Fishery Management Report No. 12-31

2010 Annual Management Report
Norton Sound, Port Clarence, and Kotzebue

by

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and

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August 2012

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 about the 2010 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 areas 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,* Dolly Varden *Salvelinus malma*, saffron cod *Eleginus gracilis,* Area Management Report, Annual Management Report, AMR.

INTRODUCTION

This report summarizes the 2010 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 supersede information found in previous management reports. An attempt has been made to correct errors presented in earlier reports. Previously unreported data were included and is indicated by appropriate footnotes. Current year catch data presented were 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 have 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 appendix tables are cited in the text, and are not necessarily cited in order.

SECTION 1: MANAGEMENT AREA OVERVIEWS

BOUNDARIES

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

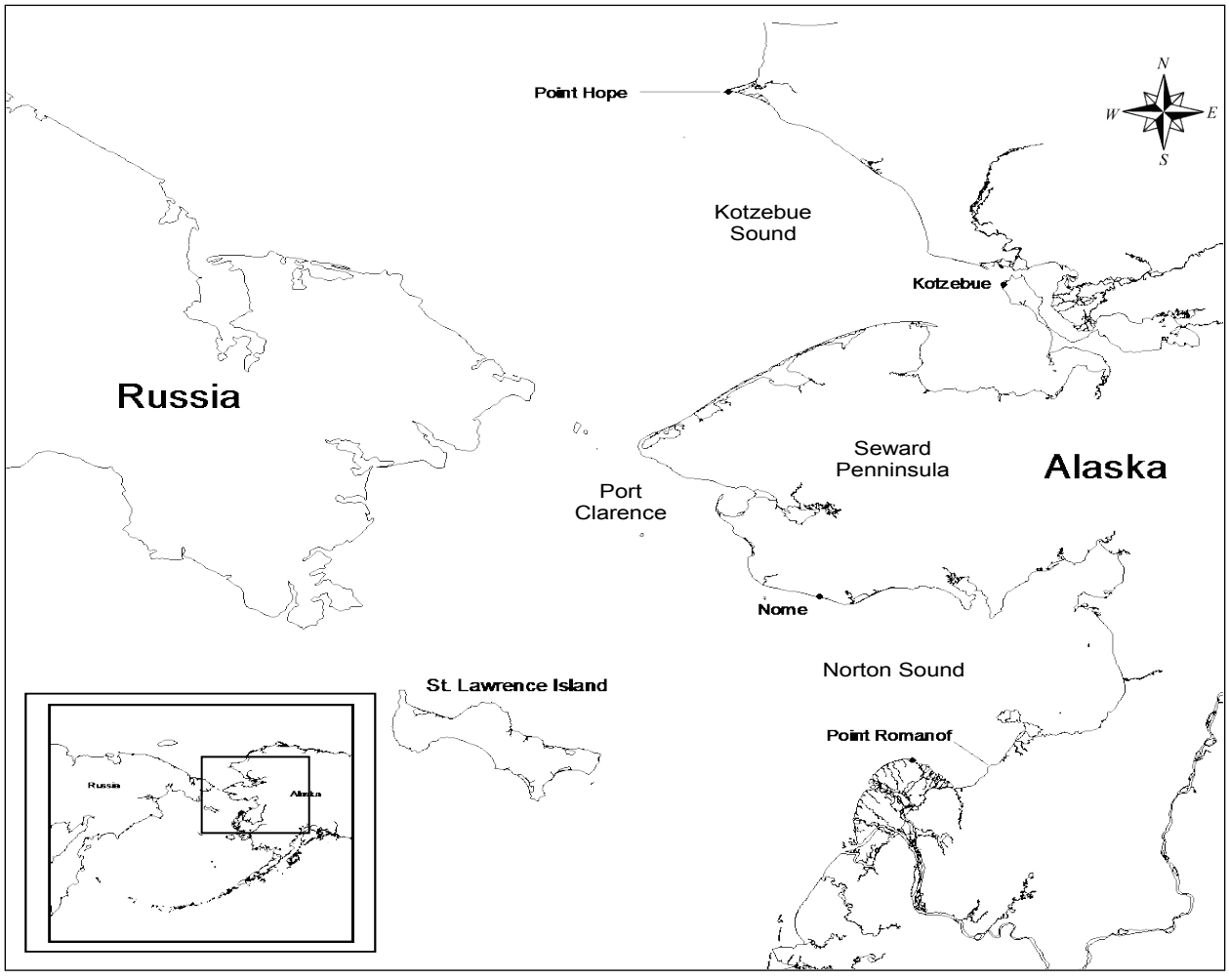


Figure 1.–Norton Sound, Port Clarence, and Kotzebue Sound management districts.

SALMON OVERVIEW

Five species of Pacific salmon are indigenous to the area; however, chum *Oncorhynchus keta* and pink salmon *O. gorbuscha* historically are the most abundant. Chum and Chinook (king) salmon *O. tshawytscha* are found as far north as Barrow; however, they are less common north of the Kotzebue Sound drainages. The northernmost large concentrations of chum salmon are found within Kotzebue Sound drainages, but large numbers of 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. Pink salmon have been observed by aerial survey in increasing numbers in rivers north of Point Hope to Barrow.

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 to harvest salmon. 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 are 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 one visit by ADF&G personnel is 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 2010, postseason household surveys were conducted in Unalakleet, Shaktoolik and Koyuk. Surveyors attempt to contact all households. ADF&G staff uses a community household list, and each year update any new households and delete those no longer there. Salmon survey data are 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 2010 consisted of an Area Management Biologist, an Assistant Area Management Biologist, a Research 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 2010, interns funded by Norton Sound Economic Development Corporation (NSEDC) were utilized as fisheries technicians at some projects. Four cooperative projects staffed by NSEDC and three projects jointly operated by NSEDC and ADF&G in Norton Sound supplemented salmon escapement monitoring activities of the area staff.

The main objective of ADF&G's program is to manage commercial and subsistence salmon fisheries on a sustained yield basis. Field projects are conducted to provide information on salmon abundance, migration, and stock composition. Summaries of ADF&G 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 difficulties 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 allow for variable fishing periods 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 2010 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, Elim (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).

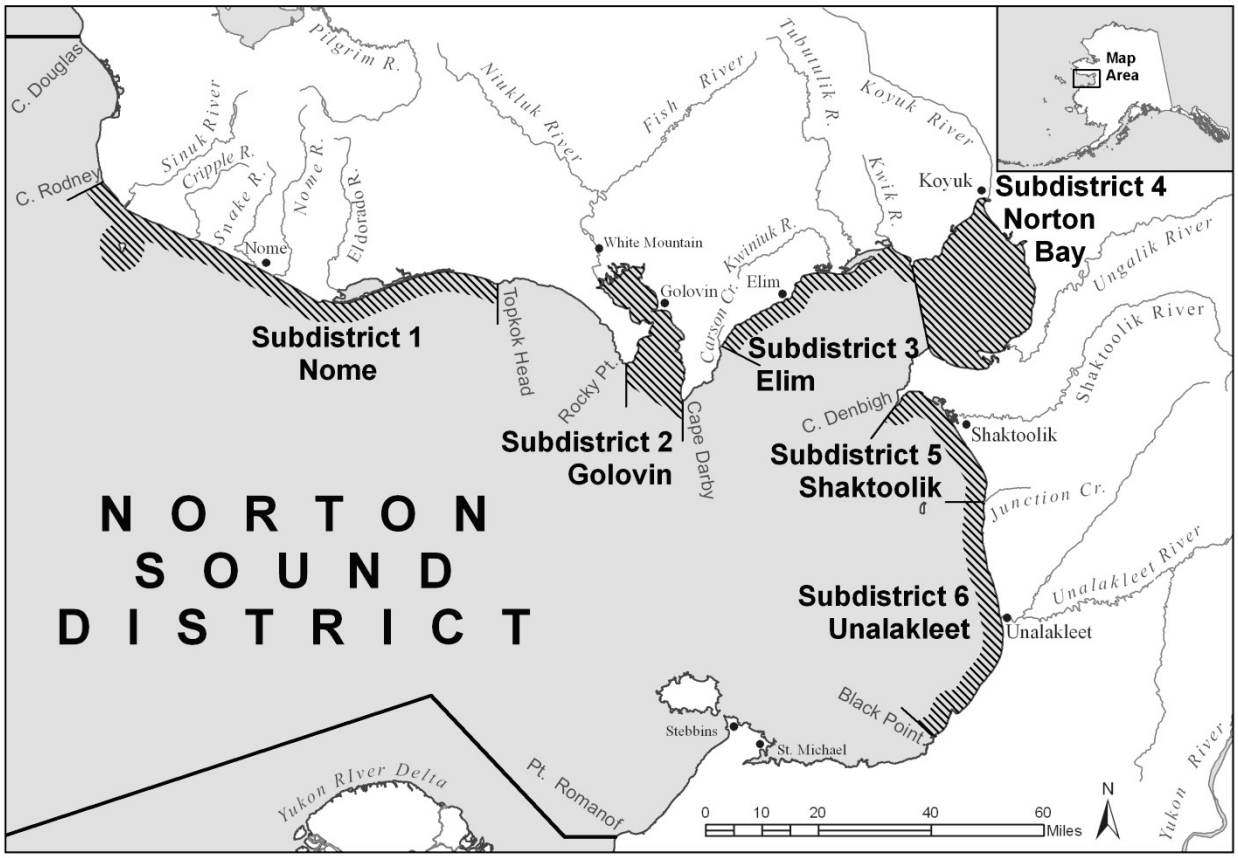


Figure 2.–Norton Sound commercial salmon fishing subdistricts and statistical areas.

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 salmon 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; however, rebounding salmon returns in the mid-2000s resulted in renewed buyer interest. 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. Also, since 2007 there has been renewed buyer interest in Golovin and Elim Subdistricts and since 2008 in Norton Bay Subdistrict. 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 impacted 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 impact 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 two tons of dried fish each year. Roadhouses were located at Golovin, Walla Walla, Moses Point, Isaac's Point, Ungalik, Robertvale, Foothills (south of Shaktoolik), Egavik, and other locations. Dried fish was bought in units of bundles (50 dried fish tied together) at a typical price of $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, St. 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. The most consistent markets are at Shaktoolik and Unalakleet and onshore processing occurs at Unalakleet. Appendix G3 gives a list of commercial processors and buyers that operated in Norton Sound, Port Clarence, and Kotzebue Sound in 2010.

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 had often terminated their operations before regulatory closure dates. However, during the last several years Norton Sound Seafood Products (NSSP) has remained operational until the regulatory closure. Commercial fishing periods are set by emergency order. No commercial salmon periods have occurred in the Nome Subdistrict since 1996. By regulation commercial chum salmon fishing is closed in Nome Subdistrict 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. In the case of pink salmon, there has been no market interest and coho salmon runs have not had a market interest in those years when large runs have occurred because of capacity problems with the good catches in other subdistricts. (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. Fishing periods restricted to 6 inch and smaller mesh gillnets are used to target chum salmon. Most gillnets fished are approximately 5-7/8 inch stretched mesh. In Unalakleet and Shaktoolik Subdistricts, 8.25 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 4.5 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. Three counting towers and six weirs operated in 2010.

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, although they have dropped from the record levels seen in Norton Sound in the mid-2000s. 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 Elim) 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 resulted in restrictive management actions during the late 1990s and early 2000s, but in the mid-2000s there was little market interest even as runs began to rebound. Improving chum salmon runs in the late 2000s in Norton Sound has sparked renewed buyer interest in the northern subdistricts.

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. However, the improving market conditions in 2010 resulted in NSSP bringing more tenders to the subdistrict.

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 Division of Commercial Fisheries and were conducted by the Division of Subsistence during the fall in 8 villages (Brevig Mission, Teller, Golovin, White Mountain, Elim, Koyuk, Shaktoolik, and Unalakleet). In 2004, surveys were replaced by permits in most of northern Norton Sound. Over the last 10 years in Norton Sound Subdistricts 1–6 (2000–2009), the average subsistence harvest was 73,482 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, are 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 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 fishing 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 (Gaudet and Schaefer 1982). 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 BOF 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 highest 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, several 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 Elim Subdistricts chum salmon were determined to be a stock of yield concern.

Based upon the stock of concern determinations, BOF made several changes to regulations for management of Norton Sound salmon. In January 2001, 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, are as follows:

<u>Subdistrict 1</u>

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

<u>Subdistrict 3</u>

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

A chum salmon management plan was adopted for Subdistrict 1 and a salmon management plan for Subdistricts 2 and 3 were adopted by the BOF. Commercial chum salmon fishing in Nome

Subdistrict was closed and the fishery may not be reopened again until the abundance of chum salmon has a harvestable surplus large enough to meet subsistence needs for 4 consecutive years.

ADF&G was given authority to establish subsistence gillnet mesh size restriction of 4.5 inch or less by emergency order when necessary to conserve chum salmon in Subdistricts 1, 2, and 3. Additionally, the Cripple and Penny rivers were closed to subsistence fishing for chum salmon.

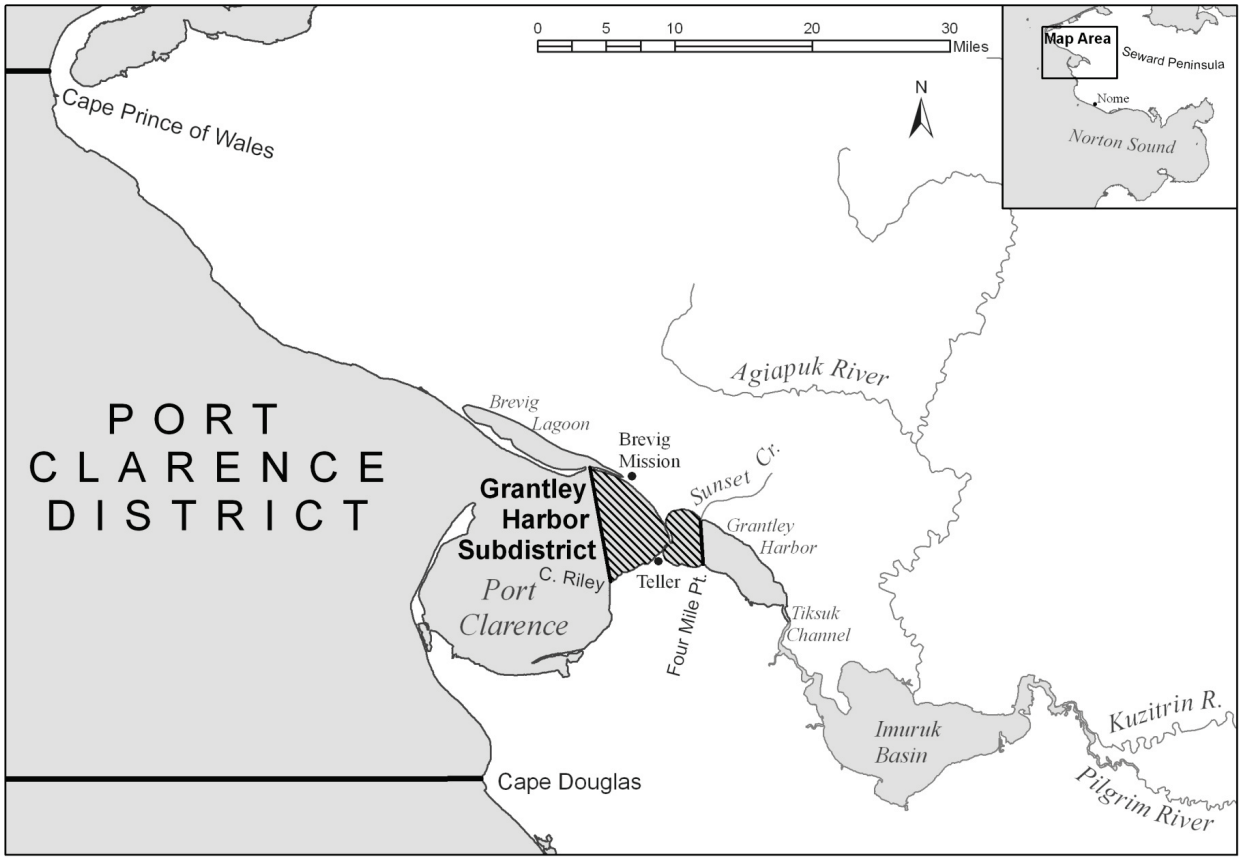
In addition, BOF expanded legal gear for the subsistence fishery to include a line attached to a rod or pole, from Cape Espenburg on the northern Seward Peninsula along the coast to Bald Head (between Elim and Koyuk). Bald Head is the western boundary of Subdistrict 4. Therefore, west of Cape Espenburg 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 2001, the chum salmon runs began to improve in Nome Subdistrict and additional permits were issued in the Tier II chum salmon fishery. Beginning in 2004, BOF expanded the Tier I salmon subsistence permit requirement for the Nome area to include all marine waters, and fresh waters flowing into marine waters from Cape Prince of Wales to Bald Head. This regulation required salmon permits to be issued in Brevig Mission, Teller, White Mountain, Golovin and Elim in addition to Nome.

PORT CLARENCE SALMON OVERVIEW

DISTRICT BOUNDARIES

Port Clarence District encompasses all waters from Cape Douglas north to Cape Prince of Wales including Salmon Lake and Pilgrim River drainages (Figure 3). Salmon, saffron cod *Eleginus gracilia*, whitefish, and herring *Clupea pallasii* are the major subsistence species.



Note: Cross-hatched area on map shows location where commercial salmon fishing may be opened.

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 salmon, 131 pink salmon, 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 the mid-2000s 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 salmon, 256 chum salmon 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 and 2010 because of poor runs of sockeye salmon[1].

[1] Catch data is from commercial fish tickets and local bulletins announcements for dry fish for sale.

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 were conducted annually by Division of Commercial Fisheries up until 1983 (Appendix B3). The Division of Subsistence conducted a partial survey of Brevig Mission in 1989, and conducted full-scale household surveys of both villages from 1994 to 2003. Since 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. To conserve declining sockeye salmon stocks, the BOF adopted a regulation in 1972 to close Salmon Lake and its tributaries to subsistence salmon fishing from July 15 through August 31. 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 beginning in the 1990s (Figure 4) and more so in the mid-2000s when there were record runs of sockeye salmon to Salmon Lake.

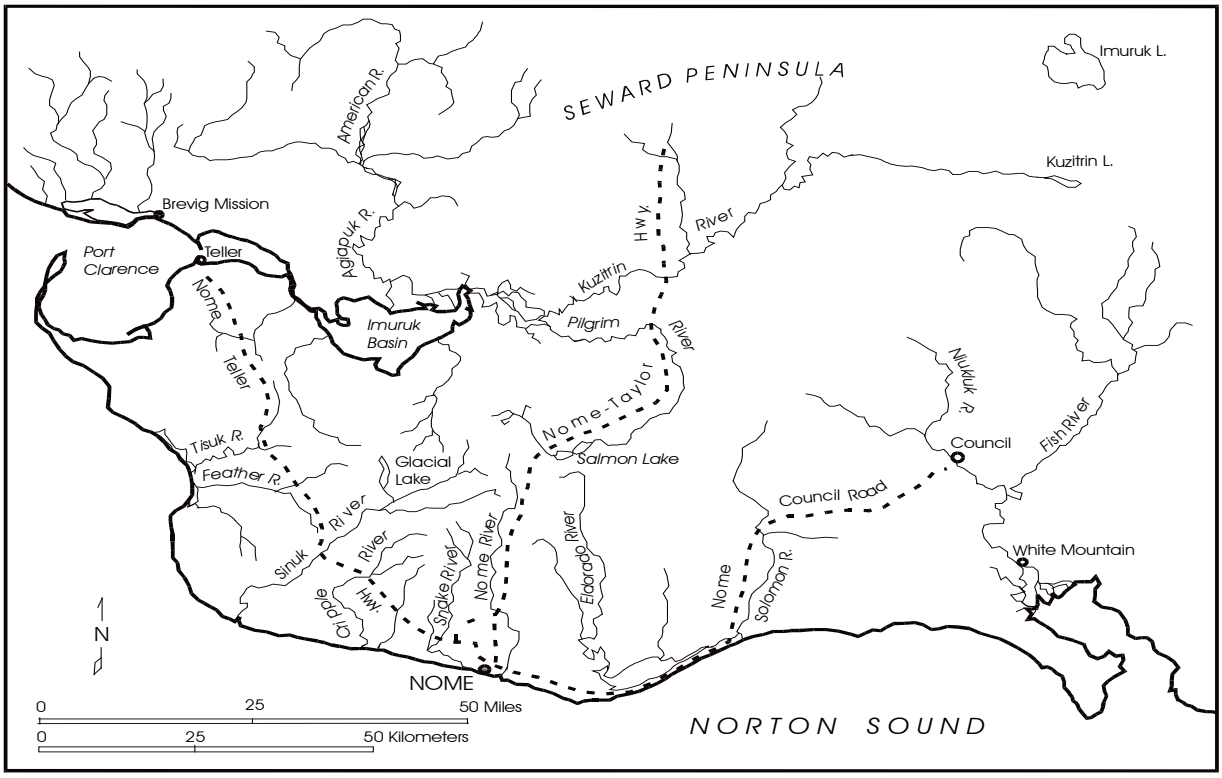


Figure 4.–Seward Peninsula with road accessible waters.

From 1997 to 2001, ADF&G conducted a fertilization program at Salmon Lake, partially funded by NSEDC and the Bureau of Land Management (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 has continued in subsequent years.

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.

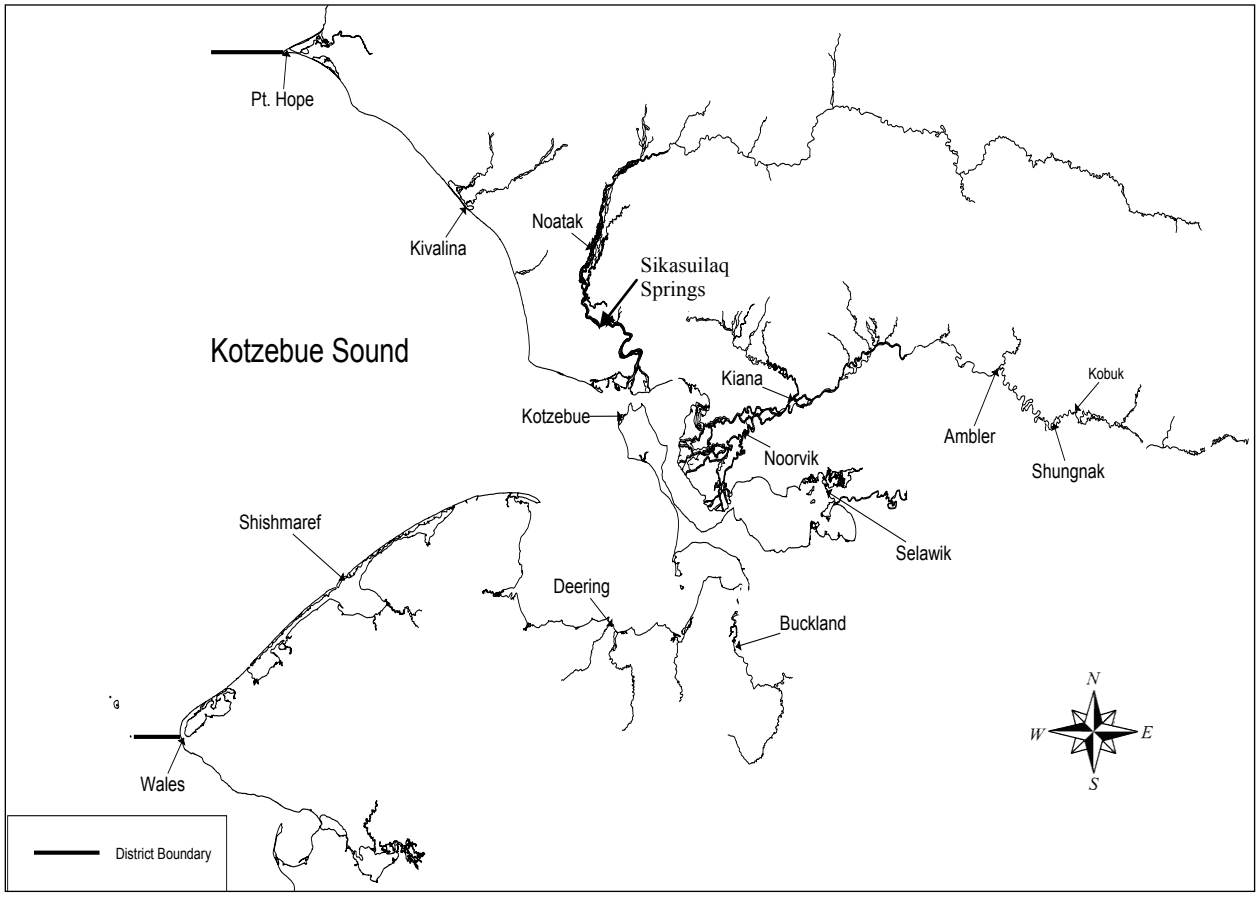


Figure 5.–Kotzebue Sound District, villages and subsistence fishing area.

COMMERCIAL FISHERY OVERVIEW

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

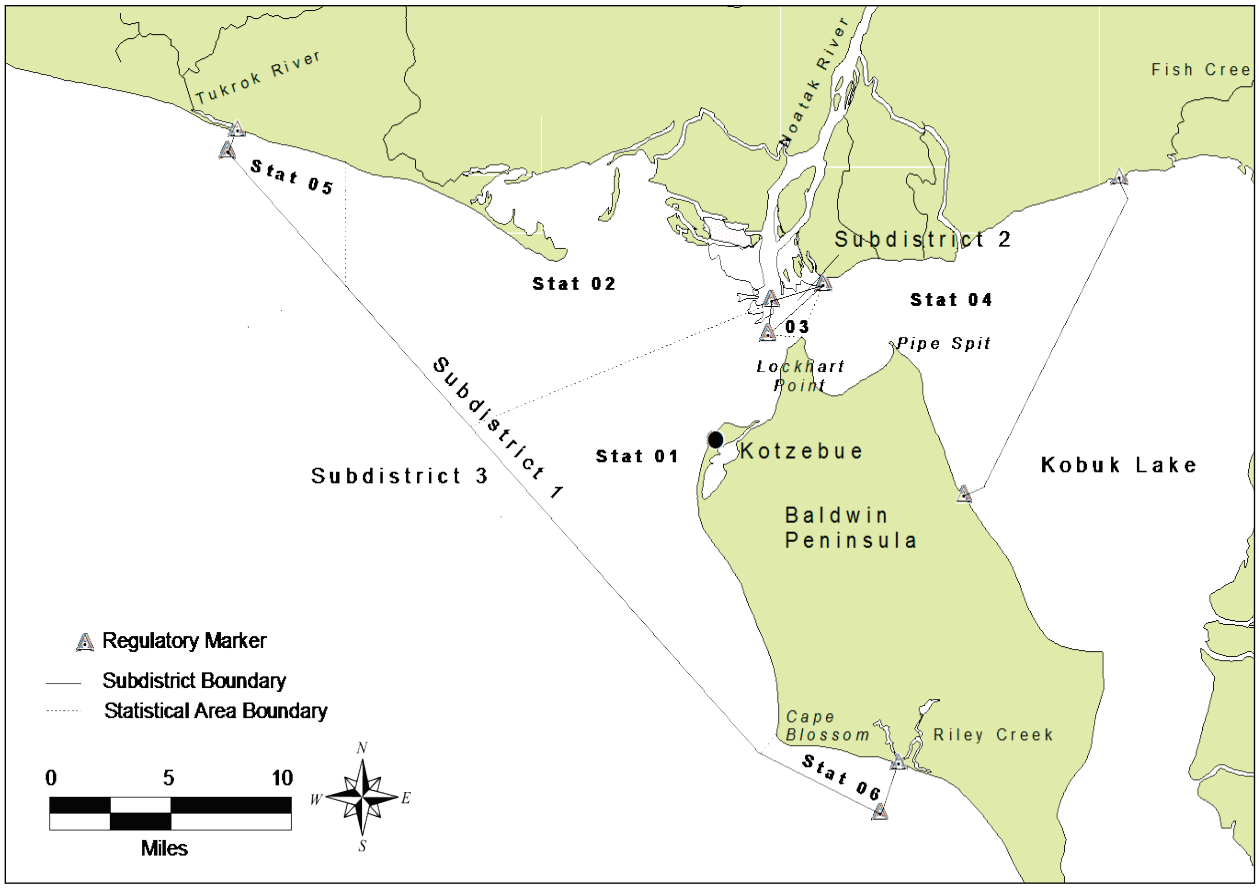


Figure 6.–Kotzebue Sound commercial salmon fishing subdistricts and statistical areas.

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 and/or limited buyer capacity 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 from 1995 to 2001 using a mail-in postcard, but has not been surveyed since.

PACIFIC HERRING OVERVIEW

DISTRICT BOUNDARIES

Pacific herring *Clupea pallasii* are present in Norton Sound, Port Clarence, and Kotzebue Sound. Norton Sound Herring District consists of all state 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.

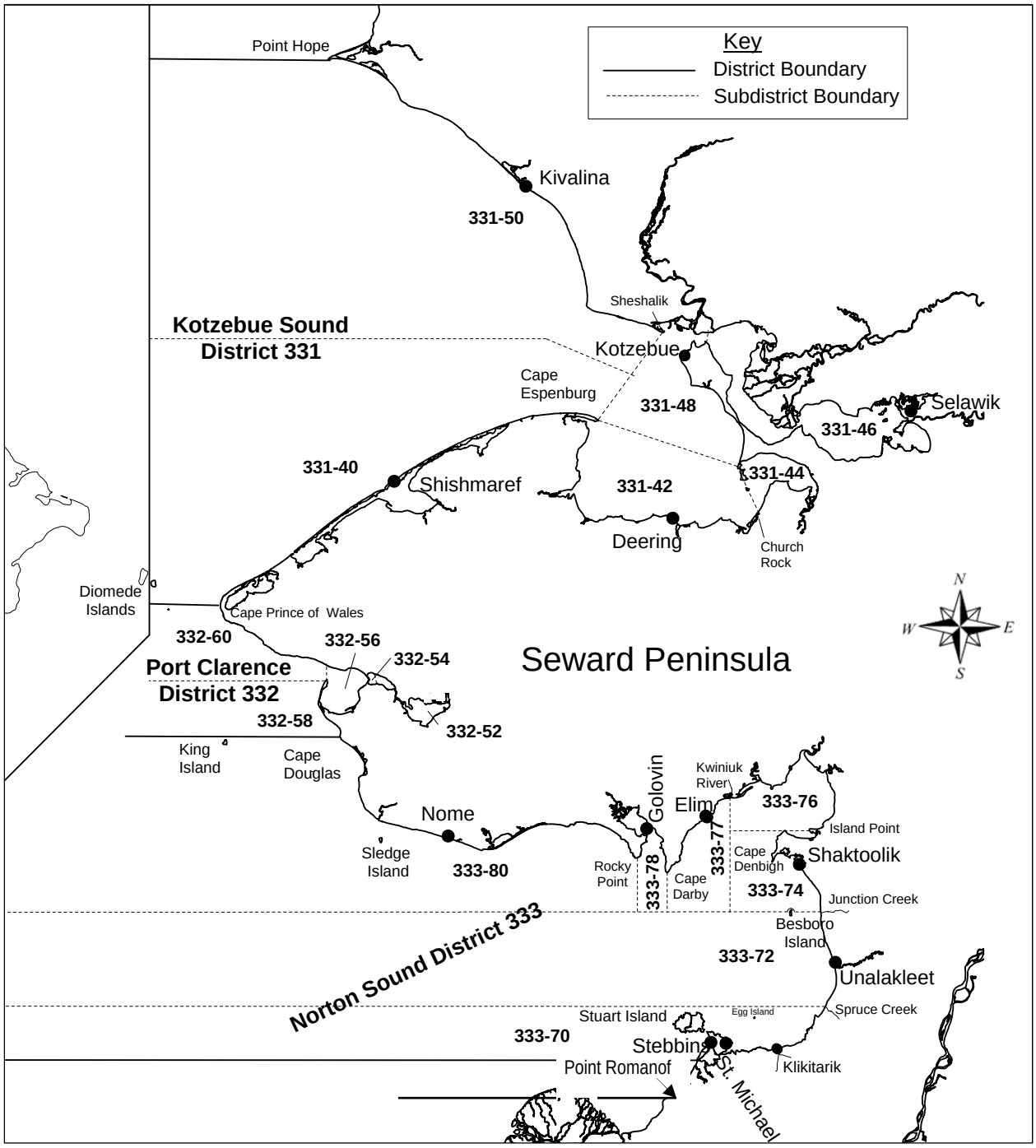


Figure 7.–Commercial herring districts and statistical areas of Norton Sound, Port Clarence, and Kotzebue Sound.

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 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 zero 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. One buyer was present in 2010 and 688 tons of herring were harvested from a quota of over 8,000 tons. One bright spot was the record recovery of 13.5% in the sac roe gillnet fishery (Appendix D3).

Spawn-on-Kelp

A small-scale spawn-on-kelp *Fucus* sp. fishery existed in Norton Sound from 1977 to 1984. Harvests during the 1977–1984 period ranged from less than 1 ton (1977) to approximately 47 tons (1981). During the 1984 season, one ton of *Macrocystis* kelp imported into Norton Sound resulted in a harvest of approximately 3 tons of product. In response to a public proposal, 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. An experimental herring spawn-on-*Macrocystis*-kelp fishery was approved by BOF to operate in Norton Sound during the 1998 season. The Commissioner approved emergency regulations to allow a herring spawn-on-wild-*Fucus*-kelp fishery shortly before the normal start of the sac roe fishery. The intent of these decisions was to allow as much opportunity as possible to sac roe permit holders, because only a small minority would have an opportunity to participate in the sac roe fishery.

At the January 1999 meeting, BOF instituted a *Macrocystis* kelp open pound fishery and allowed for a wild *Fucus* spawn-on-kelp fishery for sac roe permit holders who had not sold sac roe product. Wild *Fucus* harvest is limited to an area west of Wood Point to Canal Point, including Stuart Island 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 during 1968–1974. All foreign fleets were prohibited in 1977 from gillnet fishing in the area.

Since 1977, there has not been a consistent domestic commercial food 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 annually 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 therefore 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 in Nome in 1994 and 1995 provided a ready crab bait market and transportation for fish which 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 to 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. These data do 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. 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).

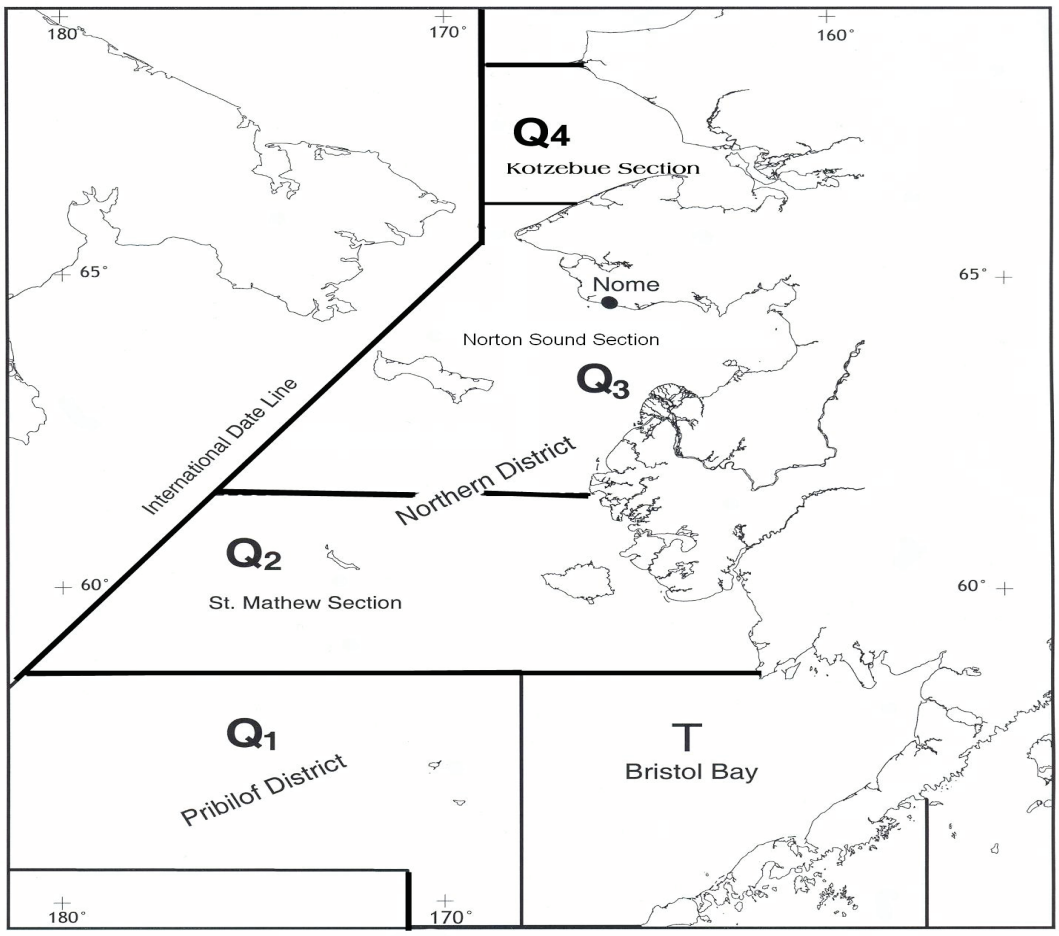


Figure 8.–King crab fishing districts and sections of Statistical Area Q.

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-1 male abundance (sublegal male crab with carapace length 90–104 mm) was also detected. Conversely, the exceptionally weak 1999 prerecruit-2 (sublegal male crab with carapace length 76–89 mm) abundance estimate suggested at least 1 year of weaker recruitment beginning during the 2001 summer fishery. Results from the 2002 trawl survey indicated an estimated abundance of legal male red king crabs at 0.77 million with a corresponding biomass of approximately 2.3 million pounds. This was less than half of the 1999 abundance estimate, yet above the all-time low in 1996. This decrease was expected because the 1999 trawl survey indicated exceptionally weak prerecruit-2 abundance. Prerecruit-2 crabs observed in 1999 made up the recruit and postrecruit portion of the 2002 legal population (Appendices E14 and E15). The 2002 estimated abundances for prerecruit-1 and prerecruit-2 males were 0.52 and 0.43 million crabs, respectively. The prerecruit-1 male abundance estimate was lower than the all-time high observed in 1999, but higher than the 3 prior surveys. These crabs molted and gave a boost to the recruit portion of the legal crab biomass in 2003. Prerecruit-2 male crab abundance was over four times greater than 1999 and fourth highest abundance estimate since 1976 indicating increased recruitment for 2004 and 2005 seasons. 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 was 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.

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 E12–E23), 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 are 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 2010 with the latest data from the 2008 trawl survey, the 2009 summer fishery, and the 2010 winter study.

In 2005, legal abundance estimate for the summer crab fishery was 2.89 million pounds, similar to the 2.93 million pounds estimated for 2004. The legal population estimate for 2006 decreased 9% from the 2005 estimate, to 2.63 million pounds, while it increased the following year, up 3% to 2.71 million pounds in 2007. Increases in abundance estimates were seen again the following two years, up 20% to 3.24 million pounds in 2008 and up 19% to 3.84 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 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 superexclusive designation went into effect for the Norton Sound commercial crab fishery June 27, 1994. This designation stated a vessel registered for the Norton Sound crab fishery may not be used to take king crab in any other registration area during that registration year. Later, a vessel moratorium put into place before the 1996 season was intended to precede a license limitation program. Community Development Quota (CDQ) groups were allocated a portion of the summer harvest beginning in 1998. Although CDQ allocation was in place, no harvest occurred until the 2000 season. The North Pacific License Limitation Program (LLP) went into effect for the Norton Sound crab fishery January 1, 2000. The program states a vessel which exceeds 32 feet in length overall must hold a valid crab license issued under LLP by National Marine Fisheries Service. Regulation changes and location of buyers resulted in harvest distribution moving eastward in Norton Sound in the mid 1990s (Appendix E11).

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 4.5 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 6.5 inch stretched mesh.

Also starting with the 2008 season, even though the minimum legal size of red king crab is 4.75 inches in carapace width (CW), the local seafood plant did not always buy crabs less than 5.0 inches in CW. The Anchorage buyer, however, has continued to buy crab as long as they are of legal size.

In 2010, due to concern over lack of stock status information, the North Pacific Fisheries Management Council closed the area above Cape Prince of Wales to crabbing. Only state waters (within 3 miles of shore) will be open to crabbing north of the latitude of Cape Prince of Wales (Appendix E10).

CDQ Fishery

The Norton Sound and Yukon Delta CDQ groups divided the CDQ allocation. Only fishermen designated by the Norton Sound and Yukon Delta CDQ groups are allowed to participate in this portion of the king crab fishery. Fishermen were required to have a CDQ fishing permit from CFEC and register their vessel with ADF&G before they made their first delivery. Fishermen operated under authority of the CDQ group and each CDQ group decided how their crab quota was harvested.

During the March 2002 BOF meeting, new regulations were adopted that affected the CDQ crab fishery and relaxed closed-water boundaries in eastern Norton Sound and waters west of Sledge Island. Closed-water boundaries are illustrated in Appendix E10. 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 1981–1982 season. Lack of success in the winter crab fishery during some past years has been attributed to a declining crab population caused by removal of crab in the summer commercial fishery together with low recruitment, low effort caused by poor ice conditions, and changes in nearshore winter distribution of crab. All these factors in varying degrees affect success of the winter fishery. During the 1978–1979 winter fishery, the king crab population was still relatively high. Despite this relatively large population, winter catches were second poorest on record indicating that major factors limiting winter catches were probably poor ice conditions and distribution of crab. During winter of 1981–1982, poor winter catches could more reasonably be attributed to a declining crab population since the crab population was at a low level. Subsistence fishing success during winters of 1982–1983 through 1986–1987 improved because of a rebuilding of the population and increased use of more efficient gear (pots instead of hand lines). Unstable ice conditions and record snowfalls adversely affected: 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 and west of 168°W longitude (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 the 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 a catch primarily of egg bearing female blue king crabs, and indicated that using standard Norton Sound crab gear would only access a nursery site for gravid blue king crab. When more suitable gear becomes available, further surveys will be necessary to determine the 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 5.5 inches to 5.0 inches. At the March 2008 BOF meeting, legal size requirement for blue king crab was changed to 5.0 inches. Preliminary data indicate blue king crab size at maturity is very similar to Norton Sound red king crab.

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 to 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[2].

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

MISCELLANEOUS FISH OVERVIEW

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

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

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

INCONNU (SHEEFISH)

Spawning Areas and Timing

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

[2] Catch data is from commercial fish tickets and local bulletins announcements for dry fish for sale.

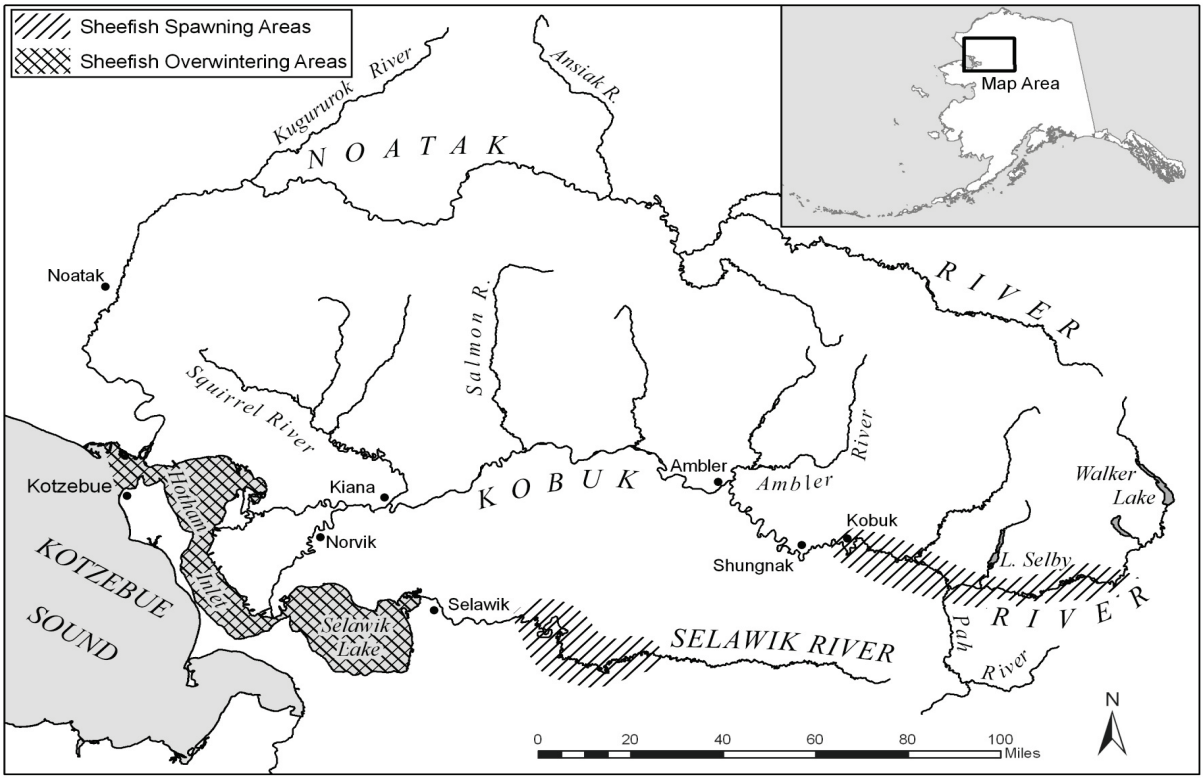


Figure 9.–Kotzebue and Kobuk River Valley villages and their spatial relationship with inconnu spawning and overwintering areas.

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 5–7 years for males and 7–11 for females, increases the time required to restore depleted populations. Sheefish have high fecundity and large females can carry over 400,000 eggs. Such populations may be subject to episodic recruitment events depending on environmental conditions. If spawner abundance is maintained above a threshold level, intermittent years of good recruitment can carry the population through years of less favorable ice conditions.

After ice breakup in Kotzebue Sound area, adult sheefish migrate upriver to spawning areas on the Kobuk and Selawik rivers. On the Kobuk River, spawning occurs upstream from the village of Kobuk, with the greatest 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 the Division of Subsistence stopped doing surveys in 2005, and harvest reports should be regarded as minimum numbers because of limited survey effort during many years.

Summer and fall subsistence fishing for inconnu 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 5.5 inch to 7.0 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. 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 and 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. No further whitefish harvests occurred until 2010 when another Nome fisherman who waived confidentiality harvested 1,000 pounds.

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, and 2004; Georgette and Shiedt 2005). No harvest data on whitefish have 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 was reported from 1995 to 2009. In 2010, 5 fishermen sold 6,390 pounds of tomcod to the seafood plant in Nome for use as crab bait.

MISCELLANEOUS FINFISH SPECIES

Other finfish species taken for subsistence in Norton Sound, Port Clarence, and Kotzebue areas include: rainbow smelt (boreal smelt), capelin, northern pike, starry flounder, yellow fin sole, Arctic flounder, Alaska plaice, Arctic grayling, burbot, and halibut (Appendix G1).

Subsistence Fishery

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

2010 NORTON SOUND SALMON FISHERY

Regulatory Changes

For the management of Norton Sound salmon, BOF made several regulation changes at the January 2010 meeting (Menard 2010).

Regulations were changed in the Golovin and Elim Subdistricts to allow for directed pink salmon commercial fishery if subsistence needs are expected to be met and chum salmon escapement goals are achieved, or after July 14 in Golovin Subdistrict and July 6 in Elim Subdistrict if it is determined there is a harvestable surplus of pink salmon and that a directed pink salmon commercial fishery will not have a significant impact on escapement of subsistence use of chum salmon. Additionally, BOF approved expanding the commercial fishing boundaries for Elim Subdistrict east to the boundary line of Norton Bay Subdistrict and west to Carson Creek near Cape Darby.

In Shaktoolik and Unalakleet Subdistricts, BOF approved a directed chum and pink salmon commercial fishery if there is a harvestable surplus and that a directed pink or chum salmon commercial fishery will not have a significant impact on escapement of subsistence use of Chinook salmon, and no earlier than July 1 if either gillnet mesh-size or subsistence fishing time are restricted in the Chinook salmon subsistence fishery.

In order to conserve Chinook salmon in both the Shaktoolik and Unalakleet Subdistricts, BOF also approved a proposal to allow the use of 7.0 inch or smaller mesh size subsistence gillnets.

Commercial Fishery Season Summary

Highlights of the 2010 Norton Sound District commercial salmon fishery included the largest commercial chum salmon harvest since 1986, record coho salmon harvests in Golovin

(Subdistrict 2) and Elim (Subdistrict 3) Subdistricts, and record exvessel value and record average value of salmon catch per permit holder without adjusting for inflation. In contrast to the strong chum and coho salmon run performances, the poorest run of Chinook salmon on record to Norton Sound precluded commercial fishing directed on Chinook salmon for the fifth consecutive season; restrictions and early closures to the Chinook salmon subsistence and sport fisheries in Shaktoolik (Subdistrict 5) and Unalakleet (Subdistrict 6) Subdistricts were also implemented to meet escapement needs. Similarly, another poor run of sockeye salmon to Salmon Lake resulted in no commercial fishing being allowed in Port Clarence District and an early closure to the Pilgrim River subsistence fishery for the second year in row.

In northern Norton Sound (Subdistricts 2–3), commercial salmon fishing began with a 48 hour opening on June 30 directed at chum salmon (Tables 1 and 2). Catches of chum salmon were well above average during this period, but the next period was not scheduled until July 5 at the request of the buyer because of limited tendering capacity. Despite similar early chum salmon run strength indications in southern Norton Sound (Subdistricts 4–6), the Unalakleet and Shaktoolik Subdistricts commercial chum salmon fishery was delayed until July 2 and 3, respectively. Norton Bay Subdistrict (Subdistrict 4) was also not opened to commercial salmon fishing until July 4 because all available tenders were committed to supporting Subdistricts 2, 3, and 5 in early July (Table 3). At the onset, ADF&G staff cautiously managed Subdistricts 5 and 6 directed chum salmon fishery beginning with 24 hour openings in each subdistrict (Tables 4 and 5). These brief openings provided ADF&G with indices of the Chinook salmon incidental catch in the directed chum salmon fishery while minimizing the impact to the Chinook salmon subsistence fishery and escapements. As a further precautionary measure, the northern half of the Unalakleet Subdistrict was closed to commercial salmon fishing until July 10 in order to protect Chinook salmon migrating through the Unalakleet Subdistrict.

By July 12, the majority of Chinook salmon run was in river in southern Norton Sound and tendering capacity had increased to handle increased harvests of chum salmon. Strong commercial catches and above average to record setting escapement counts of chum salmon were also observed throughout Norton Sound by this time. Consequently, ADF&G placed Subdistricts 2–6 on a commercial fishing schedule of two 48 hour periods per week until July 24 in order to exploit the large surpluses of chum salmon. In Shaktoolik Subdistrict, the July 22 opening was delayed until July 23 and modified from a 48 hour opening to a 54 hour opening.

In early August, ADF&G switched to coho salmon management. At this time, escapement counts of coho salmon were average to above average in northern Norton Sound, but below the recent 5- and 10-year average escapements in southern Norton Sound. However, if the record breaking coho salmon runs from 2005 to 2009 were excluded from long-term average catches and escapement indices, the coho salmon run to southern Norton Sound was showing average run strength for early August. Stock assessment data indicated that there were coho salmon surpluses available for commercial harvest and commercial fishing schedules of two 48 hour periods per week continued in Subdistricts 2–6.

Beginning August 13, Subdistricts 2–4 were placed on a schedule of two 72 hour periods per week in order to maximize harvests from the strong run of coho salmon to Subdistricts 2–3. Despite having no assessment of escapement in Subdistrict 4, there were no conservation concerns with including Norton Bay Subdistrict on the same schedule because of very little commercial fishing effort. Above average catches of coho salmon continued in the Golovin and Elim Subdistricts throughout August, which ultimately resulted in the season being extended

beyond the regulatory closure date of August 31 to September 7. Fishing time was also increased to 72 hours in the Shaktoolik and Unalakleet Subdistricts for the August 5 opening in an attempt to maximize commercial harvests during the historical "peak week" of the commercial fishery. Unlike the above average coho salmon abundance indicators observed in northern Norton Sound, CPUE indices for coho salmon in southern Norton Sound remained below recent 10-year averages for early August. Throughout mid-August, ADF&G was prepared to increase fishing time if coho salmon abundance increased. However, catch and escapement indices continued to track below recent 10-year averages and a more aggressive fishing schedule was therefore not warranted. Similarly, average coho salmon run strength was not sufficient to warrant an extension to the commercial fishing season as had been done in 3 of the previous 4 years.

Strong chum salmon runs to Norton Sound, significantly increased fishing effort in Golovin and Elim Subdistricts, and record exvessel prices were the big story in 2010. Record percentages of age-0.2 chum salmon were observed in 2009 samples from Unalakleet Subdistrict north to Kotzebue Sound. As expected, the 2010 chum salmon run had a very strong age-0.3 chum salmon contribution throughout northwest Alaska. Fortunately, this strong chum salmon run combined with improved wild salmon market conditions and commercial chum salmon harvests were the highest observed since the mid-1980s in most Norton Sound Subdistricts. Effort in Golovin Subdistrict doubled from effort during the previous two seasons directly due to the strong chum salmon run. In contrast to northern Norton Sound, coho salmon runs to Subdistricts 5 and 6 in 2010 were well below the record breaking runs of coho salmon that occurred from 2005 to 2009. However, Shaktoolik and Unalakleet Subdistricts harvests of coho salmon fell just short of being in the top 10 all time. The high grounds price paid for coho salmon also increased 50–80% from the previous year and monetarily made up for the average coho salmon run in southern Norton Sound.

There was no commercial salmon fishery in Port Clarence for the second consecutive season because of another poor sockeye salmon run and opposition to the fishery by local subsistence users. Additionally, only 1,654 sockeye salmon were enumerated through the Pilgrim River weir, which was well short of the required 30,000 sockeye salmon inriver run goal for Pilgrim River to allow for commercial fishing.

Norton Sound District combined commercial harvest of all salmon species was the second highest in the last 10 seasons (Appendix A1; Table 6). The number of commercial permits fished (115) was the highest since 1994 (Appendix A2). The 2010 fishery value to permit holders of $1,220,487 was a record without adjusting for inflation (Appendix A3) and the average value per permit holder of $10,613 was the highest on record without adjusting for inflation. Average price paid was $2.25/lb for Chinook salmon, $.63/lb for sockeye salmon, $1.47/lb for coho salmon, $.32/lb for pink salmon, and $.62/lb for chum salmon (Appendix A4). Average weight was 7.6 pounds for coho, 2.8 for pink, and 6.8 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 62,079 was nearly 44% below the recent 5-year average, but only 8% below the recent 10-year average. The chum salmon harvest of 117,743 was over six times the 5-year average, but only 24% above the long-term (1961–2009) average.

The 115 permit holders participating in the commercial fishery this year were well above average. The previous 5-year average in Norton Sound was 70 permits fished and the previous 10-year average was 56 permits fished (Appendix A2).

Only one salmon buyer operated in Norton Sound during the 2010 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 2–5.

Subsistence Fishery Season Summary

Subsistence salmon fishermen in Port Clarence District and Subdistricts 1–3 (Nome, Golovin, and Elim) were required to possess a subsistence salmon fishing 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 7).

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

In Norton Sound District, there are limits on subsistence salmon harvests only in Nome Subdistrict where salmon limits have been in place since 1985. Also, hook and line subsistence fishermen must follow sport fish bag limits except in the Nome Subdistrict subsistence zones where they can catch the subsistence limit. In 2010, an average chum salmon run was forecasted for Nome Subdistrict and the subdistrict was not closed to salmon fishing in mid-June for the fifth 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 (ANS).

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.

Regulations allow 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, 3 customary trade finfish permits were issued to Nome residents; in 2009, one permit was issued to a Teller resident; and in 2010, one permit was issued to a Nome resident. 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 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. During an aerial survey on June 30, biologists observed thousands of pink and chum salmon in the lower reaches of Nome Subdistrict drainages and beach seining was opened up in the Eldorado, Flambeau, and Sinuk Rivers and in Safety Sound west of the Safety Sound bridge. By July 5, cumulative chum salmon escapement at the Eldorado River weir was above the historical average for that date and subsistence fishermen reported very good catches of chum salmon. Additionally, area biologists observed large schools of chum salmon in the lower reaches of all Nome Subdistrict drainages by this date. As a result, on July 6, subsistence fishing time was increased in marine waters from 72 hours to 120 hours per week to provide additional opportunity for subsistence uses of chum salmon and to let users take advantage of good drying weather. By mid-July, chum salmon escapement at Eldorado River weir had surpassed the upper end of the SEG range of 6,000–9,200 chum salmon. Chum salmon escapement goals were also nearly reached at Snake River weir and on pace to easily be reached at Nome River weir. Taken collectively, chum salmon assessment data showed that the Nome Subdistrict BEG range of 23,000–35,000 chum salmon would easily be surpassed and additional harvest opportunity for chum salmon was warranted. Also, the pink salmon escapement goal was attained by July 11. In response to the abundance of salmon, area managers further liberalized the subsistence fishery to allow a more efficient harvest of chum and pink salmon surpluses. On July 12, all subsistence catch limits for pink and chum salmon were waived, subsistence gillnet fishing in the marine waters was increased from 120 hours (5 days) to 144 hours (6 days) per week, and beach seining for salmon during marine and freshwater subsistence schedules was permitted until July 26. An estimated 97,721 chum salmon escaped to reach spawning areas in 2010 despite the aggressive subsistence fishing schedule and use of beach seines. The 2010 Nome Subdistrict escapement of chum salmon was a record and was 180% above the upper end of the BEG range of 23,000–35,000 fish. Similarly, escapement counts of chum salmon exceeded the upper end of SEG ranges for the Eldorado (6,000–9,200), Nome (2,600–4,300), and Snake (1,600–2,500) rivers by 31%, 79%, and 37%, respectively. Eldorado River chum passage was grossly underestimated due to breaches in the weir that allowed several thousand chum salmon to escape without being enumerated in early July; consequently, mid-July aerial survey counts of chum salmon were substantially higher than cumulative weir passage estimates for mid-July.

Effective July 26, ADF&G switched to coho salmon management and returned marine waters to the subsistence fishing schedule of 5 days per week and freshwater areas to two 48 hour periods per week by regulation. Beginning August 15, subsistence fishing was allowed 7 days a week per regulation in marine waters. By August 20, Nome River coho salmon cumulative passage (867 coho salmon) was below the recent 5-year average count of 1,063 coho salmon, but above the recent 9-year (2000–2009) average count of 664 coho salmon. At Snake River weir, only 177 coho salmon had been counted by August 20, which was well below the recent 5- and 9-year average counts for that date. However, aerial surveys showed several hundred coho salmon in the lower reaches of these systems as well as other Nome Subdistrict drainages around this time. With coho salmon escapement needs expected to be met, the department did not anticipate any restrictions or early closures to the subsistence fishery in 2010. By regulation on September 1, subsistence fishing time was extended to 7 days a week in freshwater subsistence areas in the Nome Subdistrict. Catch limits for coho salmon were also waived at this time in order to provide additional harvest opportunity of late run coho salmon since the majority of coho salmon were upstream from designated subsistence areas by this time.

Subsistence salmon permits have been required for Nome Subdistrict since 1975. A record 494 permits were issued during the 2010 season, a 16% increase from the 426 permits issued in 2009 and slightly above the previous record 491 permits issued in 2004. However, it is likely that high number issued in 2004 was in part due to sport fishing being closed for over a week early in the pink salmon run while subsistence hook and line fishing was open at that time. Also, in 2004 some fishermen obtained both Tier I and Tier II permits because Tier II permits expired after chum salmon season ended in late July. Therefore, the 491 permits issued in 2004 include both Tier I and Tier II permits issued.

There were 492 permits returned from the 494 Nome Subdistrict permits issued. Reported harvest was 39 Chinook, 3,124 chum, 6,281 pink, 1,983 coho, and 77 sockeye salmon (Appendix A6). The chum salmon harvest was the highest since 1995 and approximately three times the 5- and 10-year harvests. Harvest of coho salmon was 8% below the 2005–2009 average harvest of 2,151 coho salmon, but nearly 37% above the 10-year average (Appendix A6).

Golovin-Norton Sound Subdistrict 2

The 2010 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. Niukluk River has a lower bound SEG of 23,000 chum salmon used to evaluate escapement in Subdistrict 2. The Niukluk River is a tributary of Fish River and telemetry studies in the early 2000s showed an average of 33% of the chum salmon in the Fish River drainage pass the Niukluk River tower (Todd et al. 2005). Likewise coho salmon telemetry studies have also shown approximately one-third of the coho salmon in the Fish River drainage pass the Niukluk River tower (Tom Balland and Gary Todd, Commercial Fisheries Biologists, ADF&G, Nome; personal communication).

Previous to 2008 there had been no commercial chum salmon fishing in Subdistrict 2 since 2001, largely because escapements had fallen short of the previous 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 2010, the chum salmon run to northern Norton Sound showed early run strength despite a very late breakup and cool spring temperatures. By June 28, over half of the needed lower end escapement goal range had been reached in adjacent Elim Subdistrict and Golovin subsistence fishermen were reporting large catches of chum salmon.

After consultation with the buyer, a commercial fishing period was announced for both the Golovin and Elim Subdistricts. Because of low effort in Golovin, catch numbers were confidential, but the Elim harvest was 80% above the historical average catch. On July 2, the Kwiniuk River tower in Elim Subdistrict had a count of 18,183, the fourth highest in the 46-year project history for that date. Both the Golovin and Elim Subdistricts were set on a schedule of two 48 hour fishing periods a week. However, limited tendering capacity slowed the initiation of the schedule until July 11 and by then run timing projections showed that Niukluk River chum salmon escapement was expected to range between 30,000 to 48,000 fish, well above the 23,000 chum salmon SEG threshold.

ADF&G switched to coho salmon management on July 25, but the strong chum salmon run resulted in chum salmon catches still exceeding coho salmon catches for another week. The two 48 hour commercial fishing periods continued until August 11, and by then coho salmon escapement needs were projected to be easily reached. Beginning August 13, a more aggressive commercial

salmon fishing schedule of two 72 hour periods a week was implemented for the remainder of August. Continued good catches in late August led ADF&G to extend the commercial fishing season to September 7.

The commercial catch in Golovin Subdistrict was 3 Chinook, 2 sockeye, 5,586 coho, 2,039 pink and 17,212 chum salmon caught by 10 permit holders (Table 1). The coho salmon catch was a record and the chum salmon catch was the best since 1988. This was the seventh year that subsistence salmon permits were required and 159 permits were issued for Subdistrict 2 in 2010. The number of salmon reported harvested (12,864) ranked sixth highest in the last 10 years (Appendix A7). The Niukluk River escapement was 15 Chinook, 9,042 coho, 434,205 pink and 48,561 chum salmon. The chum salmon escapement was the fifth highest and the coho salmon escapement was the fourth highest on record (Appendix A24).

Elim-Norton Sound Subdistrict 3

The best chum salmon run to Norton Sound in 25 years resulted in the earliest start to commercial fishing in Elim Subdistrict in over a decade. By June 28 the passage at the Kwiniuk River tower was 8,415 chum salmon, which was 240% above the long-term average of 2,463 chum salmon for that date. The buyer and fishermen were notified that chum salmon commercial fishing could begin as soon as the buyer and fleet were ready. The first commercial fishing period commenced on June 30 for 48 hours and the chum salmon CPUE was the fourth highest on record for late June. Limited tendering capacity resulted in a slight delay until July 5 for the next 48 hour fishing period. Continued strong chum salmon catches resulted in ADF&G setting a schedule of two 48 hour fishing periods per week. The department switched to coho salmon management the last week of July, but with the strong chum salmon run the chum salmon catches continued to exceed coho salmon catches until August. In mid-August commercial fishing periods were extended from two 48 hour fishing periods a week to two 72 hour fishing periods because of a strong coho salmon run. Good catches of coho salmon and sufficient escapement at the Kwiniuk River tower resulted in the season being extended past the August 31 closure until September 7.

The commercial catch in Elim Subdistrict was 9 Chinook, 5 sockeye, 10,180 coho, 11,658 pink and 23,453 chum salmon caught by 19 permit holders (Table 2). The coho salmon catch was a record for the second year in a row and the chum salmon catch was the best since 1985. In 1985 there were 34 permit holders that harvested 24,466 chum salmon. Considering the greatly reduced effort in 2010 this year's chum salmon harvest was more impressive. The sheer size of the Elim Subdistrict chum salmon run would have easily supported a much greater harvest had there been more permit holders fishing and more tendering capacity. There were 64 subsistence salmon permits issued for Subdistrict 3 in 2010. The number of salmon reported harvested (13,538) was the highest since 1996 (Appendix A8). The Kwiniuk River escapement was 135 Chinook, 8,049 coho, 634,220 pink, and 71,388 chum salmon. The chum salmon escapement was a record eclipsing the previous record of 66,604 chum salmon in 1970 (Appendix A23).

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 it is assumed 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, and 4 permit holders participated. ADF&G again opened the commercial salmon fishery in 2009 and

7 permits holders participated. In 2010, there were 5 permit holders participating in the fishery, which was limited due to a combination of inadequate tendering capacity in early July, mechanical breakdowns on tender vessels in August, and reduced fishery participation due to concurrent fisheries prosecuted in the Elim and Shaktoolik Subdistricts.

Commercial salmon fishing began in Norton Bay Subdistrict on July 4, with a 24 hour opening targeting chum salmon. Catches from the first period remained confidential due to low number of permit holders participating in the fishery, but catches and CPUE were below the historical average for July 4. Norton Bay Subdistrict was reopened on July 9 and placed on the same schedule as Subdistricts 2 and 3 for the remainder of the season. As in previous years, there was very limited commercial fishery participation in Norton Bay Subdistrict. Additionally, good subsistence chum salmon catches were reported from the village of Koyuk and chum salmon catch and escapement indices from other Norton Sound subdistricts were above average throughout July. Later, during coho salmon season, commercial exploitation remained low and coho salmon run performance in neighboring subdistricts was sufficient to warrant additional commercial fishing. Consequently, ADF&G did not have any concerns with meeting escapement needs or providing for subsistence uses of chum or coho salmon in Subdistrict 4.

Table 3 shows commercial salmon harvest and effort by period for the 2010 season. Cumulative commercial catch by species for Norton Bay Subdistrict was 6,007 chum, 2,597 pink, 7 sockeye, and 1,606 coho salmon. The chum salmon harvest was the highest since 1988 (Appendix A9). The coho salmon harvest was the fourth highest in 16 seasons of commercial coho salmon fishing. The peak of the chum salmon fishery occurred during a 48 hour opening on July 9 when 1,343 chum salmon were harvested by 3 permit holders. On August 5, a peak harvest of 378 coho salmon was taken by 4 permit holders during a 48 hour opening. Strong westerly winds and limited tender capacity often prevented fishermen from deploying gear for the entire duration of several fishing periods in August. These limitations on effort and harvest should be taken into consideration when evaluating 2010 catches in Norton Bay Subdistrict and making interannual comparisons.

This was the third consecutive year that household subsistence salmon surveys were conducted in the village of Koyuk. Surveys were conducted from 1994 to 2003, but funding limitations precluded surveys of Koyuk during the 2004–2007 seasons. There were 73 households that were successfully contacted out of a possible 86 in 2010. Results from these households were expanded to estimate harvests by species, gear type and location (e.g., Inglutalik River, Ungalik River, Koyuk River and marine waters) for those households that were not surveyed.

An estimated 341 Chinook, 3,180 chum, 3,115 pink, 21 sockeye, and 461 coho salmon were reported harvested by Koyuk residents in 2010. Chinook salmon harvest was above the 2008 and 2009 harvests of 187 and 259 fish, respectively. The 2010 subsistence chum salmon harvest was near the 3,183 fish in 2009 and only 5% below the 2008 harvest of 3,330 fish. Coho salmon harvest was well below the 2008 and 2009 harvest estimates of 1,084 and 891 fish, respectively (Appendix A9).

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 in Unalakleet are used to set early fishing periods in both subdistricts. Both the Unalakleet River test net project (Kent 2010) and North River tower project (Jones 2006) have been used to assess run strength along with commercial and subsistence catches. Radiotelemetry projects in the Unalakleet River drainage have shown that a large percentage of the Chinook salmon run spawns in the North River compared to chum and coho salmon (Estensen et al. 2005; Estensen and Hamazaki 2007; Joy et al. 2005; Joy and Reed 2006 and 2007; Wuttig 1998 and 1999). 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 BOF continued this designation in 2007 and 2010. 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 Chinook 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 Chinook salmon passage is projected to fall short of the SEG, the department is directed to close the Chinook 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 from 2003 to 2004 and from 2006 to 2010. 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 range (1,200) 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. Likewise in 2009 with a poor early showing of Chinook salmon ADF&G closed the subsistence and sport fisheries in Subdistricts 5 and 6, on July 4. Unexpectedly, the 2009 Unalakleet River Chinook salmon run was the largest run since 1999.

After evaluating catch and escapement data following the 2009 season, area biologists projected that the Subdistricts 5 and 6 Chinook salmon run in 2010 would be below average. Despite extremely late run timing, by late June it was clear from poor subsistence that the 2010 Chinook salmon run was very weak. Several fishermen reported that they had only harvested 20% of their Chinook salmon subsistence needs by the end of June. This was in stark contrast to 2009, when many fishermen communicated that they had already pulled their nets for the season by late June because they had met their subsistence needs. Only a few were harvested before subsistence catches of Chinook salmon peaked on June 25, and catch rates plummeted drastically in late June. Set gillnets were restricted to 6.0 inches or less for the Unalakleet River on July 5 in order to protect milling Chinook salmon and large females in the lower reaches of the Unalakleet River; this marked the third consecutive year that mesh-size restrictions were implemented on the Unalakleet River before the closure of the fishery.

The record low cumulative escapement of Chinook salmon at North River (135 fish) on July 9 and weak Unalakleet River weir Chinook salmon passage (256 fish) was of concern to managers. It appeared highly unlikely that the lower end of the North River tower based SEG range (1,200–2,600 fish) would be reached based on historical run timing information. While the Unalakleet River weir project was new, the July 9 cumulative count was worrisome considering that radiotelemetry studies determined that the mainstem of the Unalakleet River contributes approximately 60% to the overall drainagewide escapement. In addition, continued poor subsistence catches in early July indicated that the main pulse of the Chinook salmon run was not sufficient to both meet escapement goals and subsistence needs. Consequently, on July 10, area managers restricted the marine subsistence Chinook salmon fishery to gillnets with a mesh size of 6 inches or less and sport fishing for Chinook salmon in Subdistricts 5 and 6 was closed. Additionally, subsistence fishing in the Unalakleet River was further restricted to set gillnets with a mesh size of 4.5 inches or less on July 10. Beginning July 9, beach seining was permitted 7 days a week in order to allow subsistence harvest opportunity of abundant pink and chum salmon, but all Chinook salmon had to be returned to the water immediately.

The 2010 Unalakleet River Chinook salmon run to Subdistricts 5 and 6 ended up being the poorest on record. However, total run size estimates are only available for the Unalakleet Subdistrict because escapement estimates are lacking for the Shaktoolik Subdistrict. The 2010 Unalakleet Subdistrict Chinook salmon total run size estimate of 3,938 fish is 35% below the recent 5-year (2005–2009) average run size of 5,926 Chinook salmon, and 163% below the long-term (1984–1986, and 1996–2009) average run size estimate of 10,160 Chinook salmon. While yields were low, restrictions and early closures to Chinook salmon fisheries had the desired effect of increasing escapements of Chinook salmon. Additionally, several individuals that were historically high harvesters of Chinook salmon focused on commercial chum salmon fishing in early July, which undoubtedly curtailed subsistence harvest pressure on Chinook salmon. Estimated escapement at North River tower was 1,256 Chinook salmon, which was 12% below the recent 5-year average escapement count. However, the lower end of the SEG range (1,200–2,600 Chinook) was exceeded for the second consecutive year (Appendix A28). Escapement goals have been reached in 3 out of 4 years since the *Subdistricts 5 and 6 Management Plan* was adopted.

Pink salmon runs to southern Norton Sound were below the even-numbered year average in 2010, although there were surpluses available for commercial harvest had there been buyer interest. However, a very strong chum salmon run coupled with a $0.65 per pound grounds price led fishermen to target chum salmon, and pink salmon harvests were incidental in other directed salmon fisheries in 2010.

By July 1, a total of 297 chum salmon had been caught in the Unalakleet River test net, which was above the recent 10-year (2000–2009) and 20-year (1990–2009) average catches for that date. NSSP expressed interest in having a chum salmon opening in early July. In consultation with NSSP, ADF&G allowed 24 hour openings in Subdistricts 5 and 6 on July 2 and 3, respectively. In light of the very poor Chinook salmon counts, fishery managers wanted to implement a very conservative management approach during the first half of the chum salmon fishery, especially given the assessment of later than average salmon run timing. Staggered times for the openings also reduced overall commercial effort, and the northern half of Subdistrict 6 was closed to commercial fishing. As a further precautionary measure, several commercial fishermen recommended prohibiting commercial fishing in the marine waters just south of the

Unalakleet River until the Chinook salmon run was over. Fishermen indicated that milling Chinook salmon will back out of the Unalakleet River and mill in the marine waters north of Coral Lake, which is known locally as "Big Lake." Biologists concurred with this opinion and limited commercial salmon fishing in Subdistrict 6 from a regulatory marker near Coral Lake south to the tip of Black Point until July 10.

A total of 8,755 chum salmon were harvested by 21 permit holders during the July 3 opening in Shaktoolik, and 2,223 chum salmon were harvested by 19 fishermen during the July 2 period in Unalakleet (Tables 4 and 5). The Shaktoolik Subdistrict chum salmon catch was the fourth highest ever. Additionally, harvest was the largest for a single 24 hour period. While the chum salmon harvest in Unalakleet was below average for early July, Unalakleet catch rates were even better considering that more than one-half of Subdistrict 6 was closed to commercial fishing to protect Chinook salmon. These 24 hour openings were beneficial to management biologists because they not only provided an early index of the strong chum salmon run, but also showed that incidental catches of Chinook salmon were low in the directed chum fishery with a combined 31 Chinook salmon harvested in both subdistricts during these periods (Tables 4 and 5). Incidental catches of Chinook salmon continued to gradually decline over the next week and the northern half of Subdistrict 6 was reopened to commercial salmon fishing on July 10. By this date, the test fishery catch of chum salmon was 672 fish, which was the third highest on record through July 10. Commercial catches of chum salmon continued to be well above average throughout the month of July in Shaktoolik Subdistrict and above average during most periods in Unalakleet Subdistrict. Shaktoolik Subdistrict chum salmon catch was the highest during the July 3 opening, whereas the peak chum salmon catch occurred during the July 6 opening in Unalakleet Subdistrict. Test fishery catches were record setting by July 22 (Table 8) and escapement indexed by the North River tower set a new record by July 26 (Appendix A28).

The first coho salmon was caught in ADF&G test net on July 19 and the department switched into coho salmon management beginning the final week of July. However, as in northern Norton Sound, coho salmon catch rates did not eclipse those of chum salmon in southern Norton Sound until the first week of August because of the large chum salmon run. In early August, commercial and test fishery catches of coho salmon were clearly below record levels observed during the 2005–2009 seasons, but near the long-term average catch indices with record runs excluded from the average. Fishery managers kept Subdistricts 5 and 6 on the schedule of two 48 hour periods per week until August 5 in order to gauge run strength. On August 5, a 72 hour period was scheduled in an attempt to maximize harvests and catch quality of coho salmon during the historical peak of the commercial coho salmon fishery. A consecutive 72 hour period would have been scheduled had coho salmon catch rates improved, but only 1,132 coho salmon were caught by 15 permit holders in Shaktoolik and 5,586 coho salmon were harvested by 49 permit holders in Unalakleet (Tables 4 and 5). If the record years of 2005–2009 were excluded from the average, catch rates in 2010 were near average. The average coho salmon run to Norton Sound did not warrant increasing the duration of subsequent fishing periods unless catch rates suddenly increased. Subdistricts 5 and 6 returned to a schedule of two 48 hour periods per week for the remainder of the season. However, the August 16 and September 2 openings were increased from 48 hours to 72 hours and 120 hours, respectively, but only as a result of stormy weather severely hampering fishing effort during these periods.

Escapement counts of coho salmon in southern Norton Sound ended up being average. At North River tower, 7,608 coho salmon were enumerated in 2010, which is eighth best in only

10 seasons of counting the entire coho salmon run. The 2010 test fishery catch of 467 coho salmon also ranked eighth best in the project's 26-year history and was slightly above average if the 1996 and 2005–2009 seasons were excluded from the average (Table 8). The commercial salmon season in Subdistricts 5 and 6 has been extended beyond the regulation closure date in 3 (2006, 2008, and 2009) of the previous 4 years due to record coho salmon runs and late season surges. However, an extension to the 2010 Subdistricts 5 and 6 commercial salmon season was not granted based on average late August catch and escapement indices of coho salmon. Consequently, the Subdistricts 5 and 6 commercial salmon fishing season closed by regulation on September 7.

Commercial harvests for 2010 in the Shaktoolik Subdistrict were 4 Chinook, 18 sockeye, 40,483 chum, 4,622 pink, and 11,868 coho salmon harvested by 35 permit holders (Table 4). In Unalakleet Subdistrict, the 2010 commercial harvest by 59 permit holders was 124 Chinook, 64 sockeye, 10,641 pink, 30,588 chum, and 32,839 coho salmon (Table 5). Chum salmon catch in the Shaktoolik Subdistrict was the highest since 1983 (67,310 chum salmon) and ranked third highest in 50 years of directed chum salmon fishing (Appendix A10). The Unalakleet Subdistrict 2010 chum salmon harvest ranked fourteenth in 50 years of fishing and was 155% above the recent 5-year (2005–2009) average harvest of 11,999 chum salmon and 22% above the long-term (1961–2009) average harvest of 25,146 chum salmon (Appendix A11). Shaktoolik Subdistrict commercial coho harvest was the twelfth best in 48 years of commercial coho salmon fishing and 55% above the long-term (1962–2009) average harvest of 7,648 coho salmon. The 2010 Shaktoolik coho salmon harvest was only 43% of the recent 5-year (2005–2009) average of 27,357 coho salmon, which is comprised of record-breaking runs (Appendix A10). Coho salmon harvest in the Unalakleet Subdistrict was only 42% of the recent 5-year average catch of 77,525 coho salmon, but was 21% above the long-term (1961–2009) average harvest of 27,125 coho salmon (Appendix A11).

Although Shaktoolik and Unalakleet Subdistrict chum salmon harvests were the best since 1983 and 1992, respectively, the harvests of chum salmon in both subdistricts would have been considerably higher had Chinook salmon conservation measures not been necessary in early July. Additionally, Shaktoolik Subdistrict harvest of chum salmon would have been much higher had there been ample tendering and processing capacity to deal with the large volume of chum salmon being taken in southern Norton Sound; the first 48 hour opening did not occur in Shaktoolik until July 15 because of these capacity concerns. Coho salmon harvests may also have been higher, but southwesterly storm systems in August reduced commercial fishing opportunity, particularly in the Shaktoolik Subdistrict. This is particularly evident by the fact that coho salmon harvest and CPUE did not peak in the Shaktoolik Subdistrict until August 23 when 20 permit holders harvested 2,289 coho salmon during the August 23 opening. This was well after the historical peak of the Shaktoolik Subdistrict coho salmon fishery which typically occurs during the first week of August.

Escapement

Table 9 and Appendix A16 summarize escapement assessments for the major index river systems of Norton Sound and Port Clarence Districts in 2010. Appendices A17–A29 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. 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 (Kent et al. 2008; Kent 2010).

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 NSEDC. ADF&G and NSEDC also operated a weir at the headwaters of Glacial Creek which flows from Glacial Lake into the Sinuk River. Except for the Glacial Lake project, most projects have been operational since the 1990s. The Unalakleet River floating weir project was initiated in 2010 and is a cooperative project between ADF&G, NSEDC, BLM and Unalakleet IRA. Funding for the project is provided for by US FWS Office of Subsistence Management. 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 July and August. 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 pressures.

Chinook Salmon

The 2010 Chinook salmon run had some of the poorest escapements seen in years throughout most of Norton Sound. Only the eastern area of Norton Sound has sizable runs of Chinook salmon, and rivers in Norton Bay, Shaktoolik and Unalakleet Subdistricts are the primary Chinook salmon producers in Norton Sound. The Unalakleet River test net and floating weir, enumeration towers on Kwiniuk, Niukluk, and North rivers, aerial surveys, and inseason subsistence catch reports were the primary assessment tools for gauging Chinook salmon run strength in Norton Sound. The Unalakleet test net catch was the sixth lowest since 1985. Prior to 1985, varying data collection and test fishing methodologies were used. Fishery managers were surprised by the poor test fishery catch in light of mesh-size restrictions and early closures. However, the catch may have been biased low due to avoidance by Chinook salmon due to a large amount of chum salmon caught in the net. The North River tower count of 1,256 Chinook salmon ranked twelfth best in 18 years of counting, but the SEG was reached for the second consecutive year, and the third time in the last 4 years (Appendix A28). Aerial surveys on the North and Shaktoolik rivers were conducted, but were rated as poor surveys because they were conducted under fair conditions after peak spawning periods for Chinook salmon.

In Elim Subdistrict, the Kwiniuk River tower count of 135 Chinook salmon was the second lowest count since 1985 and only 45% of the lower end of the SEG (300–550) range (Appendix A23). The 2010 Chinook salmon count represents the fourth time in the previous 5 years that the goal has not been reached and the seventh of twelve years that the goal has not been reached. Chinook salmon passage at the Niukluk River tower was 15 and the lowest count since the project began in 1995 (Appendix A24). The Pilgrim River Chinook salmon weir passage of 44 was the worst since the project became operational in 2003 (Appendix B2).

Chum Salmon

Chum salmon escapements were well above average to record setting across Norton Sound and the Port Clarence Area. In Nome Subdistrict, Nome River (5,906 chum salmon) and Snake River (6,973 chum salmon) weirs had their second and third highest escapements, respectively. Eldorado River had a weir count of 21,211 chum salmon, which was well below the mid-July aerial survey index of 30,600 chum salmon. Thus, the Eldorado River weir chum salmon passage in 2010 is considered to be a gross underestimate of actual escapement, and an aerial survey expansion was used to estimate escapement. All Nome Subdistrict weir escapement goals were exceeded and estimated escapement for the entire subdistrict was over 97,000 chum salmon (Appendix A20), a 179% increase from the upper end of the overall subdistrictwide BEG of 23,000–35,000 chum salmon.

Port Clarence District had an above average chum salmon run indicated by escapement at the Pilgrim River and escapement of a fall chum salmon run in the American River, a tributary of the Agiapuk River. At Pilgrim River, the escapement of 25,379 chum salmon was above the recent 5-year average of 24,163 chum salmon despite the fact that the average includes the record count of 45,361 chum salmon from the 2006 season (Appendix B2). On the American River, over 14,000 chum salmon were counted during an aerial survey conducted under exceptional viewing conditions (Table 9). The 2010 American River survey count is the highest on record, although surveys of this river are conducted sporadically and few were conducted before the late 1990s.

To the east in Golovin Subdistrict, Niukluk River tower chum salmon passage was over 48,000 fish, the fifth best since the project's inception in 1995 and well above the lower bound SEG of 23,000 chum salmon. Elim Subdistrict had record levels of chum salmon return to its major salmon-producing drainages in 2010. The 71,388 chum salmon counted at Kwiniuk River tower shattered the previous record of 66,604 chum salmon enumerated in 1970. Nearby on the Tubutulik River, over 16,000 chum salmon were estimated via an aerial survey, which is the fifth highest survey ever recorded (Table 9).

Other than aerial surveys, escapements are not assessed in Shaktoolik Subdistrict. However, Subdistricts 5 and 6 are managed according to test net and escapement indices in the Unalakleet Subdistrict because tagging studies conducted in the late 1970s showed an intermingling of stocks in Subdistricts 5 and 6 (Gaudet and Schaefer 1982). The aerial survey count of 12,815 chum salmon in Shaktoolik River was above average considering it was conducted well after peak spawning. The Unalakleet River test fishery of 2,039 chum salmon was a record for the 26-year project. There were also 16,131 chum salmon counted at North River tower, which also established a new record for that project. There were 70,811 chum salmon counted through Unalakleet River weir (Appendix A29). Radiotelemetry studies showed that approximately 20% of the mainstem chum salmon spawning escapement occurs in Unalakleet River below the current weir site. Considering this information, and that the weir was pulled before the third quarter point of the chum salmon run, escapement to the Unalakleet River was most likely well over 100,000 chum salmon this season.

Coho Salmon

Coho salmon are found in nearly all of the chum salmon producing streams throughout Norton Sound with the primary commercial contributors being the Unalakleet and Shaktoolik rivers. Because inclement weather is normally experienced in this area during August and September, escapement data can be somewhat incomplete. Escapement data are not available over a long

time series for several streams because few projects counted the coho salmon run prior to the early 2000s due to funding limitations. More recent Norton Sound escapement assessment projects have been funded to monitor coho salmon as well as chum salmon and are becoming increasingly important to fisheries management. Coho salmon escapement estimates and indices in 2010 were average to above average for most projects and aerial surveys, except in Port Clarence District.

In northern Norton Sound, the coho salmon run ended up being a bit stronger than forecasted, especially in Nome Subdistrict. Final weir counts in 2010 at Nome and Snake River weirs were 4,114 and 2,243 coho salmon, respectively (Appendix A22 and A25). Nome River coho salmon escapement was the fifth best in twelve years of fully counting the run and was 29% above the 2001–2009 average count of 3,193 coho salmon. Similarly, the Snake River count was the fourth best in 10 years of coho salmon counts and was 16% above the 2001–2009 average escapement count of 1,941 coho salmon. Record aerial survey counts of coho salmon were also observed in 2010 on the Sinuk River (5,507) and Cripple River (764), and the Penny River aerial survey count of 349 coho salmon was the second highest on record (Table 9). Dry Creek, a small tributary of Snake River near the boat harbor, was surveyed for the second consecutive year and 141 coho salmon were observed; there were 38 coho salmon counted on an aerial survey in 2009. Normal problems such as fall storm activity and rising water levels that interfere with aerial surveying were not a factor this season and viewing conditions were exceptional.

Subdistricts 2 and 3 coho salmon escapement needs were also easily met in 2010. In Golovin Subdistrict, the Niukluk River tower coho salmon escapement (9,042 fish) exceeded the upper end of the tower-based SEG range (2,400–7,200 coho salmon). The Niukluk River escapement goal has been achieved since 2005 (Appendix A24). The Kwiniuk River tower coho salmon count (8,049 fish) ranked eighth in 10 years of counting the coho salmon run. However, the Kwiniuk River and Tubutulik River coho salmon runs supported a record commercial harvest of coho salmon in 2010 and there was no commercial salmon fishing from 2001 to 2006 in the Elim Subdistrict. More importantly, escapements lower than the 2010 count have produced sustained yields of coho salmon in the past. The 2010 aerial survey count of 2,925 coho salmon was 125% above the upper end of the aerial survey SEG range of 650–1,300 coho salmon for Kwiniuk River (Table 9).

Subdistricts 5 and 6 coho salmon runs were lower than originally forecasted, at least based on North River tower counts and test fishery catches in the lower Unalakleet River. Season total coho salmon catch in the test fishery was 467 coho salmon, which was eighth highest in 26 seasons of test fishery operations. While the 2010 catch was only 73% of the long-term (1985–2009) average catch of 644, it is 95% above the long-term average of 239 coho salmon if the record-breaking runs of 1996 and 2004–2009 are excluded from the average. Coho salmon production in southern Norton Sound increased dramatically in the mid-2000s and the 2010 run was more characteristic of the period before this high productivity shift began. North River coho salmon escapement (7,608 fish) ranked eighth in 10 years of coho salmon counts. The 2002 (2,966 fish) and 2003 (5,837 fish) parent year escapements at North River produced escapements of 9,835 and 19,965 coho salmon in 2006 and 2007, respectively. Additionally, the top 2 commercial coho salmon harvests occurred during the 2006 (98,336 fish) and 2007 (88,397 fish) seasons, which further shows that escapements well below the 2010 escapement are capable of producing large yields (Appendix A11). Radiotelemetry studies indicate that North River contributes 8–15% to the overall drainagewide coho salmon escapement (Joy and Reed 2007).

Expanding the North River tower count by this range of proportional abundance suggests that the 2010 drainagewide escapement was between 53,000–100,000 coho salmon. Some subsistence and sport harvests undoubtedly occurred above the tower site and in the upper reaches of the mainstem, but exploitation of coho salmon is relatively low from these user groups. Aerial surveys were not possible in Subdistricts 5 and 6 rivers in 2010 during peak coho salmon spawning periods due to a combination of exceptionally high water levels and dark overcast skies on most days.

The Pilgrim River escapement of 272 coho salmon ranked sixth in 8 years of weir counts and was only 43% of the 2003–2009 average count of 630 coho salmon. However, Port Clarence District has never been a large producer of coho salmon relative to Norton Sound. Additionally, there have been problems with accurate speciation of coho salmon during the tail end of the sockeye salmon run in some years (i.e., 2004), leading to speculation about the validity of historical estimates of coho salmon escapement in Pilgrim River (Appendix B2). These inaccuracies were made apparent by sockeye and coho salmon scales being mixed up on scale cards in past years.

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 2010, the pink salmon run was below average for an even-numbered year, but escapement goals for pink salmon in Norton Sound were easily made.

Sockeye Salmon

River spawning sockeye salmon are typically found in small numbers throughout Norton Sound District. Glacial Lake (Nome Subdistrict) and Salmon Lake (Port Clarence District) support populations of lake-spawning sockeye salmon and constitute the northernmost populations of sockeye salmon in North America of any significance. Salmon Lake spawning populations seldom exceeded 10,000 fish in years previous to 2003, whereas from 2003 to 2007 there were near-record to record runs of sockeye salmon. Likewise, Glacial Lake saw an upswing in sockeye salmon returns beginning in 2004, and record count of 11,135 sockeye salmon occurred in 2005.

In 2008 sockeye salmon counts dropped off at both Glacial Lake and Salmon Lake and in 2009 counts further declined at both Pilgrim River weir and Glacial Lake weir. The Glacial Lake weir is operated at Glacial Creek near the outlet of the lake and about one mile upstream from the confluence with the Sinuk River and 826 sockeye salmon were counted in 2009, the lowest count since the weir project started in 2000. The Salmon Lake sockeye run was also the lowest since Pilgrim River weir began operations in 2003 with 953 sockeye salmon counted through the weir. Aerial survey counts in 2009 during peak spawning periods had 169 and 272 sockeye salmon for Glacial and Salmon Lakes, respectively. The combined aerial survey escapement goal of Salmon Lake and Grand Central River is 4,000–8,000 sockeye salmon and the Glacial Lake aerial survey escapement goal is 800–1,600 sockeye salmon.

Sockeye salmon escapements in these two systems increased in 2010, although not by much. Sockeye salmon escapement in 2010 at Glacial Lake was 1,047 sockeye salmon, tying 2002 for the third lowest count since the project began in 2000. Pilgrim River weir sockeye salmon escapement in 2010 was 1,654 sockeye salmon, which was the second lowest on record.

However, sockeye salmon escapement into Salmon Lake would have been much lower had it not been for an early closure to the Pilgrim River subsistence fishery in mid-July. Aerial surveys of Glacial Lake were not conducted in 2010 due to poor weather conditions. The combined aerial survey count for Salmon Lake and Grand Central River was 784 sockeye salmon in 2010 (Table 9).

Enforcement

Two Fish and Wildlife Protection (FWP) officers patrolled the Norton Sound District 2010 commercial salmon fisheries in Unalakleet and one FWP officer patrolled the Nome area. In addition, Nome ADF&G Division of Commercial Fisheries has 8 deputized staff with the ability to issue citations, of which 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.

2011 NORTON SOUND SALMON OUTLOOK

Salmon outlooks and harvest projections for the 2011 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 above 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 90,000 to 120,000 fish. The only expected subsistence restrictions for chum salmon will be in the Nome Subdistrict where catch limits will be in effect. ADF&G expects the pink salmon run to be above average for an odd numbered year and if there is buyer interest then the harvest could be 50,000 to 100,000 pink salmon. A harvest of this magnitude would be dependent on pink salmon directed fishing periods. However, with the expected good run of chum salmon, fishermen and the buyer will likely be targeting the more valuable chum salmon. The coho salmon run in 2011 is expected to be average based on good ocean survival conditions in recent years. The commercial harvest is expected to be 60,000 to 90,000 fish and no subsistence fishing restrictions are expected, except for catch limits in the Nome Subdistrict.

2010 PORT CLARENCE SALMON FISHERY

Commercial Fishery Season Summary

No commercial salmon fishing was allowed in 2010. ADF&G had projected that the sockeye salmon run for Pilgrim River in 2010 would not exceed the inriver goal of at least 30,000 sockeye salmon that is necessary for a commercial fishery to occur. Weak subsistence catches and poor counts at Pilgrim River weir which confirmed that the 2010 run would be similar to the poor run in 2009 resulted in the department not allowing any commercial salmon fishing.

Subsistence Fishery Season Summary

The sockeye salmon run was expected to be poor in 2010 after the crash of the sockeye salmon run that occurred in 2009. Restrictions for Pilgrim River subsistence salmon fishing were expected sometime after July 4. Reports of poor subsistence catches by fishermen in Brevig Mission and Teller and poor passage at the Pilgrim River weir resulted in ADF&G closing all net fishing in the Pilgrim River on July 10.

There were 1,654 sockeye salmon counted through Pilgrim River weir in 2010 and the count was the second lowest since the weir became operational in 2003. The previous record low at the weir was in 2009 when 953 were counted and previous to that was the record low weir count in 2008 of 20,452 sockeye salmon. Weir passage in 2003 was nearly 43,000 and in 2004, escapement through the weir was a record 85,417 sockeye salmon. From 2005 to 2007 seasons, weir passage ranged from over 43,000 to just under 56,000 sockeye salmon (Appendix B2).

Subsistence permits have been required for Pilgrim River since 1964 and beginning in 2003 the number of permits issued has skyrocketed with the record sockeye salmon runs. In 2010 there were 146 permits issued, down from 2009 when 190 permits were issued and 2008 when there was a record number of permits issued (255). 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 both 2009 and 2010.

Although permits had been required in the Pilgrim River drainage for over 40 years, 2010 was only the seventh year that permits were required throughout Port Clarence District. The number of subsistence salmon permits issued for all waters of Port Clarence District, excluding Pilgrim River and Salmon Lake, was 144 permits, similar to the 136 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 had showed an increasing trend of sockeye salmon returns to Salmon Lake since 1986 (Appendix B1). However, the run crashed beginning in 2009. An aerial survey of Salmon Lake and Grand Central River estimated 73 sockeye salmon in Salmon Lake and 711 sockeye salmon in Grand Central River, a tributary to Salmon Lake. The combined aerial survey count of 784 sockeye salmon was the second lowest on record since 1986, but was an improvement over the 186 sockeye salmon counted in 2009. The combined aerial survey escapement goal for Salmon Lake and Grand Central River is 4,000–8,000 sockeye salmon (Table 9).

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 B2). In 2008, Pilgrim River weir passage took a downturn with 20,452 sockeye salmon counted, and crashed the following years with only 953 and 1,654 sockeye salmon counted through the weir in 2009 and 2010.

Enforcement

In 2010, one FWP officer patrolled Pilgrim River in Port Clarence District.

2011 Port Clarence Salmon Outlook

The guideline harvest range (GHR) set by the BOF for the Port Clarence commercial sockeye fishery allows for a harvest of up to 10,000 sockeye salmon. Based on the poor 2009 and 2010 sockeye salmon runs and outmigrating smolt data, ADF&G expects another poor sockeye

salmon run in 2011 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 2011 the other salmon species are expected to have much improved runs allowing for subsistence fishing.

ADF&G will compare the 2011 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.

2010 KOTZEBUE SOUND SALMON FISHERY

Commercial Fishery Season Summary

The Kotzebue Sound commercial salmon fishery opened on July 12 and closed after the September 3 fishing period. This year's commercial fishery was extended, by emergency order, 3 days past the regulation closure date because of a very strong chum salmon run and exceptionally strong chum salmon catches in late August.

In the Kotzebue fishery, gear is limited to set gillnets with an aggregate of no more than 150 fathoms per permit holder. 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 farther out from shore. Most gear used in the district is 5-7/8 inch or 6 inch stretch mesh gillnet.

Similar to last year ADF&G opened the commercial fishery from Monday through Saturday with the time for Monday's fishery from 12 p.m. to 8 p.m. and the time for the other days from 6 a.m. to 2 p.m. This allowed the buyer to coordinate fishing periods with plane schedules that allowed the buyer to provide a higher quality product to their markets. Beginning with the July 26 fishing period the buyer began to shorten fishing time for their fleet because of capacity concerns. However, complaints from fishermen that some permit holders were ignoring the shorter fishing hours requested by the buyer resulted in the department setting daily fishing times by emergency order beginning with the August 6 fishing period. This resulted in a more orderly fishery because there was no longer the temptation to fish longer than the buyer requested and enforcement officers were able to issue citations for those fishing before or after the scheduled openings that were set by emergency order.

There were 67 permit holders who sold fish to the buyer, including one catcher-seller who sold fish to the buyer and also sold some of his catch to Kotzebue area residents. This was the highest number of permit holders to fish since 1997. Since 2004, when a buyer returned to Kotzebue to purchase salmon, the number of permit holders that fished had been in the 40s, except for 2009 when 62 permit holders fished and the 67 permit holders that fished this year. Still the number of permit holders fishing the last two years was less than half the number of permit holders that fished in the early 1990s, and well below the nearly 200 permit holders that fished in the 1980s (Appendix C1).

The biggest single day catch was on July 26 when 17,179 chum salmon were sold during a 7 hour opening. Fishing effort peaked during a 6 hour opening on August 6 with 36 permit holders participating. The season catch of 270,343 chum salmon was the highest commercial harvest since 290,730 chum salmon were harvested in 1995 (Appendix C1). Also harvested during the commercial fishery but kept for personal use were 13 Chinook, 8 sockeye, 557 pink, and 7 coho salmon, 1,323 Dolly Varden and 302 sheefish. There were likely some additional fish kept for personal use that did not get reported on fish tickets.

The overall chum salmon run to Kotzebue Sound in 2010 was estimated to be above average to well above average based on commercial harvest rates, subsistence fishermen reporting good catches, and the Kobuk test fish index being the fifth best in the eighteen year project history. No aerial surveys were flown in the Kobuk and Noatak River drainages because of high water resulting in murky water conditions.

Age, sex and length composition (ASL) was taken from commercial catch samples, but was not used to manage the fishery. The majority of the chum salmon run each year are usually comprised of 4- and 5-year-old fish. In 2010 there was a record number of 4-year-old fish with 88% age-0.3 fish in the commercial catch samples. Conversely, the percentage of 5-year-old fish (age-0.4) was a record low 6%. The 2010 age composition was in agreement with last year's samples, which were comprised of a record percentage of age-0.2 chum salmon from the 2006 brood year.

A total of 2,160,264 pounds of chum salmon (average weight 8.0 lbs) were sold at an average of $0.40 per pound (Table 10; Appendices C2 and C3). The total exvessel value was $860,125 to Kotzebue Sound fishermen. The average value for each participating permit holder was $12,838, the highest since 1988. The total exvessel value represents 148% of the $580,893 historical average (Appendix C4).

Subsistence Fishery Season Summary

Subsistence household surveys were regularly conducted in Kotzebue District from 1962 to 2004 by Division of Subsistence, but since 2004, no subsistence surveys have been conducted in the area (Appendices C5–C7). In 2010, 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

The 2010 test fish chum salmon CPUE cumulative index was 1,401 points (Table 11). The midpoint at the test net was August 5 and test fish catches had later than normal run timing compared to other years. There were record catches occurring the last week of the test fish project compared to previous catches in late August.

The Kobuk River test net chum salmon catches were 14% age-0.2 fish, 65% age-0.3 fish, 17% age-0.4 fish, 3% age-0.5 fish and 1% age-0.6 fish. The age-0.2 fish catch was the second highest on record and the age-0.3 fish catch was the third highest on record and the age-0.4 fish catch was the third lowest on record.

Test fishing was conducted once in the lower Noatak River by department personnel to obtain ASL information. Age composition of chum salmon from Noatak River test net drift catches were 2% age-0.2 fish, a record high 92% age-0.3 fish, a record low 5% age-0.4 fish and 1% age-0.5 fish. As in the commercial fishery samples, the 2010 test fishery age composition was consistent with last year's record percentage of 3-year-old fish from the 2006 brood year.

High water prevented aerial surveys of the Kobuk River and Noatak River drainages this season.

Enforcement

One FWP officer patrolled the Kotzebue Sound District 2010 commercial salmon fishery.

2011 Kotzebue Salmon Outlook

Outlook for the 2011 season is based on parent-year returns and returning age classes observed in the test fish samples from the Kobuk and Noatak rivers in 2010. During the 2011 season, the age-0.3 component of the run is expected to be average based on the age-0.2 return in 2010. The age-0.4 component of the run is expected to be above average based on the age-0.3 return this past season. The age-0.2 and 0.5 age classes are much smaller components of the run and are expected to be average. The commercial harvest is expected to fall within the range of 230,000 to 260,000 chum salmon, if market conditions can accept that level of harvest.

SECTION 3: PACIFIC HERRING FISHERIES

2010 NORTON SOUND PACIFIC HERRING FISHERY

SAC ROE

For the first time since 2006, there was market interest in the Norton Sound herring sac roe fishery for the 2010 season. Historical information for the Norton Sound sac roe fishery can be found in Appendix D3. Other historical fisheries information is presented in Appendices D1, D2, and D4.

SPAWN-ON-KELP

There was no market interest expressed in the commercial spawn-on-wild-kelp (*Fucus* spp.) or Macrocystis spawn-on-kelp fisheries in 2010.

BAIT FISHERY

There was a directed bait herring fishery in 2010. NSEDC purchased 65 short tons of bait herring from 11 fishermen, and total exvessel value of the fishery was $16,848 (Table 12). The bait fishery was prosecuted solely in the Unalakleet Subdistrict and occurred from June 17 to 21 as the sac roe fishery was winding down.

Commercial Fishery Management

ADF&G projection for the 2010 spawning biomass for Norton Sound sac roe fishery was 42,889 tons. At 20% exploitation rate GHL for Norton Sound District sac roe fishery was 8,578 tons with 7,432 tons allocated to the gillnet fishery. NSEDC was successful at developing a market for 1,000 short tons of sac roe herring in 2010.

Herring were first observed on June 6 by NSEDC biologists surveying the Elim Subdistrict when 112 tons of herring were observed. At this time, nearshore water temperatures were averaging 40 degrees Fahrenheit in Norton Bay. Considering the relatively warm air temperatures (60 degrees Fahrenheit) in northern Norton Sound and extensive shore fast ice in southern Norton Sound, there was a high likelihood that buying operations would begin in Elim Subdistrict. On June 7, ADF&G opened the fishery and left it open continuously to provide maximum flexibility for the buyer to coordinate with tender and catcher vessels in the area.

There was a limited amount of test fishery attempts in Elim Subdistrict, but clear water resulted in net avoidance by schooling herring. The first herring were harvested on June 11 when 1 permit holder harvested 3.8 tons of herring with a sac roe percentage of 13.8% in St. Michael Subdistrict. However, widely distributed large chunks of shore fast ice encompassed southern Norton Sound from Cape Denbigh to Stebbins and made fishing difficult throughout the duration of the fishery. Harvests peaked on June 14, when 14 permit holders in St. Michael Subdistrict harvested 105 tons of herring with an average sac roe percentage of 13.4%. Buying operations also began in the Cape Denbigh and Unalakleet Subdistricts on June 15 and June 16, respectively. Total sac roe harvest was 623.4 short tons with a record sac roe percentage of 13.5% by 28 permit holders. St. Michael, Unalakleet, and Cape Denbigh Subdistricts accounted for 50%, 38%, and 12% of the sac roe harvest, respectively (Table 13).

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 19 when the major processing vessel and accompanying tendering vessels needed to return to Bristol Bay for the onset of the salmon fishery.

Unfortunately, the ADF&G field crew was unable to deploy to Cape Denbigh to conduct test fishing operations during the 2010 season due to shore-fast ice impeding safe travel to the area. Consequently, herring age class composition by percentage of total catch using variable mesh gillnet gear was not available for 2010.

Catch Reporting and Enforcement

The herring buyer registered for the 2010 season communicated well with ADF&G during the fishery but compliance with submitting requested catch reports was mediocre as the department did not receive the majority of catch reports until several days after the fishery concluded. Nearly all fishing vessels in the fleet have VHF radios, but their activities are often beyond normal ranges.

Due to the limited Norton Sound fishery in 2010, the Unalakleet field office personnel consisted of one assistant area biologist to conduct aerial survey biomass estimates. No FWP officers were on Norton Sound herring grounds during the 2010 fishery; however, the assistant area biologist stationed in Unalakleet for the 2010 herring season was deputized and able to cite fishing violations if necessary.

Biomass Determination

Aerial surveys were conducted from May 25 to June 24 in various Norton Sound subdistricts. The peak survey was conducted on June 14 (Table 14) by NSEDC biologists, but only encompassed Subdistricts 1–3 and loosely scattered shore fast ice led to poor viewing conditions in these areas. Additionally, when ice conditions improved to the south, fog, haze, and clouds prevented ADF&G and NSEDC biologists from estimating spawning biomass in northern Norton Sound during the third week of June. Due to these factors, the peak survey is considered to be a low estimate of the actual spawning biomass.

2011 NORTON SOUND PACIFIC HERRING OUTLOOK

The 2011 projected biomass for Norton Sound District is 42,477 tons. A 20% exploitation rate would result in a GHL of 8,495 tons. A maximum of 320 tons of herring are reserved to allow for the pound fishery to harvest a maximum of 90 tons of product (combined weight of herring

roe and kelp). This leaves 8,175 tons for sac roe harvest. The beach seine harvest is allocated 10% of the sac roe projected harvest, or 818 tons. The 2011 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. Herring ages 6–9 are expected to comprise 83%, 16%, 26%, 23% and 18%, respectively, of the returning biomass (Appendix D15). Herring age 10 and older (13%) and ages 4 to 5 (4%) are expected to comprise the remaining biomass.

SECTION 4: KING CRAB FISHERIES

NORTON SOUND CRAB FISHERY

Abundance

The ADF&G length-based population model estimated legal male crab abundance for the 2010 summer commercial crab fishery at 4.45 million pounds (1.69 million crabs). This is an increase of 16% from the revised population estimate of 3.84 million pounds (1.49 million pounds) of legal male crabs for 2009. The 2010 winter study data indicate recruitment has increased compared to 2009 and might possibly decrease for next year. Current size composition data show the portions of the crab population classified as recruits and postrecruits have both increased by roughly a fourth compared to 2009 survey results, leading to a possible combined increase of 57% in legal component of the population. The winter pot study also showed that the pre-1 population has decreased by a fourth compared to 2009 survey results, but the pre-2 population is similar to 2009 (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 2010 has peaked and will likely decline in 2011 and 2012.

A 9% exploitation rate on the legal population ≥ 4.75 inch carapace width equates to a GHL of 400,000 pounds of crab. This follows the harvest strategy set by BOF. By regulation, the CDQ fishery is allocated 7.5% of the summer season quota; therefore, the CDQ harvest quota was set at 30,000 pounds preseason.

Summer Open Access Commercial Fishery

The 2010 summer open access commercial crab fishery was opened by emergency order at 12:00 noon, July 1 in Norton Sound Section, with a GHL of 370,000 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 2 tenders in eastern Norton Sound, while a fisherman based in Unalakleet flew live crabs to Aquatech in Anchorage.

First open-access delivery was made on July 4 and final delivery was made August 25, the day after the open access portion of the fishery was closed by emergency order at 12:00 noon, for a total

season length of 58 days compared to 98 days in 2009. In 2010, both buyers purchased crab continuously once the open access season was under way, with no reports of poor crab meat fill.

The open-access harvest from fish ticket reports was 139,014 red king crabs or 387,304 pounds (105% of the open-access quota). Of this total, 208 pounds were reported as deadloss, and 6,376 pounds reported as personal use. A total of 23 vessels and 25 permit holders made 256 landings, and average weight for commercially caught crab was 2.8 pounds. Number of pots registered was 1,040 (number of vessels registered was 26) and there were 8,617 pot pulls throughout the fishery, for a season CPUE of 16 crabs. In 2010, the catch rate was much higher than in 2009, and more closely resembled catch rates from the 3 years prior to 2009 (Appendix E8). Average price paid (including CDQ catch) was $3.73 per pound, the highest paid ever (Appendix E3). Exvessel value of the fishery (including CDQ) was $1,527,971, the highest since 1994 when Norton Sound was designated a super-exclusive area, which effectively changed the character of the fishery from a large vessel to a small vessel fishery (Appendix E9).

CDQ Fishery

For the first time, the CDQ fishery opened concurrently with the open-access fishery in 2009. In 2010, neither buyer was ready to purchase open access crab by the end of June; therefore, similar to years prior to 2009, the CDQ fishery was opened first, on June 28. First CDQ delivery was made on June 30, the season lasted 17 days, and final delivery was made July 16, when 100% of the CDQ allocation, 30,000 pounds of crab, had been harvested (Table 15). Nine permit-holders were registered to fish CDQ but only 7 actually fished, making a total of 30 landings and 1,081 pots lifts. Average price paid to fishermen was $3.77 per pound, for an exvessel value of $110,808 for the CDQ fishery. This was the tenth year a CDQ harvest occurred since the CDQ fishery was implemented in 1998, and the seventh year the fishery harvested or nearly harvested the entire allocation.

Fish ticket reports document that 8 statistical areas were fished in the open access and CDQ fisheries (Table 16), compared to 13 areas in 2009, when the crabbers moved around a lot more as they searched for crab. Similar to years prior to 2009, the majority of the harvest came from statistical area 636401 (44%). Significant harvests also came from 3 other areas: 656401 (20%), 646401 (19%), and 626401 (12%), all of which are directly south of the closed boundary line (Appendices E10 and E24). The catch from statistical areas east of 164°W longitude made up 51% of the harvest, similar to 54% last year (Appendices E1 and E11).

Commercial Catch Sampling

Carapace length measurements and shell age were collected from 5,902 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 86% of the total legal crabs sampled, and old-shell crabs made up 14%. Recruit crabs are new-shell legal crabs < 116-mm carapace length (CL). Postrecruit crabs are legal new-shell male crabs $\geq$ 116 mm CL and all legal old-shell males. Recruit crabs made up 49% of the legal crabs sampled and postrecruit crabs made up 51% (Appendix E4). Overall mean carapace length of legal male crabs was 115 mm. For comparison of historical length composition of Norton Sound red king crab summer commercial harvests from 1981 to 2010, see Appendices E16–E23.

Enforcement

No FWP trooper made dockside checks during the 2010 summer crab fishery; however, an ADF&G staff member who worked the king crab fishery was deputized to cite violations if necessary.

Winter Commercial Fishery

The winter commercial season opened November 15, 2009, and 10 fishermen registered. Based on fish tickets submitted, the first landing was made December 27, 2009. From then until the last landing on May 14, the 10 fishermen made a total of 184 landings, with an overall CPUE of 2.6, and average weight of 2.5 pounds per crab. Price of crab averaged $3.54 per pound, and total exvessel value of the fishery was $42,592. A total of 4,834 crabs (12,028 pounds) were sold, with percentages of crabs sold (and CPUE) each month as follows: January 3% (1), February 36% (3), March 32% (2), April 18% (4), and May 9% (5). Total number of crabs harvested was very similar to 2009, and 88% more than the average harvest from 1978 to 2009 (Appendix E5). As an indicator of near-shore ice instability, commercial fishermen reported losing 32 pots during the 2010 winter season. Pots were fished from 12 miles east to 12 miles west of Nome, excluding the area closed to commercial fishing from 3.5 miles east to 2.0 miles west of Nome. Unlike most previous years when all the crabbers worked out of Nome, one crabber in 2010 fished out of Elim and one fished out of St. Michael.

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.

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 2009–2010 winter crab season, 125 permits were issued, 123 returned, and 85 permit holders reported fishing for a total of 7,044 harvested crabs (compared to 4,752 crabs for 2009). Residents of Brevig Mission, Elim, Golovin, St. Michael, Unalakleet, and White Mountain had a combined harvest of 1,382 crabs, or 20% of the total harvest. Out of 165 pots reported fishing, 63 (38%) were lost during the season due to moving ice. Percentages of subsistence crabs harvested each month are as follows: January 9%, February 37%, March 30%, April 17%, and May 7%. Nearly all of the crabs were caught with pots.

During the 2010 Norton Sound summer subsistence crab season, 27 permits were issued and returned, and out of 15 permit holders that set pots, 13 fishermen reported harvesting a total of 660 crabs, over half of which were harvested near Nome. Crabs kept per fisherman averaged 44 crabs for summer 2010.

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 (4.75 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 2011. Results of the winter project will be used in the length-based model to project the summer 2011 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. 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 2010. No permit holders fished in the Kotzebue section in 2010.

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 2009–2010 by several fishermen, no fish tickets were submitted to ADF&G. In Kotzebue Sound District, no fishermen reported selling inconnu (Appendix F1). Sheefish is not commonly found in either Norton Sound or Port Clarence Districts.

Subsistence and Sport Fishery

Villages in Kotzebue Sound District were not surveyed for subsistence sheefish harvests from 1988 to 1990, and since 2004. Data from subsistence household surveys conducted by Divisions of Commercial Fisheries and Subsistence for 1966–1987 and 1991–2004 are 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 595 sheefish in 2010. 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 2010, test fishing on Kobuk River resulted in 429 sheefish caught in 234 drifts, for a cumulative CPUE of 423. The CPUE ranked eighth out of thirteen 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 2010, no Dolly Varden were reported caught in Norton Sound commercial fisheries. Kotzebue District reported 1,323 caught but not sold, compared to last year when 960 were caught and not sold (Appendix F4).

Subsistence and Sport Fishery

Subsistence harvest data for Dolly Varden were 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 2010. 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 1,835 Dolly Varden in Norton Sound in 2010 compared to 3,600 Dolly Varden in 2009 and 493 Dolly Varden was harvested in Kotzebue/Chukchi Sea areas compared to the 1,406 harvested in 2009 (Appendix F3). The majority of Dolly Varden sport fish harvest in Norton Sound was taken from Unalakleet River with 1,4115 fish. Overall, Dolly Varden sport fish harvests in the last 10 years in Norton Sound averaged nearly 4,000 annually (Appendix F6).

Escapement

Dolly Varden escapement is determined from aerial surveys conducted by ADF&G Division of Sport Fish in the Kotzebue area, and weir or tower counts in Norton Sound. In 2010, a survey on the Wulik River counted a total of 36,866 Dolly Varden (Appendix F7).

WHITEFISH

Commercial Fishery

There was one permit holder who harvested whitefish commercially in 2010, who waived confidentiality and sold 1,000 pounds for an average price of $0.50/lb. The previous last reported harvest was during the 2006–2007 season when one fisherman who waived confidentiality sold a total of 3,723 pounds 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 were 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 2010. However, historical survey data collected from

various years during 1970–2004 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 are collected in Norton Sound, Port Clarence, or Kotzebue Sound Districts for whitefish.

SAFFRON COD

Commercial Fishery

Five permit holders harvest 6,390 pounds of saffron cod *Eleginus gracilis*, commonly known as tomcod, in 2010. The fish were sold to a commercial buyer for use as crab bait. This was the first reported commercial sale of saffron cod since 1995.

Subsistence and Sport Fishery

In Norton Sound areas tomcod is primarily fished by "jigging" through the ice. Since no subsistence permit is required and a sportfish license is not needed for Alaska residents in northern Norton Sound from Cape Prince of Wales to Bald Head, harvests of tomcod are not reported or documented. In 2010, 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 Golovin, Subdistrict 2, Norton Sound, 2010.

Period	Target Species	Dates Fished	Length (hours)	Permits Fished	Chinook Harvest	Chum Harvest	Pink Harvest	Sockeye Salmon	Coho Harvest
1	Chum	6/30 - 7/02	48	Catch Information By Period Confidential					
2	Chum	7/05 - 7/07	48	4	0	2,842	118	0	0
3	Chum	7/09 - 7/11	48	6	0	2,504	1,701	0	0
4	Chum	7/12 - 7/14	48	6	0	2,669	208	0	0
5	Chum	7/15 - 7/17	48	5	0	2,208	12	0	0
6	Chum	7/19 - 7/21	48	6	0	2,398	0	0	66
7	Chum	7/23 - 7/25	54	6	0	872	0	2	188
8	Chum	7/26 - 7/28	48	4	0	441	0	0	313
9	Coho	7/29 - 7/31	48	5	1	375	0	0	552
10	Coho	8/02 - 8/04	48	6	0	237	0	0	883
11	Coho	8/05 - 8/07	48	6	0	153	0	0	717
12	Coho	8/09 - 8/11	72	4	0	196	0	0	967
13	Coho	8/13 - 8/16	72	5	0	63	0	0	519
14	Coho	8/17 - 8/20	72	5	2	56	0	0	618
15	Coho	8/21 - 8/24	72	3	0	16	0	0	362
16	Coho	8/25 - 8/28	72	3	0	29	0	0	329
17	Coho	8/29 - 9/01	72	No One Fished					
18	Coho	9/02 - 9/07	120	3	0	6	0	0	72
Totals			1,086	10	3	17,212	2,039	2	5,586

Note: There were 2 Chinook salmon retained for personal use in 2010.

Table 2.–Commercial salmon set gillnet catches from Elim, Subdistrict 3, Norton Sound, 2010.

Period	Target Species	Dates Fished	Length (hours)	Permits Fished	Chinook Harvest	Chum Harvest	Pink Harvest	Sockeye Harvest	Coho Harvest
1	Chum	6/30 - 7/02	48	14	1	5,701	2,562		0
2	Chum	7/05 - 7/07	48	16	0	5,383	1,241		0
3	Chum	7/09 - 7/11	48	15	0	2,715	1,079		1
4	Chum	7/12 - 7/14	48	14	0	2,731	2,452		0
5	Chum	7/15 - 7/17	48	9	0	957	1,033	3	1
6	Chum	7/19 - 7/21	48	14	1	2,414	3,291	0	24
7	Chum	7/23 - 7/25	54	13	1	1,673	-	0	176
8	Chum	7/26 - 7/28	48	10	0	617	-	0	191
9	Coho	7/29 - 7/31	48	No One Fished					
10	Coho	8/02 - 8/04	48	16	0	412	-	0	917
11	Coho	8/05 - 8/07	48	16	1	331	-	0	1,063
12	Coho	8/09 - 8/11	72	13	0	61	-	0	627
13	Coho	8/13 - 8/16	72	13	4	42	-	1	1,602
14	Coho	8/17 - 8/20	72	17	1	161	-	1	2,480
15	Coho	8/21 - 8/24	72	16	0	123	-	0	1,514
16	Coho	8/25 - 8/28	72	11	0	62	-	0	865
17	Coho	8/29 - 9/01	72	14	0	68	-	0	619
18	Coho	9/02 - 9/07	120	3	0	2	-	0	100
Totals			1,086	19	9	23,453	11,658	5	10,180

Note: There were 1 Chinook, 2 chum, and 3 coho salmon retained for personal use in 2010.

Table 3.–Commercial salmon set gillnet catches from Norton Bay, Subdistrict 4, Norton Sound, 2010.

Period	Target Species	Dates Fished	Length (hours)	Permits Fished	Chinook Harvest	Chum Harvest	Pink Harvest	Sockeye Harvest	Coho Harvest
1	Chum	7/04 - 7/05	24			Catch Information Confidential			
2	Chum	7/09 - 7/11	48	3	0	1,343	303	0	0
3	Chum	7/12 - 7/14	48	3	0	749	709	0	0
4	Chum	7/15 - 7/17	48	3	0	478	353	0	1
5	Chum	7/19 - 7/21	48	3	0	445	757	0	17
6	Chum	7/23- 7/25	54	3	0	942	227	1	143
7	Chum	7/26 - 7/28	48	3	0	320	0	0	51
8	Chum	7/29 - 7/31	48			No One Fished			
9	Coho	8/02 - 8/04	48	3		144	0	1	128
10	Coho	8/05 - 8/07	48	4	0	320	0	0	378
11	Coho	8/09 - 8/11	48	4	0	161	0	0	168
12	Coho	8/13 - 8/16	72			Catch Information Confidential			
13	Coho	8/17 - 8/20	72	3	0	140	0	1	321
14	Coho	8/21 - 8/24	72			No One Fished			
15	Coho	8/25 - 8/28	72			Catch Information Confidential			
16	Coho	8/29 - 9/01	72	3	0	74	0	0	76
17	Coho	9/02 - 9/07	120	3	0	105	0	0	41
Totals			990	5	0	6,007	2,597	7	1,606

Table 4.–Commercial salmon set gillnet catches from Shaktoolik, Subdistrict 5, Norton Sound, 2010.

Period	Target Species	Dates Fished	Length (hours)	Permits Fished	Chinook Harvest	Chum Harvest	Pink Harvest	Coho Harvest
1	Chum	7/03-7/04	24	21	4	8,755	3,303	0
2	Chum	7/06-7/07	36	22	0	8,306	1,284	1
3	Chum	7/10-7/11	36	21	0	5,146	0	1
4	Chum	7/13-7/14	24	20	0	3,204	12	1
5	Chum	7/15-7/17	48	16	0	2,873	0	3
6	Chum	7/19-7/21	48	13	0	2,475	0	108
7	Chum	7/23-7/25	54	23	0	2,688	23	644
8	Chum	7/26-7/28	48	21	0	1,280	0	655
9	Chum	7/29-7/31	48	16	0	2,126	0	1,515
10	Coho	8/02-8/04	48	22	0	1,144	0	1,226
11	Coho	8/05-8/08	72	15	0	1,145	0	1,132
12	Coho	8/09-8/11	48	14	0	171	0	297
13	Coho	8/12-8/14	48	17	0	205	0	844
14	Coho	8/16-8/19	72	13	0	203	0	712
15	Coho	8/20-8/22	48	15	0	245	0	1,395
16	Coho	8/23-8/25	48	20	0	380	0	2,289
17	Coho	8/26-8/28	48	18	0	79	0	572
18	Coho	8/30-9/01	48	16	0	58	0	473
19	Coho	9/02-9/07	120			No one fished.		
Totals			966	35	4	40,483	4,622	11,868

Note: There were 410 chum salmon and 12 pink salmon retained for personal used in 2010. There were also 18 sockeye salmon sold commercially in 2010.

Table 5.–Commercial salmon set gillnet catches from Unalakleet, Subdistrict 6, Norton Sound, 2010.

Period	Target Species	Dates Fished	Length (hours)	Permits Fished	Chinook Harvest	Chum Harvest	Pink Harvest	Coho Harvest
1	Chum	7/02-7/03	24	19	27	2,223	3,159	0
2	Chum	7/06-7/08	48	23	24	4,832	3,153	1
3	Chum	7/10-7/11	36	27	17	3,249	1,609	4
4	Chum	7/13-7/14	24	10	7	1,830	427	6
5	Chum	7/15-7/17	48	19	1	2,075	706	26
6	Chum	7/19-7/21	48	24	9	3,289	777	309
7	Chum	7/22-7/24	48	21	6	1,152	238	563
8	Chum	7/26-7/28	48	39	8	2,138	375	1,417
9	Chum	7/29-7/31	48	41	3	2,243	197	2,016
10	Coho	8/02-/804	48	43	3	1,472	0	3,096
11	Coho	8/05-8/08	72	49	7	2,260	0	5,586
12	Coho	8/09-8/11	48	39	0	1,274	0	4,236
13	Coho	8/12-8/14	48	50	2	871	0	3,716
14	Coho	8/16-8/19	72	28	5	542	0	3,871
15	Coho	8/20-8/22	48	37	1	243	0	1,795
16	Coho	8/23-8/25	48	35	2	288	0	2,113
17	Coho	8/26-8/28	48	27	0	196	0	812
18	Coho	8/30-9/01	48	29	2	174	0	990
19	Coho	9/02-9/07	120	20	0	237	0	2,282
Totals			972	59	124	30,588	10,641	32,839

Note: Out of the 124 Chinook harvested, 19 were retained for personal use. Also, 7 sockeye, 6 coho, and 5 pink salmon were retained for personal use. An additional 64 sockeye salmon were sold commercially in 2010.

Table 6.–Norton Sound commercial salmon harvest summary by subdistrict, 2010.

		Subdistricts						
		1	2	3	4	5	6	Total [a]
Number of Fishermen [b]		0	10	19	5	35	59	115
Chinook	Number	0	3	9	0	4	124	140
	Weight (lbs)	0	6	81	0	36	1,574	1,697
Sockeye	Number	0	2	5	7	18	71	103
	Weight (lbs)	0	15	35	56	133	487	726
Coho	Number	0	5,586	10,180	1,606	11,868	32,839	62,079
	Weight(lbs)	0	41,235	78,391	12,788	90,800	249,725	472,939
Pink	Number	0	2,039	11,658	2,597	4,622	10,641	31,557
	Weight (lbs)	0	5,498	32,978	7,626	13,353	28,499	87,954
Chum	Number	0	17,212	23,453	6,007	40,483	30,588	117,743
	Weight (lbs)	0	114,354	158,095	41,911	277,812	207,378	799,550
Total	Number	0	24,842	45,305	10,217	56,995	74,263	211,622
	Weight (lbs)	0	161,108	269,580	62,381	382,134	487,663	1,362,866

[a] Total number includes salmon retained for personal use that were not commercially sold. Poundage is from fish sold for commercial use. Average commercial weights by species were 14.4 lbs for Chinook salmon, 7.6 lbs for sockeye salmon, 7.6 lbs for coho salmon, 2.8 lbs for pink salmon and 6.8 lbs for chum salmon.

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

Table 7.–Subsistence salmon harvest for northern Norton Sound, 2010.

	Permits Fished [a]	Number of Salmon Harvested					
		Chinook	Sockeye	Coho	Pink	Chum	Total
Marine Waters	55	25	34	307	2,229	1,835	4,430
Bonanza River	24	0	0	192	307	112	611
Cripple Creek	14	0	0	21	59	10	90
Eldorado River	14	0	0	56	702	424	1,182
Flambeau River	1	0	0	52	2	16	70
Safety Sound	1	0	0	0	0	1	1
Nome River- above weir	14	6	0	26	106	1	139
Nome River - below weir	176	6	25	486	2,183	449	3,149
Penny River	20	0	0	39	83	8	130
Sinuk River	48	1	15	329	105	177	627
Snake River - unknown location	6	0	0	22	5	0	27
Snake River - below weir	54	1	3	382	203	51	640
Solomon River	29	0	0	71	297	39	407
Topkok Creek	1	0	0	0	0	1	1
Nome Subdistrict Total [b]	372	39	77	1,983	6,281	3,124	11,504
Cape Woolley [c]	4	0	3	0	20	62	85
Marine Waters	16	42	15	162	684	455	1,358
Kachavik River	10	0	0	25	2,874	217	3,116
McKinley River	7	1	0	147	33	0	181
Chinik Creek	4	0	0	22	142	0	164
Fish River	56	16	3	1,253	4,819	371	6,462
Niukluk River- above tower	21	0	2	199	943	87	1,231
Niukluk River- below tower	18	0	12	212	0	3	227
Other Creeks/Rivers	1	0	0	0	125	0	125
Golovin Subdistrict Total [d]	112	59	32	2,020	9,620	1,133	12,864
Marine Waters	17	55	5	506	2,958	2,802	6,326
Kwiniuk River - above tower	13	4	2	180	2,214	211	2,611
Kwiniuk River - below tower	27	28	0	572	1,136	404	2,140
Next Creek	3	0	0	20	84	0	104
Tubutulik River	17	3	0	390	1,012	234	1,639
Iron Creek	5	7	0	9	426	124	566
Other Creeks/Rivers	2	0	0	2	0	150	152
Elim Subdistrict Total [e]	54	97	7	1,679	7,830	3,925	13,538
Port Clarence - Marine Waters	65	55	512	527	4,321	4,146	9,561
Tuksuk Channel	13	2	78	66	660	888	1,694
Imuruk Basin	0	0	0	0	0	0	0
Agiapuk River	1	0	0	0	0	142	142
Kuzitrin River	1	0	0	0	2	1	3
Pilgrim River- above weir	2	0	25	3	4	0	32
Pilgrim River- below weir	19	6	209	0	215	55	485
Port Clarence District Total [f]	117	63	824	596	5,202	5,232	11,917
Total	659	258	943	6,278	28,953	13,476	49,908

[a] There were 6 locations where Tier I subsistence permits were issued in 2010 for northern Norton Sound: 1 - Nome Subdistrict; 2 - Cape Woolley; 3 - Golovin Subdistrict; 4 - Elim Subdistrict; 5 - Pilgrim River; and 6 - Port Clarence District. Permits fished include those permit holders who fished, but reported no harvest.

[b] There were 494 Nome Subdistrict permits issued and 492 were returned.

[c] All 15 Cape Woolley permits issued were returned.

[d] All 159 Golovin Subdistrict permits issued were returned.

[e] All 64 Elim Subdistrict permits issued were returned.

[f] All 146 Pilgrim River permits issued were returned, and all 144 Port Clarence District permits issued were returned. Salmon Lake was closed and no permits were issued.

Table 8.–Historical Chinook, coho, and chum salmon catches for Unalakleet River set net test fishery, 1985-2010.

		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
2010	6/08-9/03	41	7/03	2,039	7/17	467	8/13

Table 9.–Salmon counts of rivers and associated salmon escapement goal ranges (SEG, BEG or OEG), Norton Sound and Port Clarence, 2010.

	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.							14,100		
Pilgrim R.	44				25,379				
Glacial L.									
Sinuk R.							3,955	11,107	
Cripple R.									
Penny R.									
Anvil Creek									
Dry Creek									
Snake R.	43				6,973	1,600 - 2,500 [c]	2,625		
Nome R.	9				5,906	2,900 - 4,300 [c]	2,998		
Flambeau R.							13,600	25,009	
Eldorado R. [b]	23				42,612	6,000 - 9,200 [c]	30,600	42,612	
Bonanza R.			2				686	3,513	
Solomon R.							454	2,678	
Nome Subdistrict						23,000 - 35,000 [d]		97,798	
Fish R.				Combined					
Boston Cr.			29	100 - 250				3,010	
Niukluk R.	15				48,561	>30,000			
Ophir Cr.									
Kwiniuk R.	135	300 - 550	44		71,388	11,500 - 23,000 [e]	13,047		
Tubutulik R.			122			9,200 - 18,400 [e, f]	16,093		
Ungalik R.									
Inglutalik R									
Pikmiktalik R									
Shaktoolik R.				400 - 800					
Unalakeet R.	1,021			Combined	70,811				Combined
Old Woman R.				550 - 1,100					2,400 - 4,800
North R.	1,256			1,200-2,600	16,131				

-continued-

Table 9.–Page 2 of 2.

Stream	Coho Salmon			Sockeye Salmon			Pink Salmon		
	Weir/ Tower Count	Aerial Survey Count [a]	Escapement Goal Range	Weir/ Tower Count	Aerial Survey Count [a]	Escapement Goal Range	Weir/ Tower Count	Escapement Goal Range	Aerial Survey Count [a]
Salmon L.					73	Combined			
Grand Central R.					711	4,000 - 8,000			
Agiapuk R.									
American R.					2				
Pilgrim R.	272			1,654			29,239		
Glacial L.				1,047		800 - 1,600			
Sinuk R.		5,507			1				168,600
Cripple R.		764							26,415
Penny R.		349							13,300
Anvil Creek		112							
Dry Creek		141							
Snake R.	2,243	1,378		124	2		51,079		22,095
Nome R.	4,114			43			171,760	13,000	98,272
Flambeau R.									36,000
Eldorado R. [b]	2			8			48,136		84,542
Bonanza R.									106,000
Solomon R.					1				21,804
Fish R.									
Boston Cr.			Tower Goal		73				5,110
Niukluk R.	9,042		2,400-7,200				434,205	10,500	
Ophir Cr.									
Kwiniuk R.	8,049	2,925	650-1,300		2		634,220	8,400	27,833
Tubutulik R.		1,914			5				16,520
Ungalik R.									
Inglutalik R									
Pikmiktalik R									
Shaktoolik R.									
Unalakeet R.	5,382			130			832,904		
Old Woman R.									
North R.	7,608		550-1,100				150,807	25,000	

Note: Data not available for all streams.

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

[b] Weir was breached. Counts should be considered minimum, except chum salmon which was determined by aerial survey expansion.

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

[d] BOF established BEG is based on a combination of weir counts and expanded aerial survey counts.

[e] 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.

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

Table 10.–Kotzebue District commercial chum salmon catch and average weight by week, 2010.

Date	Number of Fishermen	Number of Landings	Catch	Pounds	Average Weight
7/12	14	61	9,230	70,066	7.6
7/19	32	175	30,715	253,651	8.3
7/26	47	220	59,554	489,033	8.2
8/2	49	194	46,683	384,085	8.2
8/9	46	196	37,541	304,791	8.1
8/16	34	135	28,730	217,231	7.6
8/23	33	151	36,443	280,303	7.7
8/30	28	130	21,447	161,104	7.5
Total	67	1,262	270,343	2,160,264	8.0

Note: Also harvested during the 2010 commercial fishery and kept for personal use were 15 Chinook salmon, 8 sockeye salmon, 557 pink salmon, 7 coho salmon, 302 sheefish, and 1,323 Dolly Varden.

Table 11.–Historical chum salmon catch for Kobuk River drift test fishery, 1993–2010.

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
2010	7/15-8/24	234	1,401	8/05

[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, 2010.

Period	Date	Unique Permits	Landings	Total Pounds	Total Short Tons	Fishery Value
1	6/17	5	5	25,400	13	$3,302
2	6/19	6	8	85,600	43	$11,128
3	6/20	2	2	7,400	4	$962
4	6/21	2	2	11,200	6	$1,456
		11	17	129,600	65	$16,848

Note: Price per pound of bait herring was $0.13 in 2010.

Table 13.–Commercial herring sac roe harvest summary by period and subdistrict, Norton Sound District, 2010.

	St. Michael Subdistrict (333-70)			Unalakleet Subdistrict (333-72)			Cape Denbigh Subdistrict (333-74)			Norton Sound District Total		
Date	Number of Permit Holders	Sac Roe Short Tons	Percent Roe	Number of Permit Holders	Sac Roe Short Tons	Percent Roe	Number of Permit Holders	Sac Roe Short Tons	Percent Roe	Number of Permit Holders	Sac Roe Short Tons	Percent Roe
6/11	1	3.8	13.8							1	3.8	13.8
6/12	2	23.4	13.8							2	23.4	13.8
6/13	9	82.7	12.7							9	82.7	12.7
6/14	14	104.7	13.4							14	104.7	13.4
6/15	12	42.4	13.4				4	40.4	14.0	16	82.7	13.7
6/16				9	48.2	12.5	7	33.3	13.8	16	81.5	13.0
6/17	6	18.7	16.0	14	114.9	13.5				19	133.6	13.8
6/18	7	10.9	15.1	12	72.6	13.7				13	83.5	13.9
6/19	7	27.5	13.9							7	27.5	13.9
Total	28	314.1	13.5	16	235.7	13.3	8	73.6	13.9	30	623.4	13.5

Note: In 2010, price per pound was $0.10 for 10% roe with $0.01 increase per 1% increase in roe %. Total fishery value, based on an average of 13.5% roe, was $168,318.

Table 14.–Daily observed peak biomass estimates of Pacific herring, Norton Sound District, 2010.

	Flight	Observer	Survey		Spawn		Estimated Biomass (in short ton) By Index Area [a]							
Date	No.	Initials [b]	Hours	Rating [c]	No.	Length (mi.)	KLK	UNK	CDB	NTB	ELM	GOL	NOM	TOTAL
5/25/10	1	WJ	1.0			0.0		0	0					0
5/30/10	2	WJ	1.0			0.0		0	0					0
6/3/10	3	WJ	1.0			0.0		0	0					0
6/6/10	4	WJ	2.5	1		0.0		0	0	0	113			113
6/7/10	5	SK, WJ	2.0	1		0.0		0	0	0	362			362
6/8/10	6	CL, WJ	2.0	2		0.0		0	29	0	616	24		670
6/10/10	7	CL, WJ	1.5	4		0.0	28	0						28
6/11/10	8	CL, WJ	2.5	4		5.9	2,530	0	0					2,530
6/12/10	9	CL, WJ	3.8	4		3.2	4,339	71	15	0	30	339		4,794
6/13/10	10	CL	3.2	4		15.0	7,460	3,302	0					10,762
6/14/10	11	CL, WJ	2.2	4	54	8.4	10,271	13,275	1,348					24,894
6/15/10	12	CL, WJ	3.4	4	31	1.7	7,643	6,835	3,321					17,799
6/16/10	13	CL, WJ	5.9	4	3	0.6	4,101	5,303	4,676	0	15	0	108	14,203
6/18/10	14	WJ	2.0	5		0.0		314	108	0	111			532
6/21/10	15	CL	1.8	2									92	92
6/24/10	16	CL	1.8	2									129	129
Total	16		37.4	3	88	34.8								
													Peak Survey	24,894
													Total Harvest	688.0
													Biomass [d]	25,582
													Exploit %	2.69%

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] CL = Charlie Lean, 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 15.–Daily catch for the CDQ summer commercial king crab harvest, Norton Sound Section, Eastern Bering Sea, June 28–July 16, 2010.

Date [a]	Landings	Number of Crabs	Pounds Harvested	Cumulative Total (lbs)	Number of Pots Pulled	Average Weight (lbs)	CPUE
6/30	3	444	1,246	1,246	90	2.8	5
7/01	1	94	263	1,509	31	2.8	3
7/02	5	1,326	3,806	5,315	200	2.9	7
7/03	1	380	1,072	6,387	40	2.8	10
7/04	4	2,901	8,088	14,475	159	2.8	18
7/05	1	503	1,382	15,857	40	2.7	13
7/07	4	1,861	5,135	20,992	159	2.8	12
7/08	1	296	803	21,795	40	2.7	7
7/09	3	491	1,356	23,151	120	2.8	4
7/11	2	633	1,751	24,902	61	2.8	10
7/13	2	444	1,219	26,121	61	2.7	7
7/14	1	760	1,998	28,119	39	2.6	19
7/15	1	654	1,826	29,945	40	2.8	16
7/16	1	21	55	30,000	1	2.6	21
Total	30	10,808	30,000		1,081	2.8	10

Source: Fish ticket data.

[a] The CDQ fishery closed by regulation 7/16, and last delivery was made 7/16.

Table 16.–Commercial harvest of red king crab from Norton Sound Section by statistical area, Norton Sound District, 2010.

Statistical Area	Number [a]	Pounds	Pots Pulled	CPUE	Average Weight (lbs)
626401	18,820	52,054	1,361	13.8	2.8
636330	921	2,584	99	9.3	2.8
636401	65,071	182,040	3,487	18.7	2.8
646330	453	1,205	50	9.1	2.7
646401	27,530	77,437	1,531	18.0	2.8
656330	6,372	17,660	441	14.4	2.8
656401	30,073	82,747	2,689	11.2	2.8
666402	582	1,577	40	14.6	2.7
Total	149,822	417,304	9,698	15.4	2.8

Note: Data for summer fishery only.

[a] Includes 10,808 crabs (30,000 lbs) from the CDQ fishery.

APPENDIX A: NORTON SOUND FISHERIES

Appendix A1.–Commercial salmon catch by species, Norton Sound District, 1961–2010.

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 2005-2009	70	94	109,902	19,303	19,140	148,510
Average 2000-2009	133	59	67,425	26,307	12,341	106,264

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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
2010	140	103	62,079	31,557	117,743	211,622
Average 2005-2009	70	94	109,902	19,303	19,140	148,510
Average 2000-2009	133	59	67,425	26,307	12,341	106,264

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

Appendix A2.–Number of commercial salmon permits fished, Norton Sound, 1970–2010.

Year	SUBDISTRICT 1	2	3	4	5	6	District 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
2010	0	10	19	5	35	59	115
Avg 2005-2009	0	2	8	2	19	44	70
Avg 2000-2009	0	3	6	1	16	35	56

[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, 1961–2010.

Year	Pounds Caught (Round Wt. in lbs)				Salmon	Value of
	Chinook	Coho	Pink	Chum	Roe (lbs)	Catch ($)
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

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Year	Pounds Caught (Round Wt. in lbs)				Salmon Roe (lbs)	Value of Catch ($)
	Chinook	Coho	Pink	Chum		
2000	11,240	307,565	369,800	40,298	0	149,907
2001	3,803	152,293	0	79,558	0	56,921
2002	50	12,972	0	4,555	0	2,941
2003	136	139,775	0	23,687	0	64,473
2004	0	302,379	0	42,385	0	122,506
2005	2,511	659,278	0	28,071	0	296,154
2006	167	869,427	0	68,500	0	389,707
2007	206	1,002,078	10,537	151,386	0	572,195
2008	970	855,980	187,979	171,151	0	759,451
2009	0	679,416	46,698	240,502	0	722,167
2010	1,697	472,939	87,954	799,550	0	1,220,487

[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, 1962–2010.

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 2005-09	1.00	0.62	0.18	0.24	0.48

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Year	Chinook	Coho	Pink	Chum	Sockeye
	Price Per Pound				
2000	1.30	0.30	0.10	0.15	
2001	1.00	0.25	-	0.19	0.37
2002	0.39	0.20	-	0.07	
2003	0.64	0.44	-	0.14	0.45
2004	-	0.39	-	0.14	
2005	1.22	0.44	-	0.15	0.45
2006	1.49	0.44	-	0.14	
2007	0.55	0.53	0.14	0.24	0.55
2008	0.73	0.77	0.23	0.34	0.56
2009	-	0.93	0.18	0.33	0.34
2010	2.25	1.47	0.32	0.62	0.63
Avg 2005-09	1.00	0.62	0.18	0.24	0.48

Note: Sockeye salmon was only purchased in 1993, 2001, 2003, 2005, and 2007–2010.

Appendix A5.–Mean commercial salmon harvest weights, Norton Sound District, 1964–2010.

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
2010	14.4	7.6	2.8	6.8

[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, 1964–2010.

	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]	0	0	0	0	0	0	35	165	2,151	5,667	1,161	9,178	35	165	2,151	5,667	1,161	9,178
10-year avg.[b]	0	0	0	0	0	0	35	120	1,452	4,982	956	7,545	35	120	1,452	4,982	956	7,545

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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
2010	0	0	0	0	0	0	39	77	1,983	6,281	3,124	11,504	39	77	1,983	6,251	3,124	11,504
5-year avg.[a]	0	0	0	0	0	0	35	165	2,151	5,667	1,161	9,178	35	165	2,151	5,667	1,161	9,178
10-year avg.[b]	0	0	0	0	0	0	35	120	1,452	4,982	956	7,545	35	120	1,452	4,982	956	7,545

[a] 2005–2009.

[b] 2000–2009.

Appendix A7.–Commercial and subsistence salmon catch by species, by year in Golovin Subdistrict, Norton Sound District, 1962–2010.

	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	542	540	142	1,223	161	100	1,468	8,812	1,767	12,308	161	100	2,009	9,352	1,909	13,531
10-year avg. [c]	0	4	438	2,011	797	3,250	146	69	1,316	9,601	1,752	12,884	146	74	1,754	11,612	2,549	16,134

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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
2010 [e]	3	2	5,586	2,039	17,212	24,842	59	32	2,020	9,620	1,133	12,864	62	34	7,606	11,659	18,345	37,706
5-yr avg. [b]	0	0	542	540	142	1,223	161	100	1,468	8,812	1,767	12,308	161	100	2,009	9,352	1,909	13,531
10-yr avg. [c]	0	4	438	2,011	797	3,250	146	69	1,316	9,601	1,752	12,884	146	74	1,754	11,612	2,549	16,134

[a] Subsistence surveys were not conducted.

[b] 2005–2009.

[c] 2000–2009.

[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 Elim Subdistrict, Norton Sound District, 1962–2010.

	ELIM (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	4,015	3,244	1,094	8,354	296	7	1,863	3,971	1,217	7,353	297	7	5,878	7,215	2,310	15,707
10-year avg. [c]	2	0	2,695	6,259	668	9,625	379	20	1,574	4,596	1,198	7,767	381	21	4,270	10,854	1,866	17,392

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Appendix A8.–Page 2 of 2.

ELIM (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
2010 [e]	9	5	10,180	11,658	23,453	45,305	97	7	1,679	7,830	3,925	13,538	106	12	11,859	19,488	27,378	58,843
5-year avg. [b]	1	0	4,015	3,244	1,094	8,354	296	7	1,863	3,971	1,217	7,353	297	7	5,878	7,215	2,310	15,707
10-year avg. [c]	2	0	2,695	6,259	668	9,625	379	20	1,574	4,596	1,198	7,767	381	21	4,270	10,854	1,866	17,392

[a] Subsistence surveys were not conducted.

[b] 2005–2009.

[c] 2000–2009.

[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, 1962–2010.

	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]	99	0	463	416	1,211	2,188	367	13	654	4,487	3,665	9,186	369	13	1,117	4,845	4,137	10,479

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	NORTON BAY (SUBDISTRICT 4)																	
	Commercial						Subsistence						Combined					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
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
2010	0	7	1,606	2,597	6,007	10,217	341	21	461	3,115	3,180	7,118	341	28	2,067	5,712	9,187	17,335
5-year avg. [b]	99	0	463	416	1,211	2,188	367	13	654	4,487	3,665	9,186	369	13	1,117	4,845	4,137	10,479

[a] Subsistence surveys were not conducted.

[b] Average is from years 1992–1993, 1997, and 2008–2009 for commercial fishery, and 2001–2003 and 2008–2009 for subsistence fishery.

[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, 1961–2010.

	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]	13	12	27,357	2,673	5,434	35,490	509	25	1,794	6,124	319	8,770	522	37	29,151	8,797	5,753	44,259
10-year avg. [c]	32	6	16,468	9,886	3,386	29,777	697	35	2,096	7,462	708	10,999	729	42	18,564	17,348	4,094	40,776

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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
2010	4	18	11,868	4,622	40,483	56,995	327	115	1,940	6,406	1,680	10,468	331	133	13,808	11,028	42,163	67,463
5-yr avg.[b]	13	12	27,357	2,673	5,434	35,490	509	25	1,794	6,124	319	8,770	522	37	29,151	8,797	5,753	44,259
10-yr avg.[c]	32	6	16,468	9,886	3,386	29,777	697	35	2,096	7,462	708	10,999	729	42	18,564	17,348	4,094	40,776

[a] Subsistence surveys were not conducted.

[b] 2005–2009.

[c] 2000–2009.

[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, 1961–2010.

	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]	54	82	77,525	12,489	11,999	102,149	1,938	322	7,605	17,298	2,588	29,752	1,992	404	85,130	29,787	14,588	131,901
10-year avg. [d]	98	46	47,592	7,972	7,255	62,963	2,271	318	6,801	16,875	2,668	28,932	2,369	364	54,393	24,847	9,922	91,895

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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
2010	124	71	32,839	10,641	30,588	74,263	1,257	297	3,780	9,002	3,159	17,495	1,381	368	36,619	19,643	33,747	91,758
5-year avg. [c]	54	82	77,525	12,489	11,999	102,149	1,938	322	7,605	17,298	2,588	29,752	1,992	404	85,130	29,787	14,588	131,901
10-year avg. [d]	98	46	47,592	7,972	7,255	62,963	2,271	318	6,801	16,875	2,668	28,932	2,369	364	54,393	24,847	9,922	91,895

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

[b] Subsistence surveys were not conducted.

[c] 2005–2009.

[d] 2000–2009.

[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, 1994–2010.

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
2010	Subsistence surveys were not conducted.					
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
2010	Subsistence surveys were not conducted.					

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, 1961–2010.

	SUBDISTRICTS 1-6																	
	Commercial						Subsistence						Sportfish					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
1961	5,300	35	13,807	34,237	48,332	101,711	-	-	-	-	-	-	-	-	-	-	-	-
1962	7,286	18	9,156	33,187	182,784	232,431	-	-	-	-	-	-	-	-	-	-	-	-
1963	6,613	71	16,765	46,180	154,749	224,378	5	-	118	16,607	17,635	34,365	-	-	-	-	-	-
1964	2,018	126	98	13,567	148,862	164,671	565	-	2,567	9,225	12,486	24,843	-	-	-	-	-	-
1965	128	30	2,030	220	36,795	39,203	574	-	4,812	19,131	30,772	55,289	-	-	-	-	-	-
1966	1,553	14	5,755	12,778	80,245	100,345	269	-	2,210	14,335	21,873	38,687	-	-	-	-	-	-
1967	1,804	-	2,379	28,879	41,756	74,818	817	-	1,222	17,516	22,724	42,279	-	-	-	-	-	-
1968	1,045	-	6,885	71,179	45,300	124,409	237	-	2,391	36,912	11,661	51,201	-	-	-	-	-	-
1969	2,392	-	6,836	86,949	82,795	178,972	436	-	2,191	18,562	15,615	36,804	-	-	-	-	-	-
1970	1,853	-	4,423	64,908	107,034	178,218	561	-	4,675	26,127	22,763	54,126	-	-	-	-	-	-
1971	2,593	-	3,127	4,895	131,362	141,977	1,026	197	4,097	10,863	21,618	37,801	-	-	-	-	-	-
1972	2,938	-	454	45,182	100,920	149,494	804	93	2,319	14,158	13,873	31,247	-	-	-	-	-	-
1973	1,918	-	9,282	46,499	119,098	176,797	392	-	520	14,770	7,185	22,867	-	-	-	-	-	-
1974	2,951	-	2,092	148,519	162,267	315,829	420	-	1,064	16,426	3,958	21,868	-	-	-	-	-	-
1975	2,393	2	4,593	32,388	212,485	251,861	186	11	192	15,803	8,113	24,305	-	-	-	-	-	-
1976	2,243	11	6,934	87,919	95,956	193,063	203	-	1,004	18,048	7,718	26,973	-	-	-	-	-	-
1977	4,500	5	3,690	48,675	200,455	257,325	846	-	2,530	14,296	26,607	44,279	197	0	449	2,402	670	3,718
1978	9,819	12	7,335	325,503	189,279	531,948	1,211	-	2,981	35,281	12,257	51,730	303	0	742	7,399	546	8,990
1979	10,706	57	31,438	167,411	140,789	350,401	747	-	8,487	25,247	11,975	46,456	-	-	-	-	-	-
1980	6,311	40	29,842	227,352	180,792	444,337	1,397	-	8,625	63,778	19,622	93,422	52	0	1,455	7,732	1,601	10,840
1981	7,929	56	31,562	232,479	169,708	441,734	2,021	38	13,416	28,741	32,866	77,082	70	0	1,504	3,101	1,889	6,564
1982	5,892	10	91,690	230,281	183,335	511,208	1,011	8	14,612	54,249	18,580	88,460	409	0	2,986	13,742	2,620	19,757
1983 [a]	10,308	27	49,735	76,913	319,437	456,420	1,942	86	8,799	21,894	11,492	44,213	687	0	3,823	4,583	2,042	11,135
1984 [a]	8,455	6	67,875	119,381	146,442	342,159	1,733	17	8,470	34,600	8,231	53,051	247	351	7,582	8,322	1,481	17,983
1985 [a]	19,491	166	21,968	3,647	134,928	180,200	1,830	119	6,496	5,312	18,457	32,214	239	20	1,177	1,138	1,036	3,610
1986 [a]	6,395	233	35,600	41,260	146,912	230,400	150	107	688	8,720	8,085	17,750	1,077	19	3,926	3,172	1,719	9,913
1987 [a]	7,080	207	24,279	2,260	102,457	136,283	200	107	1,100	1,251	8,394	11,052	615	924	2,319	1,304	814	5,976
1988 [a]	4,096	1,252	37,214	74,604	107,966	225,132	63	133	1,076	2,159	5,952	9,383	400	782	5,038	2,912	1,583	10,715
1989 [a]	5,707	265	44,091	123	42,625	92,811	24	131	5,150	18,424	4,787	4,947	203	165	4,158	3,564	1,497	9,587
1990 [a]	8,895	434	56,712	501	65,123	131,665	2,534	234	510	2,233	4,246	7,281	364	198	3,305	7,647	925	12,439
5-year avg. [b]	70	94	109,902	19,303	19,140	148,510	3,027	620	15,275	43,271	8,355	70,547	329	20	7,797	3,059	247	11,453
10-year avg. [c]	133	57	67,425	26,307	12,341	106,263	3,752	569	13,592	45,984	9,586	73,482	438	116	6,428	3,338	565	10,885

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SUBDISTRICTS 1-6

	Commercial						Subsistence						Sportfish					
Year	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total	Chinook	Sockeye	Coho	Pink	Chum	Total
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
2010	140	103	62,079	31,557	117,743	211,622	2,120	549	11,863	42,254	16,201	72,987	61	0	5,876	2,717	118	8,772
5-year avg. [b]	70	94	109,902	19,303	19,140	148,510	3,027	620	15,275	43,271	8,355	70,547	329	20	7,797	3,059	247	11,453
10-year avg. [c]	133	57	67,425	26,307	12,341	106,263	3,752	569	13,592	45,984	9,586	73,482	438	116	6,428	3,338	565	10,885

[a] Not all subdistricts were surveyed.

[b] 2005–2009.

[c] 2000–2009.

Appendix A14.–Sport salmon harvest by species, by year for the Unalakleet River, 1990–2010.

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
2010	61	3,006	59	535	3,661
Avg 2005-2009	315	4,837	156	929	6,237
Avg 2000-2009	317	3,917	274	920	5,428

Appendix A15.–Sport salmon harvest by species, by year for the Fish/Niukluk Rivers, 1990–2010.

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
2010	0	1,069	0	99	1,168
Avg 2005-2009	13	1,012	50	243	1,318
Avg 2000-2009	38	800	127	223	1,188

Appendix A16.–Comparative salmon aerial survey escapement indices of Norton Sound streams unless noted otherwise, 1961–2010.

	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]
2010	0 [d]	3,955 [d]	168,600 [d]	5,507 [d]	0 [d]	2,998 [d]	98,272 [d]	0 [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]
2010	0 [d]	13,600 [d]	36,000 [d]	-	-	0 [d]	30,600 [d]	84,582 [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	-	-
2010	-	-	-	-	-	29 [d]	3,010 [d]	5,110 [d]	-	73 [d]

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	Niukluk River					Kwiniuk River				
Year [a]	Chinook	Chum	Pink	Pink & Chum [e]	Coho	Chinook [g]	Chum [g]	Pink [g]	Pink & Chum [e]	Coho [g]
1962	11	-	-	27,878	-	3	-	-	23,249	-
1963	1	13,687	4,103	-	-	2	11,340	3,779	-	-
1964	-	8,395	10,495	-	-	-	14,533	-	-	-
1965						14	26,634	8,668	-	-
1966	-	21,300	8,600	4,700	-	7	32,786	10,629	-	-
1967	-	20,546	-	-	-	13	24,444	3,587	-	-
1968	-	-	-	87,093	-	27	18,813	129,052	-	-
1969	-	10,240	92,650	-	-	12	19,687	56,683	-	-
1970	-	7,300	60,350	-	-	-	68,004	226,831	-	-
1971	-	22,605	8,370	-	-	37	39,046	16,634	-	-
1972	-	10,500	22,600	-	-	65	30,686	62,461	-	-
1973	-	15,156	14,790	-	-	57	28,617	37,070	-	-
1974	1	8,720	8,915	-	-	62	35,899	39,375	-	-
1975	-	10,089	16,258	-	-	44	14,344	55,293	-	-
1976	-	4,130	7,190	-	-	12	6,977	35,226	-	375 [a]
1977	19	10,456	4,150	-	-	84	22,757	47,934	-	-
1978	2	14,365	208,300	-	-	74 [h]	14,408 [h]	70,148 [h]	-	-
1979	8	1,282	2,119	-	-	107	12,355	167,492	-	-
1980	-	8,915	75,770	-	-	177	19,374	319,363	-	-
1981	-	7,249	-	-	-	136	34,561	566,417	-	-
1982	20	2,557	227,440	-	-	138	44,036	469,674	-	-
1983	54	8,886	50	-	-	267	56,907	251,965	-	-
1984	6	34,572	22,636		998	736	54,043	736,544	-	983 [i]
1985	25	11,140	-	-	332 [j]	712	9,912	18,237	-	673 [i]
1986	2	2,442	0	-	-	653	24,704	241,446	-	421 [i]
1987	10	4,145	0	-	257 [j]	314	16,134	5,567	-	819 [i]
1988	18	6,521	8,160 [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	10,700	37,410	-	1,783 [k]	587	18,802	53,499	-	809 [i]
1992	-	7,770	803,200	-	812	479	12,077	1,464,717	-	532 [i]
1993	15	19,910	2,840	-	2,104	565	15,823	43,065	-	1,238 [i]
1994	7	16,470	1,294,100	-	274	627	33,010	2,304,099	-	2,547
1995	48	25,358	200	-	2,136	468	42,161	17,509	-	1,625 [i]
1996	25	9,732 [c]	153,150	-	2,047	567	27,256	907,894	-	1,410 [i]
1997	131	16,550	-	-	983	972	20,118	9,536	-	610 [i]
1998	51	2,556	205,110	-	593	296	24,248	655,933	-	610 [i]
1999	-	640	-	-	619	115	8,763	608	-	223 [i]
2000	-	-	-	-	3,812	144	12,878	750,173	-	541 [i]
2001	6	2,448	2,856	-	809	258	16,598	8,423	-	9,532
2002	-	-	-	-	1,122	778	37,995	111,410	-	6,459
2003	55	2,315	272	-	146	744	12,123	22,329	-	5,490
2004	15	173	277,900	-	828	663	10,362	3,054,684	-	11,240
2005	6	3,225	154,000	-	-	342	12,083	341,048	-	12,950
2006	-	-	-	-	737 [j]	195	39,519	1,347,090	-	22,341
2007	-	-	-	-	-	258	27,756	54,225	-	9,429
2008	-	-	-	-	1,715	237	9,462	1,442,246	-	10,461
2009	-	-	-	-	-	444	8,739	42,960	-	9,036
2010	-	-	-	-	-	135	71,388	634,220	-	8,049

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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 [k]	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
2010	122	16,097	16,520	-	50	124	1,627	1,480	-	200

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

[a] Represents "high count" for season.
[b] Boat survey.
[c] Numerous pink salmon made enumerating of chum salmon difficult; pink count may include some chum.
[d] Helicopter survey.
[e] Surveyor unable to distinguish between the 2 species.
[f] Foot survey.
[g] Total counts obtained from counting tower.
[h] Poor survey conditions or partial survey, poor counting tower conditions.
[i] Aerial survey, not tower count.
[j] Includes counts from Ophir Creek.
[k] Combined tower and aerial survey counts below the tower
[l] Combined tower and aerial survey counts below the tower.

Appendix A17.–Aerial survey numbers of chum, pink, coho, and Chinook salmon for Norton Sound, 1985–2010.

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	42,216	386,584	12,116	950
2003	22,880	49,288	6,864	1,240
2004	15,073	6,554,164	19,741	1,300
2005	36,364	1,674,571	21,029	632
2006	59,383	2,468,940	29,398	195
2007	54,522	147,081	18,512	1,645
2008	13,803	3,572,446	23,749	237
2009	17,436	254,132	14,179	1,523
2010	143,275	1,044,784	13,879	410

[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 A18.–Total escapement for chum, pink, coho, and Chinook salmon for Kwiniuk, Niukluk, Nome, and Snake Rivers (starting 1995), North River (starting 1996), and Eldorado River (starting 1997) to 2010.

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	126,045	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
2010	191,571	1,490,227	31,058	16,356

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

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

Appendix A19.–Total escapement (6 rivers) and catch (commercial, subsistence, and sportfish) for chum, pink, coho, and Chinook salmon for Norton Sound District, 1995–2010.

Year [a, b]	Chum	Pink	Coho	Chinook
1995	213,316	169,344	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	3,690,521	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	142,423	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	85,285	320,278	148,188	6,790
2010	310,758	1,432,079	110,876	3,802

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

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

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

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

Appendix A20.–Nome Subdistrict chum salmon estimated escapement, 1999–2010.

Year	Rivers	Aerial Survey Counts	Estimated Escapement [a]	Year	Rivers	Aerial Survey Counts	Estimated Escapement [a]
1999	Nome		1,048	2000	Nome	658	4,056
	Snake[b]		484		Snake[b]		1,911
	Eldorado[b]		4,218		Eldorado[b]	3,383	11,617
	Flambeau	51	637		Flambeau	819	3,947
	Solomon	51	637		Solomon	150	1,294
	Sinuk	1,697	6,370		Sinuk[c]		7,198
	Bonanza	361	2,304		Bonanza	1,130	4,876
			15,698				34,898
2001	Nome	946	2,859	2002	Nome		1,720
	Snake[b]	752	2,182		Snake[b]	402	2,776
	Eldorado[b]	4,450	11,635		Eldorado[b]		10,215
	Flambeau	3,612	10,465		Flambeau	1,876	6,804
	Solomon	280	1,949		Solomon	325	2,150
	Sinuk	3,746	10,718		Sinuk	1,682	6,333
	Bonanza	1,084	4,745		Bonanza	595	3,199
			44,553				33,197
2003	Nome	888	1,957	2004	Nome		3,903
	Snake	440	2,201		Snake		2,146
	Eldorado	1,257	3,591		Eldorado		3,277
	Flambeau	647	3,380		Flambeau	2,250	7,667
	Solomon	73	806		Solomon[c]		1,436
	Sinuk	677	3,482		Sinuk[c]		3,197
	Bonanza	220	1,664		Bonanza[c]		2,166
			17,081				23,792
2005	Nome	2,082	5,584	2006	Nome	394	5,677
	Snake	1,842	2,967		Snake	840	4,160
	Eldorado	5,445	10,369		Eldorado	2,355	42,105
	Flambeau	2,261	7,692		Flambeau	16,000	27,828
	Solomon	775	3,806		Solomon	305	2,062
	Sinuk	1,072	4,710		Sinuk	1,115	4,834
	Bonanza	1,370	5,534		Bonanza	60	708
			40,662				87,374
2007	Nome	1,449	7,034	2008	Nome	106	2,607
	Snake	1,702	8,147		Snake		1,244
	Eldorado	6,315	21,312		Eldorado		6,746
	Flambeau	4,452	12,006		Flambeau	4,235	11,618
	Solomon	673	3,469		Solomon[c]		959
	Sinuk	7,210	16,481		Sinuk[c]		5,367
	Bonanza	2,628	8,491		Bonanza[c]		3,636
			76,940				32,177

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2009	Nome		1,565	2010	Nome	2,998	5,906
	Snake		891		Snake	2,625	6,973
	Eldorado	1,069	4,943		Eldorado[d]	30,600	42,612
	Flambeau	860	4,075		Flambeau	13,600	25,009
	Solomon	89	918		Solomon	454	2,678
	Sinuk	344	2,232		Sinuk	3,955	11,107
	Bonanza	1,851	6,744		Bonanza	686	3,513
			21,368				97,798

[a] Escapement is estimated by adding Nome, Snake and Eldorado weir counts and the aerial survey expansion estimates of the other 4 rivers. Aerial survey expansion is calculated as: aerial survey count to 0.657142 power multiplied by 48.059 (Clark 2001), unless otherwise footnoted.

[b] Escapement was estimated by counting tower.

[c] Because of the lack of aerial survey estimates, method used (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 escapements combined.

[d] Weir was breached and aerial survey expansion count was used.

Appendix A21.–Historical migration of salmon and Dolly Varden at Eldorado River counting tower, 1997–2002 and weir, 2003–2010.

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
2010 [a]	June 30 - July 24	23	42,612	48,136	2	8	72

[a] Numerous breaches in weir during the season resulted in minimal counts, except for chum salmon count that was determined by aerial survey expansion from the aerial survey count.

Appendix A22.–Historical migration of salmon and Dolly Varden at Snake River counting tower, 1995–2002 and weir 2003–2010.

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
2010	July 03 - Sept 11	43	6,973	51,099	2,243	124	198

[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 the weir without being counted.

Appendix A23.–Historical salmon migration at Kwiniuk River counting tower, 1965–2010.

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
2010	June 25 - Sept 7	71,388	634,220	135	8,049

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

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

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

Appendix A24.–Historical salmon migration at Niukluk River counting tower, 1995–2010.

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	July 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
2010	July 01 - Sept 01	48,561	434,205	15	9,042

Appendix A25.–Historical salmon migration at Nome River counting tower, 1993–1995, and weir, 1996–2010.

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
2010	June 30 - Sept 16	5,906	171,760	9	4,114	43

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

Appendix A26.–Historical sockeye salmon migration at Glacial Lake weir, 2000–2010.

Year	Operating Period	Chum [a]	Pink [b]	Sockeye
2000	July 11 – July 30			884
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
2010	June 26 - July 28			1,047

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

[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 A27.–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 A28.–Historical salmon migration at North River counting tower, 1972–2010.

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	1,639	4,792
2000	June 17-Aug 12	4,971	69,703	1,046	6,959
2001	July 05-Sept 15	6,515	24,737	1,337	12,383
2002	June 19-Aug 29	5,918	321,756	1,484	2,966
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	8,151	580,929	1,948	19,965
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
2010	June 19-Sept 07	16,131	150,807	1,256	7,608

Appendix A29.–Salmon migration at Unalakleet River weir, 2010.

Year	Operating Period	Chum	Pink	Chinook	Coho	Sockeye
2010	June 22-July 31	70,811	832,904	1,021	5,382	130

APPENDIX B: PORT CLARENCE FISHERIES

Appendix B1.–Comparative sockeye salmon aerial survey indices, Port Clarence District, 1963–2010.

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	2010	73	711	784

[a] Poor survey.
[b] No survey made.
[c] Boat survey.
[d] Early count.

Appendix B2.–Historical migration of salmon and Dolly Varden at Pilgrim River counting tower, 1997, 1999–2000 and 2002 and weir 1996 and 2003–2010.

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
2010	June 24 - Sept 01	44	25,379		29,239	272		1,654	285

[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 B3.–Subsistence surveys conducted in Port Clarence District, 1963–2010.

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

-continued-

Appendix B3.–Page 2 of 2.

Year [a]		Number of Fishing Families Interviewed		Chinook	Sockeye	Coho	Pink	Chum	Total
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
2010	[g]	290	[h]	63	824	596	5,202	5,232	11,917

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

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

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

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

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

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

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

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

APPENDIX C: KOTZEBUE FISHERIES

Appendix C1.–Kotzebue District chum salmon catch statistics, 1962–2010.

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	1987	109,467	160	684
1963	54,445	61	893	1988	352,915	193	1,829
1964	76,449	52	1,470	1989	254,617	165	1,543
1965	40,025	45	889	1990	163,263	153	1,067
1966	30,764	44	699	1991	239,923	142	1,690
1967	29,400	30	980	1992	289,184	149	1,941
1968	30,212	59	512	1993 [b]	73,071	114	641
1969	59,335	52	1,141	1994	153,452	109	1,408
1970	159,664	82	1,947	1995	290,730	92	3,160
1971	154,956	91	1,703	1996	82,110	55	1,493
1972	169,664	104	1,631	1997	142,720	68	2,099
1973	375,432	148	2,537	1998	55,907	45	1,242
1974 [c]	627,912	185	3,394	1999	138,605	60	2,310
1975 [d]	563,345	267	2,110	2000	159,802	64	2,497
1976	159,796	220	726	2001	211,672	66	3,207
1977	195,895	224	875	2002	8,390	3	2,797
1978	111,494	208	536	2003	25,423	4	6,356
1979	141,623	181	782	2004	51,038	43	1,187
1980	367,284	176	2,087	2005	75,971	41	1,853
1981	677,239	187	3,622	2006	137,961	42	3,285
1982	417,790	199	2,099	2007	147,087	46	3,198
1983	175,762	189	930	2008	190,550	48	3,970
1984	320,206	181	1,769	2009	187,562	62	3,025
1985	521,406	189	2,759	2010	270,343	67	4,035
1986	261,436	187	1,398				
Avg 1962-2009	195,685	112	1,907	Avg 1962-2009	195,685	112	1,907

[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, 1962–2010.

Year	Chum Salmon Cases (48 lbs)	Chum Salmon Round weight in pounds	Other [a]	Fresh Frozen Salmon Roe (pounds)	Cured Pounds
1962	14,500				
1963	5,396				
1964	5,421	202,993			
1965	1,929	207,350			
1966		310,716		13,600	3,065
1967		273,420			11,488
1968		288,500			11,850
1969		455,013			8,183
1970		1,240,000			48,377
1971		1,264,753			27,542
1972		1,547,041			55,376
1973		3,416,431			144,768
1974		5,361,130 [e]			
1975		4,877,313 [f]			
1976		1,415,549	487		
1977		1,846,340	1,075		
1978		1,009,121	32,419		
1979		1,236,429	6,155		
1980		3,160,948	7,828		
1981		6,139,518	2,210		
1982		3,833,051	790	100	
1983		1,647,160	2,449		
1984		2,631,582	1,593		
1985		4,528,379	1,106		
1986		2,271,320	1,691		
1987		900,405	597		
1988		3,060,292	2,120		
1989		2,163,174	1,426		
1990		1,453,040	538		
1991		1,951,041	714		
1992		2,397,302	2,714		
1993 [b]		613,968	1,507	1,000	
1994 [c]		1,166,494	73		
1995		2,329,898	93		
1996 [d]		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		
2010		2,160,264	0		

Note: Data not available for all years.

[a] Chinook and 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, 1962–2010.

Year [a]	Chum Salmon Average Weight	Chum Salmon Average Price	Chinook Salmon	Pink Salmon	Inconnu	Dolly Varden
1962		0.35 [b]				
1963		0.35 [b]				
1964	8.3	0.45 [b]				
1965	9.0	0.45			1.30 [b]	
1966	10.1	0.11			1.40 [b]	0.55
1967	9.3	0.11			1.50 [b]	0.75
1968	9.7	0.14			0.91 [b]	0.98
1969	7.5	0.15			1.30 [b]	2.84
1970	8.1	0.15				
1971	8.1	0.16			0.16	0.17
1972	9.1	0.17			0.20	0.17
1973	9.1	0.25			0.30	0.16
1974 [c]	8.5	0.34			0.30	0.16
1975 [c]	8.6	0.28			0.30	0.30
1976	8.9	0.41			0.30	0.30
1977	9.6	0.56			0.30	
1978	9.1	0.57			0.30	0.25
1979	8.8	0.80				0.25
1980	8.6	0.46			0.10	0.20
1981	9.1	0.53			0.75	0.17
1982	9.3	0.51	1.25	0.15	0.75	0.20
1983	9.4	0.25	1.08	0.13		0.20
1984	8.2	0.44	1.03			0.25
1985	8.7	0.47	1.25			0.25
1986	8.7	0.41	1.25			0.20
1987	8.2	0.57	1.25			0.30
1988	8.7	0.85	1.98			0.35
1989	8.5	0.28	1.72			0.28
1990	8.9	0.31	2.00			0.25
1991	8.1	0.22	1.64		0.50	0.18
1992	8.3	0.22	1.89		0.58	0.10
1993	8.5	0.38	2.37		0.50	0.10
1994	7.8	0.20	1.14			0.17
1995	8.0	0.13	1.00		0.50	0.20
1996	8.0	0.09	1.00		0.44	0.25
1997	8.0	0.16	1.02			0.20
1998 [d]	8.0	0.15	1.00			0.20
1999 [d]	8.0	0.16	1.00			0.20
2000	8.6	0.18	1.00			0.20
2001	8.7	0.17	1.00			
2002	8.9	0.10	0.00	0.00	0.00	
2003	8.6	0.12	0.00	0.00	0.00	0.50
2004	8.2	0.15	0.72			0.26
2005	8.2	0.20	0.50			0.30
2006	7.5	0.22				
2007	8.2	0.20				
2008	8.1	0.25				
2009	8.0	0.25				
2010	8.0	0.40				

[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, 1962–2010.

Year	Gross Value of Catch to Fishermen [a]	Number of Fishermen	Average Value Per Fisherman	Year	Gross Value of Catch to Fishermen [a]	Number of Fishermen	Average Value Per Fisherman
1962	$4,500	84	$54	1987	$515,000	160	$3,219
1963	$9,140	61	$150	1988	$2,581,333	193	$13,375
1964	$34,660	52	$667	1989	$613,823	165	$3,720
1965	$18,000	45	$400	1990	$438,044	153	$2,863
1966	$25,000	44	$568	1991	$437,948	142	$3,084
1967	$28,700	30	$957	1992	$533,731	149	$3,582
1968	$46,000	59	$780	1993 [b]	$235,061	114	$2,062
1969	$71,000	52	$1,365	1994	$233,512	109	$2,142
1970	$186,000	82	$2,268	1995	$316,031	92	$3,435
1971	$200,000	91	$2,198	1996	$56,310	55	$1,024
1972	$260,000	104	$2,500	1997	$187,978	68	$2,764
1973	$925,000	148	$6,250	1998	$70,587	45	$1,569
1974 [c]	$1,822,784	185	$9,853	1999	$179,781	60	$2,996
1975 [d]	$1,365,648	267	$5,115	2000	$246,789	64	$3,856
1976	$580,375	220	$2,638	2001	$322,650	66	$4,889
1977	$1,033,950	224	$4,616	2002	$7,572	3	$2,524
1978	$575,260	208	$2,766	2003	$26,377	4	$6,594
1979	$990,263	181	$5,471	2004	$64,420	43	$1,498
1980	$1,446,633	176	$8,220	2005	$124,820	41	$3,044
1981	$3,246,793	187	$17,363	2006	$229,086	42	$5,454
1982	$1,961,518	199	$9,857	2007	$243,149	46	$5,286
1983	$420,736	189	$2,226	2008	$385,270	48	$8,026
1984	$1,148,884	181	$6,347	2009	$376,554	62	$6,073
1985	$2,137,368	189	$11,309	2010	$860,125	67	$12,838
1986	$931,241	187	$4,980				
Avg. 1962-2009	$580,893	113		Avg. 1962-2009	$580,893	113	

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

[b] Includes $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 (1914–1918, and 1962–2010) and subsistence salmon catches (1957, 1962–1986, and 1994–2004).

	Commercial Catch				Subsistence Catch			
Year [a]	Chum [b]	Other [c]	Total	Chum		Number of Fishermen Interviewed	Average Catch per Fisherman	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	36,229
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
Average 2000-'09	119,546	102	119,648	Average 1995-'04	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.				
2010	270,343	583	270,926	2010 subsistence surveys were not conducted				
Average 2000-2009	119,546	102	119,648	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.

	Village					Kobuk River	Noatak	Village						District
Year	Noorvik	Kiana	Ambler	Shungnak	Kobuk	Villages	Village	Kotzebue	Deering	Kivalina	Buckland	Candle	Shishmaref	Total
1962	15,934	3,139	[a]	[a]	2,321	21,394	48,890	[a]	[a]	[a]	[a]	[a]	[a]	70,284
1963	4,304	1,973	755	1,240	200	8,472	16,762	5,835	[a]	[a]	[a]	[a]	[a]	31,069
1964	2,167	783	2,142	3,134	1,020	9,246	12,763	7,753	[a]	[a]	[a]	[a]	[a]	29,762
1965	5,596	1,598	1,340	2,160	877	11,571	5,671	8,058	5,200	[a]	[a]	[a]	[a]	30,500
1966	3,141	433	912	899	625	6,010	19,700	3,640	6,238	[a]	[a]	[a]	[a]	35,588
1967	2,350	1,489	679	1,500	175	6,193	26,512	4,032	3,098	[a]	162	11	100	40,108
1968	2,424	2,488	457	1,600	1,030	7,999	5,490	4,324	2,838	[a]	37	89	37	20,814
1969	1,301	2,458	3,525	2,550	1,655	11,489	14,458	1,768	1,897	[a]	-	200	-	29,812
1970	6,077	3,457	2,899	3,450	600	16,483	4,120	6,814	1,242	[a]	344	113	-	29,116
1971	7,144	5,177	2,299	2,653	1,931	19,204	9,919	1,737	763	[a]	155	50	131	31,959
1972	1,744	1,435	1,469	2,665	2,119	9,432	741	1,151	369	[a]	59	113	29	11,894
1973	2,312	4,470	1,529	4,406	1,917	14,634	216	1,172	1,098	[a]	1,722	50	100	18,992
1974	6,809	2,726	1,651	6,243	2,251	19,680	4,330	[a]	1,880	[a]	639	15	200	26,744
1975	4,620	4,320	3,390	9,060	1,755	23,145	1,515	[a]	1,175	[a]	1,540	[a]	230	27,605
1976	1,555	1,579	2,000	4,213	562	9,909	4,448	[a]	1,358	[a]	[a]	[a]	[a]	15,715
1977	891	766	385	1,760	325	4,127	2,125	[a]	3,500	[a]	[a]	[a]	[a]	9,752
1978	2,034	1,493	2,224	4,766	852	11,369	1,495	[a]	[a]	[a]	[a]	50	[a]	12,914
1979	2,155	1,225	2,400	2,947	651	9,378	2,227	[a]	2,000	[a]	1,000	[a]	[a]	14,605
1980	2,229	2,551	660	2,704	350	8,494	2,135	[a]	[a]	[a]	[a]	[a]	[a]	10,629
1981 [b, c]	3,488	1,439	782	2,800	950	9,459	5,465	2,387	295	110	50	[a]	[a]	17,766
1982 [b]	7,433	4,918	2,506	4,191	600	19,648	5,479	4,099	807	210	[a]	[a]	[a]	30,243
1983 [b, d]	277	223	1,062	3,556	368	5,486	4,035	347	219	200	[a]	[a]	[a]	10,287
1984 [b, e]	[a]	[a]	2,990	4,241	[a]	7,231	6,049	88[b]	1,940	200	[a]	[a]	[a]	15,508
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	102,881

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	Village					Kobuk River	Noatak	Village						District
Year	Noorvik	Kiana	Ambler	Shungnak	Kobuk	Villages	Village	Kotzebue	Deering	Kivalina	Buckland	Candle	Shishmaref	Total
1996	13,611	5,935	9,062	8,649	1,819	39,076	10,091	50,573	[a]	[a]	[a]	[a]	[a]	99,740
1997	14,323	3,064	2,713	5,513	629	26,242	5,309	26,355	[a]	[a]	[a]	[a]	[a]	57,906
1998	9,845	3,414	2,432	4,676	1,031	21,398	2,614	24,968	[a]	[a]	[a]	[a]	[a]	48,980
1999	17,843	3,788	590	3,868	1,869	27,958	1,616	64,768	[a]	[a]	[a]	[a]	[a]	94,342
2000	10,391	2,876	5,009	2,944	318	21,538	7,293	37,144	[a]	[a]	[a]	[a]	[a]	65,975
2001	16,540	5,500	[a]	4,310	2,843	29,193	2,326	17,713	[a]	[a]	[a]	[a]	[a]	49,232
2002	13,943	[f]	[f]	[f]	[f]	[f]	2,937	[f]	[a]	[a]	[a]	[a]	[a]	16,880
2003	7,982	3,010	1,719	2,860	1,453	17,024	2,177	[a]	[a]	[a]	[a]	[a]	[a]	19,201
2004	6,025	3,896	3,446	4,186	3,087	20,640	3,997	[a]	[a]	[a]	[a]	[a]	[a]	24,637

Note: No subsistence surveys were conducted after 2004.

[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. 2003b).

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, 1962–2010.

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	

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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	2010 [d]	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.

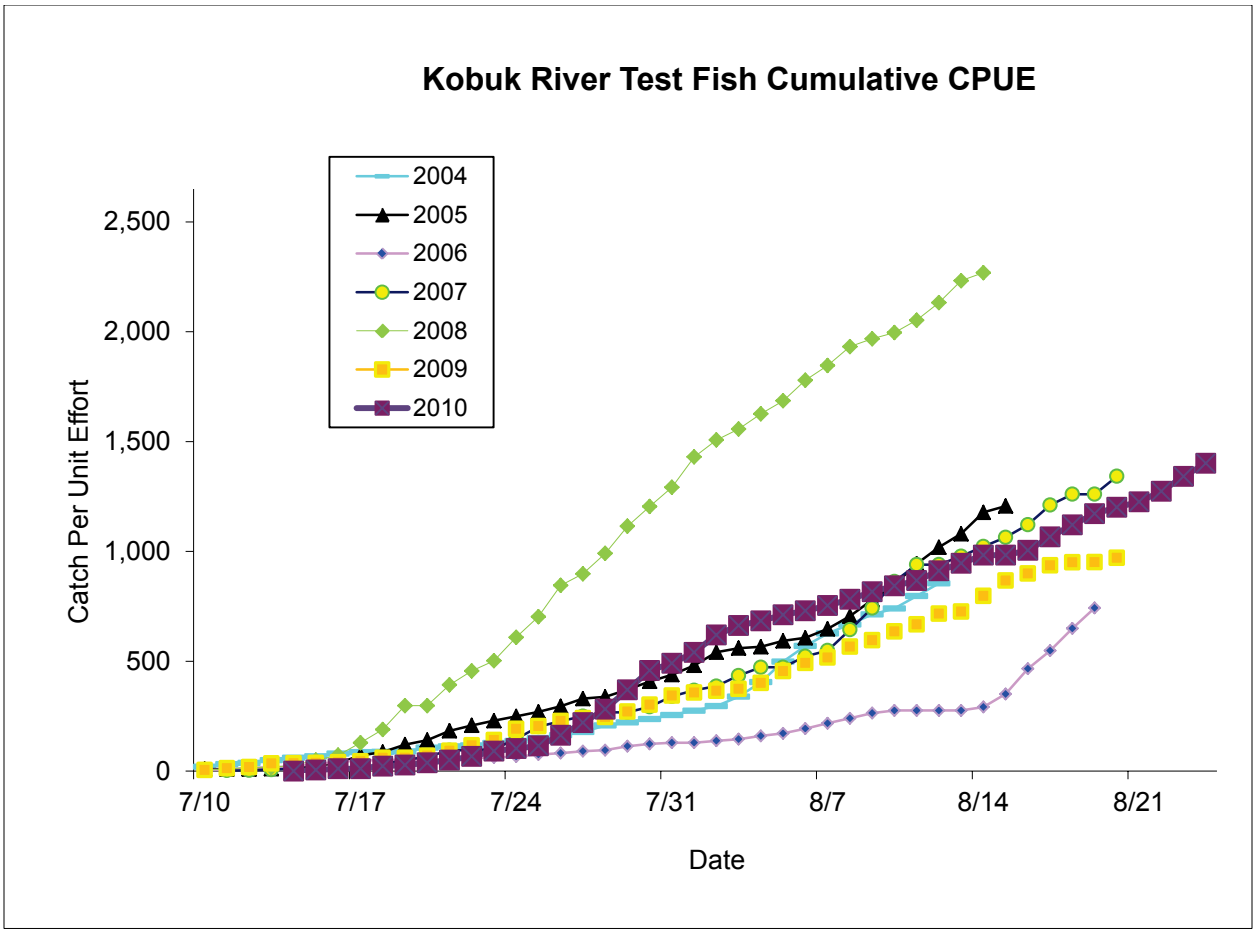
[g] Survey by foot or boat.

[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), 2004–2010.

APPENDIX D: HERRING FISHERIES

Appendix D1.–Norton Sound herring and spawn-on-kelp harvests (in tons) by U.S. commercial fishermen, 1909–2010.

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	-
2010	623	65	688	0.00

[a] Fishery occurred some years, but harvest unavailable. Fishery from 1909–1941 occurred near Golovin, and from 1964 to present has occurred in Southeast Norton Sound.

[b] Does not include approximately 6 st of wastage.

[c] Does not include approximately 2 st of wastage.

[d] Includes 3 st of spawn-on-*Macrocystis*-kelp.

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

[f] No commercial fishery took place in 1992 and no sac roe fishery took place in 2004 and 2007–2009.

[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, 1979–2010.

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	6/9	6/03-06/10
1987	32,370	3,759	323			564	2.60	11	8.6	6/7	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	6/8	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	6/4	6/03-06/10

-continued-

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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
2006	38,833 [c]	671 [d]	0	0.57	0	41	0.14	1	10.2	6/9	6/08-06/11
2007 [a]	38,415 [c]	33	0	0.14	0	7	0.02	1	[a]	6/9	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
2010	42,889 [c]	688	0	0.00	0	30	0.19	1	13.5	6/17	6/11-06/19

[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. The 2004 catch was by king crab permit holders for bait.

[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, 1979–2010.

	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
2010	314	300	74	0	0	0	0	688

[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).

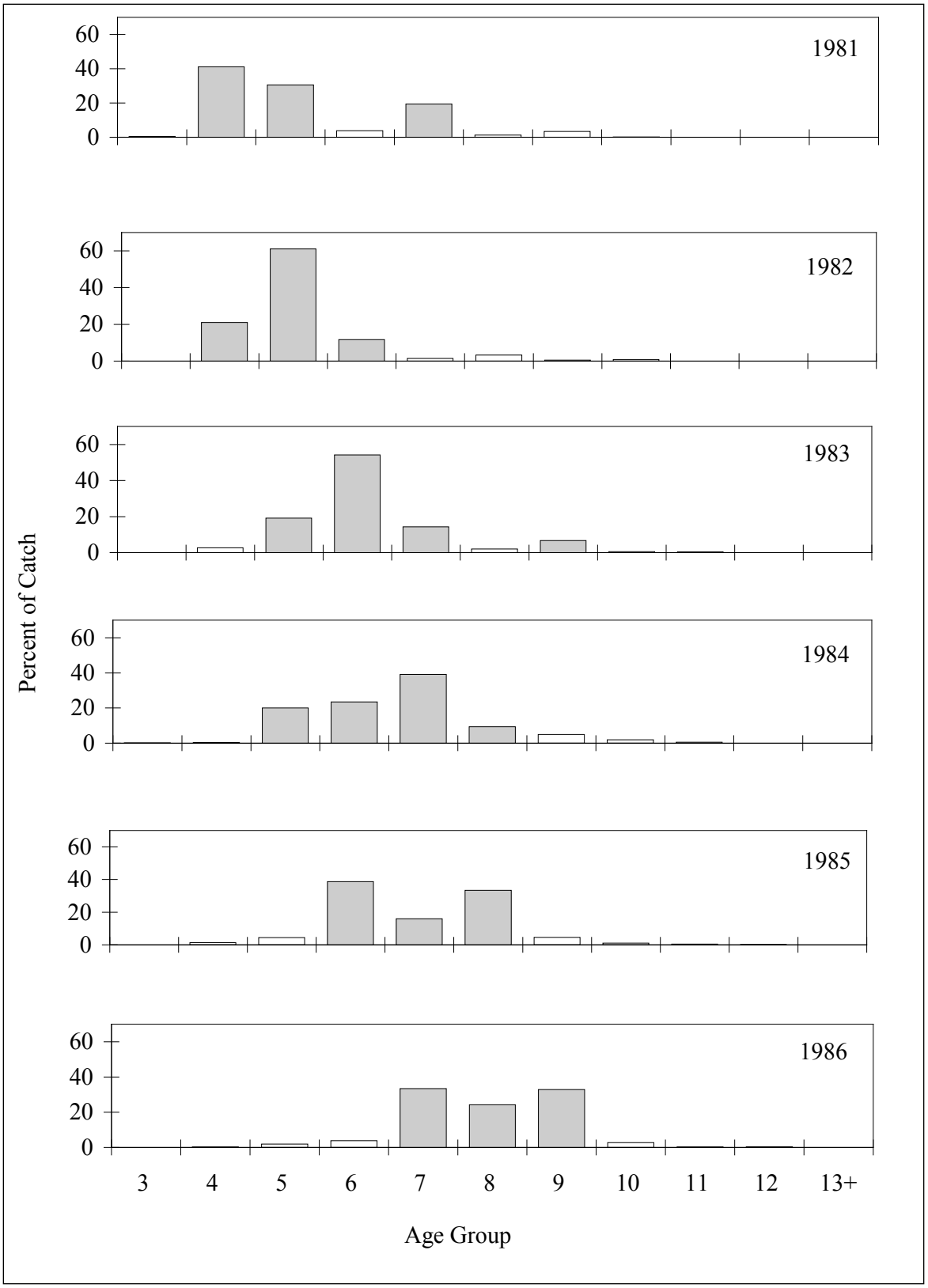
[j] Does not include an estimated 5 st of wastage.

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

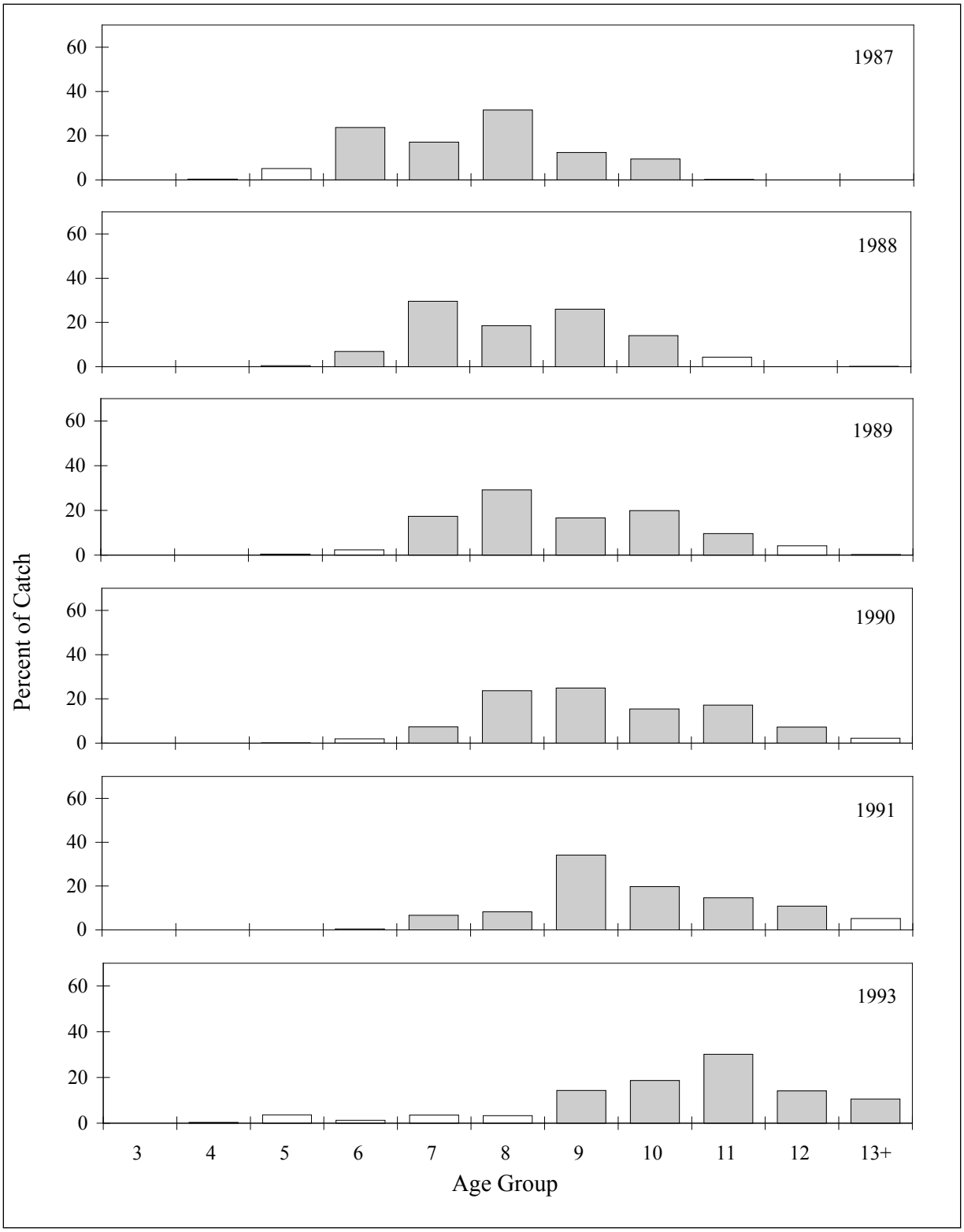
[l] There was 10% added to sac roe total due to dewatering by buyers.

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

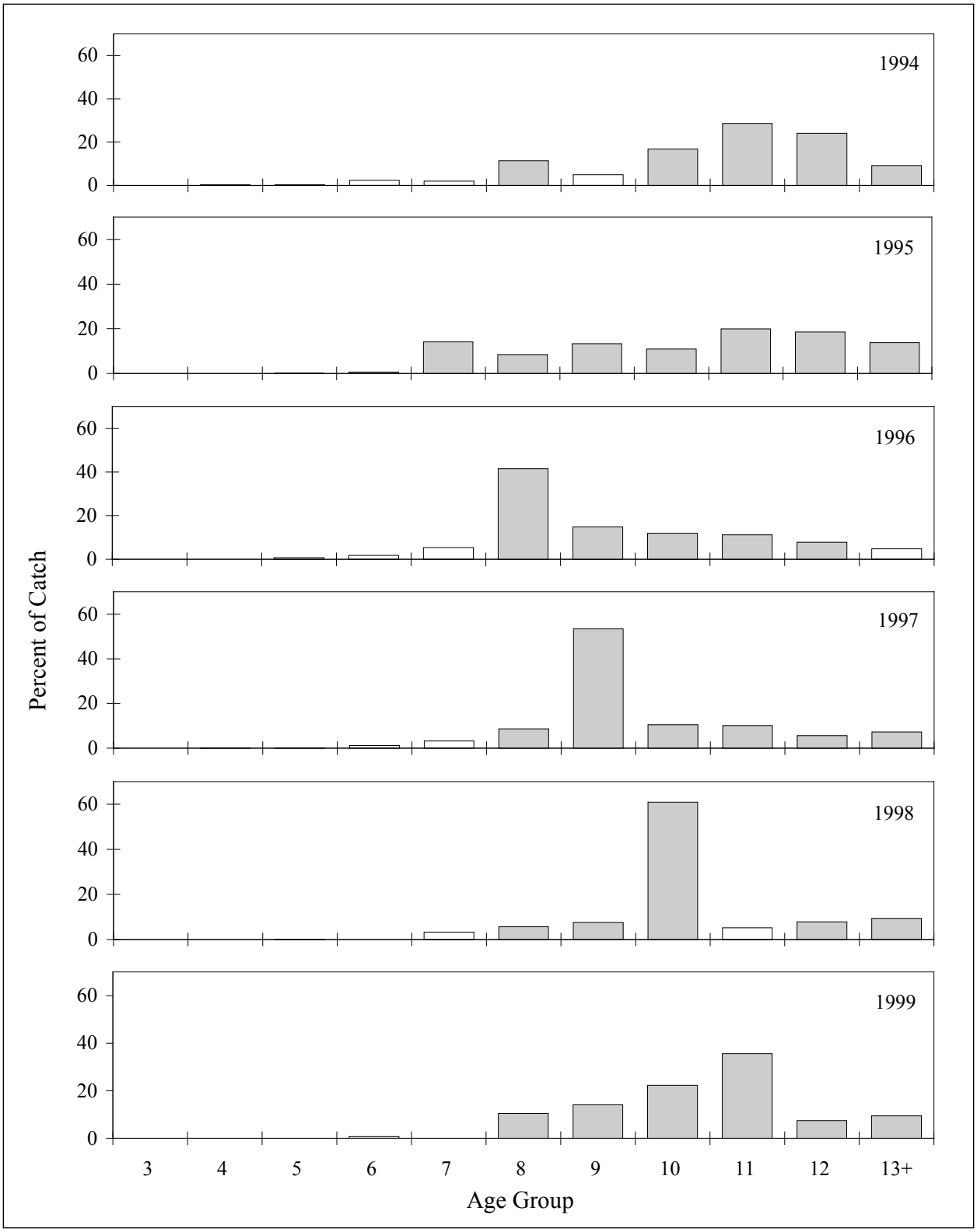


Appendix D6.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 1981–1986.



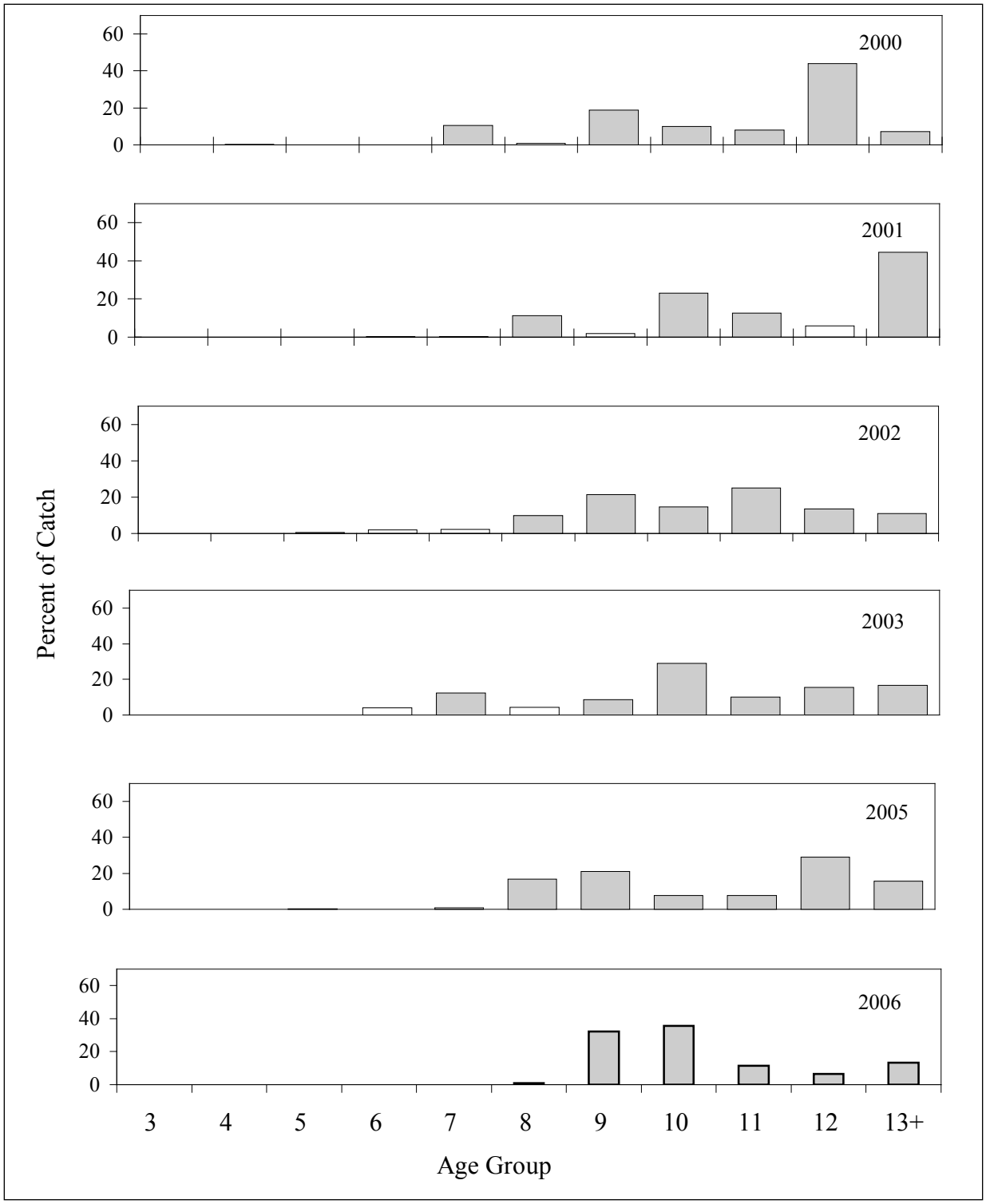
Note: No commercial fishing occurred in 1992.

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



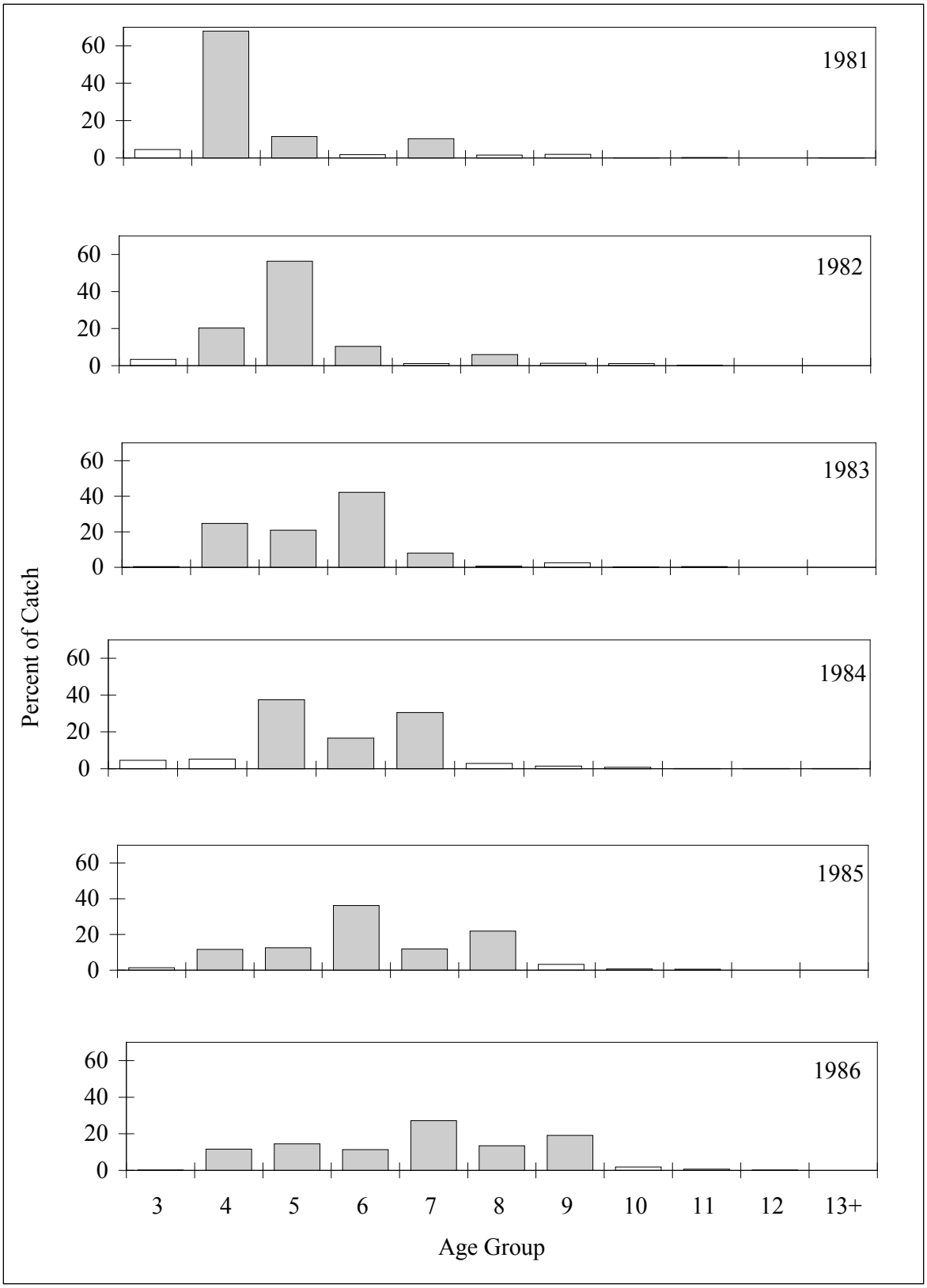
Note: No commercial catch from beach seine gear in 1998 and 1999.

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

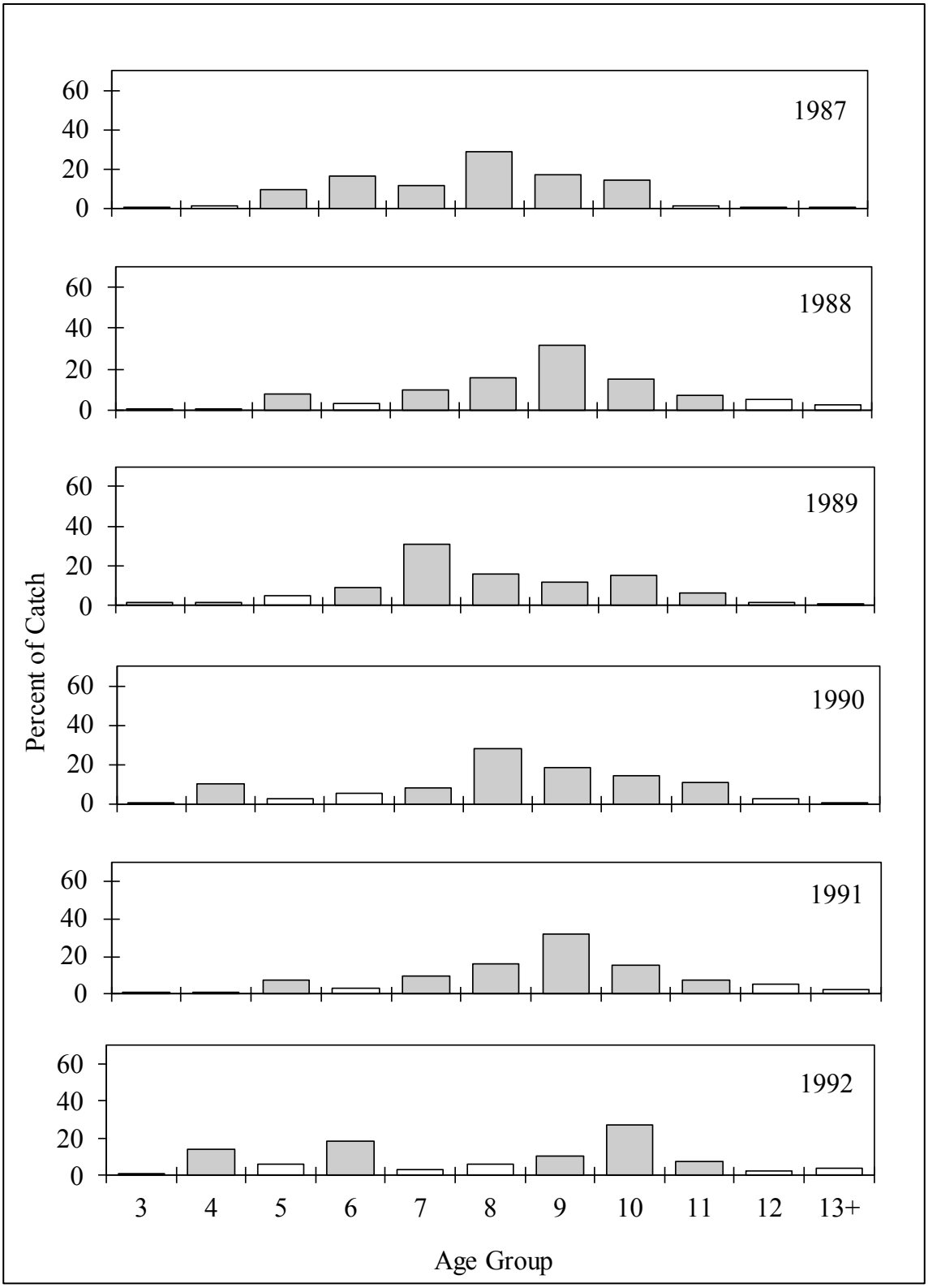


Note: No commercial catch from beach seine gear in 2001–2006. No fishery in 2004.

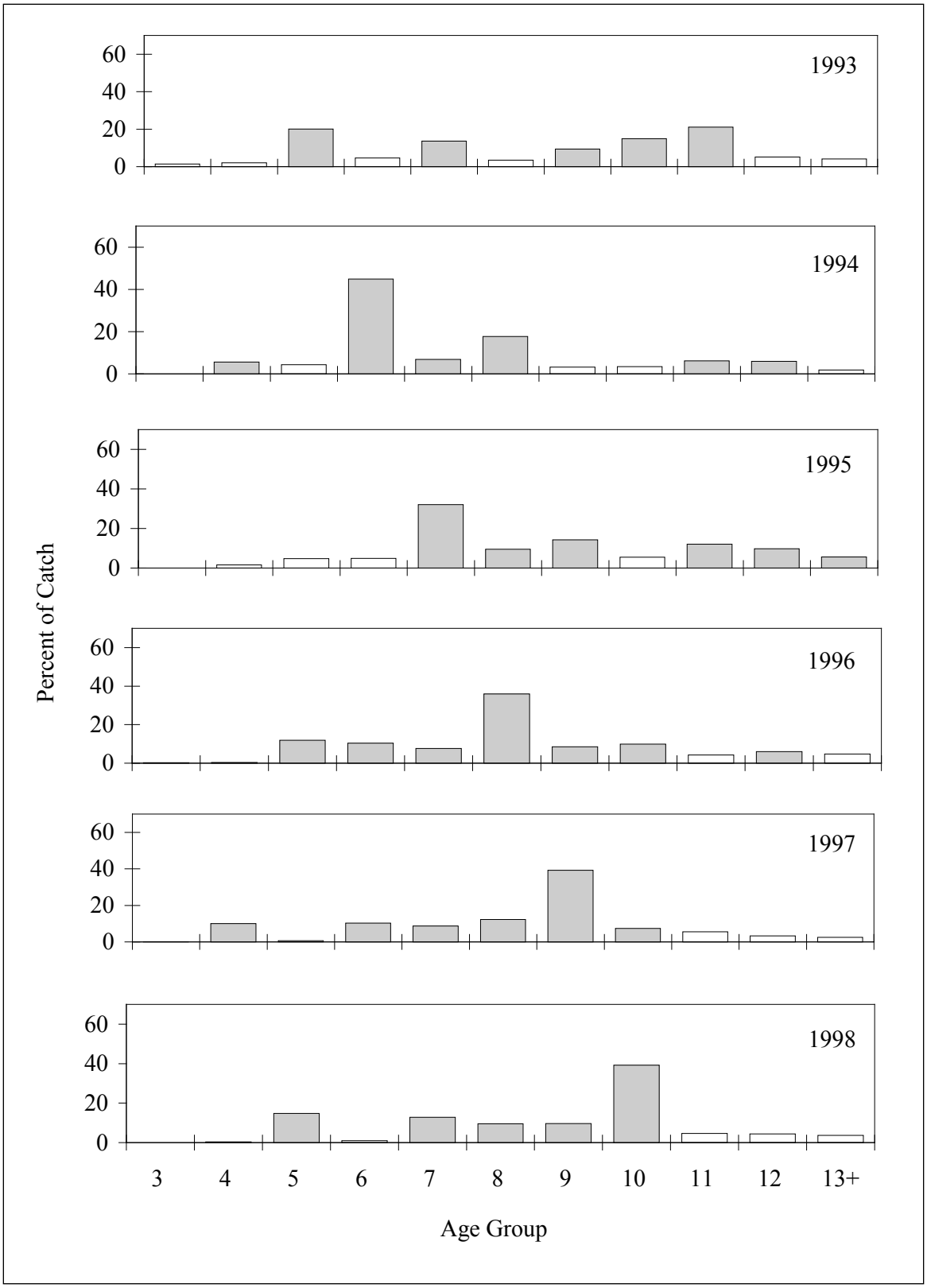
Appendix D9.–Norton Sound herring age class composition by percentage of commercial catch, commercial gear combined (beach seine and gillnet), 2000–2006.



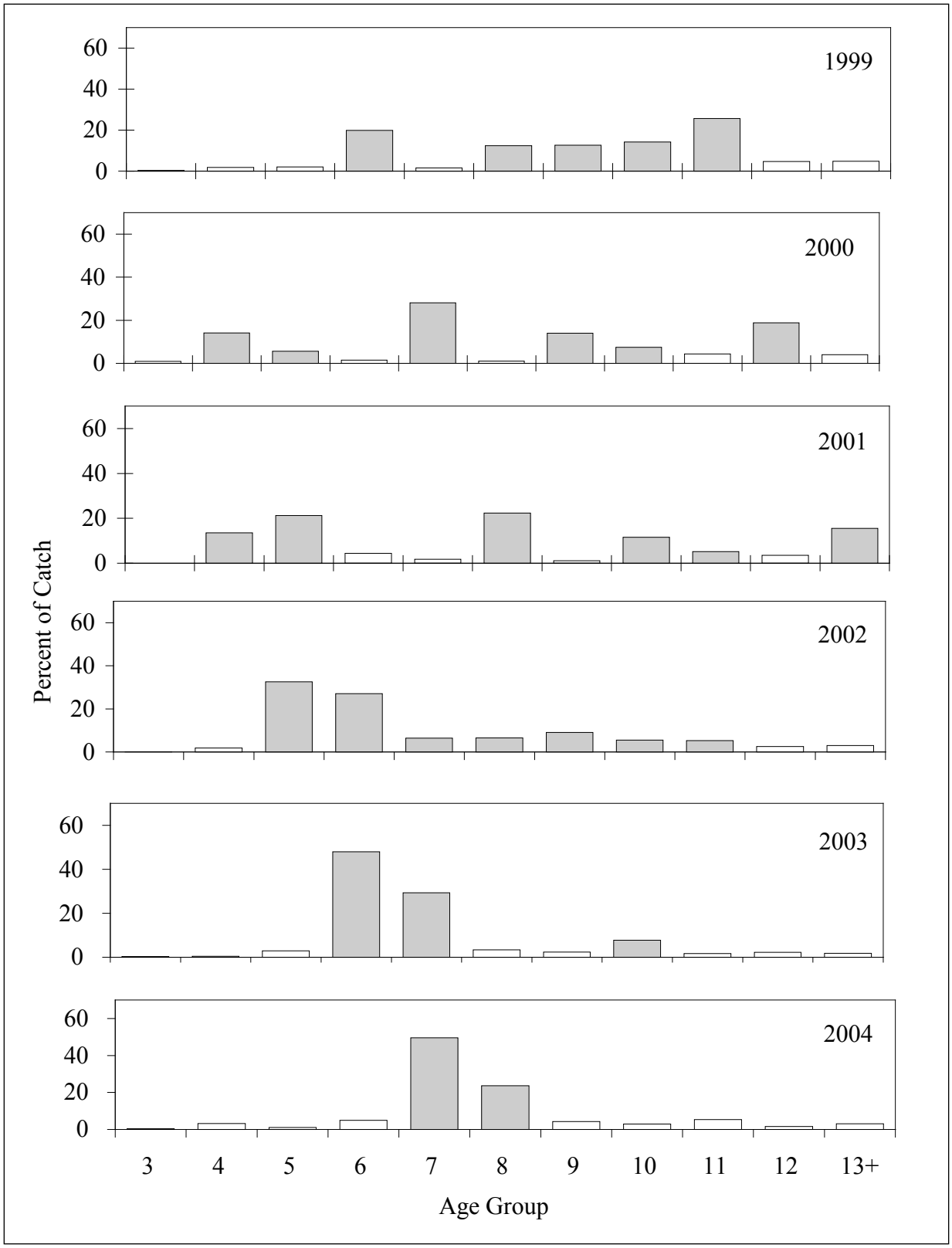
Appendix D10.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1981–1986.



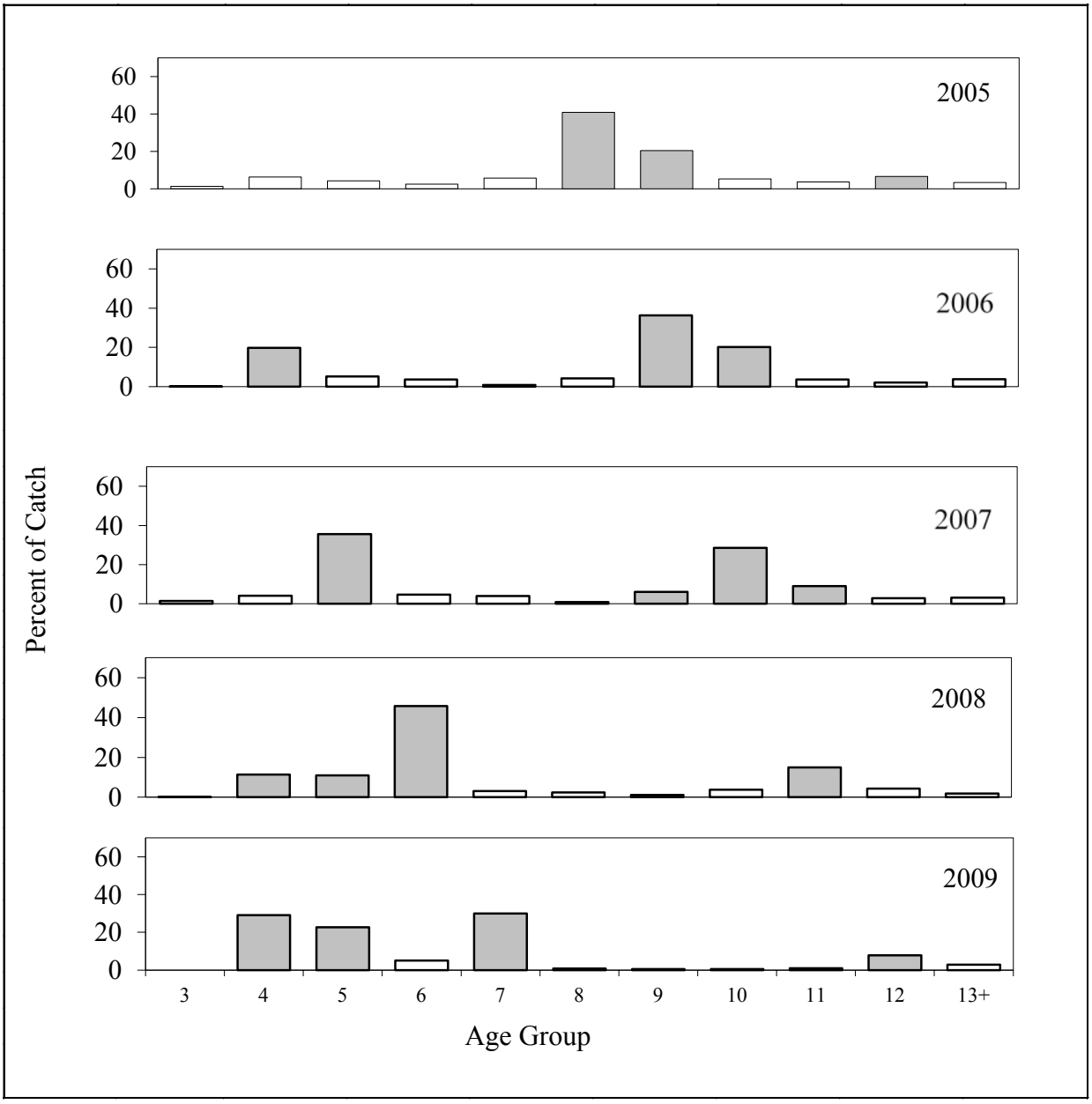
Appendix D11.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1987–1992.



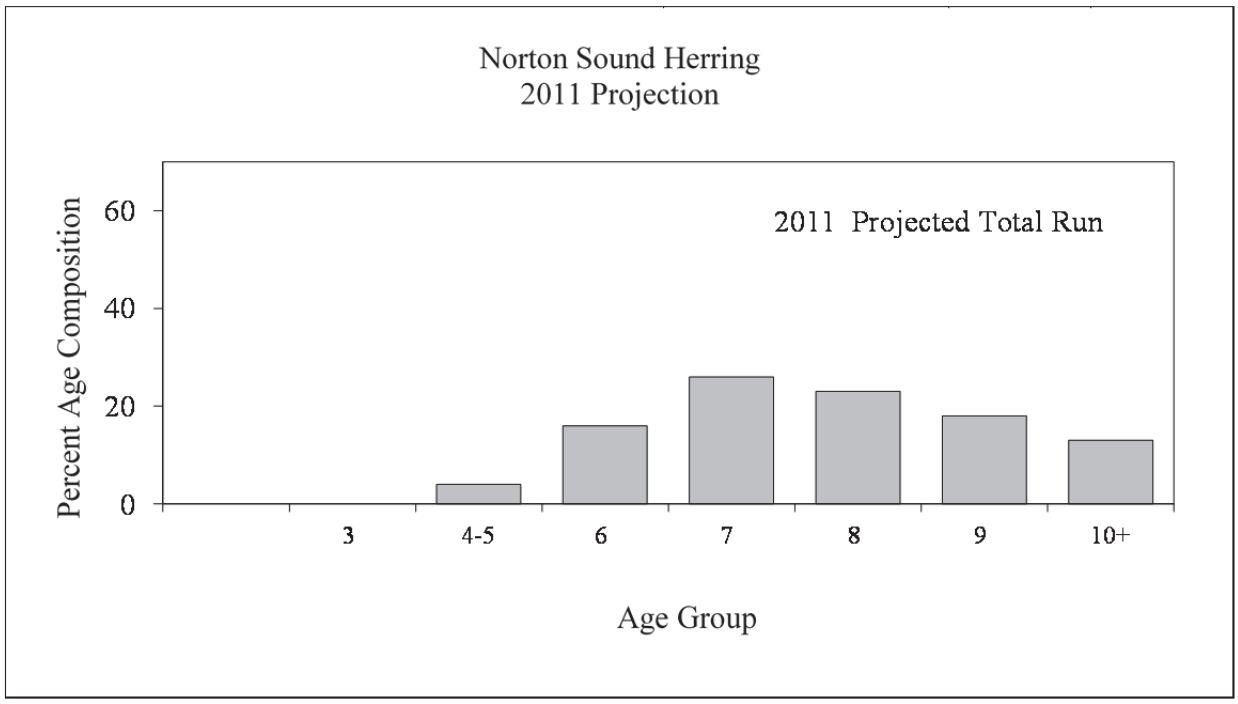
Appendix D12.–Norton Sound herring age class composition by percentage of total catch, variable mesh gillnets, 1993–1998.



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.



Note: Herring age class composition by percentage of total catch, variable mesh gear, for 2010 was not available.

Appendix D15.–Norton Sound Pacific herring projected age composition of the 2011 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, 1977–2010 (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-

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	3,340	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	37,510	105,045	22,834	1,052
646402						730	139,661	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	34,686	32,289	9,985	4,035
656402						193,079	110,289	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

-continued-

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Statistical Area	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
616331		633	4,557		3,506	646			2,357	
616401										231
626331					2,455				1,415	27,018
626401	8,065	508	4,689	61,620	53,722	15,899	23,113	94,130	118,202	61,704
626402						1,352				
636330	2,449			2,253				126	26,680	10,253
636401	10,771	14,201	130,463	91,343	50,906	83,949	166,489	227,204	224,531	123,092
636402										
646301										
646330		3,021		1,868	1,955		2,226	4,097	2,629	5,290
646401	3,194	221		4,287		3,952	1,964	149	1,660	
646402										
656300						14	932		284	1,909
656330	4,078	1,300	1,990	20,869	12,374	21,176	46,288	47,411	17,752	4,911
656401	1,127	2,739	95,979	55,158	63,038	40,566	21,579	9,405	28,434	70,065
656402						1,441		380	807	2,254
666230									1,721	
666300									18,245	
666330			5,839	7,030	1,332	1,296	12,359	142	5,041	511
666401		930	69,007	43,771	35,970	83,998	42,452	727	600	2,498
666402					30,070	12,873	23,344	16,025	1,050	2,959
666431					4,274	45				
676300										
676330										
676400										180
676430										
676501								1,008		
686330										
686431									340	
Total (tons)	15	12	156	144	130	134	170	200	226	156

-continued-

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Statistical Area	2008	2009	2010	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	52,054	811,959
626402				40,347
636330	2,350	5,026	2,584	60,119
636401	197,948	96,279	182,040	1,894,609
636402				5,220
646301				18,516
646330	1,505	933	1,205	39,358
646401	18,728	46,264	77,437	501,083
646402				288,929
656300				180,012
656330		10,617	17,660	1,279,504
656401	68,968	107,557	82,747	2,361,762
656402				1,176,819
666230				57,288
666300				366,045
666330		1,514		1,564,511
666401		10,021		2,844,861
666402		6,228	1,577	1,392,792
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	209	8,138

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]			Legal Male Biomass (millions of pounds)
				Pre-2 males [b]	Pre-1 Males [b]	Legal Males [c]	
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-2 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-2 male and pre-one male data are 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, 1977–2010.

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

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Year	Guideline Harvest Level (lbs) [b]	Legal Male Population Est. No. crab (millions)	Legal Male Population Est. lbs [b]	Commercial Harvest (lbs) [a, b] Open Access	Commercial Harvest (lbs) [a, b] CDQ	Total Number of Vessels	Total Number of Permits	Total Number of Landings	Total Number of Pots Registered	Total Number of Pots Pulls	Total Exvessel Price/lb	Total Fishery Value (millions $)	Season Length Days	Season Length Dates
2001	0.30	1.3	3.8	0.28	0.00	30	37	319	1,200	11,918	2.34	0.674	97	7/01- 9/09 [k]
2002	0.24	1.0	3.1	0.24	0.01	32	49	201	1,120	6,491	2.81	0.729	77	6/15-9/03 [l]
2003	0.25	1.0	3.1	0.25	0.01	25	43	236	960	8,494	3.09	0.823	68	6/15-8/24 [m]
2004	0.35	1.6	4.4	0.31	0.03	26	39	227	1,120	8,066	3.12	1.063	51	6/15-8/08 [n]
2005	0.37	1.7	4.8	0.37	0.03	31	42	255	1,320	8,867	3.14	1.264	73	6/15-8/27 [o]
2006	0.45	1.6	4.5	0.42	0.03	28	40	249	1,120	8,867	2.26	1.021	68	6/15-8/22 [n]
2007	0.32	1.1	3.1	0.29	0.02	38	30	251	1,200	9,118	2.49	0.750	52	6/15-8/17 [n]
2008	0.41	1.5	4.1	0.36	0.03	23	30	248	920	8,721	3.20	1.231	73	6/23-9/03 [p]
2009	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]
2010	0.40	1.7	4.5	0.39	0.03	23	32	286	1,040	9,698	3.73	1.528	58	6/28-8/24 [r]

[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.

[r] CDQ opened 6/28 - 7/16. OA opened 7/1 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, 1977–2010.

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
2010	49	51

[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, 1978–2010.

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
2010	10	4,834	2009-10	125	123	85	9,004	7,044	83
Avg 1978-2009	9	2,575	Avg 1977-2009	119	95	72	8,929	5,371	65

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

[b] The winter subsistence fishery is open 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, 2004–2010.

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
2010	27	27	15	1,086	660	44
Avg. 2005-2009	18	17	8	1,187	641	86

Appendix E7.–Size composition by percent of red king crab from winter research pots near Nome, Norton Sound, Eastern Bering Sea, 1983–2010.

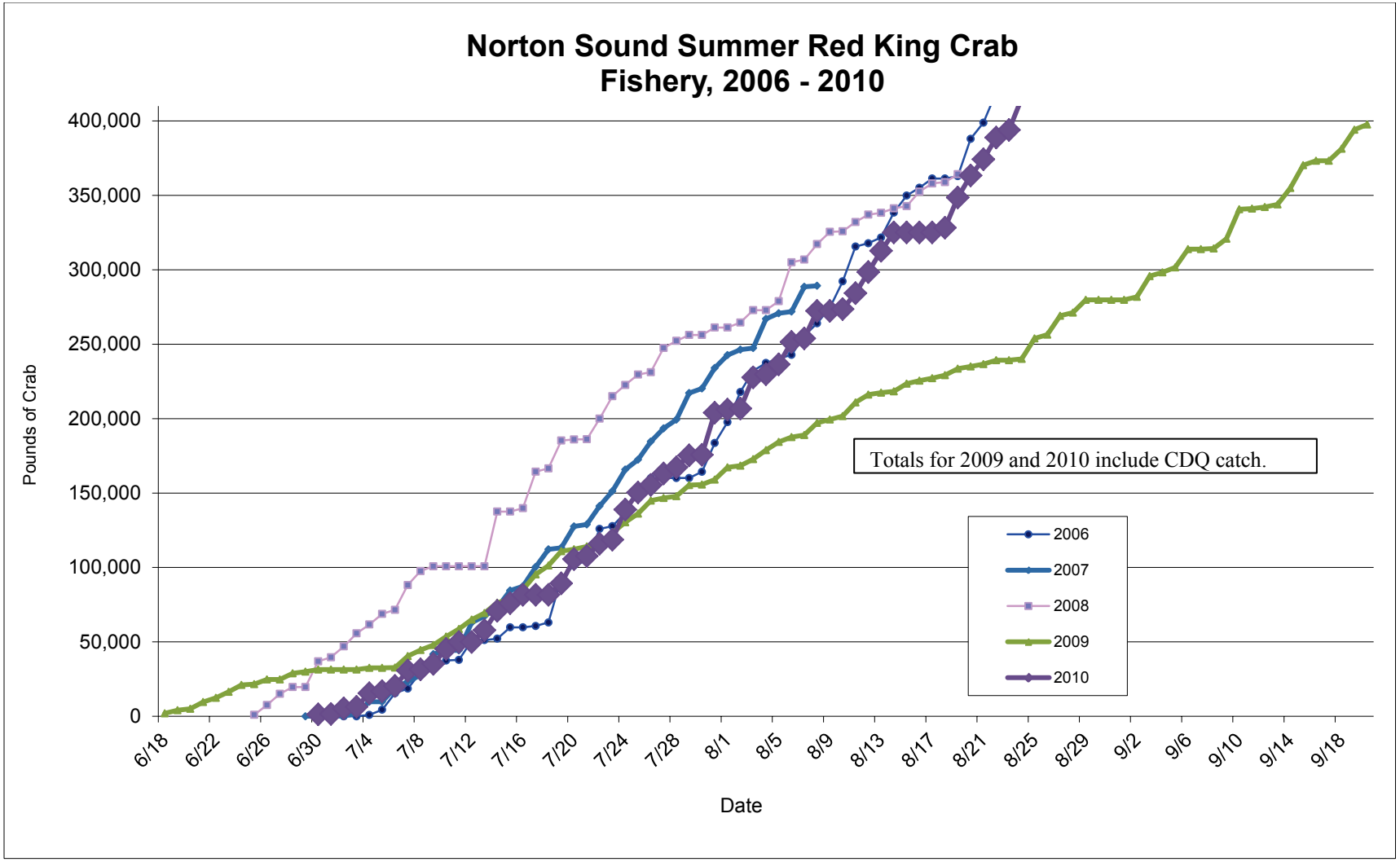
	Sublegal [a]			Legal [a]		
Year	Prerecruit Twos	Prerecruit Ones	Total	Recruits	Post-Recruits	Total
1983	26	38	64	26	10	36
1984	35	31	66	19	16	35
1985	25	45	70	20	10	30
1986	26	35	61	22	17	39
1987	13	31	44	11	45	56
1988 [b]	-	-	-	-	-	-
1989	27	15	42	27	31	58
1990	16	33	49	25	26	51
1991	5	30	36	34	31	65
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
2010	10	32	43 [d]	30	27	57

[a] Sublegals = male crabs < 4-3/4 inches carapace width. Legals = male king crabs ≥ 4-3/4 inches carapace width.

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

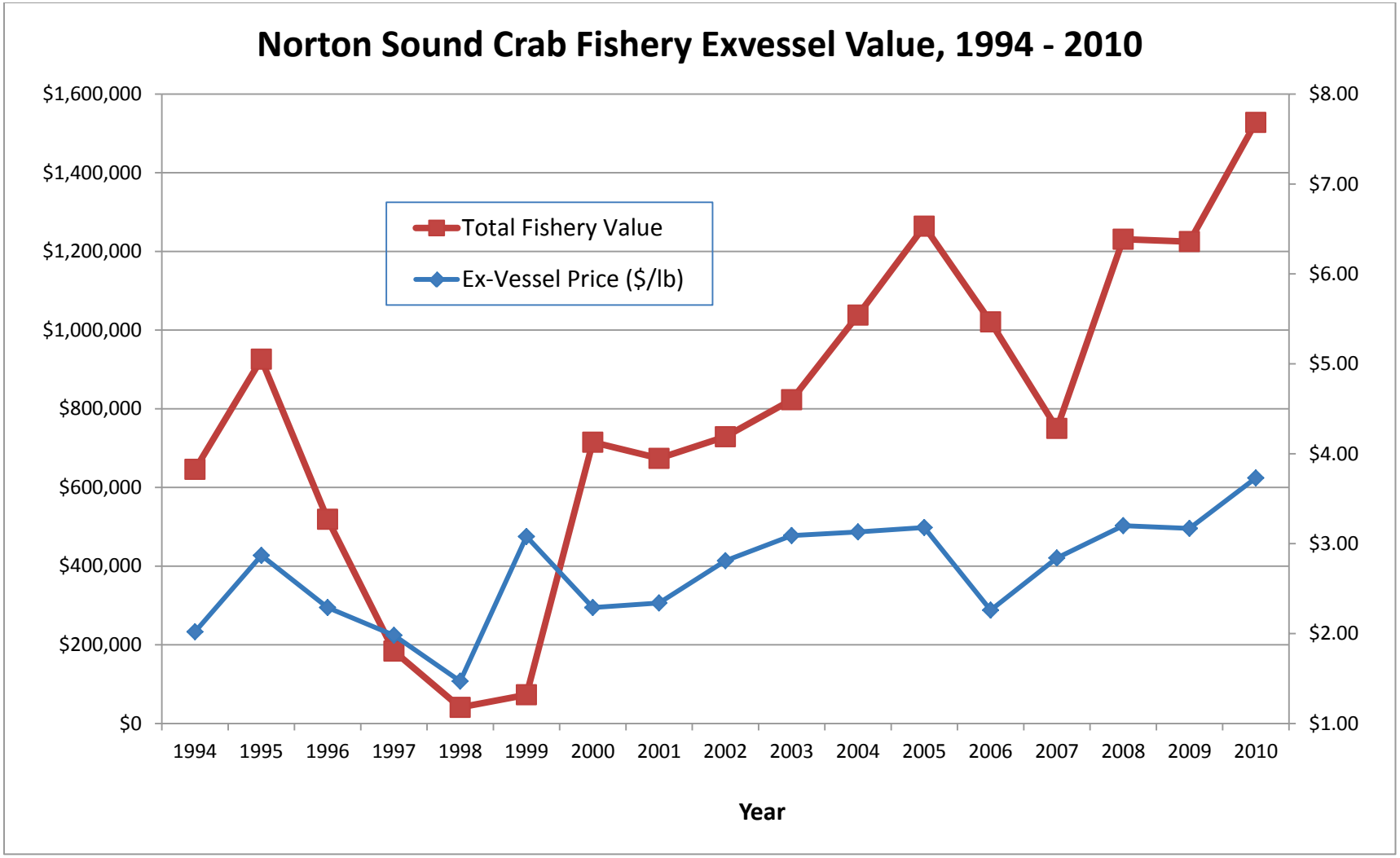
[c] No winter crab research study in 1992 or 1994.

[d] Includes prerecruit age 3.

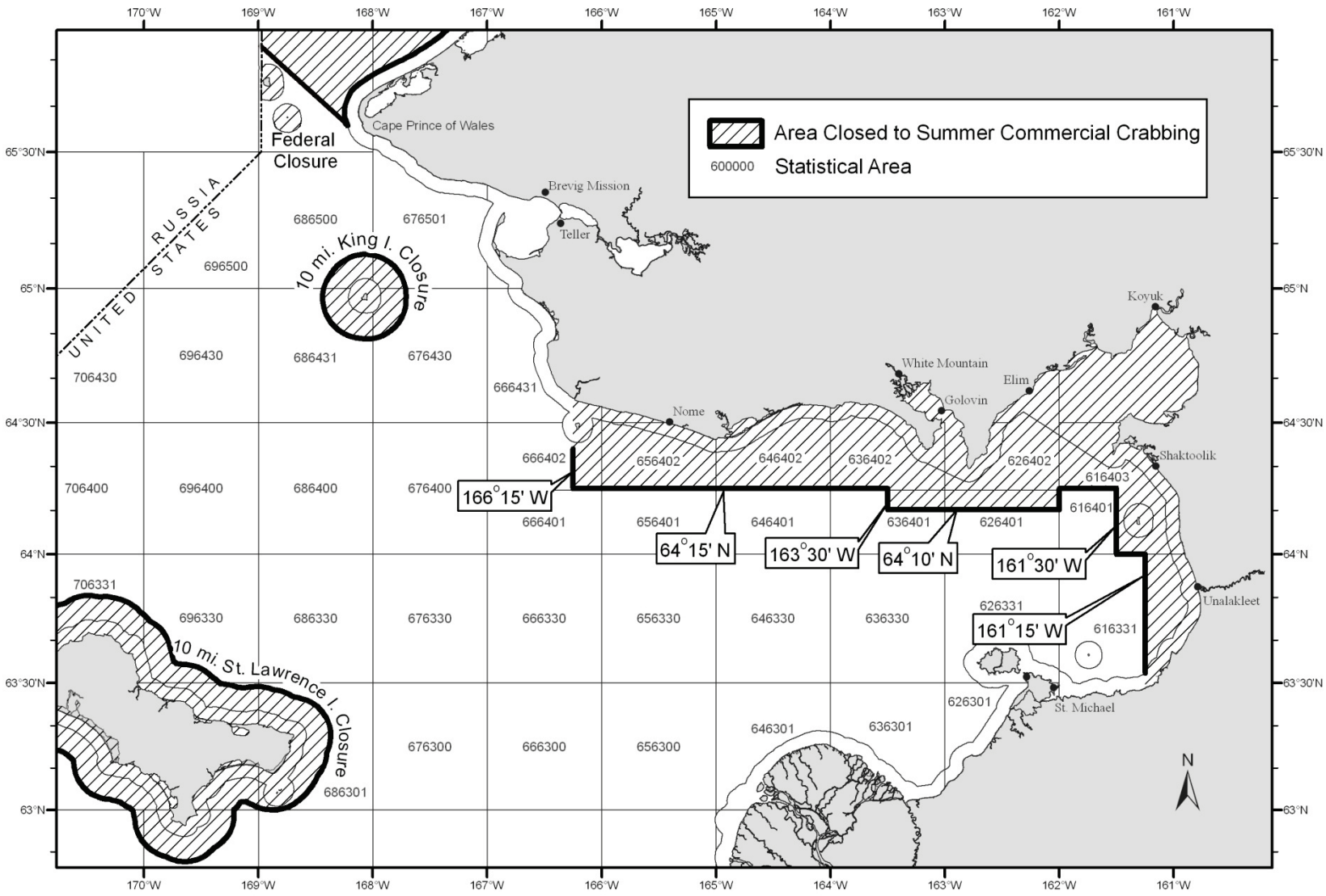


Note: CDQ catch is not included in years prior to 2009 because the open-access and CDQ portions of the crab fishery did not occur concurrently in those years.

Appendix E8.–Current and historical catch performance for the Norton Sound summer commercial crab fishery, 2006–2010.

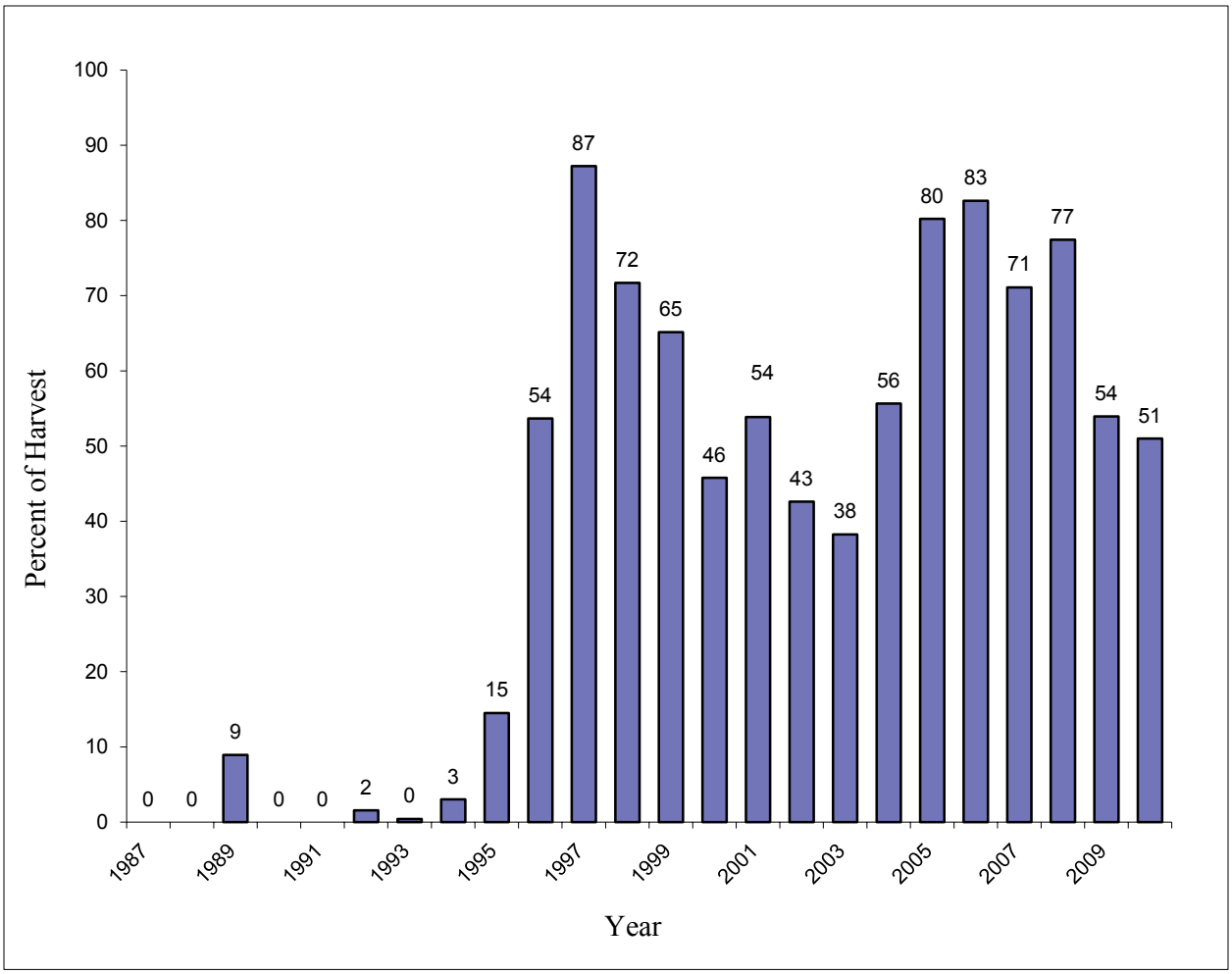


Appendix E9.–Norton Sound crab fishery exvessel value and price per pound, 1994–2010.

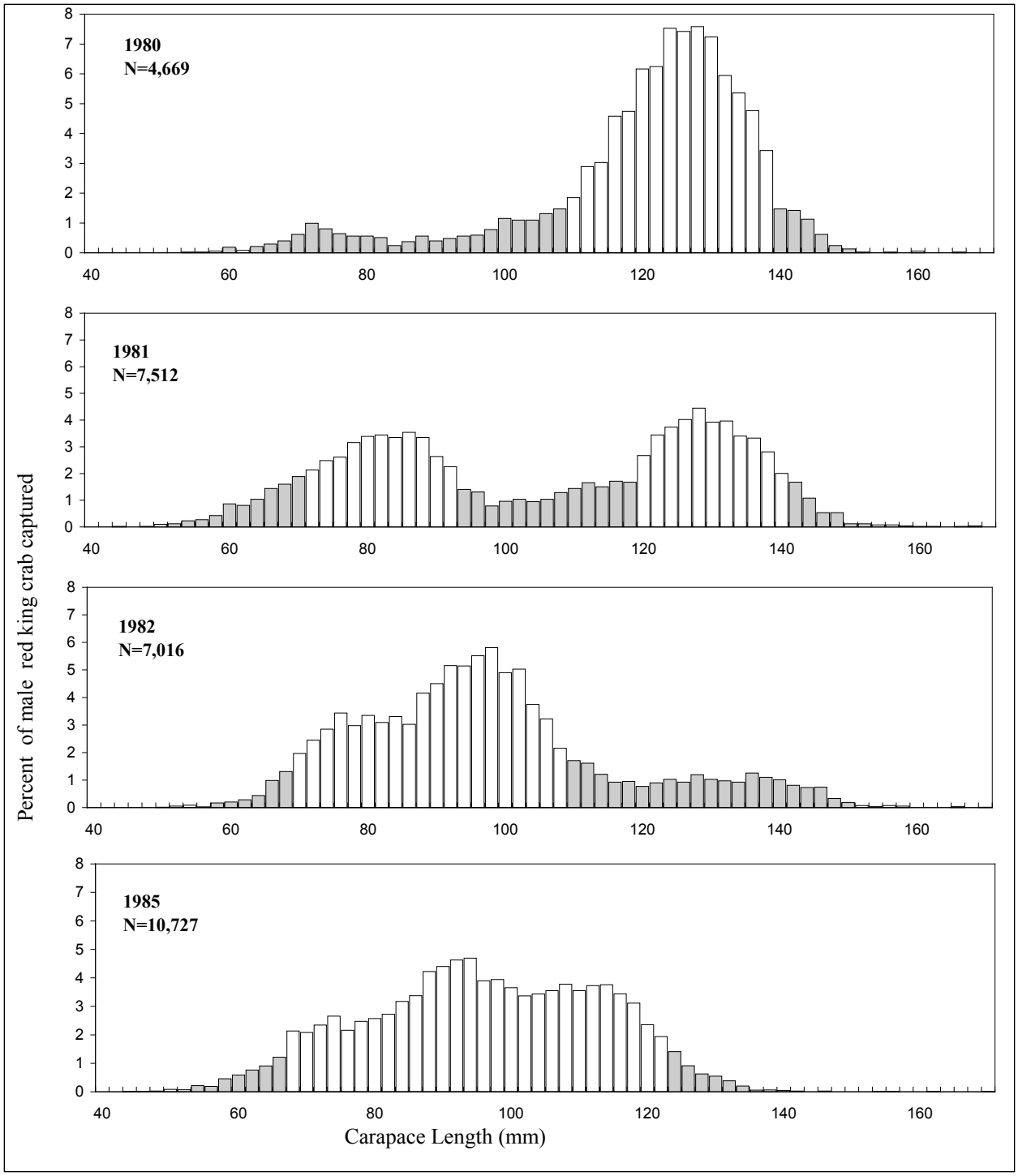


Note: Line drawn around the coastline delineates the 3-mile state waters zone.

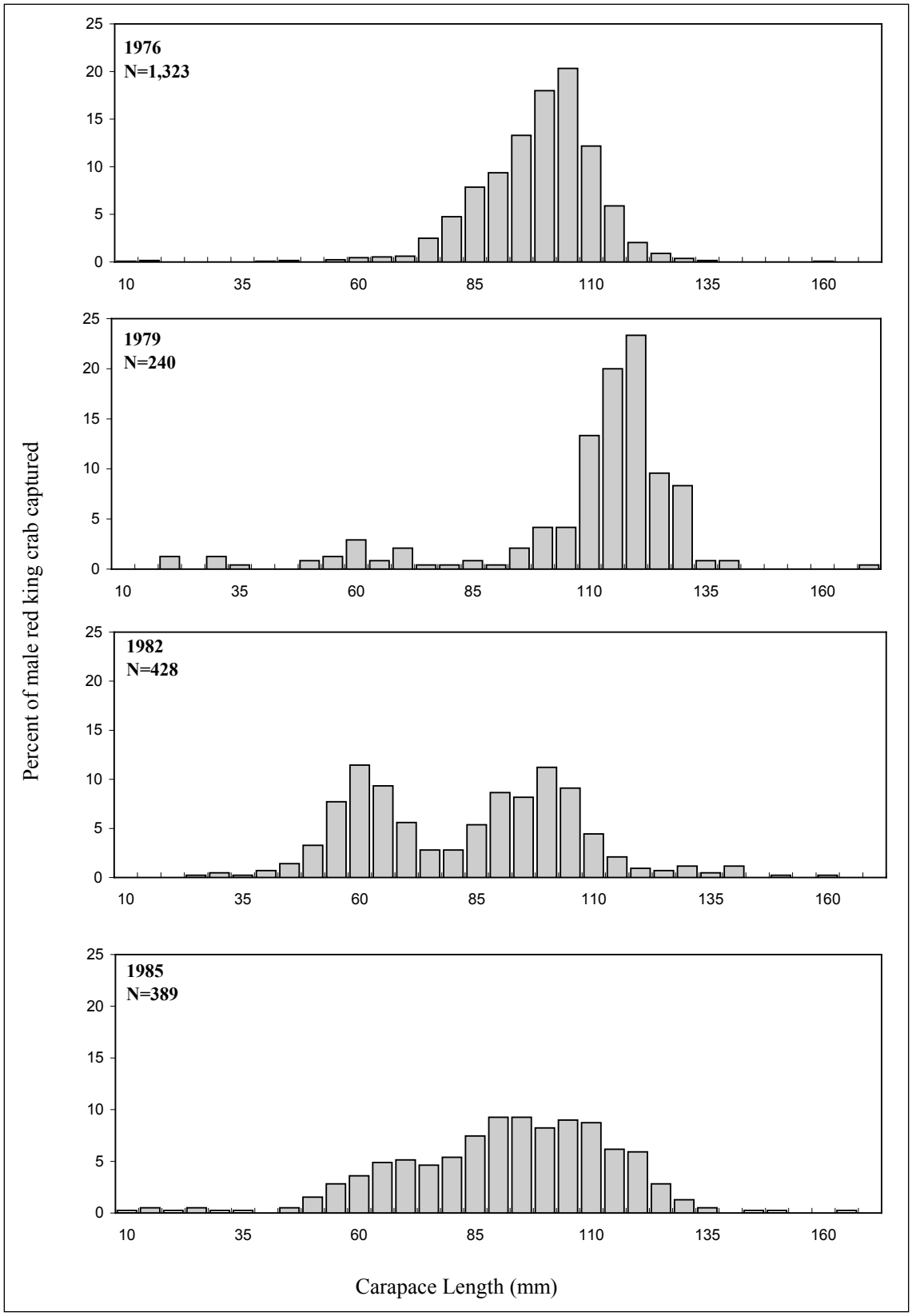
Appendix E10.–Closed water regulations in effect for the Norton Sound summer commercial crab fishery.



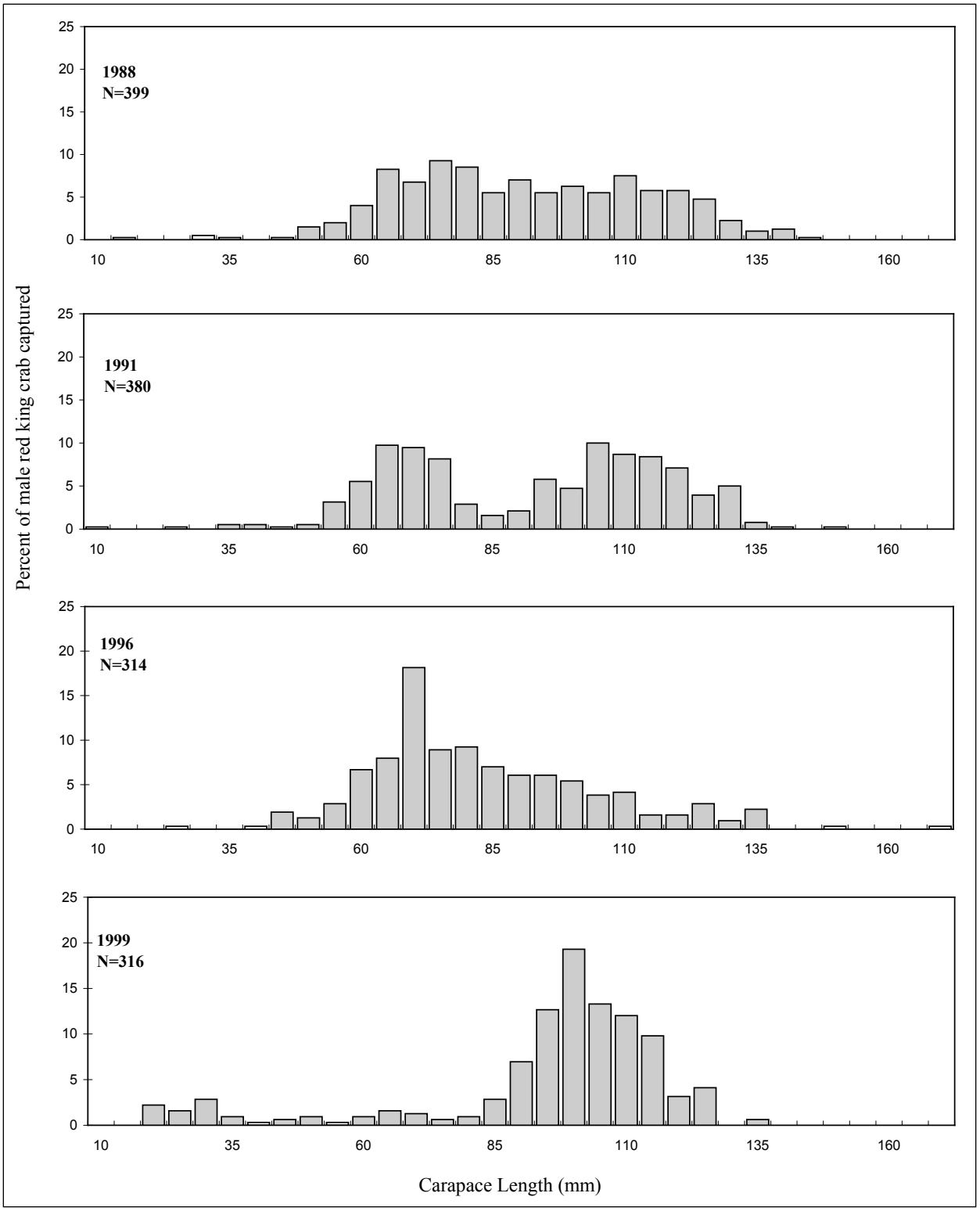
Appendix E11.–The percent of crab harvested during the Norton Sound summer commercial red king crab fishery east of 164º west longitude, 1987–2010.



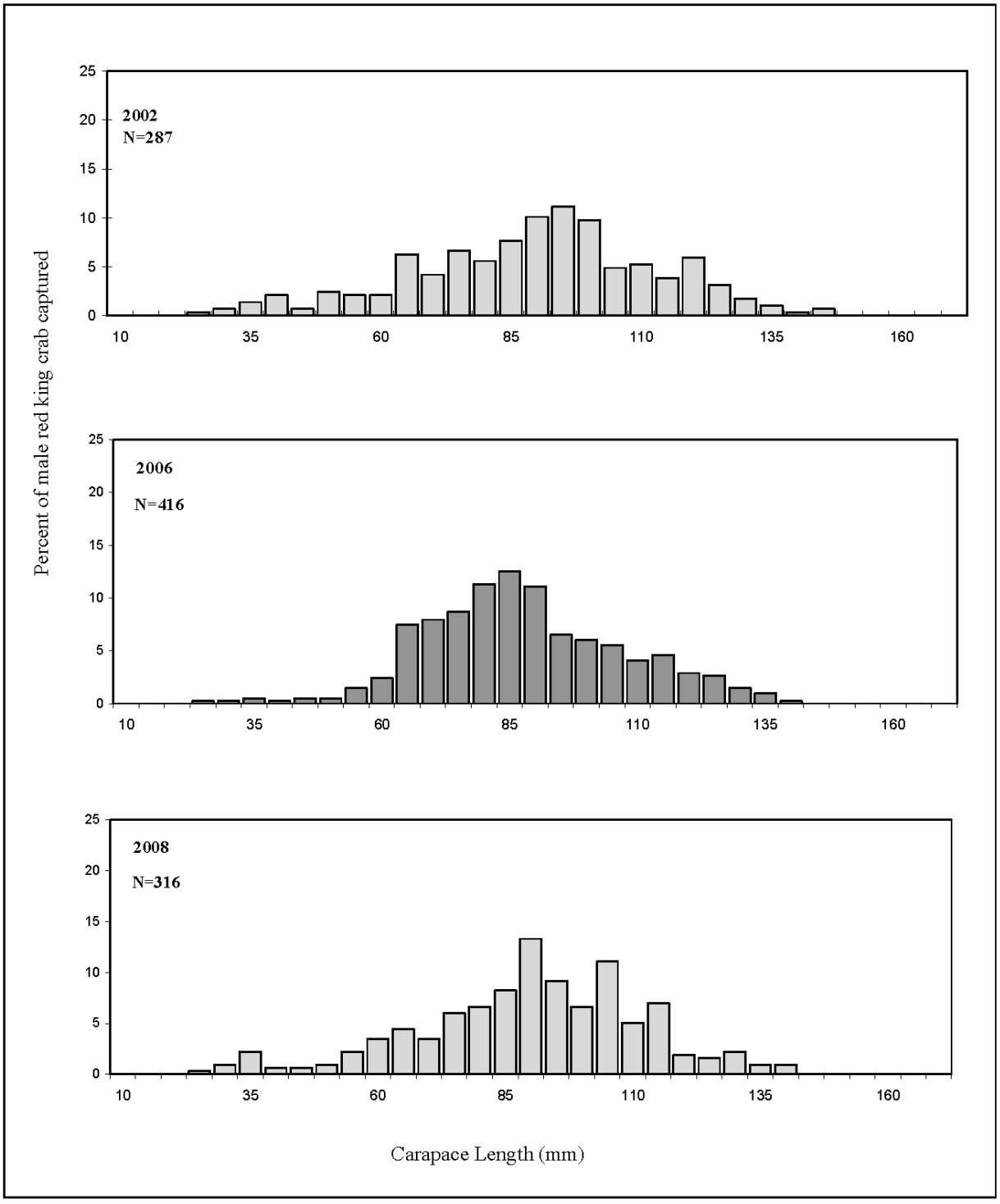
Appendix E12.–Norton Sound male red king crab size distribution from pot assessment surveys conducted by ADF&G in 1980, 1981, 1982, and 1985.



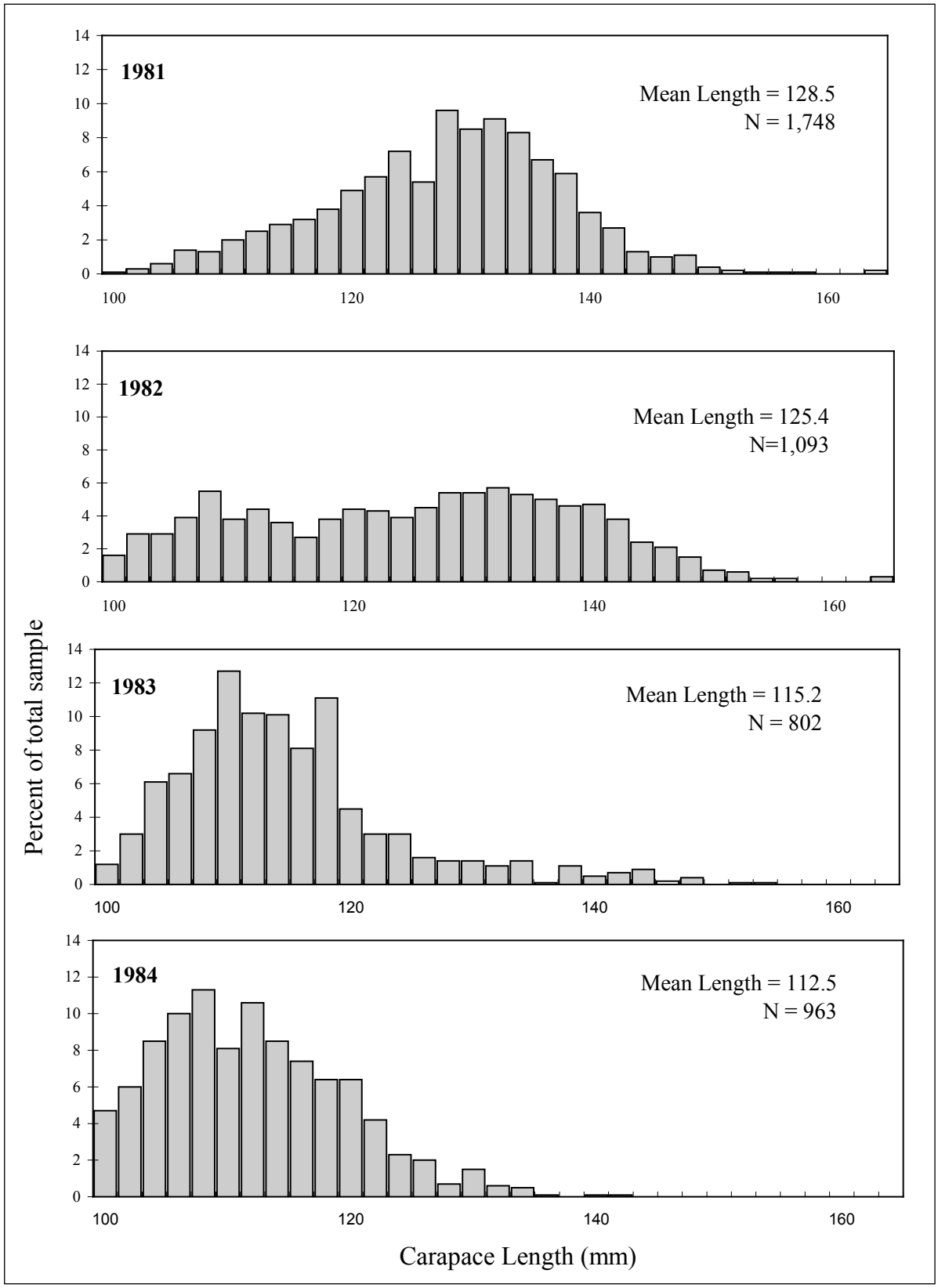
Appendix E13.–Norton Sound male red king crab size distribution from trawl assessment surveys conducted by the National Marine Fisheries Service, 1976, 1979, 1982, and 1985.



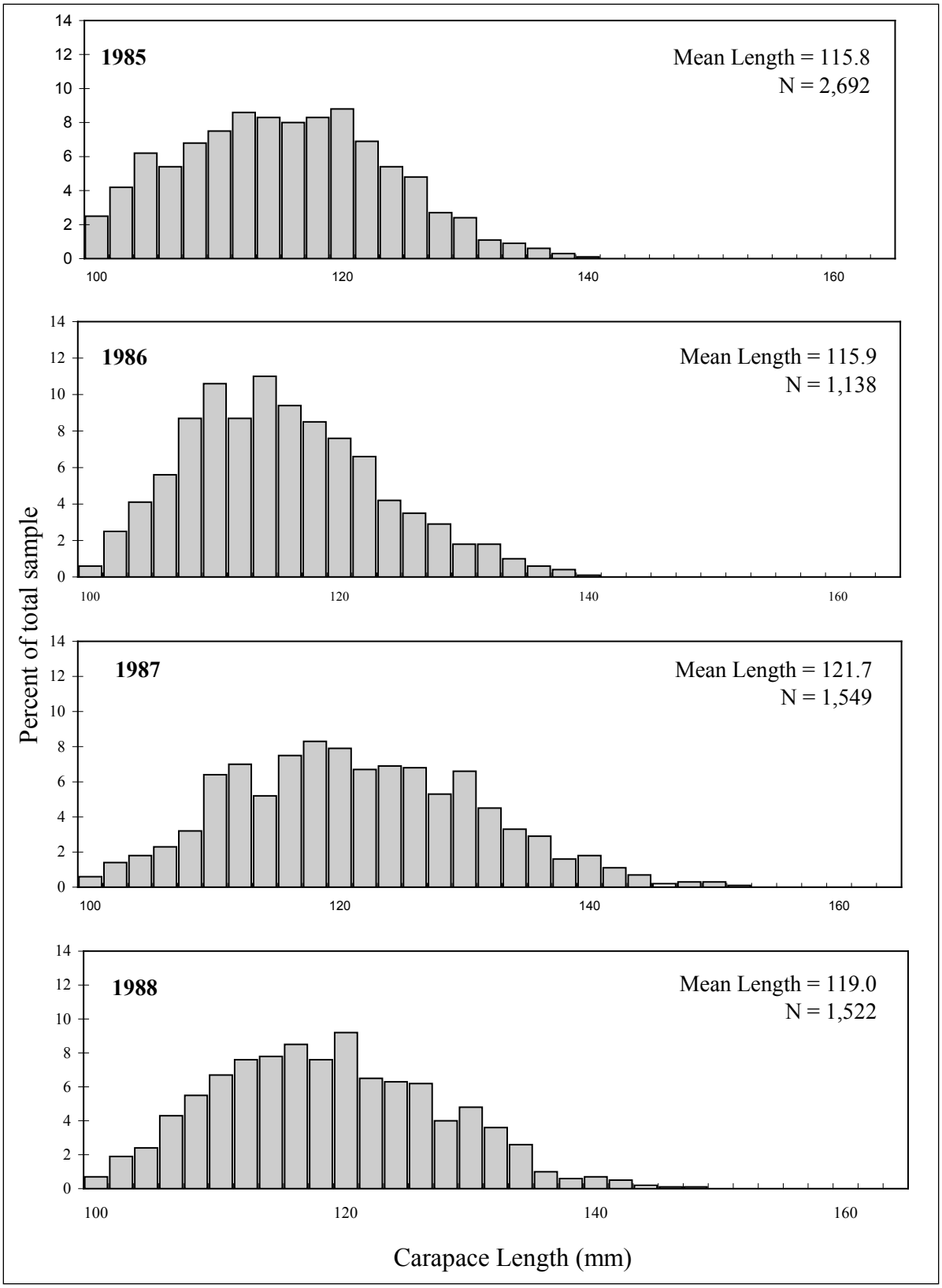
Appendix E14.–Norton Sound male red king crab size distribution from trawl assessment surveys conducted by the National Marine Fisheries Service in 1988 and 1991, and by ADF&G in 1996 and 1999.



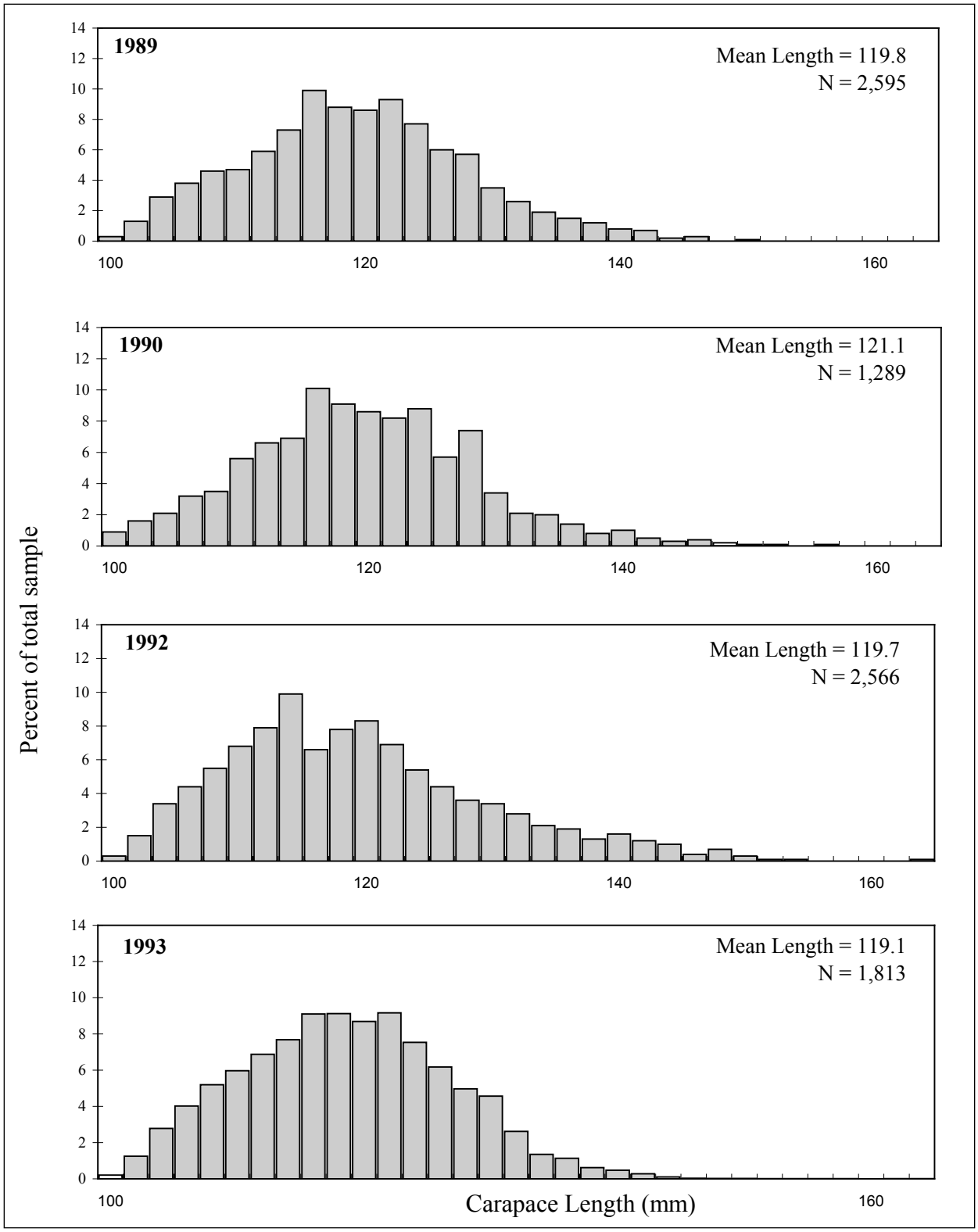
Appendix E15.–Norton Sound male red king crab size distribution from trawl assessment surveys conducted by ADF&G in 2002, 2006, and 2008.



Appendix E16.–Length composition of Norton Sound red king crab summer commercial harvests, 1981–1984.

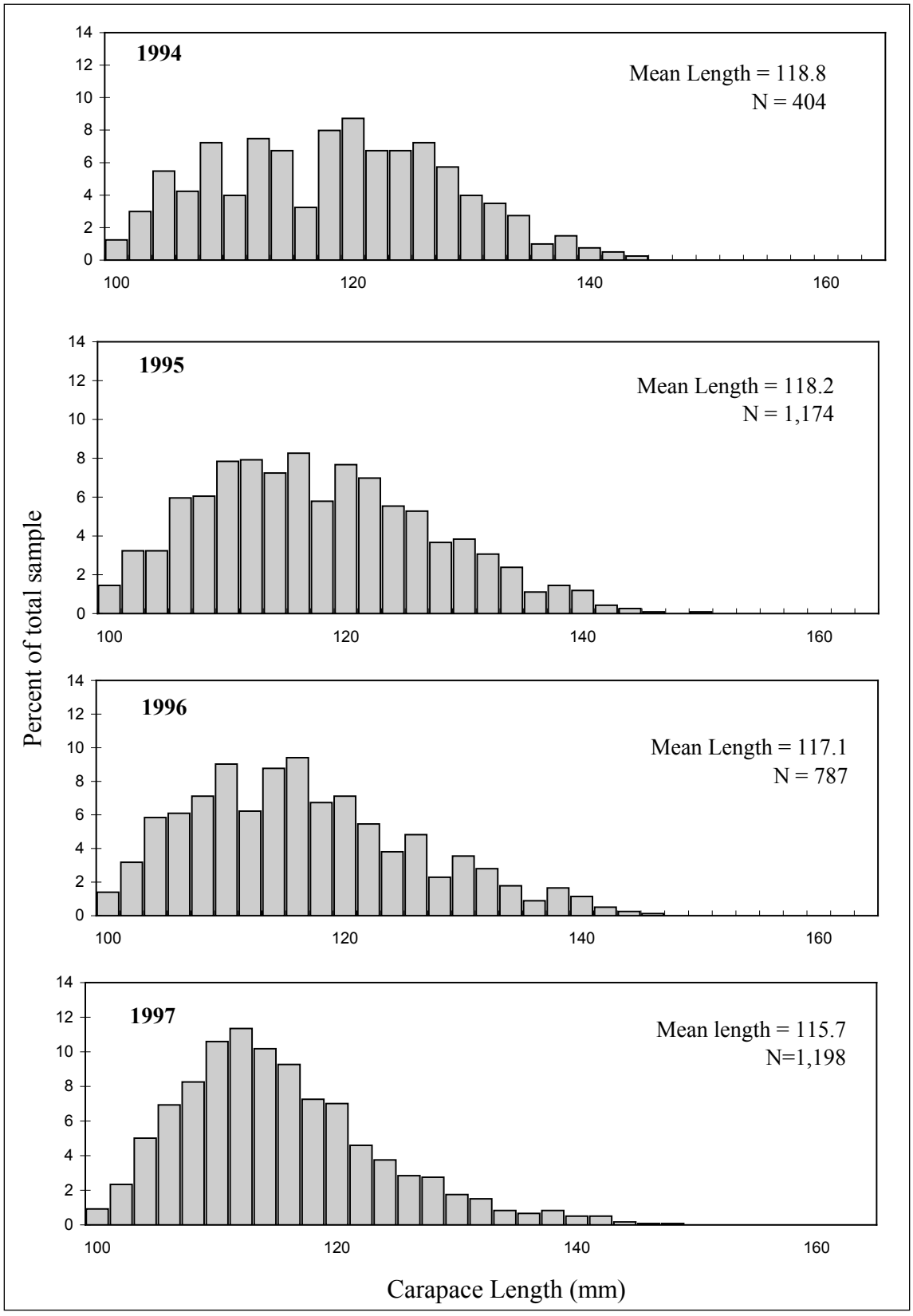


Appendix E17.–Length composition of Norton Sound red king crab summer commercial harvests, 1985–1988.

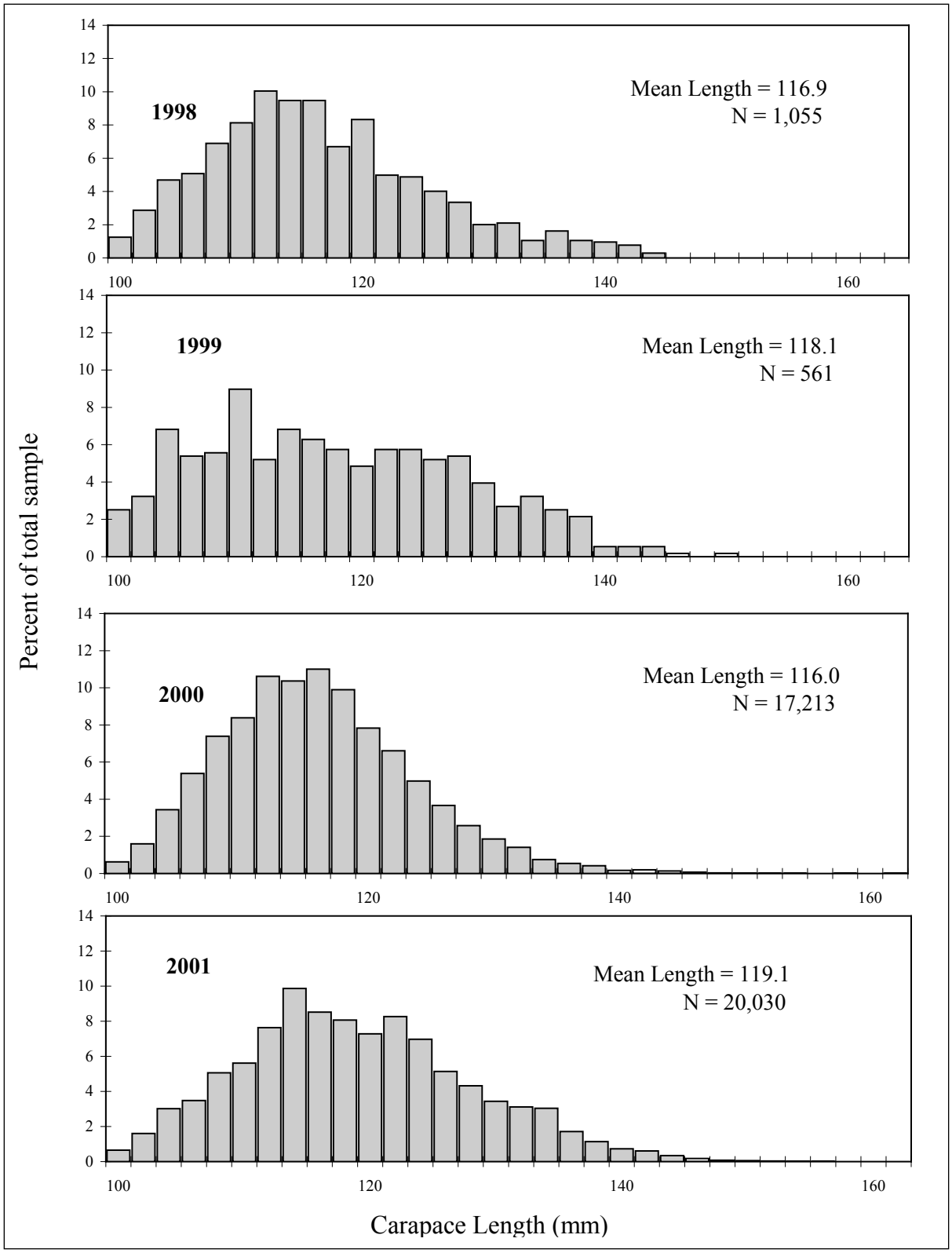


Note: No fishery in 1991.

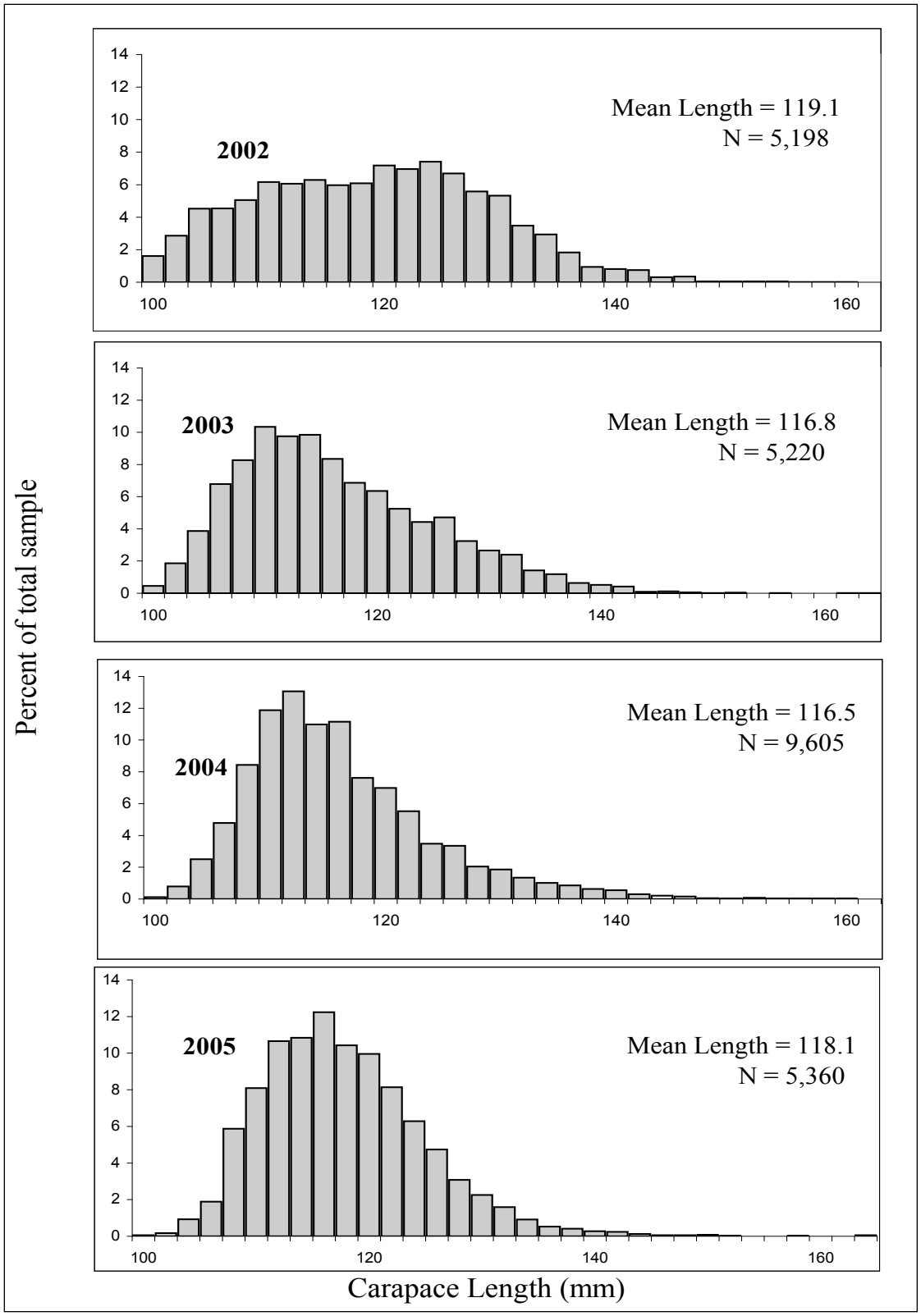
Appendix E18.–Length composition of Norton Sound red king crab summer commercial harvests, 1989–1993.



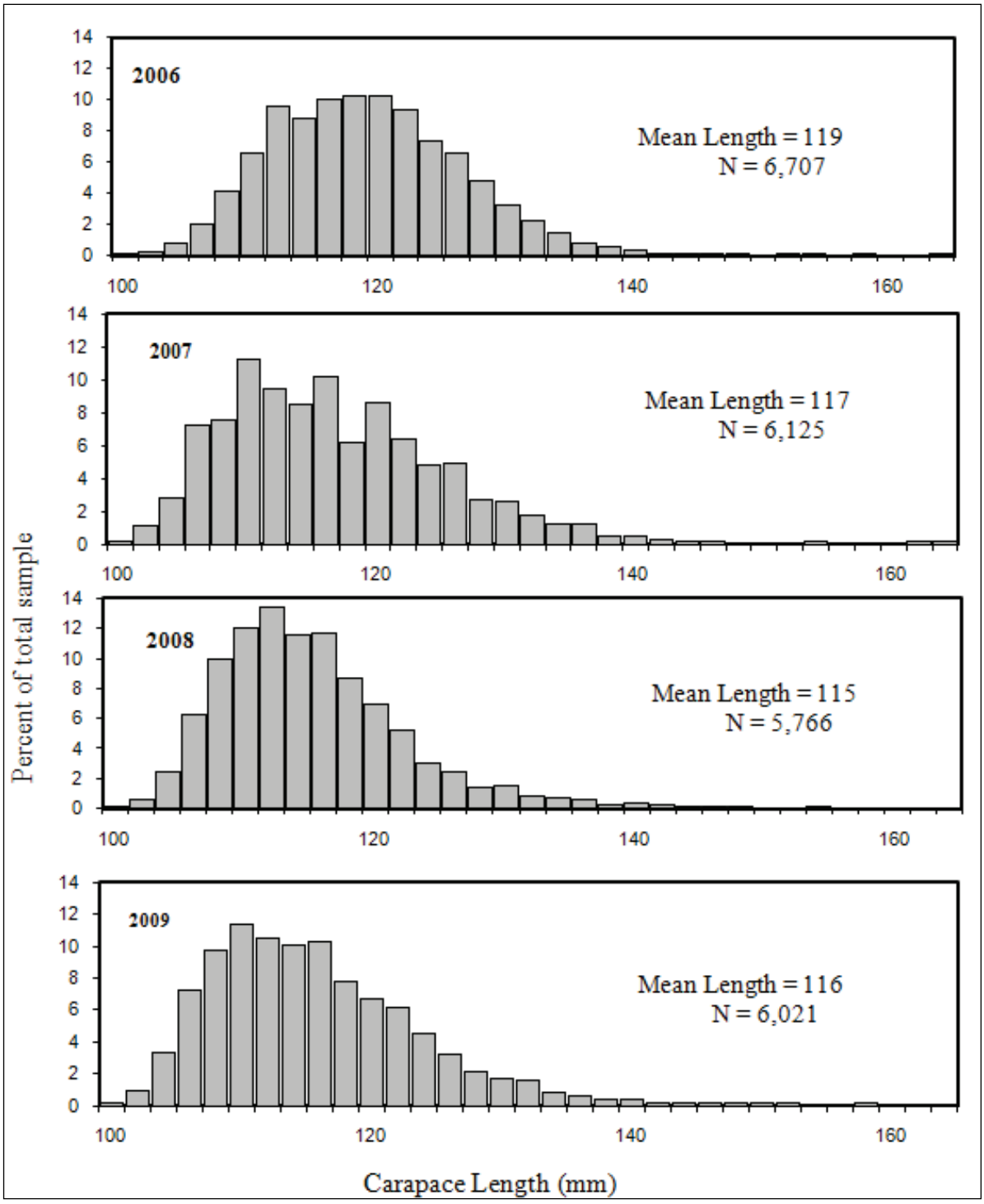
Appendix E19.–Length composition of Norton Sound red king crab summer commercial harvests, 1994–1997.



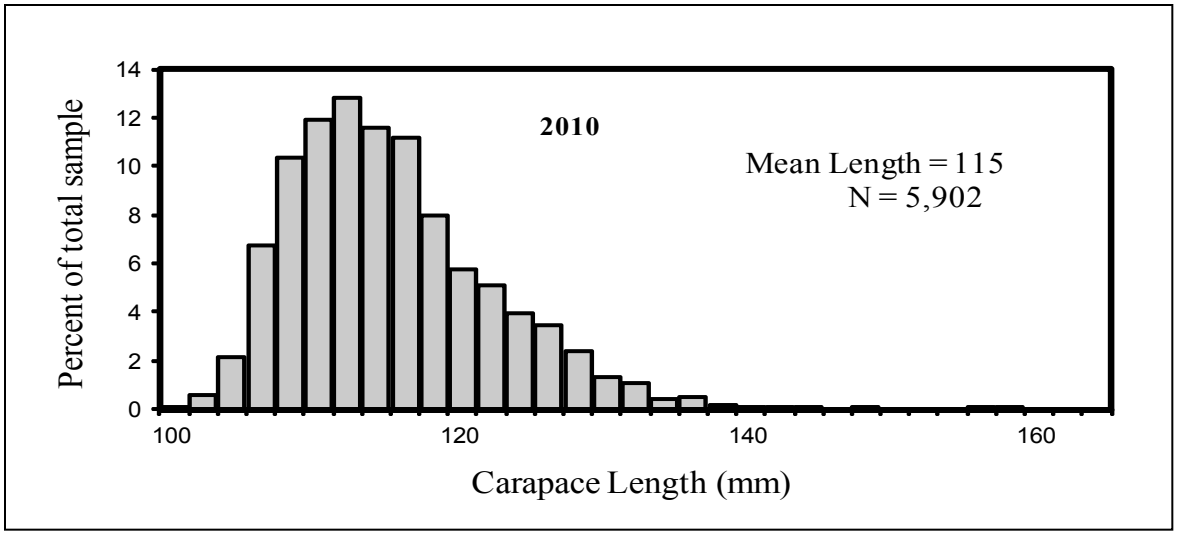
Appendix E20.–Length composition of Norton Sound red king crab summer commercial harvests, 1998–2001.



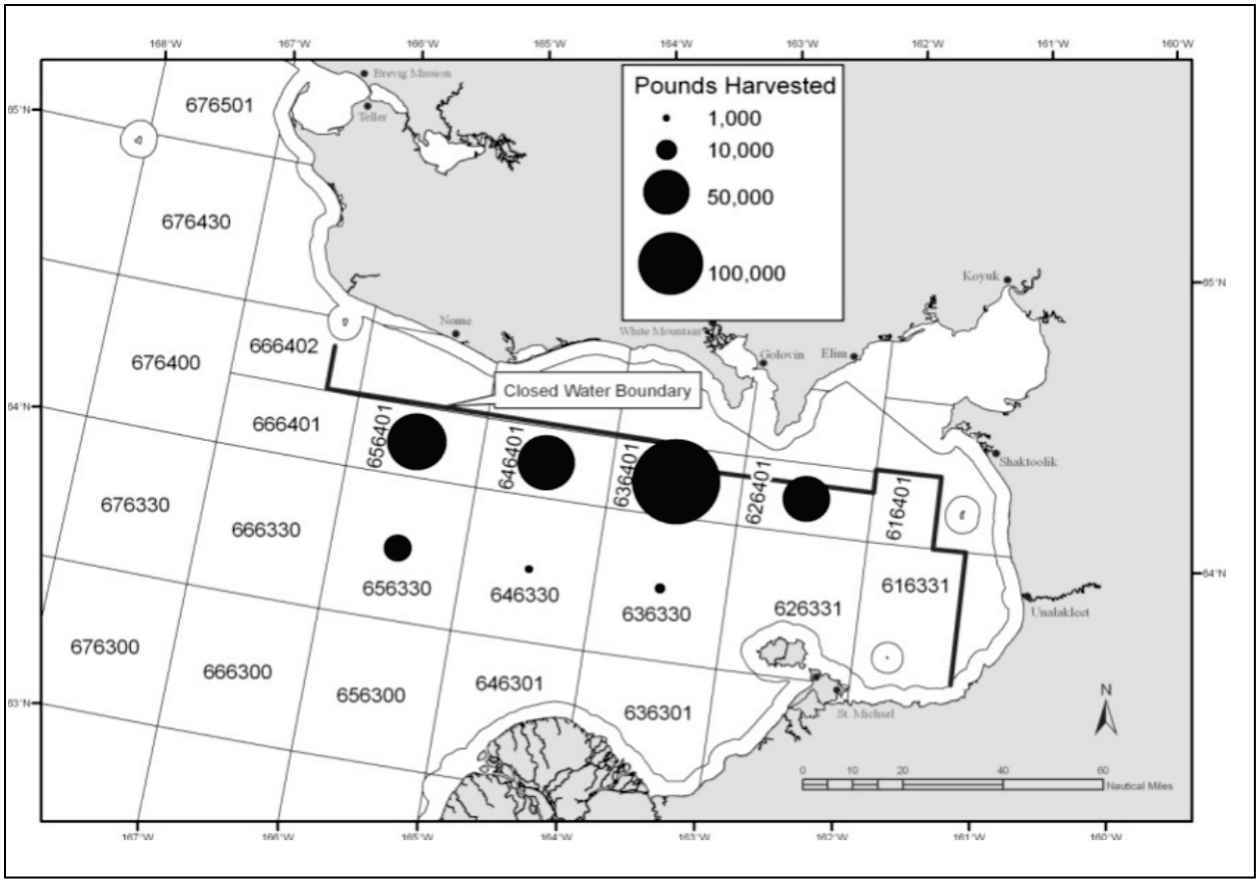
Appendix E21.–Length composition of Norton Sound red king crab summer commercial harvests, 2002–2005.



Appendix E22.–Length composition of Norton Sound red king crab summer commercial harvest, 2006–2009.



Appendix E23.–Length composition of Norton Sound red king crab summer commercial harvest, 2010.



Appendix E24.–Commercial harvest (including CDQ fishery) of red king crab from Norton Sound by statistical area, 2010.

APPENDIX F: MISCELLANEOUS FISHERIES

Appendix F1.–Kotzebue District winter commercial sheefish harvest statistics, 1967–2010.

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					
2006-10 [e]						

[a] Data are 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, 1978–2010.

	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
2010	1,835	232	493	366	595
Average					
2000-2009	3,920	984	1,474	1,053	1,044
2005-2009	3,194	696	1,550	521	657

Note: Data not available for all years.

Appendix F4.–Kotzebue District incidentally caught and sold Dolly Varden during the commercial salmon fishery, 1966–2010.

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	0.00
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	[i]	0.00
2002	0	30	0	[i]	0.00
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

-continued-

Year	Number of Fish Sold	Estimated Total Catch [a]	Pounds Sold	Average Weight [b]	Average Price
2006	0	278	0	[i]	0.00
2007	0	960	0	[i]	0.00
2008	0	1,629	0	[i]	0.00
2009	0	960	0	[i]	0.00
2010	0	1,323	0	[i]	0.00

Note: Data not available for all years.

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

[b] Some data extrapolated from average reported weight.

[c] Price per fish.

[d] Includes 269 taken by permit.

[e] Includes 179 taken by permit.

[f] Includes 234 taken during commercial sheefish fishery.

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

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

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

Appendix F5.–Subsistence harvests of Dolly Varden from the villages of Kivalina and Noatak, 1959–2007.

	Kivalina		Noatak
Year	Number	Pounds	Number [a]
1959 [b]	34,240	85,600	
1960 [b]	49,720	124,300	
1962			27,623
1963			4,130
1968 [c]	49,512	120,214	
1969	64,970	152,750	32,350
1970	33,820	79,420	3,700
1971	29,281	68,518	5,320
1972	48,807	114,637	1,492
1973 [d]			
1979 [e]	14,600		9,060
1980			7,220
1981	15,000-18,000		3,056
1982	18,438	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, 1988–2010.

	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
2010	0	165	0	1,411	12	117	0	24	106	1,835
Average										
2000-2009	148	478	84	1,649	590	192	92	99	544	3,875
2005-2009	22	488	2	1,301	505	195	117	151	324	3,105

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 1976–2010.

Year [a]	Noatak River Spawner Survey [b]	Overwintering	
		Wulik River [c]	Kivalina River [c]
1968		90,236	27,640
1969		297,257	
1976		68,300	12,600
1977 [d]			
1978 [d]			
1979		55,030	15,744
1980		113,553	39,692
1981	7,922	101,826	45,355
1982	8,275	65,581	10,932
1983	2,924 [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]
2010	[f]	36,866	[f]

Note: Data not available for all years.

[a] Counts are considered minimal as data listed include 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 2010

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, 2010.

HERRING

Herring Test Fishing

a) Location: Norton Sound ocean waters; herring fishing conducted from Unalakleet because field camp at Cape Denbigh was not operational in 2010 due to ice.

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 two 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 with assistance from NSEDC.

Unalakleet River Weir

a) Location: Unalakleet River, approximately fifteen miles upstream from village of Unalakleet.

b) Description: Determine daily and seasonal timing and magnitude of Chinook, chum and pink escapements. Collect age, sex, and length data from Chinook and chum salmon from weir trap. Cooperative ADF&G, BLM, NSEDC and Unalakleet IRA 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 with assistance from ADF&G.

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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 with assistance from 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 one 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 with assistance from 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 two 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 NSEDC with assistance from ADFG.

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, and Unalakleet were surveyed by Division of Commercial Fisheries. 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 14 miles west to 40 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, 10 to 15 miles south of land, on either side of closure line.

b) Description: To record the number, size, and sex of red king crab caught in order to ascertain any migration patterns across the closure line, and to comparison test the effectiveness of crab pots configured with different escapement mechanisms in reducing the amount of smaller sized crabs captured. 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.

-end-

Appendix G3Appendix G3.–Commercial processors and buyers operating in Norton Sound, Port Clarence, and Kotzebue Sound, 2010.

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 Seafoods	Anchorage, AK	Buy and Fly	Kotzebue Sound

Appendix G4.–Norton Sound subsistence salmon harvest survey form, 2010.

NORTON SOUND 2010 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?

RED KING CRAB

Emergency Order: 3-C-Z-01-10 Effective Date: June 28, 2010

EXPLANATION: This emergency order opens the commercial CDQ crab fishery in Norton Sound from 12:00 noon Monday, June 28 until 12:00 noon Friday, September 3, or the CDQ quota is reached.

JUSTIFICATION: By regulation the CDQ crab fishery can open anytime by emergency order. The ice has cleared out from the majority of Norton Sound and the previous concerns about lost pot gear because of ice conditions are no longer valid. The CDQ crab fishery quota is 30,000 pounds.

Emergency Order: 3-C-Z-02-10 Effective Date: July 1, 2010

EXPLANATION: This emergency order opens the commercial open access crab fishery in Norton Sound from 12:00 noon Thursday, July 1 until 12:00 noon Friday, September 3, or the open access quota is reached.

JUSTIFICATION: By regulation the open access king crab fishery can open anytime on or after June 15 by emergency order. Currently two land-based processor-buyers are registered and both buyers are ready to purchase open access crab. The guideline harvest level for the 2010 Norton Sound open access fishery is 370,000 pounds.

Emergency Order: 3-C-Z-03-10 Effective Date: August 24, 2010

EXPLANATION: This emergency order closes the commercial open access crab fishery in Norton Sound. Permit holders must have pots unbaited and secured open by 12:00 noon, Tuesday, August 24 and removed from the water by Monday, August 30, 2010.

JUSTIFICATION: The guideline harvest level for the 2010 Norton Sound open access crab fishery is 370,000 pounds. Through the morning of August 20, there were approximately 330,000 pounds reported harvested. There are currently at least 24 vessels still fishing and the quota is expected to be reached by 12:00 noon Tuesday, August 24. All crab must be delivered by 12 noon, Wednesday, August 25. All commercial crab pots must be removed from the water by Monday, August 30, 2010.

HERRING

Emergency Order: 3-H-Z-1-10 Effective Date: June 7, 2010

EXPLANATION: This emergency order opens the Norton Sound District to commercial gillnet fishing for sac roe herring beginning 12 p.m. Monday, June 7, 2010 until Thursday, July 1, 2010, unless superseded by another emergency order.

JUSTIFICATION: Herring were first sighted on Sunday, June 6 by a Norton Sound Economic Development Corporation biologist near Elim in Subdistricts 4 and 5. On the same day a Fish & Game biologist noted broken ice on the shore from Cape Denbigh to the south, Subdistricts 1-3. In years of ice at Cape Denbigh and continuing to the south the herring will often spawn near Elim. The tenders and processor arrived in Norton Sound on June 7 and the buyer is interested in purchasing 1,000 tons from a quota of 8,000 tons. To allow for maximum flexibility for the buyer the Norton Sound District will open at 12 noon, June 7 to sac roe herring commercial fishing with gillnets. The continuous opening will allow the buyer to direct their fleet when to fish.

KOTZEBUE SALMON

Emergency Order: 3-S-X-01-10 Effective Date: July 12, 2010

EXPLANATION: This emergency order opens commercial fishing in the Kotzebue District through August 31, 2010 from Monday through Saturday. Monday fishing is open from 12 p.m. to 8 p.m. and from Tuesday through Saturday fishing is open from 6 a.m. until 2 p.m.

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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. Regulation allows the season to be open from July 10 through August 31. The buyer has notified the department that they would like to begin purchasing fish on the afternoon of July 12. The forecast is for a harvest of 175,000 to 225,000 chum salmon this season. The historical harvest has been over 100,000 chum salmon most years. To provide maximum opportunity to those who will fish, the department is opening the commercial salmon season six days a week. Having the fishery open 8 hours per day will allow the buyer to determine the fishing schedule that will provide for maximum quality of salmon based on processing time and airline schedules. With a limited market and an expected low number of participating permit holders, similar to recent years, achieving escapement goals are not expected to be a problem. If escapement becomes a concern then a more restricted fishing schedule will go into effect.

Emergency Order: 3-S-X-02-10 Effective Date: August 6, 2010

EXPLANATION: This emergency order closes the Kotzebue District to commercial salmon fishing effective at 12:01 a.m. Friday, August 6 and reopens the Kotzebue District to one six hour commercial salmon fishing period on August 6, 2010 from 6 a.m. until 12:00 p.m. (noon).

JUSTIFICATION: The department had previously opened the season for eight hours daily from Monday through Saturday. However, because of capacity concerns the only buyer has had to shorten the fishing time to less than eight hours. Some fishermen have ignored the request of the buyer and continued to fish longer than the buyer requested even though they are selling to that buyer. To have an orderly fishery the department is now closing the Kotzebue salmon fishery and will reopen the fishery at the times requested by the buyer. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 8th best out of 18 years. The buyer has requested a six hour opening for Friday, August 6, 2010.

Emergency Order: 3-S-X-03-10 Effective Date: August 7, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one four hour commercial salmon fishing period on August 7, 2010 from 6:00 a.m. until 10:00 a.m.

JUSTIFICATION: During the latest six hour fishing period on August 6 there were 13,768 salmon harvested by 36 permit holders and this harvest was the third largest daily harvest this season. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 8th best out of 18 years and department test fishing on the Noatak River on August 5 resulted in the highest catch in years. The buyer has requested a four hour opening for Saturday, August 7, 2010.

Emergency Order: 3-S-X-04-10 Effective Date: August 9, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one four hour commercial salmon fishing period on August 9, 2010 from 6:00 a.m. until 10:00 a.m.

JUSTIFICATION: During the latest four hour fishing period on August 7 there were 5,339 chum salmon harvested by 19 permit holders. The cumulative chum salmon harvest is nearly 147,000 fish and is on track to be the best harvest since 1995. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 9th best out of 18 years and department test fishing on the Noatak River on August 5 resulted in the highest catch in years.

Emergency Order: 3-S-X-05-10 Effective Date: August 10, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one six hour commercial salmon fishing period on August 10, 2010 from 6:00 a.m. until 12:00 p.m., noon.

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JUSTIFICATION: During the latest four hour fishing period on August 9 there were 3,649 chum salmon harvested by 24 permit holders. The cumulative chum salmon harvest is over 150,000 fish and is on track to be the best harvest since 1995. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 9th best out of 18 years.

Emergency Order: 3-S-X-06-10 Effective Date: August 11, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one five hour commercial salmon fishing period on August 11, 2010 from 6:00 a.m. until 11:00 a.m.

JUSTIFICATION: During the latest six hour fishing period on August 10 there were 6,468 chum salmon harvested by 30 permit holders. The cumulative chum salmon harvest is nearly 157,000 fish by 52 permit holders. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 9th best out of 18 years.

Emergency Order: 3-S-X-07-10 Effective Date: August 12, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one five hour commercial salmon fishing period on August 12, 2010 from 6:00 a.m. until 11:00 a.m.

JUSTIFICATION: During the latest five hour fishing period on August 11 there were 8,247 chum salmon harvested by 34 permit holders. The cumulative chum salmon harvest is over 165,000 fish by 56 permit holders. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 11th best out of 18 years.

Emergency Order: 3-S-X-08-10 Effective Date: August 13, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one four hour commercial salmon fishing period on August 13, 2010 from 6:00 a.m. until 10:00 a.m.

JUSTIFICATION: During the latest five hour fishing period on August 12 there were 9,601 chum salmon harvested by 30 permit holders. The cumulative chum salmon harvest is nearly 175,000 fish by 56 permit holders. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 11th best out of 18 years.

Emergency Order: 3-S-X-09-10 Effective Date: August 14, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one four hour commercial salmon fishing period on August 14, 2010 from 7:00 a.m. until 11:00 a.m.

JUSTIFICATION: During the latest four hour fishing period on August 13 there were 5,260 chum salmon harvested by 25 permit holders. The cumulative chum salmon harvest is nearly 180,000 fish by 58 permit holders. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 10th best out of 18 years.

Emergency Order: 3-S-X-10-10 Effective Date: August 16, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one five hour commercial salmon fishing period on August 16, 2010 from 7:00 a.m. until 12:00 p.m.

JUSTIFICATION: During the latest four hour fishing period on August 14 there were 4,252 chum salmon harvested by 21 permit holders. The cumulative chum salmon harvest is over 184,000 fish by 59 permit holders. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 10th best out of 18 years.

Emergency Order: 3-S-X-11-10 Effective Date: August 17, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one eight hour commercial salmon fishing period on August 17, 2010 from 6:00 a.m. until 2:00 p.m.

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JUSTIFICATION: During the latest five hour fishing period on August 16 there were 689 chum salmon harvested by 7 permit holders. Weather was a factor in the lack of effort the past fishing period. The cumulative chum salmon harvest is nearly 185,000 fish by 59 permit holders. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 10th best out of 18 years.

Emergency Order: 3-S-X-12-10 Effective Date: August 18, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one seven hour commercial salmon fishing period on August 18, 2010 from 7:00 a.m. until 2:00 p.m.

JUSTIFICATION: During the latest eight hour fishing period on August 17 there were 5,669 chum salmon harvested by 20 permit holders. Weather was again a factor in the lower than normal fishing effort during Tuesday's fishing period. The cumulative chum salmon harvest is over 190,000 fish by 60 permit holders. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 10th best out of 18 years.

Emergency Order: 3-S-X-13-10 Effective Date: August 19, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one eight hour commercial salmon fishing period on August 19, 2010 from 7:00 a.m. until 3:00 p.m.

JUSTIFICATION: During the latest seven hour fishing period on August 18 there were only three permit holders fishing because of rough ocean conditions. The cumulative chum salmon harvest is over 190,000 fish by 60 permit holders. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 10th best out of 18 years. Catches have increased dramatically at the test fish project the last two days likely because weather has kept a number of permit holders from fishing since late last week. Continuing with short duration periods should not jeopardize subsistence fishing harvests or escapements.

Emergency Order: 3-S-X-14-10 Effective Date: August 20, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one eight hour commercial salmon fishing period on August 20, 2010 from 7:00 a.m. until 3:00 p.m.

JUSTIFICATION: During the latest eight hour fishing period on August 19 there were 5,057 chum salmon harvested by 18 permit holders. The cumulative chum salmon harvest is over 196,000 fish by 60 permit holders. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 10th best out of 18 years. Catches have increased dramatically at the test fish project the last several days likely because weather has kept a number of permit holders from fishing since late last week until today.

Emergency Order: 3-S-X-15-10 Effective Date: August 21, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one five hour commercial salmon fishing period on August 21, 2010 from 7:00 a.m. until 12:00 p.m.

JUSTIFICATION: During the latest eight hour fishing period on August 20 there were 9,468 chum salmon harvested by 25 permit holders. The cumulative chum salmon harvest is over 205,000 fish by 60 permit holders. The cumulative harvest has exceeded 200,000 fish for the first time since 2001. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 10th best out of 18 years.

Emergency Order: 3-S-X-16-10 Effective Date: August 23, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one five hour commercial salmon fishing period on August 23, 2010 from 7:00 a.m. until 12:00 p.m.

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JUSTIFICATION: During the latest five hour fishing period on August 21 there were 6,831 chum salmon harvested by 24 permit holders. The cumulative chum salmon harvest is over 212,000 fish by 60 permit holders. The cumulative harvest is the best since 1995. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 9th best out of 18 years.

Emergency Order: 3-S-X-17-10 Effective Date: August 24, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one seven hour commercial salmon fishing period on August 24, 2010 from 7:00 a.m. until 2:00 p.m.

JUSTIFICATION: During the latest five hour fishing period on August 23 there were 9,108 chum salmon harvested by 19 permit holders. The cumulative chum salmon harvest is nearly 222,000 fish by 60 permit holders. The cumulative harvest is the best since 1995 when 290.730 chum salmon were harvested. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 7th best out of 18 years.

Emergency Order: 3-S-X-18-10 Effective Date: August 26, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one five hour commercial salmon fishing period on August 26, 2010 from 7:00 a.m. until 12:00 p.m.

JUSTIFICATION: During the latest seven hour fishing period on August 24 there were 12,740 chum salmon harvested by 24 permit holders. The buyer actually requested permit holders to pull their gear four hours and twenty minutes into the period because of capacity concerns. There are no escapement concerns as the test fish project catch on the Kobuk River ranks 5th best out of 18 years.

Emergency Order: 3-S-X-19-10 Effective Date: August 27, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one six hour commercial salmon fishing period on August 27, 2010 from 7:00 a.m. until 1:00 p.m.

JUSTIFICATION: During the latest five hour fishing period on August 26 there were 8,946 chum salmon harvested by 29 permit holders. There are no escapement concerns as the test fish project catch on the Kobuk River saw an unprecedented spike in catches for late August.

Emergency Order: 3-S-X-20-10 Effective Date: August 28, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one four hour commercial salmon fishing period on August 28, 2010 from 8:00 a.m. until 12:00 p.m.

JUSTIFICATION: During the latest six hour fishing period on August 27 there were 5,891 chum salmon harvested by 25 permit holders. Catches for the last week of August have been record setting.

Emergency Order: 3-S-X-21-10 Effective Date: August 30, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one seven hour commercial salmon fishing period on August 30, 2010 from 7:00 a.m. until 2:00 p.m.

JUSTIFICATION: During the latest four hour fishing period on August 28 there were 5,891 chum salmon harvested by 25 permit holders. Catches for the last week of August have been record setting. There was no fishing on Saturday because of mechanical problems with the cargo planes.

Emergency Order: 3-S-X-22-10 Effective Date: August 31, 2010

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EXPLANATION: This emergency order reopens the Kotzebue District for one seven hour commercial salmon fishing period on August 31, 2010 from 7:00 a.m. until 2:00 p.m.

JUSTIFICATION: During the latest seven hour fishing period on August 30 there were 9,035 chum salmon harvested by 26 permit holders. The catch was a record for this date. Continuing with short duration periods should not jeopardize subsistence fishing harvests or escapements.

Emergency Order: 3-S-X-23-10 Effective Date: September 1, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one seven hour commercial salmon fishing period on September 1, 2010 from 7:00 a.m. until 2:00 p.m.

JUSTIFICATION: During the last week of August Kotzebue commercial salmon fishermen have been catching record numbers of chum salmon. The 2010 commercial cumulative chum salmon harvest is the best since 1995 and test fish catches on the Kobuk River and Noatak River have been above average this year. Village residents on the Kobuk and Noatak Rivers have reported good subsistence catches of chum salmon. Extending the season past the regular closure date of August 31 should not jeopardize subsistence fishing harvests or escapements.

Emergency Order: 3-S-X-24-10 Effective Date: September 2, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one eight hour commercial salmon fishing period on September 2, 2010 from 7:00 a.m. until 3:00 p.m.

JUSTIFICATION: During the last week of August Kotzebue commercial salmon fishermen have been catching record numbers of chum salmon. The 2010 commercial cumulative chum salmon harvest is the best since 1995 and test fish catches on the Kobuk River and Noatak River have been above average this year. Village residents on the Kobuk and Noatak Rivers have reported good subsistence catches of chum salmon. Extending the season past the regular closure date of August 31 should not jeopardize subsistence fishing harvests or escapements.

Emergency Order: 3-S-X-25-10 Effective Date: September 3, 2010

EXPLANATION: This emergency order reopens the Kotzebue District for one eight hour commercial salmon fishing period on September 3, 2010 from 7:00 a.m. until 3:00 p.m.

JUSTIFICATION: During the last week of August Kotzebue commercial salmon fishermen have been catching record numbers of chum salmon. The 2010 commercial cumulative chum salmon harvest is the best since 1995 and test fish catches on the Kobuk River and Noatak River have been above average this year. Village residents on the Kobuk and Noatak Rivers have reported good subsistence catches of chum salmon. Extending the season past the regular closure date of August 31 should not jeopardize subsistence fishing harvests or escapements.

NORTON SOUND SALMON – COMMERCIAL

Emergency Order: 3-S-Z-01-10 Effective Date: June 15, 2010

EXPLANATION: This emergency order sets the subsistence salmon fishing schedule for the Nome Subdistrict and catch limits for the Nome Subdistrict, and Pilgrim and Kuzitrin Rivers in the Port Clarence District. The subsistence schedule will be from 6 p.m. Thursday until 6 p.m. Sunday in the Nome Subdistrict and the catch limits for all locations are listed on the permits.

JUSTIFICATION: The department forecast for 2010 is that the chum salmon run will exceed the ANS and Tier II restrictions will not be required. Catch limits are still in effect for the various marine and fresh water subsistence areas. All catch limits are listed on the permits. The department staff will be flying frequent aerial surveys and boating some of the rivers to track the salmon migration strength and progress. The weirs and towers on the Nome, Snake, Eldorado and Pilgrim Rivers, will also be used to track the various salmon migrations. If a stream appears to

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have adequate escapement, catch limits will be lifted in that area. By regulation the subsistence gillnet fishing schedule for the Nome Subdistrict begins on June 15.

Emergency Order: 3-S-Z-02-10 Effective Date: June 15, 2010

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 Monday, June 14 and reopens the above waters beginning Tuesday, June 15 to a subsistence fishing schedule of two 48 hour periods per week (from 6 p.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: Shaktoolik and Unalakleet Subdistricts king salmon has been listed as a stock of concern since 2004 and the Board of Fisheries adopted the subsistence fishing schedule in 2007 to further protect king salmon. The intent of the subsistence fishing schedule was to provide windows of escapement unimpeded by gillnets for king salmon migrating to spawning areas. Eastern Norton Sound king salmon runs are forecasted to be below the historical average and may not provide for customary levels of use this season. North River king salmon escapement goals were not reached from 2004 to 2006, the parent years for the 2010 run. Additionally, age data show that the 2004 brood year accounted for only 22 percent of the spawning escapement in 2009. Therefore, the relatively larger 6-year old king salmon are expected to comprise a smaller proportion of the 2010 run. Mesh size restrictions are expected in late June for the Unalakleet River to conserve the majority of these large king salmon.

Emergency Order: 3-S-Z-03-10 Effective Date: June 30, 2010

EXPLANATION: This emergency order opens Subdistricts 2 and 3, the Golovnin Bay and Elim Subdistricts of the Norton Sound District to commercial salmon fishing for 48 hours from 6:00 p.m. Wednesday, June 30 to 6 p.m. Friday, July 2.

JUSTIFICATION: Chum salmon runs are making a strong early showing in most rivers throughout Norton Sound. Since counting began on Friday, June 25, an estimated 10,000 chum salmon have been counted at Kwiniuk River tower near Elim. Chum salmon escapement to the Kwiniuk River is projected to range between 30,000 and 70,000 chum salmon, well above the escapement goal range of 11,500-23,000 chum salmon. Niukluk River tower is used to assess salmon runs in the Golovnin Bay Subdistrict. Although it is not operational yet, chum salmon runs in Subdistricts 2 (Golovnin Bay) and 3 typically exhibit similar run timing and strength. Additionally, effort is expected to be limited to 4-5 permit holders in Golovnin and this 48 hour period's catch information should provide an early index of chum salmon run strength to Subdistrict 2.

Emergency Order: 3-S-Z-04-10 Effective Date: July 2, 2010

EXPLANATION: This emergency order opens the marine waters of Subdistrict 6 of the Norton Sound District, the Unalakleet Subdistrict, to commercial salmon fishing from 6:00 pm. Friday, July 2 until 6:00 p.m. Saturday, July 3. 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 net catches and tower counts of chum salmon are considered to be a strong early showing for chum considering how cold water temperatures have been in eastern Norton Sound this season. To the north in the Elim Subdistrict, where water temperatures have been warmer, chum salmon are showing up in near-record numbers. Limiting commercial to the southern half of Subdistrict 6 should have the desired effect of allowing commercial harvest of chum salmon while protecting milling Chinook salmon near the mouth of the Unalakleet River for escapement and subsistence fishing needs.

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Emergency Order: 3-S-Z-05-10 Effective Date: July 3, 2010

EXPLANATION: This emergency order opens the marine waters of Subdistrict 5 of the Norton Sound District, the Shaktoolik Subdistrict, to commercial salmon fishing from 6:00 pm. Saturday, July 3 until 6:00 p.m. Sunday, July 4. 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: The ADF&G Unalakleet River test net has caught 200 chums as of June 28, which is above the 10 and 20-year historical average catches for this date. Additionally, 480 chum salmon have been enumerated at a tower located on the North River, a tributary of the Unalakleet River. The North River tower count is the second highest for this date. Waiting until Saturday evening to conduct this brief commercial fishing period should have the desired effect of conserving the majority of Chinook salmon of Unalakleet River origin, thereby helping to meet escapement and subsistence fishing needs. Incidental catches of Chinook salmon will also be evaluated to determine the extent of further commercial fishing in Subdistrict 5.

Emergency Order: 3-S-Z-06-10 Effective Date: July 5, 2010

EXPLANATION: In order to conserve Chinook salmon, effective 8:00 a.m. Monday, July 5, 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.

JUSTIFICATION: Preliminary run strength and timing indicators suggest that the Chinook salmon run to the Unalakleet River drainage is weak and has later than average run timing. Since 2008, these inriver mesh-size restrictions have been effective at reducing Chinook salmon harvests and conserving the majority of larger, more productive female Chinook salmon so that they may reach the spawning grounds. Allowing the majority of these more productive females to reach the spawning grounds should improve future returns of Chinook salmon into the drainage.

Emergency Order: 3-S-Z-07-10 Effective Date: July 1, 2010

EXPLANATION: This emergency order allows for beach seining during the regularly scheduled set gillnet periods in the Eldorado, Flambeau and Sinuk Rivers and in Safety Sound west of the Safety Sound bridge.

JUSTIFICATION: An aerial survey on June 30 was conducted on Subdistrict 1 Rivers. Over ten thousand salmon were observed in the lower Sinuk River with a seal feasting on salmon in the muddy waters leading into the Sinuk River mouth. The majority of the salmon were pink salmon, but thousands of larger salmon were also seen. Most were believed to chum salmon and the escapement goal of Sinuk River is expected to be easily reached. The Eldorado and Flambeau Rivers in western Safety Sound had hundreds of pink salmon with thousands of pink salmon in Safety Sound. Chum salmon were not as plentiful as pink salmon, but with near record chum salmon runs returning in adjacent subdistricts, escapement is expected to be easily reached in the Eldorado-Flambeau drainage. The opportunity to use seines will provide more opportunity for subsistence fishermen to capture salmon particularly during the better drying weather of early summer.

Emergency Order: 3-S-Z-08-10 Effective Date: July 5, 2010

EXPLANATION: This emergency order opens Subdistricts 2 and 3, the Golovnin Bay and Elim Subdistricts of the Norton Sound District to commercial salmon fishing for 48 hours from 6:00 p.m. Monday, July 5 to 6 p.m. Wednesday, July 7.

JUSTIFICATION: Chum salmon runs continue to be strong in northern Norton Sound. In the Elim Subdistrict, commercial catches from the recent 48 hour period ending Friday, July 2 were 1 king, 5,700 chum, and 2,500 pink salmon for 14 permit holders. The chum salmon catch was 80% above the historical average catch for this date and catch per unit of effort was the fourth highest on record. The latest period's total catch of chum salmon in the

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Golovnin Bay Subdistrict was below average, but catch per unit of effort was a record for this date. Catches for the last period in Golovin are confidential due to low effort.

Emergency Order: 3-S-Z-09-10 Effective Date: July 4, 2010

EXPLANATION: This emergency order opens the marine waters of Subdistrict 4, the Norton Bay Subdistrict, to commercial salmon fishing with gillnets for one 24 hour period from 6:00 p.m. Sunday, July 4 to 6:00 p.m. Monday, July 5. 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: Chum salmon runs continue to be strong in northern Norton Sound. In the Elim Subdistrict, commercial catches from the recent 48 hour period ending Friday, July 2 were 1 king, 5,700 chum, and 2,500 pink salmon for 14 permit holders. The chum salmon catch was 80% above the historical average catch for this date and catch per unit of effort was the fourth highest on record. The latest period's total catch of chum salmon in the Golovnin Bay Subdistrict was below average, but catch per unit of effort was a record for this date. Catches for the last period in Golovin are confidential due to low effort. Norton Bay Subdistrict does not have a management plan in regulation. However, like all areas the department does manage for sustained yield and for a priority to subsistence fishers. Salmon stock assessment data from neighboring subdistricts such as the Elim Subdistrict are used to determine if commercial fishing is warranted in the Norton Bay Subdistrict. Typically, brief periods are allowed at the beginning of the season in Norton Bay in order to obtain an index of chum salmon abundance and determine if additional commercial fishing is warranted.

Emergency Order: 3-S-Z-10-10 Effective Date: July 6, 2010

EXPLANATION: This emergency order opens the marine waters of Subdistrict 5 of the Norton Sound District, the Shaktoolik Subdistrict, to commercial salmon fishing for 36 hours from 12:00 pm. Tuesday, July 6th until midnight Wednesday evening, July 7th. 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: The chum salmon catch from recent commercial fishing period in the Shaktoolik Subdistrict was above average. In the Shaktoolik Subdistrict, 19 permit holders caught 4 king, 7,400 chum, 3,700 pink, and 3 sockeye salmon during the July 3rd 24 hour period. This period's chum salmon catch was the 4th highest on record and record setting for a 24 hour period in that subdistrict. Additionally, the chum salmon catch per unit of effort index of 16 points easily surpassed the previous record catch per unit of effort of 12 index points that occurred in late June of 1984.

Emergency Order: 3-S-Z-11-10 Effective Date: July 6, 2010

EXPLANATION: This emergency order opens the marine waters of Subdistrict 6 of the Norton Sound District, the Unalakleet Subdistrict, to commercial salmon fishing from 12:00 pm. Tuesday, July 6 until 12:00 p.m. Thursday, July 8. 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: Catches from recent commercial fishing periods in the Shaktoolik and Unalakleet Subdistricts were above average. In the Unalakleet Subdistrict, 19 permit holders harvested 27 king, 2,220 chum, 3,200 pink, and 3 sockeye salmon for the 24 hour July 2 opener. The Unalakleet chum salmon catch was slightly below average for early July, but the catch per unit of effort of 4.8 index points was more than double the average of 1.8 index points for early July. Incidental catches of king salmon have represented only 1-3 percent of the overall chum salmon catch during the Shaktoolik and Unalakleet Subdistrict's chum salmon directed fishery. Continuing to limit commercial to the southern half of Subdistrict 6 should have the desired effect of allowing commercial harvest of chum salmon while protecting milling Chinook salmon near the mouth of the Unalakleet River for escapement and subsistence fishing needs.

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Emergency Order: 3-S-Z-12-10 Effective Date: July 9, 2010

EXPLANATION: This emergency order opens Subdistricts 2-4, the Golovnin Bay, Elim, and Norton Bay Subdistricts of the Norton Sound District to commercial salmon fishing for 48 hours from 6:00 p.m. Friday, July 9 to 6 p.m. Sunday, July 11.

JUSTIFICATION: Early season counts at the escapement projects show a strong run of chum salmon, especially in Subdistricts 2 and 3, the Golovnin Bay and Elim Subdistricts. Norton Bay does not have an escapement project but escapement data from neighboring subdistricts such as Elim are used to an index of salmon abundance in Norton Bay. At Kwiniuk River tower in the Elim Subdistrict, 36,000 chum salmon have been enumerated through July 5th. The Kwiniuk River count is a record for early July and has already exceeded the escapement goal range of 11,500 to 23,000 chum salmon. To the west in Golovnin Bay Subdistrict, chum salmon escapements to the Fish River drainage have also increased in recent days. The escapement count at the Niukluk River tower is over 4,500 chum salmon through July 5th, which is above the recent 15-year average for July 5th. If the 2010 Niukluk River chum salmon run has average run timing, chum salmon escapement to the Niukluk River is projected to exceed 30,000 chum salmon, well above the sustainable escapement threshold goal of 23,000 chum salmon. Chum salmon escapement goals have already been achieved at Kwiniuk River in the Elim Subdistrict, and escapement goals are projected to easily be reached in the Niukluk River of the Fish River drainage, the major salmon producer in Golovnin Bay Subdistrict. There are also indications that chum salmon subsistence needs will easily be met this season in these subdistricts and throughout Norton Sound. Large surpluses of chum salmon are available for commercial harvest and further commercial salmon fishing directed on chum salmon is warranted. The department will continue consultations with the buyer to determine if a commercial fishing schedule can be implemented in Subdistricts 2 and 3 once there is enough tender capacity to process the catch.

Emergency Order: 3-S-Z-13-10 Effective Date: July 6, 2010

EXPLANATION: This emergency order amends the subsistence salmon gillnet fishing schedule in the Nome Subdistrict for two additional days in the marine waters from the previous three day schedule. Fishing will now be allowed from 6 p.m. Tuesday July 6 until 6 p.m. Sunday, July 11.

JUSTIFICATION: Because chum salmon counts at the Eldorado River weir, the department projects that escapement will be obtained, and reports from subsistence fishermen of very good catches of chum salmon in marine waters and a large number of chum salmon seen in the river mouths the department will expand gillnet fishing time in the marine waters of the Nome Subdistrict to 5 days this week. This will provide further opportunity to subsistence fishermen during the usual good weather of early summer.

Emergency Order: 3-S-Z-14-10 Effective Date: July 10, 2010

EXPLANATION: This emergency order closes the Pilgrim and Kuzitrin Rivers to the use of gillnets and seines for all species of fish.

JUSTIFICATION At Pilgrim River only 8 sockeyes and 9 pinks have passed the weir through July 7. The average historical midpoint of sockeye passage at the weir is mid-July. The weir at Pilgrim River has been operational since 2003 and the count to date is as poor as last year's run at this time. The cumulative passage for sockeye salmon in 2009 was only 953 sockeyes. The escapement goal at Salmon Lake is 4,000 to 8,000 sockeye salmon observed by aerial survey. To have any chance of reaching the escapement goal, all gillnetting and seining must be closed in the Pilgrim River and Kuzitrin River to which the Pilgrim River is a tributary.

Emergency Order: 3-S-Z-15-10 Effective Date: July 8, 2010

EXPLANATION: This emergency order allows subsistence fishing with beach seines for the next two weeks from 6 p.m. Monday until 6 p.m. Wednesday and from 6 p.m. Thursday until 6 p.m. Saturday in Nome Subdistrict subsistence areas, except for the Nome River and waives the subsistence catch limits on pink salmon and in the

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Eldorado, Flambeau, Bonanza and Sinuk Rivers waives the subsistence catch limits on chum salmon.

JUSTIFICATION: Aerial surveys in the Nome Subdistrict on Wednesday showed large numbers of pink salmon moving along the shore in the marine waters likely heading for Nome Subdistrict rivers. The Eldorado, Flambeau, Bonanza and Sinuk Rivers had good numbers of chum salmon and will easily meet escapement. The Nome River is also expected to meet escapement, but with the higher escapement goal than Snake River, the department will delay allowing beach seining in the Nome River.

Emergency Order: 3-S-Z-16-10 Effective Date: July 9, 2010

EXPLANATION: Effective 6:00 p.m. Friday July 9, the marine waters of Subdistricts 5 and 6, and all freshwaters of the Shaktoolik and Unalakleet Subdistricts will reopen to subsistence salmon fishing with beach seines 24 hours a day, seven days a week. Any king salmon incidentally captured in beach seines must be immediately released.

JUSTIFICATION: Using beach seines to target abundant chum and pink salmon will provide subsistence users with additional opportunity to target these species and take advantage of good drying weather while protecting king salmon. All king salmon caught in beach seines are required to be released immediately into the water.

Emergency Order: 3-S-Z-17-10 Effective Date: July 10, 2010

EXPLANATION: This emergency order closes the marine waters of Subdistricts 5 and 6 of the Norton Sound District, the Shaktoolik and Unalakleet Subdistricts, effective 6:00 p.m. Saturday July 10 to subsistence fishing with set gillnets. This emergency order also suspends the weekly salmon gillnet fishing schedule and reopens the marine waters of Subdistricts 5 and 6 to subsistence salmon fishing 7 days a week to set gillnets with a mesh size of 6 inches or less until midnight Saturday evening, July 31.

JUSTIFICATION: As of July 7th, only 120 king salmon have been counted passed the salmon counting tower on the North River, a tributary of the Unalakleet River. North River king salmon passage is only 30% of the recent 5-year average of 391 king salmon for this date. Unless there is a late surge of king salmon, the lower end of North River tower king salmon escapement goal will not be reached this year. The Unalakleet River King Salmon Management Plan directs the department to close all fishing for king salmon if escapement past the North River tower is projected to fall short of the lower end of the escapement goal range of 1,200 – 2,600 fish. The closure of all king salmon fisheries is necessary for there to be any chance of obtaining the escapement goal at the North River tower.

Emergency Order: 3-S-Z-18-10 Effective Date: July 10, 2010

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 36 hours from 12:00 p.m. Saturday, July 10 to midnight Sunday evening, July 11. Fishermen are limited to 100 fathoms of net in aggregate length and set gillnets must have a stretched-mesh size no greater than 6 inches.

JUSTIFICATION As of July 8, the ADF&G Unalakleet River test net has caught over 600 chum salmon, which is third highest catch on record for this date. North River tower chum salmon passage as of July 7th is 3,300 chum salmon, which is also the third highest count on record for this date. Incidental catches of king salmon have represented less than ½ a percent of the overall catch of salmon during the Shaktoolik and Unalakleet Subdistrict's chum salmon directed fishery. Available assessment information suggests that the majority of king salmon returning to the Shaktoolik and Unalakleet River drainages are in the lower reaches of these rivers. Allowing further commercial harvest opportunity for chum salmon should not jeopardize king salmon escapement needs in eastern Norton Sound based on low incidental catch rates of king salmon observed in the chum fishery and historical run timing data. Chum salmon catch and escapement indices are well above the historical average and additional commercial fishing is warranted. Additionally, the low incidental catches of king salmon observed in the commercial fishery indicate that the entire Unalakleet Subdistrict can be opened to commercial chum salmon fishing.

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Emergency Order: 3-S-Z-19-10 Effective Date: July 10, 2010

EXPLANATION: Effective 8:00 p.m. Saturday July 10, all freshwaters of the Unalakleet River drainage will close to subsistence salmon fishing with set gillnets with a mesh size of 6 inches or less. This emergency order also reopens all freshwaters of the Unalakleet River drainage to subsistence salmon fishing with set gillnets 7 days a week until midnight, Saturday evening, July 31, but set gillnets must have a mesh size no greater than 4 ½ inches.

JUSTIFICATION: As of July 7th, only 120 king salmon have been counted passed the salmon counting tower on the North River, a tributary of the Unalakleet River. North River king salmon passage is only 30% of the recent 5-year average of 391 king salmon for this date. Unless there is a late surge of king salmon, the lower end of North River tower king salmon escapement goal will not be reached this year. The Unalakleet River King Salmon Management Plan directs the department to close all fishing for king salmon if escapement past the North River tower is projected to fall short of the lower end of the escapement goal range of 1,200 – 2,600 fish. The closure of all king salmon fisheries is necessary for there to be any chance of obtaining the escapement goal at the North River tower. Restricting the subsistence salmon fishery to set gillnets with a 4 ½ or less mesh size will have the desired effect of protecting milling king salmon. Additionally, allowing the use of this gear 7 days a week will provide subsistence users with reasonable opportunity to target abundant pink salmon while the drying weather is optimal.

Emergency Order: 3-S-Z-20-10 Effective Date: July 12, 2010

EXPLANATION: This emergency order allows subsistence fishing with beach seines for the next two weeks from 6 p.m. Monday until 6 p.m. Wednesday and from 6 p.m. Thursday until 6 p.m. Saturday in Nome Subdistrict subsistence areas and waives the subsistence catch limits on pink and chum salmon in Nome Subdistrict waters, except for the Penny and Cripple Rivers where regulations do not allow the retention of chum salmon. Also, subsistence set gillnet fishing is expanded for an additional day in the marine waters.

JUSTIFICATION: Eldorado River weir chum salmon passage has surpassed the escapement goal range of 6,000 to 9,200 fish. Snake River weir passage is nearing the escapement goal range 1,600 to 2,500 chum salmon. At Nome River weir the historical first quarter point of the chum salmon run is mid-July and the escapement goal range of 2,900 to 4,300 chum salmon should easily be met. The pink salmon escapement goal of 13,000 fish at Nome River has been exceed by a factor of four.

Emergency Order: 3-S-Z-21-10 Effective Date: July 12, 2010

EXPLANATION: This emergency order opens Subdistricts 2 and 3, the Golovnin Bay and Elim Subdistricts of the Norton Sound District to a commercial salmon fishing schedule of two 48 hour-periods per week from 6 p.m. Monday, July 12 to 6 p.m. Saturday, July 24. Periods will be from 6 p.m. Mondays to 6 p.m. Wednesdays, and from 6 p.m. Thursdays to 6 p.m. Saturdays.

JUSTIFICATION: Chum salmon are returning to Norton Sound in the highest abundance observed in over 20 years. As of July 11, the Norton Sound commercial chum salmon harvest is over 55,000 chum salmon, and is projected to eclipse 100,000 chum salmon this season, the largest since 1988. Over 50,000 chum salmon have been enumerated at the Kwiniuk River tower in the Elim Subdistrict. The escapement goal for chum salmon is 11,500 – 23,000 chum salmon at the Kwiniuk River tower. At Niukluk River tower, over 19,000 chum salmon have been counted through July 11 and the escapement at the tower is expected to exceed the SEG threshold of 23,000 chum salmon by the end of the week. Escapement goals have already been exceeded at Kwiniuk River tower and will be easily be reached at Niukluk River in the coming days. In consultation with the buyer, the department is establishing a commercial salmon fishing schedule for the next two weeks to target the large chum salmon harvest surpluses in Norton Sound Subdistricts 2-3.

Emergency Order: 3-S-Z-22-10 Effective Date: July 13, 2010

EXPLANATION: This emergency order reopens the marine waters of Subdistricts 4-6 of the Norton Sound District, the Norton Bay, Shaktoolik, and Unalakleet Subdistricts, to commercial salmon fishing for 24 hours from 6:00 p.m.

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Tuesday, July 13 to 6:00 p.m. Wednesday, July 14, and for three 48 hour periods from 6:00 p.m. Thursday, July 15 to 6:00 Saturday, July 17, and from 6:00 p.m. Monday, July 19 to 6:00 p.m. Wednesday, July 21, and from 6:00 p.m. Thursday, July 22 to 6:00 p.m. Saturday, July 24. Permit holders are limited to 100 fathoms of net in aggregate length and set gillnets must have a stretched-mesh size no greater than 6 inches.

JUSTIFICATION: Chum salmon are returning to Norton Sound in the highest abundance observed in over 20 years. As of July 11, the Norton Sound commercial chum salmon harvest is over 55,000 chum salmon, and is projected to eclipse 100,000 chum salmon this season, the largest since 1988. Most chum salmon escapement goals have already been exceeded in Norton Sound, or are projected to easily be reached over the next week. In consultation with the buyer, the department is establishing a commercial salmon fishing schedule for the next two weeks to target the large chum salmon harvest surpluses in Norton Sound Subdistricts 2-6.

Emergency Order: 3-S-Z-23-10 Effective Date: July 23, 2010

EXPLANATION: This emergency order supersedes emergency orders 3-S-Z-21-10 and 3-S-Z-22-10 which established fishing schedules for Subdistricts 2-5 of the Norton Sound Subdistricts. This emergency order closes the marine waters of Subdistricts 2-5 of the Norton Sound District, the Golovin Bay, Elim, Norton Bay, and Shaktoolik Subdistricts, to commercial salmon fishing effective 6:00 p.m. Wednesday, July 21, and reopens Subdistricts 2-5 to commercial salmon fishing for 54 hours from 12:00 p.m. Friday, July 23 to 6:00 p.m. Sunday, July 25. Permit holders in Subdistricts 2-5 are limited to 100 fathoms of net in aggregate length and set gillnets must have a stretched-mesh size no greater than 6 inches. Fishing periods are being modified in Subdistricts 2-5 in order to provide members of the fishing public with an opportunity to attend the funeral of Tom Sagoonick on Thursday, July 22. Tom lost his life commercial salmon fishing in the Shaktoolik Subdistrict on Friday, July 16.

JUSTIFICATION: The salmon buyer has requested from the department that we modify fishing times for the upcoming period in Subdistricts 2-5 in order to allow Norton Sound Seafood tender vessel staff and members of public to attend Tom's funeral scheduled for Thursday, July 22. Accordingly, the department will be modifying the 48 hour period initially scheduled from 6 p.m. Thursday, July 22 to 6 p.m. Saturday, July 24.

Emergency Order: 3-S-Z-24-10 Effective Date: July 26, 2010

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

JUSTIFICATION: The subsistence fishing schedule is set in regulation. The department has waived the chum salmon and pink salmon subsistence limits because the escapement goals for the Nome Subdistrict has been reached. Penny and Cripple Rivers are closed to the taking of chum salmon by regulation.

Emergency Order: 3-S-Z-25-10 Effective Date: July 26, 2010

EXPLANATION: This emergency order reopens Subdistricts 2-6, of the Norton Sound Subdistrict, the Golovin Bay, Elim, Norton Bay, Shaktoolik, and Unalakleet Subdistricts, to commercial salmon fishing for two 48 hour periods effective 6 p.m. Monday, July 26. Periods will be from 6:00 p.m. Monday, July 26 to 6:00 p.m. Wednesday, July 28, and from 6:00 p.m. Thursday, July 29 to 6:00 p.m. Saturday, July 31. Permit holders in Subdistricts 2-6 are limited to 100 fathoms of net in aggregate length and set gillnets must have a stretched-mesh size no greater than 6 inches.

JUSTIFICATION: Norton Sound is experiencing its best chum salmon run in nearly 25 years. To date, nearly 93,000 chum salmon have been harvested in the Norton Sound commercial chum salmon fishery and the harvest is on track to be the largest since 1986. A record-breaking chum salmon escapement of 68,000 chum salmon has also occurred at the Kwiniuk River tower near Elim, and nearly 1,500 chum salmon have been caught in the Unalakleet River test fishery, also a new record for July 23. In all other areas, escapement counts are well above average for late July. These two periods will allow additional harvest from the late surge of chum salmon and will provide the department with an early index of silver salmon run strength and movement into the Norton Sound District. Catch

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and escapement information will be evaluated throughout the following week to determine if additional commercial fishing for silver salmon is warranted.

Emergency Order: 3-S-Z-26-10 Effective Date: August 1, 2010

EXPLANATION: This emergency order supersedes emergency order 3-S-Z-16-10 and extends the beach seining season for another week in all freshwaters and the marine waters of Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts. Beach seining will be allowed 24 hours a day for another week from midnight Saturday evening, July 31 to midnight Sunday, evening, August 8th. Any king salmon incidentally captured in beach seines must be immediately released.

JUSTIFICATION: The beach seining season is being extend to allow subsistence fishermen the opportunity to target abundant pink and chum salmon during a period of dry weather conditions. Using beach seines to target abundant chum and pink salmon will provide subsistence users with additional opportunity to target these species and take advantage of good drying weather while protecting king salmon. All king salmon caught in beach seines are required to be released immediately into the water.

Emergency Order: 3-S-Z-27-10 Effective Date: August 2, 2010

EXPLANATION: This emergency order reopens Subdistricts 2-6, of the Norton Sound Subdistrict, the Golovin Bay, Elim, Norton Bay, Shaktoolik, and Unalakleet Subdistricts, to commercial salmon fishing for two 48 hour periods effective 6 p.m. Monday, August 2. Periods will be from 6:00 p.m. Monday, August 2 to 6:00 p.m. Wednesday, August 4, and from 6:00 p.m. Thursday, August 5 to 6:00 p.m. Saturday, August 7. Permit holders in Subdistricts 2-6 are limited to 100 fathoms of net in aggregate length and set gillnets must have a stretched-mesh size no greater than 6 inches.

JUSTIFICATION: Ratios of silver salmon to chum salmon in Norton Sound commercial catches are finally beginning to even out. As a result of a late surge of chum salmon, silver salmon catches only recently surpassed chum salmon catches in the Golovin Bay Subdistrict during the latest commercial opener ending Saturday, July 31. During that same opening, silver salmon comprised 45% of the total chum and silver catch in the Shaktoolik and Unalakleet Subdistricts. Fishing did not occur in the Elim and Norton Bay Subdistricts during this period due to tender mechanical problems. The buyer has informed the department that full tendering capacity has been restored. These two periods will provide the department with an early index of silver salmon run strength and movement into the Norton Sound District.

Emergency Order: 3-S-Z-28-10 Effective Date: August 5, 2010

EXPLANATION: This emergency order expands commercial fishing time in Subdistricts 5-6, of the Norton Sound Subdistrict, the Shaktoolik, and Unalakleet Subdistricts, from 48 hours to 72 hours starting at noon, August 5. Permit holders in Subdistricts 2-6 are limited to 100 fathoms of net in aggregate length and set gillnets must have a stretched-mesh size no greater than 6 inches.

JUSTIFICATION: Historically, the peak of the Norton Sound silver salmon commercial fishery occurs sometime during the first two weeks of August. Since 1980, the percentage of the overall season catch of silver salmon that has occurred during the first two weeks of August has ranged from 28% in 2007 to 60% in 1995. On average, nearly 50% of the commercial silver salmon harvest occurs during this peak fishing period. This year's silver salmon run is showing similar run timing to the 2008 and 2009 silver salmon runs. In 2008 and 2009, 37% and 46% of the catch occurred between August 2 and August 12, respectively. Silver salmon catches are now exceeding chum salmon catches in all subdistricts except for the Norton Bay Sundistrict where chum salmon catches have been nearly equal to silver salmon catches. The silver salmon passage at the North River tower escapement counting project ranks 10th out of 14 years and downriver the Unalakleet test net silver catch ranks 8th out of 26 years. Run timing in the southern subdistricts of Shaktoolik and Unalakleet should now be nearing historical midpoint.

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Emergency Order: 3-S-Z-29-10 Effective Date: August 8, 2010

EXPLANATION: This emergency order extends the closure of the Pilgrim and Kuzitrin Rivers to the use of gillnets, but allows for the use of beach seines. All king, sockeye and silver salmon must be released from beach seines immediately.

JUSTIFICATION: Salmon passage at Pilgrim River weir through August 6 is 32 kings, 14,196 chums, 28,833 pinks, 1,565 sockeyes, and 4 silvers. At this time king salmon passage is the lowest since the weir project began in 2003 and the sockeye salmon passage is the second lowest. Chum salmon passage ranks fourth highest at the weir. Historically, the average midpoint of chum salmon passage at the weir is August 1 and the average third quarter point is August 12. Chum salmon passage numbers are showing late run strength. Pink salmon passage at the weir ranks fourth highest, but only third highest for four years of even-numbered year counts. The average third quarter point of pink salmon passage at the weir is August 12. Silver salmon passage at the weir is just beginning and the average midpoint isn't until late August and early September. To provide opportunity for subsistence fishermen interested in obtaining chum and pink salmon, beach seining will be allowed.

Emergency Order: 3-S-Z-30-10 Effective Date: August 9, 2010

EXPLANATION: This emergency order reopens Subdistricts 2-6, of the Norton Sound Subdistrict, the Golovnin Bay, Elim, Norton Bay, Shaktoolik, and Unalakleet Subdistricts, to commercial salmon fishing for one 48 hour period from 6 p.m. Monday, August 9 to 6:00 p.m. Wednesday, August 11.

JUSTIFICATION: Catch and escapement information shows considerable variability in early silver salmon run strength to Norton Sound. In Norton Sound Subdistricts 5 and 6, the Shaktoolik and Unalakleet Subdistricts, commercial catch per unit of effort indices and escapement counts of silver salmon are below the long-term average. The Unalakleet River test net has caught 110 silvers, which is only 65% of the long-term average catch of 170 silvers for August 7. Similarly, the North River counting tower has enumerated 2,982 silvers through August 7, which is only 54% and 69% of recent 5- and 10-year average counts for this date, respectively. However, considering that on average, only 12% of the silver salmon of Unalakleet River origin spawn in the North River, projected drainage-wide escapement estimates for Unalakleet River silver salmon range between 75,000 – 106,000 fish. Such levels of silver salmon abundance should easily provide for both silver salmon escapement and subsistence fishing needs. To the north in Golovnin Bay and Elim Subdistricts, silver salmon commercial catches and escapement counts are above average for early August. The silver salmon catch in Golovnin Bay is on pace to establish a new record and the counting tower on the Niukluk River, a tributary of the Fish River, has counted 1,230 silver salmon as of August 7. This count is nearly double the recent 5-year average count of 652 silvers, and 29% above the recent 10-year count of 954 silvers. Even early run timing projection models show the Niukluk River silver salmon escapement approaching the upper end of sustainable escapement goal range of 2,400 – 7,200 silver salmon. At Kwiniuk River tower, silver salmon counts are nearly three times the cumulative count last season when a record commercial harvest of 9,582 silvers occurred in the Elim Subdistrict. Escapement data suggest that increased fishing time is possible later in the week for Golovnin Bay and Elim Subdistricts if escapements continue to increase at the current pace and if the buyer has sufficient capacity to process the catch.

Emergency Order: 3-S-Z-31-10 Effective Date: August 12, 2010

EXPLANATION: This emergency order reopens Subdistricts 5 and 6, of the Norton Sound Subdistrict, the Shaktoolik, and Unalakleet Subdistricts, to commercial salmon fishing for one 48 hour period from 6 p.m. Thursday, August 12 to 6:00 p.m. Saturday, August 14.

JUSTIFICATION: The Unalakleet River test net has caught 166 silvers, which is only 71% of the long-term average catch of 235 silvers for August 11. Similarly, the North River counting tower has enumerated 4,500 silvers through August 11, which is only 64% and 76% of recent 5- and 10-year average counts for this date, respectively. Average run timing models show the projected drainage-wide escapement estimates for Unalakleet River silver salmon to range between 78,000 – 110,000 fish. Such levels of silver salmon abundance should easily provide for both silver salmon escapement and customary levels of subsistence use of silver salmon.

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Emergency Order: 3-S-Z-32-10 Effective Date: August 13, 2010

EXPLANATION: This emergency order reopens Subdistricts 2-4, of the Norton Sound Subdistrict, the Golovnin Bay, Elim, and Norton Bay Subdistricts, to commercial salmon fishing for two 72 hour periods from 12:00 noon Friday, August 13 to 12:00 noon Monday, August 16, and from 6:00 p.m. Tuesday, August 17 to 6:00 p.m. Friday, August 20.

JUSTIFICATION: At the Niukluk and Kwiniuk River towers, cumulative silver salmon escapement counts as of August 11 are 1,880 and 3,600 silver salmon, respectively. The Kwiniuk River silver count is the 3rd best since the project began counting silvers in 2001. Normal run timing models place the projected Kwiniuk River silver salmon escapement between 10,000 and 15,000 silvers this season, which is more than enough to meet escapement and inriver subsistence fishing needs. At Niukluk River, silver salmon passage is the 4th best on record, and silver salmon escapement is projected to exceed the upper bounds of the sustainable escapement goal range of 2,400-7,200 silver salmon. Stock assessment data from Subdistricts 2-3 indicate that both silver salmon escapement and subsistence fishing needs will easily be reached this season. Norton Bay Subdistrict does not currently have an escapement project and is managed using catch and escapement information from neighboring subdistricts such as Elim and Shaktoolik. Subsistence fishing reports from Koyuk suggest that there are good numbers of silvers in the Inglutalik and Ungalik Rivers and that silver salmon subsistence needs will easily be reached this season.

Emergency Order: 3-S-Z-33-10 Effective Date: August 16, 2010

EXPLANATION: This emergency order reopens Subdistricts 5 and 6, of the Norton Sound Subdistrict, the Shaktoolik, and Unalakleet Subdistricts, to commercial salmon fishing for one 48 hour period from 6 p.m. Monday, August 16 to 6:00 p.m. Wednesday, August 18.

JUSTIFICATION: The Unalakleet River test net has caught 246 silvers, which is only 80% of the long-term average catch of 308 silvers for August 16. Before high water suspended counts at the North River counting tower, cumulative silver salmon passage was 4,500 silvers through August 11. While this count is below the recent 5- and 10-year averages, normal run timing models show the projected drainage-wide escapement estimates for Unalakleet River silver salmon to range between 78,000 – 110,000 fish. Such levels of silver salmon abundance should easily provide for both silver salmon escapement and customary levels of subsistence use of silver salmon.

Emergency Order: 3-S-Z-34-10 Effective Date: August 18, 2010

EXPLANATION: This emergency order supersedes emergency order 3-S-Z-33-10 by extending the August 16 48 hour opening for Subdistricts 5 and 6 of the Norton Sound District, the Shaktoolik and Unalakleet Subdistricts, by 24 hours from the original closure date and time of 6 p.m. Wednesday, August 18 to the new closure date and time of 6 p.m. Thursday, August 19. Additionally, this emergency order reopens Subdistricts 5 and 6 to commercial salmon fishing for one 48 hour period from 6 p.m. Friday, August 20 to 6 p.m. Sunday, August 22.

JUSTIFICATION: This extension will mitigate the diminished effort that has occurred due to severe westerly weather that occurred this week. Catch rates of silver salmon for those who fished thus far this period have been above average. The Unalakleet River test net has caught 282 silvers, which is only 83% of the long-term average catch of 340 silvers for August 17. Similarly, cumulative silver salmon passage at the North River tower is 4,500 silvers through August 17. However, the tower was not operational from August 12 to August 15 and more days of missed counts are anticipated soon as water levels increase from the latest storm in southern Norton Sound. Based on normal run timing models, conservative estimates for Unalakleet River silver salmon drainage-wide escapements range between 50,000 – 68,000 fish.

Emergency Order: 3-S-Z-35-10 Effective Date: August 21, 2010

EXPLANATION: This emergency order reopens Subdistricts 2-4, of the Norton Sound Subdistrict, the Golovnin Bay, Elim, and Norton Bay Subdistricts, to a commercial salmon fishing schedule of two 72 hour periods and one 48 hour period for the remainder of August. Periods will be from 6:00 p.m. Saturday, August 21 to 6:00 p.m.

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Tuesday, August 24, from 6:00 p.m. Wednesday, August 25 to 6:00 p.m. Saturday, August 28, and from 6:00 p.m. Sunday, August 29 to 6:00 p.m. Tuesday, August 31.

JUSTIFICATION: At the Niukluk and Kwiniuk River towers, cumulative silver salmon escapement counts as of August 18 are 4,250 and 4,131 silver salmon, respectively. The Kwiniuk River silver count is the 6th best in 10 years of counting. Normal run timing models place the projected Kwiniuk River silver salmon escapement between 8,000 and 9,500 silvers this season, which is more than enough to meet escapement and inriver subsistence fishing needs. At Niukluk River, silver salmon passage is the 4th best in 15 years of counting silver salmon escapements at Niukluk River tower. Historical run timing data indicate that the Niukluk River silver salmon escapement is projected to range between 7,000 and 11,000 silvers. This range is well above the upper bounds of the silver salmon sustainable escapement goal range of 2,400-7,200 fish. As of August 18, 7 permit holders have harvested 4,450 silvers in Golovin, 15 permit holders have harvested 5,700 silvers in Elim, and 4 permit holders have caught 1,100 silvers in Norton Bay. The Golovnin Bay Subdistrict catch of silver salmon is record setting and the Elim Harvest is well above average for the third week of August. Norton Bay has had very limited effort due to it being a new fishery and more recently westerly storms.

Emergency Order: 3-S-Z-36-10 Effective Date: August 23, 2010

EXPLANATION: This emergency order reopens Subdistricts 5 and 6, of the Norton Sound Subdistrict, the Shaktoolik, and Unalakleet Subdistricts, to a commercial salmon fishing schedule of two 48 hour periods per week until Saturday, September 4. Periods will be from 6 p.m. Mondays until 6 p.m. Wednesdays and from 6 p.m. Thursdays until 6 p.m. Saturdays.

JUSTIFICATION: The Unalakleet River test net has caught 332 silvers, which is 90% of the long-term average catch of 373 silvers for August 19. Similarly, cumulative silver salmon passage at the North River tower is over 4,500 silvers through August 19. However, the tower was not operational from August 12 to August 15 and for part of August 18 and 19. Based on normal run timing models, conservative estimates for Unalakleet River silver salmon drainage-wide escapements range between 50,000 – 68,000 fish. A combination of the regular commercial fishing schedule of two 48 hour periods per week and fall storm activity should optimize commercial harvests of silver salmon while not jeopardizing silver salmon escapement needs or subsistence uses.

Emergency Order: 3-S-Z-37-10 Effective Date: August 30, 2010

EXPLANATION: This emergency order supersedes emergency order 3-S-Z-35-10 by extending the August 29, 48 hour opening for Subdistricts 2-4, of the Norton Sound District, the Golovnin Bay, Elim, and Norton Bay Subdistricts, by 24 hours from the original closure date and time of 6 p.m. Tuesday, August 31 to the new closure date and time of 6 p.m. Wednesday, September 1. Additionally, this emergency order extends the commercial salmon fishing season by reopening Subdistricts 2-4 to commercial salmon fishing for one final 120 hour period from 6 p.m. Thursday, September 2 to 6 p.m. Tuesday, September 7. The season will close effective 6 p.m. Tuesday, September 7.

JUSTIFICATION: Escapement counts of silvers have been average to well above average in Subdistricts 2 and 3, the Golovnin Bay and Elim Subdistricts. The department operates cooperative salmon counting projects with Norton Sound Economic Development Corporation (NSEDC) at the Niukluk River in the Golovnin Bay Subdistrict, and at Kwiniuk River in the Elim Subdistrict. At Niukluk River tower, cumulative silver salmon passage as of August 29 is 8,500 silvers, which is 36% above the 10-year average count of 5,400 silvers. Additionally, the upper limit of the tower-based sustainable escapement goal (SEG) range of 2,400 – 7,200 silver salmon has already been exceeded. At Kwiniuk River tower near the village of Elim, 6,400 silvers have been enumerated through August 29, which is only 81% of the recent 9-year average of 7,900 silvers. However, if the record escapement year of 2006 is excluded from the average, this year's silver count is 93% of the average. Additionally, levels of silver salmon escapement similar to those observed this season have produced above average yields in recent years. Escapement and subsistence fishing needs for silver salmon will easily be reached this season and increased commercial fishing time is warranted. Commercial salmon fishermen in Golovin set a new record for silver salmon catches in a single

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season in 2010, and Elim commercial fishermen are on the verge of a new record silver catch. Thus far this season, 6 permit holders in Golovin have harvested nearly 5,500 silvers and 16 permit holders have caught nearly 9,500 silvers in Elim. The 2009 Elim record silver catch of 9,582 silvers is expected to be surpassed during the next period.

Emergency Order: 3-S-Z-38-10 Effective Date: September 5, 2010

EXPLANATION: This emergency order reopens Subdistricts 5 and 6, of the Norton Sound Subdistrict, the Shaktoolik, and Unalakleet Subdistricts, to a commercial salmon fishing for one 48 hour period from 6 p.m. Sunday, September 5 to 6 p.m. Tuesday, September 7.

JUSTIFICATION: The southern Norton Sound silver salmon run has been average. Consequently, an extension to the Subdistricts 5 and 6 salmon seasons will not be granted this year. Silver salmon commercial catches and catch per unit of effort indices have been below the long-term average throughout most of the season in the Unalakleet and Shaktoolik Subdistricts. For the season, Unalakleet River test fishery catches are slightly above the long-term average if the record runs of 2005-2009 are excluded from the analysis. However, escapement and test fishery counts dropped off sharply during the last week of August and daily catches are below the long-term average for the last week of August. The Unalakleet River test net caught an average of 5 silvers a day during the last week of August, which is below the long-term average daily catch of 14 silvers for the last week of August. In 2006, 2008, and 2009, years in which extensions were granted, silver salmon test net catches averaged 20, 37, and 61 silvers a day for the last week of August, respectively. Similarly, the North River tower has only counted a total of 7,100 silvers, the third lowest since silver salmon runs have been counted at the tower. Based on tower counts, the estimated drainage-wide escapement for the entire Unalakleet River drainage, including North River, is between 60,000 and 66,000 silver salmon. This estimate is only one-half the 2004-2009 average drainage-wide escapement estimate of 132,000 silver salmon. All available assessment data indicate that an extension to the commercial salmon season is not warranted in Subdistricts 5 and 6 based on the average run and poor late season indices of silver salmon abundance. In order to ensure that escapement needs and subsistence uses of silver salmon are not jeopardized, the department will close the season effective 6 p.m. Tuesday, September 7.

Emergency Order: 3-S-Z-39-10 Effective Date: September 4, 2010

EXPLANATION: This emergency order supersedes emergency order 3-S-Z-36-10 by extending the September 2, 48 hour opening for Subdistricts 5 and 6 of the Norton Sound District, the Shaktoolik and Unalakleet Subdistricts, by 24 hours from the original closure date and time of 6 p.m. Saturday, September 4, to the new closure date and time of 6 p.m. Sunday, September 5. This action effectively merges the September 2, 48 hour opener with the September 5, 48 hour opener and creates a single 120 hour commercial fishing period ending 6 p.m. Tuesday, September 7.

JUSTIFICATION: This action effectively merges the September 2nd 48 hour opener with the September 5, 48 hour opener and creates one 120 hour commercial fishing period ending 6 p.m. Tuesday, September 7. This extension will mitigate the diminished effort that has occurred due to severe southwesterly weather that occurred this week and the majority of late-run silver salmon should reach the spawning grounds.

NORTON SOUND SALMON – SPORT FISH

Emergency Order: 3-KS-01-10 Effective Date: July 10, 2010

EXPLANATION: This emergency order prohibits the harvest of king salmon while sport fishing in the Shaktoolik and Unalakleet River drainages. In addition, this emergency order prohibits the use of bait in these drainages.

JUSTIFICATION: Escapement counts of king salmon at the North River tower on the Unalakleet River are below historical averages. As of July 6, only 108 king salmon had passed the counting tower. From 2005 – 2009 an

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average of 319 king salmon had passed the counting tower by this date. According to the Unalakleet River King Salmon Management Plan, when the projected escapement is below the lower end of the escapement goal, all fishing will be closed. It appears that the escapement goal for king salmon will not be reached in 2010. This action is in alignment with the management plan. The department does not have a stock assessment project in the Shaktoolik River, but the king salmon run generally cycles in accordance with Unalakleet stocks. Unalakleet River test fishery indices are also below historical averages for this date. The elimination of sport harvests of king salmon in the Unalakleet and Shaktoolik rivers will provide protection for returning fish. The prohibition of bait while sport fishing is in accordance with provisions set forth in 5 AAC 75.003 (1)(A). This action should minimize catch-and-release mortality for king salmon caught incidentally while sport fishing for other species.

Emergency Order: 3-PS-01-10 Effective Date: July 10, 2010

EXPLANATION: This emergency order increases the bag and possession limit for pink salmon in the Nome Subdistrict (all flowing waters between the west banks of the Sinuk River and Topkok Head) and the Golovin Subdistrict (all flowing waters of the Fish River drainage, including the Niukluk and Casadepaga rivers) to 20 fish.

JUSTIFICATION: Aerial surveys conducted in the Nome Subdistrict reveal that large schools of pink salmon are building along the coast from the Sinuk River east to Solomon River, and escapements of pink salmon into the rivers of the Nome Subdistrict are expected to be well above average. In the Nome River, just 1,500 pink salmon have passed the counting weir as of July 7, but over 15,000 were counted in the lower river below the weir by aerial survey, with many more seen nearby in marine waters. The sustainable escapement goal (SEG) for pink salmon in the Nome River is 13,000 fish. Likewise, other nearby drainages, while not having escapement goals or enumeration projects, track similarly to the Nome River and are showing large returns of pink salmon as well. In anticipation of large escapements, Division of Commercial Fisheries has waived all pink salmon limits for subsistence fishers in Nome Subdistrict. Due to the high projected escapement of pink salmon in the Nome River drainage and continued high returns of pink salmon in other drainages within the Nome Subdistrict, an increase in the daily bag and possession limit for pink salmon from 10 to 20 fish is warranted. Similarly, escapement counts of pink salmon at the Niukluk River tower have already exceeded the SEG. As of July 7, 80,000 pink salmon have passed the tower. The SEG for pink salmon in the Niukluk River is 8,400 fish. Based on this information, an increase in the daily bag and possession limit for pink salmon from 10 to 20 fish is warranted.

Emergency Order: 3-SS-01-10 Effective Date: August 21, 2010

EXPLANATION: This emergency order increases the sport fish bag and possession limit for coho salmon in all waters of the Fish River drainage, including the Niukluk River, from 3 to 6 fish.

JUSTIFICATION: Escapement counts of coho salmon at the Niukluk River counting tower in the Fish River drainage are the third highest since the counting tower was initiated in 1995. As of August 17th, 4,230 coho salmon had passed the tower. This is well above the recent ten-year average of 2,295 coho salmon for this date. The biological escapement goal (BEG) for coho salmon in the Niukluk River is 2,400 --- 7,200 fish. It is anticipated that the upper end of the escapement goal will be surpassed within the next seven days. Due to the high escapement of coho salmon in the Fish River drainage an increase in the bag and possession limit for coho salmon from 3 to 6 fish is warranted.

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