 | 47 | 29,845 | 123,233 | 39,186 | 198,468 | 869 | 24 | 5,808 | 5,750 | 4,235 | 16,666 | 7,026 | 71 | 35,653 | 128,983 | 43,421 | 215,154 |
| 1982 | 3,768 | 2 | 61,343 | 142,856 | 44,520 | 252,489 | 913 | 2 | 7,037 | 20,045 | 4,694 | 32,691 | 4,681 | 4 | 68,380 | 162,901 | 49,214 | 285,180 |
| 1983 | 7,022 | 13 | 36,098 | 26,198 | 109,220 | 178,551 | 1,868 | 32 | 6,888 | 13,808 | 4,401 | 26,998 | 8,890 | 46 | 42,986 | 40,006 | 113,621 | 205,549 |
| 1984 | 6,804 | 6 | 47,904 | - | 43,317 | 98,031 | 1,650 | 1 | 6,675 | 17,418 | 3,348 | 29,092 | 8,454 | 7 | 54,579 | 17,418 | 46,665 | 127,123 |
| 1985 | 12,621 | 21 | 15,421 | 1 | 25,111 | 53,175 | 1,397 | 3 | 2,244 | 55 | 1,968 | 5,667 | 14,018 | 24 | 17,665 | 56 | 27,079 | 56,842 |
| 1986 | 4,494 | 153 | 20,580 | - | 30,239 | 55,466 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1987 | 3,246 | 141 | 15,097 | 97 | 17,525 | 36,106 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1988 | 2,218 | 157 | 24,232 | 23,730 | 25,363 | 75,700 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1989 | 4,402 | 222 | 36,025 | - | 20,825 | 61,474 | - | - | 4,681 | 17,500 | 1,388 | - | - | - | - | - | - | - |
| 1990 | 5,998 | 358 | 52,015 | 0 | 23,659 | 82,030 | 2,476 | - | - | - | - | - | - | - | - | - | - | - |
| 1991 | 4,534 | 147 | 52,033 | 0 | 39,609 | 96,323 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1992 | 3,409 | 229 | 84,449 | 6,284 | 52,547 | 146,918 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1993 | 5,944 | 251 | 26,299 | 42,061 | 25,156 | 102,702 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1994 | 4,400 | 71 | 71,019 | 480,158 | 12,288 | 567,936 | 5,294 | 819 | 16,081 | 31,572 | 12,732 | 66,498 | 9,694 | 890 | 87,100 | 511,730 | 25,020 | 634,404 |
| 1995 | 7,617 | 78 | 31,280 | 37,009 | 24,843 | 100,827 | 5,049 | 807 | 13,110 | 17,248 | 13,480 | 49,672 | 12,666 | 885 | 44,390 | 54,255 | 38,303 | 150,499 |
| 1996 | 3,644 | 0 | 52,200 | 113,837 | 7,369 | 177,050 | 5,324 | 608 | 15,963 | 19,782 | 16,481 | 58,157 | 9,968 | 808 | 68,163 | 133,619 | 23,850 | 235,207 |
| 1997 | 9,067 | 159 | 26,079 | 0 | 17,139 | 52,444 | 6,325 | 353 | 9,120 | 10,804 | 7,649 | 34,251 | 15,302 | 512 | 35,199 | 10,804 | 24,788 | 85,895 |
| 5-year avg. ^a | 6,134 | 112 | 41,374 | 154,613 | 17,959 | 200,192 | - | - | - | - | - | - | - | - | - | - | - | - |
| 10-year avg. ^b | 5,123 | 167 | 45,562 | 70,308 | 25,180 | 146,340 | - | - | - | - | - | - | - | - | - | - | - | - |

^a 1993-1997

^b 1988-1997

^c Subsistence catches from 1966-72 includes fish taken at St. Michael.

^d Subsistence surveys not conducted

^e In-depth survey by Subsistence Division.

^f Harvest estimate from Div. of Subsistence survey. Includes harvest in Stebbins and St. Michael.

Appendix Table A8. Commercial and subsistence salmon catches by species, by year for all subdistricts in Norton Sound District, 1961-1997

| Year | ALL SUBDISTRICTS | | | | | | | | | | | | | | | | | |
|---------------------------|------------------|---------|---------|---------|---------|-----------|-------------|---------|--------|--------|--------|---------|----------|---------|---------|-----------|---------|-----------|
| | Commercial | | | | | | Subsistence | | | | | | Combined | | | | | |
| | Chinook | Sockeye | Coho | Pink | Chum | Total | Chinook | Sockeye | Coho | Pink | Chum | Total | Chinook | Sockeye | Coho | Pink | Chum | Total |
| 1961 | 5,300 | 35 | 13,807 | 34,327 | 48,332 | 101,801 | - | - | - | - | - | - | 5,300 | 35 | 13,807 | 34,327 | 48,332 | 101,801 |
| 1962 | 7,286 | 18 | 9,156 | 33,187 | 182,784 | 232,431 | - | - | - | - | - | - | 7,286 | 18 | 9,156 | 33,187 | 182,784 | 232,431 |
| 1963 | 6,613 | 71 | 16,765 | 25,625 | 154,789 | 233,863 | 5 | - | 118 | 16,607 | 17,635 | 34,365 | 6,618 | 71 | 16,883 | 72,232 | 172,424 | 268,228 |
| 1964 | 2,018 | 126 | 98 | 13,567 | 148,862 | 164,671 | 565 | - | 2,567 | 9,225 | 12,486 | 24,843 | 2,563 | 126 | 2,665 | 22,792 | 161,348 | 189,514 |
| 1965 | 1,440 | 30 | 2,030 | 220 | 36,795 | 40,524 | 574 | - | 4,812 | 19,131 | 30,772 | 55,289 | 2,723 | 30 | 6,842 | 19,351 | 67,567 | 85,813 |
| 1966 | 1,553 | 14 | 5,755 | 12,778 | 80,245 | 100,345 | 269 | - | 2,210 | 14,335 | 21,873 | 38,687 | 1,822 | 14 | 7,965 | 27,113 | 102,118 | 139,032 |
| 1967 | 1,804 | - | 2,370 | 28,879 | 41,756 | 74,818 | 817 | - | 1,222 | 17,516 | 22,724 | 42,279 | 2,621 | - | 3,601 | 46,395 | 64,480 | 117,097 |
| 1968 | 1,045 | - | 6,885 | 71,179 | 45,300 | 124,409 | 237 | - | 2,391 | 36,912 | 11,681 | 51,201 | 1,282 | - | 9,276 | 108,091 | 58,961 | 175,810 |
| 1969 | 2,392 | - | 6,836 | 96,940 | 82,795 | 178,972 | 436 | - | 2,191 | 18,562 | 15,615 | 36,804 | 2,828 | - | 8,027 | 105,511 | 98,410 | 215,776 |
| 1970 | 1,853 | - | 4,423 | 64,908 | 107,034 | 178,218 | 561 | - | 4,675 | 26,127 | 22,783 | 54,126 | 2,414 | - | 9,098 | 91,035 | 129,797 | 232,344 |
| 1971 | 2,593 | - | 3,127 | 4,895 | 131,362 | 141,977 | 1,026 | 197 | 4,057 | 10,863 | 21,618 | 37,801 | 3,619 | 197 | 7,224 | 15,758 | 152,980 | 179,778 |
| 1972 | 2,938 | - | 454 | 45,152 | 100,920 | 149,494 | 804 | 93 | 2,319 | 14,158 | 13,873 | 31,247 | 3,742 | - | 2,773 | 59,340 | 114,793 | 180,741 |
| 1973 | 1,918 | - | 9,282 | 48,499 | 119,098 | 176,797 | 392 | - | 520 | 14,770 | 7,185 | 22,867 | 2,310 | - | 9,802 | 61,269 | 126,283 | 199,664 |
| 1974 | 2,951 | - | 2,092 | 148,519 | 182,267 | 315,829 | 420 | - | 1,064 | 16,426 | 3,058 | 21,868 | 3,371 | - | 3,156 | 164,945 | 166,225 | 337,697 |
| 1975 | 2,393 | 2 | 4,593 | 32,388 | 212,485 | 251,861 | 186 | 11 | 192 | 15,803 | 8,113 | 24,305 | 2,579 | 13 | 4,785 | 48,191 | 220,598 | 276,166 |
| 1976 | 2,243 | 11 | 6,934 | 97,919 | 95,056 | 193,063 | 203 | - | 1,004 | 18,048 | 7,718 | 26,773 | 2,446 | 11 | 7,938 | 105,967 | 103,674 | 229,039 |
| 1977 | 4,500 | 5 | 3,660 | 48,675 | 200,455 | 257,325 | 846 | - | 2,530 | 14,296 | 26,607 | 44,279 | 5,346 | 5 | 6,220 | 62,071 | 227,062 | 301,604 |
| 1978 | 9,819 | 12 | 7,335 | 325,503 | 189,279 | 531,948 | 1,211 | - | 2,981 | 35,281 | 12,257 | 51,730 | 11,030 | 12 | 10,316 | 380,784 | 201,536 | 583,678 |
| 1979 | 10,706 | 57 | 31,438 | 167,411 | 140,789 | 350,401 | 747 | - | 8,487 | 25,247 | 11,975 | 46,456 | 11,453 | 57 | 39,926 | 192,658 | 152,764 | 396,857 |
| 1980 | 6,311 | 40 | 29,842 | 227,352 | 180,792 | 444,337 | 1,397 | - | 8,625 | 63,778 | 19,622 | 93,422 | 7,708 | 40 | 38,467 | 291,130 | 200,414 | 627,755 |
| 1981 | 7,925 | 56 | 31,562 | 232,479 | 169,708 | 441,734 | 2,021 | 38 | 13,416 | 28,741 | 32,866 | 77,082 | 9,950 | 94 | 44,978 | 261,226 | 202,574 | 518,816 |
| 1982 | 5,892 | 10 | 91,690 | 230,281 | 183,335 | 511,208 | 1,011 | 8 | 14,612 | 54,249 | 18,580 | 88,460 | 6,903 | 18 | 126,302 | 284,530 | 201,015 | 599,688 |
| 1983 | 10,398 | 27 | 49,735 | 76,913 | 319,437 | 456,420 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1984 | 8,455 | 6 | 67,875 | 119,381 | 146,442 | 342,159 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1985 | 19,491 | 166 | 21,968 | 3,647 | 134,928 | 180,200 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1986 | 6,395 | 233 | 35,600 | 41,260 | 146,912 | 230,400 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1987 | 7,080 | 207 | 24,279 | 2,260 | 102,457 | 138,283 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1988 | 4,096 | 1,252 | 37,214 | 74,604 | 107,966 | 225,132 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1989 | 5,707 | 265 | 44,091 | 123 | 42,625 | 82,811 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1990 | 8,895 | 434 | 56,712 | 501 | 65,123 | 131,665 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1991 | 6,068 | 203 | 63,647 | 0 | 86,871 | 158,789 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1992 | 4,541 | 298 | 105,418 | 6,284 | 83,394 | 199,933 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1993 | 8,972 | 279 | 43,283 | 157,574 | 53,562 | 263,670 | - | - | - | - | - | - | - | - | - | - | - | - |
| 1994 | 5,285 | 80 | 102,140 | 982,389 | 18,290 | 1,108,184 | 7,374 | 1,161 | 22,124 | 71,066 | 25,020 | 126,745 | 12,959 | 1,241 | 124,264 | 1,053,455 | 49,310 | 1,234,929 |
| 1995 | 8,860 | 129 | 47,862 | 81,944 | 42,898 | 181,292 | 7,768 | 1,222 | 23,015 | 38,594 | 43,014 | 119,611 | 18,326 | 1,350 | 70,877 | 120,238 | 85,912 | 295,003 |
| 1996 | 4,984 | 1 | 68,208 | 487,441 | 10,609 | 571,241 | 7,255 | 1,182 | 26,304 | 64,734 | 34,585 | 134,050 | 12,239 | 1,183 | 94,310 | 552,165 | 45,164 | 705,291 |
| 1997 | 12,573 | 161 | 32,284 | 20 | 34,100 | 79,141 | 8,998 | 1,892 | 16,476 | 27,200 | 26,889 | 81,379 | 21,371 | 2,052 | 48,780 | 27,220 | 80,906 | 160,511 |
| 5-year avg. ^a | 8,135 | 130 | 58,755 | 341,814 | 31,892 | 440,726 | - | - | - | - | - | - | - | - | - | - | - | - |
| 10-year avg. ^b | 6,998 | 310 | 60,086 | 170,058 | 54,544 | 300,996 | - | - | - | - | - | - | - | - | - | - | - | - |

^a 1993-1997

^b 1988-1997

^c These figures also include data from Stebbins and St. Michael

^d Subsistence surveys not conducted.

^e Harvest estimate from Div. of Subsistence survey.

^f 1997 Subsistence totals include Savoonga and Gamble.

Appendix Table A9. Mean salmon weights, Norton Sound District, 1962-1997.

| Year | Mean Round Weight in Pounds ^a | | | |
|-------------------|--|------|------|------|
| | Chinook | Coho | Pink | Chum |
| 1962 | - | - | - | - |
| 1963 | - | - | - | - |
| 1964 | - | - | - | 7.0 |
| 1965 | - | - | 2.3 | 7.1 |
| 1966 | - | - | 3.5 | 7.8 |
| 1967 | 23.7 | 7.0 | 3.6 | 7.2 |
| 1968 | 20.0 | 7.0 | 4.0 | 7.5 |
| 1969 | 19.3 | 7.5 | 3.6 | 6.4 |
| 1970 | 20.0 | 7.0 | 3.5 | 7.8 |
| 1971 | 23.7 | 7.0 | 3.6 | 7.2 |
| 1972 | 20.0 | 7.3 | 2.8 | 6.9 |
| 1973 | 20.3 | 6.8 | 3.9 | 7.1 |
| 1974 | 18.2 | 6.7 | 3.4 | 6.6 |
| 1975 | 10.8 | 7.4 | 2.9 | 6.5 |
| 1976 | 15.2 | 7.2 | 3.1 | 7.0 |
| 1977 | 22.7 | 7.6 | 3.3 | 7.0 |
| 1978 | 22.8 | 6.9 | 3.6 | 7.4 |
| 1979 | 22.9 | 7.1 | 3.6 | 7.2 |
| 1980 | 21.5 | 6.8 | 3.2 | 7.2 |
| 1981 | 20.7 | 6.7 | 3.5 | 7.6 |
| 1982 | 16.5 | 7.1 | 2.9 | 7.3 |
| 1983 | 17.4 | 7.2 | 3.6 | 7.4 |
| 1984 | 20.0 | 7.7 | 2.9 | 7.0 |
| 1985 | 21.5 | 7.7 | 3.1 | 7.0 |
| 1986 | 20.8 | 6.9 | 3.2 | 6.9 |
| 1987 | 20.0 | 7.3 | 3.0 | 7.1 |
| 1988 | 16.4 | 7.5 | 3.0 | 7.1 |
| 1989 | 18.4 | 7.6 | 3.6 | 7.0 |
| 1990 | 19.0 | 7.5 | - | 7.4 |
| 1991 | 17.7 | 7.4 | - | 6.9 |
| 1992 ^b | 12.7 | 7.8 | 2.9 | 7.1 |
| 1993 | 16.9 | 6.6 | 2.6 | 6.5 |
| 1993 | 18.6 | 7.5 | 2.2 | 6.7 |
| 1995 | 19.7 | 7.4 | 2.4 | 6.7 |
| 1996 | 19.2 | 8.4 | 2.4 | 7.9 |
| 1997 | 17.9 | 7.3 | 2.5 | 7.4 |

^a Based on age-weight-length samples or fish tickets.

^b Low chinook weight due to restricted mesh size.

Appendix Table A10. Estimated mean prices paid to commercial salmon fishermen, Norton Sound District, 1962 - 1997.

| Year | Chinook | Coho | Pink | Chum |
|-----------------|---------------------|--------|---------------------|--------|
| Price Per Fish | | | | |
| 1962 | \$3.85 | \$0.60 | \$0.25 | \$0.35 |
| 1963 | \$3.85 | \$0.60 | \$0.25 | \$0.35 |
| 1964 | \$4.50 | - | \$0.25 | \$0.40 |
| 1965 | \$3.75 | \$0.45 | - | \$0.40 |
| 1966 | \$4.80 | \$1.05 | \$0.25 | \$0.65 |
| Price Per Pound | | | | |
| 1967 | \$0.20 | \$0.14 | \$0.07 | \$0.09 |
| 1968 | \$0.25 | \$0.14 | \$0.06 | \$0.10 |
| 1969 | \$0.22 | \$0.14 | \$0.06 | \$0.11 |
| 1970 | \$0.25 | \$0.14 | \$0.06 | \$0.10 |
| 1971 | \$0.25 | \$0.14 | \$0.07 | \$0.10 |
| 1972 | \$0.27 | \$0.16 | \$0.06 | \$0.11 |
| 1973 | \$0.40 | \$0.16 | \$0.07 | \$0.32 |
| 1974 | \$0.40 | \$0.16 | \$0.13 | \$0.32 |
| 1975 | \$0.40 | \$0.16 | \$0.13 | \$0.24 |
| 1976 | \$0.50 | \$0.32 | \$0.17 | \$0.30 |
| 1977 | \$0.65 | \$0.40 | \$0.16 | \$0.30 |
| 1978 | \$0.65 | \$0.35 | \$0.20 | \$0.30 |
| 1979 | \$0.88 | \$0.66 | \$0.16 | \$0.41 |
| 1980 | \$0.74 | \$0.63 | \$0.07 | \$0.23 |
| 1981 | \$1.25 | \$0.62 | \$0.13 | \$0.26 |
| 1982 | \$1.25 | \$0.57 | \$0.12 | \$0.32 |
| 1983 | \$1.13 | \$0.39 | \$0.11 | \$0.28 |
| 1984 | \$1.20 | \$0.45 | \$0.11 | \$0.24 |
| 1985 | \$1.08 | \$0.48 | \$0.20 | \$0.31 |
| 1986 | \$0.88 | \$0.52 | \$0.15 | \$0.27 |
| 1987 | \$1.11 | \$0.57 | \$0.20 | \$0.33 |
| 1988 | \$1.26 | \$1.13 | \$0.19 | \$0.39 |
| 1989 | \$0.73 | \$0.43 | \$0.10 | \$0.18 |
| 1990 | \$1.01 | \$0.50 | \$0.75 ^a | \$0.23 |
| 1991 | ^b \$0.87 | \$0.36 | - | \$0.27 |
| 1992 | ^c \$0.66 | \$0.33 | \$0.16 | \$0.22 |
| 1993 | ^d \$0.72 | \$0.22 | \$0.15 | \$0.24 |
| 1994 | \$1.02 | \$0.52 | \$0.15 | \$0.29 |
| 1995 | \$0.66 | \$0.43 | \$0.18 | \$0.18 |
| 1996 | \$0.54 | \$0.28 | \$0.10 | \$0.08 |
| 1997 | \$1.00 | \$0.47 | \$0.06 | \$0.11 |

^a Price paid per pound of roe.

^b Price paid for coho and chum roe was \$3.00 per pound.

^c Price paid for coho roe was \$1.50 per pound.

^d Price paid for coho roe was \$1.76 per pound and \$0.40 per pound for sockeye

Appendix Table A11. Dollar estimates of Norton Sound District commercial salmon fishery, 1961 - 1997.

| Year | Gross Value of Catch to Fishermen | Wages Earned ^b | License and Tax Revenues to State (License Fees Only) |
|------|-----------------------------------|---------------------------|---|
| 1961 | ^a | ^a | \$2,010.00 |
| 1962 | \$105,800.00 | ^a | \$16,341.00 |
| 1963 | \$104,000.00 | ^a | \$18,009.00 |
| 1964 | \$51,000.00 | ^a | \$11,305.00 |
| 1965 | \$21,483.00 | ^a | \$5,084.00 |
| 1966 | \$68,000.00 | ^a | \$4,680.00 |
| 1967 | \$44,038.00 | \$58,000.00 | \$3,500.00 |
| 1968 | \$63,700.00 | ^a | \$4,000.00 |
| 1969 | \$95,297.00 | \$72,145.00 | ^a |
| 1970 | \$99,019.00 | \$55,100.00 | \$5,595.00 |
| 1971 | \$101,000.00 | \$65,500.00 | \$5,730.00 |
| 1972 | \$102,225.00 | \$68,700.00 | \$7,000.00 |
| 1973 | \$308,740.00 | \$81,000.00 | \$15,400.00 |
| 1974 | \$437,127.00 | \$129,600.00 | \$20,028.00 |
| 1975 | \$413,255.00 | \$172,800.00 | \$28,230.00 |
| 1976 | \$285,283.00 | ^a | \$10,133.00 |
| 1977 | \$528,610.00 | ^a | \$11,386.00 |
| 1978 | \$814,221.00 | ^a | \$12,002.00 |
| 1979 | \$876,547.00 | ^a | \$11,780.00 |
| 1980 | \$583,388.00 | ^a | \$11,640.00 ^c |
| 1981 | \$758,471.00 | ^a | \$11,940.00 |
| 1982 | \$988,588.00 | ^a | \$7,155.00 ^{c,d} |
| 1983 | \$1,038,967.00 | ^a | \$10,700.00 ^c |
| 1984 | \$721,055.00 | ^a | \$9,690.00 ^c |
| 1985 | \$822,056.00 | ^a | \$5,820.00 ^e |
| 1986 | \$539,576.00 | ^a | \$5,970.00 ^e |
| 1987 | \$504,631.00 | ^a | \$5,940.00 ^e |
| 1988 | \$754,751.00 | ^a | \$10,050.00 ^{e,f} |
| 1989 | \$274,817.00 | ^a | \$10,300.00 ^e |
| 1990 | \$497,623.00 | ^a | \$10,350.00 ^e |
| 1991 | \$425,430.00 | ^a | \$10,250.00 ^e |
| 1992 | \$448,395.00 | ^a | \$10,200.00 ^e |
| 1993 | \$322,117.00 | ^a | \$8,835.00 ^e |
| 1994 | \$864,882.00 | ^a | \$10,000.00 ^e |
| 1995 | \$356,912.00 | ^a | \$5,250.00 ^e |
| 1996 | \$340,347.00 | ^a | \$4,300.00 ^e |
| 1997 | \$363,907.48 | ^a | \$5,100.00 ^e |

^a Information not available.

^b Includes wages paid to tender boat operators, processing plant employees in district.

^c Includes only permit renewals and vessel license fees.

^d The Alaska state legislature lowered all resident permit renewal fees and vessel license fees to poverty level fees for 1982.

^e Includes only permit renewal fees.

^f The Alaska state legislature raised resident permit renewal fee to \$50.00 in 1988.

Appendix Table A12. Round weight of commercially caught salmon by species, Norton Sound District, 1961 - 1997.

| Year | Pounds Caught (Round Wt. in Lbs) | | | | Salmon Roe (lbs) |
|-------------------|----------------------------------|---------|-----------|-----------|------------------|
| | Chinook | Coho | Pink | Chum | |
| 1961 | 120,405 | 96,649 | 102,711 | 347,990 | |
| 1962 ^a | 157,000 | - | 10,569 | 221,645 | |
| 1963 ^a | 89,700 | 51,750 | - | - | |
| 1964 ^a | 39,169 | 686 | - | 249,890 | |
| 1965 | 33,327 | 14,210 | 660 | 264,924 | ^b |
| 1966 | 35,259 | 40,285 | 38,334 | 577,764 | 16,901 |
| 1967 | 41,854 | 15,944 | 100,913 | 289,473 | 21,429 |
| 1968 ^c | 22,954 | 50,665 | 250,044 | 306,871 | 20,381 |
| 1969 | 51,441 | 50,461 | 312,836 | 529,235 | 5,578 |
| 1970 | 38,103 | 25,000 | 156,313 | 610,588 | 1,345 |
| 1971 | 43,112 | 22,078 | 15,377 | 857,014 | 1,122 |
| 1972 | 57,675 | 3,257 | 133,389 | 710,853 | 1,083 |
| 1973 | 38,935 | 63,812 | 185,799 | 845,596 | ^b |
| 1974 | 54,433 | 15,023 | 511,737 | 1,082,575 | 39,876 |
| 1975 | 25,964 | 32,345 | 87,586 | 1,318,111 | 46,470 |
| 1976 | 34,095 | 49,822 | 271,867 | 669,728 | ^b |
| 1977 | 102,341 | 28,044 | 162,457 | 1,415,981 | ^b |
| 1978 | 222,974 | 50,872 | 1,164,174 | 1,389,806 | ^b |
| 1979 | 231,988 | 251,129 | 598,785 | 1,001,548 | ^b |
| 1980 | 135,646 | 204,498 | 719,368 | 1,301,693 | ^b |
| 1981 | 164,182 | 212,065 | 719,102 | 1,284,193 | ^b |
| 1982 | 97,255 | 648,212 | 659,171 | 1,338,788 | 95 |
| 1983 | 179,666 | 360,264 | 274,568 | 2,352,104 | 239 |
| 1984 | 169,104 | 523,310 | 343,685 | 1,020,635 | 0 |
| 1985 | 419,331 | 169,413 | 11,458 | 939,885 | 0 |
| 1986 | 133,161 | 247,333 | 133,319 | 1,011,824 | 0 |
| 1987 | 141,494 | 177,569 | 6,691 | 731,597 | 0 |
| 1988 | 67,148 | 280,658 | 226,966 | 767,168 | 0 |
| 1989 | 104,829 | 336,652 | 439 | 297,156 | 0 |
| 1990 | 168,745 | 426,902 | - | 482,060 | 75 |
| 1991 | 107,541 | 469,495 | - | 597,272 | 221 |
| 1992 | 57,571 | 820,406 | 18,230 | 595,345 | 2,641 |
| 1993 | 151,504 | 287,702 | 406,820 | 347,072 | 2,608 |
| 1994 | 98,492 | 102,140 | 2,185,066 | 122,540 | 0 |
| 1995 | 174,771 | 356,190 | 198,121 | 290,445 | 0 |
| 1996 | 95,794 | 573,372 | 1,196,115 | 84,349 | 0 |
| 1997 | 225,136 | 235,517 | 50 | 253,006 | 880 |

^a Does not include canned salmon cases [48#]

1962: 29 chinook, 883 coho, 927 pink, 12459 chum

1963: 604 chinook, 808 coho, 1,918 pink, 13,308 chum

1964: 75 chinook, 452 pink, 9,357 chum

^b Information not available.

^c Includes about 48,000 lbs of salted coho, about 150,000 lbs. of salted pink, and 150,000 lbs of salted chum.

^d Includes about 598 lbs. of salted chinook, about 48,092 lbs. of salted pink and about 117,664 lbs. salted chum.

Appendix Table A13. Comparative salmon escapement indexes of Norton Sound streams, 1961-1997^a.

| Year | Chinook | Chum | Pink & Chum ^b | | Coho |
|----------------|----------------|--------------------|--------------------------|-------------------|--------------------|
| | | | Pink | Chum ^b | |
| Sinuk River | | | | | |
| 1975 | - | 4,662 | 5,390 | - | - |
| 1977 | - | 5,207 | 1,302 | - | - |
| 1978 | - | 8,756 | 22,435 | - | - |
| 1980 | 3 | 2,022 | 199,000 | - | 1,002 |
| 1981 | - | 5,579 | 350 | - | - |
| 1982 | - | 638 | 148,800 | - | - |
| 1983 | 48 | 2,150 | 10,770 | - | 96 |
| 1984 | 7 ^h | 493 ^h | 284,400 ^h | - | 192 |
| 1985 | 4 | 1,910 | 8,860 | - | 33 |
| 1986 | 4 | 1,960 | 28,690 | - | - |
| 1987 | 5 | 4,540 | 30 | - | 230 |
| 1988 | 3 | 2,070 | 4,852 ^f | - | 563 |
| 1989 | - | 1,025 | 26,850 | - | 75 |
| 1990 | - | 95 | 29,040 | - | 161 |
| 1991 | 3 | 5,420 | 14,680 | - | 701 |
| 1992 | - | 470 | 292,400 | - | 422 |
| 1993 | 7 | 1,570 | 5,120 | - | 104 |
| 1994 | 10 | 1,140 | 492,000 | - | 307 |
| 1995 | - | 3,110 | 1,250 | - | 290 |
| 1996 | 5 | 1,815 | 74,100 | - | 367 |
| 1997 | - | 2,975 | 1,200 | - | 57 |
| Nome River | | | | | |
| 1971 | - | 75 | 7,765 | - | - |
| 1972 | - | 710 | 14,960 | - | - |
| 1973 | 6 | 1,760 | 14,940 | - | - |
| 1974 | - | 854 | 17,832 | - | - |
| 1975 | 1 | 2,161 | 3,405 | - | - |
| 1977 | 5 | 3,046 | 1,726 | - | - |
| 1978 | 2 | 5,242 | 34,900 | - | - |
| 1980 | 5 | - | - | 179,095 | 920 |
| 1981 | 15 | 1,195 | 12,565 | - | - |
| 1982 | - | 700 | 327,570 | - | - |
| 1983 | 2 | 198 | 9,170 | - | 365 |
| 1984 | - | 2,084 ^h | 178,870 | - | 839 |
| 1985 | 7 | 1,967 | 2,250 | - | 242 |
| 1986 | 2 | 1,150 | 13,580 | - | - |
| 1987 | 3 | 1,646 | 1,400 ^h | - | 419 |
| 1988 | 3 | 973 | 2,490 ^f | - | 1,280 ^h |
| 1989 | 2 | 72 | 1,365 | - | 375 |
| 1990 | - | 541 | 13,085 | - | 617 |
| 1991 | 9 | 3,520 | 4,690 | - | 611 |
| 1992 | 3 | 813 | 255,700 | - | 691 |
| 1993 | 8 | 1,520 | 8,941 | - | 276 ^h |
| 1994 | 2 | 350 | 265,450 | - | 631 ^h |
| 1995 | - | 1,855 | 182 | - | 517 |
| 1996 | - | 799 | 34,520 | - | 723 |
| 1997 | 4 | 958 | 65 | - | 544 |
| Flambeau River | | | | | |
| 1976 | - | 375 | 1,994 | - | - |
| 1977 | - | 1,275 | 10 | - | - |
| 1978 | - | 7,110 | - | - | - |
| 1979 | - | 283 | 291 | - | - |
| 1980 | - | - | - | 29,190 | - |
| 1981 | 1 | 12,031 | 2,710 | - | - |
| 1982 | 1 | 5,097 | 25,001 | - | - |
| 1983 | 2 | 1,195 | 200 | - | - |
| 1984 | 1 | 3,150 ^h | 20,200 ^h | - | - |
| 1985 | 1 | 3,215 | 260 | - | - |
| 1986 | 2 | 3,075 | 300 | - | - |
| 1987 | 0 | 115 | 0 | - | - |
| 1988 | 3 | 765 | 10 | - | - |
| 1989 | - | - | - | - | - |
| 1990 | - | - | - | - | - |
| 1991 | 2 | 1,564 | 570 | - | - |
| 1992 | - | 608 | 160 | - | - |
| 1993 | - | 1,590 | - | - | - |
| 1994 | 1 | 4,968 | 290 | - | - |
| 1995 | - | 6,455 | 350 | - | 68 |
| 1996 | - | 5,395 | - | - | - |
| 1997 | 1 | 627 | - | - | 96 |

-Continued-

Appendix Table A13. (page 2 of 5)

| Year | Chinook | Chum | Pink | Pink & Chum ^b | Coho |
|-------------------|-----------------|---------------------|-------------------------|--------------------------|-------|
| Eldorado River | | | | | |
| 1974 | 13 | 2,143 | 6,185 | - | - |
| 1977 | - | 1,835 | 125 | - | - |
| 1978 | - | 10,125 | 12,800 | - | - |
| 1980 | 6 | 9,900 | 55,520 | - | - |
| 1981 | - | 15,605 | 495 | - | - |
| 1982 | 2 | 1,095 | 163,300 | - | - |
| 1983 | 11 | 994 | 270 | - | 100 |
| 1984 | 14 ⁱ | 4,361 ^{g1} | 1,924,935 ^{g1} | - | 261 |
| 1985 | 8 | 6,090 | 150 | - | 67 |
| 1986 | 9 | 3,490 | 18,200 | - | - |
| 1987 | 6 | 3,860 | 0 | - | 106 |
| 1988 | 17 | 2,645 | 1,045 | - | 76 |
| 1989 | - | 350 | 1,550 | - | 67 |
| 1990 | 17 | 884 | 2,050 | - | 44 |
| 1991 | 76 | 5,755 | 1,590 | - | 98 |
| 1992 | - | 4,887 | 6,615 | - | 113 |
| 1993 | 38 | 2,885 | 120 | - | 110 |
| 1994 | 2 | 5,140 | 53,890 | - | 242 |
| 1995 | - | 9,025 | 50 | - | 247 |
| 1996 | 21 | 23,820 | 40,100 | - | 254 |
| 1997 | 40 | 5,967 | 10 | - | 37 |
| Fish River | | | | | |
| 1961 | 1 | - | - | 14,100 | - |
| 1962 | 48 | - | - | 28,918 | - |
| 1963 | 21 | - | - | 25,728 | - |
| 1964 | - | 18,670 | 10,935 | 14,550 | - |
| 1966 | 7 | - | - | 17,955 | - |
| 1967 | 20 | - | - | 13,610 | - |
| 1968 | 10 | - | - | 164,000 | - |
| 1969 | - | 2,080 | 124,000 | - | - |
| 1970 | 33 | 76,550 | 198,000 | - | - |
| 1971 | 1 | 13,185 | 1,670 | - | - |
| 1972 ^b | - | 3,616 | 13,050 | - | - |
| 1973 | 31 | 6,887 | 15,564 | - | - |
| 1974 | 7 | 10,945 | 15,690 | - | - |
| 1975 | 26 | 20,114 | 15,840 | - | - |
| 1976 | 1 | 8,390 | 15,850 | 8,550 | - |
| 1977 | 9 | 9,664 | 2,430 | - | - |
| 1978 | 29 | 26,797 | 140,640 | - | - |
| 1979 | 11 | 6,893 | 9,132 | - | - |
| 1980 | - | 19,100 | 33,500 | - | - |
| 1981 | 90 | 24,095 | 450 | - | - |
| 1982 | - | - | - | 241,700 | - |
| 1983 | 87 | 20,037 | 300 | - | - |
| 1984 | 42 | - | - | 293,245 | - |
| 1985 | 303 | 21,080 | 7,365 | - | - |
| 1986 | 200 | 25,190 | 140 | - | - |
| 1987 | 193 | 7,886 | 0 | - | - |
| 1988 | 36 | 1,240 | 29,950 ⁱ | - | - |
| 1989 | - | - | - | - | - |
| 1990 | - | - | - | - | - |
| 1991 | 58 | 10,190 | 51,190 | - | - |
| 1992 | 4 | 390 | 1,387,000 | - | - |
| 1993 | 48 | 12,695 | 13,440 | - | - |
| 1994 | 55 | 16,500 | 910,000 | - | - |
| 1995 | 40 | 13,433 | 780 | - | 1,829 |
| 1996 | 189 | 5,840 ⁱ | 684,780 | - | - |
| 1997 | 110 | 19,515 | 800 | - | 465 |

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Appendix Table A13 (page 3 of 5)

| Year | Chinook | Chum | Pink | Pink & Chum ^b | Coho |
|-------------------|---------|--------|-----------|-----------------------------|--------------------|
| Boston Creek | | | | | |
| 1963 | 67 | 1,669 | - | - | - |
| 1964 | 10 | 3,315 | - | - | - |
| 1966 ^f | 153 | 761 | - | - | - |
| 1968 | 7 | 2,500 | 2,500 | - | - |
| 1969 | 100 | 7,000 | 16,000 | - | - |
| 1970 | 246 | 8,200 | 12,900 | - | - |
| 1971 | 42 | 7,045 | 80 | - | - |
| 1972 | 57 | 4,252 | 3,950 | - | - |
| 1973 | 153 | 3,014 | 3,213 | - | - |
| 1974 | 231 | 2,426 | 749 | - | - |
| 1975 | 147 | 1,885 | 2,556 | - | - |
| 1977 | 76 | 1,325 | 385 | - | - |
| 1978 | 136 | 2,655 | 74,221 | - | - |
| 1979 | 58 | 882 | 271 | - | - |
| 1980 | 16 | 2,450 | 1,510 | - | - |
| 1982 | 10 | 1,730 | 22,020 | - | - |
| 1983 | 154 | 704 | - | - | - |
| 1984 | 35 | - | - | 47,850 | - |
| 1985 | 243 | 3,450 | - | - | - |
| 1986 | 2 | 220 | 0 | - | - |
| 1987 | 583 | 3,640 | 0 | - | - |
| 1988 | 163 | 1,040 | 7,400 | - | - |
| 1989 | - | - | - | - | - |
| 1990 | - | 1,455 | 8,440 | - | - |
| 1991 | 152 | 2,550 | 3,210 | - | - |
| 1992 | 68 | 1,540 | 803,200 | - | - |
| 1993 | 227 | 4,513 | 1,930 | - | - |
| 1994 | 95 | 4,270 | 355,600 | - | - |
| 1995 | 78 | 4,221 | - | - | 230 |
| 1996 | 133 | 3,505 | 35,980 | - | - |
| 1997 | 452 | 4,545 | - | - | - |
| Niukluk River | | | | | |
| 1962 | 11 | - | - | 27,679 | - |
| 1963 | 1 | 13,687 | 4,103 | - | - |
| 1964 | - | 8,395 | 10,495 | - | - |
| 1966 | - | 21,300 | 8,600 | 4,700 | - |
| 1967 | - | 20,546 | - | - | - |
| 1968 | - | - | - | 87,085 | - |
| 1969 | - | 10,240 | 92,650 | - | - |
| 1970 | - | 7,300 | 60,350 | - | - |
| 1971 | - | 22,605 | 8,370 | - | - |
| 1972 ^f | - | 10,500 | 22,800 | - | - |
| 1973 | - | 14,365 | 14,790 | - | - |
| 1974 | 1 | 8,720 | 8,915 | - | - |
| 1975 | - | 10,089 | 16,258 | - | - |
| 1978 | - | 4,130 | 7,190 | - | - |
| 1977 | 19 | 10,456 | 4,150 | - | - |
| 1978 | 2 | 14,365 | 208,300 | - | - |
| 1979 ^g | 8 | 10,127 | 30,147 | - | - |
| 1980 | - | 8,915 | 75,770 | - | - |
| 1981 | - | 7,249 | - | - | - |
| 1982 | 20 | 2,557 | 227,540 | - | - |
| 1983 | 54 | 8,886 | 50 | - | - |
| 1984 ^h | 6 | - | - | 57,208 | 3,072 |
| 1985 | 25 | 11,140 | - | - | 332 ^k |
| 1986 | 2 | 2,442 | 0 | - | - |
| 1987 | 10 | 4,145 | 0 | - | 257 ^k |
| 1988 | 18 | 6,501 | 8,760 | - | 1,095 ^k |
| 1989 | - | - | - | - | 182 |
| 1990 | - | 6,200 | - | - | 170 |
| 1991 | 24 | 10,660 | 37,410 | - | 1,783 |
| 1992 | - | 7,770 | 803,200 | - | 812 |
| 1993 | 15 | 19,910 | 2,840 | - | 2,104 |
| 1994 | 7 | 16,470 | 1,294,100 | - | 274 |
| 1995 | 48 | 25,358 | 200 | - | 2,136 |
| 1996 | 25 | 9,732 | 153,150 | - | 2,047 |
| 1997 | 131 | 16,550 | - | - | 983 |

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Appendix Table A13. (page 4 of 5)

| Year | Chinook | Chum | Pink | Pink & Chum ^b | Coho |
|---------------------|----------------------------------|--------|-----------|-----------------------------|-------|
| Kwiniuk River | | | | | |
| 1962 | 3 | | | 23,249 | |
| 1963 | 2 | 11,340 | 3,779 | | |
| 1964 | | 14,533 | | | |
| 1965 ^a | 14 | 26,634 | 8,301 | | |
| 1966 ^a | 7 | 32,786 | 10,629 | | |
| 1967 ^a | 13 | 24,444 | 3,508 | | |
| 1968 ^a | 27 | 18,813 | 126,764 | | |
| 1969 ^a | 12 | 19,687 | 56,683 | | |
| 1970 ^a | | 68,004 | 236,131 | | |
| 1971 ^a | 37 | 39,046 | 16,742 | | |
| 1972 ^a | 65 | 30,686 | 62,461 | | |
| 1973 ^a | 57 | 28,617 | 38,420 | | |
| 1974 ^a | 62 | 35,899 | 40,816 | | |
| 1975 ^a | 44 | 14,344 | 57,317 | | |
| 1976 ^a | 12 | 6,977 | 29,471 | | |
| 1977 ^a | 84 | 22,757 | 46,234 | | |
| 1978 ^{a,d} | 74 | 14,408 | 72,270 | | |
| 1979 ^a | 107 | 12,365 | 187,492 | | |
| 1980 ^a | 177 | 19,374 | 320,389 | | |
| 1981 ^a | 136 | 34,561 | 566,417 | | |
| 1982 ^a | 138 | 44,036 | 469,674 | | |
| 1983 ^a | 267 | 56,907 | 251,965 | | |
| 1984 ^a | 736 | 54,043 | 736,544 | | 983 |
| 1985 ^a | 712 | 9,912 | 22,548 | | 673 |
| 1986 ^a | 653 | 24,704 | 241,446 | | 421 |
| 1987 ^a | 314 | 16,134 | 5,567 | | 819 |
| 1988 ^a | 321 | 13,301 | 187,904 | | 444 |
| 1989 ^a | 282 | 13,689 | 30,275 | | |
| 1990 ^a | 744 | 13,735 | 404,452 | | 746 |
| 1991 ^a | 587 | 18,802 | 54,591 | | 809 |
| 1992 ^a | 479 | 12,077 | 1,464,717 | | 532 |
| 1993 ^a | 565 | 15,823 | 43,065 | | 1,238 |
| 1994 ^a | 627 | 33,010 | 2,303,112 | | 2,841 |
| 1995 ^a | 468 | 42,161 | 17,573 | | 1,625 |
| 1996 ^a | 567 | 27,256 | 937,736 | | 1,410 |
| 1997 ^a | 972 | 20,118 | 9,536 | | 610 |
| Tubutulik River | | | | | |
| 1962 | 3 | | | 16,690 | |
| 1963 | 9 | 16,069 | 4,365 | | |
| 1964 | | 15,469 | 10,043 | 3,420 | |
| 1966 | | 5,514 | 26,000 | | |
| 1967 | 1 | | | 22,475 | |
| 1969 | 3 | 12,040 | 12,788 | 3,045 | |
| 1970 | | 53,290 | 136,590 | | |
| 1971 | | 16,820 | 7,500 | 5,065 | |
| 1972 ^a | | 8,070 | 21,100 | | |
| 1973 | 131 | 5,383 | 15,665 | | |
| 1974 | 136 | 9,560 | 17,940 | | |
| 1975 | 7 | 17,141 | 38,003 | | |
| 1976 | | 1,095 | 6,095 | 2,600 | |
| 1977 | | 8,540 | 4,685 | | |
| 1978 | 2 | 5,865 | 1,364 | | |
| 1979 | | 812 | 1,624 | | |
| 1980 ^a | 405 | 21,616 | 663,937 | | |
| 1981 | | | | | |
| 1982 ^a | 49 | 2,044 | 53,605 | | |
| 1983 | 135 | 16,345 | 40,790 | | |
| 1984 | 139 | 56,210 | 93,600 | | |
| 1985 | 472 | 13,645 | 18,940 | | |
| 1986 | 453 | 5,975 | 35,680 | | |
| 1987 | 474 | 9,605 | 580 | | |
| 1988 | 961 | 4,660 | 114,450 | | |
| 1989 ^a | | | | | |
| 1990 | 397 | 4,350 | 186,400 | | |
| 1991 | 561 | 7,085 | 26,870 | | |
| 1992 | 260 | 2,595 | 138,600 | | |
| 1993 | 1,061 | 8,740 | 18,650 | | 1,398 |
| 1994 | No survey due to poor conditions | | | | |
| 1995 | 377 | 16,158 | 4,020 | | 930 |
| 1996 | 439 | 10,790 | 226,750 | | |
| 1997 | 1,946 | 3,105 | 16,890 | | |

-Continued-

Appendix Table A13. (page 5 of 5)

| Year | Chinook | Chum | Pink | Pink & Chum ^b | Coho |
|-------------------|----------------------------------|------------------|----------------------|-----------------------------|------------------|
| | | | North River | | |
| 1962 | 162 | - | - | 16,087 | - |
| 1963 ^c | 287 | - | - | 73,274 | - |
| 1964 | 23 | - | - | 5,981 | - |
| 1965 | 153 | - | - | 16,600 | - |
| 1970 ^c | 1 | 20,655 | 12,400 | - | - |
| 1971 ^c | 256 | - | - | 1,047 | - |
| 1972 ^d | 561 | 2,332 | 54,934 | - | - |
| 1973 ^d | 298 | 4,332 | 26,542 | - | - |
| 1974 ^d | 220 | 861 | 154,285 | - | - |
| 1975 ^c | 60 | 5,237 | 17,885 | - | - |
| 1976 ^c | 66 | 196 | 10,606 | - | - |
| 1977 | 1,275 | 8,139 | 4,565 | - | - |
| 1978 | 321 | 9,349 | 21,813 | - | - |
| 1979 | 735 | 1,130 | 9,500 | - | - |
| 1980 | 61 | 2,300 | 127,900 | - | 204 |
| 1981 | 68 | 405 | 575 | - | 263 |
| 1982 | 8 | 599 | 173,352 | - | 4,145 |
| 1983 | 347 | 4,135 | 4,980 | - | - |
| 1984 ^d | 2,844 | 2,915 | 458,387 | - | 152 ^f |
| 1985 ^d | 1,426 | 4,567 | 4,360 | - | 2,045 |
| 1986 ^d | 1,613 | 3,738 | 236,487 | - | - |
| 1987 | 445 | 392 | 0 | - | 680 |
| 1988 | 202 | 30 | 112,770 ^f | - | 240 |
| 1989 ^c | - | - | - | - | - |
| 1990 | 255 | 510 | 25,685 | - | - |
| 1991 | 656 | 2,435 | 118,720 | - | 2,510 |
| 1992 | 329 | - | 631,140 | - | 398 |
| 1993 | 900 | 445 | 13,570 | - | 1,397 |
| 1994 | No survey due to poor conditions | | | | |
| 1995 | 622 | 1,370 | 18,300 | - | 690 ^g |
| 1996 | 106 | 220 ^f | 125,500 | - | 917 |
| 1997 | 1,605 | 9,045 | 17,870 | - | - |

^a Represents "high count" for season.

^b Surveyor unable to distinguish between the two species.

^c Poor survey conditions or partial survey, poor counting tower conditions.

^d Total counts obtained from counting tower.

^e Combined tower and aerial survey counts below the tower.

^f Aerial survey, not tower count.

^g Helicopter survey.

^h Boat survey.

ⁱ Foot survey.

^j Includes counts from Casadepaga and Ophir Creeks.

^k Includes counts from Ophir Creek.

^l Numerous pink salmon made enumerating of chum salmon difficult; pink count may include some chum.

PORT CLARENCE DISTRICT

District Boundaries

The Port Clarence District encompasses all waters from Cape Douglas north to Cape Prince of Wales including the Salmon Lake and Pilgrim River drainage (Figure 2). Salmon, saffron cod, whitefish and herring are the major subsistence species; however, other fishery resources are also utilized.

Commercial Fishery

Commercial salmon fishing in this district has been prohibited since 1967. In 1966 a total of 1,216 salmon consisting of 93 sockeye, 131 pinks and 922 chums was taken commercially in the Grantley Harbor/Tuksuk Channel area. A few salmon are sold or bartered each year in Teller and Nome. Due to the relatively small runs in this area and the existence of an important subsistence fishery, commercial salmon fishing has not been reopened.

Subsistence Fishery

A traditional subsistence salmon fishery has probably occurred within this district for centuries; however, subsistence fishing has only been reported at Salmon Lake since the 1930's and monitored at the upper Pilgrim River since 1962. Data collected by Department personnel has indicated a majority of the fishermen of Brevig Mission fish the northern and northeastern sections of Port Clarence, while Teller fishermen utilize Grantley Harbor and Tuksuk Channel. Interviews with local residents have also indicated substantial fishing effort within the Agiapuk River. Village subsistence surveys had been conducted annually by the Division of Commercial Fisheries up until 1983 (Appendix Table B1). Subsistence Division conducted a partial survey of Brevig Mission in 1989. The department has conducted full-scale household surveys of both villages since 1994.

Salmon Lake and Pilgrim River stocks have been utilized by Nome residents in addition to those of Brevig Mission and Teller. The Alaska Board of Fisheries adopted a regulation in 1972 that closed Salmon Lake and tributaries to subsistence salmon fishing from July 15 through August 31 to conserve declining sockeye salmon stocks. Subsistence salmon fishing permits are required for the Pilgrim and Kuzitrin Rivers. Beginning in the 1991 season, an increase was observed in the number of subsistence permits issued to Nome residents intending to fish in the area. This was due in part to a strong sockeye salmon return. Another reason was the extensive subsistence fishing closures in the Nome area that made the Pilgrim River an alternative location to obtain their subsistence needs. In 1997, 17 households requested permits for this area (Table 2). Some subsistence salmon fishing by Nome residents in the Port Clarence District may not be documented by household surveys or permit data. Permits are required only on the Pilgrim River.

The 1997 estimated subsistence salmon harvest in Port Clarence District was 7,019 fish. This was 35 to 55 percent lower than the annual subsistence salmon harvest for 1994-96. Of the total harvest, 2.3 percent were chinook, 29.9 percent were chum salmon, 10.8 percent were pink, 45.3 percent were sockeye, and 11.8 percent were coho. A summary of the subsistence salmon harvest estimates by community is presented in Table 10.

The estimated mean harvest in the Port Clarence District was 43 salmon per household, which included 1.0 chinook, 12.9 chum, 4.6 pink, 19.5 sockeye, and 5.1 coho. Brevig Mission had a mean household harvest of 49 fish and Teller had a mean household harvest of 47 fish. Households with Pilgrim River permits harvested a mean of three fish per household.

In the Port Clarence District, 44 percent of households subsistence fished for salmon in 1997. About 14 percent helped other households process subsistence-caught fish. No subsistence caught salmon were reported to be used for dog food. Set gillnets were used by 81 percent of the households to harvest salmon, while rod and reel was used by about 10 percent, and seine nets used by one percent. Less than one percent of the salmon harvest was caught with rod and reel. Approximately 53 percent of the fishing households responded that their chum fishing season was "average" and 36 percent said "poor".

Escapement

Aerial surveys are not typically flown in this district, with the exception of Salmon Lake, due to the low priority assigned to areas which do not support commercial fisheries. Aerial surveys show an increasing trend of sockeye returns to Salmon Lake since 1986 (Appendix Table B2). The 1997 aerial survey count of 8,760 red salmon is the highest on record since 1963. Recent year counts are in the upper end of the range and reflect an increasing population of red salmon.

Table 10. 1997 Port Clarence subsistence salmon harvests.

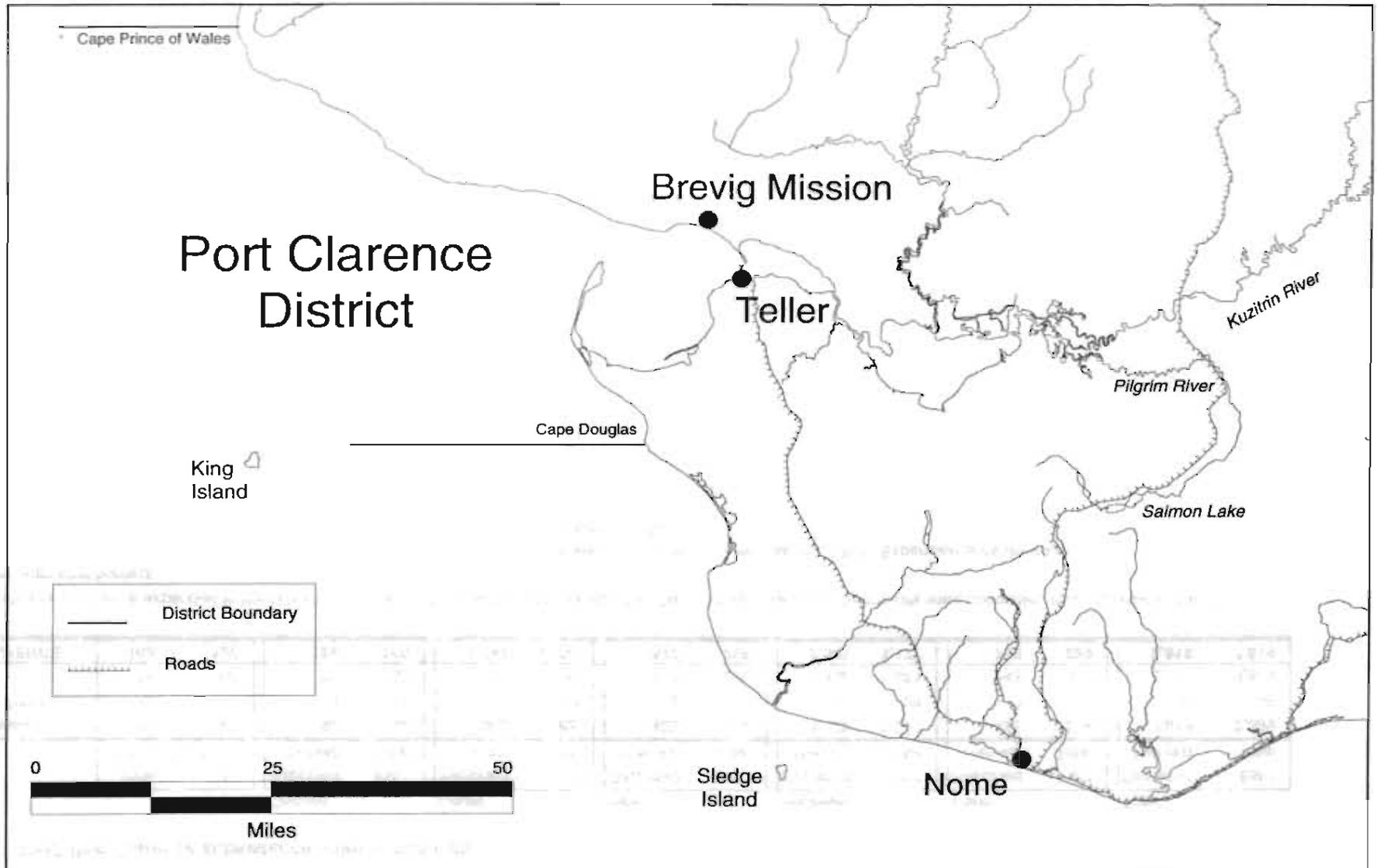
| | Total HH's Contacted | | Chinook | | Chum | | Pink | | Sockeye | | Coho | | Total | |
|---------------------------------|----------------------|-------------|------------------|-------------|------------------|--------------|------------------|-------------|------------------|--------------|------------------|-------------|------------------|--------------|
| | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total |
| Brevig Mission | 70 | 61 | 50 | 56 | 965 | 1,086 | 423 | 476 | 1,126 | 1,267 | 455 | 514 | 3,019 | 3,399 |
| Pilgrim R. Permits ¹ | 17 | 9 | 0 | 0 | 8 | 13 | 2 | 3 | 18 | 29 | 0 | 0 | 28 | 46 |
| Teller | 76 | 56 | 79 | 102 | 769 | 1,000 | 217 | 276 | 1,458 | 1,881 | 248 | 316 | 2,771 | 3,574 |
| PORT CLARENCE | 163 | 126 | 129 | 158 | 1,742 | 2,099 | 642 | 755 | 2,602 | 3,177 | 703 | 829 | 5,818 | 7,019 |

* Data from households were expanded to households not contacted. If less than 30 and less than 50% of households in a community were contacted, then reported harvest is used for estimated harvest.

¹ Alaska Department of Fish and Game, Division of Commercial Fisheries Management and Development, permit returns, 1997. Expansion is by drainage.

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, household surveys, 1997.

Figure 2. Port Clarence Salmon District



Appendix Table B1. Subsistence surveys conducted in Port Clarence District 1963 - 1997.

| Year | Number of Fishing Families | | | | | | Total |
|-------------|----------------------------|---------|---------|-------|-------|-------|--------|
| | Interviewer | Chinook | Sockeye | Coho | Pink | Chum | |
| 1963 | 19 | 9 | 4,866 | 25 | 1,061 | 1,279 | 7,240 |
| 1964 | 22 | 17 | 1,475 | 227 | 371 | 1,049 | 3,139 |
| 1965 | 29 | 36 | 1,804 | 639 | 1,854 | 1,602 | 5,935 |
| 1966 | 26 | 10 | 1,000 | 896 | 859 | 2,875 | 5,640 |
| 1967 | 19 | 12 | 2,068 | 232 | 767 | 1,073 | 4,152 |
| 1968 | 24 | 40 | 688 | 133 | 1,906 | 904 | 3,671 |
| 1969 | 13 | 2 | 180 | 27 | 548 | 932 | 1,689 |
| 1970 | 18 | 4 | 588 | 1,071 | 1,308 | 4,231 | 7,202 |
| 1971 | 22 | 31 | 850 | 959 | 1,171 | 3,769 | 6,780 |
| 1972 | 8 | 4 | 68 | 388 | 75 | 2,806 | 3,341 |
| 1973 | 4 | 22 | 46 | 280 | 424 | 1,562 | 2,334 |
| 1974 | 13 | - | 28 | 62 | 14 | 2,663 | 2,767 |
| 1975 | 17 | - | 244 | 5 | 743 | 1,589 | 2,581 |
| 1976 | 15 | 7 | 291 | 20 | 436 | 6,026 | 6,780 |
| 1977 | ^a 13 | - | - | - | - | - | 5,910 |
| 1978 | 26 | 1 | 392 | - | 7,783 | 705 | 8,881 |
| 1979 | 26 | - | 320 | 35 | 741 | 1,658 | 2,754 |
| 1980 | 22 | 7 | 3,195 | 5 | 3,170 | 1,715 | 8,092 |
| 1981 | 10 | 8 | 255 | 110 | 765 | 5,845 | 6,983 |
| 1982 | 27 | 23 | 405 | 100 | 4,345 | 684 | 5,557 |
| 1983 | ^b 3 | 17 | 261 | - | 615 | 299 | 1,192 |
| 1984 - 1988 | ^c | | | | | | |
| 1989 | ^d 15 | 28 | 535 | 472 | 395 | 410 | 1,840 |
| 1990 - 1993 | ^c | | | | | | |
| 1994 | ^e 127 | 181 | 1,979 | 1,692 | 3,849 | 2,042 | 9,743 |
| 1995 | ^e 122 | 76 | 4,481 | 1,739 | 3,293 | 6,011 | 15,600 |
| 1996 | ^e 117 | 195 | 4,558 | 2,079 | 2,587 | 1,264 | 10,684 |
| 1997 | ^e 126 | 158 | 3,177 | 829 | 755 | 2,099 | 7,019 |

^a Species composition estimated at 75% chum, 10% pink, 10% sockeye and 5% chinook and coho combined.

^b Data collected from returned catch calendars. Due to low return of calendars and absence of household surveys, the resultant catches are incomplete and not comparable to past years.

^c Surveys not conducted.

^d Survey conducted by Subsistence Division and contacted 15 of 43 households in Brevig Mission.

^e Harvest estimate from Div. of Subsistence survey.

Appendix Table B2. Comparative sockeye salmon aerial survey indices, Port Clarence District, 1963 -1997.

| Year | Salmon | Grand Central | Total |
|-------------------|--------|------------------|--------|
| | Lake | River | |
| 1963 | 866 | 620 | 1,486 |
| 1964 ^c | 76 | 590 | 666 |
| 1965 | 250 | 160 | 410 |
| 1966 | 1,120 | 370 | 1,490 |
| 1967 | 129 | 280 | 409 |
| 1968 ^c | 830 | 645 | 1,475 |
| 1969 | 24 | 171 | 195 |
| 1970 ^a | - | - | - |
| 1971 | 538 | 512 | 1,050 |
| 1972 ^c | 680 | 300 ^b | 980 |
| 1973 | 1,747 | 607 | 2,354 |
| 1974 | 820 | - | 820 |
| 1975 | 537 | 123 | 660 |
| 1976 | 132 | 22 | 154 |
| 1977 | 317 | 235 | 552 |
| 1978 | 822 | 280 | 1,102 |
| 1979 | 1,250 | 261 | 1,511 |
| 1980 ^c | 512 | 175 | 687 |
| 1983 | 970 | - | 970 |
| 1984 | 445 | 30 | 475 |
| 1985 | 730 | 250 | 980 |
| 1986 | 2,125 | 160 | 2,285 |
| 1987 | 4,040 | 530 | 4,570 |
| 1988 | 1,195 | 6 | 1,201 |
| 1989 | 3,055 | 525 | 3,591 |
| 1990 | 2,834 | 926 | 3,760 |
| 1991 | 3,790 | 1,570 | 5,360 |
| 1992 | 1,500 | ^a | 1,500 |
| 1993 | 2,885 | 216 | 3,092 |
| 1994 | 3,740 | 1,230 | 4,970 |
| 1995 | 5,433 | 628 ^d | 6,061 |
| 1996 | 6,610 | 770 | 7,380 |
| 1997 | 8,760 | 1,520 | 10,280 |

^a No survey made.

^b Boat survey.

^c Poor survey.

^d Early count

KOTZEBUE SOUND DISTRICT

History

The Kotzebue Sound District supports the northernmost commercial salmon fishery in Alaska (Figure 3). The Kotzebue District is divided into three subdistricts. Subdistrict 1 has six statistical areas where the commercial salmon fishing occurs (Figure 4).

The recent commercial fishery opened under state management in 1962. Salmon harvests consist primarily of chum salmon although limited amounts of Dolly Varden and a few chinook salmon are harvested as well. There are 215 commercial permit holders, of which an average of 124 were active over the ten year period 1988 to 1997. Eighty-seven percent of the permittees are residents of the district and 99 percent are residents of the state.

The earliest documented sales of salmon in the Kotzebue District were in 1909 when Lockhart's store purchased 21,906 pounds of salmon from local Native Alaskans and resold it at \$0.05/lb. Of that, 21,366 pounds were sold to gold miners on the Kobuk River drainage and 540 pounds were sold to a company in Seattle. A commercial fishery occurred from 1914 to 1918. Salmon were canned and the bulk of the harvest was thought to have been sold to miners working in the upper Kobuk River drainage. The next organized commercial fishery began under state management in 1962 and continues to the present. The current fishery became fully developed in the mid-1970s. The fishery displayed a gradually declining pattern of overall run strength with four year cycles of stronger returns followed by weaker returns. In 1987, the fisheries managers began a rebuilding program with an emphasis on attaining escapement goals. Prior to 1987, harvest had been proportional to total return. During the last few years, poor market conditions have caused harvests to fall short of their potential and consequently escapements have been very strong.

General Information

Each commercial fisherman is limited to 150 fathoms of gear. These gillnets are generally operated as a single unit of gear, although the nets are occasionally broken down to single 50 fathom shackles. Most gillnets are made of 5-7/8 inch stretched measure multifilament web. Fishermen generally operate with one end on or near shore and with all three shackles connected. Fishermen also set in deeper channels in the mud flats further out from shore.

Primary fishery management objectives were to provide adequate chum salmon escapement through the commercial fishery: (1) to ensure sustained runs by allowing adequate natural escapement, and (2) to meet subsistence harvest needs. Fishery management depended on comparing period and cumulative season catch rates to that of previous years. A comparison of catch rates over the history of the fishery has shown a close relationship to the total run strength. Because of a lack of trained personnel, the Noatak River sonar was not in operation in 1997.

Noatak R. sonar escapement counts had been used with strong consideration in the management of the final third of the season.

Age composition of the catch was also closely monitored to determine the strength of age classes in the return. Older salmon tend to migrate into freshwater first, a fact that affects catch rate as the season progresses and influences the fishery manager's evaluation of the catch statistics. Weak 4-year-old age classes tend to depress mid-season catches (Table 13, Figure 7).

1997 Commercial Season Summary

A preseason meeting was held with fishermen in coordination with an Arctic-Yukon-Kuskokwim (AYK) chum salmon marketing seminar to discuss inseason management. Fishermen were told that management strategy would be similar to recent years as long as escapements were being achieved. This would ensure a consistent marketable quality flesh. The marketing portion of the meeting stressed quality. With good quality and the currently low salmon prices, previously closed markets now may be able to afford fresh and frozen salmon.

The Kotzebue Sound commercial salmon season was opened July 10 by emergency order as established by regulation. Generally, the first three periods are scheduled to be 24 hours in length to assess the early portion of the run as there are no other indicators. There are normally two openings per week beginning on Monday and Thursday. However, with the demand for higher quality, limited markets and only one buyer, these openings were shortened. Commercial openings were coordinated between the processor, a single local buyer and the Fish and Game office. Once a fishing period was decided on, the department would fax or call in a Public Service Announcement (PSA) to the local radio station which then would air the announcement.

From the onset of the commercial season, the buyer requested frequent openings and reduced fishing time instead of the long, bi-weekly fishing periods. Also, commercial openings were coordinated with the buyer so fish purchased could be shipped and processed in a timely manner. Scheduling openings with this method kept salmon at a high quality that enabled processors to market Kotzebue chum salmon. A total of thirty-three openings were fished in 1997 for a total of 396 hours. This is very near the historical average total fishing time of 405 hours. Commercial fishing periods were all 12 hours in length during the 1997 season. Because of the low salmon prices, fishermen concentrated their efforts close to Kotzebue (Statistical Area 331-01) to minimize the costs of fuel and oil. Sixty percent of the fish were harvested from this statistical area (Table 12, Figure 4).

The buyer contacted the department concerning the possibility of using an average weight for all chum salmon before the season began. The processor and local buyer were using any means available to reduce the cost of handling fish. The buyer began using the average weight from the first opening, 8.0 pounds, during the second opening. According to Alaska Statute 16.10.270 (a), averaging the individual salmon can be done if the "primary fish buyer and the seller agree in

writing on a sample weighing technique that will fairly determine the average weight of the fish purchased". Fishermen agreed to this and the buyer continued purchasing fish in this manner for the remainder of the season.

Commercial catch statistics from openings on Monday, Tuesday and Wednesday were combined to compare to historical data for the first opening of the week. Statistics from openings on Thursday, Friday and Saturday were combined to compare to historical data for the second opening of the week (Table 13, Figure 6). This was done to compare this year's more frequent openings to historical bi-weekly period data. Commercial fishing periods this year began with 12 hours of fishing time. Because of the very constant rate of catch throughout the season, the length of fishing time never changed. Fishing periods were on Monday, Tuesday, Thursday and Friday from 6:00 a.m. to 6:00 p.m. Occasionally the buyer requested a Wednesday opening. These usually occurred after a poor commercial catch on the preceding day due to poor weather conditions and were allowed.

The commercial harvest in the Kotzebue District during 1997 consisted of 142,720 chum salmon, 45 chinook salmon, and 3,320 Dolly Varden (Table 11). This translates to a total weight of 1,141,741 pounds of chum salmon (average weight 8.0) at \$.16 per pound, 649 pounds of chinook salmon (average weight 14.4) at an average of \$1.02 per pound, and 23,203 pounds of Dolly Varden (average weight 7.0) at an average of \$.20 per pound. This commercial chum harvest was substantially below the projected harvest of 250,000-350,000 salmon. The shortfall was due primarily to a weak market. However, the run strength was probably below average as well. The harvest was well below the 18 year (1979-1996) average of 272,000. The total ex-vessel value was \$187,978 to Kotzebue area fishermen with an average of \$2,764 for each participating permit holder (Appendix Table C3). The buyer packed the fish in ice and flew them out in the round to Anchorage for processing.

There were 68 permits that fished this year. The last two years represent the fewest number of participants since the late 1960's. The low fishing effort is attributed to construction related employment opportunities available in the region and low salmon prices.

Generally, age-5 salmon tend to dominate the early commercial openings with the younger age classes moving through during the middle and latter part of the fishery. In 1997, age-5 salmon dominated the first three-quarters of the season while age-4 salmon dominated the final quarter of the season. The presence of age-6 salmon was 4-5 percent higher than the historical average throughout the season. Only 1987 had a greater abundance of age-6 salmon (11%) than 1997 (10.2%). There was also a small percentage of 7 year old salmon which are normally quite rare. Age-3 salmon remained well below average the entire season. This may be the result of a continuing trend of older fish returning to spawn (Appendix Table C9).

A test fishery occurred for the fifth year on the Kobuk River. Test fish indices were monitored for run strength and timing, providing managers with the only inseason escapement information

in the district. Contact with the Kobuk River subsistence fishermen with fishing sites near Kiana was maintained. No escapement project has operated on the Noatak River since 1994.

Subsistence Season Summary

In the Kotzebue Sound District, household surveys were conducted in the Noatak and Kobuk River villages of Noatak, Noorvik, Kiana, Ambler, Shungnak, and Kobuk. In 1997, a total of 86 percent of households in these communities were surveyed about their subsistence salmon catches. Kotzebue has a population of approximately 3,000 people, and was too large to survey house-to-house in an effective and timely way. Therefore the department assessed subsistence salmon harvests in Kotzebue through a mail-out postcard survey. The post card survey is an abbreviated version of the household survey instrument. It asked if households harvested salmon for subsistence use, the quantities harvested, and type of fishing gear used. About 20 percent of the households receiving the postcard responded and an undetermined number of households that were missed by the postcard survey, especially those who have recently moved to Kotzebue.

The subsistence salmon harvest in the Kotzebue District in 1997 was 60,925 fish (Table 16). Chum salmon made up 95 percent of the catch with the remaining portion a mix of other salmon species, which are present in only small numbers in the district. The 1997 subsistence salmon harvest was 38 to 40 percent lower than the harvest in the two preceding years. Poor weather and mediocre salmon returns contributed to the reduced harvest.

The estimated mean salmon harvest was about 54 salmon per household. This included 0.4 chinook, 51.6 chum, 1.1 pink, 0.5 sockeye, and 0.8 coho. Noorvik had the highest mean household harvest of 122 salmon. Shungnak had a mean household harvest of 97 salmon, Noatak 63 salmon, Kotzebue 44 salmon, Ambler 33 salmon, Kiana 30 salmon, and Kobuk 24 salmon.

In the Kotzebue District, 46 percent of households subsistence fished for salmon in 1997 and about 8 percent assisted other households in processing subsistence-caught salmon. About 33 percent of the subsistence harvest was used for dog food. Set gillnets were used by 77 percent of households for harvesting salmon, while 22 percent of households used rod and reel, 5 percent used seine and 0.1 percent used drift net. Only about four percent of the salmon catch was caught by rod and reel.

In the Kotzebue District, 49 percent of the fishing households responded that their chum salmon fishing season was "average," 30 percent said "very good," and 21 percent said "poor."

Enforcement

A single Fish and Wildlife Protection enforcement officer stationed in Kotzebue conducted patrols via airplane to monitor openings and closures. Occasionally during the openings, patrols were conducted by boat with the Department of Fish and Game employees to check permits, identification cards and helpers licenses. Because of the dedicated presence and participation of enforcement, the fishery was very orderly.

Sikusuilag Hatchery

The total predicted return of hatchery produced chum salmon was 90,000. Forty-seven percent of the commercial catch was sampled with a total of 35 adipose clipped chum salmon found. From the 35 heads sent in, 12 heads were lost and only 2 of the remaining heads were found with tags in them. Both of these tags were from the 1993 brood year. Due to the lack of tag information, no conclusions can be made of the hatchery contribution for 1997.

Escapement

A test fishing project located in Kiana monitored chum salmon run strength and timing into the Kobuk River. The test fish crews in Kiana also visited with subsistence fishermen throughout the season to monitor subsistence catches. As mentioned, previously, no inseason salmon escapement monitoring project was operated on the Noatak River this year.

The test fishing cumulative index of 797 chum salmon per 100 fishermen per hour from the Kobuk River in 1997 indicated escapements were achieved (Table 15, Figure 9). In 1993, a cumulative index of 494 was achieved. That same year, Kobuk River escapement goals by aerial survey under good conditions were just met. This year's cumulative test fish index (797) was roughly 60% greater than 1993's cumulative index. This year's migration timing was longer than average. Even though subsistence catches were some of the earliest recorded, the peak of the Kobuk River test-fishing index did not occur until the final week of the project.

Aerial survey conditions this year were some of the worst in recent years. Aerial surveys in the Kotzebue District typically begin in August. Because of constant cloudy skies and turbid water conditions, surveys were not conducted until the second week of September. Surveys on the lower Kobuk River tributaries (Salmon R., Squirrel R. & Tutuksuk R.) were conducted two weeks past peak spawning. Assessment of the escapements into those tributaries was not possible. A survey on the Upper Kobuk River index area under poor conditions counted roughly 85% of the escapement goal by aerial survey. Escapement goals for this index area were most likely met. (Figure 8). The Noatak River was never surveyed due to poor conditions. Because neither aerial survey nor the main river sonar project was conducted, the department does not know what the escapement levels were into the Noatak River. Some of the earliest subsistence catches of chum salmon were recorded. However, spawn timing of salmon by aerial survey seemed to be normal. This indicates that the run was extended. The Kobuk River test fish also indicated an extended run timing with consistent CPUE was observed throughout the season.

1998 Outlook

The outlook for the 1998 season is based on the returning age classes of the 1997 season. During the 1998 season, the four and five year components of the return are expected to be near average, while the six-year-old component is expected to be above average. The three-year-old component is generally small, and it is assumed to be near average. The commercial harvest is expected to fall within the range of 200,000 to 350,000 chum salmon, if market conditions can accept that level of harvest.

Table 11. Commercial catches of chum salmon, chinook salmon and Dolly Varden by period in the Kotzebue District, 1997. ^a

| Period | Date | Hours Fished | Number of Fishermen | Catch Rate (chum) | Chum | | | Chinook | | | Dolly Varden | | |
|---------------|-----------|--------------|---------------------|-------------------|---------|-----------|----------|---------|--------|----------|--------------|--------|----------|
| | | | | | Number | Pounds | Avg. Wt. | Number | Pounds | Avg. Wt. | Number | Pounds | Avg. Wt. |
| 1 | 10-Jul-97 | 12 | 6 | 13.4 | 967 | 7,736 | 8.0 | 1 | 13 | 13.0 | 1 | 10 | 10.0 |
| 2 | 11-Jul-97 | 12 | 1 | 5.8 | 70 | 560 | 8.0 | 0 | | | 0 | | |
| 3 | 14-Jul-97 | 12 | 10 | 9.5 | 1,135 | 9,080 | 8.0 | 0 | | | 1 | 18 | 18.0 |
| 4 | 15-Jul-97 | 12 | 11 | 11.7 | 1,547 | 12,376 | 8.0 | 0 | | | 0 | | |
| 5 | 17-Jul-97 | 12 | 16 | 21.3 | 4,095 | 32,760 | 8.0 | 2 | 23 | 11.5 | 29 | 188 | 6.5 |
| 6 | 18-Jul-97 | 12 | 18 | 15.4 | 3,337 | 26,696 | 8.0 | 0 | | | 33 | 261 | 7.9 |
| 7 | 21-Jul-97 | 12 | 24 | 18.2 | 5,245 | 41,960 | 8.0 | 4 | 29 | 7.3 | 58 | 349 | 6.0 |
| 8 | 22-Jul-97 | 12 | 24 | 12.8 | 3,684 | 29,472 | 8.0 | 2 | 24 | 12.0 | 31 | 229 | 7.4 |
| 9 | 24-Jul-97 | 12 | 11 | 21.7 | 2,863 | 22,904 | 8.0 | 1 | 15 | 15.0 | 4 | 31 | 7.8 |
| 10 | 25-Jul-97 | 12 | 20 | 18.1 | 4,332 | 34,656 | 8.0 | 2 | 29 | 14.5 | 30 | 200 | 6.7 |
| 11 | 28-Jul-97 | 12 | 32 | 21.1 | 8,106 | 64,848 | 8.0 | 3 | 41 | 13.7 | 76 | 544 | 7.2 |
| 12 | 29-Jul-97 | 12 | 21 | 20.8 | 5,242 | 41,936 | 8.0 | 1 | 10 | 10.0 | 37 | 263 | 7.1 |
| 13 | 31-Jul-97 | 12 | 31 | 23.6 | 8,790 | 70,320 | 8.0 | 2 | 36 | 18.0 | 159 | 1,146 | 7.2 |
| 14 | 1-Aug-97 | 12 | 36 | 28.6 | 12,375 | 99,000 | 8.0 | 3 | 39 | 13.0 | 274 | 1,939 | 7.1 |
| 15 | 4-Aug-97 | 12 | 10 | 9.2 | 1,108 | 8,864 | 8.0 | 0 | | | 45 | 318 | 7.1 |
| 16 | 5-Aug-97 | 12 | 22 | 15.8 | 4,178 | 33,424 | 8.0 | 2 | 30 | 15.0 | 204 | 1,434 | 7.0 |
| 17 | 6-Aug-97 | 12 | 26 | 22.4 | 7,003 | 56,005 | 8.0 | 3 | 66 | 22.0 | 191 | 1,333 | 7.0 |
| 18 | 7-Aug-97 | 12 | 32 | 18.8 | 7,234 | 57,872 | 8.0 | 4 | 69 | 17.3 | 100 | 702 | 7.0 |
| 19 | 8-Aug-97 | 12 | 32 | 22.5 | 8,621 | 68,968 | 8.0 | 2 | 25 | 12.5 | 177 | 1,239 | 7.0 |
| 20 | 11-Aug-97 | 12 | 25 | 16.2 | 4,870 | 38,960 | 8.0 | 1 | 28 | 28.0 | 351 | 2,517 | 7.2 |
| 21 | 12-Aug-97 | 12 | 35 | 15.7 | 6,600 | 52,800 | 8.0 | 4 | 34 | 8.5 | 468 | 3,361 | 7.2 |
| 22 | 14-Aug-97 | 12 | 27 | 15.1 | 4,886 | 39,088 | 8.0 | 0 | | | 346 | 2,125 | 6.1 |
| 23 | 15-Aug-97 | 12 | 25 | 15.7 | 4,698 | 37,584 | 8.0 | 0 | | | 239 | 1,670 | 7.0 |
| 24 | 18-Aug-97 | 12 | 20 | 18.7 | 4,477 | 35,816 | 8.0 | 1 | 26 | 26.0 | 221 | 1,566 | 7.1 |
| 25 | 19-Aug-97 | 12 | 17 | 18.6 | 3,788 | 30,304 | 8.0 | 0 | | | 92 | 662 | 7.2 |
| 26 | 20-Aug-97 | 12 | 22 | 18.8 | 4,976 | 39,808 | 8.0 | 1 | 5 | 5.0 | 71 | 483 | 6.8 |
| 27 | 21-Aug-97 | 12 | 19 | 16.2 | 3,699 | 29,592 | 8.0 | 1 | 8 | 8.0 | 26 | 195 | 7.5 |
| 28 | 22-Aug-97 | 12 | 24 | 19.5 | 5,618 | 44,944 | 8.0 | 1 | 25 | 25.0 | 36 | 242 | 6.7 |
| 29 | 25-Aug-97 | 12 | 17 | 17.2 | 3,504 | 28,032 | 8.0 | 0 | | | 16 | 130 | 8.1 |
| 30 | 26-Aug-97 | 12 | 15 | 10.9 | 1,957 | 15,656 | 8.0 | 1 | 19 | 19.0 | 2 | 21 | 10.5 |
| 31 | 27-Aug-97 | 12 | 10 | 13.4 | 1,603 | 12,824 | 8.0 | 1 | 29 | 29.0 | 2 | 27 | 13.5 |
| 32 | 28-Aug-97 | 12 | 11 | 12.1 | 1,593 | 12,744 | 8.0 | 1 | 16 | 16.0 | 0 | | |
| 33 | 29-Aug-97 | 12 | 10 | 4.3 | 519 | 4,152 | 8.0 | 1 | 10 | 10.0 | 0 | | |
| Season Totals | | 396 | 68 | 5.3 | 142,720 | 1,141,741 | 8.0 | 45 | 649 | 14.4 | 3,320 | 23,203 | 7.0 |

^a Chum salmon were weighed during the first commercial opening only. Chum salmon for all other periods were considered to be 8 pounds.

Table 12. Kotzebue District commercial chum salmon, chinook salmon, and Dolly Varden catch by statistical area, 1997.

| Statistical Area | Number of Fishermen | Chum | | | Chinook | | | Dolly Varden | | |
|------------------|---------------------|----------------|------------------|------------|-----------|------------|-------------|--------------|---------------|------------|
| | | Number | Pounds | Avg. Wt. | Number | Pounds | Avg. Wt. | Number | Pounds | Avg. Wt. |
| 331-01 | 64 | 85,739 | 685,912 | 8.0 | 23 | 337 | 14.7 | 1,645 | 11,419 | 6.9 |
| 331-02 | 22 | 15,042 | 120,336 | 8.0 | 16 | 225 | 14.1 | 1,317 | 9,363 | 7.1 |
| 331-03 | 9 | 3,762 | 30,096 | 8.0 | 1 | 10 | 10.0 | 56 | 329 | 5.9 |
| 331-04 | 13 | 18,306 | 146,429 | 8.0 | 3 | 61 | 20.3 | 205 | 1,405 | 6.9 |
| 331-05 | 1 | 63 | 504 | 8.0 | 0 | | | 8 | 63 | 7.9 |
| 331-06 | 18 | 19,808 | 158,464 | 8.0 | 2 | 16 | 8.0 | 89 | 624 | 7.0 |
| Totals | 68 | 142,720 | 1,141,741 | 8.0 | 45 | 649 | 14.4 | 3,320 | 23,203 | 7.0 |

Table 13. Kotzebue District 1997 chum salmon commercial and 18 year average catch statistics (1979-1996).

| 18 Year Avg. | | | | | | Cumulative | | | |
|--------------|-------|----------------|--------------------|------|-------------|--------------------|------|-------------|--|
| Period | Hours | Number Permits | Catch ^a | CPUE | Prop. Catch | Catch ^a | CPUE | Prop. Catch | |
| 1 | 24 | 37 | 3,265 | 4.5 | 0.000 | 3,084 | 4.5 | 0.011 | |
| 2 | 23 | 62 | 5,373 | 6.1 | 0.000 | 8,457 | 5.0 | 0.031 | |
| 3 | 23 | 86 | 10,135 | 7.1 | 0.000 | 18,591 | 5.9 | 0.068 | |
| 4 | 24 | 105 | 18,133 | 9.0 | 0.000 | 36,725 | 6.9 | 0.135 | |
| 5 | 26 | 115 | 22,355 | 9.9 | 0.000 | 59,079 | 7.6 | 0.218 | |
| 6 | 28 | 121 | 29,379 | 15.0 | 0.000 | 85,194 | 8.3 | 0.314 | |
| 7 | 32 | 124 | 35,085 | 14.3 | 0.000 | 118,330 | 9.0 | 0.436 | |
| 8 | 35 | 136 | 38,869 | 14.0 | 0.000 | 152,880 | 9.3 | 0.563 | |
| 9 | 37 | 121 | 37,284 | 14.4 | 0.000 | 190,164 | 10.0 | 0.700 | |
| 10 | 36 | 130 | 42,662 | 15.8 | 0.000 | 225,716 | 10.3 | 0.831 | |
| 11 | 39 | 120 | 24,710 | 8.5 | 0.000 | 244,934 | 10.2 | 0.902 | |
| 12 | 37 | 99 | 14,626 | 12.8 | 0.000 | 257,123 | 10.1 | 0.947 | |
| 13 | 38 | 76 | 10,015 | 5.7 | 0.000 | 265,469 | 9.6 | 0.978 | |
| 14 | 36 | 57 | 7,195 | 5.9 | 0.000 | 269,866 | 9.4 | 0.994 | |
| 15 | 37 | 37 | 3,297 | 4.7 | 0.000 | 271,514 | 9.3 | 1.000 | |

| 1997 | | | | | | Cumulative | | | |
|--------|-------|----------------|--------|------|-------------|------------|------|-------------|--|
| Period | Hours | Number Permits | Catch | CPUE | Prop. Catch | Catch | CPUE | Prop. Catch | |
| 1 | 24 | 7 | 1,037 | 6.2 | 0.007 | 1,037 | 6.2 | 0.007 | |
| 2 | 24 | 12 | 2,682 | 9.3 | 0.019 | 3,719 | 8.2 | 0.026 | |
| 3 | 24 | 23 | 7,432 | 13.5 | 0.052 | 11,151 | 11.1 | 0.078 | |
| 4 | 24 | 30 | 8,929 | 12.4 | 0.063 | 20,080 | 11.6 | 0.141 | |
| 5 | 24 | 23 | 7,195 | 13.0 | 0.050 | 27,275 | 12.0 | 0.191 | |
| 6 | 24 | 35 | 13,348 | 15.9 | 0.094 | 40,623 | 13.0 | 0.285 | |
| 7 | 24 | 39 | 21,165 | 22.6 | 0.148 | 61,788 | 15.2 | 0.433 | |
| 8 | 36 | 32 | 12,289 | 10.7 | 0.086 | 74,077 | 14.2 | 0.519 | |
| 9 | 24 | 42 | 15,855 | 15.7 | 0.111 | 89,932 | 17.8 | 0.630 | |
| 10 | 24 | 35 | 11,470 | 13.7 | 0.080 | 101,402 | 16.8 | 0.710 | |
| 11 | 24 | 33 | 9,584 | 12.1 | 0.067 | 110,986 | 15.8 | 0.778 | |
| 12 | 36 | 31 | 13,241 | 11.9 | 0.093 | 124,227 | 20.1 | 0.870 | |
| 13 | 24 | 27 | 9,317 | 14.4 | 0.065 | 133,544 | 19.6 | 0.936 | |
| 14 | 36 | 20 | 7,064 | 9.8 | 0.049 | 140,608 | 18.6 | 0.985 | |
| 15 | 24 | 16 | 2,112 | 5.5 | 0.015 | 142,720 | 18.3 | 1.000 | |

^a Cumulative catch and catch by period derived differently.

Table 14. Historical average age composition by period for the recent 18 years (1979-1996) and 1997.

| 18 Year Average | | Percent | | | | Catch by Age | | | |
|-----------------|--------|---------|------|------|-----|--------------|--------|--------|-------|
| Period | Catch | 3 | 4 | 5 | 6 | 3 | 4 | 5 | 6 |
| 1 | 3,265 | 0.4 | 31.8 | 62.2 | 5.6 | 13 | 1,038 | 2,031 | 183 |
| 2 | 5,373 | 0.8 | 39.7 | 54.5 | 5.0 | 43 | 2,133 | 2,928 | 269 |
| 3 | 10,135 | 1.3 | 39.8 | 53.0 | 5.9 | 132 | 4,034 | 5,371 | 598 |
| 4 | 18,133 | 1.2 | 48.4 | 46.5 | 3.9 | 218 | 8,776 | 8,432 | 707 |
| 5 | 22,355 | 1.3 | 46.5 | 46.9 | 5.2 | 291 | 10,395 | 10,484 | 1,162 |
| 6 | 29,379 | 1.8 | 53.0 | 42.2 | 2.9 | 529 | 15,571 | 12,398 | 852 |
| 7 | 35,085 | 2.6 | 57.1 | 37.5 | 2.8 | 912 | 20,034 | 13,157 | 982 |
| 8 | 38,869 | 4.0 | 60.2 | 33.6 | 2.2 | 1,555 | 23,399 | 13,060 | 855 |
| 9 | 37,284 | 5.1 | 58.8 | 33.4 | 2.7 | 1,901 | 21,923 | 12,453 | 1,007 |
| 10 | 42,662 | 5.3 | 62.0 | 31.1 | 1.7 | 2,261 | 26,450 | 13,268 | 725 |
| 11 | 24,710 | 9.5 | 65.0 | 24.1 | 1.4 | 2,347 | 16,061 | 5,955 | 346 |
| 12 | 14,626 | 11.0 | 60.3 | 26.8 | 2.0 | 1,609 | 8,820 | 3,920 | 293 |
| 13 | 10,015 | 9.9 | 61.5 | 26.3 | 2.3 | 991 | 6,159 | 2,634 | 230 |
| 14 | 7,195 | 9.4 | 61.3 | 28.0 | 1.3 | 676 | 4,411 | 2,015 | 94 |
| 15 | 3,297 | 4.4 | 66.6 | 27.6 | 1.4 | 145 | 2,196 | 910 | 46 |

| 1997 | | Percent | | | | Catch by Age | | | |
|--------|--------|---------|------|------|------|--------------|-------|--------|-------|
| Period | Catch | 3 | 4 | 5 | 6 | 3 | 4 | 5 | 6 |
| 1 | 1,037 | 0.0 | 7.4 | 71.1 | 20.8 | 0 | 77 | 737 | 216 |
| 2 | 2,682 | 0.0 | 13.3 | 62.0 | 23.8 | 0 | 357 | 1,663 | 638 |
| 3 | 7,432 | 0.3 | 11.0 | 68.4 | 19.4 | 22 | 818 | 5,083 | 1,442 |
| 4 | 8,929 | 0.0 | 16.4 | 71.1 | 12.5 | 0 | 1,464 | 6,349 | 1,116 |
| 5 | 7,195 | 0.0 | 12.6 | 68.9 | 17.7 | 0 | 907 | 4,957 | 1,274 |
| 6 | 13,348 | 0.9 | 10.3 | 72.9 | 15.9 | 120 | 1,375 | 9,731 | 2,122 |
| 7 | 21,165 | 0.4 | 18.4 | 64.5 | 16.0 | 85 | 3,894 | 13,651 | 3,386 |
| 8 | 12,289 | 1.6 | 33.5 | 57.1 | 7.8 | 197 | 4,117 | 7,017 | 959 |
| 9 | 15,855 | 1.0 | 29.8 | 58.6 | 9.6 | 159 | 4,725 | 9,291 | 1,522 |
| 10 | 11,470 | 1.5 | 36.3 | 53.0 | 8.9 | 172 | 4,164 | 6,079 | 1,021 |
| 11 | 9,584 | 4.4 | 43.9 | 45.8 | 6.0 | 417 | 4,207 | 4,389 | 571 |
| 12 | 13,241 | 1.9 | 47.9 | 46.3 | 3.2 | 252 | 6,342 | 6,131 | 424 |
| 13 | 9,317 | 4.7 | 44.3 | 44.6 | 5.7 | 434 | 4,124 | 4,156 | 530 |
| 14 | 7,064 | 2.4 | 46.4 | 44.5 | 6.4 | 170 | 3,278 | 3,143 | 452 |
| 15 | 2,112 | 1.7 | 55.4 | 38.9 | 4.0 | 36 | 1,170 | 822 | 84 |

Table 15. Kobuk River chum salmon drift test fishing mean daily and cumulative CPUE, 1993-1997. *

| Date | 1993 | | 1994 | | 1995 | | 1996 | | 1997 | |
|--------|-------|--------|--------|----------|-------|----------|--------|----------|-------|--------|
| | Daily | Cum. | Daily | Cum. | Daily | Cum. | Daily | Cum. | Daily | Cum. |
| 05-Jul | | | | | | | | | | |
| 06-Jul | | | | | | | | | | |
| 07-Jul | | | | | | | | | | |
| 08-Jul | | | | | | | | | | |
| 09-Jul | | | | | | | 12.77 | 12.77 | 5.85 | 5.85 |
| 10-Jul | | | | | | | 15.00 | 27.77 | 0.00 | 5.85 |
| 11-Jul | | | | | | | 98.38 | 126.15 | 5.31 | 11.16 |
| 12-Jul | 11.18 | 11.18 | | | 0.00 | 0.00 | 45.54 | 171.69 | 7.19 | 18.35 |
| 13-Jul | 14.22 | 25.40 | 0.00 | 0.00 | 0.93 | 0.93 | 74.29 | 245.98 | | 18.35 |
| 14-Jul | 20.57 | 45.97 | 2.68 | 2.68 | 2.80 | 3.73 | | 245.98 | 6.25 | 24.60 |
| 15-Jul | 35.08 | 81.05 | 2.58 | 5.26 | 2.77 | 6.50 | 83.75 | 329.73 | 3.65 | 28.25 |
| 16-Jul | 13.19 | 94.24 | 11.35 | 16.61 | | 6.50 | 71.35 | 401.08 | 14.28 | 42.53 |
| 17-Jul | 17.27 | 111.51 | | 16.61 | 0.00 | 6.50 | 55.49 | 456.57 | 15.17 | 57.70 |
| 18-Jul | | 111.51 | 7.16 | 23.77 | 1.81 | 8.31 | 89.86 | 546.43 | 16.12 | 73.82 |
| 19-Jul | 10.71 | 122.22 | 12.40 | 36.17 | 9.89 | 18.20 | 54.74 | 601.17 | 17.98 | 91.80 |
| 20-Jul | 2.76 | 124.98 | 3.65 | 39.82 | 16.30 | 34.50 | 63.70 | 664.87 | | 91.80 |
| 21-Jul | 3.20 | 128.18 | 7.30 | 47.12 | 38.54 | 73.04 | 52.12 | 716.99 | 18.53 | 110.33 |
| 22-Jul | 5.52 | 133.70 | 3.56 | 50.68 | 21.18 | 94.22 | 50.97 | 767.96 | 13.28 | 123.61 |
| 23-Jul | 27.15 | 160.85 | 16.49 | 67.17 | 50.58 | 144.80 | 91.36 | 859.32 | 10.79 | 134.40 |
| 24-Jul | 9.06 | 169.91 | | 67.17 | 28.46 | 173.26 | 91.89 | 951.21 | 22.86 | 157.26 |
| 25-Jul | | 169.91 | 14.38 | 81.55 | 40.16 | 213.42 | 76.80 | 1,028.01 | 21.57 | 178.83 |
| 26-Jul | 15.22 | 185.13 | 47.65 | 129.20 | 35.15 | 248.57 | 55.68 | 1,083.69 | 14.66 | 193.49 |
| 27-Jul | 8.06 | 193.19 | 40.66 | 169.86 | 63.94 | 312.51 | 29.79 | 1,113.48 | 18.46 | 211.95 |
| 28-Jul | 16.36 | 209.55 | 57.83 | 227.69 | 62.49 | 375.00 | 49.06 | 1,162.54 | 30.53 | 242.48 |
| 29-Jul | 0.93 | 210.48 | 33.62 | 261.31 | 46.11 | 421.11 | 70.13 | 1,232.67 | 28.13 | 270.61 |
| 30-Jul | 0.92 | 211.40 | 69.21 | 330.52 | 57.86 | 478.97 | 35.29 | 1,267.96 | 22.33 | 292.94 |
| 31-Jul | 12.58 | 223.98 | | 330.52 | 29.89 | 508.86 | 82.27 | 1,350.23 | 32.57 | 325.51 |
| 01-Aug | | 223.98 | 82.16 | 412.68 | 72.91 | 581.77 | 167.67 | 1,517.90 | 41.41 | 366.92 |
| 02-Aug | 6.74 | 230.72 | 65.12 | 477.80 | 48.71 | 630.48 | 62.02 | 1,579.92 | 22.41 | 389.33 |
| 03-Aug | 54.49 | 285.21 | 71.79 | 549.59 | 48.40 | 678.88 | 48.7 | 1,628.62 | 35.21 | 424.54 |
| 04-Aug | 44.23 | 329.44 | 108.98 | 658.57 | 53.00 | 731.88 | 65.93 | 1,694.55 | 26.67 | 451.21 |
| 05-Aug | 89.30 | 418.74 | 59.74 | 718.31 | 49.95 | 781.83 | 60.33 | 1,754.88 | 24.47 | 475.68 |
| 06-Aug | 18.60 | 437.34 | 102.56 | 820.87 | | 781.83 | 80.47 | 1,835.35 | 42.25 | 517.93 |
| 07-Aug | 20.52 | 457.86 | | 820.87 | 46.39 | 828.22 | 90.99 | 1,926.34 | 36.00 | 553.93 |
| 08-Aug | | 457.86 | 62.75 | 883.62 | 44.02 | 872.24 | 146.94 | 2,073.28 | 45.07 | 599.00 |
| 09-Aug | 1.84 | 459.70 | 96.86 | 980.48 | 68.22 | 940.46 | 106.11 | 2,179.39 | 55.14 | 654.14 |
| 10-Aug | 12.63 | 472.33 | 45.83 | 1,026.31 | 56.33 | 996.79 | 56.95 | 2,236.34 | | 654.14 |
| 11-Aug | 18.11 | 490.44 | 57.02 | 1,083.33 | 37.95 | 1,034.74 | | 2,236.34 | 43.75 | 697.89 |
| 12-Aug | 3.74 | 494.18 | 90.54 | 1,173.87 | 63.92 | 1,098.66 | 72.29 | 2,308.63 | 37.36 | 735.25 |
| 13-Aug | | | 11.36 | 1,185.23 | | 1,098.66 | 114.63 | 2,423.26 | 45.93 | 781.18 |
| 14-Aug | | | | 1,185.23 | 29.35 | 1,128.01 | 158.13 | 2,581.39 | 16.01 | 797.19 |
| 15-Aug | | | 5.13 | 1,190.36 | 25.26 | 1,153.27 | | | | |
| 16-Aug | | | 16.23 | 1,206.59 | 35.04 | 1,188.31 | | | | |
| 17-Aug | | | 0.00 | 1,206.59 | | | | | | |
| 18-Aug | | | 0.00 | 1,206.59 | | | | | | |
| 19-Aug | | | 3.12 | 1,209.71 | | | | | | |
| 20-Aug | | | 0.00 | 1,209.71 | | | | | | |
| 21-Aug | | | | 1,209.71 | | | | | | |
| 22-Aug | | | 0.00 | 1,209.71 | | | | | | |
| 23-Aug | | | 0.00 | 1,209.71 | | | | | | |
| 24-Aug | | | 0.00 | 1,209.71 | | | | | | |
| 25-Aug | | | 0.91 | 1,210.62 | | | | | | |
| 26-Aug | | | 5.56 | 1,216.18 | | | | | | |
| 27-Aug | | | 1.86 | 1,218.04 | | | | | | |
| 28-Aug | | | 0.93 | 1,218.97 | | | | | | |
| 29-Aug | | | 0.00 | 1,218.97 | | | | | | |
| 30-Aug | | | 0.00 | 1,218.97 | | | | | | |
| 31-Aug | | | | | | | | | | |

* The "+", "b" indicate the first and third quartiles and "*" indicates the mid-way point.

^b Regular day off.

Table 16. 1997 Kotzebue Sound subsistence salmon harvests.

| | | | Chinook | | Chum | | Pink | | Sockeye | | Coho | | Total | |
|-----------------------|----------------------|------------|------------------|-------------|------------------|---------------|------------------|--------------|------------------|-------------|------------------|-------------|------------------|---------------|
| | Total HH's Contacted | HH's | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total | Reported Harvest | Est.* Total |
| Ambler | 83 | 69 | 0 | 0 | 2,337 | 2,713 | 12 | 14 | 4 | 5 | 1 | 1 | 2,354 | 2,732 |
| Kiana ¹ | 108 | 86 | 0 | 0 | 1,887 | 3,064 | 5 | 6 | 0 | 0 | 116 | 138 | 2,008 | 3,208 |
| Kobuk | 26 | 22 | 0 | 0 | 629 | 629 | 0 | 0 | 0 | 0 | 0 | 0 | 629 | 629 |
| Kotzebue ² | 640 | 117 | 82 | 449 | 4,818 | 26,355 | 198 | 1,083 | 81 | 443 | 4 | 22 | 5,183 | 28,351 |
| Noatak | 84 | 75 | 4 | 4 | 4,930 | 5,309 | 0 | 0 | 0 | 0 | 8 | 9 | 4,942 | 5,323 |
| Noorvik | 124 | 114 | 8 | 9 | 13,284 | 14,323 | 72 | 78 | 74 | 80 | 628 | 677 | 14,066 | 15,166 |
| Shungnak | 57 | 47 | 2 | 2 | 4,831 | 5,513 | 0 | 0 | 0 | 0 | 0 | 0 | 4,833 | 5,515 |
| Kotzebue Sound | 1,122 | 530 | 96 | 464 | 32,716 | 57,906 | 287 | 1,181 | 159 | 528 | 757 | 848 | 34,015 | 60,925 |

* Data from households were expanded to households not contacted. If less than 30 and less than 50% of households in a community were contacted, then reported harvest is used for estimated harvest.

¹ Estimate chum salmon harvest in Kiana includes 818 chum from the ADF&G test net fishery in addition to the survey results.

² Alaska Department of Fish and Game, Division of Subsistence, postcard survey, 1997

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, household surveys, 1997.

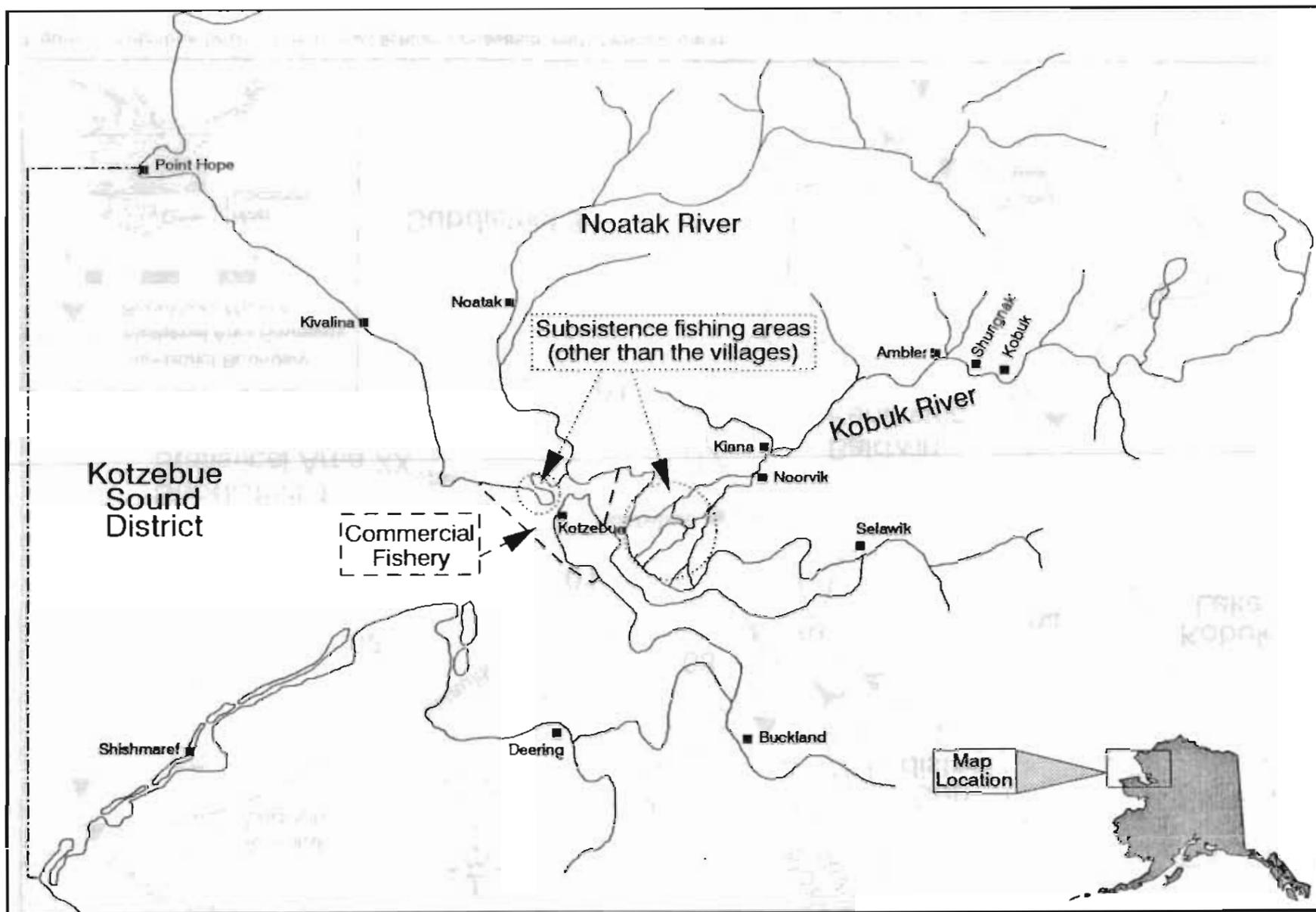


Figure 3. Kotzebue Sound commercial fishing district, villages and subsistence fishing areas.

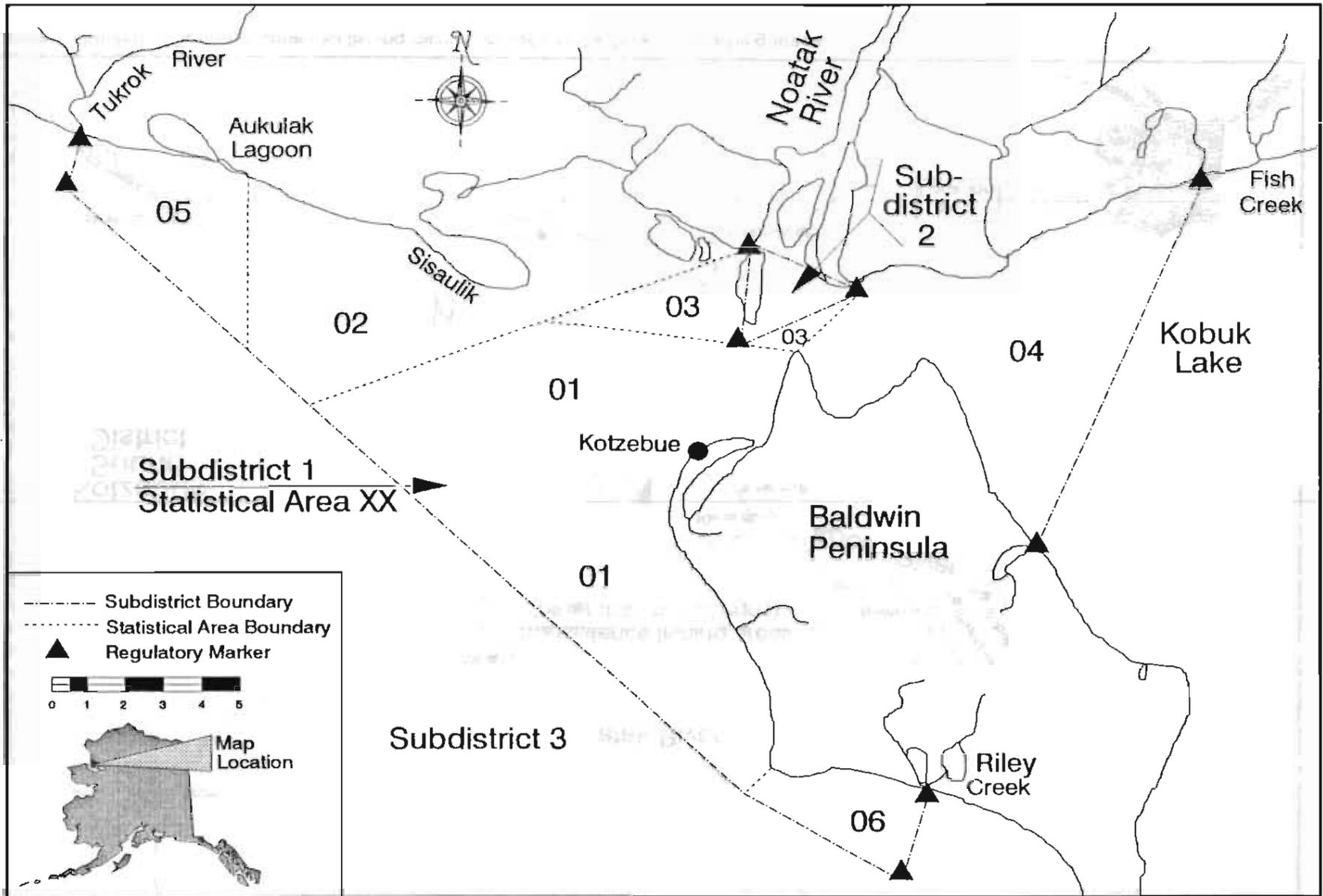


Figure 4., Kotzebue Sound commercial fishing subdistricts and statistical areas.

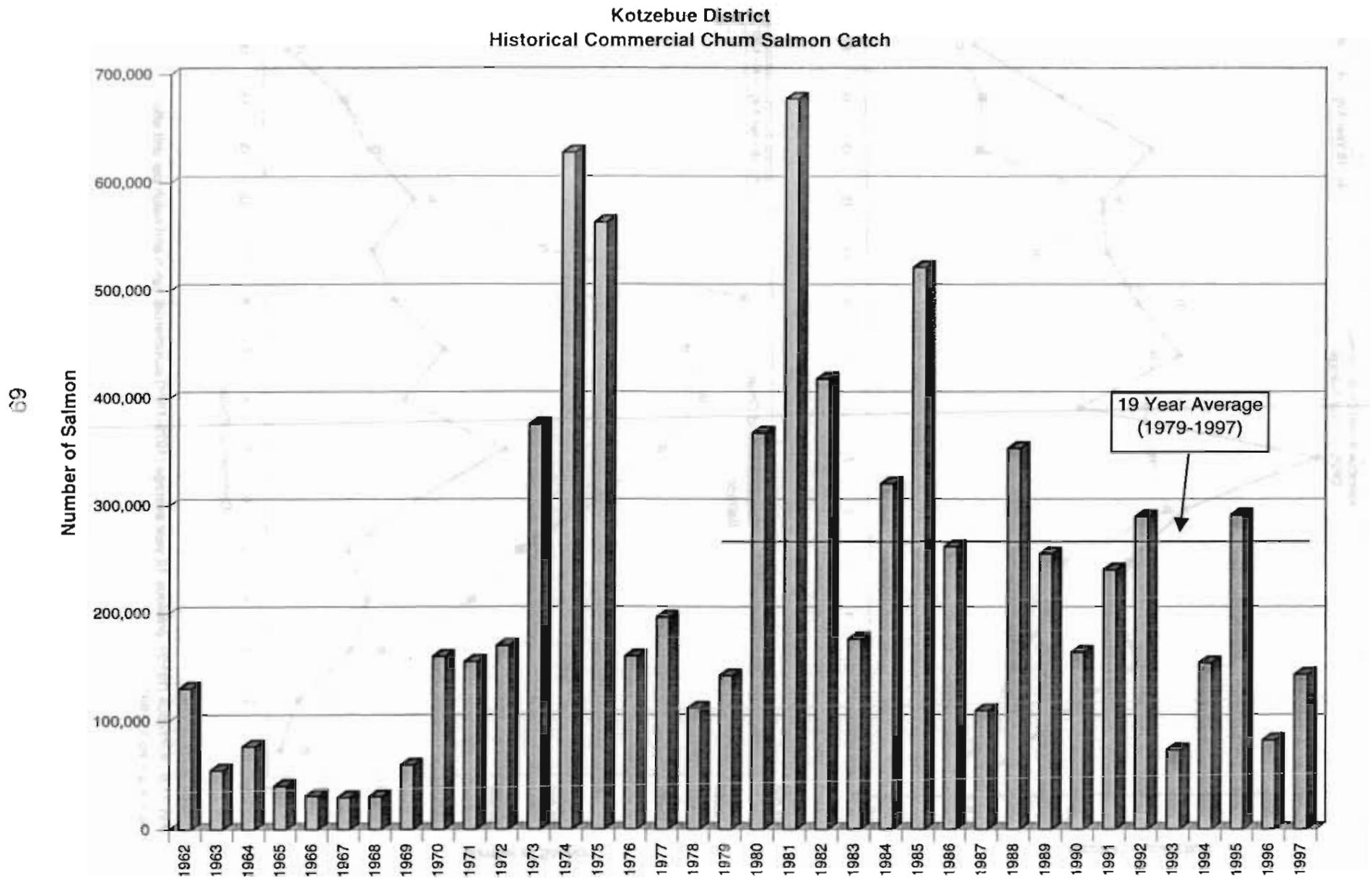


Figure 5. Kotzebue District chum salmon commercial catch by year, 1962-1997, and the 19 year average.

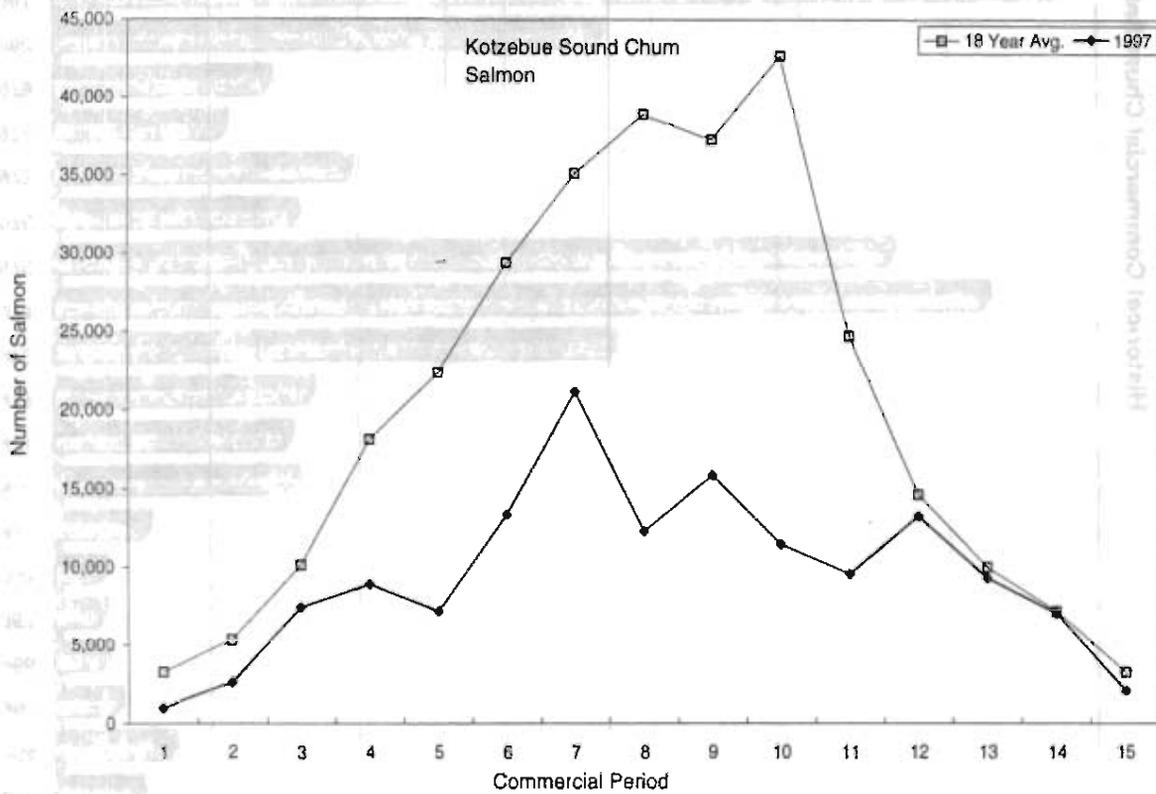
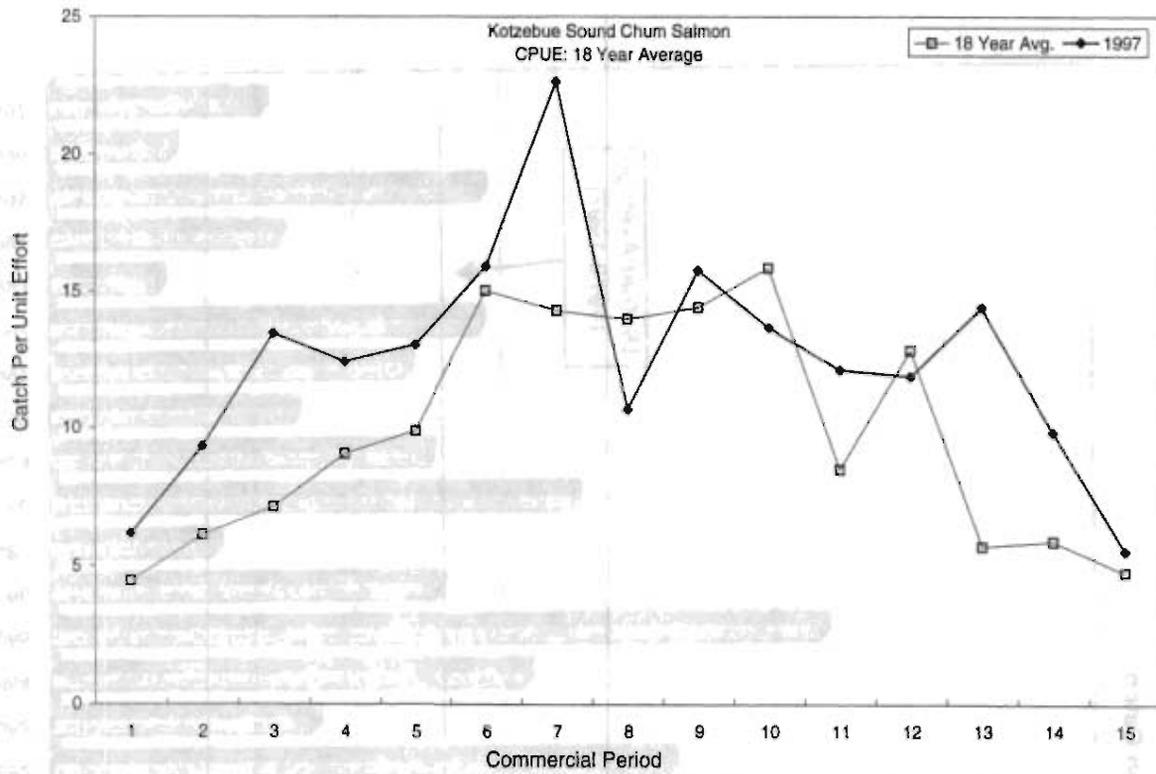


Figure 6. Kotzebue District previous 18 year average (1979-1996) commercial catch and catch per unit effort as compared to 1997.

Kotzebue Sound Commercial Chum Salmon

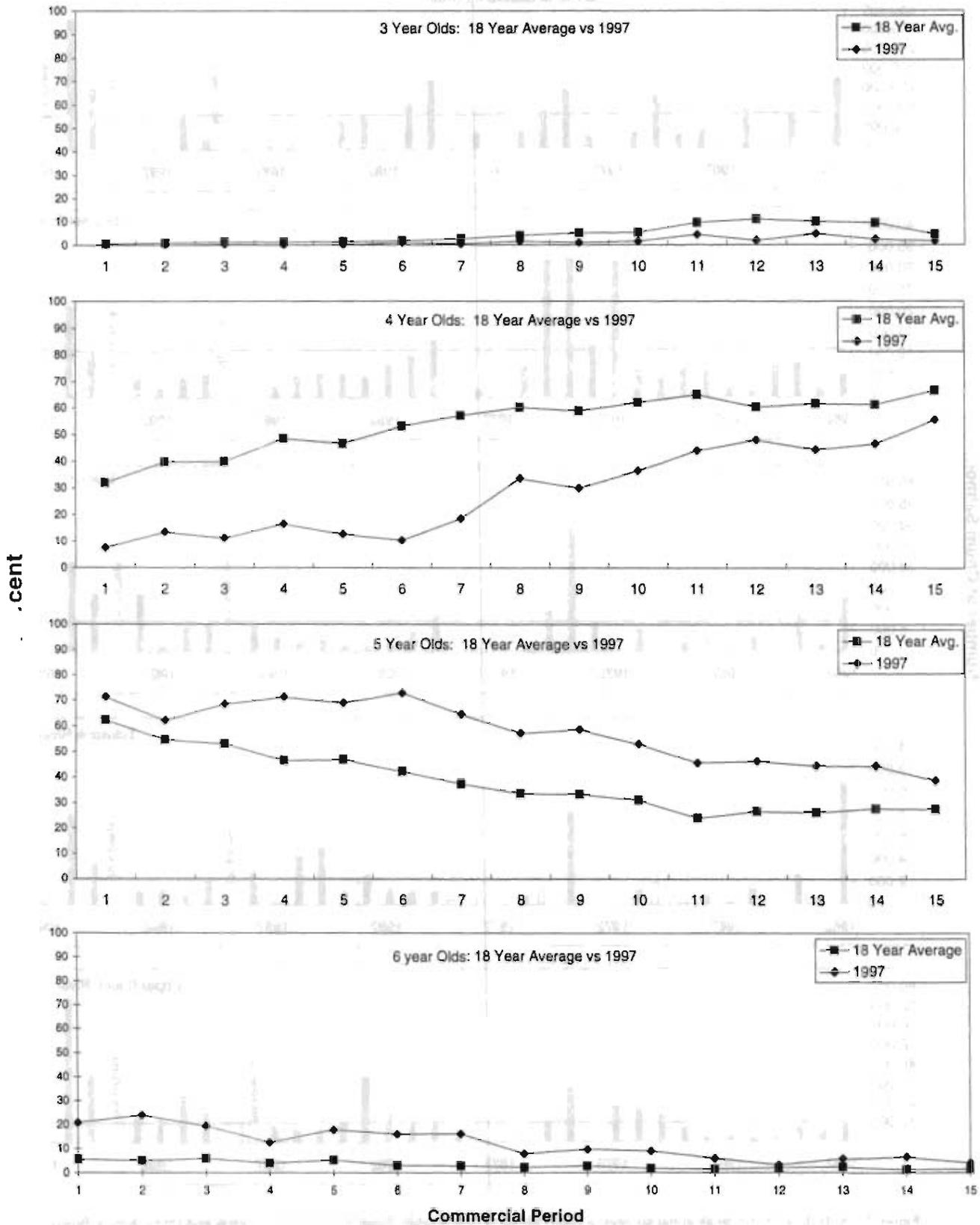


Figure 7. Kotzebue District commercial chum salmon 18 year average age composition by period, compared to 1997.

Kotzebue District Historical Chum Salmon Aerial Surveys

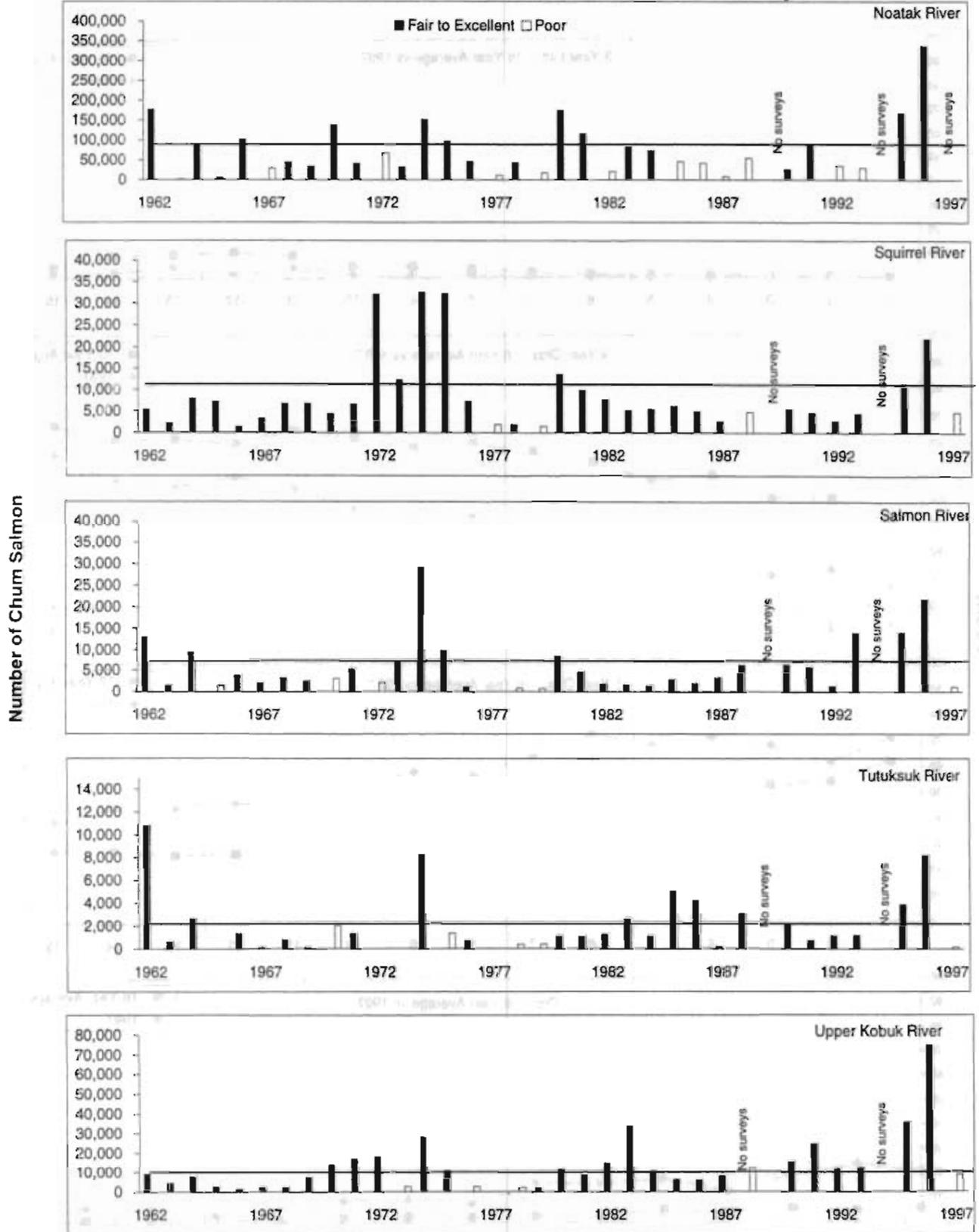


Figure 8. Kotzebue District peak aerial surveys of chum salmon in the Noatak, Squirrel, Salmon, Tutuksuk and Upper Kobuk Rivers. The horizontal line indicates the escapement goals for these rivers. These goals were established in the mid-1980's using limited information. No aerial surveys were conducted in 1989 or 1994 due to poor weather.

Kobuk River Test Fishing Cumulative CPUE

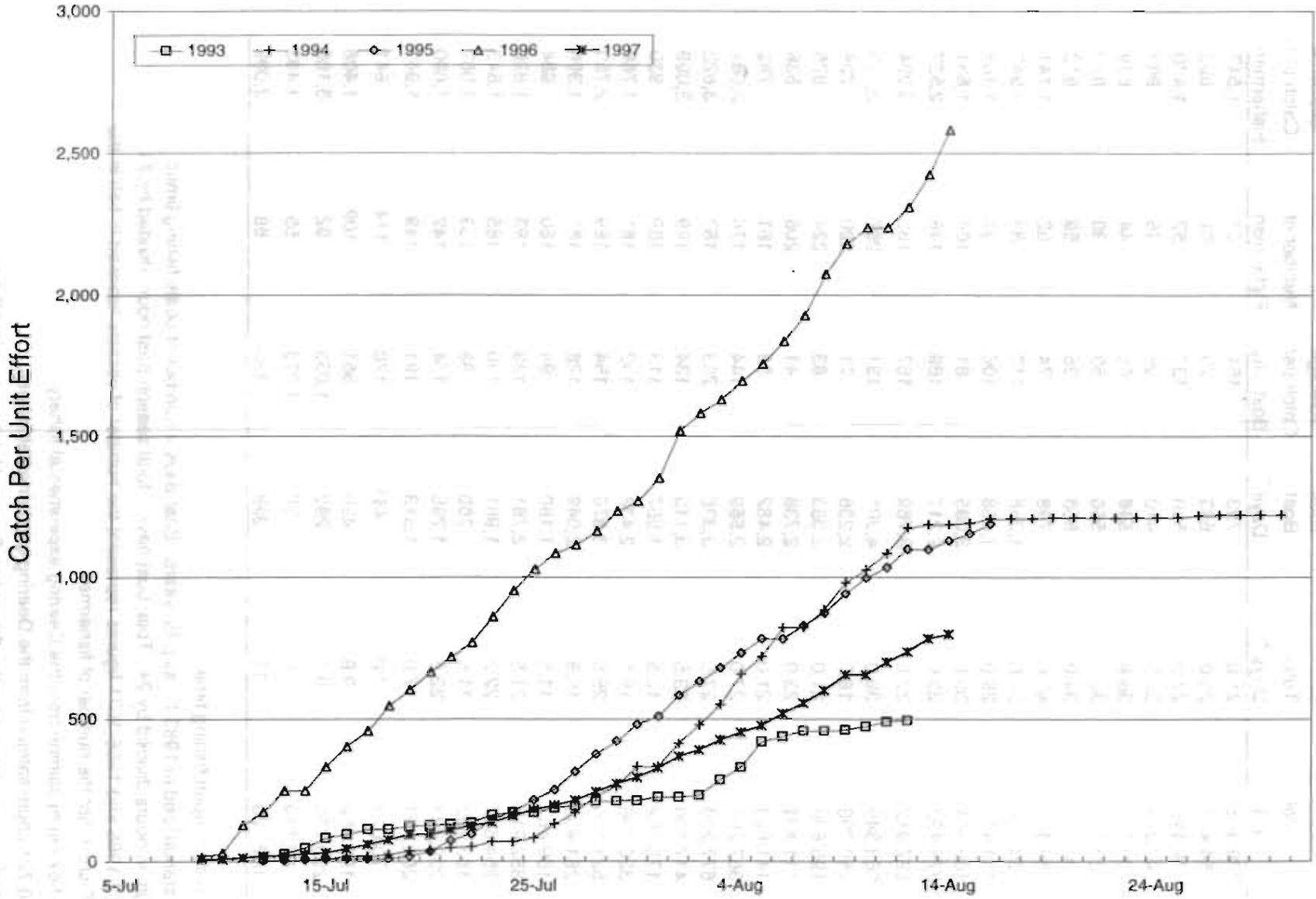


Figure 9. Kobuk River chum salmon drift test fish cumulative CPUE, 1993-1997.

Appendix Table C.1. Kotzebue District chum salmon commercial catch statistics, 1962-1997.

| Year | Total Catch | Total Days ^a | Total Boat Days ^b | Average Catch per Boat Day | Number of Fishermen ^c | Average Seasonal Catch per Fishermen |
|-------------------|-------------|-------------------------|------------------------------|----------------------------|----------------------------------|--------------------------------------|
| 1962 | 129,948 | 21.0 | 793 | 164 | 84 | 1,547 |
| 1963 | 54,445 | 20.0 | 693 | 79 | 61 | 893 |
| 1964 | 76,449 | 27.0 | 560 | 137 | 52 | 1,470 |
| 1965 | 40,025 | 32.0 | 410 | 98 | 45 | 889 |
| 1966 | 30,764 | 35.0 | 548 | 56 | 44 | 699 |
| 1967 | 29,400 | 33.0 | 556 | 53 | 30 | 980 |
| 1968 | 30,212 | 34.0 | 858 | 35 | 59 | 512 |
| 1969 | 59,335 | 40.0 | 798 | 74 | 52 | 1,141 |
| 1970 | 159,664 | 32.0 | 1,368 | 117 | 82 | 1,947 |
| 1971 | 154,956 | 29.0 | 1,468 | 106 | 91 | 1,703 |
| 1972 | 169,664 | 35.0 | 2,095 | 81 | 104 | 1,631 |
| 1973 | 375,432 | 25.0 | 2,217 | 169 | 148 | 2,537 |
| 1974 ^d | 627,912 | 32.0 | 3,769 | 167 | 185 | 3,394 |
| 1975 ^e | 563,345 | 39.0 | 4,301 | 131 | 267 | 2,110 |
| 1976 | 159,796 | 16.0 | 2,236 | 71 | 220 | 726 |
| 1977 | 195,895 | 21.0 | 2,353 | 83 | 224 | 875 |
| 1978 | 111,494 | 23.0 | 2,738 | 41 | 208 | 536 |
| 1979 | 141,623 | 21.0 | 2,462 | 58 | 181 | 782 |
| 1980 | 367,284 | 27.0 | 2,559 | 144 | 176 | 2,087 |
| 1981 | 677,239 | 27.0 | 3,336 | 203 | 187 | 3,622 |
| 1982 | 417,790 | 23.5 | 3,115 | 134 | 199 | 2,099 |
| 1983 | 175,762 | 12.5 | 1,557 | 113 | 189 | 930 |
| 1984 | 320,206 | 19.5 | 2,432 | 132 | 181 | 1,769 |
| 1985 | 521,406 | 25.5 | 3,376 | 154 | 189 | 2,759 |
| 1986 | 261,436 | 15.5 | 2,049 | 128 | 187 | 1,398 |
| 1987 | 109,467 | 11.5 | 1,160 | 94 | 160 | 684 |
| 1988 | 352,915 | 21.5 | 2,761 | 128 | 193 | 1,829 |
| 1989 | 254,617 | 22.2 | 1,961 | 130 | 165 | 1,543 |
| 1990 | 163,263 | 11.5 | 1,760 | 93 | 153 | 1,067 |
| 1991 | 239,923 | 22.5 | 1,795 | 134 | 142 | 1,690 |
| 1992 | 289,184 | 17.0 | 1,513 | 191 | 149 | 1,941 |
| 1993 ^f | 73,071 | 7.0 | 431 | 170 | 114 | 641 |
| 1994 ^g | 153,452 | 9.8 | 426 | 361 | 109 | 1,408 |
| 1995 | 290,730 | 9.7 | 282 | 1,033 | 92 | 3,160 |
| 1996 ^h | 82,110 | 6 | 76 | 1,079 | 55 | 1,493 |
| 1997 | 142,720 | 17 | 328 | 435 | 68 | 2,099 |

^a Day = 24 hours of open fishing time.

^b Boat days standardized in 1983 for all prior years. Boat days = number of boats fishing times period length in hours divided by 24. Total boat days = total season boat hours divided by 24.

^c During 1962-1966 and 1968-1971 figures represent the number of vessels licensed to fish in the Kotzebue District, not the number of fishermen.

^d Includes 6,567 chum salmon from the Deering experimental fishery.

^e Includes 10,704 chum salmon from the Deering experimental fishery.

^f Includes 2,000 chum salmon from the Sikusuitaq Springs Hatchery terminal fishery.

^g Includes 4,000 chum salmon commercially caught but not sold on July 29.

^h Includes 2,200 chum salmon commercially caught but not sold on July 29.

Appendix Table C.2. Kotzebue District chum salmon type of processing and weights, 1962-1997.

| Year | Chum Salmon | | Other ^a | Fresh Frozen Salmon Roe (pounds) | Cured Pounds |
|-------------------|------------------|---|--------------------|--|-----------------|
| | Cases (48lbs) | Fresh Frozen (Round weight in pounds) | | | |
| 1962 | 14,500 | | | | |
| 1963 | 5,396 | | | | |
| 1964 | 5,421 | 202,993 | | | |
| 1965 | 1,929 | 207,350 | | | |
| 1966 | | 310,716 | | 13,600 | 3,065 |
| 1967 | | 273,420 | | | 11,488 |
| 1968 | | 288,500 | | | 11,850 |
| 1969 | | 455,013 | | | 8,183 |
| 1970 | | 1,240,000 | | | 48,377 |
| 1971 | | 1,264,753 | | | 27,542 |
| 1972 | | 1,547,041 | | | 55,376 |
| 1973 | | 3,416,431 | | | 144,768 |
| 1974 | | 5,361,130 ^b | | | |
| 1975 | | 4,877,313 ^c | | | |
| 1976 | | 1,415,549 | 487 | | |
| 1977 | | 1,846,340 | 1,075 | | |
| 1978 | | 1,009,121 | 32,419 | | |
| 1979 | | 1,236,429 | 6,155 | | |
| 1980 | | 3,160,948 | 7,828 | | |
| 1981 | | 6,139,518 | 2,210 | | |
| 1982 | | 3,833,051 | 790 | 100 | |
| 1983 | | 1,647,160 | 2,449 | | |
| 1984 | | 2,631,582 | 1,593 | | |
| 1985 | | 4,528,379 | 1,106 | | |
| 1986 | | 2,271,320 | 1,691 | | |
| 1987 | | 900,405 | 597 | | |
| 1988 | | 3,060,292 | 2,120 | | |
| 1989 | | 2,163,174 | 1,426 | | |
| 1990 | | 1,453,040 | 538 | | |
| 1991 | | 1,951,041 | 714 | | |
| 1992 | | 2,397,302 | 2,714 | | |
| 1993 ^d | | 613,968 | 1,507 | 1,000 | |
| 1994 ^e | | 1,166,494 | 73 | | |
| 1995 | | 2,329,898 | 93 | | |
| 1996 ^f | | 97,510 | 51 | | |
| 1997 | | 1,141,741 | 649 | | |

^a Chinook and pink salmon.

^b Includes 36,775 pounds from the experimental commercial fishery at Deering.

^c Includes 80,801 pounds from the experimental commercial fishery at Deering. Includes 11,160 pounds from the Sikusuiq Springs Hatchery terminal fishery. Pounds of roe stripped are from a verbal report.

^e Includes 31,500 pounds commercially caught but not reported on fish tickets.

^f Includes 17,600 pounds commercially caught but not sold on fish tickets.

Appendix Table C3. Kotzebue District commercial fishery dollar value estimates, 1962-1997. ^a

| Year | Gross Value of Catch to Fishermen | Wholesale Value of Pack ^b | License and Tax Revenue to State |
|-------------------|-----------------------------------|--------------------------------------|----------------------------------|
| 1962 | \$4,500 | \$304,500 | \$11,635 |
| 1963 | \$9,140 | \$113,316 | \$6,040 |
| 1964 | \$34,660 | \$158,020 | \$5,279 |
| 1965 | \$18,000 | \$83,294 | \$2,952 |
| 1966 | \$25,000 | \$84,630 | \$2,820 |
| 1967 | \$28,700 | \$100,450 | \$4,245 |
| 1968 | \$46,000 | \$62,000 | \$2,800 |
| 1969 | \$71,000 | f | |
| 1970 | \$186,000 | f | \$5,520 |
| 1971 ^c | \$200,000 | f | \$5,970 |
| 1972 ^d | \$260,000 | f | |
| 1973 | \$925,000 | f | |
| 1974 | \$1,822,784 | f | \$18,121 |
| 1975 | \$1,365,648 | f | \$16,955 |
| 1976 | \$580,375 | f | \$15,364 |
| 1977 | \$1,033,950 | f | \$19,960 |
| 1978 | \$575,260 | f | \$9,913 ^e |
| 1979 | \$990,263 | f | \$18,302 ^e |
| 1980 | \$1,446,633 | f | \$11,820 ^e |
| 1981 | \$3,246,793 | f | \$11,220 ^e |
| 1982 | \$1,961,518 | f | \$7,085 ^e |
| 1983 | \$420,736 | f | \$24,097 ^e |
| 1984 | \$1,148,384 | f | \$39,696 ^e |
| 1985 | \$2,137,368 | f | \$6,720 ^g |
| 1986 | \$931,241 | f | \$6,840 ^g |
| 1987 | \$515,000 | f | \$6,930 ^g |
| 1988 | \$2,581,333 | f | \$11,490 ^g |
| 1989 | \$613,823 | f | \$11,250 ^g |
| 1990 | \$438,044 | f | \$11,370 ^g |
| 1991 | \$437,948 | f | \$10,920 ^g |
| 1992 | \$533,731 | f | \$10,565 ^g |
| 1993 ^h | \$235,061 | f | \$10,645 ^g |
| 1994 | \$233,512 | f | \$10,520 ^g |
| 1995 | \$316,031 | f | \$10,315 ^g |
| 1996 | \$56,310 | f | \$10,565 ^g |
| 1997 | \$187,978 | f | \$11,050 ^g |

^a Some estimates between 1962 and 1981 include only chum value which in figures represent over 99% of the total value. Figures after 1981 represent the chum value as well as incidental species such as char, whitefish and other salmon.

^b Based on type of processing when fish were shipped out of the district.

^c Includes \$9,193 from the experimental commercial fishery at Deering.

^d Includes \$17,776 from the experimental commercial fishery at Deering.

^e Includes permit and vessel fees only.

^f Information not available.

^g Includes permit renewal fees only; vessels were not required.

^h Includes \$3,648 from the Sikusuilaq Springs Hatchery terminal fishery.

Appendix Table C.4. Kotzebue District mean prices paid per pound to salmon fishermen by species, 1962-1997 ^a

| Year | Chum Salmon | | Chinook Salmon | Pink Salmon | Inconnu | Dolly Varden |
|-------------------|----------------|---------------------|----------------|-------------|---------------------|--------------|
| | Average Weight | Average Price | | | | |
| 1962 | | \$0.35 ^c | | | | |
| 1963 | | \$0.35 ^c | | | | |
| 1964 | 8.3 | \$0.45 ^c | | | | |
| 1965 | 9.0 | \$0.45 | | | \$1.30 ^c | |
| 1966 | 10.1 | \$0.11 | | | \$1.40 ^c | \$0.55 |
| 1967 | 9.3 | \$0.11 | | | \$1.50 ^c | \$0.75 |
| 1968 | 9.7 | \$0.14 | | | \$0.91 ^c | \$0.98 |
| 1969 | 7.5 | \$0.15 | | | \$1.30 ^c | \$2.84 |
| 1970 | 8.1 | \$0.15 | | | | |
| 1971 | 8.1 | \$0.16 | | | \$0.16 | \$0.17 |
| 1972 | 9.1 | \$0.17 | | | \$0.20 | \$0.17 |
| 1973 | 9.1 | \$0.25 | | | \$0.30 | \$0.16 |
| 1974 ^b | 8.5 | \$0.34 | | | \$0.30 | \$0.16 |
| 1975 ^b | 8.6 | \$0.28 | | | \$0.30 | \$0.30 |
| 1976 | 8.9 | \$0.41 | | | \$0.30 | \$0.30 |
| 1977 | 9.6 | \$0.56 | | | \$0.30 | |
| 1978 | 9.1 | \$0.57 | | | \$0.30 | \$0.25 |
| 1979 | 8.8 | \$0.80 | | | | \$0.25 |
| 1980 | 8.6 | \$0.46 | | | \$0.10 | \$0.20 |
| 1981 | 9.1 | \$0.53 | | | \$0.75 | \$0.17 |
| 1982 | 9.3 | \$0.51 | \$1.25 | \$0.15 | \$0.75 | \$0.20 |
| 1983 | 9.4 | \$0.25 | \$1.08 | \$0.13 | | \$0.20 |
| 1984 | 8.2 | \$0.44 | \$1.03 | | | \$0.25 |
| 1985 | 8.7 | \$0.47 | \$1.25 | | | \$0.25 |
| 1986 | 8.7 | \$0.41 | \$1.25 | | | \$0.20 |
| 1987 | 8.2 | \$0.57 | \$1.25 | | | \$0.30 |
| 1988 | 8.7 | \$0.85 | \$1.98 | | | \$0.35 |
| 1989 | 8.5 | \$0.28 | \$1.72 | | | \$0.28 |
| 1990 | 8.9 | \$0.31 | \$2.00 | | | \$0.25 |
| 1991 | 8.1 | \$0.22 | \$1.64 | | \$0.50 | \$0.18 |
| 1992 | 8.3 | \$0.22 | \$1.89 | | \$0.58 | \$0.10 |
| 1993 | 8.5 | \$0.38 | \$2.37 | | \$0.50 | \$0.10 |
| 1994 | 7.8 | \$0.20 | \$1.14 | | | \$0.17 |
| 1995 | 8.0 | \$0.13 | \$1.00 | | \$0.50 | \$0.20 |
| 1996 | 8.0 | \$0.09 | \$1.00 | | \$0.44 | \$0.25 |
| 1997 | 8.0 | \$0.16 | \$1.02 | | | \$0.20 |

information not available for some species in some years.

^b Includes price paid to fishermen of Deering during the experimental commercial fishery.

^c Price per fish.

Appendix Table C.5. Kotzebue District commercial and subsistence salmon catches, 1914-1997.

| Year ^a | Commercial Catch | | | Subsistence Chum Catch | | | |
|-------------------|---------------------|--------------------|---------|------------------------|-------------------------------|-----------------------------|------------------------|
| | Chum ^b | Other ^c | Total | Chum | Number of Fishermen Interview | Average Catch per Fishermen | Total Documented Catch |
| 1914 | 8,550 | | 8,550 | | | | |
| 1915 | 4,750 | | 4,750 | | | | |
| 1916 | 19,000 | | 19,000 | | | | |
| 1917 | 44,612 | | 44,612 | | | | |
| 1918 | 27,407 | | 27,407 | | | | |
| 1957 | | | | 298,430 ^d | | | |
| 1962 | 129,948 | 27 | 129,975 | 70,283 | 81 | 868 | 200,258 |
| 1963 | 54,445 | 143 | 54,588 | 31,069 | 67 | 464 | 85,657 |
| 1964 | 76,499 | 5 | 76,504 | 29,762 | 58 | 513 | 106,266 |
| 1965 | 40,034 | | 40,034 | 30,500 | 89 | 343 | 70,534 |
| 1966 | 30,764 | 1 | 30,765 | 35,588 | 121 | 294 | 66,353 |
| 1967 | 29,400 | | 29,400 | 40,108 | 135 | 297 | 69,508 |
| 1968 | 30,384 | | 30,384 | 20,814 | 65 | 320 | 51,198 |
| 1969 | 59,335 | 48 | 59,383 | 29,812 | 99 | 301 | 89,195 |
| 1970 | 159,664 | | 159,664 | 28,486 | 164 | 174 | 188,150 |
| 1971 | 154,956 | 1 | 154,957 | 23,959 | 152 | 158 | 178,916 |
| 1972 | 169,664 | 3 | 169,667 | 11,085 | 96 | 115 | 180,752 |
| 1973 | 375,432 | 5 | 375,437 | 18,942 | 101 | 188 | 394,379 |
| 1974 | 634,479 | 48 | 634,527 | 26,729 | 88 | 304 | 661,256 |
| 1975 | 563,682 | 36 | 563,718 | 27,605 | 95 | 291 | 591,323 |
| 1976 | 159,796 | 2 | 159,798 | 15,765 | 91 | 173 | 175,563 |
| 1977 | 195,895 | | 195,895 | 9,752 | 83 | 117 | 205,647 |
| 1978 | 111,494 | 7,007 | 118,501 | 12,864 | 85 | 151 | 131,365 |
| 1979 | 141,623 | 910 | 142,533 | 14,605 | 97 | 151 | 157,138 |
| 1980 | 367,284 | 1,654 | 368,938 | 10,945 | 111 | 99 | 379,883 |
| 1981 | 677,239 | 237 | 677,476 | 17,766 | 71 | 250 | 695,242 |
| 1982 | 417,790 | 57 | 417,847 | 30,133 | 204 | 148 | 447,980 |
| 1983 | 175,762 | 229 | 175,991 | 8,262 ^h | 46 | 180 | 184,253 |
| 1984 | 320,206 | 107 | 320,313 | 15,508 ^h | 66 | 235 | 335,821 |
| 1985 | 521,406 | 63 | 521,469 | 13,494 ⁱ | 243 | 56 | 534,963 |
| 1986 | 261,436 | 106 | 261,542 | 36,311 | 837 | 43 | 297,853 |
| 1987 | 109,467 | 44 | 109,511 | | | | 109,511 |
| 1988 | 352,915 | 152 | 353,067 | | | | 353,067 |
| 1989 | 254,617 | 87 | 254,704 | | | | 254,704 |
| 1990 | 163,263 | 32 | 163,295 | | | | 163,295 |
| 1991 | 239,923 | 44 | 239,967 | | | | 239,967 |
| 1992 | 289,184 | 204 | 289,388 | | | | 289,388 |
| 1993 | 73,071 | 131 | 73,202 | | | | 73,202 |
| 1994 | 153,452 | 3 | 153,455 | 36,226 ⁿ | 375 | 97 | 189,681 |
| 1995 | 290,730 | 5 | 290,735 | 102,860 | 593 | 173 | 393,615 |
| 1996 | 82,110 ^m | 3 | 82,113 | 99,740 | 596 | 167 | 181,853 |
| 1997 | 142,720 | 45 | 142,765 | 57,906 | 530 | 109 | 200,671 |
| 1979-97 | | | 1994-97 | | | | |
| Average | 264,958 | 216 | 265,174 | Average 74,188 | 524 | 137 | |

^a There was no commercial fishing during 1919-1961.

^b Catches for 1914-1918 are from pack data only. Number of chum salmon estimate at 9.5 per case (#48) and 34 per barrel.

^c Includes pink, chinook, and sockeye salmon.

^d Estimated mean annual catches prior to 1957 (study by Raleigh).

^e Corrected from 1968 annual report due to addition of late catches.

^f Includes 6,567 chum salmon from the Deering experimental fishery.

^g Includes 10,704 chum salmon from the Deering experimental fishery.

^h Partial survey.

ⁱ Does not include harvest from the villages of Noatak and Kivalina.

^j Not surveyed.

^k Includes 2,000 chum salmon from the Sikusillaq Springs Hatchery terminal fishery.

^l Includes 4,000 chum salmon commercially harvested on August 5 but not sold.

^m Includes 2,200 chum salmon commercially harvested on July 29 but not sold.

ⁿ Does not include the town of Kotzebue.

Appendix T₂ . Kotzebue District subsistence chum salmon catches by village, 1962-1997.

| Year | Village | | | | | | | Village | | | | | | District Total |
|---------------------|---------|-------|--------|----------|-------|----------------|-------------------|----------|---------|----------|----------|--------|------------|-----------------------|
| | Noorvik | Kiana | Ambler | Shungnak | Kobuk | Kobuk River | Noatak Village | Kotzebue | Deering | Kivalina | Buckland | Candle | Shishmaref | |
| 1962 | 15,934 | 3,139 | b | b | 2,321 | 21,394 | 48,890 | b | b | b | b | b | b | 70,284 |
| 1963 | 4,304 | 1,973 | 755 | 1,240 | 200 | 8,472 | 16,762 | 5,835 | b | b | b | b | b | 31,069 |
| 1964 | 2,167 | 783 | 2,142 | 3,134 | 1,020 | 9,246 | 12,763 | 7,753 | b | b | b | b | b | 29,762 |
| 1965 | 5,596 | 1,598 | 1,340 | 2,160 | 877 | 11,571 | 5,671 | 8,058 | 5,200 | b | b | b | b | 30,500 |
| 1966 | 3,141 | 433 | 912 | 899 | 625 | 6,010 | 19,700 | 3,640 | 6,238 | b | b | b | b | 35,588 |
| 1967 | 2,350 | 1,489 | 679 | 1,500 | 175 | 6,193 | 26,512 | 4,032 | 3,098 | b | 162 | 11 | 100 | 40,108 |
| 1968 | 2,424 | 2,488 | 457 | 1,600 | 1,030 | 7,999 | 5,490 | 4,324 | 2,838 | b | 37 | 89 | 37 | 20,814 |
| 1969 | 1,301 | 2,458 | 3,525 | 2,550 | 1,655 | 11,489 | 14,458 | 1,768 | 1,897 | b | - | 200 | - | 29,812 |
| 1970 | 6,077 | 3,457 | 2,899 | 3,450 | 600 | 16,483 | 4,120 | 6,814 | 1,242 | b | 344 | 113 | - | 29,116 |
| 1971 | 7,144 | 5,177 | 2,299 | 2,653 | 1,931 | 19,204 | 9,919 | 1,737 | 763 | b | 155 | 50 | 131 | 31,959 |
| 1972 | 1,744 | 1,435 | 1,469 | 2,665 | 2,119 | 9,432 | 741 | 1,151 | 369 | b | 59 | 113 | 29 | 11,894 |
| 1973 | 2,312 | 4,470 | 1,529 | 4,406 | 1,917 | 14,634 | 216 | 1,172 | 1,098 | b | 1,722 | 50 | 100 | 18,992 |
| 1974 | 6,809 | 2,726 | 1,651 | 6,243 | 2,251 | 19,680 | 4,330 | b | 1,880 | b | 639 | 15 | 200 | 26,744 |
| 1975 | 4,620 | 4,320 | 3,390 | 9,060 | 1,755 | 23,145 | 1,515 | b | 1,175 | b | 1,540 | b | 230 | 27,605 |
| 1976 | 1,555 | 1,579 | 2,000 | 4,213 | 562 | 9,909 | 4,448 | b | 1,358 | b | b | b | b | 15,715 |
| 1977 | 891 | 766 | 385 | 1,760 | 325 | 4,127 | 2,125 | b | 3,500 | b | b | b | b | 9,752 |
| 1978 | 2,034 | 1,493 | 2,224 | 4,766 | 852 | 11,369 | 1,495 | b | b | b | b | 50 | b | 12,914 |
| 1979 | 2,155 | 1,225 | 2,400 | 2,947 | 651 | 9,378 | 2,227 | b | 2,000 | b | 1,000 | b | b | 14,605 |
| 1980 | 2,229 | 2,551 | 660 | 2,704 | 350 | 8,494 | 2,135 | b | b | b | b | b | b | 10,629 |
| 1981 | 3,488 | 1,439 | 782 | 2,800 | 950 | 9,459 | 5,465 | 2,387 | 295 | 110 | 50 | b | b | 17,766 ^{a,c} |
| 1982 | 7,433 | 4,918 | 2,506 | 4,191 | 600 | 19,648 | 5,479 | 4,099 | 807 | 210 | b | b | b | 30,243 ^a |
| 1983 ^{a,d} | 277 | 223 | 1,062 | 3,556 | 368 | 5,486 | 4,035 | 347 | 219 | 200 | b | b | b | 10,287 |
| 1984 ^{a,e} | b | b | 2,990 | 4,241 | b | 7,231 | 6,049 | 88 | 1,940 | 200 | b | b | b | 15,508 |
| 1985 | 7,015 | 3,494 | 3,487 | 3,115 | 300 | 17,411 | b | 13,494 | 573 | b | b | b | b | 31,478 |
| 1986 | 8,418 | b | b | 4,483 | b | 12,901 | 1,246 | 36,311 | b | b | b | b | b | 50,458 |
| 1987 | 5,092 | b | b | 1,975 | b | 7,067 | 2,921 | b | b | b | b | b | b | 9,988 |
| 1988 | 7,500 | b | b | 6,223 | b | 13,723 | b | b | b | b | b | b | b | 13,723 |
| 1989 | b | b | b | 3,894 | b | 3,894 | 1,595 | b | b | b | b | b | b | 5,489 |
| 1990 | 4,353 | b | b | b | b | 4,353 | 3,915 | b | b | b | b | b | b | 8,268 |
| 1991 | 6,855 | b | b | 4,248 | b | 11,103 | 3,637 | b | b | b | b | b | b | 14,740 |
| 1992 | 8,370 | b | b | 3,890 | b | 12,260 | 2,043 | b | b | b | b | b | b | 14,303 |
| 1993 | 8,430 | b | b | 3,730 | b | 12,160 | 3,270 | b | b | b | b | b | b | 15,430 |
| 1994 | 8,157 | 1,891 | 2,860 | 7,982 | 5,722 | 26,612 | 6,126 | b | 3,488 | b | b | b | b | 36,226 |
| 1995 | 15,485 | 5,985 | 8,558 | 5,880 | 2,959 | 38,867 | 6,359 | 50,708 | b | b | b | b | 6,947 | 102,881 |
| 1996 | 13,611 | 5,935 | 9,062 | 8,649 | 1,819 | 39,076 | 10,091 | 50,573 | b | b | b | b | b | 99,740 |
| 1997 | 14,323 | 3,064 | 2,713 | 5,513 | 629 | 26,242 | 5,309 | 26,355 | b | b | b | b | b | 57,906 |

^a No household survey, information is from return of mail questionnaires.

^b Not surveyed.

^c Does not include 310 chum salmon taken in Selawik.

^d Household surveys were conducted in Noatak, Kivalina, and Shungnak only. Other harvest information is from limited return of mail-in calendars.

^e Household surveys were conducted in Noatak, Kivalina, Ambler, and Deering. Other harvest information is from limited return of mail-in questionnaires.

Appendix Table C.7. Kotzebue District mean subsistence chum salmon catch per fisherman by village, 1962-1997.

| Year | Kotzebue | Noatak | Noorvik | Kiana | Ambler | Shungnak | Kobuk | Deering |
|-------------------|--------------|------------------|--------------|--------------|--------------|--------------|--------------|--------------|
| 1962 | ^a | 1190 | 665 | 350 | ^a | ^a | 335 | ^a |
| 1963 | 650 | 800 | 160 | ^b | 94 | ^b | 67 | ^a |
| 1964 | 515 | 710 | 220 | 260 | 310 | ^a | 205 | ^a |
| 1965 | 400 | 810 | 220 | 265 | 190 | 220 | 145 | ^a |
| 1966 | 158 | 820 | 137 | 62 | 76 | 45 | 104 | ^a |
| 1967 | 202 | 914 | 90 | 68 | 49 | 125 | 35 | ^a |
| 1968 | 135 | 220 | 84 | 96 | 33 | 114 | 206 | ^a |
| 1969 | 98 | 760 | 163 | 223 | 235 | 318 | 206 | ^a |
| 1970 | 187 | 242 | 132 | 138 | 242 | 182 | 150 | ^a |
| 1971 | 53 | 148 | 223 | 207 | 177 | 133 | 386 | ^a |
| 1972 | 63 | 74 | 84 | 84 | 244 | 266 | 302 | ^a |
| 1973 | 195 | 36 | 121 | 178 | 305 | 489 | 273 | ^a |
| 1974 | ^a | 393 | 324 | 181 | 165 | 891 | 450 | ^a |
| 1975 | ^a | 138 | 210 | 288 | 282 | 647 | 293 | ^a |
| 1976 | ^a | 212 | 259 | 79 | 250 | 281 | 70 | ^a |
| 1977 | ^a | 425 | 56 | 38 | 55 | 104 | 41 | ^a |
| 1978 | ^a | 79 | 88 | 71 | 131 | 265 | 142 | ^a |
| 1979 | ^a | 114 | 98 | 68 | 160 | 184 | 108 | ^a |
| 1980 | ^a | 164 | 318 | 213 | 132 | 246 | 88 | ^a |
| 1981 | 213 | 579 | 388 | 131 | 129 | 233 | 317 | ^a |
| 1982 | 84 | 189 | 323 | 246 | 167 | 262 | 200 | 81 |
| 1983 ^c | 50 | 269 | 139 | 223 | 531 | 254 | 368 | 44 |
| 1984 | 44 | 173 | ^a | ^a | 214 | 303 | ^a | 194 |
| 1985 | 107 | ^a | 206 | 116 | 152 | 195 | 50 | 72 |
| 1986 | 47 | 69 ^d | 271 | ^a | ^a | 195 | ^a | ^a |
| 1987 | ^a | 225 ^d | 189 | ^a | ^a | 329 | ^a | ^a |
| 1988 | ^a | ^a | 300 | ^a | ^a | 389 | ^a | ^a |
| 1989 | ^a | 133 | ^a | ^a | ^a | 216 | ^a | ^a |
| 1990 | ^a | 135 | 198 | ^a | ^a | ^a | ^a | ^a |
| 1991 | ^a | 145 | 311 | ^a | ^a | 283 | ^a | ^a |
| 1992 | ^a | 89 | 310 | ^a | ^a | 243 | ^a | ^a |
| 1993 | ^a | 136 | 312 | ^a | ^a | 196 | ^a | ^a |
| 1994 ^e | ^a | 90 | 133 | 32 | 99 | 154 | 260 | 92 |
| 1995 | 71 | 69 | 123 | 59 | 110 | 111 | 110 | ^a |
| 1996 | 73 | 115 | 117 | 58 | 111 | 154 | 76 | ^a |
| 1997 | 41 | 71 | 125 | 35 | 39 | 117 | 28 | ^a |

^a Not Surveyed.

^b Number of fishermen not known.

^c Means based on very limited number of mail-in calendars except for the villages of Noatak and Shungnak where interviews were conducted.

^d Partial harvest, fishermen were just beginning to fish.

^e Preliminary information based on interviews conducted by Division of Subsistence.

Appendix Table C.8. Chum salmon aerial survey counts for the Kotzebue District, 1962-1997^{a,b}. (p. 1 of 4)

| Stream | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 |
|-------------------------------------|---------------------------|----------------------|--------------------|----------------------|----------------|--------------------------|--------------------|--------------------|--------------------------|
| Noatak Drainage | | | | | | | | | |
| Noatak River below Kelly River | 168,000 ^d | 1,970 ^{h,i} | 89,798 | 6,152 ^{h,i} | 101,640 | 29,120 ^b | 39,394 | 33,945 | |
| Eli River | 9,080 ^d | 35 | | | 120 | | 5,502 ^f | 68 ^f | 138,145 |
| Kelly River & Lake | 1,818 ^d | 600 | | 3,155 | 570 | 225 | 375 | 150 | |
| Noatak River System Total | 178,898 | 2,605 | 89,798 | 9,307 | 102,330 | 29,345 | 45,271 | 34,163 | |
| Kobuk Drainage | | | | | | | | | |
| Kobuk to Pah River | | 400 | | 1,750 | 266 | | 530 | | |
| Pah River to just below Selby River | | 1,530 | | 500 | | | 50 | | 1,753 |
| Selby River mouth & Slough | | 1,045 | | 500 | 630 | 1,625 | 70 | | 20 |
| Selby R. mouth to Beaver C. | | 1,095 | | | | 75 | 170 | | 4,820 |
| Beaver Creek mouth | | | | | 460 | 795 | 1,550 | | 2,385 |
| Above Beaver Creek | | 465 | | | 118 | | | | 4,930 |
| Upper Kobuk River Total | 9,224 ^d | 4,535 | 7,985 ^g | 2,750 | 1,474 | 2,495 | 2,370 | 7,500 ^f | 13,908 |
| Squirrel River | 5,834 ^d | 2,200 | 8,009 | 7,230 | 1,350 | 3,332 | 6,746 | 6,714 | |
| Salmon River | 12,936 ^d | 1,535 | 9,353 | 1,500 ^b | 3,957 | 2,116 | 3,367 | 2,561 | 4,418 |
| Tutuksuk River | 10,841 ^d | 670 | 2,685 | | 1,383 | 169 | 823 ^{b,c} | 159 | 3,000 ^b |
| Kobuk River System Total | 38,835^e | 8,940 | 28,032 | 11,480 | 8,164 | 8,112^c | 13,306 | 16,934 | 2,000^b |

(continued)

Appendix Table C.8. (p. 2 of 4)

| Stream | 1971 | 1972 ^b | 1973 ^b | 1974 | 1975 | 1976 | 1977 ^k | 1978 | 1979 | 1980 |
|-------------------------------------|--------------------|--------------------|--------------------------|---------------------|--------------------|--------------------------|---------------------------|--------------------------|---------------------|--------------------|
| Noatak Drainage | | | | | | | | | | |
| Noatak River below Kelly River | 41,056 | 64,315 | 32,144 | 129,640 | 96,509 | 44,574 | 11,221 | 37,817 | 15,721 ^b | 164,474 |
| Eli River | | 3,286 | | 22,249 | 1,302 | 1,205 | 742 | 5,525 | 1,794 | 10,277 |
| Kelly River & Lake | | | 2,590 ^f | 1,381 ^f | 3,937 | 217 ^h | 290 ^b | 168 ^b | 3,200 ^g | 7,416 |
| Noatak River System Total | 41,056 | 64,315 | 34,734 | 153,270 | 101,748 | 45,996 | 12,253^b | 43,510 | 20,715 | 182,167 |
| Kobuk Drainage | | | | | | | | | | |
| Kobuk to Pah River | 4,953 | | | 2,255 | 1,873 | 485 | | 269 | 75 | 1,694 |
| Pah River to just below Selby River | 2,039 | 1,865 | | 4,710 | 3,968 | 2,037 | | 1,448 | 183 | 2,069 |
| Selby River mouth & slough | 3,490 | 7,400 | | 7,380 | | | | 211 | 1,110 | |
| Selby R. mouth to Beaver C. | 4,720 | 3,170 | 920 | 13,775 ^e | 4,861 ^e | | | 53 | 640 | 6,925 ^d |
| Beaver Creek mouth | 2,000 | 3,000 | 850 | | | | | | | 784 |
| Above Beaver Creek | | 2,720 | 700 | | | | | | | |
| Upper Kobuk River Total | 17,202 | 18,155 | 2,470^b | 28,120 | 10,702 | 2,522^b | | 1,981^b | 2,008 | 11,472 |
| Squirrel River | 6,628 | 32,126 | 12,345 | 32,523 | 32,256 | 7,229 | 1,964 ^b | 1,863 ^b | 1,500 ^g | 13,563 |
| Salmon River | 5,453 | 2,073 ^b | 6,891 | 29,190 | 9,721 | 1,161 | | 814 ^b | 674 ^h | 8,456 |
| Tutuksuk River | 1,384 ^f | | | 8,312 | 1,344 ^b | 758 | | 368 ^b | 382 ^h | 1,165 |
| Kobuk River System Total | 30,667 | 52,354 | 21,706 | 98,145 | 54,023 | 11,670 | 1,964 | 5,026 | 4,564 | 34,656 |

(continued)

| Stream | 1981 ^a | 1982 ^b | 1983 | 1984 | 1985 ^b | 1986 ^b | 1987 ^a | 1988 ^a | 1989 ^f | 1990 ^b |
|-------------------------------------|---------------------|--------------------|---------------|---------------|--------------------|-------------------|---------------------|----------------------|-------------------|---------------------|
| Noatak Drainage | | | | | | | | | | |
| Noatak River below Kelly River | 116,352 | 20,682 | 79,773 | 67,873 | 45,525 | 37,227 | 5,515 ^{hi} | 45,930 ^{hi} | | 23,345 ^b |
| Eli River | | 189 | 3,044 | 5,027 | 855 | 4,308 | 2,780 | 8,639 | | 3,000 |
| Kelly River & Lake | 13,770 | 11,604 | 12,137 | 3,499 | 1,200 | 839 | 950 | 1,460 | | 325 ^f |
| Noatak River System Total | 130,122 | 32,475 | 94,954 | 76,399 | 47,580 | 42,374 | 9,245 | 56,029 | | 26,670 |
| Kobuk Drainage | | | | | | | | | | |
| Kobuk to Pah River | 18 | 2,643 ^b | 2,147 | 402 | 2,048 ^f | 531 | | | | 4,610 |
| Pah River to just below Selby River | 309 | 598 ^b | 2,433 | 257 | 241 ^f | 511 | 2,250 | 1,135 ^a | | 305 |
| Selby River mouth & slough | 8,321 ^{4a} | 2,454 | 11,683 | | 711 ^f | 673 | 1,470 | 820 ^b | | 420 |
| Selby R. mouth to Beaver C. | | 7,268 | 13,011 | 5,910 | 3,278 ^f | 3,282 | 1,350 | 6,890 ^b | | 7,505 |
| Beaver Creek mouth | | 1,711 | 3,059 | | | | | | | |
| Above Beaver Creek | | | 1,413 | 4,052 | | 1,018 | 3,140 | 3,050 ^b | | 2,515 |
| Upper Kobuk River Total | 8,648 | 14,674 | 33,746 | 10,621 | 6,278 | 6,015 | 8,210 | 11,895 ^b | | 15,355 |
| Squirrel River | 9,854 | 7,690 | 5,115 | 5,473 | 6,160 | 4,982 | 2,708 ^c | 4,848 ^b | | 5,500 |
| Salmon River | 4,709 | 1,821 ^a | 1,677 | 1,471 | 2,884 | 1,971 | 3,333 | 6,208 | | 6,335 |
| Tutuksuk River | 1,114 | 1,322 | 2,637 | 1,132 | 5,098 | 4,257 | 206 | 3,122 | | 2,275 |
| Kobuk River System Total | 24,325 | 25,507 | 43,175 | 18,697 | 20,420 | 17,225 | 14,457 | 26,073 | | 29,465 |

(continued)

Appendix Table C.8. (p. 4 of 4)

| Stream | 1991 | 1992 ^a | 1993 | 1994 ⁱ | 1995 | 1996 | 1997 | Aerial Escapement Goals |
|-------------------------------------|---------------|-------------------|---------------|-------------------|----------------|----------------|--------------------------|-------------------------|
| Noatak Drainage | | | | | | | | |
| Noatak River below Kelly River | 82,750 | 34,335 | 25,415 | | 147,260 | 306,900 | | ⁱ |
| Eli River | 2,940 | 701 | 4,795 | | 7,860 | 30,040 | | ⁱ |
| Kelly River & Lake | 654 | 726 | 9 | | 8,384 | 1,427 | 2,792 | |
| Noatak River System Total | 86,344 | 35,762 | 30,219 | | 163,504 | 338,367 | | 84,000 |
| Kobuk Drainage | | | | | | | | |
| Kobuk to Pah River | 9,840 | 1,030 | 3,896 | | 12,190 | 20,700 | 2,248 ^b | |
| Pah River to just below Selby River | 2,780 | 3,820 | 1,535 | | 4,537 | 4,600 | 404 ^b | |
| Selby River mouth & slough | 1,040 | 1,500 | 1,800 | | 1,250 | 4,100 | 662 ^b | |
| Selby River | 1,460 | 868 | 824 | | 3,364 | 14,950 | 853 ^b | |
| Selby R. mouth to Beaver C. | 5,250 | 3,845 | 929 | | 10,898 | 15,480 | 2,582 ^b | |
| Beaver Creek mouth | | | | | | | 914 ^b | |
| Above Beaver Creek | 4,155 | 740 | 3,174 | | 3,486 | 14,940 | 850 ^b | |
| Upper Kobuk River Total | 24,525 | 11,803 | 12,158 | | 35,725 | 74,770 | 8,513^b | 10,000 |
| Squirrel River | 4,606 | 2,765 | 4,463 | | 10,605 | 10,740 | 4,779 ^b | 11,500 |
| Salmon River | 5,845 | 1,345 | 13,880 | | 13,988 | 23,790 | 1,181 ^b | 7,000 |
| Tutuksuk River | 744 | 1,162 | 1,196 | | 3,901 | 21,805 | 163 ^b | 2,000 |
| Kobuk River System Total | 35,720 | 17,075 | 31,697 | | 64,219 | 131,105 | | 30,500 |

^a Three aerial surveys are attempted yearly at different intervals for each tributary to assess escapements prior to the peak, at the peak and after the peak of the run. Indices listed in this table are the largest survey observed for each tributary during the given year.

^b Poor survey conditions or incomplete, early or late survey.

^c Survey by foot or boat.

^d These fish are unidentified salmon, mostly chums.

^e This figure includes fish observed from just above Selby Slough to the mouth of the Reed River

^f Unresolvable discrepancies in historical data put this figure in question

^g Unclear where these fish were observed.

^h The figures in this table have been corrected and supercede figures in previous reports

ⁱ Surveyed well before peak of migration.

^j Unacceptable conditions.

Appendix Table C9. Kotzebue District commercial age and sex composition of chum salmon, 1962-1997. ^a

| Year | Sample Size | Percent | | Percent Age Class | | | | |
|--------------------------|-------------|---------|---------|-------------------|-------|-------|-------|-------|
| | | Males | Females | Age-3 | Age-4 | Age-5 | Age-6 | Age-7 |
| 1962 | 69 | 26.1 | 73.9 | 7.2 | 63.8 | 27.5 | 1.4 | 0.0 |
| 1963 | 255 | 34.9 | 65.1 | 30.2 | 51.0 | 18.4 | 0.4 | 0.0 |
| 1964 | 463 | 43.6 | 56.4 | 52.9 | 44.9 | 1.7 | 0.4 | 0.0 |
| 1965 | 480 | 42.1 | 57.9 | 2.3 | 91.0 | 6.7 | 0.0 | 0.0 |
| 1966 | 430 | 40.2 | 59.8 | 10.0 | 67.2 | 22.8 | 0.0 | 0.0 |
| 1967 | 1,865 | 37.3 | 62.7 | 8.8 | 72.2 | 18.5 | 0.5 | 0.0 |
| 1968 | 1,989 | 48.2 | 51.8 | 21.2 | 58.1 | 19.8 | 0.9 | 0.0 |
| 1969 | 1,125 | 53.7 | 46.3 | 36.8 | 58.3 | 4.9 | 0.0 | 0.0 |
| 1970 | 267 | 45.3 | 54.7 | 3.7 | 91.0 | 5.2 | 0.0 | 0.0 |
| 1971 | 1,105 | 54.6 | 45.4 | 7.1 | 66.8 | 26.1 | 0.0 | 0.0 |
| 1972 | 980 | 50.9 | 49.1 | 15.8 | 59.5 | 24.1 | 0.6 | 0.0 |
| 1973 | 598 | 46.0 | 54.0 | 16.7 | 69.4 | 13.9 | 0.0 | 0.0 |
| 1974 | 350 | 47.1 | 52.9 | 28.6 | 63.4 | 7.7 | 0.3 | 0.0 |
| 1975 | 340 | 46.5 | 53.5 | 2.6 | 86.8 | 10.6 | 0.0 | 0.0 |
| 1976 | 566 | 47.9 | 52.1 | 11.1 | 51.4 | 37.3 | 0.2 | 0.0 |
| 1977 | 446 | 49.3 | 50.7 | 6.7 | 72.9 | 18.6 | 1.8 | 0.0 |
| 1978 | 579 | 49.9 | 50.1 | 10.5 | 57.5 | 31.8 | 0.2 | 0.0 |
| 1979 ^b | 658 | 53.3 | 46.7 | 30.5 | 53.2 | 15.2 | 1.1 | 0.0 |
| 1980 ^c | 710 | 56.3 | 43.7 | 15.1 | 78.2 | 6.6 | 0.1 | 0.0 |
| 1981 ^d | 1,167 | 52.4 | 47.6 | 2.4 | 67.1 | 30.5 | 0.0 | 0.0 |
| 1982 | 983 | 48.8 | 51.2 | 5.9 | 48.3 | 40.3 | 5.5 | 0.0 |
| 1983 ^e | 1,979 | 43.4 | 56.6 | 5.8 | 57.7 | 34.2 | 2.3 | 0.0 |
| 1984 ^f | 2,933 | 50.2 | 49.8 | 14.6 | 64.4 | 19.7 | 1.3 | 0.0 |
| 1985 ^g | 3,293 | 47.8 | 52.2 | 0.4 | 83.7 | 15.5 | 0.4 | 0.0 |
| 1986 ^h | 3,095 | 46.0 | 54.0 | 0.3 | 18.6 | 78.9 | 2.2 | 0.0 |
| 1987 ⁱ | 1,987 | 52.0 | 48.0 | 15.0 | 43.0 | 31.0 | 11.0 | 0.0 |
| 1988 | 3,324 | 48.0 | 52.0 | 6.5 | 74.8 | 16.9 | 1.7 | 0.1 |
| 1989 | 3,336 | 49.3 | 50.7 | 0.7 | 77.9 | 20.4 | 1.0 | 0.0 |
| 1990 ^j | 2,497 | 49.4 | 50.6 | 2.3 | 45.6 | 50.7 | 1.4 | 0.0 |
| 1991 | 3,292 | 46.4 | 53.6 | 2.9 | 60.4 | 35.8 | 0.9 | 0.0 |
| 1992 ^k | 3,706 | 39.0 | 61.0 | 0.9 | 58.5 | 37.5 | 3.1 | 0.0 |
| 1993 ^l | 3,707 | 50.9 | 49.1 | 2.9 | 26.3 | 66.5 | 4.2 | 0.1 |
| 1994 ^m | 3,744 | 44.8 | 55.2 | 3.3 | 63.0 | 30.8 | 2.9 | 0.0 |
| 1995 | 4,621 | 50.9 | 49.1 | 2.3 | 59.8 | 36.0 | 1.9 | 0.0 |
| 1996 ⁿ | 2,386 | 50.9 | 49.1 | 0.9 | 36.9 | 52.3 | 9.5 | 0.4 |
| 18 Year Avg. (1979-1996) | | 47.8 | 52.2 | 6.8 | 58.1 | 32.9 | 2.3 | 0.0 |
| 1997 | 4,824 | 57.6 | 42.4 | 1.4 | 28.7 | 58.3 | 10.2 | 1.4 |

^a Commercial periods not sampled for years 1962 to 1978 are unknown.

^b Commercial openings 1 and 10 not sampled due to period closure.

^c Commercial openings 8, 13, and 15 not sampled due to period closure.

^d Commercial openings 8, 10, 12, and 14 not sampled due to period closure.

^e Commercial openings 11, 13, 14, and 15 not sampled due to period closure.

^f Commercial openings 14 and 15 not sampled due to period closure.

^g Commercial openings 1, 3, 5, 7, 9, 11, and 13 not sampled due to period closure.

^h Commercial opening 15 not sampled due to period closure.

ⁱ Commercial openings 1, 2, 4, 6, 7, 8, 10, 11, 14, and 15 not sampled due to period closure.

^j Commercial openings 11 to 15 not sampled due to period closure.

^k Commercial opening 12 was not sampled due to period closure.

^l Commercial openings 6, 8, 10, 11, 12, 13, 14 and 15 were closed periods. Closed periods were sampled for age and sex composition from commercial test nets and are included in the 1993 data.

^m Commercial openings 14 and 15 were closed periods. Closed periods were sampled for age and sex composition from commercial test nets and are included in the 1994 data.

ⁿ The equivalent of commercial periods 8, 10, 11 and 15 were closed periods. These periods were sampled for age composition from commercial test nets and are included in the 1996 data.

Section 2: PACIFIC HERRING

(Includes Norton Sound and
Port Clarence/Kotzebue Districts)

SECTION 2 - PACIFIC HERRING

INTRODUCTION

Boundaries

The Norton Sound District consists of all waters of Alaska between the latitude of the western most tip of Cape Douglas and the latitude of Canal Point Light (Figures 10). The Port Clarence District consists of all waters of Alaska between the latitude of Cape Douglas and the latitude of Cape Prince of Wales. The Kotzebue Sound District consists of all waters of Alaska between the latitude of Cape Prince of Wales and the latitude of Point Hope (Figure 11).

Spawning Areas and Timing

The arrival of Pacific herring on the spawning grounds is greatly influenced by climate and oceanic conditions, particularly the extent and distribution of the Bering Sea ice pack. Most herring spawning populations appear near the eastern Bering Sea coast immediately after ice breakup between mid-May and mid-June. Spawning progresses in a northerly direction and may continue into July or August along portions of the Seward Peninsula or within the Chukchi Sea.

The primary spawning areas within Norton Sound have been from Stuart Island to Tolstoi Point. When sea ice has remained in this area into June, spawning has been more extensive along Cape Denbigh and several locations along the northern shore of Norton Sound between Bald Head and Bluff. More northerly spawning areas have been more difficult to identify due to small herring stock sizes and limited investigations. Likely spawning areas include Imuruk Basin, Shishmaref Inlet, Deering-Kiwalik coast, and Hotham Inlet.

NORTON SOUND DISTRICT

Fishing History

Pacific herring (*Clupea harengus pallasii*) have been utilized for subsistence purposes by coastal residents prior to the mid-1800's when their use was first documented by early explorers. The earliest American commercial effort on Bering Sea herring apparently took place in the early part of this century at Golovin Bay in Norton Sound (Appendix Table D1).

Food Herring

Early records indicate that about 3,200 short tons of "fall herring" were processed in Norton Sound from 1916 to 1941 (Appendix Table D1). This fishery was dependent on salt curing and declined because of poor marketing conditions arising from foreign competition. The Japanese began gillnetting in Norton Sound during 1968 with three vessels. Effort was concentrated about 12 miles offshore between St. Michael and Golovin. Approximately 40 Japanese vessels reported harvesting a record 1,400 short tons (st) of herring during 1969 (Appendix Table D2). An average annual harvest of approximately 440 st was reported in Norton Sound by the Japanese during 1968-1974. The Japanese gillnet fishery was prohibited in 1977.

Sac Roe

Domestic commercial effort resumed in Norton Sound in 1964 near Unalakleet and continued on a sporadic basis until 1979. Between 1964 and 1978 the fishery averaged about 14 short tons of herring annually and targeted on "spring herring" for sac roe extraction (Appendix Table D1). In 1979, a domestic herring fishery for sac roe began on a larger scale in Norton Sound when approximately 1,292 short tons (st) of herring were taken by 63 fishermen (13 purse seiners, 50 gillnetters). Purse seiners took 70% of the total catch.

After the 1979 season, the Alaska Board of Fisheries adopted a public proposal which made gillnets and beach seines the only legal commercial herring fishing gear within Norton Sound. A purse seine fishery could only be opened if the gillnet fleet could not take the allowable harvest. This regulation was an attempt to encourage involvement of local fishermen in this developing fishery. During the 1980 season, 294 gillnet fishermen harvested 2,452 short tons of herring (Appendix Table D3). Because gillnet fishermen demonstrated that they were capable of taking the available harvest, a regulation was passed in 1981 which prohibited any purse seine gear within Norton Sound.

Prior to the 1984 season, the harvest by beach seine fishermen was negligible. During 1984, ten beach seine fishermen harvested 327 st. During their 1984 fall meeting, the Board of Fisheries set a beach seine gear limit of 100 fathoms and limited the harvest to "not exceed 10 percent of the total herring sac roe harvest projection as published by the department." During the fall 1987 Board of Fisheries meetings, beach seine gear was further restricted to a limit of 75 fathoms. Beach seine harvests since 1985 have averaged 6.3% of the total reported harvest.

As with any developing fishery, fishing effort increased with each successive season. In 1984 Norton Sound became a Super-Exclusive Use herring fishing district in order to slow growth and bolster local involvement, but with only limited success. The 1987 season had the highest level of fishing effort on record with a total of 564 fishermen making at least one delivery, where 559 gillnet and 22 beach seine permits recorded landings. This was more than twice the average effort

from 1980 through 1986. Local Norton Sound area residents accounted for 36% of the effort and 29% of the total harvest.

A public proposal to the fall 1987 Board of Fish was adopted that changed the Norton Sound Herring Fishing District to Limited Entry status. Beginning with the 1988 season, a moratorium was placed on Norton Sound where no new entrants were allowed into the fishery. The Limited Entry Commission is reviewing and awarding limited entry permits to fishermen based on fishing history and will eventually reduce the total number to 301 gillnet and 4 beach seine permits as directed by the Board of Fish. Currently, most fishermen have already received limited entry permits and others are still fishing with interim-use permits while their eligibility is being evaluated on a case-by-case basis.

Commercial harvests from 1981-1984 averaged 4,137 st, and ranged from a low of 3,662 st in 1984 to 4,582 st in 1983 (Appendix Table D3). From 1985-1988, commercial herring harvests averaged 4,374 st, ranging from a low of 3,548 st in 1985 to a high of 5,194 st in 1986. And most recently, from 1989-1991, harvests have averaged 5,596 st, ranging from 4,743 st in 1989 to 6,373 st in 1990. Stock status, product value and climatic factors influence level of commercial harvest.

Spawn on Kelp

A small-scale spawn-on-kelp (*Fucus*) fishery existed in Norton Sound from 1977 to 1984. Harvests during the 1977-1984 period ranged from less than one ton (1977) to approximately 46 st (1981). In addition, during the 1984 season, one ton of macrocystus kelp was imported into Norton Sound resulting in a harvest of approximately 3 st of product. In response to a public proposal, a Board of Fisheries action prior to the 1985 season resulted in the closure of all spawn-on-kelp fisheries in Norton Sound.

Management Strategies

The overall statewide management strategy is to annually harvest 0-20% of the herring biomass. The upper end of the exploitation range is applied to stocks in good condition. The lower end of the exploitation range is applied to stocks that are exhibiting a trend of decreasing abundance and poor recruitment. If a minimum threshold level is not achieved, 7,000st for Norton Sound, no commercial fishery will be allowed.

Typically herring are long lived fish and will usually remain harvestable for at least 5 years after recruiting into the fishery. Harvesting only a percentage of the biomass ensures that some fish will be held over for following years. This type of strategy helps mitigate population fluctuations caused by successive years of poor recruitment, a common occurrence in marine spawning fish. Prior to 1983, harvests in Norton Sound were regulated on a subdistrict basis so harvests would be

dispersed over the entire fishing grounds. This was to prevent harvest efforts from concentrating in one area on what was then thought to be a distinct stock of fish.

Since methods to reliably forecast herring returns are still being developed and estimates of recruitment are not available, in-season assessments of biomass supersede the projected biomass for management of the Norton Sound herring fishery. The herring biomass is managed for a 20% exploitation rate if the in-season aerial biomass surveys and age class composition information indicate the run will achieve at least the preseason biomass projection. If the run does not materialize as projected, the harvest exploitation rate may be reduced to a lower level.

Generally, fisheries management staff have tried to set fisheries openings to allow gillnetters to fish the flood tide as it crests. The belief that the ripe females approach the beach at that time to spawn figures heavily in this strategy. The Norton Sound fishery covers a large area with varying tides. Because the large gillnet fleet can't "fit" into individual subdistricts, opening at the optimal time throughout the district is not always possible. The fishing fleet must be flexible to maximize catches.

The magnitude of beach seine openings is dependent on herring abundance near the beach and favorable weather conditions for spotters and fishing. Beach seiners prefer to work flood tides similar to those gillnetters favor, however, fisheries managers frequently provide less optimal fishing times. The beach seiners have shown the ability to harvest their allotment of 10% of the preseason harvest goal in a single three hour opening under ideal conditions. By the nature of the gear, beach seiners have the potential to wrap up large numbers of fish which could potentially exceed their allocation. Therefore, the management staff have often chosen to reduce the beach seine efficiency by allowing a gillnet opening to occur before the beach seine opening in order to break up school size and reduce the likelihood of excessive harvests. Occasionally, the beach seine fleet has been used to test the roe quality of herring newly arrived in nearshore waters prior to a gillnet opening where the potential for waste would have been great had the entire gillnet fleet fished on poor quality herring.

1997 SEASON SUMMARY

The 1997 Norton Sound herring fishery opened by emergency order on May 20. A total of four gill net openings occurred for 20.0 hours of fishing and two beach seine opening for 6.0 hours of fishing. An educational opening was announced this year to occur on May 24. The total harvest based on fish ticket data was 3,971.4 short tons (st) of herring (Appendix Table D3). Commercial harvest by subdistrict is presented in Appendix Table D4.

A total of 220 fishermen made at least one delivery during the season. During the 1997 season, 214 fishermen used gill nets, landing a total of 3,459 st. The average sac roe recovery for gill net caught herring was 10.0%. Six fishermen participated in the beach seine fishery, landing 513 st of herring.

The average sac roe recovery for beach seine caught herring was 9.2%. The average sac roe recovery for all gear types was 9.9 %. An effort was made to separate beach seiners from the gill net fleet to prevent gear conflicts and to enable the Department to better monitor the beach seine fishery. The location of the beach seine fishery utilized different beaches than the gill net fishery.

There were 9 companies present on the grounds during the season to purchase herring. Two of these companies combined to report as one buyer during the fishery. These 9 companies registered 9 processors and 46 tenders. Based on final operations reports, the average price advanced for a short ton of 10% roe herring was approximately \$153.94. Of the 3,708.7 st harvested, 262.6 st were purchased as bait herring (roe % generally less than 7.5%, ranging from 7.0% to 8.0%) for which fishermen received an average of \$50.00 per ton. The total value of the herring harvest to Norton Sound fishermen was approximately \$612,061.

Effective in the 1995 season, a holder of a valid CFEC interim use or limited use permit may take but not sell up to one ton (2,000 lb.) of herring for use as bait in the commercial fishery for which the permit is held (5AAC 27.971). In 1997, approximately 1000 lb. of herring in the Nome subdistrict was taken under this regulation.

During 1997, 17 surveys were flown between May 13 and June 2 (Table 17, 18). Survey conditions were generally good. Herring were first sighted during an aerial survey flown on May 17 and spawn was first observed on May 19. The peak aerial survey count was made on May 27 when 43,815 tons was sighted. This is the most herring ever observed in one day in Norton Sound. The 1997 herring biomass of 47,791 tons was estimated by combining the aerial survey estimate of 43,815 tons with the commercial harvest of 3,971 tons and 5 tons of estimated wastage. The preseason biomass estimate was 19,657 tons.

Fishery Management/Emergency Orders

In recent years, the fishery managers have taken a more aggressive attitude in allowing commercial openings. During 1997, low prices caused fewer fishers to participate in the fishery and the reduced harvest guideline caused less buyers and tenders to participate. Storms also delayed the arrival of many boats in Norton Sound. The older herring arrived fairly early and with mature roe. Because the participation was judged to be low, management staff opened earlier than normal to extend the time in which the fishery could occur. This strategy worked well with a minimal impact to roe quality. It did require an assumption that more herring would arrive later so that the high exploitation rates on the early arriving herring would be offset to levels mandated by regulation. The preseason guideline is based on a model of average survivals of the various returning age classes. Staff believed the preseason guideline harvest was conservative due to the poor survey data from 1996. As it was more herring arrived than were anticipated.

The first confirmed sighting of herring was made on a May 17 aerial survey. Biomass built gradually. Roe maturity tested well on the first samples and improved over the next three days.

Immature fish were in low abundance by May 19. The first gillnet opening was announced to occur on May 20. Although the harvest was small due to a low level of participation, the quality was good. A second gillnet opening was called the following day and the quality of the harvest remained high and participation was low. On May 22, The level of participation increased with the arrival of more of the fleet and the roe quality remained high. The last gill net and the first beach seine opening occurred May 23. The abundance of high roe quality herring began to decline on May 23 and there was a significant decline in abundance by May 24. The decline in abundance did not have much affect on the harvest during the last beach seine opening which produced over twice the first period's harvest. Beach Seiners were able to fish in an area where herring were still preparing to spawn.

The second wave of the herring migration arrived in nearshore waters just as the first wave was completing spawning and beginning their offshore migration. The second wave of fish was composed of some older fish, but the younger age classes predominated. The peak aerial survey count was made on May 27 when the all time record biomass observation of 47,748 st. was estimated. The biomass declined rapidly after that date.

Catch Reporting and Enforcement

Buyers registered for the 1997 season were required to report herring purchases daily (8:30 a.m.) and three hours following the closure of each period. As in past years, due to the scheduling of successive openings by gear type, clean-up catch reports were requested as soon as catch figures could become available. In general, compliance with requested catch reports was very good. The VHF radio turned out to be the communication equipment of choice due to the range of the SSB radio equipment. Communications with the field camps was accomplished with marine VHF, SSB or by aircraft radio from the aerial survey plane.

Protection efforts in Norton Sound consisted of 4 single engine aircraft (three super cubs on wheels, one super cub on floats, and a R-22 helicopter) and 2 small boats. Personnel consisted of 7 permanent, full-time Fish and Wildlife Protection officers, 2 seasonal assistants and a US Fish and Wildlife agent. Fish and Wildlife protection boarded 879 vessels statewide during the 1997 herring fishing season. Using this information 22 citations were issued during the Norton Sound fishery. Seven of these were for vessels or permit holders violating superexclusive regulations. Five boats were seized. Other citations were issued for violations including fishing an extra shackle of gear, and buying from a fisher without a permit. Fish and Wildlife Protection officers patrolled the grounds during each opening and closure. Eleven citations were issued for fishing during a closed period and one was issued for no vessel numbers visible. Approximately 14 st of herring were seized by the State of Alaska during the 1997 season

Abundance and Research

Unalakleet field office personnel during the season consisted of the area management biologist, the Norton Sound and Kotzebue assistant area management biologists, the catch monitor, one seasonal

fisheries technician, two fishery biologists from the Anchorage Regional office, the AYK Regional Supervisor. Norton Sound Economic Development Corporation supplied two fishery interns to assist ADF&G in test fishing and sampling during the herring fishery. An employee of the Bering Sea Fishermen's Association also assisted in test fishing and sampling.

Two Department field crews were operational during the 1997 season. One crew operated in the northern portion of Norton Sound at Cape Denbigh and the second crew was stationed in the southern end of the district at Klikitarik. Test fishing was conducted in the Unalakleet area as time allowed. The test fish crew's presence and sampling efforts on the herring grounds are critical to the proper management of the fishery and biological documentation of the stocks.

Test fish crews sampled 2,679 herring caught with variable-mesh gillnets from May 18 through June 10 for biological data. Age 9 herring dominated the return in both biomass (40.4%) and in numbers of fish (33.0 %). The biomass consisted of 60.3% age 9 and older herring. Recruit herring, ages 2-5, represented 21.0% of the return in numbers of fish. However, herring in Norton Sound may not be fully recruited to the fishery until age 6 (DuBois and Hamner, 1997).

A total of 1,226 herring were sampled from the commercial harvest. Age 9 herring dominated the harvest comprising 53.8% of the gillnet catch and 51.1 % of the beach seine harvest. Age 9 and older herring represented 89.0% of the gillnet sample and 72.5% of the beach seine catch. Recruit herring comprised less than 1% of the sample and recruits comprised 6.8% of the beach seine sample (DuBois and Hamner, 1997).

Biomass Determination

A complete listing of the aerial surveys flown in Norton Sound for the 1997 season is found in Table 17. The peak aerial surveys of Subdistricts 1 through 6 were flown May 27.

1998 Outlook

The biomass projected to return to Norton Sound in 1998 is 40,688 tons. A 20% exploitation rate would result in a harvest of 8,138 tons. Ages 10, 9, and 5 herring are expected to dominate the returning biomass (36.5%, 12.1%, and 14.9%, respectively) (DuBois and Hamner, 1997).

Inseason assessment of herring biomass will supersede projected biomass for management of the Norton Sound herring fishery, except where weather prevents obtaining an inseason estimate. The beach seine harvest is, by regulation, 10% of the projected harvest, or 814 tons.

Table 17. Daily observed peak biomass estimates of Pacific herring, Norton Sound District, 1997

| Date | Flight No. | Observer Initials | Survey | | Spawn | | Estimated Biomass (ST) By Index Area | | | | | | | | | |
|-----------|------------|-------------------|--------|--------|-------|-------------|--------------------------------------|----------|----------|--|---------|---------|---------|---------|---------------|----------|
| | | | Hours | Rating | No. | Length (mi) | KLK | UNK | CDB | NTB | ELM | GOL | NOM | TOTAL | | |
| 13-May-97 | 1 | FB | 1.5 | ice | 0 | 0.0 | | | 4.6 | | | | | | 4.6 | |
| 15-May-97 | 2 | CL | 1.5 | 2 | 0 | 0.0 | | | | | | | | | | |
| 17-May-97 | 3 | CL | 1.8 | 3 | 0 | 0.0 | 304.2 | | 9.1 | | | | | | 313.3 | |
| 18-May-97 | 4 | CL | 2.0 | 3 | 0 | 0.0 | 1,163.8 | 591.7 | 224.9 | | | | | | 1,980.4 | |
| 19-May-97 | 5a | CL | 1.1 | 4 | 2 | 0.2 | 1,645.0 | 169.5 | | | | | | | 1,814.5 | |
| 19-May-97 | 5b | TL | | | *2 | *.2 | 1,721.7 | 75.6 | | | | | | | 1,797.3 | |
| 20-May-97 | 6a | TL | 3.5 | 4 | 50 | 4.1 | 1,589.6 | 155.9 | 279.9 | | | | | | 2,025.4 | |
| 20-May-97 | 6b | FB | | | *71 | *3.3 | 699.5 | 28.0 | 625.8 | | | | | | 1,353.3 | |
| 21-May-97 | 7a | CL | 3.3 | 5 | 14 | 0.7 | 507.0 | | 94.5 | | | | | | 601.5 | |
| 21-May-97 | 7b | FB | | | *12 | *0.6 | 619.4 | 28.3 | 64.5 | | | | | | 712.2 | |
| 22-May-97 | 8a | CL | 2.3 | 5 | 159 | 16.2 | 3,898.9 | 555.0 | 88.0 | | | | | | 4,541.9 | |
| 22-May-97 | 8b | TL | | | *121 | *12.1 | 3,940.5 | 615.7 | 103.2 | | | | | | 4,659.4 | |
| 23-May-97 | 9a | FB | 3.5 | 4 | 72 | 2.8 | 4,754.2 | 51.1 | 514.5 | 45.6 | 944.0 | 28.3 | | | 6,337.7 | |
| 23-May-97 | 9b | TL | | | *70 | *5.2 | 4,059.8 | 332.3 | 338.7 | 91.2 | 1,199.5 | 28.3 | | | 6,049.8 | |
| 24-May-97 | 10a | CL | 3.5 | 3 | 26 | 1.0 | 2,097.4 | 472.7 | 3,708.1 | | 737.6 | 64.5 | | | 7,080.3 | |
| 24-May-97 | 10b | FB | | *3 | *28 | *1.3 | 1,814.9 | 42.9 | 709.3 | | 405.8 | 30.4 | | | 3,003.3 | |
| 25-May-97 | 11a | CL | 3.6 | 3 | 34 | 2.4 | 1,431.5 | 715.8 | 5,609.7 | | 551.2 | 643.3 | | | 8,951.5 | |
| 25-May-97 | 11b | TL | | *3 | *22 | *1.6 | 1,679.4 | 1,168.1 | 3,573.4 | 12.9 | 580.6 | 802.9 | | | 7,817.3 | |
| 26-May-97 | 12a | TL | 4.2 | 3 | 43 | 2.5 | 5,525.8 | 5,380.3 | 13,768.2 | 22.8 | 551.3 | 2,370.9 | | | 27,619.3 | |
| 26-May-97 | 12b | FB | | | 33 | 2.1 | 5,481.1 | 1,695.9 | 9,592.9 | | 769.6 | 2,144.4 | | | 19,683.9 | |
| 27-May-97 | 13a | CL | 4.9 | 3 | 24 | 1.7 | 5,343.4 | 24,056.1 | 10,745.5 | 33.4 | 285.0 | | | | 40,463.4 | |
| 27-May-97 | 13b | FB | | | 21 | 0.9 | 6,089.7 | 18,852.3 | 8,546.4 | 28.9 | 276.5 | 1,693.6 | 1,657.8 | | 37,145.2 | |
| 28-May-97 | 14a | CL | 4.8 | 4 | 16 | 1.1 | 1,818.1 | 2,385.1 | 12,299.2 | 446.7 | 937.0 | 655.5 | 2,016.7 | | 20,558.3 | |
| 28-May-97 | 14b | FB | | | 17 | 1.0 | 2,113.2 | 813.9 | 9,287.8 | 409.9 | 849.6 | 700.6 | 1,422.2 | | 15,597.2 | |
| 30-May-97 | 15 | CL | | 4 | 1 | 0.0 | | | 8,323.2 | 1,838.2 | 1,969.1 | 243.2 | 1,013.5 | | 13,387.2 | |
| 31-May-97 | 16 | CL | 3.5 | 4 | 19 | 0.8 | 76.0 | | 3,860.8 | 959.1 | 1,253.6 | 682.0 | 742.8 | | 7,574.3 | |
| 2-Jun-97 | 17 | FB | | 4 | 0 | 0 | | 51.1 | 947.9 | | 6,407.4 | 1,196.5 | 1,607.4 | | 10,210.3 | |
| 4-Jun-97 | 18 | CL | | 4 | 0 | 0 | | | | Port Clarence survey (Nome to Brevig Lagoon) | | | | 0.00 | | |
| 13-Jun-97 | 19 | FB | 1.7 | 3 | 0 | 0 | | | | Port Clarence survey (Nome to Brevig Lagoon) | | | | 3.0 | | |
| Sum | | | 36.7 | 3 | 457 | 33.7 | | 5,343.4 | 24,056.1 | 10,745.5 | Waste | 5.0 | Harvest | 3,971.4 | Total Harvest | 3,976.4 |
| | | | | | | | | | | | | 33.4 | 285.0 | 3,351.4 | Survey | 43,814.8 |
| | | | | | | | | | | | | | | | Biomass | 47,791.2 |
| | | | | | | | | | | | | | | | Exploit% | 8.3 |

Port Clarence surveys not included in Norton Sound biomass estimate or totals.
 Biomass includes combined Total Harvest, Waste, and Peak Survey Estimate.

Table 18. Norton Sound herring spawn estimates by subdistrict (s.d.), 1997.

| Date | s.d. 1 | | s.d. 2 | | s.d. 3 | | s.d. 4 | | s.d. 5 | | s.d. 6 | | s.d. 7 | | Totals | |
|--------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|--------|-------|
| | # | Miles |
| 5/13 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 5/15 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 5/17 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 5/18 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 5/19 | 2 | 0.2 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 2 | 0.2 |
| 5/20 | 47 | 3.9 | 0 | 0.0 | 3 | 0.1 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 50 | 4.0 |
| 5/21 | 14 | 0.7 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 14 | 0.7 |
| 5/22 | 154 | 14.8 | 0 | 0.0 | 5 | 1.4 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 159 | 16.2 |
| 5/23 | 66 | 2.3 | 0 | 0.0 | 6 | 0.5 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 72 | 2.8 |
| 5/24 | 17 | 1.0 | 0 | 0.0 | 9 | 0.1 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 26 | 1.1 |
| 5/25 | 20 | 0.9 | 0 | 0.0 | 4 | 1.0 | 0 | 0.0 | 10 | 0.5 | 0 | 0.0 | 0 | 0.0 | 34 | 2.4 |
| 5/26 | 35 | 1.6 | 0 | 0.0 | 3 | 0.5 | 0 | 0.0 | 5 | 0.4 | 0 | 0.0 | 0 | 0.0 | 43 | 2.5 |
| 5/27 | 17 | 1.0 | 0 | 0.0 | 0 | 0.0 | 7 | 0.7 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 24 | 1.7 |
| 5/28 | 15 | 1.1 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1 | 0.0 | 16 | 1.1 |
| 5/30 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1 | 0.0 | 0 | 0.0 | 0 | 0.0 | 1 | 0.0 |
| 5/31 | 19 | 0.8 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 19 | 0.8 |
| Totals | 406 | 28.3 | 0 | 0 | 30 | 3.6 | 7 | 0.7 | 16 | 0.9 | 0 | 0 | 1 | 0 | 460 | 33.5 |

Figure 10. Norton Sound herring districts and subdistricts.

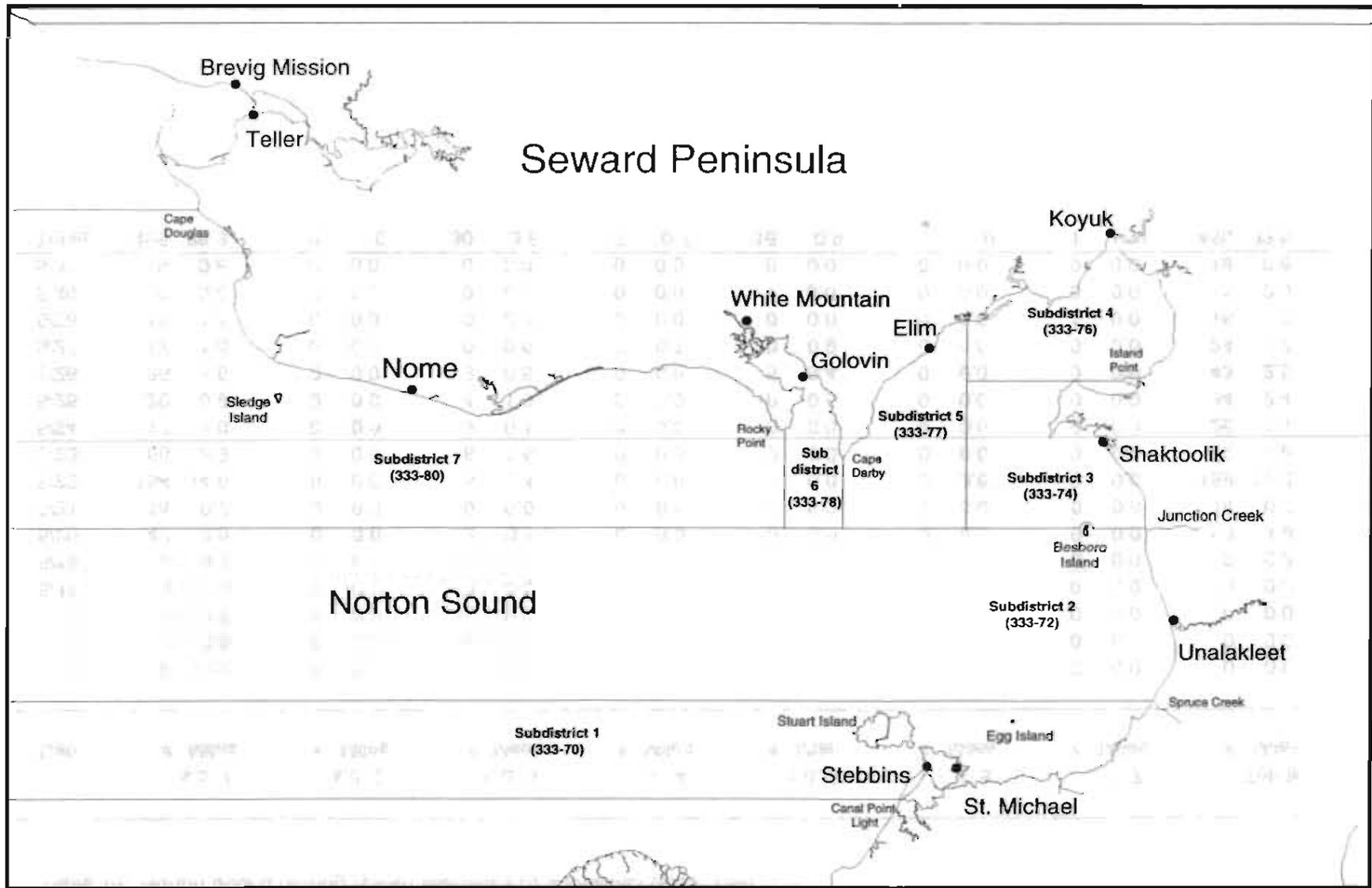
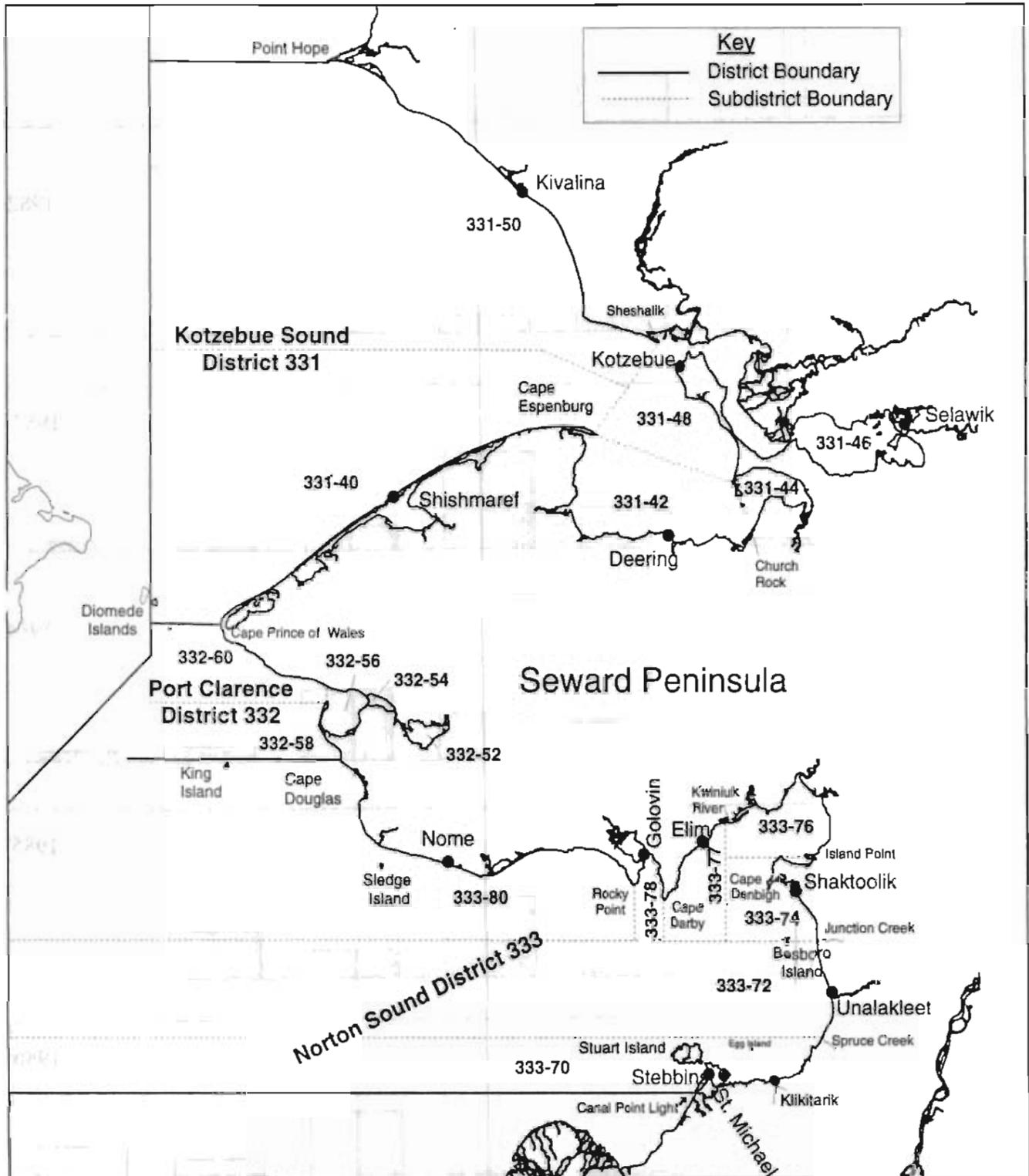


Figure 11 . Statistical areas of the Norton Sound, Port Clarence and Kotzebue Sound commercial herring fishing districts.



Norton Sound District Age Composition of Commercial Gear Combined

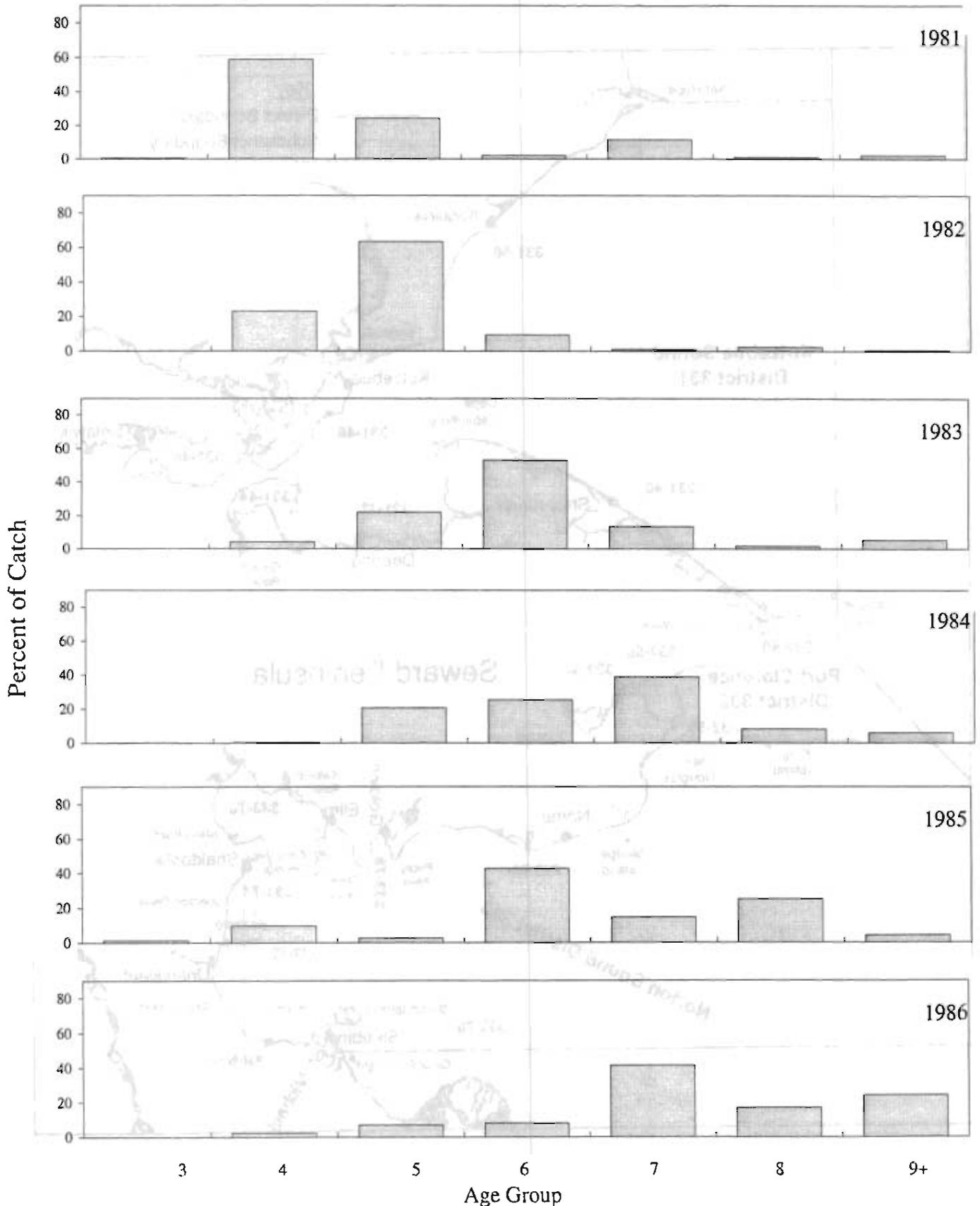


Figure 12. Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gill nets), 1981-1997. No commercial fishing occurred in 1992.

Norton Sound District
 Age Composition of Commercial Gear Combined

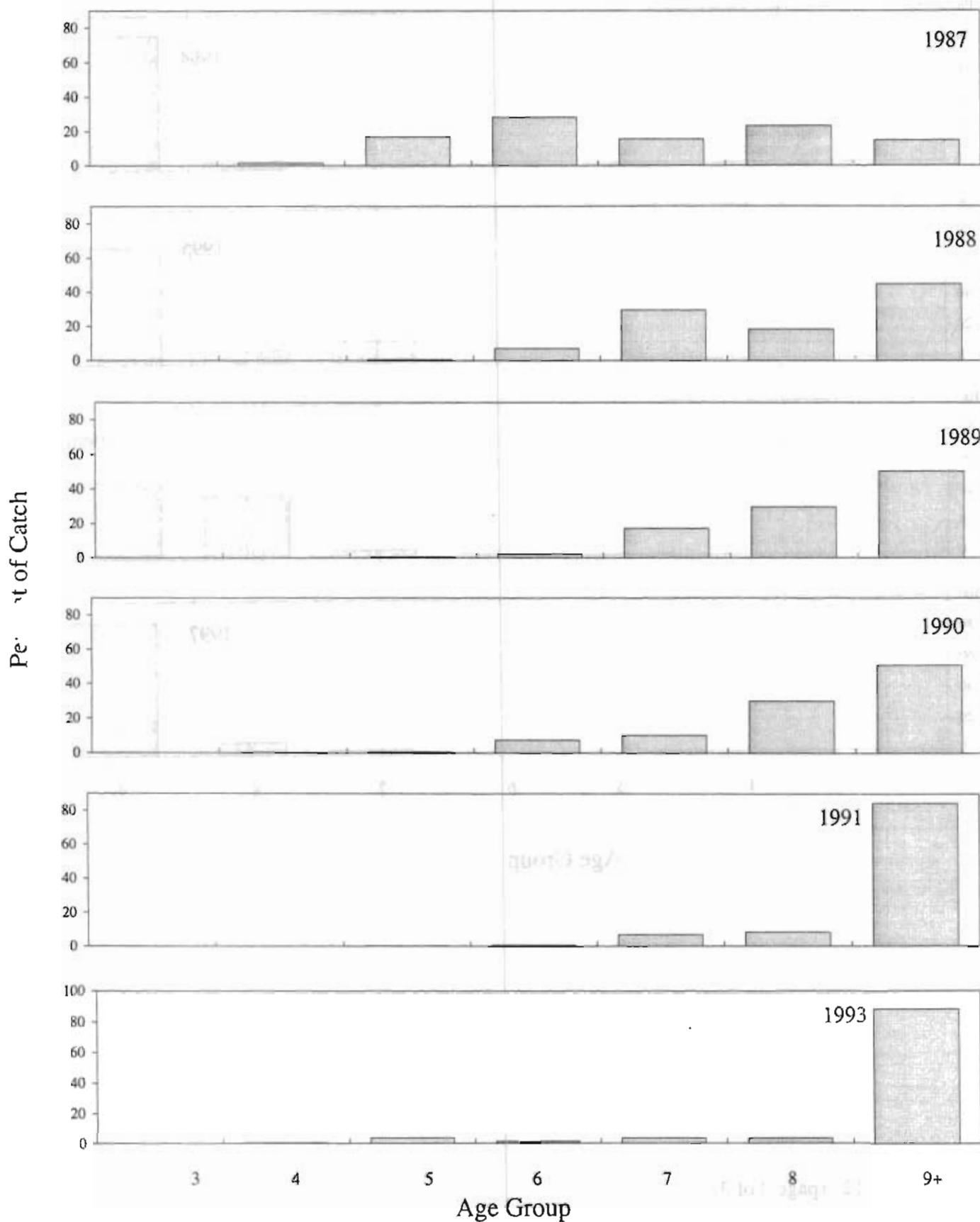


Figure 12. (page 2 of 3)

Norton Sound District
Age Composition of Commercial Gear Combined

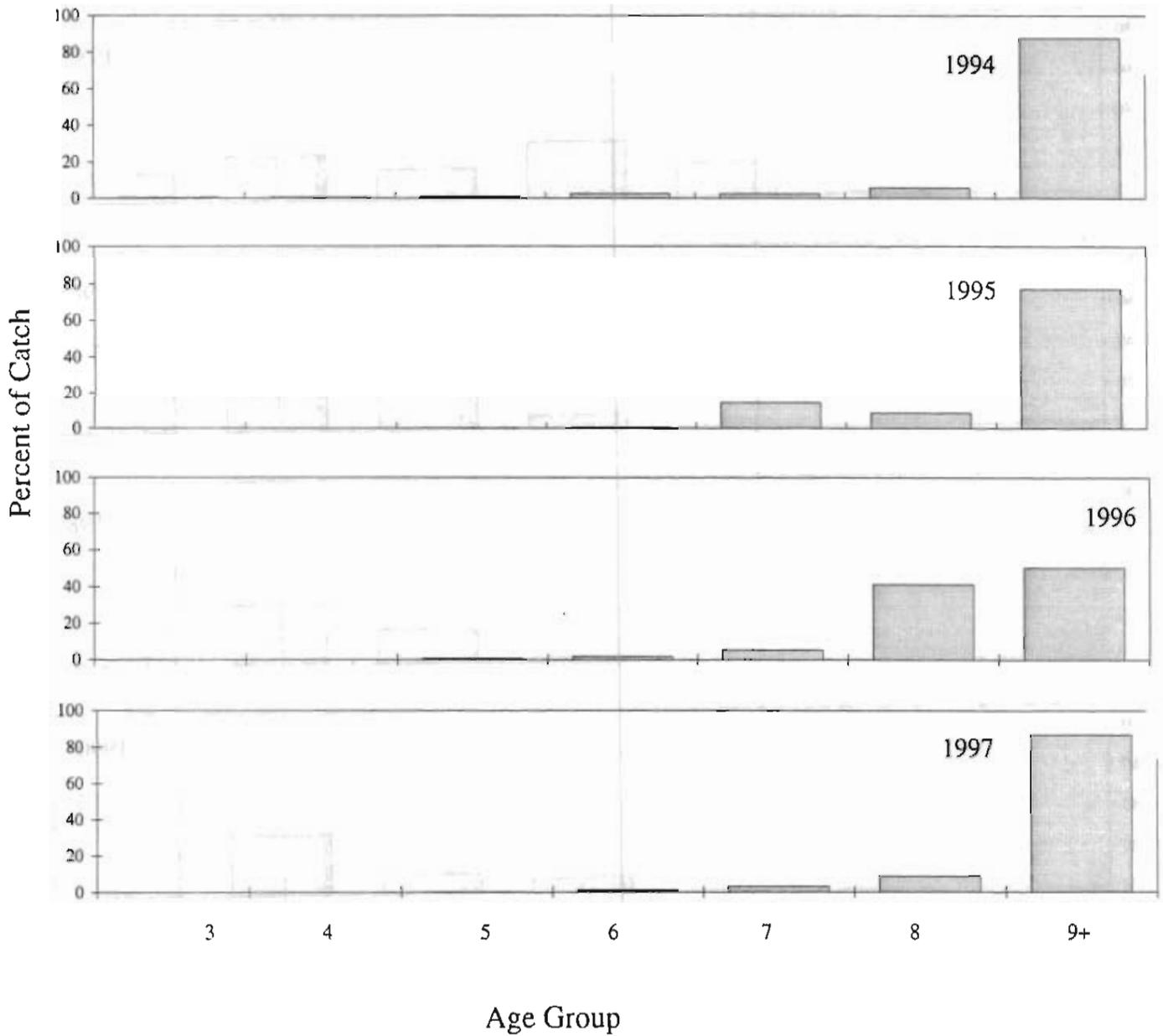


Figure 12. (page 3 of 3)

Norton Sound District Age Composition of Variable Mesh Gill Nets

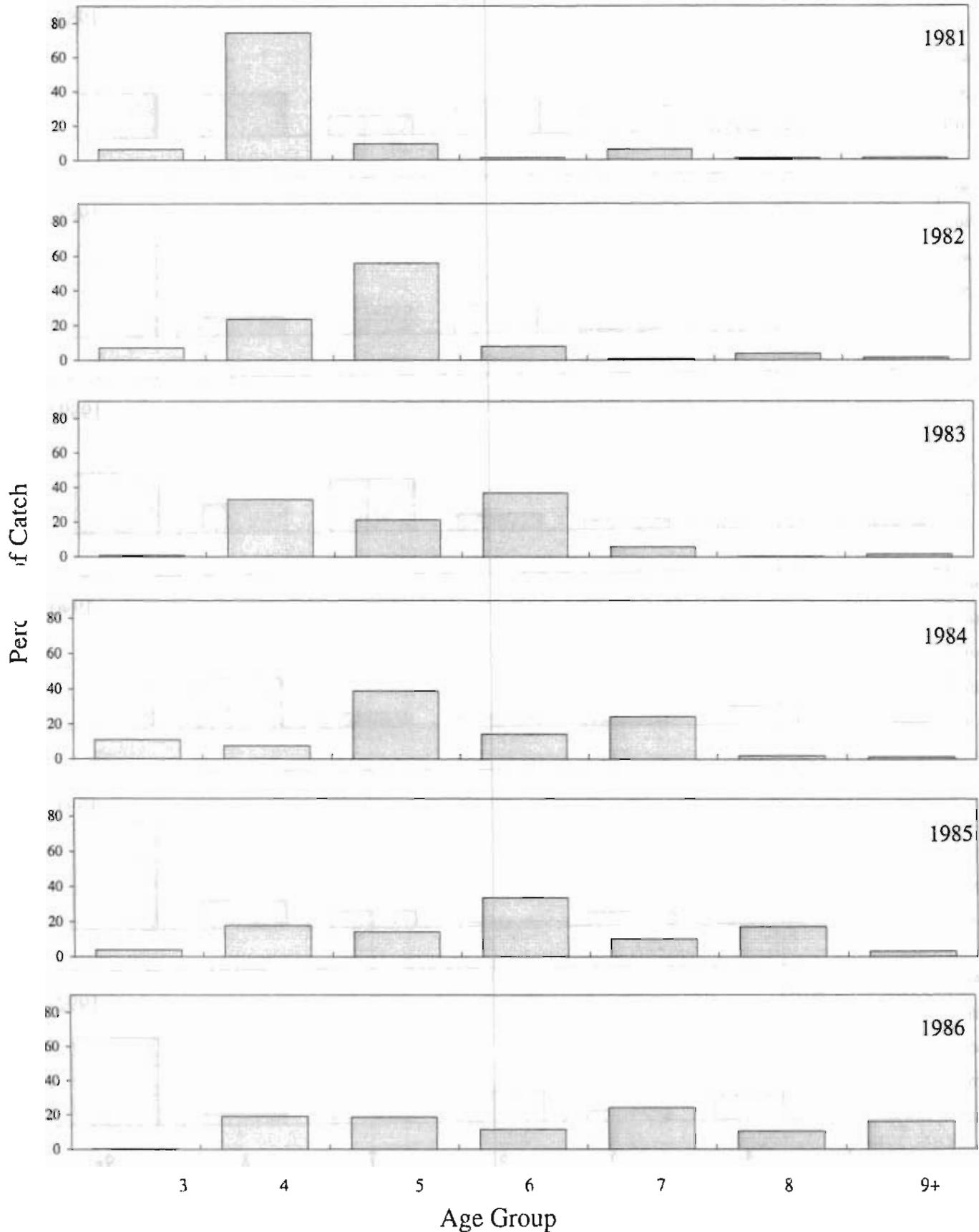


Figure 13. Norton Sound herring age class composition by percentage of total catch, variable mesh gill nets, 1981-1997.

Norton Sound District
 Age Composition of Variable Mesh Gill Nets

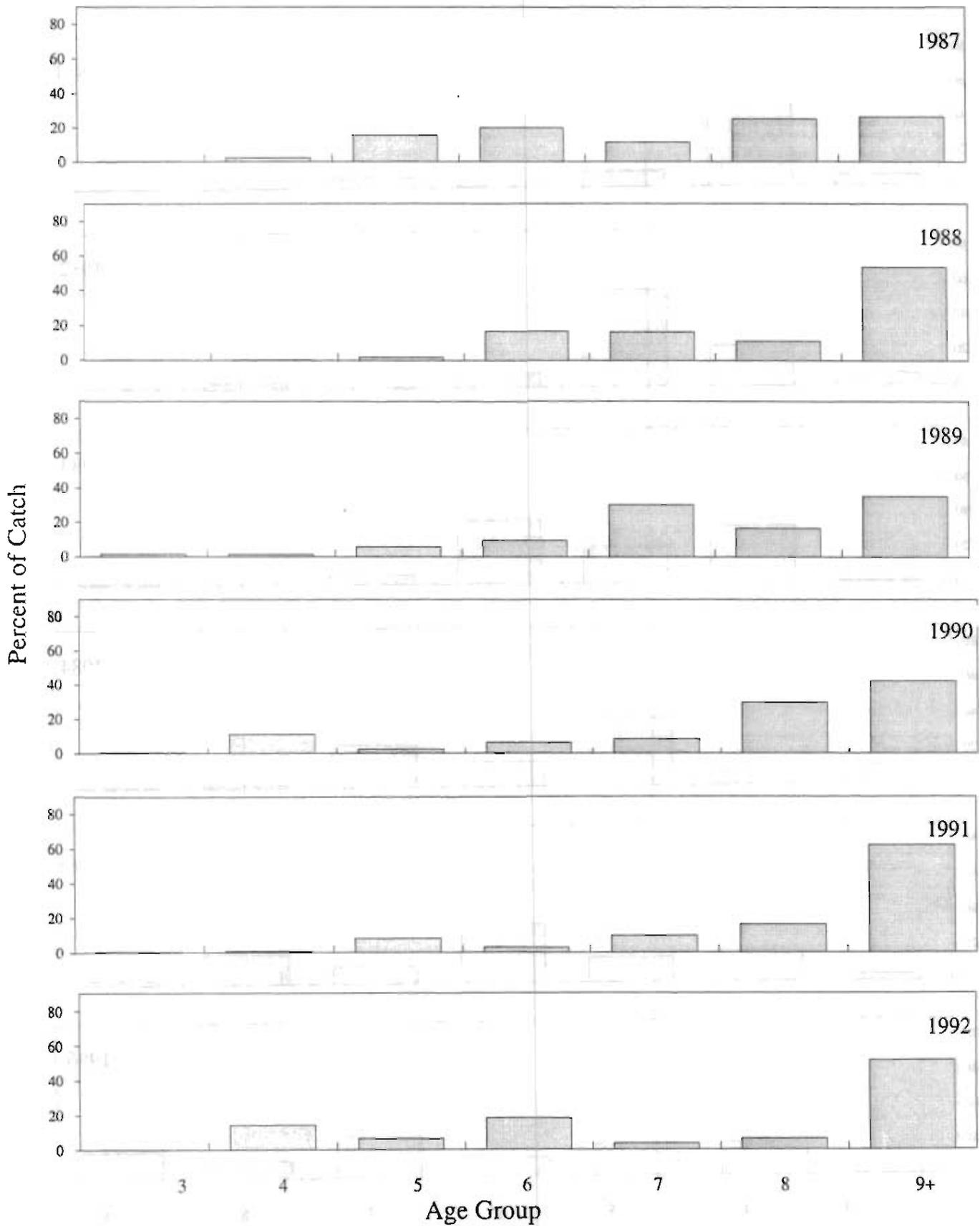


Figure 13. (page 2 of 3)

Norton Sound District Age Composition of Variable Mesh Gill Nets

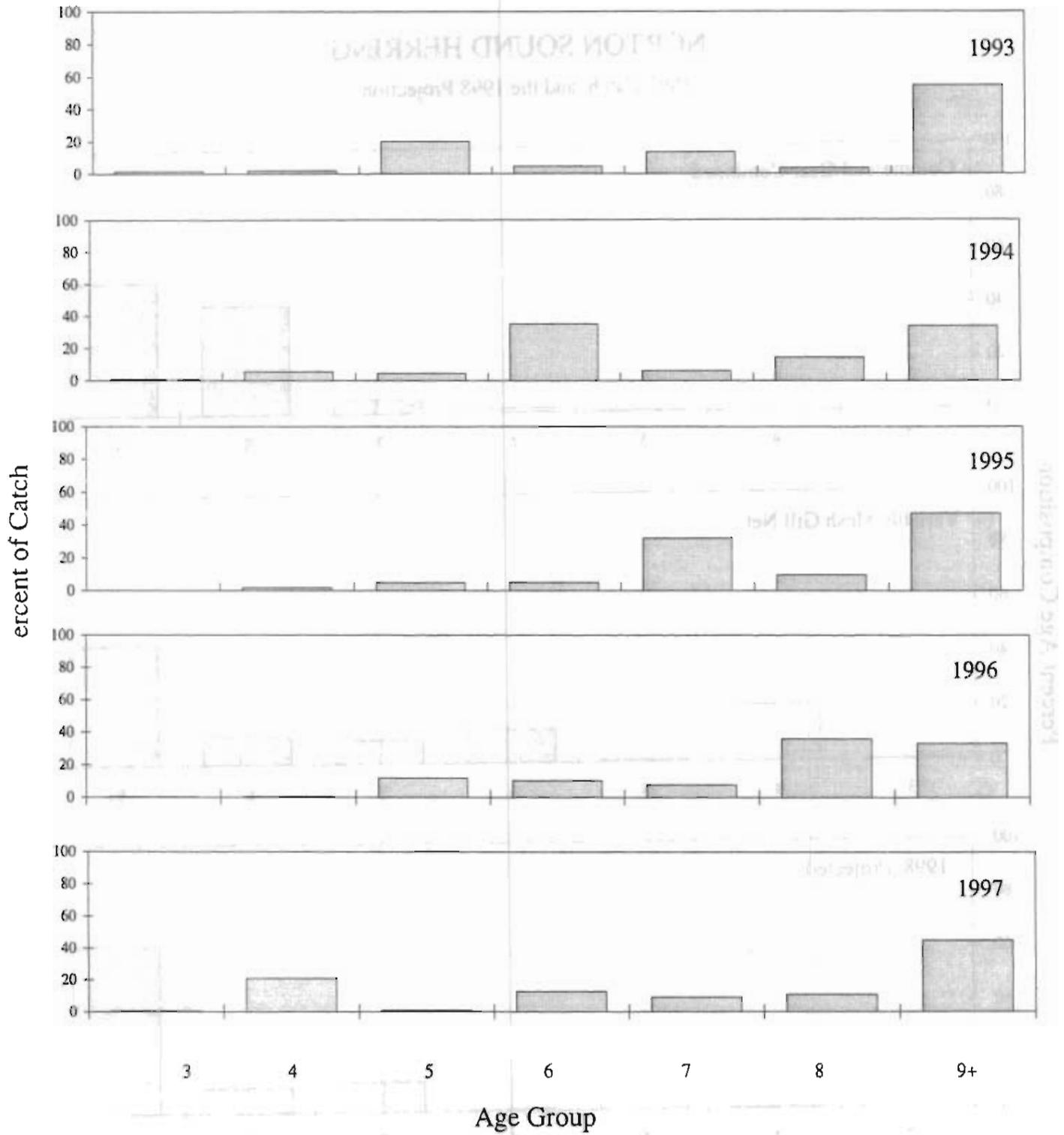


Figure 13. (page 3 of 3)

NORTON SOUND HERRING 1997 Catch and the 1998 Projection

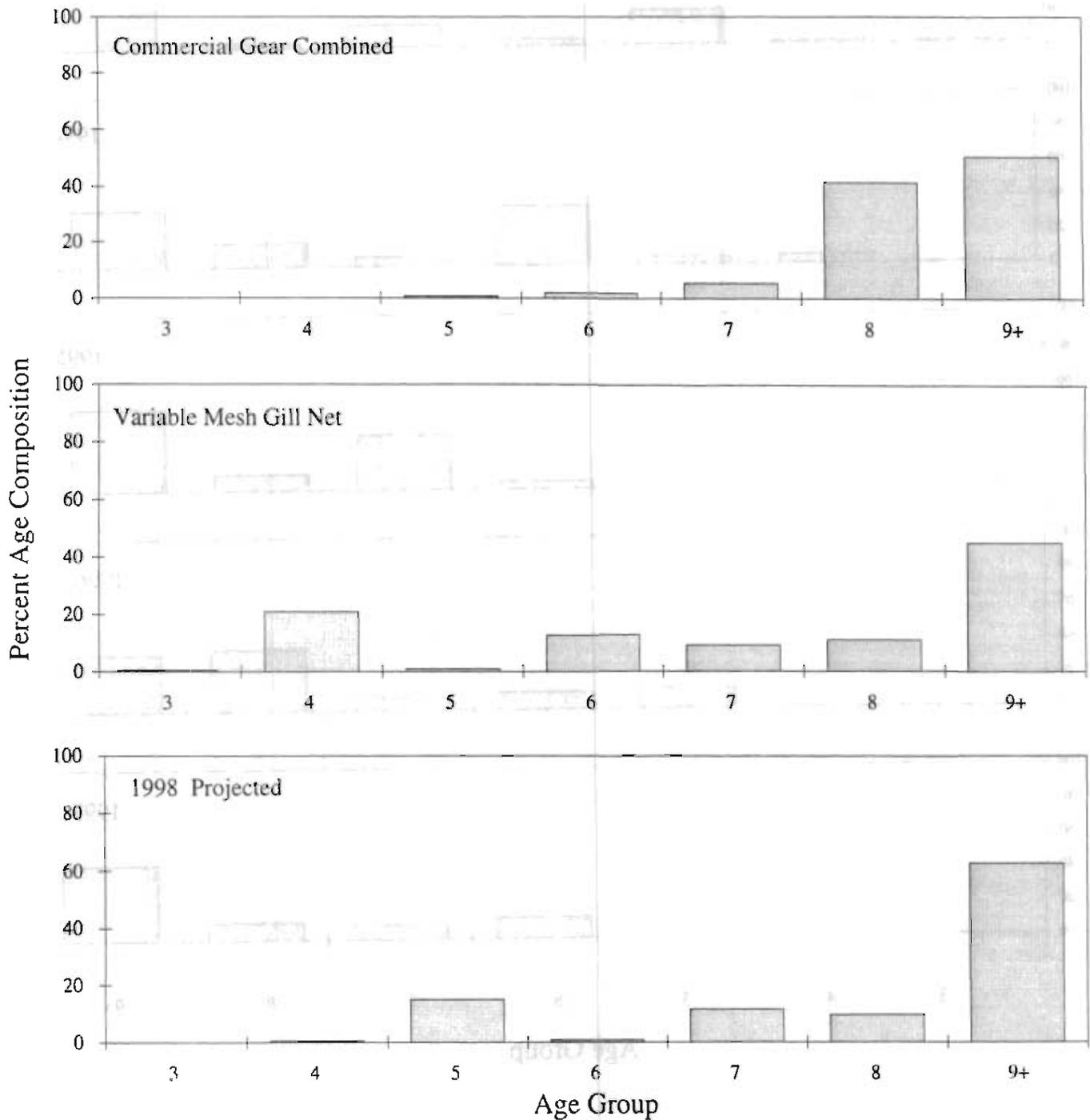


Figure 14. Norton Sound Pacific herring age composition comparison by 1997 commercial gear combined (gillnet and beach seine), variable mesh gear, and the projected age composition of the 1998 return.

Appendix Table D1. Norton Sound herring and spawn-on-kelp harvests
(in short tons) by U.S. commercial fishermen, 1909-1997.

| Year | Sac Roe Herring | Food or Bait Herring | Total | Spawn-on-kelp |
|------------------------|--------------------|-------------------------|-------|-----------------|
| 1909-1916 ^a | - | - | - | - |
| 1916-1928 | - | 1,881 | 1,881 | - |
| 1929 | - | 166 | 166 | - |
| 1930 | - | 441 | 441 | - |
| 1931 | - | 86 | 86 | - |
| 1932 | - | 529 | 529 | - |
| 1933 | - | 31 | 31 | - |
| 1934 | - | 4 | 4 | - |
| 1935 | - | 15 | 15 | - |
| 1936 | - | - | - | - |
| 1937 | - | 6 | 6 | - |
| 1938 | - | 10 | 10 | - |
| 1939 | - | 6 | 6 | - |
| 1940 | - | 14 | 14 | - |
| 1941 | - | 3 | 3 | - |
| 1942-1963 | - | - | - | - |
| 1964 | 20 | - | - | - |
| 1965 | - | - | - | - |
| 1966 | 12 | - | - | - |
| 1967 | - | - | - | - |
| 1968 | - | - | - | - |
| 1969 | 2 | - | - | - |
| 1970 | 8 | - | - | - |
| 1971 | 20 | - | - | - |
| 1972 | 17 | - | - | - |
| 1973 | 35 | - | - | - |
| 1974 | 2 | - | - | - |
| 1975 | - | - | - | - |
| 1976 | 9 | - | - | - |
| 1977 | 11 | - | - | trace |
| 1978 | 15 | - | - | 4 |
| 1979 | 1,292 | - | - | 13 |
| 1980 | 2,451 | 1 | 2,452 | 24 |
| 1981 | 4,371 | - | - | 47 ^b |
| 1982 | 3,864 | 69 | 3,933 | 38 |
| 1983 | 4,181 | 401 | 4,582 | 29 ^c |
| 1984 | 3,298 | 274 | 3,572 | 19 ^d |
| 1985 | 3,420 | 128 | 3,548 | - ^e |
| 1986 | 4,926 | 268 | 5,194 | - |
| 1987 | 3,779 | 303 | 4,082 | - |
| 1988 | 4,256 | 416 | 4,672 | - |
| 1989 | 4,494 | 247 | 4,741 | - |
| 1990 | 5,253 | 1,026 | 6,279 | - |
| 1991 | 5,465 | 207 | 5,672 | - |
| 1992 ^f | - | - | - | - |
| 1993 | 4,713 | 321 | 5,034 | - |
| 1994 | 958 | 2 | 960 | - |
| 1995 | 6,647 | 116 | 6,763 | - |
| 1996 ^g | 6,061 | 109 | 6,220 | - |
| 1997 ^h | 3,709 | 262 | 3,976 | - |

^a Fishery occurred some years, but harvest unavailable.

Fishery from 1909-1941 occurred near Golovin; 1964 to present has occurred in southeast Norton Sound

^b Does not include approximately 6 st of wastage.

^c Does not include approximately 2 st of wastage.

^d Includes 3 st of spawn on *Macrocystus* kelp.

^e All spawn-on-kelp fisheries closed by regulation prior to the 1985 season.

^f No commercial fishery took place in 1992.

^g Total includes an estimate 50 st of wastage.

^h Total includes an estimate 5 st of wastage. Includes approximately 1,000 lbs taken as bait under 5 AAC 27.971.

Appendix Table D2. Japanese gillnet herring catches in Norton Sound, 1968-1977.
(North of 63 N. Latitude and East of 167 W. Longitude)

| Year | Gillnet Catch (st) | Remarks |
|--------------|--------------------|--|
| 1968 | 131 | First foreign effort on herring in Norton Sound |
| 1969 | 1,400 | Peak catch with large effort (about 40 ships). Two vessels apprehended. |
| 1970 | 69 | |
| 1971 | 703 | |
| 1972 | 15 | |
| 1973 | 38 | |
| 1974 | 764 | |
| 1975 | - | |
| 1976 | - | Data unavailable. |
| 1977 | - | Herring fishery closed to foreign nations. |
| Total | 3,120 | Excludes 1976 catches. |

Appendix Table D3. Herring biomass estimate and commercial fisheries data for the Norton Sound District, 1979 -1997.^m

| Year | Biomass ^a (st) | Harvest ^b (st) | Percent ^c Exploitation | Dollar | | |
|------|------------------------------|------------------------------|--------------------------------------|--------|---------------------|------------------------|
| | | | | Roe % | Value (millions) | Number of Fishermen |
| 1979 | 7,700 | 1,292 | 16.8 | 7.0 | 0.6 | 67 |
| 1980 | 8,400 | 2,452 | 29.2 | 8.1 | 0.5 | 294 |
| 1981 | 25,100 | 4,371 | 17.3 | 8.8 | 1.5 | 332 |
| 1982 | 17,400 | 3,933 | 22.6 | 8.8 | 1.0 | 237 |
| 1983 | 28,100 | 4,582 | 16.3 | 8.6 | 1.4 | 272 |
| 1984 | 23,100 | 3,662 ^e | 15.8 | 10.3 | 0.9 | 194 |
| 1985 | 20,000 | 3,548 | 17.7 | 9.9 | 1.4 | 277 |
| 1986 | 28,062 | 5,194 | 18.5 | 9.6 | 2.9 | 323 |
| 1987 | 32,370 | 4,082 | 12.6 | 8.6 | 2.6 | 564 |
| 1988 | 33,924 | 4,672 | 13.8 | 9.0 | 3.9 | 348 |
| 1989 | 23,857 | 4,771 ⁱ | 20.0 | 9.2 | 2.3 | 357 |
| 1990 | 35,522 | 6,439 ^j | 18.0 | 8.7 | 3.6 | 365 |
| 1991 | 42,854 | 5,796 ^k | 13.5 ^l | 9.3 | 2.4 | 279 |
| 1993 | 46,549 | 5,034 ^l | 10.9 | 9.9 | 1.5 | 264 |
| 1994 | 37,829 | 960 | 2.5 | 10.3 | 0.3 | 215 |
| 1995 | 37,778 | 6,773 | 18.0 | 10.4 | 4.2 | 215 |
| 1996 | 26,596 | 6,220 ⁿ | 23.4 | 10.6 | 4.5 | 287 |
| 1997 | 47,748 | 3,976 ⁿ | 8.3 | 9.9 | 0.6 | 220 |

^a Methods of calculating biomass have varied over the years. Biomass estimates listed follow methods used during that year.

^b Includes both bait and sac roe harvests.

^c Represents total District exploitation.

^e Includes an estimated 90 st of wastage. minimum estimates; exploitation rate based on observed biomass.

ⁱ Includes an estimated 30 st of wastage.

^j Includes an estimated 60 st of wastage.

^k Includes an estimated 125 st of wastage.

^l Does not include an estimated 45 st of wastage.

^m No herring fishery occurred in 1992.

ⁿ Includes an estimated 50 st of wastage.

^o Includes an estimated 5 st of wastage during the fishery, and approximately 1,000 lbs of bait herring taken under 5 AAC 27.971, not during the sac roe fishery.

Appendix Table D4. Norton Sound commercial herring harvest (st) by subdistrict, by year, 1979 - 1997.^a

| Year | Subdistricts | | | | | | | Totals |
|-------------------|--------------|--------|--------|--------|--------|--------|------------------|--------------------|
| | s.d. 1 | s.d. 2 | s.d. 3 | s.d. 4 | s.d. 5 | s.d. 6 | s.d. 7 | |
| 1979 | 319 | 405 | 555 | - | - | - | 14 | 1,293 |
| 1980 | 1,176 | 632 | 632 | 5 | - | 7 | - | 2,452 |
| 1981 | 3,068 | 831 | 471 | 1 | - | - | - | 4,371 |
| 1982 | 2,062 | 946 | 925 | - | - | - | - | 3,933 |
| 1983 | 434 | 1,265 | 2,733 | - | 65 | 85 | - | 4,582 |
| 1984 | - | - | 3,572 | - | - | - | - | 3,572 |
| 1985 | 1,538 | 188 | 1,675 | - | 147 | - | - | 3,548 ^b |
| 1986 | 2,559 | - | 2,450 | - | 185 | - | - | 5,194 |
| 1987 | 2,218 | 174 | 1,690 | - | - | - | - | 4,082 |
| 1988 | 3,260 | 99 | 1,307 | - | 6 | - | - | 4,672 |
| 1989 | 3,256 | 60 | 1,425 | - | - | - | - | 4,741 ^c |
| 1990 | 4,498 | 950 | 931 | - | - | - | - | 6,379 ^d |
| 1991 | - | 880 | 4,792 | - | - | - | - | 5,672 ^e |
| 1992 ^f | - | - | - | - | - | - | - | - |
| 1993 | 2,288 | 587 | 1,881 | - | 278 | - | 0.2 | 5,034 ^g |
| 1994 | 250 | 36 | 634 | - | 40 | - | - | 960 |
| 1995 | 2,359 | 604 | 1,524 | - | 2,108 | 167 | - | 6,762 |
| 1996 | 3,074 | 111 | 2,831 | - | 153 | - | - | 6,170 ^h |
| 1997 | 2,046 | 62 | 1,864 | - | - | - | 0.5 ⁱ | 3,976 ^j |

^a Includes herring taken for sac roe and bait.

^b Does not include an estimated 90 st of wastage.

^c Does not include an estimated wastage of 30 st in abandoned gillnets.

^d Does not include an estimated wastage of 60 st in abandoned gillnets.

^e Does not include an estimated wastage of 125 st in abandoned gillnets.

^f No commercial fishery in 1992.

^g Does not include an estimated wastage of 45 st in abandoned beach seine sets.

^h Does not include an estimated 50 st of wastage.

ⁱ Does not include an estimated 5 st of wastage.

^j Approximately 1000 lbs of herring bait was taken under 5AAC 27.971 i (not during sac roe fishery).

Appendix Table D5. Norton Sound commercial spawn-on-kelp (Fucus) harvest, 1978-1984. ^a

| Year | st | Number of Fishermen |
|------|----|---------------------|
| 1978 | 4 | 9 |
| 1979 | 13 | 19 |
| 1980 | 24 | 20 |
| 1981 | 47 | 22 |
| 1982 | 38 | 44 |
| 1983 | 29 | 35 |
| 1984 | 19 | 32 |

^a Norton Sound commercial spawn-on-kelp harvest closed by regulation prior to the 1985 season.

PORT CLARENCE / KOTZEBUE DISTRICTS

Introduction

The regulation book states that in the Port Clarence and Kotzebue Districts, herring may be taken from April 15 through November 15, except that herring may not be taken during the open commercial salmon fishing season. However, prior to the 1987 season, no spring sac roe commercial fisheries had ever occurred within these districts. Interest in exploring these stocks has been expressed in recent years by industry personnel operating in the Norton Sound District. However, no large scale effort to develop the fishery has occurred due to the late ice breakup and fishery timing in the Port Clarence and Kotzebue Districts.

The Port Clarence and Kotzebue commercial herring fisheries have been in regulation since 1982. The 1983 and 1984 regulation books set a guideline harvest of 150 mt (165 st) for each district. Since the guideline harvest has never been changed or repealed by the Board of Fisheries, it is assumed 165 st guideline harvest is still in effect. Presently purse seines, beach seines, and gillnets are legal commercial gear within these districts. Spawn on kelp fisheries are also allowed in regulation. Recent attempts at open pound Macrocystitis harvest in 1991 and 1992 were unsuccessful.

Local fishermen from Teller, Shishmaref, and Kotzebue have also expressed increasing interest in exploiting these stocks. While small harvests of herring for food/bait have occurred during the fall, the fisheries in these districts have been limited by lack of markets. Local fishermen and fishery operators in Kotzebue, Brevig Mission and Nome have also expressed interest in developing a spawn-on-kelp fishery within these districts.

Resource Investigations

Resource investigations of Port Clarence and Kotzebue Sound area herring stocks were conducted by ADF&G from March 1976-September 1978 (Barton 1978). These studies indicated that herring populations from Golovin Bay (Norton Sound) northward differed significantly in size and behavioral characteristics from herring populations occurring in the southern Bering Sea. Differences between populations were summarized as follows (Barton, 1978).

Seward Peninsula Populations

Smaller herring at age with lower vertebral counts.

Lower abundance.

Subtidal spawning (3m) in shallow bays, inlets and lagoons.

Zosteria sp. primary spawning substrate.

More euryhaline.

Overwinter in shallow bays; water is warmed by river discharge under ice cover.

Fall (non-spawning) runs documented.

Larval development in brackish water.

Southern Norton Sound to Southern Bering Sea Pelagic Populations

Larger herring with probable higher vertebral counts.

Higher abundance.

Intertidal and shallow subtidal spawning along exposed rocky headlands.

Fucus sp. primary spawning substrate.

Less euryhaline.

Overwinter in deep ocean layers near the Pribilof Islands.

No fall runs documented.

Larval development probable in more saline water.

Data collected from herring populations along the Seward Peninsula strongly indicated that a separate stock of herring occurs in the Port Clarence and Kotzebue Sound areas. This does not preclude the possibility of the occurrence of more southern stocks from utilizing this region, i.e., stocks which winter near the Pribilof Islands and migrate to the western Alaska coast to spawn. It is unlikely however, that herring stocks along the western Seward Peninsula migrate to the central Bering Sea for wintering, but rather remain in coastal lagoons, bays or inlets which are warmed by river discharge under the ice (Barton 1978). This may be a major factor in explaining size differences, i.e., environmental conditions. Water temperatures and feeding conditions in deep ocean waters are probably more favorable for growth than those in herring winter habitats along the Seward Peninsula, which apparently have become adapted to Arctic conditions (Barton 1978).

Aerial surveys are very difficult in the Port Clarence District due to organic coloring of the waters of Imuruk Basin, Tuksuk Channel, Grantley Harbor and to a lesser extent, Port Clarence. Aerial surveys were impractical in Imuruk Basin and Tuksuk Channel. Additionally, the presence of other

species of fish caught in test commercial gear sets indicate the need for verifying any biomass sighted. A further complicating factor within Port Clarence is the spring ice conditions. The Port is a very sheltered body of water which becomes stained to a high degree over the winter and takes some time to clear once the ice melts. Typically, the outside waters are significantly warmer than the inside waters which are covered by ice longer thereby slowing solar gain and water mixing. Soon after the ice begins to shift the herring move into the warm shallow lagoons to spawn. The herring are invisible to aerial observation once they enter the stained water. The best aerial survey conditions exist just outside the entrance to the Port, where the herring mass just prior to the ice moving. One or two surveys have been flown each of the past several years, but virtually no herring have been observed because the narrow window of time for seeing the fish has been missed.

Spring/Fall Food/Bait Fishery

Although a fall fishery has probably existed for subsistence use within these areas for many years, a commercial venture has only been attempted recently. The primary use of those fish are for crab bait and dog food. The fishery typically occurs during September and the ice free portion of October. A fish buyer located at Nome in 1994 and 1995 who provided a ready crab bait market and transportation for the fish had facilitated the harvest. A small bait fishery with a harvest less than 10 tons occurs in most years. However, no bait fishery occurred in 1997.

Sac Roe Fishery

The Port Clarence fishermen have been unable to attract a sac roe buyer for their relatively late fishery. During 1991 and 1992, one individual imported macrocystus kelp and attempted an open pound. No herring spawned on the imported kelp, although ripe herring were found in close proximity and very light spawn was found on blades of Zosteria sp. nearby.

Table 19. Port Clarence District commercial herring fishing history.

| Year | Fishery | Effort | Harvest | Price | Value |
|------|--------------------------|---|---|----------------------------------|------------------------------------|
| 1986 | Fall Bait | 1 Permit (G/N) | 130 lbs. | \$1.00/lb | \$ 130 |
| 1987 | Sac Roe | 3 Purse Seiners 3 Gillnetters | 145.5 st | \$800/st@10% | \$ 77,466 |
| 1987 | Fall Bait | ? Permits (G/N) | 1,100 lbs | \$.30/lb | \$ 330 |
| 1988 | Sac Roe | 3 Purse Seiners 3 Gillnetters <u>Combined Total</u> | 56.4 st @7.6% 23.6 st @8.9% 80.0 st @8.2% | \$1000/st @10% | \$ 57,500 |
| 1994 | Fall Bait | 4 Permits (G/N) | 8,706 lbs | \$.45/lb | \$ 3,917 |
| 1995 | Spring Bait Fall Bait | 8 Permits (G/N) 2 Permits (G/N) <u>Combined Total</u> | 19,193 lbs 9,119 lbs 28,312 lbs | \$.61/lb \$.37/lb \$.53/lb | \$ 11,625 \$ 3,393 \$ 15,018 |
| 1996 | Spring Bait | 4 Permits | 5,546 lbs | \$.40/lb | \$ 2,218 |

SECTION 3: KING CRAB
(Includes Norton Sound,
Port Clarence and Kotzebue Districts)

SECTION 3 - KING CRAB

INTRODUCTION

Norton Sound

The Norton Sound Section of the Northern Bering Sea District consists of all waters in statistical area Q that are north of the latitude of Cape Romanzof, east of 168 west longitude, and south of the latitude of Cape Prince of Wales (Figures 15 and 16). A large vessel summer commercial red king crab (*Paralithodes camtschatica*) fishery has existed in the Norton Sound Section from 1977 through 1992 (Appendix Table E3). No summer commercial fishery occurred in 1991 due to a lack of staff necessary to manage the fishery. The budget had been cut the previous winter. In 1992, the large vessel summer commercial fishery resumed. Regulation changes adopted during the March 1993 Board of Fisheries meeting changed the character of the fishing fleet to that of a small boat fleet. A superexclusive designation went into effect for the Norton Sound commercial crab fishery June 27, 1994. A vessel registered for the Norton Sound crab fishery may not be used to take king crab in any other registration area during that registration year.

The National Marine Fisheries Service conducted their most recent trawl survey to examine the abundance of Norton Sound red king crab in late August 1991 (Appendix Table E5). The results of that survey as compared to the 6 previous trawl surveys show a gradual trend of increasing abundance since the low recorded in 1982. The 1991 survey found 3.5 million pounds of legal king crab in the commercial fishing district. NMFS has not made a survey of Norton Sound since 1991. The quota for the Norton Sound Section for the 1996 season had been set at 340,000 pounds, to approximate an exploitation rate of 10%.

The Alaska Department of Fish and Game conducted a trawl survey to examine the abundance of Norton Sound red king crab from August 7 through August 18, 1996 (Appendix Table E5). A population estimate was generated which indicated the legal biomass had declined to 40 percent of the biomass estimated in 1991. The results from the 1996 trawl survey prompted the fishery managers to reduce the harvest rate in the 1997 commercial fishery to five percent of the legal biomass and set the guideline harvest at 80,000 pounds. This is a significant reduction from the previous exploitation rate and guideline harvest.

St. Lawrence Island

The St. Lawrence Island Section lies immediately west and north of the Norton Sound Section. Because the Bering Sea crab fleet bases in Dutch Harbor, the St. Lawrence Island Section has been managed by ADF&G's Westward Region's Dutch Harbor office. Until recently, the Dutch Harbor fishing fleet has been the primary commercial group interested in that area. The only reported commercial catches to date in the St. Lawrence Island Section were made in 1983 when 52,557

pounds of blue king crab were delivered from 13 landings, in 1989, when 3,603 pounds of red king crab and 984 pounds of blue king crab were delivered from 8 landings, in 1992 when 53 pounds of blue crab were landed and in 1995 when 7,913 pounds were delivered from three landings.

In 1983, the commercial crab fleet concentrated near the southeast shore of St. Lawrence Island. The following year a regulation proposal to close the waters within 10 miles of all inhabited islands within the section was adopted in an attempt to protect stocks targeted by local fishermen and reduce impacts on subsistence marine mammal harvests during the winter. During the 1989 season, three fishing vessels prospecting in that section found relatively few blue king crab near rocks and shoals still open to commercial fishing, but red king crab were discovered in low densities near Kivalina, the northern boundary of the section. The villagers of Little Diomed Island have also traded and sold winter caught blue king crab with residents of Nome and other villages for years. The Department has not been able to obtain an accurate estimate of the magnitude of this trade. The remoteness of this village is also a factor contributing to the lack of catch records. Current regulation allows the commercial harvest and sale of king crab near shore during the winter. The Board provided the same provisions in the regulation as are in effect for Norton Sound to allow a commercial winter fishery. However, local residents of St. Lawrence Island have decided not to export any of their winter catch for commercial sale.

1997 COMMERCIAL FISHERY

Norton Sound Summer Commercial Fishery

The 1997 summer commercial red king crab fishery opened at 12 noon, July 1 in the Norton Sound Section. The first fishing vessel registered July 3. It was after the Fourth of July weekend before any other vessels registered. Fishers did not deliver any crab until July 10. A total of 19 fishing vessels registered for the summer commercial crab season. Beginning in 1996, a moratorium on new vessels, greater than 32 feet, entering the fishery was put in place. No vessels over 32 feet registered in 1997. Thirteen vessels actually made deliveries and 15 permits were fished. There were two land based processors that registered, but only one actually took part in the fishery. No floating crab processors or catcher/processors operated in Norton Sound during the 1997 summer fishery. Therefore, no independent observer was placed on board a commercial vessel. One ADF&G fishery biologist was stationed in Nome to monitor the fishery and sample legal crab delivered to buyers in Nome. This was the only person dedicated to collecting essential biological and management data, which is necessary in determining the magnitude and location of the commercial harvest and tracking the status of the stock. The observer also provides the means to enforce size and sex restriction regulations that protect the resource.

Public concern for declining nearshore catches and the apparent shift in crab distribution caused managers to announce their intent not to relax the nearshore closure line as their practice had been in recent years. As a result of crab distribution and the proximity to the closure line, most vessels

traveled to the entrance of Golovin Bay to fish, but only three vessels chose to operate from the port of Golovin. No samples were collected from those vessels.

Catch reporting logs were kept by buyers and by skippers of catcher vessels for each statistical area fished. Buyers verbal reports were relayed daily by 9:00 a.m. to the ADF&G office in Nome. Fish tickets were due in to the ADF&G office on Friday of each week throughout the duration of the fishery. Vessel reports from fishermen and Catcher/Seller fish tickets were required every Monday for the duration of the fishery. Compliance with reporting requirements was good.

Twelve percent of the total harvest was caught by Norton Sound fishers and the remaining 88% of the harvest was caught by Yukon Delta fishers. There were no fishers from other parts of the state or outside of Alaska participating in the fishery this year.

Eleven permit holders were registered as catcher/sellers, but only seventeen landings were made by five fishers registered as catcher sellers. One land based processing company operated out of Nome and one tender was used to transport live crab from Eastern Norton Sound.

Board of Fisheries regulations specific to Norton Sound Section are:

- 1) 5AAC 34.915, which directs the Department to manage the Norton Sound summer king crab fishery for a harvest of one half the exploitation rate determined under 5AAC 34.080.
- 3) 5AAC 34.935, which established a closed area with a defined boundary approximating 15 miles from the beach in the Norton Sound section, to protect a long established winter subsistence fishery.
- 3) 5AAC 34.925 (i) and (j), requiring pot tags and limiting vessels of 125 feet in length or less to 40 pots each and larger vessels are limited to 50 pots.
- 4) 5AAC 34.906, designates the Norton Sound Section to be a superexclusive registration area.

Statistical Summary

A total of 15 permit holders on 13 catcher vessels made 100 landings in the 1997 Norton Sound summer commercial red king crab fishery. The total number of crab caught was 32,606 and the total number of pots pulled was 2,982 (Table 20). The CPUE was 10.9 crab/pot. Total harvest was 92,988 pounds of king crab. The harvest goal was 80,000 pounds. The exvessel price for crab was \$1.98 per pound. The value of the 1997 fishery is estimated at \$184,116. This is the smallest summer commercial harvest since the Norton Sound crab fishery transition to a small vessel fishery in 1993 (Appendix Tables E3 & E4).

Fish ticket records show that the 1997 season's largest fishing effort (67%) and harvest (83%) occurred in statistical areas 636401 and 626401 (Table 20) just south of Golovin Bay. Prior to 1995, the fishery had typically concentrated in statistical areas south of Nome. In 1995, fishing started in the usual areas, but catches were low and fishermen spread their effort. Late in the season the best catch rates were found in the statistical areas south of Golovin Bay. Comparisons of the annual summer commercial harvest of crab by statistical area can be found in Appendix Table E1.

Based on fish ticket data, statistical area 626401 had the greatest CPUE of 14.2 crab/pot (Table 20). Overall CPUE for the 1997 season was 10.9 crab/pot. Appendix Tables E3 & E4 equate previous commercial crab harvest, effort, CPUE and value to the 1997 season. During the 1997 fishery, there were approximately 520 pots on the fishing grounds. The mean CPUE of the previous three years with a similar number of pots deployed on the grounds is 28.

Statistical areas 656330 and 636330 had the greatest average weights of 3.05 pounds per crab according to fish ticket data (Table 20). Overall average weight per crab for the 1997 season was 2.85 pounds. This compares to the combined average weight of 2.98 pounds of the previous four years.

Commercial Catch Sampling

Carapace length measurement and shell age were collected from 1,198 legal male red king crab throughout the duration of the 1997 summer fishery. Carapace age was classified as new (11 months old) or old (at least 23 months old). Overall mean carapace length of the legal male red king crab sampled was 115.7mm. The 1997 season's legal male new shell/old shell ratio was 86% new shell to 14% old shell. This compares to the previous year average of 64% new shell to 36% old shell. Generally, the 1997 proportion of new shelled crab is high.

Recruit king crab made up 49% of the harvested stock sampled during the 1997 commercial season (Appendix Table E2). This high level of recruitment has not been observed since the mid-1980s when the population was recovering from a period of intense harvest.

No sublegal male or female king crab information was collected from commercial vessels during the 1997 summer commercial king crab fishery. The small size of the vessels and the opportunistic excursion schedule made onboard sampling unfeasible.

Tagged Crab

Eight tagged crab were recovered during the 1997 summer fishery. Two of those crab were not documented properly at the time of release and that data was not usable. Of the remaining six crab recaptured during 1997, mean growth per molt was 12.9 mm.

Enforcement

The Fish and Wildlife Protection officer was unable to patrol the fishery. No cases were filed during 1997.

Norton Sound Winter Commercial Fishery

Regulation allows a winter commercial fishery in the Norton Sound Section from November 15 through May 15, the fishery typically takes place near Nome. The winter commercial fishery is required to take place from the ice, not from vessels. During the winter of 1996-1997, two commercial fishermen reported selling a total of 83 red king crab (Appendix Table E4). The villages east of Nome reported only limited harvests of crab. Ice conditions were generally unfavorable throughout Norton Sound, although the sea ice near Elim was fairly stable. Poor catch rates at Nome and unstable ice to the east kept king crab fishing to some of the lowest levels in recent years.

The harvest is divided between local residents who buy crab directly from the fishermen and other non-local markets such as Anchorage. Crab are sold in Nome for six dollars per crab, roughly \$2.85 per pound. Because of the poor harvest rate, there were no crab sold out of town. The 1996-1997 winter catch of 210 pounds was estimated to be worth about 598 dollars.

The winter crab fishermen generally use crab pots but some use handlines to "prospect". Deploying pots through sea ice is laborious, but hand lines can be dropped through a large ice auger hole in a short period of time. The other advantage of hand lines is that during periods of favorable weather hand lines may be deployed from new, less stable ice without the risk of loosing more expensive crab pots. Most fishermen consider commercial crabbing a sideline and hold other jobs. Usually, two or three of the winter crab fishermen sell the majority of the crab. Because the volume of crab involved is low, no processor has found it profitable to operate locally. The crab sold locally are all sold fresh as are those shipped to Anchorage or other non local markets. During the mid-winter months, fishermen find it difficult keeping the crab from freezing. Many Nome residents prefer to buy frozen crab since they are able to extract the meat prior to cooking. Fresh frozen crab are easily marketed in Nome, but are not accepted in Anchorage markets.

SUBSISTENCE FISHERY

Red king crab are utilized by Norton Sound residents mainly during the winter. Fishing occurs through cracks or holes cut in the ice with the use of handlines and pots. In order to document trends in the subsistence harvest, the Board of Fisheries enacted a regulation in 1977 requiring subsistence fishermen in Norton Sound to obtain a permit prior to fishing and to record daily effort and catches on these permits.

The first year subsistence permits were required had the highest number of permits issued to date and a relatively high harvest rate was recorded. The fishery declined sharply the following year and remained at very depressed levels throughout the 1981-82 season. The lack of success in the winter crab fishery during some past years has been attributed to a declining crab population caused by the removal of crab in the summer commercial fishery together with low recruitment, low effort due to poor ice conditions, and changes in the nearshore winter distribution of crab. All these factors probably had some effect on the success of the winter fishery in varying degrees. During the 1978-79 winter fishery, the king crab population was still in relatively high abundance. Despite this relatively large population, winter catches were the poorest on record indicating that the major factors limiting winter catches were probably poor ice conditions and the distribution of crab. During the winter of 1981-82, poor winter catches could more reasonably be attributed to a declining crab population since the crab population was at a much lower level. Subsistence fishing success during the winters of 1982-83 through 1986-87 had improved due to a rebuilding of the population and increased use of more efficient gear (pots instead of handlines). Unstable ice conditions and record snowfalls adversely effected the 1987-88, 1988-89, and 1992-93 catches. During years of stable ice conditions, approximately 100 fishermen have averaged 100 crab each.

The 1996-1997 season was beset with poor ice conditions. Frequent storms limited the extent of the shorefast ice and fishers had difficulty keeping their pots and finding suitable locations to fish. Of the 22 permits returned, 13 reported fishing (Table 2, Appendix Table E4). Ten fishers reported using pots, 1 reported using handlines, and 2 reported using a combination of the two gears. Permit data indicates the subsistence harvest consisted of 745 male crab and 13 female crab. Those fishers reported harvesting 59% of the male crab they caught and 3% of the females caught.

STOCK STATUS / RESEARCH

There has been a change in the character of the summer commercial fishery since 1993 due to regulation changes affecting pot limits, opening dates and a regulation making Norton Sound a superexclusive registration area. The quality and quantity of data collected since the 1993 summer crab fishery has differed greatly from previous years due to the nature of the small vessel fishery. No floating processor or catcher processor took part in the 1997 fishery, therefore no independent observers were onboard commercial vessels.

The ADF&G fishery monitor did not have the opportunity to make observations on small catcher vessels during the 1997 fishery. No information was collected on observed pot lifts, sublegal male and female length frequencies, and catch rates of legal and sublegal crab during the commercial fishery. However, sampling of the commercial catch did occur on some deliveries made in Nome. This is important to ensure size limits are being enforced, and to assist management biologists in determining recruitment and health of the crab population.

In 1976, when monitoring of the Norton Sound king crab population first began, the population was mainly composed of prerecruit and recruit crab. The initial population assessment survey by the

NMFS estimated the legal male king crab population at 8.1 million pounds (Appendix Table E5). The legal male crab population peaked in 1978 at an estimated 11 million pounds. During the 4 years following 1978, recruitment into the legal male crab population was very low. Subsequent NMFS surveys in 1979 and 1982 documented a population of predominantly postrecruit crab, and estimated the population had declined to 2.6 million pounds by 1982. Beginning in 1981, sublegal crab abundance began to increase, and by 1983 recruitment into the legal male population also began to increase. No assessment work was conducted in 1983 or 1984. However, samples of the commercial catches indicated a significant increase of recruit crab into the legal male population; from a historic low of 10% in 1981 to 59% in 1984.

In 1985, both NMFS and ADF&G conducted population assessment surveys in Norton Sound (Appendix Table E5). After the commercial fishery in 1985, NMFS conducted a population assessment survey using trawl gear over a slightly larger area than that surveyed by the Department. Male king crab sampled in NMFS trawls were in the process of or had just molted with the result being that their estimate of 3.4 million pounds of legal male king crab included some recruitment. Adjusting this estimate for molting, and including the summer commercial harvest, an estimated three million pounds were present prior to the 1985 August fishery. Both surveys documented relatively substantial numbers of recruit crab and a healthy percentage of prerecruit crab.

During September of 1988 NMFS conducted a fifth population assessment with trawl gear. They sampled an area roughly the same size as in 1985, but increased sampling frequency in the proposed mineral lease area near Nome. The timing of the study, which occurred during the male molt, was almost a month earlier than similar surveys in the past. Nearly all the 1988 catch was in pre-molt condition. NMFS estimated 3.0 million pounds of legal male and 1.0 million pounds of prerecruit-one male red king crab; totaling 4.0 million pounds. Annual mortality was estimated at approximately 20% or 0.8 million pounds. Ignoring growth and the winter harvests, the population prior to the 1989 summer fishery would have been 3.2 million pounds, very close to the 1985 trawl estimate of 3.4 million pounds.

NMFS conducted a sixth trawl survey of Norton Sound during late August 1991 with a reduced number of tows. Each station had only a single sampling tow, as compared to each station having both a day and night tows during previous surveys. This reduction in sampling had the effect of introducing more variability into the estimate. The legal crab biomass in the summer fishing area was estimated to be 3,400,000 pounds and the total Norton Sound legal biomass was estimated to be 4,009,000 pounds. Since the survey occurred prior to the molt, a mortality of 10% was assumed for the year following the estimate. With no summer or winter fishery data to compare with the survey results, a conservative biomass of 3,400,000 pounds was used as the basis for the 1992-96 harvest guideline. The Norton Sound red king crab population was thought to be stable with harvest set near 10%.

NMFS has discontinued their trawl surveys of Norton Sound. The Department was able to utilize recently appropriated money for a trawl survey of their own during August of 1996. The methodology used was very similar to that used by NMFS in previous surveys. The legal biomass

was estimate to be 1,600,000 pounds. This is a significant decline from the previous survey. Department staff met and decided that the population was far below its carrying capacity and was closely approaching the threshold below which a commercial harvest should not occur. There are indications that the sublegal portion of the population is relatively strong in comparison to the legal portion. It was decided that the exploitation rate would be reduced to five percent of the legal biomass. This reduced harvest rate and the expected strong recruitment will allow for a rapid recovery of the legal biomass.

FUTURE INVESTIGATIONS

The trawl survey that occurred during the summer of 1996 in Norton Sound was made possible by a budget increment passed by the legislature. This is to be a regularly scheduled survey rotating between districts. Both funding for a sustained winter research program and a triennial trawl survey to evaluate Norton Sound crab populations were provided for in that legislation. A winter pot survey is planned during February, March, and April 1998 and the next trawl survey to generate a population estimate is planned for 1999.

OUTLOOK FOR 1998

The outlook for 1998 is not yet complete. The guideline harvest is likely be to the same as the 1997 season; however, the winter pot survey will be used to check the projections generated from the trawl survey.

Table 20. Commercial harvest of red king crab from Norton Sound Section by statistical area, Norton Sound District, 1997 (summer fishery only).

| Statistical Area | No. of Vessels | Total Harvest | | Total Pots Lifted | Average Crab/Pot | Average Weight |
|------------------|----------------|---------------|---------------|-------------------|------------------|----------------|
| | | Number | Pounds | | | |
| 626401 | 5 | 6,242 | 18,066 | 440 | 14.2 | 2.89 |
| 636330 | 2 | 1,260 | 3,838 | 120 | 10.5 | 3.05 |
| 636401 | 10 | 21,027 | 59,206 | 1,515 | 13.9 | 2.82 |
| 646330 | 1 | 120 | 314 | 80 | 1.5 | 2.62 |
| 646401 | 1 | 389 | 1,052 | 81 | 4.8 | 2.70 |
| 656330 | 3 | 1,528 | 4,661 | 313 | 4.9 | 3.05 |
| 656401 | 4 | 1,368 | 4,035 | 301 | 4.5 | 2.95 |
| 666401 | 1 | 672 | 1,816 | 132 | 5.1 | 2.70 |
| Totals | 13 | 32,606 | 92,988 | 2,982 | 10.9 | 2.85 |

Table 21. Winter 1996-97 subsistence red king crab catches and effort by gear type, Norton Sound area.^a

| Gear Type | # Permits Fished | # Males Caught | # Males Kept | # Females Caught | # Females Kept | Total Crab Captured | Total Crab Kept | Average Harvest per Fisherman |
|-----------|------------------|----------------|--------------|------------------|----------------|---------------------|-----------------|-------------------------------|
| Pots | 10 | 1,077 | 599 | 297 | 13 | 1,374 | 612 | 61 |
| Handlines | 1 | 3 | 0 | 4 | 0 | 7 | 0 | 0 |
| Both | 2 | 160 | 133 | 76 | 0 | 236 | 133 | 67 |
| Unknown | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Totals | 13 | 1,240 | 732 | 377 | 13 | 1,617 | 745 | 57 |

^a 38 permits given out, 22 permits returned, 13 fished.

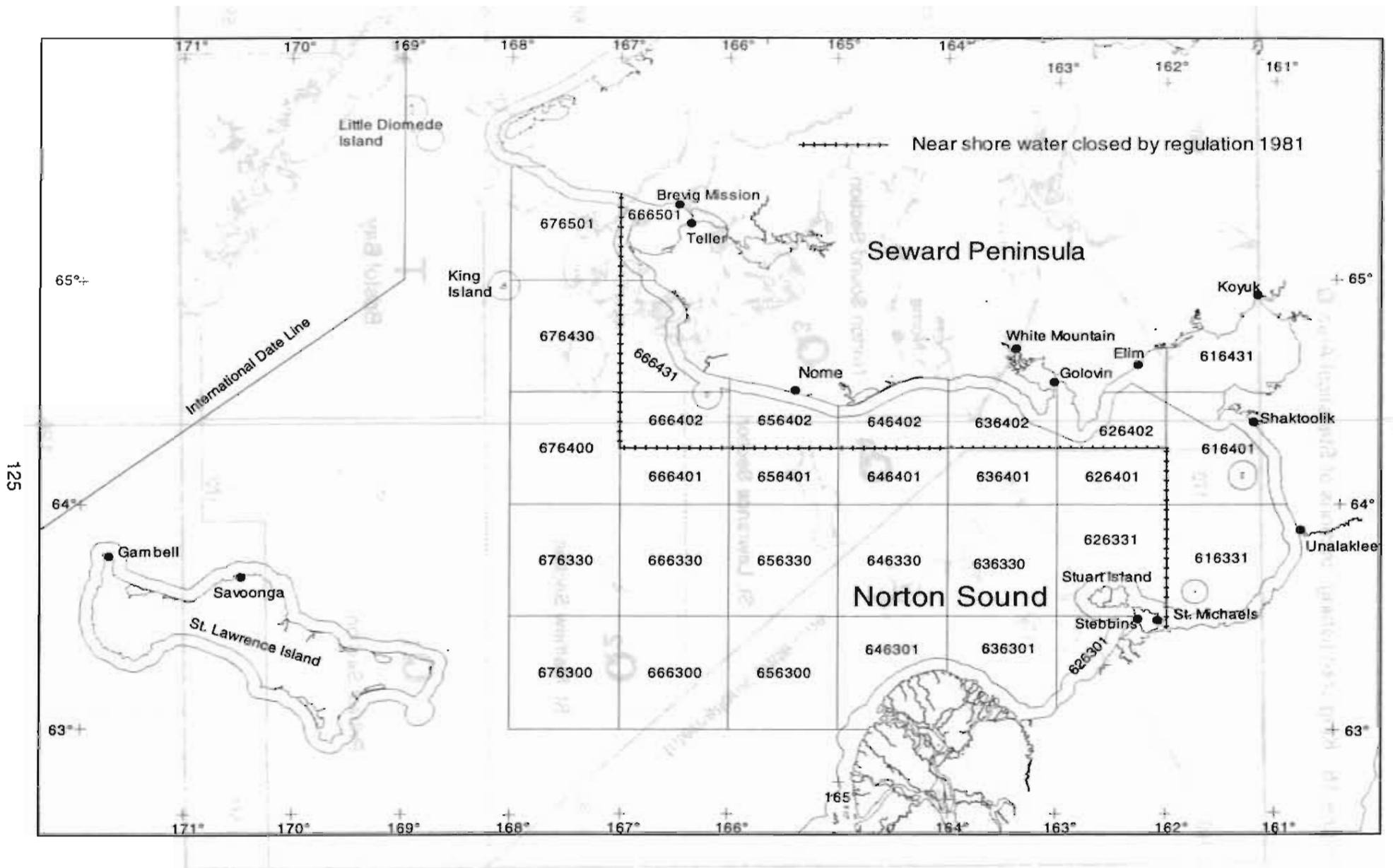
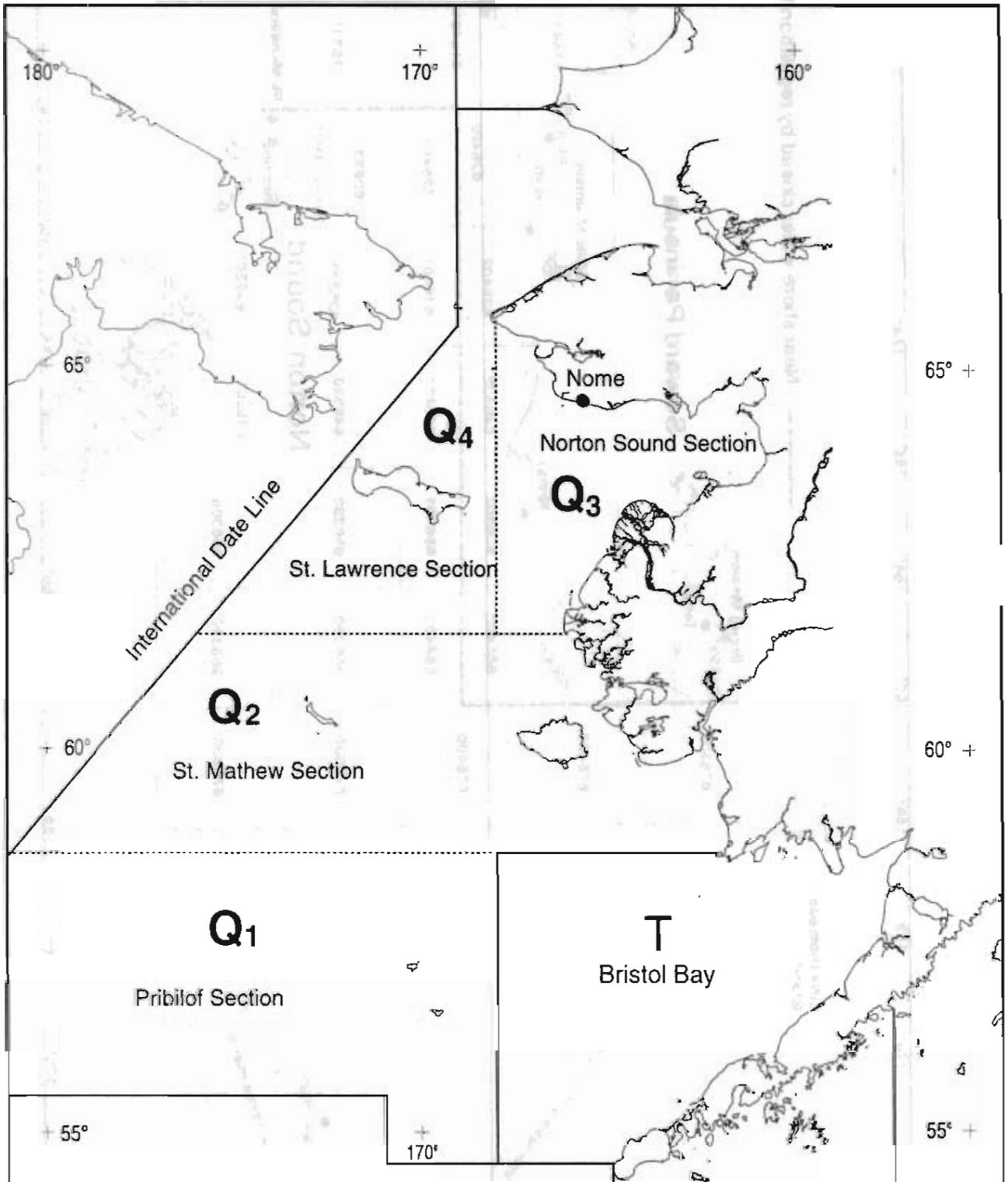


Figure 15. Statistical areas for the Norton Sound red king crab fishery

Figure 16. King crab fishing sections of Statistical Area Q.



Norton Sound Red King Crab

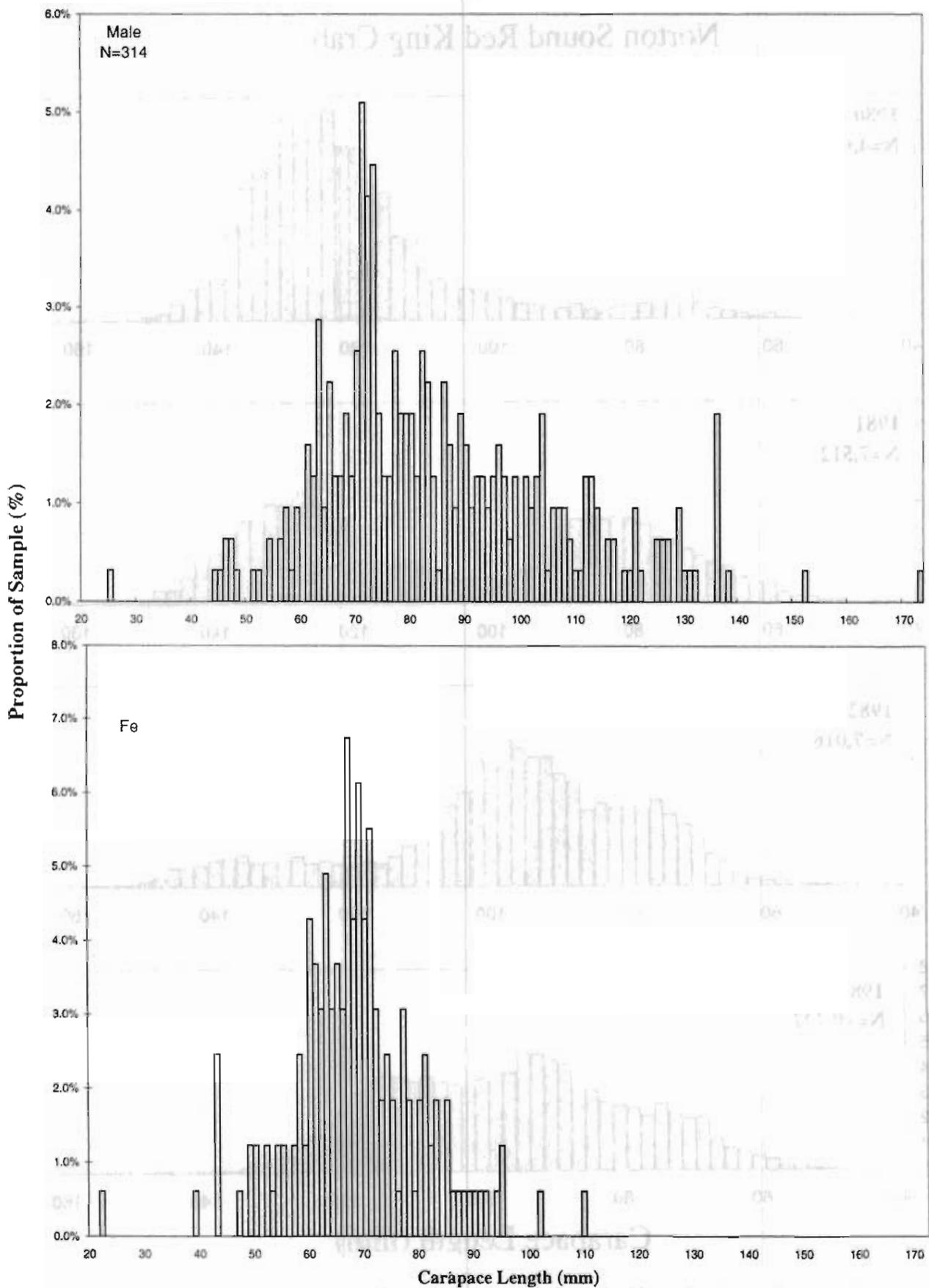


Figure 17. Norton Sound male and female red king crab size distribution from a trawl assessment survey conducted by ADF&G, 1996.

Norton Sound Red King Crab

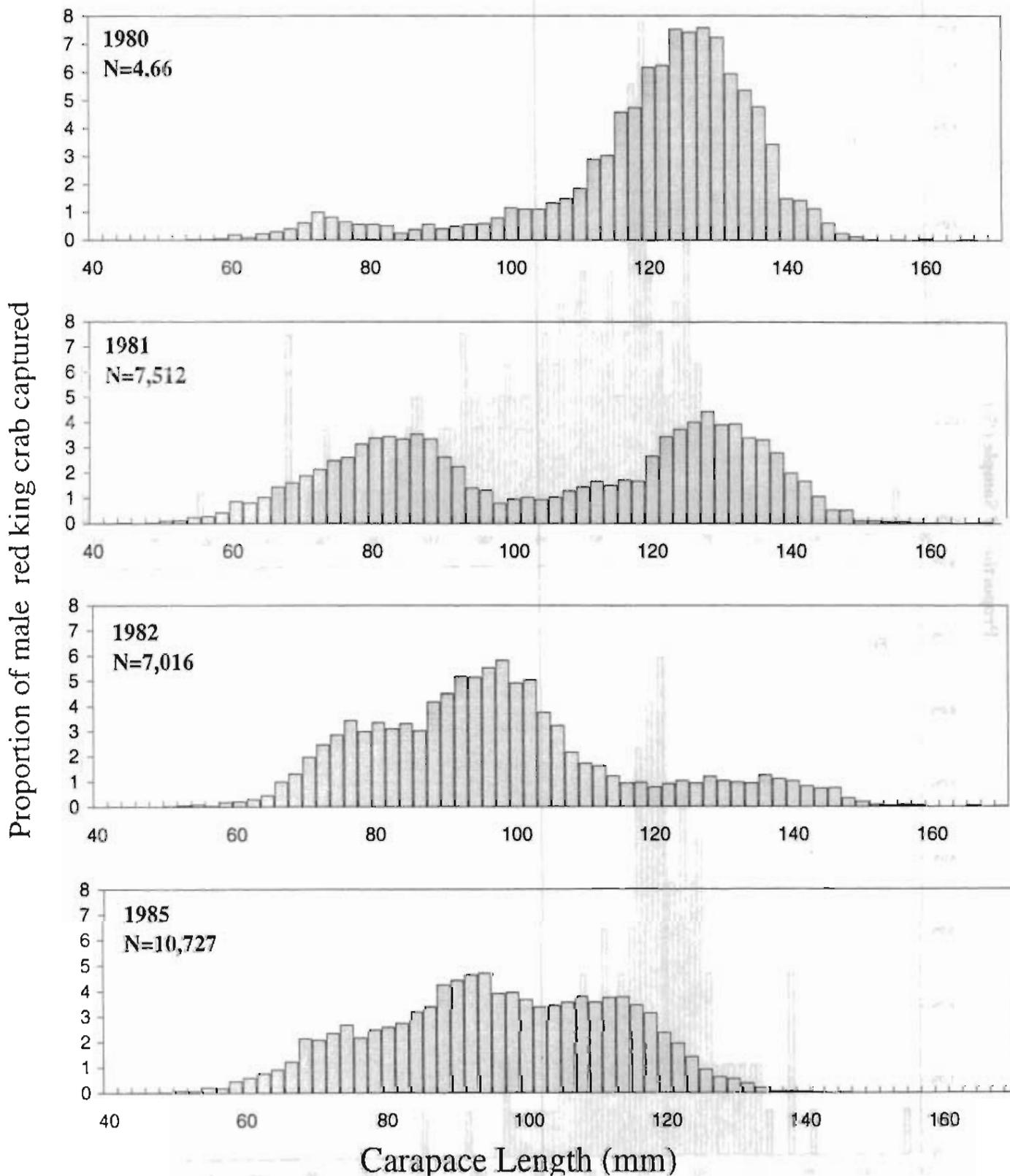


Figure 18. Norton Sound male red king crab size distribution from pot assessment surveys conducted by the Alaska Department of Fish and Game, 1980, 1981, 1982, and 1985.

Norton Sound Red King Crab

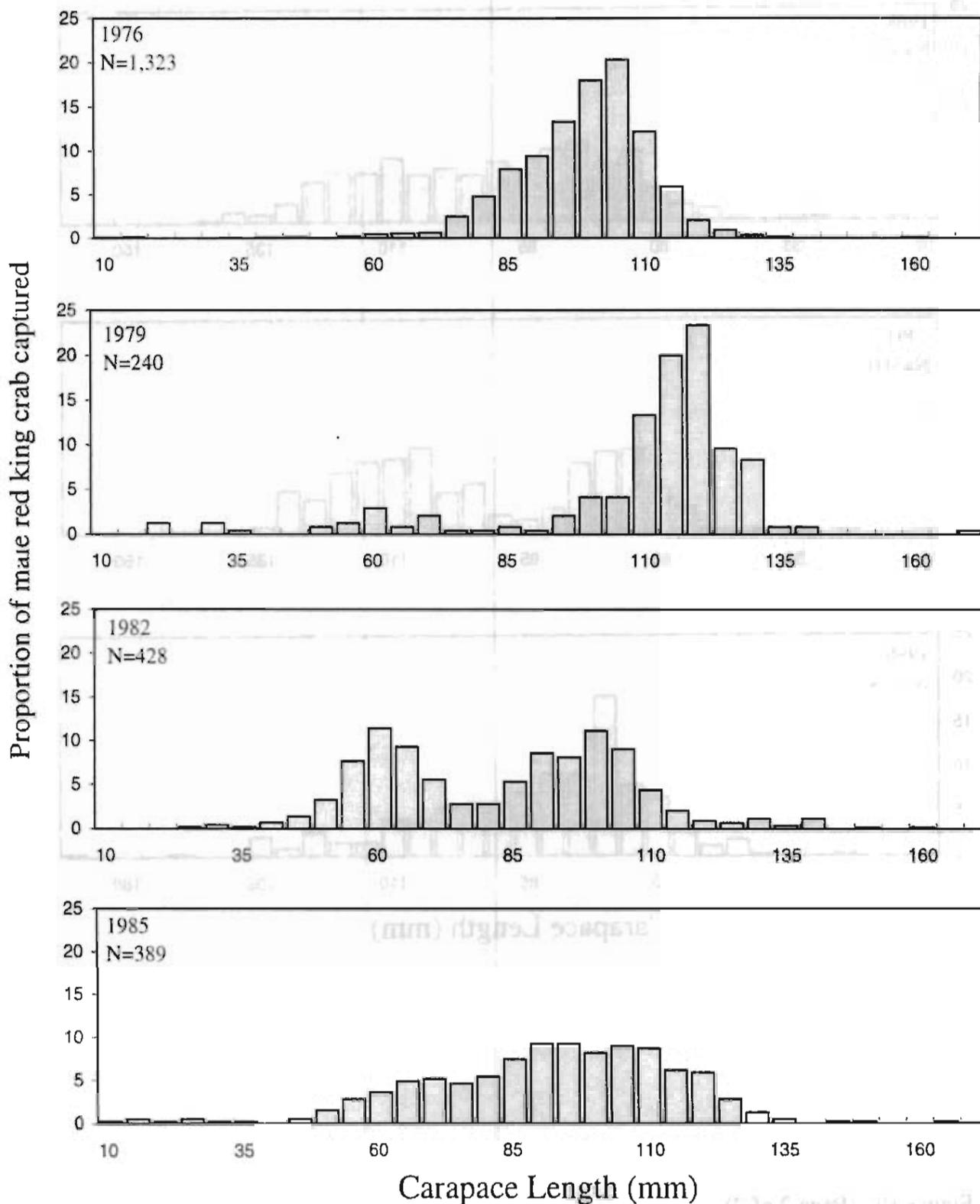


Figure 19. Norton Sound male red king crab size distribution from trawl assessment surveys conducted by the National Marine Fisheries Service, 1976, 1979, 1982, 1985, 1988, 1991, and by ADF&G in 1996 (Page 1 of 2).

Norton Sound Red King Crab

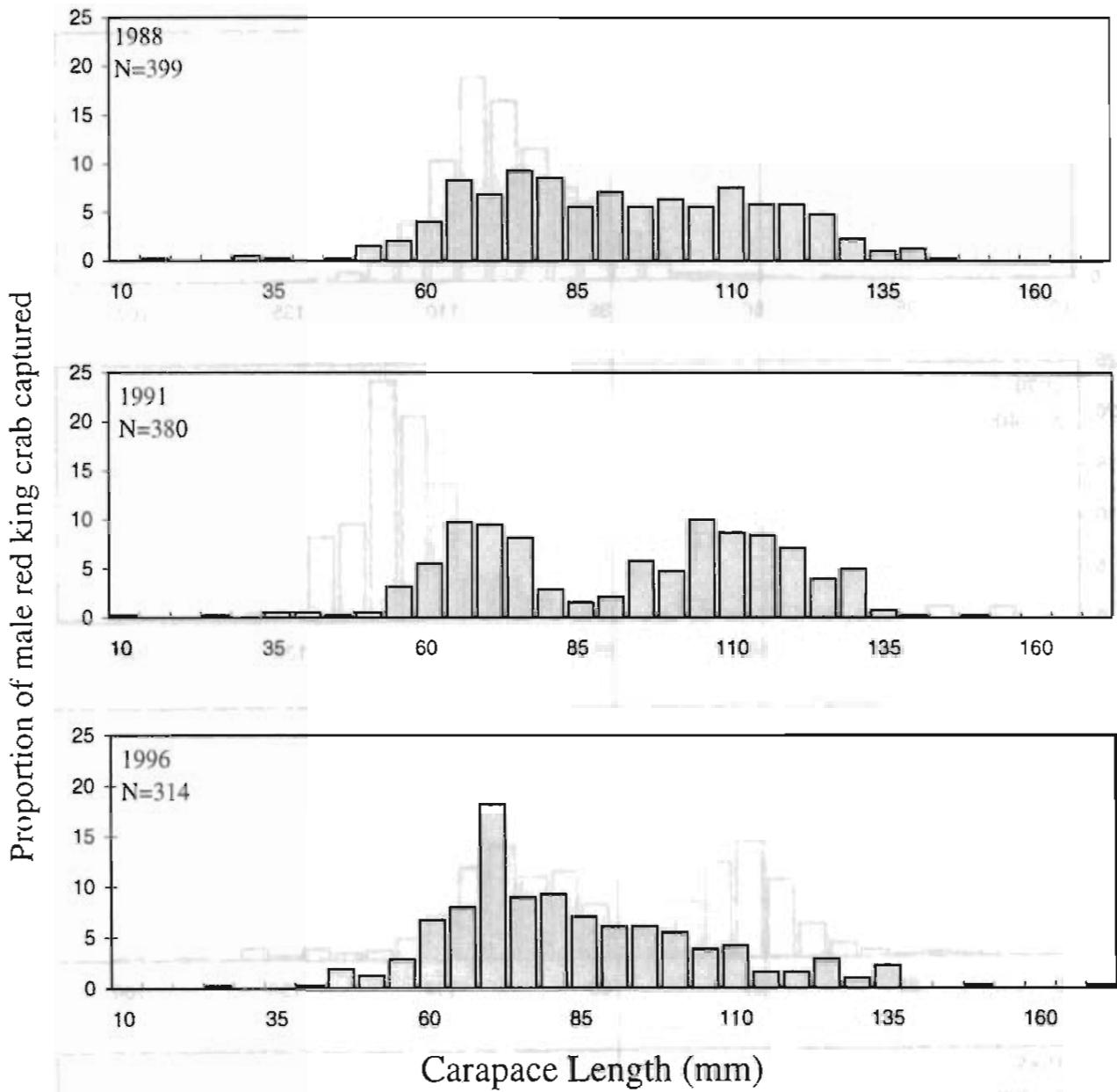


Figure 19. (Page 2 of 2)

Norton Sound Red King Crab

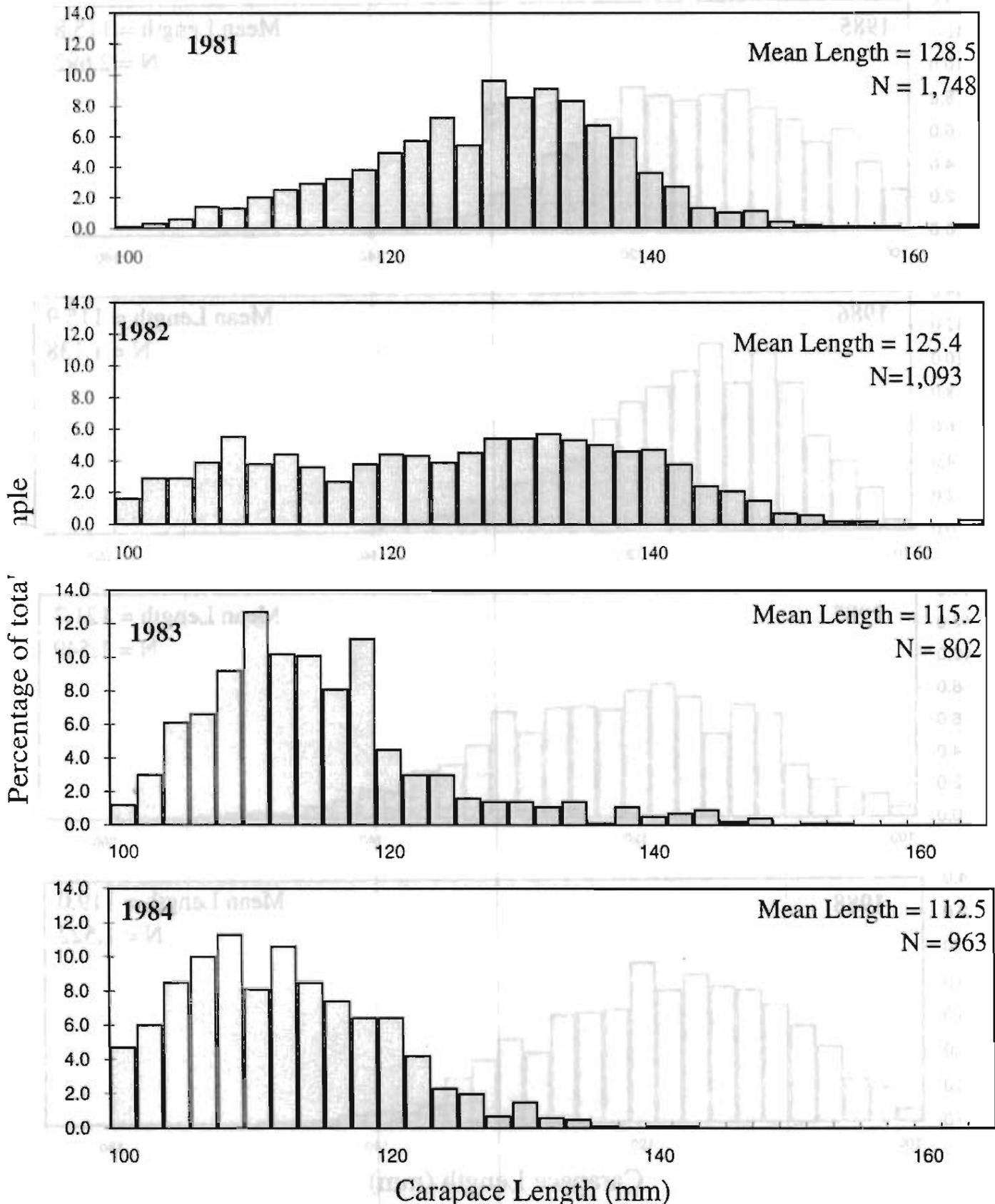


Figure 20. Norton Sound red king crab summer commercial catch samples, 1981-1997 (There was no fishery in 1991).

Norton Sound Red King Crab

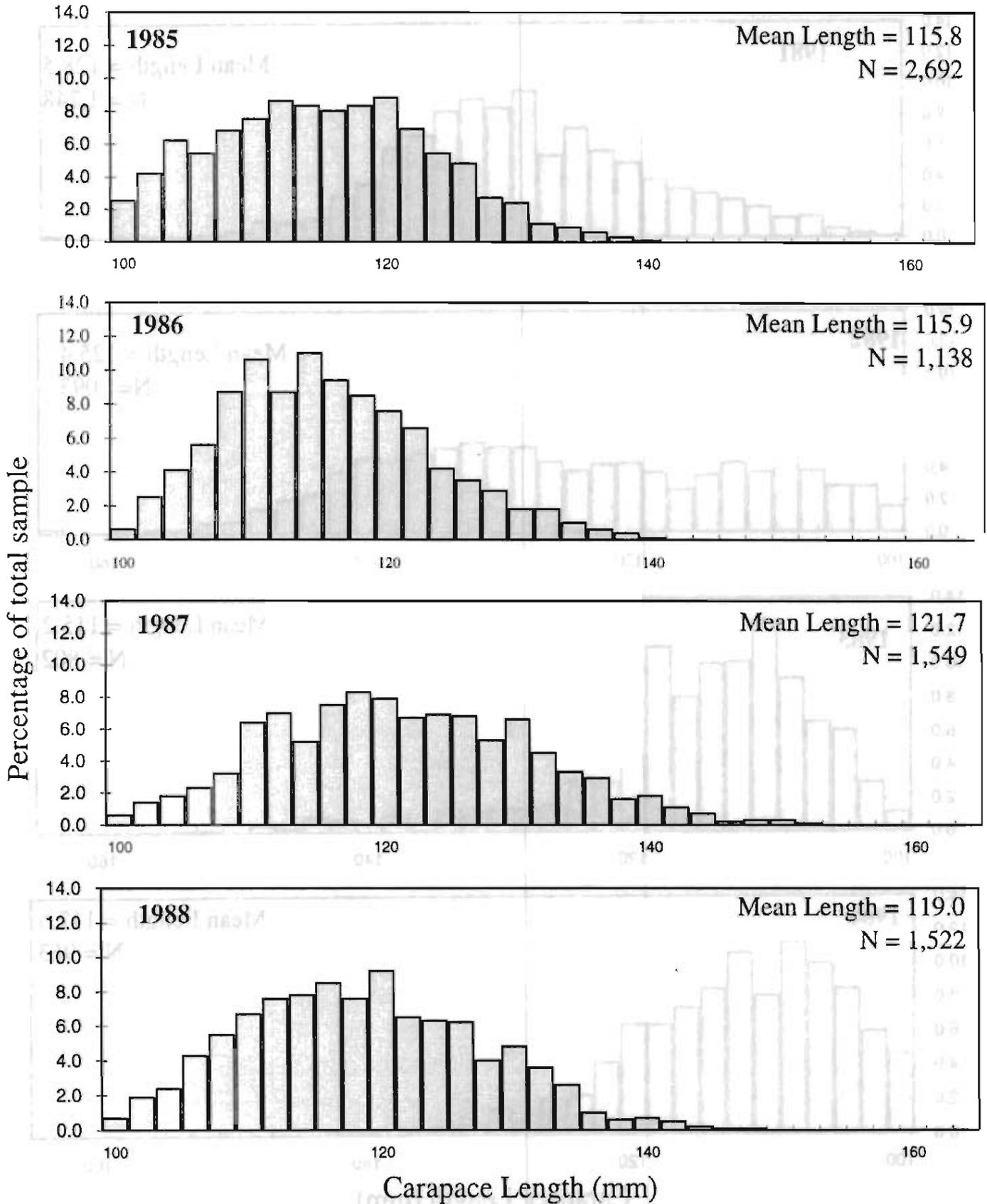


Figure 20. (page 2 of 4)

Norton Sound Red King Crab

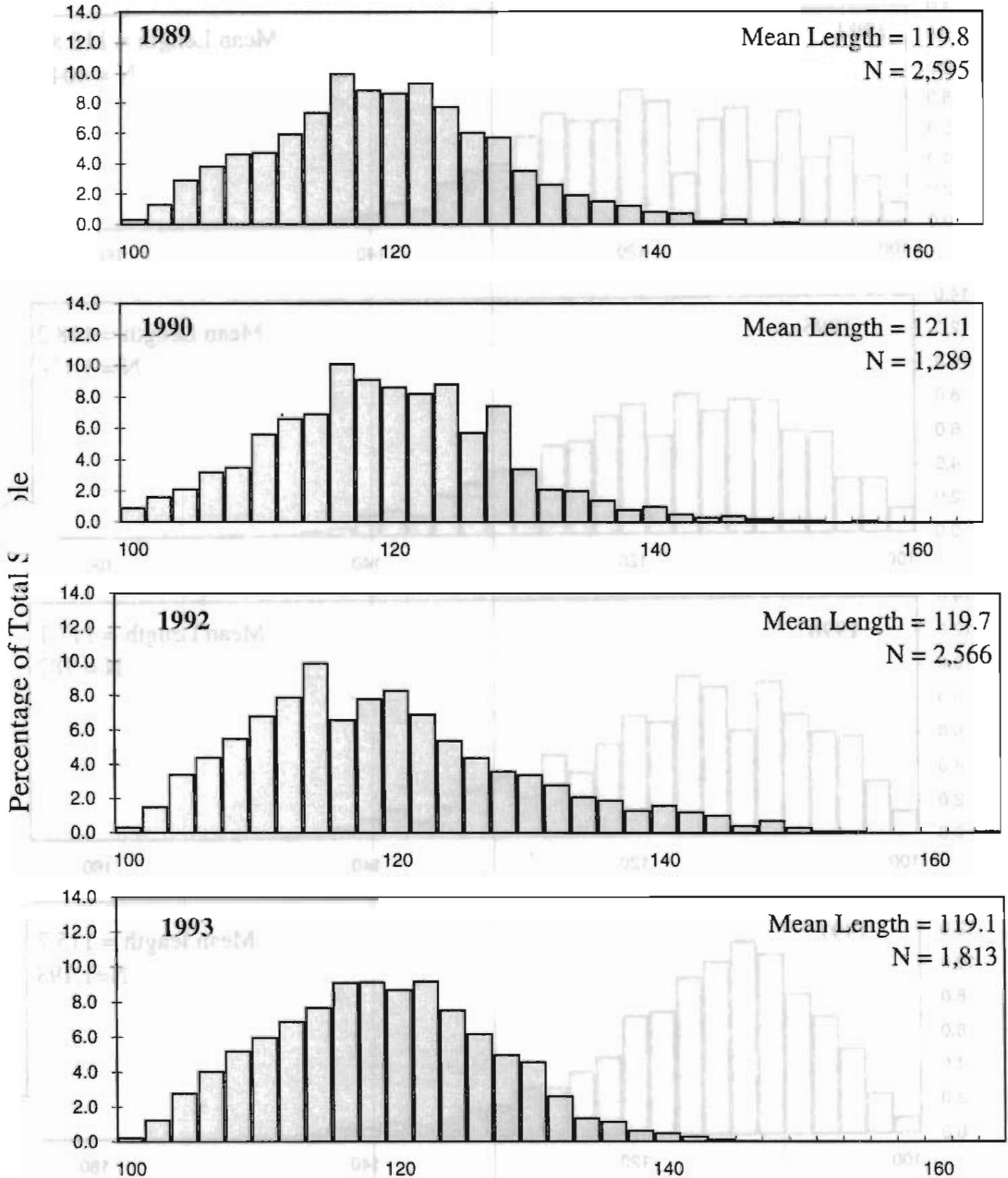


Figure 20. (page 3 of 4)

Norton Sound Red King Crab

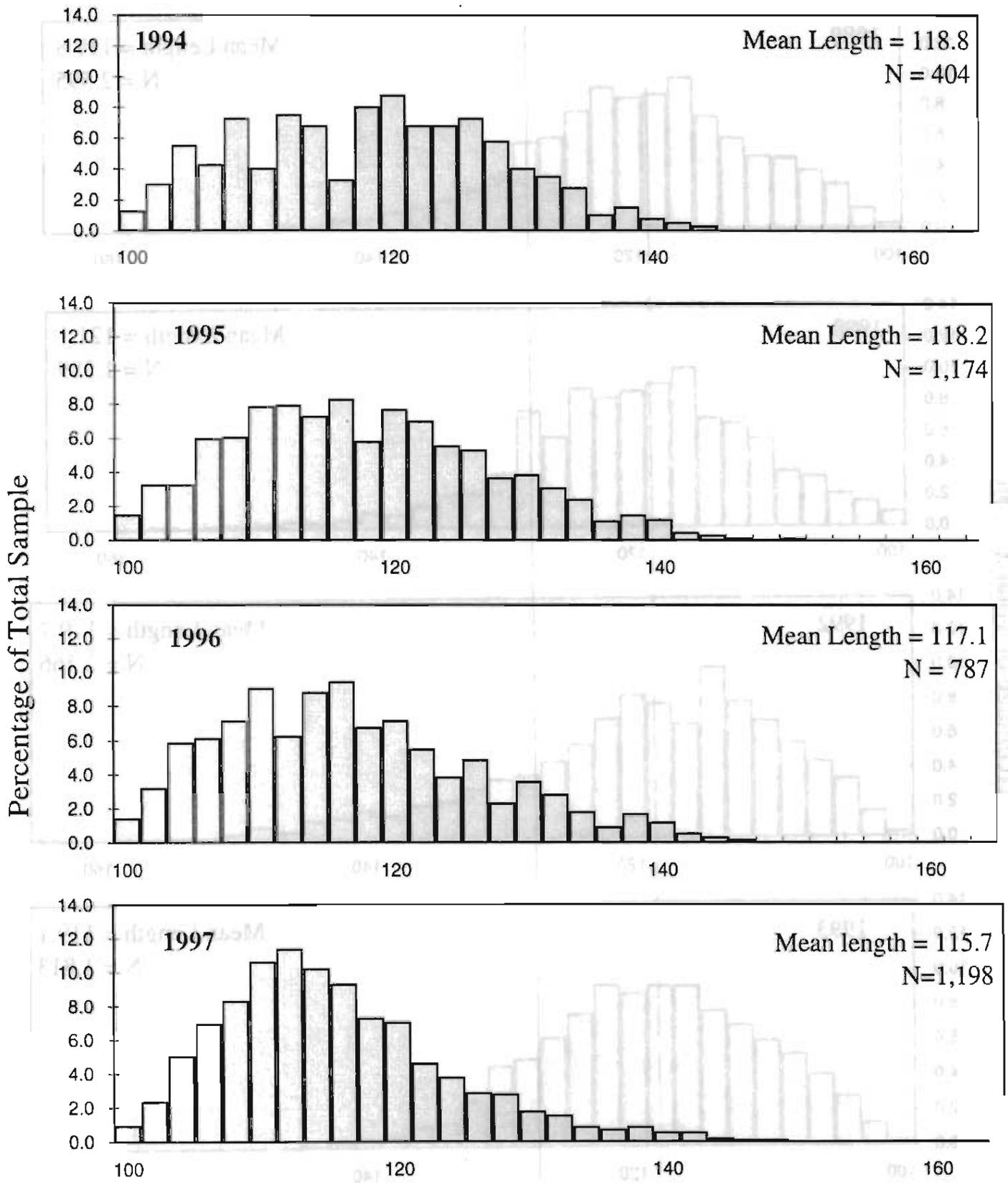


Figure 20. (page 4 of 4)

Appendix Table E1. Comparison of annual summer commercial harvest of red king crab from Norton Sound Section, Eastern Bering Sea, by statistical area, 1977-1997 (catch in pounds)

| Statistical Area | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1992 | 1993 | 1994 | 1995 | 1996 ^b | 1997 | Totals | | |
|------------------|---------|-----------|-----------|-----------|-----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|--------|---------|---------|---------|-------------------|--------|-----------|------------|-----------|
| 616331 | 7,893 | | | | | | | | | | | | | | | | 48 | | | | 7,941 | | |
| 616401 | | | | | | | | | | | | | | | | | | 35 | | | 35 | | |
| 620331 | 40,020 | | | | | 22 | | | | | | | | | | | | | 61 | | 40,103 | | |
| 626401 | 31,572 | | | 4,850 | 399 | | | | | | | | | | | | | 18,971 | 45,045 | 18,966 | 118,883 | | |
| 626402 | 38,995 | | | | | | | | | | | | | | | | | | | | 38,995 | | |
| 636330 | | | | | | | | | | | | | | | | | | | 4,560 | 3,838 | 8,398 | | |
| 636401 | | | | 12,398 | 61,823 | 32,246 | 5,886 | 41 | 891 | | | | 22,030 | | 1,159 | 1,373 | 8,087 | 24,329 | 70,677 | 59,206 | 300,140 | | |
| 636402 | | | | | | | | | | | | | | | | | 1,754 | 3,466 | | | 5,220 | | |
| 646301 | | | | | | | | | | | | | | | | | | 4,628 | 13,888 | | 18,516 | | |
| 646330 | | | | | 4,716 | | | | | | | | 5,212 | | | | | 1,493 | 2,894 | 314 | 14,629 | | |
| 646401 | | | 155,972 | | 1,319 | 17,532 | | | | | | | | | | 1,963 | 37,222 | 105,045 | 22,834 | 1,052 | 342,939 | | |
| 646402 | 80,969 | | | | | 748 | | | | | | | | | | 730 | 143,511 | 66,821 | | | 292,779 | | |
| 656300 | | | 161,699 | | 15,174 | | | | | | | | | | | | | | | | 176,873 | | |
| 656330 | | | 323,518 | 72,735 | 395,662 | 3,983 | 24,246 | 83,479 | 7,632 | | 79,006 | 36,129 | 1,757 | | 4,814 | 265 | | 19,745 | 15,446 | 4,661 | 1,073,078 | | |
| 656401 | | | 138,011 | 121,147 | 253,387 | 60,480 | 11,422 | 183,119 | 246,200 | | 194,408 | 165,644 | 100,956 | | 171 | 53,119 | 105,341 | 29,566 | 32,289 | 9,985 | 4,035 | 1,709,280 | |
| 656402 | 306,302 | 90,187 | 288,869 | 918 | 3,098 | 2,832 | | | 132,363 | | | | | | | 193,079 | 106,053 | 44,000 | | | | | 1,167,701 |
| 666230 | | 55,490 | | | | | | | | | | | | | | | | | | | | | 55,567 |
| 666300 | | 162,795 | 60,816 | 84,874 | 9,167 | 95 | | 4,534 | | | | | | | | | | | | 25,519 | | | 347,800 |
| 666330 | | 353,016 | 505,050 | 367,446 | 141,513 | 8,990 | 1,192 | | 389 | 70,615 | 2,963 | 13,020 | 1,275 | 27,185 | 4,305 | 31,758 | | 730 | | | | 1,529,447 | |
| 666401 | | 179,212 | 486,947 | 205,400 | 381,510 | 79,580 | 325,045 | 116,254 | 5,341 | 408,848 | 50,744 | 21,895 | 115,257 | 162,263 | 10,632 | 746 | 396 | | | 3,001 | 1,816 | 2,554,887 | |
| 666402 | 12,036 | 515,778 | 534,938 | 183,581 | | 17,585 | | | 32,992 | | | | | | | | 535 | 1,221 | | | | | 1,298,666 |
| 666431 | | | 146,029 | | | | | | | | | | | | | | | 1,124 | | | | | 147,153 |
| 676300 | | 13,238 | | 126,231 | | | | | | | | | | | | | | | | 546 | | | 140,015 |
| 676330 | | 51,304 | 81,798 | 6,762 | 18,734 | | | | | | | | | | | | | | | | | | 158,598 |
| 676400 | | 667,130 | 33,856 | 274 | 92,026 | 1,315 | 247 | | 32 | | | | | 3,212 | | | | | | 9,775 | | | 807,867 |
| 676430 | | 3,811 | 12,309 | | 373 | 3,513 | | | 1,171 | | | | | | | | | | | | | | 21,177 |
| 676501 | | | | | 36 | | | | | | | | | | | | | | | | | | 36 |
| 686330 | | | 1,860 | | | | | | | | | | | | | | | | | | | | 1,860 |
| Totals | 517,787 | 2,091,961 | 2,931,672 | 1,186,596 | 1,379,014 | 228,921 | 368,032 | 387,427 | 427,011 | 479,463 | 327,121 | 236,688 | 246,487 | 192,831 | 74,029 | 333,790 | 327,858 | 322,676 | 224,231 | 92,988 | | 12,378,583 | |

^a No commercial fishery occurred in 1991.

^b Does not include approximately 2,490 lbs not reported on fish tickets.

Appendix Table E2. Percent recruit and postrecruit size male red king crab from commercial catch samples by year, Norton Sound Section, Bering Sea.

| Year | Recruits ^a | Postrecruits ^b |
|-------------------|-----------------------|---------------------------|
| 1977 | 53 | 47 |
| 1978 | 29 | 71 |
| 1979 | 33 | 67 |
| 1980 | 15 | 85 |
| 1981 | 10 | 90 |
| 1982 | 27 | 73 |
| 1983 | 55 | 45 |
| 1984 | 59 | 41 |
| 1985 | 45 | 55 |
| 1986 | 49 | 51 |
| 1987 | 22 | 78 |
| 1988 | 25 | 75 |
| 1989 | 23 | 77 |
| 1990 | 21 | 79 |
| 1991 ^c | - | - |
| 1992 | 28 | 72 |
| 1993 | 31 | 69 |
| 1994 | 20 | 80 |
| 1995 | 36 | 64 |
| 1996 | 30 | 70 |
| 1997 | 49 | 51 |

^a Percent Recruits = All new shell, legal size, male king crab of carapace length <116mm.

^b Percent Postrecruits = All other, legal size, male king crab.

^c No Summer Commercial Fishery in 1991.

Appendix Table E3. Historic summer commercial red king economic performance, Norton Sound Section, Bering Sea, 1977 - 1997.

| Year | Guideline Harvest Level (lbs) ^d | Legal Male Pop. Est.(lbs) ⁱⁱ | Commercial Harvest (lbs) ^{ii,b} | Number of | | | Number of Pots | | Exvessel Price/lb | Fishery Value (millions \$) | Season Length | |
|-------------------|--|---|--|--------------|--------------|--------------|----------------|--------------|-------------------|-----------------------------|---------------|-----------------------|
| | | | | Vessels | Permits | Landings | Registered | Pulls | | | Days | Dates |
| 1977 | ^d | 10.0 | 0.52 | 7 | 7 | 13 | ^d | 5,457 | 0.75 | 0.229 | 60 | ^d |
| 1978 | 3.00 | 11.0 | 2.09 | 8 | 8 | 54 | ^d | 10,817 | 0.95 | 1.897 | 60 | 6/7-8/15 |
| 1979 | 3.00 | 5.4 | 2.93 | 34 | 34 | 76 | ^d | 34,773 | 0.75 | 1.878 | 16 | 7/15-7/31 |
| 1980 | 1.00 | 6.6 | 1.19 | 9 | 9 | 50 | ^d | 11,199 | 0.75 | 0.890 | 16 | 7/15-7/31 |
| 1981 | 2.50 | 4.7 | 1.38 | 36 | 36 | 108 | ^d | 33,745 | 0.85 | 1.172 | 38 | 7/15-8/22 |
| 1982 | 0.50 | 1.3 | 0.23 | 11 | 11 | 33 | ^d | 11,230 | 2.00 | 0.405 | 23 | 8/9-9/1 |
| 1983 | 0.30 | 2.1 | 0.37 | 23 | 23 | 26 | 3,583 | 11,195 | 1.50 | 0.537 | 3.8 | 8/1-8/5 |
| 1984 | 0.40 | 2.7 | 0.39 | 8 | 8 | 21 | 1,245 | 9,706 | 1.02 | 0.395 | 13.6 | 8/1-8/15 |
| 1985 | 0.45 | 2.4 | 0.43 | 6 | 6 | 72 | 1,116 | 13,209 | 1.00 | 0.427 | 21.7 | 8/1-8/23 |
| 1986 | 0.42 | 2.8 | 0.48 | 3 | 3 | ^d | 578 | 4,284 | 1.25 | 0.600 | 13 | 8/1-8/25 ^e |
| 1987 | 0.40 | 2.2 | 0.33 | 9 | 9 | ^d | 1,430 | 10,258 | 1.50 | 0.491 | 11 | 8/1-8/12 |
| 1988 | 0.20 | 3.2 | 0.24 | 2 | 2 | ^d | 360 | 2,350 | ^d | ^d | 9.9 | 8/1-8/11 |
| 1989 | 0.20 | 3.2 | 0.25 | 10 | 10 | ^d | 2,555 | 5,149 | 3.00 | 0.739 | 3 | 8/1-8/4 |
| 1990 | 0.20 | 3.2 | 0.19 | 4 | 4 | ^d | 1,388 | 3,172 | ^d | ^d | 4 | 8/1-8/5 |
| 1991 ^e | 0.34 | 3.4 | ^d | ^d | ^d | ^d | ^d | ^d | ^d | ^d | ^d | ^d |
| 1992 | 0.34 | 3.4 | 0.07 | 27 | 27 | ^d | 2,635 | 5,746 | 1.75 | 0.130 | 2 | 8/1-8/3 |
| 1993 | 0.34 | 3.4 | 0.33 | 14 | 20 | 208 | 560 | 7,063 | 1.28 | 0.430 | 52 | 7/1-8/28 ^f |
| 1994 | 0.34 | 3.4 | 0.32 | 34 | 52 | 407 | 1,360 | 11,729 | 2.02 | 0.646 | 31 | 7/1-7/31 |
| 1995 | 0.34 | 3.4 | 0.32 | 48 | 81 | 665 | 1,900 | 18,782 | 2.87 | 0.926 | 67 | 7/1-9/5 |
| 1996 | 0.34 | 3.4 | 0.22 | 41 | 50 | 264 | 1,640 | 10,453 | 2.29 | 0.519 | 57 | 7/1-9/3 ^g |
| 1997 | 0.08 | 1.6 | 0.09 | 13 | 15 | 100 | 520 | 2,982 | 1.98 | 0.184 | 44 | 7/1-8/13 ^h |

^a Deadloss included in total.

^b Millions of pounds.

^c No summer commercial fishery.

^d Information not available.

^e Fishing actually began 8/12.

^f Fishing actually began 7/8.

^g Fishing began 7/9 due to fishermen's strike.

^h First delivery was made 7/10.

Appendix Table E4. Winter commercial and subsistence red king crab harvests, Norton Sound, Bering Sea, 1978-1997.

| Year ^a | COMMERCIAL | | SUBSISTENCE | | | | | | |
|-------------------|---------------------|------------------|---------------------|----------------|------------------|----------------|----------------------------------|-----------------------------------|--------------------|
| | Number of Fishermen | # Crab Harvested | Winter ^b | Permits Issued | Permits Returned | Permits Fished | Total Crab Captured ^c | Total Crab Harvested ^d | Average Harvest/lm |
| 1978 | 37 | 9,625 | 1977 -78 | 290 | 206 | 149 | ^e | 12,506 | 84 |
| 1979 | 1 | 221 | 1978 -79 | 48 | 43 | 38 | ^e | 224 | 6 |
| 1980 | 1 | 22 | 1979 -80 | 22 | 14 | 9 | ^e | 213 | 24 |
| 1981 | 0 | 0 | 1980 -81 | 51 | 39 | 23 | ^e | 360 | 16 |
| 1982 | 1 | 17 | 1981 -82 | 101 | 76 | 54 | ^e | 1,288 | 24 |
| 1983 | 5 | 549 | 1982 -83 | 172 | 106 | 85 | ^e | 10,432 | 123 |
| 1984 | 8 | 856 | 1983 -84 | 222 | 183 | 143 | 15,923 | 11,220 | 78 |
| 1985 | 9 | 1,168 | 1984 -85 | 203 | 166 | 132 | 10,757 | 8,377 | 63 |
| 1986 | 5 | 2,168 | 1985 -86 | 136 | 133 | 107 | 10,751 | 7,052 | 66 |
| 1987 | 7 | 1,040 | 1986 -87 | 138 | 134 | 98 | 7,406 | 5,772 | 59 |
| 1988 | 10 | 425 | 1987 -88 | 71 | 58 | 40 | 3,573 | 2,724 | 68 |
| 1989 | 5 | 403 | 1988 -89 | 139 | 115 | 94 | 7,945 | 6,126 | 65 |
| 1990 | 13 | 3,626 | 1989 -90 | 136 | 118 | 107 | 16,635 | 12,152 | 114 |
| 1991 | 11 | 3,800 | 1990 -91 | 119 | 104 | 79 | 9,295 | 7,366 | 93 |
| 1992 | 13 | 7,478 | 1991 -92 | 158 | 149 | 105 | 15,051 | 11,736 | 112 |
| 1993 | 8 | 1,788 | 1992 -93 | 88 | 79 | 37 | 1,193 | 1,097 | 30 |
| 1994 | 25 | 5,753 | 1993 -94 | 118 | 95 | 71 | 4,894 | 4,113 | 58 |
| 1995 | 42 | 7,538 | 1994 -95 | 166 | 131 | 97 | 7,777 | 5,426 | 56 |
| 1996 | 9 | 1,778 | 1995 -97 | 84 | 44 | 35 | 2,936 | 1,679 | 48 |
| 1997 | 2 | 83 | 1996 -96 | 38 | 22 | 13 | 1,617 | 745 | 57 |

^a Prior to 1985 the winter commercial fishery occurred from January 1 thru April 30; as of March 1985, the winter commercial season was open by regulation from November 15 thru May 15.

^b The winter subsistence fishery occurs during months of two calendar years (as early as December, thru May).

^c The number of crab actually caught; some crab may have been released.

^d The number of crab "Harvested" is the number of crab caught and kept.

^e Data unavailable.

Appendix Table E5. Results of the population assessment surveys conducted for red king crab in Norton Sound since 1976.

| Year | Date | Research Agency | Gear | Population Abundance Estimates | | |
|-------------------|------------------------|-----------------|-------|--------------------------------|--------------------------|--------------------------|
| | | | | Pre-2 Males ^b | Pre-1 Males ^b | Legal Males ^a |
| 1976 | 9/2 - 9/5, 9/16 - 10/7 | NMFS | Trawl | 321,781 | 838,570 | 1,447,459 |
| 1979 ^c | 7/26 - 8/5 | NMFS | Trawl | | | 684,662 |
| 1980 ^d | 7/4 - 7/14 | ADF&G | Pots | | | 1,900,000 |
| 1981 | 6/28 - 7/14 | ADF&G | Pots | | | 1,285,195 |
| 1982 | 7/6 - 7/20 | ADF&G | Pots | | | 353,273 |
| 1982 | 9/5 - 9/11 | NMFS | Trawl | 295,497 | 819,309 | 610,174 |
| 1985 | 7/1 - 7/14 | ADF&G | Pots | | | 907,579 |
| 1985 | 9/16 - 10/1 | NMFS | Trawl | 463,022 | 739,968 | 966,566 |
| 1988 | 8/16 - 8/30 | NMFS | Trawl | 561,945 | 513,087 | 909,948 |
| 1991 | 8/22 - 8/30 | NMFS | Trawl | 287,389 | 347,155 | 1,181,496 |
| 1996 | 9/7 - 9/18 | ADF&G | Trawl | 449,505 | 354,071 | 534,446 |

^a Legal male red king crab were defined as at least 105 mm in carapace length for the 1996 ADF&G trawl survey and all NMFS trawl surveys except the 1979 survey which defined legal males as at least 100 mm in carapace length. ADF&G pot surveys defined legal males as at least 121 mm in carapace width.

^b Pre-2 males were defined as 76-89 mm in carapace length and pre-1 males were defined as 90-104 mm in carapace length.

^c Population estimates are valid for the date of the survey (i.e., either before or after the summer commercial fishery).

^d The 1980 pot survey estimate has been revised from the original estimate of 13.4 million pounds which was thought inaccurate due to an under-reporting of recovered tagged crab.

^e Pre-2 male and pre-1 male data is unavailable for the 1979 NMFS trawl survey.

Appendix Table E6. Size composition by percent of red king crab from winter research pots near Nome, Norton Sound, Bering Sea, 1983-1997.^a

| Year | SUBLEGAL | | | LEGAL | | |
|-------------------|-----------------|-----------------|-----------------|----------|---------------|--------|
| | Prerecruit Twos | Prerecruit Ones | Totals | Recruits | Post-Recruits | Totals |
| 1983 | 26 | 38 | 64 | 26 | 10 | 36 |
| 1984 | 35 | 31 | 66 | 19 | 16 | 35 |
| 1985 | 25 | 45 | 70 | 20 | 10 | 30 |
| 1986 | 26 | 35 | 61 | 22 | 17 | 39 |
| 1987 | 13 | 31 | 44 | 11 | 45 | 56 |
| 1988 ^b | - | - | - | - | - | - |
| 1989 | 27 | 15 | 42 | 27 | 31 | 58 |
| 1990 | 16 | 33 | 49 | 25 | 26 | 51 |
| 1991 | 5 | 30 | 35 | 34 | 31 | 65 |
| 1992 ^c | - | - | - | - | - | - |
| 1993 | 3 | 9 | 12 | 17 | 71 | 88 |
| 1994 ^c | - | - | - | - | - | - |
| 1995 | 10 | 11 | 23 ^d | 32 | 45 | 77 |
| 1996 | 22 | 33 | 64 ^d | 10 | 26 | 36 |
| 1997 | 32 | 21 | 64 ^d | 14 | 22 | 36 |

^a Sublegals = male crab less than 4 3/4" carapace width.

Pre-recruit Ones = Sublegals greater than 89mm in carapace length.

Pre-recruit Twos = Sublegals smaller than 90mm in carapace length.

Legals = male king crab greater than 4 3/4" carapace width.

Recruits = Legal new shell crab smaller than 116mm in carapace length.

Post-recruits = all non-recruit legal males.

^b No data collected in 1988 due to poor ice conditions.

^c No winter crab research study in 1992 or 1994.

Includes prerecruit threes.

SECTION 4 - MISCELLANEOUS SPECIES

INTRODUCTION

Several species other than salmon, crab and herring are utilized for commercial and subsistence purposes in the Norton Sound, Port Clarence and Kotzebue Districts. Primary species include inconnu or "sheefish" (Stenodus leucichthys), whitefish (Coregonus laurettae, Coregonus pidschian, Coregonus sardinella, Coregonus nasus, and Prosopium cylindraceum), (Coregonus sp., Prosopium sp.), Dolly Varden (Salvelinus malma), and saffron cod (Eleginus gracilis).

The fish are taken by set gillnets, beach seines, "jigging" through the ice, and rod and reel. Subsistence catches taken during the summer months are normally air dried, while winter catches are stored frozen. Fish are utilized both for human consumption and for dog feed. Fish taken for commercial purposes are mainly sold locally, although some are shipped from the area.

Subsistence harvest of most species is not limited by regulation. Commercial harvest may be prohibited in some freshwater areas, but limited commercial endeavors are allowed in many areas under terms of a permit.

INCONNU (Sheefish)

Introduction

The distribution of inconnu includes the Kobuk-Selawik River drainages, and Hotham Inlet of Kotzebue Sound and some Norton Sound drainages, but the largest populations and harvests occur within the former area (Figure 21). In the Kotzebue Sound area, adult fish migrate to upriver spawning areas after ice breakup and to wintering areas within the Hotham Inlet/Selawik Lake area during October-November. Although inconnu are capable of consecutive spawning, most fish spawn every two to three years. Inconnu mature slowly with males reaching maturity at 5-7 years of age and females at 7-11 years.

The inconnu's spawning and overwintering migration behavior makes them available for harvest by the various fisheries throughout their life cycle, and increases their vulnerability to overharvest. In addition, the inconnu's slow maturation rate increases the time required to restore depleted populations.

During the 1960's, age, sex and length data indicated stocks were being overharvested by the commercial and subsistence fisheries in the Kotzebue district. Consequently, an annual area

commercial harvest quota of 25,000 pounds of inconnu was instituted, although subsistence catches remained unrestricted.

Commercial Fishery

Most of the commercial fishing effort occurs near Kotzebue in Hotham Inlet. Fishermen use gillnets ranging from 5 1/2 inch - 7 inch stretched mesh which are set under the ice. Recorded commercial catches have remained relatively small; however, undocumented catches are believed to be significant and therefore, harvest totals should be considered minimum estimates. Restricted markets outside northwestern Alaska limit commercial activity greatly and most individuals who normally participate in the winter commercial fishery also fish for subsistence purposes. During some years, incidentally caught inconnu are also sold by commercial salmon fishermen when there is a market, but only in small amounts. There were no commercially sold sheefish reported in 1997 (Appendix Table F1).

Subsistence Fishery

Inconnu have long been utilized for subsistence purposes throughout the Kotzebue basin. Fishermen along the upper Kobuk River fish for inconnu during June through October, while the lower Kobuk and residents fish throughout much of the year. Kotzebue and Selawik fishermen fish in the Hotham Inlet and Selawik Lake during the winter months.

Appendix Table F2 estimates catches reported during the fall chum salmon subsistence surveys conducted by Subsistence Division, and for lower Kobuk River residents may include winter as well as summer and fall catches. In 1997 an estimated 9,805 sheefish were harvested by the Kobuk River communities. The mean harvest per household was 24.6 sheefish. Subsistence sheefish harvest information was not collected for Kotzebue where a sizable ice fishery occurs for sheefish in late winter and spring. There is also no information concerning sheefish harvests in the Selawik area.

Escapement

In recent years aerial surveys have been conducted on key inconnu spawning areas incidental to the effort of enumerating salmon. These surveys have primarily been conducted along the upper Kobuk River in September. Survey conditions historically result in either very few or no inconnu being observed (Appendix Table F3). During these surveys, species identification has been a problem in some years. Surveys were not conducted in 1985 through 1990 due to high, turbid water, poor weather conditions, or lack of personnel. Incomplete escapement and catch data provide little basis for assessing the current population status of inconnu in the Kotzebue district, however there was some local concern that the inconnu stocks are declining.

Because of these concerns, a cooperative tagging project on sheefish in the Kotzebue District began in 1994. This study is being conducted by Sport Fish, U.S. Fish & Wildlife Service (USFWS) and the National Park Service (NPS). Spawning sheefish were tagged in the Upper Kobuk River and the Selawik River. Roughly 600 sheefish were tagged in the Kobuk River by Division of Sport Fish and 150 in the Selawik River by USFWS in 1994. During the fall of 1995, roughly 617 sheefish were tagged in the Upper Selawik River and approximately 1,386 sheefish in the Upper Kobuk River. In 1996, 2,300 were tagged in the Upper Kobuk and 500 in the Selawik Rivers. The Selawik River project ended in 1996. This year, 1997, 1,757 sheefish were tagged in the Upper Kobuk River. There are now approximately 6,520 tagged sheefish from the Kobuk River and 1,200 tagged sheefish from the Selawik River at large. The spawning population of sheefish in the Upper Kobuk was roughly 32,300 in 1995, 43,700 in 1996 and 26,782 in 1997. In the Selawik River, the spawning population estimate was 5,200 to 5,300 for both 1995 and 1996. Neither of these estimates account for the strong possibilities that females may be alternate year spawners. The results of the study should provide an estimate of the spawning sheefish populations, on migration patterns and to see if the two stocks mix in the over-wintering area of Kobuk and Selawik Lakes.

Appendix Table F1. Kotzebue District winter commercial Sheefish harvest statistics, 1967-1997. ^a

| Year ^b | No. of Fishermen | No. of Fish | Pounds | | Price/Pound | Estimated Value |
|-------------------|------------------|--------------------|--------|---------|-------------|-----------------|
| | | | Total | Average | | |
| 1967 ^c | | 4,000 | 26,000 | 6.5 | \$0.20 | \$5,200 |
| 1968 | 10 | 792 | 4,752 | 6.0 | \$0.22 | \$1,045 |
| 1969 | 17 | 2,340 | 15,209 | 6.5 | \$0.25 | \$3,802 |
| 1970 ^c | | 2,206 | | | \$0.14 | |
| 1971 | 4 | 73 | 720 | 9.9 | \$0.13 | \$95 |
| 1972 | 5 | 456 | 4,071 | 8.9 | \$0.16 | \$651 |
| 1973 | 11 | 2,322 | 15,604 | 6.7 | \$0.20 | \$3,121 |
| 1974 | 6 | 1,080 ^d | 6,265 | 5.8 | \$0.30 | \$1,880 |
| 1975 | ^c | 2,543 ^d | 24,161 | 9.5 | \$0.30 | \$7,248 |
| 1976 | 14 | 2,633 | 19,484 | 7.4 | \$0.30 | \$5,845 |
| 1977 | 2 | 566 | 5,004 | 8.8 | \$0.30 | \$1,501 |
| 1978 | 11 | 2,879 | 26,200 | 9.1 | \$0.40 | \$10,480 |
| 1979 ^e | | | | | | |
| 1980 | 4 | 1,175 | 8,225 | 7.0 | \$0.50 | \$4,113 |
| 1981 | 1 | 278 | 1,836 | 6.6 | \$0.75 | \$1,377 |
| 1982 | 11 | 2,629 ^f | 17,376 | 6.6 | \$0.75 | \$13,032 |
| 1983 | 8 | 1,424 | 13,395 | 9.4 | \$0.50 | \$6,698 |
| 1984 | 5 | 927 ^d | 10,403 | 11.2 | \$0.55 | \$5,722 |
| 1985 | 4 | 342 ^d | 3,902 | 11.4 | \$0.51 | \$1,990 |
| 1986 | 2 | 26 | 312 | 12.0 | \$0.75 | \$234 |
| 1987 | 3 | 670 | 5,414 | 8.1 | \$0.49 | \$2,653 |
| 1988 | 3 | 943 | 7,373 | 7.8 | \$0.45 | \$3,318 |
| 1989 | 8 | 2,335 | 16,749 | 7.2 | \$0.51 | \$8,542 |
| 1990 ^c | 6 | 687 | 5,617 | 8.2 | | |
| 1991 | 5 | 852 | 8,224 | 9.7 | \$0.50 | \$4,112 |
| 1992 | 3 | 289 | 2,850 | 9.9 | \$0.65 | \$1,853 |
| 1993 | 1 | 210 ^d | 1,700 | 8.1 | \$0.50 | \$850 |
| 1994 ^e | | | | | | |
| 1995 | 1 | 226 | 2,240 | 9.9 | \$0.50 | \$1,120 |
| 1996 | 2 | 308 | 3,002 | 9.7 | \$0.44 | \$1,321 |
| 1997 ^e | | | | | | |

^a Data is not exact, in some instances total catch poundage was determined from average weight and catch data. Similarly, various price/pound figures were determined from price/fish and average weight data.

^b Season was from October 1 to September 30. Year indicated would be the year the commercial season ended. For example, the year 1980 would represent October 1, 1979 to September 30, 1980.

^c Data unavailable or incomplete.

^d Number of fish not always reported. Estimates were based on average weight from reported sales which documented the number of fish.

^e No reported commercial catches.

^f Estimate based on historical average weight.

Appendix Table F2. Kotzebue District reported subsistence harvests of sheefish, 1966-1997. ^a

| Year | Number of Fishermen Interviewed | Reported Harvest | Average Catch per Fisherman |
|--------------------------|---------------------------------|------------------|-----------------------------|
| 1966-1967 | 135 | 22,400 | 166 |
| 1967-1968 | 146 | 31,293 | 214 |
| 1968-1969 | 144 | 11,872 | 82 |
| 1970 | 168 | 13,928 | 83 |
| 1971 | 155 | 13,583 | 88 |
| 1972 | 79 | 3,832 | 49 |
| 1973 | 65 | 4,883 | 75 |
| 1974 | 58 | 1,062 | 18 |
| 1975 | 69 | 1,637 | 24 |
| 1976 | 57 | 966 | 17 |
| 1977 | 95 | 1,810 | 19 |
| 1978 | 95 | 1,810 | 19 |
| 1979 | 75 | 3,985 | 53 |
| 1980 | 74 | 3,117 | 42 |
| 1981 | 62 | 6,651 | 107 |
| 5/82-4/83 ^{b,c} | 130 | 4,704 | 36 |
| 5/83-4/84 ^{b,c} | 27 | 764 | 28 |
| 5/84-9/84 ^b | 30 | 2,803 | 93 |
| 1985 ^d | 2 | 60 | 30 |
| 1986 ^{b,d} | 72 | 721 | 10 |
| 1987 ^d | 46 | 276 | 6 |
| 1988 ^d | | | |
| 1989 | | | |
| 1990 | | | |
| 1991 | 40 | 2,180 | 55 |
| 1992 | 43 | 2,821 | 66 |
| 1993 | 46 | 2,441 | 53 |
| 1994 | 171 | 3,181 | 19 |
| 1995 ^e | 314 | 9,465 | 30 |
| 1996 ^e | 389 | 6,953 | 18 |
| 1997 ^e | 338 | 9,805 | 24.6 |

^a To obtain individual village catches during years previous to 1982, refer to the 1982 Annual Management Report. Due to limited effort during many years, total catch and effort should be regarded as minimum figures only and are not comparable year to year.

^b Catch by village for these years are presented in separate tables in respective year annual management reports.

^c Summer catches only; winter catches were not documented.

^d Villages were not surveyed for subsistence sheefish harvests from 1985 to 1990; figures shown are catches reported during the fall chum salmon subsistence surveys and may include summer as well as winter harvests.

^e Subsistence sheefish harvests are from villages on Kobuk River.

Appendix Table F3. Peak annual aerial survey counts of sheefish in the Kobuk and Selawik Rivers, 1966-1997. ^a

| Year | Kobuk River | Selawik River | Total |
|------|--------------------|---------------|--------------|
| 1966 | 1,200 | c | 1,200 |
| 1967 | 1,025 | c | 1,025 |
| 1968 | 4,973 | 1,234 | 6,207 |
| 1969 | 3,654 | c | 3,654 |
| 1970 | 3,220 | c | 3,220 |
| 1971 | 8,166 | 1,196 | 9,362 |
| 1972 | ^b | c | |
| 1973 | c | c | |
| 1974 | ^b | c | |
| 1975 | ^b | c | |
| 1976 | 73 | c | 73 |
| 1977 | c | c | |
| 1978 | 2,824 | c | 2,824 |
| 1979 | 1,772 | c | 1,772 |
| 1980 | 250 ^d | c | 250 |
| 1981 | ^b | c | ^b |
| 1982 | 1,009 ^d | c | 1,009 |
| 1983 | 2,604 | c | 2,604 |
| 1984 | c | c | |
| 1985 | c | c | |
| 1986 | c | c | |
| 1987 | c | c | |
| 1988 | c | c | |
| 1989 | c | c | |
| 1990 | c | c | |
| 1991 | 17,335 | c | 17,335 |
| 1992 | 3,310 | c | 3,310 |
| 1993 | c | c | |
| 1994 | c | c | |
| 1995 | 1,840 | c | 1,840 |
| 1996 | c | c | |
| 1997 | c | c | |

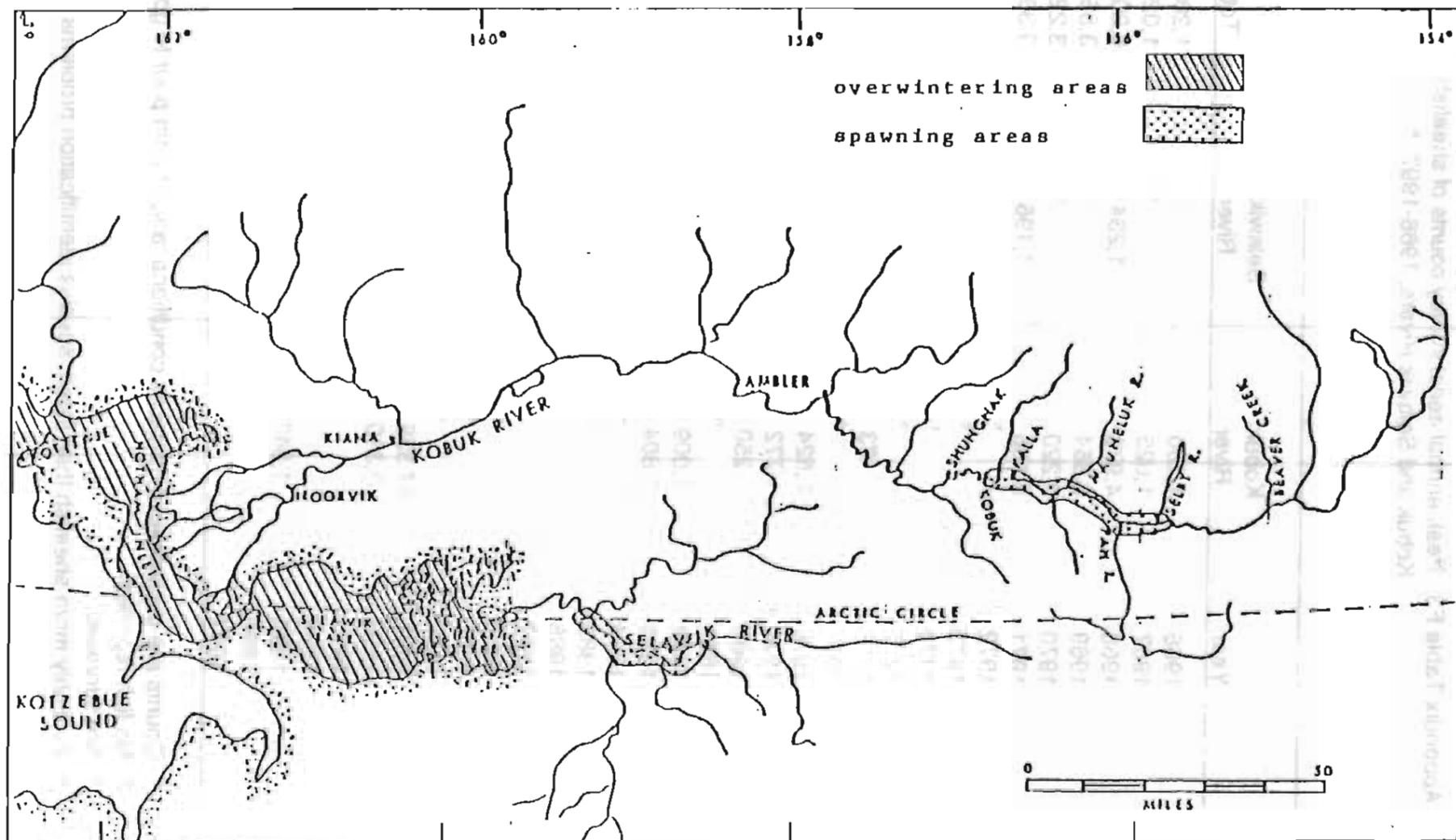
^a Counts are considered minimal as conditions ranged from poor to good.

^b No fish reported.

^c Not surveyed.

^d Probably more sheefish than listed; species identification problems.

Figure 21. Kotzebue and Kobuk River Valley villages and their spatial relationship with Inconnu spawning and overwintering areas.



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DOLLY VARDEN

Introduction

Dolly Varden (*Salvelinus malma*) are distributed throughout the Norton Sound, Port Clarence, and Kotzebue districts. Although taxonomists have disagreed on the distinguishing Dolly Varden characteristics and distribution of Arctic Char and Dolly Varden, most now agree that char in this area are the northern form of Dolly Varden. In order to eliminate confusion, in this report these fish will be referred to as Dolly Varden, the common name for this species complex.

Dolly Varden in this area are primarily nonconsecutive spawners and spawn throughout the late summer and fall. Fry emerge in the spring and migrate to the ocean during early summer after spending from 1 to 6 (generally 2-5) years in freshwater. Since Dolly Varden are a late-maturing fish (generally age 6-7), they are susceptible to overfishing by commercial, subsistence, and/or sport fisheries. Consequently, commercial fisheries have been maintained at low levels or prohibited to both reduce the potential of overharvest and provide for reproductive and subsistence fishery needs.

Commercial Fishery

Dolly Varden are taken as a non-target species in the directed Kotzebue commercial chum salmon fishery (Tables 11 and 12). Regulation changes in 1976, which closed the commercial salmon fishery on August 31, have reduced the harvest of Dolly Varden since Dolly Varden typically pass through the harvest area during September. Dolly Varden generally appear in commercial catches during the last three weeks of August. Reported Dolly Varden catches are dependent upon available markets. The typical season catch when buyers are purchasing Dolly Varden is between 1,000 to 3,000 fish (Appendix Table F4). Spawning and over-wintering Dolly Varden (locally called trout) typically migrate along the northern shore of Kotzebue Sound during the third week of August. Even with a reduced number of fishermen and a concentration of their effort near town, the incidental catch of trout was well above average. There were 3,320 Dolly Varden sold with an average weight of 7.0 pounds. The migration of Dolly Varden into the Kotzebue District was also one of the earliest in recent memory. The migration continued through its normal pattern, declining the third week of August. This may indicate an above average return of over-wintering Dolly Varden into the district. The commercial harvest has been as much as 7,700 but averages around 2,000. Historically two-thirds of the catch is taken on the north side of the district near Sheshalik.

Subsistence Fishery

Dolly Varden are an important component in the diet of subsistence users in the Norton Sound-Kotzebue Sound areas. Subsistence fishermen catch Dolly Varden with seines in the fall, hook and line through the ice in the winter, and gillnets in the spring. The fall seine fishery contributes the greatest number of fish to the annual subsistence Dolly Varden harvest. Since 1962,

seine catches made by the residents of Kivalina, within the Kotzebue District, have ranged from 7,000 to 49,000 Dolly Varden annually (Appendix Table F5)

In the Kotzebue District Fall seine fishing is a group effort with several households comprising a fishing group. The catch is stored and allowed to freeze in willow cribs located near the seining site. These fish are used throughout the winter by the fishing group. It should be pointed out that the historical subsistence Dolly Varden catches that are summarized in Appendix Table F5 are very minimal figures due to the timing of the surveys conducted. Most Dolly Varden harvest take place prior to or just after freeze-up. The village of Noatak usually fishes prior to freeze-up, while the Kobuk River villages of Shungnak and Noorvik fish for Dolly Varden throughout the winter.

Information on Dolly Varden harvests were collected in Noatak as part of the post-season subsistence salmon harvest survey. In 1997 an estimated 4,763 Dolly Varden were harvest for subsistence by the community of Noatak (Appendix F5). The mean household harvest was 57 fish.

Most villagers in the Norton Sound District report incidental catches of Dolly Varden in their subsistence salmon nets. However, the bulk of the catch is taken by seining in the late fall.

Sport Fishery

Residents of the Kotzebue area and nonlocal residents on wilderness boating trips on the Kobuk and Noatak Rivers are the primary participants in the Dolly Varden sport fishery in the Kotzebue area watershed. Approximately 1,500 Dolly Varden are taken in this fishery annually (Sport Fish Division surveys).

Overwintering Counts

Aerial survey counts of overwintering Dolly Varden on the Wulik River have ranged from 297,257 Dolly Varden in 1969 to 30,923 Dolly Varden in 1984 (Appendix Table F6). Weather and water conditions have precluded flying aerial surveys during many years. When weather permits, the Division of Sport Fisheries conducts aerial surveys of the spawning grounds on the Noatak River in the summer and the overwintering areas of the Kivalina and Wulik Rivers in the fall. During the fall of 1997, no surveys were made on the Noatak or Kivalina Rivers. The Wulik River survey estimated 95,412 Dolly Varden (Appendix Table F6).

Appendix Table F4. Kotzebue District incidental caught and sold Dolly Varden during the commercial salmon fishery, 1966-1997.

| Year | Number of Fish Sold | Estimated Total Catch ^g | Pounds Sold | Average Weight ^d | Average Price |
|------|---------------------|------------------------------------|-------------|-----------------------------|-------------------|
| 1966 | 3,325 | | | | 0.55 ^f |
| 1967 | 367 | | 2,606 | 7.1 | 0.11 |
| 1968 | 3,181 | | 21,949 | 6.9 | 0.14 |
| 1969 | 1,089 ^a | | | | 2.84 ^f |
| 1970 | 2,095 | | | | |
| 1971 | 3,828 ^b | | 23,353 | 6.1 | 0.16 |
| 1972 | 7,746 | | 56,545 | 7.3 | 0.17 |
| 1973 | 640 | | 4,608 | 7.2 | 0.16 |
| 1974 | 2,605 ^c | | 20,580 | 7.9 | 0.16 |
| 1975 | | | | | |
| 1976 | | | | | |
| 1977 | | | | | |
| 1978 | 1,229 | | 9,094 | 7.4 | 0.15 |
| 1979 | 2,523 | | 12,523 | 5.0 | 0.25 |
| 1980 | 3,049 | | 17,015 | 5.6 | 0.20 |
| 1981 | 3 ^e | | 16 | 5.3 | 0.17 |
| 1982 | 3,447 | | 23,648 | 6.9 | 0.20 |
| 1983 | 190 ^e | 845 | 1,108 | 5.8 | 0.20 |
| 1984 | 347 ^e | 1,090 | 2,104 | 6.1 | 0.25 |
| 1985 | 454 | 3,600 | 3,177 | 7.0 | 0.25 |
| 1986 | 5 ^e | 2,373 | 34 | 6.8 | 0.20 |
| 1987 | 1,261 | | 8,704 | 6.9 | 0.30 |
| 1988 | 752 | | 4,967 | 6.6 | 0.35 |
| 1989 | 3,093 | | 20,293 | 6.6 | |
| 1990 | 604 | | 4,219 | 7.0 | 0.25 |
| 1991 | 6,136 | | 40,747 | 6.6 | 0.18 |
| 1992 | 1,977 | | 11,951 | 6.0 | 0.10 |
| 1993 | 76 | | 540 | 7.1 | 0.10 |
| 1994 | 149 | | 767 | 5.1 | 0.17 |
| 1995 | 2,090 | | 13,195 | 6.3 | 0.20 |
| 1996 | 188 | | 1,153 | 6.1 | 0.25 |
| 1997 | 3,320 | | 23,203 | 7.0 | 0.20 |

^a Includes 269 taken by permit.

^b Includes 179 taken by permit.

^c Includes 234 taken during commercial sheefish fishery.

^d Some data extrapolated from average reported weight.

^e Limited Dolly Varden market; many fish were taken home or dumped.

^f Price per fish.

^g Estimate includes fish caught but not soled based on interviews of fishermen.

^h Estimate of Dolly Varden caught (but not sold) not made.

Appendix Table F5. Subsistence harvests of Dolly Varden from the villages of Kivalina and Noatak, 1959-1997.

| Year | Kivalina | | Noatak |
|-------------------|---------------------|---------|----------------------|
| | Number | Pounds | Number ^d |
| 1959 ^a | 34,240 | 85,600 | |
| 1960 ^a | 49,720 | 124,300 | |
| 1962 | | | 27,623 |
| 1963 | | | 4,130 |
| 1968 ^a | 49,512 | 120,214 | |
| 1969 | 64,970 | 152,750 | 32,350 |
| 1970 | 33,820 | 79,420 | 3,700 |
| 1971 | 29,281 | 68,518 | 5,320 |
| 1972 | 48,807 | 114,637 | 1,492 |
| 1973 ^b | | | |
| 1979 ^c | 14,600 | | 9,060 |
| 1980 | | | 7,220 |
| 1981 | 15,000-18,000 | | 3,056 |
| 1982 | 18,438 ^e | | 2,676 ^{b,i} |
| 1983 | 16,270 ^c | | 4,545 |
| 1984 | 12,000 ^c | | 2,542 |
| 1985 | 10,500 ^c | | |
| 1986 | 7,436 ^c | | 46 ^h |
| 1987 ^a | | | 1,376 ^h |
| 1988 ^a | | | |
| 1989 ^a | | | |
| 1990 ^a | | | |
| 1991 ^a | | | 4,814 |
| 1992 ^a | | | 4,395 |
| 1993 ^a | | | 4,275 |
| 1994 ^a | | | |
| 1995 ^a | | | 5,762 |
| 1996 ^a | | | 5,031 |
| 1997 ^a | | | 4,763 |

^a From Saario, Doris J. and Brian Kessel. 1966. Environment of Cape Thompson Region, Alaska. U.S. Atomic Commission.

^b Storm and ice conditions prevented fall harvest.

^c Harvest data from Division of Sport Fish surveys.

^d No data available on poundage.

^e Harvest data from Stephen Braund and Associates.

ⁱ Expanded estimates (see text on subsistence fishery in the 1982 Annual Management Report).

^h Subsistence fishermen just beginning to beach seine at the time of this survey.

Appendix Table F6. Aerial survey counts of overwintering and spawning Dolly Varden in the Kotzebue District 1968-1997. ^a

| Year | Noatak River Spawner Survey ^b | Overwintering | |
|-------------------|--|--------------------------|-----------------------------|
| | | Wulik River ^e | Kivalina River ^e |
| 1968 | | 90,236 | 27,640 |
| 1969 | | 297,257 | |
| 1976 | | 68,300 | 12,600 |
| 1977 ^d | | | |
| 1978 ^d | | | |
| 1979 | | 55,030 | 15,744 |
| 1980 | | 113,553 | 39,692 |
| 1981 | 7,922 | 101,826 | 45,355 |
| 1982 | 8,275 | 65,581 | 10,932 |
| 1983 | 2,924 ^c | ^d | ^d |
| 1984 | 9,130 | 30,923 | 5,474 |
| 1985 | 10,979 | | |
| 1986 | ^f | 5,590 | 5,030 |
| 1987 | ^f | ^f | ^f |
| 1988 | ^f | 80,000 ^c | ^f |
| 1989 | ^f | 56,384 | ^f |
| 1990 | 7,261 | | |
| 1991 | 9,605 | 126,985 | 35,275 |
| 1992 | ^f | 135,135 | ^d |
| 1993 | 9,560 | 144,138 | 16,534 |
| 1994 | ^f | 66,752 | ^f |
| 1995 | 6,500 | 128,705 | 28,870 |
| 1996 | 12,184 | 61,005 | ^f |
| 1997 | ^f | 95,412 | ^f |

^a Counts are considered minimal as data listed includes both poor and good surveys.

^b Includes spawner count on the Kelly, Kugurorok and Nimiuktuk Rivers, tributaries of the Noatak River.

^c Incomplete survey.

^d Poor weather hampered or prevented survey.

^e Surveys conducted by Division of Sport Fish since 1979.

^f Not surveyed.

WHITEFISH

Introduction

Although inconnu belong to the whitefish family, this section deals with several smaller species of the genera Coregonus and Prosopium. The genus Coregonus contains the "broad" and "humpback" whitefish or C. nasus and C. pidschian, respectively. In addition, three whitefish species known as "ciscoes" belong to this genera; ie., the least cisco (C. sardinella), Arctic cisco (C. autumnalis) and Bering cisco (C. laurettae). "Round" whitefish (Prosopium cylindraceus) are the sole representatives of the genus Prosopium in this area. All species normally spawn in the fall in freshwater.

Whitefish occur throughout most bodies of freshwater in the Norton Sound/Port Clarence/Kotzebue areas and can also be found in inshore marine waters at various times of the year. Whitefish are harvested to a very limited extent by the commercial and sport fisheries within the area, but are uniformly important to the various subsistence fisheries. Recently, there has been increasing interest in commercial development of this resource, especially in the Kotzebue District.

Commercial Fishery

Limited commercial whitefish harvests have been allowed since statehood, normally under the auspices of a permit which delineated harvest levels, open areas, legal gear, etc. Commercial whitefish fisheries have generally been limited to large open water areas (e.g. Grantley Harbor in the Port Clarence District) or ocean waters. Beach seines have been stipulated as legal gear in some instances in order to reduce the number of incidental species taken. Little comparative commercial catch and effort data have been recorded, but harvest levels have historically been low. A majority of the commercial catches have been made in Golovin Bay within the Norton Sound District, in the Kuzitrin River of the Port Clarence District, and in Hotham Inlet and Selawik River in the Kotzebue District. The fish have been sold to local markets for human consumption, dog food, or more recently, crab bait.

Subsistence Fishery

Whitefish have been taken mainly by beach seine or set gillnets. Catches are usually dried and used for human consumption or dog food. In some areas fish are "gutted" and dried early in the summer, while later in the summer the fish are filleted and dried with the eggs and viscera intact.

Subsistence catch enumeration is difficult since fishermen do not count fish individually, but by "tubs", "bags", "strings" or any other estimators of gross abundance. Additionally, many fish have been dried and consumed or stored in caches prior to the survey period. Reported subsistence harvests were generally the result of a limited and sporadic survey effort and should be regarded as minimum figures and not comparable from year to year. In 1997, subsistence harvests of whitefish were included for the first time in Division of

Subsistence household salmon harvest surveys in Kotzebue Sound villages. An estimated 84,851 whitefish were harvested in 1997 for subsistence in Noatak and the Kobuk river villages (Appendix Table F7). Mean household harvests ranged from 28 in Noatak to 250 in Noorvik.

Escapement

Whitefish escapements have not been monitored in the past, but there have been no indications from limited Department observations or fishermen interviews of declining populations.

SAFFRON COD

Saffron cod, or tomcod as they are called locally, are extensively utilized as a subsistence resource in the Norton Sound, Port Clarence and Kotzebue Districts. Tomcod are taken through the ice by jigging as well as with gillnets in open water and dipping through the ice in Unalakleet.

There has never been an extensive commercial fishery on tomcod in the Norton Sound, Port Clarence or Kotzebue areas. During 1980, one fisherman caught and sold 89 pounds (98 tomcod) in the Nome Subdistrict. There were no commercial landings during 1982. In 1983, one Nome area fisherman caught and sold 2,548 pounds (4,348 tomcod) and in 1989 one fisherman sold 1,800 pounds locally. These fish were used for dog food, crab bait and human consumption. No commercial deliveries were reported in during 1984-1993.

In 1994, Norton Sound Economic Development Corporation (N.S.E.D.C.) had provided a market for several fish species that had not been commercially utilized in the past. The need for crab bait was the primary factor in initiating the fishery at Unalakleet, where 1402 pounds were sold in seven deliveries in January and February of 1994. In 1995, the NSEDC market was not present which was likely a factor in the reduced harvest. The 1995 harvest totaled 52 pounds which sold for \$.50 per pound with a total value of \$26.00. No harvests were reported in 1996 or 1997.

MISCELLANEOUS FINFISH SPECIES

Other finfish species taken for subsistence in the Norton Sound-Port Clarence-Kotzebue area include: rainbow smelt (boreal smelt), capelin, northern pike, starry flounder, yellow fin sole, arctic flounder, Alaska plaice, grayling, burbot, Pacific herring in the fall time, and halibut (Appendix G1).

Subsistence utilization of these species has been documented although effort and catch vary widely in scale and importance with locality. Some of these species are important to the subsistence community in certain localities during specific seasons of the year.

Rainbow smelt, like saffron cod, had a limited commercial harvest at Unalakleet. During the January, February and March of 1994, 631 pounds of rainbow smelt were reported sold in nine deliveries for bait. The smelt and cod harvests from Unalakleet both occur in estuarine areas. The Smelt were reported to be higher in the water column than the cod. Either species could often be harvested from the same jigging site. Burbot, or freshwater cod, have been sold intermittently in the past in the Kotzebue, Port Clarence and Norton Sound Districts.

RAINBOW SMELT

Rainbow smelt (Osmerus mordax) are found in the Norton Sound, Port Clarence and Kotzebue Districts. They are found in the water column and are used for jigging in open water and during the ice season.

Commercial harvests of rainbow smelt were reported in the Norton Sound, Port Clarence and Kotzebue Districts. During 1980, one fisherman caught and sold 83 pounds of rainbow smelt in the Norton Sound District. There were no commercial landings during 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030.

In 1994, the Norton Sound Economic Development Corporation (NSEDPC) had a commercial market for rainbow smelt that had not been commercially utilized in the past. The need for bait was the primary factor in initiating the fishery at Unalakleet where 631 pounds were sold in seven deliveries in January and February of 1994. In 1995, the NSEDPC market was not present which was likely a factor in the reduced harvest. The 1995 harvest totaled 77 pounds which sold for \$70 per pound with a total value of \$5,390. The harvests were reported in 1994 or 1995.

MISCELLANEOUS FINNISH SPECIES

Other finnish species taken for subsistence in the Norton Sound, Port Clarence, Kotzebue Districts include: rainbow smelt (Osmerus mordax), capelin (Mallotus villosus), starry flounder (Paralichthys oblongus), and burbot (Lota lota). Alaska plantings of rainbow smelt began in the fall of 1980 and continued through 1985.

Appendix Table F7. Subsistence whitefish catch and effort in the Kotzebue District, 1970-1997. ^a

| Year | Number of Fishermen Interviewed | Number of Whitefish Harvested |
|-------------------|---------------------------------|-------------------------------|
| 1970 | | 58,165 |
| 1971 | | 36,012 |
| 1977 | | 30,810 |
| 1978 | | 77,474 |
| 1979 | 123 | 43,653 |
| 1980 | 67 | 49,106 |
| 1981 | 71 | 37,746 |
| 1982 ^b | | |
| 1983 | 47 | 16,389 |
| 1984 | 79 | 28,614 |
| 1985 ^c | 46 | 5,229 |
| 1986 ^d | 72 | 11,854 |
| 1987 ^d | 46 | 20,020 |
| 1988 ^e | 38 | 14,000 |
| 1989 ^b | | |
| 1990 ^b | | |
| 1991 ^d | 63 | 16,015 |
| 1992 ^d | 66 | 17,485 |
| 1993 ^d | 70 | 19,060 |
| 1997 | 413 ^g | 84,851 |

^a Whitefish harvest information was collected during chum salmon subsistence surveys and is to be considered a small fraction of the annual catch.

^b Data unavailable.

^c Subsistence harvest information from Kiana and Shungnak villages only.

^d Subsistence interviews from Noatak, Noorvik and Shungnak villages only.

^e Subsistence harvest information from Noorvik and Shungnak villages only.

^g Number of households contacted. Subsistence harvest information from Ambler, Kiana, Kobuk, Noatak, Noorvik, and Shungnak.

Appendix G1. List of comon and scientific names of finfish species of the Norton Sound, Port Clarence, and Kotzebue Districts.

| Common Name | Scientific Name |
|--------------------------------|---------------------------------|
| Arctic lamprey | Lampetra japonica |
| Arctic char | Salvelinus alpinus |
| Arctic cod | Boreogadus saida |
| Arctic flounder | Liopsetta glacialis |
| Arctic grayling | Thymallus arcticus |
| Alaska plaice | Pleuronectes quadrituberculatus |
| Burbot | Lota lota |
| Bering cisco | Coregonus laurettae |
| Bering poacher | Ocella dodecaedria |
| Bering wolfish | Anarjicas orientalis |
| Blackfish | Dallia pectoralis |
| Boreal smelt (rainbow-toothed) | Osmerus mordax |
| Broad whitefish | Coregonus nasus |
| Capelin | Mallotus villosus |
| Dolly Varden | Salvinus malma |
| Pond smelt | Hypomesus olidus |
| Humpback whitefish | Coregonus pidschian |
| Inconnu (sheefish) | Stenodus leucichthys |
| Lake trout | Salvelinus namaycush |
| Least cisco | Coregonus sardinella |
| Longhead dab | Liranda probiscidea |
| Ringtail snailfish | Liparis rutteri |
| Northern Pike | Esox lucius |
| Longnose sucker | Casostomus catostomus |
| Pricklebacks | Stichaeidae |
| Pacific herring | Clupea harengus pallasii |
| Rock flounder | Lepidostetta bilineata |
| Rock greenling (terpug) | Hexagrammus lagocephalus |
| Round whitefish | Prosopium cylindraceum |
| Sculpins | Cottidae |
| Pink salmon | Oncorhynchus gorbuscha |
| Chum salmon | Oncorhynchus keta |
| Coho salmon | Oncorhynchus kisutch |
| Sockeye salmon | Oncorhynchus nerka |
| Chinook salmon | Oncorhynchus tshawytscha |
| Saffron cod | Eleginus gracilis |
| Starry flounder | Platichthys stellatus |
| Sandlance | Amrodytes hexapterus |
| Sturgeon poacher | Angonus acipenserinus |
| Threespine stickleback | Gasterosteus aculeatus |
| Ninespine stickleback | Pungitius pungitius |
| Tubenose poacher | Pallasina barbata aix |
| Whitespotted greenling | Hexagrammus stelleri |
| Yellowfin sole | Limanda aspera |

Appendix G2. Studies conducted within the Norton Sound, Port Clarence, and Kotzebue Districts, 1997

HERRING

Herring Test Fishing

- a) Location: Norton Sound ocean waters; camps located at Cape Denbigh and Klikitarik; a third test fish crew operated out of Unalakleet.
- b) Description: To determine age class composition of the Norton Sound herring return through test fishing with variable mesh gill nets and collection of commercial catch samples.

SALMON

Unalakleet Salmon Escapement Studies

- a) Location: Unalakleet River
- b) Description: To maintain an index of salmon migration up the Unalakleet River using test gill nets.

Shaktoolik River Salmon Counting Tower

- a) Location: Approximately 5 miles upstream from the mouth of the Shaktoolik River in Norton Sound.
- b) Description: To determine daily and seasonal timing and magnitude of the spawning salmon runs. Compare aerial survey totals with tower counts in order to improve survey accuracy. As time and personnel allow, collect age and sex data through escapement sampling of subsistence catches, beach seining or carcass sampling.

Kwiniuk River Salmon Counting Tower

- a) Location: Approximately five miles upstream from the mouth of the Kwiniuk River in Norton Sound.
- b) Description: Determine daily and seasonal timing and magnitude of chum and pink salmon runs. Determine age, sex and size of chinook and chum salmon of the commercial harvest in Moses Point Subdistrict and in the Kwiniuk River escapement.

Niukluk River Salmon Counting Tower

- a) Location: About five miles upstream from the mouth of the Niukluk River in Norton Sound.
- b) Description: Determine daily and seasonal timing and magnitude of the spawning salmon runs.

Appendix G2. (continued)

Nome River Salmon Counting Wier

a)Location: Nome River, approximately 4 miles east of Nome, Norton Sound.

b)Description: Determine daily and seasonal timing and magnitude of the spawning salmon runs. Compare aerial survey totals with tower counts in order to improve survey accuracy. As time and personnel allow, collect age and sex data through escapement sampling of subsistence catches, beach seining or carcass sampling.

Northwest Salmon Biological / Rehabilitation Projects

1). Hobson Creek Instream Incubation Project

a)Location: A spring fed tributary to the Nome River

b)Description: Instream incubator boxes for supplemental chum salmon production.

2). Boulder Creek Instream Incubation Project

a)Location: A spring fed tributary to the Snake River

b)Description: Instream incubator boxes for supplemental chum salmon production.

3). Shovel Creek Instream Incubation Project

a)Location: A spring fed tributary to the Solomon River

b)Description: Experimental instream incubator boxes for supplemental chum salmon production.

4). Sinuk River Instream Incubation Project

a)Location: A spring fed tributary to the Sinuk River

b)Description: Experimental instream incubator boxes for supplemental chum salmon production.

5). Salmon Lake Instream Incubation Project

a)Location: A spring fed tributary to the Salmon Lake

b)Description: Experimental instream incubator boxes for supplemental sockeye salmon production.

Appendix G2.(continued)

6). Salmon Lake Limnology Project

a)Location: A 1,851 acre lake at the headwaters of the Pilgrim River which drains into Port Clarence.

b)Description: To apply liquid fertilizer to restore the sockeye population to historic levels and to obtain limnological and biological data to evaluate the effectiveness of fertilizer application.

7). Glacial Lake Limnology Project

a)Location: A 986 acre lake at the headwaters of the Snake River which drains into the Bering Sea.

b)Description: To obtain limnological and biological data to evaluate the potential to restore the sockeye population to historic levels.

Kobuk River Test Fish Project

a)Location: Lower Kobuk River

b)Description: 1) To evaluate the chum salmon abundance migrating into the Kobuk River drainage using systematic drift gill net catches. 2) To assess, in a qualitative way, the impact of the Kotzebue District commercial salmon fishery on chum salmon abundance into the Kobuk River drainage for fisheries management purposes.

3) Describe the migratory timing for chum salmon in the lower Kobuk River. 4) Sample for age, sex and size.

Subsistence Salmon Fishing Surveys

a)Location: Norton Sound, Port Clarence, and Kotzebue Districts.

b)Description: Determine subsistence utilization of salmon for formulating management procedures and goals. House-to-house surveys were conducted in the Norton Sound, Port Clarence, and Kotzebue District surrounding villages by the State of Alaska Division of Subsistence. Subsistence salmon permits were issued in the Nome Subdistrict.

CRAB

Nearshore Winter King Crab Study

a)Location: Ocean waters of Norton Sound, 1 to 1.5 miles south of Nome.

b)Description: Document the abundance and distribution of red king crab in nearshore Nome waters. Tag all male new shell red king crab with carapace length \leq 100 mm.

Appendix G3. Emergency Orders issued during 1997.

| Emergency Order Number | Effective Date | Action Taken | Comments |
|------------------------|--------------------------------|---|---|
| 3-S-Z-1-97 | 6:00 p.m. ADT June 12, 1997 | This emergency order opens the Shaktoolik, and Unalakleet Subdistricts to commercial king salmon fishing for a standard 24 hour period at 6:00 p.m. Thursday, June 12. The fishing period will run from 6:00 p.m. Thursday until 6:00 p.m. Friday. Only nets with a mesh size of seven and one-half inches or larger will be allowed. | Subsistence catch data and the Unalakleet sport fishery both indicate the salmon migration is now moving into the rivers. King salmon have been present in nearshore waters for at least ten days. Warm temperatures in the rivers and the recent rise in the king salmon catches in subsistence nets indicate the king salmon migration is about to begin in earnest. This opening is intended to test the abundance of salmon in the waters of eastern Norton Sound. Little king salmon escapement is thought to have occurred to date. A reduced fishing schedule will be in place until the king salmon escapement is thought to be adequate in the rivers flowing into the open commercial subdistricts. Commercial fishermen are reminded that unsold salmon caught in commercial gear must be reported on fish tickets. |
| 3-S-Z-2-97 | 6:00 p.m. ADT June 16, 1997 | This emergency order opens the Shaktoolik, and Unalakleet Subdistricts to commercial king salmon fishing for a standard 24 hour period at 6:00 p.m. Monday, June 16. The fishing period will run from 6:00 p.m. Monday until 6:00 p.m. Tuesday. Only nets with a mesh size of seven and one-half inches or larger will be allowed. | The recent fishing period which occurred on June 12 and 13 harvested 1,132 chinook salmon in the Unalakleet Subdistrict and 500 chinook salmon in the Shaktoolik Subdistrict. These catches were slightly above average and occurred earlier in the season than typical. The Department's test net in the Unalakleet River indicates chinook salmon escapements are slightly below average and showed a drop in escapement rate during the commercial period. Since the Department believes that it is still early in the chinook run, commercial salmon fishing will be managed as if it were an average return for this coming period. Additional fishing periods will be modified as more information becomes available. Commercial fishermen are reminded that unsold salmon caught in commercial gear must be reported on fish tickets. |
| 3-S-Z-3-97 | 6:00 p.m. ADT June 15, 1997 | This emergency order closes the Nome Subdistrict to subsistence salmon fishing in the Sinuk, Cripple, Penny, Snake, Nome, Flambeau, Eldorado, Bonanza, and Solomon Rivers. In addition, the waters of Safety Sound and Bonanza Channel inside the barrier spit and Safety Bridge, as well as ocean waters from the Cape Nome jetty west to the Sinuk River mouth are closed to salmon fishing from 6:00 p.m. June 15 through July 30. | During the four year period, 1987 to 1990 salmon escapements in the immediate Nome area were well below historic levels and the levels the department staff believes are needed to maintain the salmon runs. This is particularly true of the chum salmon stocks. During the next four years, the trend of declining chum salmon escapements was broken. Many streams in the Nome area were judged to have adequate chum escapement levels. A similar management technique to what was used in 1995 is planned for the 1997 season. Subsistence fishing will reopen as pink or coho salmon become abundant and as chum salmon escapement goals are met. Various locations and streams will be judged individually and opened on the basis of their individual chum salmon escapement and pink or coho salmon abundance. The staff will be flying frequent surveys and boating some of the rivers to track the salmon migration's strength and progress. The weir on the Nome River, and the counting towers on the Snake, and Eldorado rivers will also be used to track the various salmon migrations. If a stream appears to have adequate escapement, restrictions will be lifted in that area; otherwise, the restrictions will remain in place until they no longer benefit the species of concern. Subsistence fishers of the Nome Subdistrict are reminded of the regulatory changes that occurred in 1995. The first change is that a maximum of 50 fathoms of net may be used in saltwater and that only 50 feet of net may be used in freshwater. The fishing period in saltwater has been extended, the periods now begin 6:00 p.m. Monday and close 6:00 p.m. Saturday. Freshwater openings will continue to be the two 48 hour openings beginning at 6:00 p.m. on Mondays and Thursdays, once freshwater openings. |

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Appendix C Emergency Orders issued during 1997.

| Emergency Order Number | Effective Date | Action Taken | Comments |
|------------------------|--------------------------------|--|---|
| 3-S-Z-4-97 | 6:00 p.m. ADT June 18, 1997 | This emergency order opens the Golovin Bay, and Elim Subdistricts to commercial king salmon fishing for a standard 24 hour period at 6:00 p.m. Wednesday, June 18. The fishing period will run from 6:00 p.m. Wednesday until 6:00 p.m. Thursday. Only nets with a mesh size of seven and one-half inches or larger will be allowed. | In previous years, a limited number of king salmon were taken incidentally to the commercial chum salmon fishery in these two subdistricts. With the recent conservation actions directed at chum salmon, there has been no opportunity for commercial king salmon fishing. It now appears that an above average king salmon migration is underway in eastern Norton Sound and in other fisheries to the south. Allowing a harvest in the historic harvest range should help to offset the lost opportunity for king salmon fishing during the former chum salmon fishery. A minimum mesh size of at least seven and one-half inches will be required. A conservative chum salmon harvest policy will be in place in the Elim Subdistrict this season. Commercial fishermen are reminded that unsold salmon caught in commercial gear must be reported on fish tickets. |
| 3-S-Z-5-97 | 6:00 p.m. ADT June 19, 1997 | This emergency order opens the Shaktoolik, and Unalakleet Subdistricts to commercial king salmon fishing for a standard schedule of two 48 hour periods per week beginning 6:00 p.m. Thursday, June 19. The fishing periods will run from 6:00 p.m. Monday until 6:00 p.m. Wednesday and from 6:00 p.m. Thursday until 6:00 p.m. Saturday. | The Unalakleet test net, the sport fishery, and the commercial fishery all indicate an above average number of king salmon in eastern Norton Sound. The Unalakleet escapement index indicates a normal escapement is now in the river and that the migration is continuing. An increased level of harvest is now appropriate due to the strength of the return. The mesh size restriction in these subdistricts has been lifted to allow the harvest of small male kings and chum salmon. Some interest in early chum salmon has been expressed and jack kings seem to be present in above average levels. With the weak chum salmon market this season, no conservation problem with chum harvest is anticipated for these subdistricts. Commercial fishermen are reminded that unsold salmon caught in commercial gear must be reported on fish tickets. |
| 3-S-Z-6-97 | 6:00 p.m. ADT June 21, 1997 | This emergency order opens the Golovin Bay Subdistrict to commercial salmon fishing for a 24 hour period at 6:00 p.m. Saturday, June 21. The fishing period will run from 6:00 p.m. Saturday until 6:00 p.m. Sunday. | During the first salmon opening in the Golovin Bay and Moses Point Subdistricts, over 740 king salmon were harvested from the Moses Point Subdistrict. This is the fourth highest annual king harvest on record. However, relatively few king salmon have entered the local rivers at this time. No further king salmon directed commercial openings are anticipated for the Moses Point Subdistrict this year. There was no harvest at Golovin Bay during the same period. Because there is not the same concern about chum salmon conservation there, as in Moses Point, a 24 hour opening with no mesh restrictions will be allowed this weekend. Commercial salmon nets must have at least a four inch mesh. Commercial fishermen are reminded that unsold salmon caught in commercial gear must be reported on fish tickets. |
| 3-S-Z-7-97 | 6:00 p.m. ADT June 25, 1997 | This emergency order opens the Norton Bay Subdistrict to commercial salmon fishing for a 24 hour period at 6:00 p.m. Wednesday, June 25. The fishing period will run from 6:00 p.m. Wednesday until 6:00 p.m. Thursday. | The Norton Bay Subdistrict typically does not attract a salmon buyer due to it's remoteness, it's low quantities of salmon harvested, and it's reputation for water-marked fish. Recently the western boundary of the subdistrict was moved westward to the tip of Bald Head in an attempt to improve fish quality. This fishing period is scheduled at the request of a salmon buyer interested in testing the commercial salmon potential of the redefined subdistrict and at the request of fishermen from the neighboring Moses Point Subdistrict who are interested in traveling to the Norton Bay Subdistrict to fish. Unrestricted gillnet mesh size will be allowed as a means to sample what is available for harvest regarding species and flesh condition. Chinook salmon will be managed for an average historical harvest for years when a fishery did occur. The chum salmon harvest is expected to be well below historical levels due to poor market conditions, however it is hoped that this early fishing period and the boundary change will improve fish quality and therefore the market. |

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Appendix G3. Emergency Orders issued during 1997.

| Emergency Order Number | Effective Date | Action Taken | Comments |
|------------------------|--------------------------------|--|---|
| 3-S-Z-8-97 | 6:00 p.m. ADT June 26, 1997 | This emergency order opens the Golovin Bay Subdistrict to commercial salmon fishing for a 48 hour period at 6:00 p.m. Thursday, June 26. The fishing period will run from 6:00 p.m. Thursday until 6:00 p.m. Saturday. | The first period in the Golovin Bay Subdistrict reported no salmon harvest and the second period reported only a small harvest of 17 chinook and 243 chum salmon taken by 2 fishermen. The only fish buyer is losing interest because of the large investment in tendering fish out of the subdistrict for such a small quantity of salmon. Due to encouragement by fishermen in the Golovin Bay Subdistrict saying effort should be greater than previous periods and because the chum salmon abundance is still increasing, the salmon buyer has said they would operate one more period in the subdistrict. This period will provide additional fishing opportunity while a market is still present. Gillnet mesh size requirements will be unrestricted because it is anticipated that most effort will target chum salmon and neither chum salmon nor chinook salmon are conservation concerns at the anticipated harvest levels. Commercial fishermen are reminded that unsold salmon caught in commercial gear must be reported on fish tickets. |
| 3-S-Z-9-97 164 | 6:00 p.m. ADT June 29, 1997 | This emergency order opens the Golovin Bay Subdistrict to commercial salmon fishing for a 24 hour period at 6:00 p.m. Sunday, June 29. The fishing period will run from 6:00 p.m. Sunday until 6:00 p.m. Monday. | The Third period in the Golovin Bay Subdistrict reported no salmon harvest due to the lack of a tender and buyer. The fishing period did not occur. This period will provide additional fishing opportunity while a market is still present prior to July Fourth. Gillnet mesh size requirements will be unrestricted because it is anticipated that most effort will target chum salmon and neither chum salmon nor chinook salmon are conservation concerns at the anticipated harvest levels. Commercial fishermen are reminded that unsold salmon caught in commercial gear must be reported on fish tickets. |
| 3-S-Z-10-97 | 6:00 p.m. ADT June 30, 1997 | This emergency order extends the current commercial opening in Golovin Bay Subdistrict to 12:00 Noon, Tuesday, July 1. | Delays in the tender's arrival has again delayed the commercial opening in Golovin Bay; as a consequence, commercial fishing did not begin until Monday morning. This extension will allow for roughly 24 hours fishing. Salmon are now reported as far upstream as Council in good numbers. No conservation problems are evident. Gillnet mesh size requirements will be unrestricted because it is anticipated that most effort will target chum salmon. Commercial fishermen are reminded that unsold salmon caught in commercial gear must be reported on fish tickets. |
| 3-S-Z-11-97 | 6:00 p.m. ADT July 3, 1997 | This emergency order closes the Shaktoolik Subdistrict to commercial salmon fishing until further notice. | The primary salmon buyer in Norton Sound has decided to cease buying operations during the Fourth of July holiday. The chum salmon market is near capacity and king salmon quality is declining. The subdistricts with no catcher sellers are being closed to prevent wastage. Unalakleet Subdistrict remains open, but fishers need to check their markets before fishing. |
| 3-S-Z-12-97 | 6:00 p.m. ADT July 9, 1997 | This emergency order extends the commercial fishing period in the Unalakleet Subdistrict to allow commercial salmon fishing to continue from Monday until Saturday. | The primary salmon buyer in Norton Sound has ceased buying operations for the time being. A few catcher sellers have continued to fish, but their combined harvest is much reduced from the normal harvest at this time of year. The king salmon return is judged to be the second strongest on record with more than twice the normal escapement. The chum salmon return is still building and early indications are that the return is near average. The increased opportunity to harvest king salmon is not expected to cause any conservation concerns. |

Appendix C Emergency Orders issued during 1997.

| Emergency Order Number | Effective Date | Action Taken | Comments |
|------------------------|--------------------------------|--|---|
| 3-S-Z-13-97 | 6:00 p.m. ADT July 14, 1997 | This emergency order returns the commercial salmon fishing schedule in the Unalakleet Subdistrict to the standard two 48 periods per week, Mondays at 6 p.m. through Wednesdays at 6 p.m. and Thursdays at 6 p.m. through Saturdays at 6 p.m.. Fishing gear will be restricted to a maximum mesh size of 6 inches. | The primary salmon buyers have ceased buying operations throughout Norton Sound and only a few fishermen in the Unalakleet Subdistrict have found small markets where they can sell their catch. Chum salmon escapements to the Unalakleet Subdistricts are near normal and harvest rates have been well below average. Commercial fishing regulations mandate that gillnets must be restricted to a 6 inch maximum mesh size in order to manage for a chum directed fishery prior to July 16. The predicted low level of harvest under these conditions is not expected to adversely effect chum salmon escapements at this time. As an additional reminder, commercial fishermen should be sure of their markets before they go fishing. |
| 3-S-Z-14-97 | 6:00 p.m. ADT July 21, 1997 | This emergency order opens the Golovin Bay Subdistrict to commercial salmon fishing at 6:00 p.m. Monday, July 21 for a regular schedule of two 48 hour openings each week until further notice. | Recent aerial surveys of the Fish River system have found sufficient chum salmon to meet the escapement goals for the Fish River system and the anticipated inriver harvests. The Niukluk Counting Tower also shows a sustained chum salmon migration and the beginning of the pink salmon migration. Local commercial fishers have reported a limited local market for chum salmon. A regional fish buyer has expressed interest in salmon buying next week as well. As a result of at least a limited market and the fact that the reproductive needs of the chum salmon have been met a normal schedule of fisheries openings will be allowed in Golovin Bay. Fishers should be sure of their markets needs prior to fishing. Commercial fishermen are reminded that unsold salmon caught in commercial gear must be reported on fish tickets. |
| 3-S-Z-15-97 | 6:00 p.m. ADT July 21, 1997 | This emergency order opens the Flambeau and Eldorado Rivers. In addition, the waters of Safety Sound west of the Safety Bridge are opened to salmon fishing effective July 21. | Aerial surveys flown over the past week have found an adequate number of chum salmon in the Eldorado River to provide for the reproductive needs and a limited subsistence harvest of that stock. The chum salmon escapement of the Flambeau River is well below average, however the low water level of this summer appear to be discouraging chum salmon from entering that river and some of those salmon have taken up residence in the Eldorado. The Eldorado and Flambeau are essentially the same system unlike most of the other rivers in the Nome Subdistrict. No other river system in the Nome Subdistrict has closely approached its chum salmon escapement goal. Consequently, only the Eldorado the Flambeau and that portion of Safety Sound the salmon migrate through will be opened to subsistence fishing. The staff will be continue flying frequent surveys and boating some of the rivers to track the salmon migration's strength and progress. The weir on the Nome River, and the counting towers on the Snake, and Eldorado rivers will also be used to track the various salmon migrations. If a stream appears to have adequate escapement, restrictions will be lifted in that area; otherwise, the restrictions will remain in place until silver salmon predominate in the subsistence fishery. Subsistence fishers of the Nome Subdistrict are reminded of the regulatory changes that occurred in 1995. The first change is that a maximum of 50 fathoms of net may be used in saltwater and that only 50 feet of net may be used in freshwater. The fishing period in saltwater has been extended, the periods now begin 6:00 p.m. Monday and close 6:00 p.m. Saturday. Freshwater openings will continue to be the two 48 hour openings beginning at 6:00 p.m. on Mondays and Thursdays, once freshwater reopens. |

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| 3-S-Z-16-97 | 6:00 p.m. ADT July 28, 1997 | This emergency order shifts the Golovin Bay Subdistrict commercial salmon openings to begin fishing at 12:00 noon. Tuesday, July 29 for a regular schedule of two 48 hour openings each week until further notice. The periods will run from 12:00 noon Tuesday until 12:00 noon Thursday and from 12:00 noon Friday until 12:00 noon Sunday. | The local fish buyer has requested that the commercial fishing schedule be shifted to accommodate a buying schedule in multiple subdistricts. No catcher sellers or other buyers are registered for this subdistrict. Recent chum salmon escapement indices of the Fish River system have found sufficient chum salmon to meet the escapement goals and the anticipated inriver harvests. Since the reproductive needs of the chum salmon have been met, a normal schedule of fishery openings will be continued Golovin Bay. Fishers should be sure of their markets needs prior to fishing. Commercial fishermen are reminded that unsold salmon caught in commercial gear must be reported on fish tickets. |
| 3-S-Z-17-97 | 6:00 p.m. ADT August 4, 1997 | This emergency order opens the Moses Point and Shaktoolik Subdistricts to commercial salmon fishing beginning August 4 at 6 p.m. There will be a standard fishing schedule of two 48 hour periods per week in both subdistricts that will run from 6 p.m. Mondays through 6 p.m. Wednesdays and from 6 p.m. Thursdays through 6 p.m. Saturdays. Fishing gear will be restricted to a maximum mesh size of 6 inches. | The Moses Point Subdistrict has met its chum salmon escapement goals as evaluated by tower count and aerial survey. Silver salmon now outnumber chum salmon in the Shaktoolik Subdistrict coastal waters. Nearly all the chum salmon have completed their migration into the area's streams and further fisheries restrictions would have little effect. This is a transition time in the salmon season where the abundance both species is low and is switching from chum to silver salmon. A Fish buyer has expressed interest in purchasing salmon from the Moses Point and Shaktoolik Subdistricts. This fishing schedule is being set because the management focus is shifting to a directed silver salmon fishery and there is a commercial market that will accept both chum and silver salmon. |
| 3-S-Z-18-97 | 12:00 noon ADT August 5, 1997 | This emergency order closes the Golovin Bay Subdistrict to commercial salmon fishing until further notice. | The local fish buyer has requested that the commercial fishing in the Golovin Bay Subdistrict be closed. Recent deliveries have been mostly number two quality watermarked chum salmon. Very few silver salmon have been caught which would help to provide more value in the fishery. The late arrival of silver salmon may indicate a weak return which could be offset by allowing less fishing to boost escapement. The Golovin Bay Subdistrict will not be reopened until the silver salmon migration significantly increases and a market exists for the salmon. |
| 3-S-Z-19-97 | 6:00 p.m. ADT August 5, 1997 | This emergency order opens portion of the Golovin Bay Subdistrict inside the narrows formed by the spit at the town of Golovin to commercial salmon fishing for 24 hours effective at 6:00 p.m. August 5. | The local salmon buyer has withdrawn from the Golovin Bay Subdistrict. Recent deliveries have been mostly poor quality watermarked chum salmon. Very few silver salmon have been harvested. Escapement indices indicate there is adequate chum salmon escapement. Since there will be no buyer for commercially caught salmon the harvest is expected to be small. A fishery in the inner bay should provide the crab fishermen with suitable crab bait with little impact to other fisheries. |
| 3-S-Z-20-97 | 6:00 p.m. ADT August 7, 1997 | This emergency order reduces the length of the commercial fishing periods at the Moses Point, Shaktoolik, and Unalakleet Subdistricts. The commercial fishing schedule will now be one 48 hour period and one 30 hour period per week in all three subdistricts that will run from Mondays at 6 p.m. through Wednesdays at 6 p.m. and from Thursdays at 6 p.m. through | The fish buyers in Unalakleet have requested that commercial fishing be shortened to help provide for a higher quality product from the fishery. The recent demolition of the processing plant in Unalakleet has removed their ability to hold salmon over the weekend or to provide sufficient ice for holding fish. The lack of air transportation is the limiting factor for all fish markets in eastern Norton Sound. This action is not thought to favor any group since all are affected by the same factors. |

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| 3-S-Z-21-97 | 6:00 p.m. ADT August 7, 1997 | <p>Fridays at midnight.</p> <p>This emergency order reduces the length of the commercial fishing periods at the Moses Point and Shaktoolik Subdistricts. The commercial fishing schedule will now be one 48 hour period and one 30 hour period per week in the Moses Point Subdistrict that will run from Mondays at 6 p.m. through Wednesdays at 6 p.m. and from Thursdays at 6 p.m. through Fridays at midnight. In the Shaktoolik Subdistrict, the second period of the week will run 36 hours and will close at 6:00 a.m. Saturday and in the Unalakleet Subdistrict the second period will run 48 hours and close at the normal time at 6:00 p.m. Saturday.</p> | <p>The local fish buyer in Moses Point and Shaktoolik have requested that commercial fishing be shortened to help provide for a higher quality product from the fishery. Recent discussions between Department staff, catcher sellers, and the fish buyers have arrived at this new fishing schedule in an attempt to avoid the loss of salmon quality while allowing the full potential harvest where possible.</p> |
| 3-S-Z-22-97 | 6:00 p.m. ADT August 7, 1997 | <p>This emergency order places the Nome Subdistrict and surrounding area on the normal fishing schedules and closed waters areas as described in the regulation book. Marine waters are open to subsistence fishing from 6:00 p.m. Monday until 6:00 p.m. Saturday and freshwater is open from 6:00 p.m. Monday until 6:00 p.m. Wednesday and from 6:00 p.m. Thursday until 6:00 p.m. Saturday. Subsistence fishers are reminded that many rivers have markers above which fishing is not allowed. Those markers locations can be better described when the permit is issued. Inriver subsistence gillnets are limited to 50 feet in length. Beach seines are not legal at this time.</p> | <p>Silver salmon harvests have gradually increased over the past week as their migration into fresh water begins. At the same time, the chum salmon numbers have been declining. Adequate escapements of chum salmon have been documented on some of the local streams the other streams' escapements of chum salmon are approaching the goals set for those stocks. The transition to silver salmon management has already been delayed a week and little can be done to further the escapements of chum or pink salmon at this date. Since silver salmon do not have the recent history of depressed returns chum salmon have, a normal fishing schedule will be allowed. Four year old chum salmon suffered poor returns through much of the Bering Sea this year. The silver salmon return, which are also a four year fish, are weak in many parts of the state as well. The concern for silver salmon is compounded by the fact the parent year was below average in parts of Norton Sound. Silver salmon have more variability in run timing than other species of salmon. Typically, silvers peak between August 5 and 10 in the commercial fishery, but peaks as late as August 18 have been observed. The Department staff will be keeping close track of the silver salmon returns throughout the district. Conservation actions may be required later in the season.</p> |
| 3-S-Z-23-97 | 6:00 p.m. ADT August 14, 1997 | <p>This emergency order closes the Moses Point Subdistrict to commercial salmon fishing. The commercial fishing schedule will remain the same at the Shaktoolik and the Unalakleet Subdistricts.</p> | <p>Silver salmon returns have been far below normal throughout northern Norton Sound. Commercial catch statistics compared to previous years at Moses Point indicate either a very late return or a weak return. The lack of escapement indices for silver salmon in this subdistrict is a handicap for the salmon managers. The escapement index in the adjacent subdistrict, the Niukluk Tower data, indicates one of the poorest silver salmon returns in recent years. This date is usually well past the peak of the silver salmon migration into fresh water. It is possible that a late peak could occur. However, that possibility is becoming unlikely. The Moses Point commercial fishery will be closed</p> |

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| 3-S-Z-24-97 | 6:00 p.m. ADT August 16, 1997 | This emergency order closes the Port Clarence District, and the Nome and Golovin Subdistricts to subsistence salmon fishing from 6:00 p.m. August 16 through August 31. This includes all waters from Cape Prince of Wales to Cape Darby. | effective Wednesday evening until further notice in order to allow silver salmon escapement to build to a level that is more typical for this time of year. A strong migration of silver salmon into fresh water over the next several days could provide a justification to reopen the season as early as Monday. |
| 3-S-Z-25-97 | 6:00 p.m. ADT August 23, 1997 | This emergency order closes the Shaktoolik and the Unalakleet Subdistricts to commercial salmon fishing effective the evening of Saturday August 23. | Silver salmon escapement indices on the southern Seward Peninsula indicate very weak returns. Several rivers have escapements as low as 10% of their normal levels at this date. Subsistence and sport fishers have also indicated poor catch rates. Silver salmon run strength indicators in the Cook Inlet, Bristol Bay, and Kuskokwim Districts have also found silver salmon returns to be weak. Historic escapement indices show that roughly half the silver salmon should be in fresh water at this time. Even late runs in the past have had significantly larger escapements in fresh water by this date. This closure is intended to reserve the remainder of the silver salmon return for reproductive purposes. There is little hope of achieving even an average escapement at this late date; however, it is important to act when a problem is recognized and while there is still time to help the silver salmon escapement. Silver salmon are essentially all four years of age when they return to spawn. A severely weakened brood year could remain weak for several generations; some other species of salmon have the ability to recover more rapidly since they return over a two or three year period. Silver salmon returns throughout Norton Sound are below average, although the returns in Eastern Norton Sound are not as depressed as they are in the north. Both catch and escapement are roughly 80% of the long term average, from 1981 to present. When the recent five year average is compared to the current year, the 1997 silver run looks significantly worse. The hope for a late peak to the return has now past. Typically 20% of the silver salmon harvest would not yet be harvested. This closure is intended to allow those remaining salmon to make their way into the rivers so that most will spawn and help to make up for the reduced escapements now in the rivers of eastern Norton Sound. |
| 3-S-Z-26-97 | 11:59 p.m. ADT August 31, 1997 | This emergency order reopens the Port Clarence District, the Nome and Golovin Subdistricts to subsistence salmon fishing September 1. Except that portion of the Fish River System above the lower Niukluk River mouth will remain closed to the subsistence harvest of salmon through September 10. | Silver salmon escapement indices on the southern Seward Peninsula indicate the returns have improved to roughly one-half the normal escapement levels. Historic escapement indices show that most of the silver salmon should be in fresh water at this time. Most silver salmon have begun to spawn with about a third of the silvers not yet to that point of maturity. The existing waters closed rules will protect most spawners in most rivers. The Niukluk River and upper Fish River are still susceptible to significant levels of harvest. Survival of spawning salmon and the disruption of nesting activity is of particular concern on this river. Recent surveys throughout Norton Sound have found all silver salmon escapements to be below average. Most are in the one-half to three-quarters of normal range. Fishers are reminded that this year's spawning success will have direct affect on the return in four more years. A wasted fish will hurt us all in the future. |

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| 3-S-PC-1-97 | 6:00 p.m. ADT July 1, 1997 | This emergency order opens the Port Clarence District, except the waters of the Pilgrim and Kuzitrin Rivers to subsistence fishing seven days per week. Subsistence fishing in the Kuzitrin and Pilgrim Rivers may only occur between July 1 and August 15 from 6:00 p.m. Thursday until 6:00 p.m. Tuesday. | The regulation this emergency order amends has its origin during the brief commercial fishery that occurred nearly thirty years ago. This weekly closure has not been enforced for a number of years in much of the district. The majority of the salmon stocks have been maintained at healthy levels under the regime of no weekly closures and those stocks that were depressed have shown steady progress at rebuilding recently. The sockeye and chum salmon stocks of the Pilgrim and Kuzitrin Rivers are well below historic levels. Subsistence fishing has a significant impact on those species particularly where the rivers are road accessible. This mid-week window of escapement is thought to insure a certain level of escapement throughout the migration. This weekly closure also encourages fishers to more closely tend their nets. Other salmon producing rivers in the district are thought to be sustaining runs at a more historic level. |
| 169 3-H-Z-1-97 | 2:00 p.m. ADT, May 20, 1997 | This emergency order opens a Norton Sound herring gillnet commercial fishing period in Subdistricts 1, 2, and 3 beginning at 2:00 p.m., May 20 until 5:00 p.m. Tuesday, May 20. Each vessel may operate 50 fathoms of gillnet. | Commercial gillnet samples indicate excellent roe quality at Cape Denbigh. Roughly five percent immature and very few spawned-out fish are present in the samples. Recent sampling by department staff indicates all the expected age classes are now present. Roe quality is unlikely to improve from today's situation. Significant spawn has been reported at both Subdistrict 1 and 3, which indicates roe quality will soon peak. Normally fishing periods are timed to coincide with the daily high tide in an attempt to harvest a high proportion of females. The recent storm has artificially raised the water levels in the fishing district, so staff are less concerned with tide than normal. No extension is likely. |
| 3-H-Z-2-97 | 6:00 a.m. ADT May 21, 1997 | This emergency order opens a Norton Sound herring gillnet commercial fishing period in Subdistricts 1, 2, and 3 beginning at 6:00 a.m., May 21 until 9:00 a.m. Wednesday, May 21. Each vessel may operate 50 fathoms of gillnet. | This afternoon's gillnet opening harvested roughly 380st of herring at a roe percentage of 9.8%. Roe quality was very good in Subdistrict 1 at 10.7% however harvest rates were low. Catch rates were better at Cape Denbigh, but roe quality averaged only 9.3%. Roe percentages were adversely affected by high male counts and immature fish. The quality of the harvest is above average. More herring are expected to arrive with each tide. This opening is timed to occur on the rising tide in an attempt to avoid low roe quality fish. Staff will evaluate the early success of the opening and make an announcement regarding an extension at 8:00 a.m. |
| 3-H-Z-3-97 | 9:00 a.m. ADT May 21, 1997 | This emergency order extends the current Norton Sound herring gillnet commercial fishing period in Subdistricts 1, 2, and 3 for 3 hours, until 12:00 noon. Wednesday, May 21. Each vessel may operate 50 fathoms of gillnet. | Catch rates during the early portions of the opening have been slow. With the slow catch rates, buyers have not had a chance to evaluate the sac roe quality during the first 3 hours of the opening. An extension will allow time for further evaluation. Commercial fishermen work closely with buyers, thus reducing the possibility of significant harvests of unacceptable sac roe quality herring. |
| 3-H-Z-4-97 | 8:00 a.m. ADT May 22, 1997 | This emergency order opens a Norton Sound herring gillnet commercial fishing period in Subdistricts 1, 2, and 3 beginning at 8:00 a.m., May 22 until 12:00 noon Thursday, May 22. Each vessel may operate 50 fathoms of gillnet. | This morning's gillnet opening harvested 871st of herring with an average roe recovery of 9.4 percent. Roe quality was good in Subdistrict 1 at 10.4% however harvest rates were low. Catch rates were better at Cape Denbigh, but roe quality averaged 9.1%. There has been no effort in Subdistrict 2 so far. Roe percentages were adversely affected by high male counts and immature fish. The total harvest to date is 1,251 st with an average roe recovery of 9.5%. The quality of the harvest is above average. More herring are expected to arrive with each tide. This opening is timed |

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| 3-H-Z-5-97 | 12:00 noon ADT May 22, 1997 | This emergency order extends the current Norton Sound herring gillnet commercial fishing period in Subdistricts 1, 2, and 3 for 3 hours, until 3:00 p.m. Thursday, May 22. Each vessel may operate 50 fathoms of gillnet. | to occur on the rising tide near the peak in an attempt to avoid low roe quality fish. Staff will evaluate the early success of the opening and make an announcement regarding an extension at 11:00 a.m. which will be one hour prior to the scheduled close of the period. Catch rates during the early portion of the opening have been slow, however, early indications of fish quality show good roe recoveries. Immature fish have moved into the area immediately southeast of Cape Denbigh and most fishing effort is concentrating in areas of active spawn. Fish buyers are confident that the slow catch rate will allow them to closely monitor catches and avoid harvest of poor quality herring. This period is being extended because good quality herring are available, there is an assured market for the additional catch, the cumulative total harvest including this extended period is expected to be only one half the guideline harvest based on the pre-season projection, and more herring have been observed entering nearshore waters. Further extensions to this period will not be allowed because there is some concern that spawnouts may increase in the catches as the tide drops and managers need more complete harvest reports to assess the period and plan future openings. |
| 3-H-Z-6-97 | 6:00 p.m. ADT May 23, 1997 | This emergency order opens Subdistricts 1, 2, and 3 of Norton Sound to commercial herring beach seining beginning 6:00 a.m. Friday, May 23 and running until 9:00 a.m. Friday, May 23. | Small numbers of large size mature herring have been milling in the vicinity of Cape Denbigh for the past three days. Variable test net samples have indicated that the sex ratio of males was high and it is believed that the commercial gillnet fishing gear was able to favorably select for females in the previous gillnet fishing periods. Variable test net samples also indicate new fish are entering the area while aerial surveys have observed herring beginning to accumulate along the shoreline between Shaktoolik and Tolstoi Point. Commercial markets are demanding high quality roe. It is believed that this scheduled beach seine period will provide the first opportunity to harvest quality herring in the preferred fishing locations suitable for the gear type. Beach seine fishermen are advised to test their catch prior to drying up and keep in mind the strict quality requirements in effect this season. |
| 3-H-Z-7-97 | 10:00 a.m. ADT May 23, 1997 | This emergency order opens a Norton Sound herring gillnet commercial fishing period in Subdistricts 1, 2, and 3 beginning at 10:00 a.m., May 23 until 2:00 p.m. Friday, May 23. Each vessel may operate 50 fathoms of gillnet. | Today's gillnet opening harvested 1,412st of herring with an average roe recovery of 9.6 percent and included 23st of bait. Roe quality was good in Subdistrict 1 at 10% and roe quality only averaged 8.9% in Subdistrict 3. Catch rates were initially slow in Subdistrict 1, but increased near the end of the period in the vicinity of St. Michael's as new large mature herring arrived. Subdistrict 3 started with a slow catch rate which diminished as the period progressed causing fishermen to move frequently in search of better quality herring. The combined cumulative total catch to date is 2,668st with a 9.6% roe average. Aerial surveys today observed herring coming to the beaches in Subdistrict 1 from deep water and areas of spawn increasing. This opening is timed to occur on the rising tide near it's peak in an attempt to avoid low roe quality fish and the amount of fishing time is that which is expected to be required to attain the pre-season gillnet guideline harvest. Fishermen are reminded to continue to monitor their nets closely through this period because there would potentially be new immature fish entering the area which may reduce quality. |

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| 3-H-Z-8-97 | 3:00 p.m. ADT May 23, 1997 | This emergency order opens Subdistricts 2 to the educational permit fishery beginning 3:00 p.m. May 23, 1997. Each vessel may operate 100 fathoms of gillnet. | A ten ton harvest has been allowed annually since 1989 for the educational permit held by the Bering Strait School District. This fishery can be used to judge the quantity and quality of the herring available in that subdistrict as well as providing an educational opportunity for the vocational class. This small harvest will not affect the potential of any future gillnet opening. |
| 3-H-Z-9-97 | 8:00 a.m. ADT May 24, 1997 | This emergency order opens Subdistricts 1, 2, 3, and 5 of Norton Sound to commercial herring beach seining beginning 8:00 a.m. Saturday, May 24 and running until 11:00 a.m. Saturday, May 24. | Today's beach seine opening harvested roughly 144 st, slightly over one-third the guideline harvest. The quality of the harvest was generally good with large average sizes and a average roe percentage of roughly 9.7%. Today's aerial survey indicates ripe fish continuing to migrate into the spawning grounds at Subdistrict 1 and a growing biomass at Subdistrict 5. No spawning has been observed at Subdistrict 5, but the fish observed there today seem to be preparing to spawn. The second beach seine opening is scheduled to occur at a time when more light should be available for spotting and when the tide is still rising. Staff expects the larger herring to complete their spawning cycle soon and fishers should test their catches before they completely haul their net. Unharvested dead fish are counted against the guideline. |
| 3-K-Z-1-97 | 12:00 noon ADT August 13, 1997 | This emergency order closes the summer commercial red king crab fishery in the Norton Sound Section effective 12:00 noon August 13, 1997. | The trawl survey that was conducted by ADF&G in August 1996 estimated 1.6 million pounds of legal male red king crab in Norton Sound. This was a dramatic drop in population size from the previous estimate of 3.4 million pounds in 1991. In recent years the Norton Sound red king crab stock has been exploited at 10% while maintaining a modest upward trend in population size. It was felt that this decline was a change in the trend and warranted a reduced exploitation rate. Therefore, the 1997 management plan called for an exploitation of 5% which set the 1997 summer commercial red king crab harvest quota at 80,000 pounds. Verbal catch reports current as of Sunday August 10 th put the Norton Sound commercial king crab harvest at 73,570 pounds. At the present rate of harvest, it is projected that the commercial quota will be attained by noon Wednesday. This two day notice is intended to allow crabbers adequate time to remove their pots from the water prior to the closure. |
| 3-S-X-1-97 | 6:00 a.m. ADT July 10, 1997 | This emergency order opens the Kotzebue District to two 12 hour openings. The first opening will begin at 6:00 a.m. Thursday, July 10 and end at 6:00 p.m. Thursday, July 10. The second opening will begin at 6:00 a.m. Friday, July 11 and end at 6:00 p.m. Friday, July 11. | In keeping with the management plan published prior to the season, the commercial fishery will open July 10. With only one buyer and a limited market, openings will be shorter but more frequent. This will allow a better product as all salmon sold are iced whole and flown out. The most reliable index of chum salmon run strength is the commercial catch rate. Management using comparisons of catch rate trends will not be possible with the shorter, more frequent openings. Age composition, test fisheries and subsistence reports will be a factor in management decisions as periods are shortened. With an average return expected, a limited market and a reduced number of participating fishermen, achieving escapement goals is not expected to be a problem. |

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| 3-S-X-2-97 | 6:00 a.m. ADT July 14, 1997 | This emergency order opens the Kotzebue District to two 12 hour openings. The first opening will begin at 6:00 a.m. Monday, July 14 and end at 6:00 p.m. Monday, July 14. The second opening will begin at 6:00 a.m. Tuesday, July 15 and end at 6:00 p.m. Tuesday, July 15. | Because of the demand for a better product the buyer has requested shorter but more frequent fishing periods. The most reliable index of chum salmon run strength has been the commercial catch rate. With the shorter and more frequent openings, management using comparison of catch rate trends will not be possible. Management decisions will now depend on age composition, test fisheries and subsistence reports. With an average return expected, a limited market and a reduced number of participating fishermen, achieving escapement goals is not expected to be a problem. |
| 3-S-X-3-97 | 6:00 a.m. ADT July 17, 1997 | This emergency order opens the Kotzebue District to two 12 hour openings. The first opening will begin at 6:00 a.m. Thursday, July 17 and end at 6:00 p.m. Thursday, July 17. The second opening will begin at 6:00 a.m. Friday, July 18 and end at 6:00 p.m. Friday, July 18. | Because of the demand for a better product the buyer has requested shorter but more frequent fishing periods. The most reliable index of chum salmon run strength has been the commercial catch rate. With the shorter and more frequent openings, management using comparison of catch rate trends will not be possible. Management decisions will now depend on age composition, test fisheries and subsistence reports. With an average return expected, a limited market and a reduced number of participating fishermen, achieving escapement goals is not expected to be a problem. |
| 3-S-X-4-97 | 6:00 a.m. ADT July 21, 1997 | This emergency order opens the Kotzebue District to two 12 hour openings. The first opening will begin at 6:00 a.m. Monday, July 21 and end at 6:00 p.m. Monday, July 21. The second opening will begin at 6:00 a.m. Tuesday, July 22 and end at 6:00 p.m. Tuesday, July 22. | Because of the demand for a better product the buyer has requested shorter but more frequent fishing periods. The most reliable index of chum salmon run strength has been the commercial catch rate. With the shorter and more frequent openings, management using comparison of catch rate trends will not be possible. Management decisions will now depend on age composition, test fisheries and subsistence reports. With an average return expected, a limited market and a reduced number of participating fishermen, achieving escapement goals is not expected to be a problem. |
| 3-S-X-5-97 | 6:00 a.m. ADT July 24, 1997 | This emergency order opens the Kotzebue District to two 12 hour openings. The first opening will begin at 6:00 a.m. Thursday, July 24 and end at 6:00 p.m. Thursday, July 24. The second opening will begin at 6:00 a.m. Friday, July 25 and end at 6:00 p.m. Friday, July 25. | Because of the demand for a better product the buyer has requested shorter but more frequent fishing periods. The most reliable index of chum salmon run strength has been the commercial catch rate. With the shorter and more frequent openings, management using comparison of catch rate trends will not be possible. Management decisions will now depend on age composition, test fisheries and subsistence reports. With an average return expected, a limited market and a reduced number of participating fishermen, achieving escapement goals is not expected to be a problem. |
| 3-S-X-6-97 | 6:00 a.m. ADT July 28, 1997 | This emergency order opens the Kotzebue District to two 12 hour openings. The first opening will begin at 6:00 a.m. Monday, July 28 and end at 6:00 p.m. Monday, July 28. The second opening will begin at 6:00 a.m. Tuesday, July 29 and end at 6:00 p.m. Tuesday, July 29. | Because of the demand for a better product the buyer has requested shorter but more frequent fishing periods. The most reliable index of chum salmon run strength has been the commercial catch rate. With the shorter and more frequent openings, management using comparison of catch rate trends will not be possible. Management decisions will now depend on age composition, test fisheries and subsistence reports. At this time, age composition is skewed towards older age salmon with a lack of 4-year-old salmon. However, the 6-year-old salmon are 3-4 times greater than normal. The Kobuk River test fishing is indicating escapements are being met at this time. |
| 3-S-X-7-97 | 6:00 a.m. ADT July 31, 1997 | This emergency order opens the Kotzebue District to two 12 hour openings. The first opening will begin at 6:00 a.m. Thursday, July 31 and end at 6:00 p.m. Thursday, July 31. The second opening will begin at 6:00 a.m. Friday, August 1 and end at 6:00 p.m. Friday, August 1. | Because of the demand for a better product the buyer has requested shorter but more frequent fishing periods. The most reliable index of chum salmon run strength has been the commercial catch rate. With the shorter and more frequent openings, management using comparison of catch rate trends will not be possible. Management decisions will now depend on age composition, test fisheries and subsistence reports. At this time, age composition is skewed towards older age salmon with a lack of 4-year-old salmon. However, the 6-year-old salmon are 3-4 times greater than normal. The Kobuk River test fishing is indicating escapements are being met at this time. |

Appendix C Emergency Orders issued during 1997.

| Emergency Order Number | Effective Date | Action Taken | Comments |
|------------------------|-------------------------------|--|--|
| 3-S-X-8-97 | 6:00 a.m. ADT August 4, 1997 | This emergency order opens the Kotzebue District to two 12 hour openings. The first opening will begin at 6:00 a.m. Monday, August 4 and end at 6:00 p.m. Monday, August 4. The second opening will begin at 6:00 a.m. Tuesday, August 5 and end at 6:00 p.m. Tuesday, August 5. | River test fishing is indicating escapements are being met at this time. Because of the demand for a better product the buyer has requested shorter but more frequent fishing periods. The most reliable index of chum salmon run strength has been the commercial catch rate. With the shorter and more frequent openings, management using comparison of catch rate trends will not be possible. Management decisions will now depend on age composition, test fisheries and subsistence reports. At this time, age composition is skewed towards older age salmon with a lack of 4-year-old salmon. However, the 6-year-old salmon are 3-4 times greater than normal. The Kobuk River test fishing is indicating escapements are being met at this time. |
| 173 3-S-X-9-97 | 6:00 a.m. ADT August 6, 1997 | This emergency order opens the Kotzebue District to three 12 hour openings. The first opening will begin at 6:00 a.m. Wednesday, August 6 and end at 6:00 p.m. Wednesday, August 6. The second opening will begin at 6:00 a.m. Thursday, August 7 and end at 6:00 p.m. Thursday, August 7. The third opening will begin at 6:00 a.m. Friday, August 8 and end at 6:00 p.m. Friday, August 8. | Because of the demand for a better product the buyer has requested shorter but more frequent fishing periods. The most reliable index of chum salmon run strength has been the commercial catch rate. With the shorter and more frequent openings, management using comparison of catch rate trends will not be possible. Management decisions will now depend on age composition, test fisheries and subsistence reports. At this time, age composition is skewed towards older age salmon with a lack of 4-year-old salmon. However, the 6-year-old salmon are 3-4 times greater than normal. The Kobuk River test fishing is indicating escapements are being met at this time. |
| 3-S-X-9-97 | 6:00 a.m. ADT August 6, 1997 | This emergency order opens the Kotzebue District to three 12 hour openings. The first opening will begin at 6:00 a.m. Wednesday, August 6 and end at 6:00 p.m. Wednesday, August 6. The second opening will begin at 6:00 a.m. Thursday, August 7 and end at 6:00 p.m. Thursday, August 7. The third opening will begin at 6:00 a.m. Friday, August 8 and end at 6:00 p.m. Friday, August 8. | Because of the demand for a better product the buyer has requested shorter but more frequent fishing periods. The most reliable index of chum salmon run strength has been the commercial catch rate. With the shorter and more frequent openings, management using comparison of catch rate trends will not be possible. Management decisions will now depend on age composition, test fisheries and subsistence reports. At this time, age composition is skewed towards older age salmon with a lack of 4-year-old salmon. However, the 6-year-old salmon are 3-4 times greater than normal. The Kobuk River test fishing is indicating escapements are being met at this time. |
| 3-S-X-10-97 | 6:00 a.m. ADT August 11, 1997 | This emergency order opens the Kotzebue District to two 12 hour openings. The first opening will begin at 6:00 a.m. Monday, August 11 and end at 6:00 p.m. Monday, August 11. The second opening will begin at 6:00 a.m. Tuesday, August 12 and end at 6:00 p.m. Tuesday, August 12. | Because of the demand for a better product the buyer has requested shorter but more frequent fishing periods. The most reliable index of chum salmon run strength has been the commercial catch rate. With the shorter and more frequent openings, management using comparison of catch rate trends will not be possible. Management decisions will now depend on age composition, test fisheries and subsistence reports. At this time, age composition is skewed towards older age salmon. Recent commercial openings are indicating an increase of 4-year-old salmon. The 6-year-old salmon remain 4-5 times greater than normal. The Kobuk River test fishing project is indicating escapements have been met. |

Appendix G3. Emergency Orders issued during 1997.

| Emergency Order Number | Effective Date | Action Taken | Comments |
|------------------------|-------------------------------|--|--|
| 3-S-X-11-97 | 6:00 a.m. ADT August 14, 1997 | This emergency order opens the Kotzebue District to two 12 hour openings. The first opening will begin at 6:00 a.m. Thursday, August 14 and end at 6:00 p.m. Thursday, August 14. The second opening will begin at 6:00 a.m. Friday, August 15 and end at 6:00 p.m. Friday, August 15. | Because of the demand for a better product the buyer has requested shorter but more frequent fishing periods. The most reliable index of chum salmon run strength has been the commercial catch rate. With the shorter and more frequent openings, management using comparison of catch rate trends will not be possible. Management decisions now depend on age composition, test fisheries and subsistence reports. At this time, age composition is skewed towards older age salmon. Recent commercial openings are indicating an increase of 4-year-old salmon. The 6-year-old salmon remain 4-5 times greater than normal. The Kobuk River test fishing project is indicating escapements have been met. |
| 3-S-X-12-97 | 6:00 a.m. ADT August 18, 1997 | This emergency order opens the Kotzebue District to two 12 hour openings. The first opening will begin at 6:00 a.m. Monday, August 18 and end at 6:00 p.m. Monday, August 18. The second opening will begin at 6:00 a.m. Tuesday, August 19 and end at 6:00 p.m. Tuesday, August 19. | Because of the demand for a better product the buyer has requested shorter but more frequent fishing periods. The most reliable index of chum salmon run strength has been the commercial catch rate. With the shorter and more frequent openings, management using comparison of catch rate trends will not be possible. Management decisions will now depend on age composition, test fisheries and subsistence reports. At this time, age composition is skewed towards older age salmon. Recent commercial openings are indicating an increase of 4-year-old salmon. The 6-year-old salmon remain 4-5 times greater than normal. The Kobuk River test fishing project has indicated escapements were met. |
| 3-S-X-13-97 | 6:00 a.m. ADT August 20, 1997 | This emergency order opens the Kotzebue District to three 12 hour openings. The first opening will begin at 6:00 a.m. Wednesday, August 20 and end at 6:00 p.m. Wednesday, August 20. The second opening will begin at 6:00 a.m. Thursday, August 21 and end at 6:00 p.m. Thursday, August 21. The third opening will begin at 6:00 a.m. Friday, August 22 and end at 6:00 p.m. Friday, August 22. | The buyer has requested shorter but more frequent commercial openings than in past years in order to provide a better product to retailers. The most reliable index of chum salmon run strength has been the commercial catch rate. With the shorter openings, management using comparison of catch rate trends is not possible. Management decisions now depend on age composition, test fisheries and subsistence reports. The Kobuk River test fishing index indicated escapement goals have been met into that tributary. Younger age salmon have increased to near normal averages. The number of fishermen have declined to conduct other subsistence activities. With a reduction in fishermen, an increase of younger salmon and escapement goals being met, additional fishing time is warranted. |
| 3-S-X-14-97 | 6:00 a.m. ADT August 25, 1997 | This emergency order opens the Kotzebue District to five 12 hour openings. The openings will be from Monday, August 25 through Friday, August 29, beginning at 6:00 a.m. and ending at 6:00 p.m. each day. | The buyer has requested shorter but more frequent commercial openings than in past years in order to provide a better product to retailers. The most reliable index of chum salmon run strength has been the commercial catch rate. With the shorter openings, management using comparison of catch rate trends is not possible. Management decisions now depend on age composition, test fisheries and subsistence reports. The Kobuk River test fishing index indicated escapement goals have been met into that river system. Recently, younger age salmon have increased to near normal averages. The number of fishermen has declined so that they may conduct other subsistence activities. With a reduction in fishermen, an increase of younger salmon and escapement goals being met, additional fishing time is warranted. |

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Appendix G4. Norton Sound, Port Clarence, Kotzebue Sound processors and associated data, 1997.

| <u>Company</u> | <u>Address</u> | <u>Type of Processing</u> | <u>District</u> |
|---|--|--|--|
| Aqua Tech | P.O. Box 10119 Anchorage, Ak 99510 | Fresh Crab | Norton Sound |
| Capilano Pacific Inc. | 1709 Edgewater Lane Bellingham, Wa 98226 | Frozen Herring | Norton Sound |
| Glacier Fish Co. (Co-op herring with Trident and NSEDC) | 1200 West Lake Ave Suite 900 Seattle, Wa 98109 | Frozen Salmon Frozen Herring | Norton Sound Norton Sound |
| Icicle Seafoods | P.O. Box 79003 Seattle, Wa 98119 | Frozen Herring | Norton Sound |
| Norton Sound Seafood | P.O. Box 1004 Nome, Ak 99762 | Frozen Crab | Norton Sound |
| North Alaska Fisheries | P.O. Box 92737 Anchorage, Ak 99509 | Fresh Salmon Dolly Varden | Kotzebue |
| Norton Sound Crab Co. | P.O. Box 906 Nome, Ak. 99762 | Frozen Crab Frozen Salmon Misc Bait Fish | Norton Sound Norton Sound Norton Sound |
| Norton Sound Economic Dev. Corp. (Co-op herring with Glacier & Trident) | P.O. Box 39089 Elim, Ak 99739 | Frozen Herring | Norton Sound |
| Norquest | 4225 23rd Ave West Seattle, Wa 98199 | Frozen Herring | Norton Sound |
| North Alaska Fisheries | Kotzebue | Fresh Salmon | Kotzebue |

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| Company | Address | Type of Processing | District |
|--|--|--------------------|--------------|
| Pan Pacific Seafood | 111 Quenn Anne Ave N. #202 Seattle, Wa 98109 | Frozen Herring | Norton Sound |
| Snopac | 5053 E. Marginal Way S. Seattle, Wa 98134-2407 | Frozen Herring | Norton Sound |
| Trident (co-op herring with Clacier & NSEDC) | 5303 Shilshole Ave Nw Seattle, Wa 98107 | Frozen Herring | Norton Sound |
| Wards Cove | P.O. Box C-5030 Seattle, Wa 98105-0030 | Frozen Herring | Norton Sound |
| Whitney Foods | 4401 W Intl Airport Rd Anchorage, Ak 99502 | Fresh Salmon | Norton Sound |
| Yard Arm Knot | 123 Northwest 36th #230 Seattle, Wa 98107 | Frozen Herring | Norton Sound |

NORTON SOUND AND SEWARD PENINSULA AREA

1997 SUBSISTENCE SALMON HOUSEHOLD HARVEST SURVEY

* Questions marked with an asterisk are asked of all households interviewed

Community: _____ Household Head Name: _____
 Survey Date: _____ *Household Size _____
 Interviewer: _____ Was household in community last year? No _____ Yes _____
 If no, where were you living? _____
 Household P.O. Box (if new): _____

*1. Did your household catch salmon for subsistence use or with a rod-and-reel this year?

No _____ Yes _____

*2. Does your household usually subsistence fish for salmon? No _____ Yes _____

FISHING HOUSEHOLDS ("Yes" to #1)

3. Please estimate how many salmon your household caught for subsistence use or with a rod-and-reel this year (your share of the catch if fishing with others). Include salmon you gave away, ate fresh, lost to spoilage, or obtained from helping others process fish.

CHUM _____ CHINOOK _____ PINK _____ SOCKEYE _____ COHO _____ UNKNOWN SALMON _____
 ("DOGS") ("KINGS") ("HUMPIES") ("REDS") ("SILVERS")

4. What type(s) of fishing gear did your household use for catching subsistence salmon this year?

SET GILL NET _____ SEINE _____
 ROD-AND-REEL _____ DRIFT GILL NET _____

4a. How many salmon did your household catch and keep with rod-and-reel this year?

CHUM _____ CHINOOK _____ PINK _____ SOCKEYE _____ COHO _____
 ("DOGS") ("KINGS") ("HUMPIES") ("REDS") ("SILVERS")

5. Did your household give salmon to other households this year? No _____ Yes _____

6. How was subsistence chum salmon fishing for your household this year?

_____ VERY GOOD _____ AVERAGE _____ POOR If POOR, WHY? _____

7. Did your household catch salmon for dog food? (Using salmon for dog food is allowed by regulations.)

No _____ (Go to #13) Only backbones/heads/guts/scraps/spoiled fish _____ (Go to #13) Yes _____ (Go to #8)

**NORTON SOUND AND SEWARD PENINSULA AREA
1997 SUBSISTENCE SALMON HOUSEHOLD HARVEST SURVEY (CONT)**

FISH FOR DOGS

8. How many salmon did your household catch for dog food? (Do not include fish lost to spoilage and fed to dogs.)

CHUM _____ CHINOOK _____ PINK _____ SOCKEYE _____ COHO _____ UNKNOWN SALMON _____
 ("DOGS") ("KINGS") ("HUMPIES") ("REDS") ("SILVERS")

9. Were these salmon included in the estimates you already gave me? No _____ Yes _____

10. How many dogs does your household have? _____ (Go to #13)

NON-FISHING HOUSEHOLDS ("No" to #1)

11. Did your household help another household fish, cut or hang salmon, or process it some other way? No _____ (Go to #13)
 Yes _____

12. Did you receive salmon in exchange for your help? No _____ Yes _____

If yes, please estimate how many salmon you received for your household. (Do not include fish from a F&G test net.)

CHUM _____ CHINOOK _____ PINK _____ SOCKEYE _____ COHO _____ UNKNOWN SALMON _____
 ("DOGS") ("KINGS") ("HUMPIES") ("REDS") ("SILVERS")

(Go to #13)

COMMERCIAL FISHING

*13. Did your household commercially fish for salmon this year? No _____ (Go to #17) Yes _____

If yes, where? _____

14. Were all of the salmon you caught when commercial fishing sold or were some brought home to eat or processed for subsistence? All sold _____ (Go to #17) Some used for subsistence _____

15. How many commercially caught salmon did your household use for subsistence?

CHUM _____ CHINOOK _____ PINK _____ SOCKEYE _____ COHO _____ UNKNOWN SALMON _____
 ("DOGS") ("KINGS") ("HUMPIES") ("REDS") ("SILVERS")

16. Were these salmon included in the estimates you already gave me? No _____ Yes _____

*17. Do you have any suggestions or concerns about subsistence fishing?

THANK YOU FOR YOUR TIME AND FOR HELPING WITH THIS PROJECT.

A summary of this subsistence fishing survey will be sent to you next spring (April).

KOBUK RIVER AREA

KOBUK RIVER AREA

1997 SUBSISTENCE SALMON HOUSEHOLD HARVEST SURVEY

* Questions marked with an asterisk are asked of all households interviewed

Community: _____ Household Head Name: _____
 Survey Date: _____ *Household Size _____
 Interviewer: _____ Was household in community last year? No _____ Yes _____
 If no, where were you living? _____
 Household P.O. Box (if new): _____

*1. Did your household catch salmon for subsistence use or with a rod-and-reel this year? No _____ Yes _____
 *2. Does your household usually subsistence fish for salmon? No _____ Yes _____

FISHING HOUSEHOLDS ("Yes" to #1)

3. Please estimate how many salmon your household caught for subsistence use or with a rod-and-reel this year (your share of the catch if fishing with others). Include salmon you gave away, ate fresh, lost to spoilage, or obtained from helping others process fish.

CHUM _____ CHINOOK _____ PINK _____ SOCKEYE _____ COHO _____ UNKNOWN SALMON _____
 ("DOGS") ("KINGS") ("HUMPIES") ("REDS") ("SILVERS")

4. What type(s) of fishing gear did your household use for catching subsistence salmon this year?

SET GILL NET _____ SEINE _____
 ROD-AND-REEL _____ DRIFT GILL NET _____

4a. How many salmon did your household catch and keep with rod-and-reel this year?

CHUM _____ CHINOOK _____ PINK _____ SOCKEYE _____ COHO _____
 ("DOGS") ("KINGS") ("HUMPIES") ("REDS") ("SILVERS")

5. Did your household give salmon to other households this year? No _____ Yes _____

6. How was subsistence chum salmon fishing for your household this year?

____ VERY GOOD _____ AVERAGE _____ POOR IF POOR, WHY? _____

7. Did your household catch salmon for dog food? (Using salmon for dog food is allowed by regulations.)

No _____ (Go to #13) Only backbones/heads/guts/scraps/spoiled fish _____ (Go to #13) Yes _____ (Go to #8)

8. How many salmon did your household catch for dog food? (Do not include fish lost to spoilage and fed to dogs.)

CHUM _____ CHINOOK _____ PINK _____ SOCKEYE _____ COHO _____ UNKNOWN SALMON _____
 ("DOGS") ("KINGS") ("HUMPIES") ("REDS") ("SILVERS")

9. Were these salmon included in the estimates you already gave me? No _____ Yes _____

10. How many dogs does your household have? _____ (Go to #13)

KOBUK RIVER AREA

1997 SUBSISTENCE SALMON HOUSEHOLD HARVEST SURVEY (CON'T)

NON-FISHING HOUSEHOLDS ("No" to #1)

11. Did your household help another household fish, cut or hang salmon, or process it some other way? No _____ (Go to #13)
Yes _____

12. Did you receive salmon in exchange for your help? No _____ Yes _____
If yes, please estimate how many salmon you received for your household. (Do not include fish from a F&G test net.)

CHUM ("DOGS") CHINOOK ("KINGS") PINK ("HUMPIES") SOCKEYE ("REDS") COHO ("SILVERS") UNKNOWN SALMON _____

(Go to #13)

COMMERCIAL FISHING

*13. Did your household commercially fish for salmon this year? No _____ (Go to #17) Yes _____
If yes, where? _____

14. Were all of the salmon you caught when commercial fishing sold or were some brought home to eat or processed for subsistence? All sold _____ (Go to #17) Some used for subsistence _____

15. How many commercially caught salmon did your household use for subsistence?
CHUM ("DOGS") CHINOOK ("KINGS") PINK ("HUMPIES") SOCKEYE ("REDS") COHO ("SILVERS") UNKNOWN SALMON _____

16. Were these salmon included in the estimates you already gave me? No _____ Yes _____

SHEEFISH AND WHITEFISH FISHING

*17. Did your household catch sheefish or whitefish for subsistence use this year? No _____ (Go to #19) Yes _____

18. Please estimate how many sheefish and whitefish your household caught for subsistence use this year (your share of the catch if fishing with others). Include fish you caught and gave away, ate fresh, lost to spoilage, or fed to dogs.

SHEEFISH _____ WHITEFISH _____

*19. Do you have any suggestions or concerns about subsistence fishing?

Blank space for handwritten suggestions or concerns.

THANK YOU FOR YOUR TIME AND FOR HELPING WITH THIS PROJECT.

A summary of this subsistence fishing survey will be sent to you next spring (April).

NOATAK RIVER AREA

1997 SUBSISTENCE SALMON HOUSEHOLD HARVEST SURVEY

* Questions marked with an asterisk are asked of all households interviewed

Community: _____ Household Head Name: _____
 Survey Date: _____ *Household Size _____
 Interviewer: _____ Was household in community last year? No ___ Yes ___
 If no, where were you living? _____
 Household P.O. Box (if new): _____

*1. Did your household catch salmon for subsistence use or with a rod-and-reel this year?

No ___ Yes ___

*2. Does your household usually subsistence fish for salmon? No ___ Yes ___

FISHING HOUSEHOLDS ("Yes" to #1)

3. Please estimate how many salmon your household caught for subsistence use or with a rod-and-reel this year (your share of the catch if fishing with others). Include salmon you gave away, ate fresh, lost to spoilage, or obtained from helping others process fish.

CHUM _____ CHINOOK _____ PINK _____ SOCKEYE _____ COHO _____ UNKNOWN SALMON _____
 ("DOGS") ("KINGS") ("HUMPIES") ("REDS") ("SILVERS")

4. What type(s) of fishing gear did your household use for catching subsistence salmon this year?

SET GILL NET _____ SEINE _____
 ROD-AND-REEL _____ DRIFT GILL NET _____

4a. How many salmon did your household catch and keep with rod-and-reel this year?

CHUM _____ CHINOOK _____ PINK _____ SOCKEYE _____ COHO _____
 ("DOGS") ("KINGS") ("HUMPIES") ("REDS") ("SILVERS")

5. Did your household give salmon to other households this year? No ___ Yes ___

6. How was subsistence chum salmon fishing for your household this year?

___ VERY GOOD ___ AVERAGE ___ POOR IF POOR, WHY? _____

7. Did your household catch salmon for dog food? (Using salmon for dog food is allowed by regulations.)

No ___ (Go to #13) Only backbones/heads/guts/scraps/spoiled fish ___ (Go to #13) Yes ___ (Go to #8)

8. How many salmon did your household catch for dog food? (Do not include fish lost to spoilage and fed to dogs.)

CHUM _____ CHINOOK _____ PINK _____ SOCKEYE _____ COHO _____ UNKNOWN SALMON _____
 ("DOGS") ("KINGS") ("HUMPIES") ("REDS") ("SILVERS")

9. Were these salmon included in the estimates you already gave me? No ___ Yes ___

10. How many dogs does your household have? _____ (Go to #13)

NOATAK RIVER AREA

1997 SUBSISTENCE SALMON HOUSEHOLD HARVEST SURVEY (CON'T)

NON-FISHING HOUSEHOLDS ("No" to #1)

11. Did your household help another household fish, cut or hang salmon, or process it some other way? No _____ (Go to #13)
 Yes _____

12. Did you receive salmon in exchange for your help? No _____ Yes _____

If yes, please estimate how many salmon you received for your household. (Do not include fish from a F&G test net.)

CHUM _____ CHINOOK _____ PINK _____ SOCKEYE _____ COHO _____ UNKNOWN SALMON _____
 ("DOGS") ("KINGS") ("HUMPIES") ("REDS") ("SILVERS")

(Go to #13)

COMMERCIAL FISHING

*13. Did your household commercially fish for salmon this year? No _____ (Go to #17) Yes _____
 If yes, where? _____

14. Were all of the salmon you caught when commercial fishing sold or were some brought home to eat or processed for subsistence? All sold _____ (Go to #17) Some used for subsistence _____

15. How many commercially caught salmon did your household use for subsistence?

CHUM _____ CHINOOK _____ PINK _____ SOCKEYE _____ COHO _____ UNKNOWN SALMON _____
 ("DOGS") ("KINGS") ("HUMPIES") ("REDS") ("SILVERS")

16. Were these salmon included in the estimates you already gave me? No _____ Yes _____

TROUT (CHAR) AND WHITEFISH FISHING

*17. Did your household catch trout or whitefish for subsistence use this year? No _____ (Go to #19) Yes _____

18. Please estimate how many trout and whitefish your household caught for subsistence use this year (your share of the catch if fishing with others). Include fish you caught and gave away, ate fresh, lost to spoilage, or fed to dogs.

TROUT _____ WHITEFISH _____

*19. Do you have any suggestions or concerns about subsistence fishing?

THANK YOU FOR YOUR TIME AND FOR HELPING WITH THIS PROJECT.

A summary of this subsistence fishing survey will be sent to you next spring (April).

ST. LAWRENCE ISLAND

1997 SUBSISTENCE SALMON HOUSEHOLD HARVEST SURVEY

* Questions marked with an asterisk are asked of all households interviewed

Community: _____ Household Head Name: _____
 Survey Date: _____ *Household Size _____
 Interviewer: _____ Was household in community last year? No _____ Yes _____
 If no, where were you living? _____
 Household P.O. Box: _____

1. Did your household catch salmon for subsistence use or with a rod-and-reel this year? No _____ Yes _____
 2. Does your household usually subsistence fish for salmon? No _____ Yes _____

FISHING HOUSEHOLDS ("Yes" to #1)

3. Please estimate how many salmon your household caught for subsistence use or with a rod-and-reel this year (your share of the catch if fishing with others). Include salmon you gave away, ate fresh, lost to spoilage, or obtained from helping others process fish.

| | | | | | |
|------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|----------------------|
| CHUM _____ ("DOGS") | CHINOOK _____ ("KINGS") AWISUK | PINK _____ ("HUMPIES") AMAGHTU | SOCKEYE _____ ("REDS") TUNGUYA | COHO _____ ("SILVERS") QITAQET | UNKNOWN SALMON _____ |
|------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|----------------------|

4. What type(s) of fishing gear did your household use for catching subsistence salmon this year?
 SET GILL NET _____ SEINE _____
 ROD-AND-REEL _____ DRIFT GILL NET _____

4a. How many salmon did your household catch and keep with rod-and-reel this year?

| | | | | |
|------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|
| CHUM _____ ("DOGS") | CHINOOK _____ ("KINGS") AWISUK | PINK _____ ("HUMPIES") AMAGHTU | SOCKEYE _____ ("REDS") TUNGUYA | COHO _____ ("SILVERS") QITAQET |
|------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|

5. Did your household give salmon to other households this year? No _____ Yes _____

6. How was subsistence chum salmon fishing for your household this year?
 _____ VERY GOOD _____ AVERAGE _____ POOR If poor, why? _____

7. Did your household catch salmon for dog food? (Using salmon for dog food is allowed by regulations.)
 No _____ (Go to #13) Only backbones/heads/guts/scraps/spoiled fish _____ (Go to #13) Yes _____ (Go to #8)

8. How many salmon did your household catch for dog food? (Do not include fish lost to spoilage and fed to dogs.)

| | | | | | |
|------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|----------------------|
| CHUM _____ ("DOGS") | CHINOOK _____ ("KINGS") AWISUK | PINK _____ ("HUMPIES") AMAGHTU | SOCKEYE _____ ("REDS") TUNGUYA | COHO _____ ("SILVERS") QITAQET | UNKNOWN SALMON _____ |
|------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|----------------------|

9. Were these salmon included in the estimates you already gave me? No _____ Yes _____

10. How many dogs does your household have? _____ (Go to #13)

ST. LAWRENCE ISLAND

1997 SUBSISTENCE SALMON HOUSEHOLD HARVEST SURVEY (CON'T)

NON-FISHING HOUSEHOLDS ("No" to #1)

11. Did your household help another household fish, cut or hang salmon, or process it some other way? No _____ (Go to #13)
Yes _____

12. Did you receive salmon in exchange for your help? No _____ Yes _____

If yes, please estimate how many salmon you received for your household.

| | | | | | |
|------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|
| CHUM _____ ("DOGS") | CHINOOK _____ ("KINGS") AWISUK | PINK _____ ("HUMPIES") AMAGHTU | SOCKEYE _____ ("REDS") TUNGUYA | COHO _____ ("SILVERS") QITAQET | UNKNOWN SALMON _____ (Go to #13) |
|------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|-------------------------------------|

COMMERCIAL FISHING

*13. Did your household commercially fish for salmon this year? No _____ (Go to #17) Yes _____

If yes, where? _____

14. Were all of the salmon you caught when commercial fishing sold or were some brought home to eat or processed for subsistence? All sold _____ (Go to #17) Some used for subsistence _____

15. How many commercially caught salmon did your household use for subsistence?

| | | | | | |
|------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|----------------------|
| CHUM _____ ("DOGS") | CHINOOK _____ ("KINGS") AWISUK | PINK _____ ("HUMPIES") AMAGHTU | SOCKEYE _____ ("REDS") TUNGUYA | COHO _____ ("SILVERS") QITAQET | UNKNOWN SALMON _____ |
|------------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------|----------------------|

16. Were these salmon included in the estimates you already gave me? No _____ Yes _____

*17. Have you observed any changes in salmon or salmon fishing in recent years? (More fish or fewer fish? Different species? Changes in migration or spawning? Changes in health of fish? Changes in areas used for fishing?)

*18. Do you have any suggestions or concerns about subsistence fishing?

THANK YOU FOR YOUR TIME AND FOR HELPING WITH THIS PROJECT.
A summary of this subsistence fishing survey will be sent to you this spring (April).

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