Fishery Management Report No. 08-32

2006 Annual Management Report
Norton Sound, Port Clarence, and Kotzebue

by

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Scott Kent,

and

Jim Menard

June 2008

Alaska Department of Fish and Game **Divisions of Sport Fish and Commercial Fisheries**

Symbols and Abbreviations

The following symbols and abbreviations, and others approved for the Système International d'Unités (SI), are used without definition in the following reports by the Divisions of Sport Fish and of Commercial Fisheries: Fishery Manuscripts, Fishery Data Series Reports, Fishery Management Reports, and Special Publications. All others, including deviations from definitions listed below, are noted in the text at first mention, as well as in the titles or footnotes of tables, and in figure or figure captions.

Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	$\log_2$, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

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The Division of Sport Fish Fishery Management Reports series was established in 1989 for the publication of an overview of Division of Sport Fish management activities and goals in a specific geographic area. Since 2004, the Division of Commercial Fisheries has also used the Fishery Management Report series. Fishery Management Reports are intended for fishery and other technical professionals, as well as lay persons. Fishery Management Reports are available through the Alaska State Library and on the Internet: http://www.sf.ADF&G.state.ak.us/statewide/divreports/html/intersearch.cfm. This publication has undergone regional peer review.

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PREFACE

This report summarizes the 2006 season and historical information concerning management of the commercial and subsistence fisheries of Norton Sound, Port Clarence and Kotzebue Sound Districts of the Arctic-Yukon-Kuskokwim Region. 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) Management Area Overviews
(2) Salmon Fisheries
(3) Pacific Herring Fisheries
(4) King Crab Fisheries
(5) Miscellaneous Species

Tabular data has been separated into 2 categories to facilitate use of this report: 1) Tables 1–14 present annual data, and 2) appendices generally present historical comparisons. Not all tables, figures, and appendices are cited in the text, and are not necessarily cited in order.

ABSTRACT

This report provides information for the 2006 commercial and subsistence fisheries of Norton Sound, Port Clarence, and Kotzebue management areas of the Arctic-Yukon-Kuskokwim Region of the Alaska Department of Fish and Game, Division of Commercial Fisheries. The Norton Sound, Port Clarence, and Kotzebue management area consists of all waters from Point Romanof north of the Yukon River to Point Hope. Commercial and subsistence fisheries target 5 species of salmon, Chinook *Oncorhynchus tshawytscha*, sockeye *O. nerka*, chum *O. keta*, coho *O. kisutch*, and pink *O. gorbuscha* salmon and Pacific herring *Clupea pallasi*. Other fisheries include red king crab *Paralithodes camtschaticus*, Pacific herring *Clupea pallasi* and other miscellaneous species such as inconnu (sheefish) *Stenodus leucichthys*, whitefish *Coregonus laurettae*, Dolly Varden *Salvelinus malma*, and saffron cod *Eleginus gracilis.*

Key words: Annual Management Report, Norton Sound, Port Clarence, Kotzebue Sound, subsistence, commercial fishery, management, escapement, salmon, Chinook salmon *Oncorhynchus tshawytscha*, chum salmon *O. keta*, coho salmon *O. kisutch*, pink salmon *O. gorbuscha*, sockeye (red) salmon *O. nerka*, red king crab *Paralithodes camtschaticus*, Pacific herring *Clupea pallasi*, inconnu sheefish *Stenodus leucichthys*, whitefish *Coregonus laurettae, C. pidschian, C. sardinella*, *C. nasus*, *Prosopium cylindraceum*, Dolly Varden *Salvelinus malma*, saffron cod *Eleginus gracilis*.

SECTION 1: MANAGEMENT AREA OVERVIEWS

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 (Figure 1). These management districts are over 65,000 mi ², and have a coastline exceeding that of California, Oregon, and Washington combined.

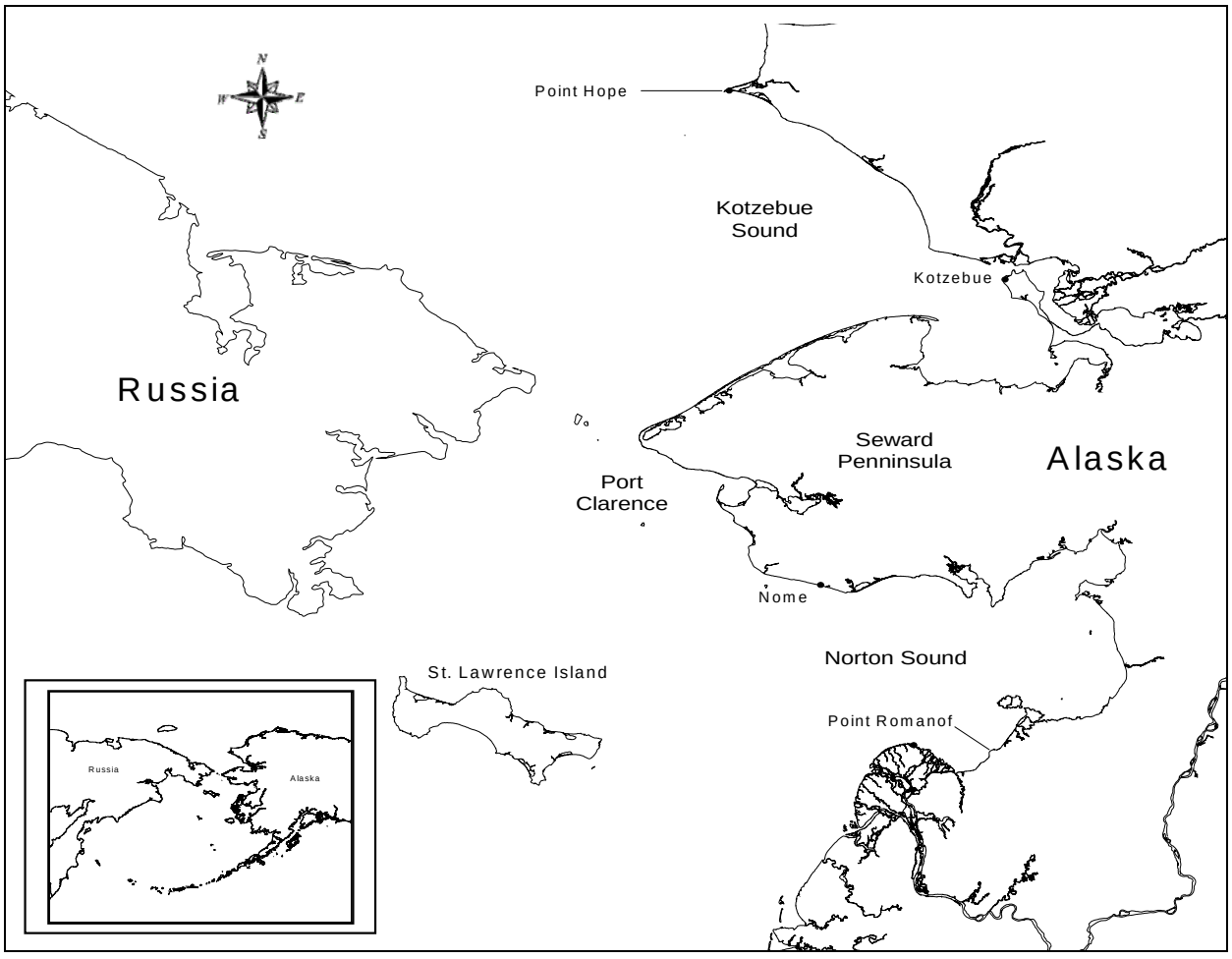

Figure 1.–Norton Sound, Port Clarence, and Kotzebue Sound management districts.

SALMON OVERVIEW

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. tshawytscha* are found as far north as Barrow; however, they 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 SALMON FISHERY

In 1959 and 1960, Alaska Department of Fish and Game (ADF&G) biologists conducted resource inventories that indicated harvestable surpluses of salmon were available in several river systems of the Norton Sound and Kotzebue areas. Generally, ADF&G has supported liberalizing various regulations and encouraged processors to explore and develop new fishing grounds since statehood. As a result, commercial salmon fishing activity grew 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 harvested in coastal marine waters.

Salmon effort and CPUE (catch per unit effort) 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) are 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 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 SALMON 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, Dolly Varden, and inconnu (sheefish). Beach seines are used 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 residents or occasionally their dogs.

Historical subsistence harvest information is discontinuous. Prior to 1960, subsistence data is either incomplete or entirely lacking. From the early 1960s until 1982, ADF&G conducted annual household surveys in communities with major salmon fisheries. In 1983, budgetary restrictions made it impossible to conduct surveys in each Norton Sound village, so surveys in many areas were suspended until 1994 when ADF&G initiated a new annual postseason

household subsistence salmon harvest survey program. This program was cut back starting in 2005 when the Division of Subsistence, due to budget constraints, discontinued household surveys for Kotzebue Sound District. In addition, expansion of the Tier I subsistence salmon permits in 2004 to Port Clarence District (affecting the communities of Teller and Brevig Mission), and Norton Sound Subdistricts 2 and 3 (affecting the communities of Council, White Mountain, Golovin, and Moses Point/Elim) has resulted in less household surveys because subsistence harvests for those communities are now reported through subsistence permits.

Two visits by ADF&G personnel are made to each village to issue Tier I subsistence fishing permits. Villagers can also call the Nome office toll free and a permit will be mailed or faxed when possible. Village residents are able to mail completed permits to the Nome office postage free. Attempts are made to contact all permit holders who did not return their household permit by phone or letter. Also, trips to villages are made postseason by ADF&G personnel to collect permits and discuss the fishing season.

In southern Norton Sound, Shaktoolik, Unalakleet, Stebbins, and St. Michael postseason household surveys are conducted. Researchers attempt to contact all households. Department staff uses a community household list, and each year update any new households and delete those no longer there. Salmon survey data is expanded to include those households that usually fish, but ADF&G was unable to contact.

SALMON MANAGEMENT

Division of Commercial Fisheries of ADF&G is responsible for the management of commercial and subsistence fisheries in this vast area. Permanent full-time staff assigned to this area during 2006 consisted of an Area Management Biologist, an Area Research Biologist, 2 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 2006, interns funded by Norton Sound Economic Development Corporation (NSEDC) were utilized as fisheries technicians at some projects. Four 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 ADF&G'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 ADF&G, Kawerak Inc., Unalakleet IRA, 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 law requires subsistence uses to receive priority over other uses of fish and wildlife resources. If subsistence harvest increases, 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 up to 4 days of fishing per

week during the open season depending on area and season differences. ADF&G 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 stations KICY and KNOM in Nome, and KOTZ in Kotzebue. Fishery news articles are published in the *Nome Nugget* and the *Arctic Sounder*.

NORTON SOUND SALMON OVERVIEW

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 6 subdistricts: Subdistrict 1, Nome (333-10); Subdistrict 2, Golovin (333-20); Subdistrict 3, Moses Point (333-31, 32, 33); Subdistrict 4, Norton Bay (333-40); Subdistrict 5, Shaktoolik (333-50); and Subdistrict 6, Unalakleet (333-60). The subdistrict and statistical area boundaries were established to facilitate management of individual salmon stocks, and each subdistrict contains at least 1 major salmon-producing stream (Figure 2).

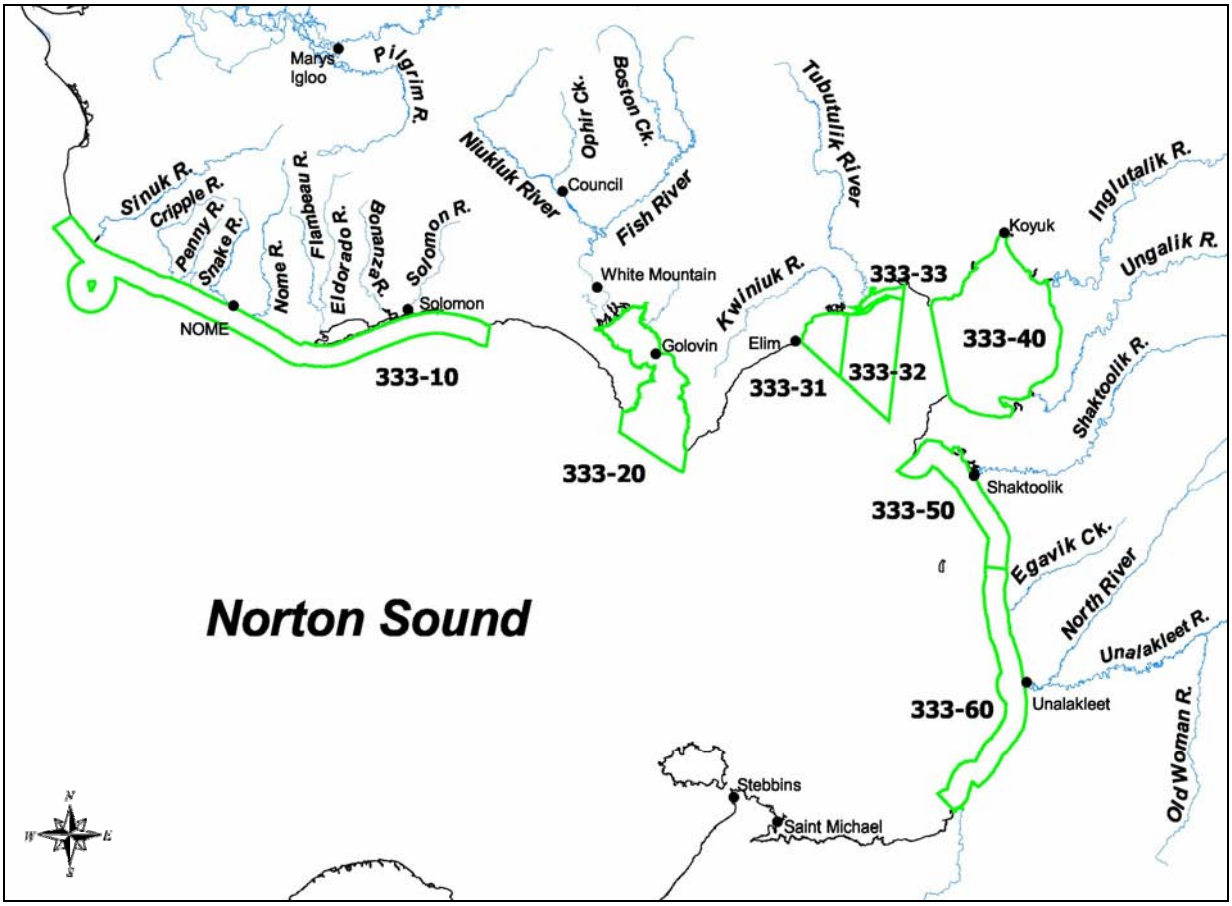

Figure 2.–Norton Sound commercial salmon fishing subdistricts and statistical areas.

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 in July and the coho salmon fishery begins the fourth week of July and closes in September. Pink salmon may be abundant in 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 has changed significantly since the mid 1990s because of limited market conditions and marginal returns of many salmon stocks within the district. There has been no commercial interest in pink salmon since 2000. Except for Nome Subdistrict, commercial fishing can only 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. 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 1 or 2 families, and set up camps near the mouths of streams. Harvest levels of fish on any 1 stream were relatively small because of low concentrations of people who caught only what their families and 1 or 2 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, which had a population of 30,000, and Council, once with 10,000 people, did not exist before gold was discovered.

In the late nineteenth century the size of dog teams increased from 2 or 3 to as many as 10 to 20. 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 2 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 $0.10 per pound from the fishers. One elder in the area thought more fish were retained for their own use, which may have averaged 5 to 10 bundles per household, compared to the amount sold (Thomas 1982).

The number of people gradually decreased over the next 20 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 $0.06 a pound and sell them for $0.10 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 snow machines 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 Shaktoolik and Unalakleet 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 midseason 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 Shaktoolik and Unalakleet and onshore processing usually occurs at Unalakleet.

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 occurred in the Nome Subdistrict since 1996 because of low fish runs or, in the case of pink salmon, no market.

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 there is a buyer, ADF&G 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 over harvesting 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 migration information and have been utilized on several river systems in Norton Sound. Four counting towers and 5 weirs were operated in 2006.

Early management emphasis is on Chinook salmon switching to chum salmon around July 1, and then gradually shifting to coho salmon during the fourth week in July. Pink salmon are abundant during even numbered years, but often no buyer is available for this species. Southern Norton Sound Subdistricts 5 and 6 (Shaktoolik and Unalakleet) have maintained commercial fisheries that target Chinook and coho salmon. Coho salmon catches have remained fairly stable while Chinook salmon catches have been declining. In recent years, there has been little market interest in chum salmon and there have been no chum directed fisheries. 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) had targeted 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 the late 1990s and 2000s, but in recent years there has been no market interest.

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

Norton Sound District household subsistence harvest surveys were not conducted district wide from 1985 to 1993 because of budgetary restrictions. From 1994 through 2003, ADF&G conducted an annual subsistence postseason salmon harvest assessment effort in northwest Alaska to provide more extensive, complete, and reliable salmon harvest estimates than had previously existed. These household subsistence harvest surveys were primarily funded by ADF&G Division of Commercial Fisheries and were conducted by the Division of Subsistence during the fall in 8 villages (Brevig Mission, Teller, Golovin, White Mountain, Elim, Koyuk, Shaktoolik, and Unalakleet). In 2004, surveys were replaced by permits in most of northern Norton Sound. For the last 10 years that this subsistence data is available for Norton Sound District (1996–2005) the average subsistence catch was 85,952 salmon including all species, although the majority of salmon taken were pinks (Appendix A13).

Goals of the postseason household subsistence 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.

In 2004, ADF&G's subsistence salmon harvest assessment program changed substantially when household surveys were discontinued in most communities because the Tier I household subsistence permit system was expanded from Nome to include Port Clarence District (affecting communities of Teller and Brevig Mission) and Norton Sound Subdistricts 2 and 3 (affecting communities of Council, White Mountain, Golovin, and Moses Point/Elim). Thereafter, subsistence salmon harvest for those communities are reported totals from subsistence permits, so household surveys have not been necessary.

In Norton Sound Subdistrict 1, Nome, low salmon stock levels combined with a large concentration of users has required subsistence harvest permits since 1974. By regulation, permits with catch calendars are issued to each requesting household listing all Nome Subdistrict fishing locations, catch limits, and gear restrictions. After the fishing season, households are required to return the completed permit to ADF&G, whether or not they actually fished. Due to this Tier I subsistence permit program, all subsistence salmon catches from Norton Sound Subdistrict 1 have been determined from permit reported totals since 1974. However, not all fishers obtained or returned permits in the past, and the data was not expanded, therefore harvest data before 2004 should be considered minimum figures.

Norton Sound Subdistricts 5 and 6, Shaktoolik and Unalakleet, have continued to be surveyed postseason, by household. Additionally, daily surveys of Unalakleet River and ocean subsistence fishers have been conducted annually during the Chinook salmon run since 1985. 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 ADF&G 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.

HISTORICAL REGULATORY ACTIONS IN NORTON SOUND 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 1978–1979 Norton Sound stock separation study confirmed this view. Salmon tagged near Nome were recaptured 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 Alaska Board of Fisheries (BOF), in response to an advisory committee petition, directed ADF&G 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 BOF 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.

ADF&G 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 regulation 5 AAC 04.360. In addition to these restrictions, a proposal to restrict the sport fishery in the Nome and Snake Rivers was adopted in 1984:

> A bag and possession limit of 15 salmon, other than Chinook salmon, of which 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 fishing 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 BOF in 1987 restricting gillnet length and mesh size.

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 permit fishery during a special meeting by BOF held in Nome, March 1999. Tier II permits are dispensed to individuals by fishing history, dependence, and projected harvestable surplus. Through a series of BOF directed meetings, BOF 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, BOF allocated a subsistence priority to 20 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, BOF 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 6 Nome Subdistrict streams into regulation.

During a BOF work session in September 2000, three 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.

BOF made several changes to regulations for management of Norton Sound salmon at the January 2001 meeting. In the subsistence fishery, BOF 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. Therefore, west of Cape Espenburg in the Kotzebue District, 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 be used for subsistence fishing, sport fish methods and means requirements still apply to harvesting of fish, for example no snagging of fish. Sport fish bag and possession limits, by species, as specified in regulation 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.

BOF repealed the existing Biological Escapement Goals (BEGs) in regulation and adopted Optimal Escapement Goals (OEGs) for chum salmon for 5 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 ADF&G escapement goal analysis (Clark 2001). Four of 5 OEGs were established for rivers where an escapement project (tower or weir project) is operated. BOF established OEGs, by subdistrict:

<u>Subdistrict 1</u>

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

BOF 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 4 consecutive years.

ADF&G 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. BOF closed Cripple and Penny Rivers to subsistence fishing for chum salmon.

Beginning in 2004, BOF expanded the salmon subsistence permit requirement for the Nome area to include all marine waters, and fresh waters flowing into marine waters from Cape Prince of Wales to Bald Head. This regulation required salmon permits to be issued in Brevig Mission, Teller, White Mountain, Golovin and Elim in addition to Nome.

PORT CLARENCE SALMON OVERVIEW

DISTRICT BOUNDARIES

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

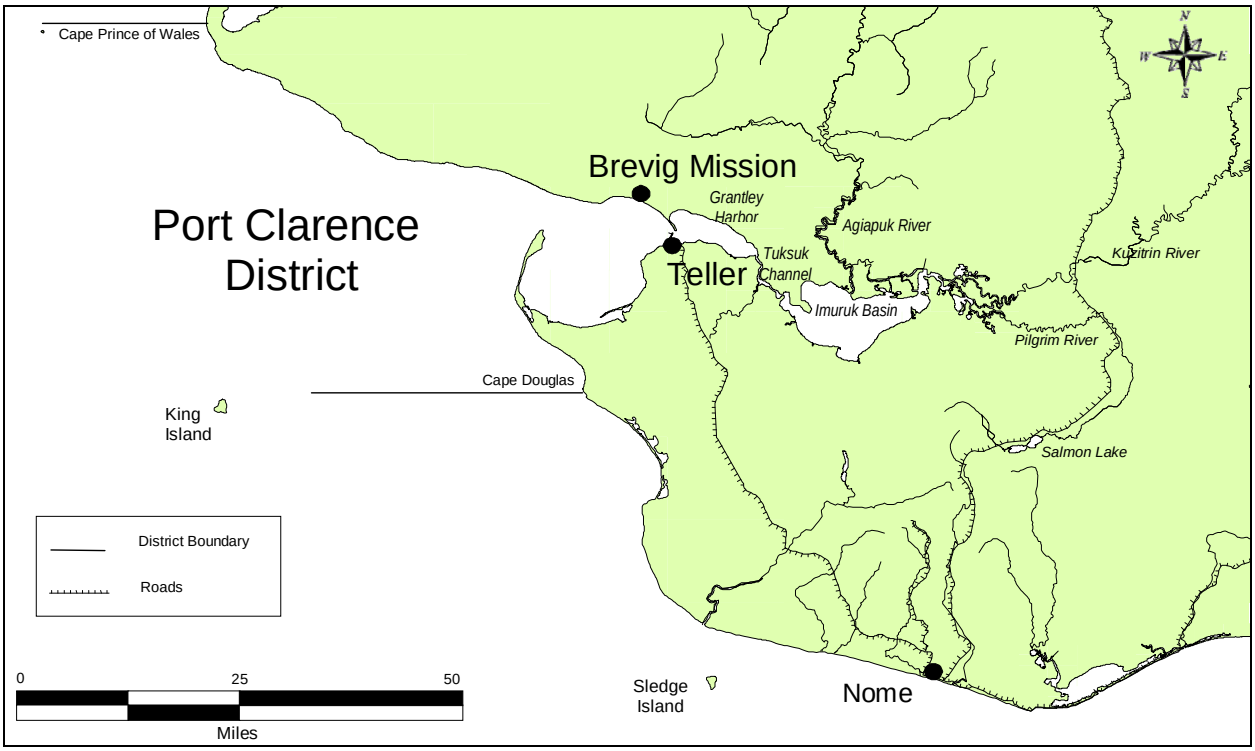

Figure 3.–Port Clarence commercial salmon district.

COMMERCIAL FISHERY OVERVIEW

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 have prohibited reopening commercial salmon fishing, but large increases in sockeye salmon runs in recent years may allow for limited commercial fishing in future.

SUBSISTENCE FISHERY OVERVIEW

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 ADF&G 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 Division of Commercial Fisheries up until 1983 (Appendix B2). The Division of Subsistence conducted a partial survey of Brevig Mission in 1989, and ADF&G conducted full-scale household surveys of both villages from 1994–2003. Since the expansion of the Tier I subsistence salmon permit and catch calendar program in 2004, subsistence salmon harvests for residents of Teller and Brevig Mission have been determined from reported totals on permits and catch calendars.

Salmon Lake and Pilgrim River stocks have been fished by Nome residents in addition to residents of Brevig Mission and Teller for quite some time. BOF 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. However, because Pilgrim River is accessible from the road system there has been increased fishing effort from Nome area residents due to increased fishing restrictions in the Nome Subdistrict.

From 1997 to 2001, ADF&G conducted a fertilization program at Salmon Lake, partially funded by NSEDC and BLM, to restore sockeye salmon to historic levels by applying liquid fertilizer. However, ADF&G could not determine if the method was effective and suspended fertilization in 2001. After impressive 2003 sockeye salmon returns, the project was reevaluated and fertilizer was applied at a reduced rate in 2004, but has not been applied since then.

KOTZEBUE SALMON OVERVIEW

DISTRICT BOUNDARIES

Kotzebue Sound District encompasses all waters from Point Hope to Cape Prince of Wales, including those waters draining into the Chukchi Sea. (Figure 4). Salmon, saffron cod, whitefish, and herring are the major subsistence species.

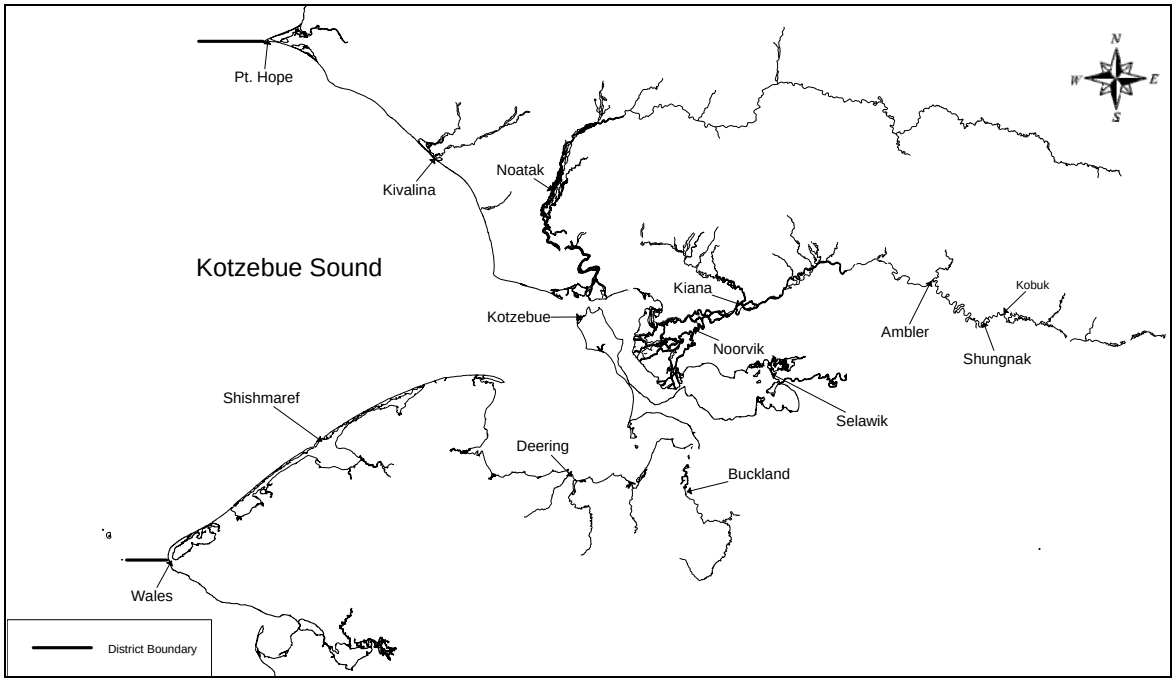

Figure 4.–Kotzebue Sound District, villages and subsistence fishing areas.

COMMERCIAL FISHERY OVERVIEW

Kotzebue Sound District supports the northernmost commercial salmon fishery in Alaska. Kotzebue District is divided into 3 subdistricts. Subdistrict 1 has 6 statistical areas where commercial salmon fishing may occur (Figure 5).

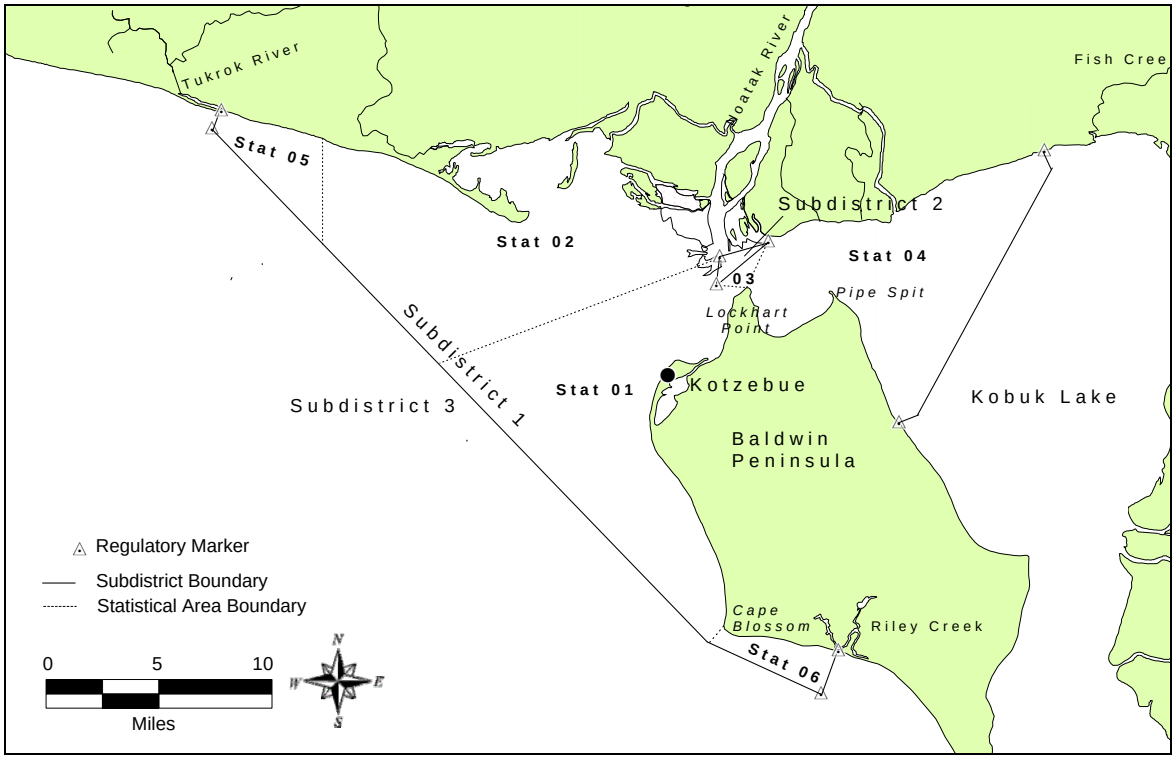

Figure 5.–Kotzebue Sound commercial salmon fishing subdistricts and statistical areas.

The commercial fishery under state management opened 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.

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 4-year cycles of stronger returns followed by weaker returns (Appendix C1). In 1987, the fisheries managers' new program emphasized attaining escapement goals. Before 1987, harvests were proportional to total return. Since 1995, poor market conditions have caused harvests to fall short of their potential.

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.

SUBSISTENCE FISHERY OVERVIEW

Subsistence salmon fishing in Kotzebue Sound District continues to be important, but fish abundance and fishing activities vary from community to community. Along the Noatak and Kobuk rivers, where chum salmon runs are strong, household subsistence activities in middle and late summer revolve around catching, drying, and storing salmon. In southern Kotzebue Sound, fewer salmon are taken for subsistence because of low availability. Also, some fishers base their fishing effort out of their village, while others move seasonally to fish camps where they stay for several days to several weeks. Chum salmon are the predominate species in the district, though small numbers of other salmon species are present.

Historical subsistence surveys for the Kotzebue area have been less complete than Norton Sound and Port Clarence Districts. Expanded documented surveys from 1994–2004 estimates total subsistence salmon harvest for Kotzebue Sound area to be 56,260 annually (Appendix C5). During these years, ADF&G Division of Subsistence conducted annual household subsistence surveys in select Kotzebue District communities. Due to budget constraints, these surveys were discontinued after 2004. The town of Kotzebue was surveyed in 1995–2001 using a mail-in postcard, but has not been surveyed since then.

PACIFIC HERRING OVERVIEW

DISTRICT BOUNDARIES

Norton Sound Pacific Herring District consists of all Alaska waters between the latitude of the western-most tip of Cape Douglas and the latitude of Point Romanof (Figure 6). Port Clarence Pacific Herring District consists of all Alaska waters between the latitude of Cape Douglas and the latitude of Cape Prince of Wales. Kotzebue Sound Pacific Herring District consists of all Alaska waters between the latitude of Cape Prince of Wales and the latitude of Point Hope.

SPAWNING AREAS AND TIMING

Arrival of Pacific herring *Clupea 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.

The largest abundance of herring in the Arctic-Yukon-Kuskokwim Region is in Norton Sound District. 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 in Port Clarence District, and Shishmaref Inlet, Deering-Kiwalik coast, and Hotham Inlet in Kotzebue District.

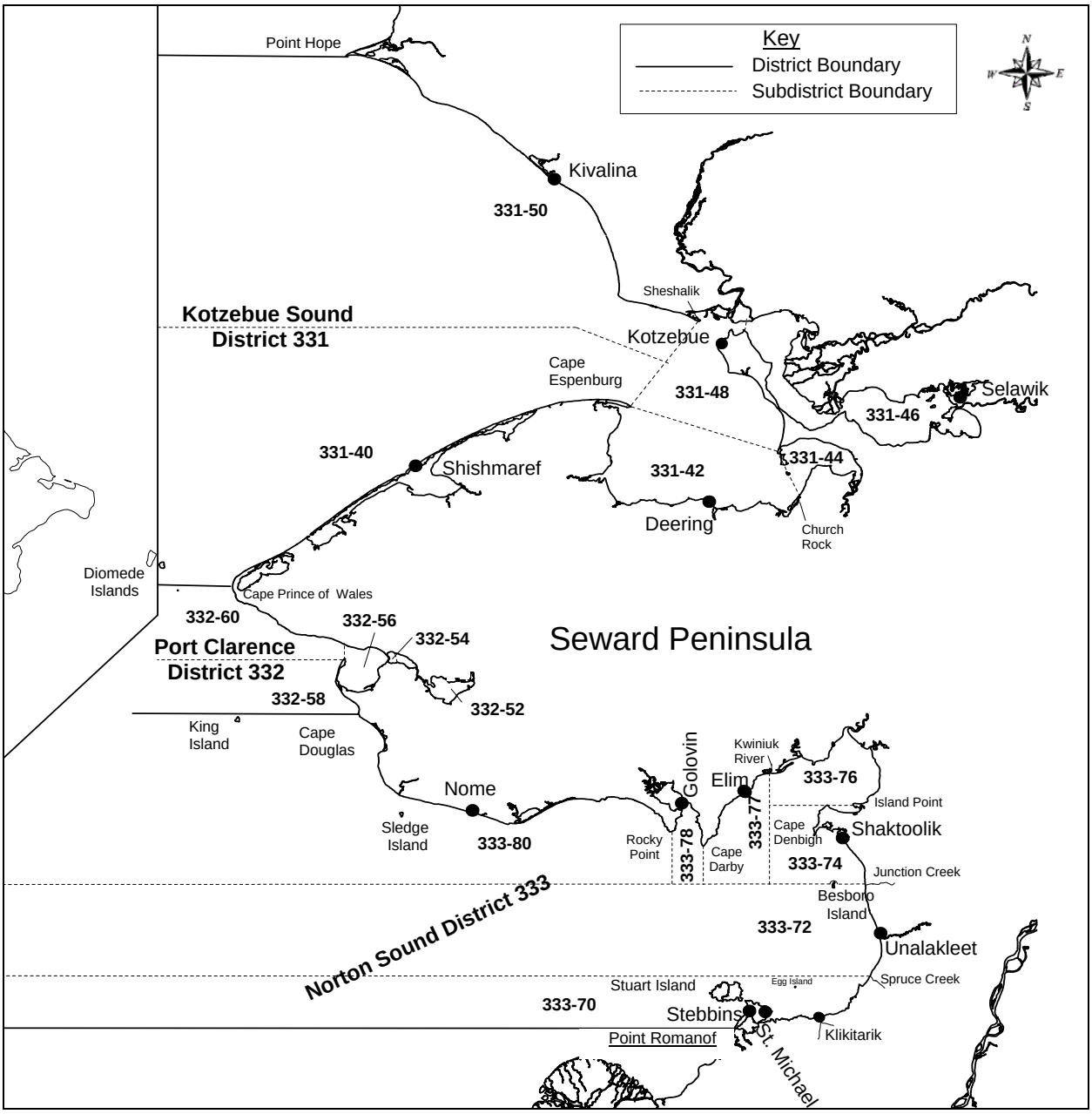

Figure 6.–Commercial herring districts and statistical areas of Norton Sound, Port Clarence, and Kotzebue Sound.

NORTON SOUND PACIFIC HERRING OVERVIEW

COMMERCIAL FISHERY OVERVIEW

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, BOF 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 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 was passed in 1981 to prohibit any purse seine gear within Norton Sound District.

Before the 1984 season, harvest by beach seine fishers was negligible, but in 1984, 10 beach seine fishers harvested 327 tons. In 1984, BOF set a beach seine gear limit of 100 fathoms and limited harvest to "not exceed 10% of the total herring sac roe harvest projection as published by the Department." During the fall 1987 BOF meetings, beach seine gear was further restricted to a limit of 75 fathoms. Beach seine harvests from 1985 to 2000 were only about 8% of total reported harvest, and since 1998 little market interest exists for herring caught with beach seines because of the smaller size herring captured.

As with most developing fisheries, fishing effort and harvest increased with each season. In 1984, Norton Sound became a superexclusive herring fishing district to slow growth and bolster local involvement, but it had limited success. The 1987 herring roe gillnet season harvested approximately 3,759 tons and had the highest level of fishing effort on record (Appendix D3). This effort was more than twice the average from 1980 through 1986, yet Norton Sound area residents accounted for only 36% of the effort and 29% of the total harvest. Then, in 1987 after a public proposal adopted at the fall BOF meeting, the Commercial Fisheries Entry Commission (CFEC) changed Norton Sound Herring Fishing District to Limited Entry status with a maximum number of 301 gillnet and 4 beach seine permits. Beginning in 1988, a moratorium was placed on Norton Sound and no new entrants were allowed into the sac roe herring fishery.

The 1988–1989 Norton Sound sac roe fisheries were about average, with approximately 4,400 tons harvested each year by gillnet, and approximately 284 tons each year by beach seine. The 1990 gillnet harvest of approximately 6,032 tons was the highest on record until 1995 when the harvest was 6,033 tons. In 1992, no harvest occurred, but the 1993 beach seine harvest of approximately 742 tons was the largest harvest on record, though it was not the highest in total gross earnings. Low prices and declining market conditions resulted in a below average harvest in 1994, but the highest earnings on record were in 1995 and 1996 for both the beach seine and gillnet fisheries (Appendix D3). More recently, the 5-year average harvests for 2001–2005 was approximately 1,388 tons for gillnet and 0 tons for beach seine. Since 1997, poor market conditions have been the primary influence on the level of commercial harvest. There were no sac roe herring buyers in 2004 due to lack of market interest and only 11 tons of bait herring were harvested. Only 1 buyer was present during the 2005 season, which had a harvest of 1,951 tons.

The Limited Entry Commission currently reviews and awards limited entry permits to fishers based on fishing history and economic dependence on the fishery. However, recently there has been little interest in this fishery.

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 1 ton (1977) to approximately 47 tons (1981). During the 1984 season, 1 ton of *Macrocystis* kelp imported into Norton Sound resulted in a harvest of approximately 3 tons of product. In response to a public proposal, BOF 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. BOF 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, because only a small minority would have an opportunity to participate in the sac roe fishery.

At the January 1999 meeting, BOF 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. ADF&G 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 3,000; if more than 25 permits are issued for this fishery, ADF&G 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.

Since 2003, little (less than 1 ton) or no harvest has occurred from either the *Macrocystis* kelp or wild *Fucus* spawn-on-kelp fisheries (Appendix D3).

Food / Bait Fishery

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. Japan began gillnetting in Norton Sound during 1968 with 3 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 in 1977 from gillnet fishing in the area.

Since 1977, there has not been a consistent domestic commercial food/bait herring fishery in Norton Sound. The majority of food/bait herring harvest estimates were initially harvested as sac roe, but bought and processed as food/bait, thus considered food/bait for the purposes of this report. The largest Norton Sound herring harvest in the past 50 years occurred in 1995 when an estimated 6,763 tons of sac roe herring were delivered, of which only 116 tons were purchased as food/bait. Since 1997, no more than 64 tons of herring were sold as food/bait (Appendix D1).

COMMERCIAL FISHERY MANAGEMENT

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 5 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.

Methods to reliably forecast herring returns are still being developed and estimates of recruitment are not available, therefore 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. However, since 1997 there have been limited markets for herring and the catch has been well below quota. Since 2002, to maximize efficiency for fishers and buyers, ADF&G has opened the fishery continuously once buyers are ready and then buyers direct the fleet when to set and pull nets.

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 provided less optimal fishing times. Beach seiners are able to harvest their allotment of 10% of the preseason harvest goal in a single 3-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. In the past, management staff 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.

In the 2000s, the market desired a higher roe percent and larger size fish. These criteria have been difficult to achieve with beach seine gear and in recent years no buyer interest has existed for herring harvested from beach seines.

HISTORICAL AND SUBSISTENCE FISHERY USE

Pacific herring were used for subsistence purposes by coastal residents well before the mid 1800s when their use was first documented by early explorers. Subsistence harvest of herring and herring roe on kelp is not documented, but is believed to be relatively small. It is also known that St. Michael and Stebbins residents harvest roe on kelp for subsistence use. 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).

PORT CLARENCE AND KOTZEBUE PACIFIC HERRING OVERVIEW

COMMERCIAL FISHERY OVERVIEW

Sac Roe

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. Before 1987, no spring sac roe commercial fisheries had ever occurred within these districts. In 1988, there was a herring roe gillnet fishery harvest of approximately 19 tons, but no beach or purse seine harvests. Then, in 1994 and 1995 there were gillnet harvests of approximately 2 tons and 7 tons. Interest in exploring these stocks has been expressed in past years by industry personnel operating in Norton Sound District, however no large-scale effort to develop a fishery has occurred because of late ice breakup and fishery timing in Port Clarence and Kotzebue Districts. In Kotzebue, no purse seine permits have been fished since 1988, and no beach seine or gillnet permits since 1996. Both Port Clarence and Kotzebue fishers have been unable to attract a sac roe buyer for their relatively late fishery due to poor market conditions.

Spawn on Kelp

Port Clarence and Kotzebue commercial herring fisheries have been in regulation since 1982. The 1983 and 1984 regulations set a guideline harvest of 150 metric tons (165 tons) for each district, which 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 *Macrocystis* harvest in Port Clarence District in 1991 and 1992 were unsuccessful.

Local fishers from Teller, Shishmaref, and Kotzebue have also expressed interest in exploiting these stocks.

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 the 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.

HISTORICAL RESOURCE INVESTIGATIONS

Resource investigations of Port Clarence and Kotzebue Sound area herring stocks were conducted by ADF&G from March 1976–September 1978 (Barton 1978). These studies indicated 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.
Over winter in shallow bays; water is warmed by river discharge under ice cover.	Over winter 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 lesser 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 Port Clarence, where herring mass just before the ice moves. One or 2 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.

KING CRAB OVERVIEW

NORTON SOUND KING CRAB OVERVIEW

District Boundaries

Norton Sound Section (Q3) consists of all waters in Registration Area Q north of the latitude of Cape Romanzof, east of the International Dateline, and south of 66°N latitude (Figure 7).

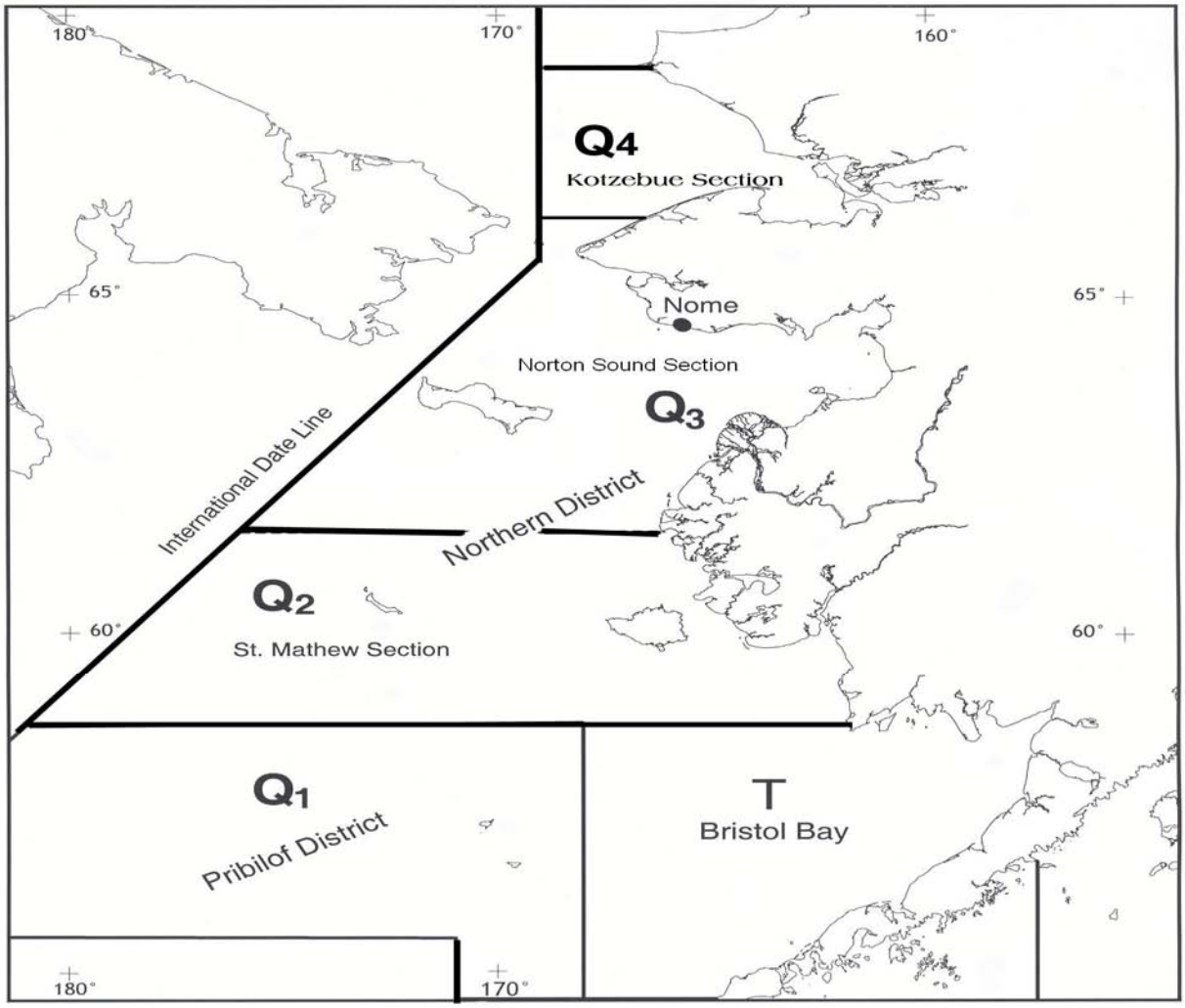

Figure 7.–King crab fishing districts and sections of Statistical Area Q.

COMMERCIAL FISHERY OVERVIEW

A large-vessel summer commercial crab fishery existed in 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 and statistical area for Norton

Sound crab fishery. Regulation changes adopted during the March 1993 BOF meeting changed participation in the fishery to that of small boats. A superexclusive 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 LLP by National Marine Fisheries Service. Regulation changes and location of buyers resulted in harvest distribution moving eastward in Norton Sound in mid 1990s (Figure 21).

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 22-32). 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 BOF, a new management strategy was enacted for 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 population of legal crab exceeds 1.5 million pounds. If legal biomass falls in the range of 1.5 to 2.5 million pounds the harvest rate will not exceed 5%, so that the stock may rebuild. If legal biomass is 2.5 million pounds or more, the harvest rate will be no more than 10%. Improved abundance estimates and current management strategy will greatly reduce the risks of over fishing the stock.

Estimates of legal red king crab biomass in Norton Sound, based on trawl and pot surveys, 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 crabs. 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 crabs in 1991. The trawl survey conducted during August of 1996 indicated a reduced stock size and estimated legal biomass at 0.5 million crabs. In 1999, the legal red king crab population of 1.6 million crabs was estimated by 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 1 year of weaker recruitment beginning during the 2001 summer fishery. Results from the 2002 trawl survey indicated an estimated abundance of legal male red king crabs at 0.77 million 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 crabs observed in 1999 made up the recruit and postrecruit portion of the 2002 legal population (Figures 24 and 25). The 2002 estimated abundances for prerecruit-1 and prerecruit-2 males were 0.52 and 0.43 million crabs, respectively. The prerecruit-1 male abundance estimate was lower than the all-time high observed in 1999, but

higher than the 3 prior surveys. These crabs molted and gave a 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. Taken as a whole, the surveys indicate periods of weak and strong recruitment.

The ADF&G length-based population model was developed to predict biomass for the red king crab population in Norton Sound. Incorporating data from trawl surveys, winter and summer pot studies, and summer and winter fisheries from 1976 to present, the model estimated legal male crab abundance for management of the summer commercial crab fishery. In 2004, abundance estimate for the summer crab fishery was 4.4 million pounds, up 30% from 3.1 million pounds estimated for 2003. The revised 2005 estimate for the summer commercial crab fishery was 4.8 million pounds, an increase of approximately 9% from 2004. These higher abundance estimates compared to 2003 reflect healthy recruitment in 2004 and 2005.

CDQ Fishery

The Norton Sound and Lower Yukon CDQ groups divided the CDQ allocation. 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 were required to have a CDQ fishing permit from CFEC and register their vessel with ADF&G before they made their first delivery. Fishers operated under authority of the CDQ group and each CDQ group decided how their crab quota was harvested.

During the March 2002 BOF meeting, new regulations were adopted that affect the CDQ crab fishery and relaxed closed-water boundaries in eastern Norton Sound and waters west of Sledge Island. Closed-water boundaries are illustrated in Figure 20. 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.

Commercial Catch Sampling

The Norton Sound red king crab commercial 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 those years. In years when there is no onboard observer, a smaller percentage of crab from the commercial harvest is sampled because fishers deliver at all times of the day and night. The new seafood processing plant that began operating in Nome in summer 2002 greatly improved the ability of Nome ADF&G staff to sample crabs brought to the Nome dock. Crabs were either sampled at the Nome plant or at the small boat harbor where non-resident fishers offload their catch for delivery to Anchorage. ADF&G will continue to make a concerted effort to coordinate catch sampling with fishers and buyers to ensure optimal commercial harvest data collection.

SUBSISTENCE FISHERY OVERVIEW

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, BOF 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.

The first year subsistence permits were required, 1978, had the highest number of permits issued (290) and highest reported harvest (12,506 crabs) (Appendix E5). The fishery declined sharply the following year and remained at low levels through the 1981–1982 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 1978–1979 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 1981–1982, 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 1982–1983 through 1986–1987 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: 1987–1988, 1988–1989, 1992–1993, 1996–1997, 2000–2001, and 2003–2004 catches. During years of stable ice conditions, approximately 100 fishers averaged 100 crabs each.

ST. LAWRENCE ISLAND

District Boundaries

Formerly, St. Lawrence Island Section lay immediately west and north of Norton Sound Section, but in May of 2006, BOF expanded Norton Sound Section to include the St. Lawrence Island Section south of 66˚N latitude (Figure 7). The St. Lawrence Island Section north of 66˚N latitude is now the Kotzebue Section.

Commercial Fishery Overview

Commercial catches in the former St. Lawrence Island Section have only been reported for 4 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 10 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 crabs and 984 pounds of blue king crabs were delivered from 8 landings. In 1992, 53 pounds of blue king crabs were landed. In 1995, 7,913 pounds of blue king crabs were delivered from 3 landings. Only 1 permit fished in 2005 in the Kotzebue area, harvesting 316 pounds of red king crab. This was the first reported commercial king crab harvest in the St. Lawrence Island Section since 1995.

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. ADF&G 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.

MISCELLANEOUS FISH OVERVIEW

Several species other than salmon, crab and herring are utilized for commercial and subsistence purposes in Norton Sound, Port Clarence and Kotzebue Districts (Appendix G1). Primary species include inconnu or "sheefish" *Stenodus leucichthys*, Dolly Varden *Salvelinus malma,* whitefish *Coregonus laurettae, C. pidschian, C. sardinella, C. nasus, and Prosopium cylindraceum, Coregonus sp., Prosopium sp.*, 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)

Spawning Areas and Timing

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 (Figure 8). 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 2 to 3 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.

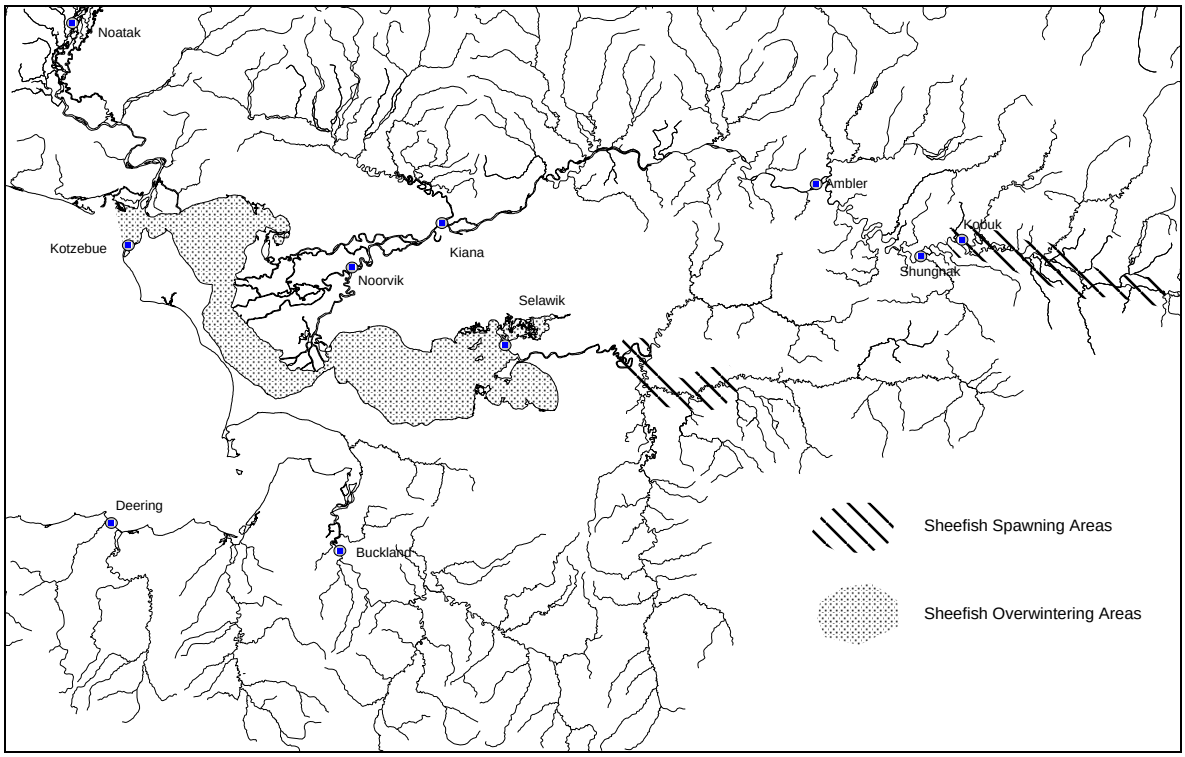

Figure 8.–Kotzebue and Kobuk River Valley villages and their spatial relationship with inconnu spawning and overwintering areas.

Historical Fishery Use

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, 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. Since 1998, harvest has been no more than 1,250 pounds, compared to the highest harvest of 26,200 pounds in 1978 (Appendix F1).

Subsistence Fishery

In 1987, BOF adopted 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 7 inches (5 AAC 01.120). This regulation was intended to conserve the larger, breeding

portion of the stock. Except for this gear restriction, ADF&G does not restrict timing, area, or quantity of subsistence inconnu harvest.

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. No requirement exists for harvest reporting; however, during various years from 1973 to 2004, Division of Subsistence has conducted household subsistence harvest surveys in various villages in Kotzebue District. Highest inconnu catch occurred in 1997, when 9,805 inconnu were reportedly harvested (Appendix F2). Due to limited survey effort during many years, harvest reported over the years should be regarded as minimum numbers.

Historical 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. 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 ADF&G Division of Sport Fish, 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 and 5,300 for 1995 and 1996, respectively. Tag recoveries showed that these stocks mixed in Hotham Inlet winter habitats, but maintained fidelity to their spawning areas (DeCicco 2001).

DOLLY VARDEN

Dolly Varden are distributed throughout Norton Sound, Port Clarence, and Kotzebue Districts. Although taxonomists disagreed on 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.

Spawning Areas and Timing

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 needs and subsistence use.

Commercial Fishery

Dolly Varden are taken as a non-target species in the directed Kotzebue Sound 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 fishery area during September. Dolly Varden generally appear in commercial catches during the last 3 weeks of August. Reported Dolly Varden catches are dependent upon available markets. The typical season catch, when buyers are purchasing Dolly Varden throughout August, is between 1,000 to 3,000 fish (Appendix F3). However, limited markets in the 2000s have resulted in less than 200 Dolly Varden reported sold each year. 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 is 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 annual subsistence Dolly Varden harvest. Since 1962, catches made by residents of Kivalina ranged from 7,000 to 65,000 Dolly Varden annually, but no harvest surveys have been conducted there since 1986 (Appendix F4).

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 F4 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.

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

Historical Escapement

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 F5). Weather and water conditions have precluded

flying aerial surveys during many years. Weather permitting, Division of Sport Fish conducts aerial surveys of Noatak River spawning grounds in summer, and Kivalina and Wulik Rivers overwintering areas in fall. Since 1999, however, only Wulik River has been surveyed.

WHITEFISH

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, 3 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 these species normally spawn in fall in fresh water.

Spawning Areas and Timing

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. Spawning occurs in late August to October when lakes and streams are close to freezing.

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 are important for subsistence use and 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 (Appendix F6).

Historical Escapement

Whitefish escapements have not been monitored in the past, but limited ADF&G 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.

No extensive commercial fishery on tomcod in Norton Sound, Port Clarence or Kotzebue areas has ever 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.

In 1994, 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 of tomcod were sold in 7 deliveries during January and February of 1994. In 1995, the NSEDC market was not present, likely a factor in the reduced total harvest of 52 pounds, which sold for $.50 per pound for a total value of $26.00. No commercial harvest was reported from 1996 through 2005.

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, in fall time, and halibut (Appendix G1).

Commercial Fishery

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 9 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.

Subsistence Fishery

Subsistence utilization of these species has been documented, although effort and catch vary widely in scale and importance with locality. Some species are important to the subsistence community in certain localities during specific seasons of the year. In the Nome Subdistrict, both Nome and Solomon Rivers were closed to subsistence fishing for Arctic grayling in 2001 when abundance was determined to be low.

SECTION 2: SALMON FISHERIES

2006 NORTON SOUND SALMON FISHERY

COMMERCIAL FISHERY SEASON SUMMARY

A record coho salmon harvest highlighted the 2006 Norton Sound commercial salmon fishery. Near record to record runs of pink, chum and sockeye salmon also occurred in many areas of Norton Sound. However, there was no market interest in a chum salmon or pink salmon directed fishery. Once again Chinook salmon run was poor and no commercial fishing targeting Chinook salmon was allowed.

ADF&G test net in Unalakleet River had record catches of coho salmon beginning the second week of July and the first 24-hour commercial opening occurred in Shaktoolik and Unalakleet Subdistricts beginning on July 21. Coho salmon catches were well above average, but because of high incidental catches of chum salmon the buyer requested another 24-hour period rather than the regular 48-hour fishing period. Catches were again well above average for both coho and chum salmon during the second fishing period and the department opened the Shaktoolik and Unalakleet Subdistricts to the regular two 48-hour commercial fishing periods weekly beginning on July 26. Record catches of coho salmon in the commercial fishery and record catches at the test net allowed for commercial fishing to continue on the normal schedule through August. In September, the buyer requested that the two 48-hour periods be merged because of the Labor Day holiday. The following week, because of continued record commercial and test net catches, the commercial fishing season was extended by allowing another 96-hour period.

Table 1 lists Norton Sound salmon current year commercial harvests and Appendix A1 lists historical harvests relative to the recent 5-year (2001–2005) and 10-year (1996–2005) averages. The coho salmon harvest of 130,808 was nearly 400% above the recent 5-year and 10-year averages. There were no chum salmon directed periods and harvest of chum salmon was incidental during the coho salmon fishery. Though the pink salmon run was near record to record breaking in many areas there was no market interest. Unalakleet River test net had record catches of pink and coho salmon and the chum salmon catch was second best.

Combined commercial harvest of all salmon species ranked third in the last 10 seasons in Norton Sound and ranked first with pink salmon harvest excluded (Appendix A1). Sixty-one permit holders participated in the commercial fishery (Appendix A2), an increase of over 50% from last season. The previous 5-year average was 34 permits fished and 10-year average was 58 permits fished. Fishery value in 2006 to the fishers of $389,707 (Appendix A3) was above the 5-year average of $108,599 and 10-year average of $183,300. Average value per permit holder was $6,389, fourth best on record without adjusting for inflation. Average price paid for Chinook salmon was $1.49 per pound, $0.45/lb for sockeye salmon, $0.44/lb for coho salmon, and $0.14/lb for chum salmon (Appendix A4).

Only 1 salmon buyer operated in Norton Sound during the 2006 season. The Unalakleet fish plant operated by Norton Sound Seafood Products was the base of commercial fisheries operations. Salmon were both delivered to the Unalakleet dock and tendered from neighboring Shaktoolik Subdistrict.

SUBSISTENCE FISHERY SEASON SUMMARY

In 2006, Norton Sound District household subsistence surveys were conducted in Shaktoolik, Unalakleet, Stebbins, and St. Michael, and attempts were made to contact 100% of the households. Catch information for Subdistricts 5 and 6 are presented in Appendices A10 and A11, while Appendix A12 presents current and historical subsistence survey results for Stebbins and St. Michael.

Subsistence salmon permits were required for all households in Norton Sound Subdistricts 1–3 (Nome, Golovin, and Moses Point) for each location intended to fish. Households may obtain and fish permits for multiple areas. Permits, issued at the Nome office and by ADF&G personnel in the field, identify gear restrictions, bag limits, subsistence zones (for Nome Subdistrict only), location and access descriptions, and subsistence regulations for each location or body of water. In addition, the permit contains a catch calendar for household members to record gear type used, area fished, and catch in numbers by species for each day fished. If subsistence fishers reach their harvest limit in 1 river, they can fish in other rivers until they reach the limit in those rivers.

In Norton Sound District, the only place there are limits on subsistence salmon harvest is in the Nome Subdistrict where salmon limits have been in place since 1985. In 2006, almost all salmon limits were doubled before the season began in anticipation of an above average run. Also, Nome Subdistrict was not closed to salmon fishing in mid June for the first time in over a decade. Furthermore, Tier II regulations were not in effect, because the chum salmon run was projected to exceed the amount necessary for subsistence. Eventually, the limits on all salmon were waived in Nome Subdistrict. Subsistence permits are important to management because they identify users, fishing effort, harvests, and limits. Return rates have been close to 100% for most permit areas.

SEASON SUMMARY BY SUBDISTRICT

Nome-Norton Sound Subdistrict 1

For over 30 years subsistence salmon permits have been required for Nome Subdistrict and during the 2006 season, 367 subsistence salmon permits were issued (Table 2). Number of permits issued in 2006 was more than the 320 permits issued in 2005, but less than the 491 permits issued in 2004. The 2004 number was much higher likely because sport fishing remained closed for over a week early in the pink salmon run and subsistence hook and line fishing was open at that time. In 2005 and 2006 both sport fishing and subsistence fishing opened concurrently. Appendix A6 compares historical subsistence salmon catch by species and by year in Nome Subdistrict.

This year for the first time since 1990, Nome Subdistrict did not close to subsistence and sport fishing for salmon on June 15. Because of the expected surplus of chum salmon the regular gillnet fishing schedule of 72 hours in marine waters and two 48-hour fishing periods a week in freshwater subsistence areas was in effect from mid June until mid July. From mid July until mid August, the fishing schedule by regulation increased to 5 days a week in marine waters and after

August 15 marine waters were open continuously. In September, by regulation, fresh water subsistence areas opened to subsistence salmon fishing continuously.

An emergency order was issued allowing beach seining beginning on July 6 and from July 10 through July 22 beach seining could occur during the regular subsistence gillnet openings.

Season limits for subsistence salmon fishers were waived at or before the midpoint of a particular species run because of the well above average to record breaking runs. Pink salmon limits were waived on July 6, chum salmon limits were waived on July 10, and sockeye salmon limits were waived on July 14. On August 19 coho salmon limits were waived in marine waters and on September 1 coho salmon limits were waived in fresh water subsistence areas.

Observations during the season indicated that Nome River was once again the river that had the most permits fished. As in 2005, the upper boundary of Nome River for net fishing was set at the VOR site (2 miles upriver of the mouth) to protect spawning salmon.

Golovnin Bay-Norton Sound Subdistrict 2

The 2006 Salmon Management Plan for Golovnin Bay Subdistrict limits commercial harvest to a maximum of 15,000 chum salmon before mid July in an attempt to protect chum salmon stocks and allow for some harvest while flesh quality is at its best. By that date, the chum salmon run usually can be assessed and fishing time adjusted accordingly. In 2006, there was no commercial chum fishing in Subdistrict 2 as it was questionable whether chum escapement goals would be reached in the Subdistrict. Also, the lone salmon buyer in Norton Sound did not want to purchase chum salmon.

The Niukluk River 2006 tower count was 29,199 chum salmon, which fell short of the 30,000 chum salmon goal (Table 3 and Appendix A21). The tower count of over 1.3 million pinks was second only to the 1.6 million pinks counted in 1998. The tower count of 11,169 cohos ranked third, behind the 11,382 cohos counted in 2000 and the 12,781 cohos counted in 1996.

This was the third year that subsistence salmon permits were required for Subdistrict 2, and 153 permits were issued, less than the 174 permits issued in 2005 and 199 permits issued last year. Number of Subdistrict 2 permits issued to Nome residents has dropped by 30% from 2004 to 2006. Appendix A7 compares historical subsistence salmon catch by species and by year in Golovin Subdistrict.

Golovnin Bay-Norton Sound Subdistrict 3

Moses Point Subdistrict chum salmon and pink salmon runs were well above average, coho salmon run was a record, and Chinook salmon run was weak. In 2006 escapement past Kwiniuk tower was 195 Chinook salmon, 39,519 chums, over 1.3 million pinks, and 22,341 cohos (Appendix A20). Chinook salmon passage was below the escapement goal range of 300–550 fish (Table 3). Chum salmon escapement was sixth highest and pink salmon escapement was fourth highest in the 42-year project history. Counting at the tower has only extended into coho salmon season the last 6 years at Kwiniuk River tower and this year had the highest escapement recorded. There was no commercial fishing in Subdistrict 3 because tenders were not available due to crab season continuing past mid August and the buyer having logistical problems because of the record coho catches in southern Norton Sound.

This was the third year that subsistence salmon permits were required for Subdistrict 3, and 63 permits were issued, less than the 70 permits issued in 2005, but more than the 58 permits issued in 2004. Historical comparison of subsistence salmon catch by species and by year in Moses Point Subdistrict is presented in Appendix A8.

Norton Bay-Norton Sound Subdistrict 4

Norton Bay Subdistrict typically has difficulty attracting a buyer due to its remoteness and a reputation for watermarked fish. Due to 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 2006, no commercial salmon fishing occurred due to a lack of buyer interest and no subsistence catch information was obtained. However, Appendix A9 presents historical subsistence salmon catch for Norton Bay Subdistrict for some of the past 40 years.

Shaktoolik and Unalakleet-Norton Sound Subdistricts 5 and 6

Both Shaktoolik and Unalakleet Subdistricts, which share a common boundary, consistently attract commercial markets due to larger volumes of fish and better transportation services. Management actions typically encompass both Subdistricts because salmon tend to intermingle and harvest in 1 subdistrict affects the movement of fish in the adjacent subdistrict. ADF&G's Unalakleet River test net, North River counting tower, and subsistence interviews in Unalakleet are used to set early fishing periods in both Subdistricts. As the season progresses, test net catches, commercial catch indices, and North River tower counts are used to assess run strength of each salmon species. Aerial surveys are only useful for late season escapement assessment because of long travel time between the 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's time to assure the harvest is directed on actively migrating stock and not on milling fish. In 2006, the Chinook salmon run was below average. An increase in test net catches occurred at the end of June and the counting tower had the best Chinook salmon counts on July 1 and 2 and then both the test net catches and tower counts dropped significantly. By the end of the first week of July, North River tower counts had continued to decrease during a time when counts should have been increasing. Because of the weak Chinook salmon run the department closed salmon gillnet fishing in both Shaktoolik and Unalakleet Subdistricts and in Unalakleet River until the last week of July. Beach seining was still allowed, but all Chinook salmon had to be returned to the water. Although the Chinook salmon run was poor, the chum salmon run was near record and the pink salmon run was record setting, but there was no interest by the buyer in chum or pink salmon.

During the second week of July the test net started to get record catches of coho salmon for that time period. Once the buyer was ready, ADF&G opened commercial coho fishing on July 21 for a 24-hour fishing period and resulting catches were well above average. Because of high incidental catch of chum salmon the buyer requested another 24-hour fishing period before the regular schedule of two 48-hour periods per week began on July 26. Catches were well above average to record setting for most fishing periods for comparable fishing dates. Commercial fishing was extended for 1 week after the regulatory closure date because of record coho catches in the commercial fishery and at Unalakleet River test net. Commercial fishing salmon season closed on September 14.

Shaktoolik Subdistrict 2006 commercial catches by 22 permit holders were 3,321 chum and 32,472 coho salmon (Table 4). Coho salmon harvest was a record and 390% above the recent 5-year average and 440% above the recent 10-year average (Appendix A10).

Unalakleet Subdistrict 2006 commercial catches harvested by 40 permit holders were 12 Chinook, 3 sockeye, 6,721 chum and 98,336 coho salmon (Table 5). Coho salmon harvest was a record and was 400% above the recent 5-year average and 370% above the recent 10-year average (Appendix A11).

Escapement

Table 3 and Appendix A16 summarize escapement assessments for the major index river systems of Norton Sound and Port Clarence Districts in 2006. These assessments are often qualitative and relative to historical escapement sizes. Most of the chum salmon assessments are described relative to a Sustainable Escapement Goal (SEG) for an index area. An SEG is a level of escapement that is 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 due to the absence of a stock specific catch estimate. BEG is based on spawner-recruit relationships estimated to provide maximum sustained yield. An Optimal Escapement Goal (OEG) is a specific management objective for escapement that considers biological and allocative factors and may differ from SEG or BEG.

ADF&G 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.

Six additional counting projects were also operated in the management area this season. Snake, Eldorado, and Pilgrim Rivers had weir projects which were set up and operated by Kawerak Corporation and North River counting tower project was operated by Unalakleet IRA. NSEDC and Bering Sea Fishermen's Association (BSFA) provided essential support to both organizations. Pikmiktalik River counting tower, near Stebbins, is a cooperative project by Kawerak and U.S. Fish & Wildlife Service. For 2 weeks during peak sockeye salmon passage, ADF&G and NSEDC operated a weir at the headwaters of Glacial Creek which flows from Glacial Lake into Sinuk River. Except for Pikmiktalik River and Glacial Lake projects, most projects have been operational since mid 1990s. Most projects operated in Norton Sound also receive funding from Norton Sound Research and Restoration Initiative. All projects supplied important daily information to ADF&G that was very useful to management of local salmon resources and will become more important the longer they operate. For current and historical escapement data for these enumeration projects, see Appendices A17 to A25.

Aerial survey assessment conditions were fair to good in most of Norton Sound for the 2006 season. However, lack of aircraft hampered surveying a number of rivers. In addition, the large number of pink salmon in the escapement again prevented chum salmon from being adequately observed in most rivers. 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 intensive subsistence and sport fishing pressure.

Chinook Salmon

The 2006 Chinook salmon run was below average throughout most of 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. Unalakleet River test net catches, North, Kwiniuk and Niukluk towers, aerial surveys and subsistence reports were the

primary assessment tools for judging Chinook salmon run strength in Norton Sound. Unalakleet River test net catch was approximately 35% above the 5-year average, but 5% below the 10-year average. North River tower fell short of the escapement goal for the third year in a row after reaching the goal in 3 previous years to 2004. The escapement goal was also not reached at Kwiniuk River, while Chinook salmon passage at Niukluk River tower was below average.

Chum Salmon

Chum salmon escapements were well above average in most areas in 2006. Nome River weir passage was a record 5,678 chum salmon since the weir began operations in the mid 1990s. Eldorado River weir passage was a record 42,105 chum salmon. Snake River weir passage of 4,160 chum salmon was the best since 1998 and exceeded the minimum escapement goal of 1,600 chum salmon for the seventh year in a row. Kwiniuk River tower counts of 39,519 chum salmon were the sixth highest in the 42-year project history, but Niukluk River tower counts were estimated to be 3% below the minimum goal of 30,000 chums. Tubutulik River was not surveyed. Unalakleet River chum escapements were well above average based on test net catches, but North River chum salmon passage was below 5-year and 10-year averages. Pilgrim River weir passage of 45,361 chum salmon almost tripled the next highest passage in the 3 years of weir operations.

Coho Salmon

Coho salmon are found in nearly all chum salmon producing streams throughout Norton Sound with primary commercial contributors being 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 the northern subdistricts of Norton Sound are typically surveyed. More recent Norton Sound ground-based escapement assessment projects are intended to monitor coho salmon as well as chum salmon and are becoming more important to fisheries management. 2006 coho salmon escapements in Norton Sound were near record to record setting in most rivers. Kwiniuk River tower passage of 22,341 coho salmon was nearly 10,000 more fish than were counted in any other year of 6 years of enumerating the coho salmon run. Niukluk River tower passage of 11,169 coho salmon fell 9% short of the previous record. Nome (8,308) and Snake (4,776) Rivers had record coho salmon passage. In Unalakleet River the cumulative test net catch was a record and more than triple the historical average. Aerial surveys of rivers indicated that escapement had been reached on numerous streams, and aerial surveys in Nome Subdistrict had record coho salmon counts for the majority of the rivers.

Pink Salmon

For over 20 years, pink salmon returns to Norton Sound have followed an odd/even year cycle with even-numbered year returns typically much higher in number than odd-numbered years. In 2006, there were near record to record escapements for a number of rivers. North River tower had a record count of over 2 million pinks past the tower. Nome River pink counts were nearly 600,000 fish and second only to the more than 1 million pinks counted in 2004. In Unalakleet River the cumulative test net catch was a record and was nearly five times the average even-year catch. Aerial surveys noted high numbers of pink salmon in other streams.

Sockeye Salmon

Sockeye salmon are typically found in small numbers throughout Norton Sound District with the largest spawning stock at Glacial Lake where 1,000 to 2,000 sockeyes usually return to spawn each year. In 2006 the sockeye run into Glacial Lake was only monitored during a 2 week period

with a weir and 6,849 sockeyes were counted (Appendix A23). Later in the season, an aerial survey count of 5,810 sockeyes in Glacial Lake was a record compared to other years, with the aerial survey escapement goal range set at 800 to 1,600 sockeye salmon (Table 3).

Enforcement

One wildlife trooper from St Mary patrolled the Norton Sound District 2006 commercial salmon fisheries in Unalakleet and one Fish and Wildlife Protection officer patrolled in Nome. In addition, Nome ADF&G Division of Commercial Fisheries has 8 deputized staff members with the ability to cite or ticket an offense, of which 2 worked the commercial salmon fishery in subdistricts 5 and 6. The subsistence fishery had no official patrol, but random checks were conducted by 2 ADF&G personnel.

2007 NORTON SOUND SALMON OUTLOOK

Salmon outlooks and harvest projections for 2007 salmon season are based on qualitative assessments of parent year escapements, subjective determinations of freshwater overwintering and ocean survival, and in the case of the commercial fishery, projections of local market conditions. Except for Chinook salmon there have been near record to record runs for all salmon species in most river drainages in Norton Sound since 2004. Parent-year escapements for Chinook salmon have been mostly poor in the 2000s. Parent-year escapements in 2003 were very poor for both chum and coho salmon and parent-year escapements in 2002 for this year's returning 5-year old chum salmon were poor to fair. Pink salmon parent-year escapements were well above average to record setting in most Norton Sound river drainages in 2005.

The excellent salmon runs in recent years for most species indicate good ocean survival conditions and will likely help to counter poor parent-year escapements for this year's returning salmon. ADF&G is cautiously optimistic that most salmon runs in Norton Sound will be better than average. However, because of poor parent-year escapements for many salmon species, the department will take action to restrict fisheries if salmon runs show early signs of being weak.

The Chinook salmon run is expected to be below average and no commercial fishing targeting Chinook salmon is expected. Chinook salmon harvest will likely be low as an incidental catch in other salmon directed fisheries. Chum salmon runs are expected to be above average, but limited commercial fishing targeting chum salmon is expected. There is some buyer interest in chum salmon this year and harvest is expected to be between 10,000 – 20,000 fish. The only expected subsistence restrictions for chum salmon will be in Nome Subdistrict where catch limits will be in effect. In the last several years there have been record breaking pink salmon runs in many locations when compared to the respective even- and odd-numbered run year cycles. Although there may be limited buyer interest this year there have been no commercial pink salmon sales since 2000. The coho salmon run in 2007 is expected to be above average based on good ocean survival conditions in recent years and record catch seen last year (Appendix A1). Commercial harvest is expected to be 60,000 to 80,000 fish and no subsistence fishing restrictions are expected, except for catch limits in Nome Subdistrict.

2006 PORT CLARENCE SALMON FISHERY

Commercial Fishery Season Summary

Commercial salmon fishing in this district has not occurred since 1966, when 93 sockeye salmon, 131 pink salmon and 922 chum salmon were caught in Grantley Harbor/Tuksuk Channel

area of Port Clarence District. From 1966–2002, weak returns of sockeye salmon to Salmon Lake precluded the prosecution of a commercial salmon fishery as harvest surpluses were only sufficient to meet subsistence needs during those years. However, sockeye salmon returns to Salmon Lake improved significantly beginning in 2003 with escapements ranging from 42,000–85,000 sockeyes. Resurgence of the Pilgrim River sockeye salmon run indicates that current harvest surpluses may also provide for a limited commercial salmon fishery in Port Clarence District. Consequently, an exploratory test fishery was conducted in July, 2006 in the Grantley Harbor Subdistrict by ADF&G and NSEDC to collect CPUE and incidental harvest data. A 50-fathom 5-3/8 in (13.6 cm) stretched mesh gillnet was checked by ADF&G personnel 1–3 times a day on 5 different days from July 3 to 21. Total harvest was 520 sockeye salmon, 502 chum salmon, 6 Chinook salmon, 72 pink salmon, and 2 Dolly Varden, with peak sockeye salmon catch and CPUE occurring on July 7 (Table 6).

Subsistence Fishery Season Summary

Subsistence household permits have been required to fish the Pilgrim River drainage for many years, however 2006 was only the third year permits were required for all waters of Port Clarence District. In Pilgrim River drainage, subsistence harvest limit is 100 salmon of which no more than 50 can be sockeye salmon. In 2006, sockeye salmon limits were waived for the Pilgrim River drainage due to an above average return. The only other catch limit for Port Clarence District is the Kuzitrin River drainage, where it is 100 salmon per household of which no more than 10 can be king salmon. In 2006, this limit was not waived.

In Port Clarence District, more permits were issued in 2006 than in 2005. In 2006, there were 345 Port Clarence District and Pilgrim River permits issued, compared to 330 issued in 2005. This was the second highest number of permits issued for this district. Of 345 permits issued, 198 were to fish only the Pilgrim River, and 147 were for the remaining waters of Port Clarence District. Harvests reported by permit holders in Port Clarence District from 1963 to 2006 are presented in Appendix B2.

Similar to previous years slightly more than half the subsistence permit holders reported harvesting Pilgrim River salmon in 2006. Reported catch from Pilgrim River permits was a record 5,556 sockeyes which was more than the 4,735 sockeyes caught in 2005 and 3,546 sockeyes caught in 2004. The total 2006 Pilgrim River subsistence catch was 6,017 salmon.

This was the second year subsistence salmon fishing was allowed in Salmon Lake in over 30 years. By regulation Salmon Lake is closed to all fishing from July 16 through August 31, and in previous years the department kept salmon fishing closed throughout the lake to protect spawning salmon. In 2005, ADF&G opened the eastern end of Salmon Lake after August to the harvest of sockeye salmon to allow people to target spawned out salmon that dry easily. Four permits were issued, with permit holders limited to 50 sockeye salmon each. Reported harvest was 19 sockeyes. This year only 1 permit was issued for Salmon Lake and no harvest was reported.

Escapement

Aerial surveys are not typically flown in Port Clarence District except for Salmon Lake because 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 2006, aerial surveys of Salmon Lake observed a peak estimate of 39,400

sockeye salmon and 2,380 sockeye salmon in Grand Central River, a tributary to Salmon Lake. Combined escapement goal of Salmon Lake and Grand Central River is 4,000–8,000 sockeye salmon (Table 3).

Port Clarence District has had a sockeye salmon spawning population near 10,000 fish in years previous to 2003 at Salmon Lake. But beginning in 2003, sockeye salmon escapements skyrocketed and weir counts have been higher than 42,000 sockeye salmon (Appendix A18). Pilgrim River escapement for 2006 was 52,323 sockeye salmon, which is the third highest number of sockeye salmon counted past Pilgrim River weir. For comparison, the tower count was less than 4,000 sockeye salmon in 2002 (but counting started late and some sockeye salmon were missed).

From 1997 to 2001, ADF&G conducted a fertilization program at Salmon Lake, partially funded by NSEDC and BLM, to restore sockeye salmon to historic levels by applying liquid fertilizer. However, ADF&G could not determine if the method was effective and suspended fertilization in 2001. After impressive 2003 sockeye salmon returns, the project was reevaluated and fertilizer was applied at a reduced rate in 2004, but then suspended again in 2005 and 2006.

Enforcement

In 2006, there was no enforcement presence in the 2006 Port Clarence District subsistence fishery. Both the Nome Fish and Wildlife Protection officer and Nome ADF&G deputized staff were unable to patrol the area.

2007 PORT CLARENCE SALMON OUTLOOK

Based on excellent runs of sockeye salmon in recent years and results from ADF&G test net fishing, there is potential for a limited commercial harvest in 2007.

2006 KOTZEBUE SOUND SALMON FISHERY

Commercial Fishery Season Summary

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 3 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.

In recent years the Kotzebue Sound commercial fishery has been limited by buyer availability. In 2002 and 2003 there was no onsite buyer. In 2004 and 2005 one onsite buyer was present and fish were processed locally. In 2006, the new buyer shipped the catch in the round to Anchorage for processing.

The overall chum salmon run to Kotzebue Sound in 2006 was estimated to be average based on the commercial harvest rates, subsistence fishers reporting average to above average catches, and the Kobuk test fish index being average. The commercial harvest consisted of 137,961 chum salmon, compared to 198,403 average harvest for 1962 to 2005 (Appendix C1). Also harvested during the commercial fishery, but retained for personal use was 9 Chinook salmon, 5 sockeye salmon, 3 pink salmon, 268 Dolly Varden and 13 whitefish (Table 7). There were likely some chum salmon kept for personal use that did not get reported on fish tickets.

Beginning on July 10, ADF&G opened the fishery continuously and let the buyer determine the fishing time for their fleet. The first week the buyer bought during 4 days and fishing periods

ranged from 6 to 8 hours daily. The second week the buyer bought for 6 days and fishing periods ranged from 7 to 8 hours. By the third week the department expressed concern with Kobuk River test fish chum salmon catches and requested buyer to only buy for 5 days and fishing periods ranged from 6 to 8 hours. By late July the test fish catch index was at a record low for chum salmon, but a record high for sheefish. Calls to subsistence fishers in the villages along the Kobuk River confirmed that subsistence fishers were catching few chum salmon, but high numbers of sheefish. By August 2 the test net CPUE chum salmon cumulative index was 138 points, nearly 100 points behind the CPUE of the lowest year, 1993 (Table 8). In the last 4 years, ADF&G has opened commercial fishing continuously, letting the buyer direct the periods, and only reduces commercial fishing time if the test fish chum salmon CPUE cumulative index is projected to fall below 600 index points. The CPUE has not fallen below 600 since the 1990s, but this year was the first time it was projected to do so since commercial fishing opened continuously each season beginning in 2002.

Low catches at the test net, responses from subsistence fishers, and lower than expected commercial catch rates resulted in commercial fishing being suspended for 4 consecutive days the first week of August. The following week no fishing was allowed for 1 day midweek and that weekend to allow more salmon to move through Kotzebue Sound and into the rivers to provide for subsistence needs and escapement. Improvements in test fish catch indices allowed the department to again open the fishery continuously beginning the week of August 14. The fishery closed by regulation August 31, but the last fish were sold on August 25 when the major buyer ceased operations.

This year's test fish chum salmon CPUE cumulative index was 743 points and ranked third lowest. A late surge at the Kobuk River test net began on August 15 and over half the chum salmon caught during the season were caught from August 15 through August 19 (Figure 9).

In 2006, 42 permit holders sold fish to the buyer, including 1 catcher-seller who sold fish to the buyer and also sold some of his catch from his boat to Kotzebue area residents. Number of permit holders that fished has been in the low 40s the last 3 years, and is less than half the permit holders that fished in the 1990s, and well below the nearly 200 permit holders that fished in the early 1980s (Appendix C1). A total of 1,040,023 pounds of chum salmon (average weight 7.5 lbs) were sold at an average of $0.22 per pound (Appendices C2 and C3). Total exvessel value was $229,086 to Kotzebue Sound fishers. Average value for each participating permit holder was $5,454. The total exvessel value represents 38% of the $605,937 historical average (Appendix C4).

Primary fishery management objectives are to provide adequate chum salmon escapement through the commercial fishery to ensure a sustained run and to provide for subsistence priority. A test fishery conducted on the Kobuk River for the fourteenth consecutive year provides the only inseason escapement information. Age, sex and length composition (ASL) was taken from commercial catch samples, but was not used to manage the fishery. The majority of the chum salmon were 4- and 5-year-old fish with commercial catch sample age composition 45% for age-0.3 fish and 52% for age-0.4 fish. Age composition was similar to years past, but the average weight of chum salmon was one-half pound to 1 pound less than previous years.

Subsistence Fishery Season Summary

Subsistence household surveys have been regularly conducted in Kotzebue District from 1962–2004 by the Division of Subsistence, but since 2004, no subsistence surveys have been conducted in the area (Appendices C5 and C6). In 2006, no other information on subsistence

harvest is available other than comments that sheefish catches were very good but chum salmon fishing on Kobuk River was slow early in the run and was much better later in the run, and chum salmon fishing was good on Noatak River.

Escapement

In 2006, an ADF&G test fish project located just downstream from the village of Kiana monitored escapement in Kobuk River. Similar to last year, the Kobuk River test fish index did not follow the typical pattern in 2006 (Table 8 and Figure 9). A smaller than average number of index points were generated in the first four-fifths of the season and a well above average number of index points were generated in the last fifth of the season indicating a later, but average chum salmon run in Kobuk River.

The test fish index of 743 was the lowest since 1998. The midpoint of the test net catches was on August 16 and was later than any other previous year. The lowest index recorded in the Kobuk River drainage was 494 in 1993 when aerial surveys indicated escapement just reached the SEG. However, in 1993 the project started later than usual, and the 164 test net drifts were the lowest number of drifts compared to all other years. In the last 7 years, including 2006, at least 200 test net drifts have been attempted each season.

Test fishing was conducted once during the chum salmon run in lower Noatak River by ADF&G. Fishing was described as excellent. Percentage of age-0.3 fish was 73% for Noatak River, ranking third in 13 years of test fishing. On Kobuk River, percentage of age-0.3 fish was 42%, similar to the commercial catch, but percentage of age-0.2 fish caught in the test net was a record 17%.

Aerial surveys were conducted on September 25 and 26, 1 week later than the survey window of September 1 – 20 for Kobuk and Noatak Rivers drainages because of lack of aircraft and unacceptable viewing conditions. Aerial survey counts were 48,750 chums in the Kobuk River index area and 39,785 chums in the Noatak River index area. The Kobuk River counts were above the goal of 8,000 to 16,000 chums and the Noatak River counts were below the goal of 64,000 to 128,000 chums.

Enforcement

Kotzebue District has been without a Fish and Wildlife Protection officer since February of 2004. Since then, the Nome Fish and Wildlife Protection officer has made attempts to patrol the area, but was unable to for the 2006 chum salmon fishery. However, Nome ADF&G Division of Commercial Fisheries does have 8 deputized staff members with the ability to cite or ticket an offense, of which 3 worked the 2006 Kotzebue District chum salmon fishery.

2007 KOTZEBUE SALMON OUTLOOK

The outlook for the 2007 season is based on the parent-year returns and returning age classes observed in the test fish samples from Kobuk and Noatak Rivers, and Kotzebue commercial catch samples in 2006. During the 2007 season, the 4-year-old component of the run is expected to be above average. Five-year-old component of the run is expected to be average based on the 4-year-old return this past season. Three-year-old and 6-year-old age classes are much smaller components of the run and are expected to be above average. Commercial harvest is expected to fall within the range of 100,000 to 150,000 chum salmon, if market conditions can accept that level of harvest.

SECTION 3: PACIFIC HERRING FISHERIES

2006 NORTON SOUND PACIFIC HERRING FISHERY

COMMERCIAL FISHERY SEASON SUMMARY

Sac Roe

The 2006 Norton Sound herring fishery opened by emergency order on June 8. One company registered to buy and intended processing approximately 1,500 tons. Total harvest of sac roe herring based on fish ticket data was 671.3 tons of herring with an average roe recovery of 10.2% (Table 9). The buyer determined that 25 tons of sac roe herring were of insufficient percent roe recovery. As a result, this tonnage was purchased by another processor for use as bait herring. Commercial fishing only occurred in Subdistricts 1 and 3 in 2006. In Subdistrict 1, a total of 191 tons of herring was harvested with an 8.7% average roe recovery. A total of 480 tons of herring with an average roe recovery of 10.7% was harvested in Subdistrict 3. There were 41 gillnet fishers who made at least one delivery during this season, ranking it the third lowest effort in the history of the Norton Sound sac roe fishery (Appendix D3). No beach seine permit holders were present in Norton Sound in 2006 and no significant beach seine fishing has been done since 1997. Other historical fisheries information is presented in Appendices D1, D2, and D4.

Only 1 company was present on the grounds during the 2006 season with 2 processors and 10 tenders registered. Based on fish ticket data, it is estimated that total value of the herring harvest for sac roe fishers was approximately $140,617, which averages out to $3,429 for each fisher making at least 1 landing. The 2006 season was the third lowest in terms of value and second lowest in terms of total catch for the Norton Sound herring fishery (Appendix D3).

Spawn on Kelp

Permit holders wishing to participate in the *Macrocystis* spawn-on-kelp open pound fishery were required to register with Nome ADF&G office by April 16. No interest was expressed in the commercial *Macrocystis* spawn-on-kelp fishery in 2006.

One permit holder participated in the commercial spawn-on-wild kelp fishery in 2006. A single processor was interested in purchasing between 2000–4000 pounds. Area managers opened the spawn-on-wild kelp fishery on June 13 and closed it on June 19. A total of 0.57 short tons of spawn-on-wild kelp was harvested in 2006. Estimated value of the spawn-on-wild kelp fishery was $4,562 in 2006.

Bait Fishery

There was no directed bait herring fishery in 2006. However, NSEDC purchased 25 tons of poor quality sac roe herring from the buyer.

COMMERCIAL FISHERY MANAGEMENT

ADF&G projection for the 2006 spawning biomass for the Norton Sound sac roe fishery was 38,833 tons. At 20% exploitation rate, guideline harvest level for Norton Sound District was 7,767 tons with 6,702 tons allocated to the gillnet fishery.

Herring were first observed in Norton Sound on May 30 when NSEDC biologists estimated 880 tons of herring in Subdistrict 3, but then herring were not sighted for several days. On June 6, an estimated 700 tons of herring were spotted near St. Michael Island by a processor helicopter pilot. The following morning, ADF&G personnel conducted an aerial survey in Subdistrict 1 and estimated 165 tons of herring. Shortly thereafter, the department opened the sac roe herring fishery effective 12:00 noon on June 7.

Two shackles of gear for a total length of 100 fathoms were allowed to be fished. Due to limited processing capacity, the fishery was left open continuously to permit the most favorable herring fishing schedule as determined by the buyers and fishers. This allowed buyers to control test fishing and fishers could immediately harvest good quality herring as buyers were able to direct fishing efforts to areas with good roe percentages and catch sizes to take advantage of marketable herring. This fishery officially ended on June 12 when the buyer needed to leave Norton Sound for other commitments.

Two ADF&G field crews operated during the 2006 season. One crew operated from Cape Denbigh while a second crew was based out of Unalakleet. The test fish crews' presence and sampling efforts on the herring grounds are critical to the proper management of the fishery and biological documentation of the stocks (Figures 10–19). Unalakleet field office personnel during the season consisted of 1 assistant area biologist, and 2 seasonal fishery biologists. NSEDC supplied 1 fishery intern to assist ADF&G in test fishing and sampling during the herring fishery.

There were 2 emergency orders issued during the 2006 Norton Sound herring fishery (Appendix G7).

Catch Reporting and Enforcement

The herring buyer registered for the 2006 season communicated exceptionally well with ADF&G during the fishery. Commercial test fishing results were relayed in a timely manner, which provided managing biologists with adequate time to formulate plans and make daily announcements. The buyer 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 very 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 assure everyone got the same message. Communications with the field camps was accomplished with marine SSB, satellite telephone or by aircraft radio from the aerial survey plane.

No Fish and Wildlife Protection officers were on the Norton Sound herring grounds during the 2005 fishery; however, 2 deputized ADF&G staff were stationed in Unalakleet for the 2006 herring season.

Biomass Determination

The peak aerial survey took place on June 15 when approximately 23,939 tons of herring were observed. Most herring were observed in Subdistrict 3 from the southern end of Beeson Slough to the western side of Cape Denbigh (Table 10). This was below the projected 38,833 tons of herring. However, no peak aerial survey was flown which included Subdistricts 4–7. Weather was good to fair for most of the aerial surveys. The best survey conditions occurred on June 12, but primary spawning was thought to have taken place between June 10 and 12. A total 49.3 miles of spawn was observed throughout the fishery.

2007 NORTON SOUND PACIFIC HERRING OUTLOOK

During 2006, the inseason biomass was estimated to be 24,610 tons. However, poor weather conditions precluded department personnel from conducting a peak biomass aerial survey. Therefore, the 2005 aerial survey biomass estimate was used to formulate the 2007 projection. By adjusting for growth and survival, it is estimated that the 2007 biomass will be 38,415 tons, allowing a harvest of 7,683 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 7,363 tons for the sac roe harvest (6,627 tons by gillnets, 736 tons by beach seines) and any subsequent bait fisheries. The beach seine harvest equates to 10% of the allowable sac roe harvest. 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 2007 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 10 (33%), 11 (17%) and 5 (28%) are expected to dominate the returning population. Age 9 and older herring are expected to comprise 61% of the biomass (Figure 19).

SECTION 4: KING CRAB FISHERIES

NORTON SOUND CRAB FISHERY

ABUNDANCE

The ADF&G length-based population model estimated legal male crab abundance for the 2006 summer commercial crab fishery at 4.5 million pounds. This is a decline of approximately 6% from the revised population estimate of 4.8 million pounds for 2005. Current size composition data from the 2006 winter crab study show the portion of the crab population classified as recruits has decreased 9.8% since the 2005 survey and the postrecruit male crab population has decreased 11.6%. The high percentage of recruit and postrecruit crabs observed during the last 2 years has passed out of the system, replaced by the lower percentage of prerecruit crabs seen the previous year. The winter study also points to an above average pre-1 and pre-2 populations. Pre-1 crabs require 1 molt to become part of the legal population next year, while pre-2 crabs require 2

molts. These findings indicate that the legal crab population is less compared to 2005, but is expected to increase over the next 2 years. A 10% exploitation rate on the legal population ≥ 5-inch carapace width equates to a guideline harvest level of 454,000 pounds of crab. This follows the harvest strategy set by the BOF. By regulation, the Community Development Quota (CDQ) fishery is allocated 7.5% of the summer season harvest; therefore, the CDQ harvest quota was set at 34,050 pounds preseason.

SUMMER OPEN ACCESS COMMERCIAL FISHERY

The 2006 Norton Sound Section summer open access commercial red king crab fishery was opened by regulation at 12:00 noon, July 1, with a guideline harvest level (GHL) of 419,950 pounds. Two companies registered to buy crab in Norton Sound during the season. One of these buyers operated a seafood processing plant in Nome and purchased crab from local Norton Sound fishers. Non-local fishers and those based in Unalakleet delivered to the second buyer in Anchorage. Some fishers also sold their catch dockside as catcher/sellers. The 2006 open access portion of the fishery was closed by emergency order 12:00 noon, August 22 when the harvest approached the goal of 419,950 pounds.

Total harvest from fish ticket reports was 139,131 red king crabs or 419,191 pounds, 1,477 pounds of which were reported as deadloss. A total of 28 vessels made deliveries, 29 permit holders fished, and a total of 224 landings were made. Average weight for commercially caught crab was 3.01 pounds. A total of 1,120 pots were registered and there were 7,886 pot pulls throughout the fishery. Average price paid was $2.26 per pound, and exvessel value of the fishery is estimated at $930,004. Appendix A3 gives historical summer commercial (including CDQ) red king crab fishery performance from 1977 to present.

Fish ticket reports document that 17 statistical areas were fished in both the open access and CDQ fishery (Table 11). Statistical areas 636401 and 626401 had the highest catch with 224,531 and 118,202 pounds of crab respectively. The other large catches came from statistical areas 656401 (28,434 pounds) and 636330 (26,680 pounds). The catch from statistical areas east of 164°W longitude made up 82.6 % of the harvest (Figure 21; Appendix E1). Overall, CPUE was 17.3 crabs per pot, slightly higher compared to the 2005 CPUE of 15.9 crabs per pot.

The first delivery was made on July 4, and the final delivery was made August 22. The commercial crab fleet concentrated in 2 main areas of operations throughout most of the open access fishery. A portion of the fleet delivered to a small tender vessel in northeastern Norton Sound. These crabs were then delivered 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. Live crabs were also shipped from Unalakleet to Anchorage by 2 fishers.

CDQ FISHERY

The 2006 CDQ fishery began at 12:00 noon June 15, and closed 12:00 noon June 28, with 1,493 pounds remaining of the quota. The fishery was not reopened after the close of the open access fishery as there was no buyer interest. The harvest was 32,557 pounds of crab, 96% of the CDQ allocation (Table 12). Eleven vessels participated and 25 landings were made. There were a total of 809 pots pulled. Average price paid to fishers for their harvest was $2.23 per pound, and exvessel value was $70,633 for the CDQ fishery.

This was the sixth year a CDQ harvest occurred since the CDQ fishery was implemented in 1998, and the third year the fishery harvested or nearly harvested the entire allocation.

COMMERCIAL CATCH SAMPLING

Carapace length measurements and shell age were collected from 6,707 commercially caught crabs during the 2006 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 $\geq$ 116 mm and all legal old shell males. Recruit crabs made up 25% of the legal crabs sampled and postrecruit crabs made up 75%, a 15% increase in the number of postrecruit crabs compared to samples from the 2005 fishery (Appendix E4). Male crabs with new shell carapaces made up 73% of the total legal crabs sampled, and old shell crabs made up 27% (Table 13). Overall mean carapace length of legal male crabs was 119.5 mm (Table 13 and Figure 32). This was an increase from the 2005 fishery and is most likely due to the increase seen in postrecruit crabs in 2006. For comparison of historical length composition of Norton Sound red king crab summer commercial harvests from 1981 to 2006, see Figures 26–32.

ENFORCEMENT

The Nome Fish and Wildlife Protection officer was unable to patrol the 2006 CDQ or Open Access Norton Sound king crab fishery. However, Nome ADF&G Division of Commercial Fisheries does have 8 deputized staff members with the ability to cite or ticket an offense, 3 of whom worked the king crab fishery.

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 presents winter commercial and subsistence harvests of crab from 1978 to 2006. During the winter of 2005–2006, three fishers registered to fish commercially, but only one made sales as a catcher-seller. Since less than 3 fishers made deliveries, all commercial catch information is confidential. Sea ice conditions were very bad for the majority of the season and fishers reported losing pots when the ice moved out during the season.

The harvest is generally divided between local residents who buy crab directly from the fishers, the seafood plant in Nome, and other non-local markets such as Anchorage. Most fishers consider commercial crabbing a sideline and hold other jobs. Usually, 2 or 3 of the winter crab fishers sell the majority of the crab.

SUBSISTENCE FISHERY

Both a summer and a winter subsistence red king crab fishery occur in Norton Sound, though the majority of the effort and harvest is from the winter fishery. During the 2005–2006 Nome area winter crab season, 98 permits were issued, 97 returned, and 69 permit holders reported fishing for a total of 1,239 crabs kept for winter subsistence use (Table 14). During the 2006 Nome area summer subsistence crab season, 6 subsistence permits were issued, 3 were returned, and 2 permit holders reported fishing for a total harvest of 62 crabs.

CURRENT AND FUTURE RESOURCE INVESTIGATIONS

In July and August 2006, ADF&G conducted the triennial Norton Sound red king crab trawl survey. Results from the survey indicated legal male red king crab estimated abundance was 0.73 million with a corresponding biomass of approximately 2.2 million pounds, a decrease of 4% from 2002. Estimated abundance of prerecruit-1 and prerecruit-2 males were 0.57 million and 0.78 million crabs, respectively. Except for the all-time high observed in 1999, the prerecruit-1 male abundance estimate was the highest since the 1985 survey. These crabs should molt and give a boost to the recruit portion of the legal crab biomass in 2007. Prerecruit-2 male crab abundance was more than 80% above 2002 and is the highest on record (Appendix E2), indicating increased recruitment for 2008 and 2009. The next trawl survey is scheduled for August 2008.

A winter pot study is planned from February through April of 2007. Results of the winter project will be used in the length-based model to project the summer 2007 legal biomass and appropriate guideline harvest level (GHL) for the summer commercial crab fishery. Size composition by year from the winter king crab project is shown in Appendix E6.

ST. LAWRENCE ISLAND CRAB FISHERY

ABUNDANCE

In late July and throughout August 2005, an exploratory pot survey was conducted by NSEDC in cooperation with ADF&G to assess the number and distribution of male blue king crab in the vicinity of King Island, Wales, and Port Clarence. The survey was only partially successful due to strong currents that made pot retrieval difficult when set deeper than 10 fathoms. Shallow pot placement resulted in catch primarily of egg bearing female blue crabs, and indicates that using standard Norton Sound crab gear would only access a nursery site for gravid blue king crab. When more suitable gear becomes available, further surveys will be necessary to determine the viability of a summer fishery. However, to aid in the development of a commercial fishery in the area, NSEDC is interested in introducing a proposal to BOF to decrease the legal size of commercial blue king crab from 5.5 inches to either 5.0 or 5.25 inches. Preliminary data indicates blue king crab size at maturity is very similar to Norton Sound red king crab whose legal size is 4.75 inches.

In August of 2006, the Northern Bering Sea Trawl Survey was conducted by NSEDC in cooperation with ADF&G to assess crab resources in the St Lawrence Island and Bering Strait areas of Norton Sound District. Primary focus was to collect information on blue king crab size, distribution, and abundance. The area surveyed lies west of the standard ADF&G triennial Norton Sound red king crab trawl survey locations. Trawls were conducted from near the southwest corner of St Lawrence Island to the Bering Strait area southwest of Cape Prince of Wales. Some size information was collected, along with the general distribution of blue king crab. More survey work is necessary to generate an abundance estimate and better understand the distribution of blue king crab. 2006 survey data should only be considered a starting point to understanding the Bering Strait and St Lawrence Island blue king crab stock.

COMMERCIAL FISHERY

In 2006, BOF split the St. Lawrence Island section between north and south of 66° N latitude. In the northern section, now known as the Kotzebue section, the commercial season was from noon June

15 through August 1. The southern section was merged into Norton Sound Section. This change was initiated by Norton Sound area fishers to expand fishing opportunity to an area that had seen little commercial utilization since 1995.

No permits fished in 2006 in the Kotzebue section.

SECTION 5: MISCELLANEOUS SPECIES

INCONNU (SHEEFISH)

Commercial Fishery

Although inconnu *Stenodus leucichthys*, commonly known as sheefish, were likely harvested and sold in 2006 by several fishers, no fish tickets were turned in to ADF&G. In Kotzebue Sound District, no fishers reported selling inconnu (Appendix F1). Sheefish is not commonly found in either Norton Sound or Port Clarence Districts.

Subsistence and Sport Fishery

Villages in Kotzebue Sound District were not surveyed for subsistence sheefish harvests from 1985 to 1990, and after 2004. But for years starting in 1966 that subsistence household surveys were conducted by Division of Subsistence, data is presented in Appendix F2. These harvests may include winter, summer, and fall catches. Due to limited survey effort during many years, total catch and effort should be regarded as minimum numbers only and are not comparable year to year. Subsistence inconnu harvest information was not always collected for the town of Kotzebue, where a sizable ice fishery occurs for sheefish in late winter and spring.

No sport fishing harvest data is collected in Kotzebue Sound District for sheefish.

Escapement

Sheefish escapement is determined from aerial surveys and ADF&G test fishing project on the Kobuk River. In 2006, no aerial surveys of the Kobuk and Selawik Rivers were conducted. Test fishing on the Kobuk River resulted in 735 sheefish caught in 217 drifts, for a cumulative CPUE of 642.

DOLLY VARDEN

Commercial Fishery

Dolly Varden *Salvelinus malma* are occasionally incidentally caught in commercial salmon fisheries in Norton Sound and Kotzebue Districts. In 2006, no Dolly Varden were reported caught in Norton Sound commercial fisheries. Kotzebue District reported 278 caught but not sold, compared to last year when 181 were caught and sold (Appendix F3).

Subsistence and Sport Fishery

Subsistence harvest data for Dolly Varden is available for parts of Norton Sound, Port Clarence, and Kotzebue Districts for various years from 1962 to present.

In 2006, Norton Sound Dolly Varden subsistence harvests were determined from reported totals on Tier I subsistence permits. Residents of communities where subsistence permits were required reported harvesting 508 Dolly Varden. Over half (54%) were from Subdistrict 2-Golovin, which includes the communities of Council, White Mountain, and Golovin, but Council is primarily fished by Nome area residents. Second largest harvest (30%) was reported from permits issued for Subdistrict 1-Nome, with 54% coming from Nome River.

Norton Sound household subsistence surveys were conducted in the villages of Shaktoolik and Unalakleet in 2006 by ADF&G Division of Commercial Fisheries; however, no data regarding Dolly Varden was obtained.

In 2006, Port Clarence Tier I subsistence permits reported harvesting 113 Dolly Varden. This included harvest from Pilgrim River and Salmon Lake.

No household surveys for Dolly Varden subsistence catches were conducted in Kotzebue Sound area communities in 2006. However, historical survey data collected by the Divisions of Sport Fish and Subsistence from 1962–2004 for the villages of Kivalina and Noatak are shown in Appendix F4.

No sport fishing harvest data is collected in either Norton Sound or Kotzebue Sound Districts for Dolly Varden .

Escapement

Dolly Varden escapement is determined from aerial surveys conducted by ADF&G Division of Sport Fish in the Kotzebue area, and weir or tower counts in Norton Sound. In 2006, no aerial surveys were flown for Noatak or Kivilina Rivers, but surveys were flown on Wulik River, which counted a total of 108,352 Dolly Varden (Appendix F5).

WHITEFISH

Commercial Fishery

No commercial or commercial bycatch for whitefish *Coregonus laurettae, C. pidschian, C. sardinella, C. nasus, and Prosopium cylindraceum, Coregonus sp., and Prosopium sp.* were reported in 2006.

Subsistence and Sport Fishery

Subsistence harvest data for whitefish is available for parts of Norton Sound, Port Clarence, and Kotzebue Districts for various years from 1962 to present.

In 2006, Norton Sound whitefish subsistence harvests were determined from reported totals on Tier I subsistence permits. Residents of communities where subsistence permits were required reported harvesting 213 whitefish, 70% of which were reported from Norton Sound Subdistrict 2-Golovin and the remainder from Subdistrict 3-Elim. None were harvested in Subdistrict 1-Nome.

Norton Sound household subsistence surveys were conducted in the villages of Shaktoolik and Unalakleet in 2006 by ADF&G Division of Commercial Fisheries; however, no data regarding whitefish was obtained.

In 2006, Port Clarence Tier I subsistence permits reported harvesting 44 whitefish. This includes harvest from Pilgrim River and Salmon Lake.

No household surveys for whitefish subsistence catches were conducted in Kotzebue Sound area communities in 2006. However, historical survey data collected from 1970 to 2004 for a few villages in the district are shown in Appendix F6. Harvest numbers are considered minimal and are not comparable year to year.

No sport fishing harvest data is collected in either Norton Sound or Kotzebue Sound Districts for whitefish.

Escapement

Whitefish escapement is not determined.

SAFFRON COD

Commercial Fishery

No commercial or commercial bycatch of saffron cod *Eleginus gracilis*, commonly known as tomcod, have been reported since 1995.

Subsistence and Sport Fishery

In Norton Sound areas tomcod is primarily fished by "jigging" through the ice. Since no subsistence permit is required and a sport fish license is not needed for Alaska residents, harvests of tomcod are not reported or documented.

In 2006, Norton Sound household subsistence surveys were conducted; however, subsistence harvests of tomcod were not collected.

Escapement

Saffron cod escapement is not determined.

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TABLES AND FIGURES

Table 1.–Norton Sound commercial salmon harvest summary by subdistrict, 2006.

		Subdistricts						
		1	**2**	**3**	**4**	**5**	**6**	**Total**
Number of Fishers		0	0	0	0	22	40	61[a]
Chinook	Number	0	0	0	0	0	12	12
	Weight (lbs)	0	0	0	0	0	167	167
Sockeye	Number	0	0	0	0	0	3	3
	Weight (lbs)	0	0	0	0	0	23	23
Coho	Number	0	0	0	0	32,472	98,336	130,808
	Weight(lbs)	0	0	0	0	216,011	653,416	869,427
Pink	Number	0	0	0	0	0	0	0
	Weight (lbs)	0	0	0	0	0	0	0
Chum	Number	0	0	0	0	3,321	6,721	10,042
	Weight (lbs)	0	0	0	0	22,553	45,947	68,500
Total	Number	0	0	0	0	35,793	105,072	140,865
	Weight (lbs)	0	0	0	0	238,564	699,553	938,117

[a] One fisher fished in both Subdistricts 5 and 6 in 2006.

Table 2.–Tier I subsistence salmon harvest for northern Norton Sound, 2006.

	Permits	Number of Salmon Harvested					
	Fished [a]	Chinook	Sockeye	Coho	Pink	Chum	Total
Marine Waters	29	17	43	270	979	397	1,706
Bonanza River	15	0	0	179	158	27	364
Cripple Creek	9	0	0	72	2	0	74
Eldorado River	9	0	0	69	475	115	659
Flambeau River	5	1	3	151	41	127	323
Nome River- above weir	29	1	1	186	289	3	480
Nome River- below weir	186	2	4	2,047	6,228	181	8,462
Penny River	16	0	0	119	19	2	140
Sinuk River	25	0	79	107	319	24	529
Snake River	54	3	12	522	472	15	1,024
Solomon River	19	0	17	86	347	49	499
Nome Subdistrict Total [b]	**279**	**24**	**159**	**3,808**	**9,329**	**940**	**14,260**
Cape Woolley [c]	**2**	**0**	**12**	**3**	**37**	**2**	**54**
Marine Waters	18	111	31	347	3,150	168	3,807
Kachauik River	10	0	0	61	1,317	124	1,502
McKinley River	8	0	1	89	5	0	95
Chinik River	9	0	2	226	941	58	1,227
Fish River	49	21	4	669	6,996	281	7,971
Niukluk River- above tower	19	0	0	193	440	78	711
Niukluk River- below tower	10	4	0	175	1,821	13	2,013
Other Rivers and Creeks	5	0	0	0	0	0	0
Golovin Subdistrict Total [d]	**104**	**136**	**38**	**1,760**	**14,670**	**722**	**17,326**
Marine Waters	9	35	13	159	230	219	656
Kwiniuk River - above tower	17	21	0	167	1,473	31	1,692
Kwiniuk River - below tower	30	36	0	794	1,429	485	2,744
Tubutulik River	22	83	0	132	1,250	394	1,859
Iron Creek	13	1	0	505	775	114	1,395
Other Rivers and Creeks	8	3	0	12	59	24	98
Moses Point Subdistrict Total [e]	**50**	**179**	**13**	**1,769**	**5,216**	**1,267**	**8,444**
Marine Waters	64	70	3,005	847	4,185	2,068	10,175
Tuksuk Channel	11	6	1,295	85	620	1,016	3,022
Agiapuk River	5	0	40	0	11	912	963
American River	2	0	0	100	0	25	125
Kuzitrin River	3	0	0	0	0	0	0
Pilgrim River- above weir	45	9	1,435	1	53	197	1,695
Pilgrim River- below weir	80	17	4,121	21	47	116	4,322
Salmon Lake	0	0	0	0	0	0	0
Other Rivers and Creeks	4	0	44	7	23	19	93
Port Clarence District Total [f]	**197**	**102**	**9,940**	**1,061**	**4,939**	**4,353**	**20,395**
Total	**632**	**441**	**10,162**	**8,401**	**34,191**	**7,284**	**60,479**

[a] There were 7 locations where Tier I subsistence permits were issued in 2006 for northern Norton Sound: 1 - Nome Subdistrict; 2 - Cape Woolley; 3 - Golovin Subdistrict; 4 - Moses Point Subdistrict; 5 - Pilgrim River; 6 - Port Clarence District; and 7 - Salmon Lake. Permits fished include those permit holders who fished, but reported no harvest.

[b] There were 367 Nome Subdistrict permits issued and 361 were returned.

[c] There were 8 Cape Woolley permits issued and 7 were returned.

[d] There were 153 Golovin Subdistrict permits issued and 149 were returned.

[e] All 63 permits issued were returned.

[f] All 198 Pilgrim River permits issued were returned, 1 of 1 Salmon Lake permit issued was returned, and 145 of 146 Port Clarence permits issued were returned.

Table 3.–Salmon counts of Norton Sound rivers in 2006 and associated salmon escapement goal ranges (SEG, BEG, or OEG).

	Chinook Salmon				Chum Salmon			
Stream	**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.								
Agiapuk R.								
American R.							4,600	
Pilgrim R.	275				45,361			
Glacial L.								
Sinuk R.						4,000 - 6,200[b]	1,115	
Cripple R.							50	
Penny R.								
Snake R.	32				4,160	1,600 - 2,500 [c]	865	
Nome R.	43				5,678	2,900 - 4,300 [c]	394	
Flambeau R.						4,100 - 6,300 [b]	16,000	
Eldorado R.	41				42,105	6,000 - 9,200 [c]	2,355	
Bonanza R.			1			2,300 - 3,400 [b]	60	
Solomon R.						1,100 - 1,600 [b]	305	
Fish R.				**Combined**				
Boston Cr.				**100 - 250**				
Niukluk R.	39				29,199	30,000		**30,000**
Ophir Cr.								
Kwiniuk R.	195	300 - 550			39,519	11,500 - 23,000 [d]		
Tubutulik R.						9,200 - 18,400 [b, d]		
Ungalik R.								
Inglutalik R								
Pikmiktalik R	99				12,711			
Shaktoolik R.			150	400 - 800				
Unalakeet R.				**Combined**				**Combined**
Old Woman R.				**550 - 1,100**				**2,400 - 4,800**
North R.	906	1,200 - 2,600			5,385			

-continued-

Table 3.–Page 2 of 2.

Stream	Coho Salmon			Sockeye Salmon			Pink Salmon		
	Weir/ Tower Count	Aerial Survey Count [a]	Escapement Goal Range	Weir/ Tower Count	Aerial Survey Count [a]	Escapement Goal Range	Weir/ Tower Count	Escapement Goal Range	Aerial Survey Count [a]
Salmon L.					39,400	**Combined**			
Grand Central R.					2,380	**4,000 - 8,000**			
Pilgrim R.	973			52,323			17,701		
Glacial L.				6,849	5,810	800 - 1,600			
Sinuk R.		2,147							515,000
Cripple R.		411							165,850
Penny R.		132							59,515
Snake R.	4,776	2,069		302	2		74,028		61,550
Nome R.	8,308	3,650		188			578,555	13,000	441,500
Flambeau R.		350							8,800
Eldorado R.	55	523		1			222,348		156,500
Bonanza R.		1,301							268,500
Solomon R.									165,215
Fish R.									
Boston Cr.									
Niukluk R.	11,169	532	2,400-5,900				1,371,919	10,500	
Ophir Cr.		737							
Kwiniuk R.	22,341		650-1,300				1,347,090	8,400	
Tubutulik R.									
Ungalik R.									
Inglutalik R									
Pikmiktalik R	9,376						45,938		
Shaktoolik R.									
Unalakeet R.									
Old Woman R.									
North R.	9,835		550-1,100				2,169,890	25,000	

Note: Data not available for all streams.

[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 Alaska 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.

Table 4.–Commercial salmon set gillnet catches from Shaktoolik, Subdistrict 5, Norton Sound, 2006.

				Chinook			Chum			Coho		
Period	Date	Length of period (hrs)	Fishers	Catch	CPUE	Cumulative Catch	Catch	CPUE	Cumulative Catch	Catch	CPUE	Cumulative Catch
1	7/21-7/22	24	8	0	0.00	0	1,156	6.02	1,156	619	3.22	619
2	7/24-7/25	24	9	0	0.00	0	652	3.02	1,808	735	3.40	1,354
3	7/26-7/28	48	7	0	0.00	0	218	0.65	2,026	394	1.17	1,748
4	7/30-8/01	48	14	0	0.00	0	697	1.04	2,723	4,315	6.42	6,063
5	8/02-8/04	48	15	0	0.00	0	551	0.77	3,274	6,317	8.77	12,380
6	8/06-8/08	48	9	0	0.00	0	0	0.00	3,274	1,614	3.74	13,994
7	8/09-8/11	48	15	0	0.00	0	0	0.00	3,274	5,903	8.20	19,897
8	8/13-8/15	48	13	0	0.00	0	33	0.05	3,307	2,758	4.42	22,655
9	8/16-8/18	48	11	0	0.00	0	3	0.01	3,310	1,481	2.80	24,136
10	8/20-8/22	48	8	0	0.00	0	11	0.03	3,321	1,810	4.71	25,946
11	8/23-8/25	48	9	0	0.00	0	0	0.00	3,321	2,967	6.87	28,913
12	8/27-8/29	48	12	0	0.00	0	0	0.00	3,321	3,210	5.57	32,123
13	8/30-9/01	48	4	0	0.00	0	0	0.00	3,321	285	1.48	32,408
14	9/04-9/08	96	3	0	0.00	0	0	0.00	3,321	45	0.16	32,453
15	9/10-9/14	96	1	0	0.00	0	0	0.00	3,321	19	0.20	32,472
Total			22	0	0.00		3,321	0.20		32,472	1.92	

Table 5.–Commercial salmon set gillnet catches from Unalakleet, Subdistrict 6, Norton Sound, 2006.

				Chinook			Chum			Coho		
Period	Date	Length of period (hrs)	No. Fishers	Catch	CPUE	Cumulative Catch	Catch	CPUE	Cumulative Catch	Catch	CPUE	Cumulative Catch
1	7/21-7/22	24	18	0	0.00	0	362	0.84	362	2,115	4.90	2,115
2	7/24-7/25	24	22	0	0.00	0	1,121	2.12	1,483	2,744	5.20	4,859
3	7/26-7/28	48	19	0	0.00	0	1,138	1.25	2,621	3,879	4.25	8,738
4	7/30-8/01	48	29	0	0.00	0	903	0.65	3,524	6,861	4.93	15,599
5	8/02-8/04	48	28	1	0.00	1	550	0.41	4,074	11,008	8.19	26,607
6	8/06-8/08	48	27	0	0.00	1	625	0.48	4,699	10,360	7.99	36,967
7	8/09-8/11	48	31	0	0.00	1	694	0.47	5,393	10,252	6.89	47,219
8	8/13-8/15	48	30	0	0.00	1	292	0.20	5,685	9,849	6.84	57,068
9	8/16-8/18	48	24	3	0.00	4	184	0.16	5,869	5,545	4.81	62,613
10	8/20-8/22	48	26	1	0.00	5	307	0.25	6,176	9,177	7.35	71,790
11	8/23-8/25	48	27	2	0.00	7	165	0.13	6,341	8,840	6.82	80,630
12	8/27-8/29	48	29	4	0.00	11	132	0.09	6,473	7,056	5.07	87,686
13	8/30-9/01	48	22	1	0.00	12	85	0.08	6,558	4,474	4.24	92,160
14	9/04-9/08	96	23	0	0.00	12	87	0.04	6,645	3,662	1.66	95,822
15	9/10-9/14	96	19	0	0.00	12	76	0.04	6,721	2,514	1.38	98,336
Total			40	101	0.00		6,721	0.22		98,336	3.20	

Table 6.–Salmon catch and CPUE by date at ADF&G test net, Port Clarence District, 2006.

	Catch (number of fish)					CPUE index [a]	
Date	Sockeye	Chum	Chinook	Pink	Dolly Varden	Sockeye	Chum
7/3	76	102	0	10	0	13.8	18.5
7/7	280	99	2	11	2	40.1	14.2
7/11	91	71	1	7	0	17.0	13.3
7/17	25	131	3	23	0	6.3	32.8
7/21	48	99	0	21	0	11.3	23.3
Totals	520	502	6	72	2	88.5	102.1
Averages	104	100	1	14	0	19.9	19.3

[a] CPUE index was calculated as (c/(l*t))*60 minutes*100 fathoms, where c is catch in number, l is length of net in fathoms, and t is fishing time in minutes.

Table 7.–Kotzebue District commercial catches of chum salmon, Chinook salmon, and Dolly Varden by week, 2006.

	No. of	Chum			Chinook [a]			Dolly Varden [a]		
Week	Fishers	Number	Pounds	Avg. Wt.	Number	Pounds	Avg. Wt.	Number	Pounds	Avg. Wt.
7/10-7/16	8	3,705	27,130	7.3	0	0	0.0	0	0	0.0
7/17-7/23	24	22,047	168,921	7.7	0	0	0.0	0	0	0.0
7/24-7/30	33	24,193	185,406	7.7	5	0	0.0	0	0	0.0
7/31-8/06	25	14,391	109,066	7.6	0	0	0.0	0	0	0.0
8/07-8/13	29	29,069	221,382	7.6	0	0	0.0	0	0	0.0
8/14-8/20	26	22,108	163,092	7.4	1	0	0.0	16	0	0.0
8/21-8/27	31	22,448	165,026	7.4	3	0	0.0	252	0	0.0
Total	42	137,961	1,040,023	7.5	9	0	0.0	268	0	0.0

[a] Chinook salmon and Dolly Varden weight not available as these species were not kept or sold for commercial use in 2006. Catch numbers reflect Chinook and Dolly Varden retained for personal use.

Table 8.–Kobuk River chum salmon drift test fish daily and cumulative CPUE, 1993–2006.

	1993		1994		1995		1996		1997		1998		1999	
Date	**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		
11-Jul							98.38	126.15	5.31	11.16	0.85	6.07	0.00	0.00
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
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
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
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
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
17-Jul	17.27	111.51	[a]	16.61	0.00	6.50	55.49	456.57	15.17	57.70	5.07	65.96	4.26	4.26
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
19-Jul	10.71	122.22	12.40	36.17	9.89	18.20	54.74	601.17	17.98	91.80	[a]	74.98	5.89	18.63
20-Jul	2.76	124.98	3.65	39.82	16.30	34.50	63.70	664.87	[a]	91.80	18.66	93.64	5.11	23.74
21-Jul	3.20	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
22-Jul	5.52	133.70	3.56	50.68	21.18	94.22	50.97	767.96	13.28	123.61	0.00	105.51	11.91	59.40
23-Jul	27.15	160.85	16.49	67.17	50.58	144.80	91.36	859.32	10.79	134.40	29.58	135.09	6.09	65.49
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
25-Jul	[a]	169.91	14.38	81.55	40.16	213.42	76.80	1028.01	21.57	178.83	24.68	187.10	28.73	119.17
26-Jul	15.22	185.13	47.65	129.20	35.15	248.57	55.68	1083.69	14.66	193.49	[a]	187.10	39.72	158.89
27-Jul	8.06	193.19	40.66	169.86	63.94	312.51	29.79	1113.48	18.46	211.95	23.91	211.01	80.39	239.28
28-Jul	16.36	209.55	57.83	227.69	62.49	375.00	49.06	1162.54	30.53	242.48	51.91	262.92	[a]	239.28
29-Jul	0.93	210.48	33.62	261.31	46.11	421.11	70.13	1232.67	28.13	270.61	34.16	297.08	55.00	294.28
30-Jul	0.92	211.40	69.21	330.52	57.86	478.97	35.29	1267.96	22.33	292.94	24.59	321.67	49.66	343.94
31-Jul	12.58	223.98	[a]	330.52	29.89	508.86	82.27	1350.23	32.57	325.51	15.69	337.36	160.53	504.47
1-Aug	[a]	223.98	82.16	412.68	72.91	581.77	167.67	1517.90	41.41	366.92	25.44	362.80	145.02	649.49
2-Aug	6.74	230.72	65.12	477.80	48.71	630.48	62.02	1579.92	22.41	389.33	[a]	362.80	41.67	691.16
3-Aug	54.49	285.21	71.79	549.59	48.40	678.88	48.70	1628.62	35.21	424.54	26.67	389.47	33.19	724.35
4-Aug	44.23	329.44	108.98	658.57	53.00	731.88	65.93	1694.55	26.67	451.21	42.35	431.82	74.23	798.58
5-Aug	89.30	418.74	59.74	718.31	49.95	781.83	60.33	1754.88	24.47	475.68	8.57	440.39	108.04	906.62
6-Aug	18.60	437.34	102.56	820.87	[a]	781.83	80.47	1835.35	42.25	517.93	6.00	446.39	82.79	989.41
7-Aug	20.52	457.86	[a]	820.87	46.39	828.22	90.99	1926.34	36.00	553.93	5.11	451.50	82.73	1072.14
8-Aug		457.86	62.75	883.62	44.02	872.24	146.94	2073.28	45.07	599.00	16.40	467.90	[a]	1072.14
9-Aug	1.84	459.70	96.86	980.48	68.22	940.46	106.11	2179.39	55.14	654.14	17.20	485.10	55.58	1127.72
10-Aug	12.63	472.33	45.83	1026.31	56.33	996.79	56.95	2236.34	[a]	654.14	9.46	494.56	44.73	1172.45
11-Aug	18.11	490.44	57.02	1083.33	37.95	1034.74	[a]	2236.34	43.45	697.59	10.29	504.85	58.13	1230.58
12-Aug	3.74	**494.18**	90.54	1173.87	63.92	1098.66	72.29	2308.63	37.36	734.95	19.44	524.29	48.50	1279.08
13-Aug			11.36	1185.23	[a]	1098.66	114.63	2423.26	45.93	780.88	10.21	534.50	78.37	**1357.45**
14-Aug			[a]	1185.23	29.35	1128.01	158.13	**2581.39**	16.01	**796.89**	3.85	538.35		
15-Aug			5.13	1190.36	25.26	1153.27					0.00	**538.35**		
16-Aug			16.23	**1206.59**	35.04	**1188.31**								

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Table 8.–Page 2 of 2.

	2000		2001		2002		2003		2004		2005		2006	
Date	**Daily**	**Cum.**	**Daily**	**Cum.**	**Daily**	**Cum.**	**Daily**	**Cum.**	**Daily**	**Cum.**	**Daily**	**Cum.**	**Daily**	**Cum.**
10-Jul	2.50	4.61	8.39	24.97	6.83	35.40	11.21	11.21	19.93	19.93	9.14	9.14	4.75	5.53
11-Jul	3.44	8.05	20.07	45.04	22.86	58.26	3.76	14.97	12.00	31.93	0.00	9.14	0.79	6.32
12-Jul	3.45	11.50	12.63	57.67	31.54	89.80	2.20	17.17	6.10	38.03	0.00	9.14	9.32	15.64
13-Jul	2.54	14.04	17.32	74.99	21.67	111.47	5.19	22.36	11.89	49.92	1.55	10.69	1.57	17.21
14-Jul	8.57	22.61	45.57	120.56	28.05	139.52	6.06	28.42	11.32	61.24	3.79	14.48	5.44	22.65
15-Jul	0.87	23.48	38.86	159.42	14.27	153.79	4.49	32.91	6.15	67.39	11.46	25.94	9.38	32.03
16-Jul	3.38	26.86	32.80	192.22	35.27	189.06	5.33	38.24	12.75	80.14	10.20	36.14	9.41	41.44
17-Jul	12.77	39.63	48.77	240.99	36.50	225.56	0.00	38.24	6.15	86.29	35.34	71.48	7.04	48.48
18-Jul	3.58	43.21	36.98	277.97	24.41	249.97	8.83	47.07	1.53	87.82	15.24	86.72	1.57	50.05
19-Jul	19.51	62.72	67.08	345.05	30.30	280.27	5.37	52.44	1.53	89.35	33.76	120.48	2.38	52.43
20-Jul	14.57	77.29	26.05	371.10	44.91	325.18	15.14	67.58	17.30	106.65	20.44	140.92	a	52.43
21-Jul	27.69	104.98	29.51	400.61	36.30	361.48	2.23	69.81	6.10	112.75	42.18	183.10	2.40	54.83
22-Jul	41.00	145.98	108.97	509.58	33.85	395.33	2.20	72.01	4.46	117.21	24.91	208.01	4.80	59.63
23-Jul	16.29	162.27	50.79	560.37	40.00	435.33	5.93	77.94	10.57	127.78	21.55	229.56	2.40	62.03
24-Jul	14.62	176.89	58.96	619.33	62.76	498.09	11.01	88.95	9.87	137.65	19.38	248.94	3.95	65.98
25-Jul	22.98	199.87	80.59	699.92	45.64	543.73	17.30	106.25	12.87	150.52	20.64	269.58	9.54	75.52
26-Jul	40.28	240.15	94.06	793.98	34.29	578.02	41.36	147.61	12.95	163.47	25.58	295.16	6.34	81.86
27-Jul	41.52	281.67	95.06	889.04	50.41	628.43	29.65	177.26	14.62	178.09	34.94	330.10	8.77	90.63
28-Jul	62.34	344.01	58.24	947.28	a	628.43	23.41	200.67	29.82	207.91	7.79	337.89	4.80	95.43
29-Jul	96.00	440.01	54.33	1001.61	25.74	654.17	37.89	238.56	13.80	221.71	33.00	370.89	17.92	113.35
30-Jul	138.20	578.21	35.36	1036.97	28.90	683.07	53.63	292.19	15.80	237.51	37.27	408.16	10.30	123.65
31-Jul	85.87	664.08	38.63	1075.60	18.33	701.40	48.54	340.73	18.00	255.51	30.72	438.88	5.58	129.23
1-Aug	101.16	765.24	61.50	1137.10	27.85	729.25	17.94	358.67	19.75	275.26	42.12	481.00	0.00	129.23
2-Aug	64.37	829.61	16.55	1153.65	19.93	749.18	38.62	397.29	20.84	296.10	60.00	541.00	8.71	137.94
3-Aug	44.32	873.93	44.21	1197.86	25.31	774.49	15.41	412.70	43.09	339.19	18.89	559.89	7.20	145.14
4-Aug	77.14	951.07	30.71	1228.57	a	774.49	20.12	432.82	66.08	405.27	6.15	566.04	15.05	160.19
5-Aug	67.26	1018.33	43.64	1272.21	12.86	787.35	29.14	461.96	93.54	498.81	26.75	592.79	11.84	172.03
6-Aug	38.92	1057.25	30.00	1302.21	23.05	810.40	31.21	493.17	71.20	570.01	14.07	606.86	21.25	193.28
7-Aug	37.50	1094.75	26.31	1328.52	10.18	820.58	62.81	555.98	56.59	626.60	40.75	647.61	24.46	217.74
8-Aug	93.37	1188.12	34.40	1362.92	11.96	832.54	39.29	595.27	41.18	667.78	57.37	704.98	22.64	240.38
9-Aug	81.50	1269.62	23.01	1385.93	8.60	841.14	27.24	622.51	45.54	713.32	74.89	779.87	23.69	264.07
10-Aug	113.87	1383.49	54.88	1440.81	15.27	856.41	29.18	651.69	27.13	740.45	68.57	848.44	12.00	276.07
11-Aug	50.57	1434.06	73.64	1514.45	11.10	867.51	40.34	692.03	56.70	797.15	95.28	943.72	a	276.07
12-Aug	24.86	1458.92	47.23	1561.68	7.66	**875.17**	17.04	709.07	57.57	**854.72**	75.35	1019.07	a	276.07
13-Aug	14.57	1473.49	13.04	**1574.72**			39.79	**748.86**			61.12	1080.19	a	276.07
14-Aug	7.83	**1481.32**									97.44	1177.63	15.60	291.67
15-Aug											28.92	**1206.55**	59.23	350.9
16-Aug													114.97	465.87
17-Aug													82.26	548.13
18-Aug													101.18	649.31
19-Aug													93.63	**742.94**

Note: Days with no data indicate days when the project was not operational.

[a] Regular day off.

Table 9.–Sac roe herring harvest and effort by date and subdistrict, Norton Sound District, 2006.

	Subdistrict 1 (333-70)			Subdistrict 3 (333-74)			Combined Totals		
Date	# of Fishers	Sac Roe (tons)	Roe %	# of Fishers	Sac Roe (tons)	Roe %	# of Fishers	Sac Roe (tons)	Average Roe %
6/08				28	50.3	9.3	28	50.3	9.3
6/09	16	77.4	8.1	22	225.0	10.5	38	302.4	9.9
6/10	14	28.7	8.6				14	28.7	8.6
6/11	12	85.1	9.5	21	204.8	11.4	33	289.9	10.8
Total	18	191.2	8.7	30	480.1	10.7	41	671.3 [a]	
								Roe recovery	10.2%

Note: Data not available for all dates.

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

Table 10.–Daily observed peak biomass estimates of Pacific herring, Norton Sound District, 2006.

	Flight	Observer	Survey		Spawn		Estimated Biomass (ST) By Index Area							
Date	No.	Initials [a]	Hours	Rating [b]	No.	Length (mi)	KLK	UNK	CDB	NTB	ELM	GOL	NOM	TOTAL
6/03	1	SMK	3.0	4	0	0.0	0.0	0.0	0.0					0.0
6/05	2	SMK	3.0	3	0	0.0	0.0	0.0	0.0					0.0
6/07	3	SMK	1.5	4	0	0.0	98.9	70.8	0.0					169.7
6/10	4	JM	1.5	4	155	11.8	2,506.5	1,255.8	0.0					3,762.3
6/11	5	SMK	1.0	4	26	2.0	0.0	1,128.1	3,112.0					4,240.1
6/12	6	SMK	2.5	4	447	34.0	10,825.3	2,237.1	6,450.2					19,512.6
6/15	7	SMK	2.5	4	20	1.5	1,928.5	378.8	21,631.9					23,939.2
Total	7		15.0	4	648.0	49.3							Survey	23,939.2
													Total Harvest	671.3
													Biomass [c]	24,610.5
													Exploit%	2.7%

Note: Data not available for all index areas.

[a] SMK = Scott Kent, JM = Jim Menard.

[b] Survey rating ranged from 1 = excellent to 5 = poor.

[c] Biomass includes combined total harvest, waste, and peak survey estimate.

Table 11.–Commercial harvest of red king crab from Norton Sound Section by statistical area, Norton Sound District, 2006.

Statistical Area	Number [a]	Pounds	Pots Pulled	CPUE	Average Weight (lbs)
616331	797	2,357	34	23.4	3.0
626331	473	1,415	28	16.9	3.0
626401	39,057	118,202	2,353	16.6	3.0
636330	8,816	26,680	325	27.1	3.0
636401	75,023	224,531	3,686	20.4	3.0
646330	879	2,629	119	7.4	3.0
646401	544	1,660	103	5.3	3.1
656300	98	284	19	5.2	2.9
656330	5,880	17,752	530	11.1	3.0
656401	9,629	28,434	1,025	9.4	3.0
666300	281	807	20	14.1	2.9
666330	592	1,721	52	11.4	2.9
666401	6,277	18,245	275	22.8	2.9
666402	1,348	5,041	75	18.0	3.7
666431	223	600	15	14.9	2.7
676400	336	1,050	23	14.6	3.1
686431	105	340	13	8.1	3.2
Total	150,358	451,748	8,695	17.3	3.0

Note: Data for summer fishery only.

[a] Includes 11,227 crab (32,557 lbs) from the CDQ fishery.

Table 12.–Daily catch for the CDQ summer commercial king crab harvest, Norton Sound Section, Eastern Bering Sea, June 15–28, 2006.

Date [a]	Landings	Number of Crab	Crab Harvested (lbs)	Cumulative Total (lbs)	No. of Pots Pulled	Average Weight (lbs)	CPUE
6/18	2	116	314	314	34	2.7	3.4
6/19	2	1,069	3,074	3,388	71	2.9	15.1
6/21	3	1,489	4,225	7,613	101	2.8	14.7
6/22	2	1,406	4,125	11,738	62	2.9	22.7
6/24	5	1,954	5,637	17,375	168	2.9	11.6
6/25	1	424	1,258	18,633	20	3.0	21.2
6/26	7	3,623	10,564	29,197	253	2.9	14.3
6/27	2	1,036	3,034	32,231	60	2.9	17.3
6/28	1	110	326	32,557	40	3.0	2.8
Total	25	11,227	32,557		809	2.9	13.9

Source: Fish ticket data.

[a] The CDQ fishery closed by regulation 6/28, and the last delivery was made 6/28.

Table 13.–Length frequencies by shell age of all legal male red king crab sampled during the 2006 Norton Sound summer open access and CDQ commercial fisheries.

Carapace	Legal New Shell Males		Legal Old Shell Males		Total Legal Males	
Length (mm)	Number	Percent	Number	Percent	Number	Percent
101	2	0.0	0	0.0	2	0.0
102	1	0.0	0	0.0	1	0.0
103	11	0.2	2	0.0	13	0.2
104	15	0.2	3	0.0	18	0.3
105	33	0.5	4	0.1	37	0.6
106	40	0.6	16	0.2	56	0.8
107	67	1.0	14	0.2	81	1.2
108	95	1.4	26	0.4	121	1.8
109	115	1.7	41	0.6	156	2.3
110	166	2.5	46	0.7	212	3.2
111	190	2.8	42	0.6	232	3.5
112	245	3.7	63	0.9	308	4.6
113	256	3.8	79	1.2	335	5.0
114	238	3.5	69	1.0	307	4.6
115	206	3.1	79	1.2	285	4.2
116	250	3.7	111	1.7	361	5.4
117	220	3.3	88	1.3	308	4.6
118	266	4.0	93	1.4	359	5.4
119	240	3.6	87	1.3	327	4.9
120	232	3.5	110	1.6	342	5.1
121	251	3.7	94	1.4	345	5.1
122	234	3.5	93	1.4	327	4.9
123	200	3.0	98	1.5	298	4.4
124	199	3.0	82	1.2	281	4.2
125	168	2.5	46	0.7	214	3.2
126	166	2.5	69	1.0	235	3.5
127	147	2.2	61	0.9	208	3.1
128	117	1.7	61	0.9	178	2.7
129	111	1.7	34	0.5	145	2.2
130	84	1.3	33	0.5	117	1.7
131	74	1.1	28	0.4	102	1.5
132	59	0.9	30	0.4	89	1.3
133	43	0.6	20	0.3	63	0.9
134	40	0.6	13	0.2	53	0.8
135	31	0.5	16	0.2	47	0.7
136	23	0.3	7	0.1	30	0.4

-continued-

Table 13.–Page 2 of 2.

Carapace	Legal New Shell Males		Legal Old Shell Males		Total Legal Males	
Length (mm)	Number	Percent	Number	Percent	Number	Percent
137	18	0.3	8	0.1	26	0.4
138	16	0.2	6	0.1	22	0.3
139	11	0.2	4	0.1	15	0.2
140	8	0.1	3	0.0	11	0.2
141	5	0.1	5	0.1	10	0.1
142	3	0.0	0	0.0	3	0.0
143	1	0.0	3	0.0	4	0.1
144	1	0.0	4	0.1	5	0.1
145	2	0.0	1	0.0	3	0.0
146	2	0.0	1	0.0	3	0.0
147	0	0.0	2	0.0	2	0.0
148	0	0.0	0	0.0	0	0.0
149	1	0.0	0	0.0	1	0.0
150	0	0.0	0	0.0	0	0.0
151	0	0.0	0	0.0	0	0.0
152	0	0.0	0	0.0	0	0.0
153	1	0.0	1	0.0	2	0.0
154	1	0.0	0	0.0	1	0.0
155	1	0.0	0	0.0	1	0.0
156	0	0.0	0	0.0	0	0.0
157	0	0.0	0	0.0	0	0.0
158	0	0.0	0	0.0	0	0.0
159	1	0.0	0	0.0	1	0.0
160	0	0.0	0	0.0	0	0.0
161	0	0.0	0	0.0	0	0.0
162	0	0.0	0	0.0	0	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	0	0.0	0	0.0	0	0.0
167	0	0.0	1	0.0	1	0.0
168	0	0.0	1	0.0	1	0.0
169	0	0.0	1	0.0	1	0.0
170	1	0.0	0	0.0	1	0.0
171	0	0.0	0	0.0	0	0.0
Totals	4,908	73.2	1799	26.8	6,707	100.0
Average Lengths	119.2		120.3		119.5	

Table 14.–Winter 2005–2006 subsistence red king crab catches and effort by gear type, Norton Sound District.

Gear Type	No. Permits Fished [a]	Total Caught	Males Kept	Females Kept	Total Kept	Average Harvest/Fisher
Pots	63	2,070	1,185	41	1,226	19
Handlines	6	13	13	0	13	2
Totals	69	2,083	1,198	41	1,239	18

[a] Number of permits given out was 98, and number of permits returned was 97.

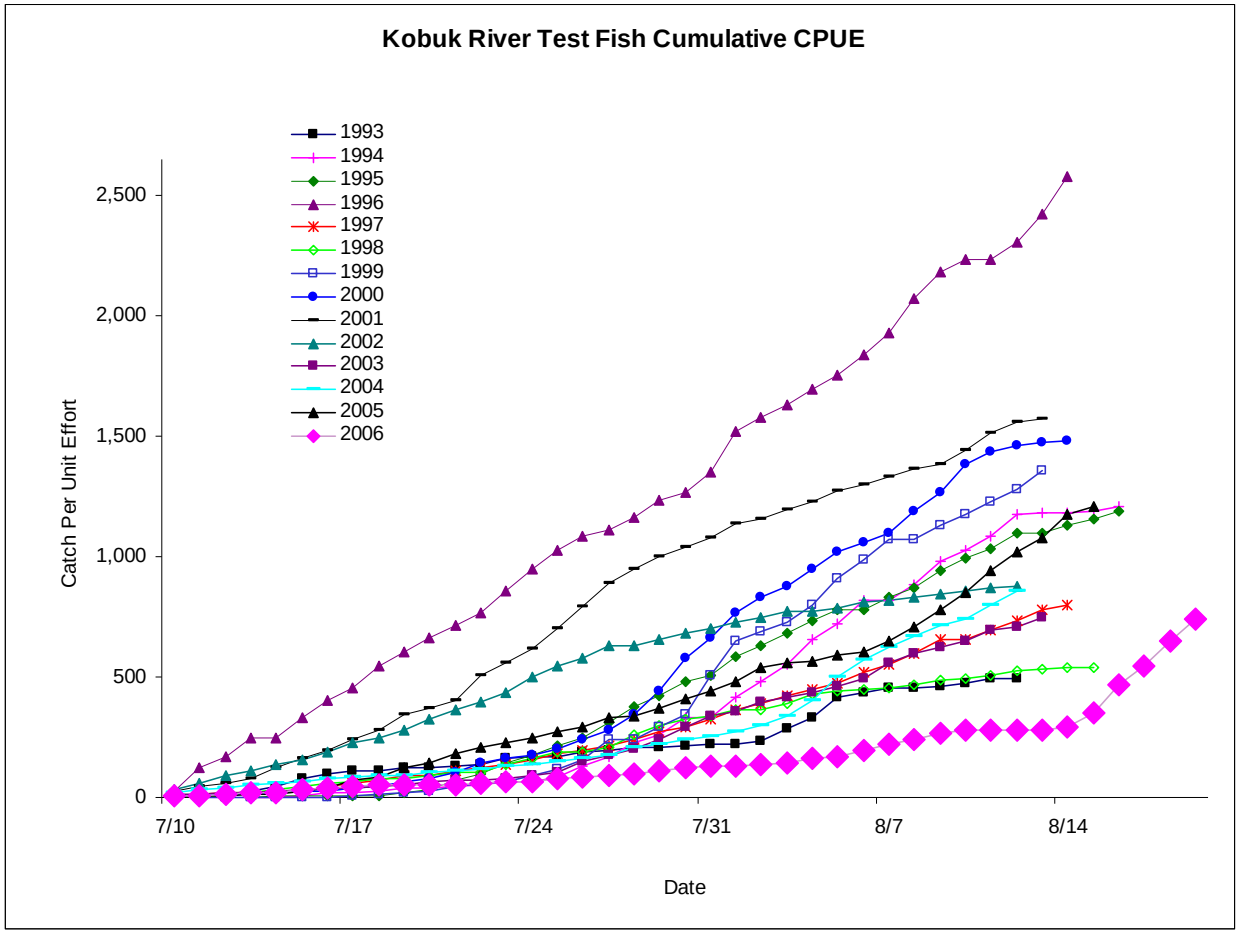


Figure 9.–Kobuk River chum salmon drift test fish cumulative Catch Per Unit Effort (CPUE), 1993–2006.

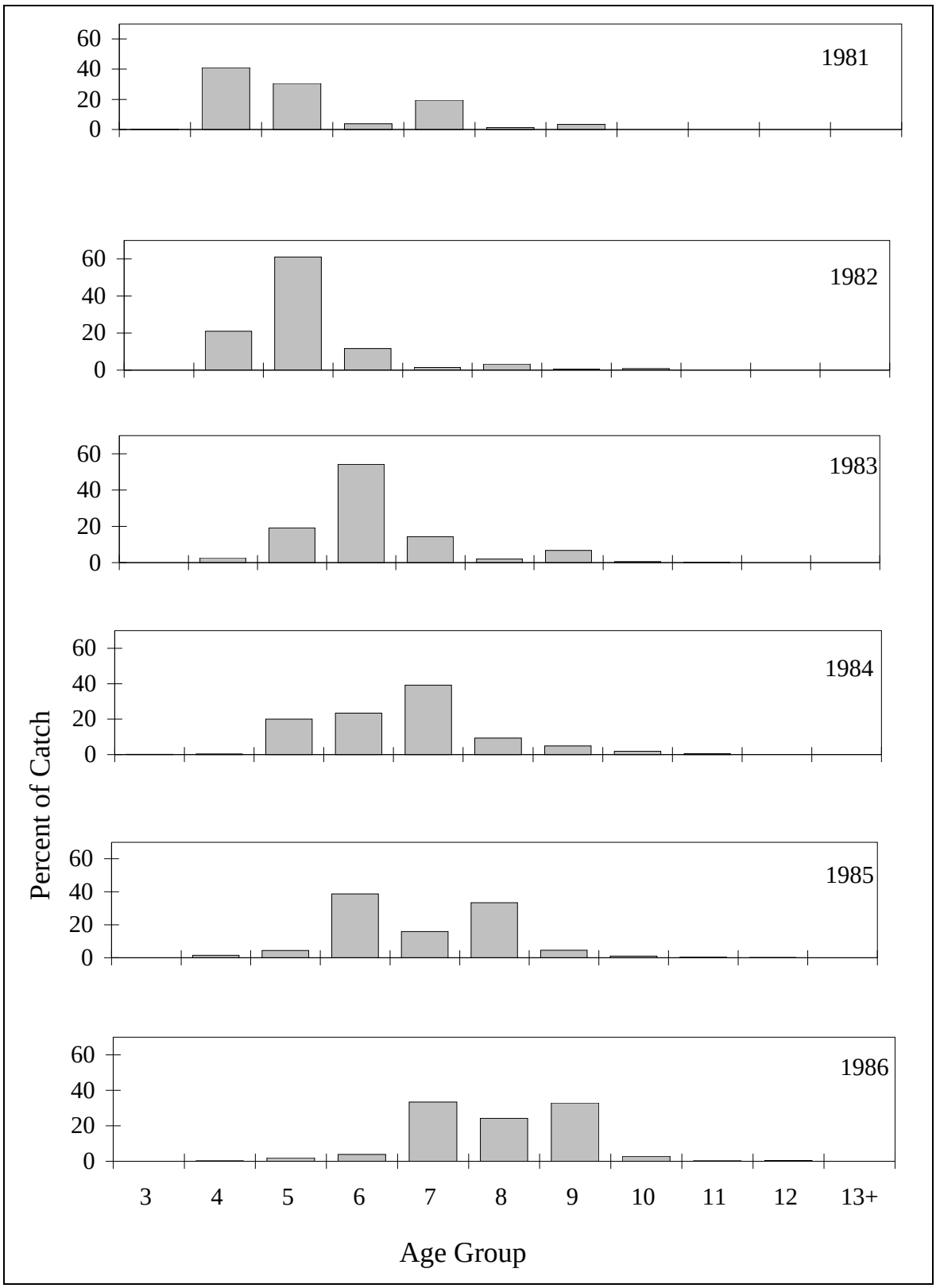
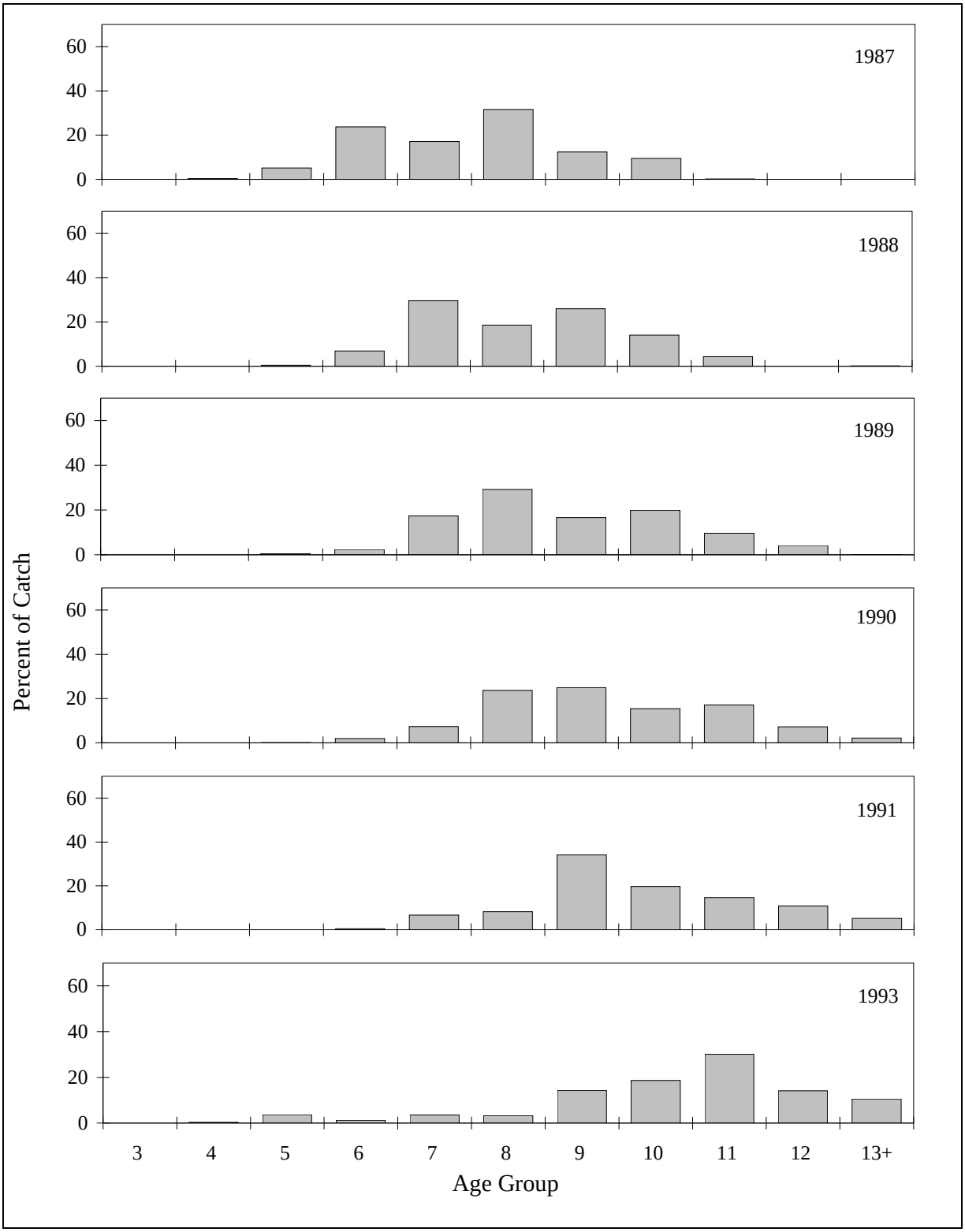


Figure 10.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 1981–1986.



Note: No commercial fishing occurred in 1982.

Figure 11.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 1987–1993.

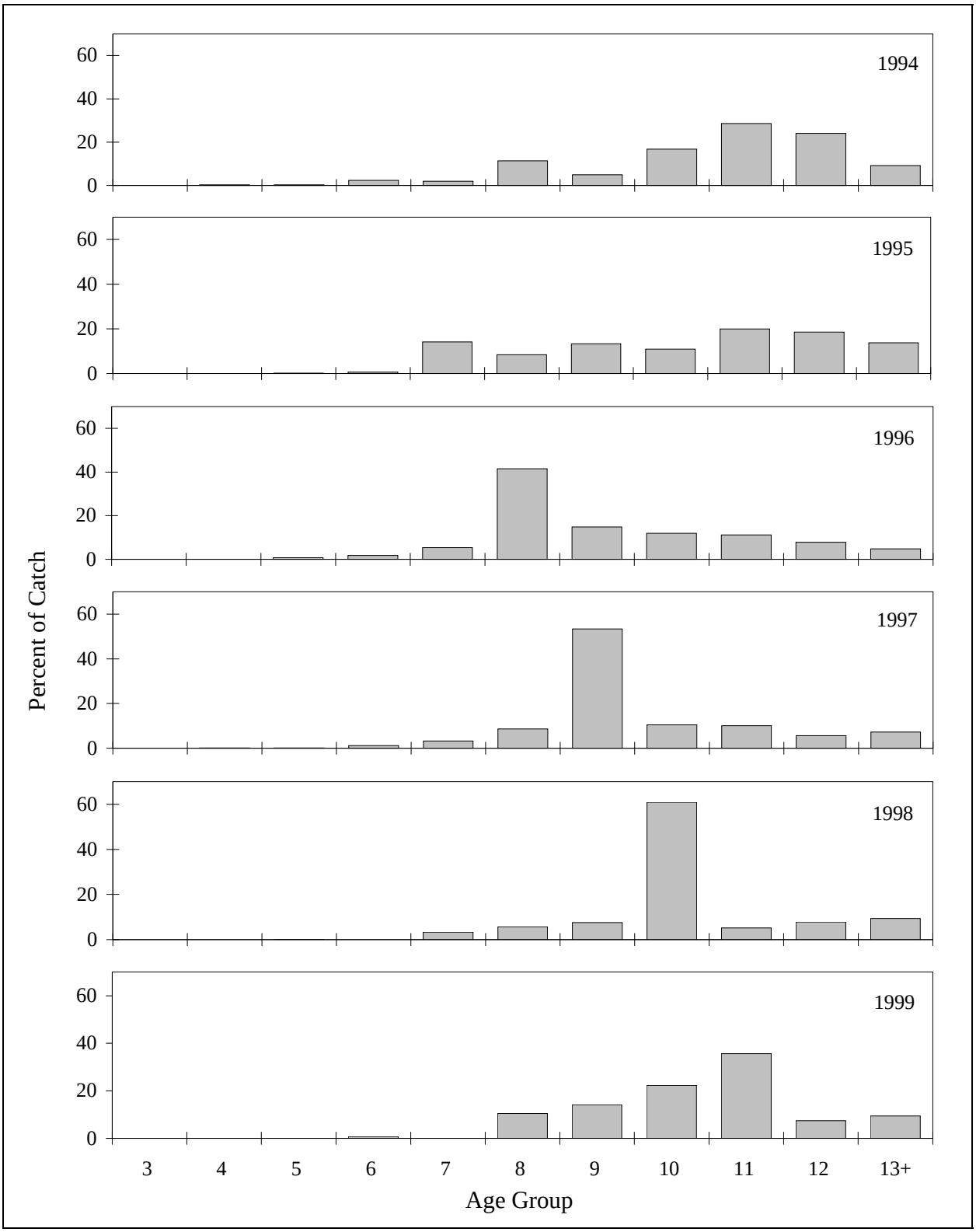
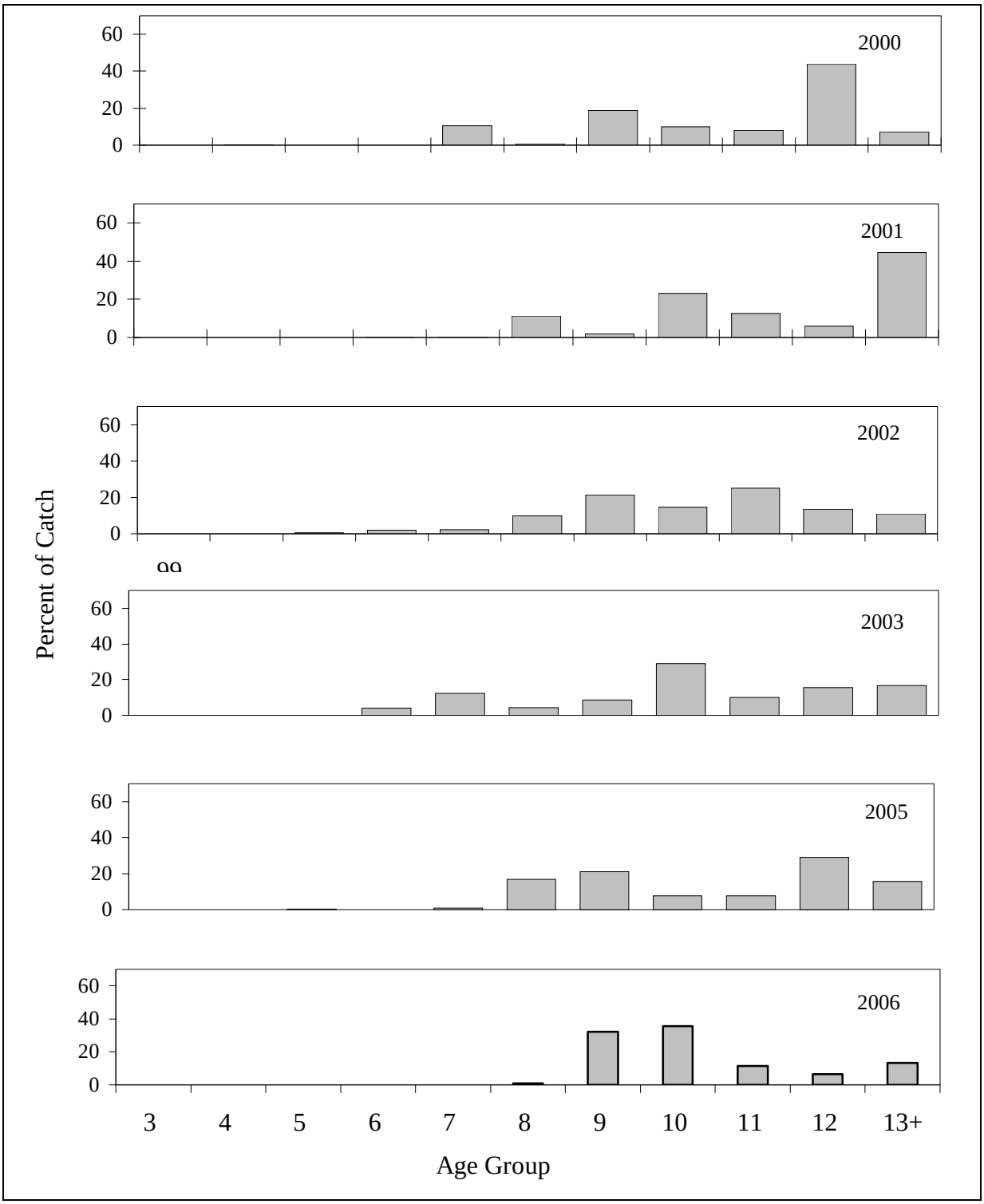


Figure 12.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 1994–1999.



Note: No commercial catch from beach seine gear in 2001–2006. No fishery in 2004.

Figure 13.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 2000–2006.

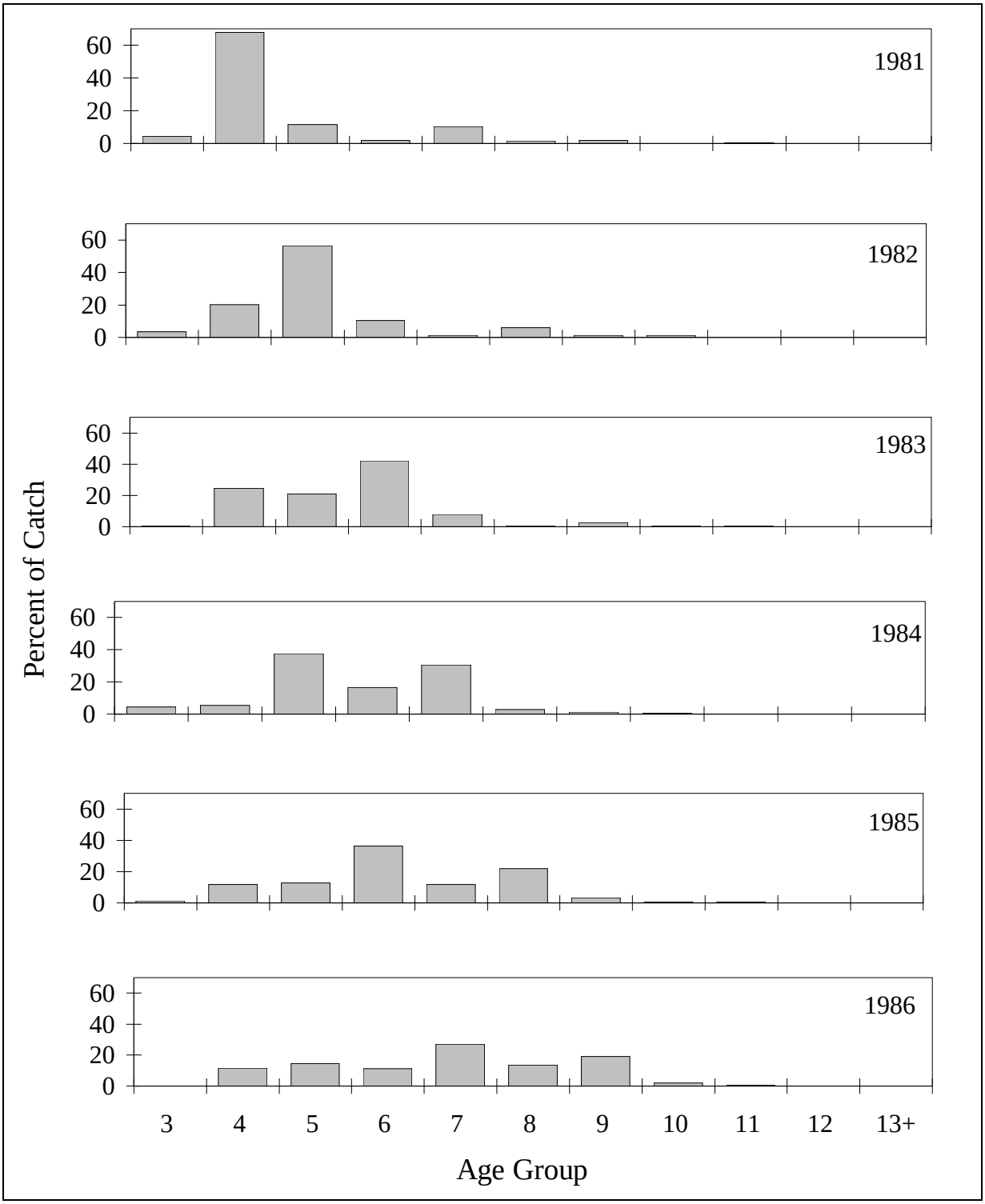


Figure 14.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1981–1986.

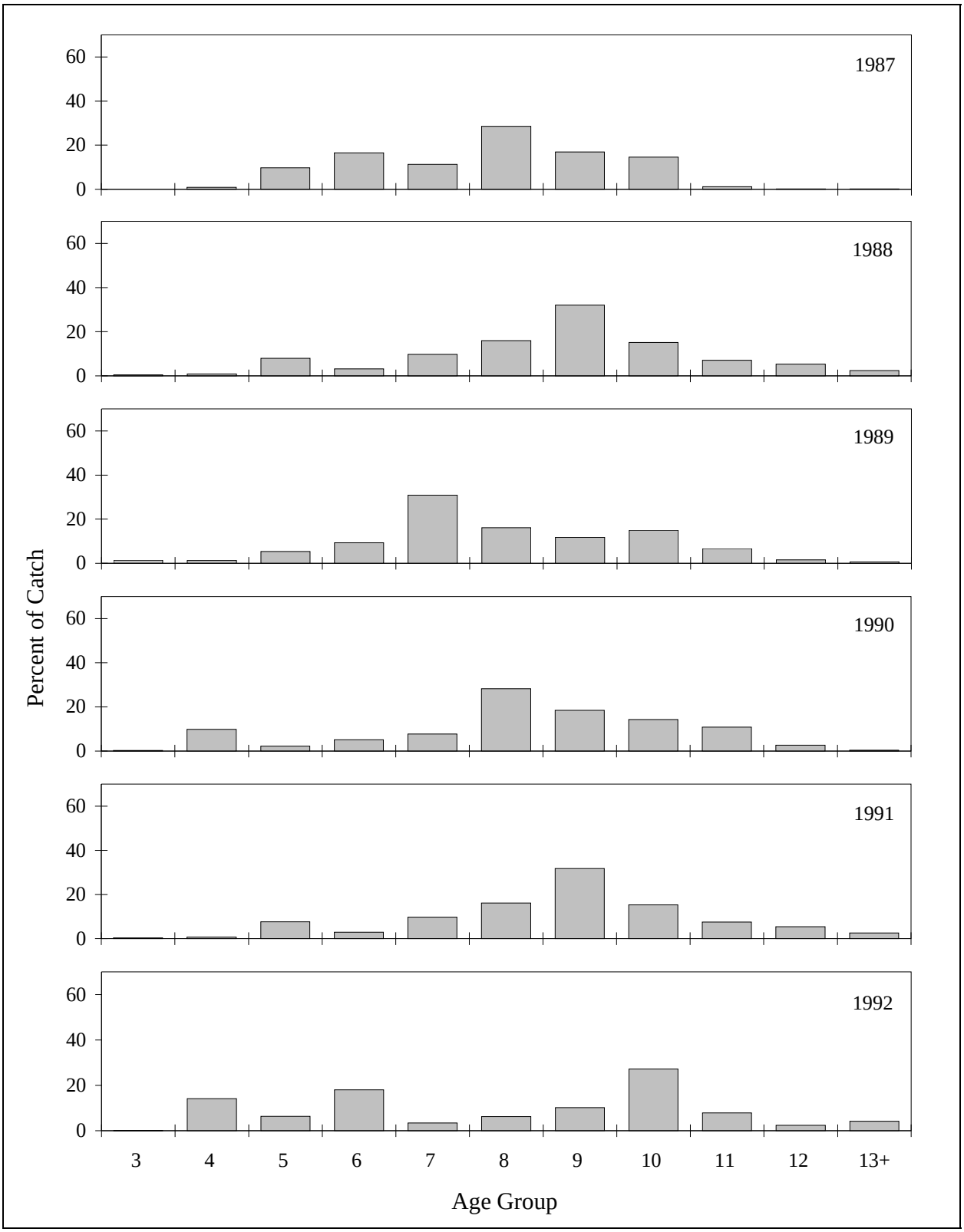


Figure 15.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1987–1992.

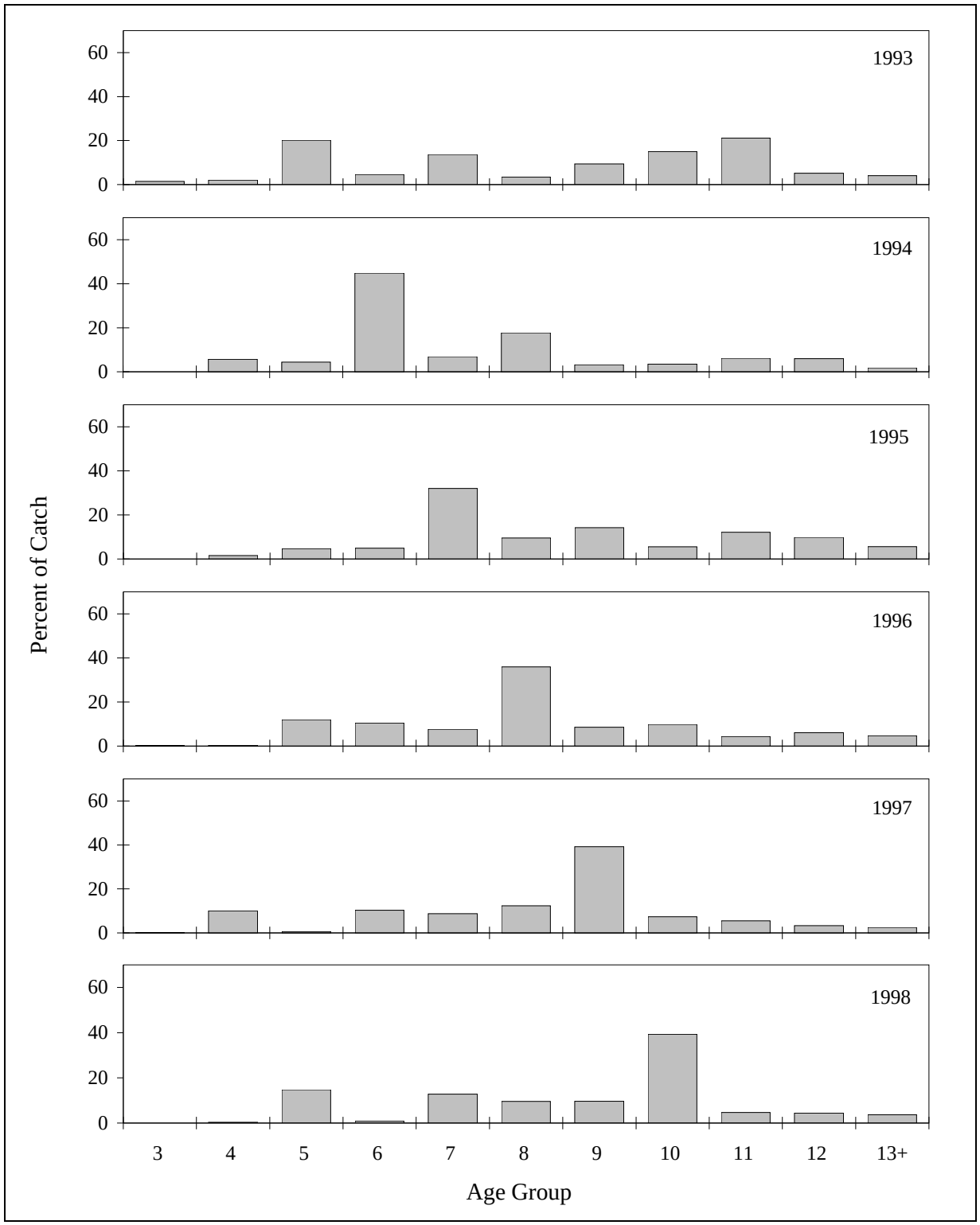


Figure 16.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1993–1998.

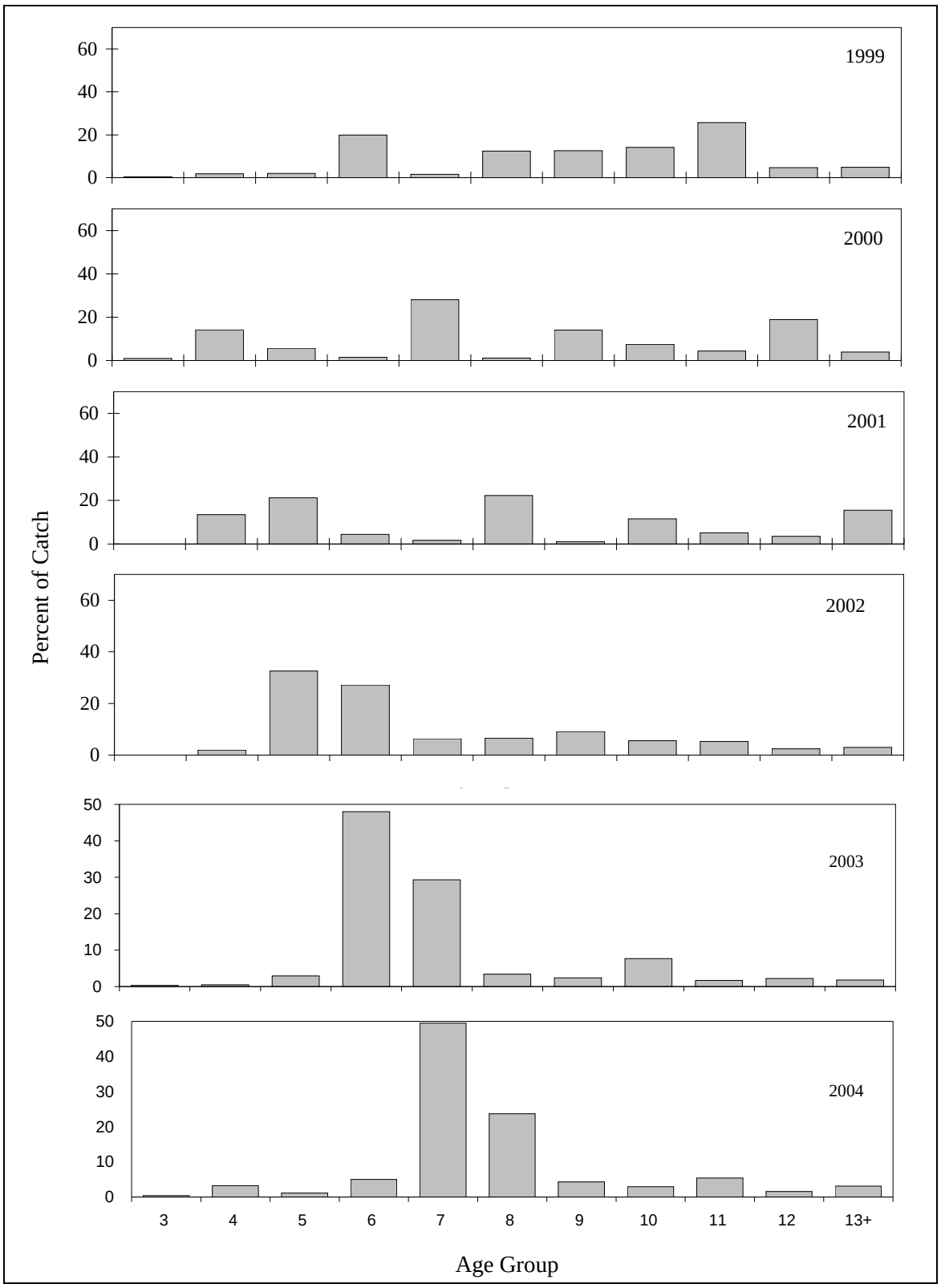


Figure 17.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1999–2004.

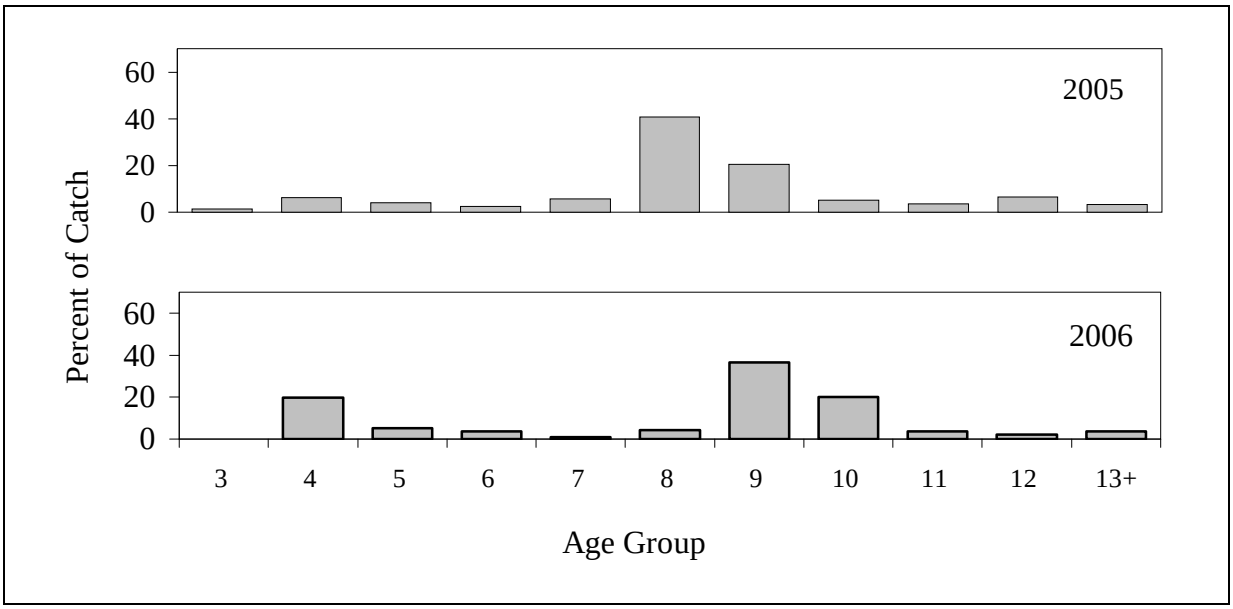


Figure 18.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 2005–2006.

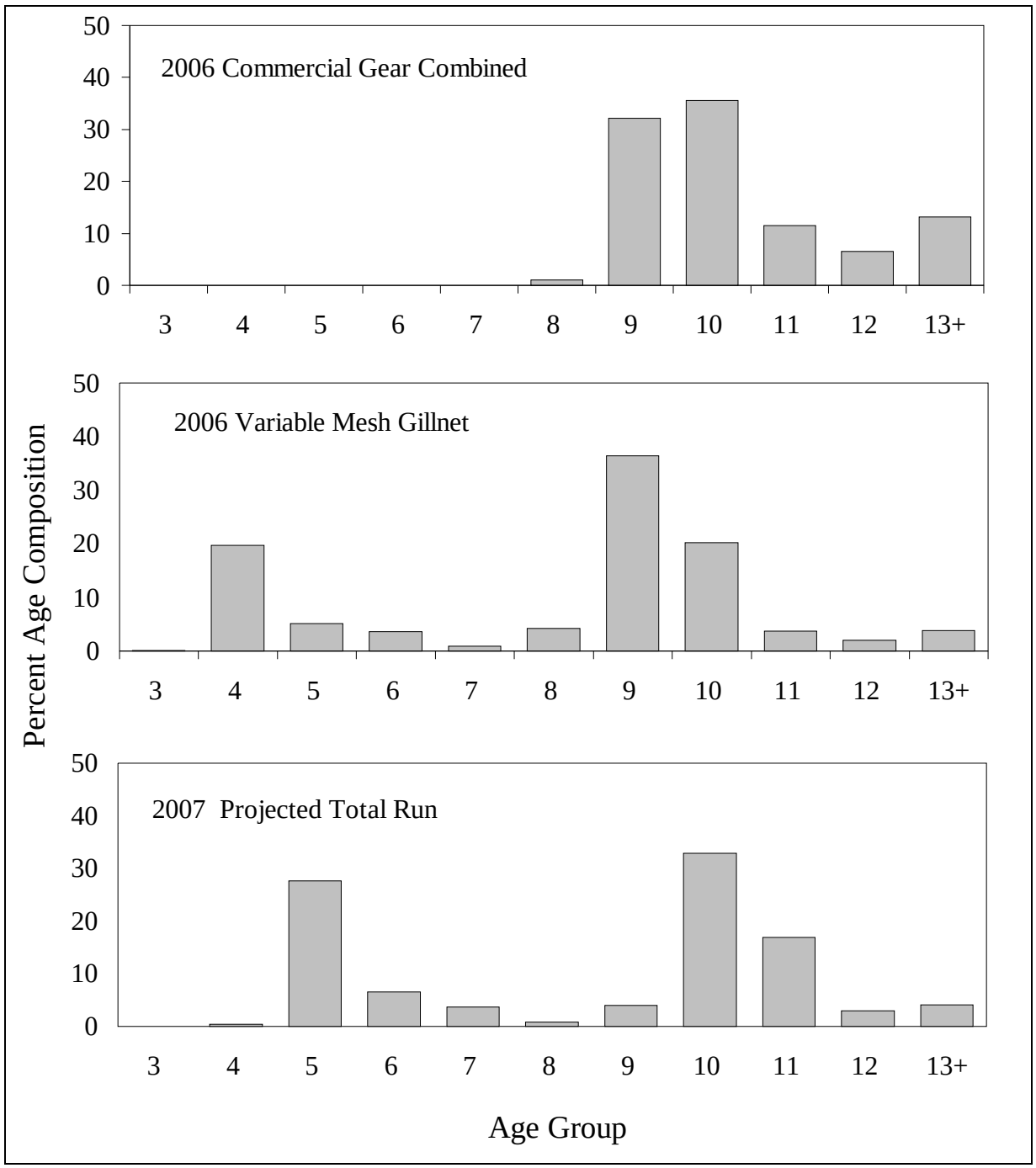
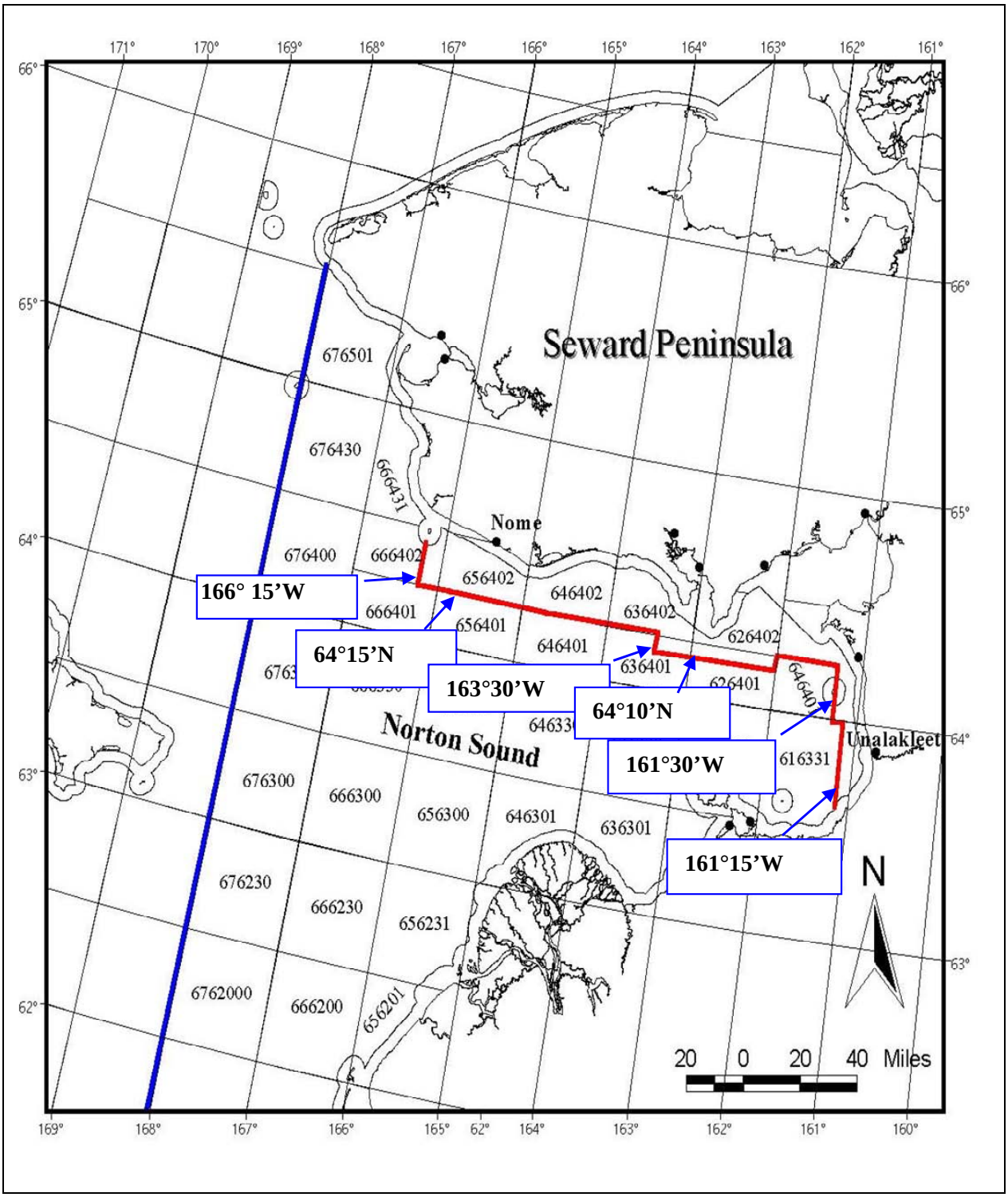


Figure 19.–Norton Sound Pacific herring age composition comparison of the 2006 commercial gillnet gear, 2006 variable mesh gear, and the projected age composition of the 2007 return.



Note: Line drawn around the coastline delineates the 3-mile state waters zone, and outer line around St. Lawrence Island shows the 10-mile closure zone.

Figure 20.–Closed water regulations in effect for the Norton Sound summer commercial crab fishery.

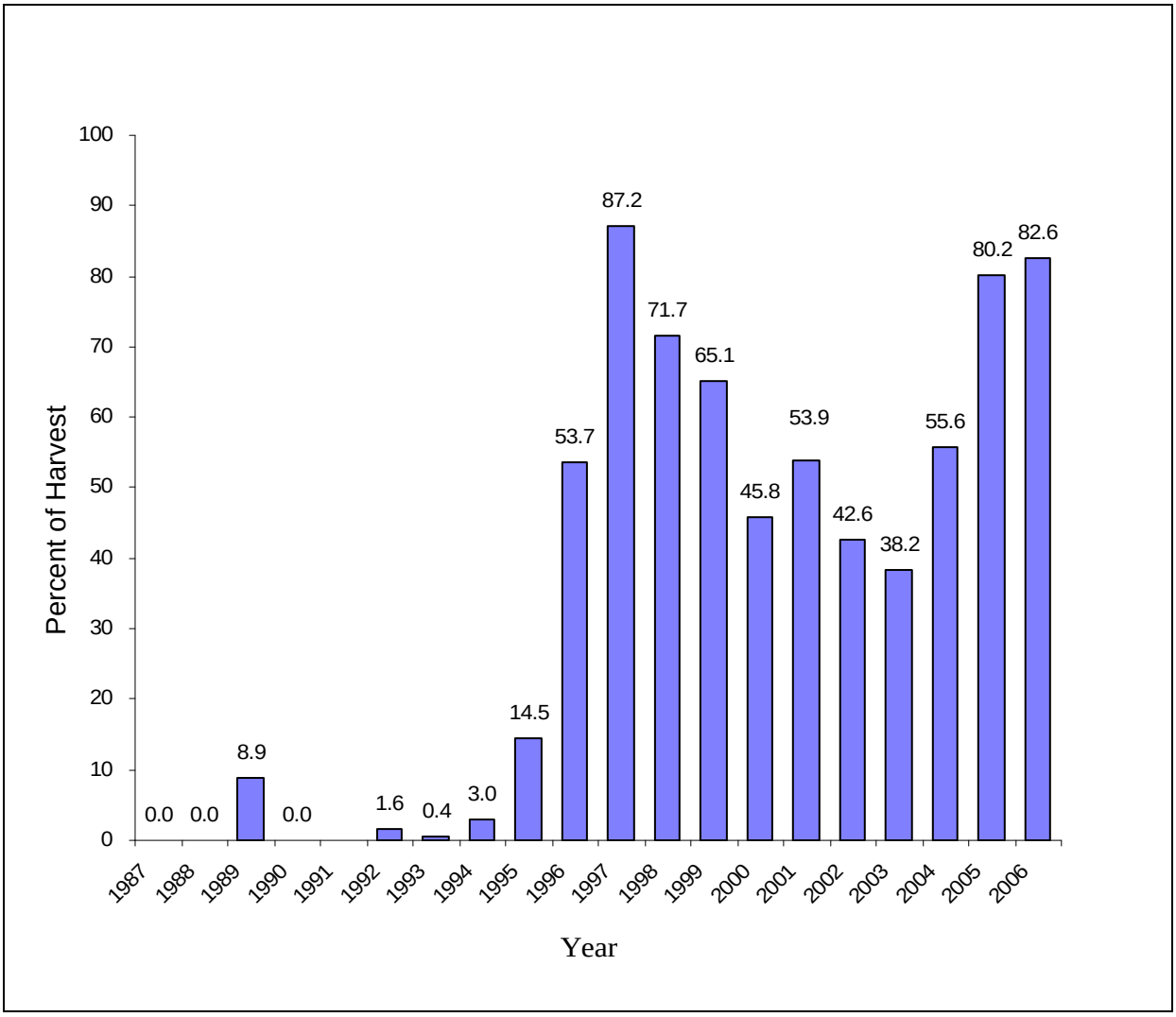


Figure 21.–The percent of crab harvested during the Norton Sound summer commercial red king crab fishery east of 164º west longitude, 1987–2006.

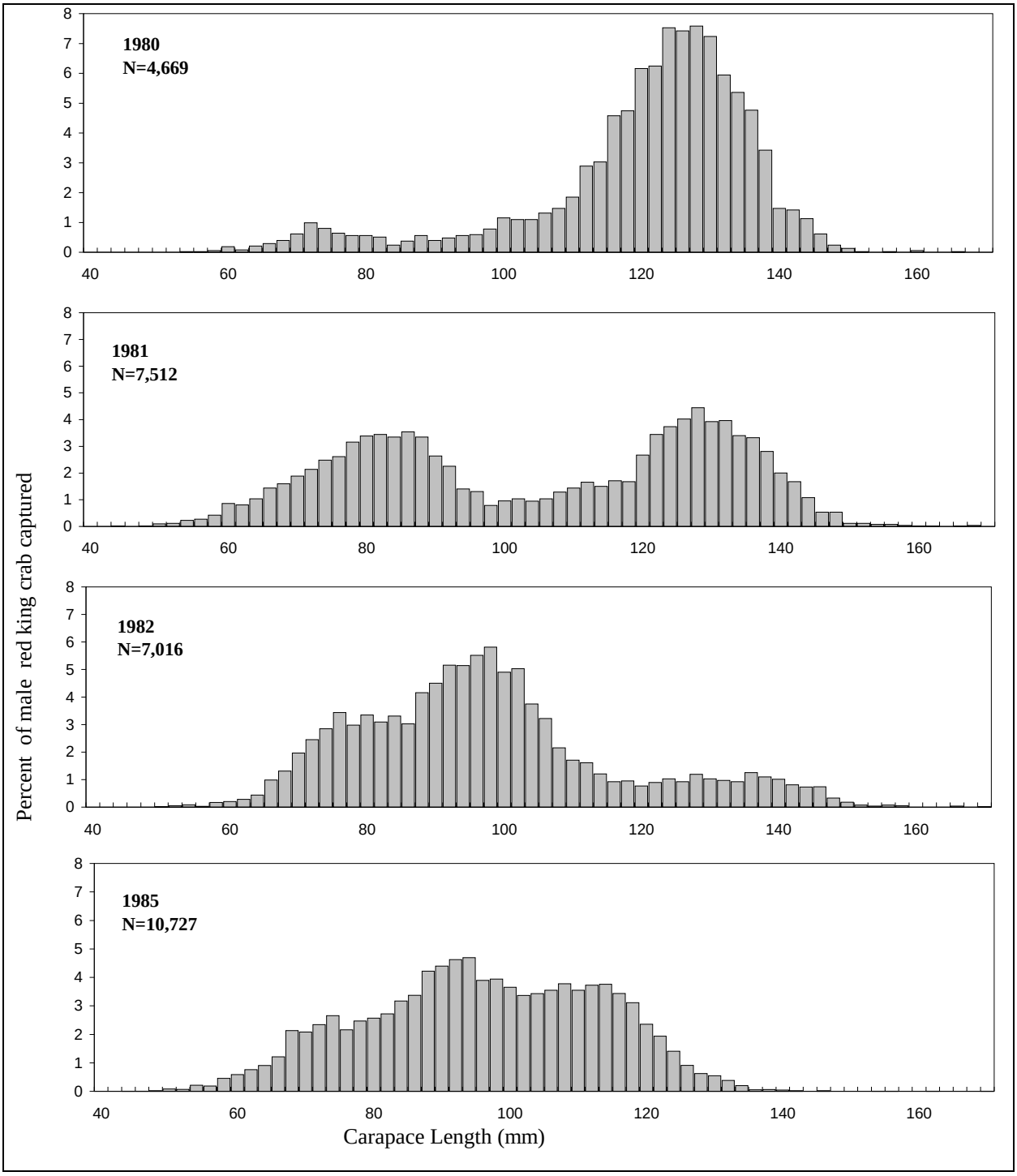


Figure 22.–Norton Sound male red king crab size distribution from pot assessment surveys conducted by ADF&G in 1980, 1981, 1982, and 1985.

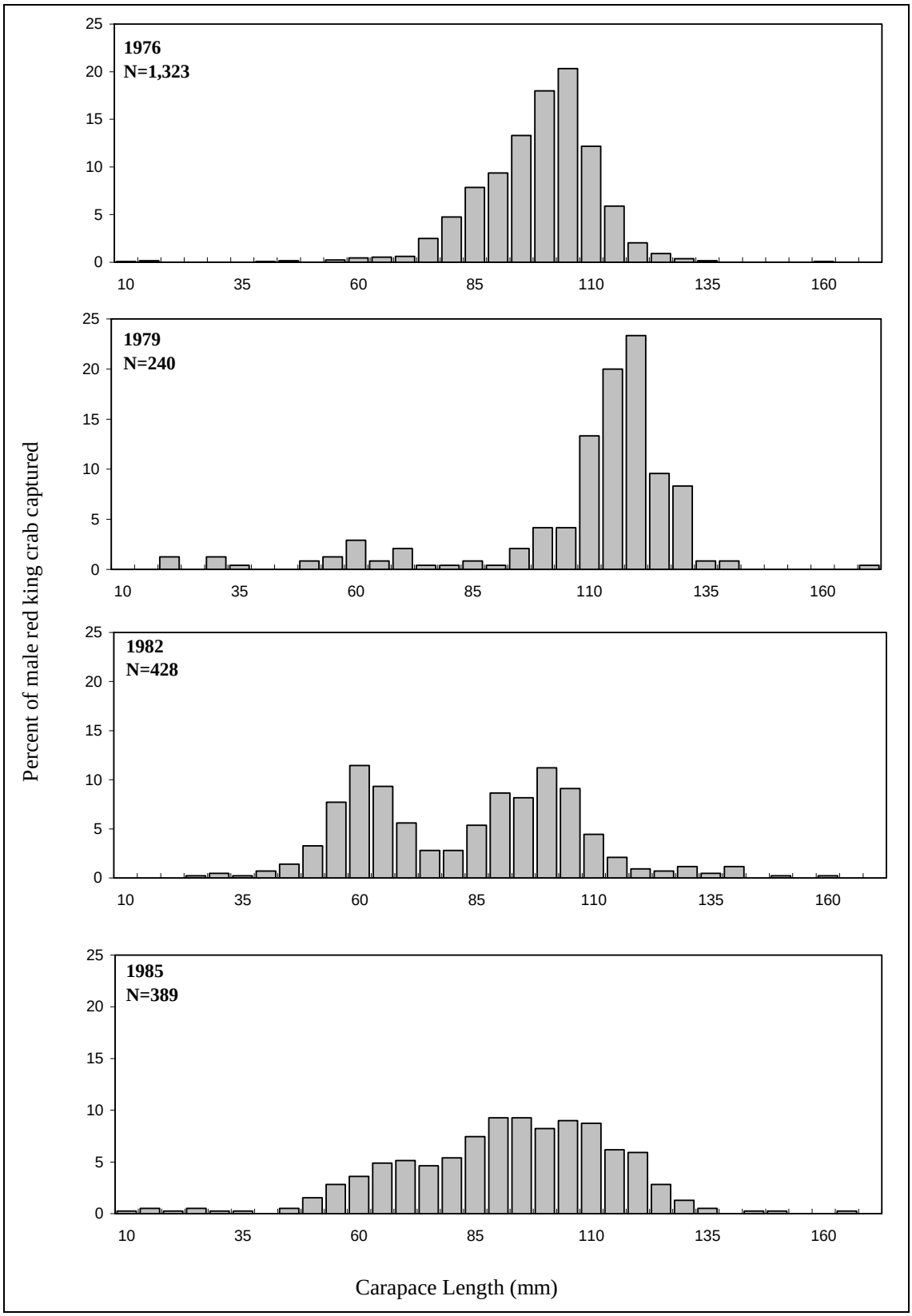


Figure 23.–Norton Sound male red king crab size distribution from trawl assessment surveys conducted by the National Marine Fisheries Service, 1976, 1979, 1982, and 1985.

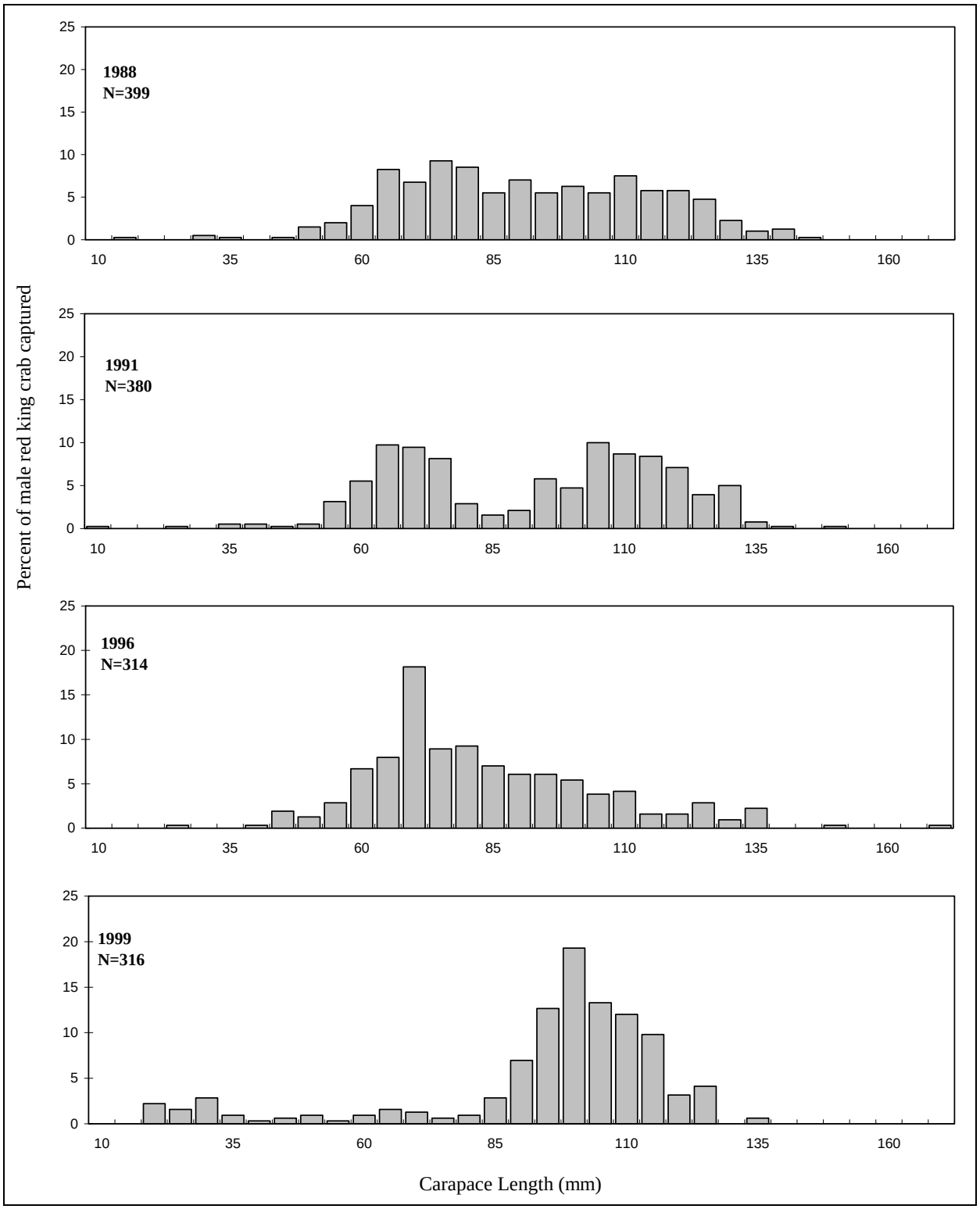


Figure 24.–Norton Sound male red king crab size distribution from trawl assessment surveys conducted by the National Marine Fisheries Service in 1988 and 1991, and by ADF&G in 1996 and 1999.

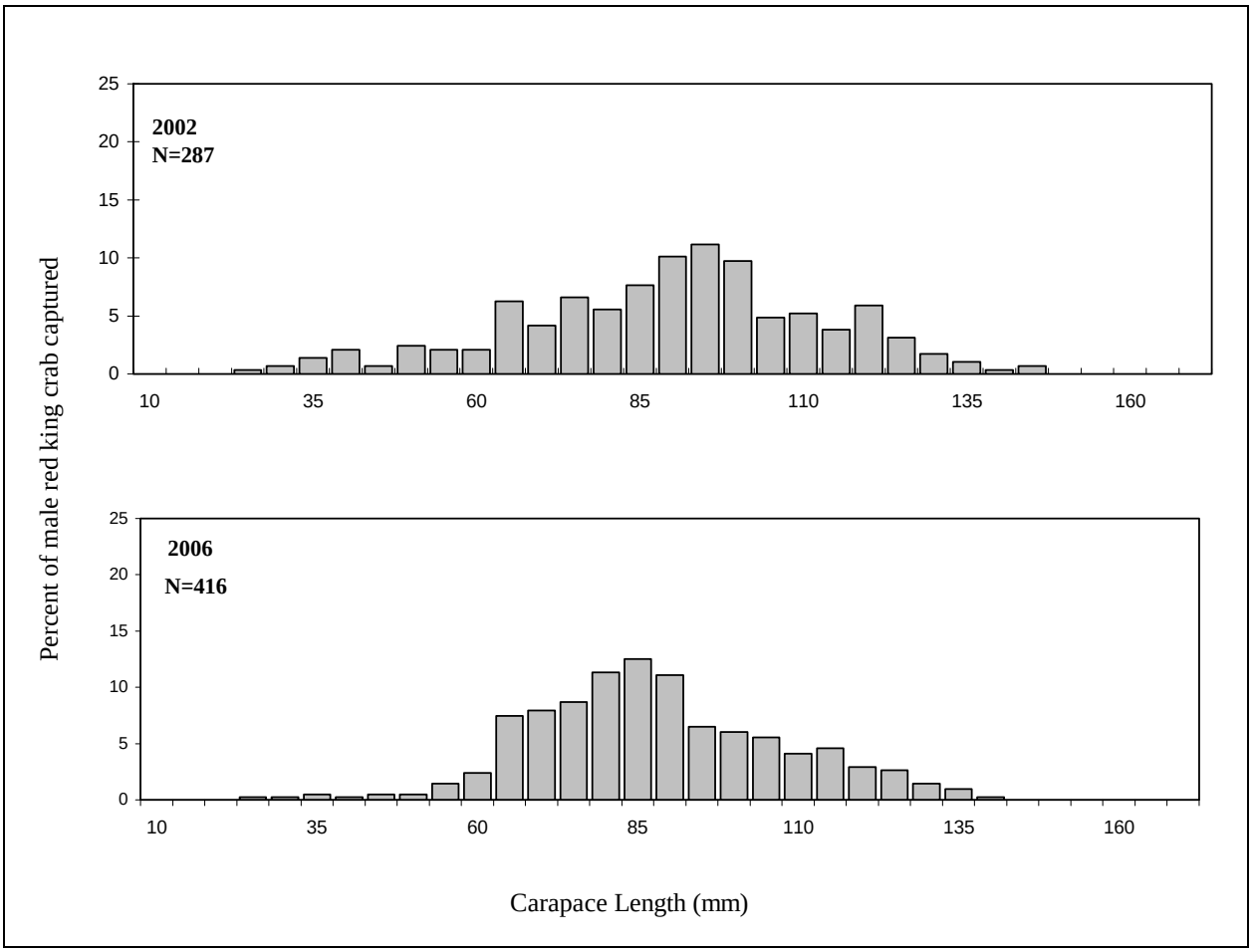


Figure 25.–Norton Sound male red king crab size distribution from trawl assessment surveys conducted by ADF&G, 2002 and 2006.

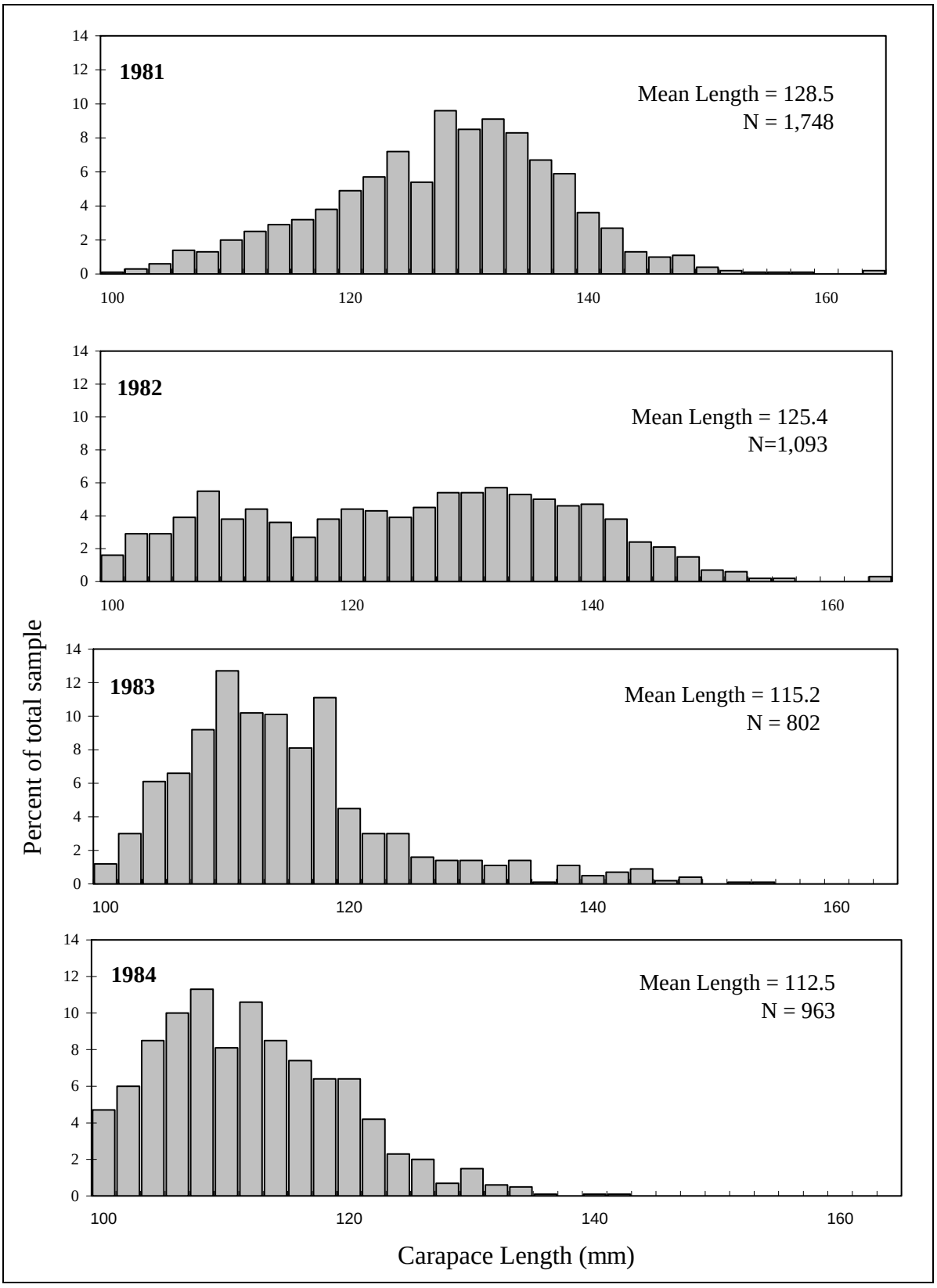


Figure 26.–Length composition of Norton Sound red king crab summer commercial harvests, 1981–1984.

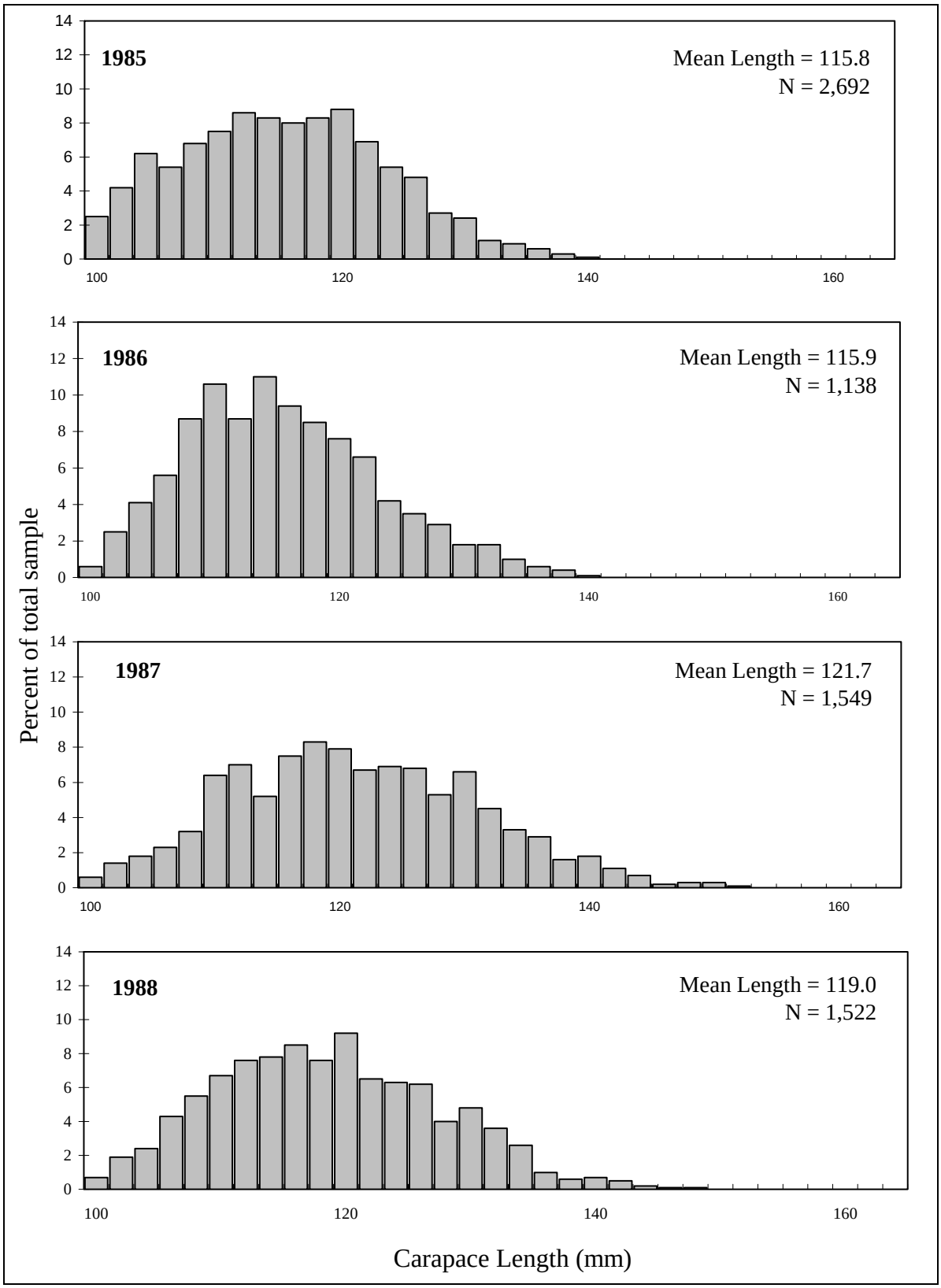
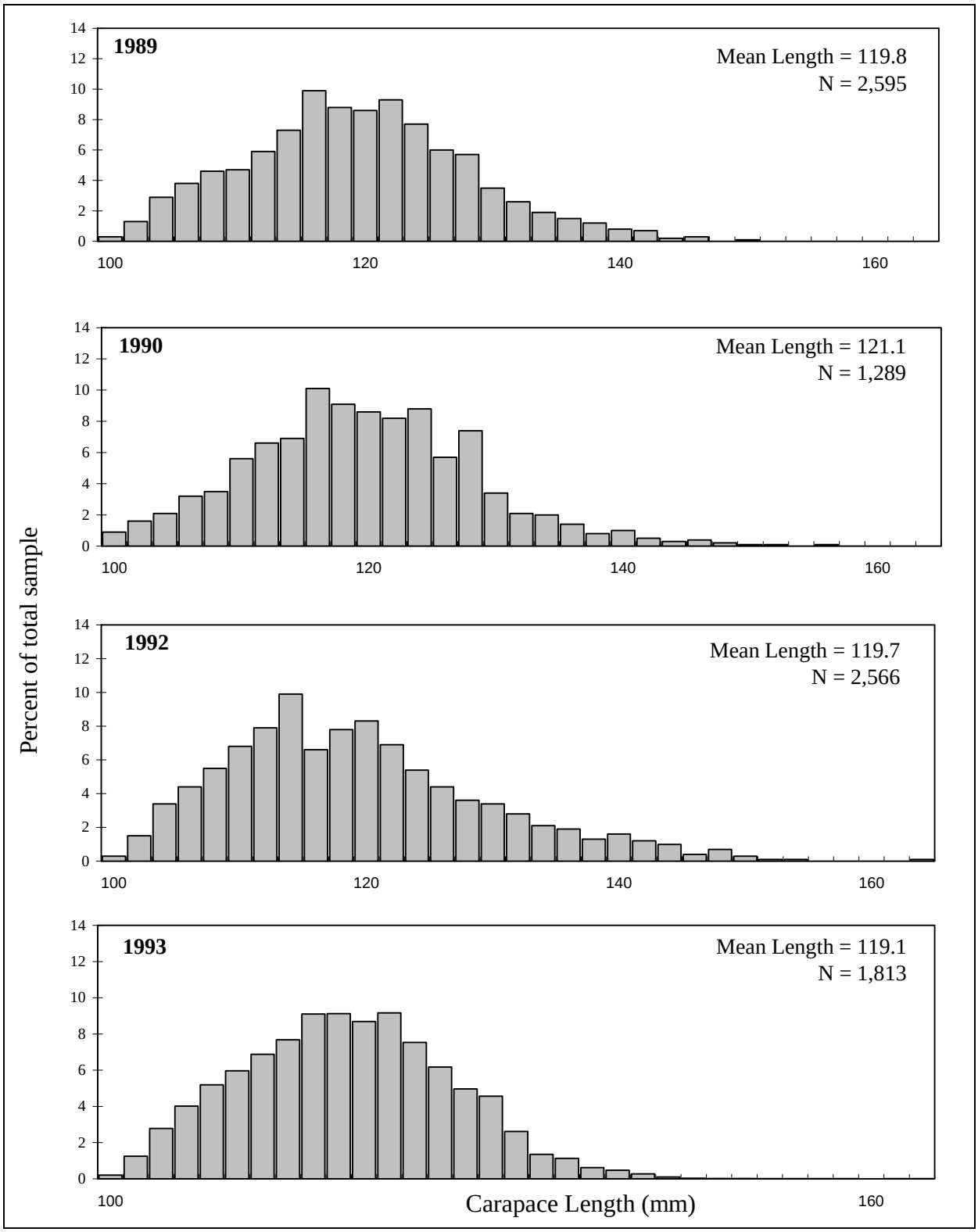


Figure 27.–Length composition of Norton Sound red king crab summer commercial harvests, 1985–1988.



Note: No fishery in 1991.

Figure 28.–Length composition of Norton Sound red king crab summer commercial harvests, 1989–1993.

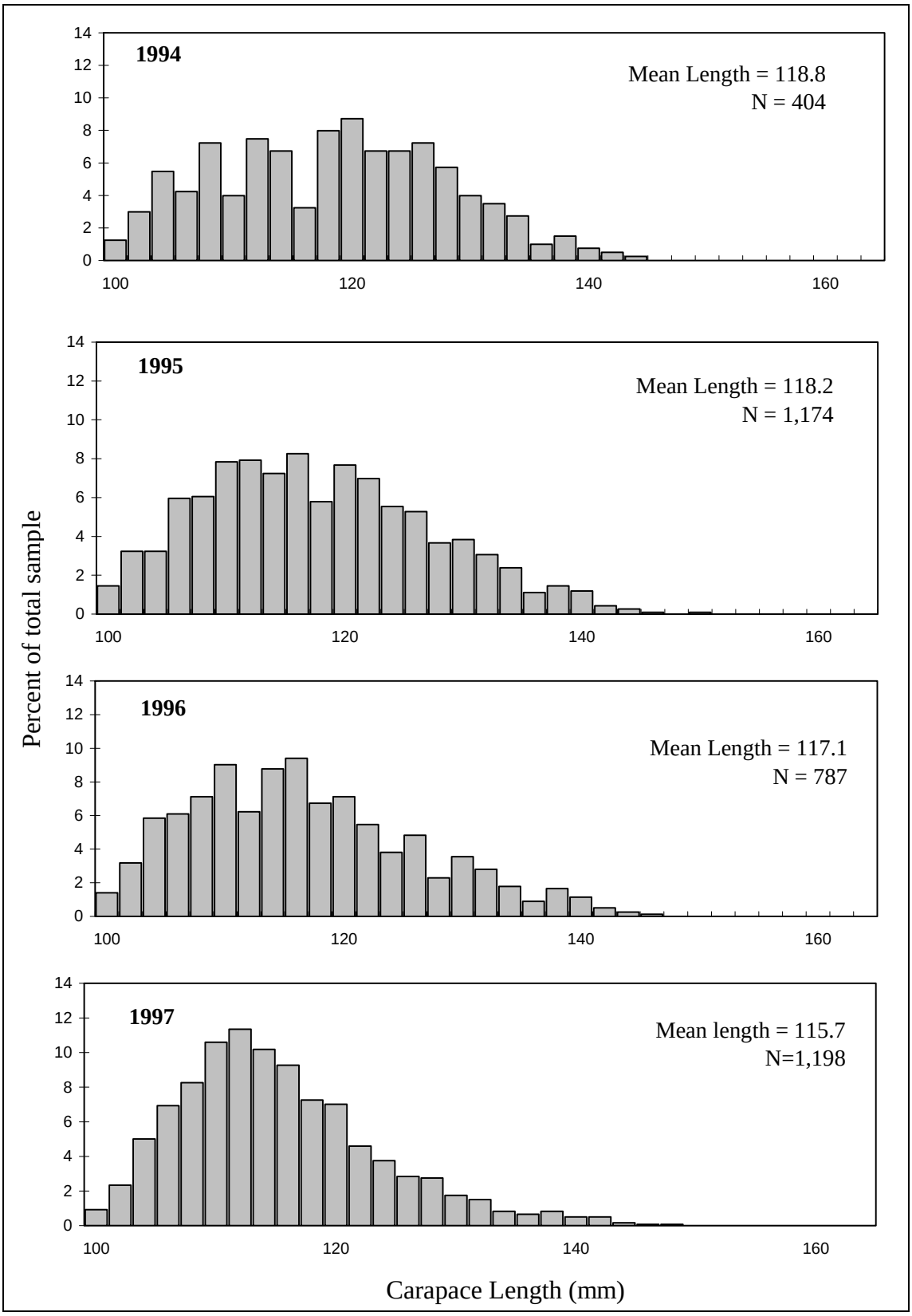


Figure 29.–Length composition of Norton Sound red king crab summer commercial harvests, 1994–1997.

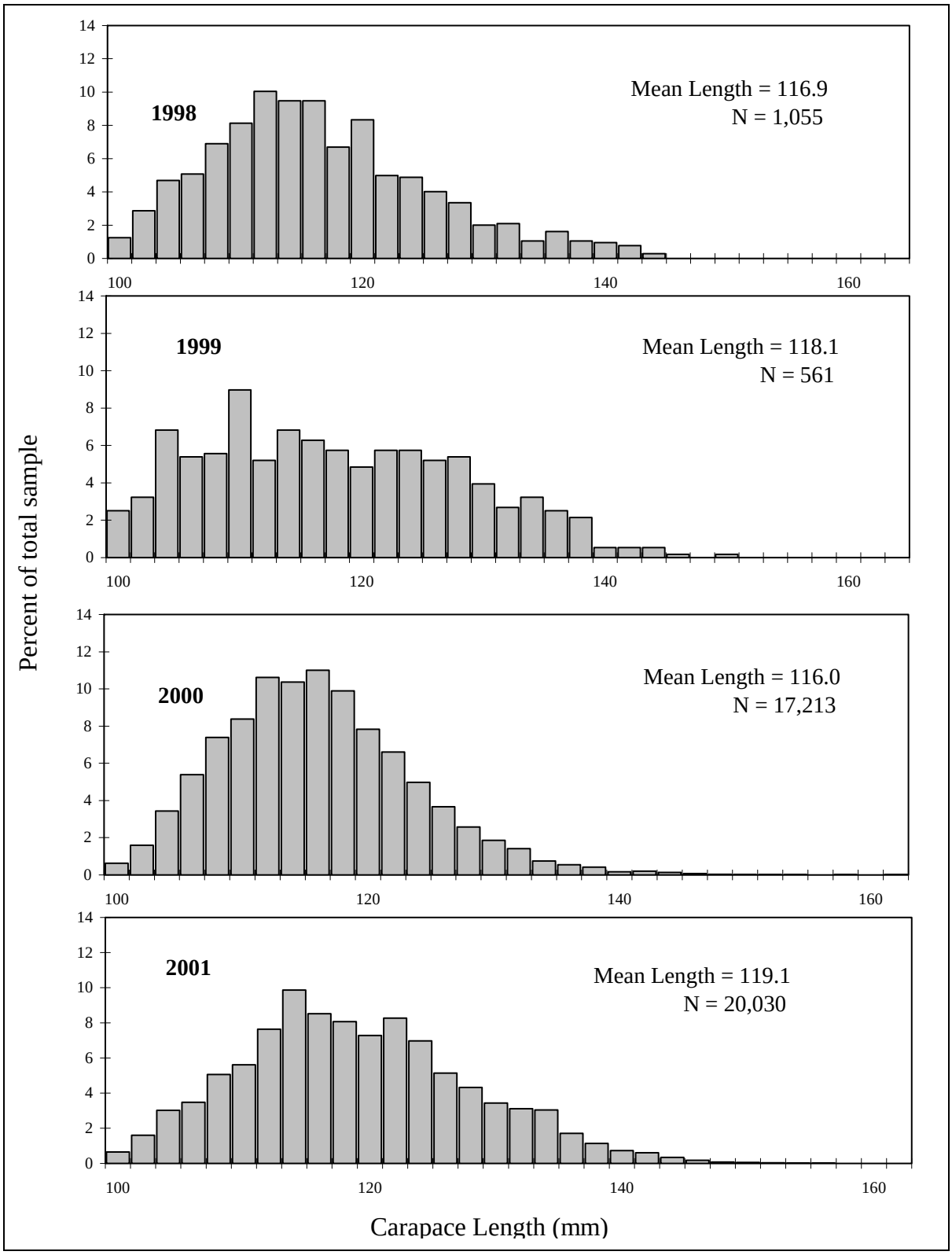


Figure 30.–Length composition of Norton Sound red king crab summer commercial harvests, 1998–2001.

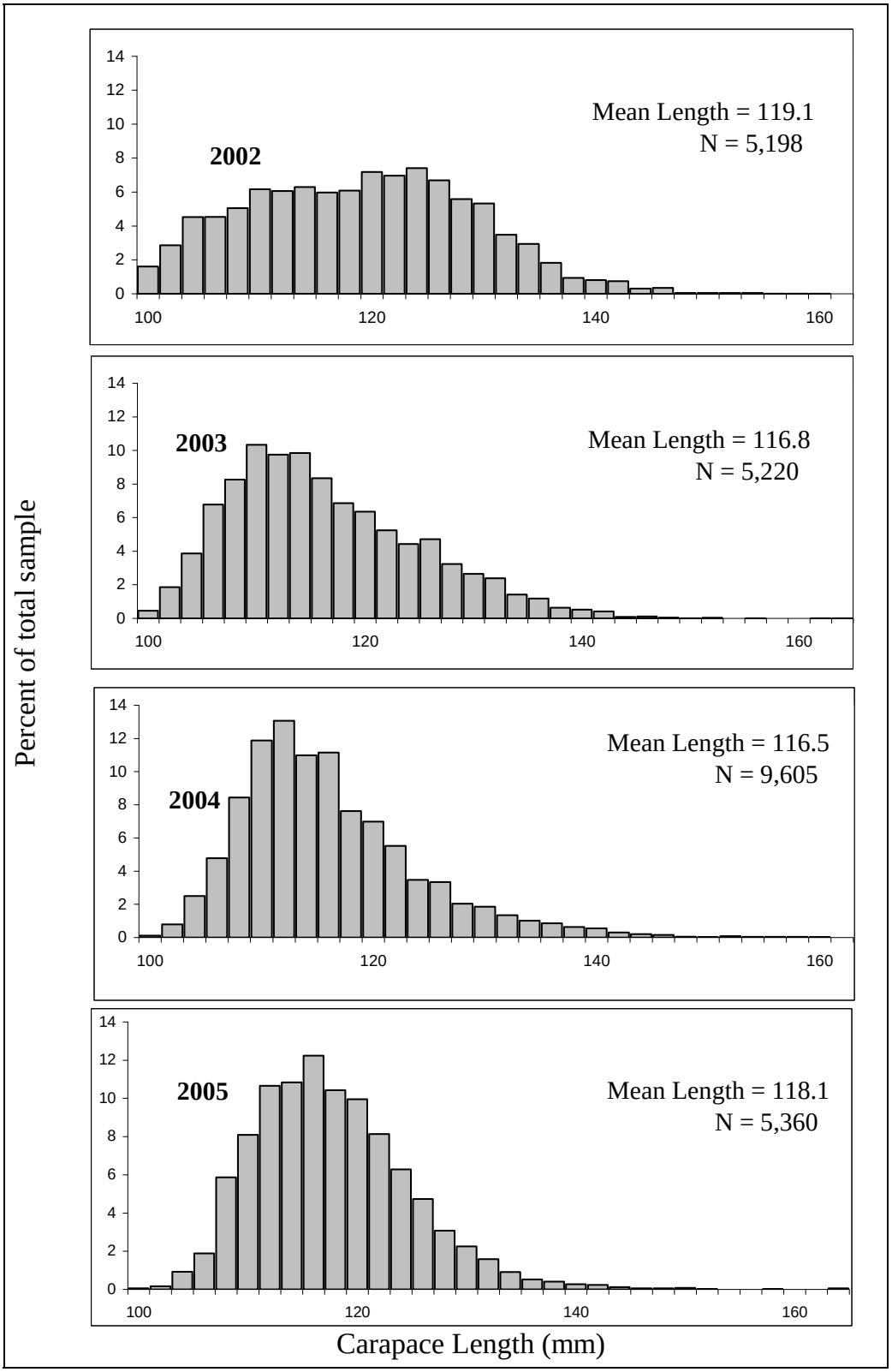


Figure 31.–Length composition of Norton Sound red king crab summer commercial harvests, 2002–2005.

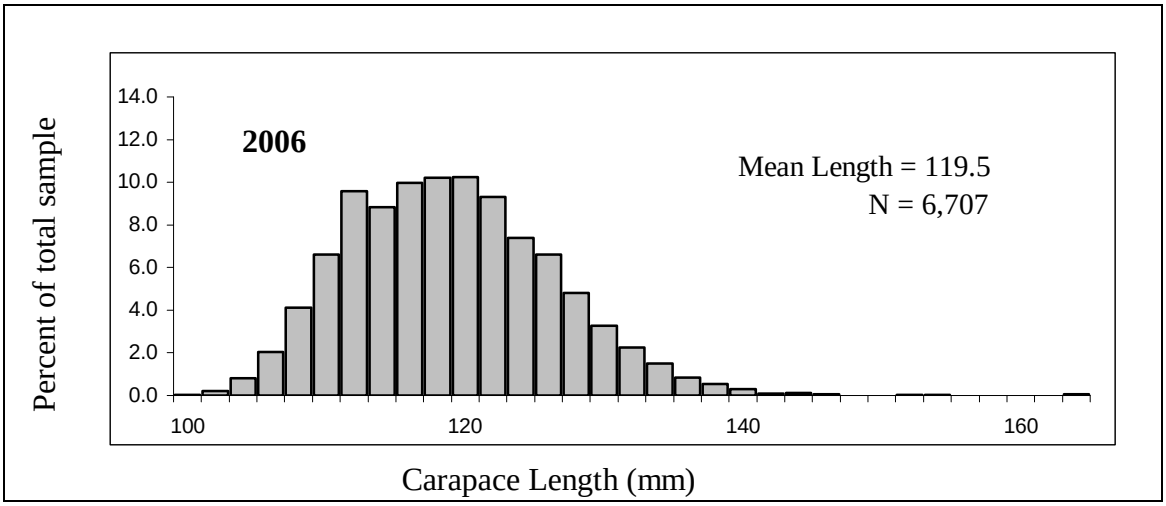


Figure 32.–Length composition of Norton Sound red king crab summer commercial harvest, 2006.

APPENDIX A.

Appendix A1.–Commercial salmon catch by species, Norton Sound District, 1961–2006.

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
2004	0	40	42,016	0	6,296	48,352
2005	151	280	85,255	0	3,983	89,669
2006	12	3	130,808	0	10,042	140,865
Average 2001–2005	76	76	33,116	0	5,108	38,376
Average 1996–2005	2,863	56	35,276	124,202	10,061	172,458

Appendix A2.–Number of commercial salmon permits fished, Norton Sound, 1970–2006.

	Subdistrict						District
Year	**1**	**2**	**3**	**4**	**5**	**6**	**Total** [a]
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
2004	0	0	0	0	11	25	36
2005	0	0	0	0	12	28	40
2006	0	0	0	0	22	40	61
Average 2001–2005	0	1	1	0	11	21	34
Average 1996–2005	0	5	7	1	16	36	58

[a] District total is the number of fishers that actually fished in Norton Sound; some fishers may have fished more than 1 subdistrict.

[b] Data not available.

Appendix A3.–Round weight and value of commercially caught salmon by species, Norton Sound District, 1961–2006.

	Pounds Caught (Round Wt. in lbs)				Salmon	Value of
Year	Chinook	Coho	Pink	Chum	Roe (lbs)	Catch($)
1961	120,405	96,649	102,711	347,990		[b]
1962[a]	157,000	[b]	10,569	221,645		105,800
1963[a]	89,700	51,750	[b]	[b]		104,000
1964[a]	39,169	686	[b]	249,890		51,000
1965	33,327	14,210	660	264,924	[b]	21,483
1966	35,259	40,285	38,334	577,764	16,901	68,000
1967	41,854	15,944	100,913	289,473	21,429	44,038
1968[c]	22,954	50,665	250,044	306,871	20,381	63,700
1969[d]	51,441	50,461	312,836	529,235	5,578	95,297
1970	38,103	25,000	156,313	610,588	1,345	99,019
1971	43,112	22,078	15,377	857,014	1,122	101,000
1972	57,675	3,257	133,389	710,853	1,083	102,225
1973	38,935	63,812	185,799	845,596	[b]	308,740
1974	54,433	15,023	511,737	1,082,575	39,876	437,127
1975	25,964	32,345	87,586	1,318,111	46,470	413,255
1976	34,095	49,822	271,867	669,728	[b]	285,283
1977	102,341	28,044	162,457	1,415,981	[b]	546,010
1978	222,974	50,872	1,164,174	1,389,806	[b]	907,330
1979	231,988	251,129	598,785	1,001,548	[b]	878,792
1980	135,646	204,498	719,368	1,301,693	[b]	572,125
1981	164,182	212,065	719,102	1,284,193	[b]	761,658
1982	97,255	648,212	659,171	1,338,788	95	1,069,723
1983	179,666	360,264	274,568	2,352,104	239	946,232
1984	169,104	523,310	343,685	1,020,635	0	738,064
1985	419,331	169,413	11,458	939,885	0	818,477
1986	133,161	247,333	133,319	1,011,824	0	546,452
1987	141,494	177,569	6,691	731,597	0	517,894
1988	67,148	280,658	226,966	767,168	0	760,641
1989	104,829	336,652	439	297,156	0	319,489
1990	168,745	426,902	[b]	482,060	75	474,064
1991	107,541	469,495	[b]	597,272	221	413,479
1992	57,571	820,406	18,230	595,345	2,641	448,395
1993	151,504	287,702	406,820	347,072	2,608	368,723
1994	98,492	766,050	2,185,066	122,540	0	863,060
1995	174,771	356,190	198,121	290,445	0	356,164
1996	95,794	573,372	1,196,115	84,349	0	340,347
1997	225,136	235,517	50	253,006	880	363,908
1998	127,831	232,705	1,330,624	106,687	0	358,982
1999	48,421	88,037	0	57,656	0	76,860
2000	11,240	307,565	369,800	40,298	0	149,907
2001	3,803	152,293	0	79,558	0	56,921
2002	50	12,972	0	4,555	0	2,941
2003	136	139,775	0	23,687	0	64,473
2004	0	302,379	0	42,385	0	122,506
2005	2,511	659,278	0	28,071	0	296,154
2006	167	869,427	0	68,500	0	389,707

[a] Does not include canned salmon cases (48#) 1962: 29 Chinook, 883 coho, 927 pink, and 12,459 chum. 1963: 604 Chinook, 808 coho, 1,918 pink, and 13,308 chum. 1964: 75 Chinook, 452 pink, and 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 of salted chum.

Appendix A4.–Estimated mean prices paid to commercial salmon fishers in dollars, Norton Sound District, 1962–2006.

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
2004	-	0.39	-	0.14
2005[f]	1.22	0.44	-	0.15
2006	1.49	0.44	-	0.14
Average 2001–2005	0.81	0.34		0.14

[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 for sockeye was $0.37 per pound.
[f] Price paid for sockeye was $0.45 per pound.

Appendix A5.–Mean commercial salmon harvest weights, Norton Sound District, 1964–2006.

	Mean Round Weight in Pounds [a]			
Year	**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
1994	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[b]	10.0	7.4	-	7.6
2003[b]	11.3	8.2	-	6.7
2004	-	7.2	-	6.7
2005	16.6	7.7	-	7.0
2006	14.4	6.6	-	6.8

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

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

Appendix A6.–Commercial and subsistence salmon catch by species, by year in Nome Subdistrict, Norton Sound District, 1964–2006.

	NOME (SUBDISTRICT 1)																	
	Commercial						Subsistence						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
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	26	148	1,365	336	3,794	5,669	26	149	1,734	336	3,916	6,161
1996	0	0	9	13	3	25	9	185	828	3,510	2,287	6,819	9	185	837	3,523	2,290	6,844
1997	0	0	0	0	0	0	10	50	325	175	2,696	3,256	10	50	325	175	2,696	3,256
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

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Appendix A6.–Page 2 of 2.

	NOME (SUBDISTRICT 1)																	
	Commercial						Subsistence						Combined					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
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	1,114	5,024	4	79	666	3,161	1,114	5,024
2003	0	0	0	0	0	0	63	76	351	507	565	1,562	63	76	351	507	565	1,562
2004	0	0	0	0	0	0	100	106	1,574	15,047	685	17,512	100	106	1,574	15,047	685	17,512
2005	0	0	0	0	0	0	62	177	1,287	5,075	803	7,404	62	177	1,287	5,075	803	7,404
2006	0	0	0	0	0	0	24	159	3,808	9,329	940	14,260	24	159	3,808	9,329	940	14,260
5-year avg.[a]	0	0	0	0	0	0	46	106	861	4,781	805	6,598	46	106	861	4,781	805	6,598
10-year avg.[b]	0	0	1	1	0	2	24	81	618	3,191	986	4,958	24	81	675	3,192	986	4,960

[a] 2001–2005.

[b] 1996–2005.

Appendix A7.–Commercial and subsistence salmon catch by species, by year in Golovin Subdistrict, Norton Sound District, 1962–2006.

	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	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1984	31	-	2,462	88,588	54,153	145,234	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1985	193	113	1,196	3,019	55,781	60,302	12	2	430	1,904	9,577	11,925	205	115	1,626	4,923	65,358	72,227
1986	81	8	958	25,425	69,725	96,197	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1987	166	51	2,203	1,579	44,334	48,333	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1988	108	921	2,149	31,559	33,348	68,085	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1989	0	0	0	0	0	0	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1990	52	21	0	0	15,993	16,066	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1991	49	1	0	0	14,839	14,889	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1992	6	9	2,085	0	1,002	3,102	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1993	1	4	2	8,480	2,803	11,290	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1994 [b]	0	0	3,424	0	111	3,535	253	168	733	8,410	1,337	10,901	253	168	4,157	8,410	1,448	14,436
1995 [b]	0	0	1,616	4,296	1,987	7,899	165	34	1,649	7,818	10,373	20,039	165	34	3,265	12,114	12,360	27,938
1996 [b]	0	0	638	0	0	638	86	134	3,014	17,399	2,867	23,500	86	134	3,652	17,399	2,867	24,138
1997 [b]	19	2	102	20	8,003	8,146	138	427	555	4,570	4,891	10,581	157	429	657	4,590	12,894	18,727

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	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
1998 [b]	1	0	3	106,761	723	107,488	184	37	1,292	13,340	1,893	16,746	185	37	1,295	120,101	2,616	124,234
1999 [b]	0	0	0	0	0	0	60	48	1,234	469	3,656	5,467	60	48	1,234	469	3,656	5,467
2000 [b]	0	0	1,645	17,408	164	19,217	169	18	2,335	10,906	1,155	14,583	169	18	3,980	28,314	1,319	33,800
2001 [b]	0	43	30	0	7,094	7,167	89	72	880	1,665	3,291	5,997	89	115	910	1,665	10,385	13,164
2002 [b]	0	0	0	0	0	0	69	66	1,640	14,430	1,882	18,087	69	66	1,640	14,430	1,882	18,087
2003 [b]	0	0	0	0	0	0	166	28	309	5,012	1,477	6,992	166	28	309	5,012	1,477	6,992
2004 [c]	0	0	0	0	0	0	164	6	654	19,936	880	21,640	164	6	654	19,936	880	21,640
2005 [c]	0	0	0	0	0	0	96	15	686	11,467	1,852	14,116	96	15	686	11,467	1,852	14,116
2006 [c]	0	0	0	0	0	0	136	38	1,760	14,670	722	17,326	136	38	1,760	14,670	722	17,326
5-year avg. [d]	0	9	6	0	1,419	1,433	117	37	834	10,502	1,876	13,366	117	46	840	10,502	3,295	14,800
10-year avg. [e]	2	4	220	11,290	1,453	12,969	102	34	1,145	9,018	2,168	12,519	103	81	1,365	20,308	3,621	25,488

[a] Subsistence surveys were not conducted.

[b] Subsistence harvests were estimated from Division of Subsistence surveys.

[c] Beginning in 2004 a permit was required for Golovin Subdistrict that replaced household surveys. The permit system helped to record harvest by residents outside the Subdistrict.

[d] 2001–2005.

[e] 1996–2005.

Appendix A8.–Commercial and subsistence salmon catch by species, by year in Moses Point Subdistrict, Norton Sound District, 1962–2006.

	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	-	-	-	-	-	-	-	-	-	-	-	-
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	-	-	-	3,435	28,916	32,386
1965	-	-	-	-	-	-	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	-	-	5,256	30,150	35,687
1967	-	-	-	-	-	-	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	-	-	13,597	27,897	41,641
1970	39	-	-	13,052	29,726	42,817	16	-	160	4,661	6,960	11,797	55	-	-	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	-	-	15,203	56,999	72,412
1975	16	-	-	4,407	46,699	51,122	2	-	6	1,280	508	1,796	18	-	-	5,687	47,207	52,918
1976	24	-	232	5,072	10,890	16,218	22	-	-	5,016	1,548	6,586	46	-	-	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	-	-	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	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1984	-	-	5,959	28,035	9,477	43,471	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1985	816	32	1,803	559	24,466	27,676	67	-	1,389	1,212	947	3,615	883	-	3,192	1,771	25,413	31,291
1986	600	41	5,874	15,795	20,668	42,978	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1987	907	15	64	568	17,278	18,832	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1988	663	93	3,974	13,703	18,585	37,018	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1989	62	0	0	0	167	229	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1990	202	0	0	501	3,723	4,426	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1991 [b]	161	0	0	0	804	965	312	-	2,153	3,555	2,660	8,680	473	-	2,153	3,555	3,464	9,645
1992 [b]	0	0	3,531	0	6	3,537	100	-	1,281	6,152	1,260	8,793	100	-	4,812	6,152	1,266	12,330
1993 [b]	3	0	4,065	0	167	4,235	368	-	1,217	1,726	1,635	4,946	371	-	5,282	1,726	1,802	9,181
1994 [b]	0	0	5,345	0	414	5,759	322	104	1,180	9,345	3,476	14,427	322	104	6,525	9,345	3,890	20,186
1995 [b]	4	44	3,742	2,962	1,171	7,923	284	17	1,353	2,046	3,774	7,474	288	61	5,095	5,008	4,945	15,397
1996 [b]	0	0	1,915	68,609	0	70,524	417	52	1,720	9,442	2,319	13,950	417	52	3,635	78,051	2,319	84,474
1997 [b]	844	0	1,409	0	2,683	4,936	619	50	1,213	1,314	2,064	5,260	1,463	50	2,622	1,314	4,747	10,196

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	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
1998 [b]	105	0	1,462	145,669	2,311	149,547	414	49	1,831	6,891	1,376	10,561	519	49	3,293	152,560	3,687	160,108
1999 [b]	0	0	0	0	0	0	424	13	975	1,564	744	3,720	424	13	975	1,564	744	3,720
2000 [b]	10	0	5,182	46,369	535	52,096	248	46	1,429	5,983	1,173	8,879	258	46	6,611	52,352	1,708	60,975
2001 [b]	7	0	1,696	0	681	2,384	427	70	1,352	1,390	898	4,137	434	70	3,048	1,390	1,579	6,521
2002 [b]	0	0	0	0	0	0	565	14	1,801	8,345	1,451	12,176	565	14	1,801	8,345	1,451	12,176
2003 [b]	0	0	0	0	0	0	660	39	1,143	2,524	1,687	6,053	660	39	1,143	2,524	1,687	6,053
2004 [c]	0	0	0	0	0	0	412	0	704	7,858	683	9,657	412	0	704	7,858	683	9,657
2005 [c]	0	0	0	0	0	0	225	9	1,011	3,721	598	5,564	225	9	1,011	3,721	598	5,564
2006 [c]	0	0	0	0	0	0	179	13	1,769	5,216	1,267	8,444	179	13	1,769	5,216	1,267	8,444
5-year avg.[d]	1	0	339	0	136	477	458	26	1,202	4,768	1,063	7,517	459	26	1,541	4,768	1,200	7,994
10-year avg.[e]	97	0	1,166	26,065	621	27,949	441	34	1,318	4,903	1,299	7,996	538	34	2,484	30,968	1,920	35,944

[a] Subsistence surveys were not conducted.

[b] Subsistence harvests were estimated from Division of Subsistence surveys.

[c] Beginning in 2004 a permit was required for the subdistrict that replaced household surveys. The permit system helped to record harvest by residents outside the subdistrict.

[d] 2001–2005.

[e] 1996–2005.

Appendix A9.–Commercial and subsistence salmon catch by species, by year in Norton Bay Subdistrict, Norton Sound District, 1962–2006.

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	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1984	-	-	-	1,162	3,442	4,604	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1985	528	-	384	68	9,948	10,928	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1986	139	2	1,512	40	1,994	3,687	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1987	544	-	145	16	3,586	4,291	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1988	434	2	709	1,749	7,521	10,415	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1989	-	-	-	-	-	-	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1990	0	0	0	0	0	0	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1991	0	0	0	0	0	0	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1992	27	0	0	0	1,787	1,814	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1993	267	0	0	290	1,378	1,935	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1994 [b]	0	0	0	0	0	0	308	1	370	6,049	4,581	11,309	308	1	370	6,049	4,581	11,309
1995 [b]	0	0	0	0	0	0	475	46	985	3,514	5,828	10,848	475	46	985	3,514	5,828	10,848
1996 [b]	0	0	0	0	0	0	295	3	676	3,929	4,161	9,064	295	3	676	3,929	4,161	9,064

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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
1997 [b]	194	0	0	0	531	725	656	54	322	1,795	4,040	6,867	850	54	322	1,795	4,571	7,592
1998 [b]	0	0	0	0	0	0	684	0	388	2,009	6,192	9,273	684	0	388	2,009	6,192	9,273
1999 [b]	0	0	0	0	0	0	327	0	167	1,943	4,153	6,590	327	0	167	1,943	4,153	6,590
2000 [b]	0	0	0	0	0	0	397	2	267	2,255	4,714	7,635	397	2	267	2,255	4,714	7,635
2001 [b]	0	0	0	0	0	0	460	14	276	5,203	4,445	10,398	460	14	276	5,203	4,445	10,398
2002 [b]	0	0	0	0	0	0	557	0	509	6,049	3,971	11,086	557	0	509	6,049	3,971	11,086
2003 [b]	0	0	0	0	0	0	373	46	510	4,184	3,397	8,510	373	46	510	4,184	3,397	8,510
2004	0	0	0	0	0	0	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
2005	0	0	0	0	0	0	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
2006	0	0	0	0	0	0	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
5-year avg. [c]	0	0	0	0	0	0	278	12	259	3,087	2,363	5,999	278	12	259	3,087	2,363	5,999
10-year avg. [d]	16	0	0	0	48	66	312	11	283	2,488	3,188	6,311	329	11	283	2,488	3,965	6,377

[a] Subsistence surveys were not conducted.

[b] Subsistence harvests were estimated from Division of Subsistence surveys.

[c] 2001–2005.

[d] 1996–2005.

Appendix A10.–Commercial and subsistence salmon catch by species, by year in Shaktoolik Subdistrict, Norton Sound District, 1961–2006.

	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	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1984	1,613	-	10,730	1,596	32,309	46,248	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1985	5,312	-	2,808	-	13,403	21,523	298	-	1,379	24	298	1,999	5,610	-	4,187	24	13,701	3,522
1986	1,075	29	6,626	-	16,126	23,856	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1987	2,214	-	6,193	-	14,088	22,495	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1988	671	79	6,096	3,681	21,521	32,048	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1989	1,241	43	8,066	0	19,641	28,991	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1990	2,644	49	4,695	0	21,748	29,136	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1991	1,324	55	11,614	0	31,619	44,612	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1992	1,098	56	14,660	0	27,867	43,681	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1993	2,756	20	11,130	106,743	20,864	141,513	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
1994 [b]	885	8	22,065	502,231	5,411	530,600	1,175	1	2,777	9,133	1,221	14,307	2,060	9	24,842	511,364	6,632	544,907
1995 [b]	1,239	5	10,856	37,377	14,775	64,252	1,275	2,480	2,626	7,024	2,480	15,885	2,514	2,485	13,482	44,401	17,255	80,137

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	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
1996 [b]	1,340	1	13,444	304,982	3,237	323,004	1,114	31	3,615	8,370	4,425	17,555	2,454	32	17,059	313,352	7,662	340,559
1997 [b]	2,449	0	4,694	-	5,747	12,890	1,146	62	2,761	5,779	1,612	11,360	3,595	62	7,455	5,779	7,359	24,250
1998 [b]	910	0	3,624	236,171	7,080	247,785	982	92	1,872	6,270	1,034	10,250	1,892	92	5,496	242,441	8,114	258,035
1999 [b]	581	0	2,398	0	2,181	5,160	818	183	1,556	5,092	467	8,116	1,399	183	3,954	5,092	2,648	13,276
2000 [b]	160	3	7,779	85,493	2,751	96,186	440	20	2,799	5,432	2,412	11,103	600	23	10,578	90,925	5,163	107,289
2001 [b]	90	0	2,664	0	1,819	4,573	936	143	2,090	10,172	1,553	14,894	1,026	143	4,754	10,172	3,372	19,467
2002 [b]	1	0	680	0	261	942	1,230	4	2,169	8,769	800	12,972	1,231	4	2,849	8,769	1,061	13,914
2003 [b]	2	0	4,031	0	485	4,518	881	50	2,941	12,332	587	16,791	883	50	6,972	12,332	1,072	21,309
2004	0	0	12,734	0	1,372	14,106	943	12	1,994	7,291	139	10,379	943	12	14,728	7,291	1,511	24,485
2005	50	0	21,818	0	791	22,659	807	0	1,913	12,075	202	14,997	857	0	23,731	12,075	993	37,656
2006	0	0	32,472	0	3,321	35,793	382	36	1,968	4,817	351	7,554	382	36	34,440	4,817	3,672	43,347
5-year avg. [c]	29	0	8,385	0	946	9,360	959	42	2,221	10,128	656	14,007	988	42	10,607	10,128	1,602	23,366
10-year avg. [d]	558	0	7,387	62,665	2,572	73,182	930	60	2,371	8,158	1,323	12,842	1,488	60	9,758	70,823	3,896	86,024

[a] Subsistence surveys were not conducted.

[b] Subsistence harvests were estimated from Division of Subsistence surveys.

[c] 2001–2005.

[d] 1996–2005.

Appendix A11.–Commercial and subsistence salmon catch by species, by year in Unalakleet Subdistrict, Norton Sound District, 1961–2006.

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	-	-	-	-	-	-	-	-	-	-	-	-
1962	5,089	-	6,739	6,769	30,283	48,880	-	-	-	-	-	-	-	-	-	-	-	-
1963	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	-	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	1,842	-	6,592	11,512	35,289	55,235
1966 [a]	1,208	-	4,183	5,023	16,840	27,254	90	-	789	6,083	3,387	10,349	1,298	-	4,972	11,106	20,227	37,603
1967 [a]	1,751	-	1,544	21,961	8,502	33,758	490	-	484	9,964	-	10,938	2,241	-	2,028	31,925	-	44,696
1968 [a]	960	-	6,549	41,474	14,865	63,848	186	-	1,493	11,044	2,982	15,705	1,146	-	8,042	52,518	17,847	79,553
1969 [a]	2,276	-	5,273	40,558	22,032	70,139	324	-	1,483	4,230	4,196	10,233	2,600	-	6,756	44,788	26,228	80,372
1970 [a]	1,604	-	4,261	30,779	40,029	76,673	495	-	3,907	10,104	7,214	21,720	2,099	-	8,168	40,883	47,243	98,393
1971 [a]	2,166	-	2,688	1,196	37,543	43,593	911	-	3,137	2,230	7,073	13,351	3,077	-	5,825	3,426	44,616	56,944
1972 [a]	2,235	-	412	28,231	20,440	51,318	643	-	1,818	3,132	4,132	9,725	2,878	-	2,230	31,363	24,572	61,043
1973	1,397	-	8,922	13,335	25,716	49,370	323	-	213	6,233	3,426	10,195	1,720	-	9,135	19,568	29,142	59,565
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	-	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	-	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	-	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	-	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	-	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	-	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
1986	4,494	153	20,580	-	30,239	55,466	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]
1987	3,246	141	15,097	97	17,525	36,106	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]
1988	2,218	157	24,232	23,730	25,363	75,700	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]
1989 [c]	4,402	222	36,025	-	20,825	61,474	[b]	[b]	4,681	17,500	1,388	[b]	[b]	[b]	40,706	17,500	22,213	[b]
1990	5,998	358	52,015	-	23,659	82,030	2,476 [d]	[b]	[b]	[b]	[b]	[b]	8,474	[b]	[b]	[b]	[b]	[b]
1991	4,534	147	52,033	-	39,609	96,323	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]
1992	3,409	229	84,449	6,284	52,547	146,918	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]
1993	5,944	251	26,290	42,061	28,156	102,702	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]	[b]
1994 [d]	4,400	71	71,019	480,158	12,288	567,936	5,294	819	16,081	31,572	12,732	66,498	9,694	890	87,100	511,730	25,020	634,434
1995 [d]	7,617	78	31,280	37,009	24,843	100,827	5,049	807	13,110	17,246	13,460	49,672	12,666	885	44,390	54,255	38,303	150,499

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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
1996 [d]	3,644	-	52,200	113,837	7,369	177,050	5,324	608	15,963	19,782	16,481	58,158	8,968	-	68,163	133,619	23,850	235,208
1997 [d]	9,067	159	26,079	-	17,139	52,444	6,325	353	9,120	10,804	7,649	34,251	15,392	512	35,199	-	24,788	86,695
1998 [d]	6,413	7	24,534	99,412	6,210	136,576	5,915	639	11,825	17,259	7,962	43,600	12,328	646	36,359	116,671	14,172	180,176
1999 [d]	1,927	0	10,264	0	5,700	17,891	4,504	848	10,250	10,791	10,040	36,433	6,431	848	20,514	10,791	15,740	54,324
2000 [d]	582	11	29,803	17,278	2,700	50,374	2,887	569	9,487	11,075	7,294	31,312	3,469	580	39,290	28,353	9,994	81,686
2001 [d]	116	1	15,102	0	1,512	16,731	3,662	376	9,520	11,710	9,163	34,431	3,778	377	24,622	11,710	10,675	51,162
2002 [d]	4	1	1,079	0	339	1,423	3,044	600	8,301	23,599	8,599	44,143	3,048	601	9,380	23,599	8,938	45,566
2003	10	0	13,027	0	3,075	16,112	2,585	283	6,192	21,777	1,785	32,622	2,595	283	19,219	21,777	4,860	48,734
2004	0	40	29,282	0	4,924	34,246	2,801	334	5,978	20,883	1,211	31,207	2,801	374	35,260	20,883	6,135	65,453
2005	101	280	63,437	0	3,192	67,010	2,115	593	6,949	21,836	1,506	32,999	2,216	873	70,386	21,836	4,698	100,009
2006	11	3	98,336	0	6,721	105,071	2,155	326	7,937	22,547	2,712	35,677	2,166	329	106,273	22,547	9,433	140,748
5-year avg. [e]	46	11	17,659	3,456	2,510	23,777	2,996	432	7,896	17,809	5,610	34,743	3,138	443	25,554	21,264	8,120	58,520
10-year avg. [f]	2,186	45	24,073	20,957	4,742	51,805	3,264	473	8,508	15,411	6,517	34,469	5,086	463	32,581	35,385	11,259	86,274

[a] Subsistence catches from 1966–1972 includes fish taken at St. Michael.

[b] Subsistence surveys were not conducted.

[c] In-depth survey by the Division of Subsistence.

[d] Subsistence harvests were estimated from Division of Subsistence surveys and included harvests in Stebbins and St. Michael.

[e] 2001–2005.

[f] 1996–2005

Appendix A12.–Subsistence salmon catch by species and year for St. Michael and Stebbins in Norton Sound District, 1993–2006.

Year [a]	Chinook	Chum	Pink	Sockeye	Coho	Total
St Michael						
1994	769	4,309	2,673	127	1,022	8,900
1995	1,267	5,778	391	45	2,235	9,716
1996	1,400	6,352	1,503	3	1,641	10,899
1997	970	2,816	84	41	547	4,458
1998	542	1,502	961	143	1,406	4,554
1999	1,053	3,036	365	111	798	5,363
2000	160	1,381	80	16	1,180	2,817
2001	282	2,246	229	17	491	3,265
2002	227	1,136	583	20	989	2,955
2003	295	1,994	577	89	1,438	4,393
2004	Subsistence surveys were not conducted.					
2005	998	3,614	1,742	61	1,497	7,912
2006	271	2,628	480	347	1,256	4,982
Stebbins						
1994	1,525	5,989	5,552	288	3,948	17,302
1995	1,211	5,042	758	207	2,570	9,788
1996	1,030	7,401	2,375	424	3,746	14,976
1997	1,164	3,230	243	116	1,826	6,579
1998	1,410	3,909	3,125	295	3,116	11,855
1999	760	3,312	459	200	1,312	6,043
2000	298	2,913	364	341	2,429	6,345
2001	570	3,999	202	0	2,759	7,530
2002	450	3,586	7,459	300	2,324	14,119
2003	265	2,399	2,685	171	1,215	6,735
2004	Subsistence surveys were not conducted.					
2005	485	5,164	4,353	59	2,702	12,763
2006	355	4236	4321	140	4856	13,908

[a] Harvest numbers shown have been expanded to include households not contacted.

Appendix A13.–Commercial, subsistence, and sport salmon catch by species, by year for all subdistricts in Norton Sound District, 1961–2006.

	ALL SUBDISTRICTS																	
	Commercial						Subsistence						Sport					
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	34,237	48,332	101,711	-	-	-	-	-	-	-	-	-	-	-	-
1962	7,286	18	9,156	33,187	182,784	232,431	-	-	-	-	-	-	-	-	-	-	-	-
1963	6,613	71	16,765	46,180	154,749	224,378	5	-	118	16,607	17,635	34,365	-	-	-	-	-	-
1964	2,018	126	98	13,567	148,862	164,671	565	-	2,567	9,225	12,486	24,843	-	-	-	-	-	-
1965	128	30	2,030	220	36,795	39,203	574	-	4,812	19,131	30,772	55,289	-	-	-	-	-	-
1966	1,553	14	5,755	12,778	80,245	100,345	269	-	2,210	14,335	21,873	38,687	-	-	-	-	-	-
1967	1,804	-	2,379	28,879	41,756	74,818	817	-	1,222	17,516	22,724	42,279	-	-	-	-	-	-
1968	1,045	-	6,885	71,179	45,300	124,409	237	-	2,391	36,912	11,661	51,201	-	-	-	-	-	-
1969	2,392	-	6,836	86,949	82,795	178,972	436	-	2,191	18,562	15,615	36,804	-	-	-	-	-	-
1970	1,853	-	4,423	64,908	107,034	178,218	561	-	4,675	26,127	22,763	54,126	-	-	-	-	-	-
1971	2,593	-	3,127	4,895	131,362	141,977	1,026	197	4,097	10,863	21,618	37,801	-	-	-	-	-	-
1972	2,938	-	454	45,182	100,920	149,494	804	93	2,319	14,158	13,873	31,247	-	-	-	-	-	-
1973	1,918	-	9,282	46,499	119,098	176,797	392	-	520	14,770	7,185	22,867	-	-	-	-	-	-
1974	2,951	-	2,092	148,519	162,267	315,829	420	-	1,064	16,426	3,958	21,868	-	-	-	-	-	-
1975	2,393	2	4,593	32,388	212,485	251,861	186	11	192	15,803	8,113	24,305	-	-	-	-	-	-
1976	2,243	11	6,934	87,919	95,956	193,063	203	-	1,004	18,048	7,718	26,973	-	-	-	-	-	-
1977	4,500	5	3,690	48,675	200,455	257,325	846	-	2,530	14,296	26,607	44,279	197	0	449	2,402	670	3,718
1978	9,819	12	7,335	325,503	189,279	531,948	1,211	-	2,981	35,281	12,257	51,730	303	0	742	7,399	546	8,990
1979	10,706	57	31,438	167,411	140,789	350,401	747	-	8,487	25,247	11,975	46,456	-	-	-	-	-	-
1980	6,311	40	29,842	227,352	180,792	444,337	1,397	-	8,625	63,778	19,622	93,422	52	0	1,455	7,732	1,601	10,840
1981	7,929	56	31,562	232,479	169,708	441,734	2,021	38	1,416	28,741	32,866	77,082	70	0	1,504	3,101	1,889	6,564
1982	5,892	10	91,690	230,281	183,335	511,208	1,011	8	1,612	54,249	18,580	88,460	409	0	2,986	13,742	2,620	19,757
1983 [a]	10,308	27	49,735	76,913	319,437	456,420	1,942	86	8,799	21,894	11,492	44,213	687	0	3,823	4,583	2,042	11,135
1984 [a]	8,455	6	67,875	119,381	146,442	342,159	1,733	17	8,470	34,600	8,231	53,051	247	351	7,582	8,322	1,481	17,983
1985 [a]	19,491	166	21,968	3,647	134,928	180,200	1,830	119	6,496	5,312	18,457	32,214	239	20	1,177	1,138	1,036	3,610
1986 [a]	6,395	233	35,600	41,260	146,912	230,400	150	107	688	8,720	8,085	17,750	1,077	19	3,926	3,172	1,719	9,913
1987 [a]	7,080	207	24,279	2,260	102,457	136,283	200	107	1,100	1,251	8,394	11,052	615	924	2,319	1,304	814	5,976
1988 [a]	4,096	1,252	37,214	74,604	107,966	225,132	63	133	1,076	2,159	5,952	9,383	400	782	5,038	2,912	1,583	10,715
1989 [a]	5,707	265	44,091	123	42,625	92,811	24	131	5,150	18,424	4,787	4,947	203	165	4,158	3,564	1,497	9,587
1990 [a]	8,895	434	56,712	501	65,123	131,665	58	234	510	2,233	4,246	7,281	364	198	3,305	7,647	925	12,439
1991 [a]	6,068	203	63,647	-	86,871	156,789	395	166	3,432	3,749	6,375	14,117	404	237	5,800	1,738	1,415	9,594
1992 [a]	4,541	296	105,418	6,284	83,394	199,933	252	163	2,762	13,503	2,944	19,624	204	131	4,671	6,403	523	11,932
1993 [a]	8,972	279	43,283	157,574	53,562	263,670	420	80	3,287	2,599	3,401	9,787	595	10	3,783	2,250	691	7,329
1994	5,285	80	102,140	982,389	18,290	1,108,184	7,375	1,162	22,124	71,065	25,020	126,746	600	18	5,547	7,051	536	13,752
1995	8,860	128	47,863	81,644	42,898	181,393	7,274	3,532	21,088	37,984	39,709	109,587	438	104	3,705	928	394	5,569

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	ALL SUBDISTRICTS																	
	Commercial						Subsistence						Sport					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
1996	4,984	1	68,206	487,441	10,609	571,241	7,245	1,013	25,816	62,432	32,540	129,046	662	100	7,289	5,972	662	14,685
1997 [b]	12,573	161	32,284	20	34,103	79,141	8,989	1,843	16,267	27,088	24,503	78,690	1,106	30	4,393	1,458	278	7,265
1998 [b]	7,429	7	29,623	588,013	16,324	641,396	8,295	1,214	19,007	51,933	20,032	100,480	590	16	4,441	6,939	682	12,668
1999	2,508	0	12,662	0	7,881	23,051	6,144	1,177	14,343	19,917	19,397	60,978	630	0	5,582	3,039	211	9,462
2000	752	14	44,409	166,548	6,150	217,873	4,148	681	17,064	38,308	17,283	77,484	889	45	7,441	2,886	1,097	12,358
2001	213	44	19,492	0	11,106	30,855	5,576	767	14,543	30,253	20,208	71,347	271	39	4,802	360	1,709	7,181
2002	5	1	1,759	0	600	2,365	5,469	763	15,086	64,353	17,817	103,488	802	0	4,211	4,303	818	10,134
2003	12	0	17,058	0	3,560	20,630	4,728	522	11,446	46,336	9,498	72,530	239	572	3,039	2,222	292	6,364
2004 [a]	0	40	42,016	0	6,296	48,352	4,420	458	10,904	71,015	3,598	90,395	535	404	5,806	8,309	498	15,552
2005 [a]	151	280	85,255	0	3,983	89,669	3,305	794	11,846	54,174	4,961	75,080	216	0	3,959	473	36	4,684
2006 [a]	11	3	130,808	0	10,042	140,864	2,876	572	17,242	56,579	5,992	83,261	427	22	11,427	5,317	344	17,110
5-year avg. [c]	76	73	33,116	0	5,109	38,374	4,700	661	12,765	53,226	11,216	82,568	413	203	4,363	3,133	671	8,783
10-year avg. [d]	2,863	55	35,276	124,202	10,061	172,457	5,832	923	15,632	46,581	16,984	85,952	594	121	5,096	3,596	628	10,035

[a] Not all subdistricts were surveyed.

[b] Subsistence totals include data from Savoonga and Gamble.

[c] 2001–2005.

[d] 1996–2005.

Appendix A14.–Sport salmon harvest by species, by year for the Unalakleet River, 1990–2006.

Year	Chinook	Coho	Chum	Pink	Total
1990	276	1,826	298	1,180	3,580
1991	296	2,180	497	437	3,410
1992	117	1,555	379	779	2,830
1993	382	643	116	89	1,230
1994	379	2,425	220	402	3,426
1995	259	2,033	207	222	2,721
1996	384	3,411	463	59	4,317
1997	842	2,784	228	1,055	4,909
1998	513	2,742	447	434	4,136
1999	415	2,691	211	2,946	6,263
2000	345	4,150	403	961	5,859
2001	250	2,766	714	188	3,918
2002	544	2,937	607	1,378	5,466
2003	97	1,604	191	29	1,921
2004	356	3,524	47	2,003	5,930
2005	216	3,959	36	473	4,684
2006	394	4,985	224	891	6,494
2001–2005 avg.	293	2,958	319	814	4,384
1996–2005 avg.	396	3,057	335	953	4,740

Appendix A15.–Sport salmon harvest by species, by year for the Fish/Niukluk, 1990–2006.

Year	Chinook	Coho	Chum	Pink	Total
1990	0	267	216	638	1,121
1991	14	977	272	356	1,619
1992	0	753	15	357	1,125
1993	9	1,185	514	278	1,986
1994	10	1,122	119	231	1,482
1995	18	818	27	136	999
1996	11	1,652	166	404	2,233
1997	71	462	0	58	591
1998	0	316	0	0	316
1999	44	1,365	0	80	1,489
2000	174	1,165	0	51	1,390
2001	0	969	439	161	1,569
2002	75	298	45	254	672
2003	39	216	101	196	552
2004	22	291	435	353	1,101
2005	37	400	0	58	495
2006	0	948	0	134	1,082
2001–2005 avg.	35	435	204	204	878
1996–2005 avg.	47	713	119	162	1,041

Appendix A16.–Comparative salmon aerial survey escapement indices of Norton Sound streams unless noted otherwise, 1961–2006.

	Sinuk River				Nome River			
Year[a]	Chinook	Chum	Pink	Coho	Chinook	Chum	Pink	Coho
1963					-	126	3,719	-
1965					-	294	-	-
1971					-	75	7,765	-
1972					-	710	14,960	-
1973					6	1,760	14,940	-
1974		463	7,766	-	-	854	17,832	-
1975	-	4,662	5,390	-	1	2,161	3,405	-
1976	-							
1977	-	5,207	1,302	-	5	3,046	1,726	-
1978	-	8,756	22,435	-	2	5,242	34,900	-
1979			100					
1980	3	2,022	199,000	1,002	5	7,745	171,350	1,145
1981	-	5,579	350	-	15	1,195	12,565	-
1982	-	638	148,800	-	-	700	327,570	-
1983	48	2,150	10,770	96	2	198	9,170	365
1984	7[b]	493[b]	284,400[b]	192	1	2,084[b]	178,870	839
1985	4	1,910	8,860	33	7	1,967	2,250	242
1986	4	1,960	28,690	-	2	1,150	13,580	-
1987	5	4,540	30	230	3	1,646	1,400[b]	419
1988	3	2,070	4,652[c]	563	3	973	2,490l	1,108[b]
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
1992	1	470	292,400	422	3	813	255,700	691
1993	7	1,570	5,120	104	8	1,520	8,941	276
1994	10	1,140	492,000	307	2	350	265,450	631
1995	-	3,110	1,250	290	-	1,865	182	517
1996	5	1,815	74,100	367	1	799	34,520	723
1997	-	2,975	1,200	57	4	956	65	544
1998	-	630	372,850	322	3	335	179,680	515
1999	-	1,697	180	217	-	375	345	620
2000	-	10	12,608	912	-	658	6,380	1,032
2001	-	3,746	115[d]	750	-	946[d]	790[d]	1,307[d]
2002	-	1,682	28,487	1,290[d]	-	127[d]	295[d]	1,796
2003	-	677	9,885	190	8	337	2,841	604
2004	-	100[d]	1,267,100[d]	2,085	-	3[d]	707,350[d]	1,687
2005	-	1,072	211,000	2,045	2	2,082	212,000	3,541
2006	0	1,115	515,000	2,147	0	394	1,121,000	3,650

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	Flambeau River					Eldorado River			
Year[a]	Chinook	Chum	Pink	Pink & Chum[e]	Coho	Chinook	Chum	Pink	Coho
1961	-	400	80	-					
1962									
1963						-	400	2,000	-
1964									
1966									
1967	-	190	-	-	-				
1968	-	197	1,505	-	-				
1969	-	375	1,994	-	-				
1970	-	1,275	10	-	-				
1971	-	7,110	-	-	-				
1972	-	283	291	-	-				
1973	-	-	-	29,190	-				
1974	-	12,031	2,710	-	-	13	2,143	6,185	-
1975	1	5,097	25,001	-	-				
1976	2	1,195	200	-	-	-	328	1,340	-
1977	1	3,150[d]	20,200[d]	-	-	-	1,835	125	-
1978	-	3,215	260	-	-	-	10,125	12,800	-
1979	2	3,075	300	-	-	-	326	652	-
1980	0	115	0	-	-	6	9,900	55,520	56
1981	3	765	10	-	-	-	15,605	495	-
1982	-	-	-	-	-	2	1,095	163,300	-
1983	-	-	-	-	-	11	994	270	100
1984	2	1,607	570	-	-	14[f]	4,362[d,f]	1,924,935[d,f]	261
1985	-	606	180	-	-	8	6,090	150	67
1986	4	1,590	-	-	-	9	3,490	18,200	-
1987	1	4,960	290	-	-	6	3,860	130	108
1988	-	7,205	350	-	68	17	2,645	1,045	78
1989	-	5,390	-	-	-	-	350	1,550	87
1990	-	905	-	-	96	17	884	2,050	44
1991	-	2,828	7,180	-	-	76	5,755	1,590	98
1992	-	55	-	-	42	2	4,887	6,615	113
1993	-	819	640	-	11	38	2,895	120	111
1994	-	3,612	4	-	213	-	5,140	53,890	242
1995	-	1,876	1,102	-	186	4	9,025	50	247
1996	-	647	355	-	71	21	20,710	40,100	254
1997	-	2,250[d]	200[d]	-	751	40	5,967	10	37
1998	-	2,828	7,180	-	-	-	3,000	123,950	71
1999	-	55	-	-	42	2	1,741	6	45
2000	-	819	640	-	11	2	3,383	16,080	24
2001	-	3,612	4	-	213	2	4,450	8	232
2002	-	1,876	1,102	-	186	8	139	58,700	463
2003	-	647	355	-	71	12	1,257	821	71
2004	-	2,250	200	-	751	-	109[d]	52,000[d]	755
2005	-	2,261	100	-	154	2	5,445	2,050	376
2006	0	16,000	8,800	0	0	0	2,355	156,500	523

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	Fish River					Boston Creek				
Year[a]	Chinook	Chum	Pink	Pink & Chum[e]	Coho	Chinook	Chum	Pink	Pink & Chum[e]	Coho
1961	1	-	-	14,100	-					
1962	48	-	-	28,918	-					
1963	21	-	-	25,728	-	67	1,669	-	-	-
1964	-	18,670	10,935	14,550	-	10	3,315	-	-	-
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	-	3,616	13,050	-	-	57	4,252	3,950	-	-
1973	31	6,887	15,564	-	-	153	3,014	3,213	-	-
1974	3	10,945	15,690	-	-	231	2,426	749	-	-
1975	26	20,114	15,840	-	-	147	1,885	2,556	-	-
1976	1	8,390	15,850	8,550	-					
1977	9	9,664	2,430	-	-	76	1,325	385	-	-
1978	29	26,797	140,600	-	-	136	2,655	74,221	-	-
1979	11	6,893	9,132	-	-	58	882	271	-	-
1980	-	19,100	33,500	-	-	16	2,450	1,510	-	-
1981	90	24,095	450	-	-	-	1,985	-	-	-
1982	-	-	-	241,700	-	10	1,730	22,020	-	-
1983	87	20,037	300	-	-	154	704	-	-	-
1984	42	-	-	293,245	-	35	-	-	47,850	-
1985	303	21,080	7,365	-	-	243	3,450	-	-	-
1986	200	25,190	140	-	-	2	220	0	-	-
1987	193	7,886	0	-	-	583	3,640	0	-	-
1988	36	1,240	29,950[c]	-	-	163	1,015	7,400[c]	-	-
1989						112	1,455	8,440	-	-
1990	58	10,470	51,190	-	-	152	2,560	3,210	-	-
1991	4	390	1,387,000	-	-	68	1,540	50,850	-	-
1992	48	12,695	13,440	-	-	227	4,563	1,930	-	-
1994	55	16,500	910,000	-	-	95	4,270	355,600	-	-
1995	40	13,433	780	-	1,829	78	4,221	-	-	230
1996	189	5,840[c]	684,780	-	-	-	3,505[c]	35,980	-	-
1997	110	19,515	800	-	465	452	4,545	-	-	-
1998	96	28,010	663,050	-	-	255	1,570	175,330	-	-
1999	-	50	20	-	821	-	-	-	-	319
2000	-	-	-	-	805	-	-	-	-	414
2001	8	3,220	1,744	-	1,055	33	3,533	1,038	-	155
2003	95	3,200	1,014	-	-	145	750	701	-	-
2004	19	621	404,430	-	90	93	55	135,000	-	140
2005	0	6,875	319,170	-	-	46	1,675	5,850	-	-
2006	-	-	-	-	532					

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	Niukluk River					Kwiniuk River				
Year[a]	Chinook	Chum	Pink	Pink & Chum[b]	Coho	Chinook[g]	Chum[g]	Pink[g]	Pink & Chum[b]	Coho[g]
1962	11	-	-	27,878	-	3	-	-	23,249	-
1963	1	13,687	4,103	-	-	2	11,340	3,779	-	-
1964	-	8,395	10,495	-	-	-	14,533	-	-	-
1965						14	26,634	8,668	-	-
1966	-	21,300	8,600	4,700	-	7	32,786	10,629	-	-
1967	-	20,546	-	-	-	13	24,444	3,587	-	-
1968	-	-	-	87,093	-	27	18,813	129,052	-	-
1969	-	10,240	92,650	-	-	12	19,687	56,683	-	-
1970	-	7,300	60,350	-	-	-	68,004	226,831	-	-
1971	-	22,605	8,370	-	-	37	39,046	16,634	-	-
1972	-	10,500	22,600	-	-	65	30,686	62,461	-	-
1973	-	15,156	14,790	-	-	57	28,617	37,070	-	-
1974	1	8,720	8,915	-	-	62	35,899	39,375	-	-
1975	-	10,089	16,258	-	-	44	14,344	55,293	-	-
1976	-	4,130	7,190	-	-	12	6,977	35,226	-	375
1977	19	10,456	4,150	-	-	84	22,757	47,934	-	-
1978	2	14,365	208,300	-	-	74[h]	14,408[h]	70,148[h]	-	-
1979	8	1,282	2,119	-	-	107	12,355	167,492	-	-
1980	-	8,915	75,770	-	-	177	19,374	319,363	-	-
1981	-	7,249	-	-	-	136	34,561	566,417	-	-
1982	20	2,557	227,440	-	-	138	44,036	469,674	-	-
1983	54	8,886	50	-	-	267	56,907	251,965	-	-
1984	6	34,572	22,636		998	736	54,043	736,544	-	983[i]
1985	25	11,140	-	-	332[j]	712	9,912	18,237	-	673[i]
1986	2	2,442	0	-	-	653	24,704	241,446	-	421[i]
1987	10	4,145	0	-	257[j]	314	16,134	5,567	-	819[i]
1988	18	6,521	8,160[c]	-	1,095[j]	321	13,301	187,991	-	444[i]
1989	-	-	-	-	182[j]	282	13,689	27,487	-	-
1990	15	6,200	115,250	-	170	744	13,735	416,511	-	746[i]
1991	42	10,700	37,410	-	1,783	587	18,802	53,499	-	809[i]
1992	-	7,770	803,200	-	812	479	12,077	1,464,717	-	532[i]
1993	15	19,910	2,840	-	2,104	565	15,823	43,065	-	1,238[i]
1994	7	16,470	1,294,100	-	274	627	33,010	2,304,099	-	2,547
1995	48	25,358	200	-	2,136	468	42,161	17,509	-	1,625[i]
1996	25	9,732[c]	153,150	-	2,047	567	27,256	907,894	-	1,410[i]
1997	131	16,550	-	-	983	972	20,118	9,536	-	610[i]
1998	51	2,556	205,110	-	593	296	24,248	655,933	-	610[i]
1999	-	640	-	-	619	115	8,763	608	-	223[i]
2000	-	-	-	-	3,812	144	12,878	750,173	-	541[i]
2001	6	2,448	2,856	-	809	258	16,598	8,423	-	9,532
2002	-	-	-	-	1,122	778	37,995	111,410	-	6,459
2003	55	2,315	272	-	146	744	12,123	22,329	-	5,490
2004	15	173	277,900	-	828	663	10,362	3,054,684	-	11,240
2005	6	3,225	154,000	-	-	342	12,083	341,048	-	12,950
2006	-	-	-	0	737	195	39,519	1,347,090	-	22,341

-continued-

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	Tubutulik River					North River				
Year[a]	Chinook	Chum	Pink	Pink & Chum[e]	Coho	Chinook	Chum	Pink	Pink & Chum[e]	Coho
1962	3	-	-	16,690	-	162	-	-	16,087	-
1963	9	16,069	4,355	-	-	287 [h]	-	-	73,274[h]	-
1964	-	15,469	10,043	3,420	-	23	-	-	5,981	-
1965										
1966	-	5,514	26,000	-	-	153	-	-	16,600	-
1967	1	-	-	22,475	-					
1969	3	12,040	12,788	3,045	-					
1970	-	53,290	136,590	-	-	1 [h]	20,655[h]	1,240 [h]	-	-
1971	-	16,820	7,500	5,065	-	256 [h]	-	-	1,047[h]	-
1972	-	8,070	21,100	-	-	561 [g]	2,332[g]	54,934 [g]	-	-
1973	131	5,383	15,665	-	-	298 [g]	4,332[g]	26,542 [g]	-	-
1974	136	9,560	17,940	-	-	196 [g]	826[g]	143,789 [g]	-	-
1975[h]	7	17,141	38,003	-	-	60	5,237	17,885	-	-
1976	-	1,095	6,095	2,600	-	66 [h]	1,963[h]	10,606 [h]	-	-
1977	-	8,540	4,685	-	-	1,275	8,139	4,565	-	-
1978	2	5,865	1,364	-	-	321	9,349	21,813	-	-
1979	-	812	1,624	-	-	735	1,130	9,500	-	-
1980	405	21,616	663,937	-	-	61	2,300	127,900	-	204
1981	30	2,105	480			68	405	575	-	263
1982	49	2,044	53,605	-	-	8	599	168,902	-	4,145
1983	135[k]	16,345[k]	40,797[k]	-	-	347	4,135	4,980	-	-
1984	270	56,210	93,600	-	-	2,844 [g]	2,915[g]	458,387 [g]	-	152
1985[h]	472	13,645	8,940	-	-	1,426 [g]	4,567[g]	4,360 [g]	-	2,045[g]
1986	453	5,975	35,680	-	-	1,613 [g]	3,738[g]	236,487 [g]	-	-
1987	474	9,605	580	-	-	445	392	0	-	680
1988	561	4,662	114,340	-	-	202	30	112,770 [c]	-	240
1990	397	4,350	186,400	-	-	255	1,345	25,685	-	-
1991	661	7,085	26,870	-	-	656	2,435	119,140	-	2,510
1992[h]	260	2,595	138,600	-	-	329	-	631,140	-	398
1993	1,061	8,740	18,650	-	1,395	900	445	13,570	-	1,397
1995	377	16,158	4,020	-	930	622	1,370	18,300	-	690[h]
1996	439	10,790	226,750	-	-	106	270[h]	125,500	-	917
1997	1,946	3,105	16,890	-	-	1,605	9,045	17,870	-	-
1998	894	10,180	1,124,800	-	-	591	50	153,150	-	233
1999	-	-	-	-	-	18	1,480	3,790	-	533
2001	77	863	-	-	-	367	330	-	-	-
2002	42	180	182,000	-	-	122	217	4,590	-	800
2003	50	1,352	60	-	292	131	222	11,010	-	-
2004	321	1,117	391,000	-	779	189	283	264,000	-	1,386
2005	78	1,336	48,203	-	-	156	310	381,150	-	1,963
2006	-	-	-	-	-	-	-	-	-	-

Note: Years for which there are no survey or weir count data are excluded.

[a] Represents "high count" for season.

[b] Boat survey.

[c] Numerous pink salmon made enumerating of chum salmon difficult; pink count may include some chum.

[d] Helicopter survey.

[e] Surveyor unable to distinguish between the 2 species.

[f] Foot survey.

[g] Total counts obtained from counting tower, 1965-2005.

[h] Poor survey conditions or partial survey, poor counting tower conditions.

[i] Aerial survey; not tower count.

[j] Includes counts from Ophir Creek.

[k] Combined tower and aerial survey counts below the tower.

Appendix A17.–Historical migration of salmon and Dolly Varden at Eldorado River counting tower, 1997–2002 and weir, 2003–2006.

Year	Operating Period	Chinook	Chum	Pink	Coho	Sockeye	Dolly Varden
1997	June 29 - Aug 19	98	14,302	1,022	194	n/a	n/a
1998	June 29 - Aug 12	446	13,808	137,283	21	n/a	n/a
1999	July 10 - Sept 1	28	4,218	977	510	n/a	n/a
2000	June 29 - Aug 25	33	11,617	55,992	192	n/a	n/a
2001	July 8 - Sept 13	50	11,635	488	1,509	n/a	n/a
2002	June 24 - Sept 10	26	10,215	119,098	540	10	377
2003	June 21 - Sept 8	29	3,591	173	115	0	60
2004	June 22 - Sept 9	25	3,277	60,866	1,151	57	n/a
2005	June 23 - Sept 2	32	10,369	12,356	689	10	23
2006	June 26 - Aug 3	41	42,105	222,348	55	1	65

Appendix A18.–Historical migration of salmon and Dolly Varden at Pilgrim River counting tower, 1997, and weir, 2003–2006.

Year	Operating Period	Chinook	Chum	Pink	Coho	Sockeye	Dolly Varden
1997	July 12 - Aug 21	356	15,619 [a]	5,557	452	15,619 [a]	n/a
1999	July 13 - Aug 6	6	2,617	35,577	104	4,650	n/a
2000	July 5 - Aug 18	72	861	374	21	12,141	n/a
2002	July 4 - Aug 4	150	5,590	3,882	246	3,888	n/a
2003	June 21 - Sept 14	1,016	15,200	14,100	677	42,729	550
2004	June 21 - Sept 14	925	10,239	50,760	1,573 [b]	85,417	264
2005	June 24 - Sept 5	216	9,685	13,218	304	55,951	112
2006	June 30 - Sept 9	275	45,361	17,701	973	52,323	505

[a] Chum and sockeye escapements were combined due to species identification problems during 1997.

Appendix A19.–Historical migration of salmon and Dolly Varden at Snake River counting tower, 1995–2002 and weir, 2003–2006.

Year	Operating Period	Chinook	Chum	Pink	Coho	Sockeye	Dolly Varden
1995	July 1 - Aug 18	0	4,393	917	856	0	n/a
1996	July 3 - Aug 22	5	2,772	44,558	1,638	0	n/a
1997	July 7 -Aug 18	12	6,184	6,742	1,157	0	n/a
1998	July 1 - Aug 11	0	11,067	219,679	178	0	n/a
1999	July 1 - Aug 14	20	484	116	90	0	n/a
2000	June 29 - Aug 25	28	1,911	4,723	406	0	n/a
2001	July 8 - Sept 5	33	2,182	1,295	1,335	0	n/a
2002	June 28 - Sept 16	9	2,776	4,103	851 [a]	8	149
2003	June 26 - Sept 11	50	2,201	2,856	489	84	111
2004	June 23 - Sept 3	17	2,146	126,917	474	22	290
2005	June 27 - Sept 11	31	2,967	13,813	2,948	275	28
2006	July 1 - Sept 11	32	4,160	74,028	4,776	302	614

[a] Includes 442 coho estimated by aerial survey to be holding below the weir site after the weir was removed.

Appendix A20.–Historical salmon migration at Kwiniuk River counting tower, 1965–2006.

Year [a]	Operating period	Chum	Pink	Chinook	Coho
1965	June 18-Jul 19	32,861	8,668	19	
1966	June 19-Jul 28	32,786	10,629	7	
1967	June 18-Jul 28	26,661	3,587	13	
1968	June 18-Jul 24	19,976	129,052	27	
1969	June 26-Jul 26	19,687	56,683	12	
1970	June 25-Jul 29	66,604	226,831		
1971	June 29-Jul 29	38,679	16,634		
1972	June 28-Jul 27	30,686	62,461	65	
1973	June 25-Jul 25	28,029	37,070	57	
1974	June 20-Jul 26	35,161	39,375	62	
1975	July 4-Jul 26	14,049	55,293	44	
1976	July 4-Jul 25	8,508	35,226	12	
1977	June 26-Jul 25	21,798	47,934		
1978	July 4-Jul 22	11,049	70,148		
1979	June 28-Jul 25	12,355	167,492	107	
1980	June 22-Jul 28	19,374	319,363	177	
1981	June 19-Aug 2	34,565	566,534	136	
1982	June 21-Jul 26	44,099	469,674	138	
1983	June 19-Jul 27	56,907	251,965	267	
1984	June 19-Jul 25	54,043	736,544	736 [b]	
1985	June 26-Jul 28	9,013	18,237	955 [c]	
1986	June 19-Jul 26	24,700	241,446	654	
1987	June 25-Jul 23	16,133	5,566	317	
1988	June 18-July 26	13,303	187,907	321	
1989	June 27-Jul 27	14,529	27,488	248	
1990	June 21-Jul 25	13,957	416,512	900	
1991	June 18-Jul 27	19,801	53,499	708	
1992	June 27-Jul 28	12,077	1,464,716	479	
1993	June 27-Jul 27	15,824	43,063	600	
1994	June 23-Aug 9	33,012	2,303,114	625	2,547
1995	June 21-Jul 26	42,500	17,511	498	114
1996	June 20-Jul 25	28,493	907,893	577	461
1997	June 18-Jul 27	20,119	9,535	974	
1998	June 18-Jul 27	24,247	655,934	303	
1999	June 25-Jul 28	8,763	607	116	
2000	June 22-Jul 27	12,879	750,173	144	41
2001	June 27-Sept 15	16,598	8,423	261	9,532
2002	June 17-Sept 11	37,995	1,114,410	778	6,459
2003	June 15-Sept 15	12,123	22,329	744	5,490
2004	June 16-Sept 14	10,362	3,054,684	663	11,240
2005	June 17-Sept 13	12,083	341,048	342	12,950
2006	June 22 - Sept 12	39,519	1,347,090	195	22,341

Note: Data not available for all species in all years.

[a] Counts from 1965–1994 are from the original project reports located in Nome office of ADF&G and counts for 1995–2003 are from Kohler 2003.

[b] Chinook salmon counts from 1965–1984 were not expanded.

[c] Chinook salmon counts in 1985 and after were expanded.

Appendix A21.–Historical salmon migration at Niukluk River counting tower, 1995–2006.

Year	Operating period	Chum	Pink	Chinook	Coho
1995	June 29-Sept 12	86,332	17,088	123	4,713
1996	June 23-Sept 12	80,178	1,154,922	243	12,781
1997	June 28-Sept 9	57,305	10,468	259	3,994
1998	July 4-August 9	45,588	1,624,438	260	840
1999	June 4-Sept 4	35,239	20,351	40	4,260
2000	July 4-Aug-27	29,573	961,603	48	11,382
2001	July 10-Sept 8	30,662	41,625	30	3,468
2002	June 25-Sept 10	35,307	645,141	621	7,391
2003	June 25-Sept 10	20,018	75,855	179	1,282
2004	June 25-Sept 8	10,770	975,895	141	2,064
2005	June 28-Sept 9	25,598	270,424	41	2,727
2006	June 26 - Sept 8	29,199	1,371,919	39	11,169

Appendix A22.–Historical salmon migration at Nome River counting tower, 1993–1995, and weir, 1996–2006.

Year	Operating period	Chum	Pink	Chinook	Coho	Sockeye
1993	July 25-Aug 28	1,859	13,036	63	4,349	
1994	June 24-Aug 15	2,893	142,604	54	726	
1995	June 22-Sept 6	5,092	13,893	5	1,650	
1996	June 26-Jul 23	3,339	95,681 [a]	5	66	
1997	June 27-Aug 27	5,131	8,035	22	321	
1998	July 01-Aug 11	1,930	359,469	70	96	
1999	July 02-Aug 25	1,048	2,033	3	417	6
2000	June 29-Aug 25	4,056	41,673	25	698	19
2001	July 8-Sept 11	2,859	3,138	7	2,418	55
2002	June 29-Sept 11	1,720	35,057	7	3,418	29
2003	July 5-Sept 10	1,957	11,402	12	548	47
2004	June 25-Sept 12	3,903	1,051,146	51	2,283	114
2005	June 27-Sept 11	5,584	285,759	69	5,848	381
2006	July 2 - Sept 7	5,678	578,555	43	8,308	188

[a] In 1996 the majority of pink salmon escaped through the pickets and were not counted.

Appendix A23.–Historical sockeye salmon migration at Glacial Lake weir, 2001–2006.

Year	Operating period	Sockeye
2001	July 2 - July 28	2,487
2002	June 25 - July 26	1,047
2003	June 24 - July 28	2,004
2004	June 18 - July 25	8,115
2005	June 20 - July 25	11,135
2006	July 4 - July 18	6,849

Appendix A24.–Historical salmon and Dolly Varden migration at Pikmiktalik River counting tower, 2003–2006.

Year	Operating period	Chum	Pink	Chinook	Coho	Dolly Varden
2003	June 19 - July 27	7,707	13,165	345	87	527
2004	June 18 - Aug 31	8,051	50,621	225	11,799	616
2005	June 21 - Sept 07	8,824	56,469	153	17,718	123
2006	June 25 - Sept 10	12,711	45,938	99	9,376	837

Appendix A25.–Historical salmon migration at North River counting tower, 1972–1974, 1984–1986, and 1996–2006.

Year	Operating period	Chum	Pink	Chinook	Coho
1972	July 07 - July 28	2,332	54,934	561	
1973	June 29 - July 23	4,334	26,542	298	
1974	June 25 - July 17	826	143,789	196	
1984	June 25 - July 28	2,915	458,387	2,844	
1985	June 27 - Aug 31	4,567	4,360	1,426	2,045
1986	June 25 - July 18	3,738	236,487	1,613	
1996	June 16 - July 25	9,789	332,539	1,197	1,229
1997	June 16 - Aug 21	6,904	127,926	4,185	5,768
1998	June 15 - Aug 12	1,526	74,045	2,100	3,361
1999	June 30 - Aug 31	5,600	48,993	2,263	4,792
2000	June 17 - Aug 12	4,971	69,703	1,046	6,961
2001	July 05 - Sept 15	6,515	24,737	1,337	12,383
2002	June 19 - Aug 29	6,143	324,595	1,505	3,210
2003	June 15 - Sept 13	9,859	280,212	1,452	5,837
2004	June 15 - Sept 14	10,036	1,162,978	1,125	11,187
2005	June 15 - Sept 15	11,984	1,670,934	1,015	19,189
2006	June 18 - Sept 11	5,385	2,169,890	906	9,835

Appendix A26.–Total escapement for chum, pink, coho, and Chinook salmon for Kwiniuk, Niukluk, Nome, and Snake Rivers (1995–2005), North River (starting 1996), and Eldorado River (starting 1997).

Year	Chum	Pink	Coho[a]	Chinook
1995	138,317	49,409	7,333	626
1996[b]	124,571	2,535,593	16,175	2,027
1997	109,945	163,728	11,434	5,550
1998	98,166	3,070,848	4,496	3,179
1999	55,352	73,077	10,069	2,470
2000	65,007	1,883,867	19,680	1,324
2001	70,451	79,706	30,645	1,718
2002	94,156	2,242,404	21,869	2,946
2003	49,749	392,827	13,761	2,466
2004	40,494	6,432,486	28,399	2,022
2005	68,585	2,594,334	44,351	1,530
2006	171,406	5,763,830	56,484	1,256

[a] Most projects did not operate during the coho season until 2001.

[b] In 1996 the majority of pink salmon for Nome River escaped through the pickets and were not counted.

Appendix A27.–Total escapement (6 rivers) and catch (commercial, subsistence, and sport) for chum, pink, coho, and Chinook salmon for Norton Sound, 1995–2006.

Year[a]	Chum	Pink	Coho	Chinook
1995	221,318	169,965	79,989	17,198
1996[b]	168,382	3,091,438	117,486	14,918
1997[c]	168,829	192,294	64,378	28,218
1998[c]	135,204	3,717,733	57,567	19,493
1999	82,841	96,033	42,656	11,752
2000	89,537	2,091,609	88,594	7,113
2001	103,474	110,319	69,482	7,778
2002	113,391	2,311,060	42,925	9,222
2003	63,099	441,385	45,304	7,445
2004[d]	50,886	6,511,810	87,125	6,977
2005[d]	77,565	2,648,981	145,411	5,202
2006[d]	187,784	5,825,726	215,961	4,570

[a] Kwiniuk, Niukluk, Nome, and Snake Rivers (1995–2006), North River (1996–2006), and Eldorado River (1997–2006).

[b] In 1996, the majority of pink salmon for Nome River escaped through the pickets and were not counted.

[c] Subsistence totals for 1997 and 1998 include data from Savoonga and Gamble.

[d] Not all subdistricts in 2004-2006 were surveyed for subsistence use.

Appendix A28.–Aerial survey numbers of chum, pink, coho, and Chinook salmon for Norton Sound, 1985–2006.

Year[a]	Chum	Pink	Coho	Chinook
1985	74,367	50,342	3,392	3,200
1986	70,459	574,223	421	2,942
1987	53,168	7,997	2,513	1,451
1988	42,287	459,258	3,596	1,744
1989	21,541	69,112	719	447
1990	29,510	796,461	1,594	1,540
1991	69,575	319,459	6,512	2,246
1992	30,597	5,030,222	3,010	1,146
1993	68,980	108,316	6,636	2,869
1994	80,492	5,675,143	4,214	796
1995	118,577	43,393	8,680	1,637
1996	81,364	2,283,129	5,789	1,353
1997	85,026	46,571	3,447	5,260
1998	73,407	3,661,033	2,344	2,186
1999	14,801	4,949	3,439	135
2000	17,748	785,881	7,551	146
2001	39,746	14,978	14,053	751
2002	42,216	386,584	12,116	950
2003	22,880	49,288	6,864	1,240
2004	15,073	6,554,164	19,741	1,300
2005	36,364	1,674,571	21,029	632
2006	59,383	3,148,390	29,398	195

[a] Rivers surveyed were the Sinuk, Nome, Flambeau, Eldorado, Fish, Niukluk, Kwiniuk, Tubutulik, North, and Boston Creek. Not all rivers were surveyed for all the years.

APPENDIX B.

Appendix B1.–Comparative sockeye salmon aerial survey indices, Port Clarence District, 1963–2006.

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
1981	-	-	-
1982	-	-	-
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
2004	23,005	2,855	25,860
2005	41,500	740	42,240
2006	39,400	2,380	41,780

[a] Poor survey.

[b] No survey made.

[c] Boat survey.

[d] Early count.

Appendix B2.–Subsistence surveys conducted in Port Clarence District 1963–1983, 1989, and 1994–2006.

Year [a]	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	0	28	62	14	2,663	2,767
1975	17	0	244	5	743	1,589	2,581
1976	15	7	291	20	436	6,026	6,780
1977 [b]	13	-	-	-	-	-	5,910
1978	26	1	392	0	7,783	705	8,881
1979	26	0	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 [c]	3	17	261	-	615	299	1,192
1989 [d]	15	28	535	472	395	410	1,840
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,f]	204	177	4,495	1,434	4,113	2,430	12,649
2004 [g]	376 [h]	276	8,288	1,031	5,817	2,501	17,913
2005 [g]	335 [h]	152	8,492	726	6,615	2,479	18,464
2006 [g]	345 [h]	102	9,940	1,061	4,939	4,353	20,395

[a] Surveys were not conducted from 1984–1988, and from 1990–1993.

[b] Species composition was estimated at 75% chum, 10% pink, 10% sockeye and 5% Chinook and coho combined.

[c] Data were 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.

[d] Survey conducted by ADF&G Division of Subsistence, which contacted 15 of 43 households in Brevig Mission.

[e] Harvest estimate from ADF&G Division of Subsistence survey.

[f] Includes harvest reported from 59 Pilgrim River permits. 101 permits were issued and 79 were returned.

[g] Beginning in 2004 a permit was required for Port Clarence (including Pilgrim River and Salmon Lake), that replaced household surveys.

[h] The number is all permits issued for the Port Clarence District (including Pilgrim River and Salmon Lake permits).

APPENDIX C.

Appendix C1.–Kotzebue District chum salmon catch statistics, 1962–2006.

Year	Total Catch	Total Days [a]	Boat Days [b]	Catch/Boat Day	Number of Fishers [c]	Season Catch per Fisher
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	45.0	19 [j]	442	3	2,797
2003 [k]	25,423	52.0	32 [j]	770	4	6,356
2004	51,038	51.0	139 [l]	367	43	1,187
2005	75,971	52.0	111 [l]	745	41	1,853
Ave. 1962-2005	198,403	24.5	1,433	241	118	1,779
2006	137,961	9.4	394 [l]	350	42	3,285

[a] Day = 24 hours of open fishing time

[b] Boat days were 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 number of vessels licensed to fish in the Kotzebue District, not number of fishers.

[d] Includes 6,567 chums from the Deering experimental fishery.

[e] Includes 10,704 chums from Deering experimental fishery.

[f] Includes 2,000 chums from the Sikusuilaq Springs Hatchery terminal fishery.

[g] Includes 4,000 chums commercially caught but not sold.

[h] Includes 2,200 chums commercially caught but not sold.

[I] Includes 10 chums commercially caught but not sold.

[j] In 2002–2003 the season was open continuously and boat days are days fished.

[k] An additional 340 chums from the commercial catch were kept for subsistence use.

[l] Boat days are calculated only from hours the buyer reported as having been fished.

Appendix C2.–Kotzebue District chum salmon type of processing and weights, 1962–2006.

Year	Chum Salmon		Other[a]	Fresh Frozen Salmon Roe (pounds)	Cured Pounds
	Cases (48 lbs)	Fresh Frozen (Round weight in pounds)			
1962	14,500				
1963	5,396				
1964	5,421	202,993			
1965	1,929	207,350			
1966		310,716		13,600	3,065
1967		273,420			11,488
1968		288,500			11,850
1969		455,013			8,183
1970		1,240,000			48,377
1971		1,264,753			27,542
1972		1,547,041			55,376
1973		3,416,431			144,768
1974		5,361,130[b]			
1975		4,877,313[c]			
1976		1,415,549	487		
1977		1,846,340	1,075		
1978		1,009,121	32,419		
1979		1,236,429	6,155		
1980		3,160,948	7,828		
1981		6,139,518	2,210		
1982		3,833,051	790	100	
1983		1,647,160	2,449		
1984		2,631,582	1,593		
1985		4,528,379	1,106		
1986		2,271,320	1,691		
1987		900,405	597		
1988		3,060,292	2,120		
1989		2,163,174	1,426		
1990		1,453,040	538		
1991		1,951,041	714		
1992		2,397,302	2,714		
1993 [d]		613,968	1,507	1,000	
1994 [e]		1,166,494	73		
1995		2,329,898	93		
1996 [f]		97,510	51		
1997		1,141,741	649		
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		
2004		419,059	1,450		
2005		621,573	1,258		
2006		1,040,023	0		

Note: Data not available for all years.

[a] Chinook, 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 C3.–Kotzebue District mean prices paid per pound in dollars to salmon fishers by species, 1962–2006.

Year[a]	Chum Salmon Average Weight	Chum Salmon Average Price	Chinook Salmon	Pink Salmon	Inconnu	Dolly Varden
1962		0.35 [b]				
1963		0.35 [b]				
1964	8.3	0.45 [b]				
1965	9.0	0.45			1.30 [b]	
1966	10.1	0.11			1.40 [b]	0.55
1967	9.3	0.11			1.50 [b]	0.75
1968	9.7	0.14			0.91 [b]	0.98
1969	7.5	0.15			1.30 [b]	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 [c]	8.5	0.34			0.30	0.16
1975 [c]	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 [d]	0.15	1.00			0.20
1999	8.0 [d]	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
2004	8.2	0.15	0.72			0.26
2005	8.2	0.20	0.50			0.30
2006	7.5	0.22	0.00	0.00	0.00	0.00

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

[b] Price per fish.

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

[d] Each chum salmon was assumed to weigh 8 pounds, but no fish were weighed individually.

Appendix C4.–Kotzebue District commercial fishery dollar value estimates, 1962–2006.

Year	Gross Value of Catch to Fishers [a]
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
2003	26,377
2004	64,420
2005	124,820
Average 1962–2005	605,937
2006	229,086

[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 and 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 C5.–Kotzebue District commercial and subsistence salmon catches, 1914–1918, and 1957–2006.

	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	70,284	81	868	200,259
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	29,116	164	178	188,780
1971	154,956	1	154,957	31,959	152	210	186,916
1972	169,664	3	169,667	11,894	96	124	181,561
1973	375,432	5	375,437	18,992	101	188	394,429
1974	634,479 [f]	48	634,527	26,744	88	304	661,271
1975	563,682 [g]	36	563,718	27,605	95	291	591,323
1976	159,796	2	159,798	15,715	91	173	175,513
1977	195,895		195,895	9,752	83	117	205,647
1978	111,494	7,007	118,501	12,914	85	152	131,415
1979	141,623	910	142,533	14,605	97	151	157,138
1980	367,284	1,654	368,938	10,629	111	96	379,567
1981	677,239	237	677,476	17,766	71	250	695,242
1982	417,790	57	417,847	30,243	204	148	448,090
1983	175,762	229	175,991	10,287 [h]	46	224	186,278
1984	320,206	107	320,313	15,420 [h]	66	234	335,733
1985	521,406	63	521,469	31,478 [i]	243	130	552,947
1986	261,436	106	261,542	50,458	837	60	312,000
1987	109,467	44	109,511	9,988	[j]	[j]	119,499

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	Commercial Catch				Subsistence Chum Salmon Catch			
Year	Chum	Other [c]	Total		Chum	Number of Fishers Interviewed	Average Catch per Fisher	Total Documented Catch
1988	352,915	152	353,067		13,723	[j]	[j]	366,790
1989	254,617	87	254,704		5,489	[j]	[j]	260,193
1990	163,263	32	163,295		8,268	[j]	[j]	171,563
1991	239,923	44	239,967		14,740	[j]	[j]	254,707
1992	289,184	204	289,388		14,303	[j]	[j]	303,691
1993	73,071 [k]	131	73,202		15,430	[j]	[j]	88,632
1994	153,452 [l]	3	153,455		36,226 [m]	375	97	189,681
1995	290,730	5	290,735		102,881	593	173	393,616
1996	82,110 [n]	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		48,980	592	83	105,097
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 [m,o]	191	88	25,270
2003	25,423	0	25,423		19,201 [m]	446	43	44,624
2004	51,038	116	51,154		24,637	440	63	75,791
2005	75,971	7	75,978		2005 subsistence surveys were not conducted.			
1979-Average	198,673	160	205,928	1994-Average	56,000	450	124	176,070
2006	137,961	17	137,978		2006 subsistence surveys were not conducted.			

Note: Data not available for all years.

[a] There was no commercial fishing during 1919–1961.
[b] Catches for 1914–1918 are from pack data only. Number of chum salmon estimated at 9.5 per case (#48) and 34 per barrel.
[c] Includes Chinook, pink, 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] Information not available.
[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] Does not include the town of Kotzebue.
[n] Includes 2,200 chum salmon commercially harvested on July 29 but not sold.
[o] Only 2 of 6 villages surveyed.

Appendix C6.–Kotzebue District subsistence chum salmon catches by village, 1962–2006.

	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	[a]	[a]	2,321	21,394	48,890	[a]	[a]	[a]	[a]	[a]	[a]	70,284
1963	4,304	1,973	755	1,240	200	8,472	16,762	5,835	[a]	[a]	[a]	[a]	[a]	31,069
1964	2,167	783	2,142	3,134	1,020	9,246	12,763	7,753	[a]	[a]	[a]	[a]	[a]	29,762
1965	5,596	1,598	1,340	2,160	877	11,571	5,671	8,058	5,200	[a]	[a]	[a]	[a]	30,500
1966	3,141	433	912	899	625	6,010	19,700	3,640	6,238	[a]	[a]	[a]	[a]	35,588
1967	2,350	1,489	679	1,500	175	6,193	26,512	4,032	3,098	[a]	162	11	100	40,108
1968	2,424	2,488	457	1,600	1,030	7,999	5,490	4,324	2,838	[a]	37	89	37	20,814
1969	1,301	2,458	3,525	2,550	1,655	11,489	14,458	1,768	1,897	[a]	-	200	-	29,812
1970	6,077	3,457	2,899	3,450	600	16,483	4,120	6,814	1,242	[a]	344	113	-	29,116
1971	7,144	5,177	2,299	2,653	1,931	19,204	9,919	1,737	763	[a]	155	50	131	31,959
1972	1,744	1,435	1,469	2,665	2,119	9,432	741	1,151	369	[a]	59	113	29	11,894
1973	2,312	4,470	1,529	4,406	1,917	14,634	216	1,172	1,098	[a]	1,722	50	100	18,992
1974	6,809	2,726	1,651	6,243	2,251	19,680	4,330	[a]	1,880	[a]	639	15	200	26,744
1975	4,620	4,320	3,390	9,060	1,755	23,145	1,515	[a]	1,175	[a]	1,540	[a]	230	27,605
1976	1,555	1,579	2,000	4,213	562	9,909	4,448	[a]	1,358	[a]	[a]	[a]	[a]	15,715
1977	891	766	385	1,760	325	4,127	2,125	[a]	3,500	[a]	[a]	[a]	[a]	9,752
1978	2,034	1,493	2,224	4,766	852	11,369	1,495	[a]	[a]	[a]	[a]	50	[a]	12,914
1979	2,155	1,225	2,400	2,947	651	9,378	2,227	[a]	2,000	[a]	1,000	[a]	[a]	14,605
1980	2,229	2,551	660	2,704	350	8,494	2,135	[a]	[a]	[a]	[a]	[a]	[a]	10,629
1981[b,c]	3,488	1,439	782	2,800	950	9,459	5,465	2,387	295	110	50	[a]	[a]	17,766
1982[b]	7,433	4,918	2,506	4,191	600	19,648	5,479	4,099	807	210	[a]	[a]	[a]	30,243
1983[b,d]	277	223	1,062	3,556	368	5,486	4,035	347	219	200	[a]	[a]	[a]	10,287
1984[b,e]	[a]	[a]	2,990	4,241	[a]	7,231	6,049	88[b]	1,940	200	[a]	[a]	[a]	15,420
1985	7,015	3,494	3,487	3,115	300	17,411	[a]	13,494	573	[a]	[a]	[a]	[a]	31,478
1986	8,418	[a]	[a]	4,483	[a]	12,901	1,246	36,311	[a]	[a]	[a]	[a]	[a]	50,458
1987	5,092	[a]	[a]	1,975	[a]	7,067	2,921	[a]	[a]	[a]	[a]	[a]	[a]	9,988
1988	7,500	[a]	[a]	6,223	[a]	13,723	[a]	[a]	[a]	[a]	[a]	[a]	[a]	13,723
1989	[a]	[a]	[a]	3,894	[a]	3,894	1,595	[a]	[a]	[a]	[a]	[a]	[a]	5,489
1990	4,353	[a]	[a]	[a]	[a]	4,353	3,915	[a]	[a]	[a]	[a]	[a]	[a]	8,268
1991	6,855	[a]	[a]	4,248	[a]	11,103	3,637	[a]	[a]	[a]	[a]	[a]	[a]	14,740
1992	8,370	[a]	[a]	3,890	[a]	12,260	2,043	[a]	[a]	[a]	[a]	[a]	[a]	14,303
1993	8,430	[a]	[a]	3,730	[a]	12,160	3,270	[a]	[a]	[a]	[a]	[a]	[a]	15,430
1994	8,157	1,891	2,860	7,982	5,722	26,612	6,126	[a]	3,488	[a]	[a]	[a]	[a]	36,226
1995	15,485	5,985	8,558	5,880	2,959	38,867	6,359	50,708	[a]	[a]	[a]	[a]	6,947	102,881
1996	13,611	5,935	9,062	8,649	1,819	39,076	10,091	50,573	[a]	[a]	[a]	[a]	[a]	99,740
1997	14,323	3,064	2,713	5,513	629	26,242	5,309	26,355	[a]	[a]	[a]	[a]	[a]	57,906

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	Village					Kobuk River	Noatak	Village						District
Year	Noorvik	Kiana	Ambler	Shungnak	Kobuk	Villages	Village	Kotzebue	Deering	Kivalina	Buckland	Candle	Shishmaref	Total
1998	9,845	3,414	2,432	4,676	1,031	21,398	2,614	24,968	[a]	[a]	[a]	[a]	[a]	48,980
1999	17,843	3,788	590	3,868	1,869	27,958	1,616	64,768	[a]	[a]	[a]	[a]	[a]	94,342
2000	10,391	2,876	5,009	2,944	318	21,538	7,293	37,144	[a]	[a]	[a]	[a]	[a]	65,975
2001	16,540	5,500	[a]	4,310	2,843	29,193	2,326	17,713	[a]	[a]	[a]	[a]	[a]	49,232
2002	13,943	[f]	[f]	[f]	[f]	[f]	2,937	[f]	[a]	[a]	[a]	[a]	[a]	16,880
2003	7,982	3,010	1,719	2,860	1,453	17,024	2,177	[a]	[a]	[a]	[a]	[a]	[a]	19,201
2004	6,025	3,896	3,446	4,186	3,087	20,640	3,997	[a]	[a]	[a]	[a]	[a]	[a]	24,637
2005	2005 subsistence catches not surveyed													
2006	2006 subsistence catches not surveyed													

[a] Not surveyed.

[b] No household survey; information is from return of mail questionnaires.

[c] Does not include 310 chum salmon taken in Selawik.

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

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

[f] The Kotzebue Sound communities of Ambler, Kiana, Kobuk, Kotzebue, and Shungnak, though normally included, were not surveyed in 2002 (Georgette et al. 2003).

Appendix C7.–Kotzebue District average subsistence chum salmon harvest per household by village, 1962–2006.

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	[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	78	18	151	42	8	76	81	[a]
2000	48	72	93	33	72	64	11	[a]
2001	23	24	152	62	[a]	94	109	[a]
2002	[a]	29	121	[a]	[a]	[a]	[a]	[a]
2003	[a]	21	58	32	26	57	43	[a]
2004	[a]	50	56	46	56	75	111	[a]
2005	2005 subsistence catches not surveyed							
2006	2006 subsistence catches not surveyed							

[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 interviews were conducted.

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

APPENDIX D.

Appendix D1.–Norton Sound herring and spawn-on-kelp harvests (in tons) by U.S. commercial fishers, 1909–2006.

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	-

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Year	Sac Roe Herring	Food or Bait Herring	Total	Spawn on Kelp
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 [i]
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
2004 [f]	-	11	11	-
2005	1,951	-	1,951	-
2006	646	25	671	1

[a] Fishery occurred some years, but harvest unavailable. Fishery from 1909–1941 occurred near Golovin, and from 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 *Macrocystis* kelp.

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

[f] No commercial fishery took place in 1992 and no sac roe fishery took place in 2004.

[g] Total includes an estimate 50 st of wastage.

[h] Total includes an estimate 5 st of wastage. Includes approximately 1,000 lbs taken as bait.

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

[j] Includes an estimate 5 st of wastage.

[k] Includes an estimate 15 st of wastage.

Appendix D2.–Japanese gillnet herring catches in Norton Sound, 1968–1977.

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.

Note: Catches are North of 63 N. Latitude and East of 167 W. Longitude.

Appendix D3.–Commercial herring fishery summary information, Norton Sound District, 1979–2006.

Year	Estimated Biomass (tons)	Catch Gillnet (tons)	Beach Seine (tons)	Wild Kelp (tons)	*Macrocystis* Kelp (lbs.)	Number of Fishers	Dollar Value (millions)	Number 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/05-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	08-June	03-June/11-June
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-June	06-June/28-May
1985	20,000	3,379	169			277	1.4	11	9.9	20-June	13-June/21-June
1986	28,100	4,979	215			323	2.9	10	9.6	09-June	03-June/10-June
1987	32,370	3,759	323			564	2.6	11	8.6	07-June	07-June/08-June
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[a]	57,974	0	0				0.0			20-June[b]	
1993	46,549	4,291	742			264	1.5	5	9.9	25-May	24-May/05-June
1994	31,088	921	40			215	0.3	6	10.3	08-June	05-June/09-June
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/09-June
1999	34,314	2,755	0		7,482	122	0.6	4	10.5	17-June	13-June/22-June
2000	32,680	4,390	81		4,500	97	0.8	4	9.5	11-June	07-June/15-June
2001	26,305	2,245	0		4,400	76	0.3	3	12.3	12-June	12-June/16-June
2002	27,068	1,123	0		0	46	0.1	2	10.6	24-May	22-May/03-June
2003	32,918	1,608	0		1,750	32	0.2	2	10.5	18-May	16-May/25-May
2004[a]	34,180	11	0	0	0	4	0.0	0		24-May[b]	
2005	43,013	1,951	0	0	0	56	0.3	1	11.4	04-June	03-June/10-June
2006	24,635[c]	671[d]	0	0.57	0	41	0.1	1	10.2	09-June	08-June/11-June

[a] No fishery due to late sea ice breakup in 1992 and no sac roe fishery in 2004 due to lack of a buyer.

[b] Date of peak aerial survey biomass estimate, typically 1 or 2 days prior to peak catch.

[c] Biomass estimate does not include surveys of subdistricts 4-7 due to lack of funding and ice conditions.

[d] Twenty-five tons out of total sac roe herring catch was sold off as bait to NSEDC.

Appendix D4.–Norton Sound commercial herring harvest (tons) by subdistrict, by year, 1979–2006.

	Subdistricts							
Year [a]	**1**	**2**	**3**	**4**	**5**	**6**	**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	1 [i]	3,976 [j]
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	0	750	0	0	0	0	1,123
2003 [l]	283	0	1,325	0	0	0	0	1,608
2004	0	0	0	0	0	0	11	11
2005 [l]	783	9	1,149	0	10	0	0	1,951
2006	191	0	480	0	0	0	0	671

[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] Approximately 1,000 lbs of herring bait was taken under 5 AAC 27.971 in June (not during sac roe fishery).

[j] Does not include an estimated 5 st of wastage.

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

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

APPENDIX E.

Appendix E1.–Historical commercial summer harvest of red king crab from Norton Sound Section, Eastern Bering Sea, by statistical areas, 1977–2006 (catch in pounds).

Statistical Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
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		
636402											
646301											
646330					4,716						
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
656401			138,011	121,147	253,387	60,480	11,422	183,119	246,200		194,408
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
666401		179,212	486,947	205,400	381,510	79,580	325,045	116,254	5,341	408,848	50,744
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 (tons)	259	1,046	1,466	593	690	114	184	194	214	240	164

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Statistical Area	1988	1989	1990	1991[a]	1992	1993	1994	1995	1996[b]	1997	1998
616331							48				
616401								35			
626331									61		
626401								18,971	45,045	18,066	8,065
626402											
636330									4,560	3,838	2,449
636401		22,030			1,159	1,373	8,087	24,329	70,677	59,206	10,771
636402							1,754	3,466			
646301								4,628	13,888		
646330		5,212						1,493	2,894	314	
646401						1,963	37,222	105,045	22,834	1,052	3,194
646402						730	143,511	66,821			
656300											
656330	36,129	1,757			4,814	265		19,745	15,446	4,661	4,078
656401	165,644	100,956	171		53,119	105,341	29,566	32,289	9,985	4,035	1,127
656402						193,079	106,053	44,000			
666230											
666300									25,519		
666330	13,020	1,275	27,185		4,305	31,758		730			
666401	21,895	115,257	162,263		10,632	746	396		3,001	1,816	
666402						535	1,221				
666431								1,124			
676300									546		
676330											
676400			3,212						9,775		
676430											
676501											
686330											
Totals (tons)	118	123	96		37	168	164	161	112	46	15

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Statistical Area	1999	2000	2001	2002	2003	2004	2005	2006	Total
616331	633	4,557		3,506	646			2,357	19,640
616401									35
626331				2,455				1,415	43,973
626401	508	4,689	61,620	53,722	15,899	23,113	94,130	118,202	498,831
626402					1,352				40,347
636330			2,253				126	26,680	39,906
636401	14,201	126,994	91,343	50,906	83,949	166,489	227,204	224,531	1,296,528
636402									5,220
646301									18,516
646330	3,021		1,868	1,955		2,226	4,097	2,629	30,425
646401	221		4,287		3,952	1,964	149	1,660	358,366
646402									292,779
656300					14	932		284	178,103
656330	1,300		20,869	12,374	21,176	46,288	47,411	17,752	1,244,326
656401	2,739	94,813	55,158	63,038	40,566	21,579	9,405	28,434	2,026,139
656402					1,441		380	807	1,170,329
666230								1,721	57,288
666300								18,245	366,045
666330		5,839	7,030	1,332	1,296	12,359	142	5,041	1,562,486
666401	930	60,762	43,771	35,970	83,998	42,452	727	600	2,824,097
666402				30,070	12,873	23,344	16,025	1,050	1,382,028
666431				4,274	45				151,472
676300									140,015
676330									158,598
676400									807,867
676430									21,177
676501							1,008		1,044
686330									1,860
686431								340	340
Totals (tons)	12	149	144	130	134	170	200	226	7,369

Note: Data not available or no harvests were recorded for all statistical areas or years.

[a] No commercial fishery occurred in 1991.

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

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

				Population Abundance Estimates			Legal Male
		Research		Number of crab [a]			Biomass
Year	Date	Agency	Gear	Pre-two males [b]	Pre-one Males [b]	Legal Males [c]	(millions of lbs.)
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 - 8/05	NMFS	Trawl			809,799	2,429,397
1980 [e]	7/04 - 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	7/06 - 7/20	ADF&G	Pots			353,273	1,059,819
1982	9/05 - 9/11	NMFS	Trawl	356,724	832,581	877,722	2,633,166
1985	7/01 - 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	9/07 - 9/18	ADF&G	Trawl	452,580	325,699	536,235	1,608,705
1999	7/28 - 8/07	ADF&G	Trawl	103,832	940,198	1,594,341	4,783,023
2002	7/27 - 8/06	ADF&G	Trawl	427,703	518,638	771,569	2,314,707
2006	7/25 - 8/08	ADF&G	Trawl	775,076	569,833	726,251	2,178,753

Note: Data not available for all years.

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

[b] Pre-two males were defined as 76–89 mm in carapace length (CL) and pre-one males were defined as 90–104 mm in CL.

[c] Legal male red king crabs were defined as ≥ 121 mm (4.75 in) in carapace width for the pot surveys and all ADF&G trawl surveys (except for 1996, when legals were defined as at least 105 mm CL), and ≥ 104 mm CL for all of the NMFS trawl surveys (except the 1979 survey which defined legal males as at least 100 mm CL).

[d] Pre-two male and pre-one 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 E3.–Historical summer commercial red king crab fishery economic performance, Norton Sound Section, Eastern Bering Sea, 1977–2006.

	Guideline Harvest Level	Legal Male Population Est.		Commercial Harvest (lbs) [a,b]		Total Number (incl. CDQ)			Total Number of Pots		Total Exvessel	Total Fishery Value	Season Length	
Year	(lbs) [b]	No. crab (millions)	lbs [b]	Open Access	CDQ	Vessels	Permits	Landings	Registered	Pulls	Price/lb	(millions $)	Days	Dates
1977	[c]	1.7	5.1	0.52		7	7	13	[c]	5,457	0.75	0.229	60	[c]
1978	3.00			2.09		8	8	54	[c]	10,817	0.95	1.897	60	6/07-8/15
1979	3.00	0.8	2.4	2.93		34	34	76	[c]	34,773	0.75	1.878	16	7/15-7/31
1980	1.00	1.9	5.7	1.19		9	9	50	[c]	11,199	0.75	0.890	16	7/15-7/31
1981	2.50	1.2	3.6	1.38		36	36	108	[c]	33,745	0.85	1.172	38	7/15-8/22
1982	0.50	0.9	2.7	0.23		11	11	33	[c]	11,230	2.00	0.405	23	8/09-9/01
1983	0.30			0.37		23	23	26	3,583	11,195	1.50	0.537	3.8	8/01-8/05
1984	0.40			0.39		8	8	21	1,245	9,706	1.02	0.395	13.6	8/01-8/15
1985	0.45	1.1	3.3	0.43		6	6	72	1,116	13,209	1.00	0.427	21.7	8/01-8/23
1986	0.42			0.48		3	3	[c]	578	4,284	1.25	0.600	13	8/01-8/25 [d]
1987	0.40			0.33		9	9	[c]	1,430	10,258	1.50	0.491	11	8/01-8/12
1988	0.20	1.0	3.0	0.24		2	2	[c]	360	2,350	[c]	[c]	9.9	8/01-8/11
1989	0.20			0.25		10	10	[c]	2,555	5,149	3.00	0.739	3	8/01-8/04
1990	0.20			0.19		4	4	[c]	1,388	3,172	[c]	[c]	4	8/01-8/05
1991	0.34	1.3	3.9	No Summer Fishery										
1992	0.34			0.07		27	27	[c]	2,635	5,746	1.75	0.130	2	8/01-8/03
1993	0.34			0.33		14	20	208	560	7,063	1.28	0.430	52	7/01-8/28 [e]
1994	0.34			0.32		34	52	407	1,360	11,729	2.02	0.646	31	7/01-7/31
1995	0.34			0.32		48	81	665	1,900	18,782	2.87	0.926	67	7/01-9/05
1996	0.34	0.5	1.5	0.22		41	50	264	1,640	10,453	2.29	0.519	57	7/01-9/03 [f]
1997	0.08			0.09		13	15	100	520	2,982	1.98	0.184	44	7/01-8/13 [g]
1998	0.08			0.03	0.00	8	11	50	360	1,639	1.47	0.041	65	7/01-9/03 [h]
1999	0.08	1.6	4.8	0.02	0.00	10	9	53	360	1,630	3.08	0.073	66	7/01-9/04 [i]
2000	0.33	1.4	4.2	0.29	0.01	15	22	201	560	6,345	2.32	0.715	91	7/01- 9/29 [j]
2001	0.30	1.3	3.8	0.28	0.00	30	37	319	1,200	11,918	2.34	0.674	97	7/01- 9/09 [k]
2002	0.24	1.0	3.1	0.24	0.01	32	49	201	1,120	6,491	2.81	0.729	77	6/15-9/03 [l]
2003	0.25	1.0	3.1	0.25	0.01	25	43	236	960	8,494	3.09	0.823	68	6/15-8/24 [m]
2004	0.35	1.6	4.4	0.31	0.03	26	39	227	1,120	8,066	3.12	1.063	51	6/15-8/08 [n]
2005	0.37	1.7	4.8	0.37	0.03	31	42	255	1,320	8,867	3.14	1.264	73	6/15-8/27 [o]
2006	0.45	1.6	4.5	0.42	0.03	28	40	249	1,320	8,695	2.26	1.021	68	6/15-8/22 [n]

[a] Deadloss included in total. Data not available for all years.
[b] Millions of pounds.
[c] Information not available.
[d] Fishing actually began 8/12.
[e] Fishing actually began 7/8.
[f] Fishing began 7/9 due to fishers' strike.
[g] First delivery was made 7/10.
[h] First delivery was made 7/16.
[i] The season was extended 24 hours due to bad weather.
[j] Open access fishery (OA) closed 8/29. CDQ fishery opened 9/1-9/29.
[k] OA closed 9/1. CDQ fishery opened 9/1-9/9.
[l] OA was 7/1-8/6. CDQ fishery opened 6/15-6/28 and 8/9-9/3.
[m] OA was 7/1-8/13. CDQ fishery opened 6/15-6/28 and 8/15-8/24
[n] CDQ fishery opened 6/15-6/28. OA opened 7/1 to the end date.
[o] OA was 7/1-8/15. CDQ fishery opened 6/15-6/28 and 8/17-8/27.

Appendix E4.–Percentage of recruit and postrecruit male red king crab from summer commercial fishery catch samples in Norton Sound Section, Bering Sea, 1977–2006.

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
2004	49	51
2005	36	64
2006	25	75

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

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

[c] No summer commercial fishery.

Appendix E5.–Winter commercial and subsistence red king crab harvests, Norton Sound, Eastern Bering Sea, 1978–2006.

Commercial			Subsistence						
Year [a]	Number of Fishers	No. Crab Harvested	Winter[b]	No. Permits Issued	No. Permits Returned	No. Permits Fished	Total Crab Caught [c]	Total Crab Harvested[d]	Average No./ Permits Fished
1978	37	9,625	1977–1978	290	206	149	[e]	12,506	84
1979	1	221	1978–1979	48	43	38	[e]	224	6
1980	1	22	1979–1980	22	14	9	[e]	213	24
1981	0	0	1980–1981	51	39	23	[e]	360	16
1982	1	17	1981–1982	101	76	54	[e]	1,288	24
1983	5	549	1982–1983	172	106	85	[e]	10,432	123
1984	8	856	1983–1984	222	183	143	15,923	11,220	78
1985	9	1,168	1984–1985	203	166	132	10,757	8,377	63
1986	5	2,168	1985–1986	136	133	107	10,751	7,052	66
1987	7	1,040	1986–1987	138	134	98	7,406	5,772	59
1988	10	425	1987–1988	71	58	40	3,573	2,724	68
1989	5	403	1988–1989	139	115	94	7,945	6,126	65
1990	13	3,626	1989–1990	136	118	107	16,635	12,152	114
1991	11	3,800	1990–1991	119	104	79	9,295	7,366	93
1992	13	7,478	1991–1992	158	105	105	15,051	11,736	112
1993	8	1,788	1992–1993	88	79	37	1,193	1,097	30
1994	25	5,753	1993–1994	118	95	71	4,894	4,113	58
1995	42	7,538	1994–1995	166	131	97	7,777	5,426	56
1996	9	1,778	1995–1996	84	44	35	2,936	1,679	48
1997	2	83	1996–1997	38	22	13	1,617	745	57
1998	5	984	1997–1998	94	73	64	20,327	8,622	135
1999	5	2,714	1998–1999	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	2000–2001	50	27	12	366	256	21
2002	11	2,591	2001–2002	114	101	67	8,805	3,669	55
2003	13	6,853	2002–2003	107	73	64	9,052	4,140	65
2004	2	522	2003–2004	96	77	41	1,775	1,181	29
2005	4	2,121	2004–2005[f]	170	102	60	6,496	3,973	66
2006	1	75	2005-2006[f]	98	97	67	2,083	1,239	18
Avg 1978–2005	9	2,438	Avg 1977–2005	119	92	70	8,320	5,204	65

[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 2 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.

[f] Prior to 2005, permits were only given out of the Nome ADF&G office. Starting with the 2004-5 season, permits were also given out in Elim, Golovin, Shaktoolik, and White Mountain.

Appendix E6.–Size composition by percent of red king crab from winter research pots near Nome, Norton Sound, Bering Sea, 1983–2006.

	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
2004	9	40	49 [d]	37	13	50
2005	16	24	41 [d]	25	34	59
2006	29	33	63 [d]	16	22	38

[a] Sublegals = male crabs less than 4 3/4" carapace width. Legals = male king crabs greater than 4 3/4" carapace width.

[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 F.

Appendix F1.–Kotzebue District winter commercial sheefish harvest statistics, 1967–2006.

Year [b]	Number of Fishers	Number of Fish	Pounds [a] Total	Pounds [a] Average	Price per 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
2004	1	37	474	12.8	1.91	905
2005 [g]	All Information Confidential					
2006 [e]						

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

[g] Less than 4 deliveries, data confidential under Alaska Statute 16.05.815. Prior to 2005, confidentiality was waived by permit holders.

Appendix F2.–Kotzebue District reported subsistence harvests of sheefish, 1966–2006.

Year[a,b]	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 [c,d]	130	4,704	36
5/83-4/84 [c,d]	27	764	28
5/84-9/84 [c]	30	2,803	93
1985 [b,e]	2	60	30
1986 [b,c,e]	72	721	10
1987 [b,e]	46	276	6
1988	No subsistence survey conducted in 1988.		
1989	No subsistence survey conducted in 1989.		
1990	No subsistence survey conducted in 1990.		
1991	40	2,180	55
1992	43	2,821	66
1993	46	2,441	53
1994	171	3,181	19
1995 [f]	314	9,465	30
1996 [f]	389	6,953	18
1997 [f]	338	9,805	25
1998 [f]	435	5,350	14
1999 [f]	191	8,256	19
2000 [f]	237	7,446	17
2001 [f]	363	3,838	9
2002	101	3,882	38
2003	488	7,823 [g]	16
2004	440	8,897	20
2005	No subsistence survey conducted in 2005.		
2006	No subsistence survey conducted in 2006.		

[a] Due to limited survey effort during many years, total catch and effort should be regarded as minimum numbers only and are not comparable year to year.

[b] Villages were not surveyed for subsistence sheefish harvests from 1985 to 1990, and after 2004.

[c] Catch by village for these years are presented in separate tables in respective year annual management reports.

[d] Summer catches only; winter catches were not documented.

[e] Catches were reported during the fall chum salmon subsistence surveys and may include summer as well as winter harvests.

[f] Subsistence sheefish harvests are from villages on Kobuk River.

[g] Includes 10 reported from commercial salmon fishery and used for subsistence.

Appendix F3.–Kotzebue District incidentally caught and sold Dolly Varden during the commercial salmon fishery, 1966–2006.

Year	Number of Fish Sold	Estimated Total Catch [a]	Pounds Sold	Average Weight [b]	Average Price
1966	3,325				0.55 [c]
1967	367		2,606	7.1	0.11
1968	3,181		21,949	6.9	0.14
1969	1,089 [d]				2.84 [c]
1970	2,095				
1971	3,828 [e]		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 [f]		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 [g]		16	5.3	0.17
1982	3,447		23,648	6.9	0.20
1983	190 [g]	845	1,108	5.8	0.20
1984	347 [g]	1,090	2,104	6.1	0.25
1985	454	3,600	3,177	7.0	0.25
1986	5 [g]	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
2004	124	[h]	846	6.8	0.26
2005	181	[h]	1,158	6.4	0.30
2006	0	278	0	[i]	0.00

Note: Data not available for all years.

[a] Estimate includes fish caught but not sold based on interviews of fishers or fish tickets.

[b] Some data extrapolated from average reported weight.

[c] Price per fish.

[d] Includes 269 taken by permit.

[e] Includes 179 taken by permit.

[f] Includes 234 taken during commercial sheefish fishery.

[g] Limited Dolly Varden market; many fish were taken home or dumped.

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

[i] Dolly Varden caught but not sold were not weighed.

Appendix F4.–Subsistence harvests of Dolly Varden from the villages of Kivalina and Noatak, 1959–2006.

	Kivalina		Noatak
Year	Number	Pounds	Number [a]
1959 [b]	34,240	85,600	
1960 [b]	49,720	124,300	
1962			27,623
1963			4,130
1968 [c]	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 [d]			
1979 [e]	14,600		9,060
1980			7,220
1981	15,000-18,000		3,056
1982	18,438 [c]		2,676 [d, f]
1983	16,270 [e]		4,545
1984	12,000 [e]		2,542
1985	10,500 [e]		
1986	7,436 [e]		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 [g]			5,670
2004 [g]			10,914
2005	Subsistence survey not conducted in 2005.		
2006	Subsistence survey not conducted in 2006.		

Note: Data not available for all years.

[a] No data available on poundage.

[b] From Wilimovsky and Wolfe 1966.

[c] Harvest data from Stephen Braund and Associates.

[d] Storm and ice conditions prevented fall harvest.

[e] Harvest data from Division of Sport Fish surveys.

[f] Expanded estimates (see text on subsistence fishery in the 1982 annual management report, Schwarz 1982).

[g] Based on ADF&G, Division 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 F5.–Aerial survey counts of overwintering and spawning Dolly Varden in the Kotzebue District, 1968–1969, 1976–2006.

		Overwintering	
Year [a]	Noatak River Spawner Survey [b]	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 [e]	[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 [e]	[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 [g]	70,704	[f]
2000	[f]	[f]	[f]
2001	[f]	92,614	[f]
2002	[f]	44,257	[f]
2003	[f]	1,500 [h]	[f]
2004	[f]	100,806	[f]
2005	[f]	120,848	[f]
2006	[f]	108,352	[f]

Note: Data not available for all years.

[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] Surveys conducted by Division of Sport Fish since 1979.

[d] Poor weather hampered or prevented survey.

[e] Incomplete survey.

[f] Not surveyed.

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

[h] Spawning survey conducted very early (8/20/03).

Appendix F6.–Subsistence whitefish catch and effort in the Kotzebue District, 1970–1971, 1977–1993, 1997–2006.

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	446	73,242
2004	440 [f]	50,501
2005	Subsistence survey not conducted in 2005.	
2006	Subsistence survey not conducted in 2006.	

Note: Data not available for all years.

[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] Subsistence harvest information is from Ambler, Kiana, Kobuk, Noatak, Noorvik, and Shungnak.

[g] Subsistence harvest information is from Noatak and Noorvik.

APPENDIX G.

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, 2006.

HERRING

Herring Test Fishing

a) Location: Norton Sound ocean waters; camps at Cape Denbigh and a 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 (ADF&G) project.

SALMON

Kobuk River Test Fish

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. ADF&G project.

Unalakleet River Test Fish

a) Location: Unalakleet River, approximately 3 miles upstream from village of Unalakleet at first bluff; and, at village of Unalakleet.

b) Description: To maintain an index of migration up the Unalakleet River using test gillnets. Sample commercial catch for age and size at Unalakleet. ADF&G project.

Kwiniuk River Tower

a) Location: Kwiniuk River, approximately 5 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. ADF&G project with additional funding from Norton Sound Initiative (NSI) and NSEDC.

-continued-

Niukluk River Tower

a) Location: Niukluk River, approximately 5 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. ADF&G project with additional funding from NSI and NSEDC.

North River Tower

a) Location: North River, approximately 2 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 ADF&G.

Eldorado River 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 ADF&G, and funded by Kawerak Inc., BSFA, NSI, and NSEDC.

Glacial Lake 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. Collect age and sex data through escapement sampling of weir trap. Cooperative project by NSEDC and ADF&G.

Nome River 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. Collect age and sex data through escapement sampling of weir trap or beach seining sampling. ADF&G project with additional funding from NSI and NSEDC.

-continued-

Pilgrim River 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 ADF&G, BSFA, Norton Sound Initiative (NSI), and NSEDC.

Snake River Weir

a) Location: Snake River, approximately 5 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 ADF&G, and funded by Kawerak Inc., BSFA, NSI, and NSEDC.

Fish River Coho 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 at the Niukluk Tower.

b) Description: Seine and gill net coho salmon for monitoring upriver migrations to determine drainage wide distribution, peak spawning areas, and timing. Estimate drainage population using ratio of tagged to untagged coho salmon that pass the Niukluk tower. Estimate stock origin of Niukluk and Fish River coho 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.

Unalakleet River Coho Salmon Radiotelemetry

a) Location: Unalakleet River, approximately 3 miles upstream from the village of Unalakleet. Ground-based radio telemetry receiving and recording stations in four locations: just below tag site; main confluence of North and Unalakleet Rivers; at the North River Tower; and one up the main Unalakleet River.

b) Description: Seine coho salmon for monitoring upriver migrations to determine drainage wide distribution, peak spawning areas, and timing. Estimate drainage population using ratio of tagged to untagged coho salmon that pass the North tower. Estimate stock origin of North and Unalakleet River coho salmon through collection of age, length, and sex data. Additional escapement estimates done with aerial surveys on tributary rivers and creeks. Project by ADF&G Commercial Fisheries, ADF&G Sport Fish, and Unalakleet IRA with funding from OSM.

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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. ADF&G project with additional funding from NSEDC, BLM and NSI.

Juvenile Chum Salmon Ecology Project

a) Location: Safety Sound and Nome River, 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.

Nome River Coho Salmon Smolt Abundance

a) Location: Nome River, throughout.

b) Description: Trap and tag coho salmon smolt to estimate abundance. To determine juvenile coho 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.

Hobson Creek Incubation Project

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

b) Description: Incubation facility for supplemental salmon production. Chum and coho salmon eggs were taken in 2006 and incubated over the winter. Nome Fishermen's Association project with funding from NSEDC. Land leased by Fish & Game from Sitnasuak Native Corporation. Fish & Game facility provided.

Mist Incubation and Egg Planting Project

a) Location: Nome and Snake Rivers.

b) Description: Collection of chum salmon eggs from the Nome and Snake Rivers. Eggs where incubated and planted in both rivers. Collection of coho salmon eggs from the Snake River. Eggs where incubated and planted in Moonlight Springs off of the Snake River. NSEDC project.

Nome River Chum Salmon Habitat Mapping

a) Location: Nome River, throughout.

b) Description: Mapping chum salmon spawning locations. Nome Fishermen's Association project with funding from NSI.

-continued-

Snake River Chum Salmon Habitat Mapping

a) Location: Snake River, throughout.

b) Description: Mapping chum salmon spawning locations and describing habitat characteristics at those locations. Kawerak project with funding from Kawerak, NSEDC, and NSI.

Genetic Variation in Chum Salmon Population

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

b) Description: Collecting and analyzing chum salmon genetic samples from 14 rivers in the region to determine population structure. Kawerak project with funding from AYK SSI and NSEDC.

Using Otolith to Study Straying and Population Dynamics

a) Location: Norton Sound, throughout.

b) Description: A pilot study to collect and analyze otolith from coho and chum salmon from Nome Niukluk fish and Unalakleet Rivers. USGS project with assistance form Kawerak with funding from AYK SSI.

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. Subsistence salmon permits were issued in northern Norton Sound and Port Clarence Districts by the Division of Commercial Fisheries. Saint Michael, Shaktoolik, Stebbins, and Unalakleet were surveyed by Commercial Fisheries Division. ADF&G project.

CRAB

Near shore Winter King Crab Study

a) Location: Ocean waters of Norton Sound, 1 to 1.5 miles south of Nome and 7 miles west to 5 miles east of Nome.

b) Description: Document the abundance and distribution of red king crab in near shore Nome waters. Tag all male new shell red king crab with carapace length $\leq$ 100 mm. ADF&G project.

Norton Sound Red King Crab Trawl Survey (Conducted in 2006; next survey 2008)

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 presence-absence data taken. ADF&G project with financial assistance from the National Oceanic and Atmospheric Administration (NOAA).

Appendix G3.–Commercial processors and buyers operating in Norton Sound, Port Clarence, and Kotzebue Sound, 2006.

Company	Address	Type of Processing	District
Aqua Tech	P.O. Box 10119 Anchorage, AK 99510	Fresh Crab	Norton Sound
Norton Sound Seafoods	Nome, AK 99762 and Unalakleet, AK 99684	Frozen/Fresh Salmon Herring Roe King Crab	Norton Sound
Great Pacific	Anchorage, AK	Buy and Fly	Kotzebue Sound

Appendix G4.–Norton Sound subsistence salmon harvest survey form, 2006.

NORTON SOUND 2006 SUBSISTENCE SALMON HARVEST SURVEY
Alaska Department of Fish and Game

Community ID#_____
Household ID#_____

Community: _____
Survey Date: _____
Interviewer: _____

Household Size: _____
(If new household) PO Box:_____

Household participation is voluntary. Individual household data will not be released without permission of household head.

1. **Did your household fish for salmon for subsistence use this year? (Include fishing with a rod and reel)** ☐ YES ☐ NO

2. **Does your household <u>usually</u> subsistence fish for salmon?** ☐ YES ☐ NO

<u>FOR SALMON FISHING HOUSEHOLDS ONLY ("Yes" to #1)</u>

3. **Please estimate how many salmon your household caught for subsistence use this year, including with a rod and reel. It is important not to double count fish harvests. Report only your share of the catch if fishing with others. Include salmon you gave away, ate fresh, fed to dogs, lost to spoilage, or obtained from helping others process fish.**

SPECIES	NUMBER OF SALMON YOUR HOUSEHOLD HARVESTED (BY GEAR TYPE)			Of your TOTAL HARVEST how many salmon were caught JUST for dog food? (Number of fish)
	SUBSISTENCE GILL NET or SEINE (Number of fish)	ROD & REEL (Number of fish)	KEPT FROM COMMERCIAL FISHING (Number of fish)	
CHUM SALMON Dog				
CHINOOK SALMON King				
PINK SALMON Humpy				
SOCKEYE SALMON Red				
COHO SALMON Silver				

4. **How was subsistence <u>chum</u> salmon fishing for your household this year ?**

☐ VERY GOOD ☐ AVERAGE ☐ POOR **IF POOR, why?**_____

5. **Does anyone in your household trade or barter subsistence-caught fish with people in other households or communities?**

☐ YES ☐ NO

6. **Comments or Suggestions?**

RED KING CRAB

Emergency Order: 3-C-Z-01-06 Effective Date: June 15, 2006

EXPLANATION: This emergency order opens the commercial CDQ crab fishery in Norton Sound from 12:00 noon Thursday, June 15 until 12:00 noon Wednesday, June 28.

JUSTIFICATION: 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 2005 Norton Sound crab fishery is 370,000 pounds. By regulation, the CDQ fishery is allocated 7.5% of the summer season harvest. Therefore, the CDQ harvest quota is set at 27,750 pounds. Only fishers designated by the Norton Sound and Yukon Delta 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.

Emergency Order: 3-C-Z-02-06 Effective Date: August 22, 2006

EXPLANATION: This emergency order closes the commercial open access king crab fishery in Norton Sound at 12:00 noon Tuesday, August 22.

JUSTIFICATION: Through August 21st approximately 398,700 pounds of king crab have been harvested in the Norton Sound Open Access fishery. The GHL for the 2006 summer open access fishery is 419,950 pounds of crab. There are 28 vessels registered and 215 deliveries have been made. It is expected that the GHL will be reached by 12:00 noon Tuesday, August 22.

HERRING

Emergency Order: 3-H-Z-1-06 Effective Date: June 7, 2006

EXPLANATION: This emergency order opens the Norton Sound District to commercial gillnet herring fishing beginning 12 p.m. Wednesday, June 7 through June 12, unless superseded by another emergency order.

JUSTIFICATION: The preseason biomass projection for the Norton Sound District is 41,257 tons with an allowable gillnet harvest of 6,702 tons. The buyer has indicated to the department that they intend to buy only 1,000 to 1,500 tons of herring. The buyers have a maximum daily processing capacity of 360 tons. Only 40 to 50 fishers are expected to participate.

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On June 6, an estimated 700 tons of herring were spotted in Subdistrict 1, near St. Michael Island, by a helicopter pilot. A survey by Fish & Game located 165 tons the following morning and the buyer requested that the fishery be open at noon, June 7 to allow for commercial fishing as soon as marketable herring are present. This will enable the buyer to direct the commercial fleet where to test fish and if roe quality is acceptable to keep fishing with no down time. By opening all subdistricts of the Norton Sound District the buyer has maximum flexibility to move their tenders to any location where herring are spotted.

With the limited processing capacity Norton Sound District will be open continuously to allow the most optimal herring fishing schedule as determined by the buyers and the fishers. Fishers have been informed to keep in close contact with the buyers to monitor roe quality and harvest capacity.

The buyer has notified the department that because of previous commitments the last day they will buy herring will be June 12. Likely the commercial harvest will be 10 to 15 percent of the allowable quota. As the Norton Sound herring population biomass has been high and stable in recent years, opening the fishery to commercial fishing should not jeopardize the resource or subsistence fishing.

Emergency Order: 3-H-Z-2-06 Effective Date: June 13, 2006

EXPLANATION: This emergency order opens Subdistrict 1 from Canal Point to Wood Point to wild kelp harvest.

JUSTIFICATION: A Norton Sound herring permit holder has notified the department that he has a market for 2,000 to 4,000 pounds of spawn-on-kelp. The permit holder has not participated in the sac roe herring fishery and wishes to harvest kelp. Permit holders can only harvest kelp if they have not participated in the sac roe or herring pound fishery. Spawning has occurred for less than one week and the kelp should be of marketable quality. The wild kelp fishery will be open for one week to allow for any factors such as weather or mechanical problems delaying the harvest of the kelp. Up to 30 metric tons may be taken in the wild kelp fishery and the harvest of 4,000 pounds should not affect subsistence harvests or future herring returns.

KOTZEBUE SALMON

Emergency Order: 3-S-X-01-06 Effective Date: July 10, 2006

EXPLANATION: This emergency order opens commercial fishing in the Kotzebue District until September 1, 2006. Commercial permit holders may fish at any time a market is available for their catch.

-continued-

JUSTIFICATION: One major commercial salmon buyer has registered to purchase Kotzebue chum salmon this season. The buyer has limited quantities of ice and the Kotzebue airport will be closed up to 12 hours per day for maintenance and that will affect the buyer's ability to ship fish out. The season normally opens on July 10 and by regulation closes after August 31. The buyer has notified the department that they would like to begin purchasing fish on July 10. The forecast was for a harvest of 100,000 to 150,000 chum salmon this year. 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, 2006. Permit holders can choose when they want to fish according to market conditions. Having the fishery open 24 hours per day will allow the buyer to determine the fishing schedule that will provide for maximum quality of salmon based on processing time and airline schedules. With a limited market and an expected low number of participating permit holders, similar to recent years, achieving escapement goals are not expected to be a problem. If escapement becomes a concern then a restricted fishing schedule will go into effect. Permit holders will have to make use of any salmon the buyer does not purchase. If any dumping of salmon occurs the department will close the fishery and meet with buyers and permit holders and design a schedule that is more efficient and to remind permit holders that the buyer is not required to buy any salmon not meeting quality standards.

Emergency Order: 3-S-X-02-06 Effective Date: August 2, 2006

EXPLANATION: This emergency order closes commercial fishing in the Kotzebue District until superseded by subsequent emergency order.

JUSTIFICATION: Catches of chum salmon in the department test net on the Kobuk River near Kiana have been the worst in the 14-year history of the project. At first the catch indices were thought to be low because of high water affecting net efficiency, but the test net has had record catches of sheefish. Discussion by telephone with IRA personnel in villages along Kobuk River and with subsistence fishers in Kobuk River villages confirmed lots of sheefish in their nets, but low numbers of chum salmon. The previous low cumulative test net index of 494 in 1993 resulted in aerial survey goals being met, but just by 5% over the goal. As of August 1 the cumulative test net index is 130 compared to 223 in 1993. Historically, the first week of August is the peak week in the commercial fishery as the latter half of the Kobuk River chum salmon run combines with the increasing number of Noatak River chum salmon entering the Kotzebue Sound fishing district. A closure to commercial fishing is necessary at this time to provide an opportunity for more chum salmon to move upstream in the Kobuk River for subsistence and escapement needs.

Emergency Order: 3-S-X-03-06 Effective Date: August 7, 2006

EXPLANATION: This emergency order opens commercial fishing in the Kotzebue District for two 6-hour fishing periods.

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JUSTIFICATION: The two major chum salmon stocks caught in the Kotzebue commercial fishery are from the Kobuk River and Noatak River. Historically by the second week of August the majority of the commercial catch is comprised of Noatak River stocks. The fishing periods on Monday and Tuesday will help to determine early run strength of Noatak River stocks. Also, fishing periods of shorter duration should allow remaining Kobuk River chum salmon more opportunity to pass through the commercial fishing district.

The season chum salmon catches at the department test fish project on the Kobuk River, near Kiana, are the lowest in the 14-year project history. The total catch this season is less than one-half the catch in the previous worst year of chum salmon test fish catches. Historically, the first week of August produces the best chum salmon catches at the test net. However, after a slight upswing at the test net, with double digit chum salmon catches in late July, the catches began to drop in early August. In recent days there has been some improvement as chum salmon catches are again in double digits and higher catches should be seen at the test net later in week as a result of the four day commercial fishing closure. Further fishing commercial fishing time will be dependent on run strength as determined by commercial catch indices and sufficient escapement upstream to allow for subsistence and spawning needs. Two 6-hour fishing commercial fishing periods should not jeopardize subsistence or escapement.

Emergency Order: 3-S-X-04-06 Effective Date: August 10, 2006

EXPLANATION: This emergency order opens commercial fishing in the Kotzebue District for 6-hour fishing periods Monday through Friday from 5:00 a.m. until 11:00 a.m. beginning Thursday, August 10, and ending Friday, August 18.

JUSTIFICATION: The most recent commercial catches in the Kotzebue District were strong. On Monday August 7th, 5,521 chum salmon were caught by 22 permit holders, and 22 fishers caught 8,143 chum salmon on Tuesday, August 8th. The two major chum salmon stocks caught in the Kotzebue commercial fishery are from the Kobuk and Noatak rivers. However, by the second week of August, the commercial catch is comprised largely of Noatak River chum salmon. Additionally, the current fishing schedule is brief and should allow the majority of the few remaining Kobuk River chum salmon to pass through the commercial fishing district and reach the spawning grounds.

The 2006 chum salmon catch at the department test fish project on the Kobuk River, near Kiana, is the lowest in the 14-year project history. The total catch this season is less than one-half the catch in the previous worst year of chum salmon test fish catches. Historically, the first week of August produces the best chum salmon catches at the test net. However, after a slight upswing at the test net, with double digit chum salmon catches in late July, the catches began to drop in early August. In recent days, chum salmon catches at the test net have improved and are again in double digits. Further fishing commercial fishing time will be dependent on run strength as determined by commercial catch indices and sufficient escapement upstream to allow for subsistence and spawning needs. The brief 6-hour commercial fishing periods should not jeopardize subsistence or escapement.

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Emergency Order: 3-S-X-05-06 Effective Date: August 18, 2006

EXPLANATION: This emergency order reopens commercial fishing in the Kotzebue District until September 1, 2006. Commercial permit holders may fish at any time a market is available for their catch.

JUSTIFICATION: Catches this week in the commercial fishery have been well above average for mid-August. Department test fishing on the Kobuk and Noatak Rivers has indicated good numbers of chum salmon moving upstream this week. Subsistence fishers in the villages report greatly improved catches of chum salmon. The buyer has been affected by airline schedules in shipping fish out and by the lengthening hours of darkness and will likely have their fleet fish no more than 6 hours per day. 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, 2006. Permit holders can choose when they want to fish according to market conditions. Having the fishery open 24 hours per day will allow the buyer to determine the fishing schedule that will provide for maximum quality of salmon based on processing time and airline schedules. If escapement becomes a concern then the department will again return to a restricted fishing schedule.

NORTON SOUND SALMON

Emergency Order: 3-S-Z-01-06 Effective Date: June 15, 2006

EXPLANATION: This emergency order sets the subsistence salmon fishing schedule for the Nome Subdistrict and catch limits for the Nome Subdistrict, Pilgrim River, and Kuzitrin River.

JUSTIFICATION: Since 1991 Subdistrict 1, the Nome Subdistrict, has closed to salmon fishing beginning on June 15th and opened periodically during the season based on salmon run strength. In 1999 Subdistrict 1 became a Tier II chum salmon fishery because of declining chum runs. If the forecast is below the amount necessary for subsistence (ANS) a Tier II situation exists and Subdistrict 1 is closed to the taking chum salmon except for Tier II permit holders. This year the department forecast is that the chum salmon run will exceed the ANS and Tier II restrictions will not be required. Catch limits are still in effect for the various marine and fresh water subsistence areas and are listed on the back of the permits. Most catch limits have been doubled because of the expected strong run of all species of salmon. The last two years most salmon limits were waived in mid-season because of strong runs. In addition the Pilgrim River and Kuzitrin River also have catch limits. All catch limits are listed on the permits. The Nome River has the subsistence gillnet area further restricted to downstream of the VOR site in order to protect salmon escapement upstream of the weir.

The department staff will be flying frequent aerial surveys and boating some of the rivers to track the salmon migration 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, catch limits will be lifted in that area.

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Emergency Order: 3-S-Z-02-06 Effective Date: July 6, 2006

EXPLANATION: This emergency order allows subsistence fishing with beach seines for one 48-hour period in Nome Subdistrict subsistence areas.

JUSTIFICATION: Record numbers of pink and chum salmon have been caught in the department test net in the Unalakleet River. Salmon counts at other escapement projects have been increasing rapidly with near record passage of chum salmon. Pink and chum salmon have been observed in large numbers in the lower river areas of Nome Subdistrict streams. Catch limits are in effect for the various marine and fresh water subsistence areas and are listed on the back of the permits. Most catch limits have been doubled because of the expected strong run of all species of salmon. The last two years most salmon limits were waived in mid-season because of strong runs. The Nome River has the subsistence gillnet area further restricted to downstream of the VOR site in order to protect salmon escapement upstream of the weir.

Opening the subsistence areas to one 48-hour fishing period will allow fishers to harvest salmon while drying weather is best and should not jeopardize escapement based on the expected large returns of salmon this year.

Emergency Order: 3-S-Z-03-06 Effective Date: July 7, 2006

EXPLANATION: This emergency order waives the pink salmon limit for the Nome Subdistrict as set out in emergency order 3-S-Z-01-06.

JUSTIFICATION: Tens of thousands of pink salmon are in Nome Subdistrict rivers and projections show that over one million pinks will be returning to Nome Subdistrict waters. There is one escapement goal set in Nome River of 13,000 pinks. That goal will likely be surpassed today and therefore all limits on pink salmon are waived in Nome Subdistrict waters.

Emergency Order: 3-S-Z-04-06 Effective Date: July 10, 2006

EXPLANATION: This emergency order closes all fresh waters and marine waters in Subdistrict 6, the Unalakleet Subdistrict, and all marine waters in Subdistrict 5, the Shaktoolik Subdistrict to salmon gillnet fishing. Beach seining is allowed in the Unalakleet River, but all king salmon captured must be returned to the water immediately.

JUSTIFICATION: The department test net on the Unalakleet River has not caught any king salmon for four consecutive days and the cumulative catch is only three-quarters of the ten year average. At the North River, a tributary of the Unalakleet River, the tower counts dropped from the peak count of 96 kings on July 2, to three consecutive days of counts in the 20s. The cumulative escapement count is 348 king salmon. The historical midpoint of the run at the tower is July 10 and even using late run timing models the king escapement is now projected to fall below the minimum escapement goal of 1,200 king salmon. The last two years the minimum escapement goal was not met at North River and there were at least 200 more kings past the

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tower by this date in those previous years. To have any chance of reaching the escapement goal a closure to king salmon fishing is necessary. All salmon nets must be removed from all fresh waters and marine waters of Subdistrict 6, the Unalakleet Subdistrict, and the marine waters of Subdistrict 5, the Shaktoolik Subdistrict, and no gillnet with a mesh 4 inches or greater may be used in the above mentioned waters closed to salmon gillnets. The marine waters of the Shaktoolik Subdistrict are being closed as tagging studies have shown an intermingling of Shaktoolik and Unalakleet Subdistrict fish in each Subdistrict. Beach seining is allowed in the Unalakleet River to harvest salmon other than king salmon. Any king salmon caught in beach seines must be returned to the water immediately.

Emergency Order: 3-S-Z-05-06 Effective Date: July 10, 2006

EXPLANATION: This emergency order allows subsistence fishing with beach seines for the next two weeks from 6 p.m. Monday until 6 p.m. Wednesday and from 6 p.m. Thursday until 6 p.m. Saturday in Nome Subdistrict subsistence areas.

JUSTIFICATION: Pink salmon are passing in near record numbers at the Nome River. The escapement goal is 13,000 pinks and already 86,000 pinks have passed through the weir as of July 8. The pink escapement is on track to reach 1 million fish. Other rivers in the Nome Subdistrict have tens of thousands of pink salmon. Catch limits are in effect for the various marine and fresh water subsistence areas and are listed on the back of the permits, except the pink salmon limit was waived a few days ago. The last two years most salmon limits were waived in mid-season because of strong runs. The Nome River has the subsistence gillnet area further restricted to downstream of the VOR site in order to protect salmon escapement upstream of the weir.

Emergency Order: 3-S-Z-06-06 Effective Date: July 12, 2006

EXPLANATION: This emergency order waives the chum salmon limit for the Nome Subdistrict as set out in emergency order 3-S-Z-01-06.

JUSTIFICATION: Fourteen thousand chum salmon have passed at Eldorado River weir. The escapement goal range is 6,000 to 9,200 chums. Nome and Snake River weirs are nearing the low end of the escapement goal range and historically the quarter point of chum escapement is now. All goals are expected to be exceeded and all limits on chum salmon are now waived in Nome Subdistrict waters.

Emergency Order: 3-S-Z-07-06 Effective Date: July 14, 2006

EXPLANATION: This emergency order waives the sockeye salmon limit for the Nome Subdistrict as set out in emergency order 3-S-Z-01-06.

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JUSTIFICATION: Four thousand sockeye have passed at Glacial Lake weir. The escapement goal at Glacial Lake is an aerial survey goal of 800 – 1,600 sockeye salmon. Thousands more salmon were seen below the weir and therefore all limits on sockeye salmon are now waived in Nome Subdistrict waters.

Emergency Order: 3-S-Z-08-06 Effective Date: July 18, 2006

EXPLANATION: This emergency order changes the subsistence salmon fishing schedule for the Nome Subdistrict to the coho salmon season schedule. Catch limits for the Nome Subdistrict for coho salmon and for salmon in the Pilgrim and Kuzitrin River are in effect.

JUSTIFICATION: In Subdistrict 1, the Nome Subdistrict, escapements have been reached for chum, pink and sockeye salmon. The coho salmon subsistence fishing schedule allows for up to five days a week fishing in the ocean as opposed to three days a week fishing during chum salmon season. The Nome Subdistrict by regulation is scheduled to switch to 5 days/week fishing on July 26. As escapement has already been reached, for salmon species preceding the coho salmon run, the fishing schedule will be liberalized earlier in the season to allow subsistence fishers further opportunity to catch salmon. The coho salmon limits of 40 fish in the ocean and coho salmon limits listed for the rivers remain in effect.

Emergency Order: 3-S-Z-09-06 Effective Date: July 19, 2006

EXPLANATION: This emergency order reopens the fresh waters of the Unalakleet River downstream of the confluence of the South River and all other fresh waters and marine waters in Subdistrict 6, the Unalakleet Subdistrict, and all marine waters in Subdistrict 5, the Shaktoolik Subdistrict to salmon gillnet fishing. Beach seining is allowed in the Unalakleet River, but all king salmon captured must be returned to the water immediately.

JUSTIFICATION: The department test net on the Unalakleet River has had a late surge of king salmon after the both Subdistrict 5 and 6 marine waters and the fresh waters of Subdistrict 6 were closed over a week ago. The test net has caught 28 king salmon in the last 5 days, and that is one-third of the test net's king catch this season. Before the recent closure, the preceding 10 days king catches at the test net were 2 fish. With over one-third of the season's king catch in the last few days the closure had the desired effect of increasing king salmon in the Unalakleet River drainage. Coho salmon catches in the last few days have reached double digits at the test net and the cumulative catch is 77 coho salmon. For comparison the 5, 10, and 20, year averages are one or less coho salmon caught in the test net by this date. Furthermore, the chum and pink catches at the test net have been records this season.

To allow subsistence opportunity the marine waters of Subdistrict 5 and 6 will reopen and all fresh waters of Subdistrict 6, except the Unalakleet River will reopen to salmon gillnets. The Unalakleet River, downstream of the confluence of the South River, will be reopen to salmon

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gillnets. The restriction on the Unalakleet River upstream of the South River will remain in effect to protect king salmon as the escapement is still projected to fall below the minimum escapement goal of 1,200 king salmon at North River. Beach seining is allowed in the Unalakleet River to harvest salmon other than king salmon. Any king salmon caught in beach seines must be returned to the water immediately.

Emergency Order: 3-S-Z-10-06 Effective Date: July 21, 2006

EXPLANATION: This emergency order opens the Unalakleet and Shaktoolik Subdistricts to commercial salmon fishing for one 24-hour period beginning on 6 p.m. Friday, July 21 until 6 p.m. Saturday, July 22. Only gillnets with a mesh size of 6 inches or less are allowed to be fished.

JUSTIFICATION: The department is projecting a strong run of coho salmon this season. The 2004 and 2005 coho runs had early run timing and were strong. Coho salmon passage in 2006 is also showing similar run timing and strength. As of July 18, the Unalakleet River test net has caught over 100 coho salmon, which is a new record for this date. In addition, the North River Tower coho passage is 300 cohos and is the third highest on record by this date. This 24-hour commercial fishing period will give the department another index of coho run strength and enable the buyer to determine if the chum and pink salmon incidental catch is acceptable. This brief commercial fishing period should not jeopardize subsistence fishing or coho salmon escapement needs.

Emergency Order: 3-S-Z-11-06 Effective Date: July 21, 2006

EXPLANATION: This emergency order waives the sockeye salmon limit for the Pilgrim River.

JUSTIFICATION: Thirty thousand sockeye salmon have been counted through the weir on Pilgrim River. Historically the run is usually at the three-quarter point now. The aerial survey goal is 4,000 to 8,000 sockeyes at Salmon Lake. Permit data the last two years indicates that less than 2,000 sockeyes are harvested above the weir and under good conditions well over half of the sockeyes in Salmon Lake are observed during an aerial survey. The escapement goal has been exceeded and all sockeye limits are now waived. Limits on other salmon as listed on the permit are still in effect.

Emergency Order: 3-S-Z-12-06 Effective Date: July 24, 2006

EXPLANATION: This emergency order opens Subdistricts 5 and 6, the Unalakleet and Shaktoolik Subdistricts, to commercial salmon fishing for one 24-hour period beginning on 6 p.m. Monday, July 24 until 6 p.m. Tuesday, July 25. Only gillnets with a mesh size of 6 inches or less are allowed to be fished.

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JUSTIFICATION: The coho catches for the first 24-hour fishing period in Shaktoolik and Unalakleet Subdistricts were records for this date. There were 1,156 chums and 619 cohos caught in Shaktoolik Subdistrict by 8 permit holders and there were 2,115 cohos, 362 chums and 1 sockeye caught by 17 permit holders in Unalakleet Subdistrict. Both coho catches were records for this early in the season. The department test net in the Unalakleet River has had record coho catch to date and the North River tower coho passage is double the 5-year average. The normal fishing schedule is two 48-hour fishing periods a week, but the buyer has requested a 24-hour period because of high chum catches. This brief commercial fishing period should not jeopardize subsistence fishing or coho salmon escapement needs.

Emergency Order: 3-S-Z-13-06 Effective Date: July 25, 2006

EXPLANATION: This emergency order sets the subsistence salmon fishing restrictions when fishing with hook and line in northern Norton Sound where hook & line is legal subsistence gear.

JUSTIFICATION: The limit of three coho salmon per day when hook and line fishing is in effect to protect overharvest of the species. Coho salmon can be easily targeted by hook and line and in many areas in Norton Sound there is no subsistence limit. The fresh water subsistence areas in the Nome Subdistrict already have limits and hook and line fishers can take the subsistence limit in those areas. The bag and possession limits specified in sport fish regulations apply in all other areas to protect salmon from overharvest.

Emergency Order: 3-S-Z-14-06 Effective Date: July 26, 2006

EXPLANATION: This emergency order opens the Unalakleet and Shaktoolik Subdistricts to commercial salmon fishing for two 48-hour periods a week. Beginning 6 p.m. Wednesday, July 26 commercial salmon fishing will be open from 6 p.m. Wednesday until 6 p.m. Friday and from 6 p.m. Sunday until 6 p.m. Tuesday. Only nets with a mesh size no larger than 6 inches will be allowed.

JUSTIFICATION: Commercial catches for the two 24-hour openers in the Unalakleet and Shaktoolik Subdistricts were excellent for this early in the season. Cumulative catches were 1,357 cohos for the Shaktoolik Subdistrict and 4,859 cohos in the Unalakleet Subdistrict. Thus far, the incidental chum salmon catch has remained below the coho catch.

As of July 25, the Unalakleet River Test Net has caught a total of 142 coho salmon, which is a record for this date. The North River Tower has a cumulative coho salmon count of 1134 and is the fourth highest for this date. The 2004 and 2005 coho salmon runs were strong and the 2006 run is showing similar early run strength and timing.

This week is usually the start of the coho salmon run into the Unalakleet and Shaktoolik Subdistricts and allowing the normal commercial fishing schedule should not jeopardize subsistence fishing or coho salmon escapement needs.

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Emergency Order: 3-S-Z-15-06 Effective Date: August 19, 2006

EXPLANATION: This emergency order waives the coho salmon limit for the marine waters of the Nome Subdistrict and doubles the fresh water subsistence areas limit as set out in emergency order 3-S-Z-08-06 and listed on the Nome Subdistrict subsistence permit.

JUSTIFICATION: Coho salmon have been entering Norton Sound streams at near record to record numbers. In the Nome Subdistrict the midpoint of the run at the escapement counting projects is usually the last week of August, and escapement counts are nearly double last years record counts for this date.

Emergency Order: 3-S-Z-16-06 Effective Date: September 1, 2006

EXPLANATION: This emergency order closes the northwest portion of Salmon Lake to subsistence fishing.

JUSTIFICATION: By regulation Salmon Lake is closed to subsistence fishing from July 15 until September 1. Historically Salmon Lake has been closed to all salmon fishing to protect spawning salmon. However, the department has the option to allow the harvest of salmon from the lake after August 31. Limited numbers of spawning salmon in most years has resulted in Salmon Lake being closed to salmon fishing throughout the year. In the last four years there have been record runs to Salmon Lake. The department is opening the northeast half of Salmon Lake to subsistence fishing o allow the harvest of some salmon. The subsistence limit is set at 50 sockeye salmon and fishers cannot fish within 100 feet of any tributary. The northwest half of Salmon Lake will remain closed to protect the majority of the spawning grounds and the sockeye salmon there. Having a small harvest on the mostly spawned out sockeye salmon should not jeopardize future runs to Salmon Lake.

Emergency Order: 3-S-Z-17-06 Effective Date: September 3, 2006

EXPLANATION: This emergency order changes the commercial fishing schedule for the upcoming week from starting at 6:00 p.m. Sunday to starting at 6:00 p.m. Monday. The weekly two 48-hour commercial fishing periods will be combined and commercial fishing will be open from 6 p.m. Monday until 6 p.m. Friday. This change was requested by the buyer because of the Labor Day holiday affecting the plane schedules.

JUSTIFICATION: Silver salmon catches have set records for both the Shaktoolik and Unalakleet Subdistricts this season. By regulation the season closes after September 7, but because of Labor Day plane schedules affecting fish shipments the buyer has requested a change from the schedule. Allowing this change should not jeopardize subsistence fishing and escapement needs.

Emergency Order: 3-S-Z-18-06 Effective Date: September 10, 2006

EXPLANATION: This emergency order extends the commercial fishing schedule for the

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upcoming week. The weekly two 48-hour commercial fishing periods will be combined and commercial fishing will be open from 6 p.m. Sunday until 6 p.m. Thursday.

JUSTIFICATION: Silver salmon catches have set records for both the Shaktoolik and Unalakleet Subdistricts this season. By regulation the season closes after September 7. However, the Unalakleet River test net has had record catches for the season and for the month of September. The test net catch on September 8 of 77 silvers was the second best of the season. Allowing an extra week of commercial fishing should not jeopardize subsistence fishing and escapement needs.