Fishery Management Report No. 10-49

2008 Annual Management Report
Norton Sound, Port Clarence, and Kotzebue

by

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and

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December 2010

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)

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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ABSTRACT

This report provides information for the 2008 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; Pacific herring *Clupea pallasi*, red king crab *Paralithodes camtschaticus*, and miscellaneous species such as inconnu (sheefish) *Stenodus leucichthys*, whitefish *Coregonus laurettae*, Dolly Varden *Salvelinus malma*, and saffron cod *Eleginus gracilis.*

Key words: 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*.

INTRODUCTION

This report summarizes the 2008 season and historical information concerning management of the commercial and subsistence fisheries of Norton Sound-Port Clarence and Kotzebue Areas 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 1–18 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.

SECTION 1: MANAGEMENT AREA OVERVIEWS

BOUNDARIES

Norton Sound, Port Clarence and Kotzebue Areas include all waters from Point Romanof in southern Norton Sound to Point Hope, and St. Lawrence Island (Figure 1). This area encompasses 65,000 mi², and has a coastline exceeding that of California, Oregon, and Washington combined.

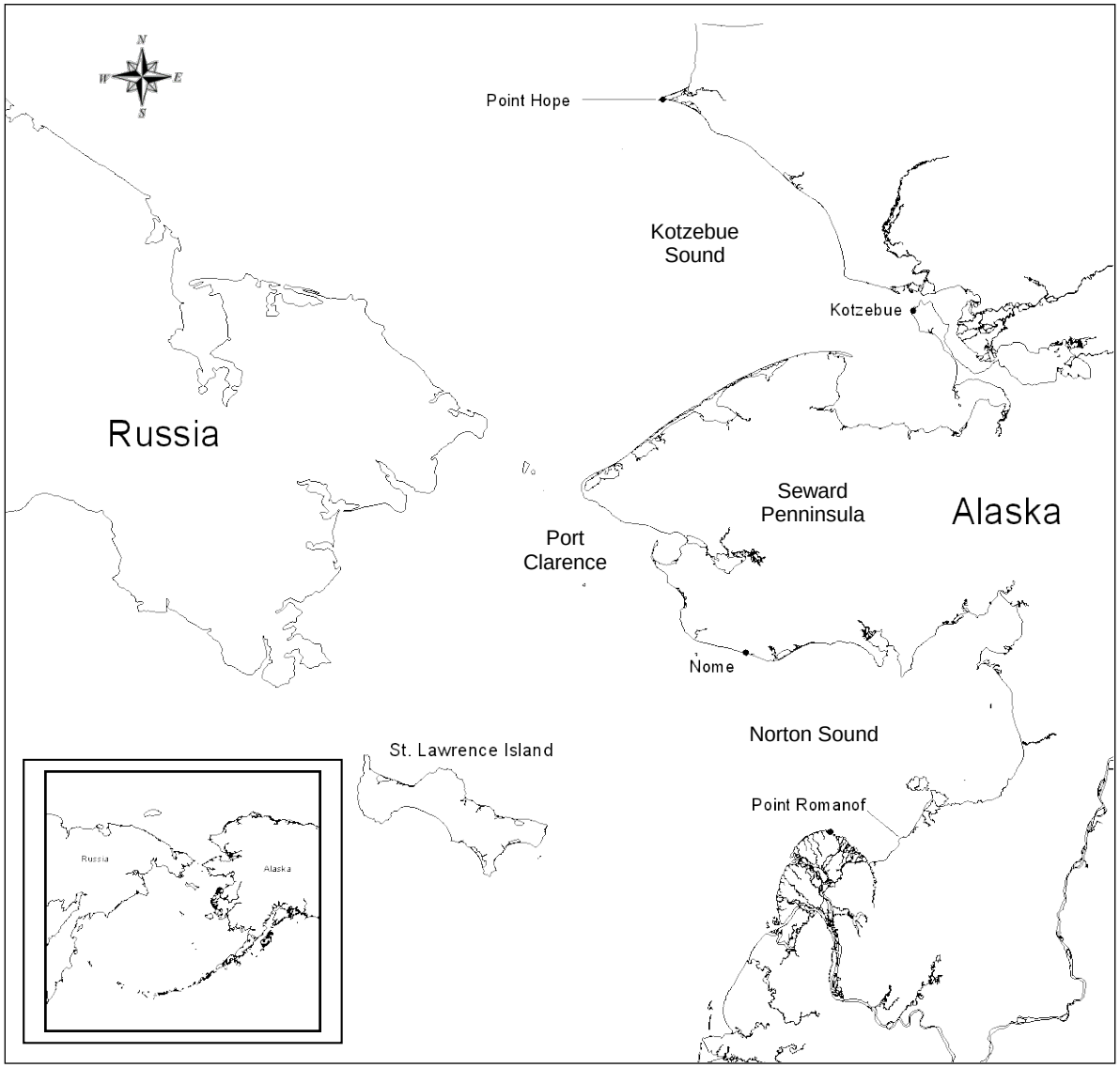

Figure 1.–Norton Sound, Port Clarence, and Kotzebue Sound management districts.

SALMON OVERVIEW

Five species of Pacific salmon *Oncorhynchus* spp. are indigenous to the area; however, chum *O. 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. Historically, ADF&G has supported liberalizing various regulations by encouraging processors to explore and develop new fishing grounds since statehood. As a result, commercial salmon fishing activity grew significantly in the region and enabled some local residents to obtain cash income.

Currently, most commercial fishermen and many buying station workers are resident Native Alaskans (Yupik, Inupiat, and Siberian Yupik). Commercial fishermen operate set gillnets from outboard powered skiffs and all commercial caught salmon are harvested in coastal marine waters.

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 local residents are dependent to varying degrees on fish and game resources for their livelihood.

Subsistence fishermen operate gillnets or seines in the main rivers, and to a lesser extent in coastal marine waters, capturing primarily salmon, whitefish *Coregonus laurettae*, Dolly Varden *Salvelinus malma*, 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 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 also cut after the 2003 season in Norton Sound and after the 2004 in Kotzebue Sound when the Division of Subsistence, due to budget constraints, discontinued household surveys. 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. Also, in 2004, the Division of Commercial Fisheries began doing subsistence salmon surveys yearly in Shaktoolik and Unalakleet, and in other southern Norton Sound villages periodically.

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, and Koyuk, postseason household surveys were conducted in 2008. Surveyors attempt to contact all households. ADF&G staff use 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

ADF&G Division of Commercial Fisheries is responsible for management of commercial and subsistence fisheries in this vast area. Permanent full-time staff assigned to this area during 2008 consisted of an Area Management Biologist, an Assistant Area Management Biologist, and a 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 regional staff provided additional assistance. In 2008, interns funded by Norton Sound Economic Development Corporation (NSEDC) were utilized as fisheries technicians at some projects. Three cooperative projects staffed by NSEDC, 2 projects jointly operated by NSEDC and ADF&G, and one project jointly operated by the Unalakleet IRA and ADF&G 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. Field projects are conducted to provide information on salmon abundance, migration, and stock composition. Summaries of ADF&G, NSEDC, and Unalakleet IRA projects are presented in Appendix G2.

Management of salmon fisheries is complicated by difficulties in obtaining accurate escapement data and 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 cornerstone 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 with fishery status and schedules are broadcast during the fishing season over radio stations KICY and KNOM in Nome, and fishery news articles are published in the *Nome Nugget* and *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 and corresponding statistical areas: 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 one major salmon-producing stream (Figure 2).

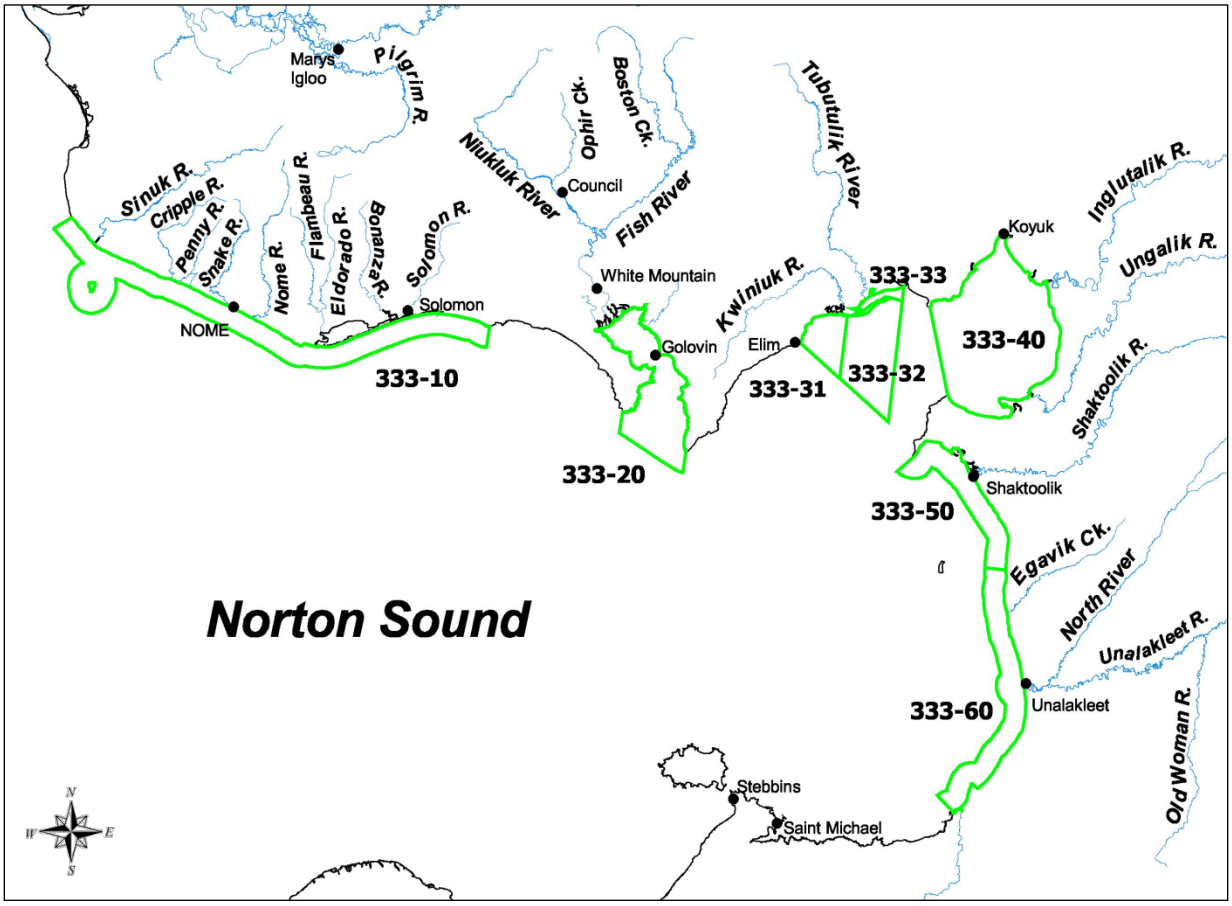

Figure 2.–Norton Sound commercial salmon fishing subdistricts and statistical areas.

All commercial salmon fishing in the district is by set gillnets in marine waters; however, 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 are much more abundant in even numbered year returns. A pink salmon directed fishery may coincide with 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 had been no commercial interest in pink salmon from 2000 to 2006, but in 2007 and 2008, there was some commercial fishing to harvest a small portion of the pink salmon run. 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 usually disperse in groups comprised of 1 or 2 families, and set up camps near the mouths of streams. Harvest levels of fish on any one stream were relatively small because of low concentrations of people who caught only what their families and 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 affected fish populations significantly. Nearly every stream on the Seward Peninsula has had some sort of mining operation, ranging 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 affect was 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 which had 10,000, 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 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 fishermen. 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 and the last dog team mail contract ended in 1962 at Savoonga. Yet, 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 began in Shaktoolik and Unalakleet Subdistricts in 1961. Most 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 Golovin 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 fishermen limited to salmon caught in the internal waters of Golovin 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. Commercial fishing periods are set by emergency order. 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 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 if there are Chinook salmon fishing periods 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.

COMMERCIAL FISHERY MANAGEMENT

Norton Sound District is managed on comparative commercial catch data, escapements and weather conditions. A combination of factors are considered before managers 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. There were 3 counting towers and 5 weirs operated in 2008.

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 chum and coho salmon. Coho salmon catches have remained fairly stable while chum salmon catches have been rebounding in recent years; however, there has been limited market interest in chum salmon. Management has consisted of a series of emergency orders that open and close fishing seasons and periods, adjust fishing time, and establish gillnet mesh size specifications.

Commercial fisheries in Subdistricts 2 and 3 (Golovin and Moses Point) 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 little 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 subsistence salmon harvest surveys have been conducted sporadically since statehood. 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 Commercial Fisheries Division 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. Over the last 10 years in Norton Sound Subdistricts 1-6 (1998-2007), the average subsistence harvest was 69,226 salmon, with the

majority being pink salmon (Appendix A13). However, from 2004 to 2007, the village of Koyuk was not surveyed and therefore no harvest data from Norton Bay, Subdistrict 4, is included for those years in 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 returned permits since 1974. However, not all fishermen obtained or returned permits in the past, and the data were not expanded for unreturned permits because the assumption was those permit holders did not fish. Beginning in 2004 stricter enforcement of regulations including fines for failure to return a permit resulted in nearly 99% of all permits issued being returned.

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 fishermen have been conducted annually during the Chinook salmon run since 1985. Although total harvests by subsistence fishermen 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.

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.

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. 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. 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.

Through a series of BOF directed meetings, the BOF concluded the previous management plan did not provide adequate opportunity for all subsistence salmon users to supply their annual needs for chum salmon. Therefore, 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. As a result, ADF&G allowed 20 individuals who scored high on the Tier II application process in 1999 to subsistence fish. The intent was to allow 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 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. In 1999, due to poor chum salmon returns, ADF&G closed even the Tier II fishery and in 2000, only 10 Tier II permits were issued.

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. In January 2001, BOF expanded legal gear for the subsistence fishery to include a line attached to a rod or pole, 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 became 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 in the Nome Subdistrict subsistence areas designated for each river. However, fishermen cannot combine sport fish bag and possession limits with subsistence harvest permit limits.

In addition, the BOF repealed the existing biological escapement goals (BEG) in regulation and adopted optimal escapement goals (OEG) 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 five OEGs were established for rivers where an escapement project (tower or weir project) is operated. BOF established OEGs, by subdistrict as follows:

<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

<u>Subdistrict 3</u>

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 4.5 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.

In 2001, the chum salmon runs began to improve in Nome Subdistrict and additional permits were issued in the Tier II chum salmon fishery. Beginning in 2004, BOF expanded the Tier I 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.

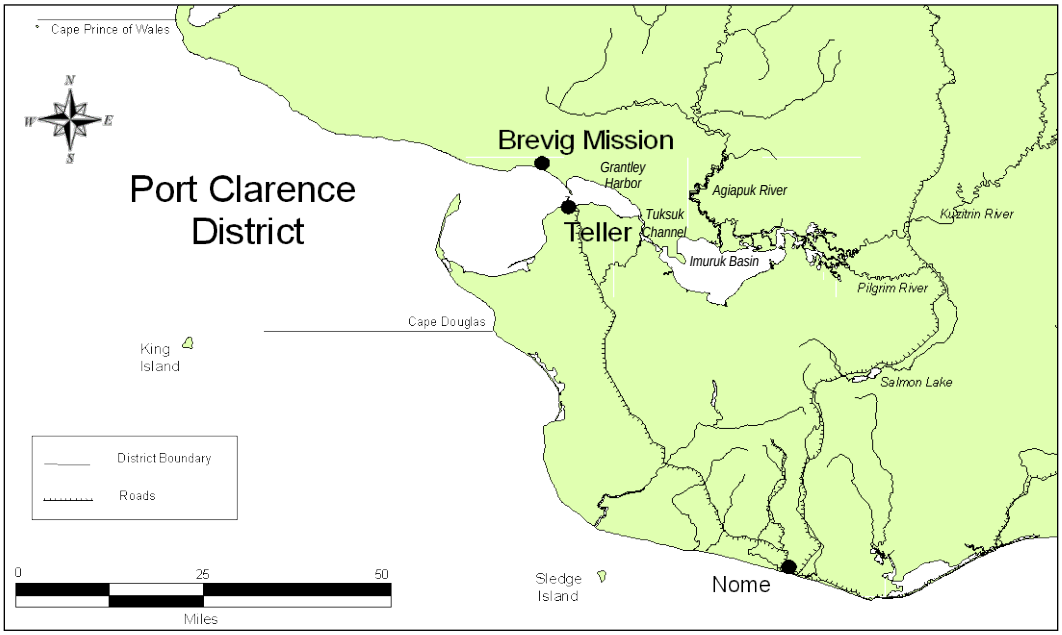

Figure 3.–Port Clarence commercial salmon district.

COMMERCIAL FISHERY OVERVIEW

Few subsistence caught salmon are sold or bartered each year in Teller and Nome, but the last commercial fishery took place in 1966, when a total of 1,146 salmon consisting of 93 sockeye, 131 pink, and 922 chum salmon were taken in Grantley Harbor/Tuksuk Channel area. Since then, commercial salmon fishing in this district had been prohibited due to relatively small runs in this area and the existence of a subsistence fishery. However, large increases in sockeye salmon runs in recent years and positive results from an ADF&G test fishery in 2006 led to the opening of a limited commercial fishery beginning in 2007.

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 fishermen of Brevig Mission fish northern and northeastern sections of Port Clarence, and Teller fishermen 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). Division of Subsistence conducted a partial survey of Brevig Mission in 1989, and conducted full-scale household surveys of both villages from 1994 to 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 Nome Subdistrict (Figure 4).

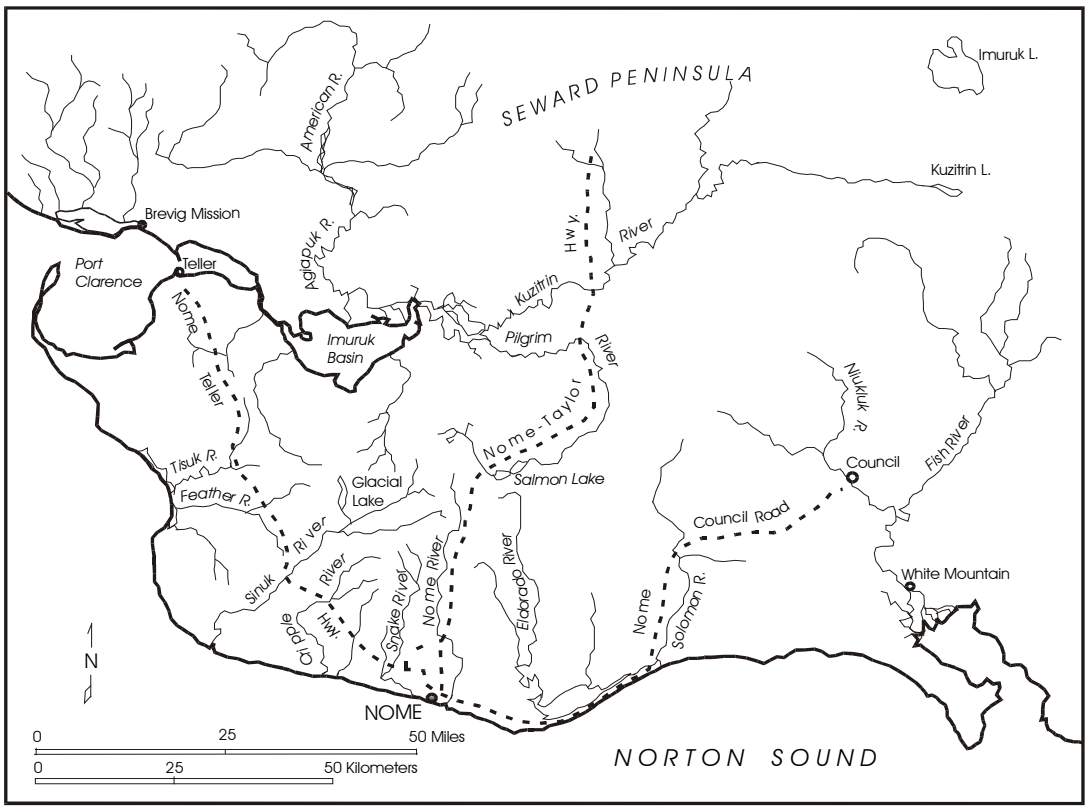

Figure 4.–Seward Peninsula with road accessible waters.

From 1997 to 2001, ADF&G conducted a fertilization program at Salmon Lake, partially funded by NSEDC and BLM to restore sockeye salmon to historical 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, stopped again in 2005 and 2006, and reapplied in 2007 and 2008.

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 5). Salmon, saffron cod, whitefish, and herring are the major subsistence species.

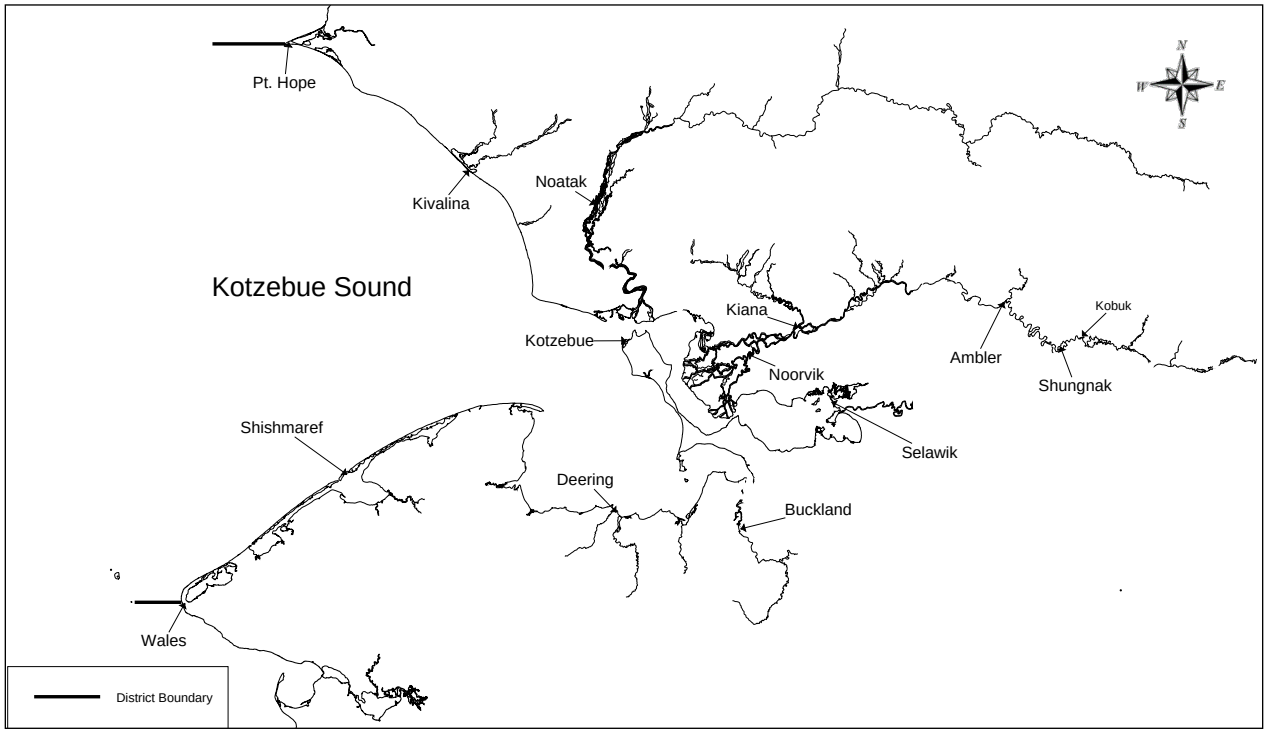

Figure 5.–Kotzebue Sound District, villages and subsistence fishing area.

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 6).

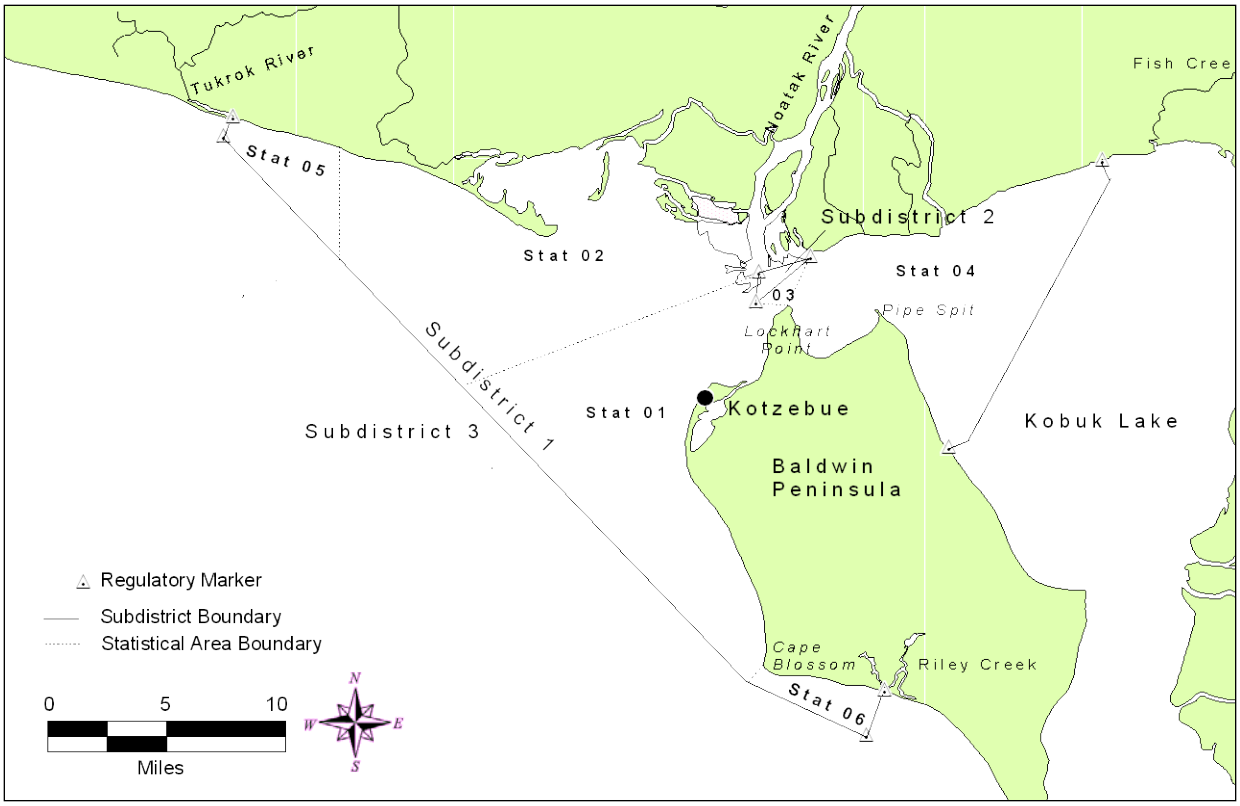

Figure 6.–Kotzebue Sound commercial salmon fishing subdistricts and statistical areas.

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 is assumed to have been sold to miners who worked 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 due to 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 fishermen 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 is 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. However, expanded documented surveys from 1995 to 2004 results in an estimated total subsistence salmon harvest for Kotzebue Sound area to be 57,977 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 from 1995 to 2001 using a mail-in postcard, but has not been surveyed since.

PACIFIC HERRING OVERVIEW

DISTRICT BOUNDARIES

Pacific herring *Clupea pallasi* are present in Norton Sound, Port Clarence, and Kotzebue Sound. The Norton Sound 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 7). Port Clarence Herring District consists of all Alaska waters between the latitude of Cape Douglas and the latitude of Cape Prince of Wales. Kotzebue Sound 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 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. Additional 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.

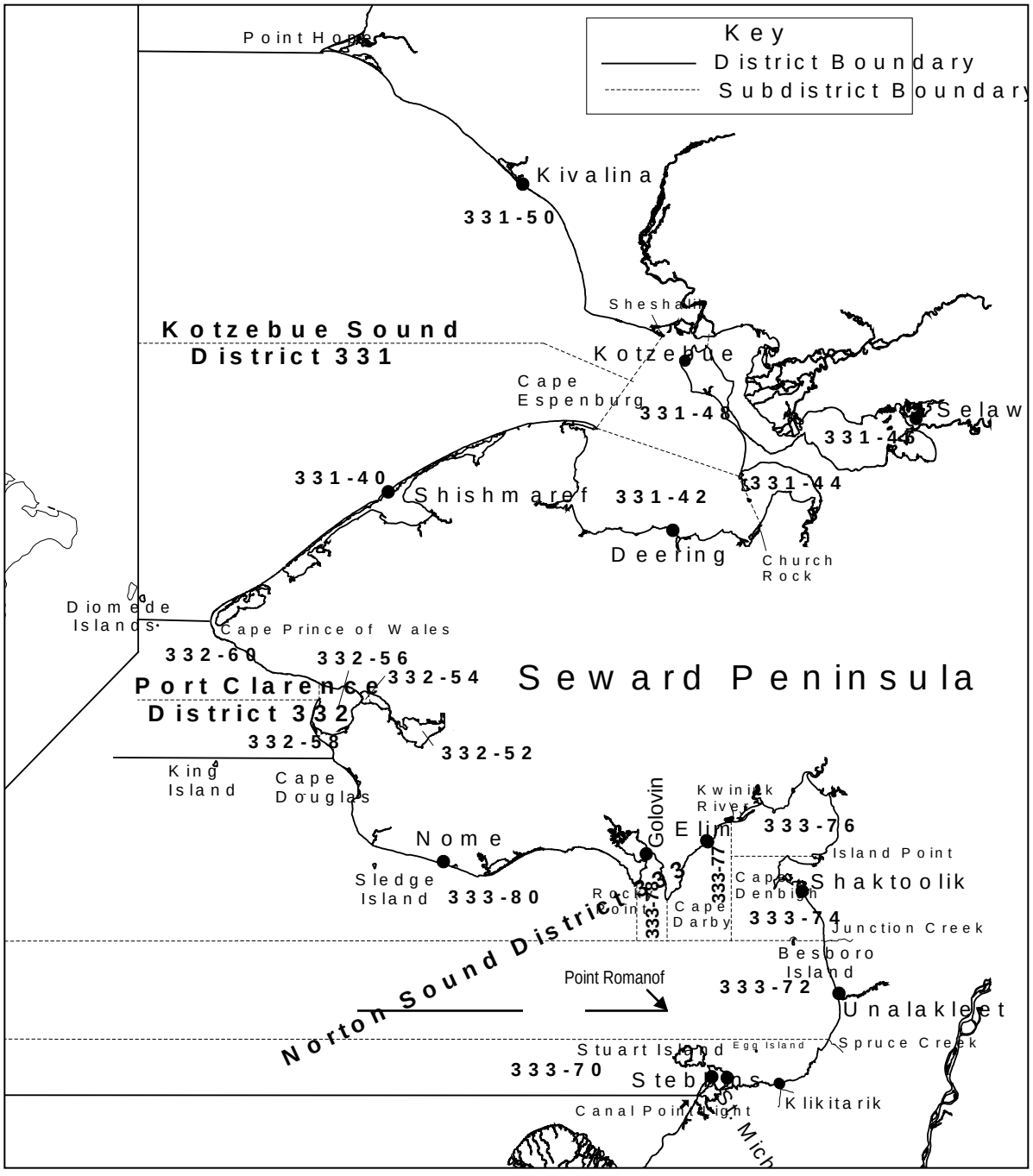

Figure 7.–Commercial herring districts and statistical areas of Norton Sound, Port Clarence, and Kotzebue Sound.

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 fishermen (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. The regulation attempted to encourage local fishermen in this developing fishery.

During the 1980 season, 294 gillnet fishermen harvested 2,452 tons of herring (Appendix D3 and D4). Because gillnet fishermen 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 fishermen was negligible, but in 1984, 10 beach seine fishermen 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 average size of herring captured.

As with most developing fisheries, fishing effort and harvest increased with each season. In 1984, Norton Sound became a super exclusive 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 to 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 because of later ice breakup. 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 harvest for 2002 through 2006 was 1,073 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, when 1,951 tons were harvested, and again in 2006, only 1 buyer was present, purchasing 671 tons. In 2007 and 2008, there were no sac roe herring buyers, and 33 and 91 tons of bait herring, respectively, were harvested.

The Limited Entry Commission currently reviews and awards limited entry permits to fishermen 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 2002, 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 and 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 450 tons was reported in Norton Sound by the Japanese during 1968 to 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 and bait herring fishery in Norton Sound. The majority of food and bait herring harvest estimates were initially harvested as sac roe, but bought and processed as food and bait, thus considered food and 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 and bait. Since 1997, no more than 91 tons of herring were sold as food and 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 (Appendix D4). 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 fishermen 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

Port Clarence and Kotzebue commercial herring fisheries have been in regulation since 1982. 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. The 1983 and 1984 regulations set a guideline harvest of 150 metric tons (165 tons) for each subdistrict, 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.

Before 1987, no spring sac roe commercial fisheries had ever occurred within these districts. In 1987 and 1988 a spring sac roe herring fishery was attempted in the Port Clarence District. A fish buyer located at Nome in 1994 and 1995 provided a ready crab bait market, and transportation for fish facilitated a spring harvest. However, no one has fished for bait since 1996 (Appendix D5).

Regulations allow spawn-on-kelp fisheries in Port Clarence and Kotzebue. Attempts at open pound *Macrocystis* harvest in Port Clarence District in 1991 and 1992 were unsuccessful.

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 two surveys were flown each of the past several years, but virtually no herring were observed because the narrow window of time for seeing fish was missed.

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 (61 degrees 49 minutes N latitude), east of the International Dateline, and south of 66 degrees N latitude (Figure 8).

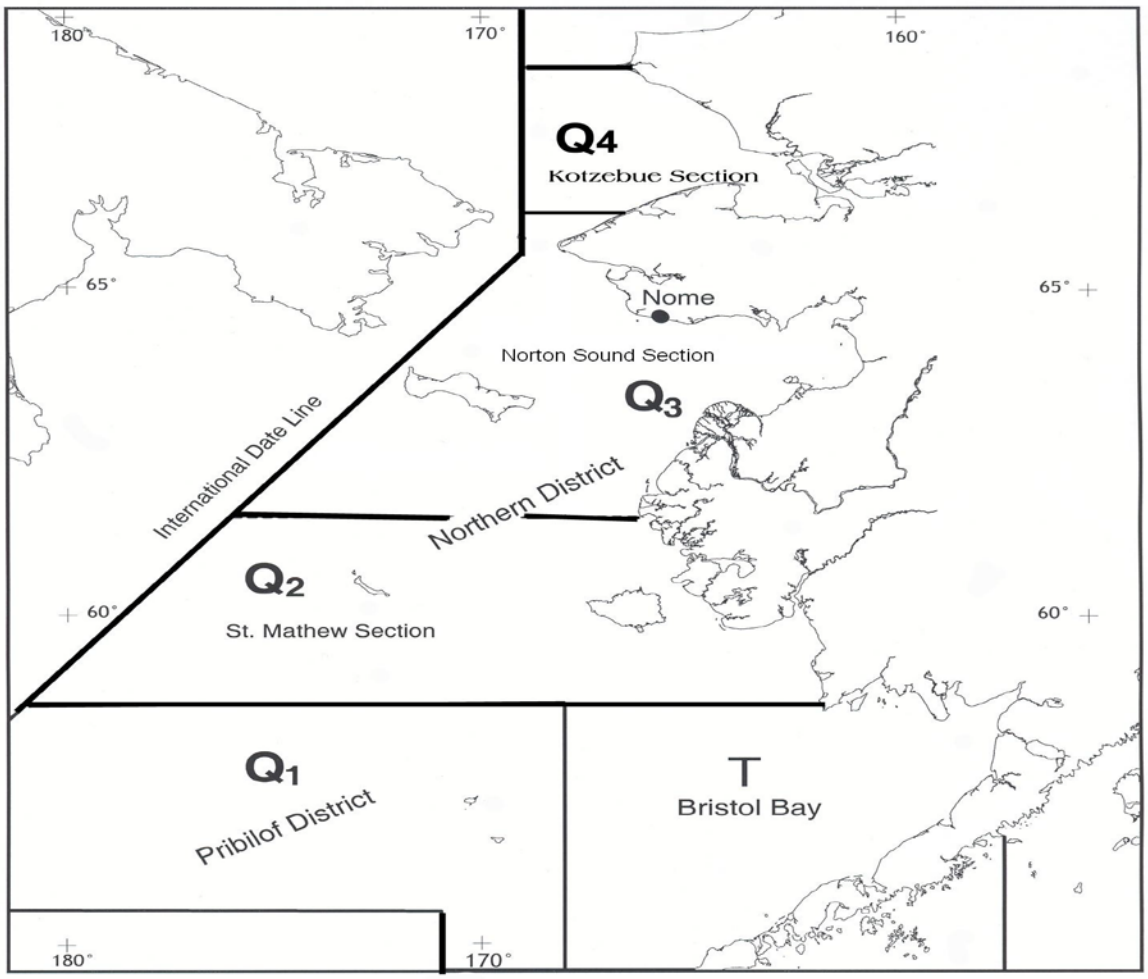

Figure 8.–King crab fishing districts and sections of Statistical Area Q.

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 of staff constraints. 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 super exclusive designation went into effect for the Norton Sound commercial crab fishery June 27, 1994. This designation stated a vessel registered for the Norton Sound crab fishery may not be used to take king crab in any other registration area during that registration year. Later, a vessel moratorium put into place before the 1996 season was intended to precede a license limitation program. Community Development Quota (CDQ) groups were allocated a portion of the summer harvest beginning in 1998. Although CDQ allocation was in place, no harvest occurred until the 2000 season. The North Pacific License Limitation Program (LLP) went into effect for the Norton Sound crab fishery January 1, 2000. The program states a vessel which exceeds 32 feet in length overall must hold a valid crab license issued under LLP by National Marine Fisheries Service. Regulation changes and location of buyers resulted in harvest distribution moving eastward in Norton Sound in mid 1990s (Appendix E9).

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 (Appendices E10-E19). 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 BOF meeting a new management strategy was enacted for the Norton Sound summer red king crab fishery. A threshold level of abundance of legal male red king crab biomass was set at 1.5 million pounds. A summer commercial season may only open if the legal crab population exceeds 1.5 million pounds, and if legal biomass falls in the range of 1.5 to 2.5 million pounds the harvest rate will not exceed 5% so the stock may rebuild. If legal biomass is 2.5 million pounds or more, the harvest rate can be no more than 10%. Improved abundance estimates and the current management strategy will greatly reduce the risks of overfishing the stock.

Estimates of legal red king crab biomass in Norton Sound indicate periods of weak and strong recruitment, and have been standardized to account for design and coverage based on trawl and pot surveys and the average weight for legal red king crab has been 3 pounds (Appendix E2). In 1976 there were estimated to be roughly 1.7 million legal red king crab. By 1982, the number had fallen to 0.9 million legal crab because of little recruitment and high harvest rates in the summer commercial fishery. The population then gradually recovered to an estimated 1.3 million legal crab in 1991. The trawl survey conducted during August of 1996 indicated a reduced stock size and estimated the legal population at 0.5 million crab. In 1999, the legal red king crab population of 1.6 million crab was estimated by trawl survey to be near the historical high (Appendix E2). The population level had nearly tripled since 1996. An all-time high prerecruit-one 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 crab 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 crab observed in 1999 made up the recruit and postrecruit portion of the 2002 legal population (Appendices E12 and E13). The 2002 estimated abundances for prerecruit-one and prerecruit-2 males were 0.52 and 0.43 million crab, respectively. The prerecruit-one 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 4 times greater than 1999 and fourth highest abundance estimate since 1976 indicating increased recruitment for 2004 and 2005 seasons. In 2006, legal male abundance was estimated at approximately 0.73 million crab, which is 95% of the 2002 estimate and 68% of the long-term trawl survey average. Prerecruit-1 male abundance was estimated at approximately 0.57 million crab, 10% greater than the 2002 estimate, and prerecruit-2 male abundance was estimated at approximately 0.78 million crab, the highest abundance estimate on record, which is expected to increase recruitment for the 2008 and 2009 seasons.

The ADF&G length-based population model was developed to predict biomass for the red king crab population in Norton Sound (Zheng et al. 1998). 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. Every time new data is incorporated into the population model, it estimates current abundance as well as revises prior years' abundances.

The following estimates are based on the model's results from spring of 2008 with the latest data from the 2006 trawl survey, the 2007 summer fishery, and the 2008 winter study. In 2004, legal abundance estimate for the summer crab fishery was 3.20 million pounds, up 9% from 2.93 million pounds estimated for 2003. The 2005 estimate for the summer commercial crab fishery was 3.30 million pounds, an increase of approximately 3% from 2004. These higher abundance estimates compared to 2003 reflect increased recruitment in 2004 and 2005, which had been anticipated from the 2002 trawl survey results. The legal population estimate for 2006 decreased 8% from the 2005 estimate, to 3.02 million pounds, while it increased again the following year, up 4% to 3.14 million pounds in 2007.

CDQ Fishery

The Norton Sound and Yukon Delta CDQ groups divided the CDQ allocation. Only fishermen designated by the Norton Sound and Yukon Delta CDQ groups are allowed to participate in this portion of the king crab fishery. Fishermen were required to have a CDQ fishing permit from CFEC and register their vessel with ADF&G before they made their first delivery. Fishermen 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 affected 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 21. 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. At the March 2008 BOF meeting the regulation requiring the herring fishery to be closed was repealed, and the CDQ fishery was allowed to occur by emergency order before, during, or after 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 with no onboard observer, a smaller percentage of crab from the

commercial harvest is sampled because fishermen 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 crab catch brought to the Nome dock. These crab were either sampled at the Nome plant or at the small boat harbor where non-resident fishermen offload their catch for delivery to Anchorage. ADF&G will continue to make a concerted effort to coordinate catch sampling with fishermen 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 fishermen in Norton Sound to obtain a permit before fishing. Fishermen 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 crab) (Appendix E5). The fishery declined sharply the following year and remained at low levels through the 1981–1982 seasons. 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: 1992–1993, 1996–1997, 2000–2001, 2003–2004, and 2005–2006 catches. During years of stable ice conditions, approximately 100 fishermen averaged 100 crab each.

ST. LAWRENCE ISLAND KING CRAB OVERVIEW

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 8). 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 fishermen and reduce impacts on marine mammal subsistence harvests. In 1989, 3,603 pounds of red king crab and 984 pounds of blue king crab were delivered from 8 landings. In 1992, 53 pounds of blue king crab were landed. In 1995, 7,913 pounds of blue king crab were delivered from 3 landings. Only one 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

Sheefish are distributed throughout nearshore estuarine areas of Kotzebue Sound, with the largest spawning stocks, and harvests in the Kobuk-Selawik River drainages and Hotham Inlet. However, there is a small population in the Sheshalik and Krusenstern areas of southern Kotzebue Sound and in the Koyuk River of Norton Bay in Norton Sound (Figure 9).

Inconnu's spawning and overwintering migration behavior makes them available for harvest by various fisheries throughout their life cycle, yet increases their vulnerability to overharvest. Although inconnu are capable of consecutive spawning, most spawn every 2 to 3 years, and slow maturation rates of 5-7 years for males and 7–11 for females, increases the time required to restore depleted populations. Sheefish have high fecundity and large females can carry over 400,000 eggs. Such populations may be subject to episodic recruitment events depending on environmental conditions. If spawner abundance is maintained above a threshold level, intermittent years of good recruitment can carry the population through years of less favorable ice conditions.

After ice breakup in Kotzebue Sound area, adult sheefish migrate upriver to spawning areas on the Kobuk and Selawik Rivers. On the Kobuk River, spawning occurs upstream from the village

of Kobuk, with the greatest observed between the Mauneluk and Beaver Rivers. Then, when spawning is complete in late September and early October sheefish disperse downstream to overwintering areas within Hotham Inlet/Selawik Lake.

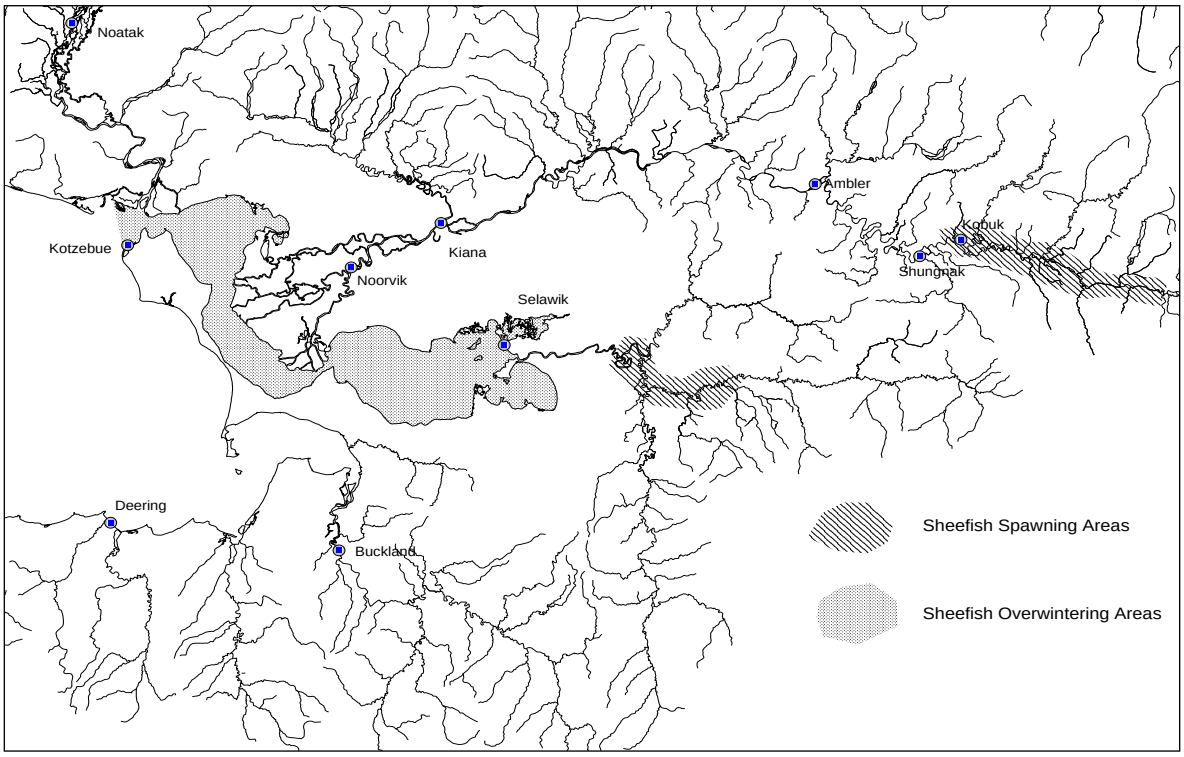

Figure 9.–Kotzebue and Kobuk River Valley villages and their spatial relationship with inconnu spawning and overwintering areas.

Historical Fishery Use

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

Subsistence Fishery

Inconnu have long been utilized for subsistence purposes throughout Kotzebue basin, especially in Kotzebue, Selawik, and the villages along the Kobuk River. In 2004, an estimated 10,163 sheefish were harvested, surpassing the previous record since 1971 estimated at 9,805 in 1997, and 7,823 in 2003 (Appendix F2). Due to budget constraints the Division of Subsistence stopped doing surveys in 2005, and harvest reports should be regarded as minimum numbers because of limited survey effort during many years.

Summer and fall subsistence 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 fishermen 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 conducted household subsistence harvest surveys in various villages in Kotzebue District.

In 1987, BOF adopted a regulation limiting size of gillnets used to take inconnu for subsistence to be not more than 50 fathoms in aggregate length, 12 meshes in depth, nor have a mesh size larger than 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.

Commercial Fishery

Most commercial fishing effort occurs through the ice near Kotzebue in Hotham Inlet with gillnets ranging from 5.5 inch to 7 inch stretched mesh. 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 fishermen 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).

Sport Fishery

Kotzebue district sheefish are considered by many to be among the pinnacle of Alaskan freshwater sport fishing due to their large size. Since the start of the ADF&G Trophy Fish Program in 1967, all but one qualifying sheefish came from the Kobuk River. In spite of this, the level of sport fishing effort is still quite low.

Residents of Kobuk River villages have expressed concern over sport fish practices near spawning grounds on the upper Kobuk River. Catch-and-release fishing is considered by some local residents to be disrespectful and damaging to sheefish. Also, the practice of discarding filleted carcasses in the water is thought to drive other sheefish away from the area. In 1986, Division of Subsistence investigated these concerns and found the concerns could be addressed if sport anglers were more aware of local customs and culture. An educational brochure is now available to fishermen on upper Kobuk River in hope that proper handling during catch-and-release can minimize impacts on spawning populations. Although overall harvests are substantial, populations appear to be healthy, spawner abundances are increasing, and sport harvests are relatively low (Scanlon 2009).

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 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 northwest Alaska are primarily nonconsecutive spawners and spawn throughout late summer and fall in almost all drainages of Norton Sound, some northern Seward Peninsula rivers, and the major drainages of Kotzebue Sound and Chukchi Sea. Fry emerge in spring and migrate to the ocean during early summer after spending from 1 to 6 (generally 2–5) years in freshwater. Movements of Norton Sound Dolly Varden coincide with salmon. In spring, Dolly Varden are likely to remain longer in streams following a large pink salmon run to feed on abundant out migrating fry. Also, they are sometimes present in streams during summer to feed on salmon eggs, especially during years of high pink salmon abundance.

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 overharvest and provide for reproductive needs and subsistence uses.

Subsistence Fishery

Dolly Varden is an important component in the diet of subsistence users in Norton Sound-Kotzebue Sound areas. In some communities, they outrank salmon and whitefish in importance to subsistence; however, most villagers in Norton Sound District report Dolly Varden as incidental catches in subsistence salmon nets. Subsistence fishermen harvest 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.

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. It should be noted that historical subsistence Dolly Varden catches in Appendix F5 are minimal figures because of survey timings. Most Dolly Varden harvests take place before or just after freeze up. The village of Noatak usually fishes before freeze up, but Kobuk River villages of Shungnak and Noorvik fish for Dolly Varden throughout the winter. Since 1962, catches made by residents of Kivalina ranged from 7,000 to 65,000 Dolly Varden annually, but except for 2007, no harvest surveys have been conducted there since 1986 (Appendix F5).

Commercial Fishery

Dolly Varden generally appear in commercial catches during the last 3 weeks of August and are taken as a non-target species in the Kotzebue Sound commercial chum salmon fishery. In 1976, regulations closed the commercial chum salmon fishery on August 31, and thus reduced harvest of Dolly Varden. Spawning and overwintering Dolly Varden typically pass through the area during September, but typically begin migration along the northern shore of Kotzebue Sound during the third week of August. Reported Dolly Varden sales 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 F4). However, limited markets in the 2000s have resulted in less than 200 Dolly Varden reported sold each year, and zero sold since 2006 because the buyer no longer purchases Dolly Varden. Regardless of sales, Dolly Varden catches are still required to be reported on fish tickets.

Sport Fishery

Drainages of Kotzebue Sound and the Chukchi Sea are known for the large size of anadromous Dolly Varden; yet, Kotzebue area residents and non-locals boating on Kobuk and Noatak Rivers are the primary participants in this area's Dolly Varden sport fishery. Both Noatak and Kobuk Rivers are National Wild and Scenic Rivers with headwaters included in Gates of the Arctic National Park. However, the Wulik River is probably the most important Dolly Varden stream in northwestern Alaska. The 90-mile Wulik River is known for the largest and most abundant Dolly Varden populations. Located approximately 90 miles north of Kotzebue, Wulik River flows into the Chukchi Sea through Kivalina Lagoon near the village of Kivalina and is estimated to have over 100,000 overwintering Dolly Varden annually.

Since the start of the ADF&G Trophy Fish Program in 1967, 140 of 219 qualifying Dolly Varden have come from Kotzebue Sound and Chukchi Sea drainages. Additionally, the current Alaska sport fish angling record for Dolly Varden was 12.4 kg. (27 lbs 4 oz) taken from the Wulik River in 2002, surpassing the previous record also taken from the Wulik River in 2000. In spite of this, sport fishing effort has been consistently low, which is likely due to remote location and difficult access of fishing sites (Scanlon 2009).

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 F7). 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.

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

Commercial Fishery

Limited commercial whitefish harvests have been 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. During the 2006–2007 season, one local Nome fishermen, who waived confidentiality, sold 3,723 pounds of whitefish.

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 fishermen 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 F8).

The relative importance of whitefish is higher in the Kotzebue Sound District than in many areas of the state. Average subsistence harvests of whitefish for the village of Noatak and the 5 Kobuk River villages combined from 1998 to 2002 was 44,552. In 2003, 73,242 whitefish were estimated harvested, and in 2004 there were 50,501 estimated (Georgette et al. 2003a, b, and 2004; Georgette and Shiedt 2005). No harvest data on whitefish has been collected since 2004.

Historical Escapement

Whitefish escapements have not been monitored in the past, but limited ADF&G observations and fishermen 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 fisherman caught and sold 89 pounds (98 tomcod) in Nome Subdistrict. In 1983, one Nome area fisherman caught and sold 2,548 pounds (4,348 tomcod) and in 1989 one fisherman sold 1,800 pounds locally. These fish were used for dog food, crab bait, and human consumption.

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 $0.50 per pound for a total value of $26.00. No commercial harvest was reported from 1996 through 2007.

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 and halibut (Appendix G1).

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.

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.

Sport Fishery

Sport fisheries for Arctic grayling exist in Norton Sound, Port Clarence, and Kotzebue areas, but are relatively small. Average annual sport fish harvests for Arctic grayling are 2,000 in Norton Sound, and 1,300 in Kotzebue area. Despite low harvests, average Arctic grayling sport fish

harvests are the second highest non-salmon species in Norton Sound, as well as in Kotzebue area (Appendix F3).

SECTION 2: SALMON FISHERIES

2008 NORTON SOUND SALMON FISHERY

Regulatory Changes

The Alaska Board of Fisheries (BOF) made several regulation changes at meetings in February and March 2007 for the management of Norton Sound salmon (Menard 2007).

BOF changed the stock of concern classification for Subdistrict 1 (Nome) chum salmon from a management concern to a yield concern. Subdistricts 2 and 3 (Golovin and Moses Point) chum salmon stocks and Subdistricts 5 and 6 (Shaktoolik and Unalakleet) Chinook salmon stocks were continued as stocks of yield concern.

A Chinook salmon management plan for Subdistricts 5 and 6 was established to address the poor Chinook salmon runs in the 2000s. Beginning June 16, subsistence fishing in marine waters of Subdistricts 5 and 6 were restricted to two 48-hour fishing periods a week from 6:00 p.m. Monday until 6:00 p.m. Wednesday and from 6:00 p.m. Thursday until 6:00 p.m. Saturday. Also beginning June 16, subsistence fishing in Unalakleet River was restricted from 8:00 a.m. Monday until 8:00 p.m. Tuesday and from 8:00 a.m. Friday until 8:00 p.m. Saturday.

The upper subsistence fishing boundary on Nome River was moved downstream several miles to the ADF&G marker at the VOR site approximately 2 miles upstream of its mouth, and the boundary on Cripple River was moved from the ADF&G marker approximately 400 yards upstream from its mouth to 200 yards upstream from the mouth. The Penny River upper river boundary remained at the marker 100 yards upstream from the mouth. Subsistence fishing for chum salmon remains closed in Cripple and Penny Rivers, but other salmon may be taken in areas open to fishing. All additional closed waters to subsistence fishing for salmon listed in 5 AAC 01.175 remained the same, except BOF amended the regulation to allow subsistence fishing with a hook and line attached to a rod or pole in those closed areas, provided sport fishing is allowed and sport fishing methods and means are followed.

BOF also approved new regulations to allow for cash sales of up to $200 worth of subsistence-taken finfish per household, per year, harvested in Norton Sound-Port Clarence Area only. Persons intending to sell any subsistence-taken herring, salmon, whitefish, trout, or other finfish will need to obtain a free customary trade permit from Nome ADF&G and record cash sales on the permit. Sales cannot be made to a fishery business or resold by the buyer, and may only occur within the Norton Sound-Port Clarence Area.

Commercial Fishery Season Summary

Highlights of the 2008 Norton Sound District commercial salmon fishery included the third highest coho salmon harvest on record, a resurgence of directed pink salmon fishing in Norton Sound, and the return of commercial salmon fishing in Subdistrict 2 (Golovin) and Subdistrict 4 (Norton Bay) for the first time in years. Also, there was increased commercial interest in chum salmon, but the onset of the chum salmon fishery was delayed until mid-July in southern Norton Sound in order to conserve Chinook salmon. In northern Norton Sound, below average chum salmon escapements limited directed chum salmon fishing to a few brief periods.

Commercial salmon fishing began with a 12-hour opening in Subdistricts 2 and 4 on July 1 directed at pink and chum salmon. A subsequent 12-hour period occurred on July 3 in Subdistricts 2 and 4. During the second opening fishermen were allowed to target chum salmon in Subdistrict 2, but mesh size was restricted to 4.5-inches or less in Subdistrict 4 in order to minimize the incidental harvest of Chinook salmon because of weakness shown in the Chinook salmon run in southern Norton Sound.

Commercial fishing for chum salmon was permitted for a third 12-hour period in Subdistrict 2 (July 7) and for two 12-hour periods in Subdistrict 3 (July 5 and July 9). However, it was apparent from the low commercial CPUE and comparably poor tower counts that there was not a surplus available for commercial harvest and directed chum salmon fishing was no longer permitted in these subdistricts. Directed pink salmon fishing continued in the Moses Point Subdistrict for two 24-hour periods (July 22 and July 26) after the majority of chum run was over.

Despite a record coho salmon run in Subdistrict 2, commercial fishing for coho salmon was limited to two 48-hour periods (August 14 and August 20) because the buyer determined the minimal fishing effort did not warrant deploying a tender to the area. An above-average coho run also occurred in Subdistrict 3, although the quarter-point was about a week later than average which delayed the Subdistrict 3 commercial coho salmon fishery until August 16. Commercial coho salmon fishing was allowed for two 48-hour periods per week in Moses Point until the season closed by regulation on August 31.

Commercial salmon fishing began in Subdistrict 5 (Shaktoolik) and Subdistrict 6 (Unalakleet) on July 8, with a 6-hour pink salmon opener. From July 9 to July 15, commercial pink salmon fishing continued with 3 more 6-hour periods and four 8-hour periods. The buyer requested that periods be brief in order to ensure that they did not exceed their processing capacity. Strong southwesterly winds during early to mid-July kept Shaktoolik fishermen on the beach for 3 of the 8 periods. Catches in the Unalakleet River test net for chum salmon were record-setting in early July, but the department held off on commercial fishing until July 17 in order to protect Chinook salmon. Chinook salmon runs have been poor throughout the 2000s in Subdistricts 5 and 6 and the 2008 run ended up being the worst on record. Subsistence fishing for Chinook salmon was closed on July 5 in both the marine waters in Subdistricts 5 and 6 and in the Unalakleet River drainage. The North River, a tributary of the Unalakleet River, had the lowest tower count of Chinook salmon in the project's history.

Subdistricts 5 and 6 have experienced strong coho runs since 2004, and 2008 was another above average run. Cumulative Unalakleet River test net and Subdistrict 5 commercial fishery coho salmon catches were record setting in 2008 and the Subdistrict 6 commercial coho catch was the fourth highest. The Unalakleet River test net caught its first coho salmon on July 7 and record-setting test fishery catches occurred in late July and continued throughout the duration of the run. A

24-hour opening occurred on July 17 in Subdistricts 5 and 6 to allow fishermen to target the latter portion of the chum salmon run. In recent years, mid July openings are typically used by fishery managers as an early evaluation of coho salmon run strength. Commercial coho salmon catches by period were above average throughout most of the season. Record commercial and test fishery coho salmon catches in early September suggested that there was a late surge of coho salmon in southern Norton Sound. By regulation, Subdistricts 5 and 6 commercial salmon season closes on September 7. However, the abundance of late-run coho salmon in conjunction with continued market interest warranted additional commercial salmon fishing. The season was extended by emergency order for two additional 48-hour periods until the fishery was closed on Friday, September 12.

In the Port Clarence District there was a limited commercial salmon fishery for the second consecutive year. As in 2007, this was a directed sockeye salmon fishery, but the harvest of chum salmon was nearly 3 to 1 sockeye salmon There were five 24-hour periods from July 1 to July 12. By mid July, the Pilgrim River inriver goal of 30,000 sockeye salmon was projected to fall short and there was little interest from the buyer to continue the fishery due to the small sockeye salmon catches. Commercial catches in the Port Clarence District were 89 sockeye, 256 chum, and 910 pink salmon.

The Norton Sound District combined commercial harvest of all salmon species ranked first in the last 10 seasons. The number of commercial permits fished (91) was the highest since 1997, but twelfth lowest on record. The 2008 fishery value to permit holders of $759,451 was well above the recent 5-year average of $289,047 and the highest since 1994 (Appendix A3). The average value per permit holder of $8,346 was a record without adjusting for inflation. The average price paid for Chinook salmon was $0.73 per pound, $0.56/lb for sockeye salmon, $0.77/lb for coho salmon, $0.23/lb for pink salmon, and $0.34/lb for chum salmon (Appendix A4).

Appendix A1 lists the Norton Sound District salmon historical and current year commercial harvests relative to the recent 5- and 10-year averages. The coho salmon harvest of 120,293 was nearly 150% above the recent 5-year average and nearly 240% above the recent 10-year average. There were 3 directed chum salmon commercial openings in Subdistrict 2 (July 1, July 3, and July 7), 2 in Subdistrict 3 (July 5 and July 9) and Subdistrict 4 (July 1 and July 18), and 1 directed chum salmon period in Subdistricts 5 and 6 (July 17). There was a significant increase in the amount of market interest in pink salmon for fillets and roe in 2008. Watermarked pink salmon were purchased for crab bait. The buyer purchased 75,384 pink salmon in the Norton Sound District, the majority of which were harvested in Subdistricts 5 and 6 during 8 directed pink salmon periods from July 8 to July 15.

The Unalakleet River test net had above average catches of Chinook salmon, and record catches of chum and coho salmon, but pink salmon catches were below the even-year average. Ninety-one permit holders participated in the commercial fishery (Appendix A2), twenty more than last year. However, this total includes 8 permit holders that participated in the Subdistrict 2 and Subdistrict 4 commercial fisheries. Prior to this year, commercial salmon fishing had not occurred in Subdistrict 2 since 2001 and in Subdistrict 4 since 1997. The previous 5-year average was 48 permits fished and the previous 10-year average was 52 permits fished.

Only one salmon buyer operated in Norton Sound during the 2008 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 the Golovin, Moses Point,

Norton Bay, and Shaktoolik Subdistricts. Salmon caught in the Port Clarence District were brought to the Nome plant via truck for processing.

Subsistence Fishery Season Summary

Subsistence salmon fishermen in Port Clarence District and Subdistricts 1–3 (Nome, Golovin, and Moses Point) were required to possess a subsistence salmon permit for each household that fished in these locations. Households may obtain 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, Salmon Lake and Pilgrim River 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 fishermen reach their harvest limit in one river, they can fish in other rivers until they reach the limit in those rivers. 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.

Norton Sound District household subsistence surveys were conducted in Shaktoolik, Unalakleet, and Koyuk, and attempts were made to contact 100% of the households. Catch information for Subdistricts 4, 5 and 6 are presented in Appendices A9–A11.

In Norton Sound District, there are limits on subsistence salmon harvests only in Nome Subdistrict where salmon limits have been in place since 1985. Also, hook and line subsistence users must follow sport fish bag limits except in the Nome Subdistrict subsistence zones where they can catch the subsistence limit. In 2008, an average to below average chum salmon run was forecasted for Nome Subdistrict and the subdistrict was not closed to salmon fishing in mid June for the third year in a row. From 1991 through 2005, Nome Subdistrict was closed to subsistence salmon fishing in mid June in order for ADF&G to determine the run strength of chum salmon before allowing fishing. Furthermore, Tier II regulations were not in effect because the chum salmon run was projected to exceed the amount necessary for subsistence.

In the Port Clarence District subsistence permits are required and a separate permit is required for the Pilgrim River and for Salmon Lake. There are no salmon harvest limits in the Port Clarence District, except for Kuzitrin River, Pilgrim River and Salmon Lake.

A new BOF approved regulation, effective July 1, 2007, allowed for cash sales of up to $200 worth of subsistence-taken finfish per household, per year, in the Norton Sound-Port Clarence area only. In 2008, only 4 customary trade finfish permits were issued for Norton Sound. There were no reported sales.

Season Summary by Subdistrict

Nome-Norton Sound Subdistrict 1

For over 30 years subsistence salmon permits have been required for the Nome Subdistrict and during the 2008 season, 461 subsistence salmon permits were issued, substantially higher than the 329 issued in 2007 and 368 permits issued in 2006. The most permits ever issued for the Nome Subdistrict was 491 permits 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. The dramatic increase in subsistence permits observed in 2008 may largely be the result of the below average Pilgrim River sockeye salmon run and increased fishing

costs due to rising fuel prices. For most Nome residents, hook and line subsistence fishing in the Nome Subdistrict is relatively convenient and inexpensive when compared to vehicle and boating fuel costs associated with a trip to the Pilgrim River. Poor catch rates were also communicated by Pilgrim River fishermen which probably further discouraged some residents from targeting sockeye salmon. Fortunately, the near-record coho salmon run helped mitigate the below-average sockeye salmon run in 2008.

Of the 461 permits issued for the Nome Subdistrict there were 363 households that reported fishing and over half of those households fishing had fished in the Nome River and slightly less than one-quarter of the households fishing reported fishing in the Snake River (Table 2). The third highest fishing location reported was in the marine waters where approximately 15% of fishing households reported fishing. Similar to recent even-numbered year salmon harvests, over 70% of subsistence salmon catches were by hook and line and the majority of the catch was pink salmon. In 2008 the reported salmon catch by hook and line was 12,149 (71.8%), by gillnet was 4,511 (26.7%) and by seine was 260 (1.5%).

Golovin-Norton Sound Subdistrict 2

The 2008 Salmon Management Plan for Subdistrict 2 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.

Previous to 2008 there had been no commercial chum salmon fishing in Subdistrict 2 since 2001, largely because escapements had fallen short of the sustainable escapement goal (SEG) of 30,000 at the Niukluk River. Consequently, ADF&G has implemented a conservative approach with respect to determining when commercial fishing may occur. In early July, ADF&G projected that the Niukluk River chum salmon run was exhibiting later than average run timing, much like the 2007 escapement. Because the chum salmon fishery was delayed in southern Norton Sound due to Chinook salmon conservation concerns, the buyer expressed interest in purchasing pink and chum salmon in Subdistrict 2. Impacts to chum salmon escapements from commercial harvest were expected to be minimal because of low fishing effort and ADF&G allowed three 12-hour commercial periods on July 1, July 3, and July 7. By mid July, chum salmon counts at the Niukluk River tower were tracking well below average and the escapement was projected to fall well short of the SEG. Commercial coho salmon fishing did occur in Subdistrict 2 during one 24-hour period on August 14 and one 48-hour period on August 20. Despite a near record coho salmon run, participation in the fishery was not sufficient for the buyer to further warrant sending a tender to the area. Commercial catches by period remain confidential because there were no more than 2 permits holders that participated during any one period. However, there were 4 permit holders for the entire season, and they harvested 623 chum, 2,699 pink, and 256 coho salmon (Table 4) in Subdistrict 2. The Niukluk River tower count of 12,078 chum salmon was the second lowest escapement since the project's inception in 1995 (Appendix A21). The tower count of 669,234 pink salmon also ranked as the second lowest out of the 7 years in which pink salmon have been counted during even-numbered years, but easily provided for commercial harvest and subsistence fishing needs. A record tower count of 13,779 coho salmon surpassed the previous record count of 12,781 coho salmon counted in 1996.

This was the fifth year that subsistence salmon permits were required and 155 permits were issued for Subdistrict 2 in 2008. There were 151 permits issued in 2007, 152 permits in 2006,

174 in 2005, and 199 permits issued in 2004. The number of Subdistrict 2 permits issued to Nome residents have dropped by 25% since 2004, but the number of permits issued to Golovin and White Mountain residents have been similar each year. It is likely that the easing of fishing restrictions in the Nome Subdistrict in conjunction with increased fuel costs have been contributing factors to the decrease in Subdistrict 2 permits requested by Nome residents. The 13,083 salmon reported harvested were second lowest since the subsistence permit system was initiated in 2004 (Appendix A7). However, the 2,337 coho salmon reported harvested were the highest ever reported on subsistence permits.

Moses Point-Norton Sound Subdistrict 3

In 2008, Subdistrict 3 Chinook and chum salmon runs were below average and pink and coho salmon runs were above average. Commercial fishing targeting chum and pink salmon began July 5. There was another period allowing the harvest of both species July 9, but mesh size was restricted to 4.5 inches or less during the remainder of July to protect chum salmon while allowing fishermen to target pink salmon. By July 9, Kwiniuk River chum salmon escapement was only 60% of the long-term average escapement for that date. As a consequence, ADF&G restricted mesh size to 4.5 or less inches during two 24-hour openings on July 22 and July 26. Additional commercial fishing for pink salmon would have been allowed in July, but southwesterly storms created hazardous fishing conditions along the coast of the southern Seward Peninsula and kept fishermen on the beach. In early August, the department was planning to reopen the commercial fishery with 6-inch mesh to allow commercial harvest of coho salmon. The coho salmon run ended up being above average, but about a week later than average, which delayed the onset of the commercial fishery until August 16. In 2008 a total of 5 Chinook, 304 chum, 14,536 pink, and 4,586 coho salmon were harvested by 12 permit holders in Subdistrict 3 (Table 5). The coho salmon harvested was the sixth highest on record during years in which there has been a directed coho fishery.

The 2008 escapement past the Kwiniuk tower was 237 Chinook, 9,462 chum, 1,442,246 pink, and 10,461 coho salmon (Appendix A20). Chinook salmon passage was below the escapement goal range of 300–550 fish for the third year in a row. The chum salmon escapement was the third poorest since the 1970s. However, the 2008 Kwiniuk chum salmon run was the second poorest on record, only surpassing the 1999 run which had a Kwiniuk River escapement of 8,763. In 1985, the estimated escapement was 9,013, but there were nearly 25,000 chum salmon harvested in the commercial fishery that season. Pink salmon escapement at the Kwiniuk tower was the fourth highest for even-numbered years since the 1970s and this year's coho salmon escapement ranked fourth highest since 2001. Prior to 2001, funding limitations precluded the coho salmon run from being fully enumerated at the Kwiniuk River tower. In actuality, the 2008 coho salmon run would likely have ranked second or third highest considering there was no commercial fishery in Moses Point in 2004 (11,240 coho salmon counted), and 2005 (12,950 coho salmon counted).

This was the fifth year that subsistence salmon permits were required in the Moses Point Subdistrict. A record low 57 permits were issued in 2008 compared to 62 permits issued in 2007, 66 permits issued for Subdistrict 3 in 2006. In 2005 there were 70 permits issued and in 2004 there were 58 permits issued. The 11,012 salmon reported harvested were the most since the subsistence permit system was initiated in 2004 (Appendix A8).

Norton Bay-Norton Sound Subdistrict 4

Subdistrict 4 typically has difficulty attracting a buyer due to its remoteness and its reputation for watermarked fish. Because of lack of timely salmon escapement information and all 3 subdistricts are believed to have similar trends in salmon run strength and timing, the Norton Bay Subdistrict is typically managed similar to the Shaktoolik and Unalakleet Subdistricts. In 2008, a small-scale commercial salmon fishery occurred in Subdistrict 4 for the first time since 1997. Most of the effort came from Shaktoolik and Elim residents. Following the season ADF&G held a meeting in Koyuk and residents indicated that they did not participate in the fishery because there was little incentive to renew their commercial salmon permits in the absence of commercial salmon fishing in the last decade. If the buyer expressed interest in Norton Bay in 2009, participation may increase if some Koyuk residents are able to obtain permits.

Commercial salmon fishing began in Subdistrict 4 on July 1 with a 12-hour opening targeting pink and chum salmon. Fishery participation was minimal from the onset of this resurgent fishery and remained so for the remainder of season. In fact, out of the 6 periods that were allowed, there were only 2 periods in which there was commercial harvest. The cumulative commercial catch by species for Subdistrict 4 was 7 Chinook, 507 chum, 1,232 pink, and 600 coho salmon caught by 4 permit holders (Table 6).

For the first time since 2003 subsistence salmon surveys were done in Koyuk. The subsistence salmon harvest reported in Koyuk was 9,092 salmon (Appendix A9). Although the total number of salmon harvested in 2008 was similar to the 5-year average harvests from 1998 to 2002, the 1,084 coho salmon harvested this year was the highest number reported during any years surveys were conducted.

Shaktoolik and Unalakleet-Norton Sound Subdistricts 5 and 6

Both Subdistricts 5 and 6, 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 one subdistrict affects the movement of fish in the adjacent subdistrict. The ADF&G's test net in the Unalakleet River, the North River counting tower and subsistence fishermen interviews at Unalakleet are used to set early fishing periods in both subdistricts. As the season progresses, test net catches, commercial catch indices, and the 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 the long travel time between the fishery and spawning grounds.

In Subdistricts 5 and 6, directed commercial Chinook salmon fishing has only occurred in 3 of the previous 9 years, and in only 1 year since 2001. Restrictive action was taken in the subsistence and sport fisheries in 2003, 2004, 2006, and 2007. The midpoint of the North River tower SEG range was reached in 2007, largely due to a restrictive subsistence fishing schedule, 50% reductions in the sport fish daily and annual possession limits, and an early closure to the subsistence and sport fisheries in early July. Prior to 2007, the lower end of the SEG (1,200) range had not been achieved since 2003.

Subdistricts 5 and 6 Chinook salmon were designated a stock of yield concern in 2004 by the BOF. To increase Chinook salmon escapements, the BOF also adopted a more conservative Subdistricts 5 and 6 King Salmon Management Plan (5 AAC 04.395) that was first implemented during the 2007 season. Under the new plan, commercial fishing directed at king salmon can

only occur if the midpoint of the North River tower SEG range is projected to be reached. Additionally, the plan directs ADF&G to provide escapement windows by restricting subsistence gillnet fishing for salmon from mid June to mid July to two 48-hour fishing periods a week in marine waters, and two 36-hour fishing periods a week in the Unalakleet River. Subsistence fishing time can be liberalized if ADF&G projects that the upper end of the SEG range will be achieved.

The 2008 Norton Sound Chinook salmon run was arguably the poorest return on record. At the onset of the season, a directed Chinook salmon commercial fishery was not expected, and early closures to the subsistence and sport fisheries were anticipated for Subdistricts 5 and 6 in early July. However, there was some optimism about meeting escapement needs while also avoiding an early closure, which was based on a combination of factors. These included: 1) sufficient escapements observed during the predominant parent years (2002 and 2003) for the 2008 return, 2) a restrictive subsistence fishing schedule that provides escapement windows throughout the run, and 3) planned mesh-size restrictions for the Unalakleet River on June 30 aimed at conserving age-5 and -6 Chinook salmon during their peak migration period.

By July 2, it was clear that the Unalakleet River Chinook salmon run had later than average run timing and was a very weak run. If there was any chance of meeting escapement needs, an early closure was necessary, and the sport and subsistence fisheries were closed effective 8 p.m. Saturday, July 5. The decision to close the Chinook fishery was based largely on the June 30 through July 2 reported Unalakleet Subdistrict marine subsistence catch and weak passage at the North River tower. There were only 145 Chinook salmon harvested by 28 fishermen during the June 30-July 2 period, a three-fold decrease from the previous 48-hour period's catch of 460 Chinook salmon caught by 31 fishermen. Additionally, only 36 Chinook were counted by the North River tower as of July 2, which is the historical quarter point of the run. The sport fishery was also closed on July 5. Beach seining was permitted in order to allow subsistence harvests of pink and chum, but all Chinook salmon had to be returned to the water immediately.

Chinook escapements improved slightly during the week following the closure. Despite proactive restrictions and eventual closures, the Chinook salmon escapement fell below the lower end of the North River SEG (1,200) range for fourth time in 5 years (Appendix A25). Additionally, the 2008 North River escapement of 903 Chinook and total run-size estimate of 3,853 Chinook were record lows. The 2008 Unalakleet River Chinook salmon total run size estimate was 21% below the previous record low of 4,961 Chinook in 2005. The exploitation rate was about 40%, a 30% increase from the exploitation rate of 28% in 2007.

Although the magnitude of the Chinook salmon escapement was poor in the Unalakleet watershed, mesh-size restrictions appear to have had the desired effect of conserving more age-5 and -6 Chinook salmon, thereby improving the quality of the escapement. Perhaps most notably, 83% of the 2008 test net samples were comprised of age-5 and older Chinook salmon, more than double the 36% age-5 and older observed in 2007. Samples collected from the Chinook salmon escapement captured in beach seines 28 kilometers up river showed a similar pattern. In 2007, the escapement was comprised of 27% age-5 and older compared to 62% in 2008. Sex composition of the 2008 test net samples was only 24% females, which was only a 4% increase from samples collected in 2007, but the percentage of females in the escapement captured in beach seines up river doubled from 11% in 2007 to 22% in 2008. Bank orientation bias associated with the test net site may account for the disparities in percentages of females between the test fishery and beach seining. These data suggest that a greater portion of the run comprised

of age-5 and -6 and predominantly female Chinook salmon reached spawning areas in the Unalakleet River drainage this season.

Pink salmon catches were below the historical average for even-numbered years at the Unalakleet River test net. However, the pink salmon run was sufficiently large to support commercial harvest without jeopardizing subsistence uses. The buyer had established markets for the roe and fillets in early July, but ADF&G did not open up the commercial pink salmon fishery until after closure of the Chinook salmon subsistence fishery. Prior to 2008, a directed pink salmon fishery had not occurred in Subdistricts 5 and 6 since 2000 (Appendices A10 and A11), although 2,121 pink salmon that were incidentally harvested in 2007 in Subdistrict 6 were sold as crab bait. Once the 2008 chum and coho salmon fisheries began, the buyer continued to purchase the incidental pink salmon harvest for crab bait.

Chum salmon catches at the test net were above average during the second week of July and the buyer expressed interest in purchasing chum salmon. The first coho salmon was caught in the test net on July 7 and catches were record-setting by July 21. By mid July, most Chinook salmon have entered their rivers of origin and few are incidentally harvested in commercial coho salmon fishery. On July 17, the Shaktoolik and Unalakleet Subdistricts were opened to commercial salmon fishing for one 24-hour period. This brief period was permitted to allow some harvest of chum obtain an early index of coho salmon run strength. In both Subdistricts 5 and 6, chum catches outnumbered coho salmon catches 3 to 1 and coho salmon catches were above average for July 17, but during the July 20 opener, catches were comprised of more than 60% coho salmon (Tables 7–8). After the July 20 opener, ADF&G switched to coho salmon management and placed Subdistricts 5 and 6 on the commercial fishing schedule of two 48-hour commercial fishing periods a week. The commercial salmon season was extended for another week due to record test net catches and above average commercial catches for early September. Subdistricts 5 and 6 were closed to commercial salmon fishing at 6:00 p.m. Friday, September 12.

The 2008 commercial catches in Subdistrict 5 were 6 Chinook, 24 sockeye, 6,042 chum, 8,219 pink, and 37,624 coho salmon harvested by 23 permit holders (Table 7). In Subdistrict 6, 58 permit holders harvested 48 Chinook, 36 sockeye, 48,698 pink, 17,648 chum, and 77,227 coho salmon (Table 8). There was little effort in the directed pink salmon fishery and the majority of the chum salmon harvest was incidental in the coho salmon fishery. Therefore, comparisons with historical commercial catch data were not possible for these species. The Subdistrict 5 commercial coho salmon harvest established a new record in the fishery and the Subdistrict 6 harvest was the fourth highest on record. The Subdistrict 5 coho salmon catch was 83% above the recent 5-year average and 214% above the recent 10-year average (Appendix A10), and this season's Unalakleet coho salmon catch was 32% above the recent 5-year average and 107% above the recent 10-year average (Appendix A11). The subsistence catches of Chinook salmon were the second lowest in the Subdistrict 5 and the lowest in the Subdistrict 6 since surveys started again in 1994. However, subsistence catches for other salmon in both subdistricts were within the ranges exhibited since 1994 (Appendices A10 and A11).

Escapement

Table 3 and Appendix A16 summarize escapement assessments for the major index river systems of Norton Sound and Port Clarence Districts in 2008. Appendices A17–A23 present passage numbers for Chinook, chum, coho, pink, and sockeye salmon at various enumeration projects in Norton Sound. Note aerial survey assessments are often qualitative and relative to

historical escapement sizes. Most of the chum salmon assessments are described relative to a 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 BEG cannot be estimated due to the absence of a stock specific catch estimate. A 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 the SEG or BEG.

ADF&G escapement projects in Norton Sound include counting towers on the Kwiniuk and Niukluk Rivers, a test net operated on the Unalakleet River, and a weir on the Nome River. NSEDC provides essential support for these projects.

Six additional counting projects were also operated in the management area this season. The Snake, Eldorado, and Pilgrim Rivers had weir projects which were set up and operated cooperatively by ADF&G and NSEDC, and the North River counting tower project was a cooperative project operated by ADF&G in June and Unalakleet IRA for the remainder of the summer with funding assistance from NSEDC. ADF&G and NSEDC also operated a weir at the headwaters of Glacial Creek which flows from Glacial Lake into the Sinuk River. Except for the Glacial Lake project, most projects have been operational since the 1990s. All projects supplied important daily information to the department that was very useful to the management of local salmon resources and will become more important the longer they operate.

Aerial survey assessment conditions were poor during the month of July. Enormous pink salmon runs and overcast conditions precluded accurate aerial surveys of chum and Chinook salmon in most Norton Sound drainages for the 2008 season. However, a lack of precipitation and overcast weather from August to mid September provided exceptional viewing conditions during peak spawning periods of the coho salmon run. As usual, the 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 2008 Chinook salmon run was well below average throughout most of Norton Sound. In Norton Sound only the eastern area has sizable runs of Chinook salmon, and rivers in the Unalakleet and Shaktoolik Subdistricts are the primary Chinook salmon producers in Norton Sound. Unalakleet River test net catches, enumeration towers on the Kwiniuk and North Rivers, aerial surveys, and inseason subsistence catch reports were the primary assessment tools for judging Chinook salmon run strength in Norton Sound. The Unalakleet test net catch was the third highest since 1985. Prior to 1985, varying data collection and test fishing methodologies were used. However, improved test net catches this year are most likely the result of a near complete removal of subsistence set gillnet gear from the Unalakleet River following mesh-size restrictions in late June. Test net catches began to peak in early July, when most inriver subsistence fishermen focused their fishing effort in marine waters where large-mesh gillnet gear was permitted. The North River tower count of 903 Chinook salmon is the lowest estimated escapement in the project's 13-year history and the lower end of the SEG (1,200) range has not been reached in 4 of the last 5 years (Appendix A25). Overcast conditions during peak Chinook salmon spawning periods prevented aerial surveys from being conducted on the Shaktoolik, Unalakleet, Old Woman, and North Rivers.

In Moses Point Subdistrict, the Kwiniuk River tower count fell short of the SEG (300–550) range for the third consecutive year and the minimum escapement goal has not been achieved in 6 of 10 years since 1999. An aerial survey of neighboring Tubutulik River, the biggest producer of Chinook salmon in Moses Point Subdistrict, was not conducted due to overcast conditions in late July. Chinook salmon passage at the Niukluk River tower was below average and the Pilgrim River Chinook salmon escapement was average.

Chum Salmon

Chum salmon escapements were well above average in Shaktoolik and Unalakleet Subdistricts. Other than aerial surveys, escapements are not assessed in Shaktoolik Subdistrict. However, Subdistricts 5 and 6 are managed according to test net and escapement indices in the Unalakleet River drainage because tagging studies conducted in the late 1970s showed an intermingling of stocks in Subdistricts 5 and 6. The Unalakleet River test net chum salmon catch of 1,932 was 30% above the previous record catch of 1,482 observed in 2006 (Table 12). There were also 9,502 chum salmon enumerated at the North River tower, which was above the recent 5-year average of 7,453 chum salmon. However, North River is not considered to be an important chum salmon spawning tributary.

Northern Norton Sound chum salmon runs were below average in the Nome, Golovin, and Moses Point Subdistricts. The Nome River weir passage of 2,607 chum salmon was the fifth lowest since the weir began operations in the mid-1990s. Moreover, this season was the first year since 2003 in which the lower end of the weir-based SEG range (2,900–4,300) was not reached. The Eldorado River weir passage of 6,746 chum salmon was the third lowest since the project was converted to a weir in 2003. However, the Eldorado River weir count did exceed the lower end of the SEG range (6,000–9,200) for the fourth consecutive year. Snake River experienced its second lowest chum salmon escapement (1,244) and 2008 was the first year since 1999 that the lower end of the SEG range (1,600–2,500) was not reached. The Kwiniuk River tower count of 9,462 chum salmon ranked third poorest. At the Niukluk River tower, only the 2004 escapement of 10,770 chum salmon was worse than the chum salmon passage estimate of 12,078 recorded in 2008. The Pilgrim River weir passage of 24,550 chum salmon was lower than chum escapements recorded in 2006 and 2007, but slightly above the recent 5-year average of 23,164 chum salmon which includes the record escapement of 45,361 chum salmon in 2006.

Coho Salmon

Coho salmon are found in nearly all of the chum salmon producing streams throughout Norton Sound with primary commercial contributors being the Unalakleet and Shaktoolik Rivers. Because inclement weather is normally experienced in this area during August and September, escapement data can be somewhat incomplete. Previous to this decade, few projects counted coho salmon escapement. The more recent Norton Sound escapement assessment projects are intended to monitor coho as well as chum salmon and are becoming more important to fisheries management. The 2008 coho salmon escapements were well above average to record-setting throughout Norton Sound. In the Unalakleet River, cumulative test net catch was 1,988 coho salmon and established a new record for the 24 year project (Table 12). The North River tower count of 15,648 coho salmon was the third best escapement since the project began in 1996. Although the run was about a week later than expected, the Kwiniuk River tower passage of 10,461 coho salmon was the fourth highest since the crew began counting the majority of the coho salmon escapement in 2001. The Niukluk River tower passage of 13,779 coho salmon surpassed the previous record coho salmon

passage of 12,781 observed in 1996. The Nome River weir passage of 4,605 coho salmon ranked third highest out of 8 years of coho salmon counting and the Snake River weir passage of 5,206 was a record in 8 years of coho salmon counting. Aerial survey estimates of coho salmon were also record-setting for 5 Nome Subdistrict rivers; the Eldorado, Solomon, Flambeau, Bonanza, and Snake Rivers (Appendix A16). Normal problems such as fall storm activity and rising water levels that interfere with aerial surveying were not a factor this season and viewing conditions were exceptional.

Pink Salmon

For over 20 years, pink salmon runs to Norton Sound have followed an odd- and even-numbered year cycle with the even-numbered year runs typically much higher in number than the odd-numbered years. In 2008, the pink salmon run was record-setting for even-numbered years in Nome Subdistrict and at Pilgrim River, about 50% of the even-numbered year escapement in Golovin Subdistrict, slightly above average in Moses Point Subdistrict, and well below the even-numbered year average in the Unalakleet Subdistrict. Escapement goals for pink salmon in Norton Sound were easily made in 2008.

Sockeye Salmon

Sockeye salmon are typically found in small numbers throughout the Norton Sound District with the largest spawning stock at Glacial Lake where 1,000 to 2,000 sockeye salmon usually return to spawn each year. Port Clarence is the salmon district immediately to the northwest of Norton Sound and has had a spawning population near 10,000 fish in years previous to 2003 at Salmon Lake. From 2003 to 2007, however, there have been near-record to record returns of sockeye salmon to Salmon Lake. Likewise, Glacial Lake saw an upswing in sockeye salmon returns beginning in 2004.

In 2008 sockeye counts dropped off at both Glacial Lake and Salmon Lake. The Glacial Lake weir is operated at Glacial Creek near the outlet of the lake and about one mile upstream from the confluence with the Sinuk River and 1,794 sockeye salmon were counted in 2008. An aerial survey count during peak spawning periods had 540 fish in Glacial Lake. The sockeye salmon aerial escapement goal is 800 to 1,600 for Glacial Lake.

In 2008 the counting weirs at Nome River and Snake River reported much lower numbers of sockeye salmon than the record numbers observed in 2007. At the Nome and Snake Rivers, there were 90 and 143 sockeye salmon that passed the weirs, respectively. This decrease in sockeye salmon production tracks with the similar decreases observed at Glacial Lake and Salmon Lake.

Enforcement

Two Fish and Wildlife Protection officers patrolled the Norton Sound District 2008 commercial salmon fisheries in Unalakleet and one Fish and Wildlife Protection officer patrolled the Nome area. In addition, Nome ADF&G Division of Commercial Fisheries has 8 deputized staff with the ability to issue citations, 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.

2009 NORTON SOUND SALMON OUTLOOK

Salmon outlooks and harvest projections for the 2009 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, the 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 2004 were fair for chum and parent-year escapements in 2004 for this year's returning 5-year old chum salmon were poor to fair. Parent-year escapements for coho salmon were good. Pink salmon parent-year escapements were average for an odd-numbered year, but had dropped considerably from the 2005 escapements.

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

The Chinook salmon run is expected to be weak and no commercial fishing targeting Chinook salmon is expected. Subsistence restrictions are expected again in southern Norton Sound. The Chinook salmon harvest will likely be low as an incidental catch in other salmon directed fisheries. Chum salmon runs are expected to be average, but limited commercial fishing targeting chum salmon is expected. There is some buyer interest in chum salmon expected and the harvest could be 50,000 to 75,000 fish. The only expected subsistence restrictions for chum salmon will be in the 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. However, in 2007 the run was average for an odd-numbered year and well below the run in 2005. In 2009 ADF&G expects the pink salmon run to be average and limited buyer interest for a commercial fishery. Harvest could be 100,000 fish in 2009 if there is active buyer interest. The coho salmon run in 2009 is expected to be above average based on good ocean survival conditions in recent years and the near record and record runs in recent years in southern Norton Sound. The commercial harvest is expected to be 80,000 to 100,000 fish and no subsistence fishing restrictions are expected, except for catch limits in the Nome Subdistrict.

2008 PORT CLARENCE SALMON FISHERY

Commercial Fishery Season Summary

In 2008 ADF&G projected an inriver run of 30,000 to 40,000 sockeye salmon for the Pilgrim River and commercial fishing was allowed. Commercial fishing started on July 1 and there were five 12-hour periods with the last being on July 12. Commercial fishing was suspended when the midseason projection showed that the inriver 30,000 sockeye salmon goal would not be reached in the Pilgrim River. One commercial permit holder fished in 2008 and waived confidentiality therefore allowing catches to be publicly reported. Catches were 89 sockeye, 256 chum, and 910 pink salmon. Like last year, chum salmon catches exceeded sockeye salmon catches for each fishing period. In 2007 catches were 1,152 sockeye and 3,183 chum salmon for 3 permit holders.

Subsistence Fishery Season Summary

Subsistence permits have been required for the Pilgrim River since 1964 and since 2002 the number of permits issued has skyrocketed with the record sockeye salmon runs. In 2008 there

were a record 255 permits issued. In 2003, the first year of the great runs of sockeye salmon there were 100 permits issued. The previous record number of permits issued was in 2004 when 223 permits were issued. For comparison, in 2002 only 25 permits were issued and a counting tower in operation that year at the same location as the present-day weir estimated less than 4,000 sockeye salmon passing.

The Pilgrim River sockeye salmon catch reported on subsistence permits was 3,439 fish in 2008 (Table 2). The catch was the lowest since 2004 when the number of subsistence permits issued for the Pilgrim River first exceeded 200 permits.

Although permits had been required in the Pilgrim River drainage for years, 2008 was only the fifth year that permits were required throughout the Port Clarence District. The number of subsistence salmon permits issued for all waters of the Port Clarence District, excluding Pilgrim River and Salmon Lake, was 150 permits, slightly less than the record 159 permits issued the previous year. The Port Clarence District catch, excluding Pilgrim River and Salmon Lake, was 11,869 fish in 2008 and was the second lowest salmon catch reported since permits were required beginning in 2004.

Three subsistence salmon fishing permits were issued for Salmon Lake in 2008. Since subsistence fishing was allowed in 2005 in Salmon Lake less than 5 permits have been issued each year. Catch at Salmon Lake is limited to 100 sockeye salmon and only the northeast half of the lake is open to subsistence salmon fishing. The reported subsistence catch at Salmon Lake was 56 sockeye salmon.

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 where commercial fishing occurs. Aerial surveys show an increasing trend of sockeye returns to Salmon Lake since 1986 (Appendix B1). In 2008, an aerial survey of Salmon Lake and Grand Central River after peak spawning estimated 9,420 sockeye salmon in Salmon Lake and 2,252 sockeye salmon in Grand Central River, a tributary to Salmon Lake. The combined escapement goal for Salmon Lake and Grand Central River is 4,000–8,000 sockeye salmon (Table 3).

Salmon Lake has had a sockeye salmon spawning population near 10,000 fish previous to 2003. But from 2003 to 2007, escapements skyrocketed and annual weir counts were higher than 42,000 fish (Appendix A18). The weir passage in 2003 was nearly 43,000 fish and in 2004 the escapement through the weir was a record of over 85,000 fish. In 2005, 2006, and 2007 the weir passage was almost 56,000, over 52,000, and over 43,000 sockeye salmon respectively. However, Pilgrim River escapement for 2008 was lowest on record for the weir with 20,452 sockeye salmon counted. Previous to 2003 the weir was not operational and estimates of escapement by counting tower and aerial survey were much lower for almost all years.

From 1997 to 2001, ADF&G conducted a fertilization program at Salmon Lake partially funded by NSEDC and BLM to restore sockeye salmon to historical 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, suspended again in 2005 and 2006, and restarted in 2007 by NSEDC and continued in 2008.

Enforcement

In 2008, one Fish and Wildlife Protection officer patrolled Pilgrim River in Port Clarence District.

2009 PORT CLARENCE SALMON OUTLOOK

The guideline harvest range (GHR) set by BOF for the Port Clarence sockeye fishery allows for a harvest of up to 10,000 fish. Based on excellent runs of sockeye salmon in recent years ADF&G expects the GHL to be reached if there is a sufficient fishing fleet. The department is projecting an inriver run of 30,000 to 40,000 sockeye salmon for the Pilgrim River.

If subsistence fishing reports indicate normal catches of sockeye salmon then commercial fishing will be allowed in Port Clarence. There may be several openings prior to the normal July 1 start date to see if there are better sockeye catches compared to chum salmon catches. In 2007 and 2008, more chum were caught than sockeye salmon during every fishing period in July. Continued commercial fishing after mid July will be dependent on sufficient subsistence fishing catches and an inriver goal of 30,000 sockeye salmon projected to be met at Pilgrim River.

No subsistence fishing time restrictions are expected in 2009, but if the weir project and aerial surveys indicate poor runs of a particular species the department will need to implement fishing restrictions.

2008 KOTZEBUE SOUND SALMON FISHERY

Commercial Fishery Season Summary

The Kotzebue Sound commercial salmon fishery opened on July 14 and the fishery closed by regulation after August 31. By regulation the fishery may open on July 10, but the lone buyer notified the department they would not be able to buy fish until July 14 because of logistical problems getting the facility ready. The buyer last purchased fish on August 29.

Gear is limited to set nets with an aggregate of no more than 150 fathoms per fishermen. Fishermen generally operate with one end on or near shore and with all 3 shackles connected. Fishermen also set in deeper channels in the mud flats further out from shore. Most gear used in the district is 5-7/8 inch (14.9 cm) or 6 inch (15.2 cm) stretch mesh gillnet.

During most of the 2000s, the Kotzebue commercial fishery has been limited by buyer capacity. In 2002 and 2003, there was no onsite buyer. In 2004 and 2005, one onsite buyer was present and fish were processed locally. Beginning in 2006, the new buyer shipped the catch in the round to Anchorage for processing.

As in recent years, ADF&G opened the commercial fishery continuously and allowed the buyer to set the fishing time for their fleet. There were 48 permit holders who sold fish to the buyer, including one catcher–seller who sold fish to the buyer and to Kotzebue area residents. The number of permit holders that fished has been in the 40s in the last 5 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).

The overall chum salmon run to Kotzebue Sound in 2008 was estimated to be well above average based on commercial harvest rates, subsistence fishermen reporting excellent catches, the Kobuk test fish index being the second best in the 16-year project history and aerial surveys in the Kobuk and Noatak River drainages. The commercial harvest was 190,550 chum salmon

(Table 10). Also harvested during the commercial fishery and kept for personal use were 4 Chinook, 9 sockeye, 693 pink, and 36 coho salmon, 1,629 Dolly Varden and 37 sheefish (Appendix C2). There were likely some additional fish kept for personal use that did not get reported on fish tickets.

Beginning on July 14, the season was opened to commercial fishing until further notice. Opening commercial fishing continuously gives the buyer maximum flexibility in determining the length of fishing periods for their fleet and also enables the buyer to more easily coordinate with changing plane schedules.

The buyer set 13 fishing periods from July 14 to 29 and fishing periods ranged from 6 to 9 hours a day. The largest one day harvest of 14,005 chum salmon occurred on July 29 during a 6-hour fishing period and the buyer reduced fishing periods to 5 hours or less during the next 2 weeks because of capacity limits. The highest number of permit holders fishing was on August 1 when 26 permit holders participated in a 4-hour fishing period. From August 14 to 28 fishing periods were from 6 to 8 hours and the last day the buyer purchased salmon was during a 9-hour fishing period on August 29.

The season catch of 190,550 chum salmon was the highest commercial harvest since 2001.

A total of 1,541,922 pounds of chum salmon (average weight 8.1 lbs) were sold at an average of $0.25 per pound, with a total exvessel value of $385,270 for Kotzebue Sound fishermen. Average value for each participating permit holder was $8,026, and total exvessel value represents 65% of the $589,858 historical average (Appendix C4).

Subsistence Fishery Season Summary

Subsistence household surveys were regularly conducted in Kotzebue District from 1962 to 2004 by the Division of Subsistence, but since 2004, no subsistence surveys have been conducted in the area (Appendices C5 and C6). In 2008, no subsistence salmon surveys were scheduled, and no other information on subsistence harvest is available other than comments that chum salmon fishing on Kobuk and Noatak Rivers was very good in August.

Escapement

This year's test fish chum salmon CPUE cumulative index was 2,269 points and ranked second out of 16 years at the Kobuk River test fish project (Table 11). The midpoint at the test fishery was July 30 and run timing was similar to other years with high CPUE at the project.

Test fishing was conducted twice during the run in the lower Noatak River by ADF&G personnel to obtain ASL information. The age composition of the Noatak River test drift catches were predominately age-0.3 and -0.4 fish with 73% age-0.3 fish and 20% age-0.4 fish caught. Likewise, at the Kobuk River test fish project the percentage of age-0.3 and -0.4 fish were the majority of catches, but the catches for each were similar with age-0.3 catch at 48%, and age-0.4 catch at 45% of the total.

Peak aerial surveys of the Kobuk River and Noatak River drainages were conducted for the first time since 2004. Extremely low water levels and clear skies resulted in exceptional viewing conditions and aerial survey estimates of chum salmon abundance were commensurate with well above average commercial and subsistence catch rates. The Noatak and Eli Rivers' aerial survey counts of 257,695 and 13,052 chum salmon were the second and third highest, respectively, since surveys were conducted in 1962 (Appendix C8). Additionally, the Noatak/Eli count of

270,747 chum salmon was more than twice the upper end of the Noatak/Eli Rivers aerial survey SEG range of 42,000–91,000 chum salmon. There were only 1,865 chum salmon counted in the Kelly River, but the low count could be the result of low water levels, which prevented many of the braided back channels from being utilized as spawning areas. In the Noatak River flood plain, most of the spawning activity occurs in these side channels in most years, but several of these areas were void of water in 2008. In the Kobuk River drainage, 41,597 chum salmon were enumerated in the upper Kobuk River and 1,750 chum salmon were counted in the Selby River. The Kobuk River chum salmon count was the third best on record, although this number is conservative because the number of dead fish was likely under estimated. Selby River counts are also thought to be conservative as the shadows from riparian timber caused the observer to miss some fish. However, the combined Kobuk/Selby Rivers count of 43,347 chum salmon was twice the upper end of the upper Kobuk/Selby Rivers aerial survey SEG range of 9,700–21,000 chum salmon.

Enforcement

One Fish and Wildlife Protection officer patrolled the Kotzebue Sound District 2008 commercial salmon fishery.

2009 Kotzebue Salmon Outlook

The outlook for the 2009 season is based on parent-year returns and returning age classes observed in test fish samples from the Kobuk and Noatak Rivers, and Kotzebue commercial catch samples in 2008. During the 2009 season, the 4-year-old component of the run is expected to be average. The 5-year-old component of the run is expected to be above average based on the 4-year-old return this past season. The 3-year-old and 6-year-old age classes are much smaller components of the run and are expected to be above average. The commercial harvest is expected to fall within the range of 150,000 to 200,000 chum salmon, if market conditions can accept that level of harvest.

SECTION 3: PACIFIC HERRING FISHERIES

2008 NORTON SOUND PACIFIC HERRING FISHERY

Commercial Fishery Season Summary

Sac Roe

There was no market interest in herring sac roe in Norton Sound during the 2008 season. Historical information for the Norton Sound sac roe fishery can be found in Appendix D3. Other historical fisheries information is presented in Appendices D1, D2, and D4.

Spawn on Kelp

There was no interest expressed in the commercial *Macrocystis* spawn-on-kelp fishery or the commercial spawn-on-wild kelp fishery in 2008.

Bait Fishery

There was a directed bait herring fishery in 2008. NSEDC purchased 91 tons of bait herring from 14 fishermen, and the total ex-vessel value of the fishery was $54,347 (Table 13).

Commercial Fishery Management

ADF&G projection for the 2008 spawning biomass for the Norton Sound sac roe fishery was 37,401 tons. At 20% exploitation rate, the guideline harvest level (GHL) for Norton Sound District was 7,480 tons with 6,444 tons allocated to the gillnet fishery.

Herring were first observed on June 5 when an NSEDC biologist estimated 12,213 tons of herring in Subdistricts 1 and 2. ADF&G was willing to open the fishery any time the buyer was ready and the buyer requested to start fishing on June 10. The department consequently opened the fishery at midnight June 10. On June 10, 3 permits fished and the next 2 days saw the greatest effort of the season when 10 permit holders fished each day. The fishery was left open continuously to allow the most favorable herring fishing schedule as determined by the buyer and fishermen.

Two shackles of gear for a total length of 100 fathoms were allowed to be fished. The fishery officially ended on June 30, but the buyer quit purchasing bait herring on June 24 when it was determined that there was enough bait for the upcoming crab season.

One ADF&G field crew operated from Cape Denbigh during the 2008 season. The test fish crew's presence and sampling efforts on the herring grounds are used for determining age and sex composition of the stocks before, during and after spawning (Appendices D6–D15). The crew also assisted with any paperwork or questions from the fishing fleet.

Catch Reporting and Enforcement

The herring buyer registered for the 2008 season communicated well with ADF&G during the fishery and 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. Test fishing results were therefore relayed via SSB radio or satellite telephone.

Due to the limited Norton Sound fishery in 2008, the Unalakleet field office personnel consisted of one assistant area biologist to conduct aerial survey biomass estimates. No Fish and Wildlife Protection officers were on the Norton Sound herring grounds during the 2008 fishery; however, the assistant area biologist stationed in Unalakleet for the 2008 herring season was deputized and able to cite fishing violations if necessary.

Biomass Determination

Inclement weather and mud plumes in Subdistrict 1 led to poor viewing conditions when the herring first arrived in early June. The peak survey was the first survey flown by an NSEDC biologist. During following surveys by NSEDC and ADF&G biologists the herring had moved north to deeper water and poor viewing conditions did not allow for a peak aerial survey (Table 14).

2009 NORTON SOUND PACIFIC HERRING OUTLOOK

The biomass of herring projected to return in 2009 to Norton Sound is 36,917 tons. A 20% exploitation rate would result in a harvest guideline of 7,383 tons. A maximum of 320 tons of

herring are reserved to allow the pound fishery to harvest a maximum of 90 tons of product (combined weight of herring roe and kelp). This leaves 7,063 tons for sac roe harvest. The beach seine harvest is, by regulation, 10% of the sac roe projected harvest, or 706 tons. The 2009 herring fishery will be opened by emergency order and the fishery will 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 5, 6 and 7 are expected to dominate the returning population, contributing 15%, 14% and 46%, respectively. Age 9 and older herring are expected to comprise 22% of the biomass (Figure 20).

SECTION 4: KING CRAB FISHERIES

NORTON SOUND CRAB FISHERY

Abundance

The ADF&G length-based population model estimated legal male crab abundance for the 2008 summer commercial crab fishery at 4.12 million pounds (1.50 million crab). This is an increase of approximately 31% from the revised population estimate of 3.14 million pounds (1.14 million pounds) for 2007. Current size composition data from the 2008 winter crab study show the portion of the crab population classified as recruits has increased 58% since the 2007 survey and the postrecruit male crab population has increased 9% (Soong and Mumm 2009). The high percentage of prerecruit-1 crab observed in 2007 likely contributed to the increase in recruitment. The winter pot study also points to a slightly above average pre-1 population and a pre-2 population that is nearly double the 24-year average. Pre-1 crab require one molt to become part of legal population next year, while pre-2 crab require 2 molts. These findings indicate that legal crab population in 2008 is greater than 2007, and will likely continue to increase in the near future, indications that are also supported by data from the 2006 trawl survey.

A 10% exploitation rate on the legal population ≥ 4.75 inch carapace width equates to a GHL of 412,000 pounds of crab. This follows the harvest strategy set by the Alaska Board of Fisheries. By regulation, the Community Development Quota (CDQ) fishery is allocated 7.5% of the summer season quota; therefore, the CDQ harvest quota was set at 30,900 pounds preseason.

Summer Open Access Commercial Fishery

The 2008 summer open access commercial crab fishery was opened by emergency order at 12:00 noon, June 23 in the Norton Sound section. The GHL was 381,100 pounds of crab. Two companies were 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 fishermen, while some fishermen based in Unalakleet delivered to the second buyer in Anchorage. Some fishermen also sold their catch dockside as catcher–sellers. The open access portion of the fishery was closed by emergency order 12:00 noon, August 18, 2008 when the harvest approached the goal of 381,100 pounds.

Total harvest from fish ticket reports was 132,295 red king crab or 364,235 pounds. Of this total, 606 pounds were reported as deadloss, and 9,452 pounds reported as personal use. A total of 22 vessels made deliveries, 23 permit holders fished, and 230 landings were made. Average weight for commercially caught crab was 2.75 pounds. Number of pots registered was 920 and there were 8,107 pot pulls throughout the fishery. Average price paid was $3.20 per pound, and exvessel value of the fishery was $1,230,932. Appendix E3 gives historical summer commercial (including CDQ) red king crab fishery performance from 1977 to present.

The first commercial delivery was made on June 25 and final delivery was made August 19. The commercial crab fleet either delivered to a small tender vessel in northeastern Norton Sound, which then delivered crab to Nome for processing, or sold their crab directly to a seafood processing plant. The majority of fishermen delivered to the plant in Nome, while .3 Unalakleet fishermen flew live crab to a buyer in Anchorage.

Fish ticket reports document that 9 statistical areas were fished in the open access and CDQ fisheries (Table 15). Same as the last 2 years, statistical area 636401 had the highest catch with 197,948 pounds of crab. The other large catches came from statistical areas 626401 (96,327 pounds) and 656401 (68,968 pounds). The catch from statistical areas east of 164°W longitude made up 77.4% of the harvest (Appendices E1 and E9). Overall, CPUE was 16.4 crab per pot compared to 2007 CPUE of 12.1 crab per pot.

CDQ Fishery

The 2008 CDQ fishery opened at 12:00 noon August 17, 2008. The harvest was 30,900 pounds of crab, 100% of the CDQ allocation (Table 16). During this fishery 7 vessels participated and 18 landings were made. There were a total of 614 pots pulled. Average price paid to fishermen for their harvest was $3.25 per pound, and exvessel value was $98,872 for the CDQ fishery, which closed 12:00 noon September 3, 2008.

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

Commercial Catch Sampling

Carapace length measurements and shell age were collected from 5,766 commercially–caught crab during the open access and CDQ fisheries. Carapace age was classified as new (2-12 months old) or old (over 13 months old). Male new-shell crab made up 77.0% of the total legal crabs sampled, and old-shell crab made up 23.0% (Table 17). Recruit crab are new-shell legal crab with <116 mm carapace length (CL). Postrecruit crab are legal new-shell male crab with $\geq$116 mm CL and all legal old-shell males. Recruit crab made up 45.1% of the legal crabs sampled and postrecruit crabs made up 54.9%. These percentages were the same for samples from the 2007 fishery (Appendix E4). Overall mean carapace length of legal male crabs was 115.4 mm (Table 17 and Figure 33). This was a decrease of 1% from the 2007 fishery. For comparison of historical length composition of Norton Sound red king crab summer commercial harvests from 1981 to 2007, see Appendices E13–E19.

Enforcement

One Alaska Department of Public Safety trooper made dockside checks during the 2008 summer crab fishery. In addition, 2 deputized ADF&G staff worked the king crab fishery.

Winter Commercial Fishery

The winter commercial season opened November 15, 2007, and 9 fishermen registered. Based on fish tickets submitted, the first landing was made February 20. From then until the last landing on May 5, 9 fishermen made a total of 129 landings and 1,008 potlifts, with an overall CPUE of 5.8 and average weight of 2.5 pounds per crab. Price of crab averaged $3.03 per pound. A total of 5,796 crab were sold, with percentages of crab sold (and CPUE) each month as follows: February 9% (7.3), March 64% (7.1), April 26% (3.9), and May 1% (1.7). Total number of crabs harvested was 75% greater than in 2007. No commercial fishermen reported losing their pots during the 2008 winter season. Pots were fished from 12 miles east to 7 miles west of Nome, excluding the area closed to commercial fishing from 3.5 miles east to 2.0 miles west of Nome.

The harvest is generally divided between local residents who buy crab directly from the fishermen, the seafood plant in Nome, and other non-local markets such as Anchorage. Most fishermen consider commercial crabbing a sideline and hold other jobs. Usually, a few of the winter crab fishermen sell the majority of the crab. Appendix E5 presents winter commercial and subsistence harvests of crab from 1978 to 2008.

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 2007 to 2008 Nome area winter crab season, 139 permits were issued, 137 returned, and 108 permit holders reported fishing for a total of 9,485 crabs (compared to 10,690 crabs for 2007) kept for winter subsistence use (Appendix E5). Table 18 gives a breakdown of crab caught by gear type.

During the 2008 Norton Sound summer subsistence crab season, 30 permits were issued and returned, and out of 14 permit holders that set pots, 10 fishermen reported harvesting a total of 1,176 crab, over 80% of which were harvested near Unalakleet. Fishermen kept an average of 84 crab each for summer 2008. Appendix E6 compares the harvest information from 2004 to 2008. Sport fishermen can fish for crab and a harvest log issued by the Nome office similar to a subsistence permit is required. Sport fishermen are only allowed to keep 6 male crabs daily and they must be of legal size (4-3/4 inch or greater). The only recent harvest by sport fishermen was in 2005. That year, 9 harvest logs were issued and 8 were returned, showing that 6 non-resident sport fishermen caught 918 crabs and kept 106, for an average harvest of 18 crabs per fisherman.

Future Resource Investigations

A winter pot study is planned from March through April of 2009. Results of the winter project will be used in the length-based model to project the summer 2009 legal biomass and appropriate GHL for the summer commercial crab fishery. Size composition by year from the winter king crab project is shown in Appendix E7.

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 crab, and indicated 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 introduced a proposal to BOF to decrease the legal size of commercial blue king crab from 5.5 to 5 inches. At the March 2008 BOF meeting the legal size regulations for blue king crab were changed to 5 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 2006, and in July and August of 2008, 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 and northwest of the standard ADF&G triennial Norton Sound red king crab trawl survey locations. In 2006, trawls were conducted from near the southwest corner of St Lawrence Island to the Bering Strait area southwest of Cape Prince of Wales. Size information and general distribution of blue king crab was collected. More survey work is necessary to generate an abundance estimate and better understand the distribution of blue king crab. In 2008 prior to the trawl survey, a camera sled was towed a few meters above the seabed to observe crab and other species in the St. Lawrence Island area that had been trawled in 2006, and in the NSEDC portion of the trawl survey in 2008 which went farther north into the Bering Strait off of Wales. The 2006 and 2008 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, the 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 with Norton Sound section. This change was initiated by Norton Sound area fishermen to expand fishing opportunity to an area with little commercial utilization since 1995. No harvest was reported from this new area in 2008. No permit holders fished in the Kotzebue section in 2008.

SECTION 5: MISCELLANEOUS SPECIES

INCONNU (SHEEFISH)

Commercial Fishery

Although inconnu *Stenodus leucichthys*, commonly known as sheefish, were likely harvested and sold in the winter of 2007–2008 by several fishermen, no fish tickets were submitted to ADF&G. In Kotzebue Sound District, no fishermen 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 1988 to 1990, and since 2004. Data from subsistence household surveys conducted by Divisions of Commercial Fisheries and Subsistence for 1966–1987 and 1991–2004 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 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.

Sport fish harvest reports indicate a record low harvest of 61 sheefish in 2008. Sheefish sport harvests in the last 10 years have averaged approximately 1,000 annually (Appendix F3).

Escapement

No aerial surveys are flown to determine sheefish escapement. An ADF&G test fishing project on the Kobuk River helps to give an index of abundance, but the test fishery is operated to determine the index of chum salmon abundance and begins operation well after sheefish have begun to pass the site. In 2008, test fishing on the Kobuk River resulted in 880 sheefish caught in 200 drifts, for a cumulative CPUE of 821. Cumulative sheefish catch and CPUE at the test fishery were a record in 2008.

DOLLY VARDEN

Commercial Fishery

Dolly Varden *Salvelinus malma* are occasionally incidentally caught in commercial salmon fisheries in Norton Sound and Kotzebue Districts. In 2008, no Dolly Varden were reported caught in Norton Sound commercial fisheries. Kotzebue District reported 1,629 caught but not sold, compared to last year when 960 were caught and not sold (Appendix F4).

Subsistence and Sport Fishery

Subsistence harvest data for Dolly Varden was not recorded for Norton Sound or Port Clarence, and household surveys for Dolly Varden subsistence catches were not conducted in Kotzebue Sound area communities in 2008. However, historical survey data collected by the Divisions of Sport Fish and Subsistence from 1959 to 2007 for the villages of Kivalina and Noatak are shown in Appendix F5.

Sport fish harvest was 3,319 Dolly Varden in Norton Sound in 2008 and was an increase from the 2,808 Dolly Varden harvest in 2007 and 852 Dolly Varden harvested in Kotzebue/Chukchi Sea areas was a decrease from the 2,924 harvested in 2007 (Appendix F3). The majority of Dolly Varden sport fish harvest in Norton Sound was taken from Unalakleet River with 1,062 fish, and Fish-Niukluk Rivers was second highest with 625 fish. Also, in 2006 and 2007 the Unalakleet River had the highest Dolly Varden harvest. However, in 2005 the highest Dolly Varden sport fish harvest was 1,148 fish from the Fish-Niukluk Rivers. Overall, Dolly Varden sport fish harvests in the last 10 years in Norton Sound averaged 4,000 annually (Appendix F6).

Escapement

Dolly Varden escapement is determined from aerial surveys conducted by ADF&G Sport Fish Division in the Kotzebue area, and weir or tower counts in Norton Sound. In 2008, no aerial

surveys were flown for Noatak or Kivalina Rivers, but a survey was flown on Wulik River, that counted a total of 71,493 Dolly Varden (Appendix F7).

WHITEFISH

Commercial Fishery

No fishermen harvested whitefish commercially in 2008. During the 2006–2007 season whitefish were sold by only one fisherman who waived confidentiality. Between September 29 and October 5, 2006, a total of 3,723 pounds were sold for an average price of $0.44/lb, with a total value to the fisherman of $1,631.

Subsistence and Sport Fishery

Subsistence harvest data for whitefish was not recorded for Norton Sound or Port Clarence Districts, and household surveys for whitefish subsistence catches were not conducted in Kotzebue Sound area communities in 2008. However, historical survey data collected from various years during 1970 to 2004 for a few villages in Kotzebue District are shown in Appendix F8. Harvest numbers are considered minimal and are not comparable year to year. For the sport fishery, no harvest data is collected in Norton Sound, Port Clarence, or Kotzebue Sound Districts for whitefish.

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 sportfish license is not needed for Alaska residents in northern Norton Sound from Cape Prince of Wales to Bald Head, harvests of tomcod are not reported or documented. In 2008, Norton Sound household subsistence surveys were conducted; however, subsistence harvest information of tomcod was not collected.

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TABLES

Table 1.–Norton Sound commercial salmon harvest summary by subdistrict, 2008.

		Subdistricts						
		1	2	3	4	5	6	Total [a]
Number of Fishermen [b]		0	4	12	4	23	58	91
Chinook	Number	0	0	5	7	6	65	83
	Weight (lbs)	0	0	87	116	93	674	970
Sockeye	Number	0	0	0	0	24	36	60
	Weight (lbs)	0	0	0	0	106	156	262
Coho	Number	0	256	4,586	600	37,624	77,227	120,293
	Weight(lbs)	0	1,512	33,647	4,156	268,437	548,228	855,980
Pink	Number	0	2,699	14,536	1,232	8,219	48,698	75,384
	Weight (lbs)	0	7,271	38,270	3,327	21,463	117,648	187,979
Chum	Number	0	623	304	507	6,042	17,648	25,124
	Weight (lbs)	0	4,098	2,073	3,677	41,296	120,007	171,151
Total	Number	0	3,578	19,431	2,346	51,915	143,674	220,944
	Weight (lbs)	0	12,881	74,077	11,276	331,395	786,713	1,216,342

[a] Total number includes salmon retained for personal use that were not commercially sold. Poundage is from fish sold for commercial use. Average commercial weights by species were 14.70 lbs for Chinook, 5.70 lbs for sockeye, 7.12 lbs for coho, 2.49 lbs for pink and 6.81 lbs for chum salmon.

[b] Number of Fishermen is unique number of permit holders that fished in each subdistrict. Some permit holders fished in more than one subdistrict.

Table 2.–Tier I subsistence salmon harvest for northern Norton Sound, 2008.

	Permits Fished [a]	Number of Salmon Harvested					
		Chinook	Sockeye	Coho	Pink	Chum	Total
Marine Waters	53	19	60	630	2,823	469	4,001
Bonanza River	11	0	6	171	156	13	346
Cripple Creek	22	0	10	132	56	5	203
Eldorado River	8	6	3	257	707	124	1,097
Flambeau River	1	0	0	25	0	0	25
Nome River- above weir	33	0	0	171	1,129	0	1,300
Nome River- below weir	195	14	0	936	6,530	87	7,567
Penny River	28	0	0	161	237	0	398
Sinuk River	35	0	18	319	456	19	812
Snake River - above weir	13	0	0	71	93	0	164
Snake River - below weir	71	0	24	519	379	22	944
Solomon River	10	0	6	31	26	0	63
Nome Subdistrict Total [b]	363	39	127	3,423	12,592	739	16,920
Cape Woolley [c]	5	6	6	0	49	36	97
Marine Waters	23	81	89	388	1,894	216	2,668
Kachavik River	10	0	0	37	754	11	802
McKinley River	10	0	0	141	18	0	159
Chinik Creek	19	0	2	289	1,256	6	1,553
Fish River	50	59	0	979	3,719	56	4,813
Niukluk River- above tower	14	1	4	152	825	26	1,008
Niukluk River- below tower	15	4	0	335	1,687	35	2,061
Other Creeks/Rivers	7	1	0	16	2	0	19
Golovin Subdistrict Total [d]	100	146	95	2,337	10,155	350	13,083
Marine Waters	9	78	0	115	353	355	901
Kwiniuk River - above tower	10	1	0	91	387	291	770
Kwiniuk River - below tower	39	131	0	1,003	2,394	238	3,766
Next Creek	2	0	0	12	45	0	57
Tubutulik River	17	57	0	82	1,208	240	1,587
Iron Creek	11	2	0	501	3,268	160	3,931
Moses Point Subdistrict Total [e]	48	269	0	1,804	7,655	1,284	11,012
Port Clarence - Marine Waters	65	76	1,399	461	6,206	1,638	9,780
Tuksuk Channel	12	32	238	72	881	491	1,714
Imuruk Basin	0	0	0	0	0	0	0
Agiapuk River	4	0	0	0	0	244	244
Kuzitrin River	3	0	12	2	14	38	66
Pilgrim River- above weir	45	8	1,094	12	162	72	1,348
Pilgrim River- below weir	71	9	2,345	15	364	16	2,749
Salmon Lake	2	0	56	0	0	0	56
Port Clarence District Total [f]	231	125	5,144	562	7,627	2,499	15,957
Total	747	585	5,372	8,126	38,078	4,908	57,069

[a] There were 7 locations where Tier I subsistence permits were issued in 2008 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 461 Nome Subdistrict permits issued and 450 were returned.

[c] All 12 Cape Woolley permits issued were returned.

[d] All 155 Golovin Subdistrict permits issued were returned.

[e] All 57 Moses Point Subdistrict permits issued were returned.

[f] There were 255 Pilgrim River permits issued and 253 were returned, all 3 Salmon Lake permits issued were returned, and 150 Port Clarence District permits were issued and 145 returned.

Table 3.–Salmon counts of Norton Sound rivers in 2008 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.	-	-	-	-	-	-	-	-
Pilgrim R.	137	-	-	-	24,550	-	-	-
Glacial L.	-	-	-	-	10	-	-	-
Sinuk R.	-	-	-	-	-	4,000 – 6,200[b]	-	-
Cripple R.	-	-	-	-	-	-	-	-
Penny R.	-	-	-	-	-	-	-	-
Snake R.	13	-	-	-	1,244	1,600 – 2,500 [c]	-	-
Nome R.	28	-	-	-	2,607	2,900 – 4,300 [c]	106	-
Flambeau R.	-	-	-	-	-	4,100 – 6,300 [b]	4,235	-
Eldorado R.	36	-	-	-	6,746	6,000 – 9,200 [c]	-	-
Bonanza R.	-	-	-	-	-	2,300 – 3,400 [b]	-	-
Solomon R.	-	-	-	-	-	1,100 – 1,600 [b]	-	-
Fish R.	-	-	-	Combined	-	-	-	-
Boston Cr.	-	-	-	100 – 250	-	-	-	-
Niukluk R.	33	-	-	-	12,078	30,000	-	-
Ophir Cr.	-	-	-	-	-	-	-	-
Kwiniuk R.	237	300 – 550	-	-	9,462	11,500 – 23,000 [d]	-	-
Tubutulik R.	-	-	-	-	-	9,200 – 18,400 [b, d]	-	-
Ungalik R.	-	-	-	-	-	-	-	-
Inglutalik R	-	-	-	-	-	-	-	-
Pikmiktalik R	-	-	-	-	-	-	-	-
Shaktoolik R.	-	-	-	400 – 800	-	-	420	-
Unalakeet R.	-	-	-	Combined	-	-	782	Combined
Old Woman R.	-	-	-	550 – 1,100	-	-	127	2,400 – 4,800
North R.	903	1,200 – 2,600	-	-	9,502	-	527	-

-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.	-	-	-	-	9,420	Combined	-	-	-
Grand Central R.	-	-	-	-	2,252	4,000 - 8,000	-	-	-
Pilgrim R.	260	-	-	20,452	-	-	92,471	-	-
Glacial L.	-	-	-	1,794	540	800 –1,600	614	-	151
Sinuk R.	-	1,633	-	-	-	-	-	-	1,496,000
Cripple R.	-	401	-	-	-	-	-	-	402,000
Penny R.	-	298	-	-	-	-	-	-	-
Snake R.	5,206	2,233	-	143	-	-	145,761	-	-
Nome R.	4,605	2,051	-	90	-	-	1,186,554	13,000	528,000
Flambeau R.	-	918	-	-	-	-	-	-	106,200
Eldorado R.	38	1,160	-	-	-	-	244,641	-	-
Bonanza R.	-	3,608	-	-	-		-	-	212,000
Solomon R.	-	880	-	-	-	-	-	-	81,000
Fish R.	-	-	-	-	-	-	-	-	-
Boston Cr.	-	-	Tower Goal	-	-	-	-	-	-
Niukluk R.	13,779	1,715	2,400-6,100	-	-	-	669,234	10,500	-
Ophir Cr.	-	521	-	-	-	-	-	-	-
Kwiniuk R.	10,461	2,676	650-1,300	-	-		1,442,246	8,400	-
Tubutulik R.	-	4,197	-	-	-	-	-	-	-
Ungalik R.	-	-	-	-	-	-	-	-	-
Inglutalik R	-	-	-	-	-	-	-	-	-
Pikmiktalik R	-	-	-	-	-	-	-	-	-
Shaktoolik R.	-	5,207	-	-	-	-	-	-	330
Unalakeet R.	-	10,401	-	-	178	-	-	-	-
Old Woman R.	-	2,775	-	-	-	-	-	-	340
North R.	15,648	2,774	550-1,100	-	-	-	240,286	25,000	325

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 Golovin, Subdistrict 2, Norton Sound, 2008.

Period	Target Species	Dates Fished	Length (hours)	Permits Fished	Chinook Harvest	Chum Harvest	Pink Harvest	Coho Harvest
1	Pink & Chum	7/01	12	Catch information by period confidential				
2	Pink & Chum	7/03	12	Catch information by period confidential				
3	Pink & Chum	7/07	12	Catch information by period confidential				
4	Coho	8/14-8/15	24	No one fished				
5	Coho	8/20-8/22	48	Catch information by period confidential				
Totals			108	4	0	623	2,699	256

Table 5.–Commercial salmon set gillnet catches from Moses Point, Subdistrict 3, Norton Sound, 2008.

Period	Target Species	Dates Fished	Length (hours)	Permits Fished	Chinook Harvest	Chum Harvest	Chum CPUE	Pink Harvest	Pink CPUE	Coho Harvest	Coho CPUE
1	Pink & Chum	7/05	12	5	5	145	2.42	2,830	47.17	0	0.00
2	Pink & Chum	7/09	12	No one fished due to storm conditions							
3	Pink	7/22-7/23	24	7	0	57	0.34	8,118	48.32	3	0.02
4	Pink	7/26-7/27	24	5	0	41	0.34	3,588	29.90	36	0.30
5	Coho	8/16-8/18	48	7	0	4	0.01	0	0.00	1,880	5.60
6	Coho	8/19-8/21	48	9	0	14	0.03	0	0.00	1,176	2.72
7	Coho	8/22-8/24	48	No one fished due to storm conditions							
8	Coho	8/25-8/27	48	6	0	17	0.06	0	0.00	820	2.85
9	Coho	8/28-8/30	48	5	0	26	0.11	0	0.00	671	2.80
Totals			312	12	5	304		14,536		4,586	

Table 6.–Commercial salmon set gillnet catches from Norton Bay, Subdistrict 4, Norton Sound, 2008.

Period	Target Species	Dates Fished	Length (hours)	Permits Fished	Chinook Harvest	Chum Harvest	Pink Harvest	Coho Harvest
1	Pink & Chum	7/01	12	Catch information by period confidential				
2	Pink	7/03	12	No one fished				
3	Chum	7/18-7/19	24	No one fished				
4	Coho	7/28-7/29	24	No one fished				
5	Coho	8/08-8/10	48	Catch information by period confidential				
6	Coho	8/15-8/17	48	No one fished				
Totals			168	4	7	507	1,232	600

Table 7.–Commercial salmon set gillnet catches from Shaktoolik, Subdistrict 5, Norton Sound, 2008.

Period	Target Species	Dates Fished	Length (hours)	Permits Fished	Chinook Harvest	Chum Harvest	Chum CPUE	Pink Harvest	Pink CPUE	Coho Harvest	Coho CPUE
1	Pink	7/08	6			No one fished due to storm conditions					
2	Pink	7/09	6	3	-	64	3.56	888	49.33	0	0.00
3	Pink	7/10	6	4	-	45	1.88	1,028	42.83	0	0.00
4	Pink	7/11	6							No one fished due to storm conditions	
5	Pink	7/12	8	4	-	189	5.91	3,440	107.50	0	0.00
6	Pink	7/13	8			No one fished due to storm conditions					
7	Pink	7/14	8	2	-	2	0.13	284	17.75	1	0.06
8	Pink	7/15	8	6	-	70	1.46	1,048	21.83	15	0.31
9	Chum	7/17–7/18	24	7	4	568	3.38	920	5.48	168	1.00
10	Coho	7/20–7/22	48	11	1	878	1.66	357	0.68	1,285	2.43
11	Coho	7/23–7/25	48	18	1	652	0.75	151	0.17	778	0.90
12	Coho	7/27–7/29	48	16	-	780	1.02	103	0.13	1,439	1.87
13	Coho	7/30–8/01	48	1	-	12	0.25	-	-	44	0.92
14	Coho	8/03–8/05	48	16	-	764	0.99	-	-	7,663	9.98
15	Coho	8/06–8/08	48	13	-	403	0.65	-	-	3,428	5.49
16	Coho	8/10–8/12	48	17	-	525	0.64	-	-	4,520	5.54
17	Coho	8/13–8/15	48	17	-	575	0.70	-	-	6,242	7.65
18	Coho	8/17–8/19	48	17	-	227	0.28	-	-	3,154	3.87
19	Coho	8/20–8/22	48	15	-	72	0.10	-	-	2,005	2.78
20	Coho	8/24–8/26	48	14	-	86	0.13	-	-	1,653	2.46
21	Coho	8/27–8/29	48	13	-	58	0.09	-	-	1,932	3.10
22	Coho	8/31–9/02	48	9	-	41	0.09	-	-	2,480	5.74
23	Coho	9/03–9/05	48	8	-	28	0.07	-	-	690	1.80
24	Coho	9/07–9/09	48	3	-	3	0.02	-	-	107	0.74
25	Coho	9/10–9/12	48	1	-	0	0.00	-	-	20	0.42
Totals			848	23	6	6,042	-	8,219	-	37,624	-

Note: There were also 24 sockeye salmon harvested in the Shaktoolik Subdistrict in 2008.

Table 8.–Commercial salmon set gillnet catches from Unalakleet, Subdistrict 6, Norton Sound, 2008.

Period	Target Species	Dates Fished	Length (hours)	Permits Fished	Chinook Harvest	Chum Harvest	Chum CPUE	Pink Harvest	Pink CPUE	Coho Harvest	Coho CPUE
1	Pink	7/08	6	8	3	52	1.08	6,029	125.60	1	0.02
2	Pink	7/09	6	18	1	140	1.30	6,492	60.11	5	0.05
3	Pink	7/10	6	12	0	90	1.25	4,073	56.57	1	0.01
4	Pink	7/11	6	16	0	251	2.61	7,163	74.61	30	0.31
5	Pink	7/12	8	18	0	417	2.90	9,472	65.78	2	0.01
6	Pink	7/13	8	3	1	61	2.54	2,103	87.63	3	0.13
7	Pink	7/14	8	14	0	176	1.57	4,861	43.40	18	0.16
8	Pink	7/15	8	12	1	335	3.49	5,700	59.38	27	0.28
9	Chum	7/17–7/18	24	27	14	2,351	3.63	1,807	2.79	645	1.00
10	Coho	7/20–7/22	48	24	10	1,852	1.61	895	0.78	3,148	2.73
11	Coho	7/23–7/25	48	40	3	2,397	1.25	87	0.05	3,610	1.88
12	Coho	7/27–7/29	48	35	2	2,954	1.76	16	0.01	6,583	3.92
13	Coho	7/30–8/01	48	20	3	1,252	1.30	-	-	3,426	3.57
14	Coho	8/03–8/05	48	49	1	1,305	0.55	-	-	12,393	5.27
15	Coho	8/06–8/08	48	49	3	742	0.32	-	-	7,642	3.25
16	Coho	8/10–8/12	48	47	3	931	0.41	-	-	9,041	4.01
17	Coho	8/13–8/15	48	43	2	925	0.45	-	-	5,617	2.72
18	Coho	8/17–8/19	48	36	0	387	0.22	-	-	4,235	2.45
19	Coho	8/20–8/22	48	34	0	263	0.16	-	-	2,750	1.69
20	Coho	8/24–8/26	48	20	1	214	0.22	-	-	3,137	3.27
21	Coho	8/27–8/29	48	26	0	141	0.11	-	-	4,323	3.46
22	Coho	8/31–9/02	48	29	0	189	0.14	-	-	4,224	3.03
23	Coho	9/03–9/05	48	24	0	169	0.15	-	-	3,931	3.41
24	Coho	9/07–9/09	48	17	0	26	0.03	-	-	1,222	1.50
25	Coho	9/10–9/12	48	10	0	28	0.06	-	-	1,213	2.53
Totals	-	-	848	58	48	17,648	-	48,698	-	77,227	-

Note: There were also 36 sockeye salmon harvested in the Unalakleet Subdistrict in 2008.

Table 9.–Commercial salmon set gillnet catches from Port Clarence District, 2008.

Period	Date	No. of Fishermen	No. of Landings	Sockeye		Chum		Pink	
				Catch	Cum.	Catch	Cum.	Catch	Cum.
1	7/1	1	1	17	17	46	46	0	0
2	7/4–7/5	1	1	17	34	0	46	30	30
3	7/8	1	1	24	58	64	110	210	240
4	7/12	1	2	31	89	146	256	383	623
Total		1[a]	5	89		256		623	

[a] Total number of unique permits fished during the season was 1, and permit holder waived confidentiality.

Table 10.–Kotzebue District commercial chum salmon catch and average weight by week, 2008.

Week	Number of Fishermen	Catch	Pounds	Average Weight
7/21 – 7/25	14	11,616	96,209	8.3
7/28 – 8/01	25	30,850	251,894	8.2
8/04 – 8/09	35	38,632	329,123	8.5
8/11 – 8/15	35	42,196	336,810	8.0
8/13 – 8/18	30	22,150	176,640	8.0
8/18 – 8/22	24	33,800	267,969	7.9
8/25 – 8/29	17	11,306	83,277	7.4
Total	48	190,550	1,541,922	8.1

Note: Also harvested during the commercial fishery and kept for personal use were 15 Chinook, 9 sockeye, 693 pink, and 36 coho salmon, 1,629 Dolly Varden, and 37 sheefish.

Table 11.–Historical chum salmon catch for Kobuk River drift test fishery, 1993–2008.

Year	Dates of Operation	Number of Drifts	Cumulative CPUE[a]	Midpoint Date
1993	7/12–8/12	164	494	8/03
1994	7/13–8/16	248	1,207	8/04
1995	7/12–8/16	196	1,188	8/02
1996	7/10–8/14	208	2,581	7/31
1997	7/10–8/14	202	797	8/03
1998	7/10–8/15	182	538	7/29
1999	7/11–8/13	176	1,357	8/02
2000	7/10–8/14	228	1,481	8/01
2001	7/10–8/13	232	1,575	7/26
2002	7/10–8/12	218	875	7/24
2003	7/10–8/13	214	749	8/02
2004	7/10–8/12	242	855	8/05
2005	7/10–8/15	207	1,207	8/06
2006	7/10–8/19	217	743	8/16
2007	7/11–8/20	207	1,342	8/09
2008	7/09–8/14	200	2,269	7/30

[a] Cumulative CPUE is calculated as the sum of daily CPUE during the period of data collection, and daily CPUE (I) is calculated as the number of fish that would have been caught if 100 fathoms of gillnet had been fished for 60 minutes. I= (6,000*C)/(L*T), where C = number of chum salmon caught, L = length of gillnet in fathoms, and T = mean fishing time in minutes.

Table 12.–Historical Chinook, coho, and chum salmon catches for Unalakleet River set net test fishery, 1985–2008.

		Chinook		Chum		Coho	
Year	Dates of Operation	Total Catch	Midpoint Date	Total Catch	Midpoint Date	Total Catch	Midpoint Date
1985	6/05–9/21	193	7/08	916	7/10	206	8/21
1986	6/17–9/10	52	6/26	1,063	7/23	163	8/18
1987	6/20–9/08	52	7/07	707	7/22	149	8/27
1988	6/20–9/12	15	6/27	662	7/25	216	8/12
1989	6/13–9/12	50	6/19	856	7/11	232	8/16
1990	6/15–9/13	43	6/20	383	7/14	284	8/21
1991	6/10–9/10	36	6/24	834	7/27	177	8/26
1992	6/27–9/08	25	7/12	976	7/12	455	8/12
1993	6/08–9/08	94	6/26	700	7/29	156	8/24
1994	6/16–9/07	35	6/22	949	7/02	297	8/22
1995	6/05–9/11	99	6/20	1,212	7/11	213	8/14
1996	6/05–9/11	138	6/14	1,635	7/06	717	8/06
1997	6/05–9/10	202	6/27	832	7/16	197	8/12
1998	6/05–9/09	110	7/07	535	7/18	220	8/17
1999	6/05–9/08	63	7/08	1,022	7/27	206	8/23
2000	6/05–9/08	61	6/28	1,075	7/18	257	8/16
2001	6/15–9/07	79	7/04	645	7/09	219	8/15
2002	6/05–9/08	44	6/26	852	7/08	394	8/25
2003	6/02–9/08	25	7/02	458	7/30	267	8/24
2004	6/02–9/10	29	7/01	976	7/17	829	8/15
2005	6/04–9/08	78	6/23	1,209	7/10	1,080	8/19
2006	6/08–9/14	79	6/30	1,482	7/01	1,738	8/16
2007	6/04–9/09	96	6/29	978	7/15	1,087	8/06
2008	6/09–9/13	123	7/07	1,932	7/18	1,988	8/15

Table 13.–Commercial herring bait fishery summary by period, Unalakleet Subdistrict, 2008.

Period	Date	Unique Permits	Landings	Pounds	Total Short Tons	Fishery Value[a]
1	6/10	3	3	12,929	6.46	$3,878.70
2	6/11	10	14	56,442	28.22	$16,932.60
3	6/12	10	14	44,769	22.38	$13,430.70
4	6/13	4	5	15,816	7.91	$4,694.80
5	6/14	5	6	16,705	8.35	$5,011.50
6	6/15	5	5	4,664	2.33	$1,399.20
7	6/17	2	2	983	0.49	$294.90
8	6/18	1	2	3,562	1.78	$1,068.60
9	6/19	2	3	4,055	2.03	$1,216.50
10	6/21	2	3	7,232	3.62	$2,169.60
13	6/22	1	2	2,008	1.00	$602.40
14	6/23	3	8	12,129	6.06	$3,611.40
15	6/24	1	1	122	0.06	$36.60
		14	68	181,416	90.71	$54,347.50

[a] Price per short ton of bait herring was $600 in 2008.

Table 14.–Daily observed peak biomass estimates of Pacific herring, Norton Sound District, 2008.

	Flight	Observer	Survey		Spawn		Estimated Biomass (in short ton) By Index Area[a]							
Date	No.	Initials[b]	Hours	Rating[c]	No.	Length (mi.)	KLK	UNK	CDB	NTB	ELM	GOL	NOM	TOTAL
6/05	1[d]	WWJ	2.0	3.5	57	4.9	11,947.6	265.6	-	-	-	-	-	12,213.2
6/09	2[d]	WWJ	2.5	4.0	19	1.5	5,022.5	2,733.2	742.8	-	-	-	-	8,498.5
6/10	3	SMK	1.0	3.8	6	0.5	956.9	548.4	-	-	-	-	-	1,505.3
6/11	4	SMK	4.0	3.9	13	2.2	-	419.3	121.2	3,172.3	2,836.9	1,889.4	66.9	8,506.0
6/11	4[d]	WWJ	4.0	2.7	26	1.8	-	2,154.8	4,434.9	0.0	2,158.0	931.5	1,813.8	11,493.0
Total[e]	4		9.5		95	9.1							Survey	12,213.2
													Total Harvest	90.7
													Biomass[f]	12,304
													Exploit %	0.74%

Note: Data not available for all index areas.

[a] KLK = Klikitarik, UNK = Unalakleet, CDB = Cape Denbigh, NTB = Norton Bay, ELM = Elim, GOL = Golovin, NOM = Nome.

[b] SMK = Scott Kent, WWJ = Wesley Jones.

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

[d] Surveys 1 and 2 were conducted by NSEDC staff. Survey 4 was done in same plane by both NSEDC and ADF&G staff.

[e] Total does not include NSEDC staff data from 6/11 because both ADF&G and NSEDC staff flew the same survey.

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

Table 15.–Commercial harvest of red king crab from Norton Sound Section by statistical area, Norton Sound District, 2008.

Statistical Area	Number[a]	Pounds	Pots Pulled	CPUE	Average Weight (lbs)
616331	2,057	5,658	205	10.0	2.75
616401	150	416	20	7.5	2.77
626331	1,115	3,235	76	14.7	2.90
626401	34,532	96,327	2,165	16.0	2.79
636330	852	2,350	35	24.3	2.76
636401	71,934	197,948	3,736	19.3	2.75
646330	524	1,505	73	7.2	2.87
646401	6,813	18,728	296	23.0	2.75
656401	25,360	68,968	2,115	12.0	2.72
Total	143,337	395,135	8,721	16.4	2.76

Note: Data for summer fishery only.

[a] Includes 11,042 crabs (30,900 lbs) from the CDQ fishery.

Table 16.–Daily catch for the CDQ summer commercial king crab harvest, Norton Sound Section, Eastern Bering Sea, August 17–September 3, 2008.

Date[a]	Landings	Number of Crab	Pounds Harvested	Cumulative Total (lbs)	No. of Pots Pulled	Average Weight (lbs)	CPUE
8/21	1	663	1,847	1,847	37	2.8	17.9
8/22	2	1,206	3,379	5,226	79	2.8	15.3
8/24	4	2,818	8,060	13,286	154	2.9	18.3
8/25	1	347	989	14,275	22	2.9	15.8
8/27	1	1,620	4,418	18,693	39	2.7	41.5
8/29	3	2,221	6,204	24,897	119	2.8	18.7
8/30	4	1,661	4,523	29,420	125	2.7	13.3
8/31	1	406	1,173	30,593	15	2.9	27.1
9/03	1	100	307	30,900	24	3.1	4.2
Total	17	11,042	30,900		614	2.8	18.0

Source: Fish ticket data.

[a] The CDQ fishery closed by regulation 9/3, and the last delivery was made 9/3.

Table 17.–Length frequencies by shell age of all legal male red king crab sampled during the 2008 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
100	1	0.0	0	0.0	1	0.0
101	1	0.0	0	0.0	1	0.0
102	5	0.1	1	0.0	6	0.1
103	20	0.3	7	0.1	27	0.5
104	34	0.6	15	0.3	49	0.8
105	68	1.2	26	0.5	94	1.6
106	103	1.8	35	0.6	138	2.4
107	180	3.1	44	0.8	224	3.9
108	218	3.8	50	0.9	268	4.6
109	262	4.5	42	0.7	304	5.3
110	272	4.7	94	1.6	366	6.3
111	262	4.5	63	1.1	325	5.6
112	342	5.9	84	1.5	426	7.4
113	284	4.9	63	1.1	347	6.0
114	286	5.0	69	1.2	355	6.2
115	263	4.6	50	0.9	313	5.4
116	281	4.9	69	1.2	350	6.1
117	256	4.4	68	1.2	324	5.6
118	228	4.0	54	0.9	282	4.9
119	173	3.0	43	0.7	216	3.7
120	175	3.0	54	0.9	229	4.0
121	130	2.3	38	0.7	168	2.9
122	115	2.0	50	0.9	165	2.9
123	97	1.7	40	0.7	137	2.4
124	63	1.1	29	0.5	92	1.6
125	53	0.9	31	0.5	84	1.5
126	47	0.8	26	0.5	73	1.3
127	41	0.7	23	0.4	64	1.1
128	34	0.6	13	0.2	47	0.8
129	17	0.3	16	0.3	33	0.6
130	23	0.4	25	0.4	48	0.8
131	19	0.3	17	0.3	36	0.6
132	13	0.2	16	0.3	29	0.5
133	12	0.2	8	0.1	20	0.3
134	12	0.2	14	0.2	26	0.5
135	8	0.1	4	0.1	12	0.2
136	9	0.2	9	0.2	18	0.3

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Carapace	Legal New Shell Males		Legal Old Shell Males		Total Legal Males	
Length (mm)	Number	Percent	Number	Percent	Number	Percent
137	9	0.2	6	0.1	15	0.3
138	3	0.1	2	0.0	5	0.1
139	4	0.1	2	0.0	6	0.1
140	3	0.1	4	0.1	7	0.1
141	7	0.1	5	0.1	12	0.2
142	1	0.0	5	0.1	6	0.1
143	0	0.0	5	0.1	5	0.1
144	2	0.0	0	0.0	2	0.0
145	0	0.0	1	0.0	1	0.0
146	2	0.0	1	0.0	3	0.1
147	3	0.1	2	0.0	5	0.1
148	0	0.0	0	0.0	0	0.0
149	0	0.0	1	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	0	0.0	0	0.0	0	0.0
154	0	0.0	1	0.0	1	0.0
Totals	4,441	77.0	1325	23.0	5,766	100.0
Average Lengths	114.9		117.1		115.4	
				Total Recruits <116mm =	2,601	45.1%
				Total Postrecruits ≥116mm and all legal old shell males =	3,165	54.9%

Table 18.–Winter 2007–2008 subsistence red king crab catches and effort by gear type, Norton Sound District.

Gear Type	Permits Fished[a]	Total Caught	Males Kept	Females Kept	Total Kept	Average Harvest/ Fishermen
Pots	104	17,511	8,879	142	9,021	87
Handlines	2	7	7	0	7	4
Both	2	1,103	457	0	457	229
Totals	108	18,621	9,343	142	9,485	88

[a] Number of permits given out was 139, and number of permits returned was 137.

APPENDIX A: NORTON SOUND FISHERIES

Appendix A1.–Commercial salmon catch by species, Norton Sound District, 1961–2008.

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
Average 2003-2007	39	68	80,250	754	9,262	90,374
Average 1998-2007	1,110	41	50,920	75,833	8,837	136,740

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Year	Chinook	Sockeye	Coho	Pink	Chum	Total
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
2007	19	2	126,115	3,769	22,431	152,336
2008	83	60	120,293	75,384	25,124	220,944
Average 2003-2007	39	68	80,250	754	9,262	90,374
Average 1998-2007	1,110	41	50,920	75,833	8,837	136,740

Note: Dashes indicate data not available for all species in all years.

Appendix A2.–Number of commercial salmon permits fished, Norton Sound, 1970–2008.

	Subdistrict						District
Year	1	2	3	4	5	6	Total [a]
1970	6	33	21	0	12	45	-
1971	7	22	45	6	19	72	-
1972	20	20	48	32	20	71	-
1973	21	34	57	30	27	94	-
1974	25	25	60	8	23	53	-
1975	24	42	67	42	39	61	-
1976	21	22	54	27	37	60	-
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
2007	0	0	11	0	15	47	71
2008	0	4	12	4	23	58	91
Average 2003-2007	0	0	2	0	14	32	48
Average 1998-2007	0	3	5	0	16	34	52

Note: Dashes indicate No Data.

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

Appendix A3.–Round weight and value of commercially caught salmon by species, Norton Sound District, 1961–2008.

Year	Pounds Caught (Round Wt. in lbs)				Salmon Roe (lbs)	Value of Catch ($)
	Chinook	Coho	Pink	Chum		
1961	120,405	96,649	102,711	347,990	-	-
1962[a]	157,000	-	10,569	221,645	-	105,800
1963[a]	89,700	51,750	-	-	-	104,000
1964[a]	39,169	686	-	249,890	-	51,000
1965	33,327	14,210	660	264,924	-	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[b]	22,954	50,665	250,044	306,871	20,381	63,700
1969[c]	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	-	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	-	285,283
1977	102,341	28,044	162,457	1,415,981	-	546,010
1978	222,974	50,872	1,164,174	1,389,806	-	907,330
1979	231,988	251,129	598,785	1,001,548	-	878,792
1980	135,646	204,498	719,368	1,301,693	-	572,125
1981	164,182	212,065	719,102	1,284,193	-	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	-	482,060	75	474,064
1991	107,541	469,495	-	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

-continued-

Year	Pounds Caught (Round Wt. in lbs)				Salmon Roe (lbs)	Value of Catch ($)
	Chinook	Coho	Pink	Chum		
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
2007	206	1,002,078	10,537	151,386	0	572,195
2008	970	855,980	187,979	171,151	0	759,451

Note: Dashes indicate No Data.

[a] Does not include canned salmon cases (48#) 1962: 29 Chinook, 883 coho, 927 pink, and 12,459 chum salmon. 1963: 604 Chinook, 808 coho, 1,918 pink, and 13,308 chum. 1964: 75 Chinook, 452 pink, and 9,357 chum salmon.

[b] Includes about 48,000 lbs of salted coho, about 150,000 lbs of salted pink, and 150,000 lbs of salted chum salmon.

[c] Includes about 598 lbs of salted Chinook, about 48,092 lbs of salted pink, and about 117,664 lbs of salted chum salmon.

Appendix A4.–Estimated mean prices paid to commercial salmon fishermen in dollars, Norton Sound District, 1962–2008.

Year	Chinook	Coho	Pink	Chum	Sockeye
		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 for roe)	0.23	-
1991	0.87	0.36 (3.00 for roe)	-	0.27 (3.00 for roe)	-
1992	0.66	0.33 (1.50 for roe)	0.16	0.22	-
1993	0.72	0.22 (1.76 for roe)	0.15	0.24	0.40
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	-
Avg 2003-07	0.98	0.45	-	0.16	0.48

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Year	Chinook	Coho	Pink	Chum	Sockeye
		Price Per Pound			
2000	1.30	0.30	0.10	0.15	-
2001	1.00	0.25	-	0.19	0.37
2002	0.39	0.20	-	0.07	-
2003	0.64	0.44	-	0.14	0.45
2004	-	0.39	-	0.14	-
2005	1.22	0.44	-	0.15	0.45
2006	1.49	0.44	-	0.14	-
2007	0.55	0.53	0.14	0.24	0.55
2008	0.73	0.77	0.23	0.34	0.56
Avg 2003-07	0.98	0.45	-	0.16	0.48

Note: Sockeye salmon was only purchased in 1993, 2001, 2003, 2005, 2007, and 2008. Dashes indicate No Data.

Appendix A5.–Mean commercial salmon harvest weights, Norton Sound District, 1964–2008.

Year	Mean Round Weight in Pounds [a]			
	Chinook	Coho	Pink	Chum
1964	-	-	-	7.0
1965	-	-	2.3	7.1
1966	-	-	3.5	7.8
1967	23.7	7.0	3.6	7.2
1968	20.0	7.0	4.0	7.5
1969	19.3	7.5	3.6	6.4
1970	20.0	7.0	3.5	7.8
1971	23.7	7.0	3.6	7.2
1972	20.0	7.3	2.8	6.9
1973	20.3	6.8	3.9	7.1
1974	18.2	6.7	3.4	6.6
1975	10.8	7.4	2.9	6.5
1976	15.2	7.2	3.1	7.0
1977	22.7	7.6	3.3	7.0
1978	22.8	6.9	3.6	7.4
1979	22.9	7.1	3.6	7.2
1980	21.5	6.8	3.2	7.2
1981	20.7	6.7	3.5	7.6
1982	16.5	7.1	2.9	7.3
1983	17.4	7.2	3.6	7.4
1984	20.0	7.7	2.9	7.0
1985	21.5	7.7	3.1	7.0
1986	20.8	6.9	3.2	6.9
1987	20.0	7.3	3.0	7.1
1988	16.4	7.5	3.0	7.1
1989	18.4	7.6	3.6	7.0
1990	19.0	7.5	-	7.4
1991	17.7	7.4	-	6.9
1992[b]	12.7	7.8	2.9	7.1
1993	16.9	6.6	2.6	6.5
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	[c]	7.3
2000	14.9	6.9	2.2	6.5
2001	17.8	7.8	[c]	7.2
2002[b]	10.0	7.4	[c]	7.6
2003[b]	11.3	8.2	[c]	6.7
2004	[c]	7.2	[c]	6.7
2005	16.6	7.7	[c]	7.0
2006[b]	14.4	6.6	[c]	6.8
2007[b]	10.8	7.9	2.8	6.7
2008[b]	14.7	7.1	2.5	6.8

Note: Dashes indicate No Data.

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

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

[c] None caught commercially.

Appendix A6.–Commercial and subsistence salmon catch by species, by year in Nome Subdistrict, Norton Sound District, 1964–2008.

	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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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
2007	0	0	0	0	0	0	18	297	1,103	850	2,938	5,206	18	297	1,103	850	2,938	5,206
2008	0	0	0	0	0	0	39	127	3,423	12,592	739	16,920	39	127	3,423	12,592	739	16,920
5-year avg.[a]	0	0	0	0	0	0	53	163	1,625	6,162	1,186	9,189	53	163	1,625	6,162	1,186	9,189
10-year avg.[b]	0	0	0	0	0	0	31	111	1,118	4,159	974	6,393	31	111	1,118	4,159	974	6,393

Note: Dashes indicate No Data.

[a] 2003–2007.

[b] 1998–2007.

Appendix A7.–Commercial and subsistence salmon catch by species, by year in Golovin Subdistrict, Norton Sound District, 1962–2008.

	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
2007 [c]	0	0	0	0	0	0	188	321	1,179	3,980	4,217	9,885	188	321	1,179	3,980	4,217	9,885
2008 [c]	0	0	256	2,699	623	3,578	146	95	2,337	10,155	350	13,083	146	95	2,593	12,854	973	16,661
5-year avg. [d]	0	0	0	0	0	0	150	82	918	11,013	1,830	13,992	150	82	918	11,013	1,830	13,992
10-year avg. [e]	0	4	168	12,417	798	13,387	132	65	1,197	9,588	2,103	13,084	132	69	1,365	22,004	2,901	26,471

Note: Dashes indicate No Data.

[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 living outside the Subdistrict.

[d] 2003–2007.

[e] 1998–2007.

Appendix A8.–Commercial and subsistence salmon catch by species, by year in Moses Point Subdistrict, Norton Sound District, 1962–2008.

	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
2007 [c]	1	0	5,908	1,648	4,567	12,124	260	0	2,295	1,742	2,334	6,631	261	0	8,203	3,390	6,901	18,755
2008 [c]	5	0	4,586	14,536	304	19,431	269	0	1,804	7,655	1,284	11,012	274	0	6,390	22,191	1,588	30,443
5-year avg.[d]	0	0	1,182	330	913	2,425	347	12	1,384	4,212	1,314	7,270	347	12	2,566	4,542	2,227	9,695
10-year avg.[e]	12	0	1,425	19,369	809	21,615	381	25	1,431	4,523	1,221	7,582	394	25	2,856	23,892	2,031	29,197

Note: Dashes indicate No Data.

[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] 2003–2007.

[e] 1998–2007.

Appendix A9.–Commercial and subsistence salmon catch by species, by year in Norton Bay Subdistrict, Norton Sound District, 1962–2008.

	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)

Year	Commercial						Subsistence						Combined					
	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]
2007	0	0	0	0	0	0	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]	[a]
2008	7	0	600	1,232	507	2,346	187	2	1,084	4,489	3,330	9,092	194	2	1,684	5,721	3,837	11,438
5-year avg. [c]	0	0	0	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-
5-year avg. [d]	0	0	0	0	0	0	423	12	346	3,927	4,136	8,844	423	12	346	3,927	4,136	8,844

Note: Dashes indicate No Data.

[a] Subsistence surveys were not conducted.

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

[c] 2003–2007.

[d] 1999–2003.

Appendix A10.–Commercial and subsistence salmon catch by species, by year in Shaktoolik Subdistrict, Norton Sound District, 1961–2008.

	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
2007	5	0	31,810	0	6,076	37,891	515	28	1,443	2,708	465	5,159	520	28	33,253	2,708	6,541	43,050
2008	6	24	37,624	8,219	6,042	51,915	422	2	1,504	4,920	201	7,049	428	26	39,128	13,139	6,243	58,964
5-year avg. [c]	11	0	20,573	0	2,409	22,993	706	25	2,052	7,845	349	10,976	717	25	22,625	7,845	2,758	33,969
10-year avg. [d]	180	0	12,001	32,166	2,614	46,961	793	57	2,075	7,496	801	11,222	973	57	14,076	39,662	3,415	58,183

Note: Dashes indicate No Data.

[a] Subsistence surveys were not conducted.

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

[c] 2003–2007.

[d] 1998–2007.

Appendix A11.–Commercial and subsistence salmon catch by species, by year in Unalakleet Subdistrict, Norton Sound District, 1961–2008.

	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 [c]	4,400	71	71,019	480,158	12,288	567,936	3,035	404	11,386	27,163	3,325	45,313	7,435	475	82,405	507,321	15,613	613,249
1995 [c]	7,617	78	31,280	37,009	24,843	100,827	3,114	591	9,833	16,625	5,458	35,621	10,731	669	41,113	53,634	30,301	136,448

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Appendix A11.–Page 2 of 2.

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	[c]	3,644	-	52,200	113,837	7,369	177,050	3,023	181	11,187	18,026	4,227	36,644	6,667	-	63,387	131,863	11,596	213,694
1997	[c]	9,067	159	26,079	-	17,139	52,444	4,191	196	6,746	10,600	1,603	23,336	13,258	355	32,825	-	18,742	75,780
1998	[c]	6,413	7	24,534	99,412	6,210	136,576	4,066	201	7,489	13,654	3,038	28,448	10,479	208	32,023	113,066	9,248	165,024
1999	[c]	1,927	0	10,264	0	5,700	17,891	2,691	537	8,140	10,060	3,692	25,120	4,618	537	18,404	10,060	9,392	43,011
2000	[c]	582	11	29,803	17,278	2,700	50,374	2,429	212	5,878	10,540	3,000	22,059	3,011	223	35,681	27,818	5,700	72,433
2001	[c]	116	1	15,102	0	1,512	16,731	2,810	359	6,270	11,269	2,918	23,026	2,926	360	21,372	11,269	4,430	40,357
2002	[c]	4	1	1,079	0	339	1,423	2,367	280	4,988	15,915	3,877	27,427	2,371	281	6,067	15,915	4,216	28,850
2003	[c]	10	0	13,027	0	3,075	16,112	2,585	297	6,192	21,779	1,785	32,638	2,595	297	19,219	21,779	4,860	48,750
2004		0	40	29,282	0	4,924	34,246	2,829	417	6,653	22,755	2,154	34,808	2,829	457	35,935	22,755	7,078	69,054
2005		101	280	63,437	0	3,192	67,010	2,193	656	7,886	25,447	2,660	38,842	2,294	936	71,323	25,447	5,852	105,852
2006		11	3	98,336	0	6,721	105,071	2,537	326	9,905	22,547	2,712	38,027	2,548	329	108,241	22,547	9,433	143,098
2007		13	2	88,397	2,121	11,788	102,321	1,665	292	5,895	11,674	2,057	21,547	1,678	294	94,256	13,795	13,845	123,868
2008		65	36	77,227	48,698	17,648	143,674	1,402	137	7,452	15,116	2,805	26,912	1,467	173	84,679	63,814	20,453	170,5860
5-year avg.	[d]	27	65	58,496	424	5,940	64,952	2,275	398	7,047	21,683	2,390	33,793	2,302	463	65,543	22,107	8,330	98,745
10-year avg.	[e]	918	35	37,326	11,881	4,616	54,776	2,599	358	6,911	17,255	3,212	30,334	3,517	392	44,237	29,136	7,828	85,110

Note: Dashes indicate No Data.

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

[b] Subsistence surveys were not conducted.

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

[d] 2003-2007.

[e] 1998-2007.

Appendix A12.–Subsistence salmon catch by species and year for St. Michael and Stebbins in Norton Sound District, 1993–2008.

Year	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	490	3,264
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
2007	452	2,119	265	9	622	3,467
2008	Subsistence survey data not yet available.					
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 data were not conducted.					
2005	485	5,164	4,353	59	2,702	12,763
2006	355	4,236	4,321	140	4,856	13,908
2007	763	4,980	1,881	0	2,006	9,630
2008	Subsistence survey data not yet available.					

Note: Harvest numbers shown have been expanded to include households not contacted.

Appendix A13.–Commercial, subsistence, and sport salmon catch by species, by year for Subdistricts 1-6 in Norton Sound District, 1961–2008.

	SUBDISTRICTS 1-6																	
	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	5,116	747	17,429	66,656	15,613	105,561	600	18	5,547	7,051	536	13,752

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		SUBDISTRICTS 1-6																	
		Commercial						Subsistence						Sportfish					
Year		Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
1995		8,860	128	47,863	81,644	42,898	181,393	5,339	3,316	17,836	37,363	31,707	95,536	438	104	3,705	928	394	5,569
1996		4,984	1	68,206	487,441	10,609	571,241	4,944	586	21,146	60,676	20,286	107,532	662	100	7,289	5,972	662	14,685
1997		12,573	161	32,284	20	34,103	79,141	6,104	785	11,797	22,438	12,866	53,793	1,106	30	4,393	1,458	278	7,265
1998		7,429	7	29,623	588,013	16,324	641,396	5,063	307	10,452	24,721	5,036	45,545	590	16	4,441	6,939	682	12,668
1999		2,508	0	12,662	0	7,881	23,051	4,331	866	12,439	19,186	13,049	49,665	630	0	5,582	3,039	211	9,462
2000		752	14	44,409	166,548	6,150	217,873	3,690	324	13,712	37,773	12,989	68,231	889	45	7,441	2,886	1,097	12,358
2001		213	44	19,492	0	11,106	30,855	4,724	750	11,512	29,812	13,963	60,542	271	39	4,802	360	1,709	7,181
2002		5	1	1,759	0	600	2,365	4,792	443	12,167	56,669	13,095	86,722	802	0	4,211	4,303	818	10,134
2003		12	0	17,058	0	3,560	20,630	4,728	536	11,713	46,338	9,498	72,546	239	572	3,039	2,222	292	6,364
2004	[b]	0	40	42,016	0	6,296	48,352	4,448	541	11,733	72,887	4,541	93,996	535	404	5,806	8,309	498	15,552
2005	[b]	151	280	85,255	0	3,983	89,669	3,383	857	12,926	57,785	6,115	80,923	216	0	3,959	473	36	4,684
2006	[b]	11	3	130,808	0	10,042	140,864	3,258	572	17,242	56,579	5,992	85,611	427	22	11,427	5,317	344	17,110
2007	[b]	19	2	126,115	3,769	22,431	152,336	2,646	938	12,023	20,954	12,011	48,428	147	15	6,179	1,331	96	7,621
2008		83	60	120,293	75,384	25,124	220,944	2,465	363	17,604	54,927	8,709	84,068	580	63	10,756	6,855	341	18,595
5-year avg.	[c]	39	65	80,250	754	9,262	90,370	3,693	689	13,127	50,909	7,631	76,301	313	203	6,082	3,530	253	10,266
10-year avg.	[d]	1,110	39	50,920	75,833	8,837	136,739	4,106	613	12,592	42,270	9,629	69,226	475	111	5,689	3,518	578	10,313

Note: Dashes indicate No Data.

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

[b] Not all subdistricts were surveyed.

[c] 2003–2007.

[d] 1998–2007.

Appendix A14.–Sport salmon harvest by species, by year for the Unalakleet River, 1990–2008.

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
2007	147	4,117	85	618	4,967
2008	580	6,029	175	2,077	8,861
2003-2007 avg.	242	3,638	117	803	4,799
1998-2007 avg.	328	3,348	297	992	4,964

Appendix A15.–Sport salmon harvest by species, by year for the Fish/Niukluk Rivers, 1990–2008.

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
2007	0	786	11	30	827
2008	0	1,986	166	969	3,121
2003-2007 avg.	20	528	109	154	811
1998-2007 avg.	39	675	103	132	949

Appendix A16.–Comparative salmon aerial survey escapement indices of Norton Sound streams unless noted otherwise, 1961–2008.

	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	-
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[d]	211,000[d]	2,045	2[d]	2,082[d]	212,000[d]	3,541
2006	0[d]	1,115[d]	515,000[d]	2,147	0[d]	394[d]	1,121,000[d]	3,650
2007	3[d]	7,210[d]	6,810[d]	668	4[d]	1,449[d]	3,378[d]	1,442
2008	-	-	1,496,000[d]	1,633	-	106[d]	528,000[d]	2,051

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	Flambeau River					Eldorado River			
Year[a]	Chinook	Chum	Pink	Pink & Chum[e]	Coho	Chinook	Chum	Pink	Coho
1961	-	400	80	-	-	-	-	-	-
1963	-	-	-	-	-	-	400	2,000	-
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	-	2,550[d]	200[d]	-	751	-	109[d]	52,000[d]	755
2005	-	2,261[d]	100[d]	-	154	2[d]	5,445[d]	2,050[d]	376
2006	0[d]	16,000[d]	8,800[d]	0	0	0[d]	2,355[d]	156,500[d]	523
2007	1[d]	4,452[d]	0 [d]	0	38	2[d]	6,315[d]	318[d]	34
2008	0[d]	4,235[d]	106,200[d]	0	918	-	-	-	-

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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	-	-	-	-	-	-	-	-	-	

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	Niukluk River					Kwiniuk River				
Year[a]	Chinook	Chum	Pink	Pink & Chum[e]	Coho	Chinook[g]	Chum[g]	Pink[g]	Pink & Chum[e]	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 [a]
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[k]	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	-	-	-	-	737	195	39,519	1,347,090-	-	22,341
2007	-	-	-	-	-	258	27,756	54,225	-	9,429
2008	-	-	-	-	1,715	237	9,462	1,442,246	-	10,461

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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	-
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[d]	54,934[g]	-	-
1973	131	5,383	15,665	-	-	298[g]	4,332[d]	26,542[g]	-	-
1974	136	9,560	17,940	-	-	196[g]	826[d]	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[l]	16,345[l]	40,797[l]	-	-	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[c]	125,500	-	917
1997	1,946	3,105	16,890	-	-	1,605	9,045	17,870	-	-
1998	894	10,180	1,124,800	-	-	591	-	153,150	-	-
1999	-	-	-	-	-	18	-	3,790	-	-
2001	77	863	-	-	-	367	-	-	-	-
2002	42	180	182,000	-	-	122	-	4,590	-	800
2003	50	1,352	60	-	292	131	-	11,010	-	-
2004	321	1,117	391,000	-	779	189	-	264,000	-	1,386
2005	78	1,336	48,203	-	-	156	-	381,150	-	1,963
2007	823	7,045	32,250	-	4,552	554	295	50,100	-	2,349
2008	-	-	-	-	4,197	-	-	-	-	2,774

Note: Years for which there are no survey or weir count data are excluded. Dashes indicate No Data.

[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.

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

[i] Aerial survey; not tower count.

[j] Includes counts from Ophir Creek.

[k] Includes counts from Casadepaga and Ophir Creeks.

[l] 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, 2003–2008.

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 01	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 08 - 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 08	29	3,591	173	115	0	60
2004	June 22 - Sept 09	25	3,277	60,866	1,151	57	0
2005	June 23 - Sept 02	32	10,369	12,356	689	10	23
2006	June 26 - Aug 03	41	42,105	222,348	55	1	65
2007	June 26 - Aug 06	14	21,312	833	2	22	60
2008	June 27 - July 31	36	6,746	244,641	38	3	14

Appendix A18.–Historical migration of salmon and Dolly Varden at Pilgrim River counting tower, 1997, 1999-2002, and weir, 2003–2008.

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 06	6	2,617	35,577	104	4,650	n/a
2000	July 05 - Aug 18	72	861	374	21	12,141	n/a
2002	July 04 - Aug 04	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 05	216	9,685	13,218	304	55,951	112
2006	June 30 - Sept 09	275	45,361	17,701	973	52,323	505
2007	June 29 - Sept 10	501	35,334	3,616	605	43,432	339
2008	June 25 - Sept 01	137	24,550	92,471	260	20,452	409

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

[b] Coho salmon were misidentified. Nearly 30% of scale samples in 2004 were actually sockeye salmon.

Appendix A19.–Historical migration of salmon and Dolly Varden at Snake River counting tower, 1995–2002 and weir, 2003–2008.

Year	Operating Period	Chinook	Chum	Pink	Coho	Sockeye	Dolly Varden
1995	July 01 - Aug 18	0	4,393	917	856	0	n/a
1996	July 03 - Aug 22	5	2,772	44,558	1,638	0	n/a
1997	July 07 -Aug 18	12	6,184	6,742	1,157	0	n/a
1998	July 01 - Aug 11	0	11,067	219,679	178	0	n/a
1999	July 01 - 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 08 - Sept 05	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 03	17	2,146	126,917	474	22	290
2005	June 27 - Sept 11	31	2,967	13,813	2,948	275	28
2006	July 01 - Sept 11	32	4,160	74,028	4,776	302	614
2007	July 01 - Sept 14	61	8,147	4,634	1,781	1,354	121
2008	July 06 - Sept 06	13	1,244	145,761	5,206	143	452

[a] Includes 442 coho salmon 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, 1965–2008.

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 04 - Jul 26	14,049	55,293	44	-
1976	July 04 - Jul 25	8,508	35,226	12	-
1977	June 26 - Jul 25	21,798	47,934	-	-
1978	July 04 - 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 02	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	June18 - Jul 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 09	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
2007	June 21 - Sept 10	27,756	54,255	258	9,429
2008	June 23 - Sept 07	9,462	1,442,246	237	10,461

Note: Data not available for all species in all years. Dashes indicate No Data.

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

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

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

Appendix A21.–Historical salmon migration at Niukluk River counting tower, 1995–2008.

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 09	57,305	10,468	259	3,994
1998	July 04 - Aug 13	45,588	1,624,438	260	840
1999	June 04 - Sept 04	35,239	20,351	40	4,260
2000	July 04 - Aug 27	29,573	961,603	48	11,382
2001	July 10 - Sept 08	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 08	10,770	975,895	141	2,064
2005	June 28 - Sept 09	25,598	270,424	41	2,727
2006	June 26 - Sept 08	29,199	1,371,919	39	11,169
2007	July 01 - Sept 04	50,994	43,617	30	3,498
2008	July 01 - Sept 06	12,078	669,234	33	13,779

Appendix A22.–Historical salmon migration at Nome River counting tower, 1993–1995, and weir, 1996–2008.

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 06	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 08 - 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 05 - 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 02 - Sept 07	5,677	578,555	43	8,308	188
2007	July 03 - Sept 16	7,034	24,395	13	2,437	534
2008	July 02 - Sept 17	2,607	1,186,554	28	4,605	90

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

[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, 2001–2008.

Year	Operating period	Chum [a]	Pink [b]	Sockeye
2001	July 02 - July 28	1	-	2,487
2002	June 25 - July 26	-	-	1,047
2003	June 24 - July 28	-	-	2,004
2004	June 18 - July 25	1	-	8,115
2005	June 20 - July 25	-	-	11,135
2006	July 04 - July 18	-	-	6,849
2007	July 05 - July 20	-	-	4,533
2008	June 27 - July 28	10	614	1,794

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

[a] Chum salmon will pass upstream through the Glacial Lake weir and often exit the lake.

[b] Pink salmon have been observed often in even-numbered years, but 2008 was the first year the crew was instructed to enumerate pink salmon passage.

Appendix A24.–Historical salmon and Dolly Varden migration at Pikmiktalik River counting tower, 2003–2007.

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
2007	June 27 - Sept 07	21,080	21,489	123	13,522	192

[a] The Pikmiktalik River counting tower was a 5 year project and is no longer operational.

Appendix A25.–Historical salmon migration at North River counting tower, 1972–1974, 1984–1986, and 1996–2008.

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
2007	June 16 - Sept 05	8,046	583,320	1,950	19,944
2008	June 19 - Sept 13	9,502	240,286	903	15,648

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

Appendix A26.–Total escapement for chum, pink, coho, and Chinook salmon for Kwiniuk, Niukluk, Nome, and Snake Rivers (starting 1995), 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	2,741
1999	55,352	73,077	10,069	1,846
2000	65,007	1,883,867	19,678	1,324
2001	70,451	79,706	30,645	1,718
2002	93,931	2,239,565	21,625	2,925
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
2007	123,394	708,663	37,112	2,324
2008	41,639	3,928,722	49,737	1,250

[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, 1995–2008.

Year[a,b]	Chum	Pink	Coho	Chinook
1995	213,316	169,965	76,712	15,263
1996[c]	156,128	3,089,682	112,710	12,617
1997[d]	157,192	187,644	59,711	25,333
1998[d]	120,208	3,690,921	48,978	15,823
1999	76,493	95,302	40,546	9,315
2000	85,243	2,091,074	84,983	6,655
2001	97,229	109,878	66,232	6,926
2002	108,444	2,300,537	39,368	8,524
2003	63,099	441,387	45,304	7,445
2004	51,829	6,513,682	87,800	7,005
2005	78,719	2,652,592	146,348	5,280
2006	187,784	5,825,726	217,929	4,952
2007	157,932	734,717	181,285	5,136
2008[e]	75,813	4,065,888	198,390	4,378

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

[b] Not all subdistricts from 2004 to 2007 were surveyed for subsistence use.

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

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

[e] Information not yet available from the Division of Sport Fish.

Appendix A28.–Aerial survey numbers of chum, pink, coho, and Chinook salmon for Norton Sound, 1985–2008.

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	2,468,940	29,398	195
2007	54,522	147,081	18,512	1,645
2008	13,803	3,572,446	23,749	237

[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. Kwiniuk numbers are from tower counts.

APPENDIX B: PORT CLARENCE FISHERIES

Appendix B1.–Comparative sockeye salmon aerial survey indices, Port Clarence District, 1963–2008.

Year	Salmon Lake	Grand Central River	Total	Year	Salmon Lake	Grand Central River	Total
1963	866	620	1,486	1986	2,125	160	2,285
1964 [a]	76	590	666	1987	4,040	530	4,570
1965	250	160	410	1988	1,195	6	1,201
1966	1,120	370	1,490	1989	3,055	525	3,580
1967	129	280	409	1990	2,834	926	3,760
1968 [a]	830	645	1,475	1991	3,790	1,570	5,360
1969	24	171	195	1992	1,500	- [b]	1,500
1970 [b]	-	-	-	1993	2,885	216	3,092
1971	538	512	1,050	1994	3,740	1,230	4,970
1972 [a]	680	300 [c]	980	1995	5,433	628 [d]	6,061
1973	1,747	607	2,354	1996	6,610	770	7,380
1974	820	-	820	1997	8,760	1,520	10,280
1975	537	123	660	1998	5,210	1,977	7,187
1976	132	22	154	1999	31,720	1,780	33,500
1977	317	235	552	2000	12,772	- [b]	12,772
1978	822	280	1,102	2001	9,400	155	9,555
1979	1,250	261	1,511	2002	3,520	71	3,591
1980 [a]	512	175	687	2003	19,275	1,015	20,290
1981	-	-	-	2004	23,005	2,855	25,860
1982	-	-	-	2005	41,500	740	42,240
1983	970	-	970	2006	39,400	2,380	41,780
1984	445	30	475	2007	14,920	5,692	20,612
1985	730	250	980	2008	9,420	2,252	11,672

Note: Dashes indicate no data.

[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 1994–2008.

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	203	2,220	1,892	4,309	2,294	10,918
1995[e]	122	76	4,481	1,739	3,293	6,011	15,600
1996[e]	117	194	2,634	1,258	2,236	4,707	11,029
1997[e]	126	158	3,177	829	755	2,099	7,018
1998[e]	138	289	1,696	1,759	7,815	2,621	14,180
1999[e]	155	89	2,392	1,030	786	1,936	6,233
2000[e]	134	72	2,851	935	1,387	1,275	6,520
2001[e]	160	84	3,692	1,299	1,183	1,910	8,168
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]	278	8,688	1,131	5,918	2,505	18,520
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
2007[g]	363[h]	85	9,484	705	1,468	4,454	16,196
2008[g]	408[h]	125	5,069	512	7,527	2,449	15,682

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

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

[b] Species composition was estimated at 75% chum, 10% pink, 10% sockeye and 5% Chinook and coho salmon 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 the 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: KOTZEBUE FISHERIES

Appendix C1.–Kotzebue District chum salmon catch statistics, 1962–2008.

Year	Total Catch	Number of Fishermen [a]	Season Catch per Fishermen
1962	129,948	84	1,547
1963	54,445	61	893
1964	76,449	52	1,470
1965	40,025	45	889
1966	30,764	44	699
1967	29,400	30	980
1968	30,212	59	512
1969	59,335	52	1,141
1970	159,664	82	1,947
1971	154,956	91	1,703
1972	169,664	104	1,631
1973	375,432	148	2,537
1974 [b]	627,912	185	3,394
1975 [c]	563,345	267	2,110
1976	159,796	220	726
1977	195,895	224	875
1978	111,494	208	536
1979	141,623	181	782
1980	367,284	176	2,087
1981	677,239	187	3,622
1982	417,790	199	2,099
1983	175,762	189	930
1984	320,206	181	1,769
1985	521,406	189	2,759
1986	261,436	187	1,398
1987	109,467	160	684
1988	352,915	193	1,829
1989	254,617	165	1,543
1990	163,263	153	1,067
1991	239,923	142	1,690
1992	289,184	149	1,941
1993 [d]	73,071	114	641
1994	153,452	109	1,408
1995	290,730	92	3,160
1996	82,110	55	1,493
1997	142,720	68	2,099
1998	55,907	45	1,242
1999	138,605	60	2,310
2000	159,802	64	2,497
2001	211,672	66	3,207
2002	8,390	3	2,797
2003	25,423	4	6,356
2004	51,038	43	1,187
2005	75,971	41	1,853
2006	137,961	42	3,285
2007	147,087	46	3,198
Avg 1962-2007	195,974	114	1,837
2008	190,550	48	3,970

[a] During 1962 to 1966 and 1968 to 1971, figures represent number of vessels licensed to fish in the Kotzebue District, not fishermen.

[b] Includes 6,567 chum salmon from the Deering experimental fishery.

[c] Includes 10,704 chum salmon from Deering experimental fishery.

[d] Includes 2,000 chum salmon from the Sikusuilaq Springs Hatchery terminal fishery.

Appendix C2.–Kotzebue District chum salmon type of processing and weights, 1962–2008.

Year	Chum Salmon Cases (48 lbs)	Chum Salmon Fresh Frozen (Round weight in pounds)	Other[a]	Fresh Frozen Salmon Roe (pounds)	Cured Pounds
1962	14,500				
1963	5,396				
1964	5,421	202,993			
1965	1,929	207,350			
1966		310,716		13,600	3,065
1967		273,420			11,488
1968		288,500			11,850
1969		455,013			8,183
1970		1,240,000			48,377
1971		1,264,753			27,542
1972		1,547,041			55,376
1973		3,416,431			144,768
1974		5,361,130[b]			
1975		4,877,313[c]			
1976		1,415,549	487		
1977		1,846,340	1,075		
1978		1,009,121	32,419		
1979		1,236,429	6,155		
1980		3,160,948	7,828		
1981		6,139,518	2,210		
1982		3,833,051	790	100	
1983		1,647,160	2,449		
1984		2,631,582	1,593		
1985		4,528,379	1,106		
1986		2,271,320	1,691		
1987		900,405	597		
1988		3,060,292	2,120		
1989		2,163,174	1,426		
1990		1,453,040	538		
1991		1,951,041	714		
1992		2,397,302	2,714		
1993	[d]	613,968	1,507	1,000	
1994	[e]	1,166,494	73		
1995		2,329,898	93		
1996	[f]	97,510	51		
1997		1,141,741	649		
1998		447,256	2,971		
1999		1,108,898	87		
2000		1,370,637	106		
2001		1,847,361	64		
2002		74,341	0		
2003		218,091	0		
2004		419,059	1,450		
2005		621,573	1,258		
2006		1,040,023	0[g]		
2007		1,209,842	0[h]		
2008		1,541,922	0[i]		

-continued-

Note: Blank cells indicate 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.

[g] There were 9 Chinook, 5 sockeye, and 3 pink salmon, and 278 Dolly Varden and 13 sheefish kept for personal use.

[h] There were 15 Chinook, 2 chum, 3 pink and 2 coho salmon, and 960 Dolly Varden and 13 sheefish kept for personal use.

[i] There were 4 Chinook, 9 sockeye, 693 pink and 36 coho salmon, and 1,629 Dolly Varden and 37 sheefish kept for personal use.

Appendix C3.–Kotzebue District mean prices paid per pound in dollars to salmon fishermen by species, 1962–2008.

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	8.5	0.34[c]			0.30	0.16
1975	8.6	0.28[c]			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				
2007	8.2	0.20				
2008	8.1	0.25				

Note: Blank cells indicate no data.

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

[b] Price per fish.

[c] Includes price paid to fishermen 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, 1962–2008.

Year	Gross Value of Catch to Fishermen [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
2006	229,086
2007	243,149
Average 1962–2007	589,858
2008	385,270

[a] Some estimates between 1962 and 1981 only include chum salmon value which represent over 99% of the total value. Values after 1981 represent the chum salmon 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 1957–2008.

	Commercial Catch			Subsistence Chum Salmon Catch			
Year[a]	Chum [b]	Other [c]	Total	Chum	Number of Fishermen Interviewed	Average Catch per Fishermen	Total Documented Catch
1914	8,550	-	8,550	-	-	-	-
1915	4,750	-	4,750	-	-	-	-
1916	19,000	-	19,000	-	-	-	-
1917	44,612	-	44,612	-	-	-	-
1918	27,407	-	27,407	-	-	-	-
1957	-	-	-	298,430 [d]	-	-	-
1962	129,948	27	129,975	70,284	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

-continued-

	Commercial Catch				Subsistence Chum Salmon Catch			
Year	Chum	Other [c]	Total		Chum	Number of Fishermen Interviewed	Average Catch per Fishermen	Total Documented Catch
1988	352,915	152	353,067		13,723	-	-	366,790
1989	254,617	87	254,704		5,489	-	-	260,193
1990	163,263	32	163,295		8,268	-	-	171,563
1991	239,923	44	239,967		14,740	-	-	254,707
1992	289,184	204	289,388		14,303	-	-	303,691
1993	73,071 [j]	131	73,202		15,430	-	-	88,632
1994	153,452 [k]	3	153,455		36,226 [l]	375	97	189,681
1995	290,730	5	290,735		102,881	593	173	393,616
1996	82,110 [m]	3	82,113		99,740	596	167	181,853
1997	142,720	45	142,765		57,906	530	109	200,671
1998	55,907	210	56,117		48,980	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 [ln]	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.			
2006	137,961	17	137,978		2006 subsistence surveys were not conducted.			
2007	147,087	20	147,107		2007 subsistence surveys were not conducted.			
1998-2007 Average	101,237	39	101,276	1995-2004 Average	57,977	457	127	174,709
2008	190,550	742	191,292		2008 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] Includes 2,000 chum salmon from the Sikusuilaq Springs Hatchery terminal fishery.

[k] Includes 4,000 chum salmon commercially harvested on August 5 but not sold.

[l] Does not include the town of Kotzebue.

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

[n] Only 2 of 6 villages surveyed.

Appendix C6.–Kotzebue District subsistence chum salmon catches by village, 1962–2004.

	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

Note: No subsistence surveys were conducted after 2004. Dashes indicate no data.

[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, 1962–2004.

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]

Note: No subsistence surveys were conducted after 2004.

[a] Not surveyed.

[b] Number of fishermen 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, fishermen were just beginning to fish.

Appendix C8.–Kotzebue District chum salmon aerial survey counts, 1962–2008.

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

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

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Stream[a,h]	1980	1981 [b]	1982 [b]	1983	1984	1985 [b]	1986 [b]	1987 [b]	1988 [b]	1989 [j]
Noatak Drainage										
Noatak River below Kelly River	164,474	116,352	20,682	79,773	67,873	45,525	37,227	5,515 [b,j]	45,930 [b,j]	
Eli River	10,277	-	189	3,044	5,027	855	4,308	2,780	8,639	
Kelly River & Lake	7,416	13,770	11,604	12,137	3,499	1,200	839	950	1,460	
Noatak River System Total	182,167	130,122	32,475	94,954	76,399	47,580	42,374	9,245	56,029	
Kobuk Drainage										
Kobuk to Pah River	1,694	18	2,643 [b]	2,147	402	2,048 [i]	531	-	-	
Pah River to just below Selby River	2,069	309	598 [b]	2,433	257	241 [i]	511	2,250	1,135 [b]	
Selby River mouth & slough	-	8,321 [d,e]	2,454	11,683	-	711 [i]	673	1,470	820 [b]	
Selby R. mouth to Beaver C.	6,925 [d]	-	7,268	13,011	5,910	3,278 [i]	3,282	1,350	6,890 [b]	
Beaver Creek mouth	784	-	1,711	3,059	-	-	-	-	-	
Above Beaver Creek	-	-	-	1,413	4,052	-	1,018	3,140	3,050 [b]	
Upper Kobuk River Total	11,472	8,648	14,674	33,746	10,621	6,278	6,015	8,210	11,895 [b]	
Squirrel River	13,563	9,854	7,690	5,115	5,473	6,160	4,982	2,708 [c]	4,848 [b]	
Salmon River	8,456	4,709	1,821 [c]	1,677	1,471	2,884	1,971	3,333	6,208	
Tutuksuk River	1,165	1,114	1,322	2,637	1,132	5,098	4,257	206	3,122	
Kobuk River System Total	34,656	24,325	25,507	43,175	18,697	20,420	17,225	14,457	26,073	

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Stream[a,h]	1990	[b]	1991	1992	[b]	1993	1994	[j]	1995	1996	1997		1998		1999
Noatak Drainage															
Noatak River below Kelly River	23,345	[b]	82,750	34,335		25,415	-		147,260	306,900	-	[j]	-	[b]	-
Eli River	3,000		2,940	701		4,795	-		7,860	30,040	-	[j]	-	[b]	-
Kelly River & Lake	325	[i]	654	726		9	-		8,384	1,427	2,792		2,631		-
Noatak River System Total	26,670		86,344	35,762		30,219	-		163,504	338,367	-		-	[b]	84,085
Kobuk Drainage															
Kobuk to Pah River	4,610		9,840	1,030		3,896	-		12,190	20,700	2,248	[b]	-	[b]	-
Pah River to just below Selby River	305		2,780	3,820		1,535	-		4,537	4,600	404	[b]	-	[b]	-
Selby River mouth & slough	420		1,040	1,500		1,800	-		1,250	4,100	662	[b]	-	[b]	-
Selby River	7,505		1,460	868		824	-		3364	14,950	853	[b]	730		-
Selby R. mouth to Beaver C.	-		5,250	3,845		929	-		10,898	15,480	2,582	[b]	-	[b]	-
Beaver Creek mouth	2,515		-	-		-	-		-	-	914	[b]	-	[b]	-
Above Beaver Creek	-		4,155	740		3,174	-		3,486	14,940	850	[b]	-	[b]	-
Upper Kobuk River Total	15,355		24,525	11,803		12,158	-		35,725	74,770	8,513	[b]	-	[b]	27,340
Squirrel River	5,500		4,606	2,765		4,463	-		10,605	10,740	4,779	[b]	-	[b]	13,513
Salmon River	6,335		5,845	1,345		13,880	-		13,988	23,790	1,181	[b]	-	[b]	4,989
Tutuksuk River	2,275		744	1,162		1,196	-		3,901	21,805	163	[b]	-	[b]	2,906
Kobuk River System Total	29,465		35,720	17,075		31,697	-		64,219	131,105	-		-		48,748

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Stream[a,h]	2000 [k]	2001	2002	2003	2004	2005 [k]	2006	2007 [k]	2008	Goals[l]
Noatak Drainage										
Noatak River below Kelly River	-	-	700	34,575	49,541	-	36,125 [b]	-	257,695	-
Eli River	-	-	-	-	2,917	-	1,285 [b]	-	13,052	-
Kelly River & Lake	-	-	1,116	1,566	2,987	-	2,375 [b]	-	1,865	-
Noatak River System Total	-	-	-	36,141	55,445	-	39,785 [b]	-	272,612	42,000-91,000
Kobuk Drainage	-	-	-	-	-	-	-	-	-	-
Kobuk to Pah River	-	2,790	-	5,501	7,493	-	8,525 [b]	-	19,421	-
Pah River to just below Selby River	-	1,380	857	828	1,885	-	-	-	5,795	-
Selby River mouth & slough	-	1,780	2,100	1,110	3,846	-	-	-	-	-
Selby River	-	-	-	427	3,760	-	500 [b]	-	1,750	-
Selby R. mouth to Beaver C.	-	7,470	-	1,274	6,215	-	-	-	13,201	-
Beaver Creek mouth	-	-	-	-	-	-	-	-	-	-
Above Beaver Creek	-	-	490	2,462	-	-	-	-	3,180	-
							39,725 [g]		-	-
Upper Kobuk River Total	-	13,420	3,447	11,602	23,199		48,750 [b]		43,347	9,700-21,000
Squirrel River	-	-	-	- [b]	-	-	-	-	-	4,900-10,500
Salmon River	-	-	-	- [b]	-	-	-	-	-	3,300-7,200
Tutuksuk River	-	-	-	- [b]	-	-	-	-	-	1,400-3,000
Kobuk River System Total	-	13,420	3,447	11,602	23,199	-	48,750 [b]	-	43,347	19,600-39,200

Note: Dashes indicate no data unless otherwise noted.

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

[b] Poor survey conditions or incomplete, early or late survey.

[c] Survey by foot or boat.

[d] These fish are unidentified salmon, mostly chums.

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

[f] Irresolvable discrepancies in historical data put this figure in question.

[g] Unclear where these fish were observed.

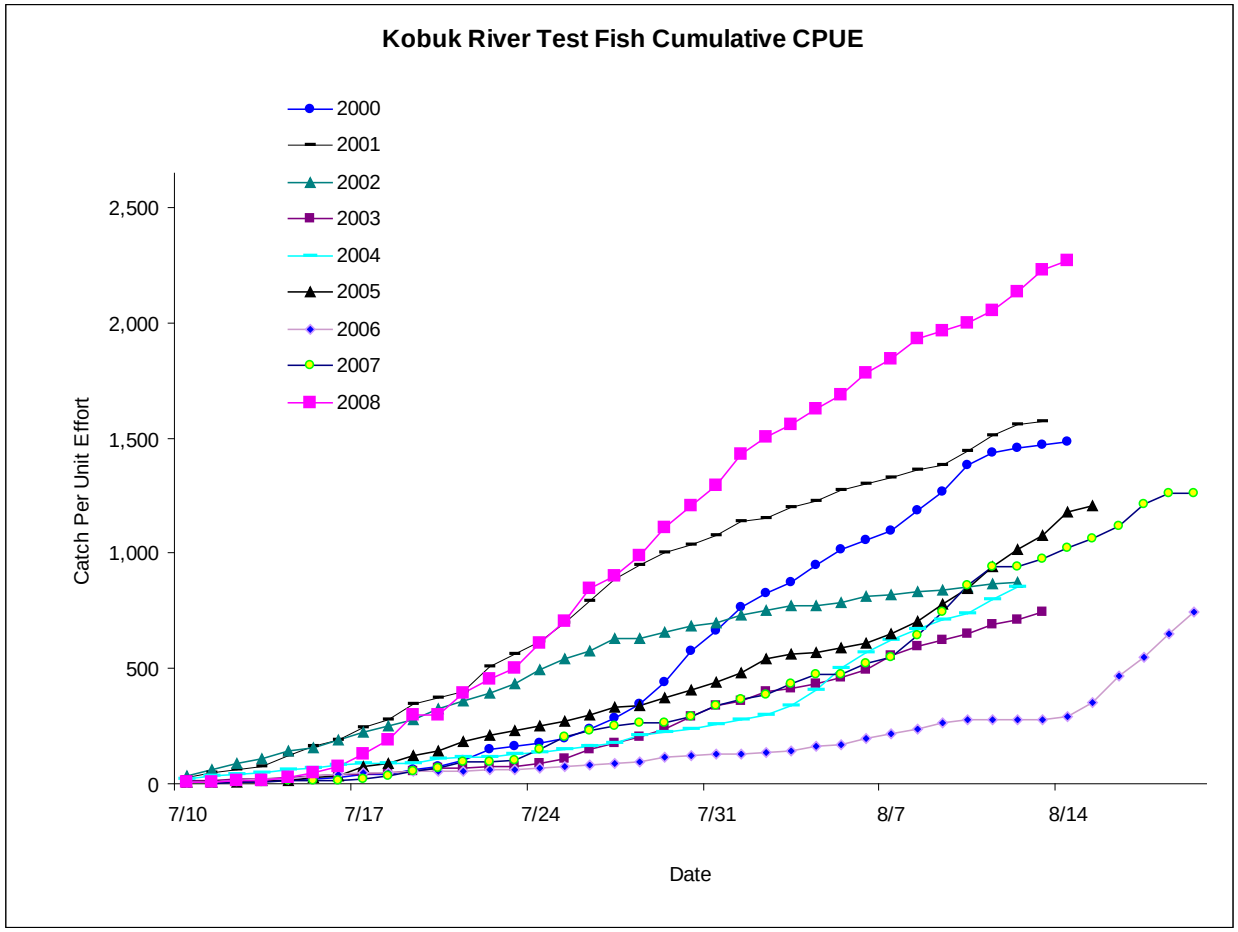
[h] The figures in this table have been corrected and supersede figures in previous reports.

[i] Surveyed well before peak of migration.

[j] Unacceptable survey conditions.

[k] No surveys flown.

[l] Aerial survey goals were revised in 2007.



Appendix C9.–Kobuk River chum salmon drift test fish cumulative catch per unit effort (CPUE), 2000–2008.

APPENDIX D: HERRING FISHERIES

Appendix D1.–Norton Sound herring and spawn-on-kelp harvests (in tons) by U.S. commercial fishermen, 1909–2008.

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	-

-continued-

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	9.04 [i]
1999	2,693 [j]	53	2,751	3.74
2000	4,487 [k]	-	4,487	2.25
2001	2,245	-	2,245	2.20
2002	1,059	64	1,123	-
2003	1,587	21	1,608	0.88
2004 [f]	-	11	11	-
2005	1,951	-	1,951	-
2006	646	25	671	0.57
2007 [f]	-	33	33	0.14
2008 [f]	-	91	91	0.18

Note: Dashes indicate no data. Short ton (st).

[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 and 2007.

[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. Short ton (st).

Appendix D3.–Commercial herring fishery summary information, Norton Sound District, 1979–2008.

Year	Estimated Biomass (tons)	Catch Gillnet (tons)	Beach Seine (tons)	Wild Kelp (tons)	*Macrocystis* Kelp (lbs.)	Number of Fishermen	Dollar Value (millions))	Number of Buyers	Average Roe %	Peak Catch Day	Fishery Duration
1979	7,700	1,292	0	13.00	-	67	0.60	7	7.0	25–May	19–May/14–June
1980	8,400	2,452	0	24.00	-	294	0.50	8	8.1	30–May	21–May/05–June
1981	25,100	4,371	0	47.00	-	332	1.50	13	8.8	24–May	18–May/28–May
1982	19,403	3,933	0	38.00	-	237	1.00	7	8.8	08–June	03–June/11–June
1983	28,100	4,541	41	29.00	-	272	1.40	9	8.6	23–May	18–May/28–May
1984	23,100	3,245	327	16.00	6,000	194	0.90	8	10.3	10–June	06–June/28–May
1985	20,000	3,379	169	-	-	277	1.40	11	9.9	20–June	13–June/21–June
1986	28,100	4,979	215	-	-	323	2.90	10	9.6	09–June	03–June/10–June
1987	32,370	3,759	323	-	-	564	2.60	11	8.6	07–June	07–June/08–June
1988	33,924	4,474	198	-	-	348	3.90	11	9.0	28–May	27–May/31–May
1989	25,981	4,351	390	-	-	357	2.30	9	9.2	28–May	27–May/30–May
1990	39,384	6,032	347	-	-	365	3.60	8	8.8	29–May	28–May/30–May
1991	42,854	5,150	522	-	-	279	2.40	8	9.3	25–May	23–May/25–May
1992	57,974	0	[a] 0	[a] -	-	-	0.00		-	20–June[b]	-
1993	46,549	4,291	742	-	-	264	1.50	5	9.9	25–May	24–May/05–June
1994	31,088	921	40	-	-	215	0.30	6	10.3	08–June	05–June/09–June
1995	37,779	6,033	614	-	-	215	4.20	6	10.4	24–May	23–May/30–May
1996	26,596	5,581	589	-	-	287	4.50	10	10.6	25–May	24–May/25–May
1997	47,748	3,459	513	-	-	220	0.61	9	9.9	22–May	20–May/24–May
1998	52,033	2,632	0	1.00	16,083	47	0.20	2	9.2	25–May	22–May/09–June
1999	34,314	2,755	0	-	7,482	122	0.61	4	10.5	17–June	13–June/22–June
2000	32,680	4,390	81	-	4,500	97	0.89	4	9.5	11–June	07–June/15–June
2001	26,305	2,245	0	-	4,400	76	0.35	3	12.3	12–June	12–June/16–June
2002	27,068	1,123	0	-	0	46	0.16	2	10.6	24–May	22–May/03–June
2003	32,918	1,608	0	-	1,750	32	0.22	2	10.5	18–May	16–May/25–May
2004 [a]	34,180	11	0	0.00	0	4	0.00	0	[a]	24–May[b]	-
2005	43,013	1,951	0	0.00	0	56	0.32	1	11.4	04–June	03–June/10–June
2006	24,635[c]	671[d]	0	0.57	0	41	0.14	1	10.2	9–Jun	08–June/11–June
2007 [a]	28,033	33	0	0.14	0	7	0.02	1	[a]	9–Jun	09–June/15–June
2008 [a]	12,213[e]	91	0	0.00	0	14	0.18	1	[a]	11–Jun	10–June/24–June

Note Dashes indicate no data.

[a] No fishery due to late sea ice breakup in 1992 and no sac roe fishery in 2004, 2007, and 2008 due to lack of a buyer.

[b] Date of peak aerial survey biomass estimate, typically one 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.

[e] Conditions did not allow for a peak survey in 2008.

Appendix D4.–Norton Sound commercial herring harvest (tons) by subdistrict, by year, 1979–2008.

	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
2007	0	33	0	0	0	0	0	33
2008	0	91	0	0	0	0	0	91

Note: Dashes indicate no data.

[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.

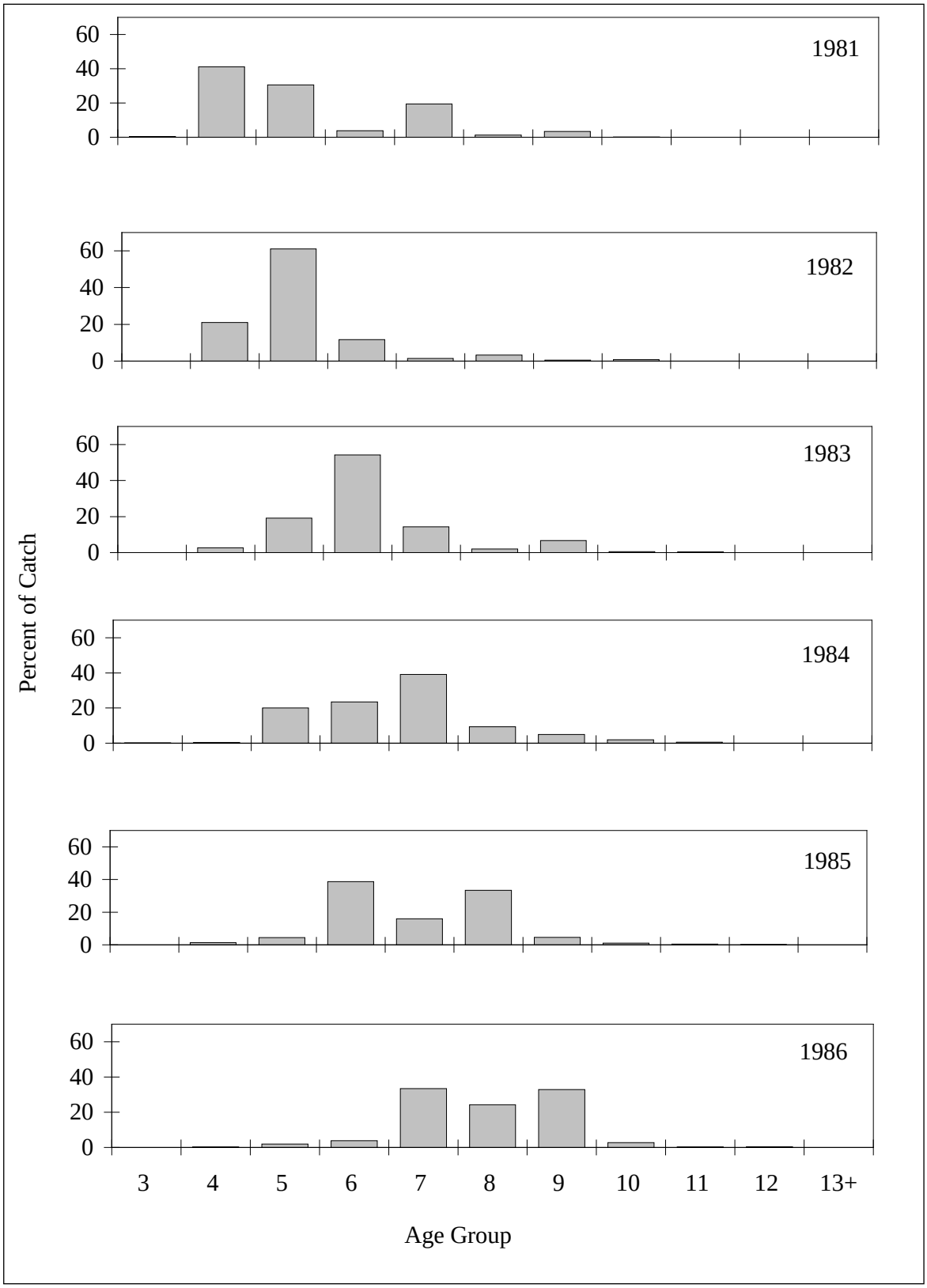
[k] There were 75.8 tons added to sac roe total due to dewatering by buyers. 3 tons added to bait total due to dewatering by the buyer. Does not include an estimated 5 st of wastage.

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

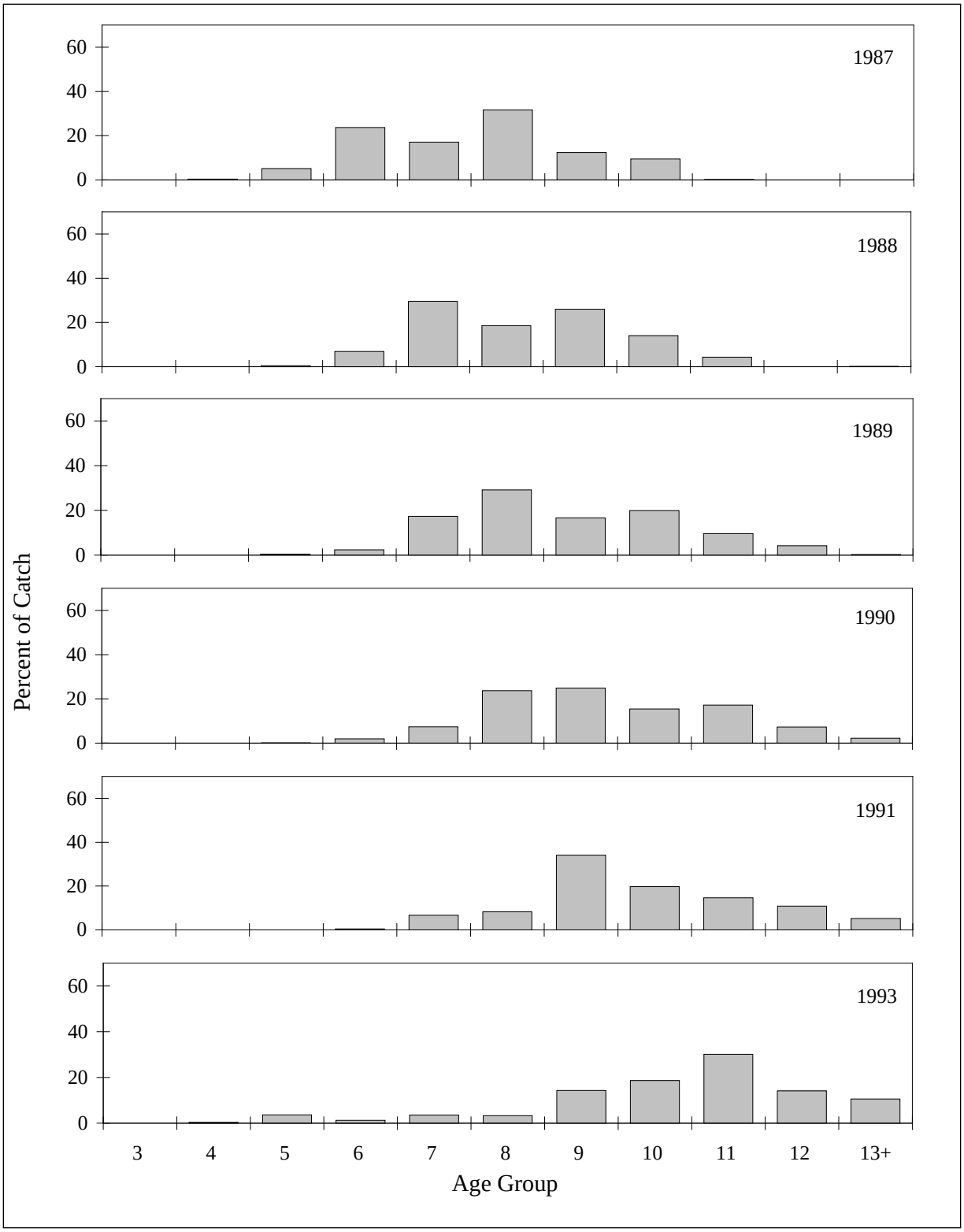
Appendix D5.–Port Clarence District commercial herring fishery, 1986–1996.

Year	Fishery	Gillnet Permits	Purse Seine Permits	Harvest (pounds)
1986	Fall Bait	1		130
1987	Sac Roe	3	3	291,000
1987	Fall Bait	Unknown		1,100
1988	Sac Roe	3	3	160,000
1994	Fall Bait	4		8,706
1995	Spring Bait	8		19,193
1995	Fall Bait	2		9,119
1996	Spring Bait	4		5,546

Note: Blank cells indicate no data.

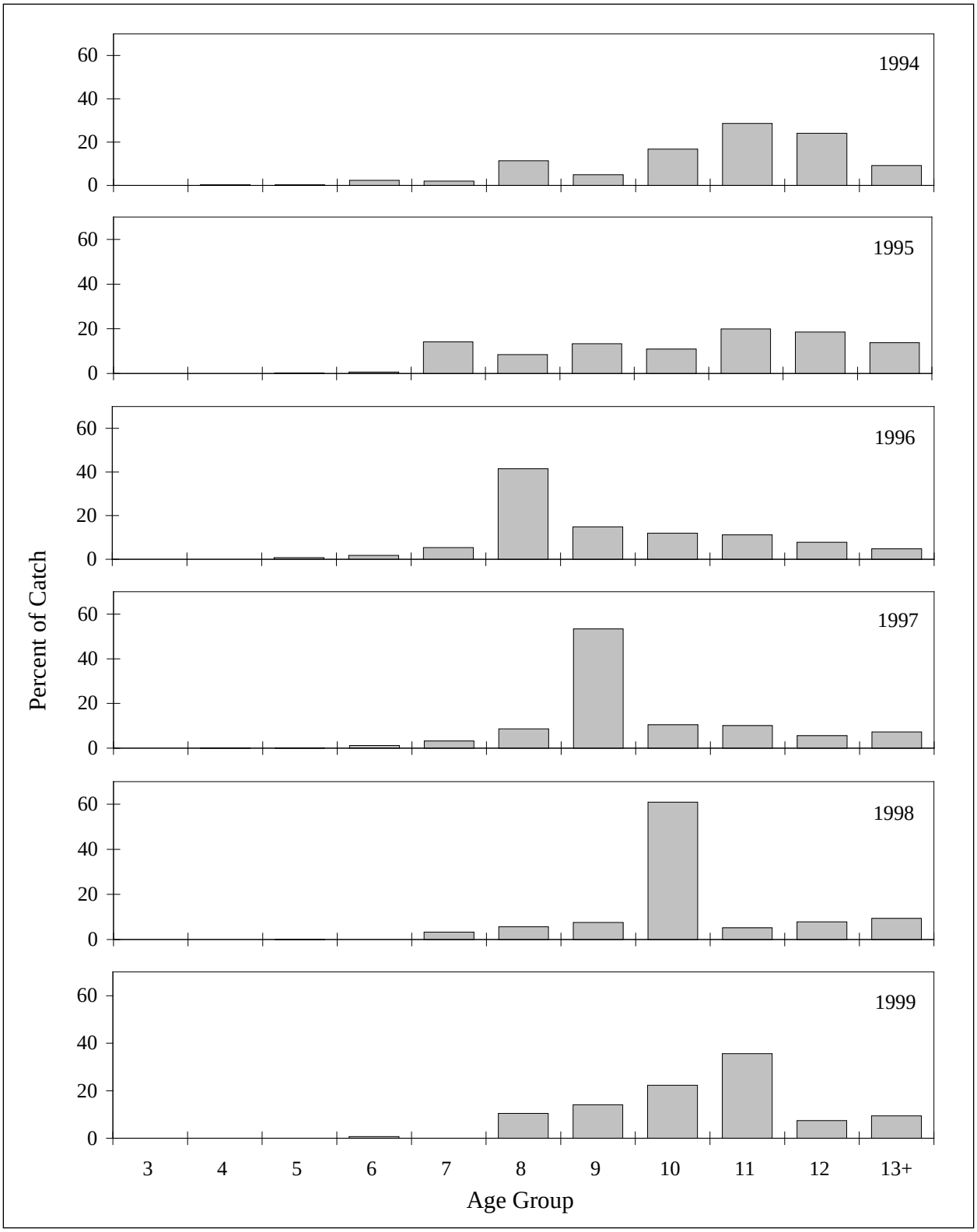


Appendix D6.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 1981–1986.

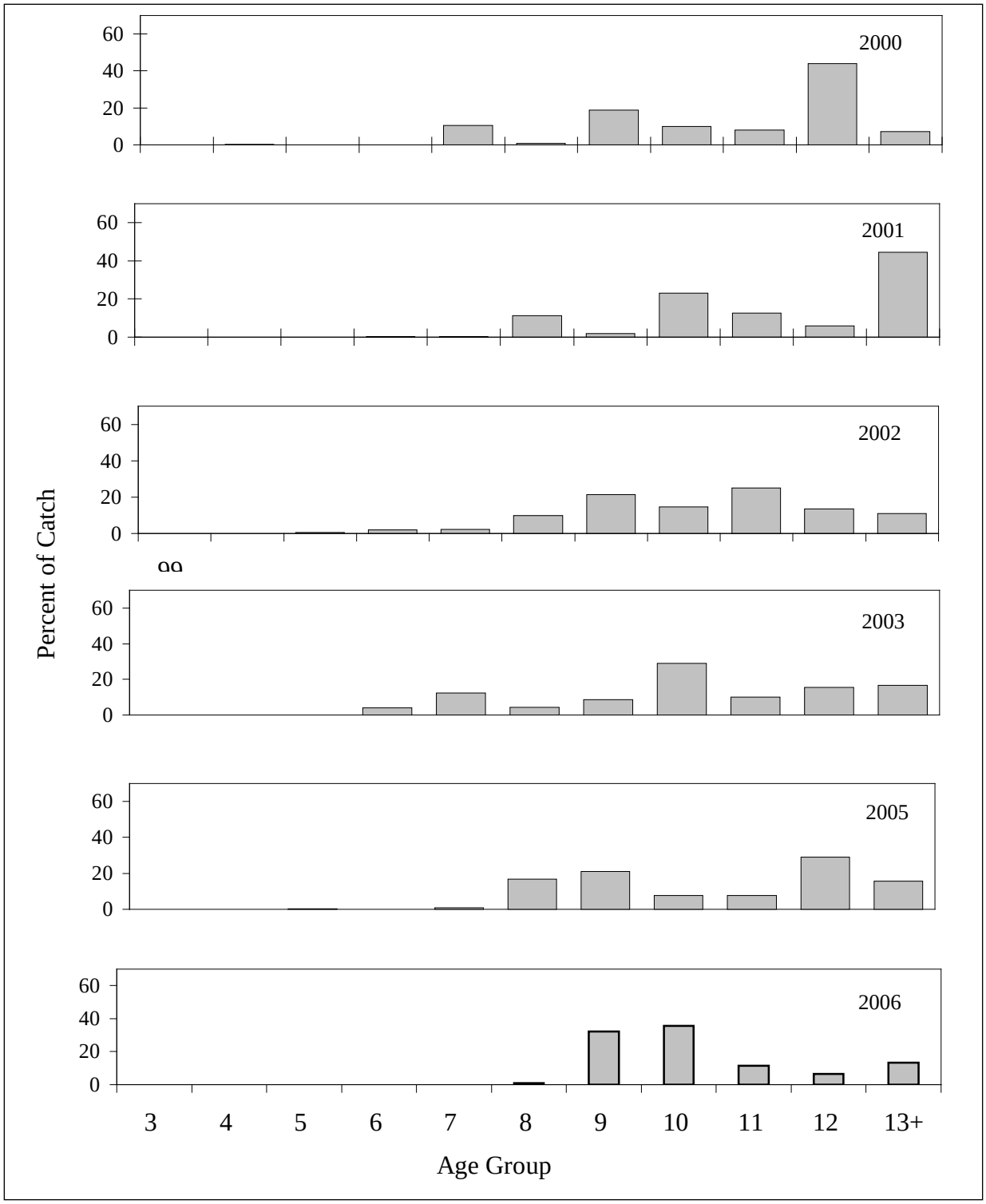


Note: No commercial fishing occurred in 1992.

Appendix D7.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 1987–1993.

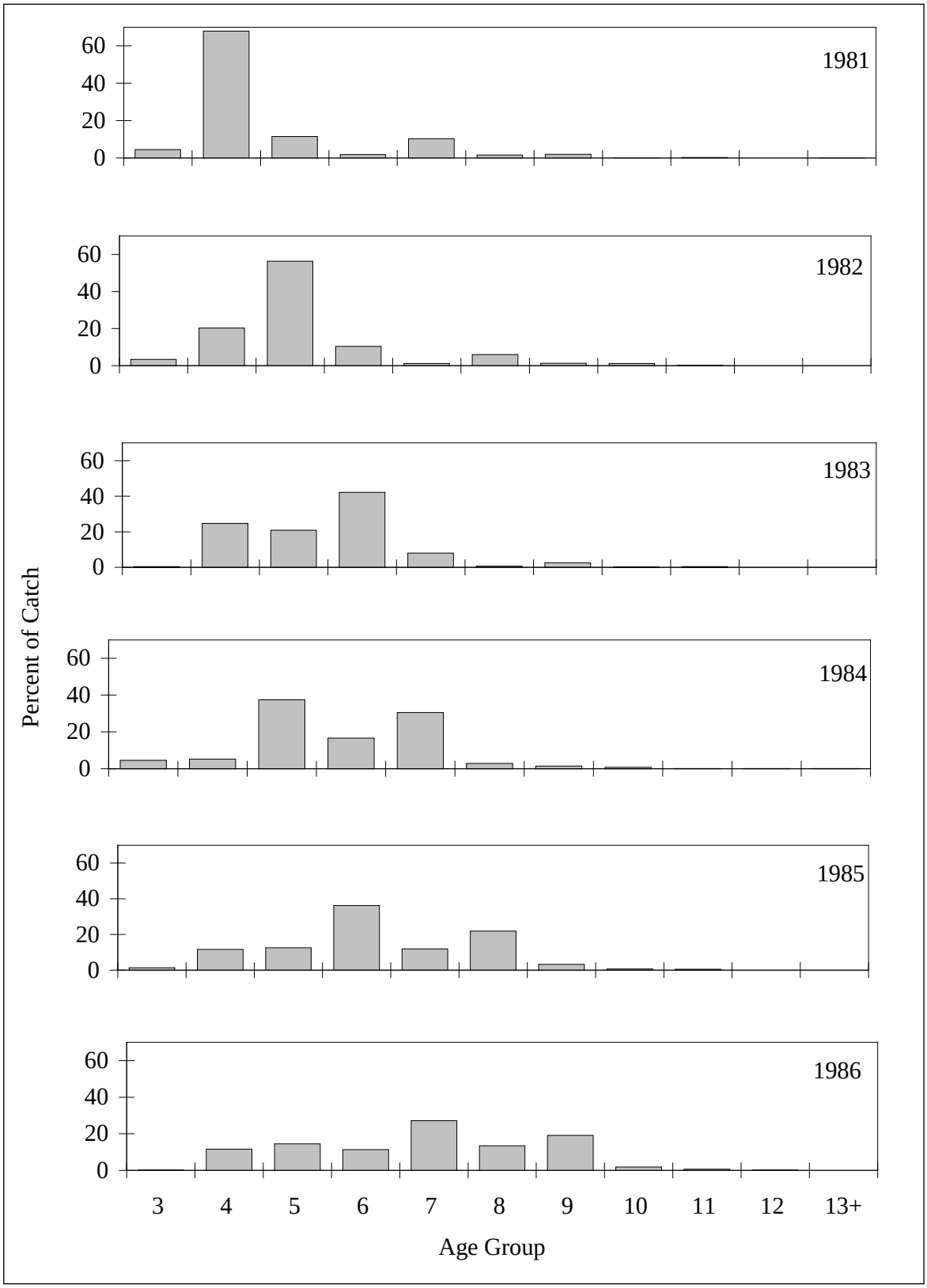


Appendix D8.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 1994–1999.

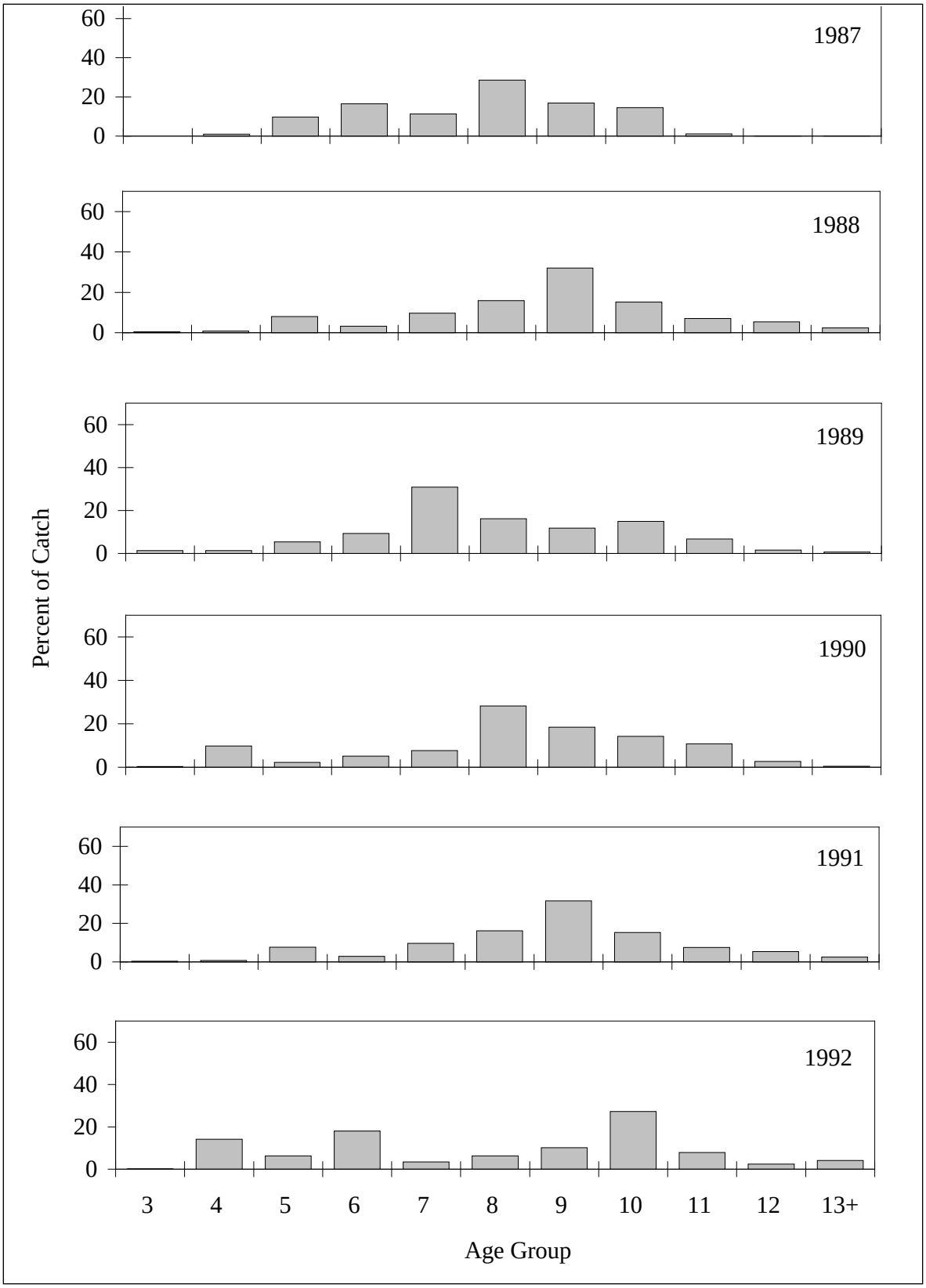


Note: No commercial catch from beach seine gear in 2001–2006. No fishery in 2004.

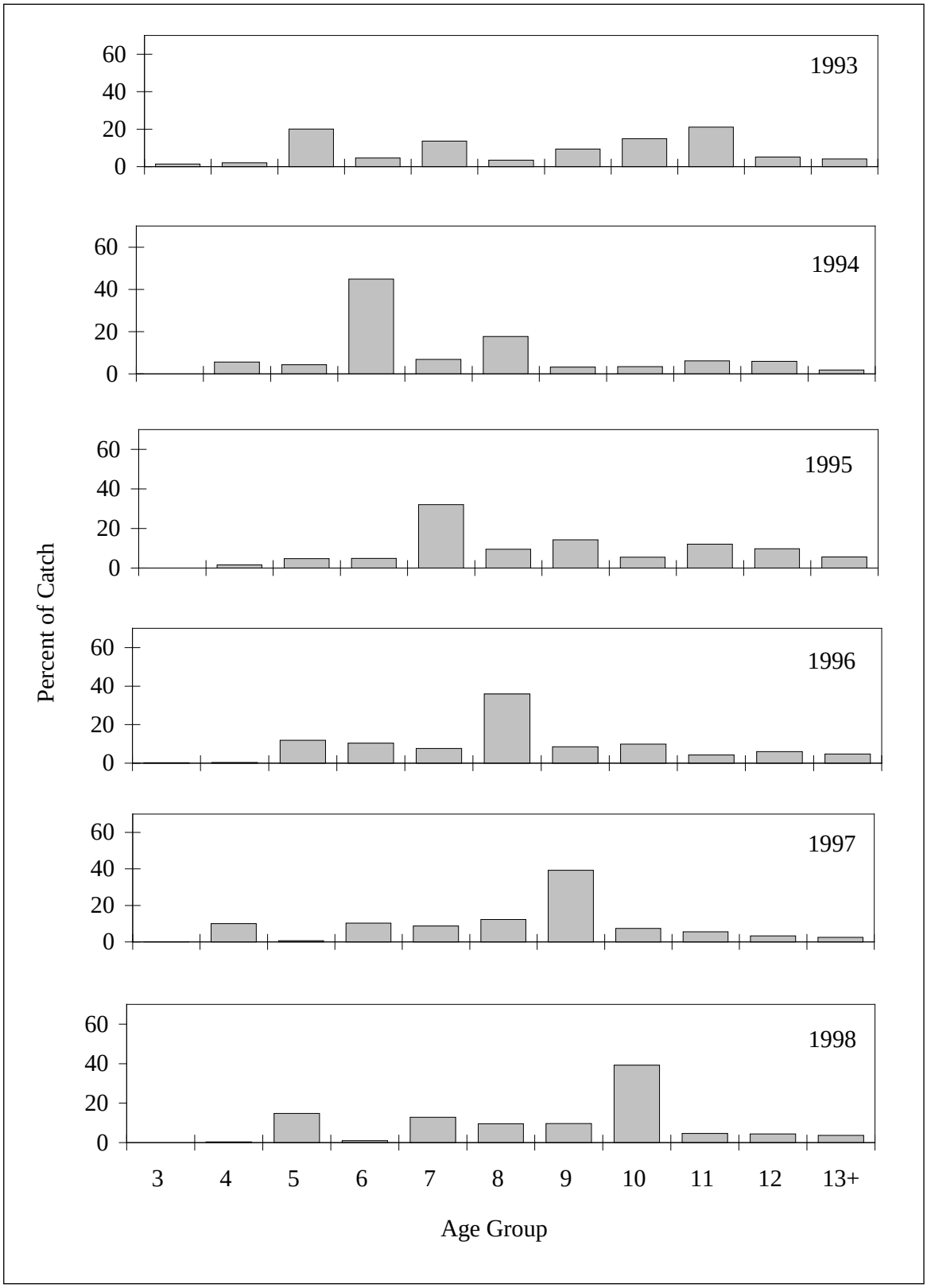
Appendix D9.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 2000–2006.



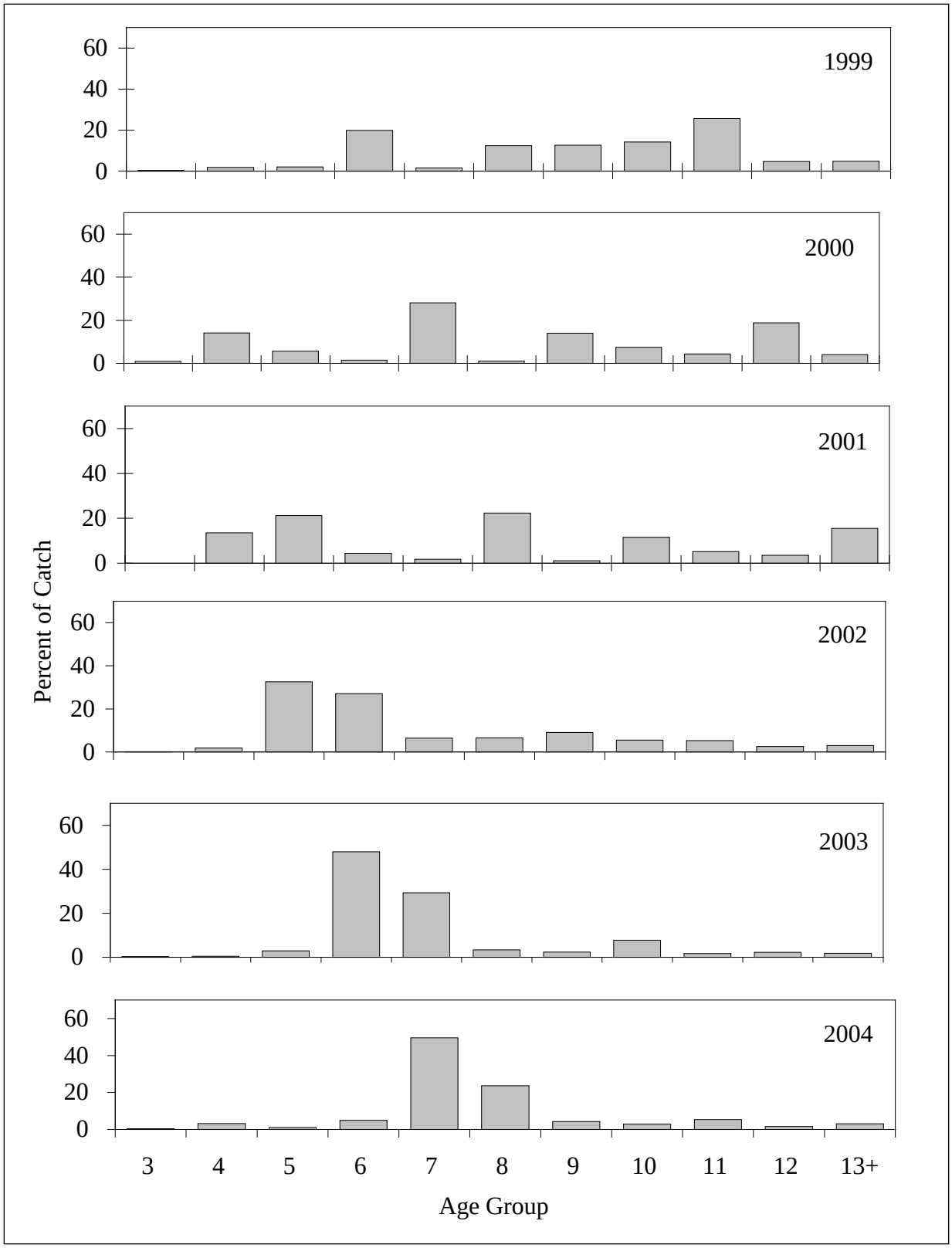
Appendix D10.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1981–1986.



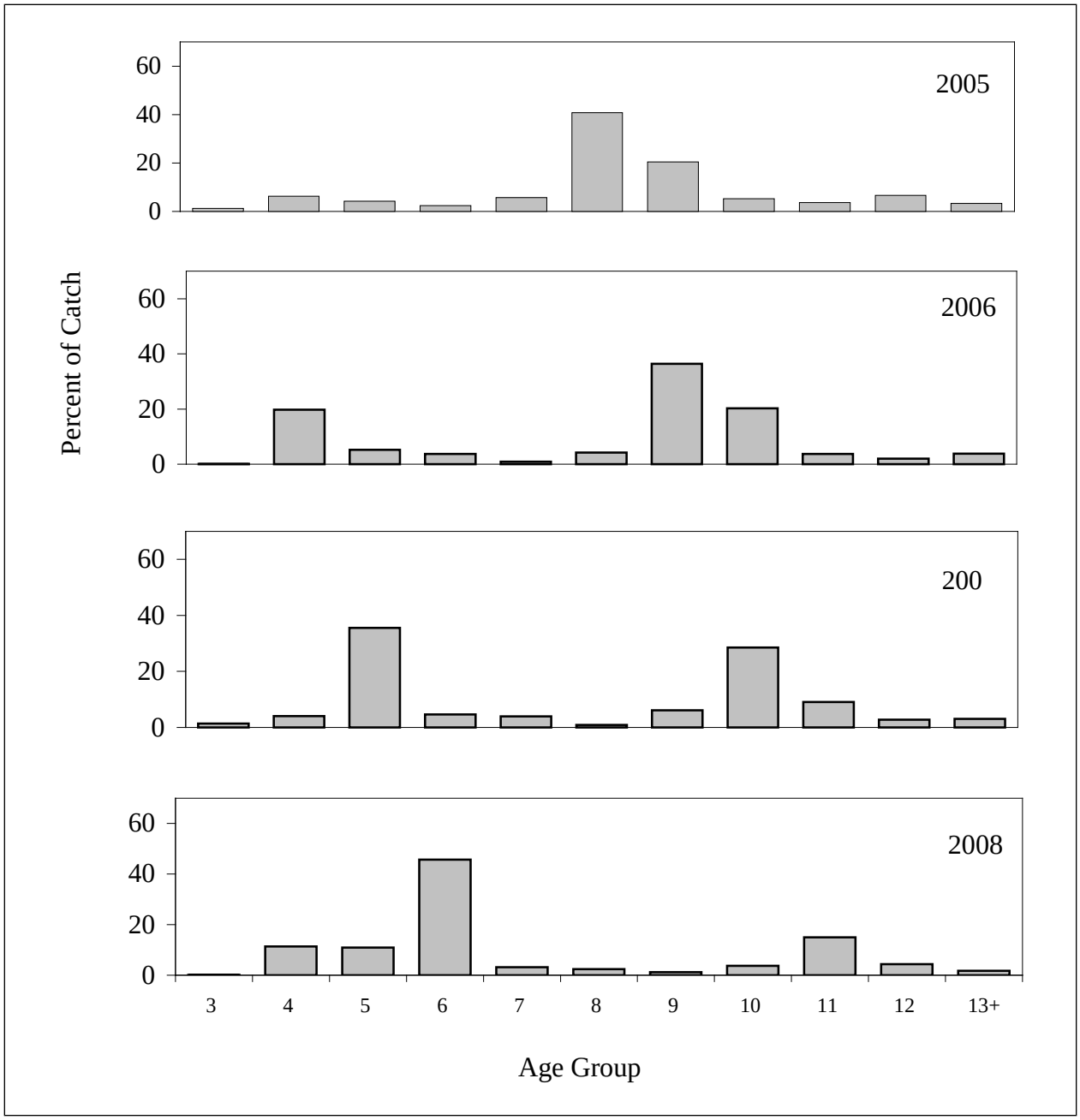
Appendix D11.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1987–1992.



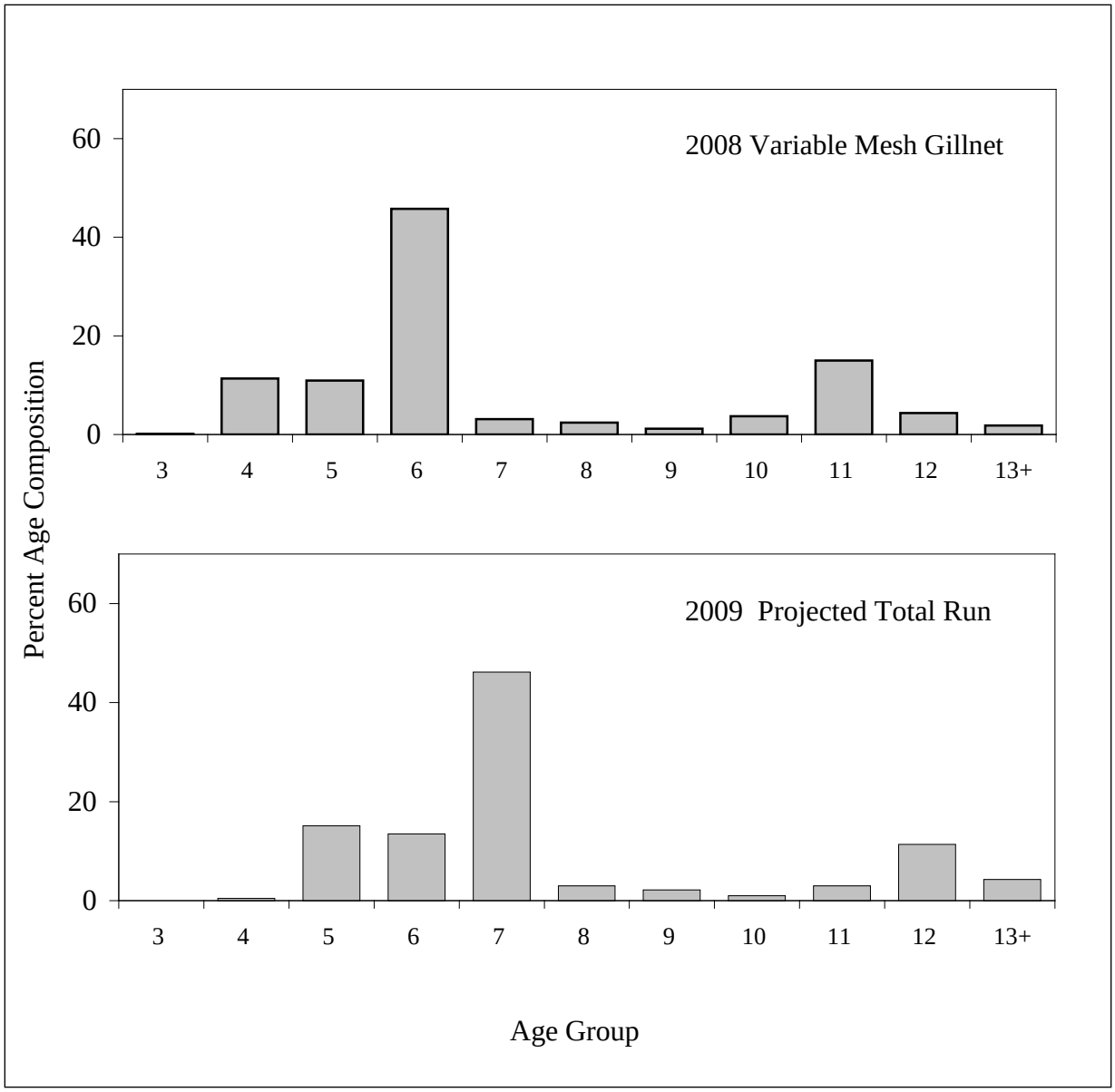
Appendix D12.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1993–1998.



Appendix D13.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1999–2004.



Appendix D14.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 2005–2008.



Appendix D15.–Norton Sound Pacific herring age composition comparison of the 2008 variable mesh gear, and the projected age composition of the 2009 return.

APPENDIX E: KING CRAB FISHERIES

Appendix E1.–Historical commercial summer harvest of red king crab from Norton Sound Section, Eastern Bering Sea, by statistical areas, 1977–2008 (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

-continued-

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

-continued-

Statistical Area	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
616331	633	4,557	-	3,506	646	-	-	2357	-	5,658	25,298
616401	-	-	-	-	-	-	-	-	231	416	682
626331	-	-	-	2,455	-	-	-	1415	27,018	3,235	74,226
626401	508	4,689	61,620	53,722	15,899	23,113	94,130	118202	61,704	96,327	656,862
626402	-	-	-	-	1,352	-	-	-	-	-	40,347
636330	-	-	2,253	-	-	-	126	26680	10,253	2,350	52,509
636401	14,201	126,994	91,343	50,906	83,949	166,489	227,204	224531	123,092	197,948	1,617,568
636402	-	-	-	-	-	-	-	-	-	-	5,220
646301	-	-	-	-	-	-	-	-	-	-	18,516
646330	3,021	-	1,868	1,955	-	2,226	4,097	2629	5,290	1,505	37,220
646401	221	-	4,287	-	3,952	1,964	149	1660	-	18,728	377,094
646402	-	-	-	-	-	-	-	-	-	-	292,779
656300	-	-	-	-	14	932	-	284	1,909	-	180,012
656330	1,300	-	20,869	12,374	21,176	46,288	47,411	17752	4,911	-	1,249,237
656401	2,739	94,813	55,158	63,038	40,566	21,579	9,405	28434	70,065	68,968	2,165,172
656402	-	-	-	-	1,441	-	380	807	2,254	-	1,172,583
666230	-	-	-	-	-	-	-	1721	-	-	57,288
666300	-	-	-	-	-	-	-	18245	-	-	366,045
666330	-	5,839	7,030	1,332	1,296	12,359	142	5041	511	-	1,562,997
666401	930	60,762	43,771	35,970	83,998	42,452	727	600	2,498	-	2,826,595
666402	-	-	-	30,070	12,873	23,344	16,025	1050	2,959	-	1,384,987
666431	-	-	-	4,274	45	-	-	-	-	-	151,472
676300	-	-	-	-	-	-	-	-	-	-	140,015
676330	-	-	-	-	-	-	-	-	-	-	158,598
676400	-	-	-	-	-	-	-	-	180	-	808,047
676430	-	-	-	-	-	-	-	-	-	-	21,177
676501	-	-	-	-	-	-	1,008	-	-	-	1,044
686330	-	-	-	-	-	-	-	-	-	-	1,860
686431	-	-	-	-	-	-	-	340	-	-	340
Totals (tons)	12	149	144	130	134	170	200	226	156	198	7,723

Note: Dashes indicate no data.

[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.

Year	Date	Research Agency	Gear	Population Abundance Estimates Number of crab [a] Pre-2 males [b]	Pre-1 Males [b]	Legal Males [c]	Legal Male Biomass (millions of pounds)
1976	9/02 - 9/05	NMFS	Trawl	331,555	808,091	1,742,755	5,228,265
	9/16 - 10/07	-	-	-	-	-	-
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 - 10/01	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
2008	7/24 - 8/11	ADF&G	Trawl	795,777	697,442	811,727	2,435,182

Note: Dashes indicate 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 crab were defined as ≥121 mm (4.75 inch) 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, 1977–2008.

	Guideline Harvest Level	Legal Male Population Est.		Commercial Harvest (lbs) [a, b]		Total Number of			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]

-continued-

Year	Guideline Harvest Level (lbs) [b]	Legal Male Population Est. No. crab (millions)	Legal Male Population Est. lbs [b]	Commercial Harvest (lbs) [a, b] Open Access	Commercial Harvest (lbs) [a, b] CDQ	Total Number of Vessels	Total Number of Permits	Total Number of Landings	Total Number of Pots Registered	Total Number of Pots Pulls	Total Exvessel Price/lb	Total Fishery Value (millions $)	Season Length Days	Season Length Dates
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	1,120	8,867	2.26	1.021	68	6/15-8/22 [n]
2007	0.32	1.1	3.1	0.29	0.02	38	30	251	1,200	9,118	2.49	0.750	52	6/15-8/17 [n]
2008	0.41	1.5	4.1	0.36	0.03	23	30	248	920	8,721	3.20	1.231	73	6/23-9/03 [p]

Note: Dashes indicate no data unless otherwise noted.

[a] Deadloss included in total.

[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 fishermen 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.

[p] OA opened 6/23-8/18. CDQ opened 8/17-9/3.

Appendix E4.–Percentage of recruit and postrecruit male red king crab from summer commercial fishery catch samples in Norton Sound Section, Eastern Bering Sea, 1977–2008.

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
2007	45	55
2008	45	55

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

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

[c] No summer commercial fishery.

Appendix E5.–Winter commercial and subsistence red king crab harvests, Norton Sound, Eastern Bering Sea, 1978–2008.

Commercial			Subsistence						
Year [a]	Number of Fishermen	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	1977-78	290	206	149	[e]	12,506	84
1979	[f]	[f]	1978-79	48	43	38	[e]	224	6
1980	[f]	[f]	1979-80	22	14	9	[e]	213	24
1981	0	0	1980-81	51	39	23	[e]	360	16
1982	[f]	[f]	1981-82	101	76	54	[e]	1,288	24
1983	5	549	1982-83	172	106	85	[e]	10,432	123
1984	8	856	1983-84	222	183	143	15,923	11,220	78
1985	9	1,168	1984-85	203	166	132	10,757	8,377	63
1986	5	2,168	1985-86	136	133	107	10,751	7,052	66
1987	7	1,040	1986-87	138	134	98	7,406	5,772	59
1988	10	425	1987-88	71	58	40	3,573	2,724	68
1989	5	403	1988-89	139	115	94	7,945	6,126	65
1990	13	3,626	1989-90	136	118	107	16,635	12,152	114
1991	11	3,800	1990-91	119	104	79	9,295	7,366	93
1992	13	7,478	1991-92	158	105	105	15,051	11,736	112
1993	8	1,788	1992-93	88	79	37	1,193	1,097	30
1994	25	5,753	1993-94	118	95	71	4,894	4,113	58
1995	42	7,538	1994-95	166	131	97	7,777	5,426	56
1996	9	1,778	1995-96	84	44	35	2,936	1,679	48
1997	[f]	[f]	1996-97	38	22	13	1,617	745	57
1998	5	984	1997-98	94	73	64	20,327	8,622	135
1999	5	2,714	1998-99	95	80	71	10,651	7,533	106
2000	10	3,045	1999-00	98	64	52	9,816	5,723	107
2001	3	1,098	2000-01	50	27	12	366	256	21
2002	11	2,591	2001-02	114	101	67	8,805	3,669	55
2003	13	6,853	2002-03	107	73	64	9,052	4,140	65
2004 [g]	2	522	2003-04	96	77	41	1,775	1,181	29
2005	4	2,121	2004-05[h]	170	102	60	6,496	3,973	66
2006	[f]	[f]	2005-06	98	97	67	2,083	1,239	18
2007	8	3,313	2006-07	129	127	116	21,444	10,690	92
2008	9	5,796	2007-08	139	137	108	18,621	9,485	88
Avg 1978-2007	9	2,388	Avg 1977-2007	118	93	71	8,607	5,254	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] Confidential under AS 16.05.815.

[g] Confidentiality was waived by the fishermen.

[h] Permits were only given out of the Nome ADF&G office, except during the 2004-5 season, when permits were also given out in Elim, Golovin, Shaktoolik, and White Mountain.

Appendix E6.–Summer subsistence red king crab harvests, Norton Sound, Eastern Bering Sea, 2004 - 2008.

Year	No. Permits Issued	No. Permits Returned	No. Permits Fished	Total Crab Caught	Total Crab Harvested	Average No./ Permits Fished
2004	38	18	5	996	350	70
2005	14	12	4	753	304	76
2006	6	4	3	67	62	21
2007	19	19	5	1,425	1,008	202
2008	30	30	14	1,816	1,176	84
Avg 2004-2007	19	13	4	810	431	92

Appendix E7.–Size composition by percent of red king crab from winter research pots near Nome, Norton Sound, Eastern Bering Sea, 1983–2008.

	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
2007	16	53	78 [d]	11	11	22
2008	36	31	71 [d]	18	12	30

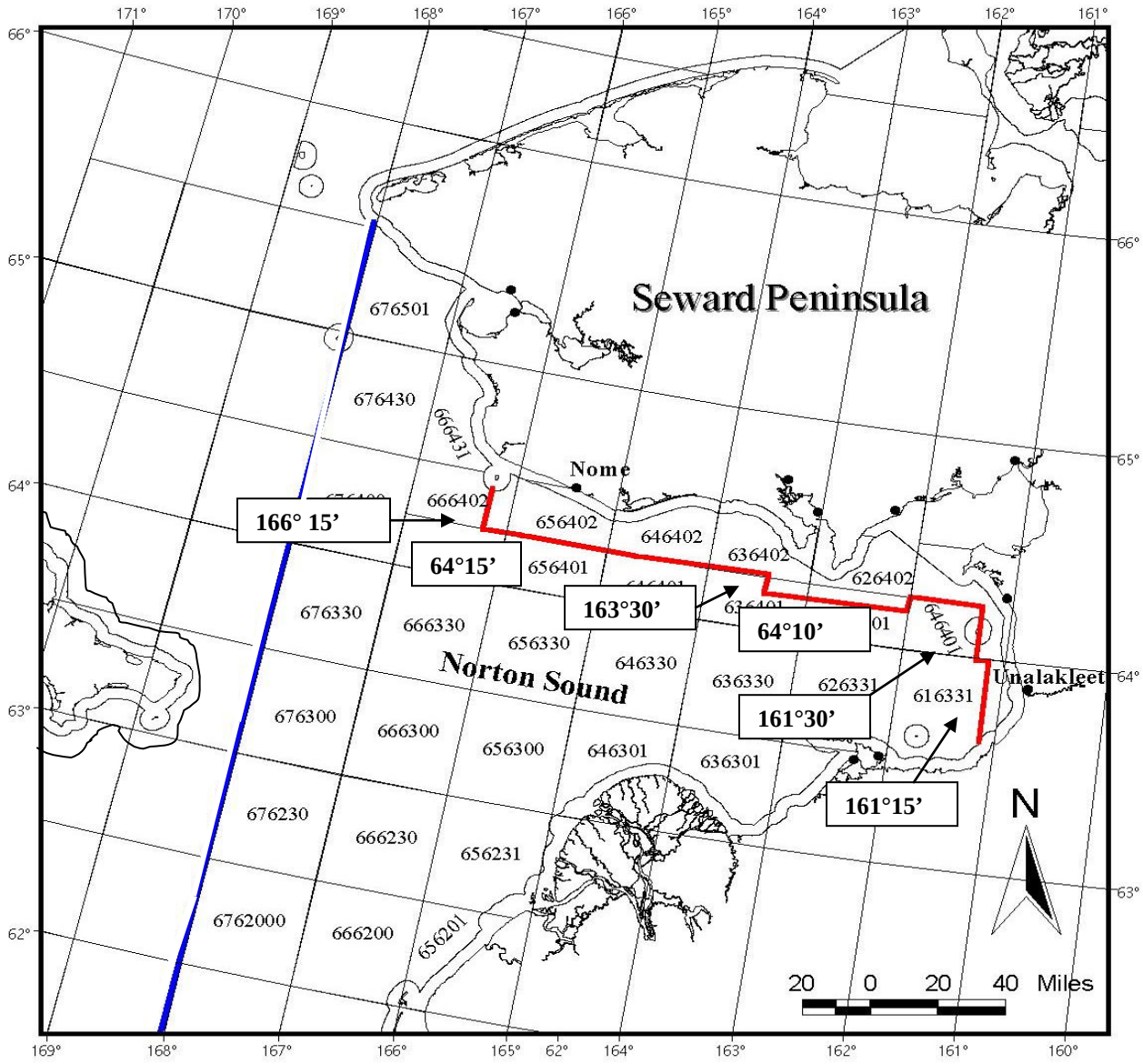
Note: Dashes indicate no data unless otherwise noted.

[a] Sublegals = male crab with less than 4.75 inch carapace width. Legals = male king crab with greater than 4.75 inch carapace width.

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

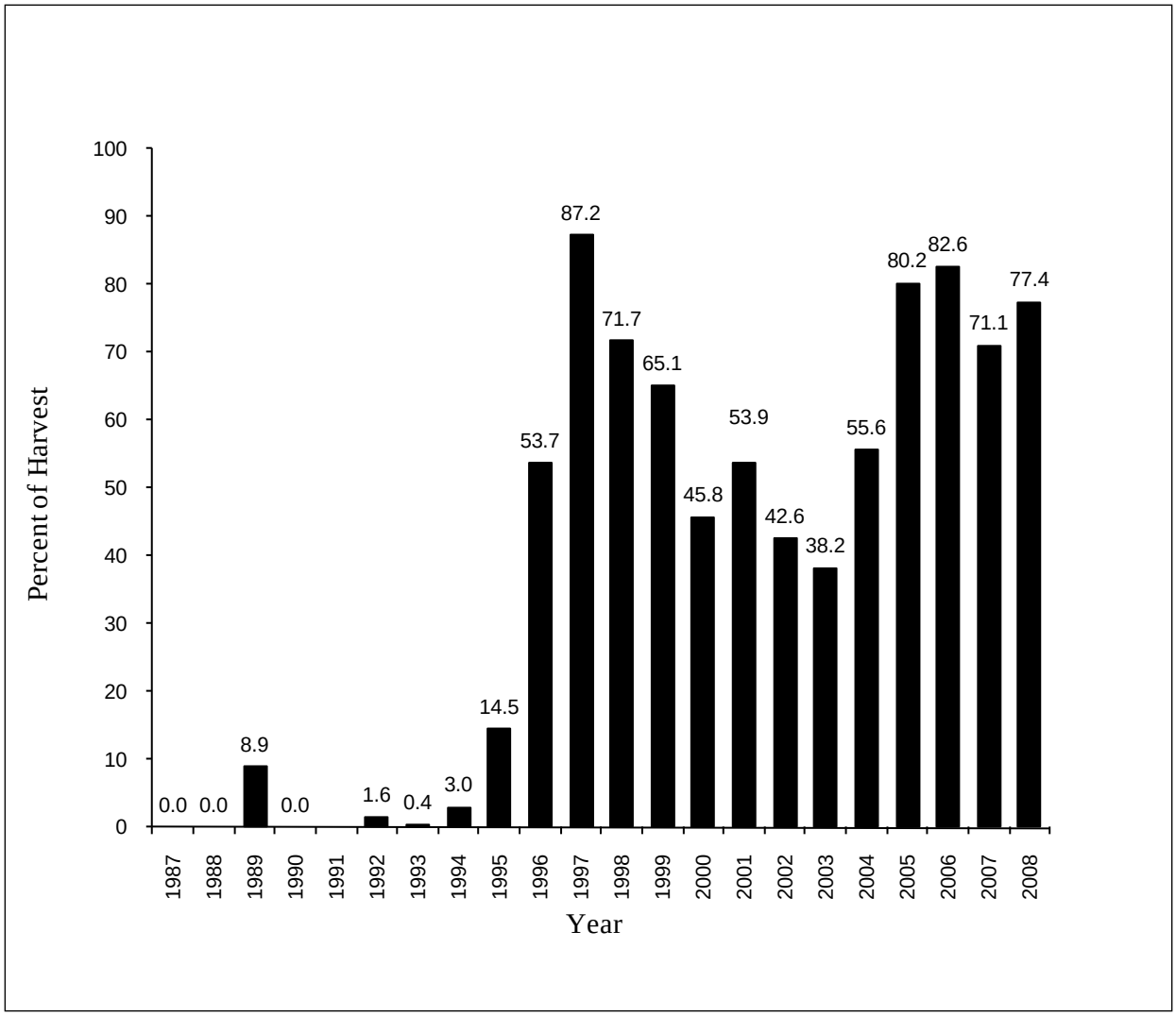
[c] No winter crab research study in 1992 or 1994.

[d] Includes prerecruit age three.

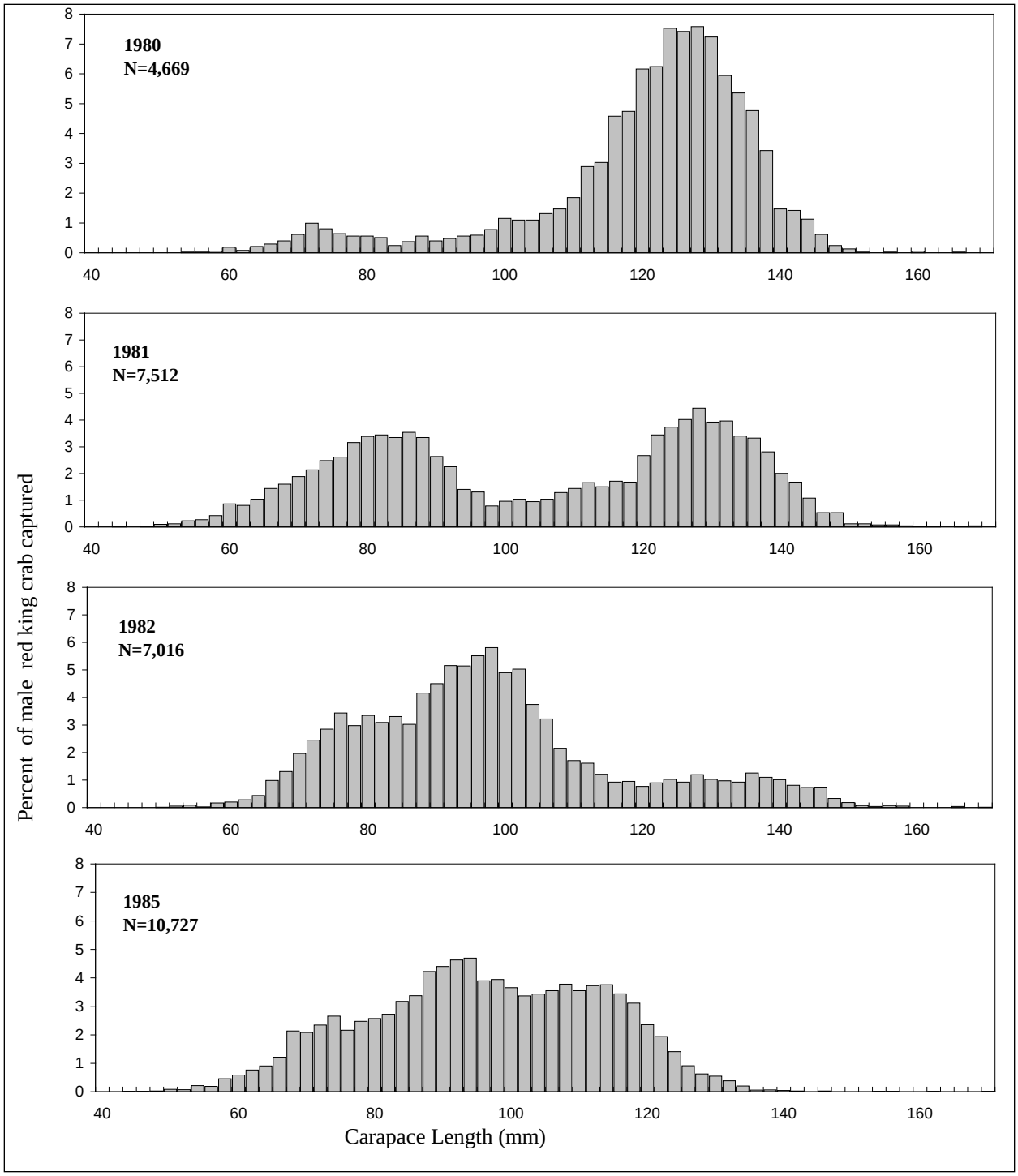


Note: Line drawn around the coastline delineates the 3-mile state waters zone, and outer line around St. Lawrence Island shows the 10-mile closure zone.

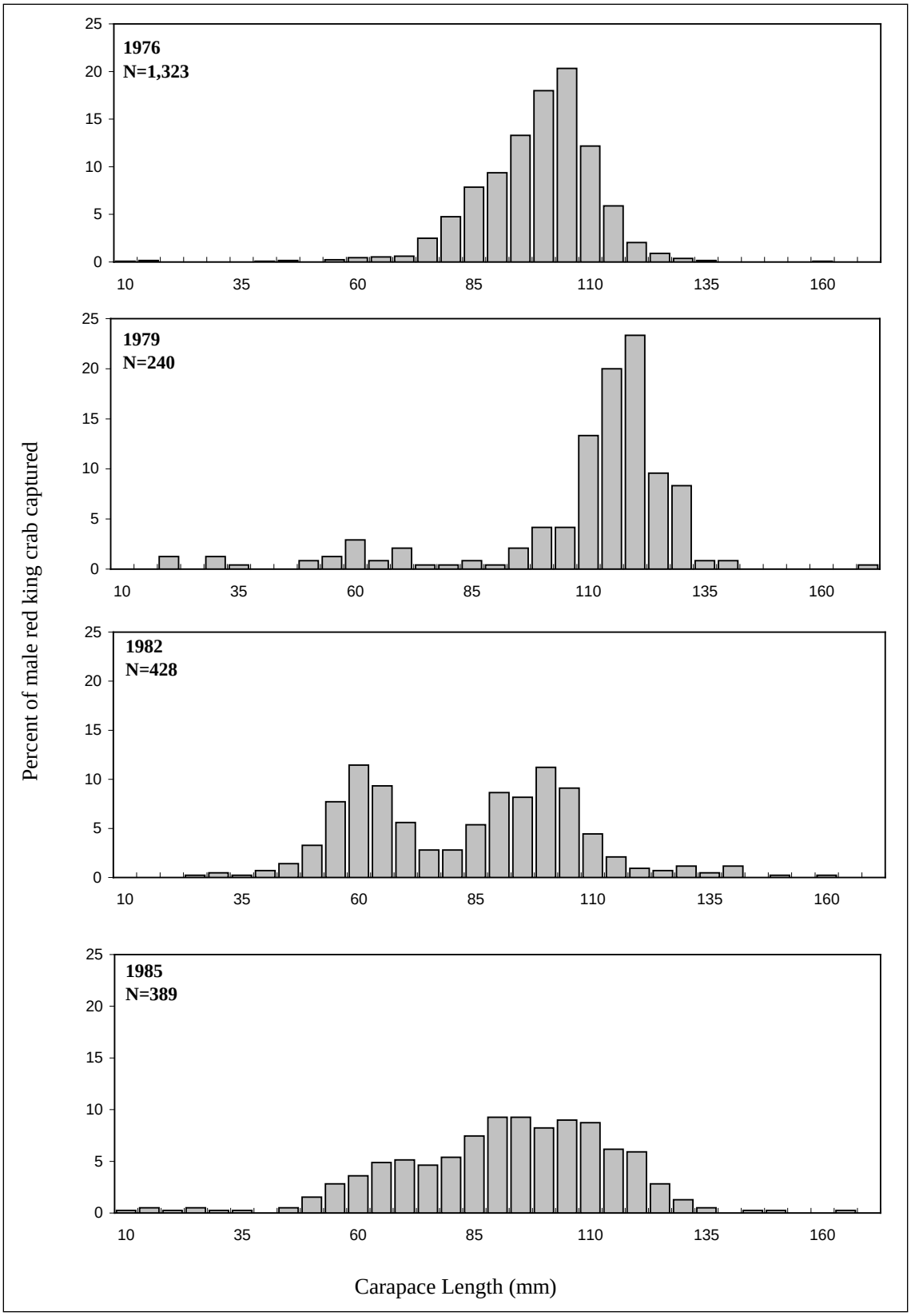
Appendix E8.–Closed water regulations in effect for the Norton Sound summer commercial crab fishery.



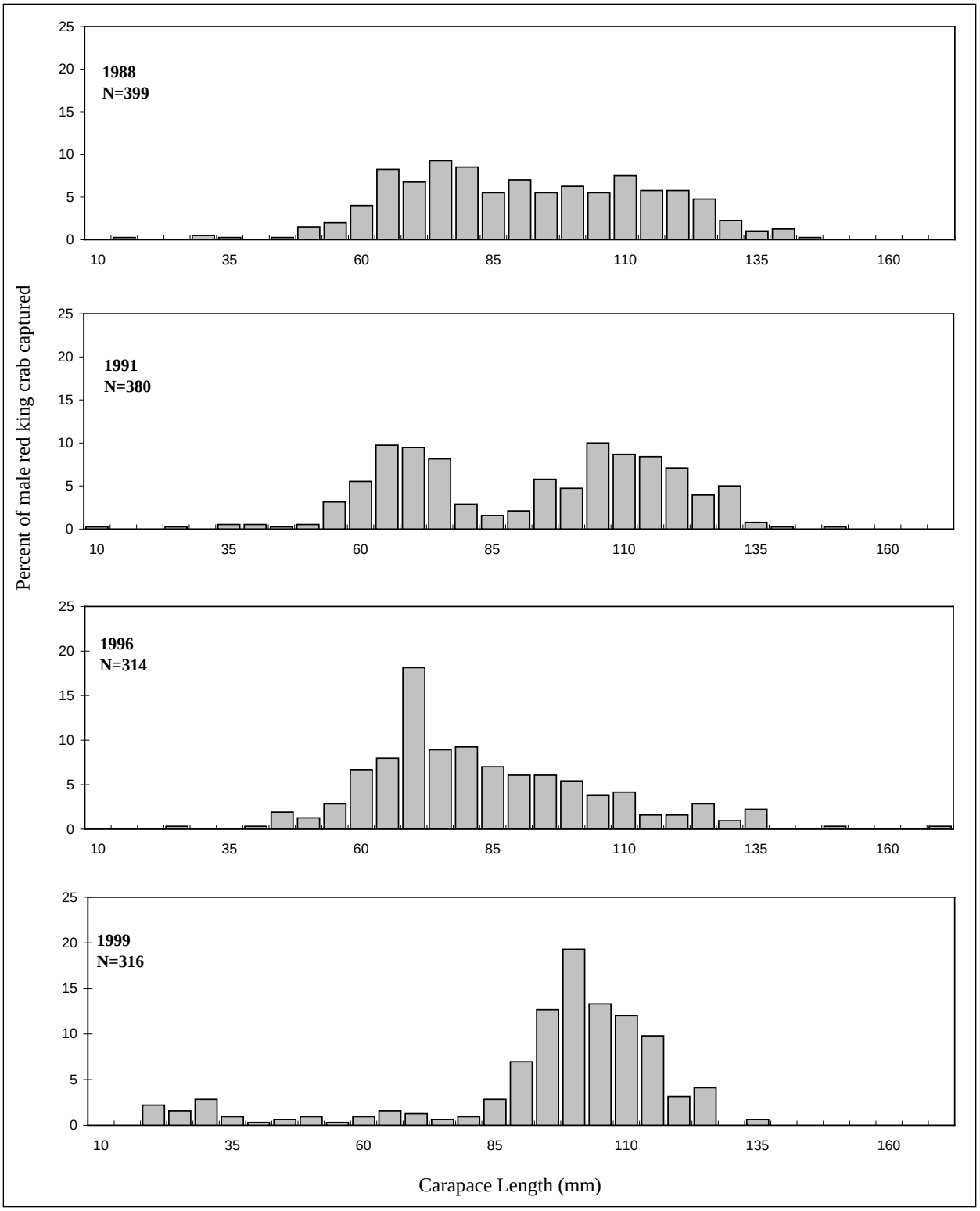
Appendix E9.–The percent of crab harvested during the Norton Sound summer commercial red king crab fishery east of 164º west longitude, 1987–2008.



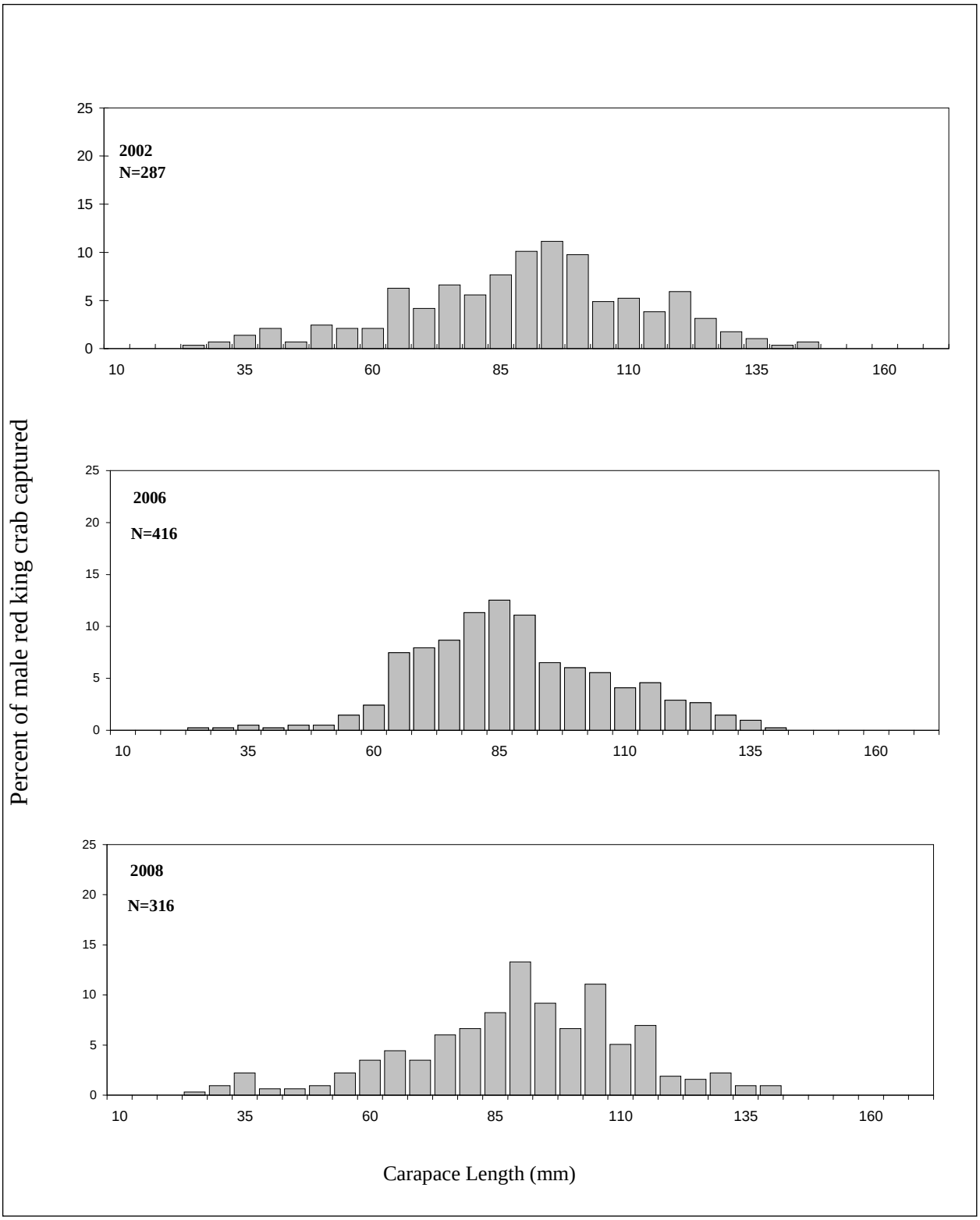
Appendix E10.–Norton Sound male red king crab size distribution from pot assessment surveys conducted by ADF&G in 1980, 1981, 1982, and 1985.



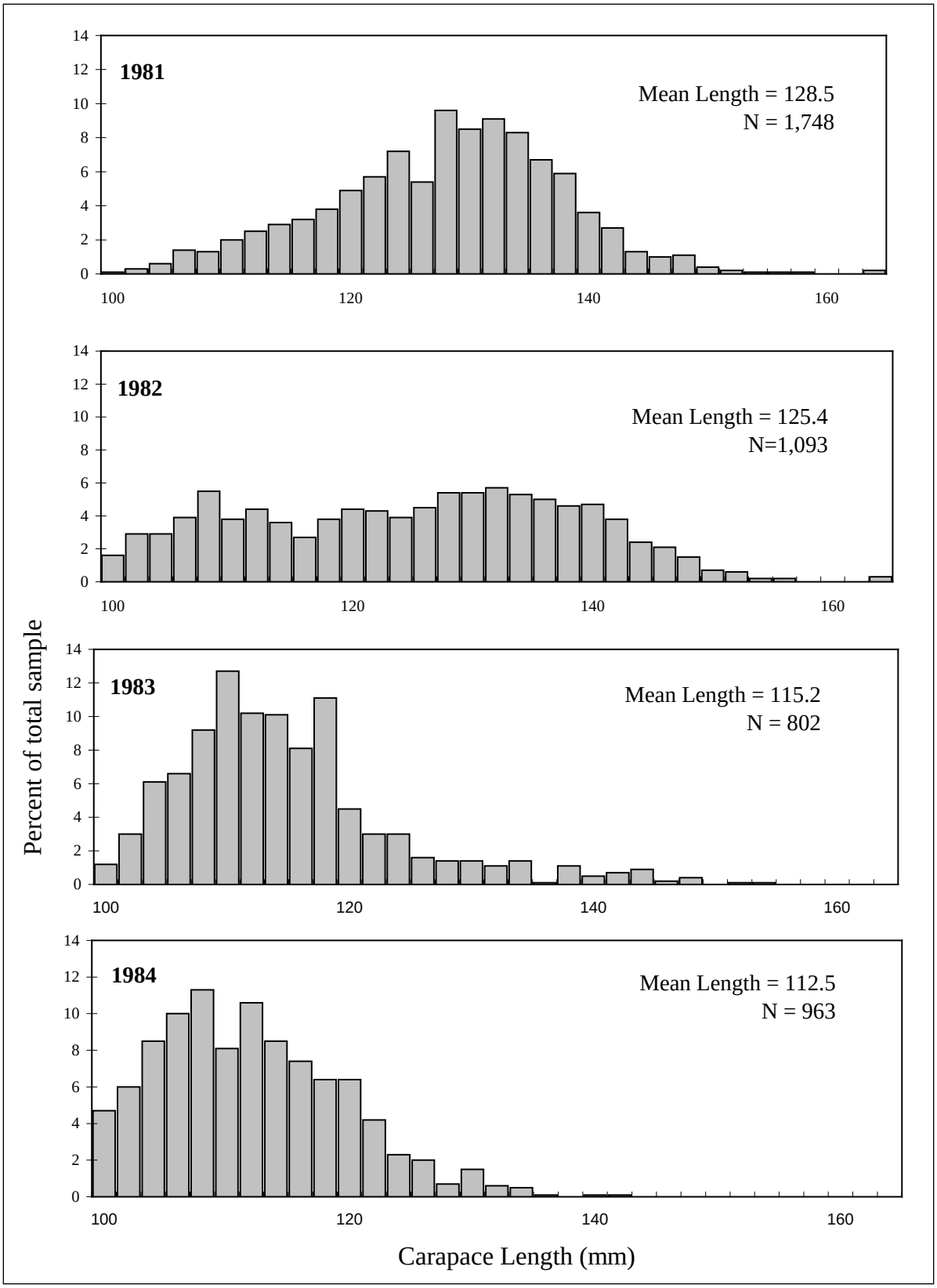
Appendix E11.–Norton Sound male red king crab size distribution from trawl assessment surveys conducted by the National Marine Fisheries Service, 1976, 1979, 1982, and 1985.



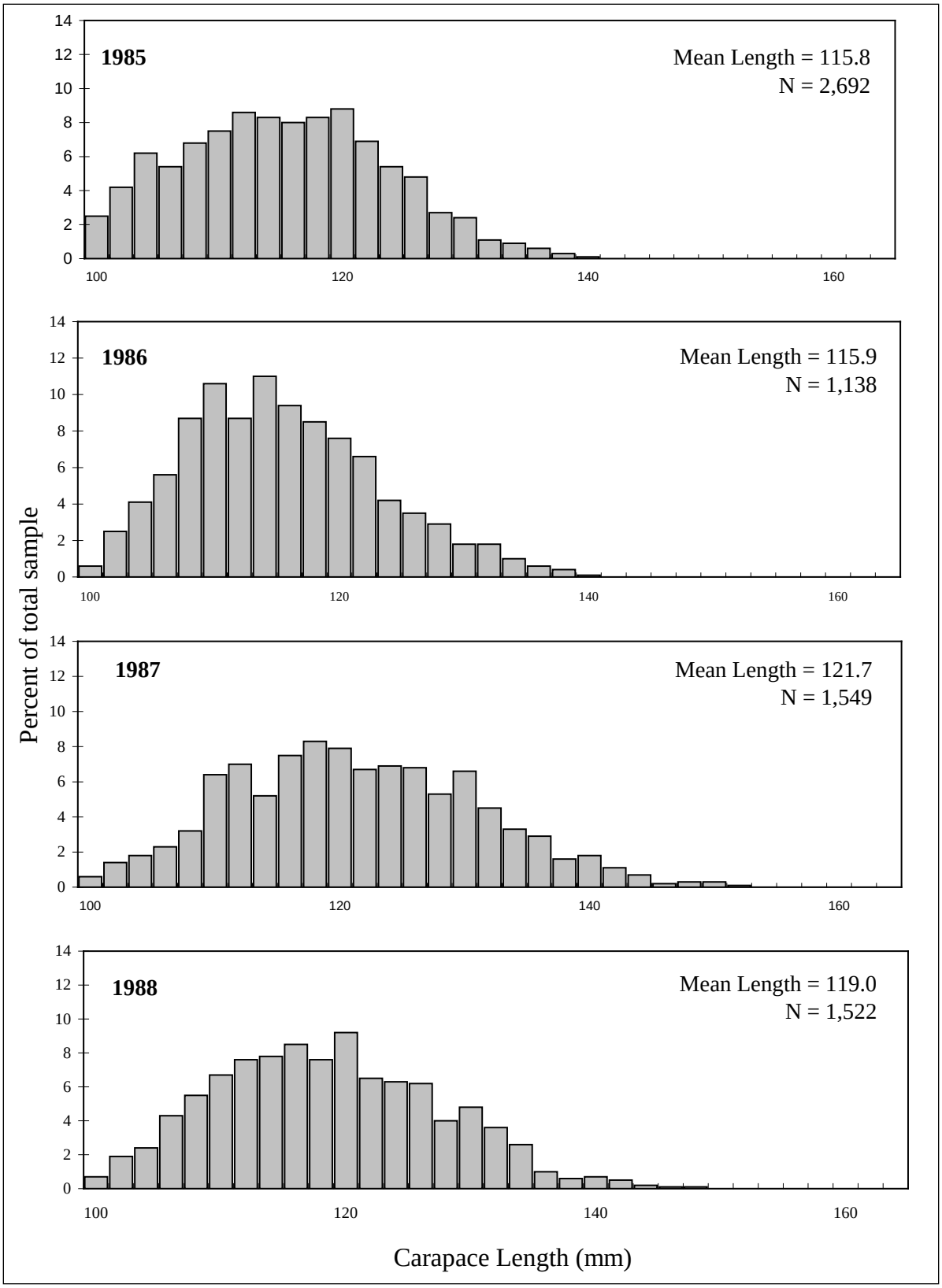
Appendix E12.–Norton Sound male red king crab size distribution from trawl assessment surveys conducted by the National Marine Fisheries Service in 1988 and 1991, and by ADF&G in 1996 and 1999.



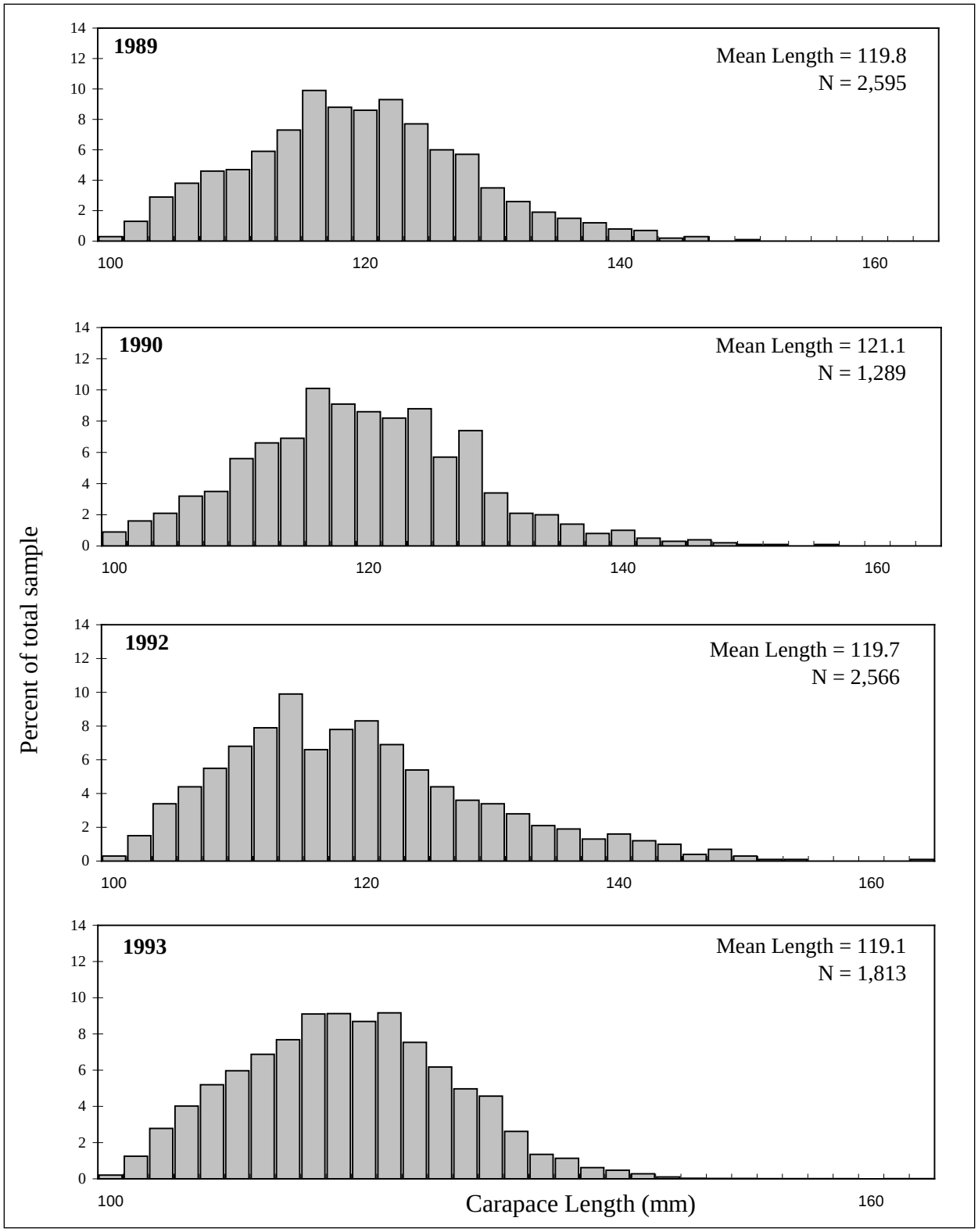
Appendix E13.–Norton Sound male red king crab size distribution from trawl assessment surveys conducted by ADF&G in 2002, 2006, and 2008.



Appendix E14.–Length composition of Norton Sound red king crab summer commercial harvests, 1981–1984.

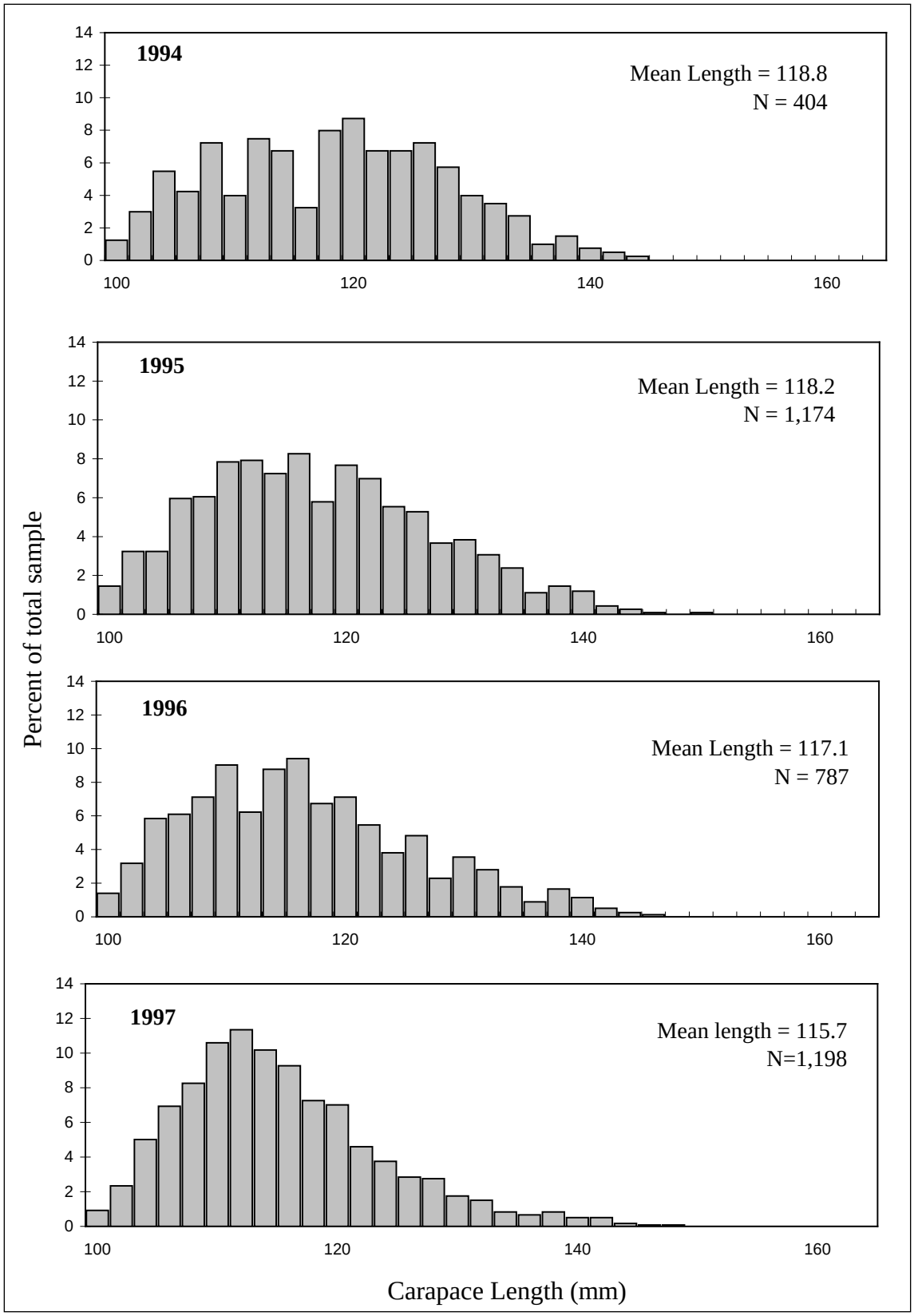


Appendix E15.–Length composition of Norton Sound red king crab summer commercial harvests, 1985–1988.

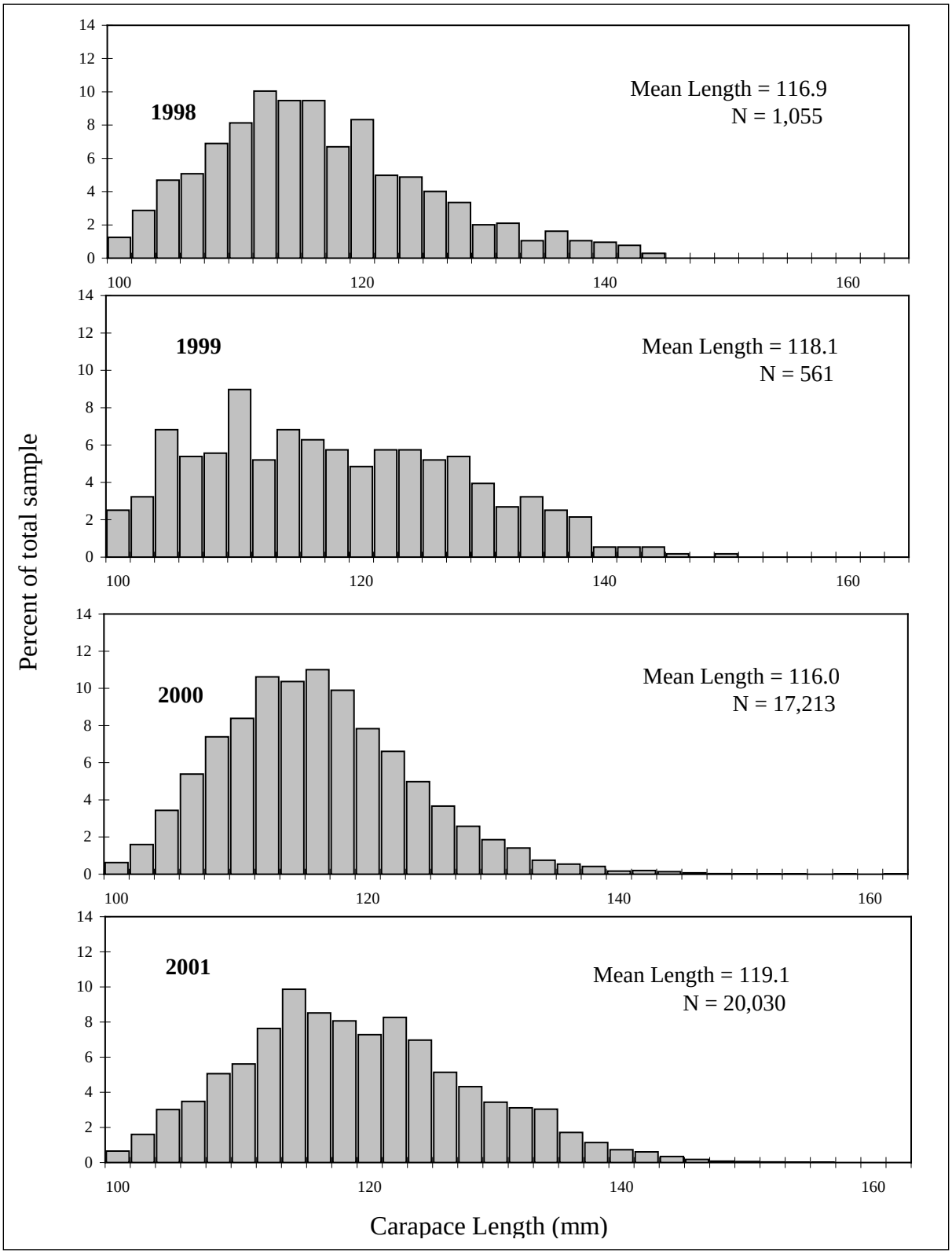


Note: No fishery in 1991.

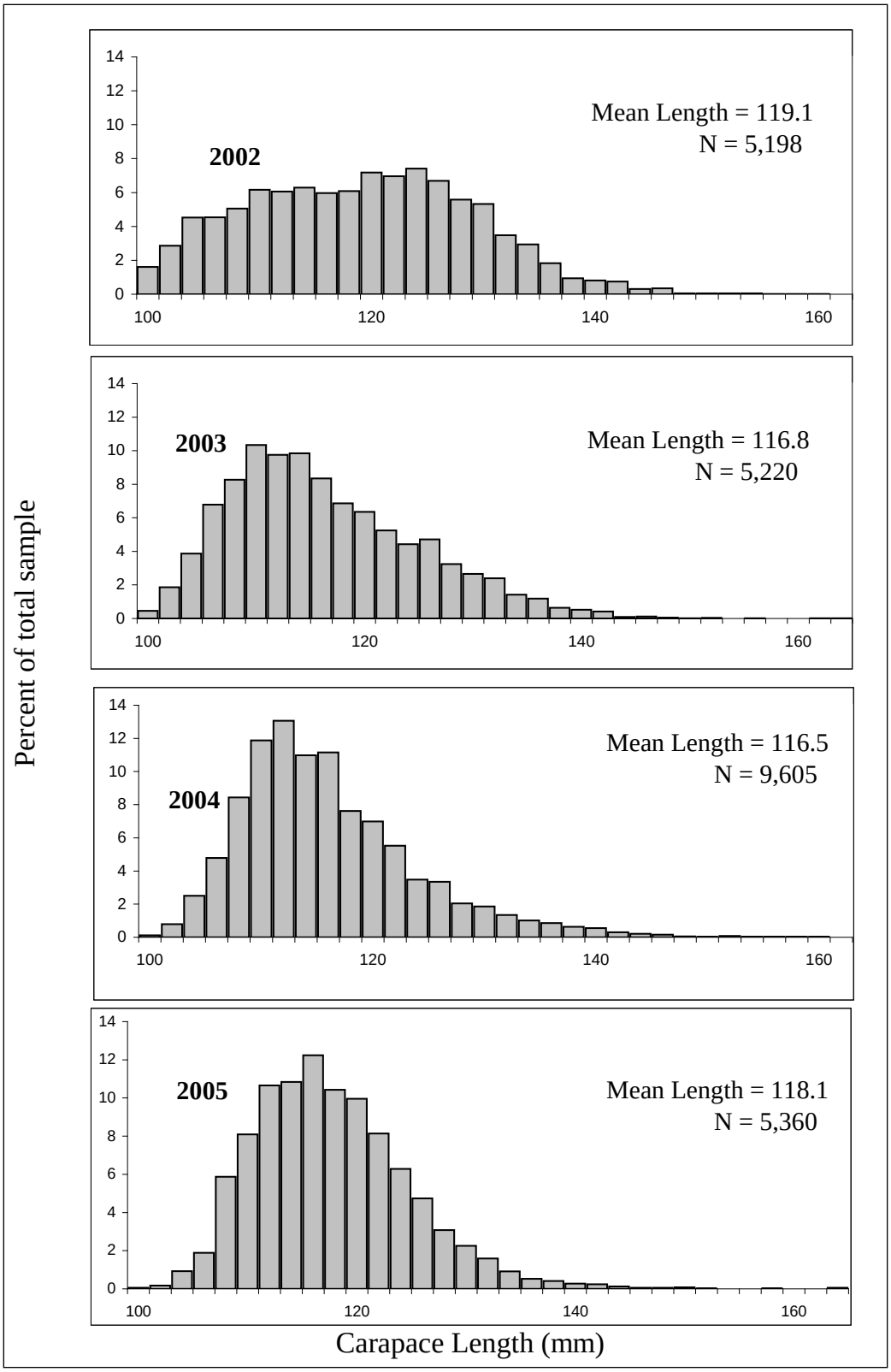
Appendix E16.–Length composition of Norton Sound red king crab summer commercial harvests, 1989–1993.



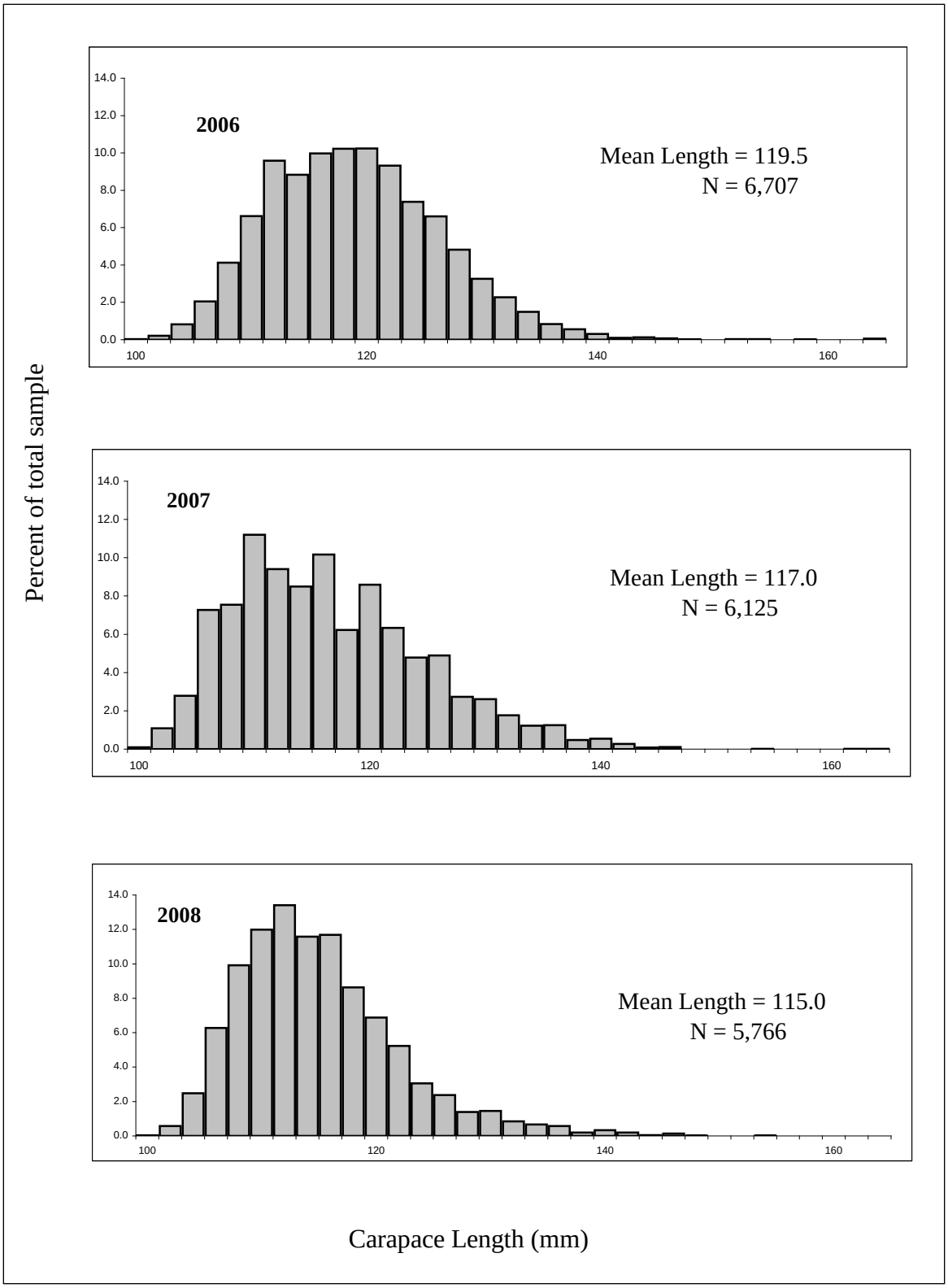
Appendix E17.–Length composition of Norton Sound red king crab summer commercial harvests, 1994–1997.



Appendix E18.–Length composition of Norton Sound red king crab summer commercial harvests, 1998–2001.



Appendix E19.–Length composition of Norton Sound red king crab summer commercial harvests, 2002–2005.



Appendix E20.–Length composition of Norton Sound red king crab summer commercial harvest, 2006–2008.

APPENDIX F: MISCELLANEOUS FISHERIES

Appendix F1.–Kotzebue District winter commercial sheefish harvest statistics, 1967–2008.

Year [b]	Number of Fishermen	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					
2006-08 [e]						

Note: Dashes indicate no data unless otherwise noted.

[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, 1966–2004.

Year[a,b]	Number of Fishermen Interviewed	Reported Harvest	Average Catch per Fishermen
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
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 [h]	440	10,163	20

Note: Subsistence surveys were not conducted from 1988 to 1990 and after 2004.

[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.

[h] Subsistence surveys were not conducted in the town of Kotzebue.

Appendix F3.–Non-salmon sport fish harvests in Norton Sound and Kotzebue/Chukchi Sea, 1978–2008.

	Norton Sound		Kotzebue / Chukchi Sea		
Year	Dolly Varden	Arctic Grayling	Dolly Varden	Arctic Grayling	Inconnu/ Sheefish
1978	1,690	-	199	-	506
1979	-	-	1,772	-	709
1980	5,811	-	301	-	1,713
1981	3,981	-	1,177	-	1,263
1982	6,498	-	1,531	-	2,222
1983	9,779	-	2,192	-	2,079
1984	4,260	-	3,804	-	3,050
1985	5,695	-	1,557	-	1,645
1986	5,381	-	1,300	-	3,363
1987	5,506	-	1,072	-	1,836
1988	4,437	4,928	983	-	964
1989	7,003	4,205	999	-	629
1990	3,765	1,378	806	622	151
1991	10,365	5,121	1,149	1,981	603
1992	2,382	492	582	968	1,904
1993	5,907	1,584	914	916	1,029
1994	3,071	1,331	2,365	814	564
1995	2,908	1,037	939	910	1,142
1996	4,285	1,485	913	2,136	485
1997	4,467	1,262	598	1,903	906
1998	2,240	298	440	1,788	414
1999	6,708	1,600	796	1,247	635
2000	7,952	1,203	1,599	1,233	1,201
2001	3,174	994	1,693	1,244	1,305
2002	2,252	1,565	1,884	1,994	500
2003	5,531	1,778	533	1,473	2,509
2004	4,318	824	1,285	1,983	1,634
2005	3,063	595	239	269	393
2006	3,180	419	2,328	760	810
2007	2,808	314	2,924	836	1,066
2008	3,319	965	852	293	61
Average					
1998-2007	4,123	1,712	1,372	1,283	1,047
2003-2007	3,780	2,293	1,462	1,064	1,282

Note: Dashes indicate data not available for all years.

Appendix F4.–Kotzebue District incidentally caught and sold Dolly Varden during the commercial salmon fishery, 1966–2008.

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]	-
2007	0	960	0	[i]	-
2008	0	1,629	0	[i]	-

Note: Dashes indicate data not available unless otherwise noted.

[a] Estimate includes fish caught but not sold based on interviews of fishermen 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 F5.–Subsistence harvests of Dolly Varden from the villages of Kivalina and Noatak, 1959–2007.

	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	-	-	-
2000 [g]	-	-	3,315
2001 [g]	-	-	2,702
2002 [g]	-	-	3,242
2003 [g]	-	-	6,386
2004 [g]	-	-	11,697
2007 [g]	20,527	67,739	10,234

Note: Subsistence surveys were not conducted in 1961, 1964-1967, 1974-1978, 2004-2006, and after 2007. Dashes indicate no data.

[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 fishermen just beginning to beach seine at the time of this survey.

Appendix F6.–Dolly Varden sport fish harvests in Norton Sound, by river, 1988–2008.

	Areas									
Year	Marine Water	Nome	Pilgrim	Unalakleet	Fish-Niukluk	Sinuk	Snake	Solomon	Other Streams	Total
1988	418	2,001	327	891	0	-	-	-	1,218	4,855
1989	55	3,551	603	570	734	-	-	-	1,545	7,058
1990	183	1,078	166	614	348	-	-	-	1,227	3,616
1991	0	1,220	856	1,474	1,474	729	1,252	2,219	1,141	10,365
1992	204	557	131	746	270	139	115	131	89	2,382
1993	205	917	448	427	1,003	536	331	893	1,050	5,810
1994	90	431	63	410	699	305	117	197	759	3,071
1995	0	462	74	976	346	158	131	366	395	2,908
1996	12	873	388	1,506	402	485	97	49	473	4,285
1997	189	328	65	936	1,071	346	81	186	265	3,467
1998	0	302	14	588	160	311	0	383	482	2,240
1999	330	791	45	2,384	1,952	88	44	154	920	6,708
2000	1,069	340	0	4,462	1,687	59	199	0	136	7,952
2001	166	43	270	1,002	1,197	86	108	162	140	3,174
2002	67	511	72	789	259	47	18	18	471	2,252
2003	0	1,223	482	134	110	712	13	0	2,857	5,531
2004	72	226	0	3,593	120	42	0	53	212	4,318
2005	95	553	12	500	1,148	141	27	0	141	2,617
2006	0	959	0	1,307	0	531	51	153	179	3,180
2007	14	625	0	731	193	144	461	481	159	2,808
2008	0	14	0	1,062	1,061	107	46	0	997	3,319
Average										
1998-2007	181	557	90	1,549	683	202	92	140	570	4,064
2003-2007	36	717	99	1,253	314	285	110	137	710	3,662

Note: Dashes indicate data not available.

Appendix F7.–Aerial survey counts of overwintering and spawning Dolly Varden in the Kotzebue District, 1968–1969, and 1976–2008.

		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]
2007	- [f]	99,311	- [f]
2008	- [f]	71,493	- [f]

Note: Dashes indicate data not available unless otherwise noted.

[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 F8.–Subsistence whitefish catch and effort in the Kotzebue District, 1970–1971, 1977–1993, and 1997–2004.

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

Note: Subsistence surveys were not conducted after 2004. Dashes indicate no data unless otherwise noted.

[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: OVERVIEW OF 2008

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, 2008.

HERRING

Herring Test Fishing

a) Location: Norton Sound ocean waters; field camp at Cape Denbigh.

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 three miles upstream from village of Unalakleet at first bluff.

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 five miles upstream from mouth.

b) Description: Determine daily and seasonal timing and magnitude of salmon escapements. Determine age, sex and length of Chinook and chum salmon in the Kwiniuk River escapement. ADF&G project with additional funding from NSEDC.

Niukluk River Tower

a) Location: Niukluk River, approximately one mile upstream from mouth.

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

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North River Tower

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

b) Description: Determine daily and seasonal timing and magnitude of salmon escapements. Cooperative project operated by Unalakleet IRA, NSEDC, and ADF&G.

Eldorado River Weir

a) Location: Eldorado River, approximately 18 miles upstream from the Safety Sound highway bridge, and approximately 3 miles above the furthest upstream connecting channel to the Flambeau River.

b) Description: Determine daily and seasonal timing and magnitude of chum and pink salmon escapements. Midseason, counting tower converted to a fixed weir. Cooperative project operated by NSEDC and ADF&G.

Glacial Lake Weir

a) Location: At outlet of Glacial Lake.

b) Description: Determine daily and seasonal timing and magnitude of sockeye salmon escapement. 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 salmon escapement. 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 NSEDC.

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 NSEDC and ADF&G.

Snake River Weir

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

b) Description: Determine daily and seasonal timing and magnitude of salmon escapements. Cooperative project operated by ADF&G and NSEDC.

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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. Fertilization of Salmon Lake. Cooperative project operated by ADF&G and NSEDC.

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 and LGL project.

Fish River Coho Salmon Smolt Abundance

a) Location: Fish 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, ADF&G and LGL project.

Mist Incubation and Egg Planting Project

a) Location: Snake and Solomon Rivers.

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

Subsistence Salmon Fishing Surveys

a) Location: Norton Sound District.

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. Koyuk, Shaktoolik, and Unalakleet were surveyed by Commercial Fisheries Division. ADF&G project.

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CRAB

Near shore Winter King Crab Study

a) Location: Ocean waters of Norton Sound, 1 to 1.5 miles south of Nome and 13 miles west to 47 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 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. Cooperative ADF&G and NSEDC project with financial assistance from the National Oceanic and Atmospheric Administration (NOAA).

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Appendix G3.–Commercial processors and buyers operating in Norton Sound, Port Clarence, and Kotzebue Sound, 2008.

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, 2008.

NORTON SOUND 2008 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? o YES o NO
   (Include fishing with a rod and reel)
2. Does your household usually subsistence fish for salmon? o YES o NO

FOR SALMON FISHING HOUSEHOLDS ONLY ("Yes" to #1)

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.

	Number of Salmon your household harvested (by gear type)			Of your TOTAL harvest, how many salmon were caught JUST for dog food?
SPECIES	Subsistence gill net or seine (# of fish)	Rod & Reel (# of fish)	Kept from commercial fishing (# of fish)	(# of fish)
Chum salmon (dog)				
Chinook salmon (king)				
Pink salmon (humpy)				
Sockeye salmon (red)				
Coho salmon (silver)				

4. How was subsistence chum salmon fishing for your household this year ?
   o VERY GOOD o AVERAGE o POOR
   IF POOR, why? _____
5. Does anyone in your household trade or barter subsistence-caught fish with people in other households or communities?
   o YES o NO
6. Comments or Suggestions?

RED KING CRAB

Emergency Order: 3-C-Z-01-08 Effective Date: June 23, 2008

EXPLANATION: This emergency order opens the commercial crab fishery in Norton Sound from 12:00 noon Monday, June 23 until 12:00 noon Wednesday, September 3.

JUSTIFICATION: By regulation the commercial crab fishery can open anytime from June 15 through September 3. The ice has cleared out from the majority of Norton Sound and the previous concerns about lost pot gear because of ice conditions are no longer valid. The guideline harvest level for the 2008 Norton Sound open access crab fishery is 381,100 pounds.

Emergency Order: 3-C-Z-02-08 Effective Date: August 17, 2008

EXPLANATION: This emergency order opens the commercial CDQ king crab fishery and closes the commercial open access crab fishery in Norton Sound. Permit holders not participating in the CDQ crab fishery must have pots unbaited and secured open by 12:00 noon, Monday, August 18 and removed from the water by 12:00 noon Saturday, August 23, 2008.

JUSTIFICATION: The guideline harvest level for the 2008 Norton Sound open access crab fishery is 381,100 pounds. Through August 12, there were 336,326 pounds reported harvested. There are currently 15 vessels still fishing and the quota is expected to be reached by 12:00 noon Monday, August 18. The CDQ commercial crab fishery will begin at noon, August 17, allowing a transition to those CDQ fishing no down time from having their crab pots fishing. The quota for the CDQ crab fishery is 30,900 pounds. Those not fishing the CDQ fishery must have their crab pots unbaited and secured open by noon, Monday, August 18. All open access commercial crab pots must be delivered by noon, Tuesday, August 19. Except for CDQ crab pots, all commercial crab pots must be removed from the water by noon, Saturday, August 23, 2008. Permit holders are advised to check weather forecast and pull pots earlier if necessary, or make arrangements with other vessels in the event of mechanical difficulties.

HERRING

Emergency Order: 3-H-Z-1-08 Effective Date: June 10, 2008

EXPLANATION: This emergency order opens the Norton Sound District to commercial gillnet herring fishing beginning 12 a.m. Tuesday, June 10, 2008 until July 1, 2008, unless superseded by another emergency order.

JUSTIFICATION: Herring were first sighted by aerial survey on June 5th in the St. Michael and Unalakleet Subdistricts. NSEDC biologists observed approximately 12,200 tons of herring and 5 miles of spawn with the vast majority in the St. Michael Subdistrict. Poor viewing conditions precluded a complete survey of Subdistricts 2 and 3. The quota this year for the Norton Sound

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District is over 7,000 tons of herring. No buyers are interested in herring for sac roe, but one buyer is interested in purchasing 100 tons of herring for use as bait. To allow maximum flexibility for the buyer the department will open the fishery for the remainder of the month unless superseded by another emergency order. The limited commercial harvest will not jeopardize the herring resource.

KOTZEBUE SALMON

Emergency Order: 3-S-X-01-08 Effective Date: July 14, 2008

EXPLANATION: This emergency order opens commercial fishing in the Kotzebue District until September 1, 2008. Commercial permit holders may fish at any time a market is available for their catch.

JUSTIFICATION: One major commercial salmon buyer has registered to purchase Kotzebue chum salmon this season. The buyer has limited quantities of ice and airline schedules 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 as soon as the plant is ready for operations. The earliest the buyer expects the plant to be ready is on July 14. 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, 2008. 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.

NORTON SOUND SALMON

Emergency Order: 3-S-Z-01-08 Effective Date: June 15, 2008

EXPLANATION: This emergency order sets the subsistence salmon fishing schedule for the Nome Subdistrict and catch limits for the Nome Subdistrict, and Pilgrim and Kuzitrin Rivers in the Port Clarence District.

JUSTIFICATION: Since 1991, with the exception of 2006 and 2007, 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

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to the taking of chum salmon except for Tier II permit holders. The department forecast for 2008 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. The last four 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 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, Eldorado and Pilgrim 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. By regulation the subsistence gillnet fishing schedule for the Nome Subdistrict begins on June 15th.

Emergency Order: 3-S-Z-02-08 Effective Date: June 30, 2008

EXPLANATION: In order to conserve Chinook salmon, effective 8:00 a.m. Monday, June 30, subsistence salmon fishing in the Unalakleet River will be restricted to gillnets not exceeding 25 fathoms in length with a stretched mesh size of no more than 6 inches. These restrictions will remain in effect until further notice. Subsistence salmon fishing in the Unalakleet River may only occur during the weekly fishing schedule from 8 a.m. Monday until 8 p.m. Tuesday and 8 a.m. Friday until 8 p.m. Saturday.

JUSTIFICATION: Chinook salmon were declared a stock of yield concern in 2004 in Subdistricts 5 and 6. Escapement goals have only been reached during 5 seasons since goals were established in 1999. Preliminary run strength and timing indicators suggest that the Chinook salmon run will once again be weak and late this season. The Unalakleet River test net catch of 19 Chinook is well below the recent 5, 10 and 20-year historical averages for June 28. In addition, there have only been 30 Chinook enumerated at the North River tower as of June 28, which is also well below the average passage for this date. Escapement goals were achieved in 2007, but only as a result of a restricted subsistence fishing schedule and an early closure to the subsistence and sport fisheries. Although escapements were met, concerns remain with the quality of the Unalakleet River Chinook salmon escapement in recent years. Females represented 45% of the test net catch from 1985-1999, but only 20% since 2000. Additionally, the percentage of age-5 and older Chinook comprised nearly 75% of the catch from 1985-1999, but only 60% of the samples from 2000-2007, and only 40% of the test net catch since 2004. In 2007, Chinook salmon were captured using beach seines in the Unalakleet River several miles upstream from subsistence fishing areas. The age structure of the seined samples was 70% age-4 and 30% age-5 and older, and only 12% of the fish captured were females. Subsistence fishermen have also communicated that the average size of their subsistence Chinook has declined in recent years. Taken collectively, this information suggests that major changes to the age, sex and size structure may be occurring with respect to Unalakleet River Chinook. More importantly, such changes could have lasting negative effects on the productivity of the population, which may be a contributing factor to the precipitous declines in Chinook returns in recent years. The majority of relatively large and more gravid female Chinook salmon is entering the Unalakleet River from late June through mid July. Previous observations suggest that these fish will spend 7-10 days milling in the lower Unalakleet River before actively migrating upstream to spawning areas.

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Unfortunately, this prolonged milling behavior increases the probability of their interception by set gillnets. Marine subsistence catches were weak in the Unalakleet Subdistrict from June 16-June 25. However, it seems that the first major pulse of Chinook has entered the Unalakleet Subdistrict, evident by improved subsistence catches during the most recent 48-hour fishing period. These proactive mesh-size restrictions are therefore being implemented so that the majority of the large females will be protected as this pulse of fish enters the Unalakleet River. Commensurate increases in Chinook test net catches and North River tower escapements are expected in the coming days. The department will closely monitor catch and escapement information in the coming days to determine if additional action is necessary to conserve Chinook salmon and meet escapement needs.

Emergency Order: 3-S-Z-03-08 Effective Date: July 1, 2008

EXPLANATION: This emergency order opens the Golovnin Bay and Norton Bay Subdistricts of the Norton Sound District to commercial salmon fishing for 12 hours from 8:00 a.m. until 8:00 p.m. Tuesday, July 1.

JUSTIFICATION: The Golovnin Bay Subdistrict management plan in regulation allows for the commercial fishery to harvest up to 15,000 chum salmon by July 15, if subsistence needs and escapement will not be jeopardized. Norton Bay Subdistrict does not have a management plan in regulation. However, like all areas the department does manage for sustained yield and for a priority to subsistence fishermen. The Moses Point Subdistrict is between Golovnin Bay and Norton Bay and the crew at the escapement counting tower on the Kwiniuk River, in Moses Point, counted over 66,000 pink salmon past the tower the last two days. The pink escapement far exceeds the escapement goal of 8.400 pink salmon. The commercial salmon fishery starting July 1 in the Golovnin Bay Subdistrict is the first one since 2001 and in Norton Bay Subdistrict the commercial salmon fishery is the first one since 1997. As this is the first opener in years the likely number of commercial fishermen will be in the single digits. With little effort expected and still early in the chum and pink runs commercial fishing should not jeopardize subsistence fishing or escapement.

Emergency Order: 3-S-Z-04-08 Effective Date: July 1, 2008

EXPLANATION: This emergency order opens the Grantley Harbor Subdistrict of the Port Clarence District to commercial salmon fishing for 12 hours from 10:00 a.m. until 10:00 p.m. Tuesday, July 1.

JUSTIFICATION: Subsistence fishermen in the two villages in Port Clarence have been catching salmon for a week. As of June 29, no salmon have yet passed by the Pilgrim River weir, but last year the first day of sockeye passage was July 2 and in 2006 the first day of sockeye passage was July 5. The in-river goal for a commercial fishery is 30,000 sockeyes for the Pilgrim River and the department has forecasted 30 to 40 thousand sockeyes past the weir this year. The recent five-year average quarter point of sockeye passage at the weir is July 9 and the five-year average midpoint of sockeye passage at the weir is July 15. The Port Clarence commercial sockeye

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salmon guideline harvest range is 0-10,000 sockeye salmon. Since 2004, the combined subsistence harvest from Port Clarence and Pilgrim River has averaged about 10,000 sockeyes. Little commercial fishing effort is expected and likely only one or two permit holders are expected to participate. With little effort expected and still early in the sockeye run commercial fishing should not jeopardize subsistence fishing or escapement.

Emergency Order: 3-S-Z-05-08 Effective Date: July 3, 2008

EXPLANATION: This emergency order opens the Golovnin Bay and Norton Bay Subdistricts of the Norton Sound District to commercial salmon fishing for 12 hours from 12:00 p.m. until midnight, Thursday, July 3.

JUSTIFICATION: The Golovnin Bay Subdistrict management plan in regulation allows for the commercial fishery to harvest up to 15,000 chum salmon by July 15, if subsistence needs and escapement will not be jeopardized. Norton Bay Subdistrict does not have a management plan in regulation. However, like all management areas the department does manage for sustained yield and for a priority to subsistence fishermen. The crew at the escapement counting tower on the Kwiniuk River, between Golovnin Bay and Norton Bay has counted over 160,000 pink salmon past the tower this season. The pink escapement far exceeds the escapement goal of 8.400 pink salmon. This will be the second 12-hour commercial opening this season. During the first opening the nets were restricted to 6 inches or less and some fishermen fished 4 ½ inch mesh to target pinks. The catch was 7 kings, 394 chums and 2,475 pinks for 5 permit holders. For this opening nets are restricted to 4 ½ inches or less to target pink salmon. With the limited fishing effort to date and net restrictions to target pink salmon the commercial fishery should not jeopardize escapement or subsistence needs.

Emergency Order: 3-S-Z-06-08 Effective Date: July 4, 2008

EXPLANATION: This emergency order opens the Grantley Harbor Subdistrict of the Port Clarence District to commercial salmon fishing for 12 hours from 12:00 a.m. until 12:00 p.m. Friday, July 4.

JUSTIFICATION: Subsistence fishermen in the two villages in Port Clarence have been catching salmon for nearly two weeks. As of July 2, only one pink salmon and no sockeye salmon have passed by the Pilgrim River weir. Last year the first day of sockeye passage was July 2 and in 2006 the first day of sockeye passage was July 5. The in-river goal for a commercial fishery is 30,000 sockeyes for the Pilgrim River and the department has forecasted 30 to 40 thousand sockeyes past the weir this year. The recent five-year average quarter point of sockeye passage at the weir is July 9 and the five-year average midpoint of sockeye passage at the weir is July 15. The Port Clarence commercial sockeye salmon guideline harvest range is 0-10,000 sockeye salmon. Since 2004, the combined subsistence harvest from Port Clarence and Pilgrim River has averaged about 10,000 sockeyes. Little commercial fishing effort is expected and likely only one or two permit holders are expected to participate. The first 12 hour commercial period on July 1 only harvested 17 red, 46 chum, and 12 pink salmon. With little effort expected and still early in the sockeye run commercial fishing should not jeopardize subsistence fishing or escapement.

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Emergency Order: 3-S-Z-07-08 Effective Date: July 5, 2008

EXPLANATION: Effective 6:00 p.m. Saturday July 5, the marine waters of Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, will be closed to subsistence salmon fishing with gillnets. This Emergency Order also closes subsistence salmon fishing with gillnets in the Unalakleet River drainage effective 8:00 p.m. Saturday, July 5. The weekly salmon gillnet fishing schedule in both the marine waters of Subdistricts 5 and 6, and the freshwaters of the Unalakleet River drainage is suspended until further notice. This emergency order also opens all fresh waters of Subdistrict 5, the Shaktoolik Subdistrict, and Subdistrict 6, the Unalakleet Subdistrict, to beach seining for salmon other than Chinook salmon 7 days a week effective 8:00 p.m. Saturday July 5.

JUSTIFICATION: Chinook salmon runs in eastern Norton Sound are developing late, but current assessment information also indicates that they exhibiting weak run strength. Marine Subsistence catches were good for the 48-hour period ending Saturday, June 28, but plummeted for the period ending Wednesday, July 2. Test fishery and escapement indices also suggest that Chinook salmon escapement needs will not be met this season unless further action is taken. This is unfortunate considering the use of mesh-size restrictions in the Unalakleet River subsistence fishery, and that the subsistence fishing schedule provides escapement windows for Chinook salmon entering the river. Based on average run timing, current escapement and catch data suggest that Chinook salmon escapement needs will not be met this season. This season's Chinook run may be similar to the 2007 run, which actually had a ¼ point of July 8. If so, it is possible that escapement needs will still be met. However, escapement needs were only met in 2007 as a result of a restricted fishing schedule followed by an early closure to the subsistence and sport fisheries. While Chinook escapements have been weak, there are tens of thousands of pink salmon available for subsistence harvest in the lower reaches of the Unalakleet and Shaktoolik Rivers. Local residents have expressed interest in harvesting pink salmon early to take advantage of the good weather. Allowing beach seining for pink salmon 7 days a week will provide maximum flexibility for subsistence fishermen so that they can coordinate fishing times with the weather forecast. Using beach seines also allows subsistence users to target other salmon while at the same time protecting Chinook salmon. Any Chinook salmon caught in beach seines must be immediately released.

Emergency Order: 3-S-Z-08-08 Effective Date: July 5, 2008

EXPLANATION: This emergency order opens the Grantley Harbor Subdistrict of the Port Clarence District to commercial salmon fishing for 12 hours from 12:00 a.m. until 12:00 p.m. Saturday, July 5.

JUSTIFICATION: Subsistence fishermen in the two villages in Port Clarence have been catching salmon for nearly two weeks. As of July 2, only one pink salmon and no sockeye salmon have passed by the Pilgrim River weir. Last year the first day of sockeye passage was July 2 and in 2006 the first day of sockeye passage was July 5. The in-river goal for a commercial fishery is 30,000 sockeyes for the Pilgrim River and the department has forecasted 30 to 40 thousand sockeyes past the weir this year. The recent five-year average quarter point of sockeye passage at

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the weir is July 9 and the five-year average midpoint of sockeye passage at the weir is July 15. The Port Clarence commercial sockeye salmon guideline harvest range is 0-10,000 sockeye salmon. Since 2004, the combined subsistence harvest from Port Clarence and Pilgrim River has averaged about 10,000 sockeyes. Little commercial fishing effort is expected and likely only one or two permit holders are expected to participate. The first 12 hour commercial period on July 1 only harvested 17 red, 46 chum, and 12 pink salmon. With little effort expected and still early in the sockeye run commercial fishing should not jeopardize subsistence fishing or escapement.

Emergency Order: 3-S-Z-09-08 Effective Date: July 6, 2008

EXPLANATION: This emergency order opens Subdistricts 2 and 3, the Golovnin Bay and Moses Point Subdistricts of the Norton Sound District to commercial salmon fishing for 12 hours from 12:00 p.m. until midnight, Sunday, July 6.

JUSTIFICATION: Pink salmon escapements have already been achieved in the freshwaters of the Golovnin Bay and Moses Point Subdistricts and subsistence needs will easily be met. The Niukluk River counting tower has enumerated over 150,000 pink salmon and over 3,300 chum salmon as of July 4. The cumulative pink salmon passage is the highest on record for this date and the chum salmon passage is only slightly behind the 3,432 chums counted by this date in 2007, the 4th highest chum escapement on record. At the Kwiniuk River tower, the 450,000 pink salmon counted as of July 4 is second only to the 556,000 pinks counted for this date during the record run of 2004. The Kwiniuk River tower crew has also counted over 5,200 chums, which is below the historical average passage estimate for this date, but the 2008 chum run is exhibiting later than average run timing. Chum salmon passage at the Kwiniuk River tower is expected to surpass the lower end of the sustainable escapement goal (SEG) range of 11,500 chums and subsistence chum salmon needs are expected to be met. Chum salmon passage at the Niukluk and Kwiniuk River towers is anticipated to increase in the coming days.

This brief period will allow fishermen to take advantage of an enormous pink salmon harvest surplus. In addition, it will maximize catch quality by ensuring that the processor does not exceed their tender capacity and will also provide the department with an early index of chum salmon run strength. Fishing effort is expected to be limited, especially in the Golovnin Subdistrict. Limited fishing effort in conjunction with the brevity of this period should not jeopardize chum salmon escapement or subsistence fishing needs. However, it will provide the department with an additional index of chum salmon run strength which will be evaluated to determine if further restrictions on mesh size are necessary to conserve chum salmon.

Emergency Order: 3-S-Z-10-08 Effective Date: July 7, 2008

EXPLANATION: This emergency order open Subdistrict 2, the Golovnin Bay Subdistrict of the Norton Sound District to commercial salmon fishing for 12 hours from 12:00 p.m. until midnight, Monday, July 7.

JUSTIFICATION: Commercial salmon fishing was originally scheduled for Sunday July 6, but the tender that was deployed to the Golovnin Bay Subdistrict was delayed. This brief period with

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limited effort will allow fishermen to take advantage of an enormous pink salmon harvest surplus. In addition, it will also provide the department with an early index of chum salmon run strength. Pink salmon escapements have already been achieved in the freshwaters of the Golovnin Bay and Moses Point Subdistricts and subsistence needs will easily be met. The Niukluk River counting tower has enumerated nearly 300,000 pink salmon and 6,105 chum salmon as of July 5. The cumulative pink salmon passage is the highest on record for this date and the chum salmon passage is ahead of the 5,085 chums counted by this date in 2007, which had the 4th highest chum escapement on record.

Emergency Order: 3-S-Z-11-08 Effective Date: July 7, 2008

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 and waives the subsistence catch limits on pink salmon.

JUSTIFICATION: Pink salmon are passing in record numbers at the Nome River and Eldorado River weirs for this early in the season. Through July 6 there have been a record 80,000 pinks passed the Eldorado River. The escapement goal is 13,000 pinks at Nome River weir and already 125,000 pinks have passed through the weir as of July 6. The pink escapement is on track to reach 1 million fish at the Nome River weir. 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, but the pink salmon limit is now waived. Opening the subsistence areas for the next two weeks to two 48-hour fishing periods a week will allow fishermen to harvest salmon while drying weather is best and should not jeopardize escapement based on the large returns of salmon this year.

Emergency Order: 3-S-Z-12-08 Effective Date: July 8, 2008

EXPLANATION: This emergency order opens the Grantley Harbor Subdistrict of the Port Clarence District to commercial salmon fishing for four 12-hour fishing periods from 12:00 a.m. until 12:00 p.m. beginning Tuesday, July 8 and ending at noon on July 12.

JUSTIFICATION: The commercial harvest for three 12-hour fishing periods has been 58 sockeyes, 176 chums and 240 pinks from one permit holder. The Pilgrim River weir crew first passed sockeyes on July 3 and through July 6 have counted 2,384 sockeyes. The in-river goal for a commercial fishery is 30,000 sockeyes for the Pilgrim River and the department has forecasted 30 to 40 thousand sockeyes past the weir this year. The recent five-year average quarter point of sockeye passage at the weir is July 9 and the five-year average midpoint of sockeye passage at the weir is July 15. The Port Clarence commercial sockeye salmon guideline harvest range is 0-10,000 sockeye salmon. Since 2004, the combined subsistence harvest from Port Clarence and Pilgrim River has averaged about 10,000 sockeyes. Little commercial fishing effort is expected and only one permit holder is expected to participate. With little effort expected and still early in the sockeye run commercial fishing should not jeopardize subsistence fishing or escapement.

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Emergency Order: 3-S-Z-13-08 Effective Date: July 7, 2008

EXPLANATION: Effective 4:00 p.m. Monday, July 7, subsistence salmon fishing in the marine waters of the Unalakleet Subdistrict will be reopened. Subsistence salmon fishing may occur seven days a week in the marine waters of the Shaktoolik and Unalakleet Subdistricts, but gillnets are restricted to 50 fathoms in length or less with a stretched-mesh size of no more than 4.5 inches.

JUSTIFICATION Effective immediately, subsistence salmon fishing is also permitted in the marine waters of the Shaktoolik and Unalakleet Subdistricts with gillnets not exceeding 50 fathoms in length with a stretched-mesh size of no more than 4 ½ inches. Subsistence salmon fishing with 4 ½ gillnets can occur 24 hours a day, 7 days a week. King salmon interception in gillnets comprised of 4.5 inches should be minimal. Additionally, current test net catch data indicates that the majority of the king salmon run is already in the Unalakleet River drainage.

Emergency Order: 3-S-Z-14-08 Effective Date: July 9, 2008

EXPLANATION: This emergency order opens Subdistrict 3, the Moses Point Subdistrict of the Norton Sound District to commercial salmon fishing for 12 hours from 12:00 p.m. until midnight, Wednesday, July 9. Commercial salmon gear is limited to nets with an aggregate length of 100 fathoms or less with a stretched-mesh size of no more than 6 inches.

JUSTIFICATION: Pink salmon passage through the morning of July 7 is nearly 800,000 pink salmon which is second only to the 915,000 pinks counted by this date in 2004, a record for even-numbered pink salmon runs. The lower end of the chum salmon sustainable escapement goal (SEG) at the Kwiniuk River is also projected to be easily reached. As of July 6, the cumulative chum salmon passage at the Kwiniuk River tower is 6,981 chums. The historical midpoint of the chum run is July 6, but current assessment information indicates that chum salmon returns are tracking several days later than average this season. However, even if the Kwiniuk River chum run is exhibiting average run timing, the lower end of the SEG range of 11,500-23,000 chum salmon should easily be surpassed. Subsistence chum salmon needs are also projected to be met. This brief period will allow fishermen to take advantage of an enormous pink salmon harvest surplus and allow a small harvest of chum salmon which will also provide an index of chum salmon run strength. Incidental king salmon harvests were low during the last period in which 5 fishermen caught 5 kings compared to 157 chum salmon and over 2,800 pink salmon. Fishing effort is expected to continue to be very limited. Limited fishing effort in conjunction with the brevity of this period should not jeopardize chum salmon escapement or subsistence fishing needs.

Emergency Order: 3-S-Z-15-08 Effective Date: July 8, 2008

EXPLANATION: Effective 2:00 p.m. Tuesday July 5, the marine waters of Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, will open to commercial salmon fishing. Fishermen are limited to 100 fathoms of net in aggregate length and only gillnets with a stretched-mesh size of 4 ½ inches or less may be used.

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JUSTIFICATION: Pink salmon escapement needs have already been achieved and subsistence pink salmon needs will easily be met. The North River pink salmon escapement goal of 25,000 pinks was surpassed on July 5. Additionally, the 4.5-inch mesh-size restriction should minimize Chinook salmon interception while allowing commercial fishermen to target pink salmon. The department would have to project that Chinook salmon escapement needs will be met before chum salmon gear will be allowed in the Shaktoolik and Unalakleet Subdistricts. Chinook salmon incidental catch will be evaluated following this brief 6-hour period to determine if additional commercial salmon fishing will be permitted.

Emergency Order: 3-S-Z-16-08 Effective Date: July 9, 2008

EXPLANATION: This emergency order reopens commercial salmon fishing in the marine waters of Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing for one 6-hour period per day from Wednesday, July 9 until Friday, July 11. Shaktoolik Subdistrict periods will be from 6:00 p.m. until midnight each evening. Fishing periods in the Unalakleet Subdistrict will be from 12:00 p.m. until 6:00 p.m. each evening. Fishermen are limited to 100 fathoms of net in aggregate length and gillnets are restricted to a stretched-mesh size of 4.5 inches or less.

JUSTIFICATION: Pink salmon escapement needs have already been achieved and subsistence pink salmon needs will easily be met. The North River pink salmon cumulative escapement is over 100,000 pink as of July 8. Additionally, catches from the latest 6-hour period in the Unalakleet Subdistrict suggest that gillnets with 4.5-inch stretched mesh are effective not only for targeting pink salmon, but also at minimizing Chinook salmon interception. Eight permit holders harvested 4 Chinook salmon, 52 chum salmon, and 6,092 pink salmon during the 6-hour opener. The low combined catch weight of the Chinook salmon catch also suggests that the small mesh size is avoiding the larger and more predominantly female Chinook salmon. Considering that there is a large pink salmon harvest surplus and that Chinook bycatch is low, additional commercial pink salmon fishing is warranted. These brief 6-hour periods in Shaktoolik and Unalakleet will allow fishermen to target pink salmon while they remain marketable, but also allow the buyer to process the catch. The timing of periods is being staggered to allow Shaktoolik fishermen to coordinate deliveries effectively with the tender. The department will continue to evaluate Chinook salmon escapements to determine if gillnets with a larger mesh size can be permitted.

Emergency Order: 3-S-Z-17-08 Effective Date: July 12, 2008

EXPLANATION: This emergency order reopens commercial salmon fishing in the marine waters of Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing for one 8-hour period per day from Saturday, July 12 until Sunday, July 13. Shaktoolik Subdistrict periods will be from 4:00 p.m. until midnight each evening. Fishing periods in the Unalakleet Subdistrict will be from 2:00 p.m. until 10:00 p.m. each evening. Fishermen are limited to 100 fathoms of net in aggregate length and gillnets are restricted to a stretched-mesh size of 4.5 inches or less.

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JUSTIFICATION: Pink salmon escapement needs have already been achieved and subsistence pink salmon needs will easily be met. The North River pink salmon cumulative escapement is over 111,000 pink as of July 11. Three 6-hour directed commercial pink salmon openings were permitted in the Shaktoolik and Unalakleet Subdistricts from Wednesday, July 9 through Friday, July 11. However, as a consequence of rough weather, fishing effort has been somewhat curtailed in the Unalakleet Subdistrict and very limited in the Shaktoolik Subdistrict. Cumulative catches from the Unalakleet Subdistrict as of July 10 are 16,954 pink salmon, 282 chum salmon, and 5 king salmon for 17 permit holders. As of July 10, 4 permit holders have harvested 109 chum salmon and 1916 pink salmon in the Shaktoolik Subdistrict. The incidental king salmon catch continues to be very low. The 4.5-inch mesh is catching a few small kings. However, the pink salmon gear is avoiding the relatively large, female kings that comprise the latter portion of the king salmon run. Additional commercial fishing for pink salmon is warranted and the buyer has requested additional fishing time in order to target pink salmon while they remain of marketable quality. Fishing effort is expected to continue to be limited in Shaktoolik due to strong southeast winds, but the winds are not expected to reduce effort in the inshore fishing areas in Unalakleet. These brief 8-hour periods in Shaktoolik and Unalakleet will allow fishermen to target pink salmon while they remain marketable, but also allow the buyer to process the catch. The timing of periods is being staggered to allow Shaktoolik fishermen to coordinate deliveries effectively with the tender. The department will continue to evaluate Chinook salmon escapements to determine if gillnets with a larger mesh size can be permitted.

Emergency Order: 3-S-Z-18-08 Effective Date: July 14, 2008

EXPLANATION: This emergency order reopens commercial salmon fishing in the marine waters of Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, for one 8-hour period per day from Monday, July 14 until Tuesday, July 15. Fishing periods will be from 2:00 p.m. until 10:00 p.m. each evening. Fishermen are limited to 100 fathoms of net in aggregate length and gillnets are restricted to a stretched-mesh size of 4.5 inches or less.

JUSTIFICATION: Commercial fishing effort was very limited in the Unalakleet Subdistrict for the most recent 8-hour period on Sunday, July 13. No one fished in the Shaktoolik Subdistrict due to rough weather. There were fewer than 4 permit holders in Unalakleet and catch totals remain confidential, but catches were good and the incidental king salmon catch continues to be very low. Additional commercial fishing for pink salmon is warranted. Fishing effort is expected to increase today as winds are easterly in the Unalakleet and Shaktoolik areas. These brief 8-hour periods in Shaktoolik and Unalakleet will allow fishermen to target pink salmon while they remain marketable, but also allow the buyer to process the catch. The department will continue to evaluate Chinook salmon escapements to determine if gillnets with a larger mesh size can be permitted.

Emergency Order: 3-S-Z-19-08 Effective Date: July 16, 2008

EXPLANATION: Effective 12:00 a.m. Wednesday July 16, the marine waters of Subdistricts 5 and 6, and all freshwaters of the Unalakleet Subdistrict will reopen to subsistence salmon fishing with gillnets 24 hours a day, seven days a week. Gillnets must have a stretched-mesh size of 6

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inches or less and are limited to 50 fathoms in length in the marine waters, and 25 fathoms in length in the Unalakleet River. This Emergency Order also opens all fresh waters of Subdistrict 5, the Shaktoolik Subdistrict, and Subdistrict 6, the Unalakleet Subdistrict, to beach seining for salmon other than king salmon seven days a week.

JUSTIFICATION: King salmon escapements at the North River tower continue to be weak and late this season. The cumulative king salmon passage at the North River tower is 702 kings which is 25% below the recent 5-year average passage for that date. However, the Unalakleet River cumulative test net catch of 107 kings is nearly double the recent 5-year average catch of 58 for July 14. Very late run timing at the North River in conjunction with above-average king test net catches suggests that there are large numbers of king salmon milling around in the lower Unalakleet River. If there is to be any chance of meeting escapement needs, it is imperative to protect these king salmon. Restrictions on mesh size are necessary for the continued conservation of king salmon. Using the 6-inch mesh will provide subsistence users with additional opportunity to target other salmon species while protecting king salmon. Furthermore beach seining will be continued to be allowed in the fresh waters of the Shaktoolik and Unalakleet Subdistricts to target salmon other than king salmon. All king salmon caught in beach seines are required to be released immediately into the water.

Emergency Order: 3-S-Z-20-08 Effective Date: July 17, 2008

EXPLANATION: This Emergency Order reopens the marine waters of Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing with gillnets for one 24-hour period from 6:00 p.m. Thursday, July 17 to 6:00 p.m. Friday, July 18. Fishermen are limited to 100 fathoms of net in aggregate length and gillnets must have a stretched-mesh size of 6 inches or less.

JUSTIFICATION: Although late, chum salmon returns are showing above-average strength in eastern Norton Sound this season. As of July 15, the cumulative chum salmon catch at the Unalakleet River test net is 762 chum salmon. This represents a 20% increase from the recent 5-year average catch for this date and a 50% increase from the recent 10-year and 20-year historical average catch. Commercial salmon fishing in eastern Norton Sound has been restricted to 4 1/2-inch mesh in order to minimize king salmon interception. As expected, king salmon interception has been very low, and by this point the vast majority of the king salmon have now entered rivers and streams in eastern Norton Sound. Very few king salmon are expected to be incidentally harvested in the chum salmon fishery as the majority of king salmon have already entered the rivers and streams of eastern Norton Sound. These are directed chum salmon periods, but strong early coho catches are also expected. The department is forecasting a strong coho salmon run this season and coho salmon are showing up early at salmon monitoring projects throughout Norton Sound. The department will evaluate chum and coho salmon commercial catch and escapement indices to determine if further commercial salmon fishing is warranted.

Emergency Order: 3-S-Z-21-08 Effective Date: July 18, 2008

EXPLANATION: This Emergency Order reopens the marine waters of Subdistrict 4, the Norton

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Bay Subdistrict, to commercial salmon fishing with gillnets for one 24-hour period from 8:00p.m. Friday, July 18 to 8:00 p.m. Saturday, July 19. Fishermen are limited to 100 fathoms of net in aggregate length and gillnets must have a stretched-mesh size of 6 inches or less.

JUSTIFICATION: Although late, chum salmon returns are showing above-average strength in eastern Norton Sound this season. As of July 15, the cumulative chum salmon catch at the Unalakleet River test net is 762 chum salmon. This represents a 20% increase from the recent 5-year average catch for this date and a 50% increase from the recent 10-year and 20-year historical average catch. Commercial salmon fishing in eastern Norton Sound has been restricted to 4 1/2-inch mesh in order to minimize king salmon interception. As expected, king salmon interception has been very low, and by this point the vast majority of the king salmon have now entered rivers and streams in eastern Norton Sound. Very few king salmon are expected to be incidentally harvested in the chum salmon fishery as the majority of king salmon have already entered the rivers and streams of eastern Norton Sound. These are directed chum salmon periods, but strong early coho catches are also expected. The department is forecasting a strong coho salmon run this season and coho salmon are showing up early at salmon monitoring projects throughout Norton Sound. The department will evaluate chum and coho salmon commercial catch and escapement indices to determine if further commercial salmon fishing is warranted.

Emergency Order: 3-S-Z-22-08 Effective Date: July 18, 2008

EXPLANATION: This emergency order allows commercial fishing with gillnets 4 ½ inches or less stretched mesh size for 24 hours in Subdistrict 1 of the Norton Sound District (Nome Subdistrict) from 12 noon, Friday, July 18 until 12 noon, Saturday, July 19.

JUSTIFICATION: The escapement goal at the Nome River weir of 13,000 pink salmon has been exceeded by over 20 times and passage is now nearing 300,000 pink salmon at the weir. Other Nome Subdistrict rivers have tens of thousands to hundreds of thousands of pink salmon in the rivers. Having a 24 hour fishing period should not jeopardize subsistence fishing or escapement based on the large returns of pink salmon this year.

Emergency Order: 3-S-Z-23-08 Effective Date: July 20, 2008

EXPLANATION: This emergency order reopens the marine waters of Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing with gillnets for one 48-hour period from 6:00 p.m. Sunday, July 20 to 6:00 p.m. Tuesday, July 22. Fishermen are limited to 100 fathoms of net in aggregate length and gillnets must have a stretched-mesh size of 6 inches or less.

JUSTIFICATION: Catches from the most recent 24-hour commercial chum salmon opening were 2,350 chums and 642 cohos for 27 permit holders in the Unalakleet Subdistrict, and 568 chums and 168 cohos for 7 fishermen in the Shaktoolik Subdistrict. Chum and coho salmon CPUE was above the historical average in both subdistricts for this date. Although late, chum salmon returns are showing above-average run strength in eastern Norton Sound this season. The Unalakleet River test net is catching 80 chums per day since July 12, and the cumulative chum

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catch of 1,096 chums is the third highest on record for July 19. The cumulative coho catch is 27 cohos and is also the third highest on record. Additionally, the coho salmon passage of 732 cohos at the North River counting tower only trails 748 cohos counted through July 19 in 2007. Chum salmon escapement and subsistence fishing needs have been met and additional commercial fishing is warranted. The coho salmon run is also showing early run strength. This 48-hour period should not jeopardize coho salmon escapement and subsistence fishing needs and will provide the department with an additional early index of coho salmon run strength. The department will evaluate coho salmon catch and escapement indices to determine if the Shaktoolik and Unalakleet Subdistricts can be placed on the weekly fishing schedule of two 48-hour periods per week.

Emergency Order: 3-S-Z-24-08 Effective Date: July 22, 2008

EXPLANATION: This emergency order reopens Subdistrict 3, the Moses Point Subdistrict of the Norton Sound District to commercial salmon fishing for 24 hours from 8:00 p.m. Tuesday, July 22 until 8:00 p.m. Wednesday, July 23. Commercial salmon gear is limited to nets with an aggregate length of 100 fathoms or less with a stretched-mesh size of no more than 4 1/2 inches.

JUSTIFICATION: Near record low chum salmon counts have been observed at the Kwiniuk and Niukluk Rivers this season. In order to conserve chum salmon, commercial pink salmon fishing has remained closed in the Golovin and Moses Point Subdistricts since July 10. At the Niukluk River, the count through July 20 is 10,500 chums, which is less than half the long-term average passage for this date. The historical third-quarter point of the chum salmon run at the Niukluk River is July 21. Based on average run timing, the projected cumulative chum salmon escapement at the Niukluk River is 14,500 chums, well short of the escapement goal of 30,000 chums. Chum escapements are also abysmal at the Kwiniuk River tower, which has a cumulative chum count of 9,000 chums through July 20; only the 1985 and 1999 seasons had lower chum salmon counts for this date. Run timing assessments indicate that the approximately 90% of the chum salmon passage has already occurred at the Kwiniuk River tower. The chum salmon run is nearly over in the Moses Point Subdistrict. Chum salmon escapements will not be affected by commercial fishing for pink salmon at this point and there are pink salmon available for commercial harvest.

Emergency Order: 3-S-Z-25-08 Effective Date: July 21, 2008

EXPLANATION: This emergency order sets the subsistence salmon fishing schedule for the Nome Subdistrict and catch limits for the Nome Subdistrict, and Pilgrim and Kuzitrin Rivers in the Port Clarence District and allows the use of beach seines.

JUSTIFICATION: By regulation coho salmon management begins on July 25 with a schedule in the marine waters of Subdistrict 1 (Nome Subdistrict) from 6:00 p.m. Monday until 6:00 p.m. Saturday. The schedule set in this emergency order will continue the fishing for this week for chum salmon season which is 6:00 p.m. Thursday until 6:00 p.m. Sunday to allow subsistence fishermen to fish on Sunday this week instead of closing on Saturday evening. Also, beach seines

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will be allowed this week to harvest the huge numbers of pink salmon in the Nome Subdistrict. As of this morning 460,000 pink salmon had passed the Nome River weir and the escapement goal there is 13,000 pink salmon. The escapement count at Nome River weir this year is second only to the record run of one million fish in 2004. At the Pilgrim River weir there is no escapement goal, but the pink salmon passage at the weir is a record for this date. Therefore subsistence pink salmon limits have been waived.

Emergency Order: 3-S-Z-26-08 Effective Date: July 23, 2008

EXPLANATION: This emergency order reopens the marine waters of Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing with gillnets for one 48-hour period from 6:00 p.m. Wednesday, July 23 to 6:00 p.m. Friday, July 25. Fishermen are limited to 100 fathoms of net in aggregate length and gillnets must have a stretched-mesh size of 6 inches or less.

JUSTIFICATION: Catches from the most recent 48-hour commercial salmon opening were 10 kings, 2 sockeyes, 895 pinks, 1,852 chums and 3,135 cohos for 24 permit holders in the Unalakleet Subdistrict, and 1 king, 357 pinks, 1,285 chums and 878 cohos for 11 permit holders in the Shaktoolik Subdistrict. Chum and coho salmon catches were above the historical average in both subdistricts for this date. Although late, chum salmon returns are showing above-average run strength in eastern Norton Sound this season. The Unalakleet River test net cumulative chum catch of 1,209 chums is the second highest on record for July 22. The cumulative coho catch is 70 cohos and is also the second highest on record. Additionally, the coho salmon cumulative passage of 1,326 cohos at the North River counting tower is a record for July 22. Chum salmon escapement and subsistence fishing needs have been met and additional commercial fishing is warranted. The coho salmon run is also showing early run strength. This 48-hour period should not jeopardize coho salmon escapement and subsistence fishing needs and will provide the department with an additional early index of coho salmon run strength. The department will evaluate coho salmon catch and escapement indices to determine if the Shaktoolik and Unalakleet Subdistricts can be placed on the weekly fishing schedule of two 48-hour periods per week.

Emergency Order: 3-S-Z-27-08 Effective Date: July 26, 2008

EXPLANATION: This emergency order reopens Subdistrict 3, the Moses Point Subdistrict of the Norton Sound District to commercial salmon fishing for 24 hours from 12:00 p.m. Saturday, July 26 until 12:00 p.m. Sunday, July 27. Commercial salmon gear is limited to nets with an aggregate length of 100 fathoms or less with a stretched-mesh size of no more than 4 1/2 inches.

JUSTIFICATION: Pink salmon counts the last two days at Kwiniuk River tower are nearly 100,000 and the total pink salmon escapement is nearing 1.3 million fish. Pink salmon escapement is on track to finish third highest all time in the 44-year project history. However, chum salmon counts have been lagging at the tower and likely will not reach the lower end of the escapement goal range of 11,500 to 23,000 chum salmon. As of July 24 the chum count past

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the tower is 9,287 chums. In the recent 24-hour commercial pink salmon fishing period ending on Wednesday evening, July 23 in Moses Point Subdistrict 7 permit holders harvested 57 chum salmon 8,118 pink salmon and 3 silver salmon. The pink catch was the best this season. As chum salmon catches during the commercial fishing periods with restricted mesh gear of 4 ½ inches or less have been minimal and the chum salmon run is nearly over in the Moses Point Subdistrict another commercial fishing period will be allowed to harvest pink salmon and should not jeopardize escapement or subsistence needs. In the Moses Point Subdistrict fishing will be allowed for one 24-hour period from 12 noon, Saturday, July 26 until 12 noon Sunday, July 27. Fishermen will be limited to 100 fathoms of net and gillnets are restricted to a mesh size of 4 ½ inches or less.

Emergency Order: 3-S-Z-28-08 Effective Date: July 27, 2008
EXPLANATION: This emergency order establishes the coho salmon commercial fishing schedule for the marine waters of Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, to two 48-hour fishing periods a week from 6 p.m. Sunday until 6 p.m. Tuesday and from 6 p.m. Wednesday until 6 p.m. Friday. Permit holders are limited to 100 fathoms of net in aggregate length and gillnets must have a stretched-mesh size of 6 inches or less.

JUSTIFICATION: Catches from the most recent 48-hour commercial salmon opening were 3 kings, 2 sockeyes, 87 pinks, 2,399 chums and 3,620 cohos for 40 permit holders in the Unalakleet Subdistrict, and 2 kings, 155 pinks, 652 chums and 778 cohos for 17 permit holders in the Shaktoolik Subdistrict. The number of permit holders fishing in each subdistrict was the highest number since 1998 for one fishing period. Catches in both subdistricts for chums and cohos were above average for this date, but the CPUE was below average. The Unalakleet River test net has a cumulative catch of 139 silvers and catches through July 25 are double the recent 5-year average and quadruple the recent 10-year average. Counts at the North River tower are 1,908 cohos through July 25 and are the second highest on record. Now that coho catches have exceeded chum catches in both subdistricts the department will shift to coho salmon management and the regular commercial fishing schedule of two 48-hour fishing periods is now in effect. Chum salmon escapement and subsistence fishing needs have been met and the coho salmon run is showing early run strength. This regular commercial fishing schedule should not jeopardize coho salmon escapement and subsistence fishing needs.

Emergency Order: 3-S-Z-29-08 Effective Date: July 28, 2008

EXPLANATION: This emergency order reopens the marine waters of Subdistrict 4, the Norton Bay Subdistrict, to commercial salmon fishing with gillnets for one 24-hour period from 6:00 p.m. Monday, July 28 until 6:00 p.m. Tuesday, July 29. Fishermen are limited to 100 fathoms of net in aggregate length and gillnets must have a stretched-mesh size of 6 inches or less.

JUSTIFICATION: Silver salmon are now moving into most Norton Sound rivers. To the south of the Norton Bay Subdistrict, the Unalakleet River test net has a cumulative catch of 148 silvers, the second highest test net catch on record. Counts at the North River tower are over 2,000 silvers and are second highest for this date. To the north of the Norton Bay Subdistrict the Kwiniuk River tower silver salmon count has slowly been building for a week and is now at 360

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silvers. Although slightly behind the recent 5-year average the counts are still good for this early in the season. In the Norton Bay Subdistrict there are no test net projects or escapement counting projects. The department uses information from adjacent fishing subdistricts and salmon projects north and south of the subdistrict. Catches and escapement indicators of silver salmon to the south have been good and to north the silver salmon are starting to move past escapement counting projects. With the expected strong run of silver salmon to Norton Sound this year the department will allow a 24-hour commercial fishing period with mesh size restricted to 6 inches or less to target silver salmon in the Norton Bay Subdistrict. This fishing period will help to assess silver run strength in the subdistrict as well as determine the chum salmon run strength at the tail end of the run. The incidental catch of chum will be beneficial to determining whether a commercial fishing opening in the adjacent Moses Point Subdistrict is justified as chum salmon escapement has been lagging in that subdistrict.

Emergency Order: 3-S-Z-30-08 Effective Date: July 28, 2008

EXPLANATION: This emergency order sets the subsistence salmon fishing schedule and catch limits for the Nome Subdistrict until mid-August.

JUSTIFICATION: For coho salmon season the subsistence fishing schedule begins on July 26 as set in regulation. A previous emergency order extended fishing through 6 p.m. Sunday, July 27 as the chum salmon subsistence fishing schedule was from 6 p.m. Thursday to 6 p.m. Sunday. The more liberal coho salmon fishing schedule of fishing five days a week in the marine waters will begin Monday, July 28. This change should not jeopardize escapement. Catch limits are in effect for coho salmon as listed on the Nome Subdistrict permit.

Emergency Order: 3-S-Z-31-08 Effective Date: July 28, 2008

EXPLANATION: This emergency order allows beach seines to be used for two 48-hour periods in Nome Subdistrict waters.

JUSTIFICATION: In the Nome Subdistrict the pink salmon run is expected to be record breaking. Yesterday at Nome River weir a one day record of 119,712 pinks were estimated through the weir. At Eldorado River weir a one day record of 38,541 pinks were estimated through the weir. Both Nome River and Eldorado River are on track to surpass the all-time pink salmon escapement record in the next few days. Coho salmon counted through the Nome River through July 27 are 60 fish and the usual midpoint of the coho run at the weir is August 25. The use of beach seines to harvest salmon allows for more efficient harvest of salmon during this period of abundance. This change should not jeopardize escapement. Catch limits are in effect for coho, sockeye and chum salmon as listed on the Nome Subdistrict permit.

Emergency Order: 3-S-Z-32-08 Effective Date: August 8, 2008

EXPLANATION: This emergency order reopens the marine waters of Subdistrict 4, the Norton Bay Subdistrict, to commercial salmon fishing with gillnets for one 48-hour period from 6:00

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p.m. Friday, August 8 until 6:00 p.m. Sunday, August 10. Fishermen are limited to 100 fathoms of net in aggregate length and gillnets must have a stretched-mesh size of 6 inches or less.

JUSTIFICATION: Silver salmon returns to most Norton Sound Rivers are showing above average run strength for early August, particularly in eastern Norton Sound. Commercial catches from the most recent 48-hour period ending 6 p.m. Tuesday, August 5 were 6,700 silvers for 15 permit holders in the Shaktoolik Subdistrict, and 12,400 silvers for 45 permit holders in the Unalakleet Subdistrict. As of August 6, the Fish & Game test net in the Unalakleet River has a record catch of 675 silvers and is averaging nearly 60 silvers a day since July 31. Additionally, the North River tower cumulative passage of 5,200 silvers and is the second highest on record for August 6. Although most northern Norton Sound Rivers are having above average silver runs, the Kwiniuk River tower silver salmon count of 942 silvers is well below the recent 5-year average of 2,500 silvers. However, silver passage at the Kwiniuk tower has improved to an average of 90 silvers a day since August 4. Silver escapements at the Kwiniuk River will be evaluated in the coming days to determine if run strength is adequate to allow for commercial salmon fishing in the Moses Point Subdistrict. In the Norton Bay Subdistrict, there are no test net projects or escapement counting projects. The department uses information from adjacent fishing subdistricts and salmon projects north and south of the subdistrict. Catches and escapement indicators of silver salmon to the south have been well above average. In northern Norton Sound, silver salmon runs are also above average with the exception of the Kwiniuk River. With the strong run of silver salmon to Norton Sound this year, the department will allow a 48-hour commercial fishing period with mesh size restricted to 6 inches or less to target silver salmon in the Norton Bay Subdistrict. This fishing period will provide an index of silver salmon run strength and should not jeopardize escapement or subsistence fishing needs.

Emergency Order: 3-S-Z-33-08 Effective Date: August 15, 2008

EXPLANATION: This emergency order reopens the marine waters of Subdistrict 4, the Norton Bay Subdistrict, to commercial salmon fishing with gillnets for one 48-hour period from 6:00 p.m. Friday, August 15 until 6:00 p.m. Sunday, August 17. Fishermen are limited to 100 fathoms of net in aggregate length and gillnets must have a stretched-mesh size of 6 inches or less.

JUSTIFICATION: Silver salmon runs continue to be above average throughout most of Norton Sound. In the Unalakleet Subdistrict, the 866 silvers caught in the Unalakleet River test net is more than double the recent 5-year average catch and the 7,000 silvers counted at the North River tower is the third highest on record for August 11. Commercial catches in the Unalakleet and Shaktoolik Subdistricts also continue to be above average Catches from the most recent 48-hour period ending 6 p.m. Friday, August 8 were 4,952 silvers for 13 permit holders in the Shaktoolik Subdistrict, and 7,268 silvers for 49 permit holders in the Unalakleet Subdistrict. In the Norton Bay Subdistrict, there are no test net projects or escapement counting projects. The department uses information from adjacent fishing subdistricts and salmon projects north and south of the subdistrict. Catches and escapement indicators of silver salmon to the south have been well above average. In northern Norton Sound, silver salmon runs are also above average with the exception of the Kwiniuk River. With the strong run of silver salmon to Norton Sound

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this year, the department will allow another 48-hour commercial fishing period with mesh size restricted to 6 inches or less to target silver salmon in the Norton Bay Subdistrict. . Fishing effort is expected to be very limited in both subdistricts and these periods should not jeopardize silver salmon escapement or subsistence needs.

Emergency Order: 3-S-Z-34-08 Effective Date: August 13, 2008

EXPLANATION: This emergency order reopens Subdistrict 2, the Golovnin Bay Subdistrict of the Norton Sound District to commercial salmon fishing for 24 hours from 6:00 p.m. Wednesday, August 13 to 6:00 p.m., Thursday, August 14.

JUSTIFICATION: Silver salmon runs continue to be above average throughout most of Norton Sound. The Niukluk River tower count of 1,920 silvers is nearly double the recent 5-year average count of 1,000 silvers for August 11, the historical quarter point of the run. Based on average run timing, the projected silver salmon escapement at the Niukluk River is estimated to be around 8,000 silvers. Silver salmon runs are showing above average run strength in the Golovnin Bay Subdistrict. Additionally, Fishing effort is expected to be very limited in both subdistricts and these periods should not jeopardize silver salmon escapement or subsistence needs. This brief 24-hour period in the Golovnin Bay Subdistrict will also provide another index of silver salmon run strength.

Emergency Order: 3-S-Z-35-08 Effective Date: August 14, 2008

EXPLANATION: This emergency order extends commercial fishing in Subdistrict 2, the Golovnin Bay Subdistrict of the Norton Sound District until 6:00 p.m. Friday, August 15.

JUSTIFICATION: At the buyer's request, the department has agreed to authorize an extension to the commercial fishing period currently underway in the Golovnin Bay Subdistrict from 24 hours to 48 hours. Commercial salmon fishing will be allowed to continue until 6 p.m. Friday, August 15. Coho salmon escapements at the Niukluk River tower are more than double the long-term average for August 13, and the Niukluk River coho count of 2,385 cohos is just shy of the lower end of the sustainable escapement goal range of 2,400-6,100 cohos. The historical quarter point of the coho salmon run at the Niukluk River is August 12. If this season's run has average run timing, the coho salmon escapement is projected to easily surpass the upper end of the sustainable escapement goal range. Additional commercial salmon fishing is warranted, fishing effort is expected to be very limited in this resurgent fishery, and escapement and subsistence fishing needs should not be jeopardized. Additionally, this period will provide an additional index of coho salmon run strength from the latter half of the run. Catch and escapement data will continue to be evaluated in order to determine if additional commercial salmon fishing periods will be allowed in the Golovnin Bay Subdistrict.

Emergency Order: 3-S-Z-36-08 Effective Date: August 16, 2008

EXPLANATION: This emergency order reopens Subdistrict 3, the Moses Point Subdistrict of

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the Norton Sound District, to commercial salmon fishing for 48 hours from 6:00 p.m. Saturday, August 16 to 6 p.m. Monday, August 18. Commercial salmon gear is limited to nets with an aggregate length of 100 fathoms or less with a stretched-mesh size of no more than 6 inches.

JUSTIFICATION: Until recently, commercial silver salmon fishing has not occurred in the Moses Point Subdistricts because of weak silver counts observed at the Kwiniuk River tower. The cumulative silver salmon passage is now at 2,829 silvers, which remains well below the recent 5-year average of 4,838 silvers, but the tower crew has counted 1,290 silvers since Wednesday. Furthermore, if the record run of 2006 is excluded from the 5-year average, the 2008 count is only lagging 25% below the average of 3,781 silvers. Subsistence fishermen also report catching silvers on every cast and that a few thousand silvers are milling in the lower Kwiniuk River. Taken collectively, this information indicates that silver salmon escapement and subsistence fishing needs will be satisfied and that there is a surplus available for commercial harvest. Additionally, this period will provide an index of coho salmon run strength in the Moses Point Subdistrict. Catch and escapement indices will be evaluated to determine if further commercial salmon fishing is warranted.

Emergency Order: 3-S-Z-37-08 Effective Date: August 19, 2008

EXPLANATION: This emergency order reopens Subdistrict 3, the Moses Point Subdistrict of the Norton Sound District to commercial salmon fishing for two 48-hour periods from 6:00 p.m. Tuesday, August 19 to 6 p.m. Thursday, August 21 and again from 6 p.m. Friday, August 22 to 6 p.m. Sunday, August 24. Commercial salmon gear is limited to nets with an aggregate length of 100 fathoms or less with a stretched-mesh size of no more than 6 inches.

JUSTIFICATION: The preliminary catch for the most recent 48-hour period in the Moses Point Subdistrict is 1,430 cohos for 7 permit holders. Catches only include deliveries made through 6 p.m. Sunday evening, but the preliminary catch is well above average for this date and will most likely be record setting for a single period. In the Moses Point Subdistrict, salmon escapements are evaluated at the Kwiniuk River enumeration tower. Although tracking later than average, this season's silver run at the Kwiniuk River is the 4th highest on record. If the record run of 2006 is excluded from the average, the 2008 silver run is 23% above the average for August 17, but the Kwiniuk River project has only counted the majority of the silver salmon run since 2001. Coho salmon escapement and subsistence fishing needs will easily be met and preliminary record catch rates reported in the Moses Point commercial fishery indicate that the latter half of the silver salmon run is also above average. The buyer has requested additional fishing time and commercial fishing is warranted. Commercial fishing opportunity has been limited this season in the Moses Point Subdistricts. These 48-hour periods will allow fishermen to take advantage of the good weather and good fishing while still providing escapement windows for silver salmon.

Emergency Order: 3-S-Z-38-08 Effective Date: August 20, 2008

EXPLANATION: This emergency order reopens commercial salmon fishing in Subdistrict 2, the Golovnin Bay Subdistrict of the Norton Sound District, for one 48-hour period from 6:00 p.m.

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Wednesday, August 20 to 6 p.m. Friday, August 22.

JUSTIFICATION: Catches from the most recent 48-hour period ending Saturday, August 16 in the Golovnin Bay Subdistrict are confidential. Silver salmon escapements continue to be near record-setting at the ADF&G tower located on the Niukluk River, the major tributary of the Fish River. The Niukluk River count of 4,371 silvers through August 17 is the third best on record, and has already surpassed the midpoint of the sustainable escapement goal range of 2,400-6,100 silvers. If this season's run has average run timing, the projected final silver escapement at the Niukluk River would be just over 12,000 silvers. The buyer has requested additional fishing time is warranted in light of above average coho escapements observed at the Niukluk River tower. This 48-hour period will allow fishermen to take advantage of the good weather and good fishing.

Emergency Order: 3-S-Z-39-08 Effective Date: August 25, 2008

EXPLANATION: This emergency order reopens Subdistrict 3, the Moses Point Subdistrict of the Norton Sound District to commercial salmon fishing for two 48-hour periods from 6:00 p.m. Monday, August 25 to 6 p.m. Wednesday, August 27 and again from 6 p.m. Thursday, August 28 to 6 p.m. Saturday, August 30. Commercial salmon gear is limited to nets with an aggregate length of 100 fathoms or less with a stretched-mesh size of no more than 6 inches.

JUSTIFICATION: In the Moses Point Subdistrict, salmon escapements are evaluated at an ADF&G counting tower located on the Kwiniuk River. This season's silver run at the Kwiniuk River is now the 2nd highest on record. Fishing effort has been very limited in the Moses Point Subdistrict this season and silver salmon escapement and subsistence fishing needs are being met. Considering these factors, the department will allow two more 48-hour commercial fishing periods next week to provide opportunity for commercial harvest. Commercial salmon fishing will be permitted in the Moses Point Subdistrict for two 48-hour periods from 6 p.m. Monday, August 25 to 6 p.m. Wednesday, August 27 and again from 6 p.m. Thursday, August 28 to 6 p.m. Saturday, August 30. Commercial salmon fishing will close by regulation in the Moses Point Subdistrict on Sunday, August 31. Fishermen are limited to 100 fathoms of net with a mesh size of 6 inches or less.

Emergency Order: 3-S-Z-40-08 Effective Date: September 1, 2008

EXPLANATION: This emergency order doubles the coho salmon limit for the marine waters of the Nome Subdistrict and doubles the fresh water subsistence areas limit listed on the Nome Subdistrict subsistence permit.

JUSTIFICATION: Coho salmon have been entering Norton Sound streams at near 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 have started to be well above average and coho escapement is expected to be near record to record setting this year for some rivers in the Nome Subdistrict.

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Emergency Order: 3-S-Z-41-08 Effective Date: September 3, 2008

EXPLANATION: This emergency order opens the northeast portion of Salmon Lake to subsistence fishing.

JUSTIFICATION: Sockeye salmon have been entering Salmon Lake since early July. This year's aerial survey observed over 11,000 sockeye salmon in the lake. The aerial goal is 4,000 to 8,000 sockeye salmon. A limited number of subsistence fishermen have harvested sockeyes from the lake because of the ease of drying spawned out salmon. To allow opportunity for subsistence fishermen to obtain sockeye salmon from Salmon Lake the northeast portion of the lake will be open to subsistence fishing until October 15. Catch limits of 100 sockeye salmon per household are in effect. Allowing fishing in the northeast portion of Salmon Lake should not jeopardize future runs.

Emergency Order: 3-S-Z-42-08 Effective Date: September 7, 2008

EXPLANATION: This emergency order extends the Subdistricts 5 (Shaktoolik) and 6 (Unalakleet) commercial fishing schedule for the upcoming week. There will be two 48-hour commercial fishing periods from 6 p.m. Sunday, September 7 to 6 p.m. Tuesday, September 8, and again from 6 p.m. Wednesday, September 10 to 6 p.m. Friday, September 12. Permit holders are limited to 100 fathoms of net in aggregate length and gillnets must have a stretched-mesh size of 6 inches or less. The commercial salmon fishing season in Norton Sound will close effective 6 p.m. Friday, September 12.

JUSTIFICATION: Test fishery and commercial catch indicators suggest that there is a late surge of silver salmon in southern Norton Sound. The Unalakleet River test net catch of 38 silvers a day since Labor Day is near record setting for this late in the silver run. Additionally, the overall test net catch is 1,644 silvers as of September 5 and will most likely surpass the 2006 record catch of 1,728 silvers. Commercial catches were also well above average this past week. Catches from the recent commercial fishing period ending Friday night were 3,943 silvers for 23 permit holders in Unalakleet, and in Shaktoolik the catches were 690 silvers for 7 permit holders. The catch and catch per unit of effort were records for early September in both the Unalakleet and Shaktoolik Subdistricts. In the Unalakleet and Shaktoolik Subdistricts, the season closes by regulation on September 7, but near-record test fishery and commercial catches for early September suggest that there is a late season abundance of silver salmon available for harvest. The buyer has indicated that they have a market for their catch and additional commercial fishing is warranted.

Emergency Order: 3-S-Z-43-08 Effective Date: September 8, 2008

EXPLANATION: This emergency order waives the coho salmon limit for the marine waters of the Nome Subdistrict and waives the fresh water subsistence areas limit listed on the Nome Subdistrict subsistence permit.

JUSTIFICATION: Coho salmon have been entering Norton Sound streams at record numbers. In the Nome Subdistrict the midpoint of the run at the escapement counting projects is usually the

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last week of August, and the Nome River weir count is above average and the Snake River weir count is a record 5,200 cohos. Aerial surveys show most Nome Subdistrict rivers have record numbers of coho salmon.

NORTON SOUND – SPORT FISH

Emergency Order: 3-KS-02-08 Effective Date: July 3, 2008

EXPLANATION: This emergency order prohibits the retention of king salmon in all waters of the Unalakleet and Shaktoolik river drainages effective 8:00 p.m. Saturday, July 5, 2008. It also prohibits the use of bait while sport fishing for all species in these rivers.

JUSTIFICATION: Escapement counts of king salmon at the North River tower on the Unalakleet River are below historic averages. As of July 1st only 36 king salmon had passed the counting tower. From 2003-2007 an average of 207 king salmon had passed the counting tower by this date. According to the Unalakleet River King Salmon Management Plan, when the projected escapement is below the lower end of the escapement goal, all fishing will be closed. It appears that the escapement goal for king salmon will not be reached in 2008. This action is in alignment with the management plan. The department does not have a stock assessment project in the Shaktoolik River, but the king salmon run generally cycles in accordance with Unalakleet stocks. Unalakleet River test fishery indices are also below historic averages for this date. The elimination of sport harvests of king salmon in the Unalakleet and Shaktoolik rivers will provide protection for returning fish. The prohibition of bait while sport fishing is in accordance with provisions set forth in 5 AAC 75.003 (1)(A). This action should minimize catch-and-release mortality for king salmon caught incidentally while sport fishing for other species.

Emergency Order: 3-PS-01-08 Effective Date: July 13, 2008

EXPLANATION: This emergency order increases the bag and possession limit for pink salmon from ten (10) to twenty (20) fish in all fresh water drainages and the salt waters of Northern Norton Sound between Cape Darby to Cape Prince of Wales effective 12:01 a.m. Sunday, July 13, 2008.

JUSTIFICATION: Escapement counts of pink salmon at the Nome River weir are at record highs for this date and are more than five times the historical average. As of July 7th, more than 180,000 pink salmon had passed the weir. During the even years from 1998-2006, an average of 33,600 pink salmon had passed the weir by this date. The sustainable escapement goal (SEG) for pink salmon in the Nome River is 13,000 fish. Escapement counts of pink salmon at the Niukluk River counting tower in the Fish River drainage are also at record highs for this date. As of July 7th, 554,000 pink salmon had passed the tower. During even years of 1998-2006, an average of 113,000 pink salmon had passed the tower by this date. The SEG for pink salmon in the Niukluk River is 8,400 fish. Likewise, other nearby drainages, while not having escapement goals or enumeration projects, track similarly to the Nome and Niukluk rivers and are showing large returns of pink salmon as well. Due to the high escapement of pink salmon in the Northern Norton Sound drainages an increase in the daily bag and possession limit for pink salmon from 10 to 20 fish is warranted.

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