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2003
NORTON SOUND - PORT CLARENCE - KOTZEBUE

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PRESENTATION

This report summarizes the 2003 season and historical information concerning management of the commercial and subsistence fisheries of 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 is 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 was included and is indicated by appropriate footnotes. Current year catch data presented was derived from seasonal field data.

This report is organized into the following major sections:

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

Tabular data has been separated into two categories to facilitate use of this report: 1) tables presenting annual data, and 2) appendices which present historical comparisons. Not all appendices are cited in the text.

SECTION 1: SALMON

(Includes Norton Sound, Port Clarence and Kotzebue Districts)

INTRODUCTION

Boundaries

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

Salmon Resources

Five species of Pacific salmon are indigenous to the area, chum *Oncorhynchus keta* and pink salmon *O. gorbuscha* historically are the most abundant. Chum, pink, and chinook (king) salmon *O. tschawytscha* are 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, but 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 Southern Seward Peninsula drainages.

Commercial Fishery

In 1959 and 1960, Alaska Department of Fish and Game (ADFG) biologists conducted resource inventories that indicated harvestable surpluses of salmon were available in several river systems of the Norton Sound- Kotzebue area. ADFG liberalized various regulations and encouraged processors to explore and develop new fishing grounds since statehood. As a result, commercial salmon fishing activity has grown significantly, enabling some local residents to obtain cash income.

Most commercial fishers and many buying station workers are resident Native Alaskans (Yupik, Inupiat, and Siberian Yupik). Commercial fishers operate set gillnets from outboard powered skiffs to capture salmon. All commercially caught salmon are fished in coastal marine waters.

Salmon effort and catch per unit of effort (CPUE) data presented throughout this section were derived in this stepwise approach:

- Boat (or fisher) 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 fisher (or boat) hour is obtained by dividing the total fisher hours into the catch for the corresponding period of time. Total fishers (or boats) is the total number of fishers making deliveries, regardless of how many deliveries were made or days fished during a particular period or season. There are a number of fishers

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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 17,000 people in the area, the majority of whom are Native Alaskans, residing in more than 30 small villages scattered along the coast and major river systems. Nearly all of the local residents are dependent to varying degrees on fish and game resources for their livelihood.

Subsistence fishers operate gillnets or seines in the main rivers and, to a lesser extent, in coastal marine waters capturing primarily salmon, whitefish, arctic char, and inconnu (sheefish). Beach seines are used near 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 early 1960s until 1982, ADFG 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 survey data are available for Norton Sound (1998-2002) the average subsistence catch was 82,776 salmon including all species (Appendix A13). The majority of salmon taken are pinks and chums.

Subsistence surveys for the Kotzebue area were less complete. An expansion of documented surveys from 1994-2002 for different villages estimates total subsistence salmon harvest for Kotzebue Sound area to be 63,383 annually (Appendix C5).

Since 1974, subsistence salmon catches in Nome Subdistrict (Subdistrict 1) have been determined from return of catch reports required under the permit system. Not all fishers obtained or returned permits, and the data were not expanded, therefore these harvests should be considered minimum figures.

In 1994, ADFG initiated a new annual subsistence salmon harvest assessment effort in northwest Alaska that provided more extensive, complete, and reliable salmon harvest estimates than existed previously. In 2003, ADFG continued its subsistence salmon harvest assessment program. Household surveys were conducted in eight communities in Norton Sound District, both communities in the Port Clarence District, and six of fifteen Kotzebue District communities. In Kotzebue, subsistence salmon harvests were determined in conjunction with a big game harvest survey. In the Nome area, harvests were determined through fishing permit catch reports. In the fourteen surveyed communities, surveyors attempted to contact 100 percent of the households. Results of these surveys for 2003 are not available at this writing.

Goals of the postseason household survey:

1) collect harvest data to estimate subsistence salmon catch by species and community.
2) compile information on gear types, participation rates, sharing, use of salmon for dog food, and household size.

Management

Division of Commercial Fisheries of ADFG is responsible for the management of commercial and subsistence fisheries in this vast area. Permanent full-time staff assigned to this area during 2003 consisted of an Area Management Biologist, and Area Research Biologist, two Assistant Area Management Biologists, an Assistant Research Biologist and the Fish and Game Program Technician stationed in the Nome office. In addition, seasonal assistance in conducting various management and research activities was provided by approximately 20 seasonal biologists and technicians in Norton Sound and Kotzebue Sound. Biologists from the regional staff provided additional assistance. In 2003, interns funded by Norton Sound Economic Development Corporation (NSEDC) were utilized as fisheries technicians in some projects. Three cooperative projects staffed by Kawerak Inc. and one project operated by U.S. Bureau of Land Management (BLM) and one project operated by the Unalakleet IRA in Norton Sound supplemented salmon escapement monitoring activities of the area staff.

The main objective of ADFG's program is to manage 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 ADFG, Kawerak Inc., and BLM projects are presented in Appendix G2.

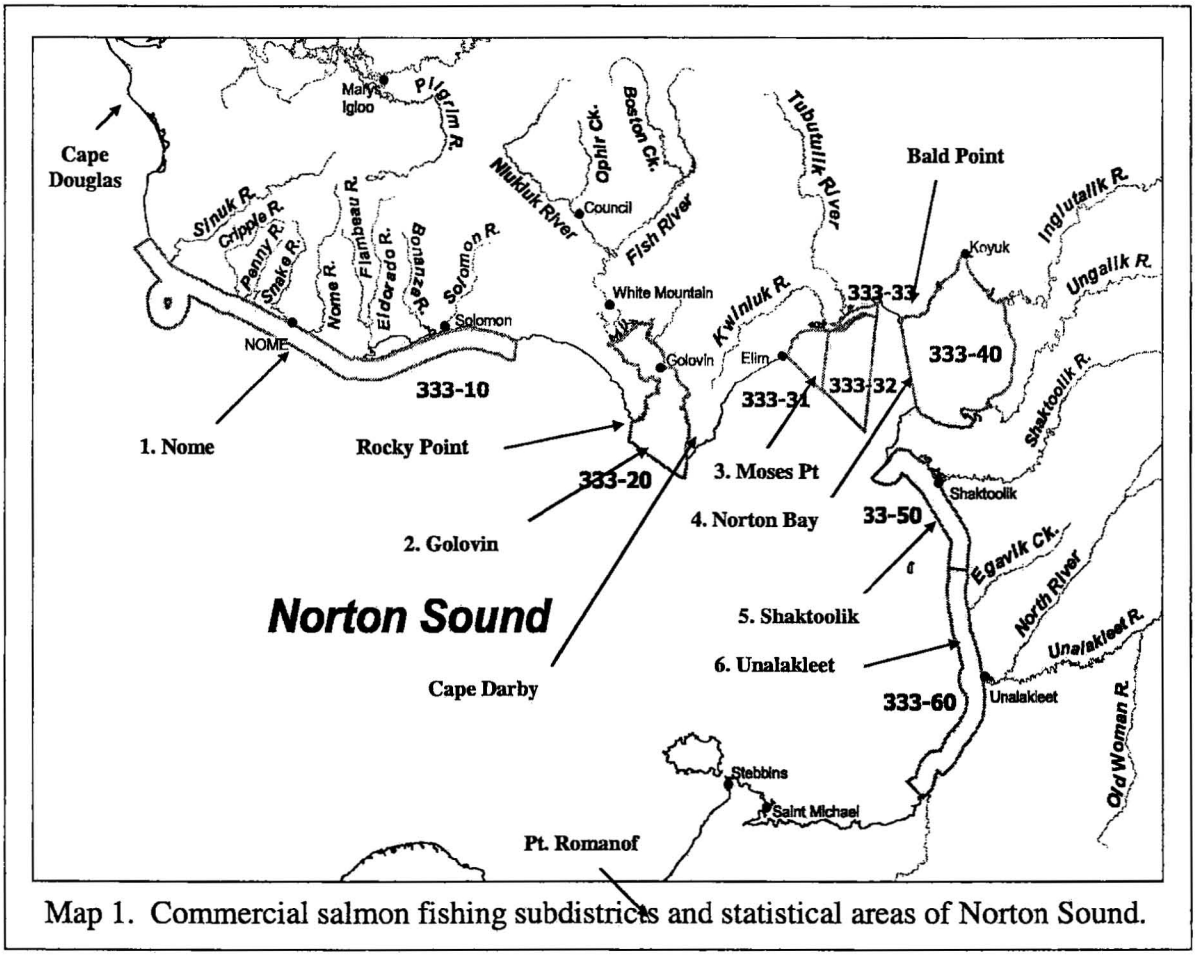
Management of the salmon fishery is complicated by the difficulty in obtaining accurate escapement data and by insufficient comparative catch and return information. Management problems are compounded by the need to provide not only for adequate escapements, but also for needs of several different user groups. Alaska State law requires that subsistence uses receive priority over other uses of fish and wildlife resources. If subsistence harvest or demands increase, commercial fishing and sport fishing may be restricted.

The basic regulation that governs commercial salmon harvest in all districts is the scheduled weekly fishing period. Commercial fishing regulations provide for two to four days of fishing per week during the open season depending on area and season differences. ADFG 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. Managers issue these orders depending upon fishing conditions and strength of runs or spawning escapements, as determined by evaluation of available run timing and abundance indicators. 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. Fishery news articles are published in the Nome Nugget and the Arctic Sounder.

NORTON SOUND DISTRICT

District Boundaries

Norton Sound Salmon District consists of all waters between Cape Douglas in the north and Point Romanof 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 (Map 1, Figure 1). Each subdistrict contains at least one major salmon-producing stream and the boundaries were established to facilitate management of individual salmon stocks.



Map 1. Commercial salmon fishing subdistricts and statistical areas of Norton Sound.

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 if sufficient run strength exists. Emphasis switches to chum salmon around June 25 and the coho salmon fishery begins the fourth week of July and closes September 7. Pink salmon may be abundant on even numbered year returns. A pink salmon directed fishery may replace or may be scheduled to alternate periods with the historical chum directed fishery.

Salmon management changed significantly during recent years because of limited market conditions and marginal returns of many salmon stocks within the northern portion of the district. Except for Nome Subdistrict, commercial fishing can occur if salmon runs are sufficient and a commercial market opens. Commercial fishing managers use estimates of run strength from escapement counting projects, test fishing, aerial surveys, and commercial fishing indexes. Nome Subdistrict is managed intensively for subsistence use including Tier II chum salmon subsistence permits, 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

Archeological evidence dating back 2,000 years indicates fishing has been a part of life for Norton Sound residents for many centuries (Bockstoce, 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 region's population lived in small groups scattered along the coast, often moving seasonally 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 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 1800s and continued after the American purchase (Magdanz and Punguk 1981). These activities and support for hundreds of commercial whalers and trading ships caused trading to increase in the region around 1848 (Ray 1975). Increased competition for walrus, caribou, and other species from outsiders may have increased the importance of salmon to area residents (Magdanz and Punguk 1981). In the late 1890s, gold was discovered on the Seward Peninsula and boom-towns sprang up with thousands of new immigrants flocking to the region. Commerce and the establishment of missions drew people to central year-round communities.

Mining impacted fish populations significantly. 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 is 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 once with 10,000 people did not exist before gold was discovered.

In the late ninteenth century 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 dried fish to feed the dog teams increased along with the development of better means to harvest fish. Winter transportation throughout the region was hired dog teams and drivers who carried mail or freight along the coast and across the state to the ice-free port at Seward. Dried fish, primarily chum and pink salmon, became a major barter item in response to the increased demand for dog food, (Thomas 1982).

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

The number of people gradually decreased over the next twenty years after the gold rush and the gold deposits were worked out. The number of dog teams diminished by the mid 1930s when mail planes and mechanical tractors were introduced. The last dog team mail contract ended in 1962 at Savoonga. Local stores continued to trade and barter in dry fish at Shaktoolik, Saint Michael, Unalakleet, and Golovin. An example of quantity was the 8x20x40 foot cache at the Shaktoolik store 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 1960s, commercial salmon fishing developed into a source of summer cash and snowmachines were replacing the need for dog teams. The use of dry fish to feed dogs decreased and cash became more available for exchange at stores.

Commercial Fishery Overview

Commercial salmon fishing in Norton Sound District first began in the Unalakleet and Shaktoolik Subdistricts in 1961. Most of the early interest involved chinook and coho salmon flown in dressed condition to Anchorage for further processing. A single U.S. freezer ship purchased and processed chum and pink salmon during 1961. In 1962, two floating cannery ships operated in the district and commercial fishing was extended into Norton Bay, Moses Point, and Golovnin Bay. The peak in salmon canning operations occurred in 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. Two Japanese freezer ships were permitted to buy directly from domestic fishers limited to salmon caught in the internal waters of Golovnin and Norton Bays. Currently, the most

consistent markets are at Unalakleet and Shaktoolik where some onshore processing usually occurs.

The commercial salmon fishing season usually opens by emergency order between June 8 and July 1, but depends 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 before regulatory closure dates. Up to two 48-hour fishing periods can occur each week unless changed by emergency order, with exception of the Moses Point Subdistrict, where two 24-hour fishing periods can be scheduled each week. No commercial salmon periods have opened in the Nome Subdistrict since 1996 because of low fish runs.

Commercial fishing gear is restricted to set gillnets. A maximum aggregate length of 100 fathoms is allowed for each fisher. No mesh size or depth restrictions are enforced during normally scheduled periods. However, mesh size is often restricted in an attempt to harvest a specific species of salmon. Most gillnets fished are approximately 5 7/8 inch stretched measure. In 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 and a market opens, ADFG establishes fishing periods allowing only 4 1/2 inch mesh or less to be used. These special small mesh periods are an attempt to target pink salmon without overharvesting larger sized salmon species.

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

Commercial Fishery Management

Norton Sound District is managed on comparative commercial catch data, escapements and weather conditions. A single factor or combination of factors may lead managers to issue emergency orders affecting seasons, fishing periods, allowable mesh size, and areas.

Aerial surveys are used to monitor escapements in most Norton Sound streams. Weather conditions, time of day, type of aircraft, water conditions, bottom conditions, date of survey, and efficiency of surveyor and pilot must be taken into account when making inter-annual aerial survey comparisons. Counting towers and weirs are a more consistent and accurate method of obtaining escapement information and have been utilized on several river systems in Norton Sound. Three counting towers and four weirs were operated in 2003.

Early management emphasis is on chinook salmon switching to chum salmon around June 25, then gradually shifting to coho salmon during the fourth week in July. Pink salmon are abundant during even numbered years, but often no market opens for this species. Southern Norton Sound Subdistricts 5 and 6 (Shaktoolik and Unalakleet) have maintained commercial fisheries that target chinook, chum, and coho salmon. Coho salmon catches

have remained fairly stable while chum and chinook salmon catches have been declining. Management has consisted of a series of emergency orders that open and close fishing seasons and periods, adjust fishing time, and restrict mesh size.

Commercial fisheries in Subdistricts 2 and 3 (Golovin and Moses Point) target chum salmon and during even numbered years, pink salmon. Commercial chum salmon harvests have dropped dramatically since the mid-1980s. Poor chum salmon runs have resulted in restrictive management actions during recent years. Seasons have been closed by emergency order to allow for escapement and subsistence needs.

Little or no commercial salmon harvest has occurred in Subdistricts 1 and 4 (Nome and Norton Bay) since the early 1980s. Nome Subdistrict has had very depressed chum salmon stocks, which in recent years require closure or severe restrictions on the subsistence fishery. Conversely, the Norton Bay Subdistrict often has healthy stocks, but has been unable to attract markets willing to operate in this remote area.

Subsistence Fishery Overview

Household subsistence harvest surveys were not conducted district wide in Norton Sound from 1985 to 1993 because of budgetary restrictions. Since 1994, ADFG has conducted an annual subsistence salmon harvest assessment effort in northwest Alaska to provide more extensive, complete, and reliable salmon harvest estimates than previously existed. These household subsistence harvest surveys are primarily funded by the Commercial Fisheries Division and were conducted by the Division of Subsistence during fall in eight Norton Sound villages. Subsistence harvest estimates for the district are generated from data gathered by the survey project.

Daily surveys of Unalakleet River and ocean subsistence fishers 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 ADFG test net in the lower Unalakleet River. Since the early 1990s some subsistence nets are fished in the ocean to avoid large debris loads from spring runoff.

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

Regulatory Actions in Subdistricts 1, 2 and 3

Subdistrict 1 has been the focus of most regulatory actions within the Norton Sound District since the 1970s. Although pink salmon are usually the most abundant species of salmon in Subdistrict 1 streams, the commercial fishery primarily targeted chum salmon during the 1970s. Relatively large chum salmon catches in this subdistrict in conjunction with weak local abundance implied the fishery intercepted 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 and to provide for an important subsistence fishery that targets local stocks, a commercial harvest guideline of 5,000-15,000 chum salmon was adopted as a regulation.

The Board of Fisheries, in response to an advisory committee petition, directed ADFG to manage Subdistrict 1 commercial fishery for optimal chum salmon escapement after poor chum salmon escapements during the 1982 and 1983 seasons. During 1984 fall Board of Fisheries meetings, directives 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 to allow for rebuilding of the river stocks that supported the historical subsistence effort.

ADFG was 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 Alaska Statute (AS) 5AAC 04.360. In addition to these 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 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.

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 to curtail commercial fishing activities, and later, sport, personal use, and subsistence were 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

Nome Subdistrict, several new regulations were adopted by the Alaska Board of Fisheries in 1987.

At that time, with the Nome Subdistrict commercial fishery all but eliminated, proposals affecting sport, personal use, and subsistence fisheries were considered. The following 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 of 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 in 1984. Additional new regulations affecting personal use and subsistence fishers adopted in 1987:

1) In Nome River, no person may operate more than 50 feet of gillnet in aggregate.

2) Nome River was added to AS 5AAC 01.170 (e) 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 beach seines in Nome Subdistrict. Managers were given authority to permit subsistence harvest of chum or pink salmon by beach seine if escapement needs were likely to be met. Beginning in 1991, no chum salmon harvests were 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. However, since 1999, beach seines were used to harvest abundant species, and allow live release of other species experiencing depressed runs.

Nome Subdistrict was designated a Tier II subsistence chum salmon management fishery during a special meeting by the Alaska Board of Fisheries held in Nome, March 1999. Tier II permits are dispensed to individuals by fishing history, dependence, and projected harvestable surplus. Through a series of Board of Fisheries directed meetings, the Board concluded the previous management plan did not provide adequate opportunity for all subsistence salmon users to supply their annual needs for chum salmon. As a result, the Board allocated a subsistence priority to twenty individuals who applied and qualified for Tier II permits. The intent was to allow up to 30 Tier II permit holders first priority over other subsistence users if only a small harvestable surplus of chum salmon return. If the run was assessed to be strong, then the subsistence fishery would open to all Alaskan residents who obtain a Tier I registration permit and individual harvests would be restricted to prescribed bag limits. In addition, the Board established "Closed Waters" areas, where no subsistence salmon fishing would be allowed at any time, to protect chum salmon on the spawning grounds and placed existing chum salmon aerial survey escapement goals for six Nome Subdistrict streams into regulation.

During a Board of Fisheries work session in September 2000, two Norton Sound District chum salmon stocks were determined to be stocks of concern based on the Policy for the Management of Sustainable Salmon Fisheries. Nome Subdistrict chum salmon were determined to be a stock of management concern and Golovin and Moses Point Subdistricts chum salmon were determined to be a stock of yield concern.

The Board of Fisheries made several changes to regulations for management of Norton Sound salmon at the January 2001 meeting. In the subsistence fishery, the Board included another gear type, a line attached to a rod or pole, as legal fishing gear from Cape Espenburg on the northern Seward Peninsula along the coast to Bald Head (between Elim and Koyuk). Bald Head is the western boundary of Subdistrict 4 (Figures 1 and 2). Therefore, in Port Clarence District and in Norton Sound District, from Cape Douglas to Bald Head, a fishing pole is legal subsistence gear. Although a fishing pole can now be used for subsistence fishing, sport fish methods and means requirements will still apply to harvesting of fish, for example no snagging of fish. Sport fish bag and possession limits, by species, as specified in AS 5 AAC 70.022 also apply, except when fishing through ice or when a subsistence salmon permit is required, in which case harvest limits specified in the subsistence permit will apply. However, fishers cannot combine sport fish bag and possession limits with subsistence harvest permit limits.

The Board repealed the existing Biological Escapement Goals (BEGs) in regulation and adopted Optimal Escapement Goals (OEGs) for chum salmon for five Norton Sound rivers. In the past, escapement goals were expressed as aerial survey counts of salmon. Aerial surveys do not count all salmon present, but serve as an index to compare current and previous surveys. New OEGs are in actual number of fish and based on ADFG escapement goal analysis (Clark 2001). Four of five OEGs were established for rivers where an escapement project (tower or weir project) is operated. The Board-established OEGs, by subdistrict:

Subdistrict 1
Snake River: 1,600 – 2,500 chum salmon
Nome River: 2,900 – 4,300 chum salmon
Eldorado River: 6,000 – 9,200 chum salmon

Subdistrict 3
Kwiniuk River: 11,500 – 23,000 chum salmon
Tubutulik River: 9,200 – 18,400 chum salmon

The Board adopted a chum salmon management plan for Subdistrict 1 and a salmon management plan for Subdistricts 2 and 3. Commercial chum salmon fishing in Nome Subdistrict was closed and the fishery may not be reopened again until the abundance of chum salmon has a harvestable surplus large enough to meet subsistence needs for four consecutive years.

ADFG was given authority to establish subsistence gillnet mesh size restriction of 4½ inch or less by emergency order when necessary to conserve chum salmon in Subdistricts 1, 2, and 3. The Board closed Cripple and Penny Rivers to subsistence fishing for chum salmon. Also, Nome and Solomon Rivers were closed to subsistence fishing for Arctic grayling, where abundance was determined to be low.

2003 Norton Sound Salmon Fishery

Commercial Fishery Summary

The 2003 Norton Sound commercial salmon season can be described as the second poorest season on record. Commercial fishing season began in late July, one month later than usual, due to weak chinook and chum salmon runs. The commercial season opened with a 24-hour test fishing period starting on July 31 in Shaktoolik and Unalakleet Subdistricts and average coho catches allowed ADFG to open commercial fishing to the regular two 48-hour commercial fishing periods per week in August. There were two fishing periods in September and the fishery closed by regulation on September 8. Combined commercial harvest of all salmon species and number of commercial permits fished was the second lowest on record (Appendix A1).

Average price paid for chinook salmon was $.64 per pound, $.45/lb for sockeye, $.44/lb for coho, and $.14/lb for chum salmon (Appendix A3). Total value of raw fish reported on fish tickets in 2003 was $64,473.25. This amount was 49% below the previous 5-year average and 77% below the 10-year average (Appendix A4). Historical commercial catch weight by species and mean weight by species are shown in Appendix A5 and Appendix A6. The 2003 fishery value was the third lowest since the 1960s.

Table 1 lists the 2003 Norton Sound commercial salmon harvest by subdistrict. Comparisons to the 5-year and 10-year averages are shown in Appendix A2. The coho salmon harvest of 17,058 was 21% below the recent 5-year average, and 58% below the recent 10-year average. There were no chinook, pink, or chum salmon directed periods and harvest of these species was incidental to the coho fishery. The chum salmon run to eastern Norton Sound Subdistricts 5 and 6 was below average. The chum salmon commercial harvest of 3,560 was 58% below the 5-year and 82% below the 10-year averages. The low total harvest of 20,646 salmon can be attributed to low salmon runs and low participation by permit holders. Only 30 permit holders participated in the commercial fishery and only 2002 had a lower participation when 12 permit holders fished. The previous 5-year average resulted from 57 permits fished, and the previous 10-year average resulted from 85 permits fished.

Only one salmon buyer operated in Norton Sound during the 2003 season. The Unalakleet fish plant operated by Norton Sound Seafood Products was the base of commercial fisheries operations. Salmon were delivered to the Unalakleet dock and tendered from neighboring Shaktoolik Subdistrict.

Subsistence Fishery Summary

The 2003 salmon runs were poor and there were various closures to fishing for some species in Port Clarence District and all subdistricts of Norton Sound, except for Norton Bay and Moses Point, at some time during the season.

In the Norton Sound Area, only Pilgrim River drainage in Port Clarence District and Nome Subdistrict in Norton Sound District require subsistence fishing permits for each household that fishes in these locations. These permits identify type of gear used and bag limit, which is specific to that body of water. In addition, the permit contains a catch calendar where the permit holder records catches in numbers of each species of fish for each day fished. If subsistence fishers have filled their harvest limit in one river they can fish in another river. The limit in marine waters of Nome Subdistrict is 200 salmon per year of which no more than 50 can be chum salmon. In Pilgrim River drainage the harvest limit is 50 salmon. These permits are important to management because they identify users and harvest limits, but actual catch information cannot be compiled until well after the season when the permits are returned to ADFG. Preliminary catch information for 2003 is presented in Tables 2 and 3.

The Board of Fisheries designated Nome Subdistrict as a Tier II chum salmon fishery in 1999. In addition, the Board established "Closed Waters" areas that would protect chum salmon on the spawning grounds where no subsistence salmon fishing would be allowed at any time. In 2003, 47 fishers applied for a Tier II permit. After scoring applications, a subsistence priority went to forty individuals who applied and qualified. The intent was to allow Tier II permit holders first priority over other subsistence users should only a small harvestable surplus of chum salmon return. If the run was assessed to be strong, the subsistence fishery would open to all residents of Alaska who obtain a subsistence salmon fishing permit and individual harvests would be restricted to prescribed bag limits as stated above.

Season Summary by Subdistrict

Nome - Subdistrict 1. The commercial salmon season in Nome Subdistrict is scheduled to take place by regulation between July 1 and August 31. However, at the January 2001 Board of Fisheries meeting, commercial fishing for chum salmon was indefinitely closed and will be reopened only after the harvestable surplus of chum salmon has met Tier I subsistence needs for four consecutive years. No commercial salmon harvest was taken because of inadequate surpluses of pink, and coho salmon (Appendix A7). Commercial fishing in the subdistrict is typically very limited because local salmon stocks are not abundant and subsistence demand is high. In 2003, 38 Tier II permits and 231 Tier I (including areas near Subdistrict 1) subsistence fishing permits were issued (Tables 2 and 3). Two individuals eligible for Tier II permits did not pick them up. Some individuals were issued both permit types and multiple permits for different fishing locations.

Subsistence fishing was closed by emergency order in mid-June, prior to the beginning of the chum salmon run, to all Tier I and Tier II fishers. One change in 2003 was that Nome River was closed to all fishing as it was not expected to achieve chum or pink salmon escapement goals. Nome River remained closed to all fishing until early August. Tier II fishing was only allowed in marine waters east of Cape Nome for three days per week beginning on June 24. The Board of Fisheries intended to allow more fishing time to Tier II permit holders early in the season when weather conditions are typically more suitable for processing salmon using traditional methods. The Board's intent was to limit the number of fishers, thereby reducing risk of over harvest early in the run before full assessment. The chum salmon run to the Nome Subdistrict was poor. After the third weekly marine opening to Tier II permit holders it was obvious that the escapement goal range of 23,000 to 35,000 chum salmon would not be reached and fishing was closed in mid-July until coho season in August.

The subdistrict reopened in both marine and fresh waters to all Tier I and Tier II fishers on August 2 to target coho salmon. However, Nome River remained closed an additional week to protect late arriving chum salmon. The coho salmon return was initially believed to be late, but escapement counts later assessed it as poor. In mid-August, Nome Subdistrict was closed to subsistence and sport coho salmon fishing through September.

Golovin - Subdistrict 2. The 2003 Salmon Management Plan stated the Golovin Subdistrict commercial harvest would be limited to a maximum of 15,000 chum salmon before mid-July to protect chum salmon stocks and allow for some harvest while flesh quality is at its best. By that date, the chum salmon run could be assessed and fishing time adjusted accordingly.

No chum salmon were commercially fished in Subdistrict 2 because runs to the south had been poor and it was questionable whether chum escapement goals would be reached in the subdistrict (Appendix A8). Marine waters of Subdistrict 2 and Niukluk and Fish River drainages had subsistence chum salmon fishing closed in mid-July because of weak runs. The pink salmon run was strong for an odd-numbered year and beach seining for pinks was allowed to continue. In August, coho escapements were first thought to be late, but by mid-month it was obvious the run was extremely poor and subsistence and sport salmon fishing for coho salmon in Subdistrict 2 was closed for the season.

Moses Point - Subdistrict 3. The Moses Point Subdistrict chum salmon return has experienced below average runs despite conservative management actions taken over the last ten years. At the Board of Fisheries meeting in January 2001, escapement goals for Kwiniuk and Tubutulik Rivers were revised to account for recent Biological Escapement Goal (BEG) analysis. The Board established an Optimal Escapement Goal (OEG) for each river that was lower than its previous escapement goal. The previous escapement goal range was 15,600 to 31,200 chum salmon and the revised optimal escapement goal range is 11,500 to 23,000 chum salmon. In 2003, escapement past Kwiniuk tower was 740 chinook salmon, 12,117 chum salmon, 22,329 pink salmon, and 5,484 coho salmon. Except for chinook salmon, all escapements were below average. There was no commercial fishing in Subdistrict 3 (Appendix A9).

Norton Bay - Subdistrict 4. Norton Bay Subdistrict typically has difficulty attracting a buyer because of its remoteness and its reputation for watermarked fish. Consequently, regulatory changes were implemented to move the western boundary from Six Mile Point to Isaac's Point in 1995 and eastern boundary out to Point Dexter in 1998 to improve fish quality. Because of lack of timely salmon escapement information, Norton Bay Subdistrict is typically managed similar to Shaktoolik and Unalakleet Subdistricts because they reflect similar trends in salmon return strength and timing. In 2003, no commercial salmon fishing occurred because of poor salmon runs and no buyer interest (Appendix A10).

Shaktoolik and Unalakleet - Subdistricts 5 and 6. Shaktoolik and Unalakleet Subdistricts, which share a common boundary, consistently attract commercial markets because of large volumes of fish and better transportation services. Management actions typically encompass both subdistricts because salmon tend to intermingle and harvest in one subdistrict affects movement of fish in the adjacent subdistrict. As stated earlier, ADFG's test net in Unalakleet River and subsistence interviews at Unalakleet are used to set early fishing periods in both subdistricts. As the season progressed, test net catches, commercial catch indices, and the North River counting tower were used to assess run strength of each salmon species. Aerial surveys are frequently not obtained in either subdistrict because of poor survey conditions and are only useful for late season escapement assessment because of the long travel time between fishery and spawning grounds.

Commercial fishing is typically only allowed after chinook salmon have been observed entering Unalakleet River in increasing numbers for a week to assure harvest is directed on actively migrating stock and not on milling fish. In 2003, the chinook salmon run was weak as determined by subsistence net catches, test net catches, tower counts, and aerial surveys (Tables 4, 5, and 6). The chum salmon run was also well below average. No chinook or chum salmon directed commercial fishing periods were opened. Concerns with both chinook and chum runs resulted in Unalakleet and Shaktoolik River drainages being closed to all subsistence gillnetting for most of July. Beach seining was allowed for pink salmon as the pink run was unusually strong for an odd-numbered year.

On July 31, both subdistricts opened with a test period reduced from the normal 48-hour duration for coho salmon to 24 hours. Harvests of coho salmon were average and the regular schedule of two 48-hour fishing periods per week occurred throughout the month of August. There were two fishing periods in September and the fishery closed by regulation on September 8.

The 2003 commercial catches in the Shaktoolik Subdistrict included 2 chinook, 4,031 coho, and 485 chum salmon harvested by 10 permit holders (Tables 1 and 5). The coho salmon harvest was 17% above the recent 5-year average, but 49% below the recent 10-year average (Appendix A11).

Unalakleet Subdistrict total commercial catch harvested by 20 permit holders included 10 chinook, 16 sockeye, 13,027 coho, and 3,075 chum salmon (Table 1 and 6). Coho salmon harvest was 19% below the recent 5-year average and 55% below the recent 10-year

average (Appendix A12). Commercial and subsistence harvests for all subdistricts and years are shown in Appendix A13.

Escapement

Table 4 and Appendix A14 summarize escapement assessments for major index river systems of Norton Sound and Port Clarence Districts. These assessments are often qualitative and relative to historical escapement sizes. Most chum salmon assessments are described relative to a Sustainable Escapement Goal (SEG) for an index area. A SEG is a level of escapement known to provide for sustained yields over a 5-to-10 year period, and is used in situations where a Biological Escapement Goal (BEG) cannot be estimated because a stock specific catch estimate is absent. A BEG is based on spawner-recruit relationships estimated to provide maximum sustained yield. The more formalized BEG has been established for the Nome Subdistrict chum salmon stock. SEGs have been established for seven of nine individual streams in Nome Subdistrict based on historical average proportion of each stream's contribution to the composite Nome Subdistrict chum salmon escapement. For streams that do not have an escapement counting project, SEGs are in expanded aerial survey counts. BEGs have also been established for chum salmon stocks that return to Kwiniuk and Tubutulik rivers. At the January 2001 meeting the Board of Fisheries established Optimal Escapement Goals (OEG) for Eldorado, Nome, Snake, Kwiniuk, and Tubutulik rivers in Norton Sound District. An OEG is a specific management objective for escapement that includes biological and allocative factors and may differ from the SEG or BEG.

ADFG escapement projects in Norton Sound include counting towers on Kwiniuk and Niukluk Rivers, a test net operated on Unalakleet River, and a weir on Nome River. Norton Sound Economic Development Corporation (NSEDC) provides essential support for these projects. The Unalakleet test net and the Kwiniuk tower projects have been in operation for many years. They provide comparable and timely information used as a basis for inseason salmon management decisions. Nome River weir first began as a counting tower project late in 1993 and was operational as a tower in 1994 and 1995 before switching to a weir in 1996. Niukluk tower became operational in 1995. Both 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.

Four additional counting projects were operated in the management area this season. Snake, Eldorado, and Pilgrim Rivers had weir projects set up and operated by Kawerak Corporation and the North River counting tower project was operated by Unalakleet IRA. NSEDC and Bering Sea Fishermen's Association (BSFA) provided essential support to both organizations. These projects have operated since the mid-1990s and are cooperative ventures with ADFG, which provided technical advice. These projects supplied important daily information to ADFG that was useful to management of local salmon resources and will become more important the longer they operate.

Aerial survey assessment conditions were poor to good in most subdistricts for 2003. As usual, Nome Subdistrict streams received the most intensive assessment efforts because salmon stocks local to the Nome area are strictly regulated, easily accessed by road system, and are exposed to intense subsistence and sport fishing pressure.

Chinook Salmon. The 2003 chinook salmon run was below average throughout most of eastern Norton Sound, but was average in northern Norton Sound. In Norton Sound, only the eastern area has sizable runs of chinook salmon, and rivers in Unalakleet and Shaktoolik Subdistricts are the primary chinook salmon producers. Aerial surveys of chinook salmon were minimal because of poor conditions in eastern Norton Sound. Unalakleet test net catches, North, Kwiniuk and Niukluk towers, and subsistence reports were primary assessment tools for judging chinook salmon run strength. Unalakleet test net catches were approximately 70% below average and the North River tower was 25% below average, but chinook escapement counts did reach the low end of the SEG for North River. Subsistence fishers in Shaktoolik and Unalakleet Subdistricts reported longer than normal time to reach their chinook salmon harvest goal and fishing was poor compared to most years. Escapement of chinook salmon past Kwiniuk and Niukluk River towers was average to above average although chinook salmon runs are smaller in those rivers.

Chum Salmon. Chum salmon escapements were below average throughout most of the management area in 2003. Survey conditions were good in the Nome Subdistrict and chum salmon escapement goals were achieved in only one of the three rivers with established OEGs. The Niukluk counting tower is used as an index for the Golovin Bay Subdistrict. The tower has operated since 1996 and estimated chum salmon passage was the lowest on record and only two-thirds of the previous lowest year. The Kwiniuk River tower in Moses Point Subdistrict had a chum salmon count that was the fourth lowest in the last 20 years, but the low end of the escapement goal range (11,500 – 23,000) was reached. An aerial survey of the Tubutulik River was conducted under poor conditions and cannot be used to judge whether the BEG was met. The Unalakleet River chum salmon escapements were below average based on test net catches, but the North River chum salmon escapements were above average based on tower counts (Appendix A14).

Coho Salmon. Coho salmon are found in nearly all chum salmon producing streams throughout Norton Sound, primary commercial contributors are Unalakleet and Shaktoolik Rivers. Because inclement weather is normally experienced in this area during August and September, escapement data can be somewhat incomplete. Streams in northern subdistricts of Norton Sound are typically surveyed. More recent Nome area escapement assessment projects are intended to monitor coho and chum salmon, and are becoming more important to fisheries management. The coho salmon run to Norton Sound was below average and continued the pattern of poor runs in recent years. Subsistence and sport fishing restrictions were implemented in Nome and Golovin Subdistricts, and in areas of Port Clarence District. In Shaktoolik and Unalakleet Subdistricts coho salmon escapement was average. In Unalakleet River the cumulative test net catch was average. An aerial survey of the Kwiniuk River indicated that escapement had been reached, but an aerial survey of Niukluk River indicated that escapement was well below the escapement goal range. Escapement

counts at Nome, Eldorado, Snake, Niukluk, and Pilgrim Rivers were the worst on record for most projects.

Pink Salmon. During recent years, pink salmon returns to Norton Sound followed an odd/even year cycle, with even-numbered year returns typically much greater in number than odd-numbered years. In 2003, escapements were highly variable, with some rivers having high returns compared to the historical average and other rivers low returns when compared to the historical average. North River had an escapement of 280,212 pink salmon, a record for an odd-numbered year; and Eldorado River had an escapement of 173 pink salmon, the lowest escapement on record (Table 4).

Sockeye Salmon. Sockeye salmon are typically found in small numbers throughout Norton Sound District. The largest stock spawns at Glacial Lake where approximately 1,000 to 2,000 fish return to spawn each year. In 2003, the sockeye run was average for Glacial Lake. Aerial surveys made of Glacial Lake estimated a peak of 865 sockeye salmon, within the aerial survey escapement goal of 800 to 1,600 sockeye salmon. A weir operated by the U.S. Bureau of Land Management (BLM) at the outlet of Glacial Lake counted 2,004 sockeye salmon into Glacial Lake.

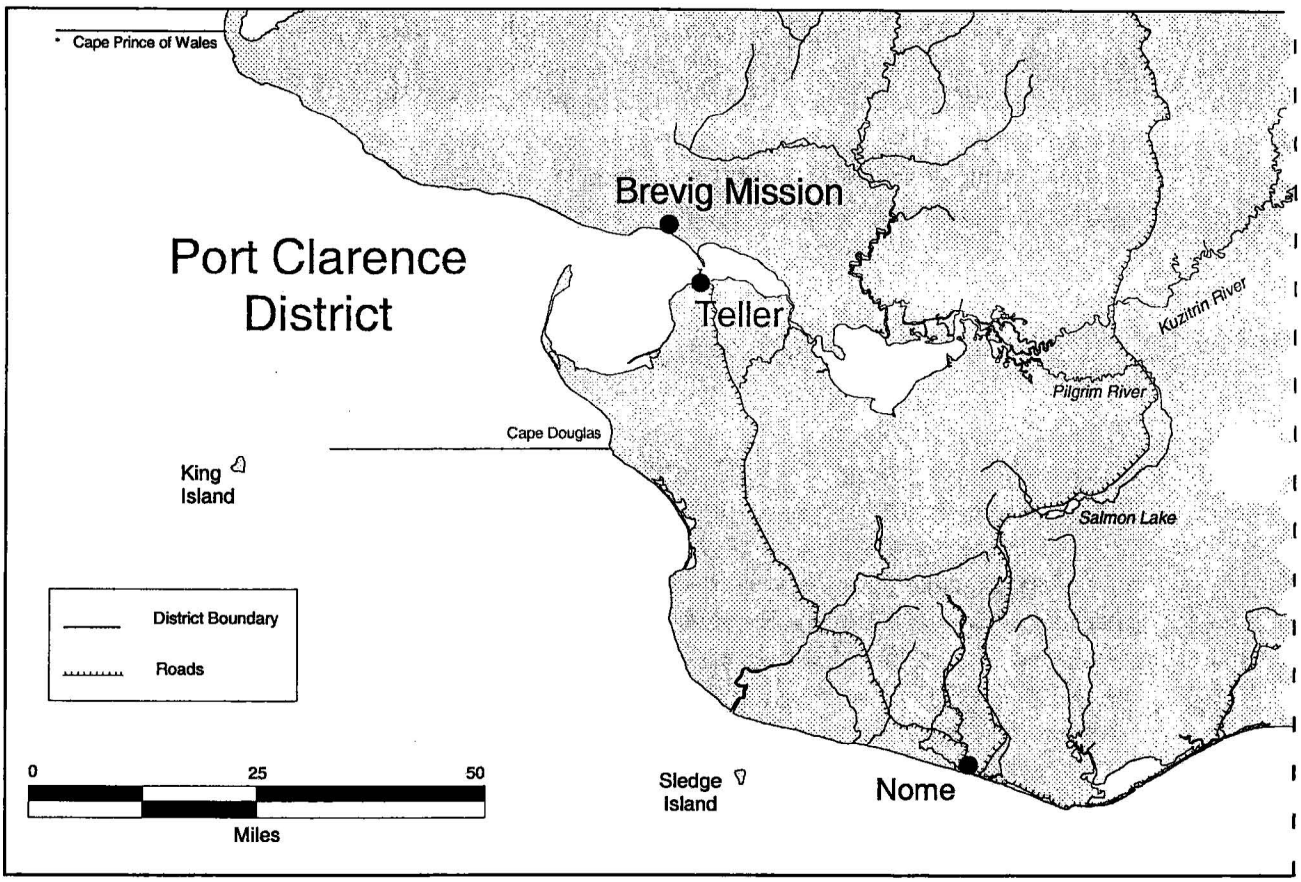
2004 Norton Sound Salmon Outlook

Salmon outlooks and harvest projections for the 2004 salmon season are based on qualitative assessments of parent year escapements, subjective determinations of freshwater overwintering and ocean survival, and for the commercial fishery, projections of local market conditions. Chinook salmon runs are expected to be below average, but subsistence restrictions are not expected. Commercial fishing for chinook salmon in Unalakleet and Shaktoolik Subdistricts is unlikely, but there will likely be one or two fishing periods in the Moses Point Subdistrict. The chinook salmon harvest will likely be 100–1,000 fish. Chum salmon runs are also expected to be below average, but commercial fishing is expected in Moses Point and Golovin Subdistricts. Chum salmon harvests are expected to be between 10,000–20,000 fish. The only expected subsistence restrictions for chum salmon will be in Nome Subdistrict. A pink salmon market is undetermined at this time. Pink salmon runs are expected to be above average and with an active fishery harvest could be 500,000-600,000 fish. A commercial fishery will be dependent on both buyer interest and permit holder participation. Coho salmon runs in 2004 are expected to be average. Commercial harvests are expected to be 20,000 to 40,000 fish and no subsistence fishing restrictions are expected.

PORT CLARENCE DISTRICT

District Boundaries

Port Clarence District encompasses all waters from Cape Douglas north to Cape Prince of Wales including Salmon Lake and Pilgrim River drainage (Map 2, Figure 3). Salmon, saffron cod, whitefish, and herring are the major subsistence species; however, this district has other fishery resources.



Map 2. Port Clarence District

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 salmon, 131 pink salmon and 922 chum salmon was taken commercially in the Grantley Harbor/Tuksuk Channel area. A few subsistence caught salmon are sold or bartered each year in Teller and Nome. Relatively small runs in this area and existence of a subsistence fishery prohibit reopening commercial salmon fishing.

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 1930s and monitored at the upper Pilgrim River since 1962. Data collected by ADFG personnel showed most fishers of Brevig Mission fish northern and northeastern sections of Port Clarence, and Teller fishers utilize Grantley Harbor and Tuksuk Channel. Interviews with local residents indicated substantial fishing effort within Agiapuk River. Village subsistence surveys had been conducted annually by the Division of Commercial Fisheries up until 1983 (Appendix B2). Subsistence Division conducted a partial survey of Brevig Mission in 1989. ADFG has conducted full-scale household surveys of both villages since 1994.

Salmon Lake and Pilgrim River stocks have been fished by Nome residents in addition to residents of Brevig Mission and Teller. The Alaska Board of Fisheries adopted a regulation in 1972 to close Salmon Lake and its tributaries to subsistence salmon fishing from July 15 through August 31 to conserve declining sockeye salmon stocks. Subsistence salmon fishing permits are only required for Pilgrim River drainage, but some fishers get permits for other Port Clarence drainages. 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, in part because of a strong sockeye salmon run. Extensive subsistence fishing closures in the Nome area made Pilgrim River an alternative location to meet subsistence needs. In 2003, 101 households requested permits for Pilgrim and Kuzitrin Rivers (Table 2). Some subsistence salmon fishing outside of the Pilgrim River by Nome residents in Port Clarence District may not be documented by household surveys or permit data.

Estimated subsistence salmon harvest in Port Clarence District for 2003 is not available at this writing. Historical subsistence harvests are shown in Appendix Table B2.

Escapement

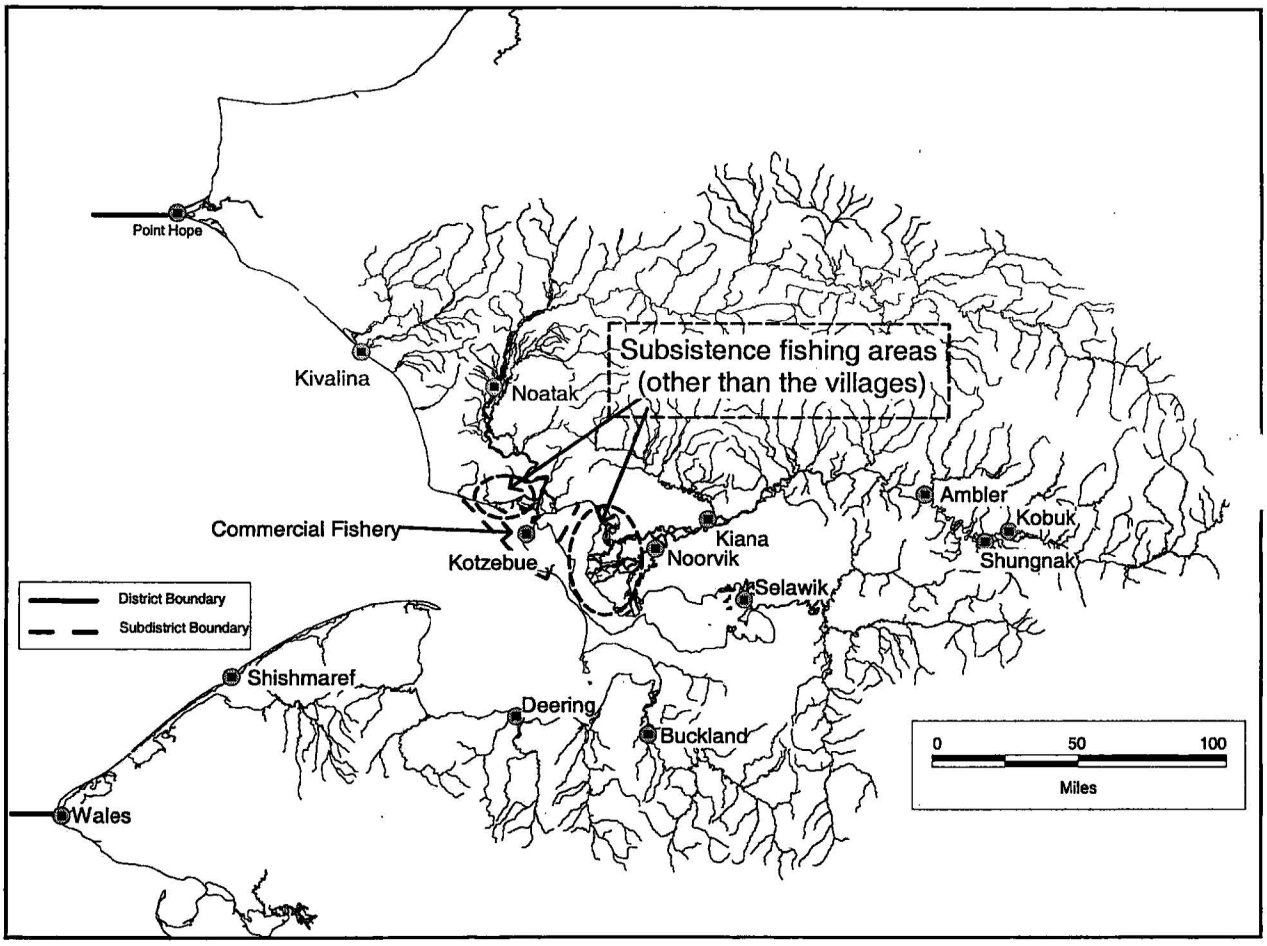
Aerial surveys are not typically flown in this district, except Salmon Lake, because a higher priority is assigned to Nome Subdistrict and surrounding areas of commercial fishing. Aerial surveys show an increasing trend of sockeye returns to Salmon Lake since 1986 (Appendix B1). In 2003, several aerial surveys were made of Salmon Lake and its tributary Grand Central River; the peak estimate was 20,290 sockeye salmon observed on August 28, the second highest on record and above the escapement goal of 4,000-8,000 (Appendix B1). Pilgrim River weir passed 42,729 sockeye salmon during 2003, its first year of operation. ADFG had run a fertilization program at Salmon Lake partially funded by NSEDC and BLM from 1997 to 2001. The goal of the project was to restore the sockeye population to historic levels by applying liquid fertilizer; however ADFG could not tell if the method was effective and suspended fertilization in 2001. As a result of the 2003 returns the project is being reevaluated.

KOTZEBUE SOUND DISTRICT

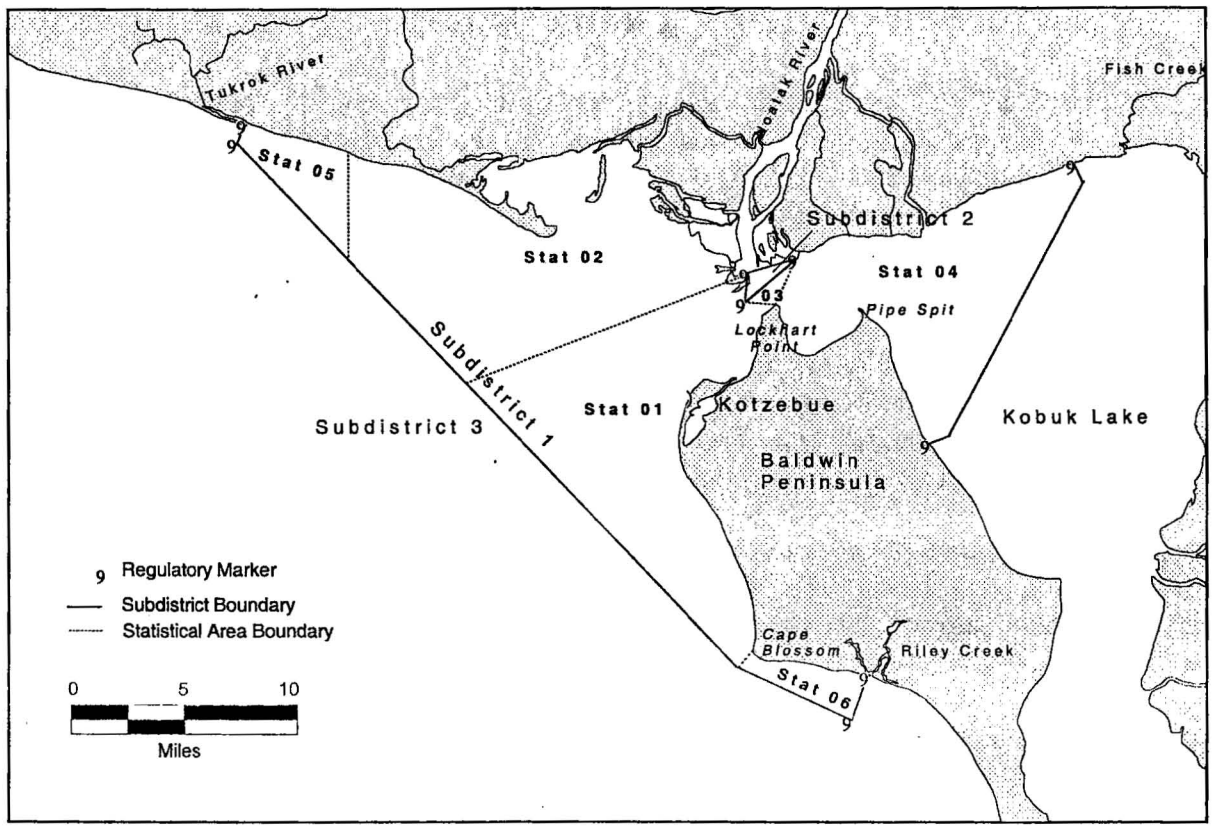
History

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

Map 3. Kotzebue Sound District, villages and subsistence fishing areas.



The 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 during the salmon fishery. Only 4 of the 183 commercial permit holders in 2003 fished. During the recent ten-year period, 1993 to 2002, participation in the fishery averaged 68 permits, and during the recent five-year period, 1998 to 2002, participation has averaged 48 permit holders.



Map 4. Kotzebue Sound salmon fishing subdistricts and statistical areas

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 those sales, 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 sold to miners working in the upper Kobuk River drainage. The next organized commercial fishery began under state management in 1962 and continues to 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' new program emphasized attaining escapement goals. Before 1987, harvests were proportional to total return. Since 1995, poor market conditions caused harvests to fall short of their potential, particularly in 1995 and 1996 when resulting escapements were strong. In 2003, harvests were below potential because a major buyer was lacking, and escapements were below average.

In 1981, a chum salmon hatchery was established at Sikasuilaq Springs, a tributary of Noatak River. The hatchery was closed in 1995 because of lack of funding support. At peak production in 1992, the hatchery incubated 11,100,000 eggs. An estimated peak adult hatchery return of 90,000 chum salmon occurred in 1997. The estimated contribution to the commercial fishery was approximately 50% in 1997.

General Information

A limited 2003 Kotzebue Sound commercial salmon season ended with the second lowest harvest and participation on record, because for the second year in a row the fishery lacked a major buyer. Commercial harvest consisted of 25,763 chum salmon (Table 7, Figure 6, and Appendix C1). The total chum harvest of 25,763 included 340 chum salmon kept for personal use. There were also 20 Dolly Varden sold. In addition, 9 chinook salmon, 147 pink salmon, 176 Dolly Varden, and 10 sheefish were caught in the fishery, but not sold. Only 4 of 183 active permit holders fished during the season. The overall chum salmon run to Kotzebue Sound in 2003 was estimated to be below average to poor based on low commercial harvest rates, subsistence fishers' reports of lower catches than normal, below average Kobuk test fish index, and aerial survey observations (Table 8 and Figure 7).

Kotzebue Sound commercial salmon fishery opened on July 11, but there were no deliveries until July 18. Because of logistic problems, permit holders did not begin fishing until July 17. The fishery closed by regulation after August 31, but the last permit holder stopped fishing August 23.

Gear is limited to set nets with an aggregate of no more than 150 fathoms per fisher. Fishers generally operate with one end on or near shore and with all three shackles connected. Fishers also set in deeper channels in the mud flats further out from shore. Most gear used in the district is 5-7/8 in (14.9 cm) or 6 in (15.2 cm) stretch mesh gillnet.

A total of 218,091 pounds of chum salmon (average weight 8.6 lbs) were sold at an average of $0.12 per pound (Appendix C2 and Appendix C3). Total exvessel value was $26,377 to Kotzebue area fishers averaging $6,594 for each participating permit holder. This represents 4% of the $645,015 historical average (Appendix C4).

2003 Commercial Season Summary

Inseason Management

Primary fishery management objectives were to provide adequate chum salmon escapement through the commercial fishery to ensure a sustained run and to provide for the subsistence priority. A test fishery conducted on the Kobuk River for the eleventh consecutive year provided the only inseason escapement information. Low participation by fishers and limited buying capacity allowed the commercial fishery unrestricted fishing time. Age-sex-length (ASL) data was not used to manage the fishery due to low volume of fish harvested. However, ASL samples of the Kotzebue commercial chum salmon catch did show a weak return of age-0.4 chum salmon compared to the historical average.

Season Narrative

Beginning on July 11, commercial fishing was opened until further notice. One fisher signed up as a catcher/seller to supply fish to the small local market, and the same permit holder was a licensed agent for a processor from outside the area. This processor had limited orders for fresh Kotzebue chum salmon and 4 permit holders fished during the season.

Commercial fishing remained open continuously to allow fishers the maximum flexibility to harvest fish and meet airline shipping schedules. Fishers reported that catch rates were poor for most of the season with occasional good catches occurring infrequently.

Subsistence Season Summary

The Subsistence Division conducted surveys in October and November to determine subsistence harvests of salmon. Survey results for 2003 are not available at this writing. Historical survey results are shown in Appendix Tables C5-C7. The only information available at this time are comments that fishing on the Kobuk River was very slow early in the run, but better late in the run.

Escapement

A test fish project located approximately three kilometers downstream from the village of Kiana provided an escapement index for the Kobuk River. The test fish index of 749 was third lowest in the eleven years the project has been in operation (Table 8). The lowest index recorded was 494 in 1993. Aerial surveys indicated that escapement just reached the goal of 30,500 chum salmon in the Kobuk River drainage that year. The Kobuk River test fish index did not follow the typical pattern in 2003. A less than average number of index points were generated in the first half of the season and a greater than average number of index points were generated in the second half of the season indicating a late and less than average chum salmon run. As there was little commercial fishing effort again this year, escapement was expected to be greater than average, but low test fish catches were in agreement with low commercial catch rates indicating a weak chum salmon run in 2003.

Test fishing was conducted by ADFG in the lower Noatak River twice during the run, and both tests were described as slow. Both Kobuk and Noatak River ASL samples show a lower than normal percentage of age-0.4 chum salmon.

Aerial surveys of Kotzebue District in 2003 occurred during acceptable viewing conditions. Aerial survey escapement goals were reached in the upper Kobuk River, but were not met in the Noatak River drainage (Appendix C8).

2004 Outlook

The outlook for the 2004 season is calculated from returning age classes of the 2003 season. During the 2004 season, the four-year-old component of the run is expected to be below average to average. The five-year-old component of the run is expected to be below average based on four-year-old returns this past season. Three-year-old and six-year-old age classes are much smaller components of the run and are expected to be below average to average. Commercial harvest is expected to fall within the range of 25,000 to 50,000 chum salmon, if market conditions can accept that level of harvest.

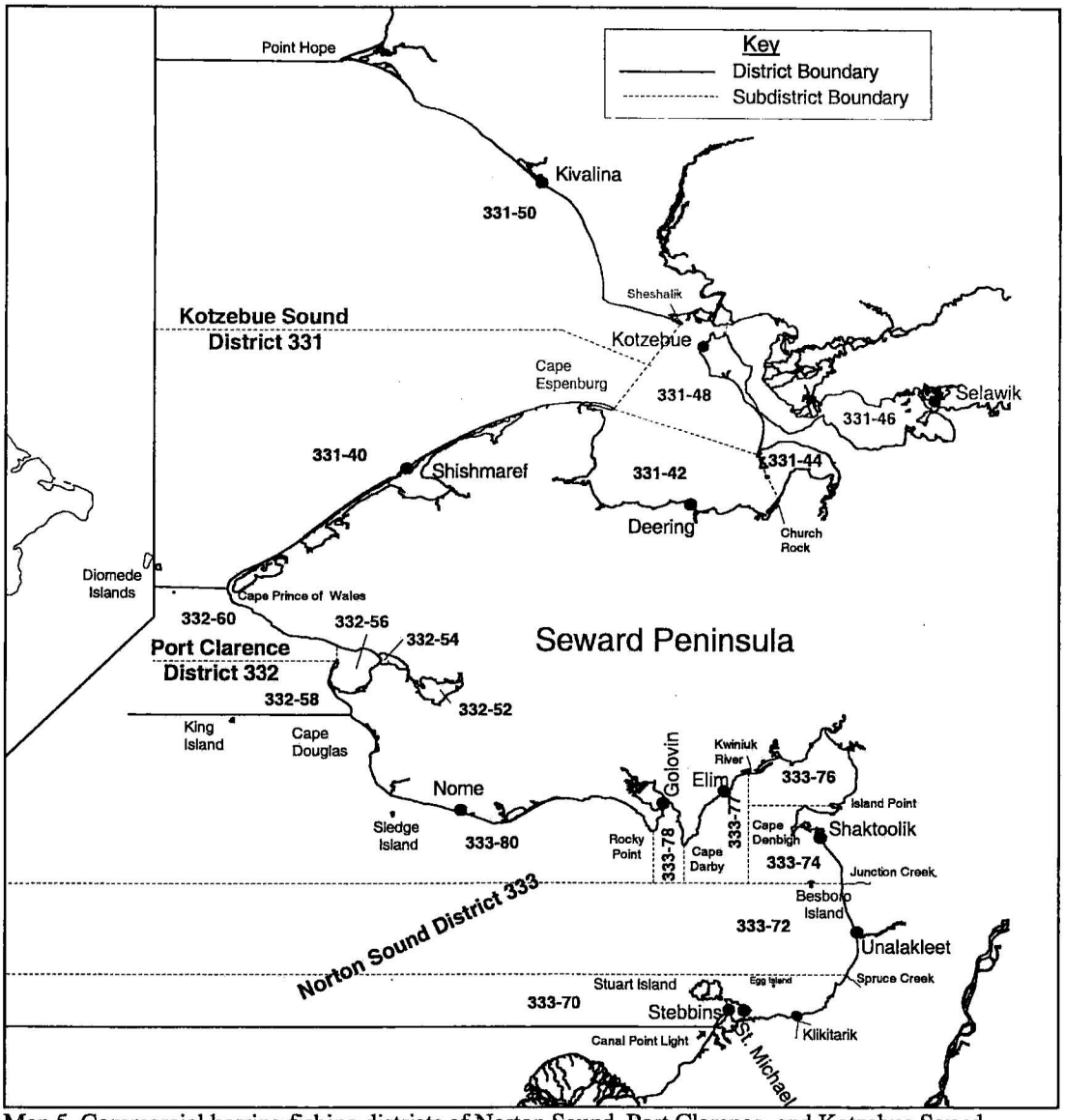
Section 2: PACIFIC HERRING

(Includes Norton Sound, Port Clarence and Kotzebue Districts)

INTRODUCTION

Boundaries

The Norton Sound District consists of all Alaska waters between the latitude of the westernmost tip of Cape Douglas and the latitude of Canal Point Light (Map 5, Figure 8). The Port Clarence District consists of all Alaska waters between the latitude of Cape Douglas and the latitude of Cape Prince of Wales. The Kotzebue Sound District consists of all Alaska waters between the latitude of Cape Prince of Wales and the latitude of Point Hope.



Map 5. Commercial herring fishing districts of Norton Sound, Port Clarence, and Kotzebue Sound.

Spawning Areas and Timing

Arrival of Pacific herring *Clupea harengus pallasi* on the spawning grounds is greatly influenced by climate and oceanic conditions, particularly the extent 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.

Norton Sound District has the largest abundance of herring in the Arctic-Yukon-Kuskokwim Region. Primary spawning areas are 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 locations along the northern shore of Norton Sound between Bald Head and Bluff. More northerly spawning areas have been more difficult to identify because of 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 were used for subsistence purposes by coastal residents well before the mid-1800s 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 the 1900s at Golovnin Bay in Norton Sound (Appendix D1).

Food Herring

Early records indicate about 3,200 tons of "fall herring" were processed in Norton Sound from 1916 to 1941 (Appendix D1). This fishery, dependent on salt curing, declined because foreign competition produced poor marketing conditions. 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 tons of herring during 1969 (Appendix D2). An average annual harvest of approximately 440 tons was reported in Norton Sound by the Japanese during 1968-1974. All foreign fleets were prohibited since 1977 from gillnet fishing in the area.

Sac Roe

Domestic commercial fishing resumed for "spring herring" in Norton Sound in 1964 near Unalakleet and continued sporadically until 1979. Between 1964 and 1978 the fishery averaged about 10 tons of herring annually for sac roe extraction (Appendix D1). In 1979, a

domestic herring fishery for sac roe began on a larger scale in Norton Sound when approximately 1,292 tons of herring were taken by 63 fishers (13 purse seiners, 50 gillnetters). Purse seiners took 70% of the total catch.

After the 1979 season, 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 fishers in this developing fishery. During the 1980 season, 294 gillnet fishers harvested 2,452 tons of herring (Appendix D3 and D4). Because gillnet fishers demonstrated they were capable of taking the available harvest, a regulation passed in 1981 to prohibit any purse seine gear within Norton Sound.

Before the 1984 season, harvest by beach seine fishers was negligible. During 1984, ten beach seine fishers harvested 327 tons. In 1984, Board of Fisheries set a beach seine gear limit of 100 fathoms and limited 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 averaged 6.3% of the total reported harvest, but since 1998 little market interest exists for herring caught with beach seines. The last commercial beach seine harvest of herring was in 2000.

As with most developing fisheries, fishing effort increased with each successive season. In 1984 Norton Sound became a Super-Exclusive Use herring fishing district to slow growth and bolster local involvement, but had only limited success. The 1987 season had the highest level of fishing effort on record, a total of 564 fishers made at least one delivery; 559 gillnet and 22 beach seine permits recorded landings (Appendix D3). Some fishers made both beach seine and gillnet deliveries. This effort was more than twice the average from 1980 through 1986. Local Norton Sound area residents accounted for only 36% of the effort and 29% of the total harvest.

A public proposal adopted at the fall 1987 Board of Fisheries meeting changed the Norton Sound Herring Fishing District to Limited Entry status. Beginning with the 1988 season, a moratorium was placed on Norton Sound and no new entrants were allowed into the fishery. The Limited Entry Commission is currently reviewing and awarding limited entry permits to fishers based on fishing history, and will eventually reduce the total number to 301 gillnet and 4 beach seine permits. As of 2003, most fishers have already received limited entry permits and others are still fishing with interim-use permits while eligibility is evaluated case-by-case.

No fishery occurred in 1992 because of a late ice breakup in Norton Sound. Low prices and declining market conditions resulted in a below average harvest in 1994. More recently, the five-year average harvest from 1998 to 2002 was 2,642 tons. Stock status, market conditions and climatic factors continue to influence the level of commercial harvest.

Spawn on Kelp

A small-scale spawn-on-kelp *Fucus sp.* fishery existed in Norton Sound from 1977 to 1984. Harvests during the 1977-1984 period ranged from less than one ton (1977) to approximately 47 tons (1981). During the 1984 season, one ton of *Macrocystis* kelp imported into Norton Sound resulted in a harvest of approximately 3 tons of product. In response to a public proposal, the Board of Fisheries closed all spawn-on-kelp fisheries in Norton Sound before the start of the 1985 season.

The 1998 herring market was known to be poor before the southernmost fisheries opened. Alaska Board of Fisheries approved an experimental herring spawn on *Macrocystis* kelp fishery to operate in Norton Sound during the 1998 season. The Commissioner approved emergency regulations to allow a herring spawn on wild *Fucus* kelp fishery shortly before the normal start of the sac roe fishery. The intent of these decisions was to allow as much opportunity as possible to sac roe permit holders, since only a small minority would have an opportunity to participate in the sac roe fishery.

At their January 1999 meeting, the Board of Fisheries instituted a *Macrocystis* kelp open pound fishery and allowed for a wild *Fucus* spawn-on-kelp fishery for sac roe permit holders who had not sold sac roe product. Wild *Fucus* harvest is limited to an area west of Wood Point to Canal Point, including Stuart Island. The herring spawn-on-kelp guideline harvest level may not be more than 90 tons, to include combined weight of herring eggs and kelp. ADFG shall manage the herring pound spawn-on-kelp fishery to achieve this level by restricting the number of blades of kelp that may be suspended from a herring pound: (1) no more than a total of 75,000 blades of kelp are allowed in the fishery; and (2) the maximum number of blades of kelp any permit holder may attach to a herring pound is 3000; if more than 25 permits are issued for this fishery, ADFG shall determine the number of blades of kelp a permit holder may attach to a herring pound by dividing 75,000 by the number of permits issued.

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 exhibiting a trend of decreasing abundance and poor recruitment. If a minimum biomass threshold level of 7,000 tons for Norton Sound is not achieved, no commercial fishery will be allowed.

Typically, herring are long-lived fish and will usually remain harvestable for at least five years after recruiting into the fishery. Harvesting only a percentage of the biomass ensures some fish will remain 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. Before 1983, harvests in Norton Sound were regulated by subdistrict

so harvests would be dispersed over the entire fishing grounds. This strategy prevented 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, inseason assessments of biomass supersede projected biomass for management of Norton Sound herring. The herring fishery is managed for a 20% exploitation rate at biomass levels twice minimum threshold or greater. If the run does not materialize as projected, the harvest exploitation rate may be reduced to a lower level.

Generally, fisheries management staff has tried to set commercial openings to allow gillnetters to fish flood tides as they crest. The belief that ripe females approach the beach at that time to spawn, figures heavily in this strategy. Because the Norton Sound fishery covers a large area with varying tides, opening at the optimal time throughout the district is not always possible. The fishing fleet must be flexible to maximize catches and roe quality.

In the past, duration of beach seine openings was dependent on herring abundance near the beach and favorable weather conditions for spotters and fishing. Beach seiners prefer to work flood tides similar to gillnetters, however, fisheries managers frequently provide less optimal fishing times. Beach seiners are able to harvest their allotment of 10% of the preseason harvest goal in a single three-hour opening under ideal conditions. By nature of the gear, beach seiners have the potential to wrap up large numbers of fish that could potentially exceed their allocation. Management staff have often reduced beach seine efficiency by allowing a gillnet opening to occur before a beach seine opening. This opening breaks up school size and reduces likelihood of excessive harvests. Occasionally, the beach seine fleet has been used to test roe quality of herring newly arrived in nearshore waters before a gillnet opening. The potential for waste would have been great had the entire gillnet fleet fished on poor quality herring.

The present market desires a high roe percent and larger size fish. These criteria have been difficult to achieve with beach seine gear and in recent years little buyer interest existed for herring harvested from beach seines.

2003 SEASON SUMMARY

A poor herring market was expected even before the southernmost herring fisheries opened.

Spawn on Kelp

Permit holders intending to participate in the *Macrocystis* spawn-on-kelp open pound fishery were required to register with the Nome Fish and Game office by April 16. Two permit holders registered as participants in the *Macrocystis* fishery. One fisher deployed

kelp during the 2003 season. A total of 1,750 pounds of kelp was harvested. No price information is available at this time.

ADFG announced one commercial wild spawn-on-kelp opening on May 30. No wild kelp was harvested.

Sac Roe

The 2003 herring fishery opened by emergency order on May 16; two companies were registered to buy (Table 9 and Appendix G7). Total harvest of sac roe herring based on fish ticket data was 1,587 tons, with an average roe recovery of 10.5% (Table 10). An additional 20.5 tons of herring was purchased as bait. This year had the third lowest harvest in the history of the fishery. In Subdistrict 1, a total of 262.4 tons of herring was harvested at 10.7% average roe recovery. In Subdistrict 3, a total of 1,324.6 tons was harvested at 10.4% average roe recovery. Buyers reported harvest with a 10% weight reduction because of water content. Consequently, staff converted reported harvest back to wet weights, which has been the standard of reporting weight in Norton Sound for comparison purposes. Thirty-one gillnet fishers made at least one delivery during the season, ranked as the lowest effort in the history of the Norton Sound sac roe fishery. No beach seine permit holders fished in Norton Sound in 2003 because of no buyer.

Two companies were present on the grounds during the 2003 season, and 1 processor and 4 tenders were registered. Based on final operations reports, average advanced price estimated for a short ton of 10% roe herring was $150. Total value of the herring harvest to sac roe fishermen was approximately $217,320 based on reported poundage with a 10% reduction caused by water content. This averages to $6,791.25 for each fisherman making a landing. The 2003 season ties with the 1998 season as the second lowest value for the Norton Sound herring fishery (Appendix D3).

Fishery Management/Emergency Orders

ADFG projections for 2003 Norton Sound sac roe fishery spawning biomass was 25,312 tons. At a 20% exploitation rate, the guideline harvest level for Norton Sound District was 5,062 tons with 4,493 tons allocated to the gillnet fishery. The first tenders arrived at Norton Sound on May 13. The majority of Norton Sound was ice free, with shore-fast and broken ice still present along the eastern edge of Cape Denbigh, Norton Bay, St. Michael Bay and western edge of Stuart Island. Some shore-fast ice also remained along the Elim shore. Herring were first observed in Norton Sound on May 15 when the first aerial survey of the season documented 500 tons. Approximately 300 tons were observed near Point Dexter and 200 tons were observed near Black Point. Spot spawns were observed near Black Point. ADFG put the herring fleet on one hour notice May 16. Once buyers determined the herring was of marketable quality, the fishery would be opened. By early afternoon, the primary herring buyer notified ADFG that test fishing off of Cape Denbigh produced over 10% roe quality and they were ready to purchase

commercially caught herring. Because of expected low participation by fishers and limited buying capacity, ADFG wanted to take advantage of good quality fish as soon as they were available. Commercial fishing was opened in Subdistrict 3 May 16 at 7:00 p.m. and remained open until further notice. Two shackles of gear for a total length of 100 fathoms were allowed to be fished. This way, the buyer could control fishing efforts and fishers could immediately harvest marketable herring. The only sac roe buyer notified the fleet when they would have tenders available to purchase herring. Because of concerns with floating ice in Subdistrict 1, fishing efforts were concentrated in Subdistrict 3 at the beginning of the season.

On May 21, a contract helicopter pilot for the industry estimated approximately 20,000 tons of herring in Subdistrict 1. A large amount of spawning activity was observed from Black Point south to St Michael. Ice began to clear from some areas in the south and the buyer was interested in purchasing herring from Subdistrict 1, St Michael Subdistrict, if commercial test fishing samples showed marketable herring. A tender was scheduled to arrive in St. Michael Subdistrict, Thursday morning, May 22 and the buyer had increased the amount of herring they were interested in buying to 1,400 tons. The buyer wanted test fishing to begin Thursday morning. To allow the fleet opportunity to begin fishing as soon as the buyer determined there was marketable herring, ADFG opened Subdistrict 1, St. Michael Subdistrict, to commercial gillnet herring fishing beginning at 6 a.m. Thursday, May 22. Two shackles of gear were allowed. Fishers were advised to keep close watch on their nets because of floating ice. Catch rates began to drop off in both subdistricts after May 23. Aerial surveys showed that herring were moving out of the area. On May 24 the buyer indicated they had achieved their tonnage goal and would no longer purchase herring for sac-roe. Subdistricts 1 and 3 remained open until May 25 to allow another buyer to harvest herring for use as bait.

Catch Reporting and Enforcement

Herring buyers registered for the 2003 season communicated well with ADFG during the fishery. Commercial test fishing results were relayed in a timely manner, which provided managers with adequate time to formulate plans and make announcements. Buyers also had a much greater role in deciding where and when to fish because of the limited market. Buyers were required to report herring purchases daily (8:30 a.m.) to the Unalakleet office for the previous 24 hour period. Compliance with requested catch reports was good. Nearly all fishing vessels in the fleet have VHF radios, but their activities are often beyond normal ranges. Managers made fishery updates and emergency order announcements over both VHF and SSB radios simultaneously to ensure everyone got the same message. Communications with the field camps were accomplished with marine SSB, satellite telephone, or by aircraft radio from the aerial survey plane.

There was no Fish and Wildlife Protection officer patrolling the Norton Sound herring grounds during the 2003 fishery.

Abundance and Research

Three ADFG field crews operated during the 2003 season, one crew operated from Cape Denbigh, a second crew operated from a camp at Klikitarik, and the third was based in Unalakleet. Test fish crews' presence and sampling efforts on the herring grounds are critical to the proper management of the fishery and biological documentation of stocks (Figure 9 and Figure 10).

Unalakleet field office personnel during the season consisted of the area management biologist, one assistant area biologist, and two seasonal fishery biologists. Norton Sound Economic Development Corporation supplied one fisheries intern to assist ADFG in test fishing and sampling during the herring fishery.

Biomass Determination

The peak aerial survey took place on May 24 when approximately 31,310 tons of herring were observed, most were north of Unalakleet in the Cape Denbigh, Norton Bay, Elim, and Golovin Subdistricts (Table 11). This observation was above the 25,312 ton projection. Weather was good to fair for most of the aerial surveys. A majority of spawning was thought to have taken place between May 15 and 20. A total of 47.9 miles of spawn were observed throughout the fishery.

2004 Outlook

By adjusting for growth and survival, it is estimated that the biomass will be 28,787 tons allowing a harvest of 5,757 tons at a 20% exploitation rate. A maximum of 320 tons of herring are reserved to allow for the pound fishery to harvest a maximum of 90 tons of product (combined weight of herring roe and kelp). This leaves 5,437 tons for sac roe harvest. Beach seine harvest is, by regulation, 10% of the sac roe projected harvest, or 544 tons. 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 2004 herring fishery will be opened by emergency order and close by emergency order when up to 20% of the available herring biomass has been harvested. Varied harvest rates may be applied to individual subdistricts based on biomass distribution, roe quality, weather, and sea ice conditions. Ages 7, 8 and 11 are expected to dominate the returning biomass (44.6 %, 29.7 % and 9.2 %, respectively). Age 9 and older herring are expected to comprise 22.6 % of the return (Figure 11).

PORT CLARENCE / KOTZEBUE DISTRICTS

Introduction

In Port Clarence and Kotzebue Districts, regulations state 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, before the 1987 season, no spring sac roe commercial fisheries had ever occurred within these districts. Interest in exploring these stocks has been expressed in past years by industry personnel operating in Norton Sound District. No large-scale effort to develop a fishery has occurred because of late ice breakup and fishery timing in Port Clarence and Kotzebue Districts.

Port Clarence and Kotzebue commercial herring fisheries have been in regulation since 1982. The 1983 and 1984 regulations set a guideline harvest of 150 mt (165 tons) for each district. Since the guideline harvest has never been changed or repealed by the Board of Fisheries, the 165 ton guideline harvest is still in effect. Presently purse seines, beach seines, and gillnets are legal commercial gear within these districts, and regulations allow spawn-on-kelp fisheries. Attempts at open pound *Macrocysitis* harvest in Port Clarence District in 1991 and 1992 were unsuccessful.

Local fishers from Teller, Shishmaref, and Kotzebue have also expressed increasing interest in exploiting these stocks. While small harvests of herring for food/bait occurred during fall, fisheries in these districts were limited by lack of markets.

Resource Investigations

Resource investigations of Port Clarence and Kotzebue Sound area herring stocks were conducted by ADFG from March 1976-September 1978 (Barton 1978). These studies indicated herring populations from Golovnin 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	Southern Norton Sound to Southern Bering Sea Pelagic Populations
Smaller herring at age with lower vertebral counts.	Larger herring with probable higher vertebral counts.
Lower abundance.	Higher abundance.
Subtidal spawning (3m) in shallow bays, inlets and lagoons.	Intertidal and shallow subtidal spawning along exposed rocky headlands.

Zosteria sp. primary spawning substrate.	*Fucus* sp. primary spawning substrate.
More euryhaline.	Less euryhaline.
Overwinter in shallow bays; water is warmed by river discharge under ice cover.	Overwinter in deep ocean layers near the Pribilof Islands.
Fall (non-spawning) runs documented.	No fall runs documented.
Larval development in brackish water.	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 Port Clarence and Kotzebue Sound areas. This data does not preclude possibility of more southern stocks utilizing this region, such as stocks which winter near the Pribilof Islands and migrate to the western Alaska coast to spawn. Migration to central Bering Sea for wintering herring stocks along the western Seward Peninsula is unlikely; rather they might remain in coastal lagoons, bays or inlets which are warmed by river discharge under the ice (Barton 1978). Size difference may be explained by warmer water temperatures from river discharge. 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, where apparently they have become adapted to Arctic conditions (Barton 1978).

Aerial surveys are difficult in Port Clarence District because of organic coloring of waters of Imuruk Basin, Tuksuk Channel, Grantley Harbor and to a lessor extent, Port Clarence. 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 spring ice conditions. Port Clarence is a sheltered body of water, which becomes highly stained over winter and takes time to clear once ice melts. Typically, outside waters are significantly warmer than inside waters, which are covered by ice longer thereby slowing solar gain and water mixing. Soon after ice begins to shift, herring move into the warm shallow lagoons to spawn. Herring are invisible to aerial observation once they enter stained water. The best aerial survey conditions exist just outside the entrance to the Port, where herring mass just before the ice moves. One or two surveys were flown each of the past several years, but virtually no herring were observed because the narrow window of time for seeing fish was 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. Primary uses of those fish were for crab bait and dog food. Typically, fishing is during September and ice free portion of October. A fish buyer located at Nome in 1994 and 1995 provided a ready crab bait market, and transportation for fish facilitated a spring harvest. However, no one has fished for bait since 1996 (Appendix D5).

Sac Roe Fishery

Port Clarence fishers were 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.

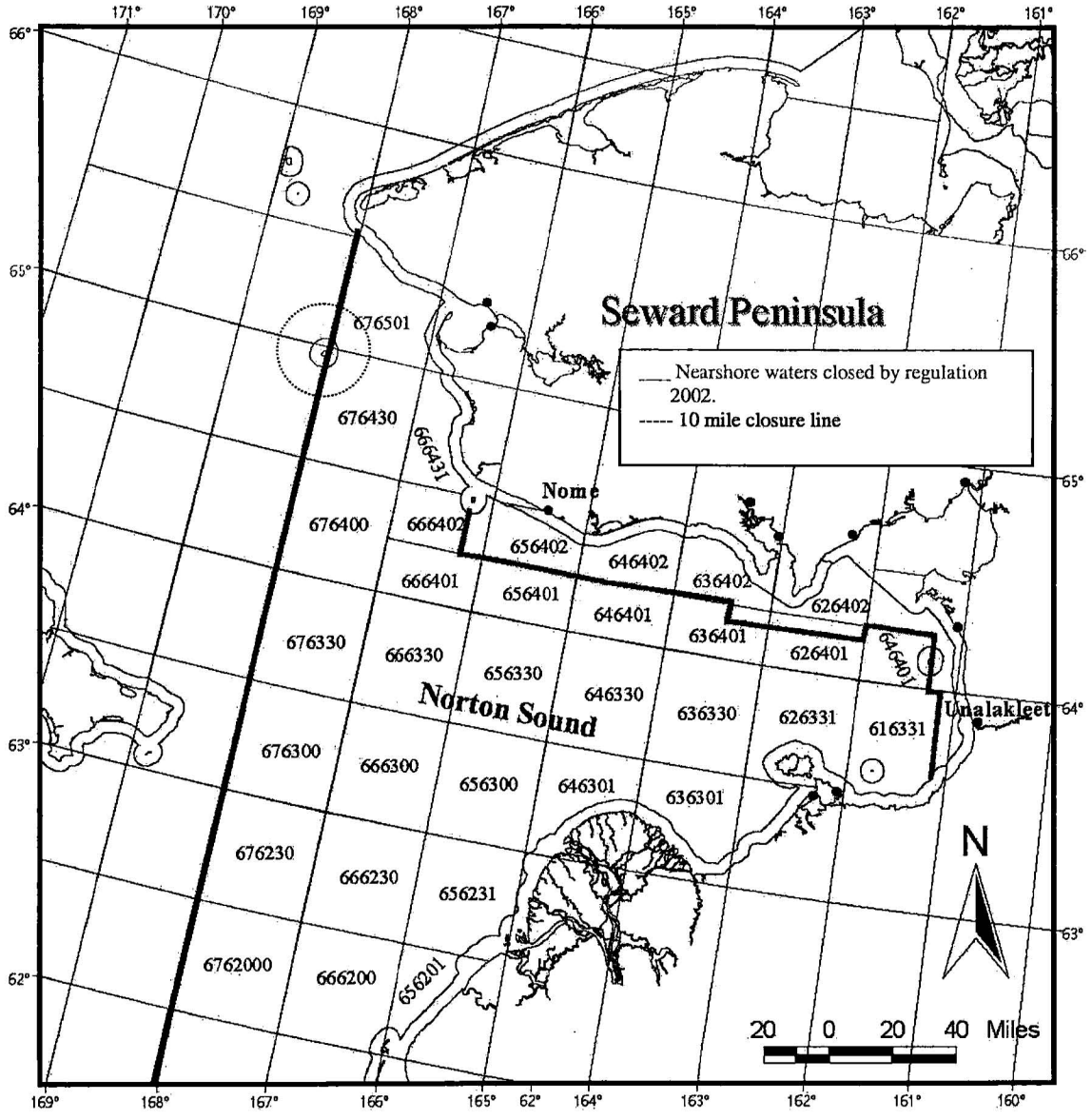
SECTION 3: KING CRAB

(Includes Norton Sound,Port Clarence and Kotzebue Districts)

INTRODUCTION

Norton Sound

Norton Sound Section (Q3) consists of all waters in Registration Area Q north of the latitude of Cape Romanzof, east of 168° west longitude, and south of the latitude of Cape Prince of Wales (Map 6, Figure 12).



Map 6. Statistical areas for the Norton Sound red king crab fishery.

A large-vessel summer commercial crab fishery existed in the Norton Sound Section from 1977 through 1990. No summer commercial fishery occurred in 1991 because staff needed to manage the fishery was cut the previous winter. In 1992, the summer commercial fishery resumed. Appendix E1 shows historical summer commercial harvest by year for the Norton Sound crab fishery. Regulation changes adopted during the March 1993 Board of Fisheries meeting changed participation in the fishery to that of small boats. A super-exclusive designation went into effect for the Norton Sound commercial crab fishery June 27, 1994. This designation stated 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. Later, a vessel moratorium put into place before the 1996 season was intended to precede a license limitation program. Community Development Quota (CDQ) groups were allocated a portion of the summer harvest beginning in 1998. Although CDQ allocation was in place, no harvest occurred until the 2000 season. The North Pacific License Limitation Program (LLP) went into effect for the Norton Sound crab fishery January 1, 2000. The program states a vessel which exceeds 32 feet in length overall must hold a valid crab license issued under the LLP by the National Marine Fisheries Service. Regulation changes and location of buyers resulted in harvest distribution moving eastward in Norton Sound in the mid 1990s (Figure 13).

Norton Sound red king crab length-based population model developed by Zheng, et al. (1998) incorporates trawl surveys, winter and summer pot studies, and summer and winter fisheries data from 1976 to present (Figures 14-16). The model can be used to project estimates in years when no trawl survey occurs, allowing abundance-based management of Norton Sound red king crab fisheries.

During the March 1999 meeting of the Board of Fisheries, a new management strategy was enacted for the Norton Sound summer red king crab fishery. A threshold level of abundance of legal male red king crab biomass was set at 1.5 million pounds. Summer commercial season may only open if the population of legal crab exceeds 1.5 million pounds. If legal biomass falls to a range of 1.5 to 2.5 million pounds the harvest rate will not exceed five percent, so that the stock may rebuild. If legal biomass is 2.5 million pounds or more, the harvest rate will be no more than ten percent. Improved abundance estimates and current management strategy will greatly reduce the risks of over fishing the stock.

New regulations adopted by the Board of Fisheries during the March 2002 meeting affected the CDQ crab fishery and relaxed closed-water boundaries in eastern Norton Sound and waters west of Sledge Island. Changes in closed-water boundaries are illustrated in Map 6 and Figure 12. The Norton Sound CDQ fishery may begin at 12:00 noon, June 15, or no less than 72 hours after commercial gillnet or beach seine herring fishing is closed, whichever is later, through 12:00 noon, June 28. After July 1, the commissioner may, by emergency order, open a CDQ fishery for any remaining allocation after closure of the open access fishery.

Estimates of legal red king crab biomass in Norton Sound, based on nine trawl surveys conducted between 1976 and 2002, have been standardized to account for design and coverage (Appendix E2). Norton Sound legal red king crab biomass in 1976 was estimated

to be roughly 1.7 million crab. By 1982, legal biomass had fallen to 0.9 million crab because of little recruitment and high harvest rates in the summer commercial fishery. The population then gradually recovered to an estimated 1.3 million legal crab in 1991. The trawl survey conducted during August of 1996 indicated a reduced stock size and estimated legal biomass at 0.5 million crab. In 1999, the legal red king crab population of 1.6 million crab was estimated by a trawl survey to be near the historical high biomass (Appendix E2). The population level had nearly tripled since 1996. An all-time high prerecruit-1 male abundance (sublegal male crab with carapace length 90-104 mm) was also detected. Conversely, the exceptionally weak 1999 prerecruit-2 (sublegal male crab with carapace length 76-89 mm) abundance estimate suggested at least one year of weaker recruitment beginning during the 2001 summer fishery. The surveys taken as a whole indicate periods of weak and strong recruitment.

A combination of the trawl survey conducted during the summer of 1999 and winter king crab study of 2000 resulted in an estimate of 4.2 million pounds of legal crab for the 2000 summer fishery. These high numbers were the result of strong recruitment over the previous three years. Estimated legal male crab abundance for the 2001 summer commercial crab fishery was 3.8 million pounds. Estimated legal male crab abundance for the 2002 summer commercial crab fishery was 3.1 million pounds, a 0.8 million pound decrease from 2001.

In August 2002, ADFG conducted the triennial Norton Sound king crab trawl survey. Estimated abundance of legal male red king crab was 771,569 with a corresponding biomass of approximately 2.3 million pounds. This was less than half of the 1999 abundance estimate, yet above the all-time low in 1996. This decrease was expected, because the 1999 trawl survey indicated exceptionally weak prerecruit-2 abundance. Prerecruit-2 crab observed in 1999 made up the recruit and postrecruit portion of the 2002 legal population (Figure 15).

Estimated abundances for pre-1 and pre-2 males were 518,638 and 427,703 crab, respectively. The 2002 pre-1 male abundance estimate was lower than the all-time high observed in 1999, but higher than the three prior surveys. These crabs molted and gave a much-needed boost to the recruit portion of the legal crab biomass in 2003. Prerecruit-2 male crab abundance was over four times greater than 1999 and fourth highest abundance estimate since 1976 indicating increased recruitment for 2004 and 2005 seasons. These recruitment events should push the legal population to higher levels than we presently observe.

Estimated legal male crab abundance for the 2003 summer commercial crab fishery was 3.1 million pounds, the same as the 2002 legal male crab abundance. Size composition data from the 2003 winter pot study indicated that the portion of crab population classified as recruits had doubled since the 2002 winter survey, but postrecruit male crab numbers are still low. An eight percent exploitation rate equated to a guideline harvest level of 253,000 pounds of crab. This follows the harvest strategy set by the Board of Fisheries. The winter pot study also showed a large prerecruit-1 and prerecruit-2 population that are expected to increase the legal crab population in the next few years. By regulation, the CDQ fishery is

allocated 7.5% of the combined summer season harvest. Therefore, the CDQ harvest quota was set at 18,957 pounds preseason.

St. Lawrence Island

St. Lawrence Island Section (Q4) lies immediately west and north of Norton Sound Section and includes Kotzebue Sound?. Commercial catches in St. Lawrence Island Section have only been reported for four years. In 1983, 52,557 pounds of blue king crab were delivered from 13 landings. The commercial crab fleet concentrated their efforts near the southeast shore of St. Lawrence Island. In 1984, a regulation was adopted to close waters within ten miles of all inhabited islands within the St. Lawrence Island Section (St. Lawrence Island, Little Diomede and King Island). This regulation attempts to protect stocks targeted by local fishers and reduce impacts on marine mammal subsistence harvests. In 1989, 3,603 pounds of red king crab and 984 pounds of blue king crab were delivered from eight landings. In 1992, 53 pounds of blue king crab were landed. In 1995, 7,913 pounds of blue king crab were delivered from three landings.

Villagers of Little Diomede and St. Lawrence Island have bartered with and sold winter-caught blue king crab to residents of Nome and other villages for years. ADFG does not have an accurate estimate of the magnitude of this trade. Remoteness of the villages contributes to lack of catch records. Current regulations allow a commercial harvest and sale of king crab caught near shore during winter. However, local residents have decided not to export any of their winter catch for commercial sale.

2003 COMMERCIAL FISHERY

Norton Sound Summer Open Access Commercial Fishery

The 2003 summer open access commercial crab fishery was opened by regulation on 12:00 noon, July 1 in Norton Sound Section. The guideline harvest level was 253,000 pounds of crab. Three companies were registered to buy crab in Norton Sound during the 2003 season. One of these buyers operated a seafood processing plant in Nome and purchased crab from only local Norton Sound fishers. Nonlocal fishers and some fishers based in Unalakleet delivered to the second buyer in Anchorage. The third buyer was a processing plant in Emmonak. Some fishers also sold their catch dockside as catcher/sellers. The open access portion of the fishery was closed by emergency order 12:00 noon, August 13, 2003 when the harvest was expected to approach the open access fishery goal of 234,000 pounds.

Total harvest from fish ticket reports was 88,810 red king crab or 253,284 pounds (Table 12). Of this total, 1,867 pounds were reported as dead loss. A total of 24 vessels made deliveries and 30 permit holders fished. Twenty of the fishers were considered local and ten were non-local. A total of 218 landings were made. Local fishers accounted for 74 percent of the total crab harvest. The average weight for commercially caught crab was 2.8 pounds. A total of 960 pots were registered and there were 8,112 pot pulls during the fishery. The

average price paid was $3.09 per pound. Exvessel value of the fishery is estimated at $782,647.

Fish ticket reports document 13 statistical areas fished in both the open access and CDQ fishery (Table 12, Figure 12). Stat areas 666401 and 636401 had the highest catch with 83,998 and 83,949 pounds of crab respectively. Other large catches came from stat areas 656401 (40,566 pounds), 656330 (21,176 pounds) and 626401 (15,899 pounds). The 2003 catch from stat areas east of 164° made up 40.2 percent of the harvest (Figure 13, Appendix E1). All other stat areas comprised 59.8 percent of the harvest. Overall, catch per unit effort (CPUE) was 11.0 crab per pot. This was slightly less than the 2002 CPUE of 13.7 crab per pot.

The first delivery was made on July 4. The final delivery was made August 15. Although the open access fishery ended 12:00 noon, August 13, some fishers had been holding storage pots off shore and had 48 hours to make deliveries. The commercial crab fleet concentrated in two main areas of operations throughout most of the open access fishery. A portion of the fleet delivered to a small tender vessel in eastern Norton Sound that transported crab to Nome for processing. The other portion of the fleet based their operations out of the Port of Nome. These fishers sold crab to the seafood processing plant in Nome or flew live crab to a buyer in Anchorage. Small amounts of crab were shipped from Unalakleet to Anchorage or delivered to a processing plant at Emmonak. CPUE improved near the end of the fishery and resulted in the guideline harvest being exceeded by almost 20,000 pounds.

CDQ Fishery

Norton Sound and Lower Yukon CDQ groups divided the CDQ allocation. Only fishers designated by Norton Sound and Lower Yukon CDQ groups are allowed to participate in this portion of the king crab fishery. Fishers were required to have a CDQ fishing permit from Commercial Fisheries Entry Commission (CFEC) and register their vessel with ADFG before they made their first delivery. Fishers operated under authority of the CDQ group and individual CDQ groups decided how the CDQ crab quota was harvested.

The CDQ fishery began at 12:00 noon June 15, 2003 and closed 12:00 noon June 28, 2003. Harvest was 2,565 pounds of crab, well below the CDQ allocation. Therefore, the CDQ fishery was allowed to re-open on August 15 once the open access fishery was complete. The CDQ harvest was adjusted to 20,741 pounds of crab because the open access fishery exceeded their harvest allocation. Fishing closed by emergency order on August 24, 2003 (Appendix G7). A total of 13,923 pounds (4,828 crab) were harvested during the CDQ fishery openings (Table 13). Nine vessels participated and 17 landings were made. There were a total of 382 pots pulled. Average price paid to fishers for their harvest was $2.93 per pound. Exvessel value was $40,854 for the CDQ fishery (Appendix E3).

Although the CDQ fishery has been in place since 1998, this was only the third year a CDQ harvest occurred. This was the second year that the CDQ fishery was allowed to take place prior to the open access fishery and closer to shore in eastern Norton Sound.

Commercial Catch Sampling

Carapace length measurements and shell age were collected from 5,226 commercially caught crab during the open access and CDQ fisheries. Carapace age was classified as new (2-12 months old) or old (over 13 months old). Recruit crab are new shell legal crab with carapace length < 116 mm. Postrecruit crab are legal new shell male crab with carapace length ≥ 116 mm and all legal old shell males. Recruit crab made up 48 percent of the legal crab sampled and postrecruit crab made up 52 percent (Table 14). This was a significant increase in recruitment from the 2002 fishery (Appendix E4). Male crab with new shells made up 86 percent of total legal crab sampled, and old shell crab made up 14 percent. Overall, mean carapace length of legal male crab was 116.8 mm (Table 14 and Figure 16). This was a decrease from the 2002 fishery and is most likely due to increase in recruit crab seen in 2003.

The Norton Sound red king crab fishery had the benefit of an onboard observer during the 2000 and 2001 seasons because there was a floating processor on the fishing grounds. In years when there is no onboard observer, a smaller percentage of crab from the commercial harvest gets sampled because fishers deliver at all times of day and night. The new seafood processing plant that began operating in Nome in summer 2002 greatly improved ability of Nome ADFG staff to sample crab brought to the Nome dock. A small amount of commercially caught crab was delivered for the first time to a processing plant in Emmonak in 2003, where ADFG personnel in Emmonak were able to sample the catch for legal length. Emmonak is home base for some Yukon Delta CDQ fishers. More crab may be delivered to this port in the future. ADFG will continue to make a concerted effort to coordinate catch sampling with fishers and buyers to ensure optimal commercial harvest data collection.

Enforcement

The Nome Fish and Wildlife Protection officer was unable to patrol the 2003 summer king crab fishery.

Norton Sound Winter Commercial Fishery

A winter commercial fishery in Norton Sound Section occurs from November 15 through May 15 and typically takes place near Nome. Vessels are prohibited and the winter commercial fishery takes place from the ice. Stability of sea ice greatly affects success of the winter fishery. Appendix E5 illustrates winter commercial and subsistence harvest of crab from 1978 to 2003. During the winter of 2002-2003, 13 commercial fishers reported selling 6,853 red king crab. Sea ice conditions were good for the majority of the season.

The harvest is divided between local residents who buy crab directly from the fishers, the new seafood plant in Nome, and other non-local markets such as Anchorage. Average price paid for crab was $3.52 per pound. The 2003 winter catch of crab was estimated to be

worth $58,949. Most fishers consider commercial crabbing a sideline and hold other jobs. Usually, two or three of the winter crab fishers sell the majority of the crab.

SUBSISTENCE FISHERY

Norton Sound residents utilize red king crab for subsistence, mainly during winter. Fishing occurs through cracks or holes cut in the ice with the use of hand lines and pots. To document trends in subsistence harvest, the Board of Fisheries enacted a regulation in 1977 requiring subsistence fishers in Norton Sound to obtain a permit before fishing. Fishers record their daily effort and catch on these permits. During the 2002-2003 season, 107 permits were issued in the Nome area, 73 were returned, and 64 permit holders reported fishing (Table 15). A total of 4,253 crab were recorded as kept for subsistence use in the Nome area.

The first year that subsistence permits were required, 1978, had the highest number of permits issued and highest reported harvest. The fishery declined sharply the following year and remained at low levels through the 1981-82 season. Lack of success in the winter crab fishery during some past years has been attributed to a declining crab population caused by removal of crab in the summer commercial fishery together with low recruitment, low effort caused by poor ice conditions, and changes in nearshore winter distribution of crab. All these factors in varying degrees affect success of the winter fishery. During the 1978-79 winter fishery, the king crab population was still relatively high. Despite this relatively large population, winter catches were second poorest on record indicating that major factors limiting winter catches were probably poor ice conditions and distribution of crab. During winter of 1981-82, poor winter catches could more reasonably be attributed to a declining crab population since the crab population was at a low level. Subsistence fishing success during winters of 1982-83 through 1986-87 improved because of a rebuilding of the population and increased use of more efficient gear (pots instead of hand lines). Unstable ice conditions and record snowfalls adversely affected 1987-88, 1988-89, 1992-93 and 2000-2001 catches. During years of stable ice conditions, approximately 100 fishers averaged 100 crabs each.

FUTURE INVESTIGATIONS

A winter pot survey is planned during February, March and April of 2004. Results of the winter project will be used in the length-based model to project the summer 2004 legal biomass and appropriate guideline harvest level (GHL). Size composition by year from the winter king crab project is shown in Appendix E6.

SECTION 4: MISCELLANEOUS SPECIES

(Includes Norton Sound, Port Clarence and Kotzebue Districts)

INTRODUCTION

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

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

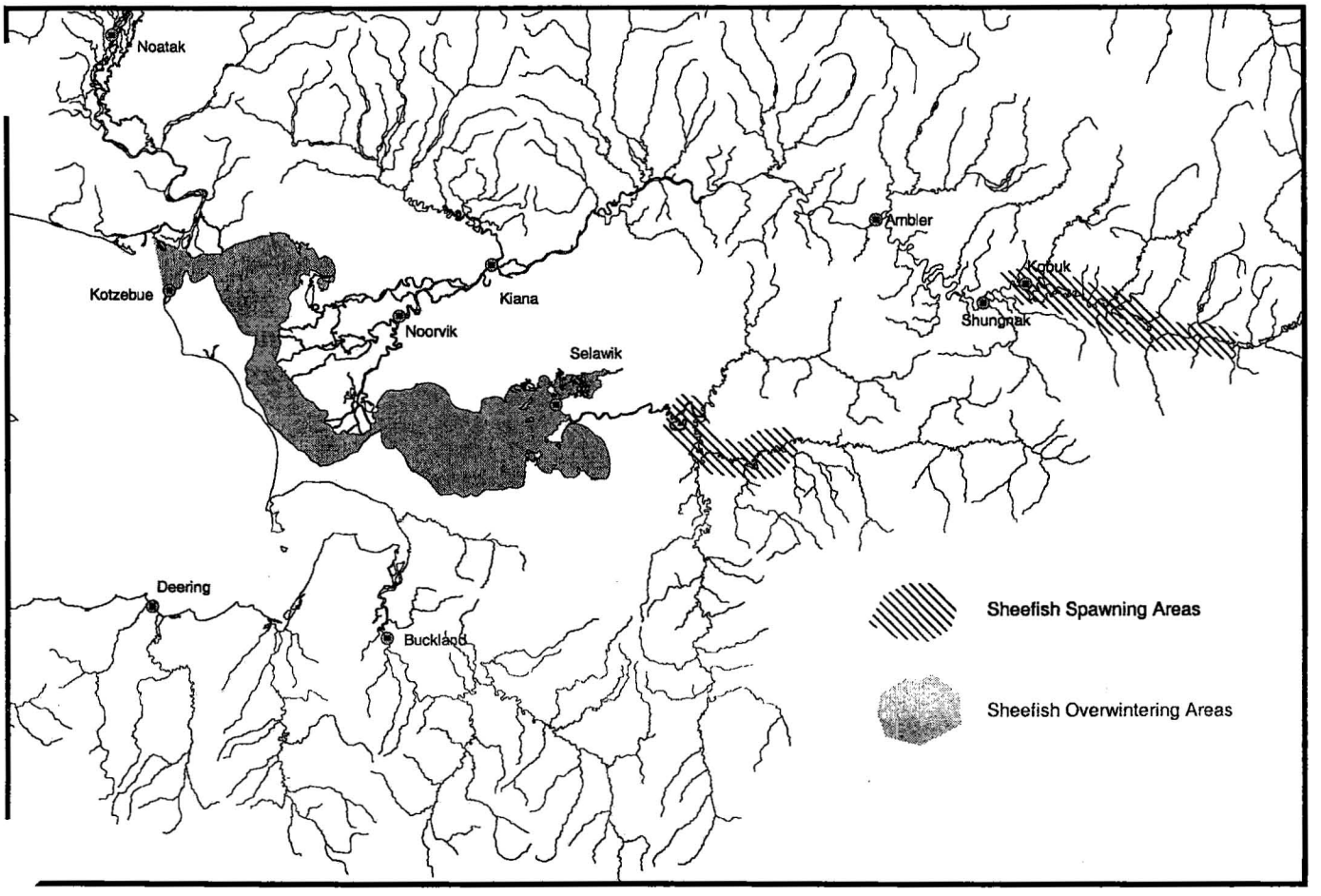
Subsistence harvest of most species is not limited by regulation. Commercial harvest may be prohibited in some freshwater areas, but limited commercial endeavors are allowed in many areas under terms of a permit.

INCONNU (Sheefish)

Introduction

Distribution of inconnu includes the Kobuk-Selawik River drainages, and Hotham Inlet of Kotzebue Sound and some Norton Sound drainages, but largest populations and harvests occur within the former area (Map 7, Figure 17). In the Kotzebue Sound area, adult fish migrate to upriver spawning areas after ice breakup and to wintering areas within 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 various fisheries throughout their life cycle, and increases their vulnerability to overharvest. In addition, the inconnu's slow maturation rate increases time required to restore depleted populations.



Map 7. Kotzebue and Kobuk River Valley villages and their spatial relationship with inconnu spawning and overwintering areas.

During the 1960s, age, sex and length data indicated inconnu stocks were overharvested by the commercial and subsistence fisheries in Kotzebue district. Consequently, an annual area commercial harvest quota of 25,000 pounds was instituted, although subsistence catches remained unrestricted.

Commercial Fishery

Most commercial fishing effort occurs near Kotzebue in Hotham Inlet. Fishers use gillnets ranging from 5 1/2 inch to 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 greatly limit commercial activity and most individuals who normally participate in the winter commercial fishery also fish for subsistence purposes. Incidentally caught inconnu are sold by commercial salmon fishers in years there is a market, but only in small amounts. Reported harvest and effort in the commercial fishery has declined in recent years. Although inconnu were likely harvested

and sold in 2003 by several fishers, only 3 fish tickets were turned in to ADFG by one permit holder with a harvest estimate of 1,250 pounds (Appendix F1).

Subsistence Fishery

In 1987, the Alaska Board of Fisheries adopted a regulation limiting size of gillnets used to take inconnu for subsistence to be not more than 50 fathoms in aggregate length, 12 meshes in depth, nor have a mesh size larger than seven inches (AS 5AAC 01.120). This regulation was intended to conserve the larger, breeding portion of the stock. Except for this gear restriction, ADFG does not restrict timing, area, or quantity of subsistence inconnu harvest. No requirement exists for harvest reporting.

Inconnu have long been utilized for subsistence purposes throughout Kotzebue basin. Fishing for inconnu occurs along Kobuk and Selawik Rivers from June through October with gillnets, beach seines, and rod and reel. In spring residents of Kotzebue, Noorvik and Selawik harvest inconnu with hand jigs through the ice of Hotham Inlet and Selawik Lake. In early winter, Kotzebue, Noorvik and Selawik fishers use gillnets set under the ice in Hotham Inlet and Selawik Lake.

Appendix F2 shows estimated inconnu catches reported during chum salmon subsistence surveys conducted in fall by Subsistence Division, and for Kobuk River residents may include winter, summer, and fall catches. The 2003 Kobuk River communities' inconnu harvest estimate is not available at this writing. Subsistence inconnu harvest information was not collected for Kotzebue where a sizable ice fishery occurs for sheefish in late winter and spring. No information was found concerning inconnu harvests in Selawik area.

Escapement

Historically aerial surveys were conducted on key inconnu spawning areas incidental to effort of enumerating salmon. These surveys were primarily conducted along 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. Surveys were not conducted in 1984 through 1990 because of high, turbid water, poor weather conditions, or lack of personnel. Through the early 1990s, incomplete escapement and catch data provided little basis for assessing current population status of inconnu in Kotzebue district, however some local residents were concerned that the inconnu stocks were declining.

Because of these concerns, a cooperative tagging project on inconnu in Kotzebue District began in 1994. This study was conducted by Sport Fish Division of ADFG, U.S. Fish & Wildlife Service (USFWS), and National Park Service (NPS). Spawning inconnu were tagged in Upper Kobuk River and Selawik River. Roughly 600 sheefish were tagged in Kobuk River by Division of Sport Fish and 150 in Selawik River by USFWS in 1994. During the fall of 1995, roughly 617 inconnu were tagged in Upper Selawik River and approximately 1,386 were tagged in Upper Kobuk River. In 1996, 2,300 were tagged in

Upper Kobuk and 500 in Selawik River. The Selawik River project ended in 1996. In 1997, 1,757 inconnu were tagged in Upper Kobuk River. Spawning population estimates of inconnu in Upper Kobuk River were 32,273 in 1995, 43,036 in 1996 and 26,800 in 1997. Inconnu spawn upstream of the village of Kobuk; greatest observed concentrations were between Meneluk and Beaver Rivers. After spawning is complete in late September, fish disperse to downstream overwintering areas. In Selawik River, the spawning population estimate was 5,200 to 5,300 for both 1995 and 1996. The tag recoveries showed that these stocks mixed in Hotham Inlet winter habitats, but maintained fidelity to their spawning areas (DeCicco 2001).

DOLLY VARDEN

Introduction

Dolly Varden are distributed throughout Norton Sound, Port Clarence, and Kotzebue Districts. Although taxonomists disagreed on the distinguishing Dolly Varden characteristics and distribution of Arctic Char and Dolly Varden, most now agree char in this area are the northern form of Dolly Varden. To eliminate confusion, in this report these fish are referred to as Dolly Varden, the common name for this species complex; however, locally they are called trout.

Dolly Varden in this area are primarily nonconsecutive spawners and spawn throughout late summer and fall. Fry emerge in spring and migrate to the ocean during early summer after spending from 1 to 6 (generally 2-5) years in freshwater. Because 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 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. Regulation changes in 1976, which closed the commercial salmon fishery on August 31, reduced harvest of Dolly Varden since they typically pass through the harvest area during September. Dolly Varden generally appear in commercial catches during the last three weeks of August. In 2003, 196 Dolly Varden were incidentally caught in the commercial fishery. Twenty were sold and 176 were retained for subsistence use. 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 F4). Spawning and overwintering Dolly Varden typically begin migrating along the northern shore of Kotzebue Sound during the third week of August.

Subsistence Fishery

Dolly Varden are an important component in the diet of subsistence users in Norton Sound-Kotzebue Sound areas. Subsistence fishers in Kotzebue District catch Dolly Varden with seines in fall, hook and line through ice in winter, and gillnets in spring. The fall seine fishery contributes the greatest number of fish to the annual subsistence Dolly Varden harvest. Since 1962, seine catches made by residents of Kivalina ranged from 7,000 to 49,000 Dolly Varden annually (Appendix Table F5).

In Kotzebue District, fall seine fishing is a group effort with several households comprising a fishing group. 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. Note: historical subsistence Dolly Varden catches in Appendix Table F5 are minimal figures because of survey timings. Most Dolly Varden harvests take place before or just after freeze-up. The village of Noatak usually fishes before freeze-up, but Kobuk River villages of Shungnak and Noorvik fish for Dolly Varden throughout the winter. The 2003 subsistence Dolly Varden harvest estimates by community are not available at this writing.

Most villagers in 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 late fall.

Sport Fishery

Residents of Kotzebue area and nonlocal residents boating on Kobuk and Noatak Rivers are the primary participants in the Dolly Varden sport fishery in the Kotzebue area. Approximately 1,500 Dolly Varden are taken in this fishery annually (Sport Fish Division surveys). The 2003 sport fishing estimates are not available at this writing.

Overwintering Counts

Aerial survey counts of overwintering Dolly Varden on the Wulik River ranged from 297,257 fish in 1969 to 1,500 fish in 2003 (Appendix F6). Weather and water conditions have precluded flying aerial surveys during many years. Weather permiting, the Division of Sport Fisheries conducts aerial surveys of Noatak River spawning grounds in summer, and Kivalina and Wulik Rivers overwintering areas in fall. No surveys were flown on Kivilina or Noatak Rivers in 2003 (Appendix Table F6).

WHITEFISH

Introduction

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

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

Commercial Fishery

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

Subsistence Fishery

Whitefish harvested for subsistence are 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 summer, but later in summer fish are filleted and dried with eggs and viscera intact.

Subsistence catch enumeration is difficult since fishers do not count fish individually, but by "tubs", "bags", "strings" or any other estimators of gross abundance. Additionally, many fish are dried and consumed or stored in caches before the survey period. Reported subsistence harvests were generally the result of a limited and sporadic survey effort and should be regarded as minimum values 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 25,607 whitefish were harvested in 2002 for subsistence in Noatak and Kobuk villages (Appendix Table F7). Mean household harvests ranged from 197 whitefish in Noorvik to 29 whitefish in Noatak (Georgette et al 2003). Harvest figures for 2003 are not yet available.

Escapement

Whitefish escapements have not been monitored in the past, but limited ADFG observations or fisher interviews do not indicate declining populations.

SAFFRON COD

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

An extensive commercial fishery on tomcod in Norton Sound, Port Clarence or Kotzebue areas has never occurred. During 1980, one fisher caught and sold 89 pounds (98 tomcod) in Nome Subdistrict. In 1983, one Nome area fisher caught and sold 2,548 pounds (4,348 tomcod) and in 1989 one fisher sold 1,800 pounds locally. These fish were used for dog food, crab bait and human consumption. No commercial deliveries were reported during 1984-1988 and 1990-1993.

In 1994, Norton Sound Economic Development Corporation (NSEDC) provided a market for several fish species not commercially utilized in the past. The need for crab bait was the primary factor in initiating the fishery at Unalakleet, where 1,402 pounds were sold in seven deliveries during January and February of 1994. In 1995, the NSEDC market was not present, which was likely a factor in reduced harvest. 1995 harvest totaled 52 pounds which sold for $.50 per pound for a total value of $26.00. No commercial harvest was reported from 1996 through 2003.

MISCELLANEOUS FINFISH SPECIES

Other finfish species taken for subsistence in Norton Sound, Port Clarence, and Kotzebue areas include: rainbow smelt (boreal smelt), capelin, northern pike, starry flounder, yellow fin sole, Arctic flounder, Alaska plaice, Arctic grayling, burbot, Pacific herring in 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 January, February and March of 1994, 631 pounds of rainbow smelt were reported sold in

nine deliveries for bait. Smelt and cod harvests from Unalakleet both occur in estuarine areas. Smelt were reported higher in the water column than cod. Either species could often be harvested from the same jigging site. Burbot, or freshwater cod, have been commercially sold sporadically in the past in Kotzebue, Port Clarence and Norton Sound Districts under commercial permits.

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Table 1. Norton Sound commercial salmon harvest summary by subdistrict, 2003.

		Subdistricts						Total
		1	2	3	4	5	6	Number
Number of Fishers		0	0	0	0	10	20	30
Chinook	Number	0	0	0	0	2	10	12
	Weight(lbs.)	0	0	0	0	24	112	136
Sockeye	Number	0	0	0	0	0	16	16
	Weight(lbs.)	0	0	0	0	0	121	121
Coho	Number	0	0	0	0	4,031	13,027	17,058
	Weight(lbs.)	0	0	0	0	33,995	105,780	139,775
Pink	Number	0	0	0	0	0	0	0
	Weight(lbs.)	0	0	0	0	0	0	0
Chum	Number	0	0	0	0	485	3,075	3,560
	Weight(lbs.)	0	0	0	0	3,422	20,245	23,667
Totals	Number	0	0	0	0	4,518	16,128	20,646
	Weight(lbs.)	0	0	0	0	37,441	126,258	163,699

Table 2. Tier I subsistence salmon harvest by Nome area fishers, Norton Sound, 2003.

	Number of Permits [a]			Number of Salmon Harvested					
	Issued	Returned	Fished	Chinook	Sockeye	Coho	Pink	Chum	Total
Bonanza River	1	1	1	0	0	1	0	0	1
Cripple Creek	0	0	0	0	0	0	0	0	0
Eldorado River	0	0	0	0	0	0	0	0	0
Flambeau River	0	0	0	0	0	0	0	0	0
Marine Waters	13	12	8	5	4	34	31	26	100
Nome River	3	3	3	0	0	11	1	8	20
Nome Subdistrict [b]	89	61	17	39	3	81	14	35	172
Penny River	0	0	0	0	0	0	0	0	0
Safety Sound	1	1	1	0	0	0	2	0	2
Sinuk River	0	0	0	0	0	0	0	0	0
Snake River	4	4	4	0	0	1	1	2	4
Solomon River	0	0	0	0	0	0	0	0	0
Total [c]	111	82	34	44	7	128	49	71	299
Fish River [d]	2	2	2	0	0	4	75	13	92
Niukluk River [d]	8	8	5	8	0	0	171	70	249
Total	10	10	7	8	0	4	246	83	341
Port Clarence [d]	1	1	1	0	9	3	14	6	32
Kuzitrin River	2	2	2	1	14	57	0	0	72
Pilgrim River [e]	97	77	53	67	1,362	10	66	69	1,574
Cape Woolley	10	7	7	0	20	5	76	22	123
Feather River	0	0	0	0	0	0	0	0	0
Total	**231**	**179**	**104**	**120**	**1,412**	**207**	**451**	**251**	**2,441**

[a] Four different Tier I subsistence permits issued in 2003 for Nome area: 1- Nome Subdistrict permit for specified rivers and marine areas; 2- Niukluk permit for Fish & Niukluk Rivers; 3- Port Clarence permit for area rivers; 4- Cape Woolley permit for area waters.

[b] Specific river usage considered minimal estimate because most fishers did not indicate, and 24 of 114 permits were not returned.

[c] Three permits issued for the Nome Subdistrict were mistakenly used for outside areas; that data is not in this count.

[d] Permits are not required for these areas, but fishers requested a permit.

[e] Four permits issued for the Pilgrim River were mistakenly used for outside areas; that data is not in this count.

Table 3. Tier II subsistence salmon harvest by Nome area fishers, Norton Sound, 2003.

	Number of Permits			Number of Salmon Harvested					
	Issued	Returned	Fished	Chinook	Sockeye	Coho	Pink	Chum	TOTAL
Nome Subdistrict	**38**	**36**	**29**	**24**	60	**216**	**469**	**548**	**1,317**
Indicated Area(s) [a]									
Bonanza River	2	2	2	0	0	15	32	20	67
Cripple Creek	0	0	0	0	0	0	0	0	0
Eldorado River	1	1	1	0	1	12	0	10	23
Flambeau River	0	0	0	0	0	0	0	0	0
Marine Waters	13	13	13	7	39	50	309	306	711
Nome Subdistrict [b]	17	17	11	16	20	127	121	202	486
Nome River	1	1	1	1	0	12	7	10	30
Penny River	0	0	0	0	0	0	0	0	0
Safety Sound [c]	1	1	0	0	0	0	0	0	0
Sinuk River	0	0	0	0	0	0	0	0	0
Snake River	0	0	0	0	0	0	0	0	0
Solomon River	0	0	0	0	0	0	0	0	0

[a] Seventeen of 34 returned Tier II 2003 permits indicated a specific area(s) fished.

[b] Harvest that was not specified by area(s) and is considered general Nome subdistrict.

[c] Indicated when issued as intended area to fish, however never fished.

Table 4. Salmon counts of Norton Sound rivers in 2003 and associated salmon escapement goal ranges (SEG, BEG or OEG).

Stream Name	Chinook				Chum			
	Weir/ Tower Count	Escapement Goal Range	Aerial Survey Count [a]	Escapement Goal Range	Weir/ Tower Count	Escapement Goal Range	Aerial Survey Count [a]	Escapement Goal Range
Salmon L.								
Grand Central R.								
Pilgrim R.	1,016		242		15,192		292	
Glacial L.					2			
Sinuk R.						4,000 - 6,200 [b]	677	
Cripple R.							46	
Penny R.							9	
Snake R.	50		4		2,197	1,600 - 2,500 [c]	440	
Nome R.	12		3		1,958	2,900 - 4,300 [c]	888	
Flambeau R.						4,100 - 6,300 [b]	647	
Eldorado R.	29		12		3,589	6,000 - 9,200 [c]	1,257	
Bonanza R.			5			2,300 - 3,400 [b]	140	
Solomon R.			1			1,100 - 1,600 [b]	73	
Fish R.			95	**Combined**			3,200	**Combined**
Boston Cr.			145	**100 - 250**			750	**23,200 - 46,400**
Niukluk R.	179		55		19,681		2,315	
Ophir Cr.								
Kwiniuk R.	740	300 - 550	63		12,117	11,500 - 23,000 [d]	4,567	
Tubutulik R.			50			9,200 - 18,400 [b, d]	1,352	
Inglutalik R								
Pikmiktalik R	345				7,707			
Shaktoolik R. [e]			15	400 - 800				
Unalakeet R.			168	**Combined**			657	**Combined**
Old Woman R.				**550 - 1,100**				**2,400 - 4,800**
North R.	1,452	1,200 - 2,400	131		9,859		222	

-Continued-

Table 4. (Page 2 of 2)

Stream Name	Coho Weir/ Tower Count	Coho Aerial Survey Count [a]	Coho Escapement Goal Range	Sockeye Weir/ Tower Count	Sockeye Aerial Survey Count [a]	Sockeye Escapement Goal Range	Pink Weir/ Tower Count	Pink Escapement Goal Range	Pink Aerial Survey Count [a]
Salmon L.					19,275	**Combined**			
Grand Central R.					1,015	**4,000 - 8,000**			
Pilgrim R.	677	127		42,729	4,336		14,100		195
Glacial L.				2,004	865	800 - 1,600			
Sinuk R.		190			300				9,885
Cripple R.		69							1,175
Penny R.		26							80
Snake R.	489	313		82	2		2,829		298
Nome R.	548	604		50			11,402	13,000	2,841
Flambeau R.		71							355
Eldorado R.	115	71					173		821
Bonanza R.		100							1,540
Solomon R.		105							157
Fish R.									1,014
Boston Cr.									701
Niukluk R.	1,275	146	**Combined**				75,111	8,400	272
Ophir Cr.		0	**950 - 1,900**						
Kwiniuk R.	5,484	760	650-1,300				22,329	12,500	390
Tubutulik R.		292							60
Inglutalik R									
Pikmiktalik R	87						13,165		
Shaktoolik R.								48,000 [b]	
Unalakeet R.									1,867
Old Woman R.									
North R.	5,837		550-1,100				280,212	8,500	11,010

[a] All aerial surveys are rated fair to good, unless otherwise noted.

[b] The goal listed is actual fish and not aerial counts. However, at this time there is no counting project on the river.

[c] The Board of Fisheries also established an OEG with the same range as the BEG.

[d] This represents the OEG in regulation. The BEG is 10,000-20,000 for the Kwiniuk River and 8,000-16,000 for the Tubutulik River.

[e] Poor survey conditions.

Table 5. Commercial salmon set gillnet catches from Shaktoolik, Subdistrict 5, Norton Sound, 2003.

			Period Catch and Catch Per Unit Effort							Cumulative Catch		
Period	Length of period (hrs)	Date	Fishers	Chinook	Chinook CPUE	Chum	Chum CPUE	Coho	Coho CPUE	Chinook	Chum	Coho
1	24	7/31-8/01	0	NO FISHING EFFORT								
2	48	8/04-8/06	0	NO FISHING EFFORT								
3	48	8/07-8/09	3	0	0.00	164	1.14	541	3.76	0	164	541
4	48	8/11-8/13	2	1	0.01	20	0.21	74	0.77	1	184	615
5	48	8/14-8/16	5	0	0.00	149	0.62	708	2.95	1	333	1,323
6	48	8/18-8/20	6	1	0.00	34	0.12	830	2.88	2	367	2,153
7	48	8/21-8/23	7	0	0.00	67	0.20	561	1.67	2	434	2,714
8	48	8/25-8/27	8	0	0.00	14	0.04	744	1.94	2	448	3,458
9	48	8/28-8/30	9	0	0.00	37	0.09	573	1.33	2	485	4,031
10	30	9/01-9/03	0	NO FISHING EFFORT						2	485	4,031
11	48	9/04-9/06	0	NO FISHING EFFORT						2	485	4,031
Total	486			2		485		4,031				

Total number of permits fished = 10

Chinook and chum were incidental catches during coho season.

Table 6. Commercial salmon set gillnet catches from Unalakleet, Subdistrict 6, Norton Sound, 2003.

			Period Catch and Catch Per Unit Effort							Cumulative Catch		
Period	Length of period (hrs)	Date	Fishers	Chinook	Chinook CPUE	Chum	Chum CPUE	Coho	Coho CPUE	Chinook	Chum	Coho
1	24	7/31-8/01	3	0	0.00	212	2.94	395	5.49	0	212	395
2	48	8/04-8/06	12	2	0.00	743	1.29	2,431	4.22	2	955	2,826
3	48	8/07-8/09	16	2	0.00	492	0.64	1,694	2.21	4	1,447	4,520
4	48	8/11-8/13	10	0	0.00	363	0.76	1,004	2.09	4	1,810	5,524
5	48	8/14-8/16	11	0	0.00	591	1.12	1,765	3.34	4	2,401	7,289
6	48	8/18-8/20	12	1	0.00	314	0.55	1,512	2.63	5	2,715	8,801
7	48	8/21-8/23	12	1	0.00	133	0.23	1,081	1.88	6	2,848	9,882
8	48	8/25-8/27	9	0	0.00	51	0.12	570	1.32	6	2,899	10,452
9	48	8/28-8/30	8	3	0.01	97	0.25	1,064	2.77	9	2,996	11,516
10	30	9/01-9/03	8	1	0.00	46	0.19	674	2.81	10	3,042	12,190
11	48	9/04-9/06	9	0	0.00	33	0.08	837	1.94	10	3,075	13,027
Total	486			10		3,075		13,027				

Total number of permits fished = 20

Chinook and chum were incidental catches during coho season. Also 16 sockeye were sold during coho season.

Table 7. Kotzebue District commercial catches of chum salmon, chinook salmon, and Dolly Varden by week, 2003.

Week	Number of Fishers	Chum			Chinook[a]			Dolly Varden[b]		
		Number	Pounds	Avg. Wt.	Number	Pounds	Avg. Wt.	Number	Pounds	Avg. Wt.
7/13 - 7/19	2	1,215	10,984	9.0	0	0	0.0	0	0	0.0
7/20 - 7/26	2	5,155	46,448	9.0	0	0	0.0	0	0	0.0
7/27 - 8/2	3	6,005	51,718	8.6	0	0	0.0	0	0	0.0
8/3 - 8/9	3	7,655	64,565	8.4	0	0	0.0	0	0	0.0
8/10 - 8/16	2	3,003	25,222	8.4	0	0	0.0	20	160	8.0
8/17 - 8/23	2	2,390	19,244	8.1	0	0	0.0	0	0	0.0
Totals[c]	4	25,423[d]	218,181	8.6	0	0	0.0	20	160	0.0

[a] Nine chinook salmon were caught but not sold.

[b] An additional 176 Dolly Vardon were caught and retained for subsistence.

[c] Forty-seven pink salmon were caught and retained for subsistence.

[d] An additional 340 chum salmon were caught and retained for subsistence.

Table 8. Kobuk River chum salmon drift test fish mean daily and cumulative CPUE, 1993-2003.

	1993		1994		1995		1996		1997		1998		1999		2000		2001		2002		2003	
Date	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
10-Jul							15.00	27.77	0.00	5.85	5.22	5.22			2.50	4.61	8.39	24.97	6.83	35.40	11.21	11.21
11-Jul							98.38	126.15	5.31	11.16	0.85	6.07	0.00	0.00	3.44	8.05	20.07	45.04	22.86	58.26	3.76	14.97
12-Jul	11.18	11.18			0.00	0.00	45.54	171.69	7.19	18.35	a	6.07	0.00	0.00	3.45	11.50	12.63	57.67	31.54	89.80	2.20	17.17
13-Jul	14.22	25.40	0.00	0.00	0.93	0.93	74.29	245.98	a	18.35	15.89	21.96	0.00	0.00	2.54	14.04	17.32	74.99	21.67	111.47	5.19	22.36
14-Jul	20.57	45.97	2.68	2.68	2.80	3.73	a	245.98	6.25	24.60	7.53	29.49	0.00	0.00	8.57	22.61	45.57	120.56	28.05	139.52	6.06	28.42
15-Jul	35.08	81.05	2.58	5.26	2.77	6.50	83.75	329.73	3.65	28.25	14.07	43.56	0.00	0.00	0.87	23.48	38.86	159.42	14.27	153.79	4.49	32.91
16-Jul	13.19	94.24	11.35	16.61	a	6.50	71.35	401.08	14.28	42.53	17.33	60.89	0.00	0.00	3.38	26.86	32.80	192.22	35.27	189.06	5.33	38.24
17-Jul	17.27	111.51	a	16.61	0.00	6.50	55.49	456.57	15.17	57.7	5.07	65.96	4.26	4.26	12.77	39.63	48.77	240.99	36.50	225.56	0.00	38.24
18-Jul	a	111.51	7.16	23.77	1.81	8.31	89.86	546.43	16.12	73.82	9.02	74.98	8.48	12.74	3.58	43.21	36.98	277.97	24.41	249.97	8.83	47.07
19-Jul	10.71	122.22	12.4	36.17	9.89	18.20	54.74	601.17	17.98	91.8	a	74.98	5.89	18.63	19.51	62.72	67.08	345.05	30.30	280.27	5.37	52.44
20-Jul	2.76	124.98	3.65	39.82	16.3	34.50	63.7	664.87	a	91.8	18.66	93.64	5.11	23.74	14.57	77.29	26.05	371.10	44.91	325.18	15.14	67.58
21-Jul	3.2	128.18	7.30	47.12	38.54	73.04	52.12	716.99	18.53	110.33	11.87	105.51	23.75	47.49	27.69	104.98	29.51	400.61	36.30	361.48	2.23	69.81
22-Jul	5.52	133.7	3.56	50.68	21.18	94.22	50.97	767.96	13.28	123.61	0.00	105.51	11.91	59.40	41.00	145.98	108.97	509.58	33.85	395.33	2.20	72.01
23-Jul	27.15	160.85	16.49	67.17	50.58	144.8	91.36	859.32	10.79	134.4	29.58	135.09	6.09	65.49	16.29	162.27	50.79	560.37	40.00	435.33	5.93	77.94
24-Jul	9.06	169.91	a	67.17	28.46	173.26	91.89	951.21	22.86	157.26	27.33	162.42	24.95	90.44	14.62	176.89	58.96	619.33	62.76	498.09	11.01	88.95
25-Jul	a	169.91	14.38	81.55	40.16	213.42	76.80	1,028.01	21.57	178.83	24.68	187.1	28.73	119.17	22.98	199.87	80.59	699.92	45.64	543.73	17.30	106.25
26-Jul	15.22	185.13	47.65	129.2	35.15	248.57	55.68	1,083.69	14.66	193.49	a	187.1	39.72	158.89	40.28	240.15	94.06	793.98	34.29	578.02	41.36	147.61
27-Jul	8.06	193.19	40.66	169.86	63.94	312.51	29.79	1,113.48	18.46	211.95	23.91	211.01	80.39	239.28	41.52	281.67	95.06	889.04	50.41	628.43	29.65	177.26
28-Jul	16.36	209.55	57.83	227.69	62.49	375.00	49.06	1,162.54	30.53	242.48	51.91	262.92	a	239.28	62.34	344.01	58.24	947.28	a	628.43	23.41	200.67
29-Jul	0.93	210.48	33.62	261.31	46.11	421.11	70.13	1,232.67	28.13	270.61	34.16	297.08	55.00	294.28	96.00	440.01	54.33	1,001.61	25.74	654.17	37.89	238.56
30-Jul	0.92	211.4	69.21	330.52	57.86	478.97	35.29	1,267.96	22.33	292.94	24.59	321.67	49.66	343.94	138.20	578.21	35.36	1,036.97	28.90	683.07	53.63	292.19
31-Jul	12.58	223.98	a	330.52	29.89	508.86	82.27	1,350.23	32.57	325.51	15.69	337.36	160.53	504.47	85.87	664.08	38.63	1,075.60	18.33	701.40	48.54	340.73
1-Aug	a	223.98	82.16	412.68	72.91	581.77	167.67	1,517.90	41.41	366.92	25.44	362.8	145.02	649.49	101.16	765.24	61.50	1,137.10	27.85	729.25	17.94	358.67
2-Aug	6.74	230.72	65.12	477.80	48.71	630.48	62.02	1,579.92	22.41	389.33	a	362.8	41.67	691.16	64.37	829.61	16.55	1,153.65	19.93	749.18	38.62	397.29
3-Aug	54.49	285.21	71.79	549.59	48.40	678.88	48.70	1,628.62	35.21	424.54	26.67	389.47	33.19	724.35	44.32	873.93	44.21	1,197.86	25.31	774.49	15.41	412.7
4-Aug	44.23	329.44	108.98	658.57	53.00	731.88	65.93	1,694.55	26.67	451.21	42.35	431.82	74.23	798.58	77.14	951.07	30.71	1,228.57	a	774.49	20.12	432.82
5-Aug	89.3	418.74	59.74	718.31	49.95	781.83	60.33	1,754.88	24.47	475.68	8.57	440.39	108.04	906.62	67.26	1,018.33	43.64	1,272.21	12.86	787.35	29.14	461.96
6-Aug	18.6	437.34	102.56	820.87	a	781.83	80.47	1,835.35	42.25	517.93	6.00	446.39	82.79	989.41	38.92	1,057.25	30.00	1,302.21	23.05	810.40	31.21	493.17
7-Aug	20.52	457.86	a	820.87	46.39	828.22	90.99	1,926.34	36.00	553.93	5.11	451.50	82.73	1,072.14	37.50	1,094.75	26.31	1,328.52	10.18	820.58	62.81	555.98
8-Aug	a	457.86	62.75	883.62	44.02	872.24	146.94	2,073.28	45.07	599.00	16.40	467.90	a	1,072.14	93.37	1,188.12	34.40	1,362.92	11.96	832.54	39.29	595.27
9-Aug	1.84	459.7	96.86	980.48	68.22	940.46	106.11	2,179.39	55.14	654.14	17.20	485.10	55.58	1,127.72	81.50	1,269.62	23.01	1,385.93	8.60	841.14	27.24	622.51
10-Aug	12.63	472.33	45.83	1,026.31	56.33	996.79	56.95	2,236.34	a	654.14	9.46	494.56	44.73	1,172.45	113.87	1,383.49	54.88	1,440.81	15.27	856.41	29.18	651.69
11-Aug	18.11	490.44	57.02	1,083.33	37.95	1,034.74	a	2,236.34	43.45	697.59	10.29	504.85	58.13	1,230.58	50.57	1,434.06	73.64	1,514.45	11.10	867.51	40.34	692.03
12-Aug	3.74	494.18	90.54	1,173.87	63.92	1,098.66	72.29	2,308.63	37.36	734.95	19.44	524.29	48.50	1,279.08	24.86	1,458.92	47.23	1,561.68	7.66	875.17	17.04	709.07
13-Aug			11.36	1,185.23	a	1,098.66	114.63	2,423.26	45.93	780.88	10.21	534.50	78.37	1,357.45	14.57	1,473.49	13.04	1,574.72			39.79	748.86
14-Aug			a	1,185.23	29.35	1,128.01	158.13	2,581.39	16.01	796.89	3.85	538.35			7.83	1,481.32						
15-Aug			5.13	1,190.36	25.26	1,153.27					0.00	538.35										
16-Aug			16.23	1,206.59	35.04	1,188.31																

[a] Regular day off

Table 9. Norton Sound herring buyers and associated data, 2003.

Company	Representative or Contact Name	Processing or Tendering Vessels	Type of Processing
Norton Sound Seafood	Tom Magwire	Land based	Freezing (bait)
Norquest Seafoods	Brandon Bell	p/v Aleutian Falcon m/v Roberta M m/v Sea Spray m/v Beverly B m/v Cape Denbigh	Freezing

Table 10. Sac roe herring harvest and effort by date and subdistrict, Norton Sound District, 2003.

	Subdistrict 1 (333-70)				Subdistrict 3 (333-74)				Combined Totals		
Date	Number Fishermen	Sac roe tons	Roe %	Bait tons	Number Fishermen	Sac roe tons	Roe %	Bait tons	Number Fishermen	Sac roe tons	Bait tons
5/16					1	1.6	9.5		1	1.6	
5/17					14	263.3	10.7		14	263.3	
5/18					22	408.3	10.1		22	408.3	
5/19											
5/20					21	162.0	10.3		21	162.0	
5/21					17	117.0	10.3		17	117.0	
5/22	7	24.1	10.7		11	36.5	10.7		18	60.6	
5/23	10	146.2	10.7		12	203.4	11.0		22	349.6	
5/24	9	64.4	10.9	20.5					9	64.4	20.5
5/25	1	1.5	8.1						1	1.5	
Total [a]	12	262.4	10.7	20.5	25	1,324.6	10.4	0.0	31	1,587.0	20.5

[a]10% added to sac roe totals due to dewatering deduction by buyers

Table 11. Daily observed peak biomass estimates of Pacific herring, Norton Sound District, 2003.

			Survey		Spawn		Estimated Biomass (ST) By Index Area							
Date	Flight No.	Observer Initials	Hours	Rating	No.	Length (mi)	KLK	UNK	CDB	NTB	ELM	GOL	NOM	TOTAL
5/15/2003	1	JM,WJ	2.0	5	18	1.3	188.8	0.0	508.1					696.9
5/17/2003	2	WJ	2.5	4	21	4.5	283.6	0.0	3,831.5					4,115.1
5/18/2003	3	WJ,JM	2.0	4	21	5.5	469.9	1,133.9	3,078.2					4,682.0
5/19/2003	4	JM	2.8	3	19	4.5	8,093.7	56.6	1,420.9					9,571.2
5/20/2003	5	JM	2.4	4	39	18.5	7,524.9	0.0	1,253.0					8,777.9
5/21/2003	6	JM	1.1	5	1	1.0		0.0	847.6					847.6
5/23/2003	7	JM	2.0	5	1	1.0	427.1	0.0	423.8					850.9
5/24/2003	8	JM	3.9	3	3	0.3	3,036.3	0.0	9,036.4	9,127.6	7,393.2	2,716.9		31,310.4
5/25/2003	9	JM	1.5	3	9	4.0	4,235.8	4.6						4,240.4
5/28/2003	10	JM	3.5	3	10	6.3	4,410.5	11,352.6	1,981.3	0.0	263.1	96.0	1,218.0	19,321.5
5/31/2003	11	WJ	3.8	3	4	1.0	2,606.6	2,179.6	13,906.2	219.0	749.0			19,660.4
6/8/2003	12	WJ	2.5	2	0	0.0	4,757.6	8,743.2	3,929.4					17,430.2
6/18/2003	13	JM	3.2	2	0	0.0							1,395.6	1,395.6
Sum			33.1	4	146	47.9							Total Harvest	1,607.5

Survey	31,310
Biomass[a]	32,918
Exploit%	4.9%

[a]Biomass includes combined Total Harvest, Waste, and Peak Survey Estimate.

Table 12. Commercial harvest of red king crab from Norton Sound Section by statistical area, Norton Sound District, 2003 (summer fishery only).

Statistical Area	Number[a]	Pounds	Pots Pulled	CPUE	Average Weight (Lbs.)
616331	257	646	62	4.1	2.5
626401	5,822	15,899	889	6.5	2.7
626402	513	1,352	30	17.1	2.6
636401	29,885	83,949	2,441	12.2	2.8
646401	1,370	3,952	127	10.8	2.9
656300	5	14	29	0.2	2.8
656330	7,137	21,176	772	9.2	3.0
656401	13,697	40,566	1,495	9.2	3.0
656402	530	1,441	48	11.0	2.7
666330	469	1,296	36	13.0	2.8
666401	29,312	83,998	2,088	14.0	2.9
666402	4,625	12,873	456	10.1	2.8
666431	16	45	21	0.8	2.8
Total	93,638	267,207	8,494	11.0	2.9

[a]Includes 4,828 crab (13,923 lbs.) from the CDQ fishery.

Table 13. Daily catch (using fish ticket data) for the CDQ summer commercial king crab harvest, Norton Sound Section, Eastern Bering Sea, June15 - June 28 and August 15 - August 24, 2003.[a]

Date	Landings	Number of Crab	Lbs of Crab Harvested	Cumulative Total (lbs)	No. of Pots Pulled	Average Weight (lbs)	CPUE
25-Jun	1	223	613	613	20	2.7	11.2
27-Jun	7	694	1,874	2,487	118	2.7	5.9
28-Jun	1	30	78	2,565	14	2.6	2.1
19-Aug	2	991	2,982	5,547	79	3.0	12.5
21-Aug	3	1,422	4,147	9,694	96	2.9	14.8
22-Aug	1	342	1,098	10,792	20	3.2	17.1
25-Aug	1	1,126	3,131	13,923	35	2.8	32.2
	17	4,828	13,923		382	2.9	12.6

[a] The CDQ fishery closed by EO 8/24, and the last delivery was made 8/25.

able 14. Length frequencies by shell age of all legal male red king crab sampled during the 2003 Norton Sound summer open access and CDQ commercial fisheries.

	Legal New Shell Males		Legal Old Shell Males		Total Legal Males	
Carapace Length (mm)	Number	Percent	Number	Percent	Number	Percent
95	0	0.0%	0	0.0%	0	0.0%
96	2	0.0%	0	0.0%	2	0.0%
97	0	0.0%	0	0.0%	0	0.0%
98	0	0.0%	1	0.0%	1	0.0%
99	3	0.1%	0	0.0%	3	0.1%
100	12	0.2%	1	0.0%	13	0.2%
101	11	0.2%	0	0.0%	11	0.2%
102	42	0.8%	4	0.1%	46	0.9%
103	51	1.0%	0	0.0%	51	1.0%
104	80	1.5%	3	0.1%	83	1.6%
105	115	2.2%	4	0.1%	119	2.3%
106	143	2.7%	10	0.2%	153	2.9%
107	191	3.7%	10	0.2%	201	3.8%
108	193	3.7%	12	0.2%	205	3.9%
109	216	4.1%	11	0.2%	227	4.3%
110	238	4.6%	17	0.3%	255	4.9%
111	274	5.2%	11	0.2%	285	5.5%
112	280	5.4%	21	0.4%	301	5.8%
113	193	3.7%	15	0.3%	208	4.0%
114	232	4.4%	30	0.6%	262	5.0%
115	237	4.5%	15	0.3%	252	4.8%
116	219	4.2%	20	0.4%	239	4.6%
117	171	3.3%	26	0.5%	197	3.8%
118	169	3.2%	26	0.5%	195	3.7%
119	145	2.8%	18	0.3%	163	3.1%
120	149	2.9%	26	0.5%	175	3.3%
121	130	2.5%	27	0.5%	157	3.0%
122	142	2.7%	38	0.7%	180	3.4%
123	77	1.5%	17	0.3%	94	1.8%
124	93	1.8%	31	0.6%	124	2.4%
125	83	1.6%	24	0.5%	107	2.0%
126	84	1.6%	38	0.7%	122	2.3%
127	81	1.5%	43	0.8%	124	2.4%
128	49	0.9%	25	0.5%	74	1.4%
129	69	1.3%	26	0.5%	95	1.8%
130	29	0.6%	28	0.5%	57	1.1%

(continued)

Table 14. Page 2 of 2.

	Legal New Shell Males		Legal Old Shell Males		Total Legal Males	
Carapace Length (mm)	Number	Percent	Number	Percent	Number	Percent
131	54	1.0%	28	0.5%	82	1.6%
132	59	1.1%	18	0.3%	77	1.5%
133	33	0.6%	15	0.3%	48	0.9%
134	30	0.6%	17	0.3%	47	0.9%
135	20	0.4%	7	0.1%	27	0.5%
136	24	0.5%	15	0.3%	39	0.7%
137	16	0.3%	7	0.1%	23	0.4%
138	12	0.2%	5	0.1%	17	0.3%
139	11	0.2%	5	0.1%	16	0.3%
140	14	0.3%	6	0.1%	20	0.4%
141	3	0.1%	4	0.1%	7	0.1%
142	11	0.2%	3	0.1%	14	0.3%
143	5	0.1%	3	0.1%	8	0.2%
144	2	0.0%	1	0.0%	3	0.1%
145	2	0.0%	0	0.0%	2	0.0%
146	4	0.1%	0	0.0%	4	0.1%
147	1	0.0%	1	0.0%	2	0.0%
148	0	0.0%	0	0.0%	0	0.0%
149	3	0.1%	0	0.0%	3	0.1%
150	0	0.0%	0	0.0%	0	0.0%
151	1	0.0%	0	0.0%	1	0.0%
152	1	0.0%	1	0.0%	2	0.0%
153	0	0.0%	0	0.0%	0	0.0%
154	0	0.0%	0	0.0%	0	0.0%
155	0	0.0%	0	0.0%	0	0.0%
156	0	0.0%	1	0.0%	1	0.0%
157	0	0.0%	0	0.0%	0	0.0%
158	0	0.0%	0	0.0%	0	0.0%
159	0	0.0%	0	0.0%	0	0.0%
160	0	0.0%	0	0.0%	0	0.0%
161	0	0.0%	0	0.0%	0	0.0%
162	1	0.0%	0	0.0%	1	0.0%
163	0	0.0%	0	0.0%	0	0.0%
164	0	0.0%	0	0.0%	0	0.0%
165	0	0.0%	0	0.0%	0	0.0%
166	1	0.0%	0	0.0%	1	0.0%
Totals	4,511	86.3%	715	13.7%	5,226	100.0%
Average Lengths	115.8		122.7		116.8	

Total Recruits <116mm =	2,513	48.1%
Total Postrecruits ≥ 116mm and all legal old shell males =	2,713	51.9%

Table 15. Winter 2002-2003 subsistence red king crab catches and effort by gear type, Norton Sound District.

Gear Type	# Permits Fished	# Males Caught	# Males Kept	# Females Caught	# Females Kept	Total Crab Captured	Total Crab Kept	Average Harvest per Fisher
Pots	39	5,467	3,020	1,590	32	7,057	3,052	78
Handlines	4	12	10	0	0	12	10	3
Both	2	69	54	8	0	77	54	27
Unknown	19	1,791	1,071	274	66	2,065	1,137	0
Totals	64	7,339	4,155	1,872	98	9,211	4,253	66

Number of permits given out= 107
Number of permits returned= 73

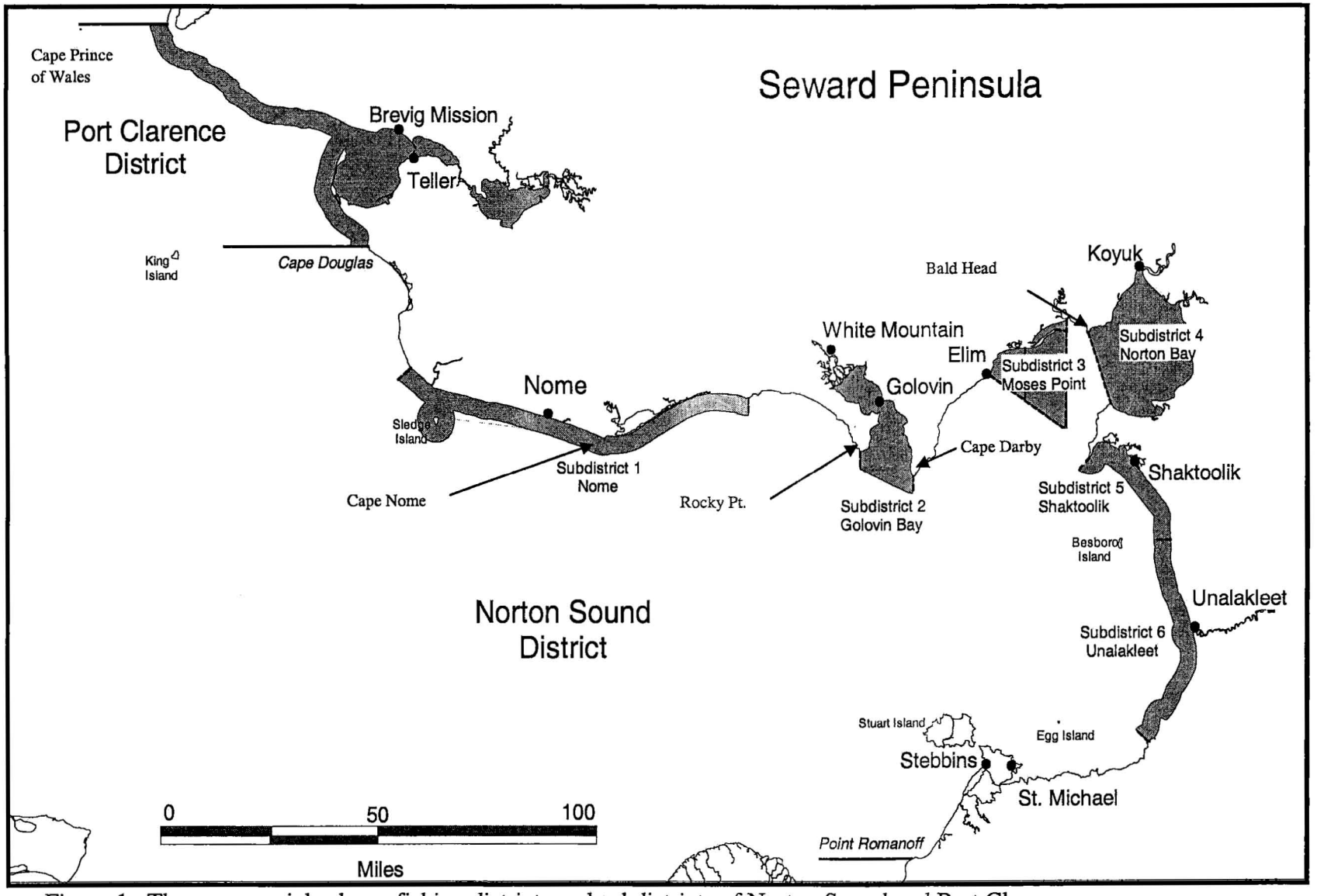

Figure 1. The commercial salmon fishing districts and subdistricts of Norton Sound and Port Clarence.

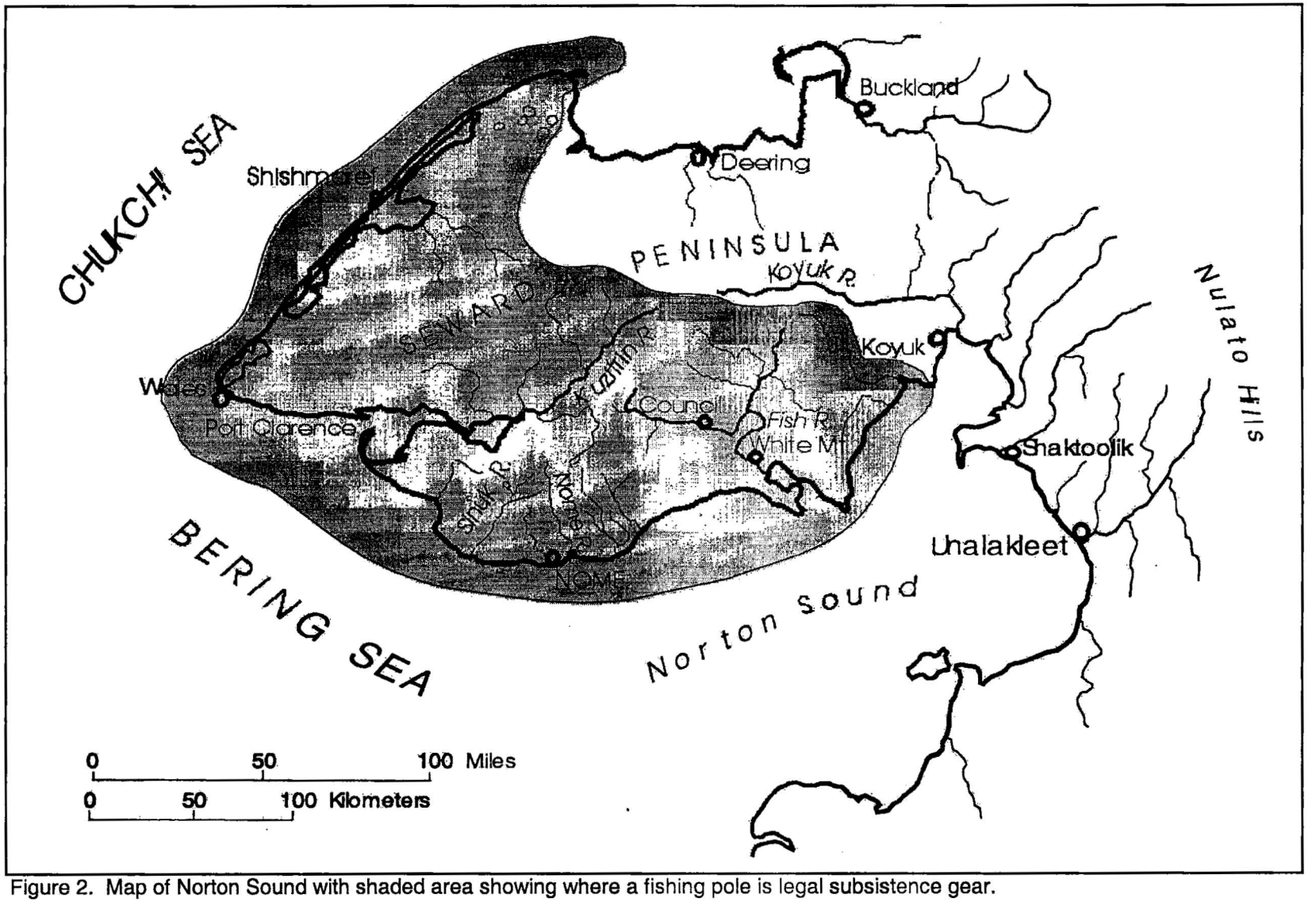

Figure 2. Map of Norton Sound with shaded area showing where a fishing pole is legal subsistence gear.

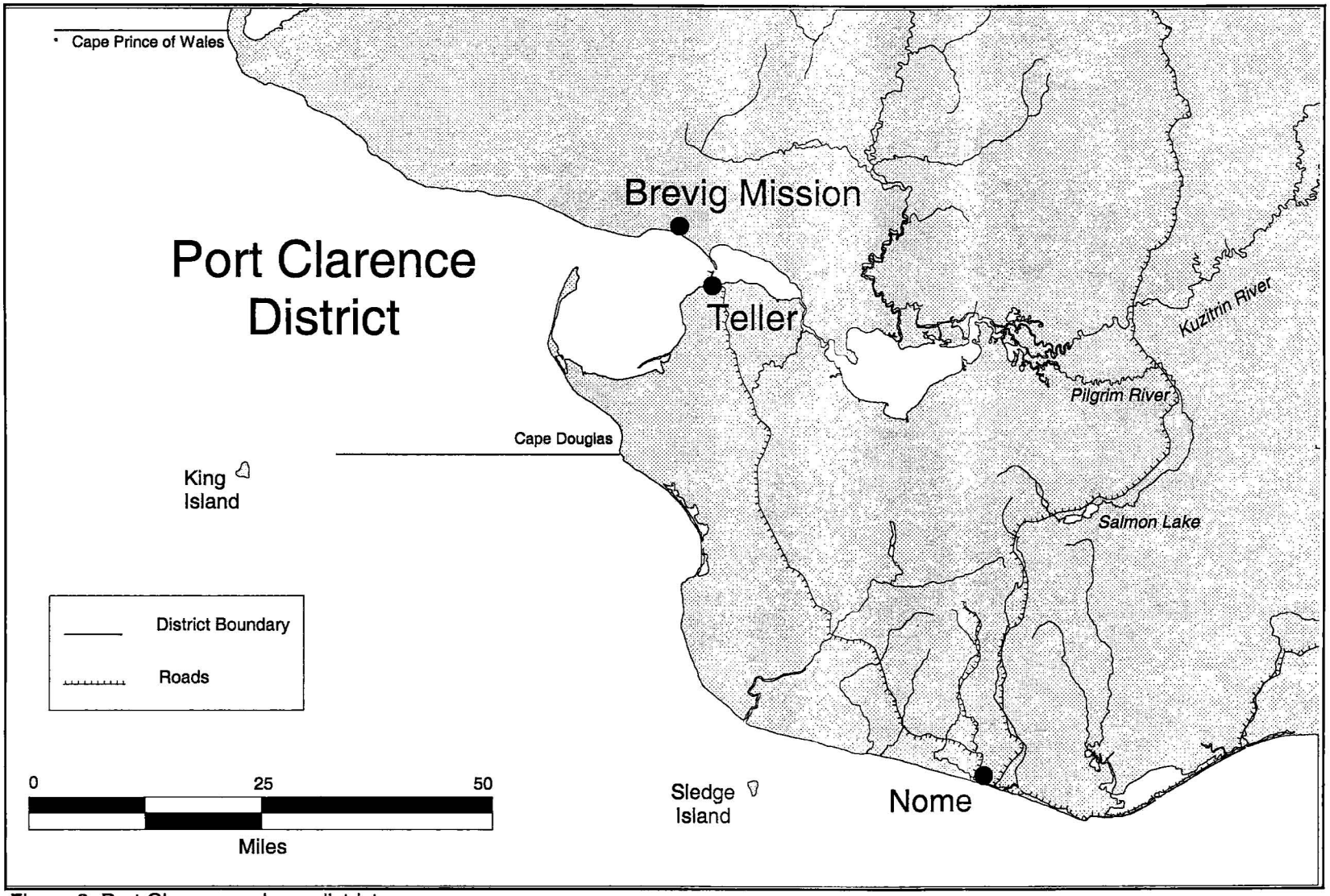

Figure 3. Port Clarence salmon district.

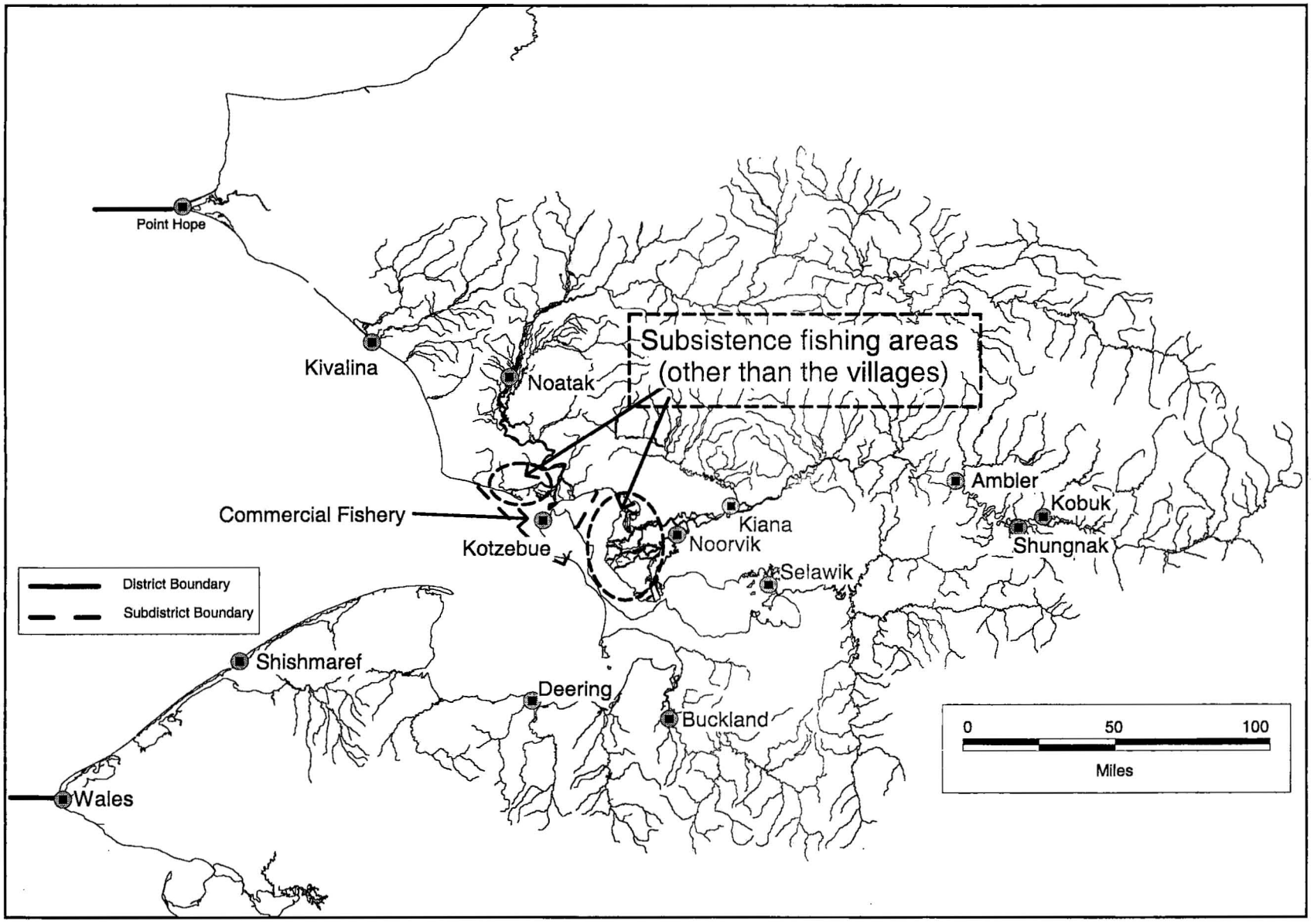

Figure 4. Kotzebue Sound salmon district, villages, and subsistence fishing areas.

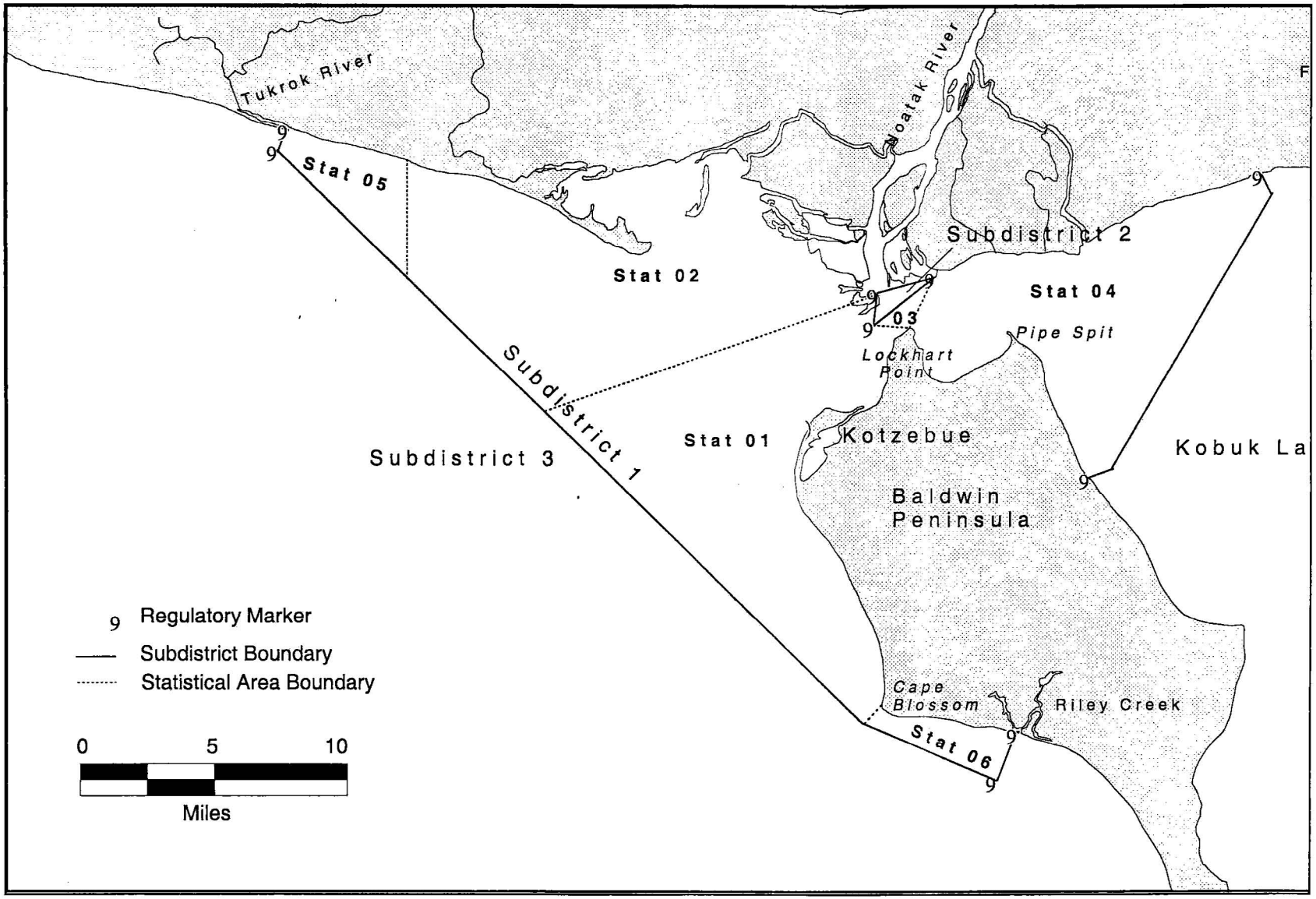

Figure 5. Kotzebue Sound salmon fishing subdistricts and statistical areas.

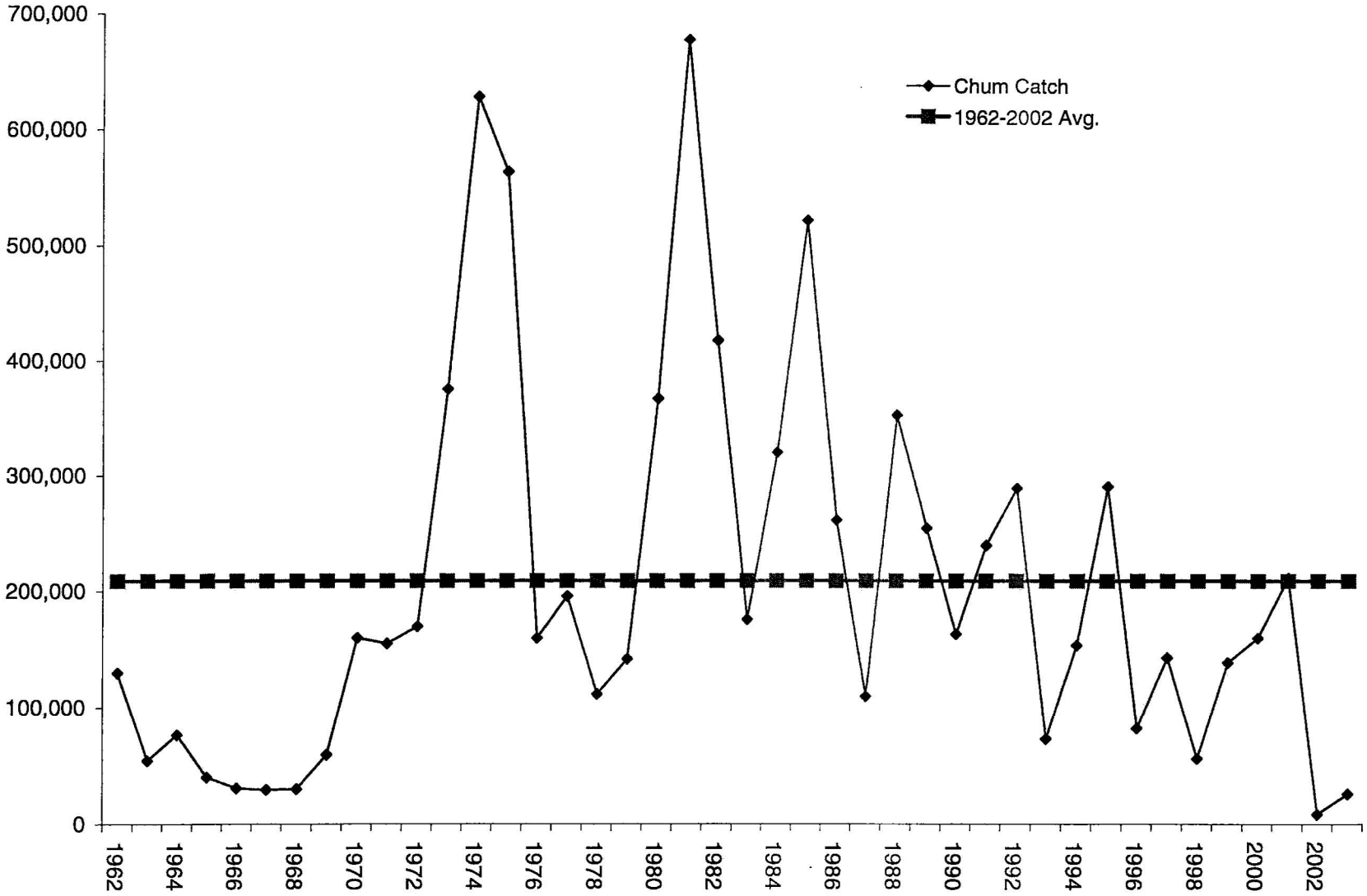

Figure 6. Kotzebue Sound commercial chum salmon catch and historical average, 1962-2003.

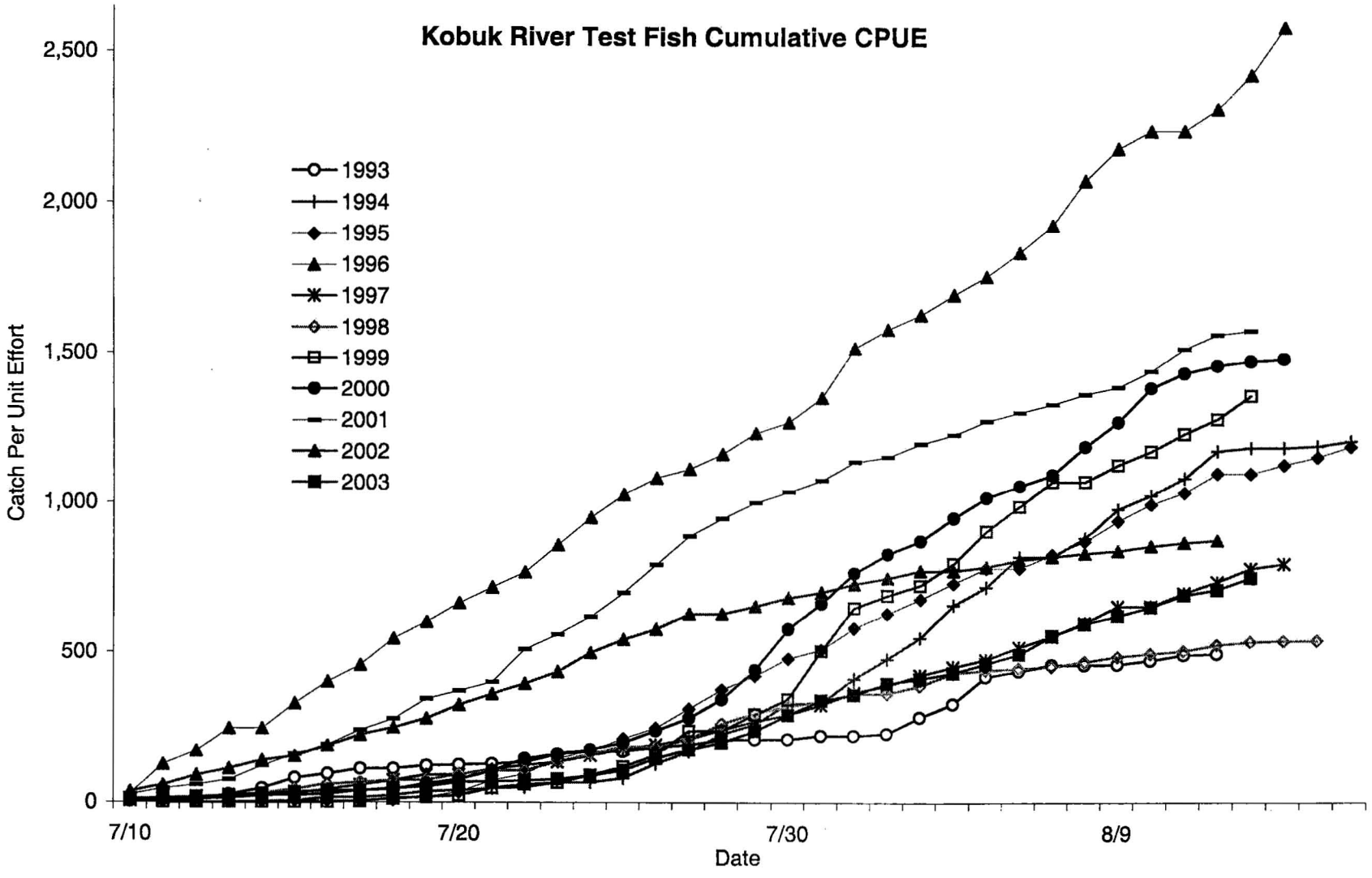

Figure 7. Kobuk River chum salmon drift test fish cumulative Catch Per Unit Effort (CPUE), 1993-2003.

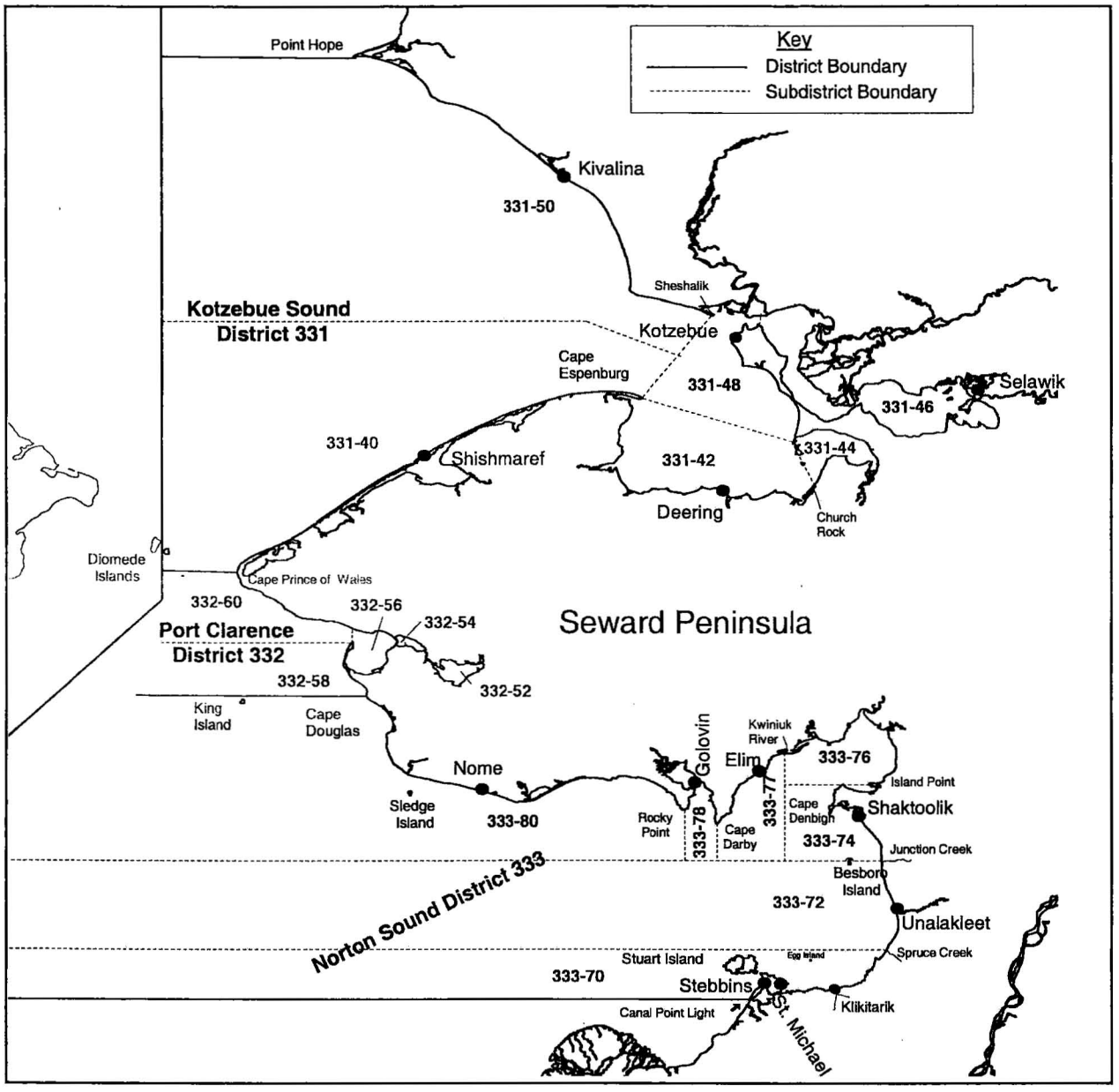

Figure 8. Statistical areas of the Norton Sound, Port Clarence and Kotzebue Sound commercial herring fishing districts.

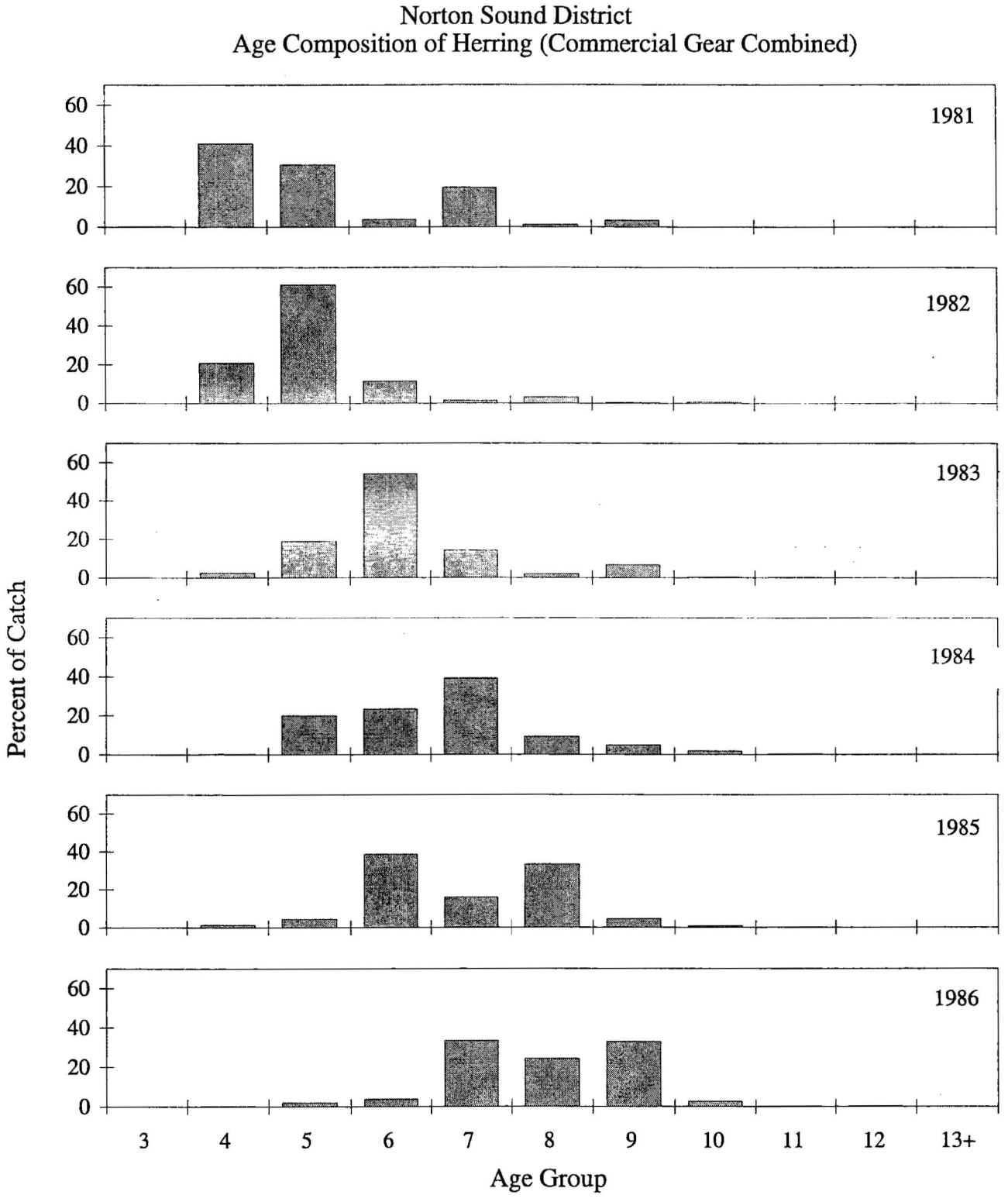

Figure 9. Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 1981-2003. (page 1 of 4)

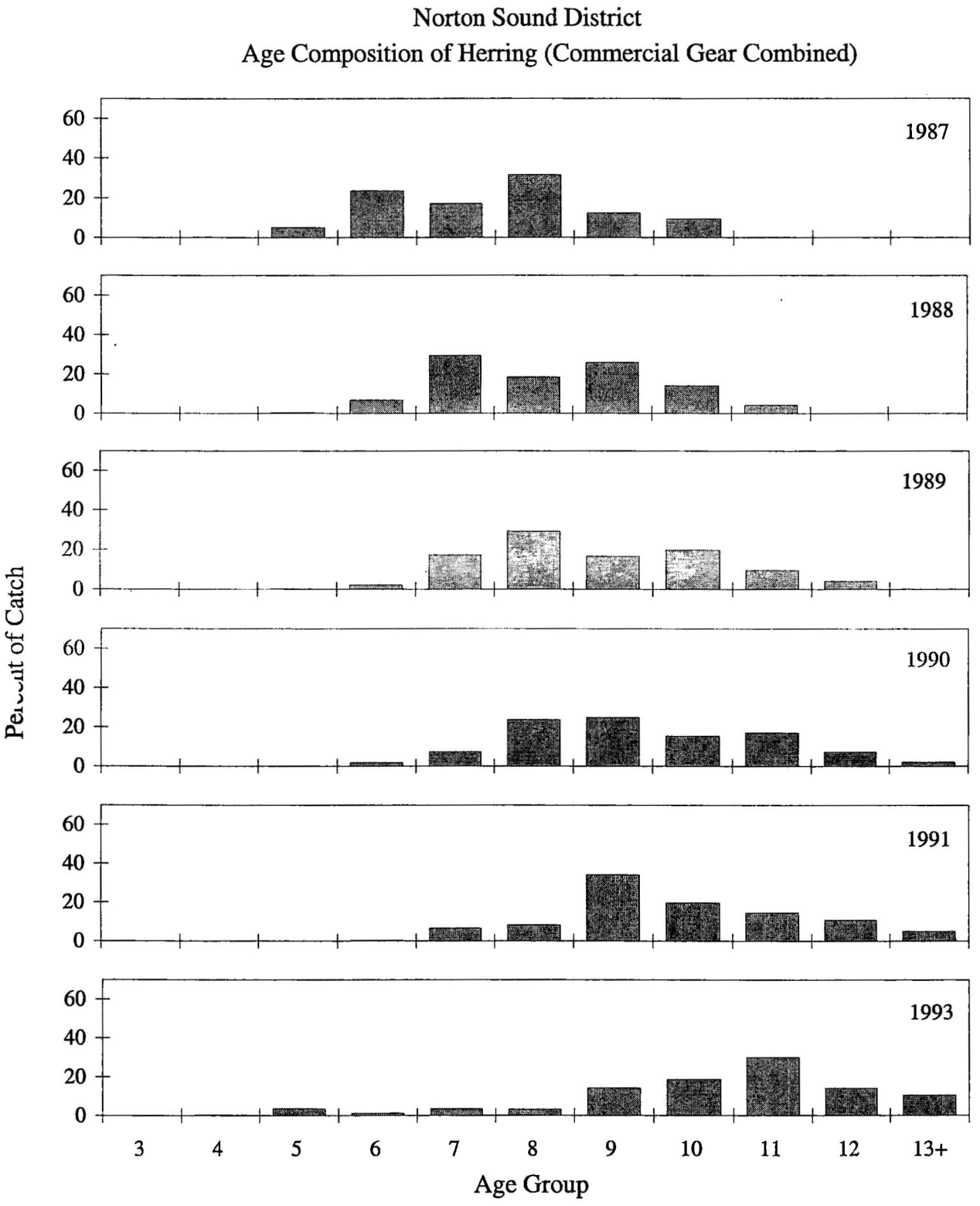

Figure 9. (page 2 of 4)
note: No commercial fishing occurred in 1992.

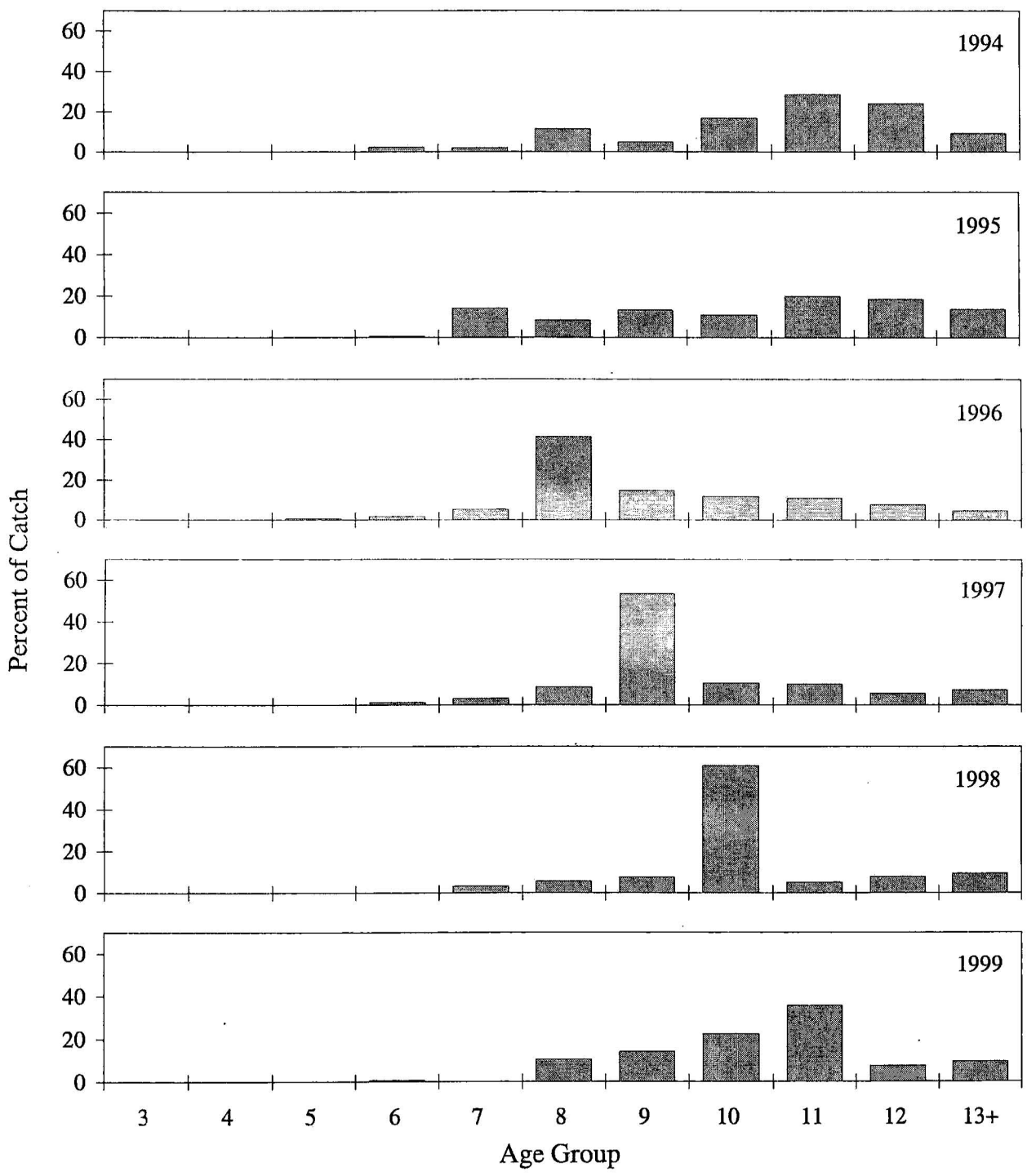

Figure 9. (page 3 of 4)
Note: No commercial catch from beach seine gear in 1998 and 1999.

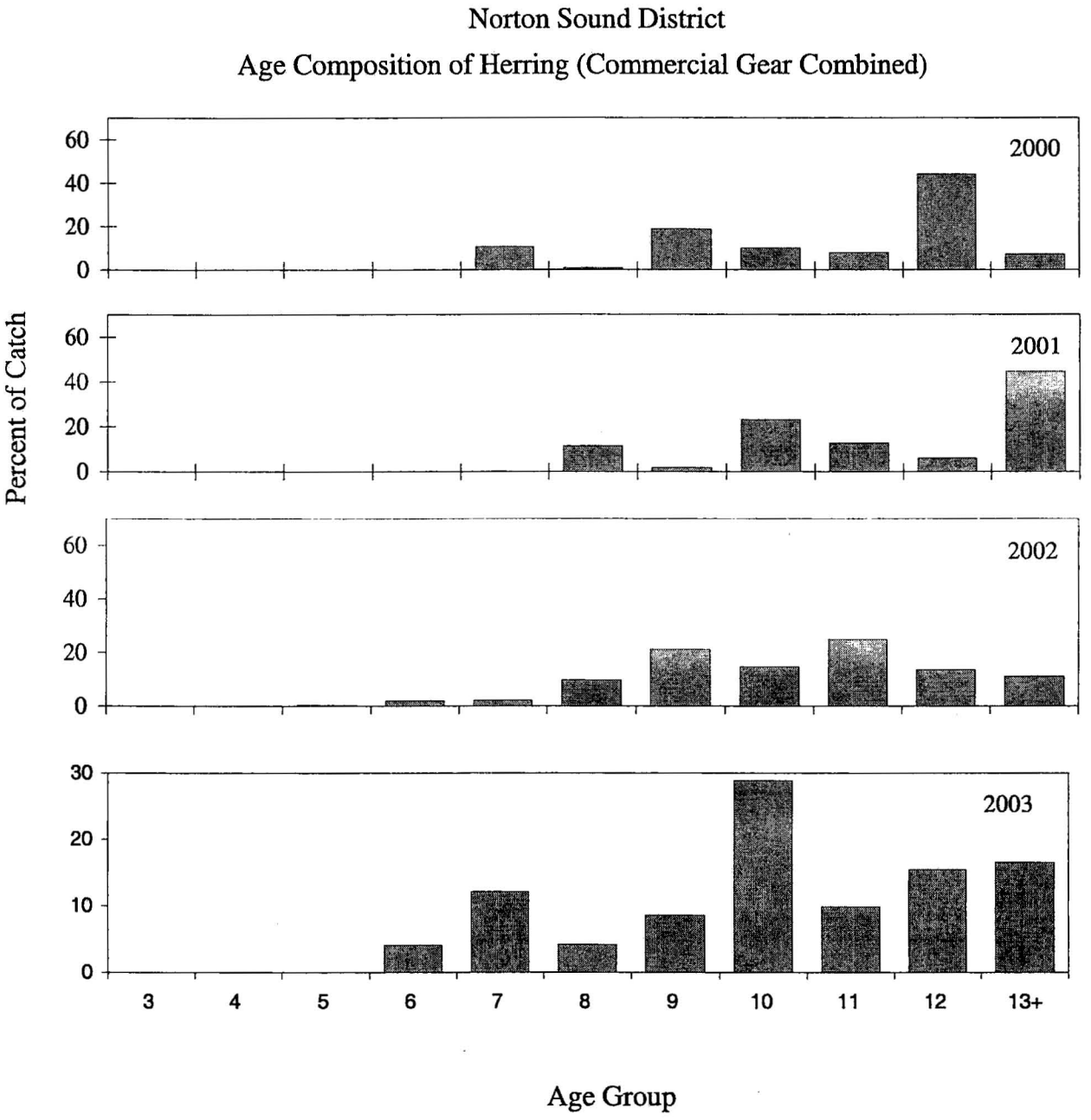

Figure 9. (page 4 of 4)
Note: No commercial catch from beach seine gear in 2001 - 2003.

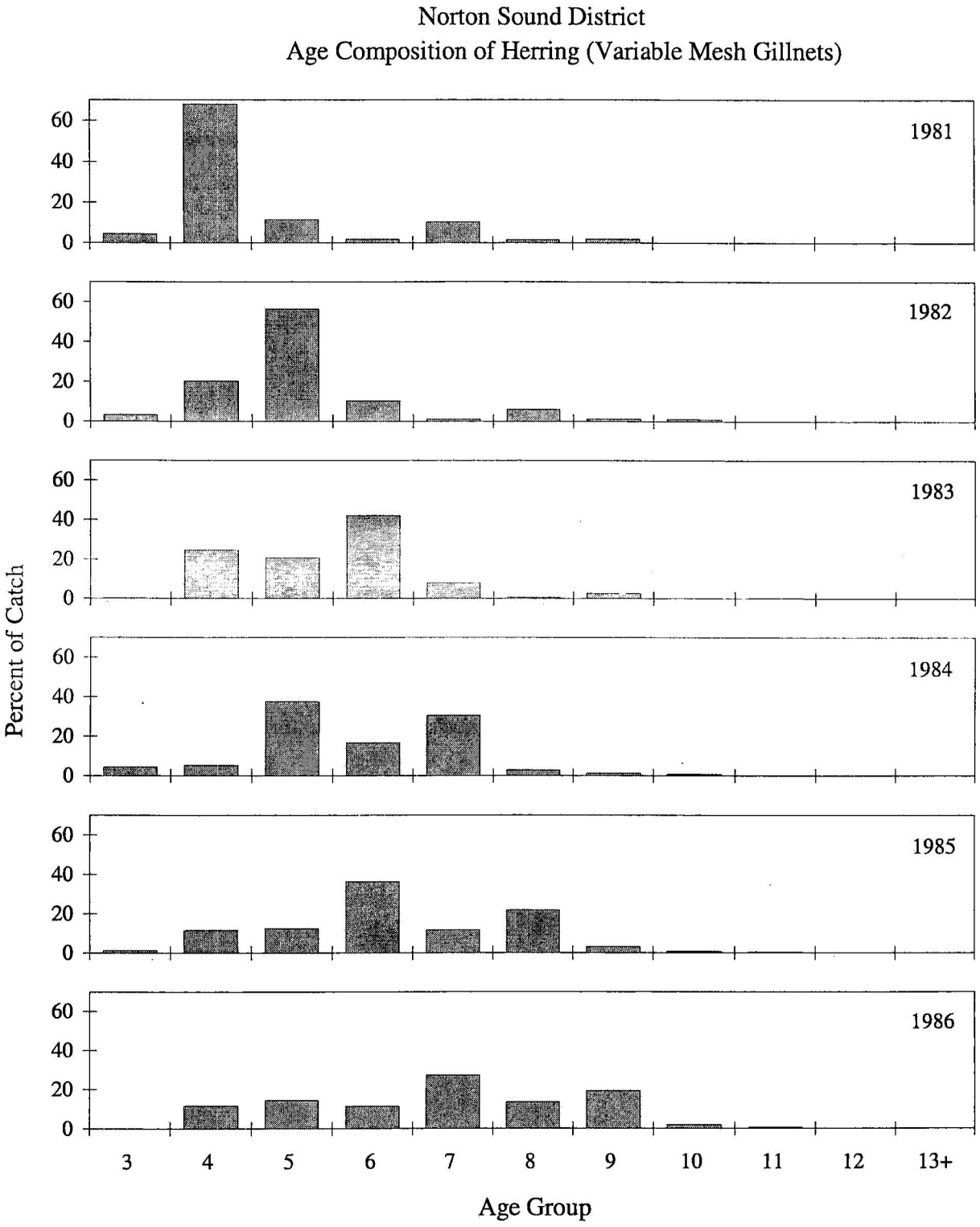

Figure 10. Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1981-2003. (page 1 of 4)

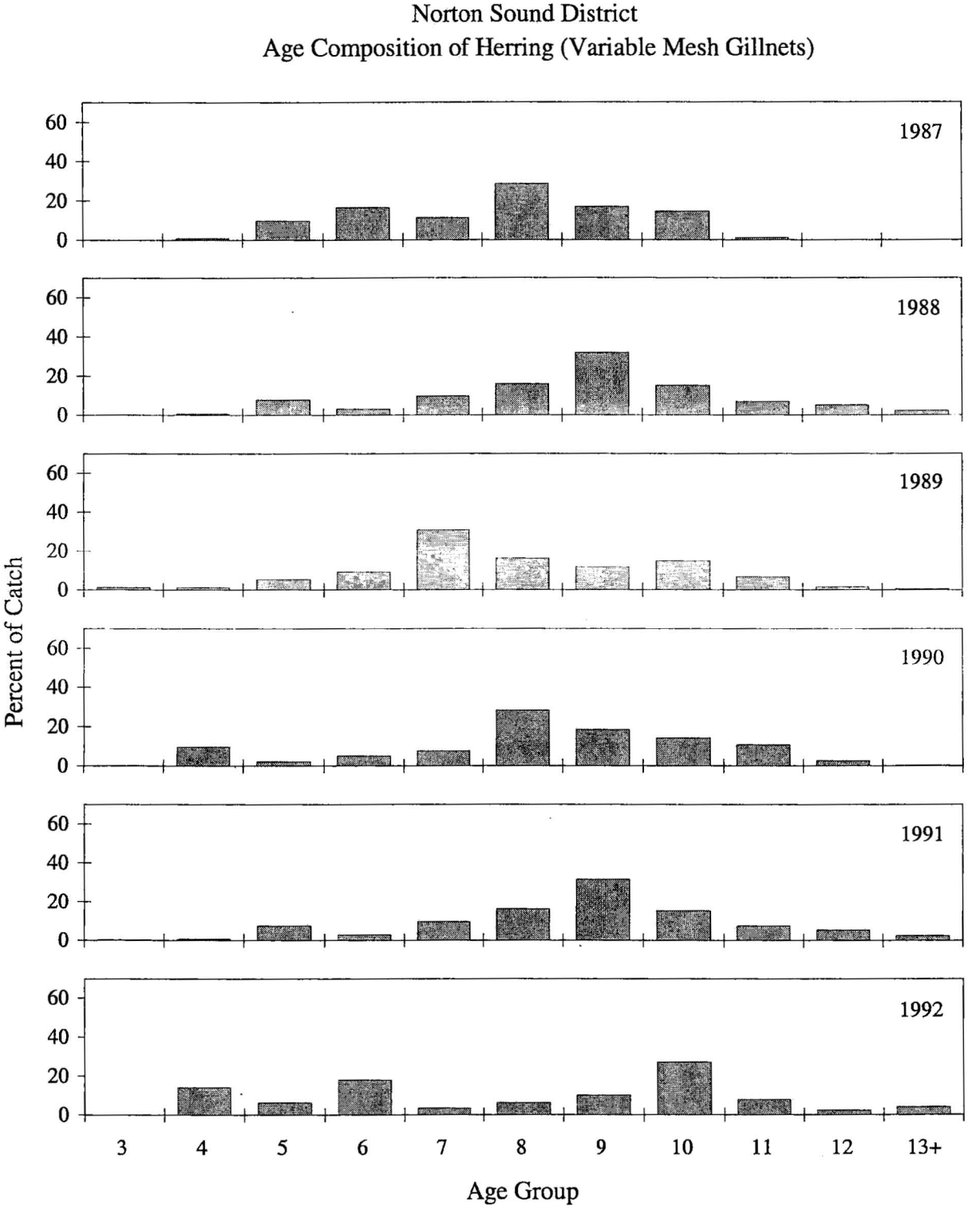

Figure 10. (page 2 of 4)

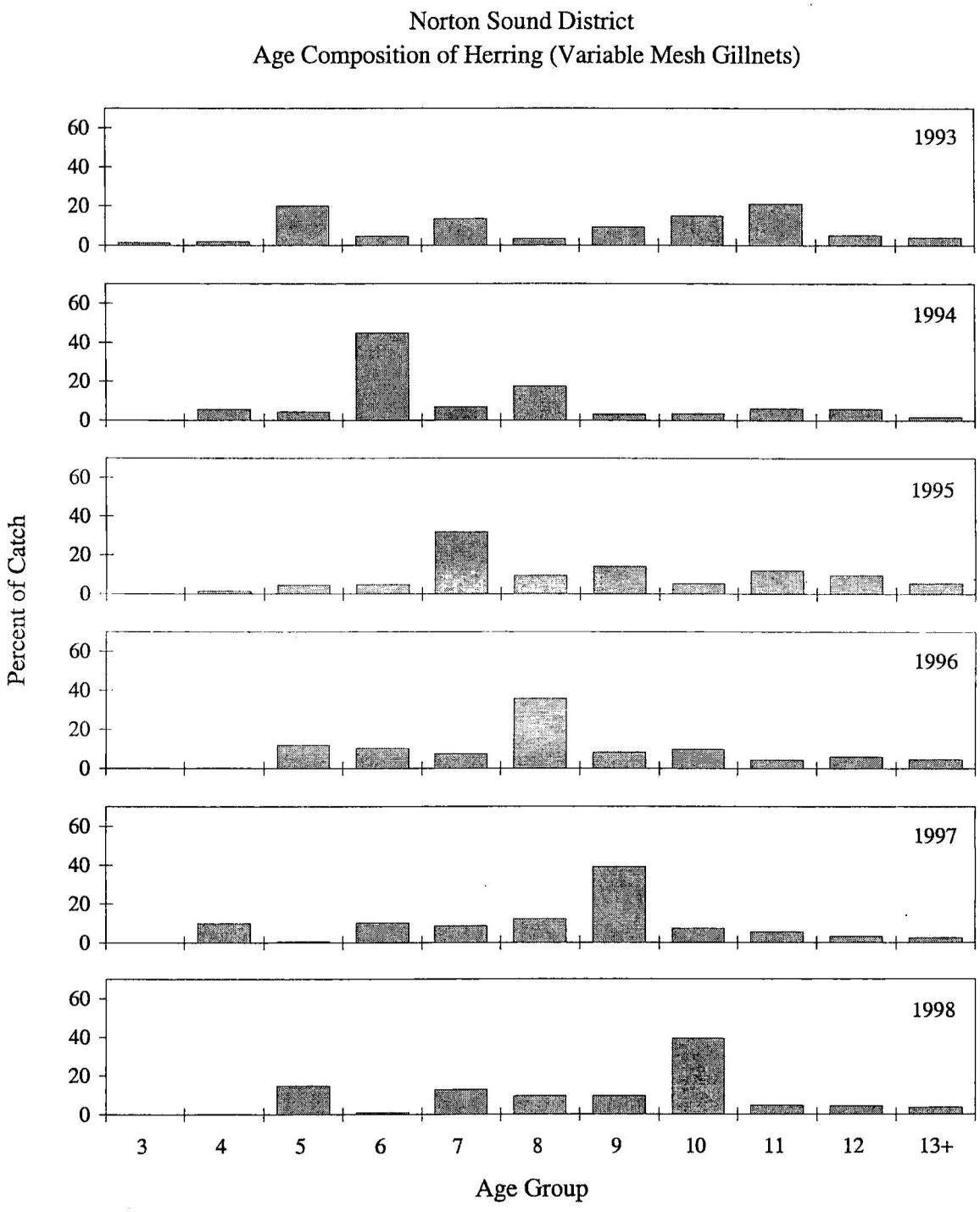

Figure 10. (page 3 of 4)

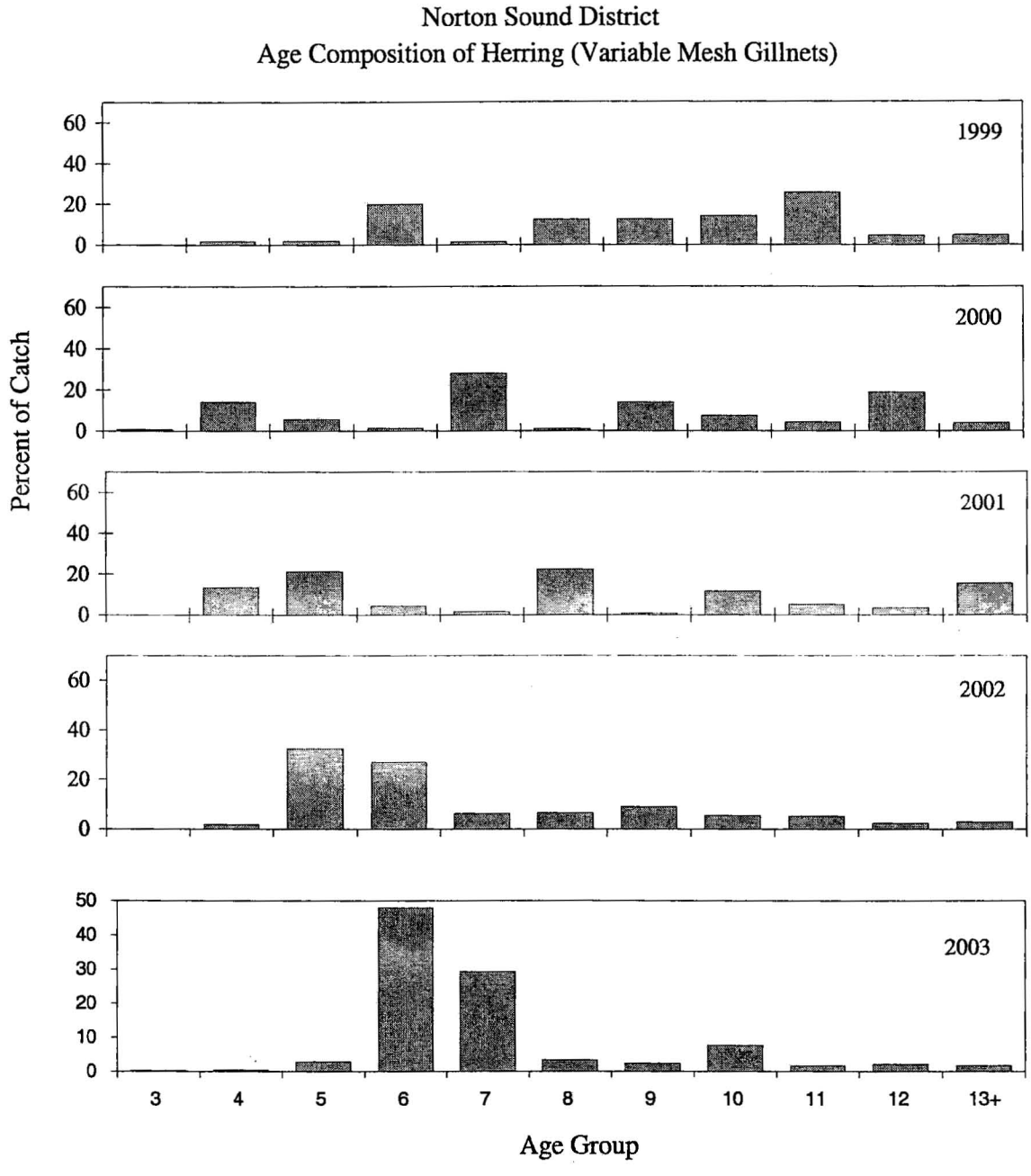

Figure 10. (page 4 of 4)

NORTON SOUND HERRING

2003 Catch and the 2004 Projection

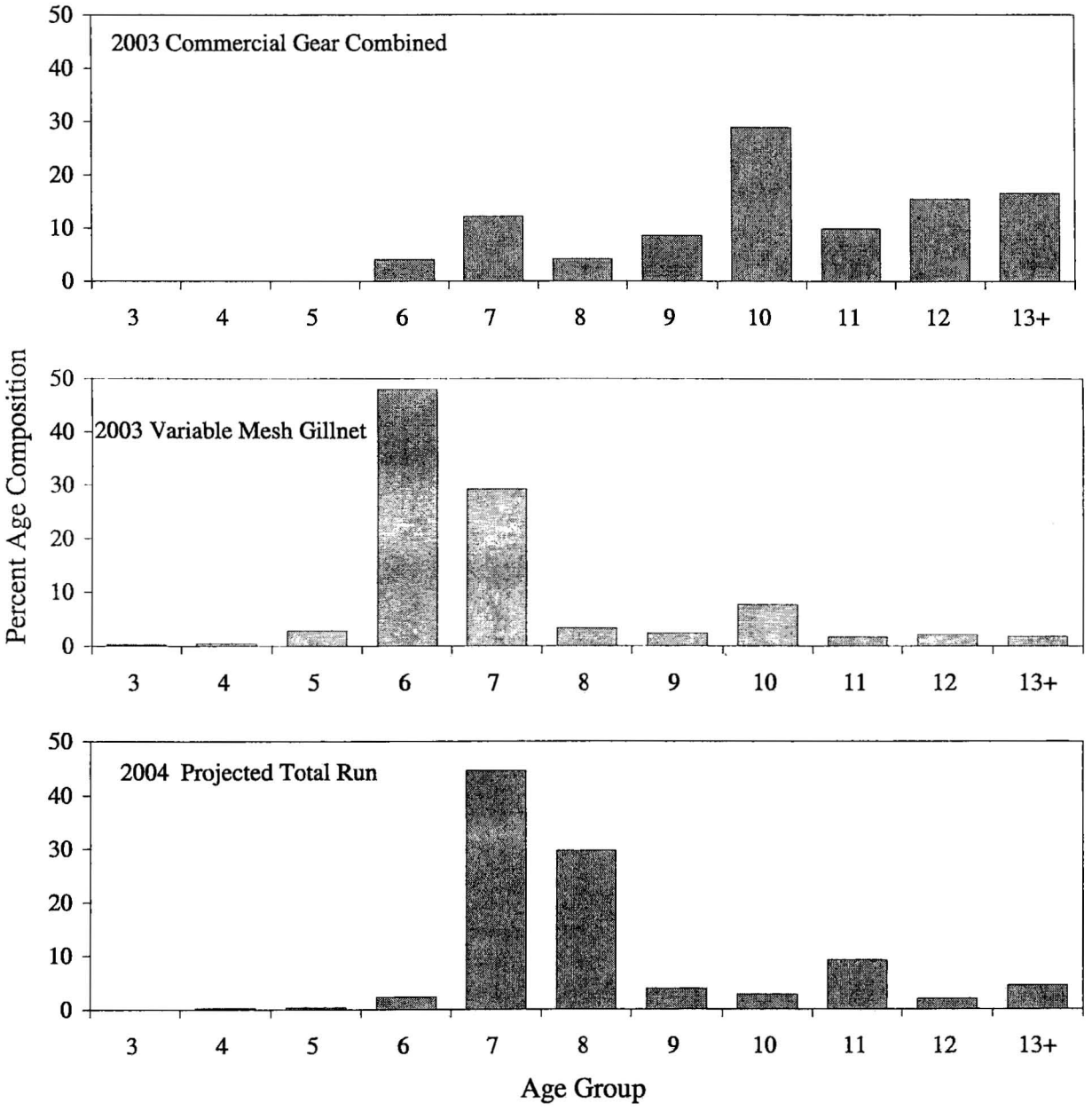

Figure 11. Norton Sound Pacific herring age composition comparison of the 2003 commercial gillnet gear, variable mesh gear, and the projected age composition of the 2004 return.

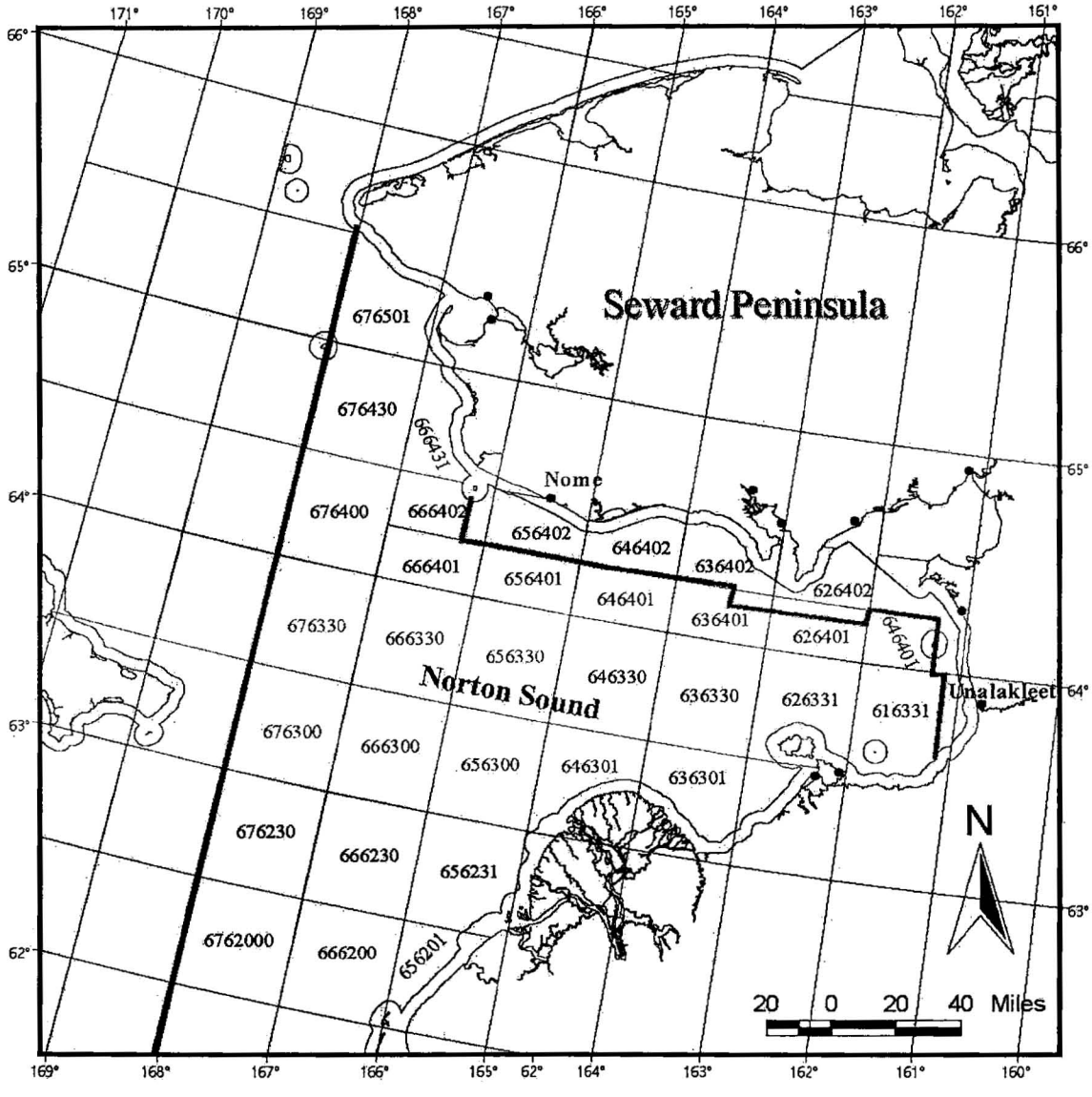

Figure 12. Statistical areas for the Norton Sound red king crab fishery.

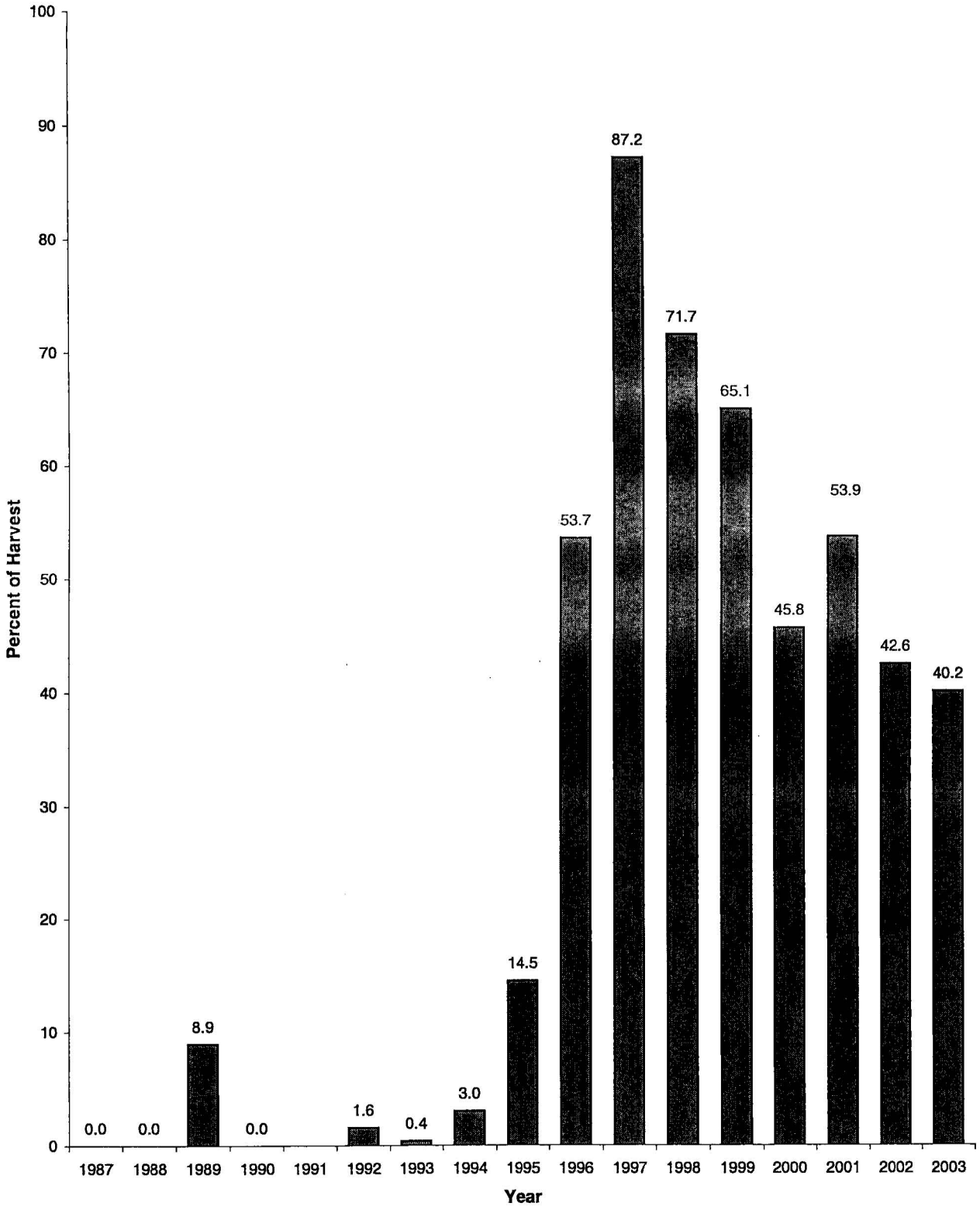

Figure 13. The percentage of crab harvested during the Norton Sound summer commercial red king crab fishery east of the 164 degrees west longitude, 1987 - 2003.

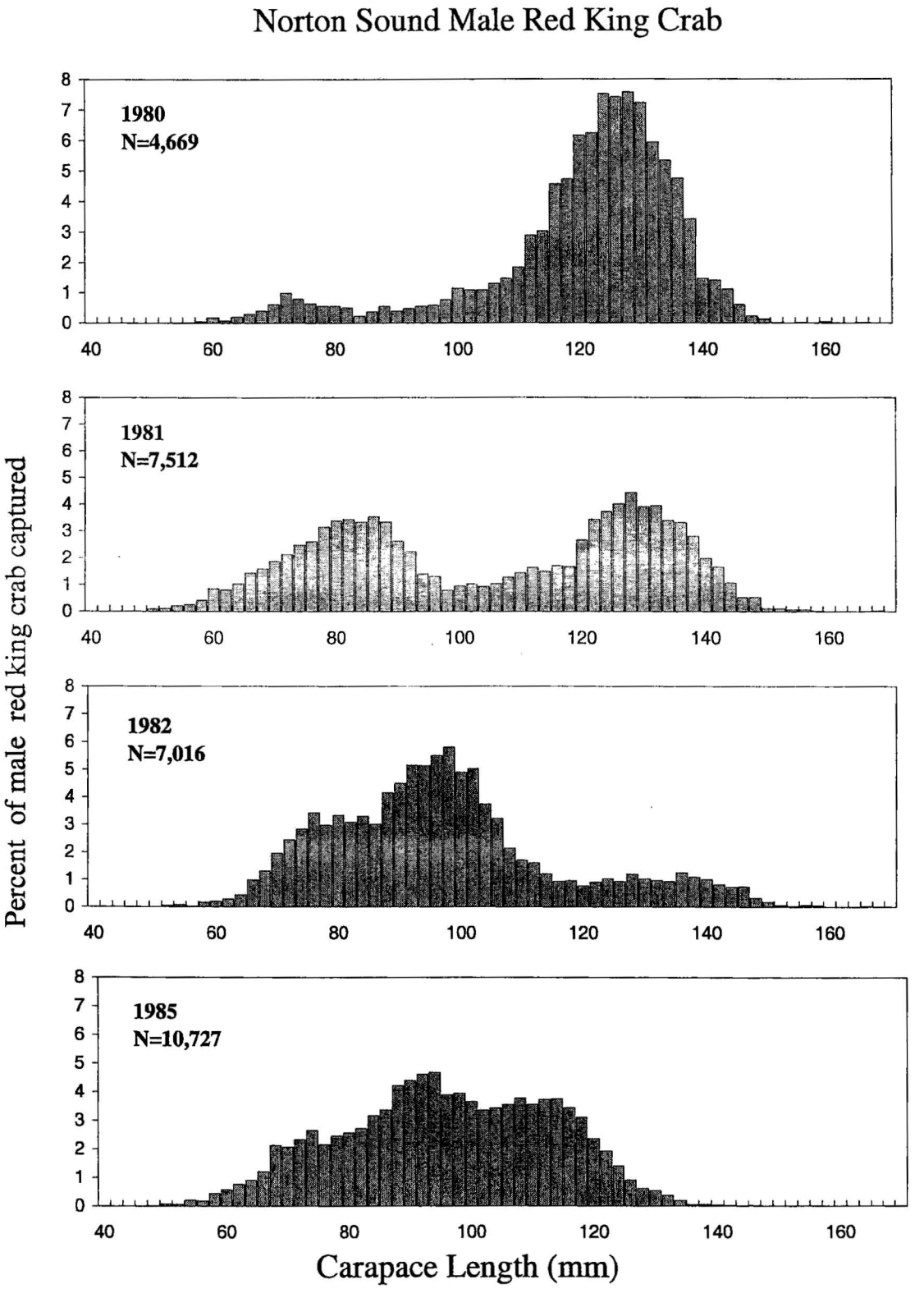

Figure 14. Norton Sound male red king crab size distribution from pot assessment surveys conducted by the Alaska Department of Fish and Game, 1980, 1981, 1982, and 1985.

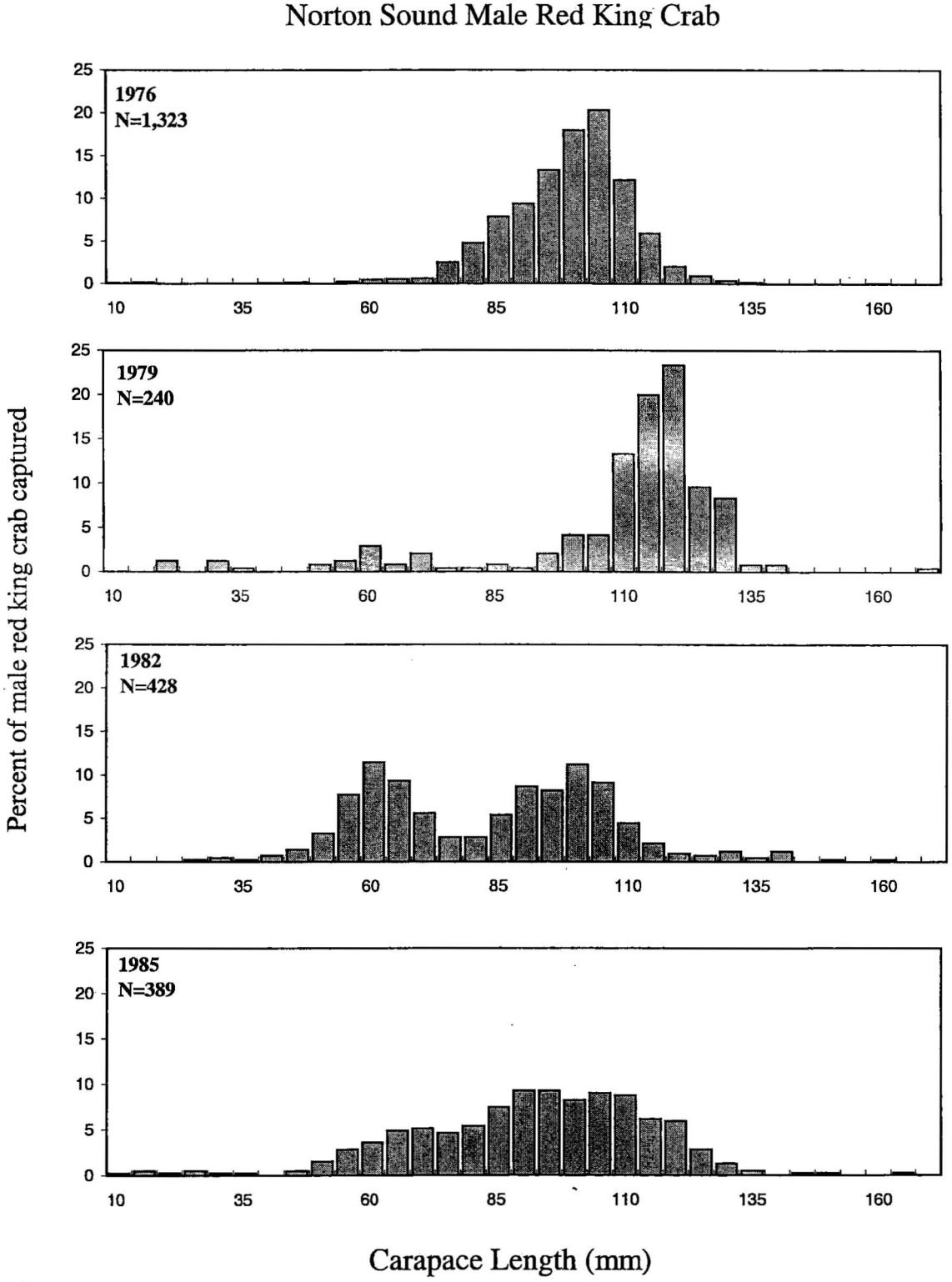

Figure 15. Norton Sound male red king crab size distribution from trawl assessment surveys conducted by the National Marine Fisheries Service, 1976, 1979, 1982, 1985, 1988, 1991, and by ADF&G in 1996, 1999. and 2002.

(Page 1 of 3).

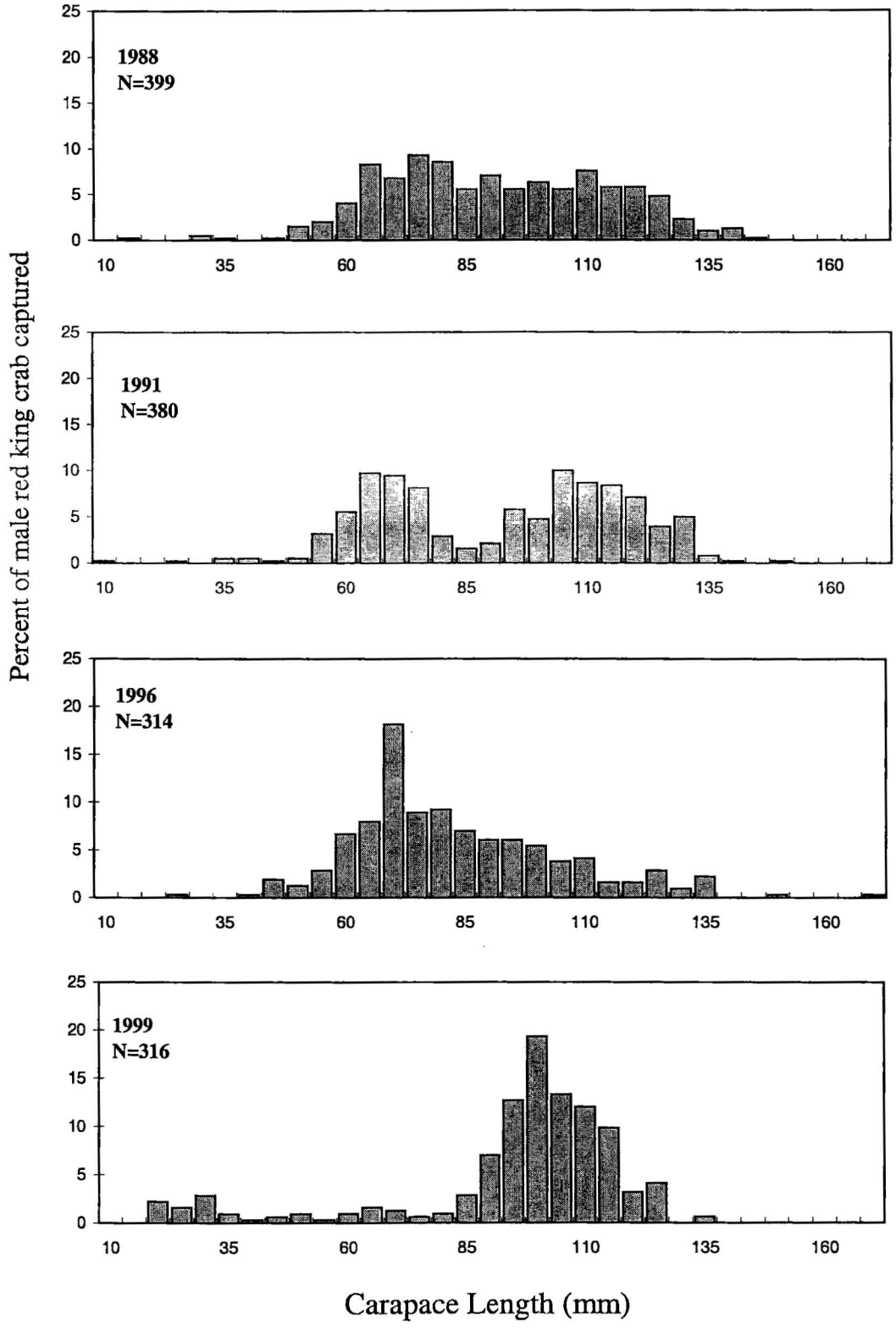

Figure 15. (Page 2 of 3)

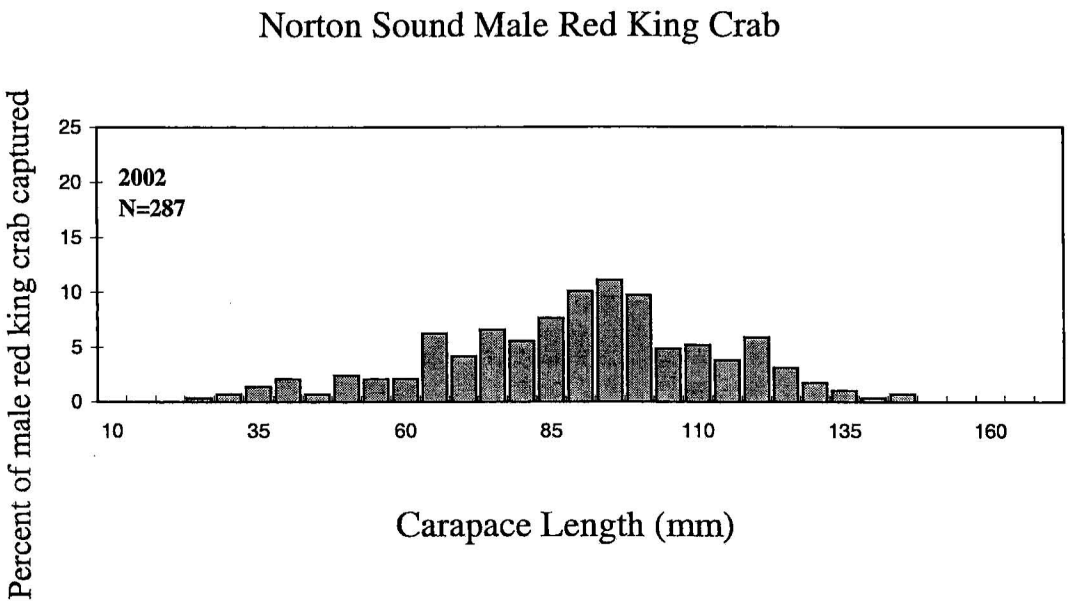

Figure 15. (Page 3 of 3)

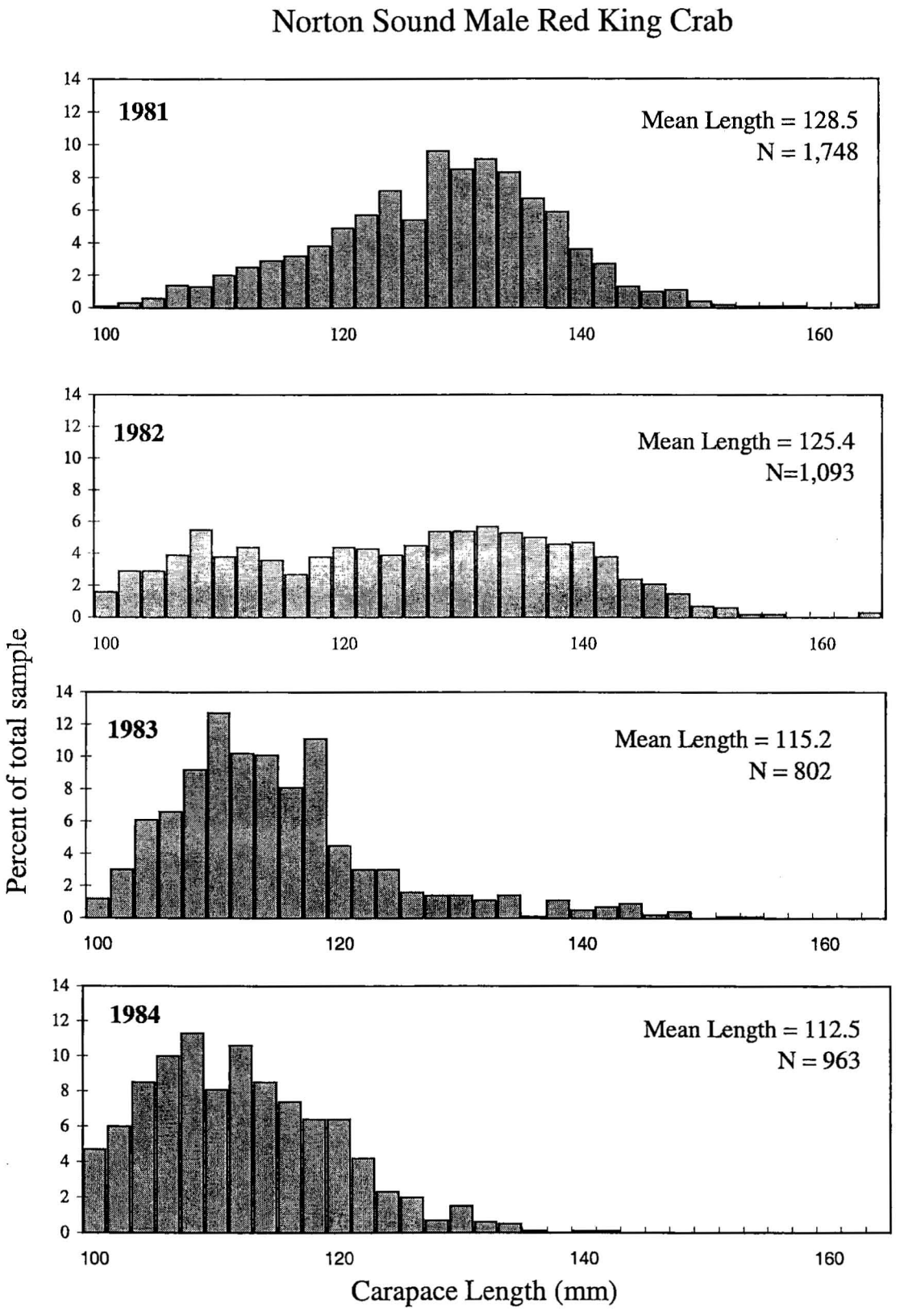

Figure 16. Length composition of Norton Sound red king crab summer commercial harvests, 1981-2003. (Page 1 of 6)

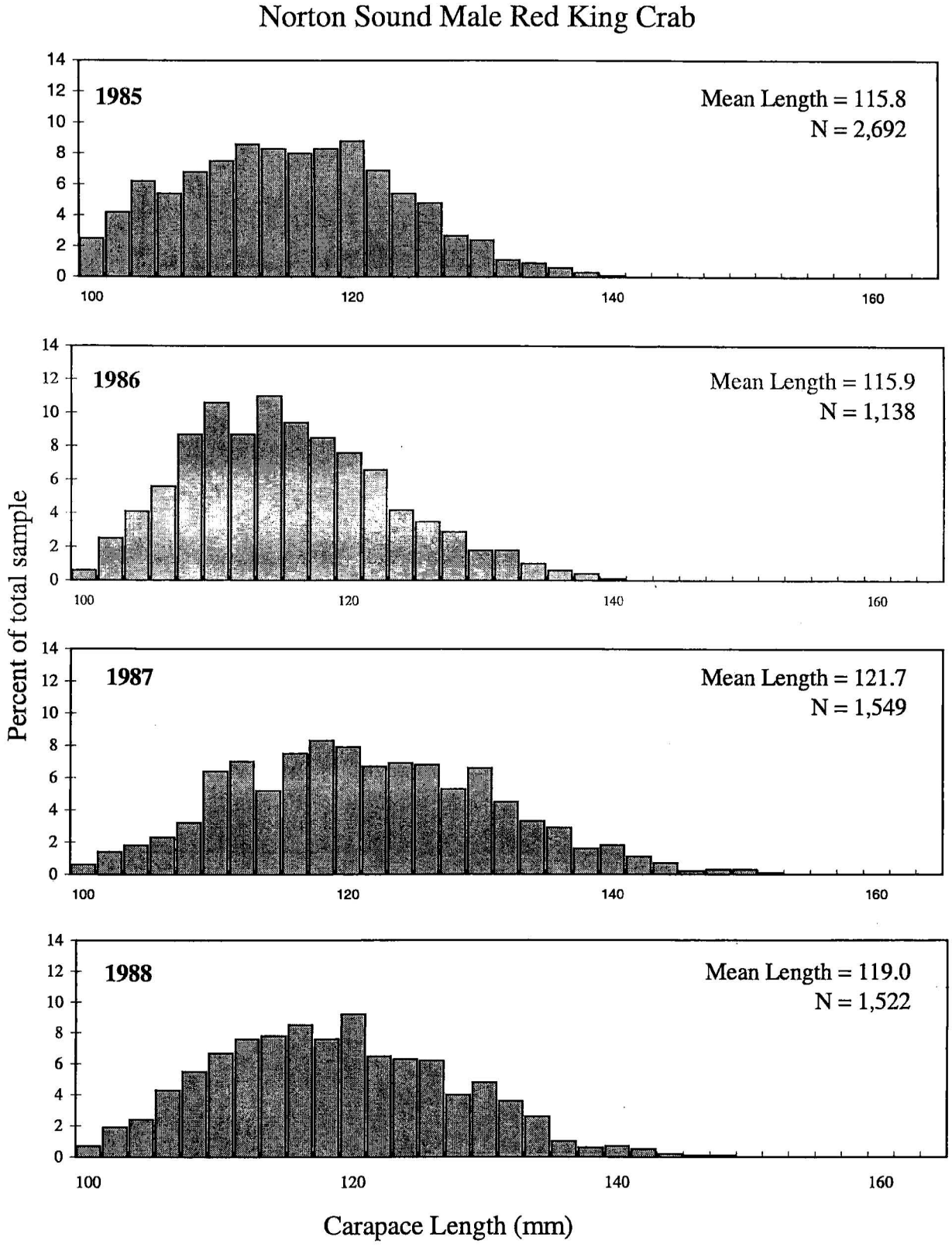

Figure 16. (page 2 of 6)

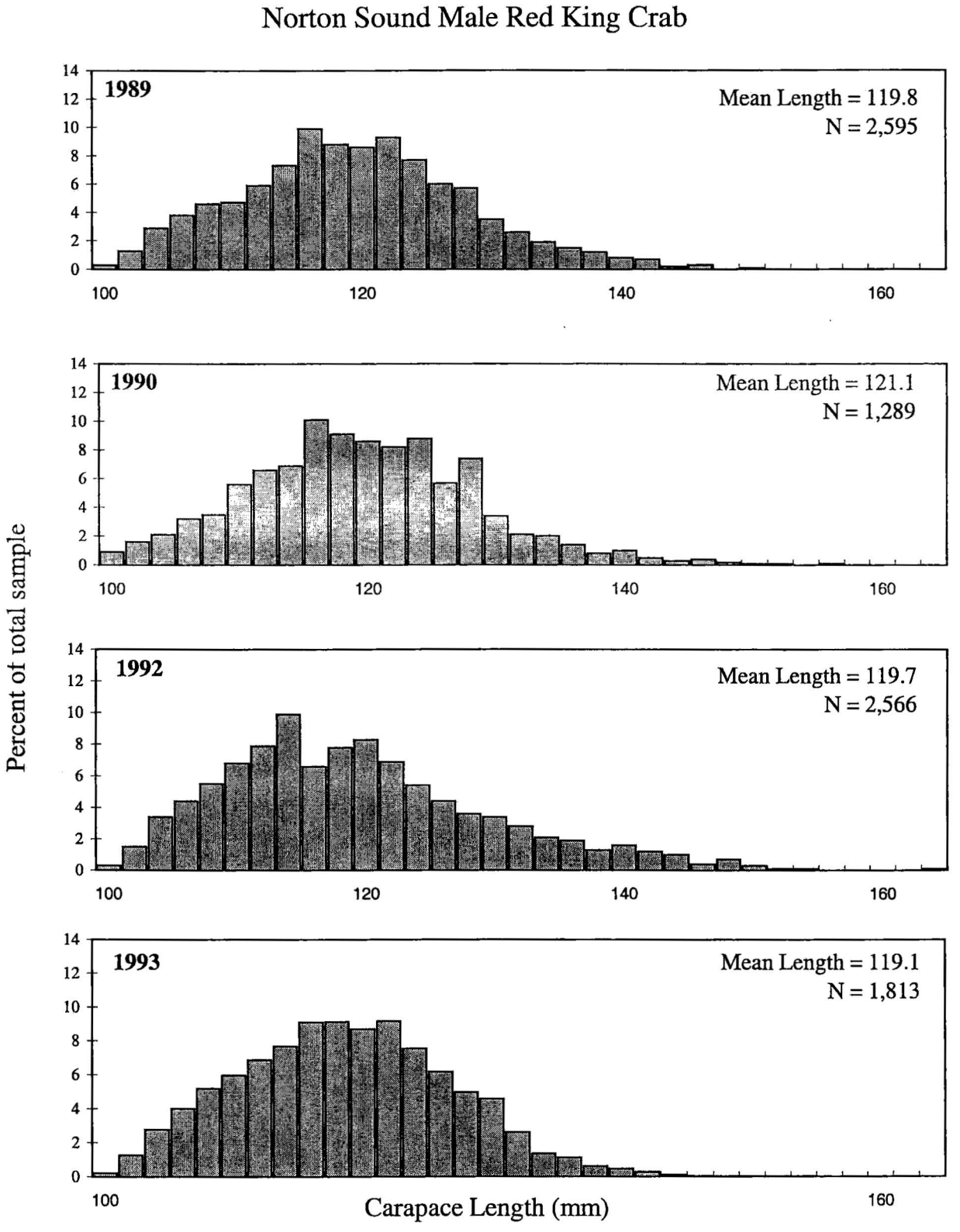

Figure 16. (page 3 of 6)
Note: There was no fishery in 1991.

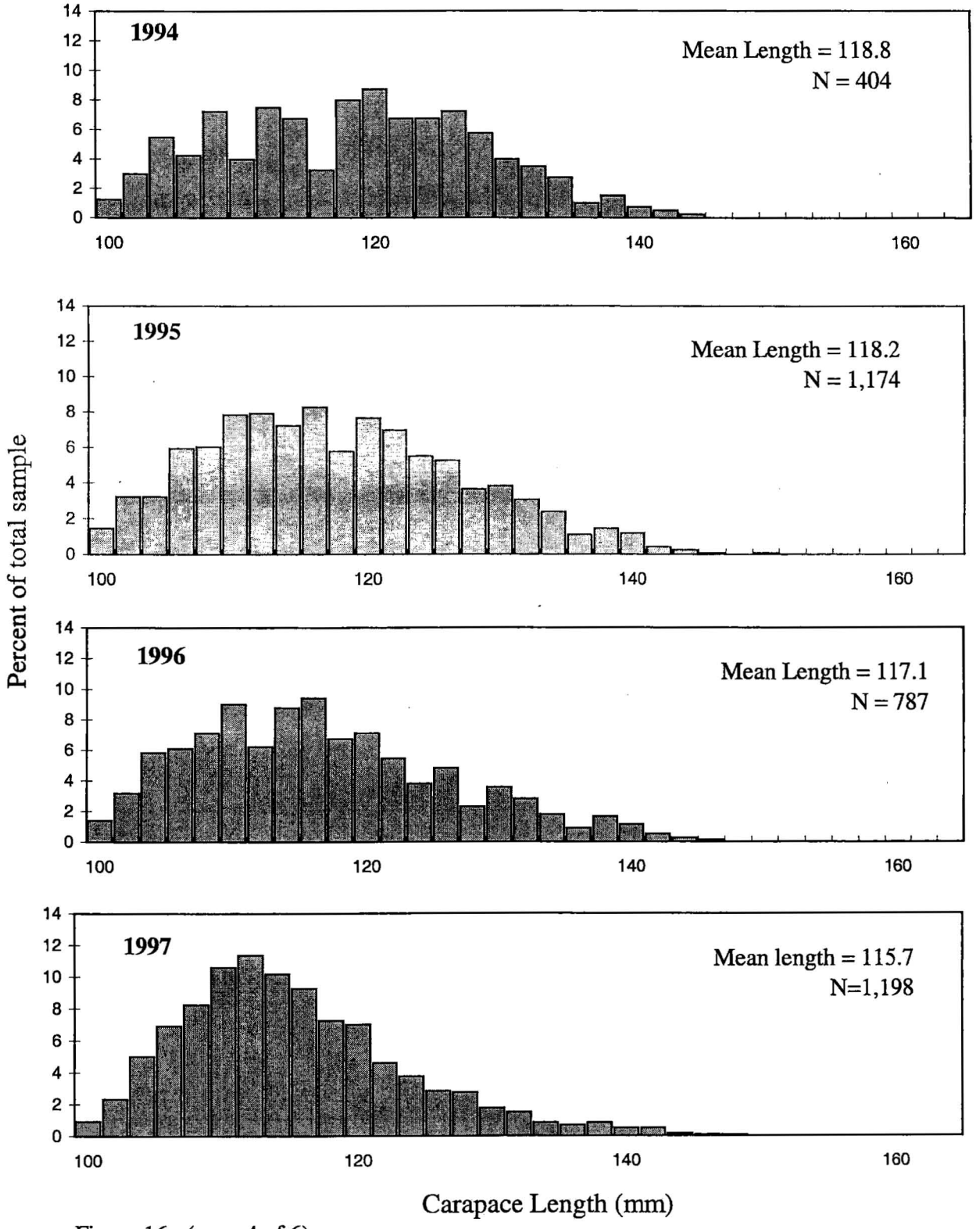

Figure 16. (page 4 of 6)

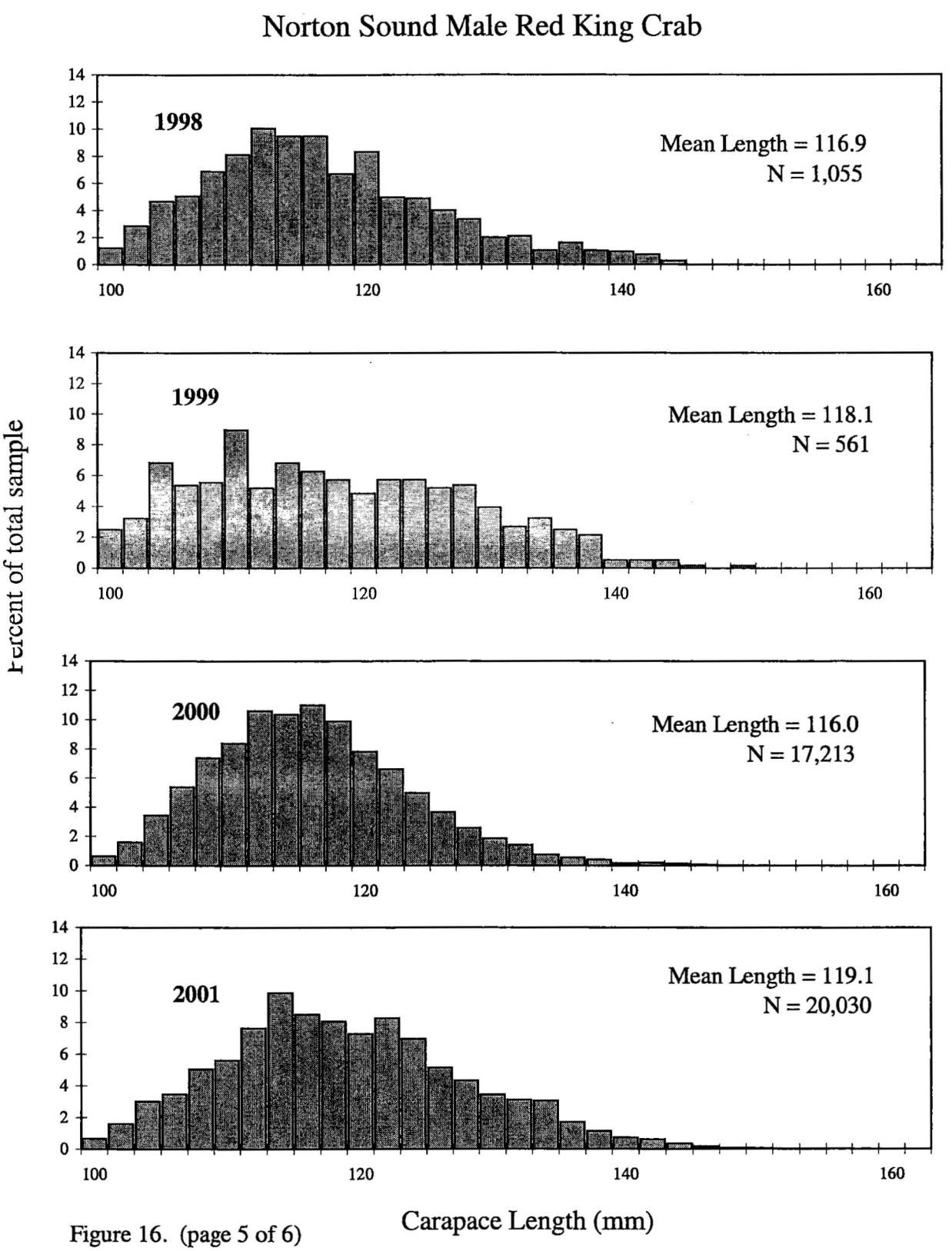

Figure 16. (page 5 of 6)

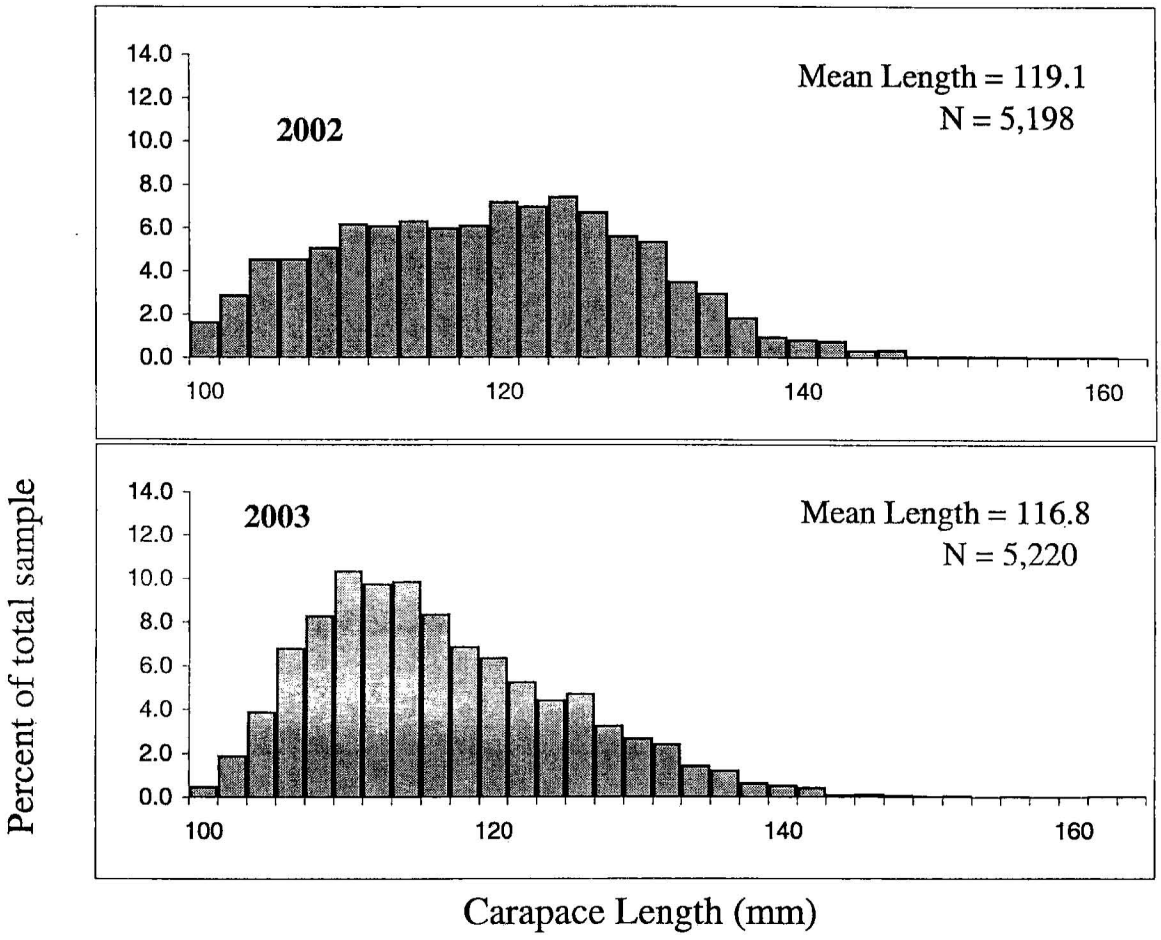

Figure 16. (page 6 of 6)

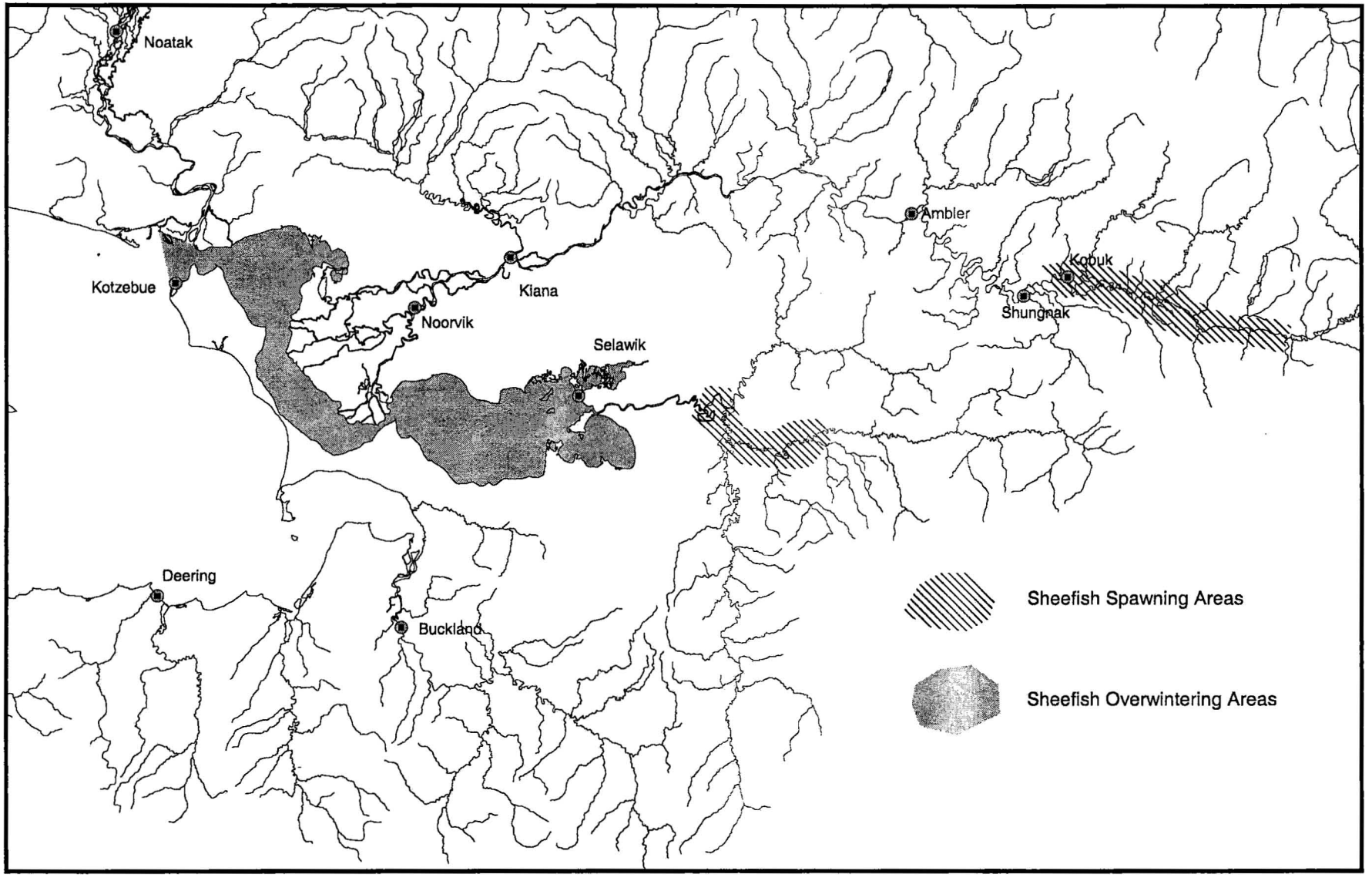

Figure 17. Kotzebue and Kobuk River Valley villages and their spatial relationship with inconnu spawning and overwintering areas.

Appendix Table A1. Number of commercial salmon permits fished, Norton Sound, 1970-2003.

Year	SUBDISTRICT 1	2	3	4	5	6	District [a] Totals
1970	6	33	21	0	12	45	[b]
1971	7	22	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
1998	0	16	23	0	28	52	82
1999	0	0	0	0	15	45	60
2000	0	12	13	0	26	49	79
2001	0	5	5	0	13	29	51
2002	0	0	0	0	7	5	12
2003	0	0	0	0	10	20	30

[a] District total is the number of fishers that actually fished in Norton Sound; some fishers may have fished more than one subdistrict.

[b] Data not available

Appendix Table A2. Commercial salmon catch by species, Norton Sound District, 1961-2003.

Year	Chinook	Sockeye	Coho	Pink	Chum	Total
1961	5,300	35	13,807	34,327	48,332	101,801
1962	7,286	18	9,156	33,187	182,784	232,431
1963	6,613	71	16,765	55,625	154,789	233,863
1964	2,018	126	98	13,567	148,862	164,671
1965	1,449	30	2,030	220	36,795	40,524
1966	1,553	14	5,755	12,778	80,245	100,345
1967	1,804	-	2,379	28,879	41,756	74,818
1968	1,045	-	6,885	71,179	45,300	124,409
1969	2,392	-	6,836	86,949	82,795	178,972
1970	1,853	-	4,423	64,908	107,034	178,218
1971	2,593	-	3,127	4,895	131,362	141,977
1972	2,938	-	454	45,182	100,920	149,494
1973	1,918	-	9,282	46,499	119,098	176,797
1974	2,951	-	2,092	148,519	162,267	315,829
1975	2,393	2	4,593	32,388	212,485	251,861
1976	2,243	11	6,934	87,916	95,956	193,060
1977	4,500	5	3,690	48,675	200,455	257,325
1978	9,819	12	7,335	325,503	189,279	531,948
1979	10,706	57	31,438	167,411	140,789	350,401
1980	6,311	40	29,842	227,352	180,792	444,337
1981	7,929	56	31,562	232,479	169,708	441,734
1982	5,892	10	91,690	230,281	183,335	511,208
1983	10,308	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	136,283
1988	4,096	1,252	37,214	74,604	107,966	225,132
1989	5,707	265	44,091	123	42,625	92,811
1990	8,895	434	56,712	501	65,123	131,665
1991	6,068	203	63,647	0	86,871	156,789
1992	4,541	296	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
1995	8,860	128	47,862	81,644	42,898	181,392
1996	4,984	1	68,206	487,441	10,609	571,241
1997	12,573	161	32,284	20	34,103	79,141
1998	7,429	7	29,623	588,013	16,324	641,396
1999	2,508	0	12,662	0	7,881	23,051
2000	752	14	44,409	166,548	6,150	217,873
2001	213	44	19,492	0	11,100	30,849
2002	5	1	1,759	0	600	2,365
2003	12	16	17,058	0	3,560	20,646
Previous 5-Yr Avg [a]	2,181	13	21,589	150,912	8,411	183,107
Previous 10-Yr Avg [b]	5,158	72	40,172	246,363	20,152	311,916

[a] 1998-2002
[b] 1993-2002

Appendix Table A3. Estimated mean prices paid to commercial salmon fishers, Norton Sound District, 1962-2003.

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
1998	$0.74	$0.29	$0.14	$0.09
1999	$0.82	$0.35	-	$0.11
2000	$1.30	$0.30	$0.10	$0.15
2001 [e]	$1.00	$0.25	-	$0.19
2002	$0.39	$0.20	-	$0.07
2003 [f]	$0.64	$0.44	-	$0.14
5 yr. Avg. 1998-2002	$0.85	$0.28		$0.12

[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.

[e] Price paid sockeye was $0.37 per pound.

[f] Price paid sockeye was $0.45 per pound.

Appendix Table A4. Dollar estimates of Norton Sound District commercial salmon fishery, 1961 - 2003.

Year	Gross Value of Catch to Fishers	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	$546,010.00	[a]	$11,386.00
1978	$907,330.00	[a]	$12,002.00
1979	$878,792.00	[a]	$11,780.00
1980	$572,125.00	[a]	$11,640.00 [c]
1981	$761,658.00	[a]	$11,940.00
1982	$1,069,723.00	[a]	$7,155.00 [c d]
1983	$946,232.00	[a]	$10,700.00 [c]
1984	$738,064.00	[a]	$9,690.00 [c]
1985	$818,477.00	[a]	$5,820.00 [e]
1986	$546,452.00	[a]	$5,970.00 [e]
1987	$517,894.00	[a]	$5,940.00 [e]
1988	$760,641.00	[a]	$10,050.00 [e f]
1989	$319,489.00	[a]	$10,300.00 [e]
1990	$474,064.00	[a]	$10,350.00 [e]
1991	$413,479.00	[a]	$10,250.00 [e]
1992	$463,616.00	[a]	$10,200.00 [e]
1993	$368,723.00	[a]	$8,835.00 [e]
1994	$863,060.00	[a]	$10,000.00 [e]
1995	$356,164.00	[a]	$5,250.00 [e]
1996	$292,264.00	[a]	$4,300.00 [e]
1997	$326,618.00	[a]	$5,100.00 [e]
1998	$351,410.00	[a]	$4,100.00 [e]
1999	$82,638.00	[a]	[a]
2000	$143,621.00	[a]	[a]
2001	$56,921.00	[a]	[a]
2002	$2,941.00	[a]	[a]
2003	$64,473.25	[a]	[a]
5-year average 1998-2002	$127,506.20		
10-year average 1993-2002	$284,436.00		

[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 A5. Round weight of commercially caught salmon by species, Norton Sound District, 1961 - 2003.

	Pounds Caught (Round Wt. in lbs)				
Year	Chinook	Coho	Pink	Chum	Salmon Roe (lbs)
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 [d]	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
1998	127,831	232,705	1,330,624	106,687	0
1999	48,421	88,037	0	57,656	0
2000	11,240	307,565	369,800	40,298	0
2001	3,803	152,293	0	79,558	0
2002	50	12,972	0	4,555	0
2003	136	139,775	0	23,687	0

[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 A6. Mean commercial salmon harvest weights, Norton Sound District, 1964-2003.

Year	Mean Round Weight in Pounds [a]			
	Chinook	Coho	Pink	Chum
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
1998	17.2	7.9	2.3	6.5
1999	19.3	6.9	-	7.3
2000	14.9	6.9	2.2	6.5
2001	17.8	7.8	-	7.2
2002	10.0	7.4	-	7.6
2003	11.3	8.2		6.7

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

[b] Low chinook weight due to utilization of restricted mesh size.

Appendix Table A7. Commercial and subsistence salmon catch by species, by year in Nome Subdistrict, Norton Sound District, 1964-2003.

NOME (SUBDISTRICT 1)

	Commercial						Subsistence [a]						Combined					
Year	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	1,825	2,605	1	-	-	973	3,766	4,740
1966	1	-	32	1	581	615	12	-	-	1,794	1,762	3,568	13	-	32	1,795	2,343	4,183
1967	-	-	-	72	406	478	11	-	-	349	627	987	11	-	-	421	1,033	1,465
1968	-	-	-	50	102	152	7	-	-	6,507	621	7,135	7	-	-	6,557	723	7,287
1969	-	-	63	330	601	994	2	-	-	3,649	508	4,159	2	-	63	3,979	1,109	5,153
1970	-	-	6	55	960	1,021	-	-	35	5,001	458	5,494	0	-	41	5,056	1,418	6,515
1971	11	-	-	14	2,315	2,340	-	-	122	5,457	2,900	8,479	11	-	122	5,471	5,215	10,819
1972	15	-	-	12	2,643	2,670	19	-	52	4,684	315	5,070	34	-	52	4,696	2,958	7,740
1973	-	-	-	321	1,132	1,453	14	-	120	5,108	1,863	7,105	14	-	120	5,429	2,995	8,558
1974	19	-	123	7,722	10,431	18,295	8	-	5	3,818	183	4,014	27	-	128	11,540	10,614	22,309
1975	2	-	319	2,163	8,364	10,848	2	-	97	6,267	2,858	9,224	4	-	416	8,430	11,222	20,072
1976	2	10	26	1,331	7,620	8,989	13	-	189	5,492	1,705	7,399	15	10	215	6,823	9,325	16,388
1977	8	-	58	65	15,998	16,129	35	-	498	2,773	12,192	15,498	43	-	556	2,838	28,190	31,627
1978	19	-	-	22,869	8,782	31,670	35	-	225	13,063	4,295	17,618	54	-	225	35,932	13,077	49,288
1979	9	-	29	5,860	5,391	11,289	11	-	1,120	6,353	3,273	10,757	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	35	14	1,726	5,584	8,579	15,938	39	14	2,234	8,786	27,245	38,318
1982	20	-	1,183	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	-	6,219	6,596	56	114	1,054	2,117	5,667	9,008	77	114	1,410	2,117	11,886	15,604

-Continued-

Appendix Table A7. Commercial and subsistence salmon catch by species, by year in Nome Subdistrict, Norton Sound District, 1964-2003. (Page 2 of 2)

NOME (SUBDISTRICT 1)

	Commercial						Subsistence [a]						Combined					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
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	63	133	1,076	2,159	5,952	9,383	65	133	1,130	2,341	7,580	11,249
1989	2	0	0	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	4,841	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
1998	0	0	0	0	0	0	15	14	1,057	4,797	964	6,847	15	14	1,057	4,797	964	6,847
1999	0	0	0	0	0	0	11	85	161	58	337	652	11	85	161	58	337	652
2000	0	0	0	0	0	0	7	26	747	2,657	535	3,972	7	26	747	2,657	535	3,972
2001	0	0	0	0	0	0	2	92	425	113	858	1,490	2	92	425	113	858	1,490
2002	0	0	0	0	0	0	4	79	666	3,161	1114	5,024	4	79	666	3,161	1,114	5,024
2003	0	0	0	0	0	0	2003 data not yet available											
5-year avg. [b]	0	0	0	0	0	0	6	71	500	1,497	711	2,785	6	71	500	1,497	711	2,785
10-year avg.c	0	0	128	1	32	162	19	111	986	2,479	2,192	5,786	19	111	1,113	2,480	2,224	5,948

[a] Subsistence harvest are incomplete prior to 1979.

[b] 1998-2002

[c] 1993-2002

Appendix Table A8. Commercial and subsistence salmon catch by species, by year in Golovin Subdistrict, Norton Sound District, 1962-2003.

GOLOVIN (SUBDISTRICT 2)

	Commercial						Subsistence						Combined					
Year	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	6,238	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	-	356	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	2,028	3,829	40	-	82	8,297	29,125	37,544
1973	70	-	183	14,145	41,689	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	-	426	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	52,609	63,783	12	-	692	10,727	4,057	15,488	48	36	1,020	21,501	56,666	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	7,916	85	5	5,570	44,262	53,838	103,760
1983	52	10	295	17,414	48,283	66,054	-	-	-	-	-	-[c]	-	-	-	-	-	-
1984	31	-	2,462	88,588	54,153	145,234	-	-	-	-	-	-[c]	-	-	-	-	-	-
1985	193	113	1,196	3,019	55,781	60,302	12	2	430	1,904	9,577	11,925[c]	205	115	1,626	4,923	65,358	72,227

-Continued-

Appendix Table A8. Commercial and subsistence salmon catch by species, by year in Golovin Subdistrict, Norton Sound District, 1962-2003.

GOLOVIN (SUBDISTRICT 2)

	Commercial						Subsistence						Combined					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
1986	81	8	958	25,425	69,725	96,197	-	-	-	-	-	- [c]	-	-	-	-	-	-
1987	166	51	2,203	1,579	44,334	48,333	-	-	-	-	-	- [c]	-	-	-	-	-	-
1988	108	921	2,149	31,559	33,348	68,085	-	-	-	-	-	- [c]	-	-	-	-	-	-
1989	0	0	0	0	0	0	-	-	-	-	-	- [c]	-	-	-	-	-	-
1990	52	21	0	0	15,993	16,066	-	-	-	-	-	- [c]	-	-	-	-	-	-
1991	49	1	0	0	14,839	14,889	-	-	-	-	-	- [c]	-	-	-	-	-	-
1992	6	9	2,085	0	1,002	3,102	-	-	-	-	-	- [c]	-	-	-	-	-	-
1993	1	4	2	8,480	2,803	11,290	-	-	-	-	-	- [c]	-	-	-	-	-	-
1994	0	0	3,424	0	111	3,535	253	168	733	8,410	1,337	10,901 [d]	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 [d]	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	23,500 [d]	86	134	3,652	17,399	2,867	24,138
1997	19	2	102	20	8,003	8,146	138	427	555	4,570	4,891	10,581 [d]	157	429	657	4,590	12,894	18,727
1998	1	0	3	106,761	723	107,488	184	37	1,292	13,340	1,893	16,747 [d]	185	37	1,295	120,101	2,616	124,235
1999	0	0	0	0	0	0	60	48	1,234	469	3,656	5,467 [d]	60	48	1,234	469	3,656	5,467
2000	0	0	1,645	17,408	164	19,217	169	18	2,335	10,906	1,155	14,583 [d]	169	18	3,980	28,314	1,319	33,800
2001	0	43	30	0	7,094	7,167	89	72	880	1,665	3,291	5,997 [d]	89	115	910	1,665	10,385	13,164
2002	0	0	0	0	0	0	69	66	1,640	14,430	1,882	18,087 [d]	69	66	1,640	14,430	1,882	18,087
2003	0	0	0	0	0	0	2003 data not yet available											
5-year avg. [a]	0	9	336	24,834	1,596	26,774	114	48	1,476	8,162	2,375	12,176	114	57	1,812	32,996	3,972	38,951
10-year avg. [b]	2	5	746	13,697	2,089	16,538												

[a] 1998-2002

[b] 1993-2002

[c] Subsistence survey not conducted.

[d] Harvest estimated from Div. of Subsistence survey.

Appendix Table A9. Commercial and subsistence salmon catch by species, by year in Moses Point Subdistrict, Norton Sound District, 1962-2003.

MOSES POINT (SUBDISTRICT 3)

	Commercial						Subsistence						Combined					
Year	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	-	-	11,100	50,683	61,810
1963	15	-	-	2,549	46,274	48,838	5	-	-	5,808	8,316	14,129	20	-	-	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	-	-	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	16	-	890	6,078	1,195	8,179	1,051	-	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	-	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	-	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	-	2,153	13,634	43,567	59,608
1983	254	-	-	17,027	65,776	83,057	-	-	-	-	-	- [o]	-	-	-	-	-	-
1984	-	-	5,959	28,035	9,477	43,471	-	-	-	-	-	- [o]	-	-	-	-	-	-
1985	816	32	1,803	559	24,466	27,676	67	-	1,389	1,212	947	3,615 [o]	883	32	3,192	1,771	25,413	31,291

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Appendix Table A9. Commercial and subsistence salmon catch by species, by year in Moses Point Subdistrict, Norton Sound District, 1962-2003.

MOSES POINT (SUBDISTRICT 3)

	Commercial						Subsistence						Combined					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
1986	600	41	5,874	15,795	20,668	42,978	-	-	-	-	-	- [o]	-	-	-	-	-	-
1987	907	15	64	568	17,278	18,832	-	-	-	-	-	- [o]	-	-	-	-	-	-
1988	663	93	3,974	13,703	18,585	37,018	-	-	-	-	-	- [o]	-	-	-	-	-	-
1989	62	0	0	0	167	229	-	-	-	-	-	- [o]	-	-	-	-	-	-
1990	202	0	0	501	3,723	4,426	-	-	-	-	-	- [o]	-	-	-	-	-	-
1991	161	0	0	0	804	965	312	-	2,153	3,555	2,660	8,680 [d]	473	-	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 [d]	100	-	4,812	6,152	1,266	12,330
1993	3	0	4,065	0	167	4,235	368	-	1,217	1,726	1,635	4,946 [d]	371	-	5,282	1,726	1,802	9,181
1994	0	0	5,345	0	414	5,759	322	104	1,180	9,345	3,476	14,427 [d]	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 [d]	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 [d]	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 [d]	1,463	50	2,622	1,314	4,747	10,197
1998	105	0	1,462	145,669	2,311	149,547	414	49	1,831	6,891	1,376	10,561 [d]	519	49	3,293	152,560	3,687	160,108
1999	0	0	0	0	0	0	424	13	975	1,564	744	3,720 [d]	424	13	975	1,564	744	3,720
2000	10	0	5,182	46,369	535	52,096	248	46	1,429	5,983	1,173	8,879 [d]	258	46	6,611	52,352	1,708	60,975
2001	7	0	1,696	0	681	2,384	427	70	1,352	1,390	898	4,137 [d]	434	70	3,048	1,390	1,579	6,521
2002	0	0	0	0	0	0	565	14	1,801	8,345	1,451	12,176 [d]	565	14	1,801	8,345	1,451	12,176
2003	0	0	0	0	0	0	2003 data not yet available											
5-year avg. [a]	24	0	1,668	38,408	705	40,805	416	38	1,478	4,835	1,128	7,895	440	38	3,146	43,242	1,834	48,700
10-year avg. [b]	97	4	2,482	26,361	796	29,740	409	46	1,407	4,805	1,891	8,553	506	51	3,889	31,166	2,687	38,294

[a] 1998-2002

[b] 1993-2002

[o] Subsistence survey not conducted.

[d] Harvest estimated from Div. of Subsistence survey.

Appendix Table A10. Commercial and subsistence salmon catch by species, by year in Norton Bay Subdistrict, Norton Sound District, 1962-2003.

NORTON BAY (SUBDISTRICT 4)

	Commercial						Subsistence						Combined					
Year	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	35,381
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	4,589	7	-	41	929	3,612	4,589
1967	-	-	-	-	-	-	12	-	14	1,097	2,945	4,068	12	-	14	1,097	2,945	4,068
1968	-	-	-	-	-	-	28	-	71	1,916	1,872	3,887	28	-	71	1,916	1,872	3,887
1969	26	-	-	4,849	3,974	8,849	59	-	189	2,115	3,855	6,218	85	-	189	6,964	7,829	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	-	-	1,645	4,672	6,345	1	-	-	10	130	141	29	-	-	1,655	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	18,679	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	6,201	15,599	25,203	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	-	2,816	5,135	9,613	17,661
1983	215	-	204	3,935	17,157	21,511	-	-	-	-	-	- [o]	-	-	-	-	-	-
1984	-	-	-	1,162	3,442	4,604	-	-	-	-	-	- [o]	-	-	-	-	-	-
1985	528	-	384	68	9,948	10,928	-	-	-	-	-	- [o]	-	-	-	-	-	-

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Appendix Table A10. Commercial and subsistence salmon catch by species, by year in Norton Bay Subdistrict, Norton Sound District, 1962-2003.

NORTON BAY (SUBDISTRICT 4)

	Commercial						Subsistence						Combined					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
1986	139	2	1,512	40	1,994	3,687	-	-	-	-	-	- [o]	-	-	-	-	-	-
1987	544	-	145	16	3,586	4,291	-	-	-	-	-	- [o]	-	-	-	-	-	-
1988	434	2	709	1,749	7,521	10,415	-	-	-	-	-	- [o]	-	-	-	-	-	-
1989	-	-	-	-	-	-	-	-	-	-	-	- [o]	-	-	-	-	-	-
1990 [d]	0	0	0	0	0	0	-	-	-	-	-	- [o]	-	-	-	-	-	-
1991 [d]	0	0	0	0	0	0	-	-	-	-	-	- [o]	-	-	-	-	-	-
1992	27	0	0	0	1,787	1,814	-	-	-	-	-	- [o]	-	-	-	-	-	-
1993	267	0	0	290	1,378	1,935	-	-	-	-	-	- [o]	-	-	-	-	-	-
1994 [d]	0	0	0	0	0	0	308	1	370	6,049	4,581	11,309 [e]	308	1	370	6,049	4,581	11,309
1995 [d]	0	0	0	0	0	0	475	46	985	3,514	5,828	10,848 [e]	475	46	985	3,514	5,828	10,848
1996 [d]	0	0	0	0	0	0	295	3	676	3,929	4,161	9,064 [e]	295	3	676	3,929	4,161	9,064
1997	194	0	0	0	531	725	656	54	322	1,795	4,040	6,777 [e]	850	54	322	1,795	4,571	7,502
1998 [d]	0	0	0	0	0	0	684	0	388	2,009	6,192	9,274 [e]	684	0	388	2,009	6,192	9,274
1999 [d]	0	0	0	0	0	0	327	0	167	1,943	4,153	6,590 [e]	327	0	167	1,943	4,153	6,590
2000 [d]	0	0	0	0	0	0	397	2	267	2,255	4,714	7,635 [e]	397	2	267	2,255	4,714	7,635
2001 [d]	0	0	0	0	0	0	460	14	276	5,203	4,445	10,397 [e]	460	14	276	5,203	4,445	10,397
2002 [d]	0	0	0	0	0	0	557	0	509	6,049	3,971	10,397 [e]	557	0	509	6,049	3,971	10,397
2003 [d]	0	0	0	0	0	0	2003 data not yet available											
5-year avg. [a]	0	0	0	0	0	0	485	3	321	3,492	4,695	8,859	485	3	321	3,492	4,695	8,859
10-year avg. [b]	46	0	0 #	29	191	266	-	-	-	-	-	-	-	-	-	-	-	-

[a] 1998-2002

[b] 1993-2002

[o] Subsistence survey not conducted.

[d] No commercial harvest reported.

[e] Harvest estimated from Div. of Subsistence survey.

Appendix Table A11. Commercial and subsistence salmon catch by species, by year in Shaktoolik Subdistrict, Norton Sound District, 1961-2003.

SHAKTOOLIK (SUBDISTRICT 5)

	Commercial						Subsistence						Combined					
Year	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	640	8,718	13,209	-	-	-	-	-	-	1,738	-	2,113	640	8,718	13,209
1963	480	11	563	5,138	19,153	25,345	-	-	-	-	-	-	480	11	563	5,138	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	40,684	45,928
1965	127	30	-	3	8,356	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	3,439	7,690	73	-	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	15,421	19,887
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	26,391	32,803	93	-	353	1,901	358	2,705	676	-	532	7,551	26,749	35,508
1975	651	2	812	1,774	49,536	52,775	18	-	14	1,394	334	1,760	669	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	36,591	46,277	49	-	170	585	2,190	2,994	1,570	4	588	8,328	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	22,233	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	-	-	-	-	-	-	- [c]	-	-	-	-	-
1984	1,613	-	10,730	1,596	32,309	46,248	-	-	-	-	-	-	- [c]	-	-	-	-	-
1985	5,312	-	2,808	-	13,403	21,523	298	-	1,379	24	298	1,999	5,610	-	4,187	24	13,701	23,522

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Appendix Table A11. Commercial and subsistence salmon catch by species, by year in Shaktoolik Subdistrict, Norton Sound District, 1961-2003.

SHAKTOOLIK (SUBDISTRICT 5)

	Commercial						Subsistence						Combined					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
1986	1,075	29	6,626	-	16,126	23,856	-	-	-	-	-	-	- [c]	-	-	-	-	-
1987	2,214	-	6,193	-	14,088	22,495	-	-	-	-	-	-	- [c]	-	-	-	-	-
1988	671	79	6,096	3,681	21,521	32,048	-	-	-	-	-	-	- [c]	-	-	-	-	-
1989	1,241	43	8,066	0	19,641	28,991	-	-	-	-	-	-	- [c]	-	-	-	-	-
1990	2,644	49	4,695	0	21,748	29,136	-	-	-	-	-	-	- [c]	-	-	-	-	-
1991	1,324	55	11,614	0	31,619	44,612	-	-	-	-	-	-	- [c]	-	-	-	-	-
1992	1,098	56	14,660	0	27,867	43,681	-	-	-	-	-	-	- [c]	-	-	-	-	-
1993	2,756	20	11,130	106,743	20,864	141,513	-	-	-	-	-	-	- [c]	-	-	-	-	-
1994	885	8	22,065	502,231	5,411	530,600	1,175	1	2,777	9,133	1,221	14,307 [d]	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	2,626	7,024	2,480	15,885 [d]	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 [d]	2,454	32	17,059	313,352	7,662	340,559
1997	2,449	0	4,694	-	5,747	12,890	1,146	62	2,761	5,779	1,612	11,360 [d]	3,595	62	7,455	5,779	7,359	24,250
1998	910	0	3,624	236,171	7,080	247,785	982	92	1,872	6,270	1,034	10,250 [d]	1,892	92	5,496	242,441	8,114	258,035
1999	581	0	2,398	0	2,181	5,160	818	183	1,556	5,092	467	8,116 [d]	1,399	183	3,954	5,092	2,648	13,276
2000	160	3	7,779	85,493	2,751	96,186	440	20	2,799	5,432	2,412	11,103 [d]	600	23	10,578	90,925	5,163	107,289
2001	90	0	2,664	0	1,819	4,573	936	143	2,090	10,172	1,553	14,895 [d]	1,026	143	4,754	10,172	3,372	19,468
2002	1	0	680	0	261	942	1,230	4	2,169	8,769	800	12,972 [d]	1,231	4	2,849	8,769	1,061	13,914
2003	2	0	4,031	0	485	4,518	2003 data not yet available											
5-year avg. [a]	348	1	3,429	64,333	2,818	70,929	881	88	2,097	7,147	1,253	11,467	1,230	89	5,526	71,480	4,072	82,396
10-year avg. [b]	1,041	4	7,933	127,300	6,413	142,691	-	-	-	-	-	-	-	-	-	-	-	-

[a] 1998-2002

[b] 1993-2002

[c] Subsistence survey not conducted.

[d] Harvest estimated from Div. of Subsistece survey.

Appendix Table A12. Commercial and subsistence salmon catch by species, by year in Unalakleet Subdistrict, Norton Sound District, 1961-2003.

UNALAKLEET (SUBDISTRICT 6)

	Commercial						Subsistence						Combined					
Year	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	37,436
1965	1,321	-	2,030	24	26,498	29,873	521	-	4,562	11,488	8,791	25,362 [c]	1,842	-	6,592	11,512	35,289	55,235
1966	1,208	-	4,183	5,023	16,840	27,254	90	-	789	6,083	3,387	10,349 [c]	1,298	-	4,972	11,106	20,227	37,603
1967	1,751	-	1,544	21,961	8,502	33,758	490	-	484	9,964	-	10,938 [c]	2,241	-	2,028	31,925	8,502	44,696
1968	960	-	6,549	41,474	14,865	63,848	186	-	1,493	11,044	2,982	15,705 [c]	1,146	-	8,042	52,518	17,847	79,553
1969	2,276	-	5,273	40,558	22,032	70,139	324	-	1,483	4,230	4,196	10,233 [c]	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 [c]	2,099	-	8,168	40,883	47,243	98,393
1971	2,166	-	2,688	1,196	37,543	43,593	911	-	3,137	2,230	7,073	13,351 [c]	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 [c]	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	59,565
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	75,808
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	29,871	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	1,046	-	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	16,686	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	33	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	58,842

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Appendix Table A12. Commercial and subsistence salmon catch by species, by year in Unalakleet Subdistrict, Norton Sound District, 1961-2003.

UNALAKLEET (SUBDISTRICT 6)

	Commercial						Subsistence						Combined					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
1986	4,494	153	20,580	-	30,239	55,466	-	-	-	-	0	- [d]	-	-	-	-	-	-
1987	3,246	141	15,097	97	17,525	36,106	-	-	-	-	-	- [d]	-	-	-	-	-	-
1988	2,218	157	24,232	23,730	25,363	75,700	-	-	-	-	-	- [d]	-	-	-	-	-	-
1989	4,402	222	36,025	-	20,825	61,474	-	-	4,681	17,500	1,388	- [e]	-	-	-	-	-	-
1990	5,998	358	52,015	-	23,659	82,030	2,476 [e]	-	-	-	-	-	-	-	-	-	-	-
1991	4,534	147	52,033	-	39,609	96,323	-	-	-	-	-	- [d]	-	-	-	-	-	-
1992	3,409	229	84,449	6,284	52,547	146,918	-	-	-	-	-	- [d]	-	-	-	-	-	-
1993	5,944	251	26,290	42,061	28,156	102,702	-	-	-	-	-	- [d]	-	-	-	-	-	-
1994	4,400	71	71,019	480,158	12,288	567,936	5,294	819	16,081	31,572	12,732	66,498 [f]	9,694	890	87,100	511,730	25,020	634,434
1995	7,617	78	31,280	37,009	24,843	100,827	5,049	807	13,110	17,246	13,460	49,672 [f]	12,666	885	44,390	54,255	38,303	150,499
1996	3,644	-	52,200	113,837	7,369	177,050	5,324	608	15,963	19,782	16,481	58,158 [f]	8,968	608	68,163	133,619	23,850	235,208
1997	9,067	159	26,079	-	17,139	52,444	6,325	353	9,120	10,804	7,649	34,251 [f]	15,392	512	35,199	10,804	24,788	86,695
1998	6,413	7	24,534	99,412	6,210	136,576	5,915	639	11,825	17,259	7,962	43,600 [f]	12,328	646	36,359	116,671	14,172	180,176
1999	1,927	0	10,264	0	5,700	17,891	4,504	848	10,250	10,791	10,040	36,433 [f]	6,431	848	20,514	10,791	15,740	54,324
2000	582	11	29,803	17,278	2,700	50,374	2,887	569	9,487	11,075	7,294	31,312 [f]	3,469	580	39,290	28,353	9,994	81,686
2001	116	1	15,102	0	1,512	16,731	3,662	376	9,520	11,710	9,163	34,431 [f]	3,778	377	24,622	11,710	10,675	51,162
2002	4	1	1,079	0	339	1,423	3,044	600	8,301	23,599	8,599	44,143 [f]	3,048	601	9,380	23,599	8,938	45,566
2003	10	0	13,027	0	3,075	16,112	2003 data not yet available											
5-year avg. [a]	1,808	4	16,156	23,338	3,292	44,599	4,002	606	9,877	14,887	8,612	37,984	5,811	610	26,033	38,225	11,904	82,583
10-year avg. [b]	3,971	58	28,765	78,976	10,626	122,395	-	-	-	-	-	-	-	-	-	-	-	-

[a] 1998-2002

[b] 1993-2002

[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 A13. Commercial and subsistence salmon catch by species, by year for all subdistricts in Norton Sound District, 1961-2003.

ALL SUBDISTRICTS

	Commercial						Subsistence						Combined					
Year	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	55,625	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	2,583	126	2,665	22,792	161,348	189,514
1965	1,449	30	2,030	220	36,795	40,524	574	-	4,812	19,131	30,772	55,289	2,023	30	6,842	19,351	67,567	95,813
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	-	2,379	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	11,661	51,201	1,282	-	9,276	108,091	56,961	175,610
1969	2,392	-	6,836	86,949	82,795	178,972	436	-	2,191	18,562	15,615	36,804	2,828	-	9,027	105,511	98,410	215,776
1970	1,853	-	4,423	64,908	107,034	178,218	561	-	4,675	26,127	22,763	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	4,097	10,863	21,618	37,801	3,619	197	7,224	15,758	152,980	179,778
1972	2,938	-	454	45,182	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	46,499	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	162,267	315,829	420	-	1,064	16,426	3,958	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	87,919	95,956	193,063	203	-	1,004	18,048	7,718	26,973	2,446	11	7,938	105,967	103,674	220,036
1977	4,500	5	3,690	48,675	200,455	257,325	846	-	2,530	14,296	26,607	44,279	5,346	5	6,220	62,971	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	360,784	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	39,925	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	537,759
1981	7,929	56	31,562	232,479	169,708	441,734	2,021	38	13,416	28,741	32,866	77,082 [c]	9,950	94	44,978	261,220	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 [c]	6,903	18	106,302	284,530	201,915	599,668
1983	10,308	27	49,735	76,913	319,437	456,420	-	-	-	-	-	- [d]	-	-	-	-	-	-
1984	8,455	6	67,875	119,381	146,442	342,159	-	-	-	-	-	- [d]	-	-	-	-	-	-

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Appendix Table A13. Commercial and subsistence salmon catch by species, by year for all subdistricts in Norton Sound District, 1961-2003.

ALL SUBDISTRICTS

	Commercial						Subsistence						Combined					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
1985	19,491	166	21,968	3,647	134,928	180,200	-	-	-	-	-	- [d]	-	-	-	-	-	-
1986	6,395	233	35,600	41,260	146,912	230,400	-	-	-	-	-	- [d]	-	-	-	-	-	-
1987	7,080	207	24,279	2,260	102,457	136,283	-	-	-	-	-	- [d]	-	-	-	-	-	-
1988	4,096	1,252	37,214	74,604	107,966	225,132	-	-	-	-	-	- [d]	-	-	-	-	-	-
1989	5,707	265	44,091	123	42,625	92,811	-	-	-	-	-	- [d]	-	-	-	-	-	-
1990	8,895	434	56,712	501	65,123	131,665	-	-	-	-	-	- [d]	-	-	-	-	-	-
1991	6,068	203	63,647	-	86,871	156,789	-	-	-	-	-	- [d]	-	-	-	-	-	-
1992	4,541	296	105,418	6,284	83,394	199,933	-	-	-	-	-	- [d]	-	-	-	-	-	-
1993	8,972	279	43,283	157,574	53,562	263,670	-	-	-	-	-	- [d]	-	-	-	-	-	-
1994 [c,e]	5,285	80	102,140	982,389	18,290	1,108,184	7,374	1,161	22,124	71,066	25,020	126,745	12,659	1,241	124,264	1,053,455	43,310	1,234,929
1995 [c,e]	8,860	128	47,862	81,644	42,898	181,392	7,766	1,222	23,015	38,594	43,014	113,611	16,626	1,350	70,877	120,238	85,912	295,003
1996 [c,e]	4,984	1	68,206	487,441	10,609	571,241	7,255	1,182	26,304	64,724	34,585	134,050	12,239	1,183	94,510	552,165	45,194	705,291
1997 [c,e,]	12,573	161	32,284	20	34,103	79,141	8,998	1,892	16,476	27,200	26,803	81,370	21,571	2,053	48,760	27,220	60,906	160,511
1998 [c,e,]	7,429	7	29,623	588,013	16,324	641,396	8,295	1,214	19,007	51,933	20,032	100,480	15,724	1,221	48,630	639,946	36,356	741,876
1999 [c,e]	2,508	0	12,662	0	7,881	23,051	6,144	1,177	14,342	20,017	19,398	61,078	8,652	1,177	27,004	20,017	27,279	84,129
2000 [c,e]	752	14	44,409	166,548	6,150	217,873	4,149	682	17,062	38,308	17,283	77,485	4,901	696	61,471	204,856	23,433	295,358
2001 [c,e]	213	44	19,492	0	11,100	30,849	5,576	767	14,543	30,253	20,210	71,349	5,789	811	34,035	30,253	31,310	102,198
2002 [c,e]	5	1	1,759	0	600	2,365	5,469	763	15,086	64,354	17,817	103,489	5,474	764	16,845	64,354	18,417	105,854
2003 [c,e]	12	16	17,058	0	3,560	20,646	2003 data not yet available											
5-year avg. [a]	2,181	13	21,589	150,912	8,411	183,107	5,927	921	16,008	40,973	18,948	82,776	8,108	934	37,597	191,885	27,359	265,883
10-year avg. [b]	5,158	72	40,172	246,363	20,152	311,916	-	-	-	-	-	-	-	-	-	-	-	-

[a] 1998-2002

[b] 1993-2002

[c] These figures also include subsistence estimates data from Stebbins and St. Michael.

[d] Subsistence surveys not conducted.

[e] Subsistence harvest estimate from Div. of Subsistence survey.

[f] Subsistence totals include Savoonga and Gamble.

Appendix Table A14. Comparative salmon escapement indices of Norton Sound streams, 1961-2003 .

	Sinuk River					Nome River					Flambeau River				
Year[a]	Chinook	Chum	Pink	Pink & Chum[b]	Coho	Chinook	Chum	Pink	Pink & Chum[b]	Coho	Chinook	Chum	Pink	Pink & Chum[b]	Coho
1961															
1962															
1963						-	126	3719	-	-	-	400	80	-	
1964															
1965						-	294	-	-	-					
1966															
1967															
1968															
1969															
1970															
1971						-	75	7,765	-	-					
1972						-	710	14,960	-	-					
1973						6	1,760	14,940	-	-					
1974		463	7766	-	-	-	854	17,832	-	-	-	190	-	-	-
1975	-	4,662	5,390	-	-	1	2,161	3,405	-	-	-	197	1505	-	-
1976	-										-	375	1,994	-	-
1977	-	5,207	1,302	-	-	5	3,046	1,726	-	-	-	1,275	10	-	-
1978	-	8,756	22,435	-	-	2	5,242	34,900	-	-	-	7,110	-	-	-
1979			100								-	283	291	-	-
1980	3	2,022	199,000	-	1,002	5	7,745	171,350		1,145	-	-	-	29,190	-
1981	-	5,579	350	-	-	15	1,195	12,565	-	-	-	12,031	2,710	-	-
1982	-	638	148,800	-	-	-	700	327,570	-	-	1	5,097	25,001	-	-
1983	48	2,150	10,770	-	96	2	198	9,170	-	365	2	1,195	200	-	-
1984	7 [h]	493 [h]	284,400 [h]	-	192	1	2,084 [h]	178,870	-	839	1	3,150 [g]	20,200 [g]	-	-
1985	4	1,910	8,860	-	33	7	1,967	2,250	-	242	-	3,215	260	-	-
1986	4	1,960	28,690	-	-	2	1,150	13,580	-	-	2	3,075	300	-	-
1987	5	4,540	30	-	230	3	1,646	1,400 [h]	-	419	0	115	0	-	-
1988	3	2,070	4,652 [l]	-	563	3	973	2,490 [l]	-	1,108 [h]	3	765	10	-	-
1989	-	1,025	31,310	-	75	2	72	1,365	-	375	-	-	-	-	-
1990	-	95	29,040	-	161	-	541	13,085	-	377	-	-	-	-	-
1991	3	5,420	14,680	-	701	11	3,520	4,690	-	611	2	1,607	570	-	-
1992	1	470	292,400	-	422	3	813	255,700	-	691	-	606	180	-	-
1993	7	1,570	5,120	-	104	8	1,520	8,941	-	276	4	1,590	-	-	-
1994	10	1,140	492,000	-	307	2	350	265,450	-	631	1	4,960	290	-	-
1995	-	3,110	1,250	-	290	-	1,865	182	-	517	-	7,205	350	-	68
1996	5	1,815	74,100	-	367	1	799	34,520	-	723	-	5,390	-	-	-
1997	-	2,975	1,200	-	57	4	956	65	-	544	-	905	-	-	96
1998	-	630	372,850	-	322	3	335	179,680	-	515	-	2,828	7180	-	-
1999	-	1,697	180	-	217	-	375	345	-	620	-	55	-	-	42
2000	-	10	12,608	-	912	-	658	6,380	-	1,032	-	819	640	-	11
2001	-	3,746	115 [g]	-	750	-	946 [g]	790 [g]	-	1,307 [g]	-	3,612	4	-	213
2002	-	1,682	28,487	-	1,290 [g]	-	127 [g]	295 [g]		1,796	-	1,876	1102	-	186
2003		677	9,885		190	8	337	2,841		604	-	647	355	-	71

[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.

(Continued)

Appendix Table A14. Comparative salmon escapement indices of Norton Sound streams, 1961-2003 .

	Eldorado River					Fish River					Boston Creek				
Year	Chinook	Chum	Pink	Pink & Chum [b]	Coho	Chinook	Chum	Pink	Pink & Chum [b]	Coho	Chinook	Chum	Pink	Pink & Chum [b]	Coho
1961						1	-	-	14,100	-					
1962						48	-	-	28,918	-					
1963	-	400	2,000	-	-	21	-	-	25,728	-	67	1,669	-	-	-
1964						-	18,670	10,935	14,550	-	10	3,315	-	-	-
1965															
1966						7	-	-	17,955	-	153	761	-	-	-
1967						-	-	-	13,610	-					
1968						10	-	-	164,000	-	7	2,500	2,500	-	-
1969						-	2,080	124,000	-	-	100	7,000	16,000	-	-
1970						33	76,550	198,000	-	-	246	8,200	12,900	-	-
1971						1	13,185	1,670	-	-	42	7,045	80	-	-
1972						[b] -	3,616	13,050	-	-	57	4,252	3,950	-	-
1973						31	6,887	15,564	-	-	153	3,014	3,213	-	-
1974	13	2,143	6,185	-	-	3	10,945	15,690	-	-	231	2,426	749	-	-
1975						26	20,114	15,840	-	-	147	1,885	2,556	-	-
1976	-	328	1,340	-	-	1	8,390	15,850	8,550	-					
1977	-	1,835	125	-	-	9	9,664	2,430	-	-	76	1,325	385	-	-
1978	-	10,125	12,800	-	-	29	26,797	140,600	-	-	136	2,655	74,221	-	-
1979	-	326	652	-	-	11	6,893	9,132	-	-	58	882	271	-	-
1980	6	9,900	55,520	-	56	-	19,100	33,500	-	-	16	2,450	1,510	-	-
1981	-	15,605	495	-	-	90	24,095	450	-	-	-	1,985	-	-	-
1982	2	1,095	163,300	-	-	-	-	-	241,700	-	10	1,730	22,020	-	-
1983	11	994	270	-	100	87	20,037	300	-	-	154	704	-	-	-
1984	14 [i]	4,362 [g i]	1,924,935 [g i]	-	261	42	-	-	293,245	-	35	-	-	47,850	-
1985	8	6,090	150	-	67	303	21,080	7,365	-	-	243	3,450	-	-	-
1986	9	3,490	18,200	-	-	200	25,190	140	-	-	2	220	0	-	-
1987	6	3,860	130	-	108	193	7,886	0	-	-	583	3,640	0	-	-
1988	17	2,645	1,045	-	78	36	1,240	29,950 [l]	-	-	163	1,015	7,400 [l]	-	-
1989	-	350	1,550	-	87						-	-	-	-	-
1990	17	884	2,050	-	44						112	1,455	8,440	-	-
1991	76	5,755	1,590	-	98	58	10,470	51,190	-	-	152	2,560	3,210	-	-
1992	2	4,887	6,615	-	113	4	390	1,387,000	-	-	68	1,540	50,850	-	-
1993	38	2,895	120	-	111	48	12,695	13,440	-	-	227	4,563	1,930	-	-
1994	-	5,140	53,890	-	242	55	16,500	910,000	-	-	95	4,270	355,600	-	-
1995	4	9,025	50	-	247	40	13,433	780	-	1,829	78	4,221	-	-	230
1996	21	20,710	40,100	-	254	189	5,840 [l]	684,780	-	-	-	3,505 [l]	35,980	-	-
1997	40	5,967	10	-	37	110	19,515	800	-	465	452	4,545	-	-	-
1998	-	3,000	123,950	-	71	96	28,010	663,050	-	-	255	1,570	175,330	-	-
1999	2	1,741	6	-	45	-	50	20	-	821	-	-	-	-	319
2000	2	3383	16,080	-	24	-	-	-	-	805	-	-	-	-	414
2001	2	4,450	8	-	232	8	3,220	1,744	-	1,055	33	3,533	1,038	-	155
2002	8	139	58,700	-	463										
2003	12	1,257	821	-	71	95	3,200	1,014	-	-	145	750	701	-	

[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.

(Continued)

Appendix Table A14. Comparative salmon escapement indices of Norton Sound streams, 1961-2003 .

	Niukluk River					Kwiniuk River					Tubutulik River				
Year	Chinook	Chum	Pink	Pink & Chum [b]	Coho	Chinook [d]	Chum [d]	Pink [d]	Pink & Chum [b]	Coho	Chinook	Chum	Pink	Pink & Chum [b]	Coho
1961															
1962	11	-	-	27,878	-	3	-	-	23,249	-	3	-	-	16,690	-
1963	1	13,687	4,103	-	-	2	11,340	3,779	-	-	9	16,069	4,355	-	-
1964	-	8,395	10,495	-	-	-	14,533	-	-	-	-	15,469	10,043	3,420	-
1965						14	26,634	8,668	-	-					
1966	-	21,300	8,600	4,700	-	7	32,786	10,629	-	-	-	5,514	26,000	-	-
1967	-	20,546	-	-	-	13	24,444	3,587	-	-	1	-	-	22,475	-
1968	-	-	-	87,093	-	27	18,813	129,052	-	-					
1969	-	10,240	92,650	-	-	12	19,687	56,683	-	-	3	12,040	12,788	3,045	-
1970	-	7,300	60,350	-	-	-	68,004	226,831	-	-	-	53,290	136,590	-	-
1971	-	22,605	8,370	-	-	37	39,046	16,634	-	-	-	16,820	7,500	5,065	-
1972 [c]	-	10,500	22,600	-	-	65	30,686	62,461	-	-	[c] -	8,070	21,100	-	-
1973	-	15,156	14,790	-	-	57	28,617	37,070	-	-	131	5,383	15,665	-	-
1974	1	8,720	8,915	-	-	62	35,899	39,375	-	-	136	9,560	17,940	-	-
1975	-	10,089	16,258	-	-	44	14,344	55,293	-	-	7	17,141	38,003	-	-
1976	-	4,130	7,190	-	-	12	6,977	35,226	-	375 [a]	-	1,095	6,095	2,600	-
1977	19	10,456	4,150	-	-	84	22,757	47,934	-	-	-	8,540	4,685	-	-
1978	2	14,365	208,300	-	-	74 [e]	14,408 [e]	70,148 [e]	-	-	2	5,865	1,364	-	-
1979	8	1,282	2,119	-	-	107	12,355	167,492	-	-	-	812	1,624	-	-
1980	-	8,915	75,770	-	-	177	19,374	319,363	-	-	[e] 405	21,616	663,937	-	-
1981	-	7,249	-	-	-	136	34,561	566,417	-	-	30	2,105	480		
1982	20	2,557	227,440	-	-	138	44,036	469,674	-	-	[c] 49	2,044	53,605	-	-
1983	54	8,886	50	-	-	267	56,907	251,965	-	-	135	16,345	40,797	-	-
1984 [j]	6	34,572	22,636		998	736	54,043	736,544	-	983 [f]	270	56,210	93,600	-	-
1985	25	11,140	-	-	332 [k]	712	9,912	18,237	-	673 [f]	472	13,645	8,940	-	-
1986	2	2,442	0	-	-	653	24,704	241,446	-	421 [f]	453	5,975	35,680	-	-
1987	10	4,145	0	-	257 [k]	314	16,134	5,567	-	819 [f]	474	9,605	580	-	-
1988	18	6,521	8,160 [l]	-	1,095 [k]	321	13,301	187,991	-	444 [f]	561	4,662	114,340	-	-
1989	-	-	-	-	182 [k]	282	13,689	27,487	-		[e] -	-	-	-	-
1990	15	6,200	115,250	-	170	744	13,735	416,511	-	746 [f]	397	4,350	186,400	-	-
1991	42	10,700	37,410	-	1,783	587	18,802	53,499	-	809 [f]	661	7,085	26,870	-	-
1992	-	7,770	803,200	-	812	479	12,077	1,464,717	-	532 [f]	260	2,595	138,600	-	-
1993	15	19,910	2,840	-	2,104	565	15,823	43,065	-	1,238 [f]	1,061	8,740	18,650	-	1,395
1994	7	16,470	1,294,100	-	274	627	33,010	2,304,099	-	2,547 [d]	No survey due to poor conditions				
1995	48	25,358	200	-	2,136	468	42,161	17,509	-	1,625 [f]	377	16,158	4,020	-	930
1996	25	9,732 [l]	153150	-	2,047	567	27,256	907,894	-	1,410 [f]	439	10,790	226,750	-	-
1997	131	16,550	-	-	983	972	20,118	9,536	-	610 [f]	1,946	3,105	16,890	-	-
1998	51	2,556	205,110	-	593	296	24,248	655,933	-	610 [f]	894	10,180	1,124,800	-	-
1999	-	640	-	-	619	115	8,763	608	-	223 [f]	-	-	-	-	-
2000	-	-	-	-	3,812	144	12,878	750,173	-	541 [f]	-	-	-	-	0
2001	6	2,448	2,856	-	1,122	258	16,598	8,423	-	9,532 [d]	77	863	-	-	-
2002	-	-	-	-	1,122	778	37,995	111,410	-	6,459 [d]	42	180	182,000	-	-
2003	55	2,315	272		146	744	12,123	22,329		5,490 [d]	50	1,352	60	-	292

[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.

(Continued)

Appendix Table A14. Comparative salmon escapement indices of Norton Sound streams, 1961-2003 . (Page 4 of 4)

	North River				
Year	Chinook	Chum	Pink	Pink & Chum [b]	Coho
1961					
1962	162	-	-	16,087	-
1963 [c]	287	-	-	73,274	-
1964	23	-	-	5,981	-
1965					
1966	153	-	-	16,600	-
1967					
1968					
1969					
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]	196	826	143,789	-	-
1975 [c]	60	5,237	17,885	-	-
1976 [c]	66	1,963	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	168,902	-	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 [l]	-	240
1989 [c]	-	-	-	-	-
1990	255	1,345	25,685	-	-
1991	656	2,435	119,140	-	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 [e]
1996	106	270 [l]	125,500	-	917
1997	1,605	9,045	17,870	-	-
1998	591	50	153,150	-	233
1999	18	1,480	3,790	-	533
2000					
2001	367	330	-	-	-
2002	122	217	45,950	-	800
2003	131	222	11,010	-	-

[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.

Appendix Table B1. Comparative sockeye salmon aerial survey indices, Port Clarence District, 1963-2003

Year	Salmon Lake	Grand Central River	Total
1963	866	620	1,486
1964 [a]	76	590	666
1965	250	160	410
1966	1,120	370	1,490
1967	129	280	409
1968 [a]	830	645	1,475
1969	24	171	195
1970 [b]	-	-	-
1971	538	512	1,050
1972 [a]	680	300 [c]	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 [a]	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	3,580
1990	2,834	926	3,760
1991	3,790	1,570	5,360
1992	1,500	[b]	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
1998	5,210	1,977	7,187
1999	31,720	1,780	33,500
2000	12,772	[b]	12,772
2001	9,400	155	9,555
2002	3,520	71	3,591
2003	19,275	1,015	20,290

[a] Poor survey.

[b] No survey made.

[c] Boat survey.

[d] Early count.

Appendix Table B2. Subsistence surveys conducted in Port Clarence District 1963 - 2003.

Year		Number of Fishing Families Interviewed	Chinook	Sockeye	Coho	Pink	Chum	Total
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
1998	[e]	138	287	1,665	1,759	7,812	2,621	14,144
1999	[e]	155	89	2,392	1,030	786	1,936	6,233
2000	[e]	134	72	2,851	935	1,387	1,275	6,521
2001	[e]	160	84	3,692	1,299	1,183	1,910	8,167
2002	[e]	159	133	3,732	2,194	3,394	2,699	12,152
2003	[e]	2003 Data not yet available						

[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 C.1. Kotzebue District chum salmon catch statistics, 1962-2002 and 2003.

Year	Total Catch	Total Days [a]	Boat Days [b]	Catch/Boat Day	Number Fishers [c]	Season Catch per Fisherman
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	360	109	1,408
1995	290,730	9.7	282	1,031	92	3,160
1996 [h]	82,110	6.0	76	1,080	55	1,493
1997	142,720	16.5	330	432	68	2,099
1998	55,907	13.0	187	300	45	1,242
1999	138,605	13.5	212	654	60	2,310
2000	159,802	14.0	283	565	64	2,497
2001 [I]	211,672	15.3	307	689	66	3,207
2002	8,390	14	19	442	3	2,797
Average	209,203	22	1,516	225	124	1,674
2003 [j]	25,423	25	33	770	4	6,356

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 fishers.

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

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

f Includes 2,000 chum salmon from the Sikusuilaq 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.

I Includes 10 chum salmon commercially caught but not sold on July 16.

j An additional 340 chum salmon from the commercial catch were kept for subsistence use.

Appendix Table C2. Kotzebue District chum salmon type of processing and weights, 1962-2003.

Year	Chum Salmon Cases (48lbs)	Chum Salmon Fresh Frozen (Round weight in pounds)	Other [a]	Fresh Frozen Salmon Roe (pounds)	Cured 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		
1998		447,256	2,971		
1999		1,108,898	87		
2000		1,370,637	106		
2001		1,847,361	64		
2002		74,341	0		
2003		218,091	0		

[a] Chinook and pink salmon and Dolly Varden.

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

[c] Includes 80,801 pounds from the experimental commercial fishery at Deering.

[d] Includes 11,160 pounds from the Sikusuilaq 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 mean prices paid per pound to salmon fishers by species, 1962-2003.

Year[a]	Chum Salmon Average Weight	Chum Salmon Average Price	Chinook Salmon	Pink Salmon	Inconnu	Dolly Varden
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
1998	8.0	$0.15	$1.00			$0.20
1999	8.0	$0.16	$1.00			$0.20
2000	8.6	$0.18	$1.00			$0.20
2001	8.7	$0.17	$1.00			
2002	8.9	$0.10				
2003	8.6	$0.12				$0.50

[a] Information not available for some species in some years.

[b] Includes price paid to fishers of Deering during the experimental commercial fishery.

[c] Price per fish.

Appendix Table C4. Kotzebue District commercial fishery dollar value estimates, 1962-2003.[a]

Year	Gross Value of Catch to Fishers
1962	$4,500
1963	$9,140
1964	$34,660
1965	$18,000
1966	$25,000
1967	$28,700
1968	$46,000
1969	$71,000
1970	$186,000
1971	$200,000
1972	$260,000
1973	$925,000
1974 [b]	$1,822,784
1975 [c]	$1,365,648
1976	$580,375
1977	$1,033,950
1978	$575,260
1979	$990,263
1980	$1,446,633
1981	$3,246,793
1982	$1,961,518
1983	$420,736
1984	$1,148,884
1985	$2,137,368
1986	$931,241
1987	$515,000
1988	$2,581,333
1989	$613,823
1990	$438,044
1991	$437,948
1992	$533,731
1993 [d]	$235,061
1994	$233,512
1995	$316,031
1996	$56,310
1997	$187,978
1998	$70,587
1999	$179,781
2000	$246,789
2001	$322,650
2002	$7,572
Average	$645,015
2003	$26,377

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

[b] Includes $9,193 from the experimental commercial fishery at Deering.

[c] Includes $17,776 from the experimental commercial fishery at Deering.

[d] Includes $3,648 from Sikusuilaq Springs Hatchery terminal fishery.

Appendix Table C5. Kotzebue District commercial and subsistence salmon catches, 1914-2003.

	Commercial Catch			Subsistence Chum Salmon Catch			
Year [a]	Chum [b]	Other [c]	Total	Chum	Number of Fishers Interviewed	Average Catch per Fisher	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 [e]		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 [f]	48	634,527	26,729	88	304	661,256
1975	563,682 [g]	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	[j]	[j]	[j]	109,511
1988	352,915	152	353,067	[j]	[j]	[j]	353,067
1989	254,617	87	254,704	[j]	[j]	[j]	254,704
1990	163,263	32	163,295	[j]	[j]	[j]	163,295
1991	239,923	44	239,967	[j]	[j]	[j]	239,967
1992	289,184	204	289,388	[j]	[j]	[j]	289,388
1993	73,071 [k]	131	73,202	[j]	[j]	[j]	73,202
1994	153,452 [l]	3	153,455	36,226 [n]	375	97	189,681
1995	290,730	5	290,735	102,880	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
1998	55,907	210	56,117	48,979	592	83	105,096
1999	139,120	5	139,125	94,342	353	267	233,467
2000	159,802	10	159,812	65,975	422	156	225,787
2001	211,672	6	211,678	49,232	408	121	260,910
2002	8,390	0	8,390	16,880 [n,o]	191	88	25,270
2003	25,423	0	25,423	2003 data not yet available			
1979-2002				1994-2002			
Average	233,712	181	233,893	Average 63,573	451	140	

[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 Sikusuilaq 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.

[o] Only 2 of 6 villages surveyed.

Appendix Table C6. Kotzebue District subsistence chum salmon catches by village, 1962-2003.

	Village					Kobuk River	Noatak	Village						District
Year	Noorvik	Kiana	Ambler	Shungnak	Kobuk	Villages	Village	Kotzebue	Deering	Kivalina	Buckland	Candle	Shishmaref	Total
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 [a]	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
1998	9,845	3,414	2,432	4,676	1,031	21,398	2,614	24,968	[b]	[b]	[b]	[b]	[b]	48,980
1999	17,843	3,788	590	3,868	1,869	27,958	1,616	64,768	[b]	[b]	[b]	[b]	[b]	94,342
2000	10,391	2,876	5,009	2,944	318	21,538	7,293	37,144	[b]	[b]	[b]	[b]	[b]	65,975
2001	16,540	5,500	[b]	4,310	2,843	29,193	2,326	17,713	[b]	[b]	[b]	[b]	[b]	49,232
2002	13,943	[f]	[f]	[f]	[f]	[f]	2,937	[f]	[b]	[b]	[b]	[b]	[b]	16,880
2003	2003 subsistence catches not yet available													

[a] No household survey, information is from return of mail questionaires.

[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 questionaires.

[f] The Kotzebue Sound communities of Ambler, Kiana, Kobuk, Kotzebue, and Shungnak, though normally included, were not surveyed in 2002.

Appendix Table C7. Kotzebue District mean subsistence chum salmon catch per fisher by village, 1962-2003.

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]
1998	35	27	79	34	30	84	41	[a]
1999	77	115	151	42	28	76	81	[a]
2000	54	72	93	33	71	64	10	[a]
2001	23	24	152	62	[a]	94	109	[a]
2002	[a]	29	124	[a]	[a]	[a]	[a]	[a]
2003	2003 subsistence catches not yet available							

[a] Not surveyed.

[b] Number of fishers not known.

[c] Estimates based on very limited number of mail-in calendars except for the villages of Noatak and Shungnak where interveiws were conducted.

[d] Partial harvest, fishers were just beginning to fish.

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

Appendix Table C8. Chum salmon aerial survey counts for the Kotzebue District, 1962-2003 . (p. 1 of 5)

Stream[a,h]	1962	1963	1964	1965	1966	1967	1968	1969	1970
Noatak Drainage									
Noatak River below Kelly River	168,000 [d]	1,970 [b,j]	89,798	6,152 [b,j]	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 [c]	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]	159	3,000 [b]
									2,000 [b]
Kobuk River System Total	38,835 [c]	8,940	28,032	11,480	8,164	8,112 [c]	13,306	16,934	

(continued)

Appendix Table C8. (p. 2 of 5)

Stream[a,h]	1971	1972 [b]	1973 [b]	1974	1975	1976	1977 [b]	1978	1979
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]
Eli River		3,286		22,249	1,302	1,205	742	5,525	1,794
Kelly River & Lake			2,590 [f]	1,381 [f]	3,937	217 [b]	290 [b]	168 [b]	3,200 [b]
Noatak River System Total	41,056	64,315 [b]	34,734	153,270	101,748	45,996	12,253 [b]	43,510	20,715
Kobuk Drainage									
Kobuk to Pah River	4,953			2,255	1,873	485		269	75
Pah River to just below Selby River	2,039	1,865		4,710	3,968	2,037		1,448	183
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
Beaver Creek mouth	2,000	3,000	850						
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
Squirrel River	6,628	32,126	12,345	32,523	32,256	7,229	1,964 [b]	1,863 [b]	1,500 [b]
Salmon River	5,453	2,073 [b]	6,891	29,190	9,721	1,161		814 [b]	674 [b]
Tutuksuk River	1,384 [f]			8,312	1,344 [b]	758		368 [b]	382 [b]
Kobuk River System Total	30,667	52,354	21,706	98,145	54,023	11,670	1,964	5,026	4,564

(continued)

Appendix Table C8. (p. 3 of 5)

Stream[a,h]	1980	1981 [b]	1982 [b]	1983	1984	1985 [b]	1986 [b]	1987 [b]	1988 [b]
Noatak Drainage									
Noatak River below Kelly River	164,474	116,352	20,682	79,773	67,873	45,525	37,227	5,515 [b,j]	45,930 [b,j]
Eli River	10,277		189	3,044	5,027	855	4,308	2,780	8,639
Kelly River & Lake	7,416	13,770	11,604	12,137	3,499	1,200	839	950	1,460
Noatak River System Total	182,167	130,122	32,475	94,954	76,399	47,580	42,374	9,245	56,029
Kobuk Drainage									
Kobuk to Pah River	1,694	18	2,643 [b]	2,147	402	2,048 [i]	531		
Pah River to just below Selby River	2,069	309	598 [b]	2,433	257	241 [i]	511	2,250	1,135 [b]
Selby River mouth & slough		8,321 [d,e]	2,454	11,683		711 [i]	673	1,470	820 [b]
Selby R. mouth to Beaver C.	6,925 [d]		7,268	13,011	5,910	3,278 [i]	3,282	1,350	6,890 [b]
Beaver Creek mouth	784		1,711	3,059					
Above Beaver Creek				1,413	4,052		1,018	3,140	3,050 [b]
Upper Kobuk River Total	11,472	8,648	14,674	33,746	10,621	6,278	6,015	8,210	11,895 [b]
Squirrel River	13,563	9,854	7,690	5,115	5,473	6,160	4,982	2,708 [c]	4,848 [b]
Salmon River	8,456	4,709	1,821 [c]	1,677	1,471	2,884	1,971	3,333	6,208
Tutuksuk River	1,165	1,114	1,322	2,637	1,132	5,098	4,257	206	3,122
Kobuk River System Total	34,656	24,325	25,507	43,175	18,697	20,420	17,225	14,457	26,073

(continued)

Appendix Table C8. (p. 4 of 5)

Stream[a,h]	1989 [j]	1990 [b]	1991	1992 [b]	1993	1994 [j]	1995	1996	1997
Noatak Drainage									
Noatak River below Kelly River		23,345 [b]	82,750	34,335	25,415		147,260	306,900	[j]
Eli River		3,000	2,940	701	4,795		7,860	30,040	[j]
Kelly River & Lake		325 [i]	654	726	9		8,384	1,427	2,792
Noatak River System Total		26,670	86,344	35,762	30,219		163,504	338,367	
Kobuk Drainage									
Kobuk to Pah River		4,610	9,840	1,030	3,896		12,190	20,700	2,248 [b]
Pah River to just below Selby River		305	2,780	3,820	1,535		4,537	4,600	404 [b]
Selby River mouth & slough		420	1,040	1,500	1,800		1,250	4,100	662 [b]
Selby River		7,505	1,460	868	824		3364	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		2,515							914 [b]
Above Beaver Creek			4,155	740	3,174		3,486	14,940	850 [b]
									[b]
Upper Kobuk River Total		15,355	24,525	11,803	12,158		35,725	74,770	8,513 [b]
Squirrel River		5,500	4,606	2,765	4,463		10,605	10,740	4,779 [b]
Salmon River		6,335	5,845	1,345	13,880		13,988	23,790	1,181 [b]
Tutuksuk River		2,275	744	1,162	1,196		3,901	21,805	163 [b]
Kobuk River System Total		29,465	35,720	17,075	31,697		64,219	131,105	

(continued)

Appendix Table C8. (p. 5 of 5)

Stream[a,h]	1998	1999	2000[k]	2001	2002	2003	Aerial Escapement Goals
Noatak Drainage							
Noatak River below Kelly River	[b]				700	34,575	
Eli River	[b]						
Kelly River & Lake	2,631				1,116	1,566	
Noatak River System Total	[b]	84,085				36,141	84,000
Kobuk Drainage							
Kobuk to Pah River	[b]			2,790		5,501	
Pah River to just below Selby River	[b]			1,380	857	828	
Selby River mouth & slough	[b]			1,780	2,100	1,110	
Selby River	730					427	
Selby R. mouth to Beaver C.	[b]			7,470		1,274	
Beaver Creek mouth	[b]						
Above Beaver Creek	[b]				490	2,462	
	[b]						
Upper Kobuk River Total	[b]	27,340		13,420	3,447	11,602	10,000
Squirrel River	[b]	13,513					11,500
Salmon River	[b]	4,989					7,000
Tutuksuk River	[b]	2,906					2,000
Kobuk River System Total		48,748		13,420	3,447	11,602	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 discrepencies 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 survey conditions.

[k] No surveys flown in 2000.

Appendix Table D1. Norton Sound herring and spawn-on-kelp harvests (in tons) by U.S. commercial fishers, 1909-2003.

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	-
1998	2,623	8	2,631	9 [l]
1999	2,693 [j]	53	2,761	4
2000	4,487 [k]	-	4,487	2
2001	2,245	-	2,245	2
2002	1,059	64	1,123	-
2003	1,587	21	1,608	2

[a] Fishery occured 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 1000 lbs taken as bait under 5 AAC 27.971.

[l] Includes 2,100 lbs of wild kelp and 16,083 pounds of *Macrocystic* kelp.

[j] Includes an estimate 5 st of wastage.

[k] Includes an estimate 15 st of wastage.

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. Commercial herring fishery summary information, Norton Sound District, 1979-2003.

Year	Est. biomass (tons)	Catch Gillnet (tons)	Beach Seine (tons)	Wild Kelp (tons)	*Macrocystis* Kelp (lbs.)	No. of Fishers	Dollar Value (millions)	No. of Buyers	Average Roe %	Peak Catch day	Fishery Duration
1979	7,700	1,292	0	13		67	0.6	7	7.0	25-May	19-May/14-June
1980	8,400	2,452	0	24		294	0.5	8	8.1	30-May	21-May/5-June
1981	25,100	4,371	0	47		332	1.5	13	8.8	24-May	18-May/28-May
1982	19,403	3,933	0	38		237	1.0	7	8.8	8-Jun	3-Jun/11-Jun
1983	28,100	4,541	41	29		272	1.4	9	8.6	23-May	18-May/28--May
1984	23,100	3,245	327	16	6,000	194	0.9	8	10.3	10-Jun	6-Jun/28-May
1985	20,000	3,379	169			277	1.4	11	9.9	20-Jun	13-Jun/21-Jun
1986	28,100	4,979	215			323	2.9	10	9.6	9-Jun	3-Jun/10-Jun
1987	32,370	3,759	323			564	2.6	11	8.6	7-Jun	7-Jun/8-Jun
1988	33,924	4,474	198			348	3.9	11	9.0	28-May	27-May/31-May
1989	25,981	4,351	390			357	2.3	9	9.2	28-May	27-May/30-May
1990	39,384	6,032	347			365	3.6	8	8.8	29-May	28-May/30-May
1991	42,854	5,150	522			279	2.4	8	9.3	25-May	23-May/25-May
1992	57,974	0 [a]	0 [a]				0.0			20-Jun [b]	
1993	46,549	4,291	742			264	1.5	5	9.9	25-May	24-May/5-Jun
1994	31,088	921	40			215	0.3	6	10.3	8-Jun	5-Jun/9-Jun
1995	37,779	6,033	614			215	4.2	6	10.4	24-May	23-May/30-May
1996	26,596	5,581	589			287	4.5	10	10.6	25-May	24-May/25-May
1997	47,748	3,459	513			220	0.6	9	9.9	22-May	20-May/24-May
1998	52,033	2,632	0	1	16,083	47	0.2	2	9.2	25-May	22-May/9-Jun
1999	34,314	2,755	0		7,482	122	0.6	4	10.5	17-Jun	13-Jun/22-Jun
2000	32,680	4,390	81		4,500	97	0.8	4	9.5	11-Jun	7-Jun/15-Jun
2001	26,305	2,245	0		4,400	76	0.3	3	12.3	12-Jun	12-June/16-June
2002	27,068	1,123	0		0	46	0.1	2	10.6	24-May	22-May/3-June
2003	32,918	1,608	0		1,750	32	0.2	2	10.5	18-May	16-May/25-May

[a] No fishery due to late sea ice breakup.

[b] Date of peak aerial survey biomass estimate, typically one or two days prior to peak catch.

Appendix Table D4. Norton Sound commercial herring harvest (tons) by subdistrict, by year, 1979-2003.

	Subdistricts							
Year[a]	s.d. 1	s.d. 2	s.d. 3	s.d. 4	s.d. 5	s.d. 6	s.d. 7	Totals
1979	319	405	555	0	0	0	14	1,293
1980	1,176	632	632	5	0	7	0	2,452
1981	3,068	831	471	1	0	0	0	4,371
1982	2,062	946	925	0	0	0	0	3,933
1983	434	1,265	2,733	0	65	85	0	4,582
1984	-	-	3,572	0	0	0	0	3,572
1985	1,538	188	1,675	0	147	0	0	3,548 [b]
1986	2,559	-	2,450	0	185	0	0	5,194
1987	2,218	174	1,690	0	0	0	0	4,082
1988	3,260	99	1,307	0	6	0	0	4,672
1989	3,256	60	1,425	0	0	0	0	4,741 [c]
1990	4,498	950	931	0	0	0	0	6,379 [d]
1991	0	880	4,792	0	0	0	0	5,672 [e]
1992 [f]	0	0	0	0	0	0	0	0
1993	2,288	587	1,881	0	278	0	0	5,034 [g]
1994	250	36	634	0	40	0	0	960
1995	2,359	604	1,524	0	2,108	167	0	6,762
1996	3,074	111	2,831	0	153	0	0	6,170 [h]
1997	2,046	62	1,864	0	0	0	0.5[j]	3,976 [i]
1998	1,543	0	1,081	0	0	0	0	2,624
1999	285	323	2,050	0	0	0	8	2,746 [k]
2000 [l]	2,623	81	1,767	0	0	0	0	4,471
2001 [l]	898	0	1,347	0	0	0	0	2,245
2002 [l]	373 [a]	0	750 [a]	0	0	0	0	1,123 [a]
2003 [l]	283	0	1,325	0	0	0	0	1,608 [a]

[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 in June (not during sac roe fishery).

[k] 75.8 tons added to sac roe total due to dewatering by buyers. 3 tons added to bait total due to dewatering by buyer. Does not include an estimated 5 st of wastage.

[l] 10% added to sac roe total due to dewatering by buyers.

Appendix Table D5. 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	Unknown # of Permits (G/N)	1,100 lbs	$.30/lb	$ 330
1988	Sac Roe	3 Purse Seiners	56.4 st @7.6%		
		3 Gillnetters	23.6 st @8.9%		
		Combined Total	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	8 Permits (G/N)	19,193 lbs	$.61/lb	$ 11,625
	Fall Bait	2 Permits (G/N)	9,119 lbs	$.37/lb	$ 3,393
		Combined Total	28,312 lbs	$.53/lb	$ 15,018
1996	Spring Bait	4 Permits	5,546 lbs	$.40/lb	$ 2,218

G/N= gillnet

Appendix Table E1. Historical commercial summer harvest of red king crab from Norton Sound Section, Eastern Bering Sea, by statistical areas, 1977-2003 (catch in pounds). (page 1 of 2)

Statistical Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
616331	7,893												
616401													
626331	40,020					22							
626401	31,572			4,830	399								
626402	38,995												
636330													
636401				12,398	61,823	32,246	5,880	41	891				22,030
636402													
646301													
646330					4,716								5,212
646401			155,972		1,319	17,532							
646402	80,969					748							
656300			161,699		15,174								
656330			323,518	72,735	395,662	3,983	24,246	83,479	7,632		79,006	36,129	1,757
656401			138,011	121,147	253,387	60,480	11,422	183,119	246,200		194,408	165,644	100,956
656402	306,302	90,187	288,869	918	3,098	2,832			132,363				
666230		55,490			77								
666300		162,795	60,816	84,874	9,167	95		4,534					
666330		353,016	505,050	367,446	141,513	8,990	1,192		389	70,615	2,963	13,020	1,275
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
666402	12,036	515,778	534,938	183,581		17,585			32,992				
666431			146,029										
676300		13,238		126,231									
676330		51,304	81,798	6,762	18,734								
676400		667,130	33,856	274	92,026	1,315	247		32				
676430		3,811	12,309		373	3,513			1,171				
676501					36								
686330			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

-Continued-

Appendix Table E1. (page 2 of 2)

Statistical Area	1990	1991[a]	1992	1993	1994	1995	1996[b]	1997	1998	1999	2000	2001	2002	2003	Totals
616331					48					633	4,557		3,506	646	17,283
616401						35									35
626331							61						2,455		42,558
626401						18,971	45,045	18,066	8,065	508	4,689	61,620	53,722	15,899	263,386
626402														1,352	40,347
636330							4,560	3,838	2,449			2,253			13,100
636401			1,159	1,373	8,087	24,329	70,677	59,206	10,771	14,201	126,994	91,343	50,906	83,949	678,304
636402					1,754	3,466									5,220
646301						4,628	13,888								18,516
646330						1,493	2,894	314		3,021		1,868	1,955		21,473
646401				1,963	37,222	105,045	22,834	1,052	3,194	221		4,287		3,952	354,593
646402				730	143,511	66,821									292,779
656300														14	176,887
656330			4,814	265		19,745	15,446	4,661	4,078	1,300		20,869	12,374	21,176	1,132,875
656401	171		53,119	105,341	29,566	32,289	9,985	4,035	1,127	2,739	94,813	55,158	63,038	40,566	1,966,721
656402				193,079	106,053	44,000								1,441	1,169,142
666230															55,567
666300							25,519								347,800
666330	27,185		4,305	31,758		730					5,839	7,030	1,332	1296	1,544,944
666401	162,263		10,632	746	396		3,001	1,816		930	60,762	43,771	35,970	83,998	2,780,318
666402				535	1,221								30,070	12,873	1,341,609
666431						1,124							4,274	45	151,472
676300							546								140,015
676330															158,598
676400	3,212						9,775								807,867
676430															21,177
676501															36
686330															1,860
Totals	192,831		74,029	335,790	327,858	322,676	224,231	92,988	29,684	23,553	297,654	288,199	259,602	267,207	13,544,482

[a] No commercial fishery occured in 1991.

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

Appendix Table E2. The results of the population assessment surveys conducted for red king crab in Norton Sound since 1976.

Year	Date	Research Agency	Gear	Population Abundance Estimatees Number of crab [a]			Legal Male Biomass
				Pre-2 males [b]	Pre-1 Males [b]	Legal Males [c]	(millions of pounds)
1976	9/2-9/5, 9/16-10/7	NMFS	**Trawl**	331,555	808,091	1,742,755	5,228,265
1979 [d]	7/26-8/5	NMFS	**Trawl**			809,799	2,429,397
1980 [e]	7/4-7/14	ADF&G	Pots			1,900,000	5,700,000
1981	6/28 - 7/14	ADF&G	Pots			1,285,195	3,855,585
1982	7/6 - 7/20	ADF&G	Pots			353,273	1,059,819
1982	9/5 - 9/11	NMFS	**Trawl**	356,724	832,581	877,722	2,633,166
1985	7/1 - 7/14	ADF&G	Pots			907,579	2,722,737
1985	9/16 - 10/1	NMFS	**Trawl**	466,858	707,140	1,051,857	3,155,571
1988	8/16 - 8/30	NMFS	**Trawl**	565,255	493,030	978,748	2,936,244
1991	8/22 - 8/30	NMFS	**Trawl**	294,801	303,682	1,287,486	3,862,458
1996	9/7 - 9/18	ADF&G	**Trawl**	452,580	325,699	536,235	1,608,705
1999	7/28 - 8/7	ADF&G	**Trawl**	103,832	940,198	1,594,341	4,783,023
2002	7/27-8/6	ADF&G	**Trawl**	427,703	518,638	771,569	2,314,707

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

[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] 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.

[d] Pre-2 male and pre-1 male data is unavailable for the 1979 NMFS trawl survey.

[e] 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.

Appendix Table E3. Historical summer commercial red king crab fishery economic performance, Norton Sound Section, Eastern Bering Sea, 1977 - 2003.

Year	Guidline Harvest Level (lbs) [b]	Legal Male Pop. Est. No. crab (millions)	Legal Male Pop. Est. lbs [b]	Commercial Harvest (lbs) [a,b] Open Access	Commercial Harvest (lbs) [a,b] CDQ	Number of Vessels	Number of Permits	Number of Landings	Number of Pots Registered	Number of Pots Pulls	Exvessel Price/lb	Fishery Value (millions $)	Season Length Days	Season Length Dates
1977	[d]	1.7	5.1	0.52		7	7	13	[d]	5,457	0.75	0.229	60	[d]
1978	3.00			2.09		8	8	54	[d]	10,817	0.95	1.897	60	6/7-8/15
1979	3.00	0.8	2.4	2.93		34	34	76	[d]	34,773	0.75	1.878	16	7/15-7/31
1980	1.00	1.9	5.7	1.19		9	9	50	[d]	11,199	0.75	0.890	16	7/15-7/31
1981	2.50	1.2	3.6	1.38		36	36	108	[d]	33,745	0.85	1.172	38	7/15-8/22
1982	0.50	0.9	2.7	0.23		11	11	33	[d]	11,230	2.00	0.405	23	8/9-9/1
1983	0.30			0.37		23	23	26	3,583	11,195	1.50	0.537	3.8	8/1-8/5
1984	0.40			0.39		8	8	21	1,245	9,706	1.02	0.395	13.6	8/1-8/15
1985	0.45	1.1	3.3	0.43		6	6	72	1,116	13,209	1.00	0.427	21.7	8/1-8/23
1986	0.42			0.48		3	3	[d]	578	4,284	1.25	0.600	13	8/1-8/25 [e]
1987	0.40			0.33		9	9	[d]	1,430	10,258	1.50	0.491	11	8/1-8/12
1988	0.20	1.0	3.0	0.24		2	2	[d]	360	2,350	[d]	[d]	9.9	8/1-8/11
1989	0.20			0.25		10	10	[d]	2,555	5,149	3.00	0.739	3	8/1-8/4
1990	0.20			0.19		4	4	[d]	1,388	3,172	[d]	[d]	4	8/1-8/5
1991 [c]	0.34	1.3	3.9											
1992	0.34			0.07		27	27	[d]	2,635	5,746	1.75	0.130	2	8/1-8/3
1993	0.34			0.33		14	20	208	560	7,063	1.28	0.430	52	7/1-8/28 [f]
1994	0.34			0.32		34	52	407	1,360	11,729	2.02	0.646	31	7/1-7/31
1995	0.34			0.32		48	81	665	1,900	18,782	2.87	0.926	67	7/1-9/5
1996	0.34	0.5	1.5	0.22		41	50	264	1,640	10,453	2.29	0.519	57	7/1-9/3 [g]
1997	0.08			0.09		13	15	100	520	2,982	1.98	0.184	44	7/1-8/13 [h]
1998	0.08			0.03	0.00	8	11	50	360	1,639	1.47	0.041	65	7/1-9/3 [i]
1999	0.08	1.6	4.8	0.02	0.00	10	9	53	360	1,630	3.08	0.073	66	7/1-9/4 [j]
2000	0.33	1.4	4.2	0.29	0.01	14	17	202	560	6,345	2.29	0.715	91	7/1- 9/29 [k]
2001	0.30	1.3	3.8	0.28	0.00	30	37	320	1,200	11,928	2.31	0.674	97	7/1 - 9/9 [l]
2002	0.24	1.0	3.1	0.24	0.01	28	32	164	1,120	6,491	2.81	0.729	77	6/15-9/3 [m]
2003	0.25	1.0	3.1	0.25	0.01	24	30	218	960	8,494	3.09	0.823	68	6/15-8/24 [n]

[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.

[i] First delivery was made 7/16.

[j] The season was extended 24 hours due to bad weather.

[k] Open access fishery closed 8/29/00. CDQ fishery ran from 9/1/00 - 9/29/00

[l] Open access fishery closed 9/1/01. CDQ fishery ran from 9/1/01 - 9/9/01

[m] Open access fishery was open 7/1/02-8/6/02.
CDQ fishery was open 6/15/02-6/28/02 and 8/9/02 - 9/3/02.

[n] Open Access fishery was open 7/1/03-8/13/03. CDQ fishery was open 6/15/03-6/28/03 and 8/15/03-8/24/03.

Appendix Table E4. Percentage of recruit and postrecruit male red king crab from summer commercial fishery catch samples in Norton Sound Section, Bering Sea, 1977-2003.

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
1998	32	68
1999	42	58
2000	41	60
2001	33	67
2002	33	67
2003	48	52

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

[b] Postrecruits = All other, legal size, male king crab.

[c] No summer commercial fishery in 1991.

Appendix Table E5. Winter commercial and subsistence red king crab harvests, Norton Sound, Eastern Bering Sea, 1978 - 2003.

Commercial			Subsistence						
Year[a]	Fishers	# Crab Harvested	Winter[b]	Permits Issued	Permits Returned	Permits Fished	Total Crab Caught[c]	Total Crab Harvested[d]	Average/ permit fished
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	105	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	167	71	57	5,918	4,059	71
1996	9	1,778	1995-96	84	44	35	2,936	1,679	48
1997	2	83	1996-97	38	22	13	1,617	745	57
1998	5	984	1997-98	94	73	64	20,327	8,622	135
1999	5	2,714	1998-99	95	80	71	10,651	7,533	106
2000	10	3,045	1999-2000	98	64	52	9,816	5,723	107
2001	3	1,098	2000-01	50	27	12	366	256	21
2002	11	2,591	2001-02	114	101	67	8,805	3,669	55
2003	13	6,853	2002-2003	107	73	64	9,052	4,140	68
Avg 1978-2002	10	2,351	Avg 1977-2002	118	90	70	8,624	5,402	67

[a] Prior to 1985 the winter commercial fishery occurred from January 1 - April 30; as of March 1985, fishing may occur from November 15 - May 15.

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

[c] The number of crab actually caught; some may have been returned.

[d] The number of crab harvested is the number of crab caught and kept.

[e] Information not available.

Appendix Table E6. Size composition by percent of red king crab from winter research pots near Nome, Norton Sound, Bering Sea, 1983-2003.

	SUBLEGAL[a]			LEGAL[a]		
Year	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
1998	36	44	82[d]	9	9	18
1999	7	42	49[d]	39	11	50
2000	16	20	36[d]	39	25	64
2001	23	16	39[d]	14	48	61
2002	43	26	79[d]	9	12	21
2003	20	42	66[d]	20	14	34

[a] Sublegals = male crab less than 4 3/4" carapace width.
Prerecruit age one = Sublegals greater than 89mm in carapace length.
Prerecruit age two = 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.
Postrecruits = 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.

[d] Includes prerecruit age three.

Appendix Table F1. Kotzebue District winter commercial sheefish harvest statistics, 1967- 2003.

Year [b]	No. of Fishers	No. of Fish	Pounds[a] Total	Pounds[a] Average	Price/ Pound	Estimated Value
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]						
1998	1	254	2,400	9.4	$0.43	$1,032
1999 [e]						
2000 [e]						
2001	1	19	200	10.5	$1.00	$200
2002	4	30	300	10.0	$1.00	$300
2003	1	122	1,250	10.2	$0.56	$700

[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, 1966-2003.

Year[a]	Number of Fishers Interviewed	Reported Harvest	Average Catch per Fisher
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 [d]			
1990 [d]			
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
1998 [e]	435	5,350	13.6
1999 [e]	191	8,256	18.6
2000 [e]	237	7,446	16.6
2001 [e]	363	3,838	8.9
2002	101	3,882	38
2003	2003 harvest not yet available	10 [f]	

[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 numbers 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; numbers 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.

[f] Reported from commercial salmon fishery and used for subsistence.

Appendix Table F3. Peak annual aerial survey counts of sheefish in the Kobuk and Selawik Rivers, 1966-2003.

Year[a]	Kobuk River	Abundance Estimate for Kobuk River spawning area[e]	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	32,273	[c]	1,840
1996	[c]	43,036	[c]	
1997	[c]	26,782	[c]	
1998	[c]		[c]	
1999	[c]		[c]	
2000	[c]		[c]	
2001	[c]		[c]	
2002	[c]		[c]	
2003	[c]		[c]	

[a] Counts are considered minimal as survey conditions ranged from poor to good.

[b] No fish reported.

[c] Not surveyed.

[d] Probably more sheefish than listed; species identification problems.

[e] Mark recapture abundance estimates for Kobuk River spawning area conducted by Div. of Sport Fish 1995-1997.

Appendix Table F4. Kotzebue District incidentally caught and sold Dolly Varden during the commercial salmon fishery, 1966-2003.

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	[h]	8,704	6.9	0.30
1988	752	[h]	4,967	6.6	0.35
1989	3,093	[h]	20,293	6.6	
1990	604	[h]	4,219	7.0	0.25
1991	6,136	[h]	40,747	6.6	0.18
1992	1,977	[h]	11,951	6.0	0.10
1993	76	[h]	540	7.1	0.10
1994	149	[h]	767	5.1	0.17
1995	2,090	[h]	13,195	6.3	0.20
1996	188	[h]	1,153	6.1	0.25
1997	3,320	[h]	23,203	7.0	0.20
1998	349	[h]	2,640	7.6	0.20
1999	1,502	[h]	11,352	7.6	0.20
2000	7	[h]	44	6.3	0.20
2001	0	[h]	0		
2002	0	30	0		
2003	20	176	160	8.0	0.50

[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 sold based on interviews of fishers.

[h] No estimate made of Dolly Varden caught but not sold.

Appendix Table F5. Subsistence harvests of Dolly Varden from the villages of Kivalina and Noatak, 1959-2003.

	Kivalina		Noatak
Year	Number	Pounds	Number [d]
1959 [a]	34,240	85,600	
1960 [a]	49,720	124,300	
1962			27,623
1963			4,130
1968 [e]	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,f]
1983	16,270 [c]		4,545
1984	12,000 [c]		2,542
1985	10,500 [c]		
1986	7,436 [c]		46 [h]
1987 [g]			1,376 [h]
1988			
1989			
1990			
1991 [g]			4,814
1992 [g]			4,395
1993 [g]			4,275
1994			
1995 [g]			5,762
1996 [g]			5,031
1997 [g]			4,763
1998 [g]			3,872
1999 [i]			
2000 [g]			3,315
2001 [g]			2,702
2002 [g]			3,242
2003	2003 data not available at this time		

[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.

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

[g] Based on ADFG, Div. of Subsistence, household surveys in Noatak.

[h] Subsistence fishers just beginning to beach seine at the time of this survey.

[i] Data not collected.

Appendix Table F6. Aerial survey counts of overwintering and spawning Dolly Varden in the Kotzebue District, 1968-2003.

Year [a]	Noatak River Spawner Survey [b]	Overwintering	
		Wulik River [c]	Kivalina River [c]
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	[f]	[f]
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]
1998	[f]	104,043	[f]
1999	9,059	70,704	[f]
2000	[f]	[f]	[f]
2001	[f]	92,614	[f]
2002	[f]	44,257	[f]
2003	[f]	1,500 [g]	

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

[b] Includes spawner counts on the Kelly, Kugurorok and Nimiuktuk Rivers, and 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.

[g] Poor conditions on the Nimiuktuk did not allow a count.

[g] Spawning survey conducted on 8/20/03.

Appendix Table F7. Subsistence whitefish catch and effort in the Kotzebue District, 1970-2003.

Year[a]	Number of Fishers 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 [f]	84,851
1998	435 [f]	39,754
1999	191 [f]	56,326
2000	237 [f]	70,097
2001	363 [f]	30,976
2002	101 [g]	25,607
2003	2003 data not yet available	

[a] Whitefish harvest information was collected during chum salmon subsistence surveys and is considered a 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.

[f] Number of households contacted. Subsistence harvest information is from Ambler, Kaiana, Kobuk, Noatak, Noorvik, and Shungnak.

[g] Number of households contacted. Subsistence harvest information is from Noatak and Noorvik.

Appendix G1. List of common 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 pallasi*
Rock flounder	*Lepidosetta bilineata*
Rock greenling (terpug)	*Hexagrammus lagocephalus*
Round whitefish	*Prosopium cylindraceum*
Sculpins	*Cottodae*
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	*Gasterocteus aculeatus*
Ninespine stickleback	*Pungitius pungitius*
Tubenose poacher	*Pallasina barbata aix*
Whitespotted greenling	*Hexagrammus stelleri*
Yellowfin sole	*Limanda aspera*

Appendix G2. Alaska Department of Fish and Game and associated cooperative studies conducted within the Norton Sound, Port Clarence, and Kotzebue Districts, 2003.

HERRING

Herring Test Fishing

a)Location: Norton Sound ocean waters; camps at Cape Denbigh and Klikitarik; and, a third test fish crew operated out of Unalakleet.

b)Description: To determine age class composition through test fishing with variable mesh gillnets and collection of commercial catch samples. Alaska Department of Fish and Game (ADFG) project with additional funding from Norton Sound Economic Development Corporation (NSEDC) for Unalakleet crew.

SALMON

Unalakleet Escapement Studies

a)Location: Unalakleet River, approximately three miles upstream from village of Unalakleet at first bluff; and, at village of Unalakleet.

b)Description: To maintain an index of migration up Unalakleet River using test gillnets at bluff. Sample commercial catch for age and size at Unalakleet. Egg collection for fecundity project conducted by NSEDC and LGL. ADFG project.

North River Tower

a)Location: North River, approximately two miles below bridge.

b)Description: Determine daily and seasonal timing and magnitude of escapements. Cooperative project operated by Unalakleet IRA, Bering Sea Fishermen's Association (BSFA), NSEDC, and ADFG.

Kwiniuk River Tower

a)Location: Kwiniuk River, approximately five miles upstream from mouth.

b)Description: Determine daily and seasonal timing and magnitude of chum and pink salmon escapements. Determine age, sex and length of chinook and chum salmon in the Kwiniuk River escapement. ADFG project with additional funding from Norton Sound Initiative (NSI) and NSEDC.

(continued)

Niukluk River Tower

a)Location: Niukluk River, approximately five miles upstream from mouth.

b)Description: Determine daily and seasonal timing, magnitude, age, sex and length of escapements. Collect age and sex data through escapement sampling of subsistence catches, beach seining or carcass sampling. ADFG project with additional funding from NSI and NSEDC.

Eldorado River Tower / Fixed Weir

a)Location: Eldorado River, approximately 18 miles upstream from the Safety Sound highway bridge, above the furthest upstream connecting channel to the Flambeau River.

b)Description: Determine daily and seasonal timing and magnitude of escapements. Midseason, counting tower converted to a fixed weir. Cooperative project operated by Kawerak Inc. with assistance from ADFG, and funded by Kawerak Inc., BSFA, NSI, and NSEDC.

Nome River Fixed Weir

a)Location: Nome River, approximately 1 mile upstream of the VOR site.

b)Description: To determine daily and seasonal timing and magnitude of the spawning runs. Compare aerial survey totals with weir counts in order to improve survey accuracy. As time and personnel allow, collect age and sex data through escapement sampling of subsistence catches, weir trap, beach seining or carcass sampling. ADFG project with additional funding from NSI and NSEDC.

Snake River Tower / Fixed Weir

a)Location: Snake River, approximately five miles upstream of boat harbor, where river turns north.

b)Description: Determine daily and seasonal timing and magnitude of escapements. Cooperative project operated by Kawerak Inc. with assistance from ADFG, and funded by Kawerak Inc., BSFA, NSI, and NSEDC.

(continued)

Fish River Chum Salmon Radiotelemetry

a)Location: Fish River, approximately 3 miles upstream from the village of White Mountain, on White Mountain IRA land. Ground-based radio telemetry receiving and recording stations in three locations: just below White Mountain; main confluence of Niukluk and Fish Rivers; and, side channel of the Niukluk River with Fish River.

b)Description: Seine chum salmon for monitoring upriver migrations to determine drainage wide distribution, peak spawning areas, and timing. Estimate drainage population using ratio of tagged to untagged chum salmon that pass the Niukluk tower. Estimate stock origin of Niukluk and Fish River chum salmon through collection of age, length, and sex data. Additional escapement estimates done with aerial surveys on tributary rivers and creeks. ADF&G project with funding from NSI with a 25% state of Alaska match.

Glacial Lake Salmon Counting Weir

a)Location: At outlet of Glacial Lake.

b)Description: Determine daily and seasonal timing and magnitude of the spawning runs. Compare aerial survey totals with weir counts in order to improve survey accuracy. As time and personnel allow, collect age and sex data through escapement sampling of weir trap, beach seining or carcass sampling. U.S. Bureau of Land Management (BLM) project.

Pilgrim River Counting Weir

a)Location: Pilgrim River, approximately 6 miles downstream of Pilgrim River bridge at mile 65 of the Kougarok Road / Nome-Taylor Highway.

b)Description: Determine daily and seasonal timing and magnitude of the salmon escapements. Cooperative project operated by Kawerak Inc. with assistance from ADFG, BSFA, Norton Sound Initiative (NSI), and NSEDC.

(continued)

Northwest Salmon Biological / Rehabilitation Projects

1). Salmon Lake Limnology Project / Sockeye Salmon Restoration

a)Location: Salmon Lake, throughout; and smolt trap 2 miles downstream from lake, on Pilgrim River.

b)Description: To restore sockeye salmon population to higher historical levels, biological (age, weight, and length) samples taken from emigrating smolt and enumerated by mark recapture. Hydroacoustic-tow net studies conducted to estimate rearing fry population and gather growth data. ADFG project with additional funding from NSEDC and BLM.

2). Hobson Creek Instream Incubation Project.

a)Location: Spring fed tributary to the Nome River, approximately mile-19 Kougarok Road / Nome-Taylor Highway.

b)Description: Instream incubator boxes and incubation facility for supplemental salmon production. ADFG project in cooperation with a NSEDC and LGL study of chum salmon egg development. Land leased from Sitnasuak Native Corporation. No eggs were taken in 2003.

3). Safety Sound Chum Salmon Juvenile Ecology Project

a)Location: Safety Sound, throughout.

b)Description: To determine juvenile chum salmon seasonal migration patterns from fresh to marine waters, and changes in seasonal juvenile body length, weight, and condition. NSEDC, LGL project with funding from NSI.

Kobuk River Test Fish Project

a)Location: Lower Kobuk River, approximately 2 miles downriver of Kiana.

b)Description: To evaluate chum salmon abundance migrating into the Kobuk River drainage using systematic drift gillnet catches. To qualitatively assess the impact of the Kotzebue District commercial salmon fishery on chum abundance into the Kobuk River drainage for fisheries management purposes. Describe migratory timing in the lower Kobuk River. Sample for age, sex and length. ADFG project.

(continued)

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 Division of Subsistence. Subsistence salmon permits were issued in the Nome Subdistrict. ADFG project with assistance from Kawerak Inc.

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. ADFG project.

Norton Sound King Crab Trawl Survey (Conducted in 2002; next survey 2005)

a)Location: Ocean waters of Norton Sound, 10 mile grid.

b)Description: Triennial trawl survey to establish abundance of red king crab. Biological (sex and size) samples, and species present-absence data taken. ADFG project with financial assistance from the National Oceanic and Atmospheric Administration (NOAA).

Appendix G3. Norton Sound, Port Clarence, Kotzebue Sound processors, 2003.

Company	Address	Type of Processing	District
Aqua Tech	P.O. Box 10119 Anchorage, AK 99510	Fresh Crab	Norton Sound
Norton Sound Seafood	Box 323 Unalakleet, AK	Frozen/Fresh Salmon Herring Roe on Kelp King Crab	Norton Sound
Great Pacific Fisheries	Anchorage, AK	Fresh Salmon	Kotzebue
Norquest Seafoods	5245 Shilshole Ave NW Seattle, WA 98107	Frozen Herring	Norton Sound

Appendix G4.

COMMUNITY ID# _____
HHID#_____

NORTON SOUND AND SEWARD PENINSULA AREA

2003 SUBSISTENCE SALMON HOUSEHOLD HARVEST SURVEY

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

Community: _____
Survey Date: _____
Interviewer:_____

Household Head Name: _____
***Household Size** _____
If new household, where were you living last year? _____
_____
P.O. Box (if new)_____

***1. Did your household catch salmon for subsistence use this year (including with a rod-and-reel)?** 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 this year , including with a rod-and-reel (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") PINK_____ ("HUMPIES") SOCKEYE _____ ("REDS") COHO_____ ("SILVERS") 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. (If rod-and- reel was used) How many salmon did your household catch and keep with rod-and-reel this year?

CHUM_____ ("DOGS") CHINOOK_____ ("KINGS") PINK_____ ("HUMPIES") SOCKEYE _____ ("REDS") COHO_____ ("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 specifically 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)

If Household Fished for Dog Food:

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") PINK_____ ("HUMPIES") SOCKEYE _____ ("REDS") COHO_____ ("SILVERS") 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)

Appendix G4.

HH ID#_____

NORTON SOUND AND SEWARD PENINSULA AREA

2003 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 _____

***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).

Appendix G5.

COMMUNITY ID# _____
HHID#_____

NOATAK RIVER AREA

2003 SUBSISTENCE SALMON HOUSEHOLD HARVEST SURVEY

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

Community: _____
Survey Date: _____
Interviewer:_____

Household Head Name: _____
***Household Size** _____
If new household, where were you living last year? _____
_____
(If new 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 <u>usually</u> 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") PINK_____ ("HUMPIES") SOCKEYE _____ ("REDS") COHO_____ ("SILVERS") 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. (If rod-and-reel was used) How many salmon did your household catch and keep with rod-and-reel this year?

CHUM_____ ("DOGS") CHINOOK_____ ("KINGS") PINK_____ ("HUMPIES") SOCKEYE _____ ("REDS") COHO_____ ("SILVERS")

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

6. How was subsistence <u>chum</u> salmon fishing for your household this year?
_____VERY GOOD _____AVERAGE _____POOR IF POOR, WHY?_____

7. Did your household catch salmon specifically 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)

If Household Fished for Dog Food:

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") PINK_____ ("HUMPIES") SOCKEYE _____ ("REDS") COHO_____ ("SILVERS") 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)

Appendix G5.

HHID#_____

NOATAK RIVER AREA

2003 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 _____

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).

Appendix G6.

COMMUNITY ID# _____
HHID#_____

KOBUK RIVER AREA

2003 SUBSISTENCE SALMON HOUSEHOLD HARVEST SURVEY

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

Community: _____
Survey Date: _____
Interviewer:_____

Household Head Name: _____
***Household Size** _____
If new household, where were you living last year? _____
_____
(If new 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") PINK_____ ("HUMPIES") SOCKEYE _____ ("REDS") COHO_____ ("SILVERS") 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. (If rod-and-reel was used) How many salmon did your household catch and keep with rod-and-reel this year?

CHUM_____ ("DOGS") CHINOOK_____ ("KINGS") PINK_____ ("HUMPIES") SOCKEYE _____ ("REDS") COHO_____ ("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 specifically 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)

If Household Fished for Dog Food:

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") PINK_____ ("HUMPIES") SOCKEYE _____ ("REDS") COHO_____ ("SILVERS") 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)

Appendix G6.

HHID#_____

KOBUK RIVER AREA

2003 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?**

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).

Appendix G7. Emergency Orders issued during 2003.

Emergency Order Number	Effective Date	Action Taken	Comments
3-S-Z-01-03	10-Jun-03	This emergency order closes Subdistrict 1 of the Norton Sound District, from Topkok Head in the east to Cape Rodney in the west, to all subsistence salmon fishing in fresh and marine waters beginning Tuesday, June 10 until August 1, 2003, unless superceded by a following emergency order. All rivers that drain into Subdistrict 1 of the Norton Sound District and all marine waters are closed to the taking of salmon.	For over a decade the Nome Subdistrict has had weak chum salmon returns and once again, the subdistrict is being closed to protect chum salmon spawning stocks. The chum salmon stock of the Nome Subdistrict is judged insufficient to support the full subsistence needs of the residents. The Board of Fisheries has mandated that a harvestable surplus of less than 3,430 chum salmon be managed as a Tier II fishery. It is anticipated that there will be a harvestable surplus of approximately 1,000 chum salmon this season. Tier II fishing allows those residents who have been determined to be the longest users and the most dependent users of chum salmon to participate in a subsistence fishery. The other salmon species present in the Nome Subdistrict during July are not present in sufficient numbers to provide for subsistence needs without also harvesting chum salmon. Chinook and sockeye salmon are very limited in number and although desirable as food, have always been caught incidentally to the chum salmon. Odd-numbered year pink salmon returns are typically not very abundant, and a Tier I opening for pink salmon is not expected this year. At this time, the Tier I closure of these other salmon species is necessary for both conservation and to allow the orderly management of the Tier II fishery. By late July, coho salmon should arrive in the Nome Subdistrict and Tier I subsistence fishing for other salmon species may be opened. The department staff will begin issuing Tier II permits June 20, at the Nome Fish and Game office. There were 48 applicants for Tier II permits and initially 30 permits will be issued. A person from each household awarded a permit will be issued a permit form and will be given an explanation of the fishing limits and rules. Although the Tier II permit limit is 100 chum salmon, historically, the average Tier II permit holder harvests only slightly more than 33 chum salmon. Therefore, the department is issuing 30 permits for the estimated 1,000 chum salmon surplus. If the harvestable surplus is estimated to be substantially greater than 1,000 chum salmon, or a number of permit holders do not fish, additional Tier II permits may be issued. Should the harvestable surplus exceed 3,430 chum salmon, the management of the fishery would be converted back to Tier I management rules. The department staff will be flying frequent aerial surveys and boating some of the rivers to track the salmon migration's strength and progress. The weirs and towers on the Nome, Snake, and Eldorado Rivers, will also be used to track the various salmon migrations. If a stream appears to have adequate escapement, fishing closures will be lifted in that area; otherwise, the restrictions will remain in place until they no longer benefit chum salmon.
3-S-Z-02-03	20-Jun-03	This emergency order closes the Nome River to all subsistence fishing from June 20, 2003 until August 1, 2003.	For over a decade the Nome Subdistrict has had weak chum salmon returns and once again, the subdistrict has been closed to protect chum salmon spawning stocks. The chum salmon stock of the Nome Subdistrict has been judged insufficient to support the full subsistence needs of the residents. The Board of Fisheries has mandated that a harvestable surplus of less than 3,430 chum salmon be managed as a Tier II fishery. Furthermore the Nome River has been unable to meet the minimum number of the chum salmon escapement goal range of 2,900 fish in four of the last five years. The Nome River escapement goal range is 2,900 to 4,300 chum salmon. Additionally, the pink salmon escapement goal of 13,000 fish has not been met by the odd-numbered year age class since 1995. It is anticipated in 2003 that the chum and pink salmon escapement goals will not be reached. Also, chinook and sockeye salmon are very limited in number and grayling has been closed by regulation in the Nome River since 2001. To protect the low numbers of fish in the Nome River all fishing is being closed to prevent any fish from being killed from catch and release fishing. The department will monitor the escapement on the Nome River at the weir site approximately three miles upstream of the river's mouth. If it appears that the Nome River will reach adequate escapement, fishing closures will be rescinded; otherwise the restrictions will remain in place until they no longer benefit chum and pink salmon.
3-S-Z-03-03	24-Jun-03	This emergency order opens the marine waters east of Cape Nome for Subdistrict 1 of the Norton Sound District to Tier II chum salmon fishing beginning 6:00 p.m. Tuesday, June 24 until 6:00 p.m. Friday, June 27, 2003, unless superceded by a following emergency order.	For over a decade the Nome Subdistrict has had weak chum salmon returns and once again, the subdistrict is being closed to protect chum salmon spawning stocks. The chum salmon stock of the Nome Subdistrict is judged insufficient to support the full subsistence needs of the residents. The Board of Fisheries has mandated that a harvestable surplus of less than 3,430 chum salmon be managed as a Tier II fishery. It is anticipated that there will be a harvestable surplus of approximately 1,000 chum salmon this season. Tier II fishing allows those residents who have been determined to be the longest users and the most dependent users of chum salmon to participate in a subsistence fishery. The other salmon species present in the Nome Subdistrict during July are not present in sufficient numbers to provide for subsistence needs without also harvesting chum salmon. Chinook and sockeye salmon are very limited in number and although desirable as food, have always been caught incidentally to the chum salmon. Odd-numbered year pink salmon returns are typically not very abundant, and a Tier I opening for pink salmon is not expected this year. At this time, the Tier I closure of these other salmon species is necessary for both conservation and to allow the orderly management of the Tier II fishery. By late July, coho salmon should arrive in the Nome Subdistrict and Tier I subsistence fishing for other salmon species may be opened. The department staff will begin issuing Tier II permits June 20, at the Nome Fish and Game office. There were 48 applicants for Tier II permits and initially 30 permits will be issued. A person from each household awarded a permit will be issued a permit form and will be given an explanation of the fishing limits and rules. Although the Tier II permit limit is 100 chum salmon, historically, the average Tier II permit holder harvests only slightly more than 33 chum salmon. Therefore, the department is issuing 30 permits for the estimated 1,000 chum salmon surplus. If the harvestable surplus is estimated to be substantially greater than 1,000 chum salmon, or a number of permit holders do not fish, additional Tier II permits may be issued. Should the harvestable surplus exceed 3,430 chum salmon, the management of the fishery would be converted back to Tier I management rules. Subsistence fishing for Tier II permit holders will be open from 6:00 p.m. June 24 until 6:00 p.m. June 27, in the marine waters from Cape Nome to Topkok Head. The department staff will be flying frequent aerial surveys and boating some of the rivers to track the salmon migration's strength and progress. The weirs and towers on the Nome, Snake, and Eldorado Rivers, will also be used to track the various salmon migrations. If a stream appears that it will reach adequate escapement, fishing closures will be lifted in that area to first allow Tier II permit holders to fish and if adequate escapement is nearly assured then Tier I fishing will be allowed; otherwise, the restrictions will remain in place until they no longer benefit chum salmon.
3-S-Z-04-03	1-Jul-03	This emergency order opens the marine waters east of Cape Nome for Subdistrict 1 of the Norton Sound District to Tier II chum salmon fishing beginning 6:00 p.m. Tuesday, July 1 until 6:00 p.m. Friday, July 4, 2003, unless superceded by a following emergency order.	For over a decade the Nome Subdistrict has had weak chum salmon returns and once again, the subdistrict is being closed to protect chum salmon spawning stocks. The chum salmon stock of the Nome Subdistrict is judged insufficient to support the full subsistence needs of the residents. The Board of Fisheries has mandated that a harvestable surplus of less than 3,430 chum salmon be managed as a Tier II fishery. It is anticipated that there will be a harvestable surplus of approximately 1,000 chum salmon this season. Tier II fishing allows those residents who have been determined to be the longest users and the most dependent users of chum salmon to participate in a subsistence fishery. The other salmon species present in the Nome Subdistrict during July are not present in sufficient numbers to provide for subsistence needs without also harvesting chum salmon. Chinook and sockeye salmon are very limited in number and although desirable as food, have always been caught incidentally to the chum salmon. Odd-numbered year pink salmon returns are typically not very abundant, and a Tier I opening for pink salmon is not expected this year. At this time, the Tier I closure of these other salmon species is necessary for both conservation and to allow the orderly management of the Tier II fishery. By late July, coho salmon should arrive in the Nome Subdistrict and Tier I subsistence fishing for other salmon species may be opened. The department staff began issuing Tier II permits June 20, at the Nome Fish and Game office. There were 48 applicants for Tier II permits and initially 30 permits will be issued. A person from each household awarded a permit that was issued a permit form was given an explanation of the fishing limits and rules. Although the Tier II permit limit is 100 chum salmon, historically, the average Tier II permit holder harvests only slightly more than 33 chum salmon. Therefore, the department is issuing 30 permits for the estimated 1,000 chum salmon surplus. The limit in marine waters is 50 chum salmon and the limit in fresh waters varies by river with a maximum take of 50 in fresh waters. However, for the first 72-hour period the last week of June only 25 eligible permit holders had picked up their permits, and the majority of the 30 eligible permit holders did not fish last week. Those that did fish reported low catches of chum salmon. Some of those who did not fish reported that they were waiting for fresh water areas to open to Tier II fishing. However, with the expected [illegible] of chum salmon there may be no fresh water salmon fishing periods until August, when the fishery returns to Tier I management [illegible] erefore, because [illegible] Tier II fishing effort in marine waters the department will allow those Tier II applicants who ranked from 31 to 40 to receive permit. Subsist[illegible]r Tier II permit holders will be open from 6:00 p.m. July 1 until 6:00 p.m. July 4, in the marine waters from Cape Nome to [illegible]d. The departm[illegible] be flying frequent aerial surveys and boating some of the rivers to track the salmon migration's strength and progress. The weirs [illegible]s on the Nom[illegible] El[illegible]do F[illegible], w[illegible]lso [illegible]ed [illegible]ck [illegible]rior [illegible]mor [illegible]grati[illegible] If [illegible]eam[illegible]ears [illegible]it wi[illegible] each [illegible]quate [illegible]aper[illegible]t, ns [illegible]clos[illegible] ill [illegible]ted [illegible]at [illegible]o [illegible]llo[illegible]r [illegible]mi[illegible]ers [illegible]sh [illegible]fa[illegible]te[illegible]mi[illegible]ne[illegible]ss[illegible]: [illegible]he[illegible]s [illegible]I. [illegible]g[illegible]s [illegible]a[illegible]d; [illegible]vis restrictions will remain in place until they no longer benefit chum salmon.

Appendix mergency Orders issued during 2003.

Emergency Order Number	Effective Date	Action Taken	Comments
3-S-Z-05-03	3-Jul-03	This emergency order closes the Shaktoolik and Unalakleet River drainages to salmon gillnet fishing. Beach seines can still be used to capture pink salmon, but chinook and chum salmon captured must be immediately returned to the water.	The chinook and chum salmon runs to the Unalakleet and Shaktoolik Subdistricts have been poor so far this season. Subsistence fishers have reported catches well below average in both subdistricts. Both the Unalakleet River test net and the Unalakleet IRA counting tower on the North River have well below average counts of chinook and chum salmon compared to previous years. The test net has a record low catch of 43 chum salmon through July 1. The previous 10-year cumulative catch average by July 1 is 237 chum salmon. The test net has caught 16 chinook salmon by July 1, and the previous 10-year average is 54 for this date. In 2000 through 2002 the catch at the test net ranged from 32 to 34 chinook salmon by July 1 and the final escapement count at the counting tower ranged from 1,046 to 1,486 chinook salmon. The escapement goal range at North River is 1,200 to 2,400 chinook salmon. The chinook run is now nearing the historical midpoint at the test net and it appears that the escapement goal for chinook salmon may not be reached in 2003. There is not a formal escapement goal for chum salmon at the North River tower, but the average count of 5,989 chum salmon for the years 1996 through 2002 does not appear likely to be reached. The goal on the Unalakleet River is a 3,000 chum salmon aerial survey index goal and would likely not be met as indicated by record low catches at the test net. Subsistence nets have been catching pink salmon in good numbers and both the test net and tower have record catches and counts of pink salmon when compared against the historical data for an odd-numbered year pink salmon run. An aerial survey of the Shaktoolik River has shown few king and chum salmon moving up the river. However, subsistence fishers in Shaktoolik have reported good catches of pink salmon. The department does not have a stock assessment project in the Shaktoolik River, but salmon runs generally cycle in accordance with Unalakleet stocks. This season subsistence fisher's reports on fishing success in the Shaktoolik and Unalakleet Subdistricts have been in agreement. Because of concerns with the low numbers of returning chinook and chum salmon, and concerns about meeting the escapement goals for chinook and chum salmon, the department will close the subsistence salmon gillnet fishery in the Shaktoolik and Unalakleet River drainages effective Thursday, July 3. All gillnets must be out of the Unalakleet and Shaktoolik Rivers and the tributaries of each river after Wednesday evening. Because of the strong pink salmon run the Shaktoolik and Unalakleet Rivers will remain open for subsistence beach seining for pink salmon. Any chinook or chum salmon captured in beach seines must be immediately returned to the water. This protective action is being taken to protect chinook and chum stocks while still allowing subsistence fishers the opportunity to harvest pink salmon in beach seines. The department will continue to assess the salmon run and if the chinook and chum salmon run appear to be nearing escapement goals then gillnet restrictions will be relaxed.
3-S-Z-06-03	8-Jul-03	This emergency order opens the marine waters east of Cape Nome for Subdistrict 1 of the Norton Sound District to Tier II chum salmon fishing beginning 6:00 p.m. Tuesday, July 8 until 6:00 p.m. Friday, July 11, 2003, unless superceded by a following emergency order.	For over a decade the Nome Subdistrict has had weak chum salmon returns and once again, the subdistrict is being closed to protect chum salmon spawning stocks. The chum salmon stock of the Nome Subdistrict is judged insufficient to support the full subsistence needs of the residents. The Board of Fisheries has mandated that a harvestable surplus of less than 3,430 chum salmon be managed as a Tier II fishery. It is anticipated that there will be a harvestable surplus of approximately 1,000 chum salmon this season. Tier II fishing allows those residents who have been determined to be the longest users and the most dependent users of chum salmon to participate in a subsistence fishery. The other salmon species present in the Nome Subdistrict during July are not present in sufficient numbers to provide for subsistence needs without also harvesting chum salmon. Chinook and sockeye salmon are very limited in number and although desirable as food, have always been caught incidentally to the chum salmon. Odd-numbered year pink salmon returns are typically not very abundant, and a Tier I opening for pink salmon is not expected this year. At this time, the Tier I closure of these other salmon species is necessary for both conservation and to allow the orderly management of the Tier II fishery. By late July, coho salmon should arrive in the Nome Subdistrict and Tier I subsistence fishing for other salmon species may be opened. The department staff began issuing Tier II permits June 20, at the Nome Fish and Game office. There were 48 applicants for Tier II permits and initially 30 permits will be issued. A person from each household awarded a permit that was issued a permit form was given an explanation of the fishing limits and rules. Although the Tier II permit limit is 100 chum salmon, historically, the average Tier II permit holder harvests only slightly more than 33 chum salmon. Therefore, the department is issuing 30 permits for the estimated 1,000 chum salmon surplus. The limit in marine waters is 50 chum salmon and the limit in fresh waters varies by river with a maximum take of 50 in fresh waters. However, for the first 72-hour period the last week of June only 25 eligible permit holders had picked up their permits, and the majority of the 30 eligible permit holders did not fish last week. Those that did fish reported low catches of chum salmon. Some of those who did not fish reported that they were waiting for fresh water areas to open to Tier II fishing. However, with the expected low run of chum salmon there may be no fresh water salmon fishing periods until August, when the fishery returns to Tier I management rules. Therefore, because of the low Tier II fishing effort in marine waters the department allowed those Tier II applicants who ranked from 31 to 40 to receive a Tier II permit. The second 72-hour Tier II opening began at 6 p.m. July 1. However, rough ocean conditions prevented many permit holders from fishing. Chum salmon are beginning to show at the escapement projects in the Nome Subdistrict. Although it is still early in the run few chum salmon have been counted at the escapement projects compared to previous years. An additional Tier II subsistence fishing period will allow the department to test the run strength and allow subsistence fishers the opportunity to catch salmon while drying conditions are likely preferable compared to later in the season. If subsistence catches are weak and escapement counts do not improve in the Nome Subdistrict rivers it is unlikely that there will be additional fishing time until coho season in August. Subsistance fishing for Tier II permit holders will be open from 6:00 p.m. July 8 until 6:00 p.m. July 11, in the marine waters from Cape Nome to Topkok Head. The department staff will be flying frequent aerial surveys and boating some of the rivers to track the salmon migration's strength and progress. The weirs on the Nome, Snake, and Eldorado Rivers, will also be used to track the various salmon migrations. If a stream appears that it will reach adequate escapement, fishing closures will be lifted in that area to first allow Tier II permit holders to fish and if adequate escapement is nearly assured then Tier I fishing will be allowed; otherwise, the restrictions will remain in place until they no longer benefit chum salmon.
3-S-Z-07-03	19-Jul-03	This emergency order closes the Fish and Niukluk River drainages to salmon gillnet fishing. Beach seines can still be used to capture pink salmon, but chum salmon captured must be immediately returned to the water. Chum salmon cannot taken by rod and reel and must be released when fishing by rod and reel for other species.	Aerial surveys of Niukluk and Fish River drainages indicate an extremely weak run of chum salmon. The aerial survey escapement goal range of 23,200 to 46,400 chum salmon will not be met in 2003, as recent aerial surveys have recorded less than half the low end of the escapement goal range. The Niukluk River tower has counted less than 9,000 chum salmon. The historical midpoint of the chum salmon run past the tower is mid-July. The chum salmon count at the tower is the lowest on record for mid-July and even late run-timing models show the Niukluk River escapement finishing with a very poor chum salmon escapement. The number of chum salmon projected to reach the spawning grounds using the late-run scenario are less than half the number that have reached the spawning grounds in other low chum salmon run years. With both the aerial survey counts and the tower counts showing a record low escapement of chum salmon into Fish and Niukluk River drainages the department will close the Fish and Niukluk River drainages to all gillnet fishing. Effective Saturday, July 19, all subsistence fishing for chum salmon with any gear type, including rod and reel, is closed until further notice. No gillnets may be placed anywhere in the Fish or Niukluk River drainages. Any chum salmon caught while fishing using rod and reel must be immediately returned to the water. Beach seining will be allowed for pink salmon, but all chum salmon captured must be immediately returned to the water. The pink salmon counts at the Niukluk River are well above average for an odd-numbered year and aerial surveys indicate more pink salmon are moving into the river. Beach seines will provide an opportunity for harvesting pink salmon and still allow protection for chum salmon.

Appendix G7. Emergency Orders issued during 2003.

Emergency Order Number	Effective Date	Action Taken	Comments
3-S-Z-08-03	21-Jul-03	This emergency order opens the Sinuk River subsistence area to the regular two 48-hour periods per week subsistence fishing schedule with beach seines or hook and line for pink salmon.	Aerial surveys of the Sinuk River drainage indicate an extremely weak run of chum salmon. The aerial survey escapement goal range of 4,000 to 6,200 chum salmon will not be met in 2003, as recent aerial surveys have recorded less than half the low end of the escapement goal range. The Glacial Lake weir has counted 1,884 sockeye salmon through July 20. The weir has been in operation to count 3 sockeye salmon runs and no escapement goal has been set at the weir. However, an escapement goal range of 800 to 1,600 exists for aerial surveys of the lake. When surveys are done in late July or early August the salmon have moved into shallow water to spawn and they can be counted. The weir is now providing an early indication of the escapement. A survey on July 18 under excellent conditions indicated 865 sockeye salmon in the lake. Although no formal escapement goal range has been established for pink salmon, there were 10,000 pink salmon counted in an aerial survey of the Sinuk River on July 18. The only river with an established pink salmon goal is the Nome River and that is 13,000 pink salmon. All other rivers in the Nome Subdistrict, except for the Sinuk River are well below 4,000 pink salmon at this time. Using the Nome River escapement goal of 13,000 pink salmon as an index for the Sinuk River and comparing the counts from the odd-numbered years when escapement was reached on the Nome River, the Sinuk River count has been less than the Nome River pink salmon escapement in other odd-numbered years. The aerial survey counts from the Sinuk River are often less than 6,000 pink salmon in odd-numbered years and this year's count of 10,000 pink salmon indicates a stronger run. Therefore, allowing for subsistence fishing for pink salmon with beach seines and hook and line will provide subsistence fishing opportunity and still protect chum salmon as all chum salmon are required to be released. Sockeye salmon may also be retained as the escapement goal at Glacial Lake has been achieved. The subsistence fishing area is from the mouth of the Sinuk River to the ADF&G markers approximately two miles upstream of the mouth, and a Tier I subsistence fishing permit is required. One Tier I permit is allowed per family and the Sinuk River limits are 100 salmon per year of which no more can be 20 coho and 20 sockeye and no chum salmon.
3-S-Z-09-03	25-Jul-03	This emergency order continues the closure of the Unalakleet River above the mouth of the South River to salmon gillnet fishing. Beach seines can still be used to capture salmon above the mouth of the South River, but chum salmon captured must be immediately returned to the water.	This action is to protect the few chum still moving up river. Historically the king and chum salmon runs are nearing completion and coho salmon are beginning to enter the Unalakleet and Shaktoolik Rivers. Pink salmon are still entering the Unalakleet River in high numbers as indicated by the test net which has caught the second highest number of pink salmon in any year. The North River is close to reaching the minimum escapement goal of 1,200 king salmon and tower counts of pink salmon are over 200,000 fish. The chum salmon catches at the Unalakleet River test net are a record low in 2003 and the restriction for gillnet fishing to downstream of the South River mouth is to allow those few chum salmon that are still moving upstream to reach the spawning grounds.
3-S-Z-10-03	31-Jul-03	This emergency order opens the Unalakleet and Shaktoolik Subdistricts to commercial salmon fishing for a single 24 hour period beginning at 6 p.m. Thursday, July 31. The period will be from 6 p.m. Thursday until 6 p.m. Friday. Only nets with a mesh size no larger than 6 inches will be allowed.	There has been no commercial fishing in Eastern Norton Sound this year. There was a weak chum salmon run. The chinook salmon run was slightly better, but escapement indicators were below average even with no commercial fishing. This week typically marks the tail end of the chum salmon run and the beginning of the coho salmon run. This 24–hour period is scheduled to test the abundance of coho salmon. Fishing effort is expected to be below average as many salmon permit holders are participating in the Norton Sound crab fishery. Having a commercial period will allow fishers to harvest some early arriving coho salmon and should not jeopardize subsistence fishing or escapement. The North River tower counts are average for this date.
3-S-Z-11-03	1-Aug-03	This emergency order extends the closure of the Nome River to all subsistence fishing from August 1, 2003 until August 7, 2003.	The Nome Subdistrict rivers have had a very poor run of chum salmon. The Tier II chum salmon fishery was closed for the second time in five years when it became obvious that the rivers were not going to reach the escapement goals. A bad run of chum salmon was expected in 2003 based on the poor run in 1999 and recent poor runs of chum salmon. The Nome River escapement goal range is 2,900 to 4,300 chum salmon and the minimum escapement goal of 2,900 chum salmon has not been reached in four of the last five years. Additionally, the pink salmon escapement goal of 13,000 fish has not been met by the odd-numbered year age class since 1995. To protect the low numbers of fish in the Nome River all fishing has been closed since June 20 to prevent any fish from being killed from catch and release fishing. The escapement through July 29 is 1,200 chum and 6,300 pink salmon. Historically in normal run timing years approximately 75% of the chum salmon and 50% of the pink salmon are past the weir by August 1. At this time it is obvious that chum salmon will not meet the minimum escapement goal, but it is possible that pink salmon may reach the escapement goal. The closure of the Nome River to all fishing was to expire on August 1 to allow for coho salmon fishing. However, coho salmon have yet to pass the weir at the Nome River and although early in the run few coho salmon are likely in the Nome River at this time. Other areas of the Nome Subdistrict will open to coho salmon fishing beginning August 1 to provide subsistence salmon fishing opportunities. The additional closure of one week to all fishing on the Nome River will allow additional chum and pink salmon to reach the spawning grounds before the river is open to coho salmon fishing.
3-S-Z-12-03	4-Aug-03	This emergency order opens the Unalakleet and Shaktoolik Subdistricts to commercial salmon fishing for two 48-hour periods from 6 p.m. Monday, August 4 until 6 p.m. Wednesday, August 6 and from 6 p.m. Thursday, August 7 until 6 p.m. Saturday, August 9. Only nets with a mesh size no larger than 6 inches will be allowed.	The first period for the Shaktoolik and Unalakleet Subdistricts was a reduced period of 24 hours, rather than the usual 48 hours, to test the strength of the coho salmon. There were 4 permit holders fishing in the Unalakleet Subdistrict and no permit holders fished in the Shaktoolik Subdistrict. The catches were 394 coho, 221 chum and 1 sockeye salmon. Catches were below average, but with the low effort and reduced fishing time the catch per unit of effort was well above average, as would be expected. Because the test period harvest was as expected with the coho catch exceeding the chum catch the department will manage the fishery for coho salmon and will allow the normal two 48-hour fishing periods next week. Catches at the Unalakleet River test net and the escapement counts at the North River tower have been average. The peak of the run usually occurs about the third week of August and allowing the normal commercial fishing schedule should not jeopardize subsistence fishing or coho salmon escapement needs.

Appendix Emergency Orders issued during 2003.

Emergency Order Number	Effective Date	Action Taken	Comments
3-S-Z-13-03	7-Aug-03	This emergency order restricts the upstream boundary of the subsistence area on the Nome River at the Fish & Game markers near the VOR site approximately one mile downstream of the weir.	The Nome River chum salmon escapement goal range of 2,900 to 4,300 fish will not be met in 2003. Historically, by August 5 usually 90% of the chum salmon have passed the weir. The escapement through August 5 is 1,478 chum salmon. Also, the pink salmon goal of 13,000 fish has not yet been met and by August 5 usually 70% of the pink salmon have passed the weir. The escapement through August 5 is 9,700 pink salmon. The normal upstream subsistence boundary on the Nome River is Osborn Creek which is located several miles upstream of the weir. Coho salmon are starting to move upstream on the Nome River and through August 5, 9 coho salmon have passed through the weir. To protect chum and pink salmon moving upstream to spawn, the upstream boundary on the Nome River is being moved to approximately one mile below the weir. Subsistence fishing will still be allowed on the Nome River on the regular schedule from 6 p.m. Monday until 6 p.m. Wednesday and from 6 p.m. Thursday until 6 p.m. Saturday to allow subsistence fishers the chance to harvest coho salmon. The season limit on the Nome River is 250 salmon per household and no more than 20 can be chum salmon and no more than 20 can be coho salmon.
3-S-Z-14-03	11-Aug-03	This emergency order opens the Unalakleet and Shaktoolik Subdistricts to commercial salmon fishing for two 48-hour periods from 6 p.m. Monday, August 11 until 6 p.m. Wednesday, August 13 and from 6 p.m. Thursday, August 14 until 6 p.m. Saturday, August 16. Only nets with a mesh size no larger than 6 inches will be allowed.	Catch results from the last commercial fishing period in Unalakleet Subdistrict were 1,613 coho and 501 chum for 14 permit holders. Although the commercial catch was well below average the CPUE was average. The catch in the Shaktoolik Subdistrict is confidential because only two permit holders fished. The weather was hot with little wind and was not considered good coho fishing conditions. Catches at the Unalakleet River test net and the escapement counts at the North River tower are slightly below average. This week is usually the peak of the coho run into the Shaktoolik and Unalakleet Subdistricts and allowing the normal commercial fishing schedule should not jeopardize subsistence fishing or coho salmon escapement needs.
3-S-Z-15-03	16-Aug-03	This emergency order restricts subsistence fishing in marine waters of the Nome Subdistrict (Subdistrict 1) from 6:00 p.m. Monday until 6:00 p.m. Saturday.	Returns of coho salmon in the Nome Subdistrict have been poor to date. Subsistence fishers have had low catches of salmon in their nets in the Nome Subdistrict. The coho counts at all weirs are well below average. There was a brief period where river levels rose and coho began to move past the weir sites, but the coho passage has slowed again.
3-S-Z-16-03	18-Aug-03	This emergency order opens the Unalakleet and Shaktoolik Subdistricts to commercial salmon fishing for one 48-hour periods from 6 p.m. Monday, August 18 until 6 p.m. Wednesday, August 20. Only nets with a mesh size no larger than 6 inches will be allowed.	Catch results from the last commercial fishing period in Unalakleet Subdistrict were 1,765 coho and 591 chum for 11 permit holders. Although the commercial catch was well below average the coho CPUE was average. Catch results from the last commercial fishing period in Shaktoolik Subdistrict were 708 coho and 149 chum for 5 permit holders. Although the commercial catch was well below average the coho CPUE was average. The coho catches in both subdistricts were better then the last opening. The weather was rainy and windy and was considered good coho fishing conditions. Catches at the Unalakleet River test net are below average but have been improving. The escapement count at the North River tower is 3348 coho and is below average. Allowing another 48 hour commercial fishing period should not jeopardize subsistence fishing or coho salmon escapement needs. Only one 48 hour period has been announced in order to allow adjustments to the fishing schedule later in the week if commercial catches and test net catches drop off and passage at the North Tower slows.
3-S-Z-17-03	21-Aug-03	This emergency order closes all marine and fresh waters draining into Norton Sound from Cape Darby to Cape Douglas and in the Port Clarence District the Pilgrim and Kuzitrin River drainages to all subsistence gillnet fishing. Coho salmon cannot be taken by rod and reel and must be released when fishing with rod and reel for other species.	Coho salmon returns to Northern Norton Sound, west of Elim, have been extremely poor to date. The Niukluk River tower has counted less than 600 coho salmon and is a record low. Coho passage at the Niukluk River tower is less than one-quarter of the average run size for this time and is approaching the midpoint of the coho run. Low catches have been reported by subsistence fishers, and sport fishers have reported coho salmon fishing as being slow in the Nome Subdistrict. The Nome weir count is 37 coho and the Eldorado weir count is 7 coho. On both rivers the coho passage is a record low for this date. No coho have passed either site in a week. The Snake weir count is 56 coho which is the second lowest on record. Surveys show that there are some cohos from the river mouths to the weirs, but overall, coho numbers in the rivers are still very low. In the Port Clarence District the coho escapement past the Pilgrim River weir continues to be slow with 83 cohos.
3-S-Z-18-03	21-Aug-03	This emergency order opens the Unalakleet and Shaktoolik Subdistricts to commercial salmon fishing for one 48-hour periods from 6 p.m. Thursday, August 21 until 6 p.m. Saturday, August 23. Only nets with a mesh size no larger than 6 inches will be allowed.	Catch results from the last commercial fishing period in Unalakleet Subdistrict were 1,411 coho and 308 chum for 11 permit holders. Although the commercial catch was well below average the coho CPUE was average. Catch results from the last commercial fishing period in Shaktoolik Subdistrict were 830 coho and 34 chum for 6 permit holders. Although the commercial catch was well below average the coho CPUE was average. The coho CPUE in both subdistricts dropped slightly from the last opening. The catches at the Unalakleet River test net is below average but has continued to improve over the last week. The escapement count at the North River tower is 3562 coho and is below average. Allowing another 48 hour commercial fishing period should not jeopardize subsistence fishing or coho salmon escapement needs.
3-S-Z-19-03	25-Aug-03	This emergency order opens the Unalakleet and Shaktoolik Subdistricts to commercial salmon fishing for two 48-hour periods from 6 p.m. Monday, August 25 until 6 p.m. Wednesday, August 27 and from 6 p.m. Thursday, August 28 until 6 p.m. Saturday, August 30. Only nets with a mesh size no larger than 6 inches will be allowed.	Catch results from the last commercial fishing period in Unalakleet Subdistrict were 1,081 coho and 133 chum for 12 permit holders. Although the commercial catch was well below average the coho CPUE was average. Catch results from the last commercial fishing period in Shaktoolik Subdistrict were 538 coho and 67 chum for 7 permit holders. Although the commercial catch was well below average the coho CPUE was average. The coho CPUE in both subdistricts dropped slightly from the last opening. The catches at the Unalakleet River test net is below average but has continued to improve over the last week. The escapement count at the North River tower is 3900 coho and is below average. This week is usually one of the last weeks of the coho fishing in the Shaktoolik and Unalakleet Subdistricts and allowing the normal commercial fishing schedule should not jeopardize subsistence fishing or coho salmon escapement needs.
3-S-Z-20-03	1-Sep-03	This emergency order opens the Unalakleet and Shaktoolik Subdistricts to commercial salmon fishing for two 48-hour periods from 6 p.m. Monday, September 1 until 6 p.m. Wednesday, September 3 and from 6 p.m. Thursday, September 4 until 6 p.m. Saturday, September 6. Only nets with a mesh size no larger than 6 inches will be allowed.	Catch results from the commercial fishing period ending August 27 in the Unalakleet Subdistrict were 570 coho and 51 chum for 9 permit holders. Although the commercial catch was well below average the coho CPUE was slightly below average. Catch results from the commercial fishing period ending August 27 in the Shaktoolik Subdistrict were 744 coho and 14 chum for 8 permit holders. The commercial catch was average and the coho CPUE was average. The catch at the Unalakleet River test net has improved over the last week and now is average. The escapement count at the North River tower is below average at just over 4000 coho but high water has prevented counts since August 24th. Allowing the normal weekly commercial fishing schedule should not jeopardize subsistence fishing or coho salmon escapement needs since the Shaktoolik and Unalakleet Subdistricts will close by regulation for the season on September 7.

Appendix G7. Emergency Orders issued during 2003.

Emergency Order Number	Effective Date	Action Taken	Comments
3-S-Z-21-03	1-Sep-03	This emergency order closes the Unalakleet and Shaktoolik Subdistricts to commercial salmon fishing for the season. The lone buyer has notified the department that they will not be able to purchase salmon and therefore the weekly two 48-hour commercial fishing period schedule is now suspended and commercial fishing is closed for the year.	The only licensed buyer has notified the department that they will no longer be able to purchase fish because of a labor shortage at the Unalakleet plant. One catcher-seller has registered with the department this season, but has not made any sales. A catcher-seller can only sell product from the boat and can not transport it. As the catcher-seller is located in Unalakleet and the people of Unalakleet can receive fish from the department's test net or subsistence fish there is virtually no commercial market in the village for salmon. One permit holder has contacted the department to become a catcher-seller with the hopes of shipping the fish to Anchorage. The permit holder was told by the department that a waiver from DEC was needed, or the permit holder would need to become a licensed agent for a buyer and he would have to be in possession of the buyer's code plate. Once the permit holder meets the requirements for shipping fish the fishery will reopen. However, the fishery closes by regulation after September 7 and the permit holder may not be ready to fish before then. No other licensed buyer has expressed interest in purchasing fish in the Shaktoolik or Unalakleet Subdistrict and the fishery will remain closed until a market is available.
3-S-Z-22-03	2-Sep-03	This emergency order opens the Unalakleet and Shaktoolik Subdistricts to commercial salmon fishing for two commercial fishing periods from 12 p.m. Tuesday, September 2 until 6 p.m. Wednesday, September 3 and from 6 p.m. Thursday, September 4 until 6 p.m. Saturday, September 6. Only nets with a mesh size no larger than 6 inches will be allowed.	Catch results from the Unalakleet River test net have been average this season. This was to be the last fishing week of the season, but the buyer said they would not buy fish because of a lack of personnel to process the fish. The department then closed the fishery. The buyer has notified the department that they will purchase salmon this week if the department opens. Returning to commercial fishing schedule should not jeopardize subsistence fishing or coho salmon escapement needs since the Shaktoolik and Unalakleet Subdistricts will close by regulation for the season on September 7.
3-S-Z-23-03	4-Sep-03	This emergency order continues the closure of all marine and fresh waters draining into Norton Sound from Cape Darby to Cape Douglas and in the Port Clarence District the Pilgrim and Kuzitrin River drainages to all subsistence gillnet fishing. Coho salmon cannot be taken by rod and reel and must be released when fishing with rod and reel for other species.	This emergency order continues the closure of the above areas. Coho salmon returns to Northern Norton Sound, west of Elim, have been extremely poor to date and the area has been closed since August 21. The Niukluk River tower has counted less than 1,200 coho salmon and is a record low. The previous record low year of 1999 had over 3,000 cohos by this same time. In average run timing years usually 90% of the coho salmon are passed the tower by now. In the Nome Subdistrict aerial surveys show low numbers of coho salmon in the rivers. The Nome weir count is 308 coho and the Eldorado weir count is 115 coho. On both rivers the coho passage is a record low for this date. No coho have passed either site in a week. The Snake weir count is 448 coho which is below average and aerial surveys have shown few coho salmon below the weir. No fish have passed the Snake River weir in four days. In the Port Clarence District the coho escapement past the Pilgrim River weir continues to be slow with 627 cohos and 5 coho salmon have passed in the last three days. The majority of coho salmon return four years after their parents have spawned. With the extremely low runs it is necessary to protect this years spawning stock to lessen the impact on the runs 4 years from now and the future generations to follow.
3-H-Z-1-03	16-May-03	This emergency order opens Subdistrict 3 of the Norton Sound District to commercial gillnet herring fishing beginning 7 p.m. Friday, May 16 through June 30, unless superceded by another emergency order.	The preseason biomass projection for the Norton Sound District is 25,312 tons with an allowable gillnet harvest of 4,268 tons. The buyer has indicated to the department that they intend to buy only 1,000 to 1,200 tons of herring. The buyer has a maximum daily processing capacity of 150 tons. The department staff observed herring in Subdistricts 1 and 3 of the Norton Sound District on May 15, 2003. Under poor survey conditions 697 tons of herring and 1.3 miles of spawn were observed. On May 16, 2003 at 2:00 p. m. four commercial test samples from the Cape Denbigh Subdistrict (Subdistrict 3) were reported with 10.5 to 15.0 percent mature roe. The buyer indicated at 5:30 p.m. that they were ready to begin purchasing herring. With approximately one-fourth of the quota to be harvested and limited processing capacity the Cape Denbigh Subdistrict (Subdistrict 3) will be open continuously to allow the most optimal herring fishing schedule as determined by the buyer and the fishers. Fishers have been informed to keep in close contact with the buyer to monitor roe quality and harvest capacity.
3-H-Z-2-03	22-May-03	This emergency order opens Subdistrict 1 of the Norton Sound District to commercial gillnet fishing beginning 6 a.m. Thursday, May 22 through June 30, unless superceded by another emergency order.	The department staff has observed herring and spawning activity in Subdistrict 1 of the Norton Sound District since May 15, 2003. To the north the commercial fishery has been open since May 16 in the Cape Denbigh Subdistrict (Subdistrict 3) with an approximate catch to date of 950 tons at 10.3% mature roe. With less than 30 permit holders fishing to date the department has kept the fishery open continuously and allowed the one herring buyer to direct fishermen as to when to set and pull their nets. This has worked efficiently for both the harvesters and the buyer in obtaining good roe quality as both the fleet and buyer have kept in close contact and the fleet has stopped fishing when the buyer has noticed declining roe quality. The preseason biomass projection for the Norton Sound District is 25,312 tons with an allowable gillnet harvest of 4,268 tons. The buyer has indicated to the department that they intend to buy only 1,425 tons of herring. To date, fishermen have not been turned away by the buyer because of low roe quality. Aerial surveys have observed 9,500 tons of herring under mostly poor conditions. With the success of cooperation between the buyer and the fishermen and only approximately one-third of the quota to be harvested the St. Michael Subdistrict (Subdistrict 1) will be open continuously to allow the most optimal herring fishing schedule as determined by the fishermen and the buyer.
3-H-Z-3-03	25-May-03	This emergency order closes Subdistricts 1 and 3 of the Norton Sound District to commercial gillnet fishing beginning 12 p.m. Sunday, May 25 through June 30, unless superceded by another emergency order.	The buyer has notified the department that they have reached their tonnage goal for the season. There are no buyers interested in purchasing herring. Subdistricts 1 and 3 had been opened to commercial gillnet herring fishery continuously by Emergency Orders 3-H-Z-1-03 and 3-H-Z-2-03, and will now be closed effective 12 noon May 25, 2003. The Norton Sound District will remain closed to commercial gillnet fishing unless another buyer is interested in purchasing herring.
3-H-Z-4-03	30-May-03	This emergency order opens Subdistrict 1 from Canal Point to Wood Point to wild kelp harvest.	A Norton Sound herring permit holder has notified the department that he has a market for 2,000 pounds of spawn-on-kelp. The permit holder has not participated in the sac roe herring fishery and wishes to haivest kelp. Permit holders can only harvest kelp if they have not participated in the sac roe or herring pound fishery. Although spawning has occurred for the past two weeks the permit holder believes there is an area of recent spawning that would be of marketable quality. The permit holder was advised to carefully check the kelp in the area he wants harvest. The kelp may not be marketable because of dirt on the kelp and/or the possibility that there is older spawn on the kelp that is now beginning to "eye up" and be near hatching. As up to 30 metric tons can be harvested in the wild kelp fishery the harvest of 2,000 pounds will not jeopardize future herring returns.

Appen[illegible] 'mergency Orders issued during 2003.

Emergency Order Number	Effective Date	Action Taken	Comments
3-S-X-01-03	11-Jul-03	This emergency order opens commercial fishing in the Kotzebue District until September 1, 2003. Commercial permit holders can fish at any time a market is available for their catch.	No major commercial salmon buyer has expressed interest in purchasing Kotzebue chum salmon this season. The season normally opens on July 10 and by regulation closes after August 31. The forecast was for a harvest of 50,000 to 100,000 chum salmon this year. One permit holder has expressed interest in being a catcher-seller this season. The same permit holder has become a licensed agent for a processing company that has expressed interest in purchasing approximately 300,000 pounds of chum salmon which is approximately 35,000 fish. The licensed agent plans to buy from several permit holders and the agent has notified the department that he is ready for commercial fishing to begin. Because of the limited number of commercial salmon permit holders that will likely participate in fishing this year the harvest will be likely much less than would be allowed under normal market conditions. The historical harvest has been over 100,000 chum salmon most years. To provide maximum opportunity to those who will fish, the department is opening the commercial salmon season 24 hours a day until further notice and the season will close on September 1, 2003. Permit holders can choose when they want to fish according to market conditions. With a limited market and an expected low number of participating permit holders, achieving escapement goals are not expected to be a problem.
3-C-Z-01-03	15-Jun-03	This emergency order opens the commercial CDQ crab fishery in Norton Sound from 12:00 noon Sunday, June 15 until 12:00 noon Saturday, June 28.	By regulation, the Norton Sound CDQ crab fishery may begin at 12:00 noon, June 15, or no less than 72 hours after the commercial gillnet or beach seine herring fishery is closed, whichever is later. The guideline harvest level for the 2003 Norton Sound crab fishery is 253,000 pounds. By regulation, the CDQ fishery is allocated 7.5% of the summer season harvest. Therefore, the CDQ harvest quota is set at 18,975 pounds. Only fishers designated by the Norton Sound and Lower Yukon CDQ groups are allowed to participate in this portion of the king crab fishery. Fishers must have a CDQ fishing permit from Commercial Fisheries Entry Commission and register with Nome or Unalakleet ADF&G prior to fishing. Fishers will also be given pot tags at the time of registration. It is important for fishers to understand that they are operating under the authority of the CDQ permit holder. It is the individual CDQ group's decision on how the CDQ crab quota will be harvested. Commercial fishers are also reminded that subsistence pots must be removed from the water 14 days prior to deploying commercial pots.
3-C-Z-02-03	13-Aug-03	This emergency order closes the commercial open access crab fishery in Norton Sound at 12:00 noon Wednesday, August 13 and reopens the Norton Sound CDQ crab fishery at 12:00 noon Friday, August 15 to harvest the remainder of the CDQ allocation. The Norton Sound CDQ portion will then close at 12:00 noon August 24.	Through August 8th approximately 205,000 pounds of king crab have been harvested in the Norton Sound Open Access fishery. The GHL for the 2003 summer open access fishery is 234,025 pounds of crab. There are 30 vessels registered and 172 deliveries have been made. It is expected that the GHL will be reached by Wednesday, August 13. By regulation, the CDQ fishery is allocated 7.5% of the summer season harvest. Therefore, the CDQ harvest quota is set at 18,975 pounds, preseason. Only fishers designated by the Norton Sound and Lower Yukon CDQ groups are allowed to participate in this portion of the king crab fishery. Fishers must have a CDQ fishing permit from Commercial Fisheries Entry Commission and register with Nome or Unalakleet ADF&G prior to fishing. It is important for fishers to understand that they are operating under the authority of the CDQ permit holder. It is the individual CDQ group's decision on how the CDQ crab quota will be harvested. Commercial fishers are reminded that they may not deploy subsistence pots until 14 days after they cease commercial operations.