Fishery Management Report No. 11-46

2009 Annual Management Report
Norton Sound, Port Clarence, and Kotzebue

by

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and

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September 2011

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 2009 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 pallasii*, 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 *Oncorhynchus keta*, coho salmon *Oncorhynchus kisutch,* pink salmon *Oncorhynchus gorbuscha,* sockeye (red) salmon *Oncorhynchus nerka,* red king crab *Paralithodes camtschaticus*, Pacific herring *Clupea pallasii*, inconnu sheefish *Stenodus leucichthys*, whitefish *Coregonus laurettae, Coregonus pidschian, Coregonus sardinella, Coregonus nasus, Prosopium cylindraceum,* Dolly Varden *Salvelinus malma*, saffron cod *Eleginus gracilis,* Area Management Report, Annual Management Report, AMR.

INTRODUCTION

This report summarizes the 2009 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 two categories to facilitate use of this report: 1) Tables 1–16 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.

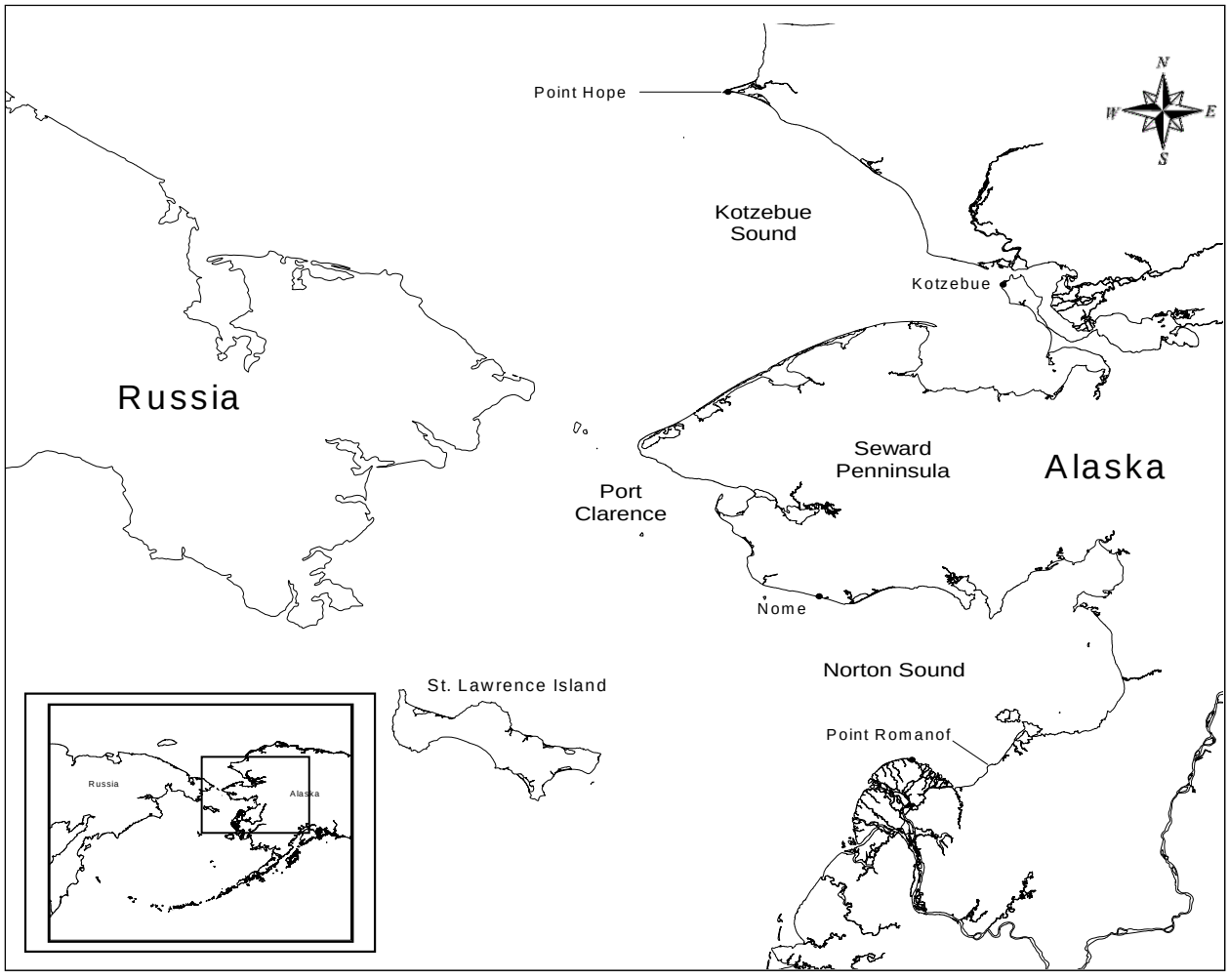

Figure 1.–Norton Sound, Port Clarence, and Kotzebue Sound management districts.

SALMON OVERVIEW

There are 5 species of Pacific salmon *Oncorhynchus* spp. 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 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, C. pidschian, C. sardinella, C. nasus, and Prosopium cylindraceum, Coregonus* sp.*, Prosopium* sp.,, Dolly Varden *Salvelinus malma*, and inconnu (sheefish) *Stenodus leucichthys*. 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 2004 in Kotzebue Sound due to budget constraints. However, 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, Division of Commercial Fisheries began doing subsistence salmon household surveys yearly in Shaktoolik and Unalakleet, and in other southern Norton Sound villages periodically.

Prior to the fishing season two visits by ADF&G personnel are usually made to each village to issue Tier I subsistence salmon 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, in 2009, postseason household surveys were conducted in Stebbins, St. Michael, Unalakleet, Shaktoolik and Koyuk. 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

The Division of Commercial Fisheries of ADF&G is responsible for management of commercial and subsistence fisheries in this vast area. Permanent full-time staff assigned to this area during 2009 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 2009, interns funded by Norton Sound Economic Development Corporation (NSEDC) were utilized as fisheries technicians at some projects. In Norton Sounds, 4cooperative projects staffed by NSEDC and 3 projects jointly operated by NSEDC and ADF&G 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 and NSEDC 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 salmon 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 run. Occasionally, fishing time is increased or decreased by emergency order. Emergency orders issued in 2009 are listed in Appendix G5. 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).

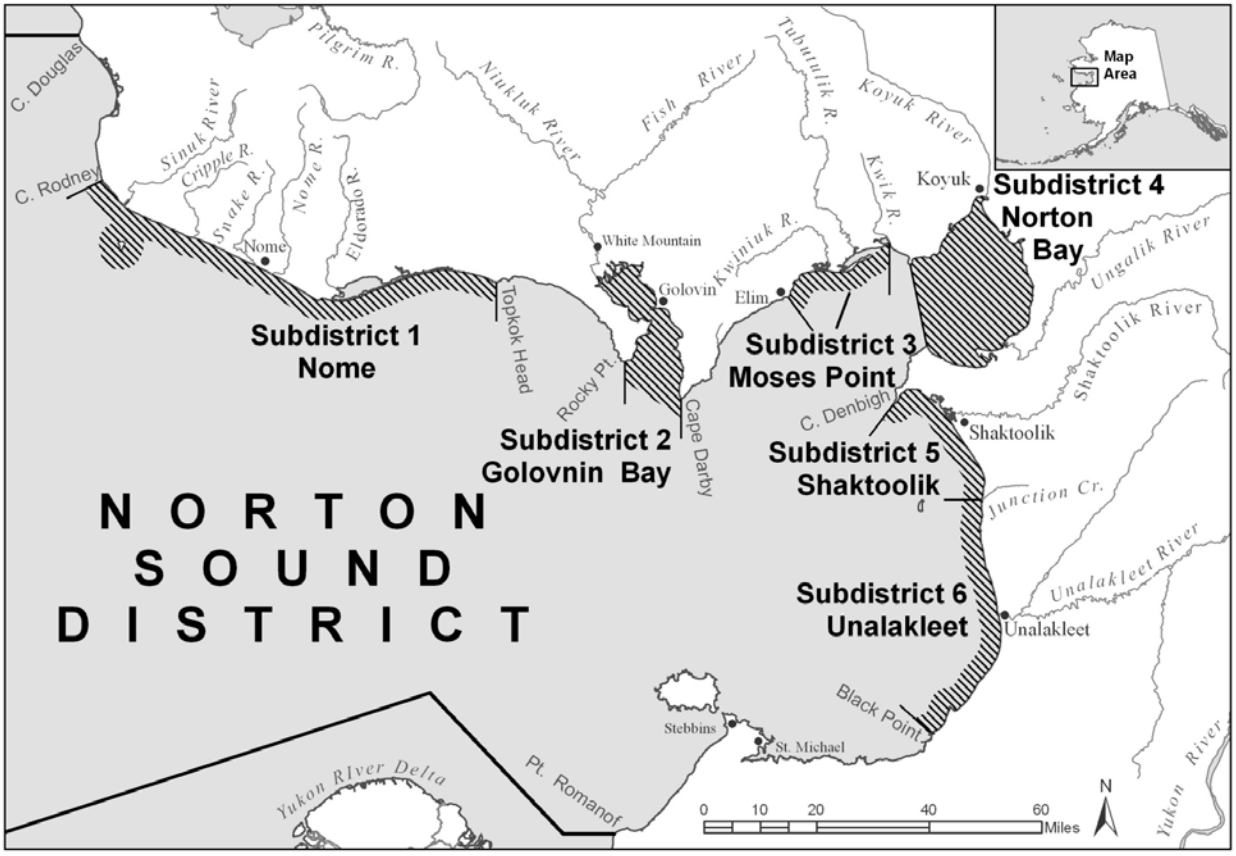

Figure 2.–Norton Sound commercial salmon fishing subdistricts and statistical areas.

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 several salmon stocks within the district. There had been no

commercial interest in pink salmon from 2000 to 2006, but beginning in 2007 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 fishery 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 one or two families, and set up camps near the mouths of streams. Harvest levels of fish on any one stream were relatively small because of low concentrations of people who caught only what their families and one or two dogs needed through the winter (Thomas 1982).

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

Mining 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 residents, 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 then 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. 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 Golovnin and Norton Bays. Currently, the most consistent markets are at Shaktoolik and Unalakleet and onshore processing usually occurs at Unalakleet. Appendix G3 gives a list of commercial processors and buyers that operated in Norton Sound, Port Clarence, and Kotzebue Sound in 2009.

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 (Appendix A6).

Commercial fishing gear is restricted to gillnets. A maximum aggregate length of 100 fathoms is allowed for each fisherman. 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 mesh. 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 and 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. In 2009 there were 3 counting towers and 5 weirs operated.

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. Management actions have consisted of a series of emergency orders that open and close fishing seasons and periods and establish gillnet mesh size specifications.

Commercial fisheries in Subdistricts 2 and 3 (Golovin and Moses Point) have targeted chum salmon and during even numbered years pink salmon in June and July, and coho salmon in late July and August. 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, that in recent years require closure or severe restrictions on the subsistence fishery. Conversely, the Norton Bay Subdistrict often has healthy stocks, but had been unable to attract markets willing to operate in this remote area until recently.

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 (1999-2008), the average subsistence harvest was 73,078 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.

Two goals of the postseason household subsistence survey are to collect harvest data to estimate subsistence salmon catch by species and community, and to compile information on gear types, participation rates, sharing, use of salmon for dog food, and household size. A copy of the Norton Sound subsistence salmon harvest survey form is shown in Appendix G4.

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 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). 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 from 1975 to 2003, 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 (Shaktoolik) and 6 (Unalakleet) have continued to be surveyed postseason by household interviews. 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 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 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 sport fishery in Nome and Snake rivers was adopted in 1984 that allowed "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 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, 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 BOF meeting held in Nome, March 1999. Tier II permits are dispensed to individuals prioritized by fishing history and dependence, and based on projected harvestable surplus. As a result, ADF&G allowed twenty 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, two Norton Sound District chum salmon stocks were determined to be stocks of concern based on the Policy for the Management of Sustainable Salmon Fisheries. Nome Subdistrict chum salmon were determined to be a stock of management concern and Golovin and Moses Point Subdistricts chum salmon were determined to be a stock of yield concern.

The 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) is operated. BOF established OEGs, by subdistrict, as follows:

Subdistrict 1

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

Subdistrict 3

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

The BOF adopted a chum salmon management plan for Subdistrict 1 and a salmon management plan for Subdistricts 2 and 3. Commercial chum salmon fishing in Nome Subdistrict was closed and the fishery may not be reopened again until the abundance of chum salmon has a harvestable surplus large enough to meet subsistence needs for 4 consecutive years.

ADF&G was given authority to establish subsistence gillnet mesh size restriction of 4½ inch or less by emergency order when necessary to conserve chum salmon in Subdistricts 1, 2, and 3. The 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, the 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 drainages (Figure 3). Salmon, saffron cod *Eleginus gracilia*, whitefish, and herring *Clupea pallasii* are the major subsistence species.

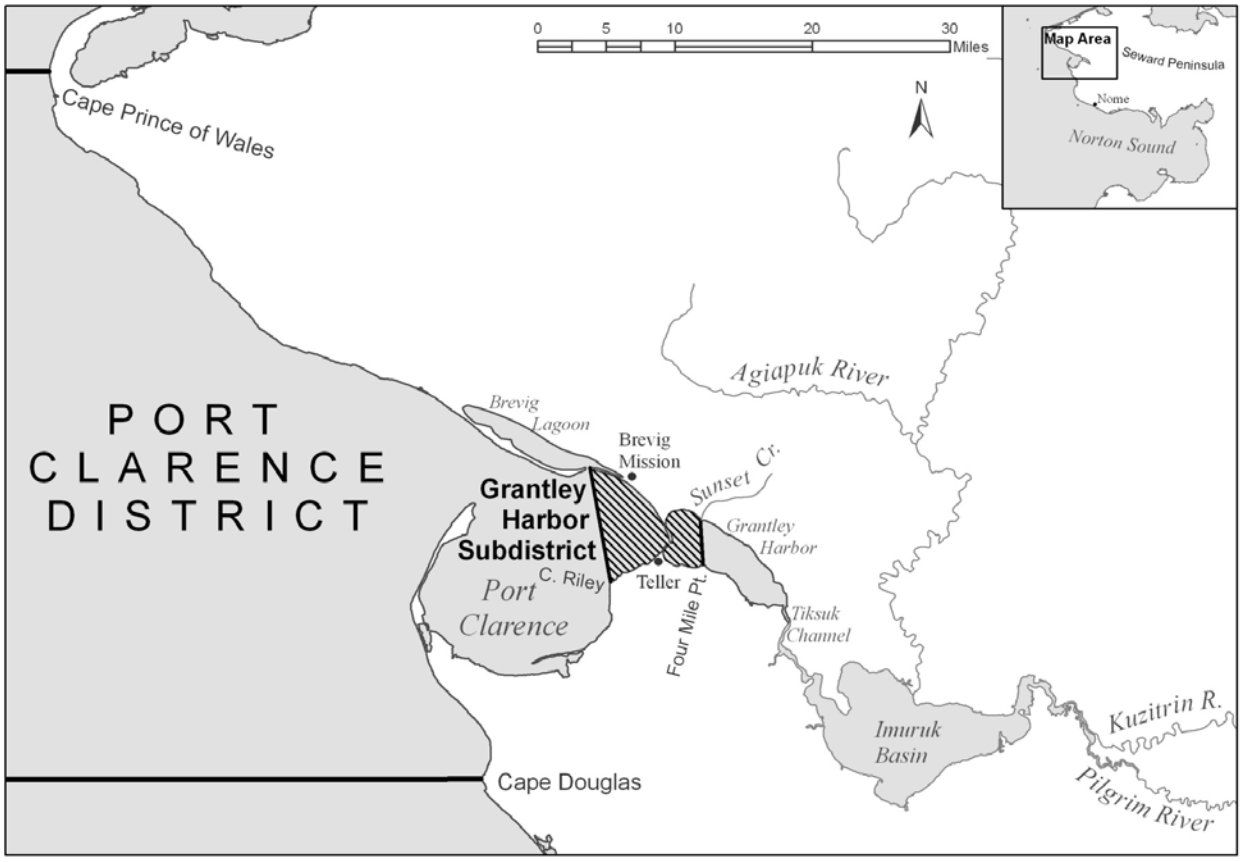

Figure 3.–Port Clarence District.

COMMERCIAL FISHERY OVERVIEW

Some subsistence caught salmon are believed to be sold or bartered each year in Teller and Nome, but commercial fishing has been limited in Port Clarence District. In 1966, a total of 1,146 salmon consisting of 93 sockeye, 131 pink, and 922 chum salmon were taken in a commercial fishery in the 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 with a catch of 1,152 sockeye salmon and 3,183 chum salmon. In 2008 the commercial fishery harvest was 89 sockeye, 256 chum and 910 pink salmon. The 2008 commercial fishery was closed when the inriver goal of 30,000 sockeye salmon for Pilgrim River was projected to fall short. The commercial fishery remained closed in 2009 because of another poor run of sockeye salmon.

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 District, 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). Subsistence Division conducted a partial survey of Brevig Mission in 1989, and conducted full-scale household surveys of both villages from 1994–2003. Since 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. The 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).

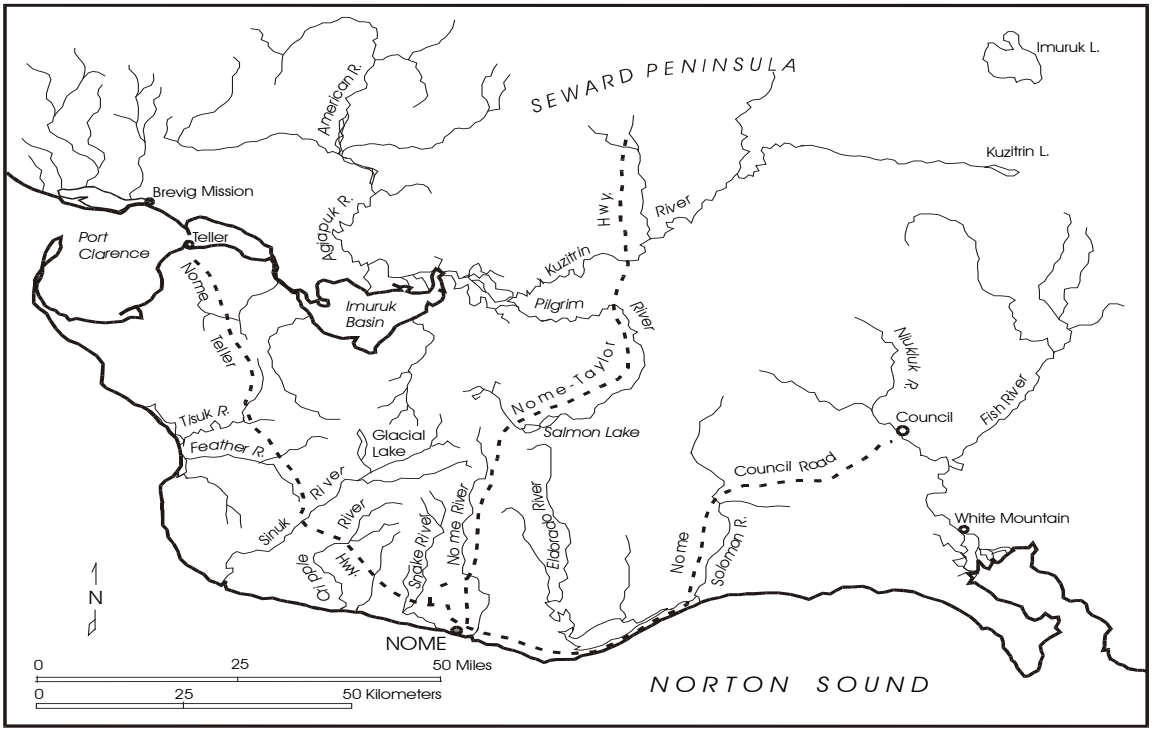

Figure 4.–Seward Peninsula with road accessible waters.

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, restarted in 2007 by NSEDC, and continued in 2008 and 2009.

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.

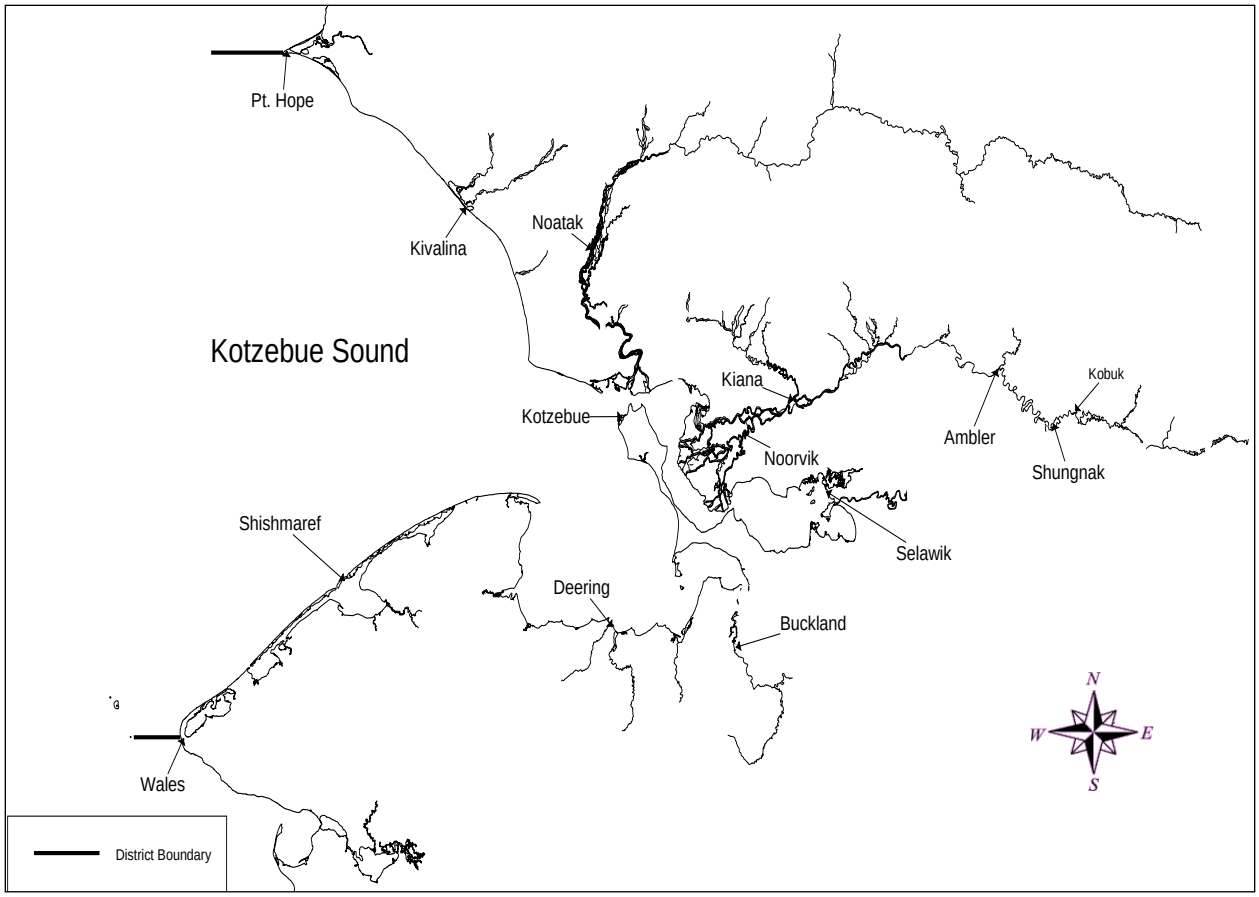

Figure 5.–Kotzebue Sound District, villages and subsistence fishing area.

COMMERCIAL FISHERY OVERVIEW

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

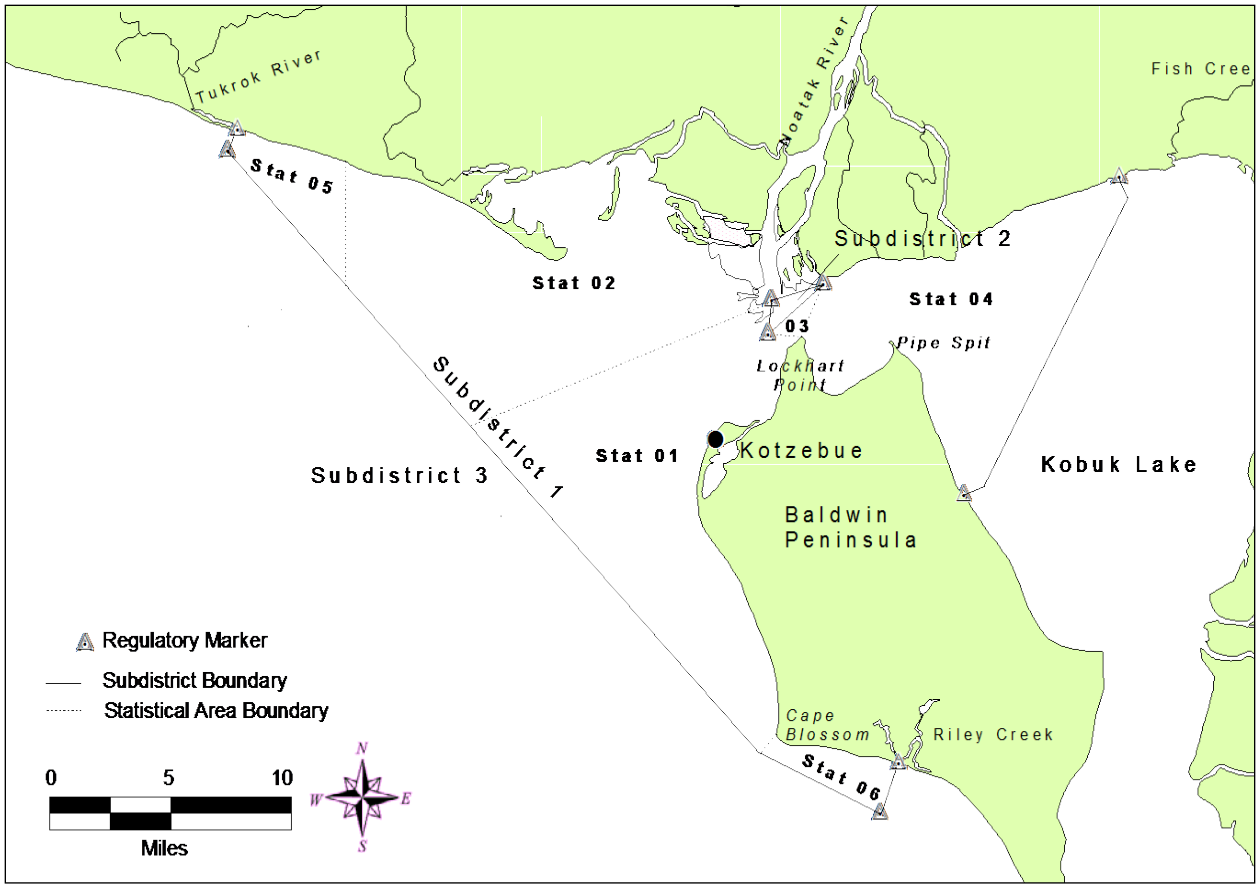

Figure 6.–Kotzebue Sound commercial salmon fishing subdistricts and statistical areas.

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, sockeye, pink and coho salmon are harvested during the salmon fishery.

The earliest documented sales of salmon in 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. 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. Predominate species in the district is chum salmon, 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 result in an estimated total subsistence salmon harvest for the 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 in 1995-2001 using a mail-in postcard, but has not been surveyed since.

PACIFIC HERRING OVERVIEW

DISTRICT BOUNDARIES

Pacific herring are present in Norton Sound, Port Clarence, and Kotzebue Sound. 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 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.

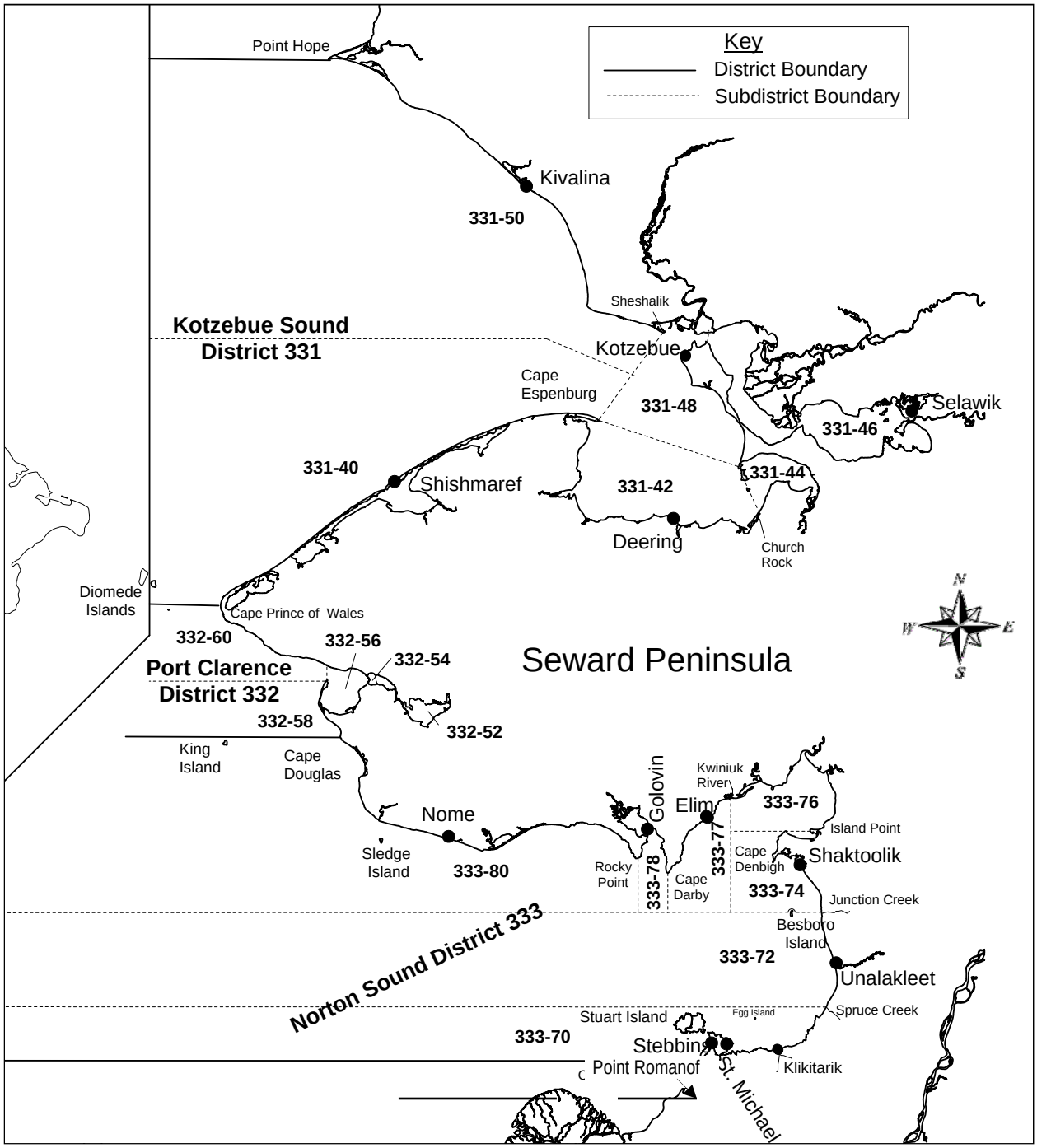

Figure 7.–Commercial herring districts and statistical areas of Norton Sound, Port Clarence, and Kotzebue Sound.

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 to participate in this developing fishery.

During the 1980 season, 294 gillnet fishermen harvested 2,452 tons of herring (Appendices 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 ADF&G." 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 superexclusive herring fishing district to slow growth and bolster local involvement, but it had limited success. The 1987 herring roe gillnet season harvested approximately 3,759 tons and had the highest level of fishing effort on record (Appendix D3). This effort was more than twice the average from 1980 through 1986, yet Norton Sound area residents accounted for only 36% of the effort and 29% of the total harvest. Then, in 1987 after a public proposal adopted at the fall BOF meeting, the Commercial Fisheries Entry Commission (CFEC) changed Norton Sound Herring Fishing District to Limited Entry status with a maximum number of 301 gillnet and 4 beach seine permits. Beginning in 1988, a moratorium was placed on Norton Sound and no new entrants were allowed into the sac roe herring fishery.

The 1988 and 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 2002–2006 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, 2008 and 2009 there were no sac roe herring buyers, and 33, 91 and 28 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 to 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, the 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. The 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, the 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 and the guideline harvest level may not exceed 30 metric tons. The herring pound 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 2001, 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 from 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 the guideline harvest level. 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 near Golovin 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.

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).

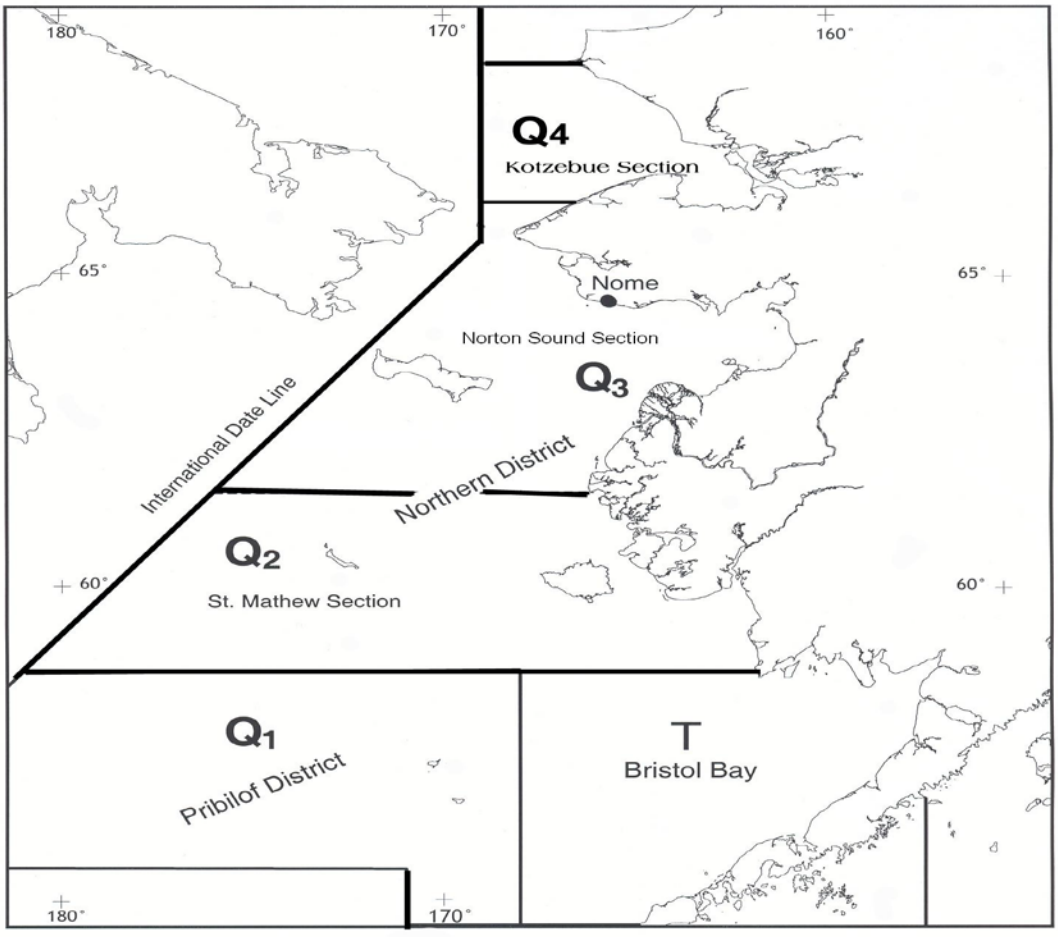

Figure 8.–King crab fishing districts and sections of Statistical Area Q.

Abundance

From 1976 to late 1990s, abundance of legal red king crab biomass in Norton Sound has been estimated based on standardized results from triennial trawl surveys and sporadic summer pot surveys, which indicated periods of weak and strong recruitment (Appendix E2). Average weight used for legal red king crab was 3 pounds. In 1976 there were estimated to be roughly 1.7 million legal red king crabs. 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 crabs in 1991. The trawl survey conducted during August of 1996 indicated a reduced stock size and estimated the legal population at 0.5 million crabs. In 1999, the legal red king crab population of 1.6 million crabs was estimated by

trawl survey to be near the historical high (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-two (sublegal male crab with carapace length 76–89 mm) abundance estimate suggested at least 1 year of weaker recruitment beginning during the 2001 summer fishery. Results from the 2002 trawl survey indicated an estimated abundance of legal male red king crabs at 0.77 million with a corresponding biomass of approximately 2.3 million pounds. This was less than half of the 1999 abundance estimate, yet above the all-time low in 1996. This decrease was expected because the 1999 trawl survey indicated exceptionally weak prerecruit-two abundance. Prerecruit-two crabs observed in 1999 made up the recruit and postrecruit portion of the 2002 legal population (Appendices E12 and 13). The 2002 estimated abundances for prerecruit-one and prerecruit-two males were 0.52 and 0.43 million crabs, 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-two male crab abundance was over four times greater than 1999 and fourth highest abundance estimate since 1976 indicating increased recruitment for 2004 and 2005 seasons. In 2006, legal male abundance was estimated at approximately 0.73 million crabs, 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 crabs, 10% greater than the 2002 estimate, and prerecruit-2 male abundance was estimated at approximately 0.78 million crabs, the highest abundance estimate on record, which is expected to increase recruitment for the 2008 and 2009 seasons. The latest trawl survey, conducted in 2008, showed a prerecruit-1 male abundance estimate at 0.70 million crabs, prerecruit-2 crabs at 0.80 million crabs, and legal male abundance estimate at 0.81 million crabs, all of which were higher than the corresponding values in the 2006 survey. Consequently, recruitment should increase for 2009 and 2010.

Since 1998 a length-based population model has been used 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 (Appendices E10–20), the model is used to project abundance estimates of legal male crabs even in years when no trawl survey occurs, allowing abundance-based 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 2009 with the latest data from the 2008 trawl survey, the 2008 summer fishery, and the 2009 winter study.

In 2005, legal abundance estimate for the summer crab fishery was 3.03 million pounds, up 4% from 2.90 million pounds estimated for 2004. This higher abundance estimate for 2005 reflected increased recruitment, which had been anticipated from the 2002 trawl survey results. The legal population estimate for 2006 decreased 10% from the 2005 estimate, to 2.73 million pounds, while it increased again the following year, up 3% to 2.82 million pounds in 2007. Increases in abundance estimates were seen again the following two years, up 17% to 3.30 million pounds in 2008 and up 14% to 3.75 million pounds in 2009. Results from the 2006 and 2008 trawl surveys had forecasted this increase in legal abundance estimate based on the high number of prerecruit-2 male crab abundance estimated.

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 and budget 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 the mid 1990s (Appendix E9).

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 over fishing the stock.

To reduce handling mortality of sublegal and smaller female crabs, BOF at its March 2008 meeting put a new regulation into effect: a minimum of 4 escapement rings are required per pot with each ring having a minimum inside diameter of 4 ½ inches located within one mesh size from the bottom of the pot, or at least one-half of the vertical surface of a square pot or sloping side-wall surface of a conical or pyramid pot must be composed of no less than 6-½ inch stretched mesh.

CDQ Fishery

The Norton Sound and Yukon Delta CDQ groups divide 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 Appendix E8. 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. Previously, the open access fishery started on July 1, but BOF passed a regulation allowing ADF&G to open the fishery by emergency order anytime beginning on or after June 15.

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 crabs brought to the Nome dock. Crabs 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 crabs) (Appendix E5). The fishery declined sharply the following year and remained at low levels through the 19811982 season. Lack of success in the winter crab fishery during some past years has been attributed to a declining crab population caused by removal of crab in the summer commercial fishery together with low recruitment, low effort caused by poor ice conditions, and changes in nearshore winter distribution of crab. All these factors in varying degrees affect success of the winter fishery. During the 1978/1979 winter fishery, the king crab population was still relatively high. Despite this relatively large population, winter catches were second poorest on record indicating that major factors limiting winter catches were probably poor ice conditions and distribution of crab. During winter of 1981–1982, poor winter catches could more reasonably be attributed to a declining crab population since the crab population was at a low level. Subsistence fishing success during winters of 1982–1983 through 1986–1987 improved because of a rebuilding of the population and increased use of more efficient gear (pots instead of hand lines). Unstable ice conditions and record snowfalls adversely affected: 1992–1993, 1996–1997, 2000–2001, 2003–2004, and 2005–2006 catches. During years of stable ice conditions, approximately 100 fishermen averaged 100 crabs 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.

Abundance

Unlike Norton Sound, the area of the Bering Strait that includes St. Lawrence Island has never been surveyed consistently by ADF&G. Even though commercial and subsistence harvests are allowed by regulation, ADF&G does not have abundance estimates for this area. In 1998 Bering Sea Fishermen's Association (BSFA) conducted a cooperative trawl survey with the department that was funded by the National Oceanic and Atmospheric Association (Fair and Nelson 1999). The trawl survey was designed to determine the feasibility of commercial fisheries on finfish and shellfish species in Kotzebue Sound. Follow up pot studies for king crab occurred in the early winter and summer of 1999 (Nelson et al. 2000) and in the summer of 2002 (NEI 2002). CPUE results were below 2 during the summer and below 1 in the winter. In summer of 2005, an exploratory pot survey was conducted by NSEDC in cooperation with ADF&G to assess the number and distribution of male blue king crab in the vicinity of King Island, Wales, and Port Clarence. The survey was only partially successful due to strong currents that made pot retrieval difficult when set deeper than 10 fathoms. Shallow pot placement resulted in catch primarily of egg bearing female blue crabs, and indicates that using standard Norton Sound crab gear would only access a nursery site for gravid blue king crab. When more suitable gear becomes available, further surveys will be necessary to determine the feasibility of a summer fishery. However, to aid in 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 5-1/2 inches to 5 inches. At the March 2008 BOF meeting, legal size requirement for blue king crab was 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 4-3/4 inches.

In summer of 2006 and 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 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 crabs and 984 pounds of blue king crabs were delivered from 8 landings. In 1992, 53 pounds of blue king crabs were landed. In 1995, 7,913 pounds of blue king crabs were delivered from 3 landings. Only 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. Except for 340 pounds harvested in 2006, no commercial king crab harvest has been reported from the former St. Lawrence Island Section since 2005.

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", Dolly Varden, whitefish,and saffron cod.

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).

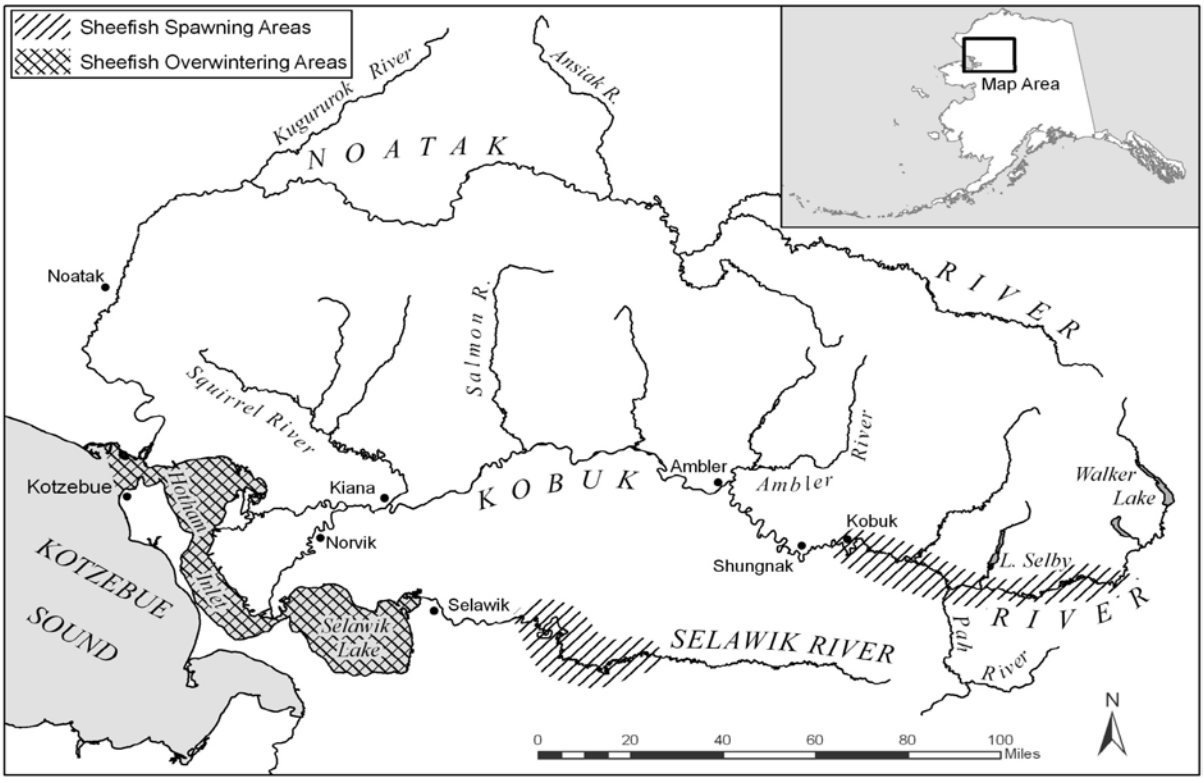

Figure 9.–Kotzebue and Kobuk River Valley villages and their spatial relationship with inconnu spawning and overwintering areas.

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 to7 years for males and 7 to 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 concentration 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.

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 Subsistence Division 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 occur 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 1/2 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 the 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 from 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, but 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. Appendix F5 shows historical subsistence Dolly Varden catches, but they should be considered minimal figures because of survey timing. 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 approximately 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 approximately 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 2005 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 fisherman, 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 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; Georgette et al. 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, and 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 $.50 per pound for a total value of $26.00. No commercial harvest has been reported since 1995.

MISCELLANEOUS FINFISH SPECIES

Other finfish species taken for subsistence in Norton Sound, Port Clarence, and Kotzebue areas include: rainbow smelt *Osmerus* (boreal smelt), capelin *Mallotus villosus*, northern pike *Esox lucius*, starry flounder *Platichthys stellatus*, yellow fin sole *Pleuronectes vetulus*, Arctic flounder *P. glacialis*, Alaska plaice *P. quadrituberculatus*, Arctic grayling *Thymallus arcticus*, burbot *Lota lota*, and halibut *Hippoglossus stenolepis* (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 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. Both smelt and cod harvests from Unalakleet 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 in the last 5 years were under 1,000 fish in Norton Sound, and Kotzebue areas. 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

2009 NORTON SOUND SALMON FISHERY

Regulatory Changes

The 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 2009 Norton Sound District commercial salmon fishery included another top 10 harvest of coho salmon for the fifth year in a row, a record Subdistrict 3 (Moses Point) coho salmon harvest, the best chum salmon harvest in over a decade and the second highest average value of salmon catch per permit holder on record without adjusting for inflation. Disappointments in 2009 included one of the poorer runs of chum salmon to northern Norton Sound and the collapse of the sockeye salmon run that resulted in no commercial fishing being allowed in Port Clarence District.

Commercial salmon fishing began with a 24-hour opening on July 8, in Subdistricts 5 and 6, directed at pink salmon, and the second 24-hour fishing period on July 10 allowed fishermen to target chum salmon (Tables 1 and 2). The following week there were three 24-hour fishing periods in Subdistricts 5 and 6 that allowed fishermen to target chum salmon. Also, ADF&G opened Subdistrict 4 on July 14, to two 36-hour fishing periods a week to target chum salmon (Table 3). Poor runs of chum salmon to northern Norton Sound kept Subdistricts 2 and 3 closed to pink and chum salmon fishing by regulation.

On July 19, ADF&G increased fishing time to two 48-hour fishing periods a week in Subdistricts 5 and 6 because of good catches of chum salmon and another early showing of coho salmon in the commercial catch indicating a good run of coho salmon was again likely in 2009. Beginning July 28, the department extended fishing time to two 48-hour fishing periods a week in Subdistrict 4 because of increasing coho salmon catches. The department delayed opening coho salmon fishing in Subdistricts 2 and 3 to protect chum salmon and on August 7, opened both subdistricts to two 48-hour fishing periods per week (Tables 4 and 5).

The last 48-hour fishing period ended in Subdistrict 4 on August 14. Effort had dwindled with the opening of Subdistrict 3 and the record coho salmon catches there. Subdistrict 3 commercial fishing was extended for one 48-hour fishing period beyond the regulation closure of August 31, because of continued good catches of coho salmon and sufficient passage at the Kwiniuk River counting tower. The last 48-hour fishing period in Subdistrict 2 ended on August 26, with coho salmon catches and fishing effort dropping off. For the second consecutive year, good catches and escapements of coho salmon in Subdistricts 5 and 6 allowed commercial fishing to be extended for two 48-hour fishing periods beyond the regulation closure date of September 7. Commercial salmon fishing has been extended beyond the regulation closure date in 3 of the previous 4 years.

Subdistricts 5 and 6 have experienced strong coho runs since 2004, and 2009 was another strong run for both subdistricts commercial coho salmon harvest of 13,063 and 60,230 respectively, ranked ninth and eighth highest (Appendices A10 and A11). In Norton Bay (Subdistrict 4) commercial fishing resumed in 2008 after a decade of no buyer interest and the 2009 harvest of 1,714 coho salmon was the third highest on record (Appendix A9). Subdistrict 3 (Moses Point) had a record coho salmon harvest of 9,582 and exceeded the previous record harvest by 60% (Appendix A8). In Subdistrict 2 (Golovin) the coho salmon harvest of 2,452 was the fourth highest on record (Appendix A7).

Commercial chum salmon catches in Shaktoolik (10,941) and Unalakleet (20,647) were the best since 1995. Improving market conditions also allowed for commercial chum salmon fishing in Norton Bay and the harvest of 1,850 chum salmon was the highest since 1988. However, chum salmon fishing in the Norton Bay Subdistrict has only occurred in 5 seasons since 1988.

Cumulative test net catch at Unalakleet River (Table 6) and tower escapement at its tributary, North River, were record highs for coho salmon (Appendix A25). Chum salmon catch at the test net was second highest and the North River tower count was fifth best out of twenty years of counts. Failure to meet chum salmon escapement in northern Norton Sound at Niukluk River and Kwiniuk River counting tower projects did not allow for commercial fishing in Subdistricts 2 and 3 until coho salmon season (Table 7).

In Port Clarence District, there was no commercial salmon fishery because of the poor sockeye salmon run, a stark contrast from the record runs of 2003 through 2007. Only 953 sockeye salmon were enumerated through the Pilgrim River weir (Appendix A18), which was well short of the required 30,000 sockeye salmon inriver goal for Pilgrim River to allow for commercial fishing.

Norton Sound District combined commercial harvest of all salmon species ranked fifth in the last 10 seasons (Appendix A1). Number of commercial permits fished (88) was the second highest since 1997, but twelfth lowest on record (Appendix A2). The 2009 fishery value to permit holders of $722,167 was well above the recent 5-year average of $428,003 and the third highest in 20 years (Appendix A3). Average value per permit holder of $8,206 was the second highest on record without adjusting for inflation. Average price paid was $.34/lb for sockeye salmon, $.93/lb for coho salmon, $.18/lb for pink salmon, and $.33/lb for chum salmon (Appendix A4). Average weight was 7.8 pounds for coho, 2.7 for pink, and 7.0 for chum salmon (Appendix A5).

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 87,041 was nearly 14% below the recent 5-year average, but 45% above the recent 10-year average. The chum salmon harvest of 34,122 was nearly triple the 5-year average and was over triple the 10-year average. Increased buyer interest in chum and pink salmon also resulted in a pink salmon harvest of 17,364 fish, the highest odd-numbered year harvest since 1995.

Eighty-eight permit holders participated in the commercial fishery, 3 less than last year. The biggest drop in permit participation was in Unalakleet where 49 permits were fished compared to 58 permits last year. However, the drop in participation may be due to other fishing subdistricts being open more in 2009. The previous 5-year average in Norton Sound was 60 permits fished and the previous 10-year average was 53 permits fished (Appendix A2).

Only one salmon buyer operated in Norton Sound during the 2009 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 Subdistricts 2 to 5.

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 and fish permits for multiple areas. Permits issued at the Nome office, and by ADF&G personnel in the field, identify gear restrictions, bag limits, subsistence zones (for Nome Subdistrict, 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 (Table 8).

Norton Sound District household subsistence surveys were conducted in St. Michael, Stebbins, Shaktoolik, Unalakleet, and Koyuk, and attempts were made to contact 100% of the households. Catch information for Subdistricts 4–6 and St. Michael and Stebbins are presented in Appendices A9–A12.

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 fishermen must follow sport fish bag limits except in the Nome Subdistrict subsistence zones where they can catch the subsistence limit. In 2009, an average to below average chum run was forecasted for Nome Subdistrict and the subdistrict was not closed to salmon fishing in mid-June for the fourth 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 Port Clarence District subsistence permits are required and a separate permit is required for Pilgrim River and for Salmon Lake. There are no salmon harvest limits in 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, three customary trade finfish permits were issued to Nome residents, and in 2009, one permit was issued to a Teller resident. To date, all issued permits have been returned and only one sale has been reported, in 2008, for $80.

Season Summary by Subdistrict

Nome-Norton Sound Subdistrict 1

The chum salmon run was anticipated to meet the amount necessary for subsistence (ANS); consequently, ADF&G allowed the regular gillnet fishing schedule of 72 hours in marine waters, and two 48-hour fishing periods a week in freshwater subsistence areas from mid-June until mid-July. However, chum salmon run projections in mid-July predicted that the lower end of the BEG range of 23,000–35,000 chum salmon for Nome Subdistrict would not be reached and all chum salmon fishing and net fishing was closed effective July 16. The final escapement estimate of 21,368 chum salmon (Table 7, Appendix 29) fell approximately 7% below the goal. Additionally, the lower end of the sustainable escapement goal (SEG) ranges for Eldorado, Nome and Snake rivers were not reached.

Subsistence net fishing reopened in early August in marine waters to the 5 days per week schedule in regulation and in the second week of August to two 48-hour fishing periods per week in fresh waters. Although the other subdistricts in Norton Sound were having another great run of coho salmon, the run to Nome Subdistrict was poor and all coho salmon fishing was closed the last weekend in August. Furthermore, all salmon net fishing was also closed.

For 35 years subsistence salmon permits have been required for Nome Subdistrict. There were 426 permits issued during the 2009 season, which was the third highest behind the 461 permits issued in 2008 and 491 permits issued in 2004. The 2004 number was much higher likely because sport fishing remained closed for over a week early in the pink salmon run and subsistence hook and line fishing was open at that time. Therefore, hook and line fishermen obtained subsistence fishing permits.

Of the 426 permits issued for Nome Subdistrict there were 261 households that reported fishing and over 35% of fishing households had fished in Nome River and slightly less than 18% of fishing households reported fishing in Snake River (Table 8). The third highest fishing location reported was in marine waters where approximately 10% of fishing households reported fishing. In 2009 the reported salmon catch by hook and line was 791 (37.6%) and by gillnet was 1,311 (62.4%). The hook and line catch was higher than most odd-numbered years, likely attributed to net fishing closures this season, but the hook and line catch percentage was much lower when compared to even-numbered years when historically over 70% of the subsistence salmon catch is by hook and line.

Golovin-Norton Sound Subdistrict 2

The 2009 Salmon Management Plan for Golovin Subdistrict limits commercial harvest to a maximum of 15,000 chum salmon before mid-July in an attempt to protect chum salmon stocks and allow for some harvest while flesh quality is at its best. By that date, the chum salmon run usually can be assessed and fishing time adjusted accordingly.

Previous to 2008 there had been no commercial chum salmon fishing in Subdistrict 2 since 2001, largely because escapements had fallen short of the SEG of 30,000 at Niukluk River counting tower. Consequently, ADF&G has implemented a conservative approach with respect to determining when commercial fishing may occur. In 2009, the poor chum salmon counts at Kwiniuk River tower in the adjacent subdistrict indicated a possible near-record low chum salmon run to northern Norton Sound and ADF&G did not open Golovin Subdistrict to commercial salmon fishing until coho salmon season. There were five 48-hour commercial fishing periods in August (Table 4). The harvest was 87 chum salmon and 2,452 coho salmon by 5 permit holders with the coho salmon harvest being fourth highest on record. Chum salmon passage at the Niukluk River tower was 15,879, which was the third lowest escapement since the project's inception in 1995. The tower count of 24,204 pink salmon exceeded the escapement goal threshold of greater than 10,500 and ranked fifth out of the eight years that pink salmon have been counted during odd-numbered years. A tower count of 6,861 coho salmon ranked sixth best and exceeded the escapement goal range of 2,400–6,100.

This was the sixth year that subsistence salmon permits were required and 161 permits were issued for Subdistrict 2 in 2009. The number of Subdistrict 2 permits issued to Nome residents has dropped by 25% since 2004 while the number of permits issued to Golovin and White Mountain residents has been similar each year. The number of salmon reported harvested (7,128) was the lowest since the subsistence permit system was initiated in 2004 (Appendix A7).

Moses Point-Norton Sound Subdistrict 3

Chum salmon fishing did not occur in 2009 because of a poor chum salmon run. The Kwiniuk River tower count of 8,739 chum salmon was one of the lowest counts on record and failed to reach the lower end of the OEG of 11,500–23,000 chum salmon. Commercial fishing targeting

coho salmon opened on August 7 and two 48-hour fishing periods per week were allowed until early September. The coho salmon run ended up being well above average and the commercial harvest was a record. A 2009 season total of 597 chum, 35 pink, and 9,582 coho salmon were harvested by 17 permit holders in Moses Point Subdistrict (Table 5).

The 2009 escapement at the Kwiniuk tower was 444 Chinook salmon, 8,739 chum salmon, 42,962 pink salmon, and 8,677 coho salmon. Chinook salmon passage was within the escapement goal range of 300–550 fish for the first time since 2005. The chum salmon escapement was the second poorest on record. However, 2009 may be the poorest chum salmon run. The previous poorest chum salmon run was in 1976 and counting ended on July 25 that year and only 8,508 chum salmon had been counted. In 2009 counting ended on September 13 with the final chum salmon escapement at 8,739, but the 2009 cumulative count through July 25 was 7,767 chum salmon. Furthermore, there were 10,890 chum salmon harvested in the commercial fishery in 1976 compared to 597 chum salmon in 2009. Pink salmon escapement at the Kwiniuk tower was the fifth highest for odd-numbered years in the last 10 odd-numbered years and easily exceeded the escapement goal threshold of greater than 8,400. The coho salmon escapement ranked third lowest in the last 9 years of counting. However, this was only the fourth year of commercial fishing in the last 9 years. This was the sixth year that subsistence salmon permits were required in the Moses Point Subdistrict and there were 73 permits issued in 2009, a record high, compared to the previous record of 70 permits in 2005. A record harvest of 2,434 coho salmon was taken in the subsistence fishery (Table 8).

Norton Bay-Norton Sound Subdistrict 4

Norton Bay Subdistrict typically has difficulty attracting a buyer due to its remoteness and its reputation for watermarked fish. Because of lack of timely salmon escapement information, Norton Bay Subdistrict is typically managed similar to Shaktoolik and Unalakleet Subdistricts because they are believed to have similar trends in salmon run strength and timing. In 2008, a small-scale commercial salmon fishery occurred in Norton Bay Subdistrict for the first time since 1997. ADF&G again opened the commercial salmon fishery in 2009 and 7 permits holders participated at some time during the season compared to 4 permit holders in 2008.

Commercial salmon fishing began in Norton Bay Subdistrict on July 14, with a 36-hour opening targeting chum salmon and continued to late July with two 36-hour fishing periods per week. When coho salmon catches started to increase, the department switched to two 48-hour fishing periods per week. The cumulative commercial catch by species for the Norton Bay Subdistrict was 1,850 chum, 558 pink, and 1,714 coho salmon (Table 3).

Shaktoolik and Unalakleet-Norton Sound Subdistricts 5 and 6

Both Shaktoolik and Unalakleet Subdistricts, which share a common boundary, consistently attract commercial markets due to larger volumes of fish and better transportation services. Management actions typically encompass both subdistricts because salmon tend to intermingle, and harvest in one subdistrict affects the movement of fish in the adjacent subdistrict. ADF&G's test net in Unalakleet River, 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 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 fishing and spawning grounds.

Subdistricts 5 and 6 Chinook salmon were designated a stock of yield concern in 2004 and the BOF continued this designation in February 2007. To increase Chinook salmon escapements, 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 Unalakleet River. Subsistence fishing time can only be liberalized if the department projects that the lower end of the SEG range will be achieved. If North River king salmon passage is projected to fall short of the SEG, the department is directed to close the king salmon fishery.

In Shaktoolik and Unalakleet Subdistricts, directed commercial Chinook salmon fishing has only occurred in 3 of the previous 10 years, and in only one year since 2001. Restrictive action was taken in the subsistence and sport fisheries in 2003, 2004, 2006, 2007, 2008 and 2009. The midpoint of the North River tower SEG range of 1,200–2,600 Chinook salmon 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. Record low Chinook salmon escapements and subsistence harvests occurred in 2008 despite Unalakleet River mesh-size restrictions and a July 5 closure to subsistence and sport fisheries.

At the onset of the 2009 season, a directed Chinook salmon commercial fishery was not expected, and closures to the subsistence and sport fisheries were anticipated for Subdistricts 5 and 6 in early July. After evaluating catch and escapement data following the 2008 season, area biologists projected that Subdistricts 5 and 6 Chinook salmon run in 2009 would be below average and perhaps as weak as the record-low run observed in 2008. Additionally, fishery managers planned and later implemented mesh-size restrictions (6-inch or less mesh) for the Unalakleet River in order to conserve larger and more productive female Chinook salmon. Given the poor forecast, it was imperative to allow more large females to reach spawning areas in order to mitigate the effects of the predicted poor run.

Catch rates in the marine subsistence fishery were consistent throughout the month of June peaking on June 25 whereas Unalakleet River subsistence catches peaked on June 26. In contrast, during the 2007 and 2008 seasons, marine subsistence catch rates were slow, peaked during the third week of June, and then plummeted in late June. In 2009, several fishermen also communicated that they quit fishing early because they met their subsistence needs. Taken collectively, subsistence catch data suggested that the Chinook salmon run was better than expected. However, it is difficult for managers to determine whether improved subsistence fishery catch rates reflect increased abundance of Chinook salmon or are attributable to some other factor related to fishing conditions. By July 2, only 90 Chinook salmon were enumerated at North River tower and with the recent 5-year average quarter-point of July 4 looming, it appeared that Chinook salmon passage would fall well short of the lower end of the SEG range. As a consequence, ADF&G announced it would be closing the Chinook salmon gillnet subsistence and sport fisheries in Subdistricts 5 and 6, effective Saturday, July 4. Beach seining was permitted 7 days a week in order to allow subsistence harvest opportunity of pink and chum salmon, but all Chinook salmon had to be returned to the water immediately.

Unexpectedly, the 2009 Unalakleet River Chinook salmon run was the largest run since 1999. Estimated escapement at North River tower was 2,355 Chinook salmon. This count represented the second highest escapement recorded since 1996 (Appendix A25). Additionally, 2009 represents only the second year in 11 years in which the midpoint of the SEG range has been reached. Further, 1,368 Chinook salmon were counted during an aerial survey conducted under good conditions in upper Unalakleet River and Old Woman River (Table 7). This was the highest aerial survey recorded since 1991 and was consistent with North River tower counts. The 2009 Unalakleet River total run size estimate of 8,403 Chinook salmon was 54% above the recent 5-year (2004–2008) average run-size estimate of 5,465 Chinook salmon, but 18% below the long-term (1984–1986 and 1996-2008) average run size of 10,270 Chinook salmon. Exploitation rate was about 27%, a 43% decrease from the exploitation rate of 47% in 2008.

Mesh-size restrictions and early closures also appear to have had the desired effect of conserving more age-5 and -6 Chinook salmon, thereby improving the quality of the escapement. Chinook salmon captured in beach seines several kilometers upstream were comprised of 33% age-4, 22% age-5, 44% age-6 and 41% female. Overall average length also increased to 714 mm, which is 70 and 117 mm greater than average lengths observed in beach-seined samples from 2007 and 2008, respectively. These data suggest that a greater portion of the run comprised of age-6 Chinook salmon reached spawning areas in the Unalakleet River drainage this year compared to previous years. Further, egg deposition on the spawning grounds undoubtedly increased in 2009 as fecundity is positively correlated with length.

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 fishing needs. The North River tower passage of 190,291 pink salmon ranked fourth highest in the 7 odd-numbered years of counts and easily exceeded the escapement goal threshold of greater than 25,000. The buyer had established markets for the roe and fillets in early July, and the commercial pink salmon fishery was opened on July 8 for a 24-hour fishing period. The fishery was the second consecutive year a directed pink salmon fishery occurred in Subdistricts 5 and 6. Once the 2009 chum salmon and coho salmon fisheries began, the buyer continued to purchase the incidental pink salmon harvest for crab and halibut bait.

Chum salmon catches at the test net were above average by late June and the buyer expressed interest in purchasing chum salmon. However, ADF&G delayed the onset of the chum salmon fishery until they could project that Chinook salmon escapement goals would be reached. By July 8, the North River tower count was 438 Chinook. Historical run-timing information indicated that the final Chinook salmon escapement was projected to range between 1,500 and 2,500 Chinook salmon. With the escapement goal projected to be reached, a 24-hour commercial chum salmon opening was permitted in Subdistricts 5 and 6 to evaluate chum salmon run strength and evaluate Chinook salmon incidental catches. Chum salmon catches were above average for the second week of July and Chinook salmon incidental catches were very low. Therefore, the department scheduled 3 more 24-hour openings and two 48-hour openings until the last week of July when coho salmon management started. Chum salmon catches outnumbered coho salmon catches until the last period in July. The first coho salmon was caught in the test net on July 18. Fishery managers held off on placing Subdistricts 5 and 6 on the coho salmon fishing schedule of two 48-hour periods per week until the test fishery and commercial fishery CPUE improved. By August 1, test fishery and commercial catches improved and the department placed Shaktoolik and Unalakleet Subdistricts on the commercial salmon fishing schedule of two 48-hour periods per week until further notice.

By August 3, test fishery catches of coho salmon were above the recent 5-year average and record-setting by August 17. Additionally, coho salmon passage at North River tower was record-setting by August 31. The commercial salmon season was extended for another week due to record test net catches and escapements and continued buyer interest in early September. Subdistricts 5 and 6 were closed to commercial salmon fishing at 6 p.m. Friday, September 11.

The 2009 commercial catches in the Shaktoolik Subdistrict were 4 Chinook salmon, 36 sockeye salmon, 10,941 chum salmon, 5,146 pink salmon, and 13,063 coho salmon harvested by 21 permit holders (Tables 9 and 1). The Unalakleet Subdistrict 2009 commercial catch harvested by 49 permit holders was 80 Chinook salmon, 89 sockeye salmon, 11,625 pink salmon, 20,647 chum salmon, and 60,230 coho salmon (Tables 9 and 2). There was little effort in a directed pink salmon fishery because most permit holders switched to 6-inch gear when ADF&G opened up the commercial chum salmon fishery on July 10. The Shaktoolik Subdistrict commercial coho harvest was the ninth highest in the fishery and the Unalakleet Subdistrict harvest was the eighth highest on record. The Shaktoolik coho salmon catch was 52% below the recent 5-year average and 15% below the recent 10-year average (Appendix A10). This season's Unalakleet coho salmon catch was 16% below the recent 5-year average but 41% above the recent 10-year average (Appendix A11).

Escapement

Table 7 and Appendix A16 summarize escapement assessments for the major index river systems of Norton Sound and Port Clarence Districts in 2009. Appendices A17–A23 present passage numbers for Chinook, chum, coho, pink, and sockeye salmon at various enumeration projects in Norton Sound. 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 OEG is a specific management objective for escapement that considers biological and allocative factors and may differ from SEG or BEG.

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

Six additional counting projects were also operated in the management area this season. Snake, Eldorado, and Pilgrim rivers had weir projects which were set up and operated cooperatively by ADF&G and NSEDC, and the North River counting tower project was a cooperative project operated by ADF&G in June and NSEDC for the remainder of the summer. 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 for management of local salmon resources and will become more important the longer they operate.

Aerial survey assessment conditions were fair during the month of July. 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, 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 2009 Chinook salmon run had some of the best escapements seen in years throughout most of Norton Sound. In Norton Sound only the eastern area has sizable runs of Chinook salmon and rivers in Unalakleet and Shaktoolik Subdistricts are the primary Chinook salmon producers in Norton Sound. Unalakleet River test net catches, enumeration towers on Kwiniuk, Niukluk, 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 River test net catch was the fourth highest since the test net was standardized in 1985. Prior to 1985, varying data collection and test fishing methodologies had been used. However, improved test net catches this year are most likely the result of a near complete removal of subsistence set gillnet gear from Unalakleet River following mesh-size restrictions in late June. The North River tower count of 2,355 Chinook salmon is the second highest escapement in the current project's 14-year history (1996–2009). Prior to 1996, a counting tower was operated at various locations from 1972 to 1974 and from 1984 to 1986 (Appendix A25). Aerial surveys on North and Unalakleet rivers had the highest counts since 1991, and the Old Woman River count of 430 Chinook salmon was a record. Additionally, the 2009 combined Unalakleet/Old Woman rivers aerial survey index of 1,368 Chinook salmon was only the second time that the lower end of the aerial survey SEG range of 550–1,100 was reached since being established in 1999 (Table 7). The Shaktoolik River count of 129 Chinook salmon was below the escapement goal range (SEG) of 400–800 Chinook salmon (Table 7). However, the 2009 aerial survey of Shaktoolik River should be considered incomplete as it was flown on August 9, well past peak spawning periods for Chinook salmon.

In Moses Point Subdistrict, the Kwiniuk River tower count of 444 Chinook salmon was within the SEG (300–550) range for the first time since 2005. The escapement goal range at Kwiniuk River has been achieved or exceeded in 5 of the last 10 years (Appendix 20). An aerial survey of neighboring Tubutulik River had a count of 627 Chinook salmon, the third highest count since 1997 (Appendix A16). Chinook salmon passage at the Niukluk River tower was 204 and the second best count this decade (Appendix A21), but Pilgrim River Chinook salmon weir passage of 52 was the worst since the project became operational in 2003 (Appendix A18).

Chum Salmon

Chum salmon escapements were average in Shaktoolik Subdistrict and well above average in Unalakleet Subdistrict. 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 Unalakleet Subdistrict because tagging studies conducted in the late 1970s showed an intermingling of stocks in Subdistricts 5 and 6. The aerial survey count of 1,180 chum salmon in Shaktoolik River (Table 7) was average for the 2000s. The Unalakleet River test net chum salmon catch of 1,687 was the second highest on record for the 25-year project, only trailing the catch of 1,932 last year (Table 6). There were also 9,783 chum salmon enumerated at North River tower, which was above the recent 5-year average of 9,012 chum salmon (Appendix A25). However, North River is not considered to be an important chum salmon spawning tributary.

Northern Norton Sound chum salmon runs were below average to nearly record lows in Nome, Golovin, and Moses Point Subdistricts. Nome River weir passage of 1,565 chum salmon was the second lowest since the counting project began operations in 1993 (Appendix A22). Moreover, this is the second season in a row since 2003 that the lower end of the weir-based SEG range (2,900–4,300) was not reached. Eldorado River weir passage of 4,943 chum salmon was the third

lowest since the project was converted to a weir in 2003 and the first year since 2004 that the lower end of the escapement goal range (SEG 6,000–9,200) was not reached (Appendix 17). Snake River weir experienced its second lowest chum salmon escapement (891) and 2009 was the second year in a row that the lower end of the SEG range (1,600–2,500) was not reached (Appendix A19). The Kwiniuk River tower count of 8,739 chum salmon ranked second poorest and would have been the poorest if counting had ended in July as in years prior to 2001 (Appendix A20). At Niukluk River tower, the 15,879 chums counted was the third poorest escapement since counting began in 1995 (Appendix 21). Pilgrim River weir passage of 5,427 chum salmon was lowest since the weir became operational in 2003 and nearly less than half the previous low of 9,685 chum salmon in 2005 (Appendix A18).

Coho Salmon

Coho salmon are found in nearly all of the chum salmon producing streams throughout Norton Sound with the primary commercial contributors being Unalakleet and Shaktoolik rivers. Because inclement weather is normally experienced in this area during August and September, escapement data can be somewhat incomplete. Previous to this decade, few projects counted the coho salmon run. More recent Norton Sound escapement assessment projects are intended to monitor coho salmon as well as chum salmon and are becoming more important to fisheries management. The 2009 coho salmon escapements were average to record-setting, except for Nome Subdistrict and Port Clarence District. In Unalakleet River, cumulative test net catch was 2,104 coho salmon and established a new record for the 25 year project (Table 6). The North River tower count of 22,276 coho salmon was the best escapement since the current project began in 1996 (Appendix A25). In comparison, the Kwiniuk River tower passage of 8,739 coho salmon ranked only seventh highest since the crew began counting the majority of the coho run in 2001 (Appendix A20). The Niukluk River tower passage of 6,861 coho salmon was sixth highest since project operations started in 1995 (Appendix A21). Nome River weir passage of 1,370 coho salmon ranked second lowest out of 9 years, but over double the previous low of 548 coho salmon counted in 2003 (Appendix A22). Snake River weir was inoperable during high water in August, but an aerial survey count of 700 coho salmon was average when compared to previous years (Table 7). Dry Creek, a small tributary of Snake River near the boat harbor, was surveyed this year and 38 coho salmon were observed. Usual problems such as fall storm activity and rising water levels that interfere with aerial surveying were not factors 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 even-numbered year runs typically much higher in number than odd-numbered years. In 2009, the pink salmon run was average for an odd-numbered year and escapement goals for pink salmon in Norton Sound were easily achieved.

Sockeye Salmon

Sockeye salmon are typically found in small numbers throughout Norton Sound District with the largest spawning stock at Glacial Lake where 1,000 to 2,000 sockeyes usually return to spawn each year. 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, near-record to record returns of sockeye salmon to Salmon Lake occurred. 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 and in 2009 there was a great drop in sockeye counts at both Pilgrim River and Glacial Lake weirs. Glacial Lake weir is operated at Glacial Creek near the outlet of the lake and about one mile upstream from the confluence with Sinuk River and 826 sockeyes were counted in 2009, the lowest count since the weir project started in 2001. An aerial survey count during peak spawning had 169 sockeye salmon in Glacial Lake (Table 7). The sockeye salmon aerial escapement goal is 800–1,600 for Glacial Lake. The Salmon Lake sockeye run was the lowest since Pilgrim River weir began operations in 2003 with 953 sockeye salmon counted through the weir (Appendix A18). An aerial survey of Salmon Lake and Grand Central River had an estimated 136 sockeye salmon in Salmon Lake and 50 sockeye salmon in Grand Central River. Another survey estimate had a total of 272 sockeye salmon for Grand Central River and Salmon Lake combined. Combined escapement goal for Salmon Lake and Grand Central River is 4,000–8,000 sockeye salmon (Table 7).

Enforcement

Two Fish and Wildlife Protection officers patrolled the Norton Sound District 2009 commercial salmon fisheries in Unalakleet and one Fish and Wildlife Protection officer patrolled the Nome area. In addition, Nome ADF&G Commercial Fisheries Division has 8 deputized staff with the ability to issue citations, of which two worked the commercial salmon fishery in Subdistricts 5 and 6. The subsistence fishery had no official patrol, but random checks were conducted by two ADF&G personnel.

2010 NORTON SOUND SALMON OUTLOOK

Salmon outlooks and harvest projections for the 2010 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. 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. Chum salmon runs are expected to be average, and more commercial fishing targeting chum salmon is expected. Buyer interest in chum salmon has been increasing in recent years and the harvest could be 60,000 to 80,000 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 for even-numbered years and good pink salmon runs are expected to continue in 2010. ADF&G expects the pink salmon run to be well above average and with the expected renewed buyer interest, harvest could be 150,000 to 300,000 pink salmon in 2010. The coho salmon run in 2010 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 Nome Subdistrict.

2009 PORT CLARENCE SALMON FISHERY

Commercial Fishery Season Summary

No commercial salmon fishing was allowed in 2009. ADF&G had projected that the sockeye salmon run for Pilgrim River in 2009 would exceed the inriver goal of at least 30,000 sockeye salmon that are necessary for a commercial fishery to occur. However, weak subsistence catches

and poor counts at Pilgrim River weir indicating that the 2009 run would be less than one-tenth of the projected run resulted in the department not allowing any commercial salmon fishing.

Subsistence Fishery Season Summary

Reports of poor subsistence catches by fishermen in Brevig Mission and Teller resulted in ADF&G holding off on commercial fishing. Usually there would be commercial fishing periods beginning in early July to test run strength, but because of poor subsistence catches reported the department waited until sockeye salmon started to pass at Pilgrim River weir before considering an opening. The passage was so low at the weir that no commercial fishing was allowed and the department closed subsistence net fishing in the river after the historical midpoint at the weir on July 15 had a cumulative count of 262 sockeye salmon.

There were 953 sockeye salmon counted through Pilgrim River weir in 2009 and the count was the lowest since the weir became operational in 2003. The previous record low at the weir was in 2008 when 20,452 sockeye salmon were counted. Weir passage in 2003 was nearly 43,000 sockeyes and in 2004, escapement through the weir was a record 85,417 sockeyes. From 2005 to 2007 seasons, weir passage ranged from over 43,000 to just under 56,000 sockeyes (Appendix A18).

Subsistence permits have been required for Pilgrim River since 1964 and since 2002 the number of permits issued has skyrocketed with the record sockeye salmon runs. In 2009 there were 190 permits issued, down from 2008 when 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 next year, 2004, there were 223 permits 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 lower number of permits issued this year was likely the result of poor fishing and the midseason closure. Salmon Lake remained closed to all salmon fishing in 2009.

The crash of the Pilgrim River sockeye salmon run was unforeseen by ADF&G. Various projections had a run of at least 40,000 sockeye salmon, but the run came in at less than one-tenth of the projections. Interestingly, all other salmon escapements at Pilgrim River weir were the lowest since the weir became operational in 2003.

Although permits had been required in the Pilgrim River drainage for over 40 years, 2009 was only the sixth year that permits were required throughout Port Clarence District. Number of subsistence salmon permits issued for all waters of Port Clarence District, excluding Pilgrim River and Salmon Lake, was 136 permits, slightly down from the 150 permits issued the previous year.

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). However, in 2009, an aerial survey of Salmon Lake and Grand Central River after peak spawning estimated 136 sockeye salmon in Salmon Lake and 50 sockeye salmon in Grand Central River, a tributary to Salmon Lake. The combined aerial survey count of 186 sockeye salmon was the second lowest on record. The combined escapement goal for Salmon Lake and Grand Central River is 4,000–8,000 sockeye salmon (Table 7).

Salmon Lake had an average sockeye salmon spawning population of roughly 12,500 fish in the 5 years previous to 2003. But from 2003 to 2007, sockeye salmon escapements skyrocketed and average weir count for the 5-year period was almost 56,000 sockeye salmon (Appendix A18). In 2008, Pilgrim River weir passage took a downturn with 20,452 sockeye salmon counted, and the 953 sockeye salmon passage in 2009 was less than one twentieth of the previous low weir count in 2008.

Similar to 2008, liquid fertilizer was applied to Salmon Lake by NSEDC in 2009.

Enforcement

In 2009, one Fish and Wildlife Protection officer patrolled Pilgrim River in Port Clarence District.

2010 PORT CLARENCE SALMON OUTLOOK

The guideline harvest range (GHR) set by BOF for the Port Clarence sockeye salmon fishery allows for a harvest of up to 10,000 sockeye salmon. Based on the poor 2009 sockeye salmon run and outmigrating smolt data, ADF&G expects another poor sockeye salmon run in 2010 and the inriver goal of 30,000 sockeye salmon for Pilgrim River is not expected to be met. Although no commercial fishing is expected in 2010 the other salmon species are expected to have much improved runs allowing for subsistence fishing.

ADF&G will compare the 2010 run with sockeye salmon escapement counts from the last few years at the weir and with the expected poor sockeye salmon run subsistence fishing restrictions are expected in Pilgrim River after July 4.

2009 KOTZEBUE SOUND SALMON FISHERY

Commercial Fishery Season Summary

Kotzebue Sound commercial salmon fishery opened on July 10 and closed by regulation after August 31. Gear is limited to set nets with an aggregate of no more than 150 fathoms per fisherman. 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 in (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 had planned to open the commercial fishery continuously and allow the buyer to set fishing time for their fleet. However, complaints from fishermen that in past years some permit holders set their nets early or pulled their nets late resulted in ADF&G setting openings for the 2009 commercial fishery from 6 a.m. to 2 p.m. every day except Sunday. The buyer could then call ADF&G and request a change to those opening hours if needed. Four times the buyer requested changing the hours to accommodate the change in plane schedule on Mondays out of Kotzebue. Fifteen times the buyer shortened the period for their fleet from 8 hours because of capacity limits. The department extended one period to 10 hours because of weather concerns.

There were 62 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 was the highest number since 2001, the last time there were two buyers in the fishery. Since 2004, when a buyer returned to Kotzebue to purchase salmon, the number of permit holders that fished

had been in the 40s, and was 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 2009 was estimated to be average to above average based on commercial harvest rates, subsistence fishermen reporting excellent catches, the Kobuk test fish index being the tenth best in the 17-year project history, and aerial surveys in the Kobuk and Noatak River drainages. The commercial harvest was 187,562 chum salmon, totaling over 1.5 million pounds, similar to the previous year (Appendix C2). Also harvested during the commercial fishery and kept for personal use were 11 Chinook salmon, 17 sockeye salmon, 47 pink salmon, 31 coho salmon, 960 Dolly Varden and 180 sheefish (Table 10). There were likely some additional fish kept for personal use that did not get reported on fish tickets.

Beginning on July 10, the season was opened to commercial fishing and fishing time was set from 6 a.m. to 2 p.m. daily, Monday through Saturday. Other than the first two periods on July 10 and July 11, when the buyer had their fleet fish for 7 hours, the buyer did not shorten fishing time until early August. Beginning on August 3, the peak of the run began to pass through the fishing district and the buyer started to shorten the fishing periods for their fleet. Only 4 days of fishing occurred the first week of August, and period length varied from 3 to 6 hours because of capacity limits. The following week there were 6 days of fishing, but periods were only 4 hours daily. Beginning on August 20 and throughout the remainder of the season the buyer had the fleet fish 8 hours daily, except during the Sunday closure.

The biggest one day catch was on August 6, when 16,335 chum salmon were sold during a 4 hour opening. Also, on that day the highest number of fishermen participated in an opening with 36 permit holders fishing. The season catch of 187,562 chum salmon was slightly below the 190,550 chum salmon harvested last year, but was the second highest commercial harvest since 2001.

A total of 1,505,734 pounds of chum salmon (average weight 8.0 lbs) were sold at an average of $0.25 per pound (Appendix C3), with a total exvessel value of $376,554 for Kotzebue Sound fishermen. Average value for each participating permit holder was $6,073, and total exvessel value represents 64% of the $585,505 historical average (Appendix C4).

Subsistence Fishery Season Summary

Subsistence household surveys were regularly conducted in Kotzebue District from 1962 to2004 by Division of Subsistence, but since 2004, no subsistence surveys have been conducted in the area (Appendices C5–C7). In 2009, no subsistence salmon surveys occurred, and no other information on subsistence harvest is available other than comments that chum salmon fishing on Kobuk and Noatak rivers was good.

Escapement

This year's test fish chum salmon CPUE cumulative index was 971 and ranked tenth out of seventeen years at the Kobuk River test fish project (Table 11). The midpoint at the test fishery was August 6, and had later than normal run timing compared to other years (Appendix C9).

Kobuk River test net catches were 8% age-0.2 fish, 27% age-0.3 fish, 54% age-0.4 fish, and 11% age-0.5 fish. The age-0.2 catch was the third highest on record and the age-0.3 catch was the third lowest on record.

Test fishing was conducted twice during the run in the lower Noatak River by department personnel to obtain ASL information. Age composition of Noatak River test net drift catches

were a record high for age-0.2 fish with 20% and a record low for age-0.3 fish with 22%. Age-0.4 fish were in the normal range with 48% and age-0.5 fish were second highest on record with 9% of the age composition.

Peak aerial surveys of Kobuk River and Noatak River drainages were conducted in mid-September. Noatak and Eli rivers aerial survey counts were 67,265 and 2,607 chum salmon and within the combined aerial survey goal range of 42,000 to 91,000 chum salmon (Appendix C8). There were 3,986 chum salmon counted in Kelly River and Kelly Lake and the count was second best in the last 10 surveys dating back to 1995. In Kobuk River drainage, 44,947 chum salmon were enumerated in upper Kobuk River and 208 chum salmon were counted in Selby River. The Selby River counts were the lowest in 13 years of surveys dating back to 1990, but are thought to be conservative because poor survey conditions resulting from winds and shadows from riparian timber caused the observer to miss some fish. However, the combined Kobuk/Selby rivers count of 45,155 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 2009 commercial salmon fishery.

2010 Kotzebue Salmon Outlook

Outlook for the 2010 season is based on parent-year returns and returning age classes observed in test fish samples from Kobuk and Noatak rivers in 2009. During the 2010 season, the 4-year-old component of the run is expected to be above average based on the 3-year-old return. The 5-year-old component of the run is expected to be 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 average. Commercial harvest is expected to fall within the range of 175,000 to 225,000 chum salmon, if market conditions can accept that level of harvest.

SECTION 3: PACIFIC HERRING FISHERIES

2009 NORTON SOUND PACIFIC HERRING FISHERY

Sac Roe

There was no market interest in herring sac roe in Norton Sound during the 2009 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

ADF&G opened the Norton Sound herring spawn-on-wild kelp fishery from June 14 until June 21 because a few Norton Sound herring permit holders notified the department that they had a market; however, no harvest occurred. There was no interest expressed in the commercial *Macrocystis* spawn-on-kelp fishery in 2009.

Bait Fishery

There was a directed bait herring fishery in 2009. NSEDC purchased 28.2 tons of bait herring from 6 fishermen, and total exvessel value of the fishery was $16,913 (Table 12).

Commercial Fishery Management

ADF&G projection for the 2009 spawning biomass for Norton Sound sac roe fishery was 36,917 tons. At 20% exploitation rate, guideline harvest level (GHL) for Norton Sound District was 7,383 tons with 6,360 tons allocated to the gillnet fishery.

Herring were first observed on June 6 by commercial pilots in St. Michael and Unalakleet Subdistricts. On June 7, NSEDC biologists conducted an aerial survey in southern Norton Sound and observed several large schools of herring and several miles of spawn in St. Michael Subdistrict. A few large schools of herring were also spotted at Cape Denbigh. However, poor viewing conditions, particularly fog, murky water, and nearshore ice, precluded a complete survey of St. Michael and Cape Denbigh Subdistricts. ADF&G was willing to open the fishery any time the buyer was ready and the buyer requested to start fishing on June 8. The department consequently opened the fishery at 12:00 p.m. June 8. First delivery was made on June 12 and 4 permit holders brought in over half of the total harvest in 9 landings (Table 12). The fishery was left open continuously to allow the most favorable herring fishing schedule as determined by the buyer and fishermen. Final delivery was made on June 15.

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 15 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 2009 season. The test fish crew's presence and sampling efforts on herring grounds are used for determining age and sex composition of the stocks before, during and after spawning (Appendices D6–15). The crew also assisted with any paperwork or questions from the fishing fleet.

Catch Reporting and Enforcement

The herring buyer registered for the 2009 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 2009, 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 Norton Sound herring grounds during the 2009 fishery; however, the assistant area biologist stationed in Unalakleet for the 2009 herring season was deputized and able to cite fishing violations if necessary.

Biomass Determination

Inclement weather, murky water, and nearshore ice in Subdistricts 1 and 3 led to poor viewing conditions when the herring first arrived in early June. Conditions had improved slightly when the peak survey was flown by ADF&G and NSEDC biologists on June 11. Two additional surveys were flown by NSEDC and ADF&G biologists the following week (Table 13).

2010 NORTON SOUND PACIFIC HERRING OUTLOOK

The biomass of herring projected to return in 2010 to Norton Sound is 42,889 tons. A 20% exploitation rate would result in a harvest guideline of 8,578 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 8,258 tons for sac roe harvest. The beach seine harvest is, by regulation, 10% of the sac roe projected harvest, or 826 tons. The 2010 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 8 are expected to dominate the returning population, contributing 36%, 24% and 27%, respectively. Age 9 and older herring are expected to comprise 8% of the biomass (Appendix D15).

SECTION 4: KING CRAB FISHERIES

NORTON SOUND CRAB FISHERY

Abundance

The ADF&G length-based population model estimated legal male crab abundance for the 2009 summer commercial crab fishery at 3.75 million pounds (1.34 million crabs). This is an increase of approximately 14% from the revised population estimate of 3.30 million pounds (1.18 million pounds) for 2008. The 2009 winter study data indicate recruitment has increased compared to 2008 and will likely continue to increase for the next year. Current size composition data show the portion of the crab population classified as recruits has increased by a third compared to 2008 survey results and postrecruit male crab population has almost doubled, leading to a possible combined increase of 46% in legal component of the population. The winter pot study also showed that the pre-1 population has increased by a third compared to 2008 survey results, but that the pre-2 population is less than a third compared to 2008 (Appendix E7). Pre-1 crabs require one molt to become part of legal population next year, while pre-2 crabs require two molts. These findings indicate that legal crab population in 2009 could be greater than in 2008 and will likely increase in 2010, followed by a possible decline in 2011.

A 10% exploitation rate on the legal population ≥ 4-3/4 inch carapace width equates to a GHL of 375,000 pounds of crab. This follows the harvest strategy set by the Alaska Board of Fisheries. By regulation, the CDQ fishery is allocated 7.5% of the summer season quota; therefore, the CDQ harvest quota was set at 28,125 pounds preseason.

Summer Open Access Commercial Fishery

The 2009 summer open access commercial crab fishery was opened by emergency order at 12:00 noon, June 15 in Norton Sound Section, with a GHL of 346,875 pounds of crab. Two companies, Norton Sound Seafood Products (NSSP) and Aquatech, were registered to buy crab, and 6 fishermen registered to sell crab dockside as catcher-sellers. NSSP operated a seafood processing plant in Nome and two tenders in eastern Norton Sound, while a fisherman based in Unalakleet flew live crabs to Aquatech in Anchorage. The majority of crabs were delivered to NSSP, while 4 catcher-sellers sold crabs directly to local residents.

First open-access delivery was made on June 18 and final delivery was made September 20, when the open access portion of the fishery was closed by emergency order at 12:00 noon, for a total season length of 98 days. In 2009, due to poor crab meat fill, NSSP stopped purchasing crab between June 29 and July 6, except for a small test catch. Aquatech continued to purchase crab, and catcher-sellers still sold their catch. Crabs with poor meat fill were generally found south of Nome in western Norton Sound and not in eastern Norton Sound. Reasons for the poor meat fill are unclear but might be an indication that crabs in certain areas molted later than usual the previous year, or had less abundant food sources.

The open-access harvest from fish ticket reports was 133,498 red king crabs or 369,462 pounds (107% of the open-access quota). Of this total, 1,942 pounds were reported as deadloss, and 8,972

pounds reported as personal use. A total of 22 vessels and 23 permit holders made 333 landings, and average weight for commercially caught crab was 2.8 pounds. Number of pots registered was 920 and there were 11,022 pot pulls throughout the fishery, for a CPUE of 12 crabs. For the months of June through August, average CPUE was 10 crabs, while for September it was 19 crabs. During the last week before fishery closure, CPUE jumped up to 26 crabs. Overall, however, the catch rate in 2009 was much lower than in the previous 5 years. In a postseason survey of permit holders some fishermen said the crab were more spread out than in previous years. Average price paid was $3.18 per pound, and exvessel value of the fishery was $1,139,208. Appendix E3 gives current and past years' fishery information and economic performance for both the open access and CDQ fisheries.

CDQ Fishery

For the first time since the CDQ fishery was implemented in 1998, the CDQ fishery opened concurrently with the open-access fishery in 2009. First CDQ delivery was made on June 18, the season lasted 43 days, and total harvest was 28,125 pounds of crab, 100% of the CDQ allocation (Table 14). The CDQ season lasted much longer than usual due to poor crab meat fill and resulting plant closure, and because the CDQ fishermen were also fishing the open access fishery. Seven permit holders were registered to fish CDQ but only 4 actually fished, making a total of 26 landings and 912 pots lifts. Average price paid to fishermen was $3.13 per pound, for an exvessel value of $85,620 for the CDQ fishery, which closed at 12:00 noon July 28, 2009. This was the ninth year a CDQ harvest occurred since the CDQ fishery was implemented in 1998, and the sixth year the fishery harvested or nearly harvested the entire allocation.

Fish ticket reports document that 13 statistical areas were fished in the open access and CDQ fisheries (Table 15). Contrary to past couple of years with half of the total harvest coming from statistical area 636401, this year roughly equal harvests came from 3 statistical areas: 626401 (26%), 636401 (24%), and 656401 (27%), all of which are directly south of the closed boundary line (Appendices E8 and E21). Fishermen moved around a lot more this year as they searched and waited for the crab to move offshore. Statistical area 646401 (12%) was the only other area with significant harvest. The catch from stat areas east of 164°W longitude made up 54% of the harvest, compared to 77% last year (Appendix E1 and E9), likely due to a difference in crab distribution and migration this year.

Commercial Catch Sampling

Carapace length measurements and shell age were collected from 6,026 commercially-caught crabs 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 crabs made up 82% of the total legal crabs sampled, and old-shell crabs made up 18% (Table 16). Recruit crabs are new-shell legal crabs < 116 mm carapace length (CL). Postrecruit crabs are legal new-shell male crabs $\geq$116mm CL and all legal old-shell males. Recruit crabs made up 43% of the legal crabs sampled and postrecruit crabs made up 57% (Appendix E4). Overall mean carapace length of legal male crabs was 116 mm (Table 16). For comparison of historical length composition of Norton Sound red king crab summer commercial harvests from 1981 to 2009 (see Appendices E14–E20).

Enforcement

One Alaska Department of Public Safety trooper made dockside checks during the 2009 summer crab fishery. In addition, two deputized ADF&G staff worked the king crab fishery.

Winter Commercial Fishery

The winter commercial season opened November 15, 2008, and 11 fishermen registered. Based on fish tickets submitted, the first landing was made December 30. From then until the last landing on May 2, 7 fishermen made a total of 130 landings and 1,282 potlifts, with an overall CPUE of 4 and average weight of 2.5 pounds per crab. Price of crab averaged $3.01 per pound, and total exvessel value of the fishery was $32,649. A total of 4,951 crabs were sold, with percentages of crabs sold (and CPUE) each month as follows: December 1% (4), January 29% (4), February 19% (4), March 32% (5), April 18% (3), and May 0% (2). Total number of crabs harvested was 15% less than in 2008. No commercial fishermen reported losing their pots during the 2009 winter season. Pots were fished from 12 miles east to 8 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 crabbers, the seafood plant in Nome, and other non-local markets such as Anchorage. Most crabbers 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 2009.

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 (Appendices E5 and E6). During the 2008/2009 Nome area winter crab season, 105 permits were issued, 105 returned, and 70 permit holders reported fishing for a total of 4,752 crabs (compared to 9,485 crabs for 2008) kept for winter subsistence use. Almost 100% of the crabs were caught with pots.

During the 2009 Norton Sound summer subsistence crab season, 20 permits were issued and returned, and out of 13 permit holders that set pots, 12 fishermen reported harvesting a total of 653 crabs, 94% of which were harvested near Unalakleet. Crabs kept per fisherman averaged 50 crabs for summer 2009. Appendix E6 compares the harvest information from 2004 to 2009.

Sport Fishery

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 2010. Results of the winter project will be used in the length-based model to project the summer 2010 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

Commercial Fishery

In 2006, BOF split the St. Lawrence Island section between north and south of 66° N latitude (Figure 8). 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 2009. No permit holders fished in the Kotzebue section in 2009.

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 2008/2009 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 to 1987 and 1991 to 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 harvest of 957 sheefish in 2009. 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 2009, test fishing on Kobuk River resulted in 438 sheefish caught in 242 drifts, for a cumulative CPUE of 465. The CPUE ranked seventh out of twelve years sheefish catches were recorded.

DOLLY VARDEN

Commercial Fishery

Dolly Varden *Salvelinus malma* are occasionally incidentally caught in commercial salmon fisheries in Norton Sound and Kotzebue Districts. In 2009, no Dolly Varden were reported

caught in Norton Sound commercial fisheries. Kotzebue District reported 960 caught but not sold, compared to last year when 1,629 fish 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 2009. 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 3,600 Dolly Varden in Norton Sound in 2009 compared to 3,319 Dolly Varden in 2008 and 1,406 Dolly Varden was harvested in Kotzebue/Chukchi Sea areas compared to the 852 harvested in 2008 (Appendix F3). The majority of Dolly Varden sport fish harvest in Norton Sound was taken from Unalakleet River with 2,905 fish, and Nome River was second highest with 255 fish. Overall, Dolly Varden sport fish harvests in the last 10 years in Norton Sound averaged almost 4,200 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 2009, no aerial surveys were flown for Noatak or Kivalina rivers, but a survey was flown on Wulik River that counted a total of 63,977 Dolly Varden (Appendix F7).

WHITEFISH

Commercial Fishery

No fishermen harvested whitefish commercially since 2007. 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 $.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 2009. However, historical survey data collected in various years from 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 sport fish 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 2009, Norton Sound household subsistence surveys were conducted; however, subsistence harvest information of tomcod was not collected.

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TABLES

Table 1.–Commercial salmon set gillnet catches from Shaktoolik, Subdistrict 5, Norton Sound, 2009.

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	7/08-7/09	24	4	0	0	0.00	2,320	24.17	0	0.00
2	Chum	7/10-7/11	24	11	1	2,222	8.42	1,763	6.68	5	0.02
3	Chum	7/12-7/13	24	10	3	1,840	7.67	133	0.55	14	0.06
4	Chum	7/14-7/15	24	9	0	1,110	5.14	124	0.57	51	0.24
5	Chum	7/16-7/17	24	12	0	1,184	4.11	305	1.06	49	0.17
6	Chum	7/19-7/21	48	14	0	1,275	1.90	271	0.40	122	0.18
7	Chum	7/22-7/24	48	14	0	1,229	1.83	200	0.30	321	0.48
8	Coho	7/26-7/28	48	10	0	429	0.89	10	0.02	319	0.66
9	Coho	7/29-7/31	48	8	0	174	0.45	14	0.04	332	0.86
10	Coho	8/02-8/04	48	16	0	237	0.31	6	0.01	890	1.16
11	Coho	8/05-8/07	48	13	0	269	0.43	0		1,386	2.22
12	Coho	8/09-8/11	48	17	0	372	0.46	0		2,355	2.89
13	Coho	8/12-8/14	48	14	0	152	0.23	0		1,207	1.80
14	Coho	8/16-8/18	48	15	0	254	0.35	0		2,582	3.59
15	Coho	8/19-8/21	48	9	0	95	0.22	0		1,101	2.55
16	Coho	8/23-8/25	48	6	0	26	0.09	0		826	2.87
17	Coho	8/26-8/28	48	9	0	36	0.08	0		937	2.17
18	Coho	8/30-9/01	48	No one fished due to storm conditions							
19	Coho	9/02-9/04	48	5	0	25	0.10	0		412	1.72
20	Coho	9/06-9/08	48	5	0	8	0.03	0		123	0.51
21	Coho	9/09-9/11	48	Catch information by period confidential							
Total			888	21	4	10,941		5,146		13,063	

Note: The 4 Chinook salmon caught were not sold. There were also 36 sockeye salmon harvested in the Shaktoolik Subdistrict in 2009.

Table 2.–Commercial salmon set gillnet catches from Unalakleet, Subdistrict 6, Norton Sound, 2009.

Period	Target Species	Dates Fished	Length (hours)	Permits Fished	Chinook Harvest	Chum		Pink		Coho	
						Harvest	CPUE	Harvest	CPUE	Harvest	CPUE
1	Pink	7/08-7/09	24	6	0	126	0.88	2,217	15.40	2	0.01
2	Chum	7/10-7/11	24	10	14	1,517	6.32	4,105	17.10	8	0.03
3	Chum	7/12-7/13	24	14	5	1,608	4.79	1,508	4.49	21	0.06
4	Chum	7/14-7/15	24	15	12	1,691	4.70	541	1.50	50	0.14
5	Chum	7/16-7/17	24	9	4	1,045	4.84	579	2.68	29	0.13
6	Chum	7/19-7/21	48	21	10	2,601	2.58	910	0.90	275	0.27
7	Chum	7/22-7/24	48	14	5	1,688	2.51	1,048	1.56	536	0.80
8	Coho	7/26-7/28	48	24	6	1,877	1.63	271	0.24	1,796	1.56
9	Coho	7/29-7/31	48	24	1	1,108	0.96	159	0.14	3,373	2.93
10	Coho	8/02-8/04	48	39	2	1,083	0.58	119	0.06	6,505	3.47
11	Coho	8/05-8/07	48	41	3	1,312	0.67	109	0.06	10,890	5.53
12	Coho	8/09-8/11	48	40	1	1,453	0.76	31	0.02	10,091	5.26
13	Coho	8/12-8/14	48	39	2	1,086	0.58	8	0.00	4,128	2.21
14	Coho	8/16-8/18	48	37	3	804	0.45	15	0.01	6,189	3.48
15	Coho	8/19-8/21	48	34	4	673	0.41	4	0.00	5,287	3.24
16	Coho	8/23-8/25	48	35	3	435	0.26	0	0.00	5,980	3.56
17	Coho	8/26-8/28	48	33	3	211	0.13	0	0.00	2,046	1.29
18	Coho	8/30-9/01	48	8	0	56	0.15	0	0.00	479	1.25
19	Coho	9/02-9/04	48	24	1	141	0.12	1	0.00	1,710	1.48
20	Coho	9/06-9/08	48	13	1	94	0.15	0	0.00	614	0.98
21	Coho	9/09-9/11	48	10	0	38	0.08	0	0.00	221	0.46
Total			888	49	80	20,647		11,625		60,230	

Note: The 80 Chinook salmon caught were not sold. There were also 89 sockeye salmon harvested in the Unalakleet Subdistrict in 2009.

Table 3.–Commercial salmon set gillnet catches from Norton Bay, Subdistrict 4, Norton Sound, 2009.

Period	Target Species	Dates Fished	Length (hours)	Permits Fished	Chinook Harvest	Chum Harvest	Chum CPUE	Pink Harvest	Pink CPUE	Coho Harvest	Coho CPUE
1	Chum	7/14-7/15	36	Catch information by period confidential							
2	Chum	7/16-7/17	36	4	0	503	3.49	132	0.92	26	0.18
3	Chum	7/20-7/21	36	4	0	170	1.18	155	1.08	30	0.21
4	Coho	7/23-7/24	36	Catch information by period confidential							
5	Coho	7/28-7/30	48	4	0	270	1.41	76	0.40	190	0.99
6	Coho	7/31-8/02	48	5	0	344	1.43	48	0.20	584	2.43
7	Coho	8/03-8/05	48	5	0	194	0.81	30	0.13	735	3.06
8	Coho	8/06-8/08	48	Catch information by period confidential							
9	Coho	8/12-8/14	48	Catch information by period confidential							
Total			384	7	0	1,850		558		1,714	

Table 4.–Commercial salmon set gillnet catches from Golovin, Subdistrict 2, Norton Sound, 2009.

Period	Target Species	Dates Fished	Length (hours)	Permits Fished	Chinook Harvest	Chum Harvest	Pink Harvest	Coho Harvest
1	Coho	8/07-8/09	48	Catch information by period confidential				
2	Coho	8/10-8/12	48	4	0	59	0	1,161
3	Coho	8/14-8/16	48	4	0	4	0	645
4	Coho	8/17-8/19	48	Catch information by period confidential				
5	Coho	8/24-8/26	48	Catch information by period confidential				
Total			240	5	0	87	0	2,452

Table 5.–Commercial salmon set gillnet catches from Moses Point, Subdistrict 3, Norton Sound, 2009.

Period	Target Species	Dates Fished	Length (hours)	Permits Fished	Chinook Harvest	Chum Harvest	Chum CPUE	Pink Harvest	Pink CPUE	Coho Harvest	Coho CPUE
1	Coho	8/07-8/09	48	13	0	150	0.24	11	0.02	2,194	3.52
2	Coho	8/10-8/12	48	12	0	109	0.19	0	0.00	1,805	3.13
3	Coho	8/14-8/16	48	13	0	78	0.13	1	0.00	1,402	2.25
4	Coho	8/17-8/19	48	12	0	51	0.09	1	0.00	1,171	2.03
5	Coho	8/24-8/26	48	11	0	115	0.22	2	0.00	1,634	3.09
6	Coho	8/27-8/29	48	13	0	29	0.05	20	0.03	918	1.47
7	Coho	9/02-9/04	48	9	0	65	0.15	0	0.00	458	1.06
Total			336	17	0	597		35		9,582	

Table 6.–Historical Chinook, coho, and chum salmon catches for Unalakleet River set net test fishery, 1985–2009.

		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
2009	6/08-9/11	135	6/28	1,687	7/18	2,104	8/18

Table 7.–Salmon counts of rivers and associated salmon escapement goal ranges (SEG, BEG or OEG), Norton Sound and Port Clarence, 2009.

	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]	Aerial Survey Expansion	Escapement Goal Range
Salmon L.									
Grand Central R.									
Agiapuk R.									
American R.									
Pilgrim R.	52				5,427				
Glacial L.									
Sinuk R.						4,000 - 6,200 [b]	344	2,232	
Cripple R.							5		
Penny R.							3		
Snake R.	6				891	1,600 - 2,500 [c]			
Nome R.	10				1,565	2,900 - 4,300 [c]			
Flambeau R.						4,100 - 6,300 [b]	860	4,075	
Eldorado R.	31		14		4,943	6,000 - 9,200 [c]	1,069		
Bonanza R.			3			2,300 - 3,400 [b]	1,851	6,744	
Solomon R.			1			1,100 - 1,600 [b]	89	918	
Nome Subdistrict						23,000 - 35,000 [d]		21,368	
Fish R.				**Combined**					
Boston Cr.				**100 - 250**					
Niukluk R.	204				15,879	>30,000			
Ophir Cr.									
Kwiniuk R.	444	300 - 550			8,739	11,500 - 23,000 [e]			
Tubutulik R.			627			9,200 - 18,400 [b, e]	3,161		
Ungalik R.									
Inglutalik R									
Pikmiktalik R									
Shaktoolik R.			129	400 - 800			1,180		
Unalakeet R.			938	**Combined**			6,113		**Combined**
Old Woman R.			430	**550 - 1,100**			1,030		**2,400 - 4,800**
North R.	2,355	1,200 - 2,600	438		9,783		3,263		

-continued-

Table 7.–Page 2 of 2.

Stream	Coho Salmon Weir/ Tower Count	Coho Salmon Aerial Survey Count [a]	Coho Salmon Escapement Goal Range	Sockeye Salmon Weir/ Tower Count	Sockeye Salmon Aerial Survey Count [a]	Sockeye Salmon Escapement Goal Range	Pink Salmon Weir/ Tower Count	Pink Salmon Escapement Goal Range	Pink Salmon Aerial Survey Count [a]
Salmon L.					136	**Combined**			
Grand Central R.					50	**4,000 - 8,000**			
Pilgrim R.	18			953			483		
Glacial L.				826	169	800 - 1,600			
Sinuk R.		508			40				6,730
Cripple R.		258							250
Penny R.		139							22
Snake R.		700					769		
Nome R.	1,370	877		103			16,490	3,150	
Flambeau R.		627							
Eldorado R.	2	301					1,119		1,598
Bonanza R.		1,165			4				210
Solomon R.		446							3,276
Fish R.									1,565
Boston Cr.			**Tower Goal**						
Niukluk R.	6,861		**2,400-6,100**				24,204	10,500	
Ophir Cr.									
Kwiniuk R.	8,563		650-1,300				42,957	8,400	
Tubutulik R.									
Ungalik R.									
Inglutalik R									12,695
Pikmiktalik R									
Shaktoolik R.		142							1,916
Unalakeet R.					70				22,570
Old Woman R.									1,352
North R.	22,114	2,830	550-1,100				189,939	25,000	8,195

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 8.–Subsistence salmon harvest for northern Norton Sound, 2009.

	Permits Fished [a]	Number of Salmon Harvested					
		Chinook	Sockeye	Coho	Pink	Chum	Total
Marine Waters	26	20	30	258	154	106	568
Bonanza River	20	1	1	148	8	29	187
Cripple Creek	2	0	0	3	0	0	3
Eldorado River	7	6	5	156	28	197	392
Flambeau River	1	0	0	0	0	0	0
Nome River- above weir	6	0	0	4	15	0	19
Nome River- below weir	75	3	4	228	219	19	473
Nome River - unknown location	11	0	0	11	0	0	11
Penny River	1	0	0	0	0	0	0
Sinuk River	19	0	18	41	12	5	76
Snake River - unknown location	6	0	0	2	2	0	4
Snake River - below weir	40	2	6	236	41	30	315
Solomon River	14		0	5	8	1	14
Topkok Creek	1	0	0	40	0	0	40
Nome Subdistrict Total [b]	261	32	64	1,132	487	387	2,102
Cape Woolley [c]	2	2	1	1	21	9	34
Marine Waters	10	158	5	138	896	265	1,462
Kachavik River	10	0	1	57	431	114	603
McKinley River	11	5	8	61	3	4	81
Chinik Creek	9	0	0	243	13	0	256
Fish River	36	39	14	583	959	754	2,349
Niukluk River- above tower	22	17	2	62	669	257	1,007
Niukluk River- below tower	21	17	3	233	796	300	1,349
Other Creeks/rivers	2	1	0	20	0	0	21
Golovin Subdistrict Total [d]	96	237	33	1,397	3,767	1,694	7,128
Marine Waters	9	120	1	186	3	21	331
Kwiniuk River - above tower	9	5	0	87	308	53	453
Kwiniuk River - below tower	49	192	11	1,006	990	367	2,566
Next Creek	3	0	0	12	0	0	12
Tubutulik River	17	158	1	171	215	49	594
Iron Creek	11	0	0	898	6	91	995
Other Creeks/rivers	7	70	0	74	0	19	163
Moses Point Subdistrict Total [e]	60	545	13	2,434	1,522	600	5,114
Port Clarence - Marine Waters	62	29	782	643	1,645	2,319	5,418
Tuksuk Channel	11	4	162	155	195	518	1,034
Imuruk Basin	1	0	5	0	7	11	23
Agiapuk River	3	0	0	0	0	161	161
Kuzitrin River	2	0	0	5	0	2	7
Pilgrim River- above weir	2	1	6	0	0	0	7
Pilgrim River- below weir	35	6	688	1	35	49	779
Port Clarence District Total [f]	148	40	1,643	804	1,882	3,060	7,429
Total	567	856	1,754	5,768	7,679	5,750	21,807

[a] There were 6 locations where Tier I subsistence permits were issued in 2009 for northern Norton Sound: 1 - Nome Subdistrict; 2 - Cape Woolley; 3 - Golovin Subdistrict; 4 - Moses Point Subdistrict; 5 - Pilgrim River; and 6 - Port Clarence District. Permits fished include those permit holders who fished, but reported no harvest.

[b] There were 426 Nome Subdistrict permits issued and 421 were returned.

[c] All 11 Cape Woolley permits issued were returned.

[d] There were 161 Golovin Subdistrict permits issued and 159 were returned.

[e] All 73 Moses Point Subdistrict permits issued were returned.

[f] All 190 Pilgrim River permits issued were returned, and 136 Port Clarence District permits were issued and 134 returned. Salmon Lake was not opened to salmon fishing.

Table 9.–Norton Sound commercial salmon harvest summary by subdistrict, 2009.

		Subdistricts						
		1	2	3	4	5	6	Total[a]
Number of Fishermen[b]		0	5	17	7	21	49	88
Chinook	Number	0	0	0	0	4	80	84
	Weight (lbs)	0	0	0	0	0	0	0
Sockeye	Number	0	0	1	0	36	89	126
	Weight (lbs)	0	0	8	0	253	322	583
Coho	Number	0	2,452	9,582	1,714	13,063	60,230	87,041
	Weight(lbs)	0	17,508	73,749	13,168	105,865	469,126	679,416
Pink	Number	0	0	35	558	5,146	11,625	17,364
	Weight (lbs)	0	0	180	1,823	13,513	31,182	46,698
Chum	Number	0	87	597	1,850	10,941	20,647	34,122
	Weight (lbs)	0	296	4,229	12,414	75,123	148,440	240,502
Total	Number	0	2,539	10,215	4,122	29,190	92,671	138,737
	Weight (lbs)	0	17,804	78,166	27,405	194,754	649,070	967,199

[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 6.9 lbs for sockeye salmon, 7.8 lbs for coho salmon, 2.7 lbs for pink salmon and 7.0 lbs for chum salmon. Chinook salmon retained for personal use; weight unavailable.

[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 10.–Kotzebue District commercial chum salmon catch and average weight by week, 2009.

Week	Number of Fishermen	Catch	Pounds	Average Weight
07/10- 07/11	12	3,461	28,237	8.2
07/13 - 07/18	25	14,610	117,823	8.1
07/20 - 07/25	37	22,982	188,408	8.2
07/27 - 08/01	36	23,817	194,721	8.2
08/03 - 08/06	45	39,922	333,094	8.3
08/10- 08/15	34	36,272	295,712	8.2
08/17 - 08/22	33	21,875	167,931	7.7
08/24 - 08/29	26	24,046	175,742	7.3
8/31	9	577	4,066	7.0
Total	62	187,562	1,505,734	8.0

Note: Also harvested during the commercial fishery and kept for personal use were 11 Chinook salmon, 17 sockeye salmon, 47 pink salmon, 31 coho salmon, 960 Dolly Varden and 180 sheefish.

Table 11.–Historical chum salmon catch for Kobuk River drift test fishery, 1993–2009.

Year	Dates of Operation	Number of Drifts	Cumulative CPUE [a]	Midpoint Date
1993	7/12-8/12	164	494	8/03
1994	7/13-8/30	248	1,207	8/04
1995	7/12-8/16	196	1,188	8/02
1996	7/09-8/14	208	2,581	7/31
1997	7/09-8/14	202	797	8/03
1998	7/10-8/15	182	538	7/29
1999	7/11-8/13	176	1,357	8/02
2000	7/07-8/14	228	1,481	8/01
2001	7/05-8/13	232	1,575	7/26
2002	7/05-8/12	218	875	7/23
2003	7/09-8/13	214	749	8/02
2004	7/02-8/12	242	855	8/05
2005	7/07-8/15	207	1,207	8/06
2006	7/07-8/19	217	743	8/16
2007	7/11-8/20	207	1,342	8/09
2008	7/09-8/14	200	2,269	7/30
2009	7/10-8/20	242	971	8/06

[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.–Commercial herring bait fishery summary by period, Unalakleet Subdistrict, 2009.

Period	Date	Unique Permits	Landings	Pounds	Total Short Tons	Fishery Value
1	6/12	4	9	37,219	18.6	$11,165.70
2	6/13	3	4	6,483	3.2	$1,944.90
3	6/14	3	3	9,814	4.9	$2,944.20
4	6/15	1	1	2,860	1.4	$858.00
		6	17	56,376	28.2	$16,912.80

Note: Price per short ton of bait herring was $600 in 2009.

Table 13.–Daily observed peak biomass estimates of Pacific herring, Norton Sound District, 2009.

Date	Flight No.	Observer Initials [b]	Survey Hours	Survey Rating [c]	Spawn No.	Spawn Length (mi.)	Estimated Biomass (in short ton) By Index Area [a] KLK	UNK	CDB	NTB	ELM	GOL	NOM	TOTAL
6/7	1	WJ	2.0	4.5	163	9.6	5,087	0	107					5,193
6/8	2	WJ	2.8	4	43	0.9	12,052	531	5,234					17,817
6/11	3	SK, WJ	2.5	3			9,829	1,883	10,715					22,427
6/16	4	SK, WJ	5.0					20	1,412	0	1,922	792	872	5,018
6/18	5	WJ	5.0					136	2,021	0	800	237	2,240	5,434
Total	5		17.3	4	206	10.5							Peak Survey	22,427
													Total Harvest	28
													Biomass [d]	22,455
													Exploit %	0.13%

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] SK = Scott Kent; WJ = Wesley Jones.

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

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

Table 14.–Daily catch for the CDQ summer commercial king crab harvest, Norton Sound Section, Eastern Bering Sea, June 15–July 28, 2009.

Date [a]	Landings	Number of Crabs	Pounds Harvested	Cumulative Total (lbs)	Number of Pots Pulled	Average Weight (lbs)	CPUE
6/18	2	556	1,607	1,607	68	2.9	8
6/20	1	356	1,004	2,611	40	2.8	9
6/21	3	1,324	3,938	6,549	101	3.0	13
6/22	1	248	697	7,246	40	2.8	6
6/24	2	596	1,736	8,982	65	2.9	9
6/26	3	1,130	3,178	12,160	120	2.8	9
7/04	1	56	167	12,327	3	3.0	19
7/10	1	779	2,210	14,537	39	2.8	20
7/12	2	1,229	3,419	17,956	79	2.8	16
7/14	1	457	1,305	19,261	40	2.9	11
7/15	1	319	869	20,130	28	2.7	11
7/16	2	1,124	3,023	23,153	80	2.7	14
7/18	1	418	1,279	24,432	40	3.1	10
7/19	1	302	723	25,154	40	2.4	8
7/23	1	422	1,206	26,360	40	2.9	11
7/24	1	281	756	27,116	40	2.7	7
7/26	1	272	714	27,830	40	2.6	7
7/28	1	118	295	28,125	9	2.5	13
Total	26	9,987	28,125		912	2.8	11

Source: Fish ticket data.

[a] The CDQ fishery closed by regulation 7/28, and last delivery was made 7/28.

Table 15.–Commercial harvest of red king crab from Norton Sound Section by statistical area, Norton Sound District, 2009.

Statistical Area	Number [a]	Pounds	Pots Pulled	CPUE	Average Weight (lbs)
616331	338	888	37	9.1	2.63
616401	2,244	6,170	219	10.2	2.75
626331	1,121	3,047	102	11.0	2.72
626401	37,502	103,043	2,679	14.0	2.75
636330	1,799	5,026	78	23.1	2.79
636401	35,206	96,279	2,667	13.2	2.73
646330	318	933	24	13.3	2.93
646401	16,775	46,264	1,633	10.3	2.76
656330	3,825	10,617	331	11.6	2.78
656401	38,082	107,557	3,609	10.6	2.82
666330	540	1,514	80	6.8	2.80
666401	3,605	10,021	333	10.8	2.78
666402	2,130	6,228	142	15.0	2.92
Total	143,485	397,587	11,934	12.0	2.77

Note: Data for summer fishery only.

[a] Includes 9,987 crab (28,125 lbs) from the CDQ fishery.

Table 16.–Length frequencies by shell age of all legal male red king crab sampled during the 2009 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
95	0	0.0	0	0.0	0	0.0
96	1	0.0	0	0.0	1	0.0
97	0	0.0	0	0.0	0	0.0
98	0	0.0	0	0.0	0	0.0
99	4	0.1	0	0.0	4	0.1
100	1	0.0	0	0.0	1	0.0
101	8	0.1	1	0.0	9	0.1
102	20	0.3	4	0.1	24	0.4
103	29	0.5	2	0.0	31	0.5
104	73	1.2	12	0.2	85	1.4
105	95	1.6	18	0.3	113	1.9
106	151	2.5	27	0.4	178	3.0
107	220	3.7	37	0.6	257	4.3
108	207	3.4	43	0.7	250	4.1
109	283	4.7	56	0.9	339	5.6
110	268	4.4	56	0.9	324	5.4
111	292	4.8	71	1.2	363	6.0
112	278	4.6	90	1.5	368	6.1
113	209	3.5	53	0.9	262	4.3
114	265	4.4	74	1.2	339	5.6
115	211	3.5	56	0.9	267	4.4
116	254	4.2	61	1.0	315	5.2
117	242	4.0	61	1.0	303	5.0
118	188	3.1	43	0.7	231	3.8
119	183	3.0	52	0.9	235	3.9
120	178	3.0	33	0.5	211	3.5
121	153	2.5	40	0.7	193	3.2
122	177	2.9	35	0.6	212	3.5
123	134	2.2	24	0.4	158	2.6
124	124	2.1	22	0.4	146	2.4
125	109	1.8	16	0.3	125	2.1
126	93	1.5	18	0.3	111	1.8
127	72	1.2	10	0.2	82	1.4
128	60	1.0	12	0.2	72	1.2
129	52	0.9	5	0.1	57	0.9
130	52	0.9	3	0.0	55	0.9
131	35	0.6	11	0.2	46	0.8
132	47	0.8	5	0.1	52	0.9
133	31	0.5	12	0.2	43	0.7
134	23	0.4	5	0.1	28	0.5
135	18	0.3	5	0.1	23	0.4
136	18	0.3	4	0.1	22	0.4

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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	11	0.2	3	0.0	14	0.2
138	7	0.1	3	0.0	10	0.2
139	16	0.3	1	0.0	17	0.3
140	10	0.2	1	0.0	11	0.2
141	7	0.1	4	0.1	11	0.2
142	7	0.1	1	0.0	8	0.1
143	4	0.1	0	0.0	4	0.1
144	3	0.0	1	0.0	4	0.1
145	1	0.0	0	0.0	1	0.0
146	3	0.0	0	0.0	3	0.0
147	1	0.0	1	0.0	2	0.0
148	2	0.0	0	0.0	2	0.0
149	0	0.0	0	0.0	0	0.0
150	1	0.0	1	0.0	2	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	1	0.0	1	0.0
154	0	0.0	0	0.0	0	0.0
155	0	0.0	0	0.0	0	0.0
156	0	0.0	0	0.0	0	0.0
157	0	0.0	0	0.0	0	0.0
158	0	0.0	1	0.0	1	0.0
Totals	4,931	81.8	1,095	18.2	6,026	100.0
Average Lengths	116		116		116	
				Total Recruits (<116 mm) =	2,615	43.4%
				Total Postrecruits (≥116mm and all legal old shell males) =	3,411	56.6%

APPENDIX A: NORTON SOUNDS FISHERIES

Appendix A1.–Commercial salmon catch by species, Norton Sound District, 1961–2009.

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 2004-2008	53	77	100,897	15,831	13,575	130,433
Average 1999-2008	376	46	59,987	24,570	9,717	94,695

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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
2009 [a]	84	126	87,041	17,364	34,122	138,737
Average 2004-2008	53	77	100,897	15,831	13,575	130,433
Average 1999-2008	376	46	59,987	24,570	9,717	94,695

[a] All Chinook salmon caught were not sold, but were used for subsistence.

Appendix A2.–Number of commercial salmon permits fished, Norton Sound, 1970–2009.

	SUBDISTRICT						District
Year	1	2	3	4	5	6	Total [a]
1970	6	33	21	0	12	45	[b]
1971	7	22	45	6	19	72	[b]
1972	20	20	48	32	20	71	[b]
1973	21	34	57	30	27	94	[b]
1974	25	25	60	8	23	53	[b]
1975	24	42	67	42	39	61	[b]
1976	21	22	54	27	37	60	[b]
1977	14	25	52	24	30	45	164
1978	16	24	44	26	26	51	176
1979	15	21	41	22	29	63	175
1980	14	17	26	13	26	66	159
1981	15	19	33	10	26	73	167
1982	18	17	28	10	32	68	164
1983	19	21	39	15	34	72	170
1984	8	22	25	8	24	74	141
1985	9	21	34	12	21	64	155
1986	13	24	34	9	30	73	163
1987	10	21	34	12	39	65	164
1988	5	21	36	13	21	69	152
1989	2	0	13	0	26	73	110
1990	0	15	23	0	28	73	128
1991	0	16	24	0	25	75	126
1992	2	1	21	9	25	71	110
1993	1	8	26	15	37	66	153
1994	1	5	21	0	39	71	119
1995	2	7	12	0	26	58	105
1996	1	4	12	0	20	54	86
1997	0	11	21	9	19	57	102
1998	0	16	23	0	28	52	82
1999	0	0	0	0	15	45	60
2000	0	12	13	0	26	49	79
2001	0	5	5	0	13	29	51
2002	0	0	0	0	7	5	12
2003	0	0	0	0	10	20	30
2004	0	0	0	0	11	25	36
2005	0	0	0	0	12	28	40
2006	0	0	0	0	22	40	61
2007	0	0	11	0	15	47	71
2008	0	4	12	4	23	58	91
2009	0	5	17	7	21	49	88
Average 2003-2007	0	1	5	1	17	40	60
Average 1998-2007	0	2	4	0	15	35	53

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

[b] Data not available.

Appendix A3.–Round weight and value of commercially caught salmon by species, Norton Sound District, 1961–2009.

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		[a]
1962 [b]	157,000	[a]	10,569	221,645		105,800
1963 [b]	89,700	51,750	[a]	[a]		104,000
1964 [b]	39,169	686	[a]	249,890		51,000
1965	33,327	14,210	660	264,924	[a]	21,483
1966	35,259	40,285	38,334	577,764	16,901	68,000
1967	41,854	15,944	100,913	289,473	21,429	44,038
1968 [c]	22,954	50,665	250,044	306,871	20,381	63,700
1969 [d]	51,441	50,461	312,836	529,235	5,578	95,297
1970	38,103	25,000	156,313	610,588	1,345	99,019
1971	43,112	22,078	15,377	857,014	1,122	101,000
1972	57,675	3,257	133,389	710,853	1,083	102,225
1973	38,935	63,812	185,799	845,596	[a]	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	[a]	285,283
1977	102,341	28,044	162,457	1,415,981	[a]	546,010
1978	222,974	50,872	1,164,174	1,389,806	[a]	907,330
1979	231,988	251,129	598,785	1,001,548	[a]	878,792
1980	135,646	204,498	719,368	1,301,693	[a]	572,125
1981	164,182	212,065	719,102	1,284,193	[a]	761,658
1982	97,255	648,212	659,171	1,338,788	95	1,069,723
1983	179,666	360,264	274,568	2,352,104	239	946,232
1984	169,104	523,310	343,685	1,020,635	0	738,064
1985	419,331	169,413	11,458	939,885	0	818,477
1986	133,161	247,333	133,319	1,011,824	0	546,452
1987	141,494	177,569	6,691	731,597	0	517,894
1988	67,148	280,658	226,966	767,168	0	760,641
1989	104,829	336,652	439	297,156	0	319,489
1990	168,745	426,902	[b]	482,060	75	474,064
1991	107,541	469,495	[b]	597,272	221	413,479
1992	57,571	820,406	18,230	595,345	2,641	448,395
1993	151,504	287,702	406,820	347,072	2,608	368,723
1994	98,492	766,050	2,185,066	122,540	0	863,060
1995	174,771	356,190	198,121	290,445	0	356,164
1996	95,794	573,372	1,196,115	84,349	0	340,347
1997	225,136	235,517	50	253,006	880	363,908
1998	127,831	232,705	1,330,624	106,687	0	358,982
1999	48,421	88,037	0	57,656	0	76,860
Average 2004-2008	771	737,828	39,703	92,299	0	428,003

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Year	Pounds Caught (Round Wt. in lbs) Chinook	Coho	Pink	Chum	Salmon Roe (lbs)	Value of Catch ($)
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
2009	0	679,416	46,698	240,502	0	722,167
Average 2004-2008	771	737,828	39,703	92,299	0	428,003

[a] Information not available.

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

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

[d] 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, 1962–2009.

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 2004-08	1.00	0.51	0.19	0.20	0.52

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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
2009	-	0.93	0.18	0.33	0.34
Avg 2004-08	1.00	0.51	0.19	0.20	0.52

Note: Sockeye salmon was only purchased in 1993, 2001, 2003, 2005, and 2007-2009.

Appendix A5.–Mean commercial salmon harvest weights, Norton Sound District, 1964–2009.

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
2009	[c]	7.8	2.7	7.0

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

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

[c] None sold.

Appendix A6.–Commercial and subsistence salmon catch by species, by year in Nome Subdistrict, Norton Sound District, 1964–2009.

	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
5-year avg.[a]	7	0	207	153	4,429	4,704	99	118	877	3,034	6,299	10,428	105	118	1,085	3,095	10,728	15,132
10-year avg.[b]	9	0	381	2,265	7,083	9,737	72	68	1,177	7,033	5,874	14,225	81	68	1,558	9,298	12,957	23,962

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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
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
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
2009	0	0	0	0	0	0	32	64	1,132	487	387	2,102	32	64	1,132	487	387	2,102
5-year avg.[a]	0	0	0	0	0	0	49	173	2,239	8,579	1,221	12,260	49	173	2,239	8,579	1,221	12,260
10-year avg.[b]	0	0	0	0	0	0	33	122	1,355	4,939	951	7,400	33	122	1,355	4,939	951	7,400

[a] 2004–2008.

[b] 1999–2008.

Appendix A7.–Commercial and subsistence salmon catch by species, by year in Golovin Subdistrict, Norton Sound District, 1962–2009.

	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]
5-year avg. [b]	0	0	51	540	125	716	146	95	1,323	12,042	1,604	15,210	146	95	1,374	12,581	1,729	15,926
10-year avg. [c]	0	4	193	2,011	788	2,996	128	71	1,301	9,269	1,948	12,718	128	75	1,495	11,280	2,736	15,714

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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
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 [d]	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 [d]	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 [d]	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 [d]	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
1998 [d]	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 [d]	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 [d]	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 [d]	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 [d]	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 [d]	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 [e]	0	0	0	0	0	0	164	6	654	19,936	880	21,640	164	6	654	19,936	880	21,640
2005 [e]	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 [e]	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 [e]	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 [e]	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
2009 [e]	0	0	2,452	0	87	2,539	237	33	1,377	3,787	1,694	7,128	237	33	3,829	3,787	1,781	9,667
5-yr avg. [b]	0	0	51	540	125	716	146	95	1,323	12,042	1,604	15,210	146	95	1,374	12,581	1,729	15,926
10-yr avg. [c]	0	4	193	2,011	788	2,996	128	71	1,301	9,269	1,948	12,718	128	75	1,495	11,280	2,736	15,714

[a] Subsistence surveys were not conducted.

[b] 2004–2008.

[c] 1999–2008.

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

[e] 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.

Appendix A8.–Commercial and subsistence salmon catch by species, by year in Moses Point Subdistrict, Norton Sound District, 1962–2009.

	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]
5-year avg. [b]	1	0	2,099	3,237	974	6,311	269	4	1,517	5,238	1,233	8,262	270	4	3,615	8,475	2,207	14,573
10-year avg. [c]	2	0	1,737	6,255	609	8,604	367	20	1,428	4,600	1,212	7,627	369	20	3,166	10,855	1,821	16,231

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Appendix A8.–Page 2 of 2.

	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
1991 [d]	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 [d]	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 [d]	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 [d]	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 [d]	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 [d]	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 [d]	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
1998 [d]	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 [d]	0	0	0	0	0	0	424	13	975	1,564	744	3,720	424	13	975	1,564	744	3,720
2000 [d]	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 [d]	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 [d]	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 [d]	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 [e]	0	0	0	0	0	0	412	0	704	7,858	683	9,657	412	0	704	7,858	683	9,657
2005 [e]	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 [e]	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 [e]	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 [e]	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
2009 [e]	0	1	9,582	35	597	10,215	545	13	2,434	1,522	600	5,114	545	14	12,016	1,557	1,197	15,329
5-year avg. [b]	1	0	2,099	3,237	974	6,311	269	4	1,517	5,238	1,233	8,262	270	4	3,615	8,475	2,207	14,573
10-year avg. [c]	2	0	1,737	6,255	609	8,604	367	20	1,428	4,600	1,212	7,627	369	20	3,166	10,855	1,821	16,231

[a] Subsistence surveys were not conducted.

[b] 2004–2008.

[c] 1999–2008.

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

[e] 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.

Appendix A9.–Commercial and subsistence salmon catch by species, by year in Norton Bay Subdistrict, Norton Sound District, 1962–2009.

	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]
5-year avg. [b]	0	0	0	0	0	0	423	12	346	3,927	4,136	8,844	423	12	346	3,927	4,136	8,844

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Appendix A9.–Page 2 of 2.

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
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 [c]	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 [c]	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 [c]	0	0	0	0	0	0	295	3	676	3,929	4,161	9,064	295	3	676	3,929	4,161	9,064
1997 [c]	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 [c]	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 [c]	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 [c]	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 [c]	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 [c]	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	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
2009	0	0	1,714	558	1,850	4,122	259	2	891	2,508	3,183	6,843	259	2	2,605	3,066	5,033	10,965
5-year avg. [b]	0	0	0	0	0	0	423	12	346	3,927	4,136	8,844	423	12	346	3,927	4,136	8,844

[a] Subsistence surveys were not conducted.

[b] 1999–2003

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

Appendix A10.–Commercial and subsistence salmon catch by species, by year in Shaktoolik Subdistrict, Norton Sound District, 1961–2009.

	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	23,522
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]
5-year avg. [b]	12	5	27,292	1,644	3,520	32,473	614	16	1,764	6,362	272	9,028	626	20	29,056	8,006	3,792	41,500
10-year avg. [c]	90	3	15,401	9,371	2,510	27,374	737	48	2,038	7,361	718	10,901	827	51	17,439	16,732	3,228	38,276

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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
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[d]	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[d]	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
1996[d]	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[d]	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[d]	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[d]	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[d]	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[d]	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[d]	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[d]	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
2009	4	36	13,063	5,146	10,941	29,190	417	57	2,141	6,101	374	9,090	421	93	15,204	11,247	11,315	38,280
5-yr avg.[b]	12	5	27,292	1,644	3,520	32,473	614	16	1,764	6,362	272	9,028	626	20	29,056	8,006	3,792	41,500
10-yr avg.[c]	90	3	15,401	9,371	2,510	27,374	737	48	2,038	7,361	718	10,901	827	51	17,439	16,732	3,228	38,276

[a] Subsistence surveys were not conducted.

[b] 2004–2008.

[c] 1999–2008.

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

Appendix A11.–Commercial and subsistence salmon catch by species, by year in Unalakleet Subdistrict, Norton Sound District, 1961–2009.

	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	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	[b]	[b]	[b]	[b]	[b]	8,474	[b]	[b]	[b]	[b]	[b]
5-year avg. [c]	38	72	71,336	10,164	8,855	90,464	2,125	366	7,551	19,508	2,478	32,027	2,163	438	78,887	29,672	11,332	122,492
10-year avg. [d]	283	37	42,595	6,810	5,760	55,485	2,351	351	6,922	16,710	2,766	29,101	2,634	389	49,518	23,520	8,526	84,586

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UNALAKLEET (SUBDISTRICT 6)

	Commercial						Subsistence						Combined					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
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 [e]	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 [e]	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
1996 [e]	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 [e]	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 [e]	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 [e]	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 [e]	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 [e]	116	1	15,102	0	1,512	16,731	2,810	359	6,270	11,269	2,918	23,626	2,926	360	21,372	11,269	4,430	40,357
2002 [e]	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 [e]	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	5,859	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	170,586
2009	80	89	60,230	11,625	20,647	92,671	1,892	200	6,923	11,707	2,708	23,430	1,972	289	67,153	23,332	23,355	116,101
5-year avg. [c]	38	72	71,336	10,164	8,855	90,464	2,125	366	7,551	19,508	2,478	32,027	2,163	438	78,887	29,672	11,332	122,492
10-year avg. [d]	283	37	42,595	6,810	5,760	55,485	2,351	351	6,922	16,710	2,766	29,101	2,634	389	49,518	23,520	8,526	84,586

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

[b] Subsistence surveys were not conducted.

[c] 2004-2008.

[d] 1999-2008.

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

Appendix A12.–Subsistence salmon catch by species and year for St. Michael and Stebbins in Norton Sound District, 1993–2009.

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 surveys were not conducted.				
2009	825	921	169	24	1,088	3,027
Stebbins						
1994	1,525	5,989	5,552	288	3,948	17,302
1995	1,211	5,042	758	207	2,570	9,788
1996	1,030	7,401	2,375	424	3,746	14,976
1997	1,164	3,230	243	116	1,826	6,579
1998	1,410	3,909	3,125	295	3,116	11,855
1999	760	3,312	459	200	1,312	6,043
2000	298	2,913	364	341	2,429	6,345
2001	570	3,999	202	0	2,759	7,530
2002	450	3,586	7,459	300	2,324	14,119
2003	265	2,399	2,685	171	1,215	6,735
2004		Subsistence surveys were not conducted.				
2005	485	5,164	4,353	59	2,702	12,763
2006	355	4,236	4,321	140	4,856	13,908
2007	763	4,980	1,881	0	2,006	9,630
2008		Subsistence surveys were not conducted.				
2009	713	1,461	328	0	1,114	3,616

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, 1961–2009.

	SUBDISTRICTS 1-6																	
	Commercial						Subsistence						Sport Fish					
Year	Chinoo	Sockey	Coho	Pink	Chum	Total	Chinoo	Sockey	Coho	Pink	Chum	Total	Chinoo	Sockey	Coho	Pink	Chu	Total
1961	5,300	35	13,807	34,237	48,332	101,71	-	-	-	-	-	-	-	-	-	-	-	-
1962	7,286	18	9,156	33,187	182,78	232,43	-	-	-	-	-	-	-	-	-	-	-	-
1963	6,613	71	16,765	46,180	154,74	224,37	5	-	118	16,60	17,63	34,36	-	-	-	-	-	-
1964	2,018	126	98	13,567	148,86	164,67	565	-	2,567	9,225	12,48	24,84	-	-	-	-	-	-
1965	128	30	2,030	220	36,795	39,203	574	-	4,812	19,13	30,77	55,28	-	-	-	-	-	-
1966	1,553	14	5,755	12,778	80,245	100,34	269	-	2,210	14,33	21,87	38,68	-	-	-	-	-	-
1967	1,804	-	2,379	28,879	41,756	74,818	817	-	1,222	17,51	22,72	42,27	-	-	-	-	-	-
1968	1,045	-	6,885	71,179	45,300	124,40	237	-	2,391	36,91	11,66	51,20	-	-	-	-	-	-
1969	2,392	-	6,836	86,949	82,795	178,97	436	-	2,191	18,56	15,61	36,80	-	-	-	-	-	-
1970	1,853	-	4,423	64,908	107,03	178,21	561	-	4,675	26,12	22,76	54,12	-	-	-	-	-	-
1971	2,593	-	3,127	4,895	131,36	141,97	1,026	197	4,097	10,86	21,61	37,80	-	-	-	-	-	-
1972	2,938	-	454	45,182	100,92	149,49	804	93	2,319	14,15	13,87	31,24	-	-	-	-	-	-
1973	1,918	-	9,282	46,499	119,09	176,79	392	-	520	14,77	7,185	22,86	-	-	-	-	-	-
1974	2,951	-	2,092	148,51	162,26	315,82	420	-	1,064	16,42	3,958	21,86	-	-	-	-	-	-
1975	2,393	2	4,593	32,388	212,48	251,86	186	11	192	15,80	8,113	24,30	-	-	-	-	-	-
1976	2,243	11	6,934	87,919	95,956	193,06	203	-	1,004	18,04	7,718	26,97	-	-	-	-	-	-
1977	4,500	5	3,690	48,675	200,45	257,32	846	-	2,530	14,29	26,60	44,27	197	0	449	2,402	670	3,718
1978	9,819	12	7,335	325,50	189,27	531,94	1,211	-	2,981	35,28	12,25	51,73	303	0	742	7,399	546	8,990
1979	10,706	57	31,438	167,41	140,78	350,40	747	-	8,487	25,24	11,97	46,45	-	-	-	-	-	-
1980	6,311	40	29,842	227,35	180,79	444,33	1,397	-	8,625	63,77	19,62	93,42	52	0	1,45	7,732	1,601	10,84
1981	7,929	56	31,562	232,47	169,70	441,73	2,021	38	13,41	28,74	32,86	77,08	70	0	1,50	3,101	1,889	6,564
1982	5,892	10	91,690	230,28	183,33	511,20	1,011	8	14,61	54,24	18,58	88,46	409	0	2,98	13,74	2,620	19,75
1983 [a]	10,308	27	49,735	76,913	319,43	456,42	1,942	86	8,799	21,89	11,49	44,21	687	0	3,82	4,583	2,042	11,13
1984 [a]	8,455	6	67,875	119,38	146,44	342,15	1,733	17	8,470	34,60	8,231	53,05	247	351	7,58	8,322	1,481	17,98
1985 [a]	19,491	166	21,968	3,647	134,92	180,20	1,830	119	6,496	5,312	18,45	32,21	239	20	1,17	1,138	1,036	3,610
1986 [a]	6,395	233	35,600	41,260	146,91	230,40	150	107	688	8,720	8,085	17,75	1,077	19	3,92	3,172	1,719	9,913
1987 [a]	7,080	207	24,279	2,260	102,45	136,28	200	107	1,100	1,251	8,394	11,05	615	924	2,31	1,304	814	5,976
1988 [a]	4,096	1,252	37,214	74,604	107,96	225,13	63	133	1,076	2,159	5,952	9,383	400	782	5,03	2,912	1,583	10,71
1989 [a]	5,707	265	44,091	123	42,625	92,811	24	131	5,150	18,42	4,787	4,947	203	165	4,15	3,564	1,497	9,587
1990 [a]	8,895	434	56,712	501	65,123	131,66	2,534	234	510	2,233	4,246	7,281	364	198	3,30	7,647	925	12,43
5-year avg. [b]	53	77	100,89	15,831	13,575	130,43	3,240	654	14,61	52,62	7,474	78,60	381	101	7,62	4,457	263	12,82
10-avg. [c]	375	44	59,987	24,570	9,717	94,694	3,847	619	13,32	45,29	9,996	73,07	474	116	6,32	3,510	544	10,96

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	SUBDISTRICTS 1-6																	
	Commercial						Subsistence						Sport Fish					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
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
1995	8,860	128	47,863	81,644	42,898	181,393	5,339	3,316	17,811	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	21,040	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	11,600	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	10,418	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	12,233	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	13,455	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	11,293	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	11,773	56,669	13,095	86,772	802	0	4,211	4,303	818	10,134
2003	12	0	17,058	0	3,560	20,630	4,728	536	11,446	46,338	9,498	72,546	239	572	3,039	2,222	292	6,364
2004 [a]	0	40	42,016	0	6,296	48,352	4,448	541	11,579	72,887	4,541	93,996	535	404	5,806	8,309	498	15,552
2005 [a]	151	280	85,255	0	3,983	89,669	3,383	857	12,783	57,785	6,115	80,923	216	0	3,959	473	36	4,684
2006 [a]	11	3	130,808	0	10,042	140,864	3,258	572	19,210	56,579	5,992	85,611	427	22	11,427	5,317	344	17,537
2007 [a]	19	2	126,115	3,769	22,431	152,336	2,646	938	11,879	20,954	12,011	48,428	147	15	6,179	1,331	96	7,768
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
2009	84	126	87,041	17,364	34,122	138,737	3,382	369	14,898	26,112	8,946	53,707	277	0	6,664	1,321	417	8,679
5-year avg. [b]	53	77	100,897	15,831	13,575	130,433	3,240	654	14,611	52,626	7,474	78,605	381	101	7,625	4,457	263	12,827
10-year avg. [c]	375	44	59,987	24,570	9,717	94,694	3,847	619	13,326	45,291	9,996	73,078	474	116	6,320	3,510	544	10,964

[a] Not all subdistricts were surveyed.

[b] 2004–2008.

[c] 1999–2008.

Appendix A14.–Sport salmon harvest by species, by year for the Unalakleet River, 1990–2009.

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
2009	236	5,095	260	586	6,177
2004-2008 avg.	339	4,523	113	1,212	6,187
1999-2008 avg.	334	3,676	269	1,156	5,436

Appendix A15.–Sport salmon harvest by species, by year for the Fish/Niukluk rivers, 1990–2009.

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
2009	30	939	72	25	1,066
2004-2008 avg.	12	882	122	309	1,325
1999-2008 avg.	39	842	120	229	1,230

Appendix A16.–Comparative salmon aerial survey escapement indices of Norton Sound streams unless noted otherwise, 1961–2009.

	Sinuk River				Nome River			
Year [a]	Chinook	Chum	Pink	Coho	Chinook	Chum	Pink	Coho
1963					-	126	3,719	-
1965					-	294	-	-
1971					-	75	7,765	-
1972					-	710	14,960	-
1973					6	1,760	14,940	-
1974		463	7,766	-	-	854	17,832	-
1975	-	4,662	5,390	-	1	2,161	3,405	-
1976	-							
1977	-	5,207	1,302	-	5	3,046	1,726	-
1978	-	8,756	22,435	-	2	5,242	34,900	-
1979			100					
1980	3	2,022	199,000	1,002	5	7,745	171,350	1,145
1981	-	5,579	350	-	15	1,195	12,565	-
1982	-	638	148,800	-	-	700	327,570	-
1983	48	2,150	10,770	96	2	198	9,170	365
1984	7 [b]	493 [b]	284,400 [b]	192	1	2,084 [b]	178,870	839
1985	4	1,910	8,860	33	7	1,967	2,250	242
1986	4	1,960	28,690	-	2	1,150	13,580	-
1987	5	4,540	30	230	3	1,646	1,400 [b]	419
1988	3	2,070	4,652 [c]	563	3	973	2,490l	1,108 [b]
1989	-	1,025	31,310	75	2	72	1,365	375
1990	-	95	29,040	161	-	541	13,085	377
1991	3	5,420	14,680	701	11	3,520	4,690	611
1992	1	470	292,400	422	3	813	255,700	691
1993	7	1,570	5,120	104	8	1,520	8,941	276
1994	10	1,140	492,000	307	2	350	265,450	631
1995	-	3,110	1,250	290	-	1,865	182	517
1996	5	1,815	74,100	367	1	799	34,520	723
1997	-	2,975	1,200	57	4	956	65	544
1998	-	630	372,850	322	3	335	179,680	515
1999	-	1,697	180	217	-	375	345	620
2000	-	10	12,608	912	-	658	6,380	1,032
2001	-	3,746	115 [d]	750	-	946 [d]	790 [d]	1,307 [d]
2002	-	1,682	28,487	1,290 [d]	-	127 [d]	295 [d]	1,796
2003	-	677	9,885	190	8	337	2,841	604
2004	-	100 [d]	1,267,100 [d]	2,085	-	3 [d]	707,350 [d]	1,687
2005	-	1,072 [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]	441,550 [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
2009	0 [d]	344 [d]	6,730 [d]	508 [d]				877 [d]

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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	-	-	-	-
2009	0 [d]	860 [d]	1,598 [d]	-	627 [d]	14 [d]	1,069 [d]	210 [d]	301 [d]

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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	-	-

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	Niukluk River					Kwiniuk River				
Year	Chinoo	Chum	Pink	Pink & Chum	Coho	Chinook	Chum [g]	Pink [g]	Pink & Chum	Coho
1962	11	-	-	27,878	-	3	-	-	23,249	-
1963	1	13,68	4,103	-	-	2	11,340	3,779	-	-
1964	-	8,395	10,495	-	-	-	14,533	-	-	-
1965						14	26,634	8,668	-	-
1966	-	21,30	8,600	4,700	-	7	32,786	10,629	-	-
1967	-	20,54	-	-	-	13	24,444	3,587	-	-
1968	-	-	-	87,093	-	27	18,813	129,052	-	-
1969	-	10,24	92,650	-	-	12	19,687	56,683	-	-
1970	-	7,300	60,350	-	-	-	68,004	226,831	-	-
1971	-	22,60	8,370	-	-	37	39,046	16,634	-	-
1972	-	10,50	22,600	-	-	65	30,686	62,461	-	-
1973	-	15,15	14,790	-	-	57	28,617	37,070	-	-
1974	1	8,720	8,915	-	-	62	35,899	39,375	-	-
1975	-	10,08	16,258	-	-	44	14,344	55,293	-	-
1976	-	4,130	7,190	-	-	12	6,977	35,226	-	375 [a]
1977	19	10,45	4,150	-	-	84	22,757	47,934	-	-
1978	2	14,36	208,300	-	-	74 [h]	14,408	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	34,57	22,636		998	736	54,043	736,544	-	983 [i]
1985	25	11,14	-	-	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 [l]	-	1095 [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	10,70	37,410	-	1,783	587	18,802	53,499	-	809 [i]
1992	-	7,770	803,200	-	812	479	12,077	1,464,71	-	532 [i]
1993	15	19,91	2,840	-	2,104	565	15,823	43,065	-	1,238
1994	7	16,47	1,294,10	-	274	627	33,010	2,304,09	-	2,547
1995	48	25,35	200	-	2,136	468	42,161	17,509	-	1,625 [i]
1996	25	9,732	153,150	-	2,047	567	27,256	907,894	-	1,410
1997	131	16,55	-	-	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	3,054,68	-	11,24
2005	6	3,225	154,000	-	-	342	12,083	341,048	-	12,95
2006	-	-	-	-	737 [j]	195	39,519	1,347,09	-	22,34
2007	-	-	-	-	-	258	27,756	54,225	-	9,429
2008	-	-	-	-	1,715	237	9,462	1,442,24	-	10,46
2009	-	-	-	-	-	444	8,739	42,960	-	9,036

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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	-
1964	-	15,469	10,043	3,420	-	23	-	-	5,981	-
1965										
1966	-	5,514	26,000	-	-	153	-	-	16,600	-
1967	1	-	-	22,475	-					
1969	3	12,040	12,788	3,045	-					
1970	-	53,290	136,590	-	-	1 [h]	20,655	1,240 [h]	-	-
1971	-	16,820	7,500	5,065	-	256 [h]	-	-	1,047 [h]	-
1972 [h]	-	8,070	21,100	-	-	561 [g]	2,332 [g]	54,934 [g]	-	-
1973	131	5,383	15,665	-	-	298 [g]	4,332 [g]	26,542 [g]	-	-
1974	136	9,560	17,940	-	-	196 [g]	826 [g]	143,789 [g]	-	-
1975	7	17,141	38,003	-	-	60 [h]	5,237 [h]	17,885 [h]	-	-
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 [l]	21,616	663,937	-	-	61	2,300	127,900	-	204
1981	30	2,105	480			68	405	575	-	263
1982 [h]	49	2,044	53,605	-	-	8	599	168,902	-	4,145
1983	135	16,345	40,797	-	-	347	4,135	4,980	-	-
1984	270	56,210	93,600	-	-	2,844 [g]	2,915 [g]	458,387 [g]	-	152
1985	472	13,645	8,940	-	-	1,426 [g]	4,567 [g]	4,360 [g]	-	2,045
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	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	1,124,80	-	-	591		153,150	-	233
1999	-	-	-	-	-	18		3,790	-	533
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
2006	-	-	-	-	-	-	-	-	-	-
2007	823	7,045	32,250	-	4,552	554	295	50,100	-	2,349
2008					4,197				-	2,774
2009	627	3,161	12,695	-	-	438	3,263	189,939	-	2,830

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

[a] Represents "high count" for season.
[b] Boat survey.
[c] Numerous pink salmon made enumerating of chum salmon difficult; pink count may include some chum.
[d] Helicopter survey.
[e] Surveyor unable to distinguish between the two 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, 2003–2009.

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	8	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
2009	July 02 - Aug 03	31	4,943	1,119	2	0	72

Appendix A18.–Historical migration of salmon and Dolly Varden at Pilgrim River counting tower, 1997, 1999–2000 and 2002, and weir, 2003–2009.

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
2009	June 26 - Aug 31	52	5,427	483	18	953	130

[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, 2003–2009.

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
2009	July 08 - Aug 30 [b]	6	891	769	50	2	14

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

[b] Weir was not fish tight last week of August and hundreds of coho salmon passed through without being counted.

Appendix A20.–Historical salmon migration at Kwiniuk River counting tower, 1965–2009.

Year [a]	Operating Period	Chum	Pink	Chinook	Coho
1965	June 18 - July 19	32,861	8,668	19	
1966	June 19 - July 28	32,786	10,629	7	
1967	June 18 - July 28	26,661	3,587	13	
1968	June 18 - July 24	19,976	129,052	27	
1969	June 26 - July 26	19,687	56,683	12	
1970	June 25 - July 29	66,604	226,831		
1971	June 29 - July 29	38,679	16,634		
1972	June 28 - July 27	30,686	62,461	65	
1973	June 25 - July 25	28,029	37,070	57	
1974	June 20 - July 26	35,161	39,375	62	
1975	July 04 - July 26	14,049	55,293	44	
1976	July 04 - July 25	8,508	35,226	12	
1977	June 26 - July 25	21,798	47,934		
1978	July 04 - July 22	11,049	70,148		
1979	June 28 - July 25	12,355	167,492	107	
1980	June 22 - July 28	19,374	319,363	177	
1981	June 19 - Aug 02	34,565	566,534	136	
1982	June 21 - July 26	44,099	469,674	138	
1983	June 19 - July 27	56,907	251,965	267	
1984	June 19 - July 25	54,043	736,544	736 [b]	
1985	June 26 - July 28	9,013	18,237	955 [c]	
1986	June 19 - July 26	24,700	241,446	654	
1987	June 25 - July 23	16,133	5,566	317	
1988	June18 - July 26	13,303	187,907	321	
1989	June 27 - July 27	14,529	27,488	248	
1990	June 21 - July 25	13,957	416,512	900	
1991	June 18 - July 27	19,801	53,499	708	
1992	June 27 - July 28	12,077	1,464,716	479	
1993	June 27 - July 27	15,824	43,063	600	
1994	June 23 - Aug 09	33,012	2,303,114	625	2,547
1995	June 21 - July 26	42,500	17,511	498	114
1996	June 20 - July 25	28,493	907,893	577	461
1997	June 18 - July 27	20,119	9,535	974	
1998	June 18 - July 27	24,247	655,934	303	
1999	June 25 - July 28	8,763	607	116	
2000	June 22 - July 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
2009	June 24 - Sept 13	8,739	42,962	444	8,677

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

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

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

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

Appendix A21.–Historical salmon migration at Niukluk River counting tower, 1995–2009.

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
2009	July 03 - Sept 02	15,879	24,204	204	6,861

Appendix A22.–Historical salmon migration at Nome River counting tower, 1993–1995, and weir, 1996–2009.

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 - July 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
2009	July 01 - Sept 20	1,565	16,490	10	1,370	103

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

Appendix A23.–Historical sockeye salmon migration at Glacial Lake weir, 2001–2009.

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
2009	June 20 - July 27			826

[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

Note: 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 1996–2009.

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
2009	June 19 - Sept 11	9,783	190,291	2,355	22,276

Appendix A26.–Total escapement index 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) to 2009.

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
2009	41,800	275,481	39,585	3,047

[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 was not counted.

Appendix A27.–Total Norton Sound run index, escapement (6 rivers) and catch (commercial, subsistence, and sport) for chum, pink, coho, and Chinook salmon, 1995–2009.

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	75,813	4,065,888	198,390	4,378
2009	84,868	318,957	141,524	6,513

[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 was not counted.

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

Appendix A28.–Aerial survey numbers of chum, pink, coho, and Chinook salmon for Norton Sound, 1985–2009.

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	451,098	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	42,089	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
2009	17,436	254,132	14,179	1,523

[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 A29.–Nome Subdistrict chum salmon estimated escapement, 2000–2009.

Year	Rivers	Aerial Survey Counts	Estimated Escapement [a]	Year	Rivers	Aerial Survey Counts	Estimated Escapement [a]
2009	Nome		1,565	2004	Nome		3,903
	Snake		891		Snake		2,145
	Eldorado	1,069	4,943		Eldorado		3,273
	Flambeau	860	4,075		Flambeau	2,250	7,667
	Solomon	89	918		Solomon [b]		1,436
	Sinuk	344	2,232		Sinuk [b]		3,197
	Bonanza	1,851	6,744		Bonanza [b]		2,166
			21,368				23,787
2008	Nome	106	2,607	2003	Nome	888	1,957
	Snake		1,244		Snake	440	2,201
	Eldorado		6,746		Eldorado	1,257	3,591
	Flambeau	4,235	11,618		Flambeau	647	3,380
	Solomon [b]		959		Solomon	73	806
	Sinuk [b]		5,367		Sinuk	677	3,482
	Bonanza [b]		3,636		Bonanza	220	1,664
			32,177				17,081
2007	Nome	1,449	7,034	2002	Nome		1,720
	Snake	1,702	8,147		Snake [c]	402	2,776
	Eldorado	6,315	21,312		Eldorado [c]		10,243
	Flambeau	4,452	12,006		Flambeau	1,876	6,804
	Solomon	673	3,469		Solomon	325	2,150
	Sinuk	7,210	16,481		Sinuk	1,682	6,333
	Bonanza	2,628	8,491		Bonanza	595	3,199
			76,940				33,225
2006	Nome	394	5,677	2001	Nome	946	2,859
	Snake	840	4,128		Snake [c]	752	2,182
	Eldorado	2,355	41,985		Eldorado [c]	4,450	11,635
	Flambeau	16,000	27,828		Flambeau	3,612	10,465
	Solomon	305	2,062		Solomon	280	1,949
	Sinuk	1,115	4,834		Sinuk	3,746	10,718
	Bonanza	60	708		Bonanza	1,084	4,745
			87,222				44,553
2005	Nome	2,082	5,584	2000	Nome	658	4,056
	Snake	1,842	2,948		Snake [c]		1,911
	Eldorado	5,445	10,426		Eldorado [c]	3,383	11,617
	Flambeau	2,261	7,692		Flambeau	819	3,947
	Solomon	775	3,806		Solomon	150	1,294
	Sinuk	1,072	4,710		Sinuk [b]		7,198
	Bonanza	1,370	5,534		Bonanza	1,130	4,876
			40,700				34,898

[a] Escapement is estimated by adding Nome, Snake and Eldorado weir counts and the aerial expansion estimates of the other four rivers. Aerial expansion used is aerial survey count to 0.657142 power multiplied by 48.059 from Clark, 2001. Biological escapement goal for chum salmon in subdistrict one of Norton Sound. RIR 3A01-09, unless otherwise footnoted.

[b] When there was no survey estimate from Clark, 2001, was Solomon = 0.368 multiplied by Nome escapement, Sinuk = 1.476 multiplied by Bonanza escapement, and Bonanza = 0.198 multiplied by Eldorado and Flambeau escapement combined.

[c] Escapement estimated by counting tower.

APPENDIX B: PORT CLARENCE FISHERIES

Appendix B1.–Comparative sockeye salmon aerial survey indices, Port Clarence District, 1963–2009.

Year	Salmon Lake	Grand Central River	Total	Year	Salmon Lake	Grand Central River	Total
1963	866	620	1,486	1987	4,040	530	4,570
1964 [a]	76	590	666	1988	1,195	6	1,201
1965	250	160	410	1989	3,055	525	3,580
1966	1,120	370	1,490	1990	2,834	926	3,760
1967	129	280	409	1991	3,790	1,570	5,360
1968 [a]	830	645	1,475	1992	1,500	[b]	1,500
1969	24	171	195	1993	2,885	216	3,092
1970 [b]	-	-	-	1994	3,740	1,230	4,970
1971	538	512	1,050	1995	5,433	628 [c]	6,061
1972 [a]	680	300 [d]	980	1996	6,610	770	7,380
1973	1,747	607	2,354	1997	8,760	1,520	10,280
1974	820	-	820	1998	5,210	1,977	7,187
1975	537	123	660	1999	31,720	1,780	33,500
1976	132	22	154	2000	12,772	[b]	12,772
1977	317	235	552	2001	9,400	155	9,555
1978	822	280	1,102	2002	3,520	71	3,591
1979	1,250	261	1,511	2003	19,275	1,015	20,290
1980 [a]	512	175	687	2004	23,005	2,855	25,860
1981	-	-	-	2005	41,500	740	42,240
1982	-	-	-	2006	39,400	2,380	41,780
1983	970	-	970	2007	14,920	5,692	20,612
1984	445	30	475	2008	9,420	2,252	11,672
1985	730	250	980	2009	136	50	186
1986	2,125	160	2,285				

[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 1994–2009.

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
2009 [g]	326 [h]	40	1,643	804	1,882	3,060	7,429

[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, 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 Subsistence Division, 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, 1962–2009.

Year	Total Catch	Number of Fishermen [a]	Season Catch per Fisherman	Year	Total Catch	Number of Fishermen [a]	Season Catch per Fisherman
1962	129,948	84	1,547	1986	261,436	187	1,398
1963	54,445	61	893	1987	109,467	160	684
1964	76,449	52	1,470	1988	352,915	193	1,829
1965	40,025	45	889	1989	254,617	165	1,543
1966	30,764	44	699	1990	163,263	153	1,067
1967	29,400	30	980	1991	239,923	142	1,690
1968	30,212	59	512	1992	289,184	149	1,941
1969	59,335	52	1,141	1993 [b]	73,071	114	641
1970	159,664	82	1,947	1994	153,452	109	1,408
1971	154,956	91	1,703	1995	290,730	92	3,160
1972	169,664	104	1,631	1996	82,110	55	1,493
1973	375,432	148	2,537	1997	142,720	68	2,099
1974 [c]	627,912	185	3,394	1998	55,907	45	1,242
1975 [d]	563,345	267	2,110	1999	138,605	60	2,310
1976	159,796	220	726	2000	159,802	64	2,497
1977	195,895	224	875	2001	211,672	66	3,207
1978	111,494	208	536	2002	8,390	3	2,797
1979	141,623	181	782	2003	25,423	4	6,356
1980	367,284	176	2,087	2004	51,038	43	1,187
1981	677,239	187	3,622	2005	75,971	41	1,853
1982	417,790	199	2,099	2006	137,961	42	3,285
1983	175,762	189	930	2007	147,087	46	3,198
1984	320,206	181	1,769	2008	190,550	48	3,970
1985	521,406	189	2,759	2009	187,562	62	3,025
Avg. 1962-2008	195,858	113	1,883	Avg. 1962-2008	195,858	113	1,883

[a] During 1962–1966 and 1968–1971, figures represent number of vessels licensed to fish in the Kotzebue District, not fishermen.
[b] Includes 2,000 chum salmon from the Sikusuilaq Springs Hatchery terminal fishery.
[c] Includes 6,567 chum salmon from the Deering experimental fishery.
[d] Includes 10,704 chum salmon from Deering experimental fishery.

Appendix C2.–Kotzebue District chum salmon type of processing and weights, 1962–2009.

Yea	Chum Salmon (48	Round in pounds	Other	Fresh Frozen Salmon Roe Pounds
196	14,500			
196	5,396			
196	5,421	202,993		
196	1,929	207,350		
196		310,716		13,600 3,065
196		273,420		11,488
196		288,500		11,850
196		455,013		8,183
197		1,240,000		48,377
197		1,264,753		27,542
197		1,547,041		55,376
197		3,416,431		144,768
197		5,361,130 [e]		
197		4,877,313 [f]		
197		1,415,549	487	
197		1,846,340	1,075	
197		1,009,121	32,41	
197		1,236,429	6,155	
198		3,160,948	7,828	
198		6,139,518	2,210	
198		3,833,051	790	100
198		1,647,160	2,449	
198		2,631,582	1,593	
198		4,528,379	1,106	

Year	Chum Salmon (48	Round in pounds	Other	Fresh Frozen Salmon Roe Pounds
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		613,968	1,507	1,000
1994		1,166,494	73	
1995		2,329,898	93	
1996		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	
2007		1,209,842	0	
2008		1,541,922	0	
2009		1,505,734	0	

Note: Data not available for all years.

[a] Chinook, pink salmon, and Dolly Varden.

[b] Includes 11,160 pounds from the Sikusuilaq Springs Hatchery terminal fishery. Pounds of roe stripped are from a verbal report.

[c] Includes 31,500 pounds commercially caught but not reported on fish tickets.

[d] Includes 17,600 pounds commercially caught but not sold on fish tickets.

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

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

Appendix C3.–Kotzebue District mean prices paid per pound in dollars to salmon fishermen by species, 1962–2009.

Year [a]	Chum Salmon Average Weight	Chum Salmon Average Price	Chinook Salmon	Pink Salmon	Inconnu	Dolly Varden	Year [a]	Chum Salmon Average Weight	Chum Salmon Average Price	Chinook Salmon	Pink Salmon	Inconnu	Dolly Varden
1962		0.35 [b]					1986	8.7	0.41	1.25			0.20
1963		0.35 [b]					1987	8.2	0.57	1.25			0.30
1964	8.3	0.45 [b]					1988	8.7	0.85	1.98			0.35
1965	9.0	0.45			1.30 [b]		1989	8.5	0.28	1.72			0.28
1966	10.1	0.11			1.40 [b]	0.55	1990	8.9	0.31	2.00			0.25
1967	9.3	0.11			1.50 [b]	0.75	1991	8.1	0.22	1.64		0.50	0.18
1968	9.7	0.14			0.91 [b]	0.98	1992	8.3	0.22	1.89		0.58	0.10
1969	7.5	0.15			1.30 [b]	2.84	1993	8.5	0.38	2.37		0.50	0.10
1970	8.1	0.15					1994	7.8	0.20	1.14			0.17
1971	8.1	0.16			0.16	0.17	1995	8.0	0.13	1.00		0.50	0.20
1972	9.1	0.17			0.20	0.17	1996	8.0	0.09	1.00		0.44	0.25
1973	9.1	0.25			0.30	0.16	1997	8.0	0.16	1.02			0.20
1974 [c]	8.5	0.34			0.30	0.16	1998 [d]	8.0	0.15	1.00			0.20
1975 [c]	8.6	0.28			0.30	0.30	1999 [d]	8.0	0.16	1.00			0.20
1976	8.9	0.41			0.30	0.30	2000	8.6	0.18	1.00			0.20
1977	9.6	0.56			0.30		2001	8.7	0.17	1.00			
1978	9.1	0.57			0.30	0.25	2002	8.9	0.10	0.00	0.00	0.00	
1979	8.8	0.80				0.25	2003	8.6	0.12	0.00	0.00	0.00	0.50
1980	8.6	0.46			0.10	0.20	2004	8.2	0.15	0.72			0.26
1981	9.1	0.53			0.75	0.17	2005	8.2	0.20	0.50			0.30
1982	9.3	0.51	1.25	0.15	0.75	0.20	2006	7.5	0.22				
1983	9.4	0.25	1.08	0.13		0.20	2007	8.2	0.20				
1984	8.2	0.44	1.03			0.25	2008	8.1	0.25				
1985	8.7	0.47	1.25			0.25	2009	8.0	0.25				

[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, 1962–2009.

Year	Gross Value of Catch to Fishermen [a]	Number of Fishermen	Average Value Per Fisherman		Gross Value of Catch to Fishermen [a]	Number of Fishermen	Average Value Per Fisherman
1962	$4,500	84	$54	1986	$931,241	187	$4,980
1963	$9,140	61	$150	1987	$515,000	160	$3,219
1964	$34,660	52	$667	1988	$2,581,333	193	$13,375
1965	$18,000	45	$400	1989	$613,823	165	$3,720
1966	$25,000	44	$568	1990	$438,044	153	$2,863
1967	$28,700	30	$957	1991	$437,948	142	$3,084
1968	$46,000	59	$780	1992	$533,731	149	$3,582
1969	$71,000	52	$1,365	1993[b]	$235,061	114	$2,062
1970	$186,000	82	$2,268	1994	$233,512	109	$2,142
1971	$200,000	91	$2,198	1995	$316,031	92	$3,435
1972	$260,000	104	$2,500	1996	$56,310	55	$1,024
1973	$925,000	148	$6,250	1997	$187,978	68	$2,764
1974[c]	$1,822,784	185	$9,853	1998	$70,587	45	$1,569
1975[d]	$1,365,648	267	$5,115	1999	$179,781	60	$2,996
1976	$580,375	220	$2,638	2000	$246,789	64	$3,856
1977	$1,033,950	224	$4,616	2001	$322,650	66	$4,889
1978	$575,260	208	$2,766	2002	$7,572	3	$2,524
1979	$990,263	181	$5,471	2003	$26,377	4	$6,594
1980	$1,446,633	176	$8,220	2004	$64,420	43	$1,498
1981	$3,246,793	187	$17,363	2005	$124,820	41	$3,044
1982	$1,961,518	199	$9,857	2006	$229,086	42	$5,454
1983	$420,736	189	$2,226	2007	$243,149	46	$5,286
1984	$1,148,884	181	$6,347	2008	$385,270	48	$8,026
1985	$2,137,368	189	$11,309	2009	$376,554	62	$6,073
Avg. 1962-2008	$585,505	113	$4,169	Avg. 1962-2008	$585,505	113	$4,169

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

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

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

Appendix C5.–Kotzebue District commercial and subsistence salmon catches, 1914–1918, and 1957–2009.

	Commercial Catch			Subsistence Chum Salmon Catch			
Year [a]	Chum [b]	Other [c]	Total	Chum	Number of Fishermen Interviewe	Average Catch per Fisherma	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]		0	20,814	65	320	20,814
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	48	26,744	88	304	26,792
1975	563,682[g]	36	36	27,605	95	291	27,641
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	0	175,991
1984	320,206	107	320,313	15,420 [h]	66	0	320,313
1985	521,406	63	521,469	31,478 [i]	243	0	521,469
1986	261,436	106	261,542	50,458	837	60	312,000
1987	109,467	44	109,511	9,988 [j]	[j]	[j]	109,511
1988	352,915	152	353,067	13,723 [j]	[j]	[j]	353,067
1989	254,617	87	254,704	5,489 [j]	[j]	[j]	254,704
1990	163,263	32	163,295	8,268 [j]	[j]	[j]	163,295
1991	239,923	44	239,967	14,740 [j]	[j]	[j]	239,967
1992	289,184	204	289,388	14,303 [j]	[j]	[j]	289,388
1993	73,071[k]	131	131	15,430 [j]	[j]	[j]	131
1994	153,452[l]	3	3	36,226 [m]	375	97	3
1995	290,730	5	290,735	102,881	593	173	393,616
1996	82,110[n]	3	3	99,740	596	167	99,743
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
Avg. 1999-2008	114,701	92	114,794	Avg. 1995-2004 57,977	457	127	174,709

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	Commercial Catch			Subsistence Chum Salmon Catch				
Year [a]	Chum [b]	Other [c]	Total		Chum	Number of Fishermen Interviewed	Average Catch per Fisherman	Total Documented Catch
2001	211,672	6	211,678		49,232	408	121	260,910
2002	8,390	0	8,390		16,880 [m, o]	191	88	25,270
2003	25,423	0	25,423		19,201 [m]	446	43	44,624
2004	51,038	116	51,154		24,637	440	63	75,791
2005	75,971	7	75,978	2005 subsistence surveys were not conducted.				
2006	137,961	17	137,978	2006 subsistence surveys were not conducted.				
2007	147,087	20	147,107	2007 subsistence surveys were not conducted.				
2008	190,550	742	191,292	2008 subsistence surveys were not conducted.				
2009	187,562	106	187,668	2009 subsistence surveys were not conducted.				
Average 1999-2008	114,701	85	105,228	Average 1995-2004	57,977	457	127	201,286

Note: Data not available for all years.

[a] There was no commercial fishing during 1919–1961.

[b] Catches for 1914–1918 are from pack data only. Number of chum salmon estimated at 9.5 per case (#48) and 34 per barrel.

[c] Includes Chinook, pink, and sockeye salmon.

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

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

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

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

[h] Partial survey.

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

[j] Information not available.

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

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

[m] Does not include the town of Kotzebue.

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

[o] Only 2 of 6 villages surveyed.

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

Year	Village					Kobuk River Village	Noata Villag	Village						District Total
	Noorvi	Kian	Amble	Shungna	Kobu			Kotzebue	Deerin	Kivalin	Bucklan	Candl	Shishmare	
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,]	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,]	277	223	1,062	3,556	368	5,486	4,035	347	219	200	[a]	[a]	[a]	10,287
1984 [b,]	[a]	[a]	2,990	4,241	[a]	7,231	6,049	88[b]	1,940	200	[a]	[a]	[a]	15,508
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	102,88

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Year	Village					Kobuk River Villages	Noatak Village	Village						District Total
	Noorvik	Kiana	Ambler	Shungnak	Kobuk			Kotzebue	Deering	Kivalina	Buckland	Candle	Shishmaref	
199	13,611			8,649		39,076			[a]	[a]	[a]	[a]	[a]	99,740
199	14,323			5,513		26,242			[a]	[a]	[a]	[a]	[a]	57,906
199	9,845			4,676		21,398			[a]	[a]	[a]	[a]	[a]	48,980
199	17,843			3,868		27,958			[a]	[a]	[a]	[a]	[a]	94,342
200	10,391			2,944		21,538			[a]	[a]	[a]	[a]	[a]	65,975
200	16,540		[a]	4,310		29,193			[a]	[a]	[a]	[a]	[a]	49,232
200	13,943	[f]	[f]	[f]	[f]	[f]		[f]	[a]	[a]	[a]	[a]	[a]	16,880
200	7,982			2,860		17,024		[a]	[a]	[a]	[a]	[a]	[a]	19,201
200	6,025			4,186		20,640		[a]	[a]	[a]	[a]	[a]	[a]	24,637

Note: No subsistence surveys were conducted after 2004.

[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	Year	Kotzebue	Noatak	Noorvik	Kiana	Ambler	Shungnak	Kobuk	Deering
1962	[a]	1190	665	350	[a]	[a]	335	[a]	1984	44	173	[a]	[a]	214	303	[a]	194
1963	650	800	160	[b]	94	[b]	67	[a]	1985	107	[a]	206	116	152	195	50	72
1964	515	710	220	260	310	[a]	205	[a]	1986	47	69 [c]	271	[a]	[a]	195	[a]	[a]
1965	400	810	220	265	190	220	145	[a]	1987	[a]	225 [c]	189	[a]	[a]	329	[a]	[a]
1966	158	820	137	62	76	45	104	[a]	1988	[a]	[a]	300	[a]	[a]	389	[a]	[a]
1967	202	914	90	68	49	125	35	[a]	1989	[a]	133	[a]	[a]	[a]	216	[a]	[a]
1968	135	220	84	96	33	114	206	[a]	1990	[a]	135	198	[a]	[a]	[a]	[a]	[a]
1969	98	760	163	223	235	318	206	[a]	1991	[a]	145	311	[a]	[a]	283	[a]	[a]
1970	187	242	132	138	242	182	150	[a]	1992	[a]	89	310	[a]	[a]	243	[a]	[a]
1971	53	148	223	207	177	133	386	[a]	1993	[a]	136	312	[a]	[a]	196	[a]	[a]
1972	63	74	84	84	244	266	302	[a]	1994	[a]	90	133	32	99	154	260	92
1973	195	36	121	178	305	489	273	[a]	1995	71	69	123	59	110	111	110	[a]
1974	[a]	393	324	181	165	891	450	[a]	1996	73	115	117	58	111	154	76	[a]
1975	[a]	138	210	288	282	647	293	[a]	1997	41	71	125	35	39	117	28	[a]
1976	[a]	212	259	79	250	281	70	[a]	1998	35	27	79	34	30	84	41	[a]
1977	[a]	425	56	38	55	104	41	[a]	1999	78	18	151	42	8	76	81	[a]
1978	[a]	79	88	71	131	265	142	[a]	2000	48	72	93	33	72	64	11	[a]
1979	[a]	114	98	68	160	184	108	[a]	2001	23	24	152	62	[a]	94	109	[a]
1980	[a]	164	318	213	132	246	88	[a]	2002	[a]	29	121	[a]	[a]	[a]	[a]	[a]
1981	213	579	388	131	129	233	317	[a]	2003	[a]	21	58	32	26	57	43	[a]
1982	84	189	323	246	167	262	200	81	2004	[a]	50	56	46	56	75	111	[a]
1983 [d]	50	269	139	223	531	254	368	44									

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, 1962–2009.

Stream [a]	1962	1963	1964	1965	1966	1967	1968	1969	1970
Noatak Drainage									
Noatak River below Kelly River	168,000 [b]	1,970 [c, d]	89,798	6,152 [c, d]	101,640	29,120 [c]	39,394	33,945	138,145
Eli River	9,080 [b]	35			120		5,502 [e]	68 [e]	
Kelly River & Lake	1,818 [b]	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	138,145
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 [b]	4,535	7,985 [f]	2,750	1,474	2,495	2,370	7,500 [g]	13,908
Squirrel River	5,834 [b]	2,200	8,009	7,230	1,350	3,332	6,746	6,714	4,418
Salmon River	12,936 [b]	1,535	9,353	1,500 [c]	3,957	2,116	3,367	2,561	3,000 [c]
Tutuksuk River	10,841 [b]	670	2,685		1,383	169	823 [c]	159	2,000 [c]
Kobuk River System Total	38,835 [g]	8,940	28,032	11,480	8,164	8,112 [g]	13,306	16,934	23,326

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Stream [a]	1971	1972 [c]	1973 [c]	1974	1975	1976	1977 [c]	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 [c]
Eli River		3,286		22,249	1,302	1,205	742	5,525	1,794
Kelly River & Lake			2,590 [e]	1,381 [e]	3,937	217 [c]	290 [c]	168 [c]	3,200 [c]
Noatak River System Total	41,056	64,315 [c]	34,734	153,270	101,748	45,996	12,253 [c]	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 [h]	4,861 [h]			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 [c]	28,120	10,702	2,522 [c]		1,981 [c]	2,008
Squirrel River	6,628	32,126	12,345	32,523	32,256	7,229	1,964 [c]	1,863 [c]	1,500 [c]
Salmon River	5,453	2,073 [c]	6,891	29,190	9,721	1,161		814 [c]	674 [c]
Tutuksuk River	1,384 [e]			8,312	1,344 [c]	758		368 [c]	382 [c]
Kobuk River System Total	30,667	52,354	21,706	98,145	54,023	11,670	1,964 [c]	5,026	4,564

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Stream [a]	1980	1981 [c]	1982 [c]	1983	1984	1985 [c]	1986 [c]	1987 [c]	1988 [c]	1989 [d]
Noatak Drainage										
Noatak River below Kelly River	164,474	116,352	20,682	79,773	67,873	45,525	37,227	5,515 [c, d]	45,930 [c, d]	
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 [c]	2,147	402	2,048 [i]	531			
Pah River to just below Selby River	2,069	309	598 [c]	2,433	257	241 [i]	511	2,250	1,135 [c]	
Selby River mouth & slough		8,321 [b, h]	2,454	11,683		711 [i]	673	1,470	820 [c]	
Selby R. mouth to Beaver C.	6,925 [b]		7,268	13,011	5,910	3,278 [i]	3,282	1,350	6,890 [c]	
Beaver Creek mouth	784		1,711	3,059						
Above Beaver Creek				1,413	4,052		1,018	3,140	3,050 [c]	
Upper Kobuk River Total	11,472	8,648	14,674	33,746	10,621	6,278	6,015	8,210	11,895 [c]	
Squirrel River	13,563	9,854	7,690	5,115	5,473	6,160	4,982	2,708 [g]	4,848 [c]	
Salmon River	8,456	4,709	1,821 [g]	1,677	1,471	2,884	1,971	3,333	6,208	
Tutuksuk River	1,165	1,114	1,322	2,637	1,132	5,098	4,257	206	3,122	
Kobuk River System Total	34,656	24,325	25,507	43,175	18,697	20,420	17,225	14,457	26,073	

-continued-

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Stream [a]	1990 [c]	1991 [c]	1992 [c]	1993	1994 [d]	1995	1996	1997	1998	1999
Noatak Drainage										
Noatak River below Kelly River	23,345 [c]	82,750	34,335	25,415		147,260	306,900 [d]	[d]	[c]	
Eli River	3,000	2,940	701	4,795		7,860	30,040 [d]	[d]	[c]	
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		[c]	84,085
Kobuk Drainage										
Kobuk to Pah River	4,610	9,840	1,030	3,896		12,190	20,700	2,248 [c]	[c]	
Pah River to just below Selby River	305	2,780	3,820	1,535		4,537	4,600	404 [c]	[c]	
Selby River mouth & slough	420	1,040	1,500	1,800		1,250	4,100	662 [c]	[c]	
Selby River	7,505	1,460	868	824		3,364	14,950	853 [c]	730	
Selby R. mouth to Beaver C.		5,250	3,845	929		10,898	15,480	2,582 [c]		
Beaver Creek mouth	2,515							914 [c]	[c]	
Above Beaver Creek		4,155	740	3,174		3,486	14,940	850 [c]	[c]	
									[c]	
Upper Kobuk River Total	15,355	24,525	11,803	12,158		35,725	74,770	8,513 [c]		27,340
									[c]	
Squirrel River	5,500	4,606	2,765	4,463		10,605	10,740	4,779 [c]		13,513
Salmon River	6,335	5,845	1,345	13,880		13,988	23,790	1,181 [c]	[c]	4,989
Tutuksuk River	2,275	744	1,162	1,196		3,901	21,805	163 [c]	[c]	2,906
Kobuk River System Total	29,465	35,720	17,075	31,697		64,219	131,105	14,636	[c]	48,748

-continued-

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Stream [a]	2000 [j]	2001	2002	2003	2004	2005 [j]	2006	2007 [j]	2008	2009	Goals [k]
Noatak Drainage											
Noatak River below Kelly River			700	34,575	49,541		36,125 [c]		257,695	67,265	
Eli River					2,917		1,285 [c]		13,052	2,607	
Kelly River & Lake			1,116	1,566	2,987		2,375 [c]		1,865	3,986	
Noatak River System Total				36,141	55,445		39,785 [c]		272,612	73,858	42,000-91,000
Kobuk Drainage											
Kobuk to Pah River		2,790		5,501	7,493		8,525 [c]		19,421	7,468	
Pah River to just below Selby River		1,380	857	828	1,885				5,795	10,852	
Selby River mouth & slough		1,780	2,100	1,110	3,846						
Selby River				427	3,760		500 [c]		1,750	208	
Selby R. mouth to Beaver C.		7,470		1,274	6,215				13,201	26,627	
Beaver Creek mouth											
Above Beaver Creek			490	2,462					3,180		
							39,725 [f]				
Upper Kobuk River Total		13,420	3,447	11,602	23,199		48,750 [c]		43,347	45,155	9,700-21,000
Squirrel River				[c]							4,900-10,500
Salmon River				[c]							3,300-7,200
Tutuksuk River				[c]							1,400-3,000
Kobuk River System Total		13,420	3,447	11,602	23,199		48,750 [c]		43,347	45,155	19,600-39,200

Note: The figures in these tables have been corrected and supersede figures in previous reports.

[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] These fish are unidentified salmon, mostly chum salmon.

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

[d] Unacceptable survey conditions.

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

[f] Unclear where these fish were observed.

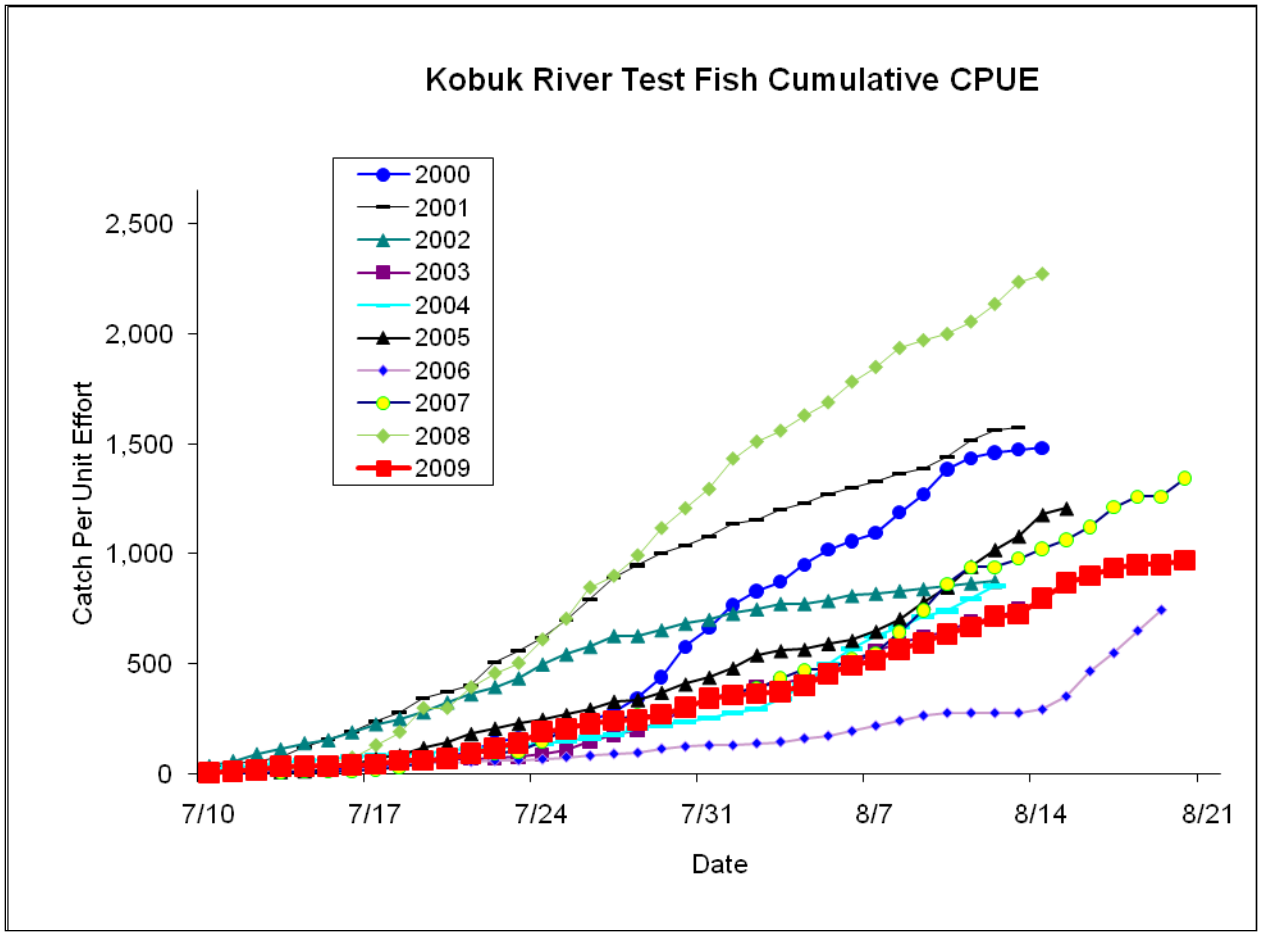
[g] Survey by foot or boat.

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

[i] Surveyed well before peak of migration.

[j] No surveys flown.

[k] Aerial survey goals were revised in 2007.



Appendix C9.–Kobuk River chum salmon drift test fish cumulative catch per unit effort (CPUE), 2000–2009.

APPENDIX D: HERRING FISHERIES

Appendix D1.–Norton Sound herring and spawn-on-kelp harvests (in tons) by U.S. commercial fishermen, 1909–2009.

Year	Sac Roe Herring	Food or Bait Herring	Total Herring	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	-
1942-63	-	-	-	-
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-

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Year	Sac Roe Herring	Food or Bait Herring	Total Herring	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
2009 [f]	-	28	28	-

[a] Fishery occurred some years, but harvest unavailable. Fishery from 1909 to 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 2007-2009.

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

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

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

[j] Includes an estimate 5 st of wastage.

[k] Includes an estimate 15 st of wastage.

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

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

Note: Catches are north of 63 N. latitude and east of 167 W. longitude.

Appendix D3.–Commercial herring fishery summary information, Norton Sound District, 1979–2009.

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	5/25	5/19-06/14
1980	8,400	2,452	0	24.00		294	0.50	8	8.1	5/30	5/21-06/05
1981	25,100	4,371	0	47.00		332	1.50	13	8.8	5/24	5/18-05/28
1982	19,403	3,933	0	38.00		237	1.00	7	8.8	6/8	6/03-06/11
1983	28,100	4,541	41	29.00		272	1.40	9	8.6	5/23	5/18-05/28
1984	23,100	3,245	327	16.00	6,000	194	0.90	8	10.3	6/10	5/28-06/06
1985	20,000	3,379	169			277	1.40	11	9.9	6/20	6/13-06/21
1986	28,100	4,979	215			323	2.90	10	9.6	6/09	6/03-06/10
1987	32,370	3,759	323			564	2.60	11	8.6	6/07	6/07-06/08
1988	33,924	4,474	198			348	3.90	11	9.0	5/28	5/27-05/31
1989	25,981	4,351	390			357	2.30	9	9.2	5/28	5/27-05/30
1990	39,384	6,032	347			365	3.60	8	8.8	5/29	5/28-05/30
1991	42,854	5,150	522			279	2.40	8	9.3	5/25	5/23-05/25
1992	57,974	0 [a]	0 [a]				0.00			6/20 [b]	
1993	46,549	4,291	742			264	1.50	5	9.9	5/25	5/24-06/05
1994	31,088	921	40			215	0.30	6	10.3	6/08	6/05-06/09
1995	37,779	6,033	614			215	4.20	6	10.4	5/24	5/23-05/30
1996	26,596	5,581	589			287	4.50	10	10.6	5/25	5/24-05/25
1997	47,748	3,459	513			220	0.61	9	9.9	5/22	5/20-05/24
1998	52,033	2,632	0	1.00	16,083	47	0.20	2	9.2	5/25	5/22-06/09
1999	34,314	2,755	0		7,482	122	0.61	4	10.5	6/17	6/13-06/22
2000	32,680	4,390	81		4,500	97	0.89	4	9.5	6/11	6/07-06/15
2001	26,305	2,245	0		4,400	76	0.35	3	12.3	6/12	6/12-06/16
2002	27,068	1,123	0		0	46	0.16	2	10.6	5/24	5/22-06/03
2003	32,918	1,608	0		1,750	32	0.22	2	10.5	5/18	5/16-05/25
2004 [a]	34,180	11	0	0.00	0	4	0.00	0	[a]	5/24 [b]	
2005	43,013	1,951	0	0.00	0	56	0.32	1	11.4	6/04	6/03-06/10
2006	38,833 [c]	671 [d]	0	0.57	0	41	0.14	1	10.2	6/09	6/08-06/11
2007 [a]	38,415 [c]	33	0	0.14	0	7	0.02	1	[a]	6/09	6/09-06/15
2008 [a]	37,401 [c]	91	0	0.00	0	14	0.18	1	[a]	6/11	6/10-06/24
2009 [a]	36,917 [c]	28	0	0.00	0	6	0.02	1	[a]	6/12	6/12-06/15

[a] No fishery due to late sea ice breakup in 1992 and no sac roe fishery in 2004 and 2007–2009 due to lack of a buyer.

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

[c] Conditions did not allow for a peak survey; therefore, biomass was estimated by extrapolation.

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

Appendix D4.–Norton Sound commercial herring harvest (tons) by subdistrict, by year, 1979–2009.

	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
2009	0	28	0	0	0	0	0	28

[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).

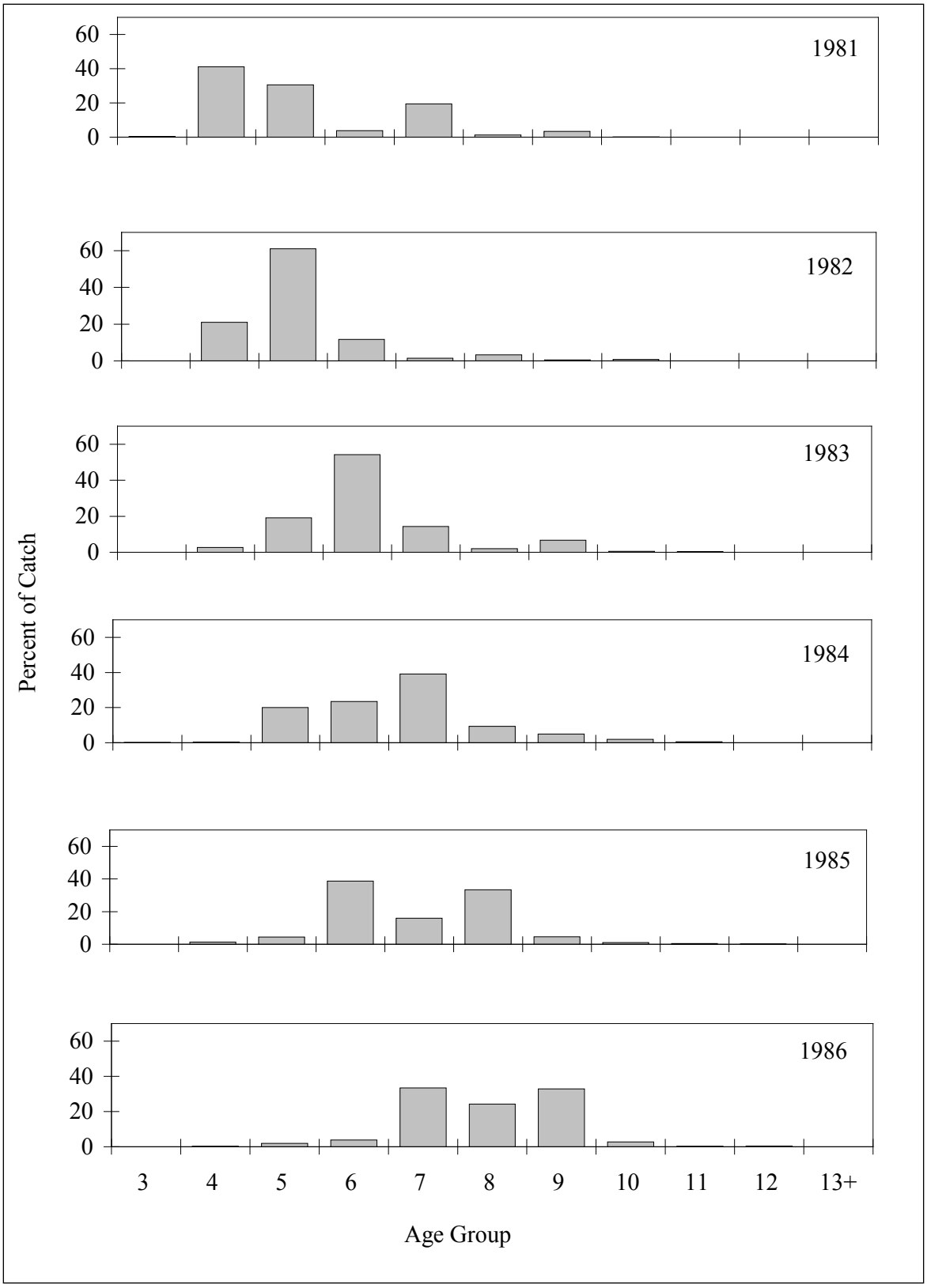
[j] Does not include an estimated 5 st of wastage.

[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.

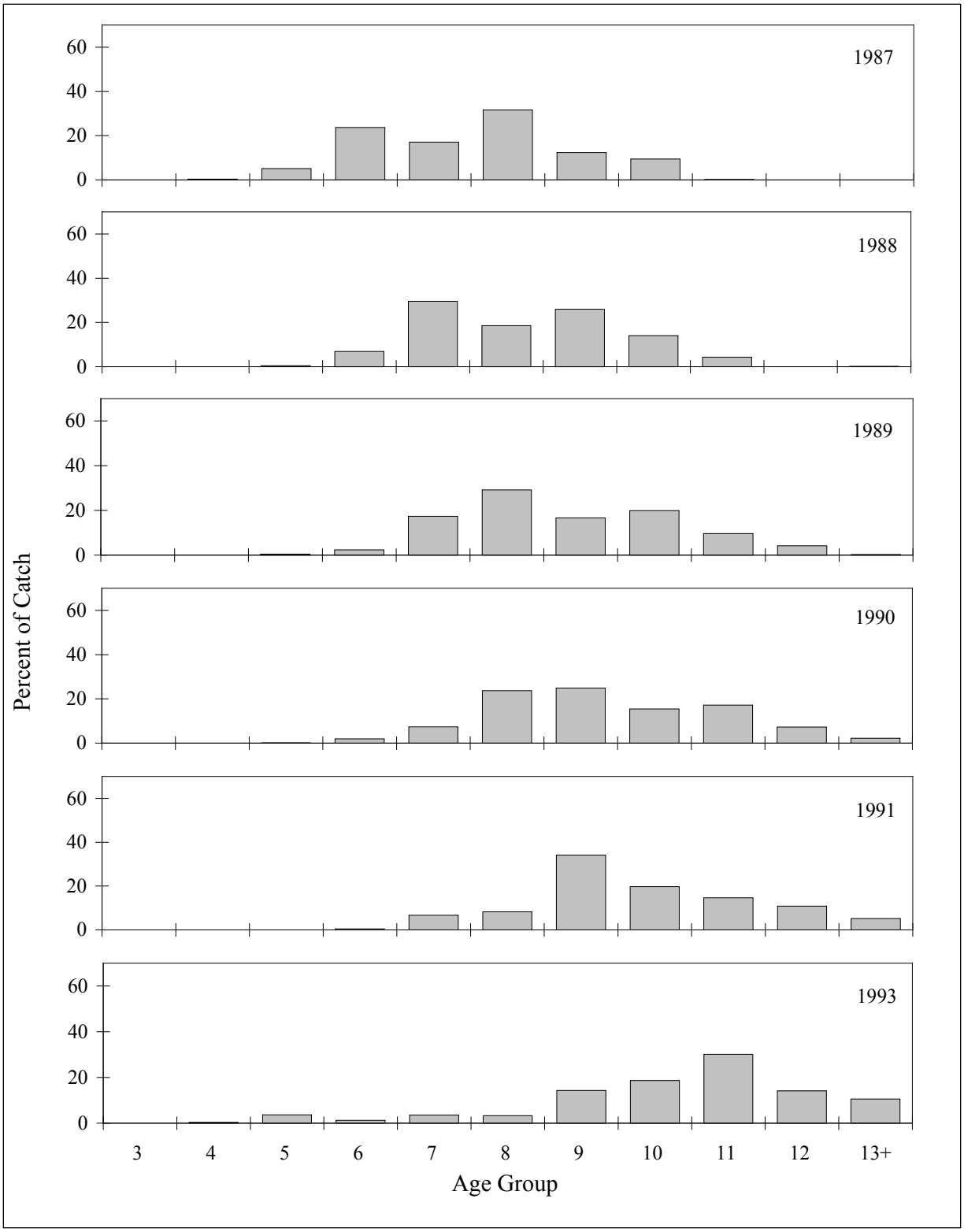
[l] There was 10% added to sac roe total due to dewatering by buyers.

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

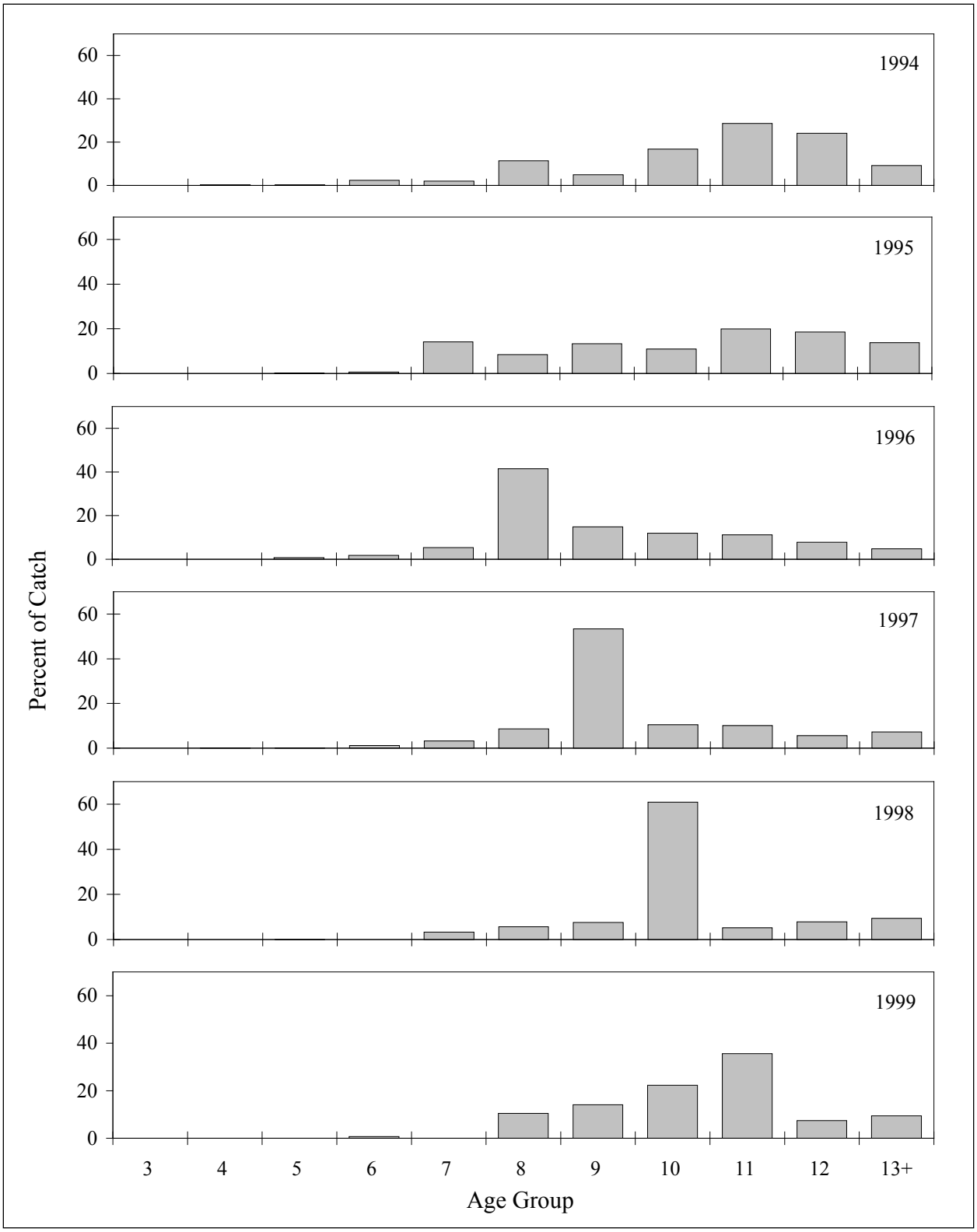


Appendix D6.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 1981–1986.

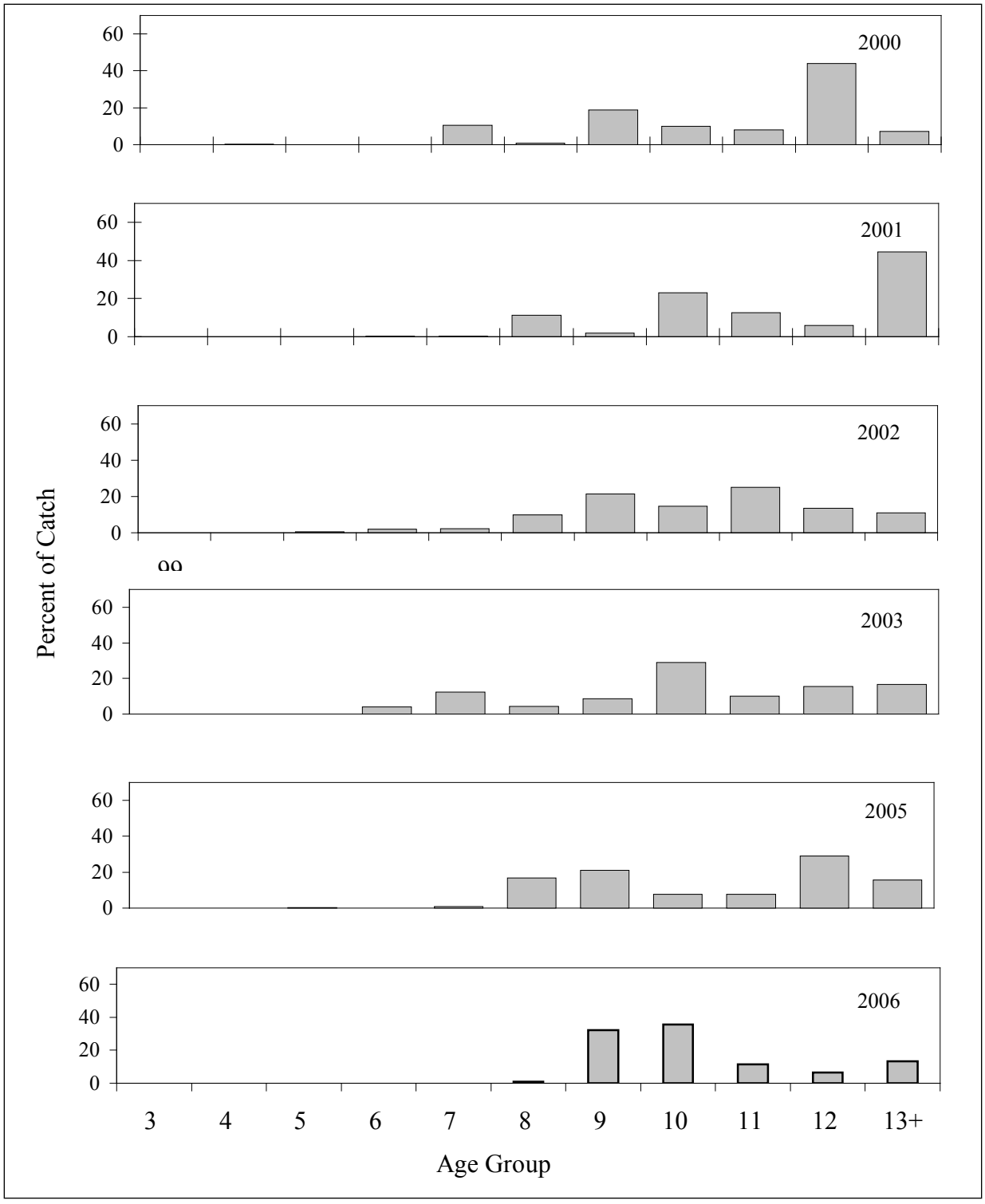


Note: No commercial fishing occurred in 1992.

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

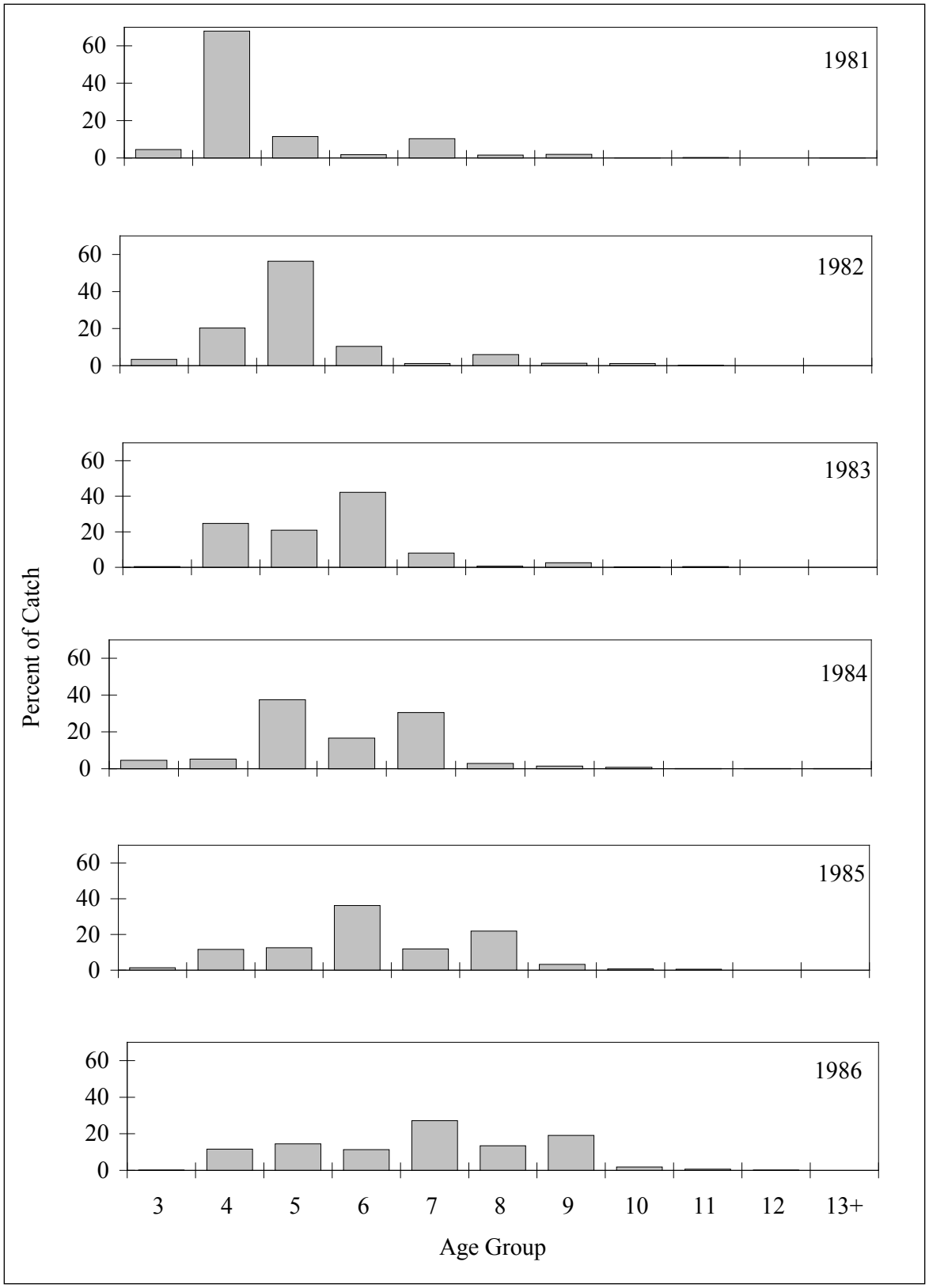


Appendix D8.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 1994–1999.

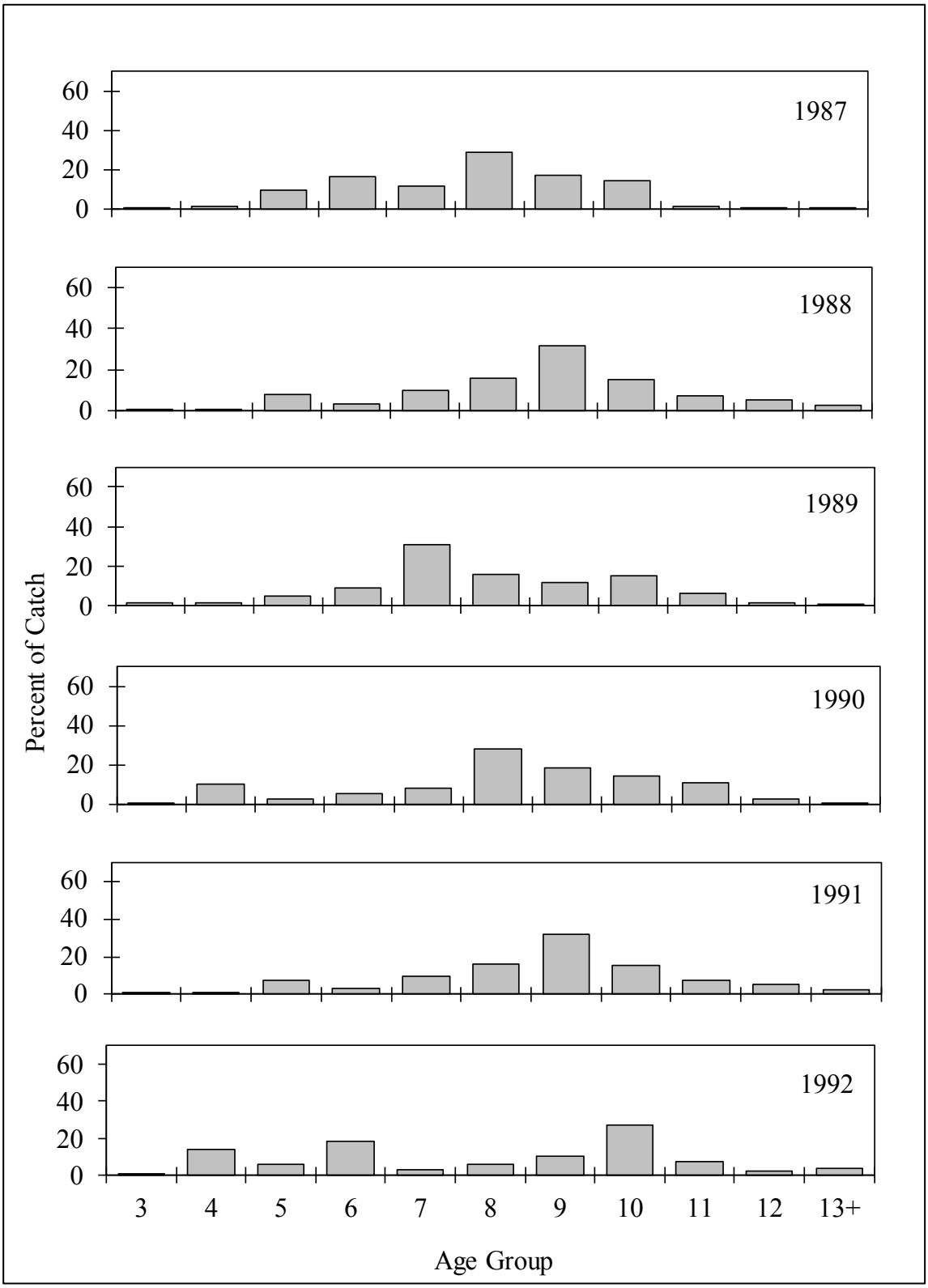


Note: No commercial catch from beach seine gear in 2001–2006. No fishery in 2004.

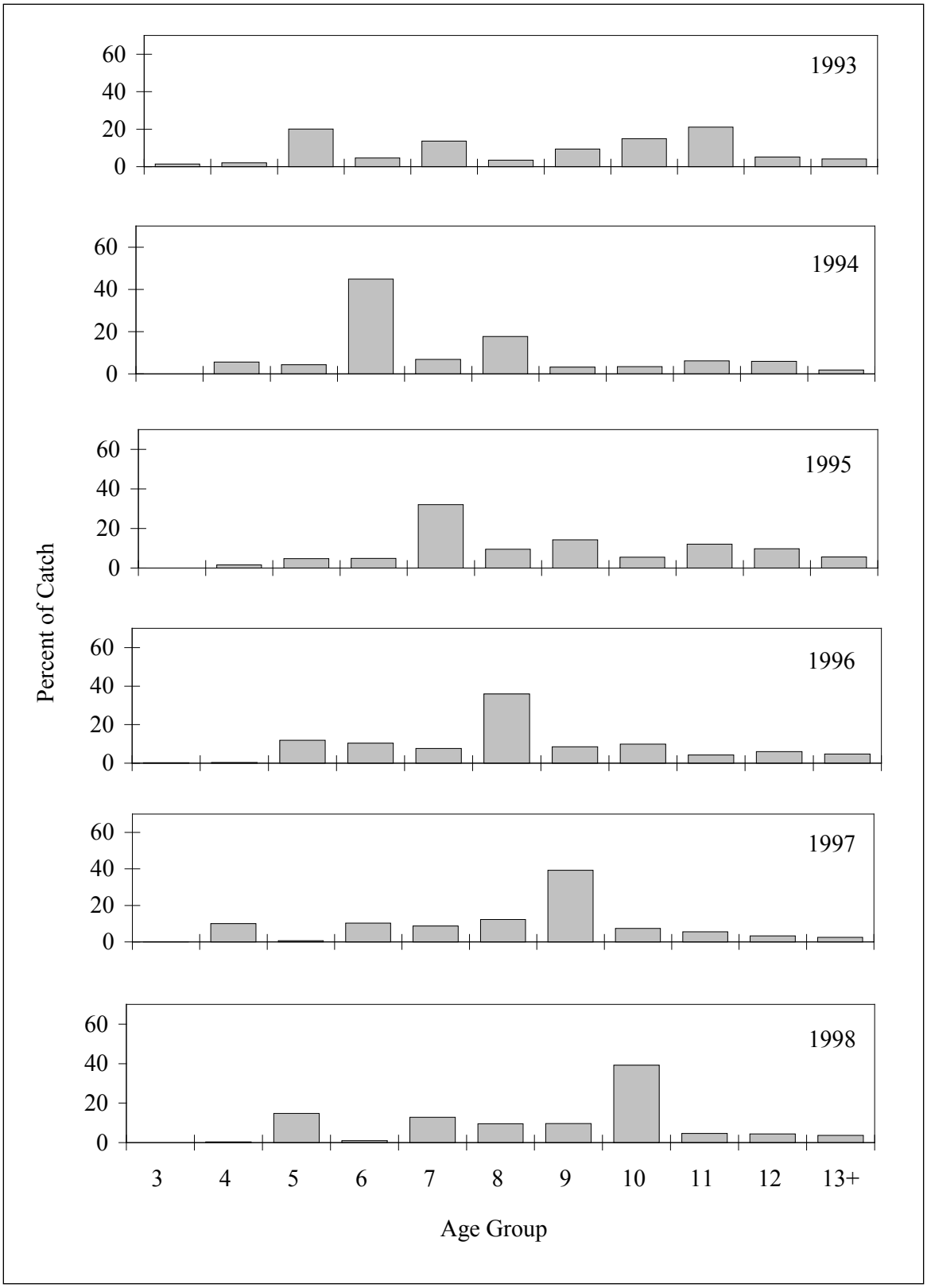
Appendix D9.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 2000–2006.



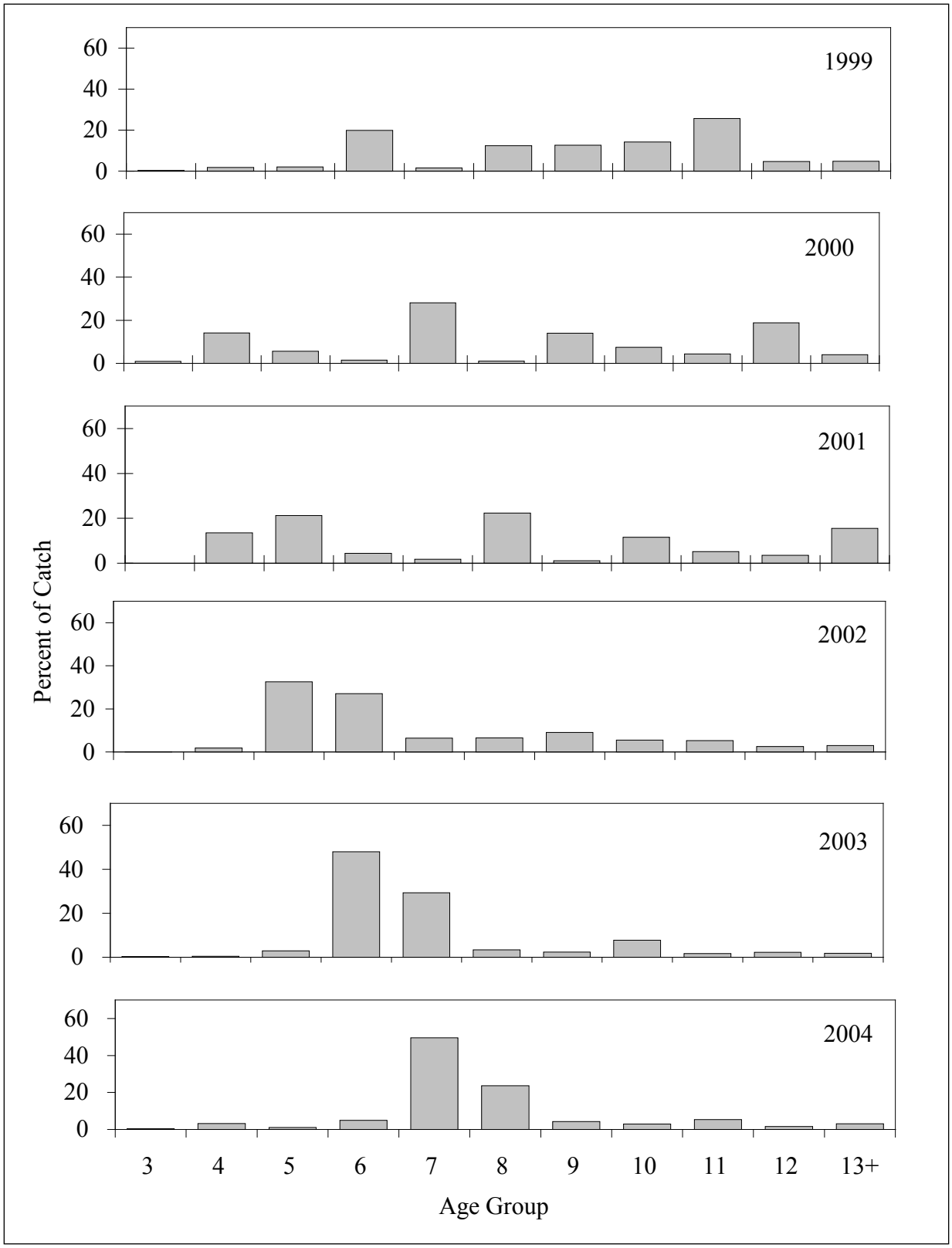
Appendix D10.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1981–1986.



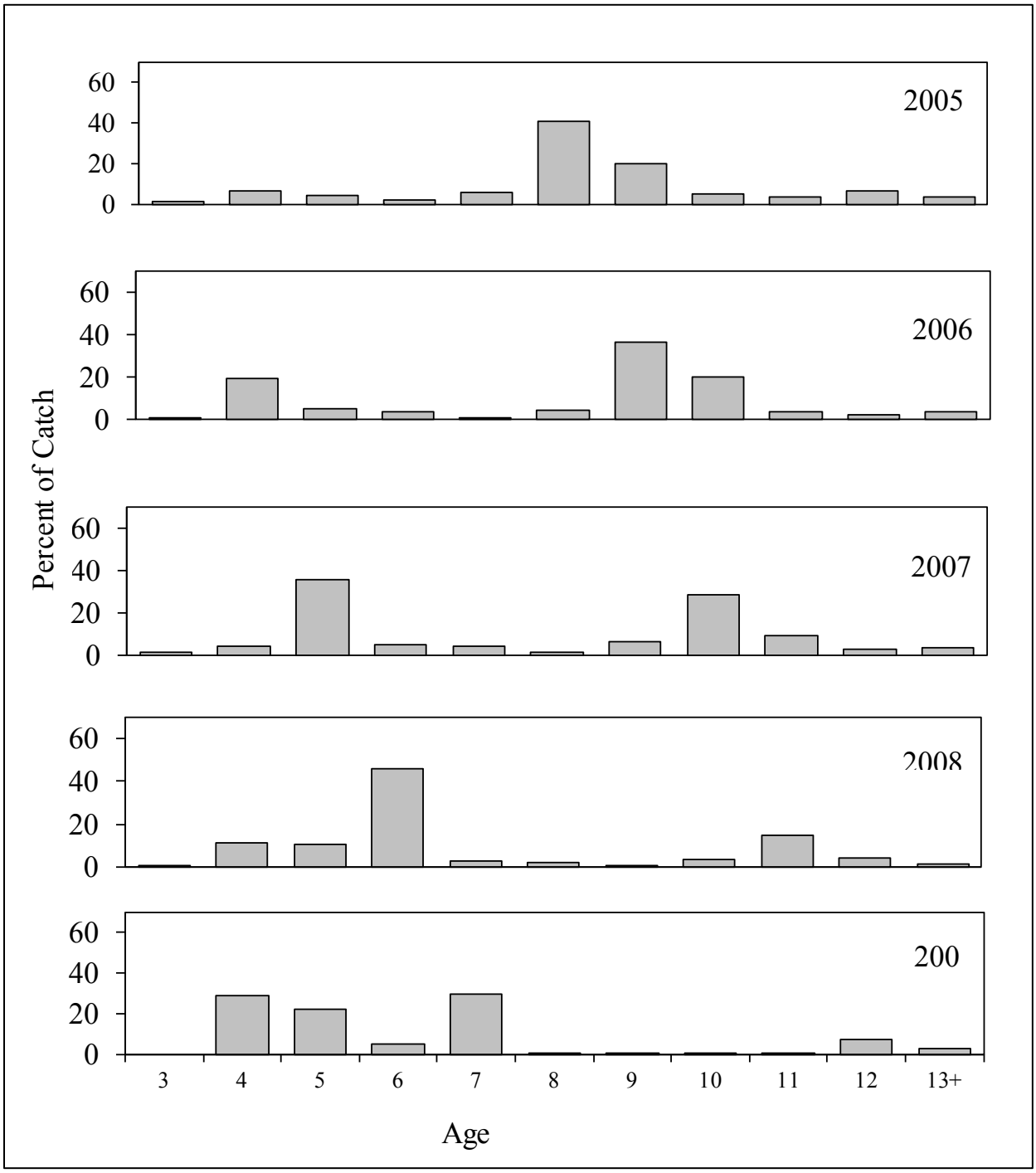
Appendix D11.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1987–1992.



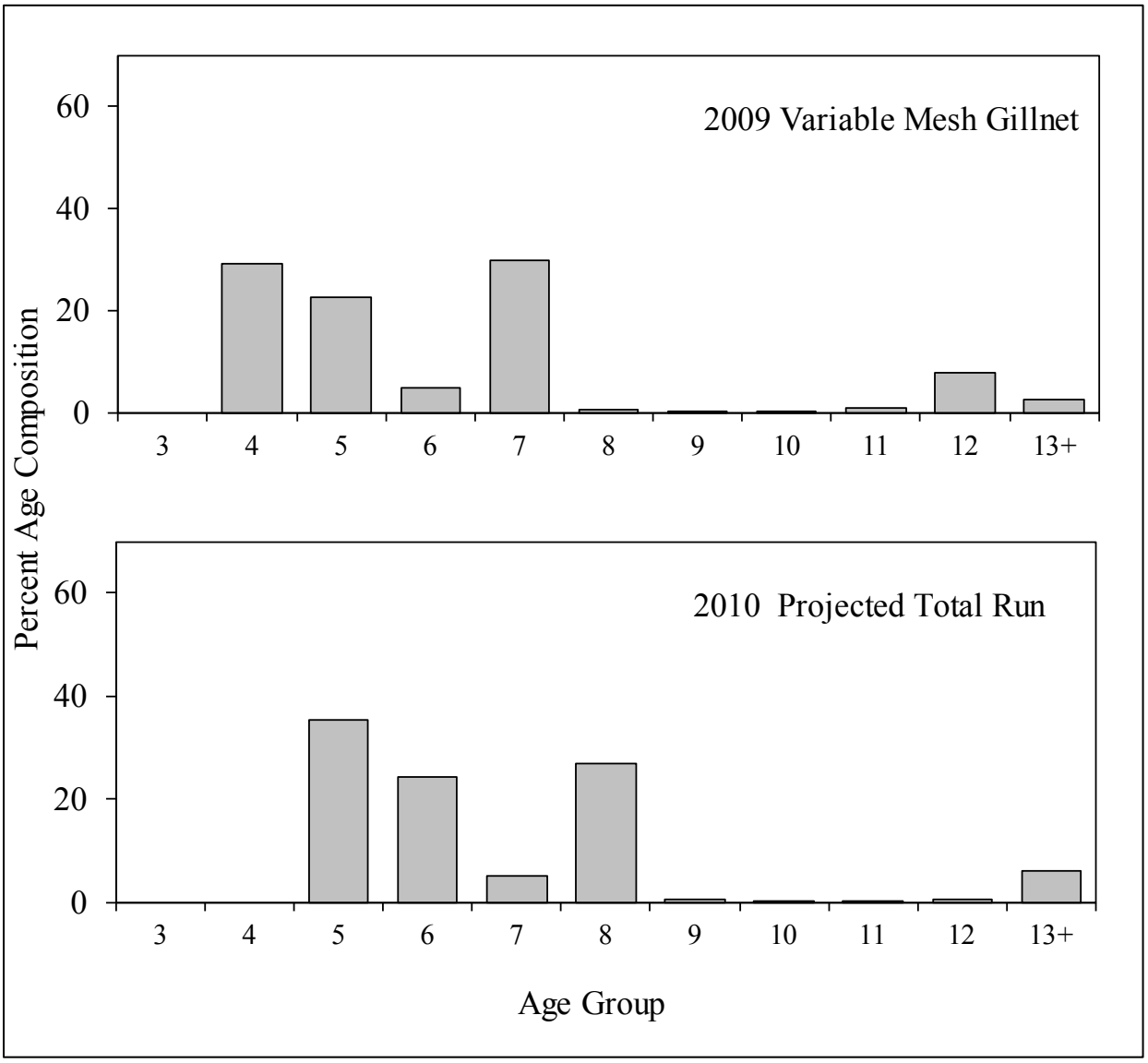
Appendix D12.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1993–1998.



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, 2005–2009.



Appendix D15.–Norton Sound Pacific herring age composition comparison of the 2009 variable mesh gear, and the projected age composition of the 2010 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, 1977–2009 (catch in pounds).

Statistical Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
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	
656401			138,011	121,147	253,387	60,480	11,422	183,119	246,200	
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
666401		179,212	486,947	205,400	381,510	79,580	325,045	116,254	5,341	408,848
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							
686431										
Total (tons)	259	1,046	1,466	593	690	114	184	194	214	240

-continued-

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Statistical Area	1987	1988	1989	1990	1992	1993	1994	1995	1996 [a]	1997
616331							48			
616401								35		
626331									61	
626401								18,971	45,045	18,066
626402										
636330									4,560	3,838
636401			22,030		1,159	1,373	8,087	24,329	70,677	59,206
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
646402						730	143,511	66,821		
656300										
656330	79,006	36,129	1,757		4,814	265		19,745	15,446	4,661
656401	194,408	165,644	100,956	171	53,119	105,341	29,566	32,289	9,985	4,035
656402						193,079	106,053	44,000		
666230										
666300									25,519	
666330	2,963	13,020	1,275	27,185	4,305	31,758		730		
666401	50,744	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										
686431										
Total (tons)	164	118	123	96	37	168	164	161	112	46

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Statistical Area	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
616331		633	4,557		3,506	646			2357	
616401										231
626331					2,455				1415	27,018
626401	8,065	508	4,689	61,620	53,722	15,899	23,113	94,130	118202	61,704
626402						1,352				
636330	2,449			2,253				126	26680	10,253
636401	10,771	14,201	126,994	91,343	50,906	83,949	166,489	227,204	224531	123,092
636402										
646301										
646330		3,021		1,868	1,955		2,226	4,097	2629	5,290
646401	3,194	221		4,287		3,952	1,964	149	1660	
646402										
656300						14	932		284	1,909
656330	4,078	1,300		20,869	12,374	21,176	46,288	47,411	17752	4,911
656401	1,127	2,739	94,813	55,158	63,038	40,566	21,579	9,405	28434	70,065
656402						1,441		380	807	2,254
666230									1721	
666300									18245	
666330			5,839	7,030	1,332	1,296	12,359	142	5041	511
666401		930	60,762	43,771	35,970	83,998	42,452	727	600	2,498
666402					30,070	12,873	23,344	16,025	1050	2,959
666431					4,274	45				
676300										
676330										
676400										180
676430										
676501								1,008		
686330										
686431									340	
Total (tons)	15	12	149	144	130	134	170	200	226	156

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Statistical Area	2008	2009	Total
616331	5,658	888	26,186
616401	416	6,170	6,852
626331	3,235	3,047	77,273
626401	96,327	103,043	759,905
626402			40,347
636330	2,350	5,026	57,535
636401	197,948	96,279	1,713,847
636402			5,220
646301			18,516
646330	1,505	933	38,153
646401	18,728	46,264	423,358
646402			292,779
656300			180,012
656330		10,617	1,259,854
656401	68,968	107,557	2,272,729
656402			1,172,583
666230			57,288
666300			366,045
666330		1,514	1,564,511
666401		10,021	2,836,616
666402		6,228	1,391,215
666431			151,472
676300			140,015
676330			158,598
676400			808,047
676430			21,177
676501			1,044
686330			1,860
686431			340
Total (tons)	198	199	7,922

Note: Not all statistical areas had recorded harvest. No commercial fishery occurred in 1991.

[a] 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 - 09/05 9/16 - 10/07	NMFS	Trawl	331,555	808,091	1,742,755	5,228,265
1979 [d]	7/26 - 08/05	NMFS	Trawl			809,799	2,429,397
1980 [e]	7/04 - 07/14	ADF&G	Pots			1,900,000	5,700,000
1981	6/28 - 07/14	ADF&G	Pots			1,285,195	3,855,585
1982	7/06 - 07/20	ADF&G	Pots			353,273	1,059,819
1982	9/05 - 09/11	NMFS	Trawl	356,724	832,581	877,722	2,633,166
1985	7/01 - 07/14	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 - 08/30	NMFS	Trawl	565,255	493,030	978,748	2,936,244
1991	8/22 - 08/30	NMFS	Trawl	294,801	303,682	1,287,486	3,862,458
1996	9/07 - 09/18	ADF&G	Trawl	452,580	325,699	536,235	1,608,705
1999	7/28 - 08/07	ADF&G	Trawl	103,832	940,198	1,594,341	4,783,023
2002	7/27 - 08/06	ADF&G	Trawl	427,703	518,638	771,569	2,314,707
2006	7/25 - 08/08	ADF&G	Trawl	775,076	569,833	726,251	2,178,753
2008	7/24 - 08/11	ADF&G	Trawl	795,777	697,442	811,727	2,435,182

Note: Data not available for all years.

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

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

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

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

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

Appendix E3.–Historical summer commercial red king crab fishery economic performance, Norton Sound Section, Eastern Bering Sea, 1977–2009.

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 Vessel	Total Number of Permit	Total Number of Landing	Total Number of Registere	Total Number of Pulls	Total Exvesse Price/lb	Total Fishery (millions $)	Season Length Day	Season Length Dates
197	[c]	1.7	5.1	0.52		7	7	13	[c]	5,457	0.75	0.229	60	[c]
197	3.00			2.09		8	8	54	[c]	10,817	0.95	1.897	60	6/07-8/15
197	3.00	0.8	2.4	2.93		34	34	76	[c]	34,773	0.75	1.878	16	7/15-7/31
198	1.00	1.9	5.7	1.19		9	9	50	[c]	11,199	0.75	0.890	16	7/15-7/31
198	2.50	1.2	3.6	1.38		36	36	108	[c]	33,745	0.85	1.172	38	7/15-8/22
198	0.50	0.9	2.7	0.23		11	11	33	[c]	11,230	2.00	0.405	23	8/09-9/01
198	0.30			0.37		23	23	26	3,583	11,195	1.50	0.537	4	8/01-8/05
198	0.40			0.39		8	8	21	1,245	9,706	1.02	0.395	14	8/01-8/15
198	0.45	1.1	3.3	0.43		6	6	72	1,116	13,209	1.00	0.427	22	8/01-8/23
198	0.42			0.48		3	3	[c]	578	4,284	1.25	0.600	13	8/01-8/25
198	0.40			0.33		9	9	[c]	1,430	10,258	1.50	0.491	11	8/01-8/12
198	0.20	1.0	3.0	0.24		2	2	[c]	360	2,350	[c]	[c]	10	8/01-8/11
198	0.20			0.25		10	10	[c]	2,555	5,149	3.00	0.739	3	8/01-8/04
199	0.20			0.19		4	4	[c]	1,388	3,172	[c]	[c]	4	8/01-8/05
199	0.34	1.3	3.9	No Summer Fishery										
199	0.34			0.07		27	27	[c]	2,635	5,746	1.75	0.130	2	8/01-8/03
199	0.34			0.33		14	20	208	560	7,063	1.28	0.430	52	7/01-8/28
199	0.34			0.32		34	52	407	1,360	11,729	2.02	0.646	31	7/01-7/31
199	0.34			0.32		48	81	665	1,900	18,782	2.87	0.926	67	7/01-9/05
199	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]
199	0.08			0.09		13	15	100	520	2,982	1.98	0.184	44	7/01-8/13
199	0.08			0.03	0.00	8	11	50	360	1,639	1.47	0.041	65	7/01-9/03
199	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]
200	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

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Year	Guideline Harvest Level (lbs) [b]	Legal Male Population Est. No. crab (millions	lbs [b]	Commercial Harvest (lbs) [a, b] Open Access	CDQ	Total Number of Vessel	Permit	Landing	Total Number of Registere	Pulls	Total Exvesse Price/lb	Total Fishery (millions $)	Season Length Day	Dates
200	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
200	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]
200	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
200	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]
200	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]
200	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]
200	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]
200	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]
200	0.38	1.3	3.8	0.37	0.03	22	27	359	920	11,934	3.17	1.225	98	6/15-9/20 [q]

[a] Deadloss included in total. Data not available for all years.

[b] Millions of pounds.

[c] Information not available.

[d] Fishing actually began 8/12.

[e] Fishing actually began 7/8.

[f] Fishing began 7/9 due to 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.

[q] CDQ opened 6/15 - 7/28. OA opened 6/15 to the end date.

Appendix E4.–Percentage of recruit and postrecruit male red king crab from summer commercial fishery catch samples in Norton Sound Section, Eastern Bering Sea, 1977–2009.

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
2009	43	57

[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, 1978–2009.

Commercial			Subsistence						
Year [a]	Number of Fishermen	Number of Crab Harvested	Winter [b]	Number of Permits Issued	Number of Permits Returned	Number of Permits Fished	Total Crab Caught [c]	Total Crab Harvested [d]	Average Number Kept/ 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
Avg 1978-2008	9	2,498	Avg 1977-2008	119	94	72	9,008	5,391	65

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Commercial			Subsistence						
Year [a]	Number of Fishermen	Number of Crab Harvested	Winter[b]	Number of Permits Issued	Number of Permits Returned	Number of Permits Fished	Total Crab Caught [c]	Total Crab Harvested [d]	Average Number Kept/ Permits Fished
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
2009	7	4,951	2008-09	105	105	70	6,971	4,752	68
Avg 1978-2008	9	2,498	Avg 1977-2008	119	94	72	9,008	5,391	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 2004-2005 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, 2004–2009.

Year	Number Permits Issued	Number Permits Returned	Number Permits Fished	Total Crab Caught	Total Crab Harvested	Average Number Kept/ 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
2009	20	20	13	1,874	653	50
Avg. 2004-2008	21	17	6	1,011	580	90

Appendix E7.–Size composition by percent of red king crab from winter research pots near Nome, Norton Sound, Eastern Bering Sea, 1983–2009.

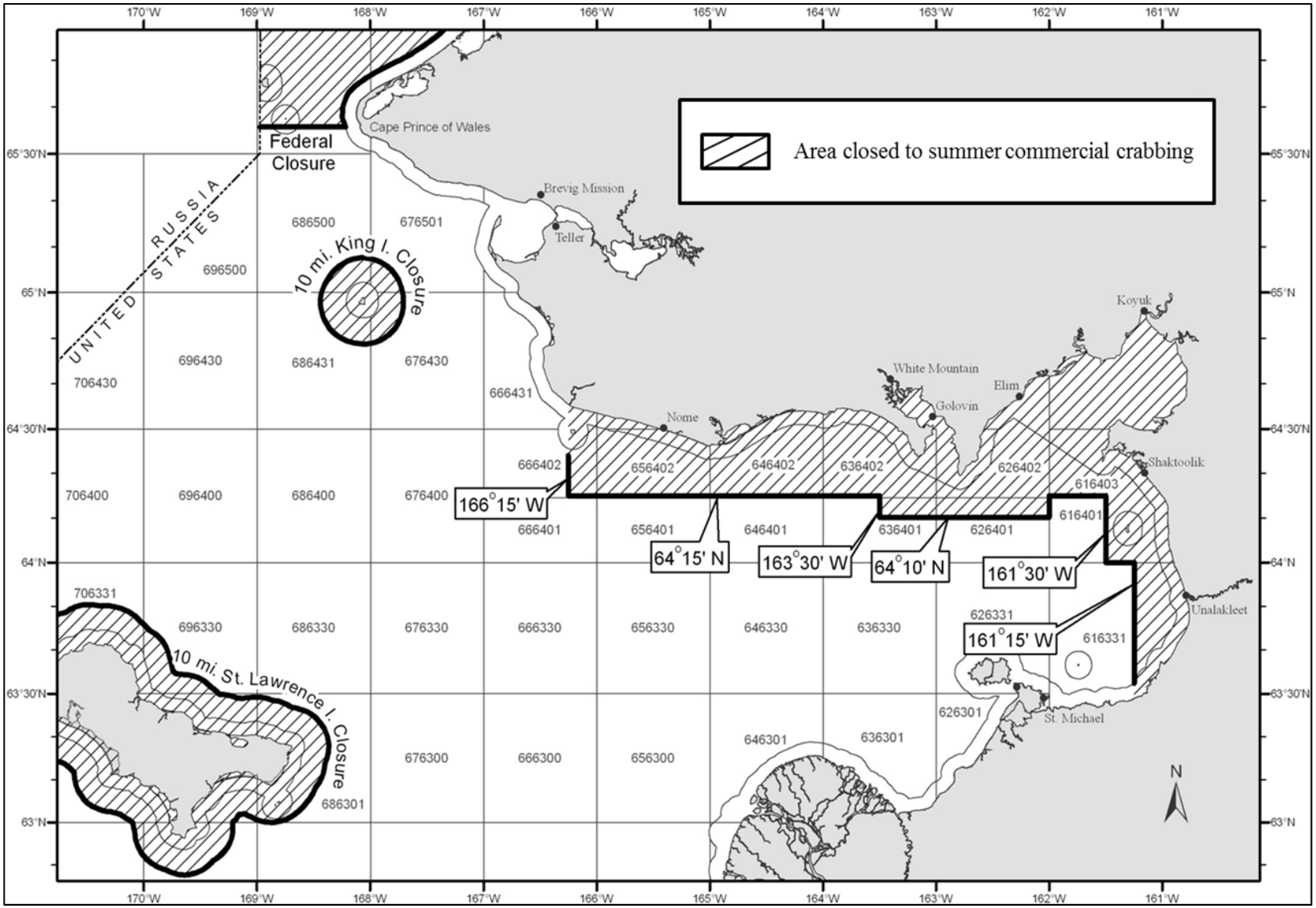
	Sublegal [a]			Legal [a]		
Year	Prerecruit Twos	Prerecruit Ones	Total	Recruits	Post-Recruits	Total
1983	26	38	64	26	10	36
1984	35	31	66	19	16	35
1985	25	45	70	20	10	30
1986	26	35	61	22	17	39
1987	13	31	44	11	45	56
1988 [b]	-	-	-	-	-	-
1989	27	15	42	27	31	58
1990	16	33	49	25	26	51
1991	5	30	36	34	31	65
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	50 [d]	39	11	50
2000	16	20	37 [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	50 [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
2009	11	42	54 [d]	24	22	46

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

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

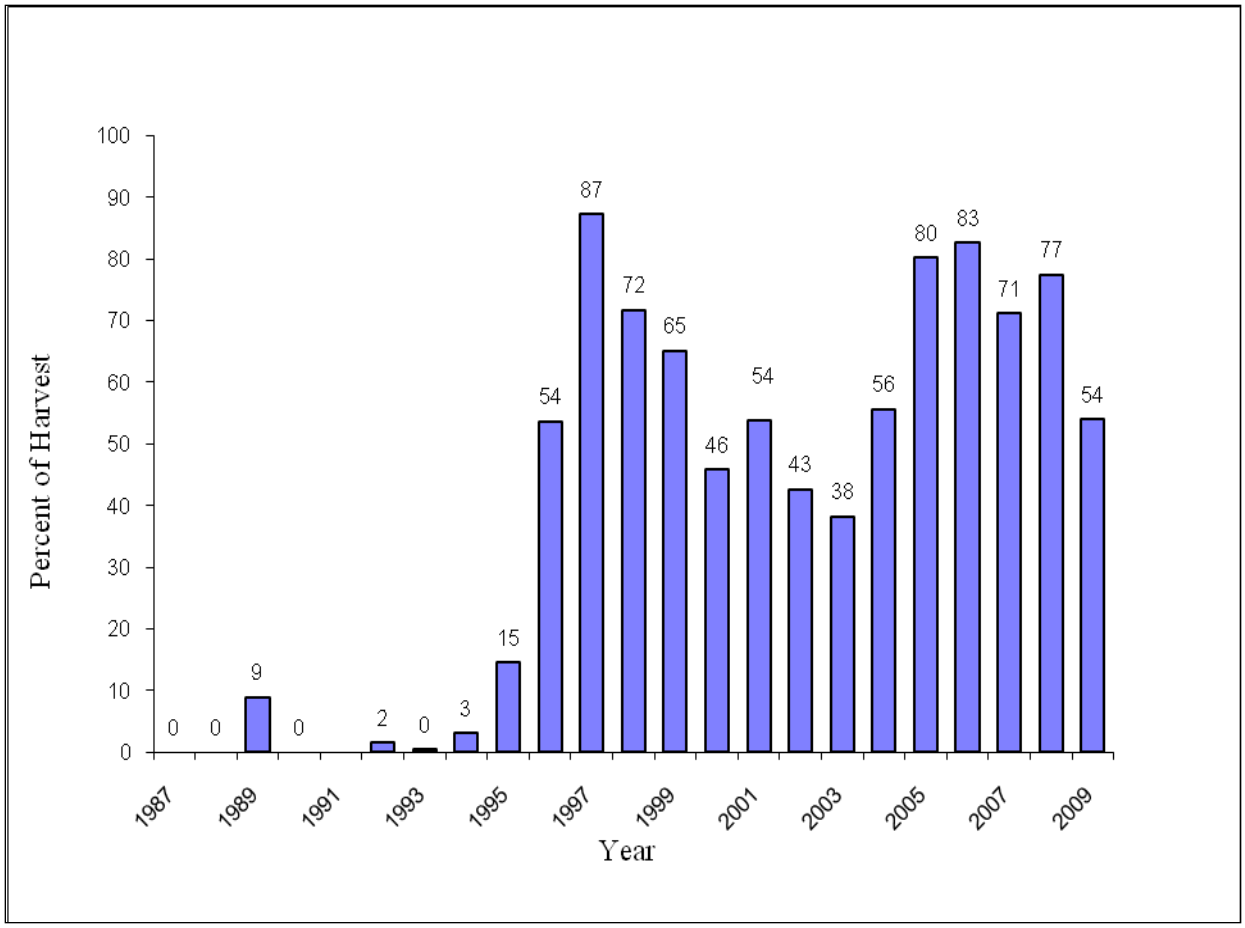
[c] No winter crab research study in 1992 or 1994.

[d] Includes prerecruit age three.

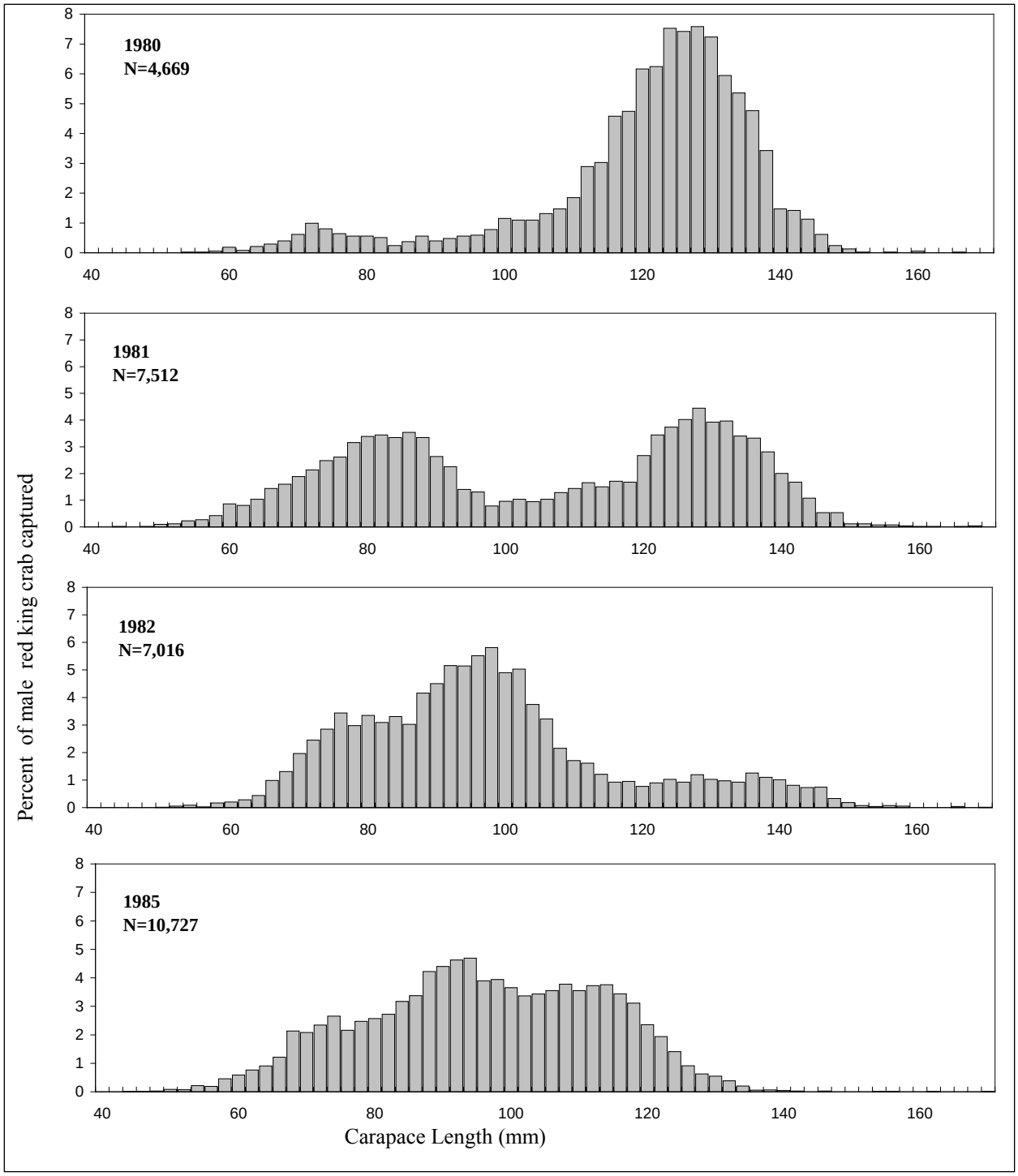


Note: Line drawn around the coastline delineates the 3-mile state waters zone.

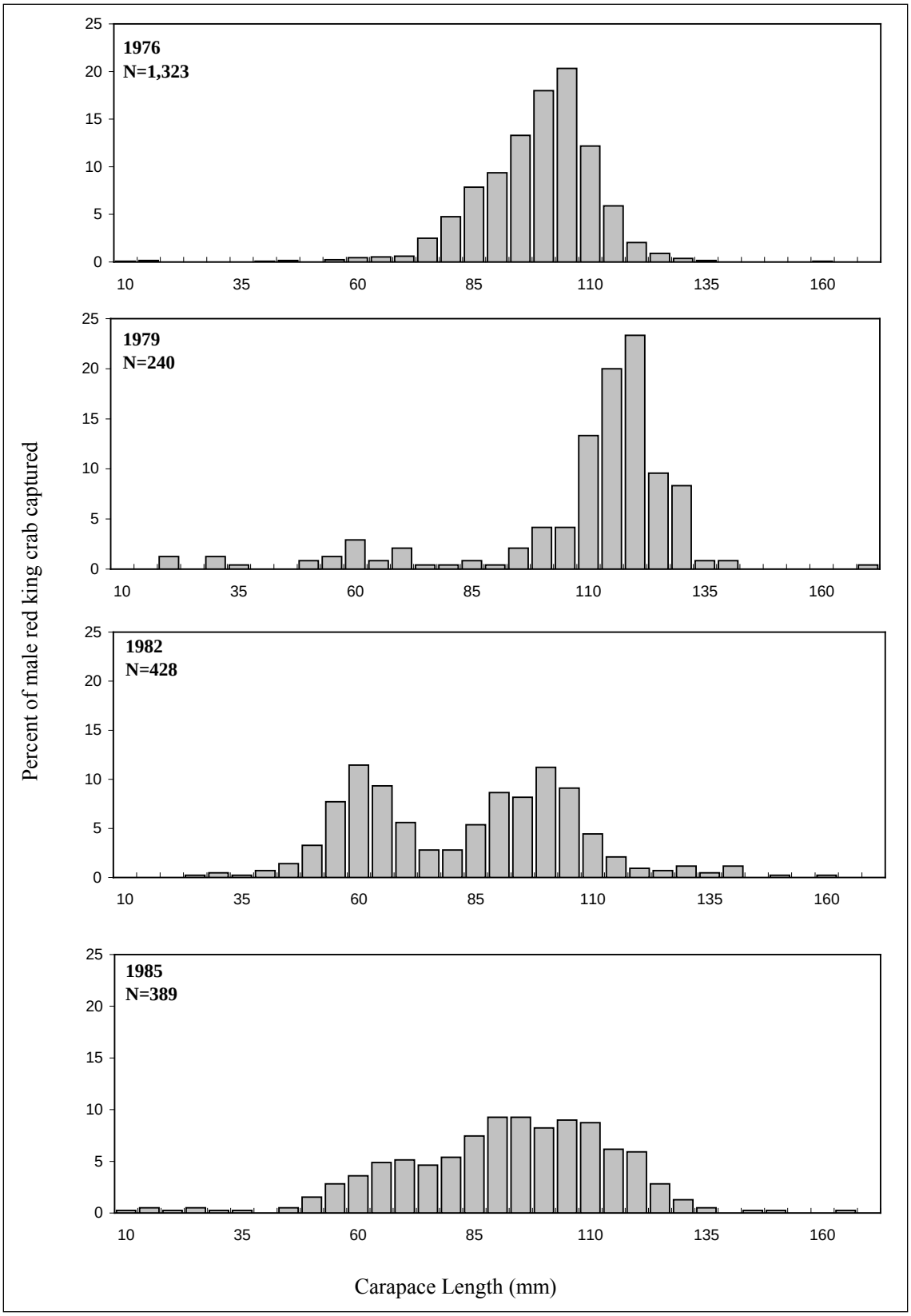
Appendix E8.–Closed water regulations in effect for the Norton Sound summer commercial crab fishery.



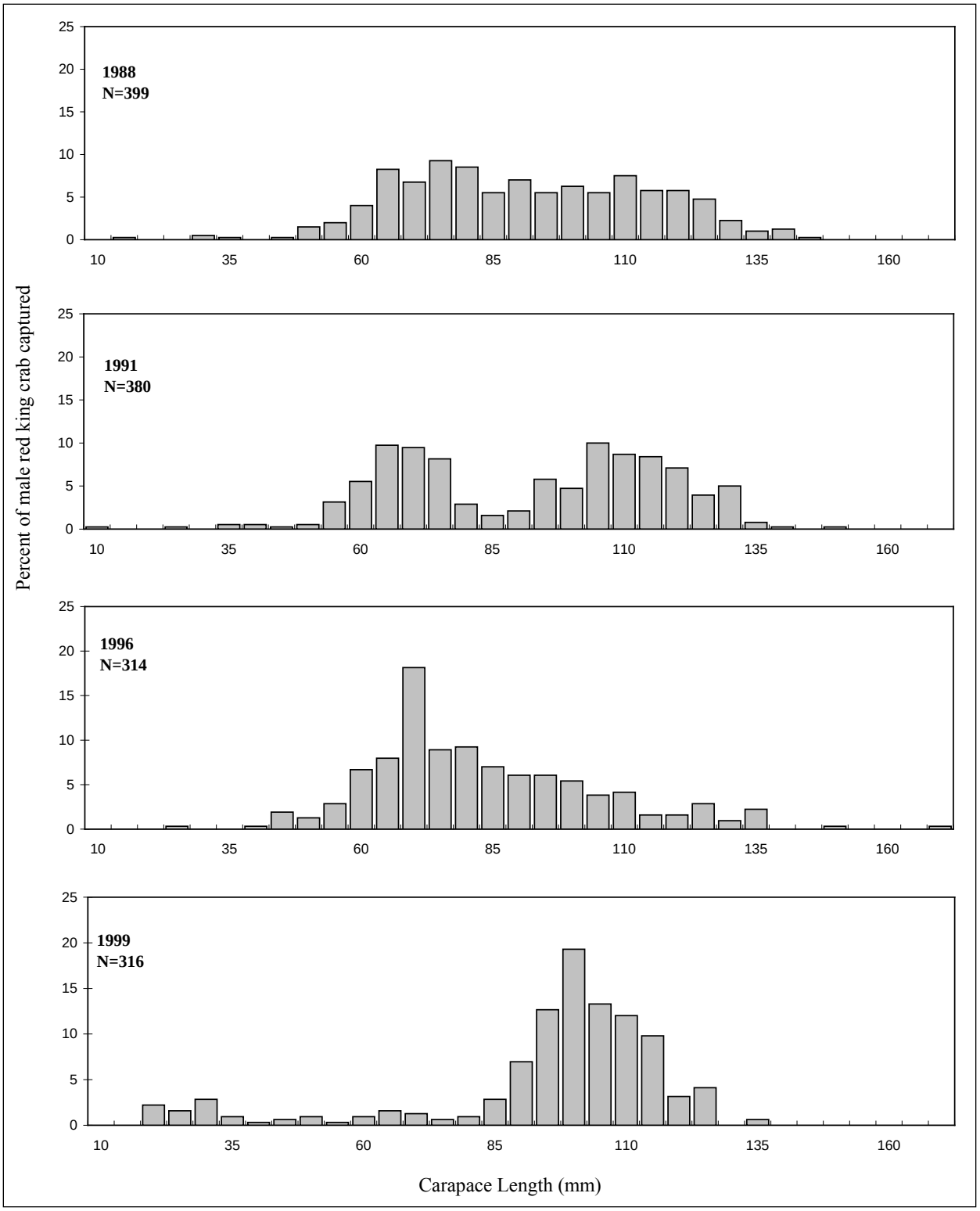
Appendix E9.–The percent of crab harvested during the Norton Sound summer commercial red king crab fishery east of 164º west longitude, 1987–2009.



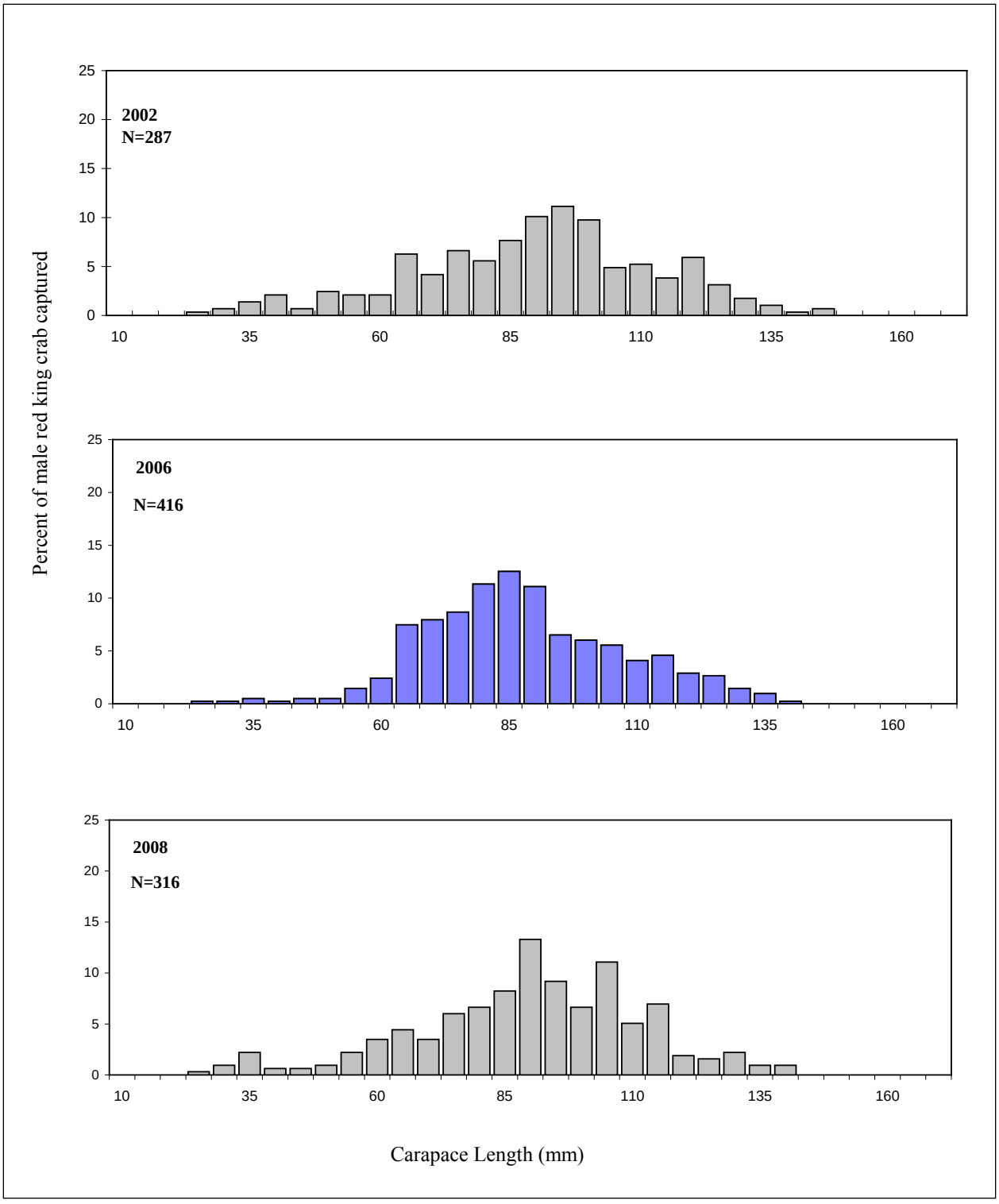
Appendix E10.–Norton Sound male red king crab size distribution from pot assessment surveys conducted by ADF&G in 1980, 1981, 1982, and 1985.



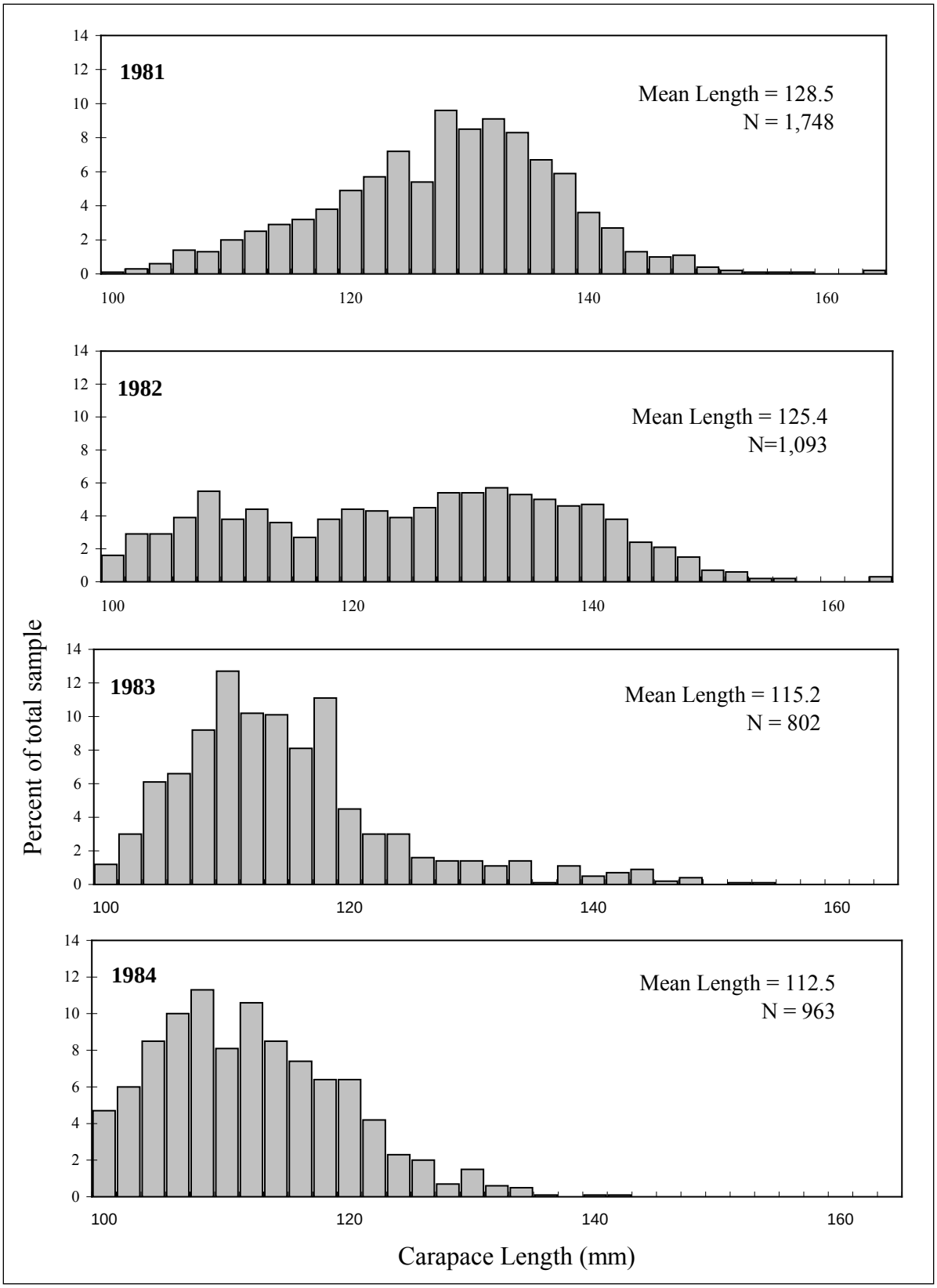
Appendix E11.–Norton Sound male red king crab size distribution from trawl assessment surveys conducted by the National Marine Fisheries Service, 1976, 1979, 1982, and 1985.



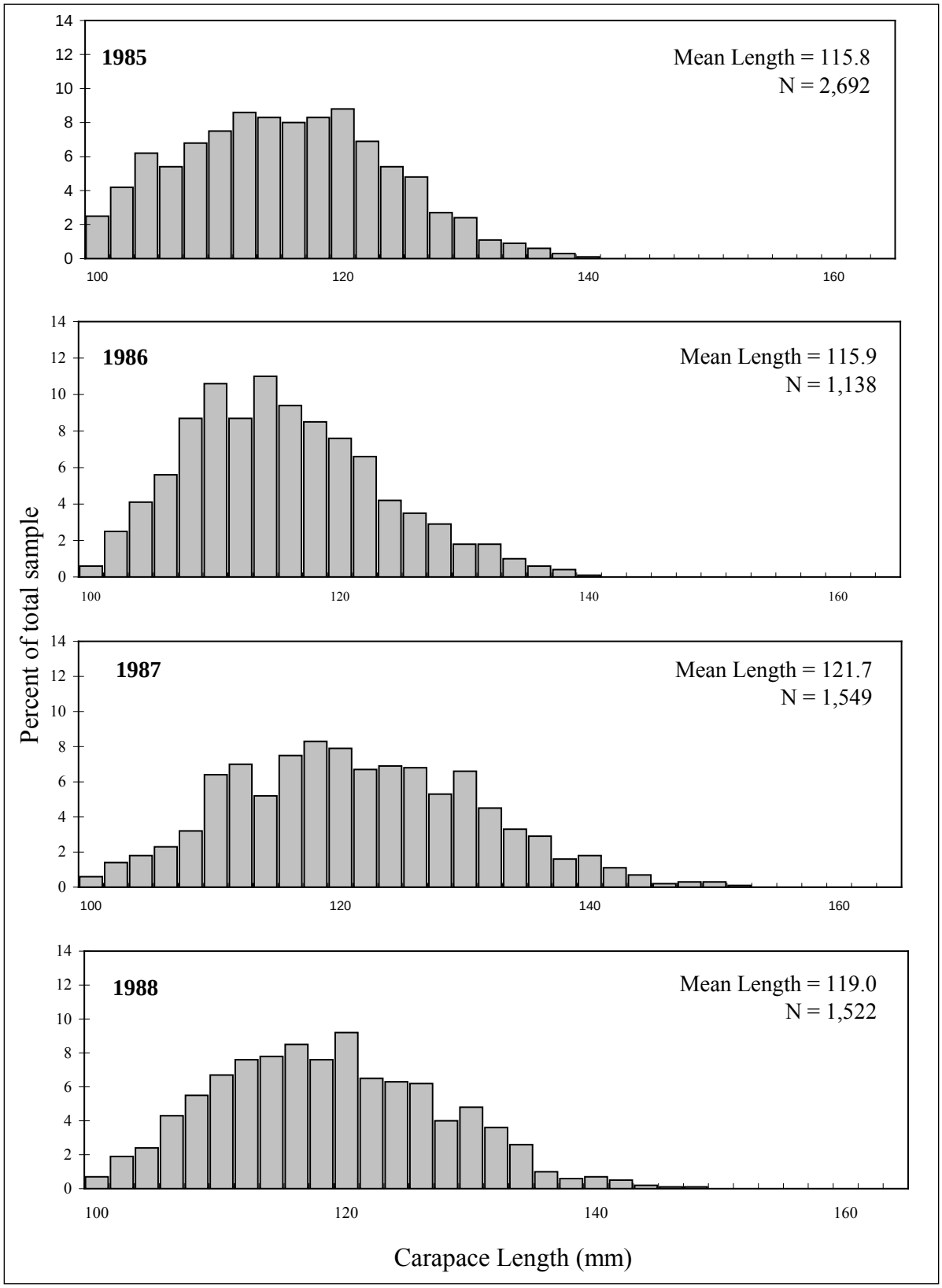
Appendix E12.–Norton Sound male red king crab size distribution from trawl assessment surveys conducted by the National Marine Fisheries Service in 1988 and 1991, and by ADF&G in 1996 and 1999.



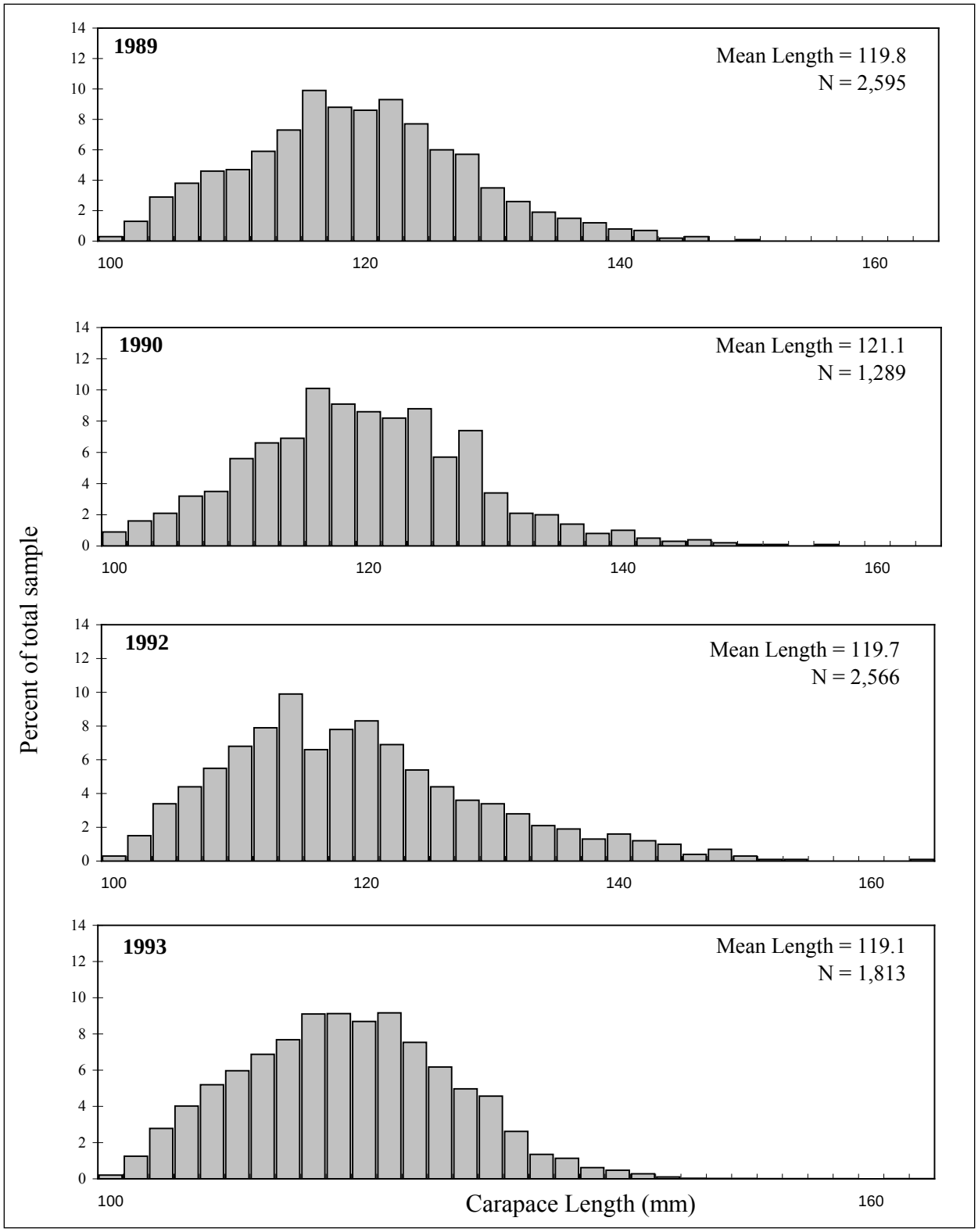
Appendix E13.–Norton Sound male red king crab size distribution from trawl assessment surveys conducted by ADF&G in 2002, 2006, and 2008.



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

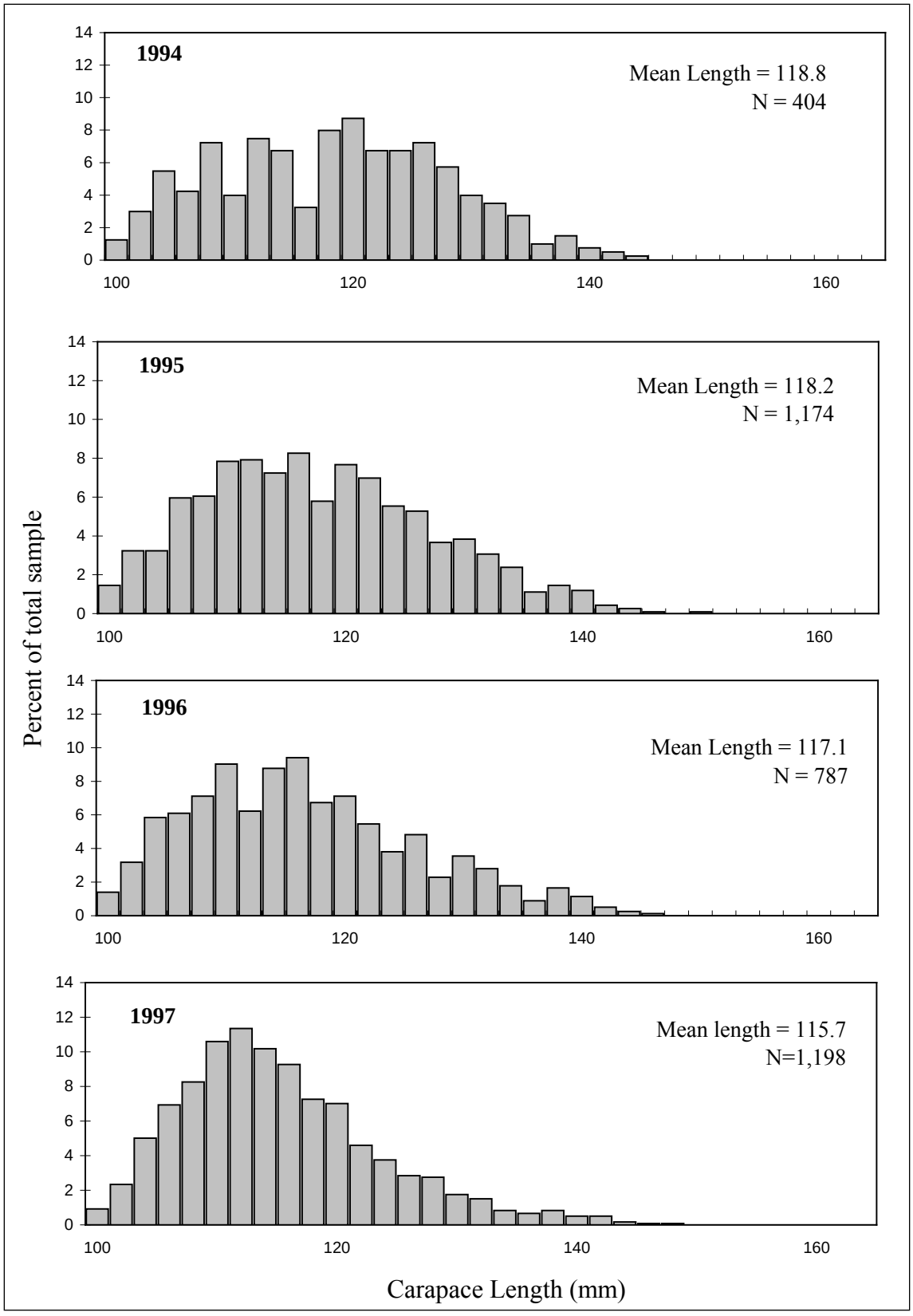


Appendix E15.–Length composition of Norton Sound red king crab summer commercial harvests, 1985–1988.

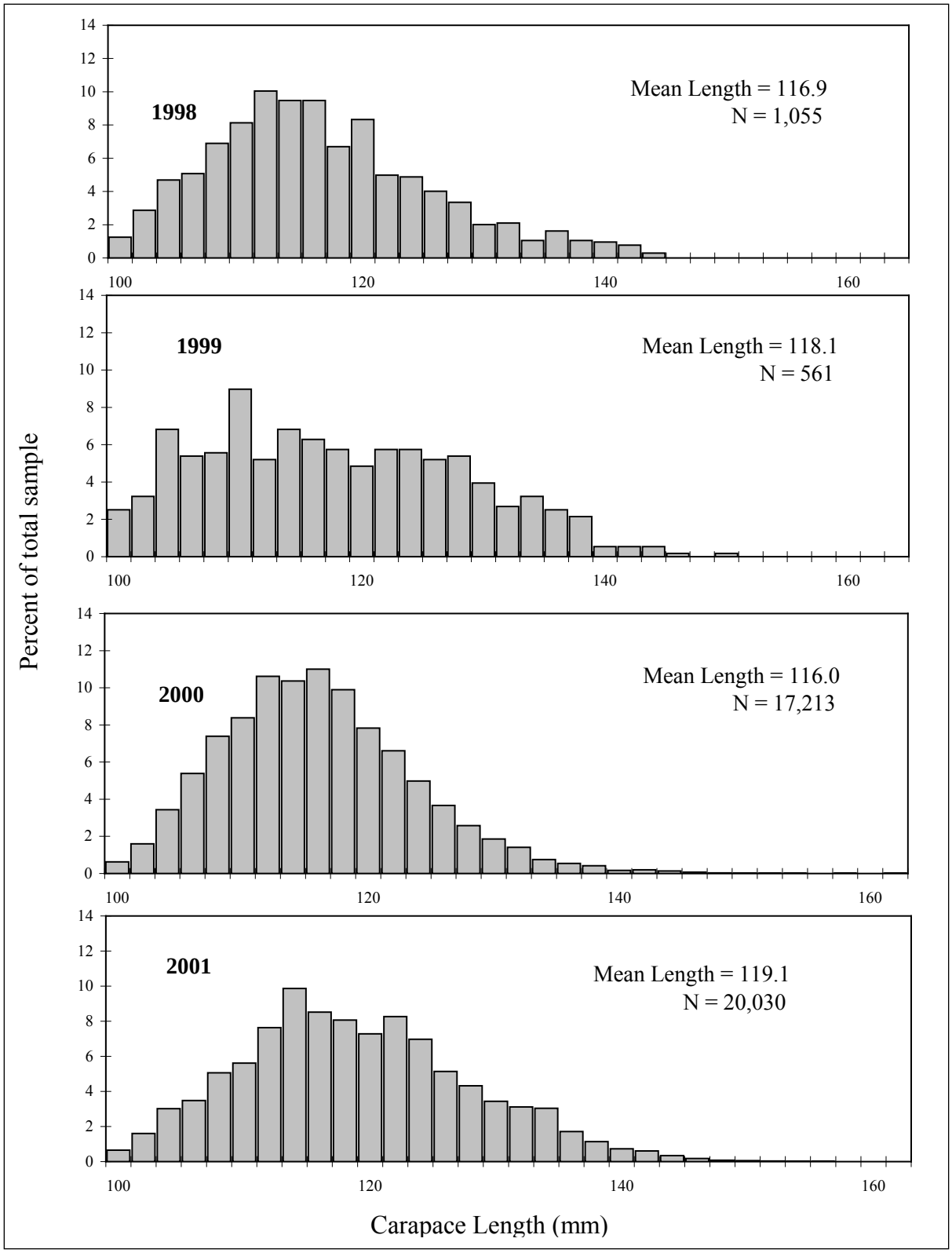


Note: No fishery in 1991.

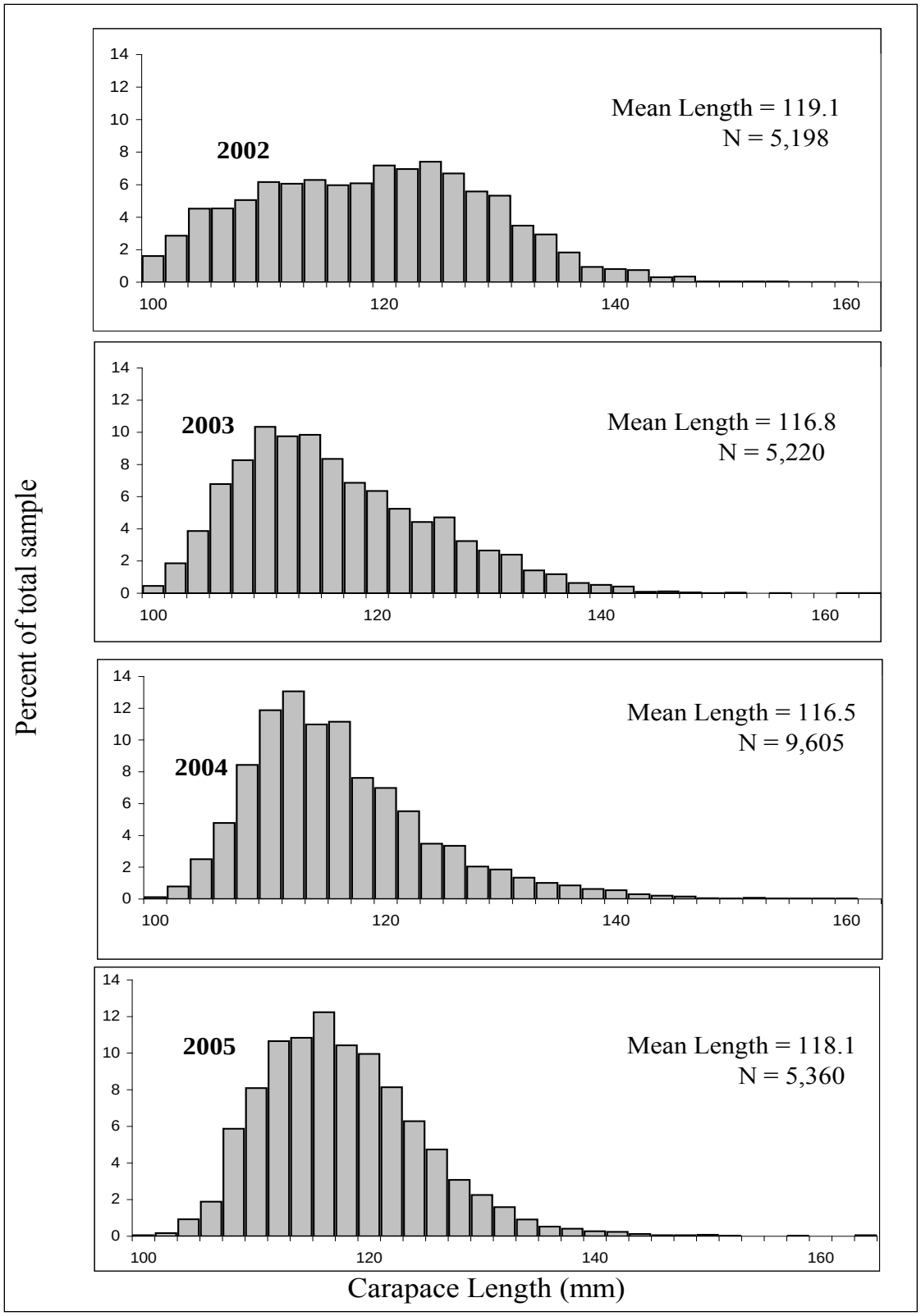
Appendix E16.–Length composition of Norton Sound red king crab summer commercial harvests, 1989–1993.



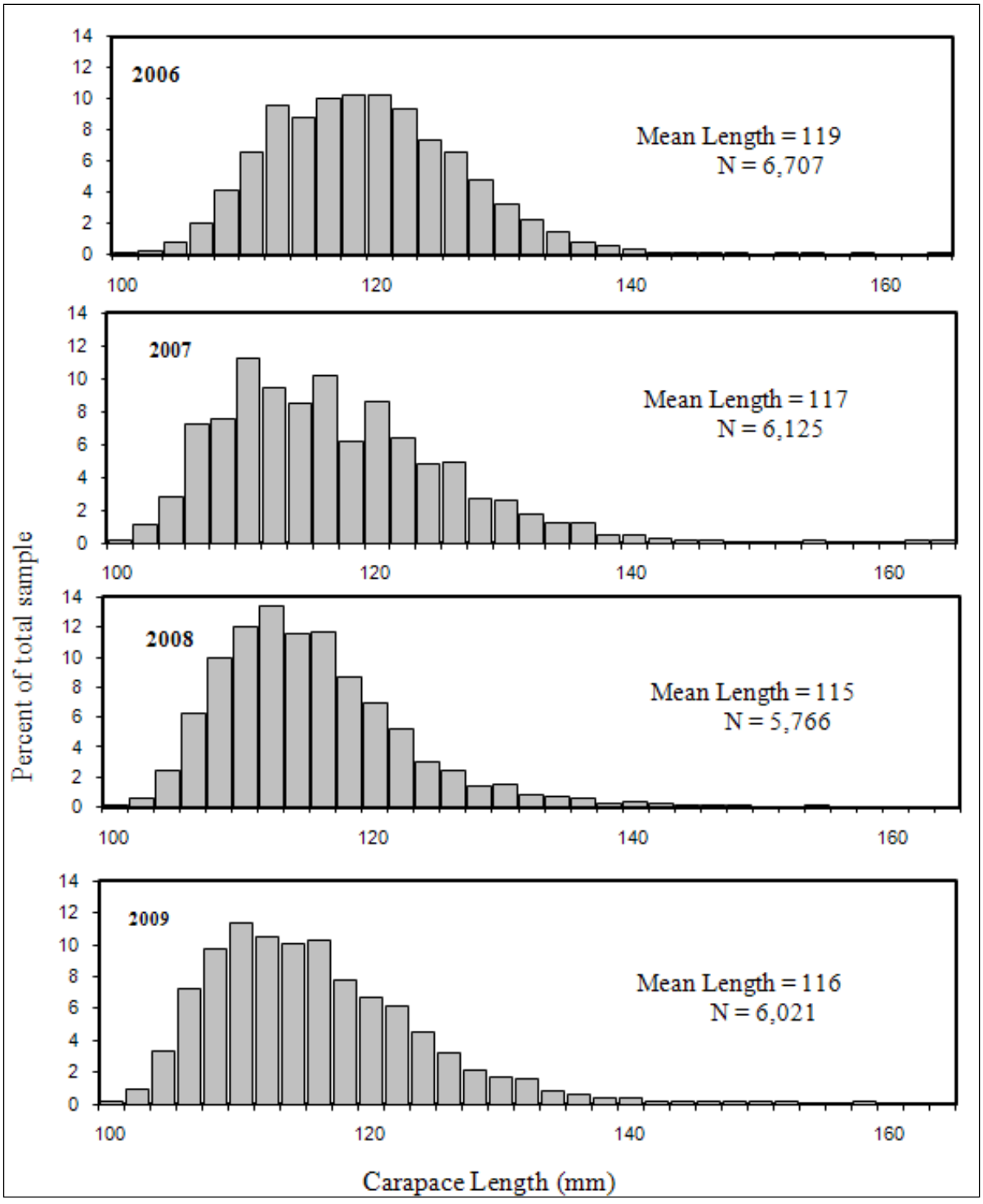
Appendix E17.–Length composition of Norton Sound red king crab summer commercial harvests, 1994–1997.



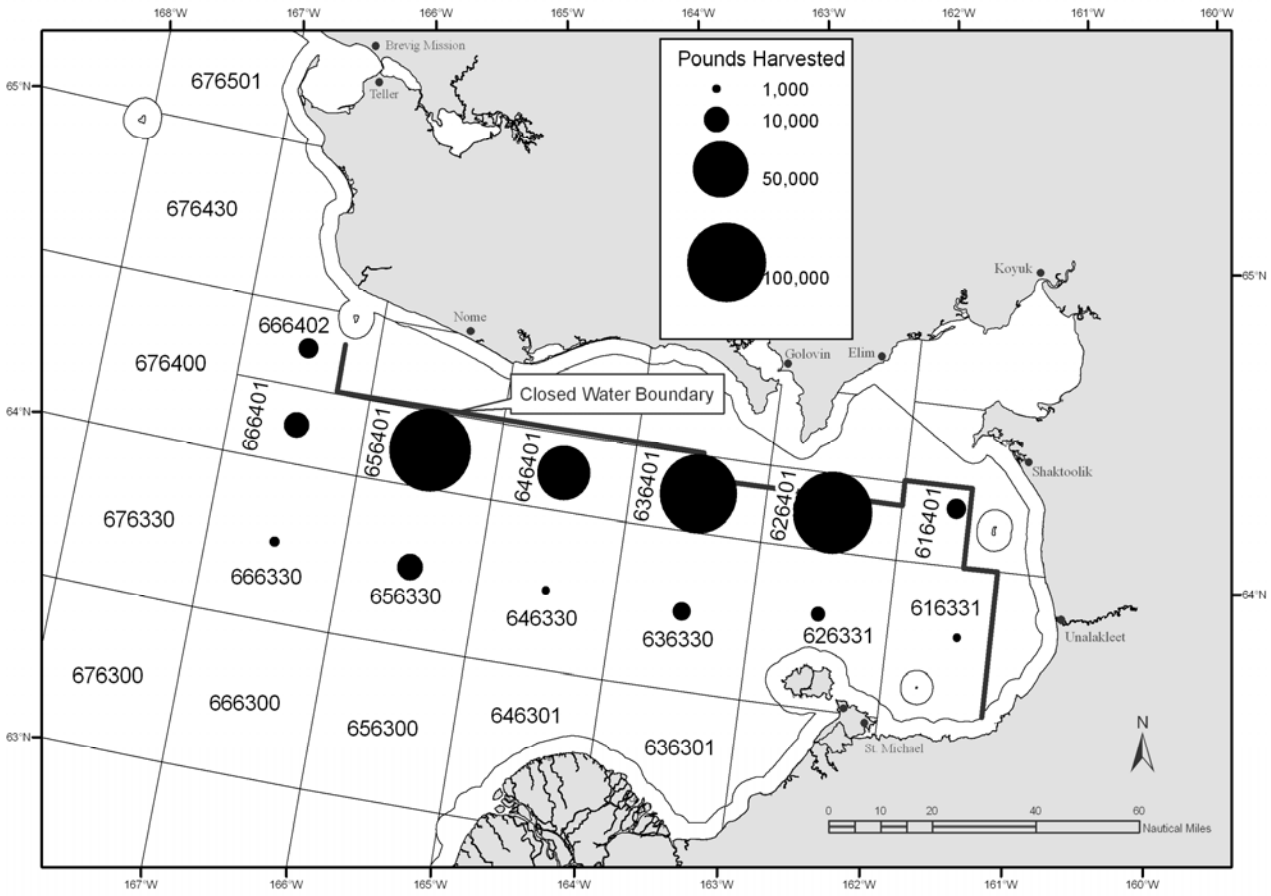
Appendix E18.–Length composition of Norton Sound red king crab summer commercial harvests, 1998–2001.



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, 2006–2009.



Appendix E21.–Commercial harvest (including CDQ fishery) of red king crab from Norton Sound by statistical area, 2009.

APPENDIX F: MISCELLANEOUS FISHERIES

Appendix F1.–Kotzebue District winter commercial sheefish harvest statistics, 1967–2009.

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					
2006-9 [e]						

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

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

[c] Data unavailable or incomplete.

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

[e] No reported commercial catches.

[f] Estimate based on historical average weight.

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

Appendix F2.–Kotzebue District reported subsistence harvests of sheefish, 1966–2004.

Year [a, b]	Number of Fishermen Interviewed	Reported Harvest	Average Catch per Fisherman
1966-1967	135	22,400	166
1967-1968	146	31,293	214
1968-1969	144	11,872	82
1970	168	13,928	83
1971	155	13,583	88
1972	79	3,832	49
1973	65	4,883	75
1974	58	1,062	18
1975	69	1,637	24
1976	57	966	17
1977	95	1,810	19
1978	95	1,810	19
1979	75	3,985	53
1980	74	3,117	42
1981	62	6,651	107
5/82-4/83 [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]	0
2004 [h]	440	10,163	23

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, 1978-2009.

	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
2009	3,600	1,185	1,406	445	957
Average					
1999-2008	4,231	1,026	1,413	1,133	1,011
2004-2008	3,338	623	1,526	828	793

Note: Data not available for all years.

Appendix F4.–Kotzebue District incidentally caught and sold Dolly Varden during the commercial salmon fishery, 1966–2009.

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]	
2009	0	960	0	[i]	

Note: Data not available for all years.

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

[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	69,059	2,676 [d, f]
1983	16,270	68,467	4,545
1984	12,000 [e]		2,542
1985	10,500 [e]		
1986	7,436 [e]		46 [h]
1987 [g]			1,376 [h]
1991 [g]			4,814
1992 [g]			4,395
1993 [g]			4,275
1995 [g]			5,762
1996 [g]			5,031
1997 [g]			4,763
1998 [g]			3,872
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, 1988–1990, 1994, 1999, 2005–2006, and after 2007.

[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, 1988–2009.

	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	46	0	1,062	1,061	107	46	0	997	3,319
2009	0	255	0	2,905	125	51	0	120	144	3,600
Average										
1999-2008	181	532	88	1,596	773	196	97	102	621	4,186
2004-2008	36	482	2	1,439	504	193	117	137	338	3,248

Note: Data not available for all years.

Appendix F7.–Aerial survey counts of overwintering and spawning Dolly Varden in the Kotzebue District, 1968–1969, and 1976–2009.

Year [a]	Noatak River Spawner Survey [b]	Overwintering Wulik River [c]	Overwintering 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]	101,806	[f]
2005	[f]	120,848	[f]
2006	[f]	108,352	[f]
2007	[f]	99,311	[f]
2008	[f]	71,493	[f]
2009	[f]	63,977	[f]

Note: Data not available for all years.

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

[b] Includes spawner counts on the Kelly, Kugurorok and Nimiuktuk rivers, and tributaries of the Noatak River.

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

[d] Poor weather hampered or prevented survey.

[e] Incomplete survey.

[f] Not surveyed.

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

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

Appendix 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	Average Catch Per Fisherman
1970		58,165	
1971		36,012	
1977		30,810	
1978		77,474	
1979	123	43,653	355
1980	67	49,106	733
1981	71	37,746	532
1982 [b]			
1983	47	16,389	349
1984	79	28,614	362
1985 [c]	46	5,229	114
1986 [d]	72	11,854	165
1987 [d]	46	20,020	435
1988 [e]	38	14,000	368
1989 [b]			
1990 [b]			
1991 [d]	63	16,015	254
1992 [d]	66	17,485	265
1993 [d]	70	19,060	272
1997	413 [f]	84,851	205
1998	435 [f]	39,754	91
1999	191 [f]	56,326	295
2000	237 [f]	70,097	296
2001	363 [f]	30,976	85
2002	101 [g]	25,607	254
2003	446	73,242	164
2004	440 [f]	50,501	115

Note: Subsistence surveys were not conducted after 2004.

[a] Whitefish harvest information was collected during chum salmon subsistence surveys and is considered a fraction of the annual catch. Whitefish numbers include all species of whitefish, except sheefish.

[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 2009

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 pallasii*
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, 2009.

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.

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 NSEDC and ADF&G.

-continued-

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 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.

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.

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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.

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, St. Michael, Stebbins, and Unalakleet were surveyed by Commercial Fisheries Division. ADF&G project.

CRAB

Nearshore 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 nearshore Nome waters. Tag all male new shell red king crab with carapace length $\leq$100 mm. ADF&G project.

Nearshore Summer King Crab Study

a) Location: Ocean waters of Norton Sound, 1 to 5 miles south of Solomon River.

b) Description: Document the abundance and distribution of red king crab in nearshore Solomon 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).

-end-

Appendix G3.–Commercial processors and buyers operating in Norton Sound, Port Clarence, and Kotzebue Sound, 2009.

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, 2009.

NORTON SOUND 2009 SUBSISTENCE SALMON HARVEST SURVEY
Alaska Department of Fish and Game

Community ID#_____
Household ID#_____

Community: _____
Survey Date: _____
Interviewer: _____

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

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

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

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

Appendix G5.–Emergency Orders issued during 2009.

RED KING CRAB

Emergency Order: 3-C-Z-01-09 Effective Date: June 12, 2009

EXPLANATION: This emergency order opens the commercial crab fishery (open-access and CDQ concurrently) in Norton Sound from 12 noon Monday, June 15 until 12 noon Wednesday, September 30.

JUSTIFICATION: By regulation the commercial crab fishery may open anytime from June 15 or after. The estimated legal male red king crab abundance for 2009 king crab season is 3.75 million pounds. The guideline harvest level for the 2009 Norton Sound open access crab fishery is 346,875 pounds. The CDQ crab fishery quota is 28,125 pounds.

Emergency Order: 3-C-Z-02-09 Effective Date: September 20, 2009

EXPLANATION: This emergency order closes the commercial open access crab fishery in Norton Sound. Permit holders must have pots unbaited and secured open by 12 noon, Sunday, September 20 and removed from the water by 12 noon Friday, September 25, 2009.

JUSTIFICATION: The guideline harvest level for the 2009 Norton Sound open access crab fishery is 346,875 pounds and is projected to be reached by noon, September 20.

HERRING

Emergency Order: 3-H-Z-1-09 Effective Date: June 8, 2009

EXPLANATION: This emergency order opens the Norton Sound District to commercial gillnet herring fishing beginning 12 a.m. Monday, June 8, 2009 until Wednesday, July 1, 2009, unless superseded by another emergency order.

JUSTIFICATION: Herring were first sighted by aerial survey on June 6th in the St. Michael Subdistrict. The quota this year for the Norton Sound District is nearly 7,400 tons. No buyers are interested in herring for sac roe, but one buyer is interested in purchasing around 25 tons of herring for use as bait. To allow maximum flexibility for the buyer the department will open the fishery for the remainder of month unless superseded by another emergency order.

Emergency Order: 3-H-Z-2-09 Effective Date: June 13, 2009

EXPLANATION: This emergency order opens Subdistrict 1 from Canal Point to Wood Point to wild kelp harvest from June 14 to June 21.

JUSTIFICATION: A few Norton Sound herring permit holders have notified the department that they have a market for herring spawn-on-wild kelp. Up to 30 metric tons may be taken in the wild kelp fishery, but the harvest is not expected to exceed 5 tons and should not affect subsistence harvests or future herring returns.

KOTZEBUE SALMON

Emergency Order: 3-S-X-01-09 Effective Date: July 10, 2009

EXPLANATION: This emergency order opens commercial fishing in the Kotzebue District through August 31, 2009 from the hours of 6 a.m. until 2 p.m. Alaska Daylight Time (ADT) Monday through Saturday.

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. To provide maximum opportunity to those who will fish, the department is opening the commercial salmon season 6 days a week from the hours 6 a.m. to 2 p.m. Monday through Saturday until further notice and the season will close after the August 31 fishing period. The forecast is for a commercial harvest of 150,000 to 200,000 chum salmon in 2009.

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Emergency Order: 3-S-X-02-09 Effective Date: July 13, 2009

EXPLANATION: This emergency order supersedes emergency order 3-S-X-01-09 and closes the regular fishing schedule in the Kotzebue District commercial salmon fishery on Monday, July 13, 2009 and reopens commercial salmon fishing in the Kotzebue District on Monday, July 13, 2009 to eight hours of fishing from 12 noon, until 8 p.m. Alaska Daylight Time (ADT).

JUSTIFICATION: Great Pacific Seafoods has requested a schedule change for Monday, July 13, 2009 in the Kotzebue District commercial salmon fishery because of plane availability to fly the catch out of Kotzebue.

Emergency Order: 3-S-X-03-09 Effective Date: July 20, 2009

EXPLANATION: This emergency order supersedes emergency order 3-S-X-01-09 and closes the regular fishing schedule in the Kotzebue District commercial salmon fishery on Monday, July 20, 2009 and reopens commercial salmon fishing in the Kotzebue District on Monday, July 20, 2009 to eight hours of fishing from 12 noon, until 8 p.m. Alaska Daylight Time (ADT).

JUSTIFICATION: Great Pacific Seafoods has requested a schedule change for Monday, July 20, 2009 in the Kotzebue District commercial salmon fishery because of plane availability to fly the catch out of Kotzebue.

Emergency Order: 3-S-X-04-09 Effective Date: July 27, 2009

EXPLANATION: This emergency order supersedes emergency order 3-S-X-01-09 and closes the regular fishing schedule in the Kotzebue District commercial salmon fishery on Monday, July 27, 2009 and reopens commercial salmon fishing in the Kotzebue District on Monday, July 27, 2009 to eight hours of fishing from 12 noon, until 8 p.m. Alaska Daylight Time (ADT).

JUSTIFICATION: Great Pacific Seafoods has requested a schedule change for Monday, July 27, 2009 in the Kotzebue District commercial salmon fishery because of plane availability to fly the catch out of Kotzebue.

Emergency Order: 3-S-X-05-09 Effective Date: July 30, 2009

EXPLANATION: This emergency order supersedes emergency order 3-S-X-01-09 and closes the regular fishing schedule in the Kotzebue District commercial salmon fishery on Thursday, July 30, 2009 and reopens commercial salmon fishing in the Kotzebue District on Thursday, July 30, 2009 to sixteen additional hours of fishing from 2 p.m. Alaska Daylight Time (ADT), Thursday, July 30 until 6 a.m. Alaska Daylight Time (ADT), Friday, July 31.

JUSTIFICATION: Severe and sudden southeasterly winds have hit the Kotzebue Sound District. Gale-force winds with gusts of 45-50 mph are currently hitting the Baldwin Peninsula but winds are expected to diminish significantly this evening. A few permit holders have communicated to the ADF&G and Fish & Wildlife Protection that their commercial gear is soaking and that it is unlikely that they will be able to retrieve their gear safely before 2 p.m. when the July 30 period closes.

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NORTON SOUND SALMON – COMMERCIAL

Emergency Order: 3-S-Z-01-09 Effective Date: June 15, 2009

EXPLANATION: This emergency order closes all marine waters in Subdistrict 6, the Unalakleet Subdistrict, and all waters of the Unalakleet River drainage and all marine waters in Subdistrict 5, the Shaktoolik Subdistrict to subsistence salmon fishing beginning midnight Sunday, June 14 and reopens the above waters beginning Monday, June 15 to a subsistence fishing schedule of two 48-hour periods per week (from 6 a.m. Monday until 6 p.m. Wednesday and from 6 p.m. Thursday until 6 p.m. Saturday) in the marine waters and two 36-hour fishing periods per week (from 8 a.m. Monday until 8 p.m. Tuesday and from 8 a.m. Friday until 8 p.m. Saturday) in the Unalakleet River drainage.

JUSTIFICATION: The intent of the subsistence fishing schedule is to provide windows of escapement unimpeded by gillnets for king salmon migrating to spawning areas. The 2009 king run is projected to be below average and may not provide for customary levels of subsistence use. Additionally, the department anticipates having difficulty reaching escapement needs in spite of the fishing schedule and early closures may be necessary.

Emergency Order: 3-S-Z-02-09 Effective Date: June 15, 2009

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

JUSTIFICATION: By regulation the subsistence gillnet fishing schedule begins on June 15th. Catch limits for each river are listed on the permits.

Emergency Order: 3-S-Z-03-09 Effective Date: June 29, 2009

EXPLANATION: In order to conserve Chinook salmon, effective 8 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: Escapement goals have only been reached 50% of the time 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 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-04-09 Effective Date: July 4, 2009

EXPLANATION: Effective 6 p.m. Saturday July 4, the marine waters of Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, will be closed to subsistence salmon fishing with gillnets. The weekly salmon gillnet fishing schedule in both the marine waters of Subdistricts 5 and 6 is suspended until further notice.

JUSTIFICATION: King salmon passage at a counting tower located on the North River, a tributary of the Unalakleet River, has been very weak, raising concerns that the king salmon escapement goal might not be met this season. Therefore, this closure is necessary in order to conserve king salmon and reach escapement goals.

Emergency Order: 3-S-Z-05-09 Effective Date: July 4, 2009

EXPLANATION: This emergency order closes subsistence salmon fishing with gillnets in the Unalakleet River drainage effective 8 p.m. Saturday, July 4. The weekly salmon gillnet fishing schedule in the freshwaters of the Unalakleet River drainage is suspended until further notice.

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JUSTIFICATION: King salmon passage at a counting tower located on the North River, a tributary of the Unalakleet River, has been very weak, raising concerns that the king salmon escapement goal might not be met this season. Therefore, this closure is necessary in order to conserve king salmon and reach escapement goals.

Emergency Order: 3-S-Z-06-09 Effective Date: July 4, 2009

EXPLANATION: Effective 8 p.m. Saturday July 4, the marine waters of Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, and all fresh waters of the Unalakleet and Shaktoolik River drainages will open, to beach seining for salmon other than king salmon seven days a week.

JUSTIFICATION: Allowing beach seining for pink salmon seven 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 protecting king salmon. Any king salmon caught in beach seines must be immediately released.

Emergency Order: 3-S-Z-07-09 Effective Date: July 8, 2009

EXPLANATION: This emergency order opens the marine waters of Subdistricts 5 and 6 of the Norton Sound District, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing from 6 pm. Wednesday, July 8 until 6 p.m. Thursday, July 9. Fishermen are limited to 100 fathoms of net in aggregate length and only gillnets with a stretched-mesh size of four and one-half inches or less may be used.

JUSTIFICATION: This brief commercial fishing period will provide the department with an early index of pink salmon run strength and should not jeopardize pink salmon subsistence fishing or escapement needs. Additionally, using 4 ½-inch mesh will allow fishermen to selectively target pink salmon while conserving king salmon.

Emergency Order: 3-S-Z-08-09 Effective Date: July 10, 2009

EXPLANATION: This emergency order reopens the marine waters of Subdistricts 5 and 6 of the Norton Sound District, the Shaktoolik and Unalakleet Subdistricts, to subsistence salmon fishing with set gillnets seven days a week effective 6 p.m. Friday evening, July 10. Set gillnets must have a mesh size of 6 inches or less.

JUSTIFICATION: To allow subsistence opportunity of other salmon species, the marine waters of Subdistrict 5 and 6 will reopen to subsistence salmon fishing with set gillnets. The 6-inch or less mesh size restrictions coupled with limited subsistence fishing effort should keep incidental catches of king salmon low.

Emergency Order: 3-S-Z-09-09 Effective Date: July 10, 2009

EXPLANATION: This emergency order opens the marine waters of Subdistricts 5 and 6 of the Norton Sound District, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing from 6 pm. Friday, July 10 until 6 p.m. Saturday, July 11. Fishermen are limited to 100 fathoms of net in aggregate length and only gillnets with a stretched-mesh size of 6 inches or less may be used.

JUSTIFICATION: Chum salmon test net catches are above the recent 5, 10 and 20-year averages indicating there is surplus available for commercial use. At this point in the king salmon run, commercial fishing directed at chum salmon is not expected to affect the outcome of king salmon escapements in Subdistricts 5 and 6. Additionally, the brevity of this period coupled with 6-inch mesh should allow permit holders to target chum salmon while conserving the majority of any late run king salmon.

Emergency Order: 3-S-Z-10-09 Effective Date: July 14, 2009

EXPLANATION: This emergency order reopens the marine waters of Subdistrict 4, the Norton Bay Subdistrict, to commercial salmon fishing with gillnets for two 36-hour periods from 12 p.m. Tuesday, July 14 to midnight Wednesday, July 15, and from 12 p.m. Thursday, July 16 to midnight Friday, July 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.

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JUSTIFICATION: Chum salmon returns are showing above-average strength in eastern Norton Sound this season. The department will evaluate chum salmon commercial catch and escapement indices to determine if further commercial salmon fishing is warranted.

Emergency Order: 3-S-Z-11-09 Effective Date: July 12, 2009

EXPLANATION: This emergency order opens the marine waters of Subdistricts 5 and 6 of the Norton Sound District, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing from 6 pm. Sunday, July 12 until 6 p.m. Monday, July 13, and from 6 p.m., Tuesday, July 14 to 6 p.m. Wednesday, July 15, and from 6 p.m. Thursday, July 16 to 6 p.m. Friday, July 17. Fishermen are limited to 100 fathoms of net in aggregate length and only gillnets with a stretched-mesh size of 6 inches or less may be used.

JUSTIFICATION: Preliminary catch data from the July 10th opening indicate that 6-inch or less mesh-size restrictions are having the desired effect of protecting king salmon while allowing fishermen to target other salmon. Additionally, test net catches indicate that chum salmon abundance in eastern Norton Sound is sufficient to both meet subsistence and escapement needs and sustain commercial harvest.

Emergency Order: 3-S-Z-12-09 Effective Date: July 16, 2009

EXPLANATION: This emergency order extends the closure of all fresh waters of the Unalakleet River drainage, except for the Unalakleet River downstream of the confluence of the North River, to subsistence salmon fishing with set gillnets. The Unalakleet River below the confluence of the North River and all other fresh waters in Subdistrict 6, the Unalakleet Subdistrict, are open to subsistence salmon fishing with set gillnets seven days a week beginning at 12:01 a.m. Thursday, July 16. Set gillnets of any mesh size may be used, but may not exceed 25 fathoms in length in fresh water and may not obstruct more than half of any waterway or river channel.

JUSTIFICATION: Since the closure last week, nearly 900 king salmon have migrated beyond the North River tower and the lower end of the escapement goal range of 1,200-2,600 king salmon is expected to be reached. Mesh-size restrictions in late June and the early closure have had the desired effect of increasing king salmon escapements in the Unalakleet River drainage. Reopening the lower river subsistence fishery to set gillnets provides additional subsistence opportunity for harvesting salmon including some late returning king salmon without jeopardizing escapement needs.

Emergency Order: 3-S-Z-13-09 Effective Date: July 16, 2009

EXPLANATION: This emergency order closes Subdistrict 1, the Nome Subdistrict, to the use of gillnets and prohibits the retention of chum salmon.

JUSTIFICATION: Chum salmon escapement counts in the Nome Subdistrict continue to be very low for mid-July. We are past the average historical midpoint of the chum run at the Eldorado River weir and the escapement is less than one-third needed to reach the lower end of the escapement goal range of 6,000 – 9,200 chums. At the Nome River weir we are past the average historical quarter point of the chum run and just over 100 chums have passed through the weir and the escapement goal range at Nome River is 2,900 – 4,300 chums. Likewise, at Snake River weir we are past the average historical quarter point of the chum run and only 60 chums have passed through the weir and the escapement goal range is 1,600 – 2,500 chums.

Emergency Order: 3-S-Z-14-09 Effective Date: July 16, 2009

EXPLANATION: This emergency order closes the Pilgrim and Kuzitrin rivers to the use of gillnets and seines.

JUSTIFICATION The average historical midpoint of the sockeye salmon run through the Pilgrim River weir is July 15. As of July 14 only 255 sockeyes have passed through the weir. The escapement goal for the sockeyes at Salmon Lake, the spawning area for the Pilgrim River sockeye salmon, is 4,000 to 8,000 fish as counted by aerial survey. To have any chance of meeting the escapement goal in the Pilgrim River and the Kuzitrin River, to which the Pilgrim River is a tributary, both rivers must be closed to salmon fishing with nets.

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Emergency Order: 3-S-Z-15-09 Effective Date: July 20, 2009

EXPLANATION: This emergency order reopens the marine waters of Subdistrict 4, the Norton Bay Subdistrict, to commercial salmon fishing with gillnets for two 36-hour periods from 12 p.m. Monday, July 20 to midnight Tuesday, July 21, and from 12 p.m. Thursday, July 23 to midnight Friday, July 24. 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: Effort in the Norton Bay fishery has been very limited so far, but catch rates of chum and coho salmon are good and the buyer has requested additional time in the Norton Bay Subdistrict. Subsistence fishermen reports from the village of Koyuk indicate that chum salmon are abundant in the Ungalik, Koyuk, and Inglutalik rivers and chum salmon subsistence and escapement needs will easily be met.

Emergency Order: 3-S-Z-16-09 Effective Date: July 19, 2009

EXPLANATION: This emergency order opens the marine waters of Subdistricts 5 and 6 of the Norton Sound District, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing for one 48-hour period from 6 pm. Sunday, July 19 until 6 p.m. Tuesday, July 21. Fishermen are limited to 100 fathoms of net in aggregate length and only gillnets with a stretched-mesh size of 6 inches or less may be used.

JUSTIFICATION: Nearly 11,000 chum salmon have been caught this season in four 24-hour periods by a few dozen fishermen. Catches and catch per unit effort are above average for mid July and test net catches continue to be above average. Test net catches indicate that chum salmon abundance in eastern Norton Sound is sufficient to both meet subsistence and escapement needs and continued commercial fishing for chum salmon is warranted.

Emergency Order: 3-S-Z-17-09 Effective Date: July 22, 2009

EXPLANATION: This emergency order opens the marine waters of Subdistricts 5 and 6 of the Norton Sound District, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing for one 48-hour period from 6 pm. Wednesday, July 22 until 6 p.m. Friday, July 24. Fishermen are limited to 100 fathoms of net in aggregate length and only gillnets with a stretched-mesh size of 6 inches or less may be used.

JUSTIFICATION: Commercial chum salmon catches and catch per unit of effort are above average for mid-July and the silver salmon catches are steadily increasing. This 48-hour period will provide opportunity to target chum salmon surpluses for commercial use and provide another index of coho salmon abundance.

Emergency Order: 3-S-Z-18-09 Effective Date: July 26, 2009

EXPLANATION: This emergency order opens the marine waters of Subdistricts 5 and 6 of the Norton Sound District, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing for one 48-hour period from 6 pm. Sunday, July 26 until 6 p.m. Tuesday, July 28. Fishermen are limited to 100 fathoms of net in aggregate length and only gillnets with a stretched-mesh size of 6 inches or less may be used.

JUSTIFICATION: Commercial chum catches were slightly below average for July 22, but catch per unit of effort was well above average. Silver salmon catches from the July 22 opener were nearly double the catch from the July 19 opener. The July 26 opener will provide opportunity to target chum salmon surpluses for commercial use and provide another index of silver salmon abundance.

Emergency Order: 3-S-Z-19-09 Effective Date: July 28, 2009

EXPLANATION: This emergency order reopens the marine waters of Subdistrict 4, the Norton Bay Subdistrict, to commercial salmon fishing with gillnets for two 48-hour periods from 12 p.m. Tuesday, July 28 to 12 p.m. Thursday, July 30, and from 12 p.m. Friday, July 31 to 12 p.m. Sunday, August 2. 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: Chum salmon runs in eastern Norton Sound have been above average and coho salmon catches increased last week. Participation in the Norton Bay fishery has been very limited so far this season and the small commercial harvests should not affect chum or coho salmon subsistence and escapement needs.

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Emergency Order: 3-S-Z-20-09 Effective Date: July 29, 2009

EXPLANATION: This emergency order opens the marine waters of Subdistricts 5 and 6 of the Norton Sound District, the Shaktoolik and Unalakleet Subdistricts, to commercial salmon fishing for one 48-hour period from 6 pm. Wednesday, July 29 until 6 p.m. Friday, July 31. Fishermen are limited to 100 fathoms of net in aggregate length and only gillnets with a stretched-mesh size of 6 inches or less may be used.

JUSTIFICATION: Test fishery chum salmon catches are above the recent 5, 10, and 20-year averages for late July. Test fishery catches of silver salmon catch have also increased and the test net is averaging 10 silvers a day since July 24. The July 29 opener will provide opportunity to target chum salmon surpluses for commercial use and provide another index of silver salmon abundance.

Emergency Order: 3-S-Z-21-09 Effective Date: August 3, 2009

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

JUSTIFICATION: Nome Subdistrict chum salmon runs have been extremely poor, but are nearing their end. With the chum salmon run ending and silver salmon appearing in northern Norton Sound drainages, the department will switch to silver salmon management. To provide subsistence harvest opportunity for other salmon species, the department will reopen the marine waters of the Nome Subdistrict to the subsistence gillnet fishing schedule.

Emergency Order: 3-S-Z-22-09 Effective Date: August 2, 2009

EXPLANATION: This emergency order extends the subsistence net fishing closure of all freshwaters of Subdistrict 1, the Nome Subdistrict, and the Pilgrim and Kuzitrin river drainages to the use of gillnets and beach seines. This emergency order also extends the closure of all freshwaters of Subdistrict 1 to the retention of chum salmon.

JUSTIFICATION: Nome Subdistrict chum salmon escapements are the second lowest on record at the Nome and Snake River weirs, and the fourth lowest at Eldorado River weir. The cumulative sockeye salmon escapement at the Pilgrim River weir is 751 sockeyes, the lowest on record. Extending restrictions on retaining chum salmon in the Nome Subdistrict as well as net fishing in the freshwaters of the Nome Subdistrict and Pilgrim and Kuzitrin rivers is necessary in order to protect late returns of chum and sockeye salmon.

Emergency Order: 3-S-Z-23-09 Effective Date: August 3, 2009

EXPLANATION: This emergency order reopens the marine waters of Subdistrict 4, the Norton Bay Subdistrict, to commercial salmon fishing with gillnets for two 48-hour periods from 12 p.m. Monday, August 3 to 12 p.m. Wednesday, August 5, and from 12 p.m. Thursday, August 6 to 12 p.m. Saturday, August 8. 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: Chum salmon runs in eastern Norton Sound have been above average and coho salmon catches increased last week. Coho salmon runs are showing average run strength and should provide for escapement and subsistence needs. Chum salmon escapement and subsistence fishing needs have already been reached in eastern Norton Sound. Participation in the Norton Bay fishery has been very limited so far this season and the small commercial harvests should not jeopardize coho salmon subsistence and escapement needs.

Emergency Order: 3-S-Z-24-09 Effective Date: August 2, 2009

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.

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JUSTIFICATION: 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 average run strength. This regular commercial fishing schedule should not jeopardize coho salmon escapement and subsistence fishing needs.

Emergency Order: 3-S-Z-25-09 Effective Date: August 7, 2009

EXPLANATION: This emergency order opens Subdistricts 2 and 3, the Golovin and Moses Point Subdistricts of the Norton Sound District to commercial salmon fishing for 48 hours from 6 p.m. Friday, August 7 to 6 p.m. Sunday, August 9.

JUSTIFICATION: While below average, Niukluk River coho passage estimates indicate that the projected escapement will range from 2,800 to 6,800 cohos, depending on whether the run has early or average run timing. The Niukluk River tower escapement goal range is 2,400-6,100 cohos and escapement needs are projected to be achieved. The average quarter point of the Niukluk River coho run is August 14. Through August 5, cumulative coho salmon passage at the Kwiniuk River tower is 465 cohos, well below the recent 5 and 10-year average counts for early August. However, age class information collected from the 2008 Moses Point commercial catch showed a high proportion of 3-year old cohos in the run indicating good survival for the 2005 brood year, the parent year of this year's run. This brief period with limited fishing effort will allow for commercial harvest of coho salmon without jeopardizing coho salmon escapement or subsistence fishing needs. It will also provide a good index of silver salmon abundance in the Golovin and Moses Point Subdistricts to determine if additional commercial opportunity is justified.

Emergency Order: 3-S-Z-26-09 Effective Date: August 10, 2009

EXPLANATION: This emergency order supersedes emergency order 3-S-Z-20-09 that extended the closure to set gillnets in the freshwater areas of the Nome Subdistrict and sets the subsistence salmon fishing schedule of two 48-hour periods per week and catch limits for the freshwater areas of the Nome Subdistrict until August 31. The freshwater subsistence gillnet schedule is from 6 p.m. Monday to 6 p.m. Wednesday and from 6 p.m. Thursday to 6 p.m. Saturday.

JUSTIFICATION: Continuing restrictions on set gillnets in freshwater will no longer improve chum salmon escapements. Reopening the freshwater areas of the Nome Subdistrict to set gillnets provides additional opportunity to harvest other salmon species, particularly coho salmon.

Emergency Order: 3-S-Z-27-09 Effective Date: August 10, 2009

EXPLANATION: This emergency order opens the marine waters of Subdistricts 2 and 3 of the Norton Sound District, the Golovin and Moses Point Subdistricts, to commercial salmon fishing for two 48-hour periods from 6 pm. Monday, August 10 until 6 p.m. Wednesday, August 12, and from 6 p.m. Friday, August 14 to 6 p.m. Sunday, August 16. Fishermen are limited to 100 fathoms of net in aggregate length and only gillnets with a stretched-mesh size of 6 inches or less may be used.

JUSTIFICATION: Commercial catch and escapement indices indicate that there is coho salmon surplus available in the Golovin and Moses Point Subdistricts. Therefore, additional commercial fishing opportunity is warranted in these areas.

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Emergency Order: 3-S-Z-28-09 Effective Date: August 12, 2009

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 p.m. Wednesday, August 12 to 6 p.m. Friday, August 14. 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: With the exception of the Nome Subdistrict, northern Norton Sound coho salmon runs are projected to easily provide for coho salmon escapement and subsistence fishing needs. Southern Norton Sound coho runs are showing above-average run strength. Participation in the Norton Bay fishery has been very limited (1-5 permit holders) so far this season and the small commercial harvests should not jeopardize coho salmon subsistence and escapement needs.

Emergency Order: 3-S-Z-29-09 Effective Date: August 17, 2009

EXPLANATION: This emergency order sets a commercial salmon fishing schedule of two 48-hour periods per week for the marine waters of Subdistricts 2 and 3 of the Norton Sound District, the Golovin and Moses Point Subdistricts. Periods will be from 6 p.m. Monday to 6 p.m. Wednesday and from 6 p.m. Thursday to 6 p.m. Saturday. 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: Through August 12, cumulative coho salmon passage estimates are 1,749 cohos at the Kwiniuk River and 1,476 cohos at the Niukluk River. Kwiniuk coho salmon escapements are below the recent 5-year average for this date. However, the final escapement is projected to range between 6,100-11,700 cohos, which will easily provide for subsistence fishing and escapement needs. Similarly, Niukluk River coho cumulative passage is slightly above average for this date and the escapement is projected to be between 5,100-6,400 cohos. The Niukluk River tower-based sustainable escapement goal range is 2,400-6,100 cohos.

Emergency Order: 3-S-Z-30-09 Effective Date: August 22, 2009

EXPLANATION: This emergency order closes the marine waters and all fresh waters draining into Norton Sound from the tip of Cape Rodney to the tip of Topkok Head to subsistence salmon fishing with set gillnets effective 6 p.m. Saturday, August 22.

JUSTIFICATION: Coho salmon runs are showing average to above-average strength for mid August throughout most areas of Norton Sound. In the Nome Subdistrict, however, coho salmon escapements are at a near record low for this date. Weir counts and historical run-timing information indicate that Nome Subdistrict coho salmon run strength is not sufficient to both reach escapement needs and support a subsistence gillnet fishery even if the run is late. Restrictive action is necessary in order to ensure that enough coho salmon reach the spawning grounds to provide for future returns.

Emergency Order: 3-S-Z-31-09 Effective Date: August 26, 2009

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 p.m. Wednesday, August 26 to 6 p.m. Friday, August 28. 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: Southern Norton Sound coho runs are showing above-average run strength. Subsistence fishermen are also reporting good subsistence catches and large numbers of coho salmon in the Ungalik and Inglutalik rivers, the major salmon producers in the Norton Bay Subdistrict. This period will provide opportunity to harvest coho salmon in Norton Bay.

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Emergency Order: 3-S-Z-32-09 Effective Date: August 29, 2009

EXPLANATION: This emergency order closes the marine waters and all fresh waters draining into Norton Sound from the tip of Cape Rodney to the tip of Topkok Head to subsistence salmon fishing for coho salmon with hook and line attached to a rod or pole.

JUSTIFICATION: Coho salmon runs are showing average to above-average strength for late August throughout most areas of Norton Sound. In the Nome Subdistrict, however, coho salmon escapements are at a near record low for this date. Nome River weir coho passage is the second poorest on record and the Snake River count is the second poorest on record and will likely be a record low after today's count. Restrictive action is necessary in order to ensure that enough coho salmon reach the spawning grounds to provide for future returns.

Emergency Order: 3-S-Z-33-09 Effective Date: September 2, 2009

EXPLANATION: This emergency order extends the commercial salmon fishing season until September 4 for the marine waters of Subdistrict 3 of the Norton Sound District, the Moses Point Subdistrict, and allows one 48-hour period from 6 p.m. Wednesday, September 2 to 6 p.m. Friday, September 4. 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: The Subdistrict 3 commercial salmon fishing season expired August 31. However, the department was planning on scheduling another 48-hour period Monday August 30, but this period was never scheduled due to forecasted gale-force winds and seven-foot seas that hit Norton Sound on Sunday. Coho salmon escapement and subsistence fishing needs will easily be reached this season. Moreover, late August above average coho salmon escapements and commercial catches indicate that abundance is sufficient to warrant additional harvest.

Emergency Order: 3-S-Z-34-09 Effective Date: September 6, 2009

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 6 to 6 p.m. Tuesday, September 8, and again from 6 p.m. Wednesday, September 9 to 6 p.m. Friday, September 11. 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: Coho salmon escapements to the Unalakleet River have been record-setting this season. The estimated drainage-wide escapement may be in excess of 165,000 cohos in 2009. Record-setting coho escapements coupled with above-average September coho harvests and continued buyer interest warrant additional commercial harvest and thus an extension.

Emergency Order: 3-S-Z-35-09 Effective Date: September 8, 2009

EXPLANATION: This emergency order opens the freshwater subsistence areas east of Cape Nome and the subsistence area of the Nome River, and the Nome River mouth area, to subsistence fishing for coho salmon with hook and line attached to a rod or pole. The subsistence hook and line limit is set at 3 coho salmon per day per household.

JUSTIFICATION: Coho salmon numbers have improved the past week as more coho salmon have been observed moving into the rivers of the Nome Subdistrict. Although the run has been well below average, the recent closure to all coho salmon fishing has allowed a number of coho salmon to reach spawning grounds during the historical midpoint of passage at the escapement counting projects. The coho salmon in streams east of Cape Nome and in the Nome River should have sufficient spawning numbers. Most of the coho salmon are now upstream of the subsistence areas on the rivers and allowing a limited harvest on the tail-end of the run should not jeopardize future runs and will allow a limited subsistence fishing opportunity to those subsistence fishermen still wanting to harvest coho salmon.

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NORTON SOUND SALMON – SPORT FISH

Emergency Order: 3-KS-04-09 Effective Date: July 3, 2009

EXPLANATION: This emergency order prohibits the retention of king salmon and the use of bait in all waters of the Unalakleet and Shaktoolik river drainages effective 8 p.m., Saturday, July 4, 2009.

JUSTIFICATION: Escapement counts of king salmon at the North River tower are below historical averages and it appears that the escapement goal for king salmon will not be reached in 2009. 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 incidentally caught while sport fishing for other species.

Emergency Order: 3-SS-01-09 Effective Date: August 24, 2009

EXPLANATION: This emergency order closes all fresh water drainages and the salt waters of Norton Sound between Cape Rodney and Topkok Head to sport fishing for coho salmon, effective 12:01 a.m. Monday, August 24, 2009. In addition the use of bait while sport fishing in these fresh waters is prohibited.

JUSTIFICATION: Escapement counts of coho salmon at the weirs on the Nome and Snake rivers are well below historical averages. Due to the current low escapement of coho salmon in these drainages and lack of escapement information on similar drainages in Norton Sound, the prohibition of sport fishing for coho salmon and the use of bait are warranted to ensure sufficient numbers of fish reach the spawning grounds.

Emergency Order: 3-SS-02-09 Effective Date: August 27, 2009

EXPLANATION: This emergency order increases the bag and possession limit for coho salmon to ten (10) fish in all waters of the Unalakleet River drainage effective at 12:01 a.m. Friday, August 28, 2009.

JUSTIFICATION: Escapement counts of coho salmon at the North River counting tower in the Unalakleet River drainage are the third highest since the counting tower was initiated in 1996. Cumulative commercial harvest of coho salmon in the Unalakleet and Shaktoolik Subdistricts are at record highs for this date, as are catches of coho salmon in the Unalakleet River test net. Due to the high escapement of coho salmon in the Unalakleet River drainage and continued high catches in the commercial fishery an increase in the daily bag and possession limit for coho salmon from 4 to 10 fish is warranted.

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